Appendix I

Correspondence and Comments

NOTICE

The information contained in this Appendix was developed strictly for the purpose of evaluating the environmental impacts associated with the Ambassador Bridge Enhancement Project and responding to the regulatory requirements applicable to this proposal. Use of this information for other purposes is not intended, and any such use is at the risk of the user.

EXECUTIVE OFFICE OF THE PRESIDENT
COUNCIL ON ENVIRONMENTAL QUALITY
WASHINGTON, D.C. 20503

CHAIRMAN

May 12, 2003

The Honorable Norman Y. Mineta
Secretary, Department of Transportation
400 Seventh St., S.W., Room 10200
Washington, D.C. 20590

Dear Secretary Mineta:

I write in response to your letter of May 6, 2003, asking for the Council on Environmental Quality's (CEQ) guidance on the issue of "purpose and need" in the context of compliance with CEQ's regulations implementing the procedural provisions of NEPA. Your letter refers to the fact that the Interagency Transportation Infrastructure Streamlining Task Force has identified "purpose and need" as a priority issue in need of clarification. Specifically, you ask for guidance on the appropriate exercise of authority by lead and cooperating agencies in determining the purpose and need.

The requirement for a discussion of "purpose and need" in an environmental impact statement under the CEQ regulations is to "briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." 40 C.F.R. §1502.13. This discussion, typically one or two paragraphs long, is important for general context and understanding as well as to provide the framework in which "reasonable alternatives" to the proposed action will be identified.

The lead agency -- the federal agency proposing to take an action -- has the authority for and responsibility to define the "purpose and need" for purposes of NEPA analysis. This is consistent with the lead agency's responsibilities throughout the NEPA process for the "scope, objectivity, and content of the entire statement or of any other responsibility" under NEPA. 42 U.S.C. §4332(D); see also, 40 C.F.R. §§1501.5, 1506.5.

Federal courts generally have been deferential in their review of a lead agency's "purpose and need" statements, absent a finding that an agency acted in an arbitrary or capricious manner. They have recognized that federal agencies should respect the role of local and state authorities in the transportation planning process and appropriately reflect the results of that process in the federal agency's NEPA analysis of purpose and need. *North Buckhead Civic Assoc. v. Skinner*, 903 F.2d 1533 (11th Cir. 1990). Courts have cautioned agencies not to put forward a purpose and need statement that is so narrow as to "define competing 'reasonable alternatives' out of consideration (and even out of existence)", *Simmons v. U.S Army Corps of Engineers*, 120 F.3rd 664 (7th Cir. 1997); (see also, *Alaska Wilderness Recreation and Tourism Association v. Morrison*, 67 F.3d 723 (9th Cir. 1995).

In situations involving two or more agencies that have a decision to make for the same proposed action and responsibility to comply with NEPA or a similar statute, it is prudent to jointly develop a purpose and need statement that can be utilized by both agencies. An agreed-upon purpose and need statement at this stage can prevent problems later that may delay completion of the NEPA process. As Congress stated in the Federal Aid Highway Act of 1973, "It is the national policy that to the maximum extent possible the procedures to be utilized by the Secretary and all other affected heads of Federal departments, agencies, and instrumentalities for carrying out this title and any other provision of law relating to the Federal highway programs shall encourage the substantial minimization of paperwork and interagency decision procedures and the best use of available manpower and funds so as to prevent needless duplication and unnecessary delays at all levels of government", 23 U.S.C. §101(e); see also, CEQ's regulations implementing NEPA at 40 C.F.R. §§1500.4, 1500.5.

In the case of a proposal intended to address transportation needs, joint lead or cooperating agencies should afford substantial deference to the DOT agency's articulation of purpose and need. 49 U.S.C. §101(b)(5). This deference reflects CEQ's expectation and experience in other settings where an agency has the primary substantive expertise and program responsibility. If a cooperating or joint lead agency identifies substantive or procedural problems with the purpose and need statement, including an omission of factors, important to that agency's independent legal responsibilities, the agency should raise those issues immediately and, if necessary, elevate those issues to higher level decisionmakers in the region and at headquarters for resolution. Thoughtful resolution of the purpose and need statement at the beginning of the process will contribute to a rational environmental review process and save considerable delay and frustration later in the decisionmaking process.

Please let me know if you have any further questions regarding this issue. Thank you for your leadership and I commend your department officials for the work they are undertaking in fulfilling the President's direction.

Sincerely,

[Original signed by]

James L. Connaughton

Transport Canada Transports Canada

Place de Ville
Ottawa
K1A 0N5

Fax (613) 990-9639 Télécopieur (613) 990-9639

Your file Votre référence
5049964

Our file Notre référence
CEAR# 04-01-8319

April 15, 2005

Mr. Scott Korpi
Project Manager
American Consulting Engineers of Florida
4111 Land O'Lakes Boulevard, Suite 210
Land O'Lakes, Florida 34639

Dear Mr. Korpi:

As you may know, Transport Canada posted a Notice of Commencement of an Environmental Assessment on the web site of the Canadian Environmental Assessment Registry on December 15, 2004. The purpose of this letter is to request additional information that is necessary for the environmental assessment (EA) process.

As discussed during our teleconference on October 21, 2004, Transport Canada and the Windsor Port Authority have formal environmental assessment responsibilities in relation to your proposal. Further, the federal EA process is being coordinated by the Canadian Environmental Assessment Agency (the Agency), which is serving as the Federal Environmental Assessment Coordinator (FEAC) for this project. This letter was prepared by Transport Canada in consultation with the Windsor Port Authority and the Agency.

We have carefully reviewed the document titled "Preliminary Permit Application for the Ambassador Bridge Enhancement Project", which is being treated as a Project Description for the purpose of the federal EA process, and we have determined that additional information is required. The information requested in this letter will assist Transport Canada and the Windsor Port Authority in fulfilling our obligations under the *Canadian Environmental Assessment Act* in relation to this proposal. In particular, we require this information to proceed with the scoping phase of the EA. The Agency's Operational Policy Statement on *Establishing the Scope of the Environmental Assessment* notes that: "scoping establishes the boundaries of an environmental assessment … and focuses the assessment on relevant issues and concerns." The scope of the project and the scope of the factors to be considered in the EA must be determined by the Responsible Authority – in this case, Transport Canada, as well as by the Windsor Port Authority.

…2/

The Project Description proposes specific changes to municipal roads in the vicinity of the existing bridge, including new access to Huron Church Road from Mill Street, and closing a portion of Huron Church Road. In order to meet our obligations under the *Canada-Ontario Agreement on Environmental Assessment Cooperation*, additional information is required about this aspect of your proposal. In particular, we need to confirm whether the proposed changes to municipal roads will be subject to the Ontario *Environmental Assessment Act*. In this regard, please provide an update on any discussions that you have had with the City of Windsor, particularly with respect to the potential application of the Municipal Class Environmental Assessment process to this component of your proposal. As we indicated during the October teleconference, if an EA is required under provincial legislation, we have a responsibility to coordinate our activities with that process. We also plan to contact the City of Windsor on this issue, however, we would appreciate receiving any information that you can provide at this time.

The Project Description also indicates that various studies and analyses were prepared to support the document. In particular, the document states that various options were considered for stormwater management, and that a noise assessment was carried out. We would appreciate receiving copies of this information, as well as any other supporting studies that you have undertaken. This data will assist us in developing the scoping document, which will identify specific issues that need to be addressed in the EA process.

We also require clarification about the purpose of your proposal, in order to establish the scope of the project to be assessed in this EA. The Project Description indicates that the purpose of the project is to reduce congestion on the existing bridge structure. However, the document identifies access road capacity as a key issue, indicating that access to the Ambassador Bridge from Huron Church Road is expected to reach capacity in the next five years. To establish the scope of the project, we need to determine what other physical works are likely to be carried out in relation to your proposal. In particular, we require information concerning any other infrastructure work that may be planned to address these access and capacity issues, or that may be required as a result of the project that you are proposing. For example, please indicate specifically whether further modifications to bridge access on Huron Church Road will be proposed or considered necessary because of the proposed second span.

We also understand that you have submitted a proposal to the Canada Border Services Agency with respect to the expansion of the Canadian customs plaza at the bridge. We would appreciate receiving a description of this proposed work, and any other related proposals (such as site plan applications), in order to help us understand the relationship of this work with the Project Description that was submitted to us for review.

...3/

We also note that the purpose of your proposal, as described in your Project Description, is to relieve congestion at the Windsor-Detroit border. As you know, this is also one of the objectives of the Canada-U.S.-Ontario-Michigan Border Transportation Partnership, of which Transport Canada is a partner. The Partnership has recently launched a formal EA process that is looking more broadly at a range of options in the Windsor-Detroit area that will contribute to a long-term solution to the border transportation needs of the region. We would appreciate understanding how the objectives of your proposal would differ from those of Bi-national EA process, and how these might be communicated to the public.

Once we receive your reply, we will proceed accordingly. In the meantime, if you have any questions or concerns, please feel free to contact the undersigned at (613) 990-2861 or stiffk@tc.gc.ca. Please also note that any information provided during the EA process will be added to the public registry for the EA, and is available to the public on request.

Yours sincerely,

Kaarina Stiff
Environmental Assessment Project Manager
Surface Programs

cc: Windsor Port Authority
Canadian Environmental Assessment Agency
Environment Canada
Fisheries and Oceans Canada
Health Canada
City of Windsor
Ministry of the Environment (Ontario)

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231-1027

RECEIVED BY
APR 25 2005
AMERICAN CONSULTING ENGINEERS
OF FLORIDA, LLC

April 21, 2005

IN REPLY REFER TO

Engineering & Technical Services
Regulatory Office
File No. 04-007-027-0

Scott Korpi
American Consulting Engineers of Florida, LLC
4111 Land O' Lakes Boulevard, Suite 210
Land O' Lakes, Florida 34639

Dear Mr. Korpi:

This is in response to your recent letter to the United States Coast Guard (USCG) requesting a review of the proposed Ambassador Bridge Enhancement Project at Detroit, Michigan. The authority of the Corps of Engineers to regulate the discharge of dredged and/or fill material into waters of the United States including their adjacent wetlands is contained in Section 404 of the Clean Water Act. We also have the authority to regulate structures or work in or affecting the navigable waters of the United States under Section 10 of the Rivers and Harbors Act. However, permit authority for the construction of bridges and causeways in navigable waters of the United States is contained under Section 9 of the Rivers and Harbors Act. This permit authority has been transferred to the USCG.

Based on the plans outlined in the Preliminary Review Permit Application Version 2.0, it appears that the project would not involve discharges of dredged and/or fill material in the Detroit River or adjacent wetlands. Therefore, no Department of the Army permit is required. However, any future construction methods or modifications involving the discharge of dredged and/or fill material in the river will require prior authorization from this office. We suggest that you contact the Michigan Department of Environmental Quality (MDEQ) at (517) 373-9244 for a determination of State permit requirements.

Thank you for giving us the opportunity to review this proposal. If you have any questions, please contact me at the above address or telephone (313) 226-5383. Please refer to File Number: 04-007-027-0.

Sincerely,

John Konik
Chief, Regulatory Office
Engineering and Technical Services

Copy Furnished

Enforcement Branch, w/encl.
USCG (Robert Bloom)

STATE OF MICHIGAN

JENNIFER M. GRANHOLM
GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
LANSING

REBECCA A. HUMPHRIES
DIRECTOR

May 3, 2005

Mr. Scott Korpi, PE, SE
American Consulting Engineers of Florida, LLC
4111 Land O'Lakes Blvd., Suite 210
Land O'Lakes, FL 34639

Dear Mr. Korpi:

Proposed Ambassador Bridge Enhancement - Preliminary Review Permit Application Version 2.0

Thank you for your request for an endangered and threatened species review of the above project. Director Humphries asked me to reply.

The location of the proposed project was checked against known localities for rare species and unique natural features, which are recorded in a statewide database. This continuously updated database is a comprehensive source of information on Michigan's endangered, threatened and special concern species, exemplary natural communities and other unique natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features at a site. The absence of records may mean that a site has not been surveyed. Records may not always be up-to-date. In some cases, the only way to obtain a definitive statement on the presence of rare species is to have a competent biologist perform a field survey. Projects that are submitted to the Department of Environmental Quality (DEQ) are routinely checked for such features regardless if they are on public or private land.

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, ...fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Department of Natural Resources, Wildlife Division. *Responsibility to protect endangered and threatened species is not limited to the list below. Other species may be present that have not been recorded in the database.*

The presence of threatened or endangered species does not preclude activities or development, but may require alterations in the project plan. Special concern species are not protected under endangered species legislation, but recommendations regarding their protection may be provided. Protection of special concern species will help prevent them from declining to the point of being listed as threatened or endangered in the future.

If the project is located on or adjacent to wetlands, lakes, streams, or other regulated resources, additional permits may be required. To obtain more information regarding permits in these areas, please visit the DEQ's website at http://www.michigan.gov/deq or, you may contact the Michigan Department of Environmental Quality, Land and Water Management Division at 517-241-1515.

NATURAL RESOURCES COMMISSION
Keith J. Charters-Chair • Mary Brown • Bob Garner • Gerald Hall • John Madigan • Frank Wheatlake

STEVENS T. MASON BUILDING • P.O. BOX 30028 • LANSING, MICHIGAN 48909-7528
www.michigan.gov/dnr • (517) 373-2329

The following is a summary of the results for the project in Wayne County, Section 19, T2S R12E:

The following list includes unique features that are known to occur on or near the site(s) and may be impacted by the project. Federally threatened or endangered species are marked with an asterisk (*). Please contact the U.S. Fish and Wildlife Service, 2651 Coolidge Road, Suite 101, East Lansing, MI, 48823 or 517-351-2555, for information on federal regulations that apply to these species.

Common Name	Status	Scientific Name
Northern riffleshell mussel*	**state/federally endangered**	***Epioblasmatorulosa rangiana***
Round hickorynut	**state endangered**	***Obovaria subrotunda***
Snuffbox mussel	**state endangered**	***Epioblasma triquetra***
Purple wartyback	**special concern**	***Cyclonaias tuberculata***

The **northern riffleshell** mussel has been known to occur in the Detroit River, very near the project site. The northern riffleshell inhabits medium to large rivers in gravel riffles, where the water is highly oxygenated. This species was formerly widespread in the Midwest, but it has declined in range by more than 95% and now exists in only eight to ten isolated populations, most of which are small and peripheral. Members of the genus *Epioblasma* seem to be particularly sensitive to impacts from impoundment, which include population fragmentation and streamflow alteration. Other threats include habitat destruction (e.g. channelization, dredging, impoundment, bulkheading), exotic species introductions, siltation, pollution, and modified streamflows due to wetland loss, dam operation, and intensive landscape modification. The other two subspecies of *E. torulosa*, *E. torulosa torulosa* and *E. torulosa gubernaculum*, appear to have already gone extinct due to modification and degradation of river systems.

The **round hickorynut mussel** has been known to occur in the Detroit River, very near the project site. This mussel inhabits medium-sized streams in sand and gravel in areas with moderate flow. The round hickorynut is a historically wide-ranging species that has disappeared from many areas due to alterations in streamflow, habitat destruction and fragmentation, and degradation in water quality.

The **snuffbox mussel** has been known to occur in the Detroit River. The snuffbox inhabits rivers and streams with cobble, gravel, or sand bottoms in swift currents and usually is deeply buried in the substrate. The snuffbox is the most widespread of the critically imperiled *Epioblasma* species, but it has been drastically reduced in range and is endangered in most of the states where it occurs. Threats include siltation, drainage of bottomland lakes, swamps, and prairie marshes, desiccation during drought, species introductions, pollution, impoundments, and increased water temperatures. Reduced summer water flow, which would result from the proposed lowering of water levels (and flow), typically results in higher water temperatures, reduced oxygen levels, increased settling out of suspended solids (silt, etc.), and an increased likelihood of desiccation due to stranding.

The **purple wartyback mussel** has been known to occur in the Detroit River. The purple wartyback mussel inhabits medium to large rivers that have gravel or mixed sand and gravel bottoms.

In summary, the project site may include suitable habitat for the above listed species. Potential impacts might include direct destruction of species and disturbance of critical habitat. Specifically, because this project may affect a protected species, **clearance from this office in the form of a "No Effect" statement will be needed before work on this project begins**. To obtain an evaluation for project clearance, please provide at least one of the following to this office:

1. Description of the project area with regard to the species habitat type(s) described above. A recent photo of the project site and a map that shows habitat type(s) and location(s) of the proposed project will be necessary. This can be done by the landowner, other responsible party, or knowledgeable source (i.e. botanist, ecologist, biologist, experienced birder, etc.). This level of evaluation will only define the presence or absence of available habitat. If this office determines that there is no significant available habitat, the project may be cleared at this point. If potential habitat does exist, the next level of evaluation must be undertaken (see options 2 or 3 below).

2. A statement from a knowledgeable source (see above) stating that suitable habitat is or is not present and why the project will not impact the species or habitat(s) identified above.

3. Results from a complete and adequate survey by a knowledgeable source (see above) showing whether or not the above listed species are present in the affected project area. Guidelines for conducting surveys can be obtained from this office on request. For additional information and guidance for conducting surveys, including consultation with MNFI staff biologists, please contact me at the number below.

In most situations, the most efficient, thorough, and expeditious evaluation of the project and its impacts results from option 3.

Thank you for your advance coordination in addressing the protection of Michigan's natural resource heritage. Responses and correspondence can be sent to me at the Michigan Department of Natural Resources, Wildlife Division – Natural Heritage Program, P.O. Box 30180 Lansing, Michigan 48909. If you have further questions, please call me at 517-373-1263 or e-mail at SargenL2@michigan.gov .

Sincerely,

Lori G. Sargent

Lori G. Sargent
Endangered Species Specialist
Wildlife Division

cc: Ms. Rebecca Humphries, Director, DNR
Mr. Dennis Fedewa, Chief Deputy, DNR
Ms. Mindy Koch, Resource Management Deputy, DNR
Mr. Craig Czarnecki, US Fish & Wildlife Service
Mr. Walter Gauthier, Chief, US Army Corps of Engineers, Detroit District
Planning Division, Michigan Department of Transportation, Lansing

U.S. Department
of Transportation
**Federal Highway
Administration**

Michigan Division

315 West Allegan Street, Room 201
Lansing, Michigan 48933

June 21, 2005

Mr. Scott Korpi, Project Manager, PE/SE
American Consulting Engineers of Florida, LLC
4111 Land O'Lakes Boulevard, Suite 210
Land O'Lakes, Florida 34639

Dear Mr. Korpi:

The Federal Highway Administration (FHWA), Michigan Division has reviewed the proposed Ambassador Bridge Enhancement Project, Preliminary Review Permit Application Version 2.0 document, which was submitted to the U.S. Coast Guard. Below are comments and observations our office had during review of the document. The comments below should not be construed in any way as an endorsement by the FHWA of the proposed project. The FHWA is engaged in a bi-national partnership study with the Michigan Department of Transportation, Transport Canada, and the Ontario Ministry of Transportation of possible future crossings and enhancements to existing crossings in the Detroit-Windsor area. The twinning of the Ambassador Bridge is one of several alternatives under consideration in the bi-national partnership study.

Our comments on the proposed Ambassador Bridge Enhancement Project are below:

- The plan and phases presented in the document do not reflect the current, staged construction by the Detroit International Bridge Company (DIBC) as currently proposed with the direct connection for commercial traffic to the freeway system without moving Fort Street.

- The long-term proposal to relocate Fort Street will require an environmental review by the FHWA and the Michigan Department of Transportation (MDOT). If the proposed Fort Street relocation is a tied action with the Coast Guards' environmental document (and the FHWA is a cooperating agency with the Coast Guard), and the piers for the new bridge are proposed to be in what appears to be a park, the FHWA will require a Section 4(f) evaluation of this impact.

BUCKLE UP AMERICA

- As a general comment, it is noted that this document, while presenting a checklist for a categorical exclusion, is lacking in quantitative data to support the conclusions made regarding lack of any significant social, environmental or economic impacts as well as secondary or cumulative impacts. It was noted that there is no analysis of impacts during construction. Will there be any supporting barge traffic in the river?

- There is no evidence in the document of any public involvement or coordination with local officials for the proposed undertaking.

- An undertaking of the scale of this proposal will very likely have impacts and affect traffic patterns on I-75/I-96 and in particular Fort Street. A more in-depth analysis should be performed for traffic on Fort Street and other streets impacted by the proposed relocation of Fort Street as well as for the Interstate routes.

- There is no indication of the estimated cost for the proposed undertaking.

- Page 9, Section 3.3 Utilities: This section makes the statement that no significant impacts to utilities are anticipated. In the recent reconstruction of Fort Street, impacts to utilities were a very significant issue. In fact, the design had to be changed to accommodate utilities that could not be relocated.

- Page 12, last paragraph: This paragraph discusses the fact that the Bridge is on the National Register of Historic Places (Register) and concludes that building another bridge in the same corridor should not have an impact on the Ambassador Bridge. Is this the conclusion of the State Historic Preservation Officer? Our experience with the second Blue Water Bridge construction would not support this conclusion. There is no indication of any consultation or coordination with the State Historic Preservation Officer or the Advisory Council on Historic Preservation.

- Page 13, Second Paragraph: This paragraph has the direction of the Detroit River and the location of Bell Isle wrong. Belle Isle is up stream from the Ambassador Bridge, not down stream. This changes the discussion in the paragraph. Also, Bell Isle is accessed via the MacArthur Bridge, not the MacArhur Bridge.

- Page 14, Section 3.10 Air Quality: There is no micro scale CO hot spot analysis or comparisons with the one hour or eight hour CO National Ambient Air Quality standards. In addition to the micro scale analysis, the proposed second span at the Ambassador would be considered a regionally significant initiative and therefore would need to undergo an air quality conformity determination by the South East Michigan Council of Governments (SEMCOG) and placed in SEMCOG's long range plan.

- Page 15, Sections 3.11 and 3.12: As mentioned in the bullet above, the analysis for noise is qualitative. What are the noise levels at receptors now and predicted for the future (at least 20 years). Is any noise mitigation measures necessary or proposed? Similarly, the traffic analysis is qualitative. What are the existing and projected traffic volumes? Page 1 indicates that auto traffic is projected to increase by 40 percent and truck by 120 percent in 30 years. Where is the analysis to support this? What are the impacts on the Interstate System, Fort Street, and other area roadways?

- Essex County Ontario is not spelled "Essox".

- Page 26, Fisheries and Mollusks: This is another instance of a qualitative analysis and not a quantitative analysis. It presents Table 6, which is a compilation of fish species, but does not indicate if any are present in the area or what, if any, are the impacts from the proposed action. This is another location where Belle Isle is reported to be downstream of the Bridge, when in fact it is upstream of the Bridge.

- Page 29, Section 3.14 Geology and Soils: Was any analysis performed to identify the presence or absence of salt mines or brine mines or caverns in the vicinity of the Ambassador Bridge? There has been and continues to be salt mining activity in the area.

- Page 31, Section 3.17 Toxic and Hazardous Materials Contamination: This section indicates that toxic and hazardous materials are not expected to be a problem in the vicinity of the Ambassador Bridge. Have investigations been performed to substantiate this statement? Hazardous materials may be in the area. Over the 76-year life of the Bridge, it is very probable that lead based paint has been used on the bridge and lead has contaminated the ground under the Bridge. In addition, the proposed Fort Street relocation will be into areas that were once railroad yards. Our experience with the reconstruction of the Dequindre Yard Bridge on I-75 found many hazardous pollutants associated with former rail operations as well as lead contamination from the bridge. The same may occur at the Ambassador.

- Page 33, Checklist Question F: The answer to this checklist question was that no controversy is expected from the proposed new bridge and there will be no negative environmental impacts. The bi-national partnership conducted several public meetings in April of this year and will do so again this month. There was substantial controversy demonstrated at these meetings by the public over the twinned bridge proposal. In FHWA's experience, significant controversy over social or environmental issues can and has elevated a categorical exclusion to an environmental assessment. We propose that if the Bridge Company anticipates performing its own environmental analysis for this proposal, that as a minimum, an environmental assessment be performed. A better course of action would be for the Bridge Company to work closely with the bi-national partnership and its study of environmental impacts (Environmental Impact Statement is being written) of proposed border crossings between Detroit and Windsor.

- On page 5 of the document, it is stated "…the Ambassador Bridge would be straightened by extending the bridge to the customs and toll facilities where the curve begins." Since this will impact current bridge traffic, the document needs to assess how this will be staged so that traffic interruption will be minimal.

- The current Ambassador Bridge just celebrated its 75th anniversary. It would appear that signification rehabilitation work would be required for the existing span in the near future. Are there plans to shut down the old bridge after the new one is in place for repair?

Sincerely,

Original signed by:

James J. Steele
Division Administrator

cc: Bob Bloom, U.S. Coast Guard, Cleveland
Mohammed Alghurabi, MDOT, Design Support Area (B220)
Jill Hochman, FHWA, Office of Interstate & Border Planning (HEPI-1)
Andy Ziegler, MDOT, Metro Region
Ruth Hepfer, FHWA, Michigan Division
(Project: 18190)

United States Department of State

Bureau of Western Hemisphere Affairs
Washington, D.C. 20520-6258

August 3, 2005

David H. Coburn, Esq.
Steptoe & Johnson, LLP
1330 Connecticut Ave., N.W.
Washington, D.C. 20036

Re: Detroit International Bridge Company

Dear Mr. Coburn:

This is in response to your question on behalf of the Detroit International Bridge Company (DIBC) as to whether the DIBC is required to obtain a Presidential Permit to construct a second span for the Ambassador Bridge, which crosses the Detroit River between Detroit, Michigan and Windsor, Ontario. In connection with your question, you have also provided the Office of the Legal Adviser with several pieces of correspondence concerning this matter. Based on the information available to us (including the information you have provided), we have determined that the DIBC does not require a Presidential permit to expand (or twin) the existing bridge at that location.

The Ambassador Bridge was constructed pursuant to a 1921 congressional statute that authorized the "American Transit Company, its successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Detroit River at a point suitable to the interests of navigation, within or near the city limits of Detroit, Wayne County, Michigan, in accordance with the provisions" of the 1906 Bridge Act, provided that the necessary authority for construction was obtained from the Canadian Government and that construction was commenced within three years and completed within seven years. Although the time periods within which the bridge could be constructed and completed were extended by Congress several times, it is our understanding that the bridge was built after Canadian approval was eventually obtained. You have further furnished us with information indicating that DIBC is the assignee of the American Transit Company, having acquired the bridge and the authority to operate it in 1927, pursuant to the 1921 congressional authorization.

In 1972, Congress enacted the International Bridge Act, which effectively ratified the Presidential permit process (delegated to the Department of State in 1968 under Executive Order 11423) that had been in operation for some time. In passing the 1972 statute, Congress made clear that activities conducted pursuant to prior congressional statutory authorizations would not be affected by the new law. Specifically, the House Report provides that the International Bridge Act "should not be construed to adversely affect the rights of those operating bridges previously authorized by Congress to repair, replace or enlarge existing bridges." H.R. Rep. No. 92-1303, 92d Cong., 2d Sess. 3-4 (1972). Further, as your letters note, in a number of prior instances, the Department has advised that the replacement or expansion of existing bridges authorized by Congress prior to passage of the 1972 International Bridge Act did not require a Presidential Permit. However, if expansion of the Ambassador Bridge Detroit were to require an agreement between the State of Michigan (or a subdivision or instrumentality of the State) and the Canadian government, a Canadian province or a subdivision or instrumentality of either, approval of such an agreement by the Secretary of State would be required under section 3 of the 1972 Act.

Therefore, based on our understanding that the DIBC is the assignee of the American Transit Company authorized by Congress to maintain and operate the Ambassador Bridge Detroit and that the DIBC is only seeking to expand (or twin) the operation of that bridge at that location, the DIBC does not require a Presidential permit under E.O. 11423, as amended. The fact that a Presidential permit is not required in this instance does not, however, exempt the DIBC from any other requirements under U.S. law, such as the requirement of advance approval of any plans for modification of the existing bridge by the Secretary of Homeland Security or his delegate under the 1906 Bridge Act.

I hope that you find this information helpful.

Sincerely yours,

Len Kusnitz
Acting Director
Office of Canadian Affairs

A-189

U.S. Department of Homeland Security
United States Coast Guard

Commander (dpw-3)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2019
Cleveland, OH 44199-2060

Phone: (216) 902-6084
FAX: (216) 902-6088

16590
B-032/sms
April 5, 2006

Mr. Gerald Fulcher, Jr., P.E.
Michigan Department of Environmental Quality - LWMD
P.O. Box 30458
Lansing, Michigan 48909-7958

Dear Mr. Fulcher,

I am writing to extend an invitation to you or your representative to attend a meeting to discuss and evaluate a proposal to construct a companion structure to the Ambassador Bridge over Detroit River. A proposal has been submitted to the Coast Guard from the Detroit International Bridge Company in Detroit and your agency may have review or permitting requirements associated with this proposed project. Your attendance will help the Coast Guard, a federal permitting agency, to determine potential environmental impacts related to the proposed project.

The meeting will take place at 10:00 a.m. on Thursday, May 4, 2006, at the CENTRA Headquarters in Warren, Michigan. The address is: 12225 Stephens Road, Warren, Michigan, 48089. A location map is attached.

Please contact Scot Striffler of this staff to advise whether you or your representative can attend this meeting. He may be reached by calling (216) 902-6087. Thank you in advance for your attention to this matter.

Sincerely,

Robert W. Bloom

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

T- One of us should attend this. This could become a district file.

Copy: U.S. Environmental Protection Agency, Chicago, Illinois

Copy: Michigan DOT – Bureau on Transportation Planning
Michigan State Historic Preservation Officer, Lansing, Michigan
Michigan Department of Natural Resources – Wildlife Division
Southeast Michigan Council of Governments, Detroit, Michigan
City of Detroit, Historic District Commission, Detroit, Michigan

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

RECEIVED BY
MAY 25 2006
AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC

May 18, 2006

Mr. Scott Korpi, PE, SE
American Consulting Engineers of Florida, LLC
4111 Land O' Lakes Boulevard, Suite 210
Land O' Lakes, Florida 34639

Dear Mr. Korpi:

SUBJECT: Preliminary Review - Proposed Ambassador Bridge Enhancement Project
City of Detroit, Wayne County Michigan

Thank you for your March 28, 2006, letter requesting comments concerning State of Michigan environmental regulations that may apply to a proposed second span of the Ambassador Bridge located in the City of Detroit. Director Steven E. Chester of the Michigan Department of Environmental Quality (MDEQ) has asked the Land and Water Management Division (LWMD) to respond to your request.

The project proposes to construct a new six lane cable stayed bridge over the Detroit River, directly west/southwest of the existing Ambassador Bridge. The proposed project would be 6200 feet in length built on piers approximately 152 feet over the river. There would be a 2247 foot clear span section over the river with no piers in the water. The report indicates that a decision has not been made on the future status of the existing 4-lane structure.

We have the following comments:

1. A permit will be required under Part 301, Inland Lakes and Streams, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). Because there will be no piers located within the river, any aquatic impacts are expected to be minimal.

2. If any of the bridge piers are located within the floodplain of the Detroit River, the project would also be reviewed under the State's Floodplain Regulatory Authority found in Part 31, Water Resources Protection, of the NREPA. The 100-year regulatory floodplain elevation on the Detroit River at the Ambassador Bridge is approximately 577.9 NGV datum of 1929. The United States Army Corps of Engineers (USACE) is currently revising the floodplain maps for this area and the 100-year elevation will be raised. The revised 100-year elevation should be used. The regulatory floodway is confined to the banks of the Detroit River. Because the piers are located landward of the river banks, a hydraulic analysis will not be required.

3. The LWMD staff reviews projects for consistency with Michigan's Coastal Management Program (MCMP), as required by Section 307 of the Coastal Zone Management Act, PL 92-583, as amended. The proposed bridge crossing project is within Michigan's coastal zone management boundary, and as such is subject to consistency requirements. A determination of consistency with the MCMP requires evaluation of a project to determine if it will have an adverse impact on coastal land or water uses or coastal resources. Projects are evaluated using the permitting criteria contained in the regulatory statutes administered by the MDEQ. These statutes, including the Floodplain Regulatory Authority found in

Part 31, Water Resources Protection; Part 301, Inland Lakes and Streams; Part 303, Wetlands Protection; Part 323, Shorelands Protection and Management; Part 325, Great Lakes Submerged Lands; Part 353, Sand Dunes Protection and Management; and Part 761 Aboriginal Records and Antiquities, of the NREPA, constitute the enforceable policies of the Coastal Management Program. Provided no valid objections based on valid environmental concerns are received during the public notice period and all required permits are issued and complied with, no adverse impacts to coastal resources are anticipated. Upon issuance of all necessary permits, this project will be consistent with the MCMP.

4. Section 3.8 states that one of the options being considered is to tie into the existing storm water/drainage facilities. There was no discussion as to the adequacy of the existing system to provide storm water treatment. Storm water runoff from the proposed bridge should be collected and treated to avoid any direct discharge to the Detroit River. A National Pollution Discharge Elimination System (NPDES) permit will be required for storm water discharges associated with construction activities in accordance with Rule 2190 promulgated in accordance with Part 31, Water Resources Protection, of the NREPA. Please contact Mr. Mark Fife, MDEQ's Water Bureau, at 517-241-8993 for additional information.

5. A permit will be required under Part 91, Soil Erosion and Sedimentation Control, of the NREPA. Part 91 permits are generally issued by the county or in some instances the local municipality. If the earth change involves two or more Part 91 permitting entities, the MDEQ issues the Part 91 permit.

6. A permit will be required for any test borings that penetrate bedrock under Part 625, Mineral Wells, of the NREPA. Questions concerning this requirement may be directed to Mr. Raymond Vugrinovich, MDEQ's Office of Geological Survey, at 517-241-1532.

7. Sections 3.10 - 3.12 indicate that air quality will not decrease and traffic circulation will improve even though the automobile and truck traffic is projected to increase by 40 percent and 120 percent. There was no detailed discussion to support these statements. At the May 4, 2006, Federal, State, and local meeting it was discussed that the data supporting these statements came from previous environmental evaluations for the Gateway Plaza and Canadian Plaza Projects. At the meeting the U.S. Environmental Protection Agency (USEPA) suggested that the pertinent data from those studies should be included in any future reports for the Ambassador Bridge project. The MDEQ supports this recommendation.

8. The MDEQ is concerned about the high air pollutant levels in Southeast Michigan; in particular the health impacts of ozone, particulates, and toxic air pollutants. A seven county area, including Wayne County, is classified as non-attainment for the PM-2.5 National Ambient Air Quality Standards (NAAQS). This area plus another county are non-attainment for the ozone NAAQS. In addition, the Detroit Air Toxics Initiative has identified elevated risk levels from toxic air pollutant emissions.

   We concur with the comments of the Federal Highway Administration that the proposed project is a regionally significant initiative. The project should undergo an air quality conformity determination and be included in the Long Range Plan for Southeast Michigan. Measures to mitigate increased particulate and diesel emissions should also be addressed.

   The MDEQ has an obligation under the federal Clean Air Act to develop and implement a strategy to reduce air pollution levels in order to attain and maintain the NAAQS in Southeast Michigan. Changes in air pollutant emissions associated with increased traffic, congestion, and other impacts are important factors in the analysis of necessary measures

to attain the NAAQS, and thus should be reviewed as part of this project. Quantification of emissions, modeling, and risk assessment for mobile source air toxics (including diesel and other toxic compounds) should also be included in analysis of this project. Questions concerning air quality issues should be directed to Ms. Barb Rosenbaum, MDEQ's Air Quality Division, at 517-335-4609.

9. Section 3.13 of the report presents a lot of general county-wide species information for plants, birds, reptiles, amphibians, fish, and mollusks. It does not appear that site-specific information along the proposed alignment has been collected or documented. This type of information (i.e. specific plant species) should be supplied with the final application package.

10. Section 3.17 states, "currently the extent of contamination within the proposed corridor is unknown." This should be investigated more thoroughly, particularly at the proposed pier locations. You should contact the MDEQ's Remediation and Redevelopment Division and the Waste and Hazardous Materials Division in the Southeast Michigan Office at 734-953-8905.

If you have any questions please contact Mr. Jerry Fulcher, LWMD, at 517-335-3172, or you may contact me.

Sincerely,

J. Wilfred Cwikiel, Acting Chief
Land and Water Management Division
517-335-6947

cc: Ms. Sherry Kamke, USEPA
Mr. John Konik, USACE
Mr. Robert Bloom, U.S. Coast Guard
Mr. Abdel Abdella, U.S. Federal Highway Administration
Mr. Craig Czarnecki, U.S. Fish and Wildlife Service
Ms. Margaret Barondess, MDOT
Mr. Steven E. Chester, Director, MDEQ
Mr. Jim Sygo, Deputy Director, MDEQ
Mr. Stanley F. Pruss, Deputy Director, MDEQ
Mr. Ray Vugrinovich, MDEQ
Mr. Mark Fife, MDEQ
Ms. Barbara Rosenbaum, MDEQ
Mr. Andy Hartz, MDEQ
Mr. Chris Antieau, MDEQ
Mr. Jerry Fulcher, MDEQ

U.S. Department
of Transportation
**Federal Highway
Administration**

Michigan Division

315 West Allegan Street, Room 201
Lansing, Michigan 48933

June 7, 2006

Mr. Robert W. Bloom Jr.
Chief Bridge Branch
US Coast Guard, Ninth District
1240 E. Ninth Street
Cleveland, OH 44199-2060

Dear Bob:

Ambassador Bridge Future Plans
and
FHWA Comments on the
Proposed Ambassador Bridge Enhancement Project

On May 24, 2006, staff from the Detroit International Bridge Company (DIBC) and the Canadian Transit Company (CTC) conducted a tour of the Ambassador Bridge and facilities for members of the Michigan Transportation Commission. During this tour, the DIBC presented the Commission members copies of the attached document (attachment 1) which outlines the DIBC's future plans for expansion of the plaza in to an "International Center," relocating various roadways, and relocating individuals and businesses (see tab marked "Ambassador Bridge Final Master Plan"). This document supports FHWA's comment number 8) and comment b which were provided to you via e-mail on April 13, 2006 (attachment 2).

It is FHWA's opinion that the DIBC's proposed Bridge Enhancement for a new structure is part of a larger plan by the DIBC and as such should be analyzed as part of the whole, not piecemeal as is being attempted. The Council on Environmental Quality regulations at 40 CFR 1508.7 and 1508.8 address this situation.

"*§ 1508.7 Cumulative impact.*
Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

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"§ 1508.8 Effects.
Effects include:
(a) Direct effects, which are caused by the action and occur at the same time and place.
(b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative.

Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial."

The FHWA believes that the cumulative impacts from the DIBC's proposed enhancement project along with the direct and indirect effects of this action be adequately addressed in the environmental analysis prepared by the DIBC.

Sincerely,

J. A. Kirschensteiner

James A. Kirschensteiner
Assistant Division Administrator

For: James J. Steele
Division Administrator

Attachments:
cc: Fred Skaer, HEPE-1, with both attachments
Jill Hochman, HEPI-1, with both attachments
Sherry Kamke, US EPA Region 5 with attachment #2
Susan Mortel, MDOT with attachment #2

Project 19855

Attachment 2

FHWA General Comments and Observations on the Ambassador Bridge Enhancement Project:

1) The document is still a qualitative document and does not perform a quantitative analysis of many topical areas.
2) The Detroit International Bridge Company (DIBC) philosophy and presentation has changed since the last document. Fort Street is not proposed to be relocated. No future expanded plaza is shown. The bridge type is now a cable stay rather than a suspension bridge similar to the old bridge. The cross section has changed with the proposed shoulders conceivably allowing conversion to additional lanes in the future (six lanes to eight lanes). DIBC is indicating that the old bridge may be replaced some day. DIBC is indicating that old bridge, once repaired, will be used for redundancy and back-up support for the new bridge when necessary to ensure free flow of traffic.
3) The philosophy is to merely added lanes, no more no less, hence the type 2 categorical exclusion.
4) DIBC reiterated that DIBC/CTC will fund the entire project. No federal funds needed.
5) Design work has begun and is expected to be completed within 18 to 24 months. Construction is scheduled to begin after design is complete and consistent with traffic volumes.
6) The analysis draws on data from the DRIC study and leans very heavily on the environmental clearance from the Ambassador Gateway.
7) This project would be a regionally significant transportation project and should be in the Long Range Transportation Plan and undergo an air quality conformity analysis by SEMCOG.
8) The information presented in this document has been revised from the previous document to only focus on a new bridge, either a twinned bridge or a replacement bridge. It does not acknowledge any of the past publicly disclosed future plans of the Detroit International Bridge Company such as relocating Fort Street to accommodate a much larger 100+ booth Customs plaza, joint US/Canadian customs inspection on the US side, combining customs inspections from the Detroit/Windsor tunnel with the Ambassador Bridge expanded customs plaza, etc. along with similar plans as proposed on the Canadian side. Even though this document focuses only on the new bridge and the new bridge appears to have independent utility under NEPA, it also appears to be segmenting the publicly proposed actions by the DIBC. The analysis also does not address any secondary or cumulative impacts which may result from the proposed project.
9) From what the FHWA has heard from public meetings on the DRIC study, it is very probable that this action proposed by the DIBC will be controversial. Under NEPA, controversy can elevate a Categorical Exclusion to an Environmental Assessment to determine the significance of the social, environmental or economic impacts from the proposed action. The FHWA recommends that the DIBC prepare an Environmental Assessment to assess the degree of significance of impacts.

Specific comments:

A. Page 9, Section 3.2 Neighborhoods; "…new bridge would reduce the length of backups on the bridges thereby reducing the amount of time trucks are idling in the neighborhoods, which could then improve air quality and noise pollution." Where is the traffic analysis, air quality analysis and noise analysis to support this statement?
B. Page 10, Section 3.6 Visual Quality and Aesthetics; it is indicated that the new proposed cable stay bridge is similar to the existing National Historic Register Ambassador bridge and should not impact it visually or aesthetically. The Section 106 consultation with the State Historic preservation Officer and/or the Advisory Council on Historic Preservation will make this determination, but in my opinion, the proposed cable stay bridge will not compliment the existing bridge, but will compete and overpower the existing bridge.
C. Page 11, Section 4(f) is discussed. Section 4(f) only applies to projects or actions of US DOT agencies. It would not apply in this instance since the US Coast Guard is not longer a part of the US DOT.
D. Page 15, Section 3.11 Noise/Vibration; a statement is made that, "Future traffic projections suggest hat automobile traffic will increase by 40% and truck traffic will increase by 120% in the next 30 years." Where will this increase take place? If it is taken from studies performed by the Border Partnership for the DRIC study then this traffic increase is cross border traffic increases, which would impact noise levels in the area. This section goes on to say, "No changes in traffic are expected as part of the proposed improvement." It goes on to say that the initial screening for noise levels is satisfactory and no further noise analysis is required. If cross border truck traffic increases by 120%, noise levels will be significantly different that they are today. Where is the noise analysis and where did the projected increase in traffic figures come from?
E. Page 15, Section 3.12; There is no traffic analysis provided. The document seems to rely heavily on work performed under the Ambassador Bridge Gateway Environmental Assessment. This document is referenced several times. The traffic analysis for the Gateway projected traffic volumes 20 years into the future to 2015. We are currently only 9 years from the Gateway projected traffic. What impact will the proposed new crossing have on traffic Interstate traffic volumes? The document cross section shows 6 through lanes with shoulders, but the shoulders could potentially be converted by the owner to through lanes at some point in the future thereby resulting in an 8 lane cross section. What impact does this have on capacity of the Interstate system at the bridge location?

Additional Comments:

a. Does this proposal need another permit such as the City of Detroit Building Permit? If yes, who signs it? And where is it?
b. Page 9, Section 3.5…No discussion for indirect and cumulative impacts (please refer to CEQ publication on considering cumulative effects).

American

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american@ace-fla.com • www.ace-fla.com

June 30, 2006

Michigan Department of Environmental Quality
Land and Water Management Division
P.O. Box 30204
Lansing, MI 48909-7704

RE: Ambassador Bridge Enhancement Project
Joint Permit Application – Section 401 Clean Water Act

Dear MDEQ:

We submitted a Joint Permit Application for the Ambassador Bridge Enhancement Project on June 28, 2006. It does not appear that Section 401 of the Clean Water Act is specifically addressed in the application. We have been asked by the United States Coast Guard to request that you specifically address by title the requirements of Section 401 of the Clean Water Act during the review and processing of the application.

If you have any questions or would like additional information, please call me directly at 813-996-2800 ext. 5567.

Very truly yours,
AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC

Scott Korpi, PE, SE
Project Manager

cc: Robert Bloom, United States Coast Guard (OBR) (Joint Permit Only)
Nick Mpras, United States Coast Guard (Joint Permit Only)
Dan Stamper, Detroit International Bridge Company (Joint Permit Only)
Craig Stamper, Detroit International Bridge Company (Joint Permit Only)

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Coon MJM MFM Scott K Dave C From Dan

Gateway Communities Development Collaborative

C/o Southwest Detroit Business Association
7752 W. Vernor Hwy.
Detroit, MI 48209
(313) 842-0986 (phone)
(313) 842-6350 (fax)

Member Organizations

Bagley Housing Association

Bridging Communities, Inc.

Greater Corktown Development Corporation

Mexicantown Community Development Corporation

Michigan Avenue Business Association

Neighborhood Centers, Inc.

Southwest Detroit Business Association

Southwest Detroit Environmental Vision

Southwest Solutions / Southwest Housing Corporation

July 19, 2006

Jeremy Richardson
Michigan Department of Environmental Quality
Land and Water Management Division
27700 Donald Court
Warren, MI 48092-2793

RE: File No. 06-82-0121-P

Dear Mr. Richardson:

I am writing on behalf of the Gateway Communities Development Collaborative (GCDC) regarding file no. 06-82-0121-P pertaining to an application for a permit under the Inland Lakes and Streams of the Natural Resources and Environmental Protection Act submitted by the Detroit International Bridge Company (DIBC) for the Ambassador Bridge Enhancement Project (ABEP). Due to the complexities and impacts of this permit application, the GCDC respectfully requests that the Michigan Department of Environmental Quality (MDEQ) conduct a public hearing within the host communities.

While there are myriad impacts of the proposed Ambassador Bridge Enhancement Project, there are two criteria included in Public Act 451 that are particularly relevant to our comments:

The availability of feasible and prudent alternative locations and methods to accomplish the expected benefits from the activity;

In considering a permit application, the department shall give serious consideration to findings of necessity for the proposed activity which have been made by other state agencies

The optimal location for expanded international border crossing capacity within the Detroit and Windsor area is currently being evaluated through the Detroit River International Crossing (DRIC) Study. The GCDC has been actively engaged in discussions and plans regarding the international border and several member organizations serve on the DRIC Local Advisory Council. At the inception of the DRIC Study, the GCDC advocated for a moratorium on governmental actions that would promote any border crossing option until the study is completed. While the DIBC may pursue its plans independent of the DRIC Study, the proper evaluation of the MDEQ permit application requires review within the context of a bi-national, multi-agency analysis of expanded border crossing capacity in the Detroit and Windsor area. *The DRIC Study evaluated the feasibility and impacts of expanded capacity at the Ambassador Bridge and concluded that it is not feasible and that there are viable alternatives.* Additionally, the

GCDC understands that there are outstanding questions regarding the process, requirements, and timeline for processing local, state, and federal governmental permits for expanded and new international border crossing capacity external to the DRIC Study. Responses to the attached correspondence from Senator Carl Levin to the U.S. Coast Guard, U.S. Department of Transportation, and the Department of State requesting an explanation of their respective regulations and oversight authority are pending. The MDEQ should conclusively ascertain that the ABEP permit application must be processed prior to completion of the DRIC Study. The GCDC would appreciate reviewing any correspondence on this matter.

The GCDC is particularly concerned that the ABEP permit application improperly and inadequately describes the full scope of the expansion that could occur at the Ambassador Bridge location and thereby segments the proposed project. The permit application states:

> "This project consists of additional lanes over the Detroit River to the west of the existing span and connecting directly into the existing plazas in both Windsor and Detroit without the need for modification."

The DIBC has repeatedly and publicly announced their intention to construct an "international plaza" that would accommodate joint United States and Canadian customs inspections requiring a substantial expansion of the existing plaza. This international plaza is described as consisting of between 100 to 200 toll booths. The DIBC has presented these plans to local, state, and federal public officials and has had these plans depicted in advertisements published in the *Detroit News*, *Detroit Free Press*, and *Crain's Detroit Business*. In October, 2005 a proposal to sell the Detroit interest in the Detroit-Windsor Tunnel to a DIBC-affiliated company including construction of a joint customs facility and connector road between the Ambassador Bridge and the Detroit-Windsor tunnel, was presented to the Detroit City Council and represented in a document entitled "Binding Agreement." Finally, the DIBC has submitted a request to the Michigan Department of Transportation requesting that Fort Street be reconfigured and relocated to the south to accommodate their expansion plans. Collectively, these actions create a compelling case that the DIBC is misrepresenting the full scope of their intended project and that the permit application for the proposed ABEP segments the project in violation of the National Environmental Protection Act under which the Gateway Project was evaluated.

In March and May 2006, the joint Michigan Senate and House of Representatives Transportation Committee held four hearings on the DRIC Study. The DIBC testified at each of these hearings directly and through their consultants. The transcripts of these hearings should be considered in the evaluation of the ABEP permit application as there were various, and conflicting, representations made by or on behalf of the DIBC with respect to the need and timing of expanded international border crossing capacity, whether state and federal funding would be requested for their border crossing projects, and the capacity of existing plaza facilities to accommodate increased traffic.

The General Services Administration (GSA) is currently undertaking a Master Planning analysis for the Ambassador Bridge inspection facility, expected to be complete in September. The outcome of

this planning process may change the location, size, and operation of the plaza facility and therefore the impacts of the ABEP. It would be prudent to delay evaluation of the MDEQ permit application until the GSA completes its Master Plan.

Under Item 2 – Project Description, the following is stated:

> "The proposed bridge will run roughly parallel to the existing Ambassador Bridge and will tie directly into the existing plaza areas without need for plaza configuration modifications beyond those already approved under the Gateway project approved by FHWA and undertaken by MDOT and DIBC. Once the new structure is completed, the exiting Ambassador Bridge will be taken out of service in order to evaluate and make repairs deemed necessary and economically feasible. Upon completion of the anticipated repairs, the existing bridge will be used to provide redundancy and backup support when necessary to ensure the free flow of traffic at all times. The existing bridge would not be placed back into service before all necessary approvals are obtained."

The Environmental Assessment (EA) conducted for the Gateway Project resulted in a Finding of No Significant Impact (FONSI). Although the Gateway Project was designed to accommodate a second span of the Ambassador Bridge – should that action be studied, mitigated, and undertaken in the future – the impacts of a new six lane bridge or two parallel bridges, representing a doubling of capacity, were not included in the Gateway Project EA.
Therefore, a full Environmental Impact Statement should be conducted on the impacts of a new six-lane bridge as well as the operations of two parallel bridges. In addition, the capacity of the plaza, following completion of the Gateway Project, to accommodate the traffic estimates for two bridges, with an appropriate time horizon, must be evaluated and its impacts determined.

One of the objectives of the DRIC Study is to recommend an alternative that will provide redundancy, or other options, for crossing the Detroit and Windsor border. Given that the ABEP permit application explicitly discusses the possibility of the project providing redundancy, the MDEQ should inquire and secure a clear definition of redundancy from the various agencies and departments participating in the DRIC Study; specifically such a definition should be requested of the Department of Homeland Security. Based on previous commentary and testimony, redundancy is not achieved by the close proximity of two parallel bridges represented in the ABEP.

The MDEQ should ascertain the position of the Canadian parties as it relates to the ABEP permit application. The DRIC Study partners developed several principles that govern the study process and the final recommendations. One principle is that decisions would not be made that disproportionately burden one side of the border. The MDEQ evaluation of the permit application should acknowledge that the DRIC Study has already determined that increased capacity at the Ambassador Bridge location is not feasible due to its impacts on the Canadian border and therefore be denied.

The permit application states that the existing Ambassador Bridge structure will be evaluated to determine the extent of repairs required and its future use. Whether the existing structure will continue to be used is predicated on the economic feasibility of the repair costs. The economic feasibility of repairs is a subjective matter and can be significantly different for a private corporation than for a public entity. Given the importance of the international crossing to the commerce, trade, and security of the United States and Canada, what is the government's role in the evaluation of the conditions of the Ambassador Bridge and the determination of economic feasibility? Since the future use of the existing structure is described in the permit application, the MDEQ should require that an independent third party inspection of the Ambassador Bridge is completed and reviewed in evaluating the permit application.

Southwest Detroit hosts extensive transportation infrastructure that primarily benefits the regional and state economies while the host communities shoulder the negative impacts. Expanded transportation infrastructure has not been coordinated within a comprehensive and cumulative framework. In particular, the environmental impacts have not been comprehensively evaluated. The ABEP permit application is another example of the piecemeal approach to transportation infrastructure expansion in southwest Detroit. The MDEQ should require and participate in a comprehensive analysis of the environmental impacts – including air quality impacts which are not reported in the permit application.

Thank you for the opportunity to comment on the permit application for the ABEP. As the process continues and additional information is disclosed, we are likely to have additional comments. Again, we request that the MDEQ hold a public hearing on this permit within the affected communities. The GCDC is available for additional discussion of this important matter.

Sincerely,

Karen Kavanaugh
Transportation Committee Chair

attachments

cc: Senator Carl Levin
Senator Debbie Stabenow
Representative Carolyn Cheeks-Kilpatrick
Governor Jennifer Granholm
Representative Steve Tobocman
Senator Buzz Thomas
Senator Hansen Clarke
Mayor Kwame Kilpatrick
Detroit City Council

Clark Park Coalition

1130 Clark Street, Detroit, Michigan 48209

August 28, 2006

Office of Commander (dpw-3)
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199-2060

RE: Public Notice 09-03-06 Dated July 28, 2006 Construction of a second (twin) fixed Highway bridge adjacent to, and immediately south of, the existing Ambassador Bridge

Dear Commander (dpw-3),

I am writing on behalf of the Clark Park Coalition regarding the referenced Public Notice above pertaining to an application for approval of location and plans for construction of a second (twin) fixed highway bridge over a navigable waterway of the United States adjacent to the existing Ambassador Bridge and submitted by the agent of the Detroit International Bridge Company (DIBC).

The Clark Park Coalition requests that the Coast Guard fully evaluate the environmental impacts, short and long term of the local host communities and regional areas regarding the complexities and impacts of this application for approval.

For myriad of serious reasons that exist within our Southwest Detroit community, the Coalition believes that the National Environmental Policy Act (NEPA), the Federal Highway Administration (FHWA) and the Michigan Department of Transportation (MDOT) needs to have a comprehensive environmental review regarding the DIBC Application for Approval. It would seem imperative that DIBC would be required to conduct a full Environmental Impact Statement (EIS) and has provided the Coast Guard with no justification for the preliminary finding that the project will qualify for a categorical exclusion for the NEPA's requirement that an environmental analysis be performed. As you are aware, the Detroit River International Crossing (DRIC) Study has been well underway to study the most appropriate location for another border crossing including all of the international governmental agencies involvement including the Southwest Detroit community. The DRIC study and it's process has been conducted quite thoroughly thus far and allowing the community to be fully engaged.

Unfortunately, the DIBC does not operate in this type of open public process and now all of a sudden since the DRIC study did not prefer the DIBC's "twinning" of their bridge proposal, DIBC has now decided to make the case that their existing bridge is obsolete and a "replacement" bridge must built. DIBC has repeatedly published full page color advertising in our city newspapers regarding their plans to build new expanded toll booth

plaza and yet within their application permit to MDEQ regarding their "bridge enhancement / bridge replacement" they state something quite to the contrary "no plaza expansion needed". Such conflicting messages to the public, to the State of Michigan, to the City, to our border country, to our federal government agencies and to the surrounding community.

The Clark Park Coalition believes the bullet points below are additional concerns that the Coast Guard must take into serious consideration:

Comprehensive environmental review

- The proposed DICB Project would in fact impact minority and low income populations that happen to be located in the geographical area of Southwest Detroit where this

- There is an on-going bi-national process that has been studying the need for additional border infrastructure capacity. That study, called the Detroit River International Crossing Study, considered the addition of a second span to the Ambassador Bridge crossing and rejected it because of the impacts on the Canadian side of the project. Nevertheless, DIBC is free to pursue construction of a second span outside of this process. However, all state and federal agencies responsible for issuing permits should agree to a moratorium on issuing all new permits related to new or expanded border crossings along the Detroit River until the DRIC study is complete. The impacts of new border crossings should not be studied independently of each other, given their close proximity.

- Given the concentration of transportation uses and proposed transportation projects in Southwest Detroit, a comprehensive transportation study is needed to truly understand the impacts of any transportation project in Southwest Detroit. No permits should be approved until that study is undertaken and completed.

- Six-lane bridge is an expansion of capacity which should have full environmental impact review, even if the existing bridge is never put back into service.

- Should the original bridge be repaired after the new bridge constructed, this project represents an *unprecedented* expansion of border capacity at the Detroit-Windsor border—and one that was rejected in the bi-national study conducted to address border capacity at the Detroit-Windsor border.

- The public deserves to be afforded the greatest protections when it comes to the quality of their community, their health and the environment. Unbridled expansion of private transportation infrastructure represents an environmental justice issue. How will community concerns like economic development, air quality, etc be addressed by this project?

- There should be an air quality analysis conducted, particularly since the expansion of the bridge will likely lead to increased truck traffic.

- Some analysis of health impacts must be undertaken. This is particularly true given the importance being placed on protecting the natural environmental. The health of humans is just as important as the health of wildlife and plant life.

Project specifications

Must independently confirm that a new bridge is needed

- Before approving this permit, the Coast Guard should require an independent analysis of the condition of the original bridge. The permit application is premised on the notion that the existing bridge is unsafe and must be repaired or shut down. Before the environment is disturbed by construction of a new crossing, we should have an independent analysis of the condition of the existing bridge.

- In addition, the claim that the existing bridge would not be put into service without "all necessary approvals" should be substantiated with a listing of the required approvals.

- While the DIBC portrays the purpose of the Gateway project as being to build a second span for the Ambassador Bridge, the actual purpose of the Gateway project is to directly tie the bridge into the freeway system in order to improve transportation movements from the bridge to the freeway system and to take truck traffic off of local roads. The Gateway project was *designed* to accommodate a second span if one were built sometime in the future, not to enable a second span to be built. The Environmental Assessment for the Gateway project did not study the impacts to the Detroit River, the environment, or the community of a second span. It studied the impacts related to the ramps and other infrastructure needed to connect the plaza to the freeway system, with or without expanded border capacity at that location.

Must evaluate whether an expanded plaza will be required

- While DIBC says that no increase in plaza size is necessary, they have provided no evidence that their current facility or even the slightly expanded facility created through the Gateway project will be able to accommodate future truck traffic should a new 6-lane bridge be built or the existing bridge rehabilitated and both bridges functioning. An expanded plaza would severely impact the growing residential community and commercial area that has already seen encroachment by the bridge compound.

- DIBC has publicly touted its proposal for a new plaza facility going south of the existing plaza toward the river. This proposal has been made to Detroit City Council, the City of Detroit Mayor's office, various meetings at the DIBC offices, and to MDOT. MDOT is currently beginning the process of studying the relocation of Fort Street as it relates to this proposal. The permit to build a second span cannot be issued without an environmental review of this proposal. The environmental consequences

of having a truck facility so close to the Detroit River must be studied to ensure that run-off and other contaminants does not pollute the environment.

Must protect the river and community from hazardous materials spills

- In addition, the permit does not speak to the treatment of hazardous materials on the new bridge. Given the existing bridge lacks the capacity to safely handle any hazardous material spills, the new bridge must have protections and safeguards to protect the Detroit River and the surrounding community from hazardous spills that might occur on the bridge. Recent media reports have revealed that DIBC engages in "lane-flushing," the practice of allowing trucks through without inspection, and have even allowed trucks known to be carrying hazardous materials, which are prohibited by federal statute from crossing the bridge, to cross. There must be a thorough understanding of the protections that will be put in place to ensure that hazardous materials re not a threat to the environment or community.

More information needed

- In fact the information provided in the permit application is minimal in terms of design, construction, and operation. More detailed information regarding site plans, construction phasing, construction methods, homeland security safeguards and other safety features must be provided before a permit can be issued.

Should be designed with true community input

- There has been limited community involvement in the design of this new bridge.

- The bridge should be designed to be a signature structure for the city, a symbol for the area.

- There should be consideration of the West Riverfront Conservancy plans to bring public access to the riverfront.

Bridge oversight and long-term community impact

- There should be open discussion and debate regarding the most appropriate governance structure for the next border crossing. While the DIBC proposes to build a new span, there should be public oversight over the crossing given the long-term implications of this expanded infrastructure. The community has no venue for having their complaints heard and a new bridge will only exacerbate this problem.

- Should an additional border crossing be pursued for construction anywhere along the Detroit River, there must be a Community Benefits Agreement between members of the host community and the project sponsors.

Thank you your completely thorough and comprehensive review the this complex issue and the request of approval of the application before you from DIBC. The Coalition has request that the Coast Guard "deny" approval of constructing a twin structure in our

international waterway. The DIBC twin border crossing at their proposed location in our Detroit River way is redundant, a homeland security issue, an environmental justice issue for the residential, small business and tourist host community including an extreme burden on our low income, minority community.

Sincerely,

Deb Sumner

Deb Sumner
President (313 522-6120)

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

Dept./Agency: David Coburn	Phone #	From: Bob Bloom	# of pages ▸ 2
Fax #		Fax #	

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
East Lansing Field Office (ES)
2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823-6316

IN REPLY REFER TO:

August 29, 2006

Mr. Robert W. Bloom, Jr., Bridge Program Manager
Office of the Commander (dpw-3)
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199

Re: Public Notice No. 09-03-06, applicant Detroit International Bridge Company

Dear Mr. Bloom:

We have reviewed the Public Notice for the above referenced file, concerning an application for a permit, pursuant to section 9 of the Rivers and Harbors Act of 1899. We submit these comments under the authority of the Endangered Species Act of 1973, as amended (Act).

According to the Public Notice, the applicant proposes to construct a second fixed highway bridge adjacent to the existing Ambassador Bridge. The proposed project would occur over Detroit River, Mile 19.5, Detroit, Wayne County, Michigan.

Endangered Species Act Comments

In accordance with section 7 of the Act, we are notifying you that the northern riffleshell mussel (*Epioblasma torulosa rangiana*), a federally listed endangered species, may occur in the vicinity of the proposed project location. The northern riffleshell historically occurred in Detroit River, but the mussel communities in the river have experienced severe declines over the past 20+ years, due mainly to the introduction of the zebra mussel (*Dreissena polymorpha*). The northern riffleshell has not been found alive in Detroit River since 1988; however, the Michigan Natural Features Inventory discovered several fresh dead valves of the northern riffleshell in the river in the summer of 2005. The status of the northern riffleshell in Detroit River is unclear; however, this new evidence indicates the potential for its continuing presence in the river.

Pursuant to section 7 of the Act you must determine whether authorization of the proposed work may affect federally listed species. If you determine that authorization of the proposed work may affect but would not likely adversely affect listed species, you must seek written concurrence from us. If you determine that authorization of the proposed work would adversely affect a listed species, you must initiate formal consultation. Biologists from this office are available to assist you in determining potential effects of the proposed work on listed species.

The northern riffleshell also receives protection by the Michigan Department of Natural Resources through Part 365, Endangered Species Protection, of the Natural Resources and Environmental Protection Act. We suggest you contact Ms. Lori Sargent at 517/373-1263 if you have questions concerning the protection of threatened and endangered species under State law.

We appreciate the opportunity to provide our resource protection recommendations. For further discussion, please contact Barbara Hosler of this office at 517/351-6326 or the above address.

Sincerely,

Craig A. Czarnecki
Field Supervisor

cc: MDNR, Wildlife Division, Lansing, MI (Attn: Lori Sargent)

s:admin/archives/aug06/ambassadorbridge_USCGPN.blh.doc

Canadian Environmental Assessment Agency
Agence canadienne d'évaluation environnementale

55 St. Clair Avenue East
Suite 907
Toronto, Ontario
M4T 1M2
Tel. (416) 952-6063
Fax (416) 952-1573

55, avenue St-Clair Est
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Toronto (Ontario)
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Tél. (416) 952-6063
Télec. (416) 952-1573

August 30, 2006

Robert W. Bloom, Jr.
Bridge Program Manager
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199

Dear Mr. Bloom:

In March of this year, the Canadian Environmental Assessment Agency (Agency) received a revised project description for the proposed Ambassador Bridge Enhancement Project. Upon our receipt of this project information, a letter was sent to a number of federal departments and agencies in Canada to identify potential environmental assessment requirements under the *Canadian Environmental Assessment Act*.

In Canada, the *Canadian Environmental Assessment Act* applies to federal authorities when they contemplate some action in relation to a project that would enable it to proceed in whole or in part. A federal environmental assessment is required when a federal authority:

(a) is the proponent of a project;
(b) provides financial assistance to the proponent;
(c) makes federal lands available for the project; or
(d) issues certain permits or licences, or other approvals.

For the proposed Ambassador Bridge Enhancement Project, Transport Canada has determined that it requires an environmental assessment because the project requires a permit under the *Navigable Waters Protection Act*. The Windsor Port Authority has also identified a need for an environmental assessment of the project as it would involve crossing over federal water lots in Windsor, Ontario. Environment Canada, Health Canada, Fisheries and Oceans Canada, and Foreign Affairs Canada are participating in this environmental assessment process as federal authorities with expert advice to contribute to the conduct of the environmental assessment.

The *Canadian Environmental Assessment Act* also requires that for every project where a federal environmental assessment is required, a federal environmental assessment coordinator (FEAC) is assigned. Currently, the Agency has assumed the role of the FEAC for this project, as we are of the understanding that the *National Environmental Policy Act* may apply, and therefore this project may be subject to the environmental assessment requirements of another jurisdiction.

In accordance with the requirements of the *Canadian Environmental Assessment Act,* Transport Canada and the Windsor Port Authority have posted a Notice of Commencement on the Canadian Environmental Assessment Registry. This notice provides a preliminary scope of the project to be assessed, and for your reference, can be found at the following link:

http://www.ceaa.gc.ca/050/Viewer_e.cfm?SrchPq+1&CEAR_ID=21100

Should it be determined that this project also requires an environmental assessment in the United States, I am interested in discussing with you our process and any opportunities that may exist for environmental assessment coordination.

With respect to Transport Canada's administration of the *Navigable Waters Protection Act*, I anticipate that you may receive further correspondence from Transport Canada directly that provides you with additional details on this permit requirement.

If you have any questions or would like to discuss further, please do not hesitate to contact me at (416) 952-6063.

Yours sincerely,

Original signed by

Cathy Hainsworth, Senior Program Officer, Canadian Environmental Assessment Agency, Ontario Region

c.c.:

Kaarina Stiff, TC
David Cree, WPA
Shawn Morton, FAC
Sherry Kamke, USEPA

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

To David Coburn		From Bob Bloom	# of pages ▸ 6
Dept./Agency		Phone #	
Fax #		Fax #	
NSN 7540-01-317-7368	5099-101	GENERAL SERVICES ADMINISTRATION	

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

AUG 30 2006

REPLY TO THE ATTENTION OF:
B-19J

Mr. Robert W. Bloom Jr.
United States Coast Guard
Office of Commander (dpw-3)
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199

RE: Comments on Public Notice 09-03-06 for Approval of Location and Plans for Construction of Second Fixed Highway Bridge over the Detroit River Known as the Ambassador Bridge Enhancement Project (ABEP)

Dear Mr. Bloom:

The U.S. Environmental Protection Agency (EPA) has responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act to review and comment on major federal activities subject to the National Environmental Policy Act (NEPA). EPA is submitting comments to you regarding the Ambassador Bridge Enhancement Project (ABEP) public notice issued by the Coast Guard and the NEPA evaluation done by the Detroit International Bridge Company (DIBC) for the ABEP. We became aware of this application through our role as a cooperating agency for the Detroit River International Crossing (DRIC) project. However, our review of this project is based on the merits of this proposal on its own without regard to its relationship to the DRIC project. We are offering our comments in order to assist in the comprehensive evaluation and disclosure of environmental impacts for the ABEP.

We are aware of the great interest in the Detroit area in preserving and enhancing the existing international crossing capacity and improving operations there, including bridge capacity, plaza facilities, and connections to highway facilities on both sides of the border. We have looked at international crossing proposals with similar questions regarding the NEPA process and concern for the environment.

We have reviewed the information entitled, "Project Description and Type 2 Categorical Exclusion Environmental Documentation," prepared by the DIBC and dated March 13, 2006, herein referred to as the CATEX document. We have also reviewed the Coast Guard's public notice for the project, which includes a preliminary determination that the proposed action should be categorically excluded from a detailed analysis under NEPA. Based on our review of the CATEX document and the Coast Guard's NEPA implementation regulations, it does not appear that any of the Coast Guard's categorical exclusions apply to the ABEP. Based on discussions EPA has had with the Coast Guard, it appears that the Coast Guard intends to utilize Categorical Exclusion Number 32(a), which deals with the Bridge Administration Program for this project. In

our opinion, this categorical exclusion for modification or replacement of an existing bridge does not apply because the proposed project is for a new bridge, with additional capacity on a new alignment, albeit very close to the existing bridge. Furthermore, contrary to Categorical Exclusion Number 32(a), the existing bridge is historic and is on the National Register of Historic Places. Additional relevant factors include the fact that the proposed bridge is international and is the subject of environmental analysis in another country. The complexities of the project, the level of coordination still required between governments, remaining environmental questions, the possibility of unevaluated connected actions, and the controversial nature of the project preclude the project from being assessed with a categorical exclusion.

We recommend that the Coast Guard increase the level of NEPA analysis for the project to at least an environmental assessment (EA). This will allow for more public involvement in the analysis process and more public disclosure of impacts. We believe that issues could be identified during an EA that could lead the Coast Guard to determine that an environmental impact statement (EIS) is warranted. We have a number of concerns, both environmentally and procedurally. We recommend that the Coast Guard address those issues before making an NEPA decision. Those issues are discussed in the enclosed detailed comments.

Thank you for the opportunity to provide these comments to you. If you have any questions on our comments, please contact Sherry Kamke. Sherry can be reached by phone at (312) 353-5794 and by e-mail at: kamke.sherry@epa.gov.

Sincerely yours,

Jerri-Anne Garl, Director
Office of Science, Ecosystems, and Communities

Enclosures (2)

cc: Dan Stamper, Detroit International Bridge Company
Jim Kirschensteiner, FHWA
Dave Wresinksi, MDOT
Cathy Hainsworth, CEAA
Kaarina Stiff, Transport Canada

Detailed Comments on the Ambassador Bridge Enhancement Project (ABEP)
Public Notice 09-03-06 and Project Description and
Type 2 Categorical Exclusion Environmental Documentation
Prepared by the Detroit International Bridge Company

Overarching Analysis Issues

Lack of a Suitable Categorical Exclusion - None of the 35 types of actions on the Coast Guard's categorical exclusion list fits for this project. The Coast Guard has indicated to EPA that it intends to rely on Categorical Exclusion Number 32(a), which reads as follows:

> "Modification or replacement of an existing bridge on essentially the same alignment or location. Excluded are bridges with historic significance or bridges providing access to undeveloped barrier islands and beaches."

In our opinion, this categorical exclusion does not apply because the proposed project is for a new bridge, with additional capacity on a new alignment, albeit very close to the existing bridge. Furthermore, the existing bridge is historic and is on the National Register of Historic Places. Additionally, other circumstances unique to this project suggest that it is not a good candidate for a categorical exclusion. We believe that the complexities of the project, the level of coordination that is still required between governments, remaining environmental questions, the possibility of unevaluated connected actions, and the controversial nature of the project preclude the project from being assessed with a categorical exclusion. Each of these factors is discussed below.

Relationship of ABEP to Other International Crossing Projects is Unclear – We are concerned about how the ABEP project relates to the whole international crossing system (freeway connections, plazas, and bridge capacity on both sides of the border). We are aware of the EA, Finding of No Significant Impact (FONSI), and subsequent re-evaluations for the Ambassador Bridge Gateway project issued by the Federal Highway Administration (FHWA). In a letter dated August 22, 2006 (enclosed), FHWA explained to EPA that the Ambassador Gateway EA did not evaluate the environmental impacts of a second bridge span. The purpose of the Gateway project was to make direct connections from the interstate system (I-75 and I-96) to the bridge and to correct structural and geometric deficiencies in I-75 and I-96 at the foot of the Ambassador Bridge.

The CATEX document states that the ABEP would seamlessly interact with the Gateway Project transportation plan already underway in the Detroit River area. There is no information in the CATEX document that suggests whether the traffic volumes evaluated in the Gateway EA are the same or different than traffic volumes anticipated after implementation of this project. DIBC appears to rely on the Gateway EA conducted by FHWA and Michigan Department of Transportation (MDOT) to satisfy the NEPA requirements for the ABEP. The information presented in the CATEX document does not support that conclusion. If the Coast Guard intends to rely, in whole or in part, on the Gateway EA, in its NEPA decision making, then the analyses relied upon should be summarized and referenced appropriately.

Uncertainty Regarding Status of Existing Bridge and Ultimate Bridge Capacity - Section 1.4 of the CATEX document characterizes the proposed enhancement as a new 6-lane cable-stayed bridge in the same corridor as the existing Ambassador Bridge, consistent with the approved and ongoing Gateway project. As stated in the CATEX document, the ABEP would simply tie the existing plazas in both Canada and the U.S. together via a new 6-lane bridge. Submitted plans indicate that once the new structure is completed, the existing bridge will be taken out of service for repair. Once repairs are completed, the existing structure will be used to provide redundancy and backup support. The CATEX document does not explain what the process will be for evaluating the existing bridge. This is a topic of concern that should be addressed in the Coast Guard's NEPA documentation. More information is needed to describe the process by which the existing structure will be evaluated for needed repairs and the process used for determining when it will be brought back into service. Without this information, it is unclear if the project intent is to ultimately have 6 lanes of bridge capacity or 10 lanes at this location. The NEPA documentation should discuss any connected actions, including additional plaza or local roadway modifications, associated with 6 lanes or 10 lanes of bridge capacity.

Lack of Analysis Determining Consistency with Local Units of Government - The CATEX document does not describe efforts used by DIBC to assess support for the project from local units of government. Therefore, it is not clear if the proposed project is consistent or inconsistent with desired social, economic, and environmental conditions on either side of the border. The Canadian government is the early stages of conducting an environmental assessment of the project. At this stage in that environmental assessment process, it is not clear what the outcome of the Canadian process will be or if there are issues that could make the current ABEP proposal inconsistent with locally desired social, economic, or environmental conditions. We recommend that the Coast Guard coordinate with the Canadian Environmental Assessment Agency to determine how the NEPA process should consider the Canadian process. As you may know, the Council on Environmental Quality issued a memorandum on July 1, 1997, dealing with the topic of transboundary effects. In that memorandum, federal agencies were instructed to analyze the effects of proposed actions regardless of where those impacts might occur, including indirect effects (those caused by the action later in time or farther removed in distance), as well as cumulative effects. Coordination with the CEAA should assist the Coast Guard in determining these transboundary effects.

Environmental Concerns

Based on the CATEX document and the Coast Guard public notice, it appears that footprint impacts from constructing the bridge may be largely avoided, since there are no structures planned to be placed in the Detroit River, or in any wetlands or floodplains. However, operational impacts - those impacts associated with 6 to 10 lanes of traffic across the Detroit River - have not been completely assessed. Discussion of construction impacts and mitigation should also be included. A complete assessment of environmental impacts from the project should be done before a NEPA decision is made. The key environmental aspects that require additional analysis are listed below.

Air Quality - The CATEX document provides a discussion of trends within the Detroit and Windsor area along with some regional data for ozone precursors and carbon monoxide. There is no comparison of air emissions with and without the ABEP. There is no other assessment of air quality impacts due to the project. We would expect that the additional bridge capacity would contribute to an increase in vehicle miles traveled (VMT) and would therefore have an effect on air quality. The CATEX document only indicates that previous assessments of air quality in Canada along Huron Church Road showed a significant increase in fine particulate matter during periods of high congestion, but not volatile organic compounds, an important ozone precursor. The CATEX document also states that the ABEP should not increase congestion and not cause a decrease in air quality because it does not include any construction with the plazas and adjacent roadways. However, the CATEX document does not provide any analysis to support this statement. Air quality from operations on the bridge is related to the international crossing system as a whole. The Coast Guard's assessment of air quality should address this issue.

FHWA has indicated to the Coast Guard that the ABEP would be a regionally significant transportation project that should be in the Metropolitan Detroit Long Range Transportation Plan and undergo an air quality conformity analysis.

The project area already has serious air pollution problems. EPA has recently designated Southeast Michigan as a non-attainment area for the fine particulate standard, referred to here as particulate matter 2.5 microns or less (PM2.5). We are concerned that local controls may be necessary in order for this area to attain the National Ambient Air Quality Standard (NAAWS) for PM2.5. This issue should be thoroughly evaluated. Cost-effective mitigation strategies should be implemented wherever possible to minimize impacts. We are specifically concerned with the lack of information presented regarding particulate matter. Idling and moving diesel trucks in the area at plaza operations, on the bridge, and surrounding freeway system are a concern from a human health perspective. Hot spot analyses for fine particulate (PM2.5) and carbon monoxide (CO) should be done and included in the Coast Guard's NEPA documentation.

Stormwater – A description of options for dealing with stormwater is presented in the CATEX document, but no detailed information is provided. The CATEX document is not clear on how the existing Ambassador Bridge collects and treats stormwater. The addition of 6 lanes of bridge capacity will increase impervious surfaces. Proper collection and treatment of stormwater from that impervious area is an important environmental issue. Additionally, the CATEX document is not clear on what provisions have been made to deal with hazardous materials incidents that may occur on the bridge. More analysis should be included in the Coast Guard's NEPA documentation.

Noise – The CATEX document states that future traffic projections suggest that automobile traffic will increase by 40% and truck traffic will increase by 120% in the next 30 years, but concludes that the traffic volume increase is not due to the proposed ABEP and that noise levels will not substantially increase over the existing levels. There is no data included in the CATEX document to support this statement.

Endangered Species and Historic Resources – Although coordination with the U.S. Fish and Wildlife Service and Michigan State Historic Preservation Office has been initiated, there is no correspondence from those agencies regarding how they view the ABEP proposal. This information is critical and should be included in the Coast Guard's NEPA documentation.

Cumulative Effects - There is no assessment of cumulative effects made in the CATEX document. It is clear that the Ambassador Bridge Gateway project, the ABEP project, and other projects in the area related to maintaining and enhancing border crossing capacity (i.e., bridge capacity, plaza facilities, and connections to highway facilities) are part of an ongoing pattern of actions that have contributed to adverse effects on the human environment. The communities on both sides of the river have been affected by the system. Cumulative effects to air quality, water quality, noise levels, and other resources could be potentially significant. The ongoing pattern of border crossing activities in the project area in the past is well known. An assessment of the future system impacts, including those from possible connected projects such as relocating local roads, state trunk highways, plans for additional plazas and other activities, should be considered cumulative effects. Impacts from the whole system should be considered in the Coast Guard's NEPA documentation.

SEMCOG . . . *Local Governments Advancing Southeast Michigan*

Southeast Michigan Council of Governments • 535 Griswold Street, Suite 300 • Detroit, Michigan 48226-3602 • 313-961-4266 • Fax 313-961-4869
www.semcog.org

August 31, 2006

Rec'd
5 Sep 06

Robert W. Bloom, Jr.
Commander (dpw-3)
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, OH 44199

Dear Mr. Bloom:

SEMCOG has reviewed the U.S. Coast Guard public notice 09-03-06 regarding the application from the Detroit International Bridge Company's (DIBC) request for approval of location and plans for construction of a second (twin) fixed highway bridge over a navigable waterway of the United States adjacent to the existing Ambassador Bridge.

Our overall concern relates to the U.S. Coast Guard's determination that the proposed action is a categorical exclusion for purposes of the National Environmental Policy Act (NEPA), because it satisfies criteria for such actions listed in the Coast Guard's NEPA Implementing Instructions. This determination would allow for the proposed project to move forward without the normally required Environmental Assessment or an Environmental Impact Statement. It is our feeling that the Coast Guard came to its conclusion in part as a result of how the proposed project limits were defined. The proposed project is not as site specific as the Coast Guard reports. The entire scope of the project includes the portions of the bridge that go over the Detroit River, but also include the plazas and connecting roadways on both sides of the border.

A finding by the Coast Guard that the project should be considered a categorical exclusion without any analysis of the possible human and environmental impacts of the entire project would result in an incomplete analysis and potentially underestimate impacts of the project. As you know, the Ambassador Bridge is the busiest commercial crossing between Canada and the United States. It connects two densely populated urban areas and carries over 3 million trucks a year. Given these conditions, we believe that an additional structure has the potential for significant social, environmental, and transportation system impacts. These potential impacts can only be sufficiently analyzed through a public review process.

A specific conflict appears to exist with regard to U.S. EPA regulations 40 CFR part 93 which govern projects subject to regional conformity analysis for air quality. According to the regulations, projects determined to be regionally significant are subject to this analysis. In addition to the points made earlier in this letter, the regulations further define regionally significant projects to include those projects, which provide "access to and from an area outside of the region." Clearly, the DIBC's proposed project is regionally significant and subject to conformity analysis. Ultimately, this is to be determined by the Interagency Consultation

John F. Jones
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Robert Hison
Vice Chairperson
Mayor, City of St. Clair Shores

Paul E. Tait
Executive Director

process, which includes representation from MDOT, Federal Highway Administration, Federal Transit Administration, and the U.S. Environmental Protection Administration.

SEMCOG requests that the U.S. Coast Guard work with the other impacted federal agencies, including the Federal Highway Administration (FHWA) and the Environmental Protection Administration (EPA) and conduct an Environmental Assessment to assess the potential environmental impacts of the proposed action before determining if further analysis is required.

If you have any questions or require additional information, please contact me or Mr. Carmine Palombo, Director, Transportation Programs.

Sincerely,

Paul E. Tait

Paul E. Tait, CAE
Executive Director

PT:tj

Cc: James Steele, FHWA
Kirk Steudle, Director, MDOT
Sherri Kamke, USEPA
Senator Carl Levin
Senator Debbie Stabenow
Representative Carolyn Cheeks-Kilpatrick
Mayor Kwame M. Kilpatrick, City of Detroit

U.S. Department of Homeland Security

United States Coast Guard

Commander (obr)
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199-2060

Phone: (216) 902-6084
FAX: (216) 902-6088
e-mail: Rbloom@D9.USCG.mil

FACSIMILE

FROM: Bob Bloom

TO: Mr. David Coburn

SUBJ: Comment letters – Ambassador Bridge Public Notice

NUMBER OF PAGES (including cover) TWELVE (12)

COMMENTS:

David,
Yesterday, 5 September 2006, we received additional comment letters in response to our public notice advising of permit application to construct second bridge at Ambassador Bridge corridor.

Transmitted with this cover sheet are comment letters as follows:

1. SEMCOG letter, dated 31 August 2006 (two pages)
2. Clark Park Coalition letter, dated 28 August 2006 (five pages)
3. Canadian Environmental Assessment Agency letter, dated 30 August 3006 (two pages) (this letter is hard copy of what previously was received by FAX and provided to you)
4. United States Department of the Interior, Fish and Wildlife Service letter, dated 29 Aug 2006

I have not sent copies of the comment letters to Scott Korpi of American Consulting Engineers. I am assuming you are taking the lead on receipt of comment letters and will provide copies to Scott as may be necessary for any comments from him. We will maintain the public docket (comment letters) with our application file and give appropriate consideration to them when we at a later time perform our review to determine if a categorical exclusion for the project is appropriate. If you have any comments relative to the letters I am forwarding to you, please provide the comments to us and we will, as appropriate, coordinate with the various agencies.

We will continue to keep you apprised of our processing status.

Bob Bloom
6 September 2006

SEMCOG . . . *Local Governments Advancing Southeast Michigan*

Southeast Michigan Council of Governments • 535 Griswold Street, Suite 300 • Detroit, Michigan 48226-3602 • 313-961-4266 • Fax 313-961-4869
www.semcog.org

August 31, 2006

Robert W. Bloom, Jr.
Commander (dpw-3)
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, OH 44199

Dear Mr. Bloom:

SEMCOG has reviewed the U.S. Coast Guard public notice 09-03-06 regarding the application from the Detroit International Bridge Company's (DIBC) request for approval of location and plans for construction of a second (twin) fixed highway bridge over a navigable waterway of the United States adjacent to the existing Ambassador Bridge.

Our overall concern relates to the U.S. Coast Guard's determination that the proposed action is a categorical exclusion for purposes of the National Environmental Policy Act (NEPA), because it satisfies criteria for such actions listed in the Coast Guard's NEPA Implementing Instructions. This determination would allow for the proposed project to move forward without the normally required Environmental Assessment or an Environmental Impact Statement. It is our feeling that the Coast Guard came to its conclusion in part as a result of how the proposed project limits were defined. The proposed project is not as site specific as the Coast Guard reports. The entire scope of the project includes the portions of the bridge that go over the Detroit River, but also include the plazas and connecting roadways on both sides of the border.

A finding by the Coast Guard that the project should be considered a categorical exclusion without any analysis of the possible human and environmental impacts of the entire project would result in an incomplete analysis and potentially underestimate impacts of the project. As you know, the Ambassador Bridge is the busiest commercial crossing between Canada and the United States. It connects two densely populated urban areas and carries over 3 million trucks a year. Given these conditions, we believe that an additional structure has the potential for significant social, environmental, and transportation system impacts. These potential impacts can only be sufficiently analyzed through a public review process.

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Paul E. Tait
Executive Director

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SEMCOG requests that the U.S. Coast Guard work with the other impacted federal agencies, including the Federal Highway Administration (FHWA) and the Environmental Protection Administration (EPA) and conduct an Environmental Assessment to assess the potential environmental impacts of the proposed action before determining if further analysis is required.

If you have any questions or require additional information, please contact me or Mr. Carmine Palombo, Director, Transportation Programs.

Sincerely,

Paul E. Tait

Paul E. Tait, CAE
Executive Director

PT:tj

Cc: James Steele, FHWA
Kirk Steudle, Director, MDOT
Sherri Kamke, USEPA
Senator Carl Levin
Senator Debbie Stabenow
Representative Carolyn Cheeks-Kilpatrick
Mayor Kwame M. Kilpatrick, City of Detroit

Clark Park Coalition

1130 Clark Street, Detroit, Michigan 48209

August 28, 2006

Office of Commander (dpw-3)
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199-2060

RE: Public Notice 09-03-06 Dated July 28, 2006 Construction of a second (twin) fixed Highway bridge adjacent to, and immediately south of, the existing Ambassador Bridge

Dear Commander (dpw-3),

I am writing on behalf of the Clark Park Coalition regarding the referenced Public Notice above pertaining to an application for approval of location and plans for construction of a second (twin) fixed highway bridge over a navigable waterway of the United States adjacent to the existing Ambassador Bridge and submitted by the agent of the Detroit International Bridge Company (DIBC).

The Clark Park Coalition requests that the Coast Guard fully evaluate the environmental impacts, short and long term of the local host communities and regional areas regarding the complexities and impacts of this application for approval.

For myriad of serious reasons that exist within our Southwest Detroit community, the Coalition believes that the National Environmental Policy Act (NEPA), the Federal Highway Administration (FHWA) and the Michigan Department of Transportation (MDOT) needs to have a comprehensive environmental review regarding the DIBC Application for Approval. It would seem imperative that DIBC would be required to conduct a full Environmental Impact Statement (EIS) and has provided the Coast Guard with no justification for the preliminary finding that the project will qualify for a categorical exclusion for the NEPA's requirement that an environmental analysis be performed. As you are aware, the Detroit River International Crossing (DRIC) Study has been well underway to study the most appropriate location for another border crossing including all of the international governmental agencies involvement including the Southwest Detroit community. The DRIC study and it's process has been conducted quite thoroughly thus far and allowing the community to be fully engaged.

Unfortunately, the DIBC does not operate in this type of open public process and now all of a sudden since the DRIC study did not prefer the DIBC's "twinning" of their bridge proposal, DIBC has now decided to make the case that their existing bridge is obsolete and a "replacement" bridge must built. DIBC has repeatedly published full page color advertising in our city newspapers regarding their plans to build new expanded toll booth

plaza and yet within their application permit to MDEQ regarding their "bridge enhancement / bridge replacement" they state something quite to the contrary "no plaza expansion needed". Such conflicting messages to the public, to the State of Michigan, to the City, to our border country, to our federal government agencies and to the surrounding community.

The Clark Park Coalition believes the bullet points below are additional concerns that the Coast Guard must take into serious consideration:

Comprehensive environmental review

- The proposed DICB Project would in fact impact minority and low income populations that happen to be located in the geographical area of Southwest Detroit where this

- There is an on-going bi-national process that has been studying the need for additional border infrastructure capacity. That study, called the Detroit River International Crossing Study, considered the addition of a second span to the Ambassador Bridge crossing and rejected it because of the impacts on the Canadian side of the project. Nevertheless, DIBC is free to pursue construction of a second span outside of this process. However, all state and federal agencies responsible for issuing permits should agree to a moratorium on issuing all new permits related to new or expanded border crossings along the Detroit River until the DRIC study is complete. The impacts of new border crossings should not be studied independently of each other, given their close proximity.

- Given the concentration of transportation uses and proposed transportation projects in Southwest Detroit, a comprehensive transportation study is needed to truly understand the impacts of any transportation project in Southwest Detroit. No permits should be approved until that study is undertaken and completed.

- Six-lane bridge is an expansion of capacity which should have full environmental impact review, even if the existing bridge is never put back into service.

- Should the original bridge be repaired after the new bridge constructed, this project represents an *unprecedented* expansion of border capacity at the Detroit-Windsor border—and one that was rejected in the bi-national study conducted to address border capacity at the Detroit-Windsor border.

- The public deserves to be afforded the greatest protections when it comes to the quality of their community, their health and the environment. Unbridled expansion of private transportation infrastructure represents an environmental justice issue. How will community concerns like economic development, air quality, etc be addressed by this project?

- There should be an air quality analysis conducted, particularly since the expansion of the bridge will likely lead to increased truck traffic.

- Some analysis of health impacts must be undertaken. This is particularly true given the importance being placed on protecting the natural environmental. The health of humans is just as important as the health of wildlife and plant life.

Project specifications

Must independently confirm that a new bridge is needed

- Before approving this permit, the Coast Guard should require an independent analysis of the condition of the original bridge. The permit application is premised on the notion that the existing bridge is unsafe and must be repaired or shut down. Before the environment is disturbed by construction of a new crossing, we should have an independent analysis of the condition of the existing bridge.

- In addition, the claim that the existing bridge would not be put into service without "all necessary approvals" should be substantiated with a listing of the required approvals.

- While the DIBC portrays the purpose of the Gateway project as being to build a second span for the Ambassador Bridge, the actual purpose of the Gateway project is to directly tie the bridge into the freeway system in order to improve transportation movements from the bridge to the freeway system and to take truck traffic off of local roads. The Gateway project was *designed* to accommodate a second span if one were built sometime in the future, not to enable a second span to be built. The Environmental Assessment for the Gateway project did not study the impacts to the Detroit River, the environment, or the community of a second span. It studied the impacts related to the ramps and other infrastructure needed to connect the plaza to the freeway system, with or without expanded border capacity at that location.

Must evaluate whether an expanded plaza will be required

- While DIBC says that no increase in plaza size is necessary, they have provided no evidence that their current facility or even the slightly expanded facility created through the Gateway project will be able to accommodate future truck traffic should a new 6-lane bridge be built or the existing bridge rehabilitated and both bridges functioning. An expanded plaza would severely impact the growing residential community and commercial area that has already seen encroachment by the bridge compound.

- DIBC has publicly touted its proposal for a new plaza facility going south of the existing plaza toward the river. This proposal has been made to Detroit City Council, the City of Detroit Mayor's office, various meetings at the DIBC offices, and to MDOT. MDOT is currently beginning the process of studying the relocation of Fort Street as it relates to this proposal. The permit to build a second span cannot be issued without an environmental review of this proposal. The environmental consequences

of having a truck facility so close to the Detroit River must be studied to ensure that run-off and other contaminants does not pollute the environment.

Must protect the river and community from hazardous materials spills

- In addition, the permit does not speak to the treatment of hazardous materials on the new bridge. Given the existing bridge lacks the capacity to safely handle any hazardous material spills, the new bridge must have protections and safeguards to protect the Detroit River and the surrounding community from hazardous spills that might occur on the bridge. Recent media reports have revealed that DIBC engages in "lane-flushing," the practice of allowing trucks through without inspection, and have even allowed trucks known to be carrying hazardous materials, which are prohibited by federal statute from crossing the bridge, to cross. There must be a thorough understanding of the protections that will be put in place to ensure that hazardous materials re not a threat to the environment or community.

More information needed

- In fact the information provided in the permit application is minimal in terms of design, construction, and operation. More detailed information regarding site plans, construction phasing, construction methods, homeland security safeguards and other safety features must be provided before a permit can be issued.

Should be designed with true community input

- There has been limited community involvement in the design of this new bridge.

- The bridge should be designed to be a signature structure for the city, a symbol for the area.

- There should be consideration of the West Riverfront Conservancy plans to bring public access to the riverfront.

Bridge oversight and long-term community impact

- There should be open discussion and debate regarding the most appropriate governance structure for the next border crossing. While the DIBC proposes to build a new span, there should be public oversight over the crossing given the long-term implications of this expanded infrastructure. The community has no venue for having their complaints heard and a new bridge will only exacerbate this problem.

- Should an additional border crossing be pursued for construction anywhere along the Detroit River, there must be a Community Benefits Agreement between members of the host community and the project sponsors.

Thank you your completely thorough and comprehensive review the this complex issue and the request of approval of the application before you from DIBC. The Coalition has request that the Coast Guard "deny" approval of constructing a twin structure in our

international waterway. The DIBC twin border crossing at their proposed location in our Detroit River way is redundant, a homeland security issue, an environmental justice issue for the residential, small business and tourist host community including an extreme burden on our low income, minority community.

Sincerely,

Deb Sumner

Deb Sumner
President (313 522-6120)

Canadian Environmental Assessment Agency
55 St-Clair Avenue East
9th Floor, Room 907
Toronto, Ontario
M4T 1M2

Agence canadienne d'évaluation environnementale
55 Avenue St-Clair Est
9ième étage, pièce 907
Toronto, Ontario
M4T 1M2

August 30, 2006

Robert W. Bloom, Jr.
Bridge Program Manager
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199

Dear Mr. Bloom:

In March of this year, the Canadian Environmental Assessment Agency (Agency) received a revised project description for the proposed Ambassador Bridge Enhancement Project. Upon our receipt of this project information, a letter was sent to a number of federal departments and agencies in Canada to identify potential environmental assessment requirements under the *Canadian Environmental Assessment Act.*

In Canada, the *Canadian Environmental Assessment Act* applies to federal authorities when they contemplate some action in relation to a project that would enable it to proceed in whole or in part. A federal environmental assessment is required when a federal authority:

(a) is the proponent of a project;
(b) provides financial assistance to the proponent;
(c) makes federal lands available for the project; or
(d) issues certain permits or licences, or other approvals.

For the proposed Ambassador Bridge Enhancement Project, Transport Canada has determined that it requires an environmental assessment because the project requires a permit under the *Navigable Waters Protection Act.* The Windsor Port Authority has also identified a need for an environmental assessment of the project as it would involve crossing over federal water lots in Windsor, Ontario. Environment Canada, Health Canada, Fisheries and Oceans Canada, and Foreign Affairs Canada are participating in this environmental assessment process as federal authorities with expert advice to contribute to the conduct of the environmental assessment.

The *Canadian Environmental Assessment Act* also requires that for every project where a federal environmental assessment is required, a federal environmental assessment coordinator (FEAC) is assigned. Currently, the Agency has assumed the role of the FEAC for this project, as we are of the understanding that the *National Environmental Policy Act* may apply, and therefore this project may be subject to the environmental assessment requirements of another jurisdiction.

In accordance with the requirements of the *Canadian Environmental Assessment Act,* Transport Canada and the Windsor Port Authority have posted a Notice of Commencement on the Canadian Environmental Assessment Registry. This notice provides a preliminary scope of the project to be assessed, and for your reference, can be found at the following link:

http://www.ceaa.gc.ca/050/Viewer_e.cfm?SrchPg+1&CEAR_ID=21100

Should it be determined that this project also requires an environmental assessment in the United States, I am interested in discussing with you our process and any opportunities that may exist for environmental assessment coordination.

With respect to Transport Canada's administration of the *Navigable Waters Protection Act,* I anticipate that you may receive further correspondence from Transport Canada directly that provides you with additional details on this permit requirement.

If you have any questions or would like to discuss further, please do not hesitate to contact me at (416) 952-6063.

Yours sincerely,

Cathy Hainsworth, Senior Program Officer, Canadian Environmental Assessment Agency, Ontario Region

c.c.:

Kaarina Stiff, TC
David Cree, WPA
Shawn Morton, FAC
Sherry Kamke, USEPA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
East Lansing Field Office (ES)
2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823-6316

IN REPLY REFER TO:

Rec'd
05 Sep06

August 29, 2006

Mr. Robert W. Bloom, Jr., Bridge Program Manager
Office of the Commander (dpw-3)
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199

Re: Public Notice No. 09-03-06, applicant Detroit International Bridge Company

Dear Mr. Bloom:

We have reviewed the Public Notice for the above referenced file, concerning an application for a permit, pursuant to section 9 of the Rivers and Harbors Act of 1899. We submit these comments under the authority of the Endangered Species Act of 1973, as amended (Act).

According to the Public Notice, the applicant proposes to construct a second fixed highway bridge adjacent to the existing Ambassador Bridge. The proposed project would occur over Detroit River, Mile 19.5, Detroit, Wayne County, Michigan.

Endangered Species Act Comments

In accordance with section 7 of the Act, we are notifying you that the northern riffleshell mussel (*Epioblasma torulosa rangiana*), a federally listed endangered species, may occur in the vicinity of the proposed project location. The northern riffleshell historically occurred in Detroit River, but the mussel communities in the river have experienced severe declines over the past 20+ years, due mainly to the introduction of the zebra mussel (*Dreissena polymorpha*). The northern riffleshell has not been found alive in Detroit River since 1988; however, the Michigan Natural Features Inventory discovered several fresh dead valves of the northern riffleshell in the river in the summer of 2005. The status of the northern riffleshell in Detroit River is unclear; however, this new evidence indicates the potential for its continuing presence in the river.

Pursuant to section 7 of the Act you must determine whether authorization of the proposed work may affect federally listed species. If you determine that authorization of the proposed work may affect but would not likely adversely affect listed species, you must seek written concurrence from us. If you determine that authorization of the proposed work would adversely affect a listed species, you must initiate formal consultation. Biologists from this office are available to assist you in determining potential effects of the proposed work on listed species.

The northern riffleshell also receives protection by the Michigan Department of Natural Resources through Part 365, Endangered Species Protection, of the Natural Resources and Environmental Protection Act. We suggest you contact Ms. Lori Sargent at 517/373-1263 if you have questions concerning the protection of threatened and endangered species under State law.

We appreciate the opportunity to provide our resource protection recommendations. For further discussion, please contact Barbara Hosler of this office at 517/351-6326 or the above address.

Sincerely,

Craig A. Czarnecki
Field Supervisor

cc: MDNR, Wildlife Division, Lansing, MI (Attn: Lori Sargent)

s:admin/archives/aug06/ambassadorbridge_USCGPN.blh.doc

SIERRA CLUB
FOUNDED 1892

Robert W. Bloom Jr.
U.S. Department of Homeland Security
U.S. Coast Guard
9th Coast Guard District
Cleveland, Ohio 44199-2060

September 13, 2006

Dear Mr. Bloom:

Thank you for the opportunity to comment on the Detroit International Bridge Company's ("DIBC") permit application to build a second span of the Ambassador Bridge ("Bridge"). The Sierra Club is a nation-wide grassroots environmental organization dedicated to protecting our communities. The Sierra Club and its members in the Detroit metropolitan area are concerned about the environmental impacts of a second span of the Ambassador Bridge. These concerns are discussed below and are supported by applicable law or findings where necessary. We believe that this project has potentially significant environmental impacts rendering it ineligible for a categorical exclusion from the requirements of the National Environmental Policy Act ("NEPA"). Due to the fact that this project would have potentially significant impacts, the United States Coast Guard should conduct an environmental assessment to determine the extent of those impacts and should move forward as required by law in addressing those impacts through mitigation or further environmental impact review.

The proposed "Ambassador Bridge Enhancement Project" involves a second bridge span between Detroit, MI and Windsor, Ontario, adding six lanes to the existing four. In their "Preliminary Review Permit Application" the project proponent, DIBC has concluded that there will be no potentially significant environmental impacts resulting from this new bridge and that the project is thus qualified for a Categorical Exclusion ("CatEx") exempting it from environmental review. This conclusion is incorrect and without merit. The permit application is filled with conclusory terms and lacks sufficient analysis or detail to support a finding of no impact.

In filling out the "CatEx Checklist," DIBC answered "NO" to every question asking whether this project would have an adverse environmental impact.[1] Several of these answers are misleading and false and do not give appropriate consideration of the project impacts. DIBC's

[1] Coast Guard CatEx Checklist. Exhibit A.

answers should be discarded upon further review. Below is an accurate and more comprehensive answer to the checklist questions suggesting that the correct answer to many of them is actually "YES" and at the very least, more data is needed to make a reasoned decision. Further review suggests that there are potentially significant environmental impacts that would result from this project and that a CatEx is not applicable.

a. **Checklist Question A:** ***Is the action likely to be inconsistent with any applicable Federal, State, Indian tribal, or local law, regulation or standard designed to protect any aspect of the environment?***

The Coast Guard should not rely on DIBC's promise that this project will not have any air quality impacts or increased traffic volumes. As we discuss in great detail below under Question D, there are potentially significant air quality impacts that will result from this project as well as increased traffic volume. Given our response to Question D below, it seems appropriate that more information and analysis will be necessary to determine whether further compliance with Federal, State, Indian tribal or local law, regulations or standards will be required. In particular, a local "Hot-Spot" analysis might be required as well as compliance with Federal and State air quality regulations and a conformity determination by the South East Michigan Council of Governments ("SEMCOG").

When considering the relevant environmental standards, the Coast Guard should also consider the standards set by the Environmental Protection Agency for $PM_{2.5}$ non-attainment areas. We have pointed out below that the Detroit area has been designated as a non-attainment area for the national standards for fine particulates. When an area is designated in non-attainment, certain transportation projects must undergo a review for localized impact for $PM_{2.5}$ also known as a "HotSpot" analysis.[2] This standard was developed by the Environmental Protection Agency to ensure that areas that have failed to attain national standards are reviewing projects that may exacerbate the negative impact of that pollutant on air quality and human health. This standard should not be ignored as the Coast Guard reviews the application for a permit for the expansion of the Ambassador Bridge. Due to the 150% increase in the size of the existing Bridge and the correlation between traffic and $PM_{2.5}$, the Coast Guard must consider the potential impact of $PM_{2.5}$ emissions from the project, their effects on nearby communities, and their impact on the ability of the region to attain the $PM_{2.5}$ NAAQS. The federal $_{2.5}$ hotspot analysis is a relevant standard to apply.

b. **Checklist Question B:** ***Is the action likely to have results that are inconsistent with locally desired social, economic, or other environmental conditions?***

The Coast Guard needs more data before accepting DIBC's answer of "NO" to this question. The purposes of NEPA are to ensure that environmental information is available to the public before decisions are made and before action is taken. This information is expected to be accurate and of high quality. Public scrutiny is seen as essential to meeting the goals of NEPA.[3] Up until this point, the public has not been given an opportunity to comment on this project. DIBC has not conducted outreach to local organizations in determining what desired social,

[2] 71 Fed. Reg 12467.
[3] 40 C.F.R. § 1500.1.

economic or other environmental conditions actually are. An answer of "NO" without this outreach or public participation frustrates the purpose of NEPA in requiring public scrutiny. Without more information, the Coast Guard cannot accept that this action is unlikely to be inconsistent with the desired environmental conditions in this community.

Public participation was addressed in a response to a letter written by James Steele, Division Administrator for the Federal Highway Administration, Michigan Division. Mr. Steele noted that there was no evidence in the documentation supporting a categorical conclusion about public involvement or coordination with local officials. Scott Korpi, the Project Manager and consultant for the twinning project responded to this criticism. He disagreed, stating, "numerous public meetings were held during the preparation, completion and approval of the Gateway Project and clearly that project anticipated the construction of a second span across the river..." Public meetings held ten years ago are not sufficient to satisfy the need for public involvement on *this* project. While a second span of the Bridge was *anticipated* in the 1997 Environmental Assessment done for the Gateway Project, it was not the focus of the project nor part of the environmental analysis. The reference to the second span and the possibility of its realization was so uncertain that the public was not given the opportunity to make meaningful comment on its impact on the desired social, economic, or environmental conditions. The information given to the public in 1997 with regard to a second bridge was not sufficiently detailed, accurate, or based on expert analysis in a way that would comply with the purposes of NEPA as described above.

Mr. Korpi's response does not take into consideration the possibility of changed conditions in the last decade. In ten years, the social, economic and environmental conditions may have changed such that these considerations must be revisited. For example, as discussed below, the regulatory regime for air quality impacts is significantly different now than it was ten years ago. Transportation studies have been published giving us more information regarding the impact of road construction on the human environment. These new environmental considerations, along with changes to local social and economic conditions must be analyzed as part of the decision to grant a CatEx. They are entirely absent from the submitted environmental documentation for the Ambassador Bridge Enhancement Project such that an answer of "NO" to checklist question B is inappropriate without further outreach and analysis.

In addition to investigating the locally desired social, economic, or other environmental conditions, it is important for the Coast Guard to take into consideration their legal mandate to give consideration to the issues of environmental justice. The Coast Guard, as a federal agency, shall make achieving environmental justice part of its mission by identifying and addressing "disproportionately high and adverse human health or environmental effects" on low-income or minority populations resulting from its programs and activities.[4] The area of southwest Detroit is already burdened by the adverse environmental impacts of the existing Ambassador Bridge and the infrastructure that surrounds it and this project may exacerbate an existing problem. In addition to the air pollution attributable to the traffic corridor, Wayne County is one of the dirtiest counties in the Country.[5] The list of existing sources of pollution is long and includes oil, automobile, steel, wastewater and power industries to name a few. Southwest Detroit is made up

[4] Exec. Order No.12,898, 59 Fed. Reg. 7629 (Feb. 11, 1994).
[5] www.scorecard.org.

of African American, Hispanic and low-income neighborhoods. This area is deserving of special attention as the Coast Guard considers this permit and the burdensome environmental impacts a new bridge will produce on top of a long legacy of environmental devastation.

c. Checklist Question D: *Is the action likely to adversely affect a significant aspect of the natural environment?*

The answer to this question is a resounding "YES." Specifically, the Sierra Club is extremely concerned with the potentially adverse impacts on air quality that will result from the twinning of the Ambassador Bridge. The discussion of air quality impacts in the permit application is incomplete and entirely insufficient to provide the foundation for the "NO" answer provided on the application checklist. The science on this subject is replete with conclusions regarding the adverse effect of car and truck emissions on human health. In light of this science, the Coast Guard should conduct further review into the potential air quality impacts of six added lanes to the existing traffic corridor, a 150% increase in the roadway capacity of the existing Ambassador Bridge

The connection between air pollution from traffic and human health is undeniable. The environmental impact of highways has been a source of concern since the 1960s and was even cited as a major factor behind the enactment of NEPA.[6] Air pollution from transportation sources includes a toxic mixture of particulate matter measuring 2.5 microns in diameter ($PM_{2.5}$), carbon monoxide, nitrogen oxides (NOx), volatile organic compounds (VOCs), and mobile source air toxics including diesel particulate matter. $PM_{2.5}$ is often linked to increased mortality, hospitalization for respiratory problems, decreased lung function, and increased respiratory symptoms[7] as well as cardiovascular and pulmonary causes of death.[8] Exposure to this toxic mixture from exposure to vehicular traffic in urban areas may increase the risk of a heart attack in susceptible persons.[9] Fine particulates are more likely to be mixtures of chemicals and metals that result from combustion sources (such as gasoline or diesel engines) and can penetrate deeper into lung tissue and even enter the blood stream. $PM_{2.5}$ and mobile source air toxics are the subject of a growing body of scientific evidence linking these pollutants to substantial adverse human health impacts.

The impact of mobile source air pollution on children is particularly acute. Some studies have shown a correlation between asthma and attending school near major roadways. A study in California's East Bay was designed to determine the relationship of the proximity of middle schools to freeways and adverse health effects.[10] The study found that the closer the schools were to the freeways, the higher the concentrations of $PM_{2.5}$ and diesel exhaust. Also higher,

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[6] Bob Yuhnke, *NEPA's Uncertainty Principle in the Federal Legal Scheme Controlling Air Pollution From Motor Vehicles*, 35 E.L.R 10273 (2005).

[7] N. Kunzli, et al, *Ambient Air Pollution and Atherosclerosis in Los Angeles, National Institute of Environmental Health Sciences* (Nov 2004). Exhibit B.

[8] Michael Jerrett, et. al., *Spatial analysis of Air Pollution and Mortality in Los Angeles*, Epidemiology, Vol. 16 No. 6 (Nov. 2005). Exhibit C.

[9] Annete Peters, et. al, *Exposure to Traffic and the Onset of Myocardial Infarction*, N. Engl. J. Med Vol 351 No. 17 (Oct. 21, 2004). Exhibit D.

[10] Janice J. Kim et al., *Traffic-Related Air Pollution Near Busy Roads: The East Bay Children's Respiratory Health Study*, 170 Am. J. Respiratory & Critical Care Med. 520 (2004). Exhibit E.

was the prevalence of asthma and bronchitis among students at the schools most affected by motor vehicle emissions.[11] Another study followed school children in 12 California communities, finding large deficits in lung function among those students living in communities with high pollutant concentrations.[12] Reductions in lung function and other health complications connected to exposure to air pollution were expected to impact those children for the remainder of their lifetimes. Yet another important study found that preliminary data suggested that concentrations of pollutants primarily generated by motor vehicle fuel combustion were higher in areas of close proximity to roadways with higher vehicle density.[13]

The U.S. Environmental Protection Agency ("EPA") recognizes that air pollution levels near major roadways are significantly higher than at locations farther away:

> Urban-scale assessments done in Houston, TX and Portland, OR illustrated steep gradients of air toxic concentrations along major roadways, as well as better agreement with monitor data. Results of the Portland study show average concentrations of motor vehicle-related pollutants are ten times higher at 50 meters from a road than they are at greater than 400 meters a road. These findings are consistent with pollutant dispersion theory, which predicts that pollutants emitted along roadways will show highest concentrations nearest a road, and concentrations exponentially decrease with increasing distance downwind. These near-road pollutant gradients have been confirmed by measurements of both criteria pollutants and air toxics, and they are discussed in detail in Chapter 3 of the RIA.[17]

Studies show that these elevated levels of ambient air pollution near major roadways result in a commensurate increase in indoor air pollution near roadways. Citing a leading study that assessed children's exposure to traffic-related air pollution while attending schools near roadways, the EPA notes:

> Overall results indicate that indoor pollutant concentrations are significantly correlated with traffic density and composition, percentage of time downwind, and distance from major roadways.[18]

The American Academy of Pediatrics has warned that children and infants are among the most susceptible to the harmful effect of air pollution.[19] The AAP notes:

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[11] See also W. James Gauderman et. al., Childhood Asthma and Exposure to Traffic and Nitrogen Dioxide, Epidemiology, Vol. 16 No.6 (Nov 2005) (examining the association between traffic-related pollution and childhood asthma) Exhibit F.

[12] J.W. Gauderman et al., *The Effect of Air Pollution on Lung Development From 10-18 Years of Age*, 351 New Eng. J. Med. 1057 (2004). Exhibit G.

[13] Northeast States for Coordinated Air Use Management, Indoor/Outdoor School Air Monitoring Pilot Project. (Sept. 13, 2002). Exhibit H.

[17] 71 Fed. Reg. 15804 (citations omitted).

[18] 71 Fed. Reg. 15804 (citations omitted).

[19] American Academy of Pediatrics (AAP), *Ambient Air Pollution: Health Hazards to Children. Committee on Environmental Health,*Pediatrics Vol. 114 Pp 1699-1707 (2004). Exhibit I.

> In addition to associations between air pollution and respiratory symptoms, asthma exacerbations, and asthma hospitalizations, recent studies have found links between air pollution and preterm birth, infant mortality, deficits in lung growth, and possibly, development of asthma.[20]

The AAP reports that these harmful health effects result in large part, from motor vehicle pollution:

> Motor vehicles represent the principal source of air pollution in many communities, and concentrations of traffic pollutants are greater near major roads.[21]

Air quality impacts on children's respiratory health are often compounded when these pollutants are present in high concentrations on playgrounds and athletic fields, where children are at even higher risk during physical activity.[22]

The connection between adverse health impacts in children and mobile source air pollution is especially relevant to the Ambassador Bridge Enhancement Project. The Border Transportation Partnership, a group proposing another bridge across the Detroit River, has published a map locating all of the schools in southwest Detroit.[23] This map shows half a dozen schools located at the foot of the existing Ambassador Bridge. These schools range from elementary through high schools, with the presence of children from the ages of roughly 5 through 18 who will be exposed to ambient concentrations of these harmful pollutants from increased traffic resulting from the new span of the Ambassador Bridge. This is in addition to the many children who may be living nearby who would be subject to these impacts in their neighborhood.

In addition to the risks to children and developing respiratory function, serious cancer risk is attributed to mobile source air pollution. A 2000 study done in the Los Angeles air basin measured exposures to 30 toxic air pollutants a 22 locations in the basin.[24] This study, known as MATES II, found that 90% of cancer risk attributed to air pollutants came from mobile sources. Logically, this risk was more pronounced near freeways and other locations dominated by mobile sources.[25] [26]

Detroit already has its fair share of air quality problems. The Detroit area is currently a non-attainment area for the National 8-hour ozone standards, as well as for National standards

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[20] AAP, *Ambient Air Pollution: Health Hazards to Children. Committee on Environmental Health,* Pediatrics Vol. 114 Pp 1699-1707 (2004).

[21] AAP, *Ambient Air Pollution: Health Hazards to Children. Committee on Environmental Health,* Pediatrics Vol. 114 Pp 1699-1707 (2004).

[22] Kenneth W. Rundell, et. al., *Vehicular Air Pollution, Playgrounds, and Youth Athletic Fields,* Inhalation Toxicology, Vol. 18 Page 541-547 (2006). Exhibit J.

[23] See Central Area Alternatives Map. Exhibit K. *Also available at* www.partnershipborderstudy.com.

[24] South Coast Air Quality Management District, *Multiple Air Toxics Exposure Study-II* (March 2000), *available at* http://www.aqmd.gov/matesiidf/matestoc.htm.

[25] See also Amir Sapkota and Timothy J. Buckly, *The Mobile Source Effect on Curbside 1,3-Butadiene, Benzene, and Particle-Bound Polycyclic Aromatic Hydrocarbons Assessed at a Tollbooth,* Journal of the Air & Waste Management Association, Vol. 53 (June 2003) (examining traffic counts and vehicle class combined with curbside concentrations of environmental carcinogens). Exhibit L.

[26] See Also, AAP(2004) noting the cancer risk resulting from diesel exhaust.

for $PM_{2.5}$, two criteria pollutants that carry serious human health concerns.[27] In addition to air quality problems, the city has identified capacity problems associated with the projected increases in vehicle and truck traffic over the next 30 years. Health related air quality impacts must be considered within this context. An additional six lane bridge, coupled with the necessary infrastructure to manage the increased vehicle capacity will lead to increased mobile source air pollution in southwest Detroit.

DIBC asserts that an increase in traffic is not anticipated as a result of the construction of additional lanes across the river. However, there is evidence to the contrary, suggesting that increased lane miles actually does result in an overall increase in traffic, and therefore, an increase in mobile source pollution.[28] NEPA analysis is required to ascertain how the proposed project would effect traffic levels. Rather than summarily concluding that a 150% increase in capacity will not result in an increase in traffic, the agency must perform appropriate modeling to quantify anticipated traffic levels. This modeling must account for the phenomenon of induced travel.[29]

The air quality and resulting health impacts of this bridge cannot be ignored. Increased lane miles lead to increased traffic. Increased traffic will lead to increases in mobile source air pollution including $PM_{2.5}$ and other air toxics which have been repeatedly linked to reduced lung function in developing children, heart attacks in susceptible populations, certain cancers as well as lasting health impacts from this exposure. The consensus among the environmental health professionals about the seriousness of this problem suggests that a six lane increase to a Bridge that has several schools positioned near its base is a project that has potentially significant, potentially life threatening impacts on human health and should be analyzed for those impacts.

Air pollution may not be the only environmental concern stemming from this project. It appears that the Michigan Department of Natural Resources ("MDNR") has identified state and federally endangered mollusk species. Before DIBC can move forward, they must obtain a "no effect" statement from the MDNR. The Coast Guard should be aware of the potential impacts that might include the direct destruction of species and disturbance of critical habitat for the endangered species identified by MDNR.

The new span of the Ambassador Bridge has the potential to have a negative impact on parklands that are adjacent to the Bridge and plaza areas. Section 4(f) of the Department of Transportation Act requires that programs or projects shall not be approved if they require use or harm to publicly owned land from a park, recreation area, wildlife and waterfowl refuge or any area of national, state, or local significance unless no prudent alternative exists. While the plans for the new span of the Bridge indicate that no such land will be used, it is important for the Coast Guard to investigate this claim and assure that the project, both the Bridge and any plazas or roadways built to accommodate the Bridge, will not use adjacent parklands in a way that would violate the requirements of 4(f).

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[27] 69 Fed. Reg 56697 (Marginal non-attainment for 8-hour ozone); 70 Fed. Reg. 943 (non-attainment for $PM_{2.5}$)
[28] Robert B. Noland and Lewison L. Lem, *A Review of the Evidence for Induced Travel and Changes in Transportation and Environmental Policy in the US and the UK,* Transportation Part D, 7 (2002). Exhibit M.
[29] See Id.

d. Checklist Question F: ***Is the action likely to generate controversy on environmental grounds?***

Yes, this project has already generated controversy on environmental grounds. An article written in the Metro Times titled "The battle of the bridge: Distrust of Moroun has Delray residents rallying behind a public span" is a good indicator of more controversy to come.[30] There is no doubt that adverse environmental consequences will be associated with increased truck traffic in southwest Detroit. Residents are also concerned with the decision making process. The Ambassador Bridge project is a private project, funded entirely by the project proponent, DIBC and its affiliates. Members of the public are concerned that a closed door, private project will lack the transparency involved with public projects and environmental review.

In addition to gathering information regarding public sentiment on the bridge enhancement project, it would be prudent for the Coast Guard to hold a public hearing regarding the permit application to better gauge public concerns in making a final determination regarding controversy on environmental grounds.

e. Checklist Question I: ***Is the action part of an ongoing pattern of actions (whether under the control of GSA or others) that are cumulatively likely to have adverse effects on the human environment?***

The twin span of the Ambassador Bridge is being described as entirely separate and apart from any other ongoing projects. This is not an accurate portrayal of other projects in the area and the Coast Guard should consider the environmental impacts of this bridge in connection with other projects in the area, that cumulatively, are likely to have a significant impact on the environment.

The second span of the Detroit Bridge will touch down in Detroit in the area that is the subject of the Gateway Project. The Gateway Project is a series of improvements to the ingress and egress systems at the foot of the existing bridge as well as improved toll and customs areas. This project was the subject of an environmental assessment done in January, 1997. The permit application repeatedly asserts that the "Ambassador Bridge Enhancement Project" consists *only* of an additional six lane bridge span. DIBC asserts that this project "is not a part of the ongoing "Gateway Project," however, four paragraphs later, DIBC notes that the bridge enhancement project would "seamlessly interact with the Gateway Project."

It is clear that these two projects, while analyzed separately by the project proponent, may have significant cumulative impacts on the air quality in the region.[31] NEPA requires that when several proposals for action will have cumulative or synergistic environmental impact,

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[30] Ben Lefebvre, "*The battle of the bridge: Distrust of Moroun has Delray residents rallying behind a public span*," Metro Times (May 24, 2006).

[31] Certain improvements to the transportation infrastructure on the Canadian side are also proposed. While these are not necessarily within the Coast Guard's permitting authority, the possibility that changes to traffic flow in Canada might increase overall traffic coming over the added lanes to the Ambassador Bridge should be considered by the Coast Guard as part of the overall, or cumulative impacts this project would have.

their environmental consequences must be considered together.[32] As discussed above, the air quality impacts of this project have not been analyzed to the extent necessary to make a determination that there is no impact and, in fact, studies on the issue suggest that air quality impacts will be significant. The finding of no impact entered on the Gateway Project is inapplicable to a cumulative impacts analysis now because the environmental assessment from that project did not identify air quality harms that are now required for $PM_{2.5}$, 8 hour ozone and other air toxics tests.

These two projects may also be considered "similar actions" under NEPA. Actions are considered similar when, viewed with other reasonably foreseeable or proposed agency actions, they have similarities that provide a basis for evaluating their environmental consequences together. These similarities can include common timing or geography. [33] The geography of these two projects is not only common but largely identical. The Gateway Project and the new bridge span will intersect and abut each other on common land. The timing of these two projects, for the purposes of an impact analysis, is also common. While the Gateway Project was analyzed for environmental impacts nearly ten years ago, to the best of our knowledge, it is far from complete. It is foreseeable that some of the construction from the Gateway Project will coincide with the construction of the proposed bridge. Because of the close geographic and temporal proximity of these two different but related projects, the Coast Guard should consider the environmental impacts together in making a determination whether further environmental review should be done. This analysis must include the impacts of construction, as well as the impacts resulting from the completed projects.

In addition to the Ambassador Bridge Enhancement Project, a second proposal for a bridge is being worked out by the Border Transportation Partnership, a group formed to assess the mobility needs of the international border traffic. This partnership includes members from the Federal Highway Administration, Michigan Department of Transportation, Ontario Ministry of Transportation and Transport Canada. While the Partnership has taken steps to determine the best location for a new bridge based on social, economic, and environmental considerations, DIBC has moved forward without these considerations to build another span of their Ambassador Bridge. There is no indication that the second span of the Ambassador would be built instead of the bridge proposed by the Border Transportation Partnership. Therefore, it is possible that both bridge proposals will move forward, resulting in two new border crossings in Detroit within close proximity of each other.[34] The possibility of this result should lead the Coast Guard to require more information regarding the location and proposal the bridge by the Border Transportation Partnership and the plan for that project to move forward if a second span of the Ambassador Bridge is built.

Conclusion

In conclusion, the Sierra Club and its members in the Detroit metropolitan area urge the Coast Guard to deny the application of a CatEx to the Ambassador Bridge Enhancement Project. Based on the above information, we feel that there are significant questions about the

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[32] *Kleppe v. Sierra Club*, 427 U.S. 390 (1976); 40 C.F.R. § 1508.25.
[33] 40 C.F.R. § 1508.25.
[34] See the Central Area Alternatives Map. Exhibit K.

environmental impact of this project, many of which have not been sufficiently addressed in the CatEx, and some which have not been addressed at all. Under NEPA, "An agency must prepare an EIS if 'substantial questions are raised as to whether a project...may cause significant degradation of some human environmental factor.'"[35] According to the Coast Guard's own NEPA implementing procedures, an environmental assessment or environmental impact statement shall be prepared for actions normally categorically excluded, but which are likely to involve significant impacts on the environment, substantial controversy on environmental grounds or be inconsistent with any Federal, State or local law. Based on our revised answers to the Coast Guard's CatEx checklist, an environmental impact statement is appropriate in this situation, and at the very least, an environmental assessment should be done to further determine what environmental impacts may be significant.

Hanging on this permit decision is the consideration of all environmental impacts that will potentially stem from this project. DIBC has stated that construction on this Bridge may commence shortly after the granting of a Coast Guard permit. If true, the timing of this project and the Coast Guard's position as the final agency arbiter of environmental impact is extremely important. Given the potential for significant environmental impacts, the Coast Guard should conduct a full environmental impact study before issuing the permit sought by DIBC.

Thank you for your consideration in this matter.

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Enclosures (13)

[35] LaFlamme v. FERC, 852 F.2d 389, 397 (9th Cir. 1998).

ENVIRONMENTAL CHECKLIST

NOTE: This checklist should be completed by the decision-maker in consultation with an **ENVIRONMENTAL PROTECTION SPECIALIST**. Please read the information on how to properly complete this checklist on pages 4-10 and make sure each question is answered using the accompanying explanations found on the pages cited after each question. Attempting to answer these questions without reading the accompanying explanations may result in an incorrect or incomplete environmental analysis.

***Project Description:**

Activity Year:

(***Note:** Checklist preparer may want to attach additional descriptive information on the proposed action such as: diagrams, site maps, and photographs.)

Part I. Checklist Analysis.

	YES	NO	NEED DATA
1. Is there likely to be a significant effect on public health or safety? (p. 5)			
2. Does the proposed action occur on or near a unique characteristic of the geographic area, such as a historic or cultural resource, park land, prime farmland, wetland, wild and scenic river, ecologically critical area, or property requiring special consideration under 49 U.S.C. 303(c)? (p. 5-6)			
3. Is there a potential for effects on the quality of the environment that are likely to be highly controversial in terms of scientific validity or public opinion? (p. 7)			
4. Is there a potential for effects on the human environment that are highly uncertain or involve unique or unknown risks? (p. 7)			
5. Will the action set a precedent for future actions with significant effects or a decision in principle about a future consideration? (p. 7)			
6. Are the action's impacts individually insignificant, but cumulatively significant when considered along with other past, present, and reasonably foreseeable future actions? (p. 7-8)			
7. Is the proposed action likely to have a significant impact on a district, site, highway, structure, or object that is listed in or eligible for listing in the National Register of Historic Places, or to cause the loss or destruction of a significant scientific, cultural, or historic resource? (p.8)			
8. Will the proposed action have a significant effect on species or habitats protected by Federal law or Executive Order ? (p. 9)			
9. Is there a potential or threatened violation of a Federal, State, or local law or requirement imposed for the protection of the environment? (p. 9-10)			
10. Is the action likely to have other significant effects on public health and safety or on any other environmental media or resources that are not specifically identified in this checklist? (p. 10)			

Part II. Comments or Additional Information Related to Part I:

Part II. Comments or Additional Information Related to Part I (continued):

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Part III. Conclusions.

1. A CE is recommended for this proposed action. [ ]
Comments:_____
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2. An EA is recommended for this proposed action. [ ]
Comments:_____
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3. An EIS is recommended for this proposed action. [ ]
Comments:_____
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_____	_____	_____
Date	*Preparer/Environmental Project Manager	Title/Position
_____	_____	_____
Date	**Environmental Reviewer	Title/Position

*The USCG preparer signs for NEPA documents prepared in-house. The USCG environmental project manager signs for NEPA documents prepared by an applicant, a contractor, or another outside party. **Signature of the Environmental Reviewer for the Bridge Administration Program may be that of the preparer's.

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Published by the National Institute of Environmental Health Sciences

Ambient Air Pollution and Atherosclerosis in Los Angeles

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doi:10.1289/ehp.7523 (available at http://dx.doi.org/)
Online 22 November 2004

The National Institute of Environmental Health Sciences
National Institutes of Health
U.S. Department of Health and Human Services

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RUNNING TITLE:

Air Pollution and Atherosclerosis

KEY WORDS

Atherosclerosis, air pollution, particulate matter

ACKNOWLEDGEMENT

Supported in part by the National Institute on Aging (grants R01AG-13860 (VEAPS) and R01AG-17160 (BVAIT)), the National Institute of Environmental Health Sciences (grant P30 ES07048, 5P01ES11627), the Wright Foundation, the Hastings Foundation, and the Health Effects Institute. There is no conflict of interest.

ABBREVIATIONS

ACS:	American Cancer Society
BVAIT:	B-Vitamin Atherosclerosis Intervention Trial
CCA	common carotid artery
CIMT:	Carotid intima-media thickness
CVD :	Cardiovascular disease
ETS:	Environmental Tabacco Smoke
GIS:	Geographic information system
LA:	Metropolitan Los Angeles area
PM:	Particulate matter
PM2.5 :	particulate matter less than or equal to 2.5 micrometers in aerodynamic diameter
VEAPS:	Vitamin E Atherosclerosis Progression Study

Outline of Section Headers:

Abstract

Introduction

Method

Result

Discussion

References

ABSTRACT

Associations have been found between long-term exposure to ambient air pollution and cardiovascular morbidity and mortality. The contribution of air pollution to atherosclerosis that underlies many cardiovascular diseases has not been investigated. Animal data suggest that ambient particulate matter (PM) may contribute to atherogenesis. We used data on 798 participants from two clinical trails to investigate the association between atherosclerosis and long-term exposure to ambient PM up to 2.5 μm in aerodynamic diameter ($PM_{2.5}$). Baseline data included assessment of the carotid intima-media thickness (CIMT), a measure of sub-clinical atherosclerosis. We geocoded subjects' residential areas to assign annual mean concentrations of ambient $PM_{2.5}$. Exposure values were assigned from a $PM_{2.5}$ surface derived from a geostatistical model. Individually assigned annual mean $PM_{2.5}$ concentrations ranged from 5.2 to 26.9 $\mu g/m^3$ (mean: 20.3). For a cross-sectional exposure contrast of 10 $\mu g/m^3$ $PM_{2.5}$, CIMT increased by 5.9% (95% CI: 1%-11%). Adjustment for age reduced the coefficients, but further adjustment for covariates indicated robust estimates in the range of 3.9% to 4.3% (p-values 0.05 to 0.1). Among older subjects (≥60), women, never smokers, and those reporting lipid-lowering treatment at baseline, the associations of $PM_{2.5}$ and CIMT were larger with the strongest associations in women ≥60 (15.7% ; 5.7% - 26.6%). These results represent the first evidence of an association between atherosclerosis and ambient air pollution. Given the leading role of cardiovascular disease as a cause of death and the large populations exposed to ambient $PM_{2.5}$, these findings may be important and need further confirmation.

INTRODUCTION

A large body of epidemiological evidence suggests associations between ambient air pollution and cardiovascular mortality and morbidity (Peters and Pope 2002) (Pope et al. 2004). All of these studies focus on events occurring at a late stage of vascular disease processes. The impact of air pollution on the underlying preclinical conditions remains poorly understood. We hypothesize that current levels of ambient fine particles up to 2.5 μm in aerodynamic diameter ($PM_{2.5}$) may contribute to atherosclerosis, leading to subclinical anatomical changes that play a major role in cardiovascular morbidity and mortality later in life. Animal studies support our hypothesis by showing that inhalation of ambient particulate matter promotes oxidative lung damage, including alveolar and systemic inflammatory responses (Fujii et al. 2002; Goto et al. 2004; Soukup et al. 1995; Suwa et al. 2002; Tepper et al. 1994; van Eeden et al. 2001).

We investigated the association between residential ambient $PM_{2.5}$ and carotid artery intima-media thickness (CIMT) using pre-randomization baseline data from two recent clinical trials conducted in Los Angeles, California (Hodis et al. 2002). CIMT is a well-established quantitative measure of generalized atherosclerosis that correlates well with all of the major cardiovascular risk factors, with coronary artery atherosclerosis, and with clinical cardiovascular events (Mack et al. 2000). It is an established tool for investigating the contribution of long-term exposures such as smoking or passive smoking to sub-clinical stages of atherosclerosis at any given age (Diez-Roux et al. 1995; Howard et al. 1994; Howard et al. 1998). This is the first study to assess the association of atherosclerosis with air pollution.

METHODS

Population and Health Assessment

We used baseline health data from two randomized, double-blind, placebo-controlled clinical trials conducted at the USC Atherosclerosis Research Unit (Hodis et al. 2002). The

Vitamin E Atherosclerosis Progression Study (VEAPS) investigated the effects of vitamin E on the progression of atherosclerosis measured by carotid artery intima-media thickness (CIMT). The B-Vitamin Atherosclerosis Intervention Trial (BVAIT) focused on the effect of vitamin B supplements on the progression of atherosclerosis (trial in progress). Baseline assessment in both trials included CIMT measured between 1998 and 2003 using the same standardized methods (Hodis et al. 2002; Selzer et al. 1994; Selzer et al. 2001). Recruitment of volunteers occurred over the entire Los Angeles Basin, covering a geographic area of approximately 64,000 km^2.

Eligible subjects for the VEAPS trial (n=353) were men and women ≥40 years old with slightly increased LDL cholesterol (≥3.37 mmol/L), but with no clinical signs or symptoms of cardiovascular disease (CVD) (Hodis et al. 2002). Subjects with diabetes, diastolic blood pressure >100 mmHg, thyroid disease, serum creatinine >0.065 mmol/L, life-threatening diseases, or high alcohol intake were excluded.

The BVAIT trial (N=506) had a similar design to VEAPS. Men and women >40 years of age were prescreened to meet study criteria (fasting plasma homocysteine ≥8.5 μmol/L; postmenopausal for women; no evidence of diabetes, heart disease, stroke, or cancer). Subjects were excluded on the basis of any clinical signs or symptoms of CVD, diabetes or fasting serum glucose ≥ 140 mg/dL, triglyceride levels ≥ 150 mg/dL, serum creatinine > 1.6 mg/dL, high blood pressure, untreated thyroid disease, life threatening disease with prognosis < 5 years, or high alcohol intake.

Thus, our study included 'healthy' subjects with biomarkers (elevated LDL-cholesterol or homocysteine) that suggested an increased risk of future cardiovascular diseases (N= 859). Fifty-eight subjects were excluded in the exposure assignment process as they lived outside the area with $PM_{2.5}$ data. Three subjects had missing data in at least one of the covariates used in the models. Our total sample consisted of 798 participants.

Health measures, including CIMT

Our main outcome of interest is the thickness of the carotid artery intima-media. In both trials, high-resolution B-mode ultrasound images of the right common carotid artery (CCA) were obtained prior to the intervention (base line) with a 7.5-mHz linear array transducer attached to an ATL Ultramark-4 Plus Ultrasound System. We used this baseline CIMT measurement as the outcome. Details of this highly reproducible method are published (Hodis et al. 2002; Selzer et al. 1994; Selzer et al. 2001). Blood pressure, height, and weight were measured with standard procedures.

The baseline questionnaires included an assessment of all major cardiovascular disease risk factors and covariates, including clinical events, diet, use of prescription medications, physical activity, current and past smoking and passive smoking, and vitamin supplements. Age, education, and other socio-demographic factors were available for each subject. Fasting blood samples were also drawn for lipid measurements. Data used in our analyses were collected with the same tools in both trials.

Exposure Assignment

To assess exposure we chose a novel approach derived from a Geographic Information System (GIS) and geostatistics. This method allows for assignment of long-term mean ambient concentrations of $PM_{2.5}$ to the zip code area of each subject's residential address (Künzli and Tager 2000). The resulting surface of $PM_{2.5}$ covered the entire Los Angeles metropolitan area. The surface is derived from a geostatistical model and data from 23 state and local district monitoring stations (year 2000). These monitors are located across the Los Angeles region to characterize urban levels of pollution. To assign exposure, $PM_{2.5}$ data were interpolated using a combination of a universal kriging model with a quadratic drift and a multiquadric radial basis function model (Bailey T and Gatrell 1995; Burrough P and McDonnell 1998). We averaged the

two surfaces based on 25 meter grid cells. Examination of errors from the universal model showed that over 50% of the study area had assigned values within 15% of monitored concentrations, while 67% were within 20%. The larger errors were on the periphery of our study area, where the density of study participants was the lowest. We linked the zip code centroids of each subject with the exposure surface through a geocoding database (www.esri.com). The map (Figure 1) illustrates the $PM_{2.5}$ surface with the geo-located zip codes. Individually assigned $PM_{2.5}$ data had a range from 5.2 to 26.9 $\mu g/m^3$ (mean: 20.3), thus exceeding the range observed across 156 metropolitan areas used in the largest cohort study of air pollution and mortality (Pope et al. 2002b). All models were implemented with ArcScript from the Environmental Systems Research Institute (ESRI, Redlands, CA).

Statistical Analyses

We tested the univariate and multivariate associations between CIMT and ambient $PM_{2.5}$ using linear regression analyses. Extensive residual diagnostics indicated some heteroscedasticity, which was rectified with the natural log-transformed CIMT. We adjusted for factors that were statistically associated with both CIMT and ambient $PM_{2.5}$ (age, male sex, low education, and low income). Next, we expanded the models using covariates that were associated with either $PM_{2.5}$ or CIMT, including indicator variables for current second hand smoke exposure and current and former personal smoking. We then added covariates that play a role in atherosclerosis such as blood pressure, LDL-C, or proxy measures such as reporting treatment with antihypertensives or lipid-lowering medications at study entry. These factors may be on the pathophysiologic pathways linking air pollution exposure and atherosclerosis (Ross 1999); thus, such models may overadjust the coefficients. We chose this conservative approach to test the sensitivity of the effect estimates under a broad range of model assumptions.

There is increasing evidence that host factors such as age, gender, or underlying disease and risk profiles may modify the effects of air pollution (Pope et al. 2002b; Zanobetti and Schwartz 2002). Furthermore, the finding of atherosclerosis in PM-exposed rabbits was based on a hyperlipidemic trait (Suwa et al. 2002). Therefore, we also stratified by gender, age (<60; ≥60 yrs), smoking status, and lipid-lowering drug therapy.

RESULTS

Table 1 summarizes the main characteristics of the study population and among main subgroups. Table 2 presents the percent change in CIMT in association with a 10 $\mu g/m^3$ contrast in ambient $PM_{2.5}$ concentrations for three cross-sectional regression models. The unadjusted model indicates a 5.9% (95% CI: 1%-11%) increase in CIMT per 10 $\mu g/m^3$ $PM_{2.5}$. For the observed contrast between lowest and highest exposure (20 $\mu g/m^3$ $PM_{2.5}$), this corresponds to a 12.1% (2.0%-23.1%) increase in CIMT. The only covariate with a substantial effect on the point estimate was age, which reduced the effect from 5.9% to 4.3% (0.4%-9%) per 10 $\mu g/m^3$ $PM_{2.5}$. This change agrees with the age-related effect modification (see below). Otherwise, effect estimates across the models remained robust, in the range of 3.9% to 4.3% with p-values from 0.05 to 0.1. To corroborate the exposure-response relationship, we also categorized $PM_{2.5}$ levels into quartiles. Figure 2 shows the adjusted mean CIMT across these four groups of equal sample size at the mean levels of the covariates (age, gender, education, and income). The trend across the exposure groups was statistically significant (p=0.041). The unadjusted means of CIMT among these quartiles of exposure were 734, 753, 758, and 774 μm, respectively.

The associations between CIMT and $PM_{2.5}$ were substantially stronger among 109 subjects reporting lipid-lowering medication at study entry, both in men and women (see Table 2 and Figure 3). The crude effect reached 15.8% (2%-31%) per 10 $\mu g/m^3$ $PM_{2.5}$ with adjusted

values ranging between 12% and 16%. Despite the small sample size, p-values of all models were mostly <0.1 and often <0.05.

Results also suggest significant age and gender interactions, with much larger effects in women and in the older age group (Figure 3). Effect estimates in women were statistically significant and typically in the range of 6% to 9% per 10 $\mu g/m^3$ $PM_{2.5}$. Associations were strongest among women ≥60 years of age (N=186), leading to crude estimates of 19.2% (9% - 31%). Adjusted coefficients ranged from 14% to 19%, being statistically significant in all models and sensitivity analyses.

Among never smokers (N=502), the effect estimate reached 6.6% (1.0% to 12.3%). As shown in Figure 3, the estimate was small and not significant in current (N=30) and former smokers (N=265).

DISCUSSION

Our study presents the first evidence for an association between CIMT and long-term exposure to ambient air pollution. As recently reviewed in a statement of the American Heart Association (Brook et al. 2004) substantial epidemiological and experimental evidence suggests a contribution of ambient air pollutants on cardiovascular mortality and morbidity. However, these studies focus on acute and sub-acute effects on cardiac autonomic function, inflammatory or thrombogenic markers, arrhythmia, myocardial infarction, cardiovascular hospital admission, and death. The only outcome considered in long-term air pollution studies has been mortality. The relative risk for acute effects on mortality have been substantially smaller than those observed for long-term associations (Pope et al. 2002a; Samet et al. 2000a). As shown by Künzli et al. cohort studies are capable of capturing acute and chronic effects of air pollution on the course of diseases that ultimately lead to premature death. In contrast, time-series and panel studies investigate only the associations of event occurrence with the most recent exposure (Künzli et al.

2001). Thus, if air pollution has both acute and cumulative long-term effects, one expects larger mortality coefficients in cohort studies. The thickness of the intima-media reflects long-term past exposure; thus, we provide the first evidence for chronic effects of air pollution on atherogenesis which may in part explain the above mentioned discrepancy between acute and long-term risk estimates (Pope et al. 2002b; Samet et al. 2000b).

There are several major aspects to be considered in the interpretation of this new finding, mainly the strength in the exposure assignment, the limited evidence for bias, the differences in effects within subgroups, and plausibility.

Exposure Assignment

The individual residence-based assignment of exposure represents a substantial improvement over most studies that have relied on central monitors or on binary road buffers combined with basic interpolation (Hoek et al. 2002; Pope et al. 2004). As a sensitivity analysis, we used weighted least squares models with the weights specified as the inverse of the standard errors from the universal kriging model to down-weight estimates with larger error. In addition, we implemented models based solely on the universal kriging estimate. In both instances results were robust and similar to what we found with our main model.

Time-activity studies show that people spend most of their time in or around home, and our restriction of exposure assessment on residential address captures the most relevant part of exposure (Leech et al. 2002). $PM_{2.5}$ generally displays spatially homogenous distributions across small areas such as neighborhoods and blocks, and as a result, the ambient conditions at the zip code centroid likely reflect the levels expected at home outdoors (Roosli et al. 2000). $PM_{2.5}$ of outdoor origin will also penetrate indoors, and correlations between long-term outdoor PM concentrations and indoor levels of PM from outdoor origin is high (Sarnat et al. 2000). Exposure to ambient air pollution while working and during commute are not included in our

exposure term but are considered to be a relevant source of exposure (Riediker et al. 2003). Although most likely a random misclassification with biases toward the null, the errors may affect subgroups differently, thus explain part of the observed interactions (see below).

In Los Angeles, no clear trends have been observed in $PM_{2.5}$ concentrations over the past 5 to 10 years. The year 2000 surface characterizes the prevailing mean $PM_{2.5}$ concentrations across several years and can be considered a measure of long-term past exposure. This year also sits in the middle of the baseline recruitment period. Overall, the various limitations in our exposure assignment may add some random error, biasing results toward weaker associations (Thomas et al. 1993).

We also assigned ambient ozone to zip code centroids. Inclusion of ozone in the models had no impact on the $PM_{2.5}$ coefficients or the standard errors. Ozone and $PM_{2.5}$ were not correlated ($r= -0.17$) and the $PM_{2.5}$ estimates were not substantially different in low and high ozone regions. The estimates of association for ozone were positive but not statistically significant and much smaller than for $PM_{2.5}$. This finding must be put in context of the specific challenges in determining long-term exposure to ozone, which are substantially different than in the case of PM exposure. In contrast to $PM_{2.5}$ from outdoor origin, ambient ozone levels have lower correlations with personal exposure (Avol et al. 1998; Sarnat et al. 2000; Sarnat et al. 2002); therefore, the ability to detect effects of ozone will likely be reduced due to greater misclassification.

Biases

Our subjects were a nonrandom sample of 'healthy' volunteers with above average education, meeting strict inclusion criteria for the two clinical trials. Although we cannot exclude some systematic selection biases affecting the cross-sectional data, it is unlikely that subjects with preclinical signs of atherosclerosis would have been more likely to volunteer if they lived in more

polluted areas. Although the selection of subjects limits the generalization to other populations, we do not expect this to lead to over or underestimating the cross-sectional associations. The two trials recruited subjects independently; thus the effects may be compared across trials to evaluate the potential influence of selecting volunteers. The populations differed with regard to age, smoking habits, baseline LDL and treatment, blood pressure, active and passive smoking, and other relevant factors; thus the PM2.5 coefficients were smaller and were not statistically significant in the VEAPS trial with its younger population. However, after taking these factors into account, the associations with ambient $PM_{2.5}$ were similar. For example, among elderly women of VEAPS (N=70) and BVAIT (N=116), the effect estimate was 18.1% (-0.1 to 36.3.%) and 13.6% (2.8 to 24.4.%), respectively. As discussed below, there is some evidence for larger effects in subjects with cardiovascular risk factors, indicated by prescriptions of lipid-lowering treatment. Our trials excluded subjects with clinically manifest cardiovascular diseases. Moreover, if air pollution amplifies systemic inflammation among those prone to atherosclerosis, exclusion of subjects with high LDL may be a source of bias. One may expect effect estimates in a less selected, less healthy population to be larger than those reported.

The wealth of baseline data from these clinical trials offered the opportunity to control for a broad array of covariates. Apart from the effect of age adjustment, estimates were robust to numerous combinations of covariates, including: income, education, active and passive tobacco smoke, cardiovascular prescriptions, vitamin intake and physical activity. Uncontrolled or residual confounding appears to be an unlikely explanation for these results. Among women, adjustment for hormone replacement therapies did not affect the $PM_{2.5}$ estimates.

In previous studies, we found that spatial autocorrelation in the residuals could affect the size and significance of pollution coefficients (Jerrett et al. 2003a). We investigated spatial autocorrelation of the unstandardized residuals. We assessed autocorrelation with a first-order, adjusted first-order, and second-order spatial weight matrices based on nearest neighbor

contiguity, but we found no evidence of spatial autocorrelation. This supports the conclusion that the models supply efficient unbiased estimates (Jerrett et al. 2003b). As part of our sensitivity analyses, we also derived $PM_{2.5}$ surfaces using different interpolations and weighted least squares with weights equal to the inverse of the standard error of the exposure estimate. All approaches produced very similar results.

Evidence for Effect Modification

The data suggest substantial interactions with age, gender, smoking, and underlying cardiovascular risk factors. Given the reduced sample size among subgroups, the recruitment of volunteers, and the cross-sectional nature of the data, it is difficult to fully explore the causes of the observed modifications of associations and to establish susceptibility profiles. If the exposure misclassifications differed across subgroups, part of the interactions may be explained by differential exposure error. The gender and age difference could also be an artifact due to measurement error in the assigned exposure as time spent in commuting and location of work places may be different in men and women and in the young and elderly. Empirical studies on mobility suggest women have smaller activity spaces than men and younger groups, meaning they tend to spend more time in and around the home (Kwan MP and Lee 2003), and the same is probably true of the elderly compared to younger groups. Exposure measurement error may be reduced in those spending more time at home, leading to stronger effects (Thomas et al. 1993). Moreover, differences in statistical power may play a role as well; as shown at least for the age range 25-40 years, power to detect effects on CIMT is larger in women than in men (Stein et al. 2004)

The finding that those reporting prescriptions of lipid-lowering medications at baseline showed stronger associations of CIMT with $PM_{2.5}$ merits further investigation. This result agrees with the observed effects of PM on atherosclerosis in experiments conducted in hyperlipidemic

rabbits (Goto et al. 2004; Suwa et al. 2002). The systemic inflammatory and atherogenic reaction in these rabbits was related to the amount of PM contained in the alveolar macrophages. In our study, being under lipid-lowering therapy is an indicator for risk profiles prone to atherogenesis. Those subjects were mostly men (64%), and, on average, older, more often active or passive smokers, and almost twice as likely to report antihypertensive treatment. The systemic response to ambient PM may amplify and expand the oxidation of LDL-C among these susceptible subjects, consequently contributing to injury in the artery wall (Goto et al. 2004; Ross 1999). Investigations of short-term effects of ambient air pollution on mortality also suggest that underlying risk profiles such as diabetes may amplify susceptibility to ambient PM (Zanobetti and Schwartz 2002), and similar findings have been shown with smoking and diabetes mellitus in association with CIMT (Karim et al. 2004). To clarify the relevance of lipid status, it would be interesting to investigate our hypothesis among cohorts with familial hypercholesteremia (Wiegman et al. 2004; Wittekoek et al. 1999).

As shown in Figure 3, the size of the point estimate was larger among the older subjects. Future research needs to clarify whether air pollution contributes to atherosclerosis only after a certain age or early on. Effects of air pollution on lung development have been observed during adolescence and may be a result of both pulmonary and chronic systemic inflammatory effects (Gauderman et al. 2002); thus, it is conceivable that atherogenic responses may occur early in life. The age-dependence of the effects may also be co-determined by genetic factors (Ross 1999) (Humphries and Morgan 2004).

We also observed larger effects in women. If other cardiovascular risk factors such as occupational exposures dominate atherosclerosis in men, we would expect a smaller effect signal and less precision in the estimates among men. We also hypothesize that interactions may reflect biological causes. If pre-menopausal women are protected against atherosclerosis by endogenous

hormones, loss of hormonal protection would lead to increased vulnerability after menopause (Kannel et al. 1976). This could explain part of the interaction by both age and gender.

Active and passive smoking did not confound results in either the total sample or among subgroups. Adjustment for active tobacco smoke led to a slight increase in the effect estimate, thus residual confounding is unlikely to overestimate the effects. However, $PM_{2.5}$ associations were clearly stronger in never smokers as compared to smokers (data not shown). This gradient was also observed in all subgroups with significant $PM_{2.5}$ associations (Figure 3). Oxidative and inflammatory effects of smoking may dominate to such an extent that the additional exposure to ambient air pollutants may not further enhance effects along the same pathways. The difference in the effects of $PM_{2.5}$ in smokers and nonsmokers needs further investigation. The ACS cohort study does not reveal a clear pattern of a smoking interaction for the association of ambient air pollution and cardiovascular death (Krewski et al. 2004; Pope et al. 2004). In the SAPALDIA study, associations between air pollution and level of pulmonary function did not differ by smoking status (Ackermann-Liebrich et al. 1997).

Some U.S. studies indicate effect modification of air pollution by socioeconomic status with much stronger effects among the less educated (Pope et al. 2002b). The cause of this interaction pattern is not well understood. Socio-economic status was rather homogenous in these mostly well-educated volunteers providing little power to investigate interactions of pollution with socioeconomic status. If lower socioeconomic status (SES) also positively modifies effects of air pollution on atherosclerosis, our population would provide an underestimate of the health effects in the general population (O'Neill et al. 2003). Further research on samples representative of the population will be needed to assess whether the high SES in the clinical trials biases the effects toward the null.

Future research should focus on identifying factors that determine susceptibility to $PM_{2.5}$. We are initiating studies on subjects with inflammatory metabolic syndromes prone to accelerated

atherosclerosis such as postmenopausal women, diabetics, obese or physically inactive people. To corroborate the cross-sectional findings, follow-up studies are ultimately needed to investigate the association of concurrent levels of air pollution exposure with the progression of CIMT.

Plausibility

From a biologic perspective, our results support the hypothesis that long-term exposure to ambient PM contributes to systemic inflammatory pathways, which are a relevant aspect of atherogenesis (Ross 1999). The findings indicate a biologically plausible link between the observed acute effects of ambient air pollution on systemic inflammation (Glantz 2002) and the long-term consequences of sustained vascular inflammation leading to increased atherosclerosis and, ultimately, cardiovascular death (Hoek et al. 2002; Pope et al. 2004). Among susceptible people, this may lead to artery wall lesions similar to those observed in the rabbit model (Fujii et al. 2002; Suwa et al. 2002). In these hyperlipidemic rabbits, four-week PM exposure was associated with the progression of atherosclerotic lesions, coupled with an enhanced release of bone marrow monocytes. These precursors of macrophages play an important role in the atherogenic inflammatory responses (Goto et al. 2004; Ross 1999; Suwa et al. 2002). Given the central role of oxidized LDL in the initiation and progression of atherogenesis, suggestions that the plasma of automotive workers with high exposure to traffic exhaust is more susceptible to oxidation is also of interest (Sharman et al. 2002).

As a quantitative plausibility check we compared the size of the $PM_{2.5}$ effects with effects of other risk factors on CIMT. Using smoking and environmental tobacco smoke (ETS) as a model for air pollution exposure, the size of our estimates appear plausible (Diez-Roux et al. 1995; Howard et al. 1994). Associations of ETS and current levels of air pollution with various respiratory outcomes are similar and support the notion of common underlying pathways (Künzli 2002). Smoking and ETS associate with stiffer and thicker artery walls, reflecting the systemic

effect of these exposures (Howard et al. 1994; Mack et al. 2003). Exposure to ETS was associated with 2% to 3% thicker intima-media, which approximate the effects observed for a 10 $\mu g/m^3$ change in $PM_{2.5}$ (Diez-Roux et al. 1995; Howard et al. 1994). Using never smokers without ETS exposure as the referent group in our data, never smokers with ETS at home had 0.9% (-2.7 to 4.5%) thicker artery walls; former smokers' CIMT was on average 3.4% (0.7-6.3%) increased; and the 30 current smokers had 5% (-1.5 to 11.6%) thicker CIMT. The trend across these four categories of tobacco exposure was statistically significant. As shown in Table 1, smokers were underrepresented in these volunteers of well-educated participants.

The observed percent change in CIMT corresponds to an increase in the thickness of approximately 20-40 μm per 10 $\mu g/m^3$ contrast in $PM_{2.5}$. This difference in CIMT translates into some 3% to 6% increase in the long-term risk for myocardial infarction (O'Leary et al. 1999). Pope et al. reported that long-term exposure to $PM_{2.5}$ was associated with an 18% (14% - 23%) increase in ischemic heart disease (Pope et al. 2004). Effect sizes reported here concur with these findings, indicating that a fraction of the total effect of ambient PM on cardiovascular mortality may be mediated through sustained long-term effects of air pollution on atherosclerosis (Künzli et al. 2001). This is in line with the proposed model (Künzli et al. 2001) that part of the effects observed in cohort studies needs to reflect long-term contributions of air pollution to the underlying disease progression, whereas in other cases, air pollution contributes only to triggering of cardiovascular events or death (Bell et al. 2004; Künzli et al. 2001; Peters and Pope 2002).

From a biological and a policy perspective we emphasize that $PM_{2.5}$ probably serves as a surrogate for the mixture of urban air pollution and constituents of PM. It is premature to conclude that $PM_{2.5}$ and its constituents are the atherogenic culprit *per se*. Atherosclerosis results from complex processes that may include a combination of various urban pollutants, host factors, and pathways that ultimately lead to the findings of a CIMT-$PM_{2.5}$ association.

In conclusion, we have presented the first epidemiological evidence supporting the idea of a chronic vascular response to respiratory and systemic effects of PM exposure. Given the leading role of heart disease as a cause of death in most westernized countries and the growing contribution in developing countries, these findings may be of high public health relevance. Further investigations need to focus on susceptible groups and follow-up of cohorts to investigate the effect of air pollution on the progression of CIMT.

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TABLES

Table 1: Description of assigned exposure (outdoor concentration in 2000), and of carotid intima-media thickness (CIMT), and main characteristics of the study population at the time of baseline measurements in the total sample, men, women, women ≥ 60 years, and subjects under lipid-lowering therapy (mean and SD, or %, respectively).

Characteristics		Total sample (798)	Men (443)	Women (355)	Women ≥60 years (186)	Lipid-lowering therapy (109)
$PM_{2.5}$ ($\mu g/m^3$)		20.3 (2.6)	20.1 (2.7)	20.5 (2.4)	20.7 (2.3)	20.0 (2.5)
Ozone (ppb) (annual mean of daily max.)		89.2 (17.9)	89.6 (18.5)	88.8 (17.3)	87.1 (17.2)	88.5 (18.6)
CIMT (μm)		755 (148)	767 (166)	740 (118)	775 (120)	788 (140)
Age (years)		59.2 (9.8)	58.3 (10.3)	60.4 (8.9)	67.3 (5.3)	63.3 (10.0)
Diastolic blood pressure (mmHg)		77.8 (9.2)	79.2 (8.8)	75.9 (9.3)	74.8 (9.5)	78.1 (8.9)
Systolic blood pressure (mmHg)		127.2 (16.3)	126.7 (16.0)	127.8 (16.6)	130.5 (16.7)	130.9 (16.2)
LDL cholesterol (mg/dL)		137.9 (29.5)	137.0 (30.9)	139.0 (27.6)	136.4 (26.9)	125.7 (33.7)
Caucasian		67.3 %	67.7 %	66.8 %	65.0 %	69.7 %
Smoking status	Never smokers	62.9 %	62.8 %	63.1 %	62.9 %	53.2 %
	Former smokers	33.2 %	33.4 %	33.0 %	33.3 %	44.0 %
	Current smokers	3.8%	3.6 %	3.9 %	3.8 %	2.8 %
Environmental tobacco smoke at home		33.5 %	21.9 %	47.9 %	55.4 %	37.5 %
Lipid-lowering therapy		13.7 %	15.3 %	11.5 %	15.1 %	100%
Antihypertensive prescriptions		26.2 %	26.6 %	25.6 %	33.3 %	42.2 %

Table 2: Percent change (and 95% CI) in the carotid intima-media thickness (μm) associated with a 10 $\mu g/m^3$ change in ambient outdoor $PM_{2.5}$ concentration at the residential zip code in the total population (N=798). a)

Model [a)]	Total sample (798)		Women ≥ 60 yrs. (186)		Lipid-lowering therapy (109)	
(with adjustment factors in the model)	% change	p-value	% change	p-value	% change	p-value
None (unadjusted estimate)	5.9 (1.0-10.9)	0.018	19.2 (8.8-30.5)	0.001	15.8 (2.1-31.2)	0.024
Age, gender, education, income [b)]	4.4 (0.0-9.0)	0.056	15.7 (5.7-26.6)	0.002	13.3 (0-28.5)	0.051
All above + active and passive smoking, multivitamins, alcohol	4.2 (-0.2-8.9)	0.064	13.8 (4.0-24.5)	0.002	13.3 (-0.3-28.8)	0.060

a) The table shows the unadjusted association (crude model) and estimates from two multivariate models. In parentheses: 95% confidence intervals of the estimates. The relative effects are based on a linear model with log-IMT as dependent variable.

b) Factors with univariate associations with both, CIMT and $PM_{2.5}$

FIGURE LEGENDS

Figure 1: Zip code locations of the study population geo-coded on the $PM_{2.5}$ surface, modeled with 2000 $PM_{2.5}$ data, and distribution of individually assigned concentrations.

Figure 2: Mean CIMT (± 1 standard error) among quartiles of the $PM_{2.5}$ distribution. The range in each quartile is shown in the x-axes. Mean CIMT levels are provided at the population average of the adjustment covariates (age, gender, education, and income). 1st quartile: reference group.

Figure 3: Percent difference (and 95% CI) in CIMT associated with a 10 $\mu g/m^3$ contrast in ambient $PM_{2.5}$ in all subjects and in subgroups. All estimates are based on the cross-sectional linear model with log-IMT as dependent variable, and home outdoor $PM_{2.5}$ as independent variable, adjusted for sex, age, education and income. Number of subjects per group is shown in parenthesis. Data ordered by size of point estimate. The null effect line is highlighted (dash).

FIGURE 1

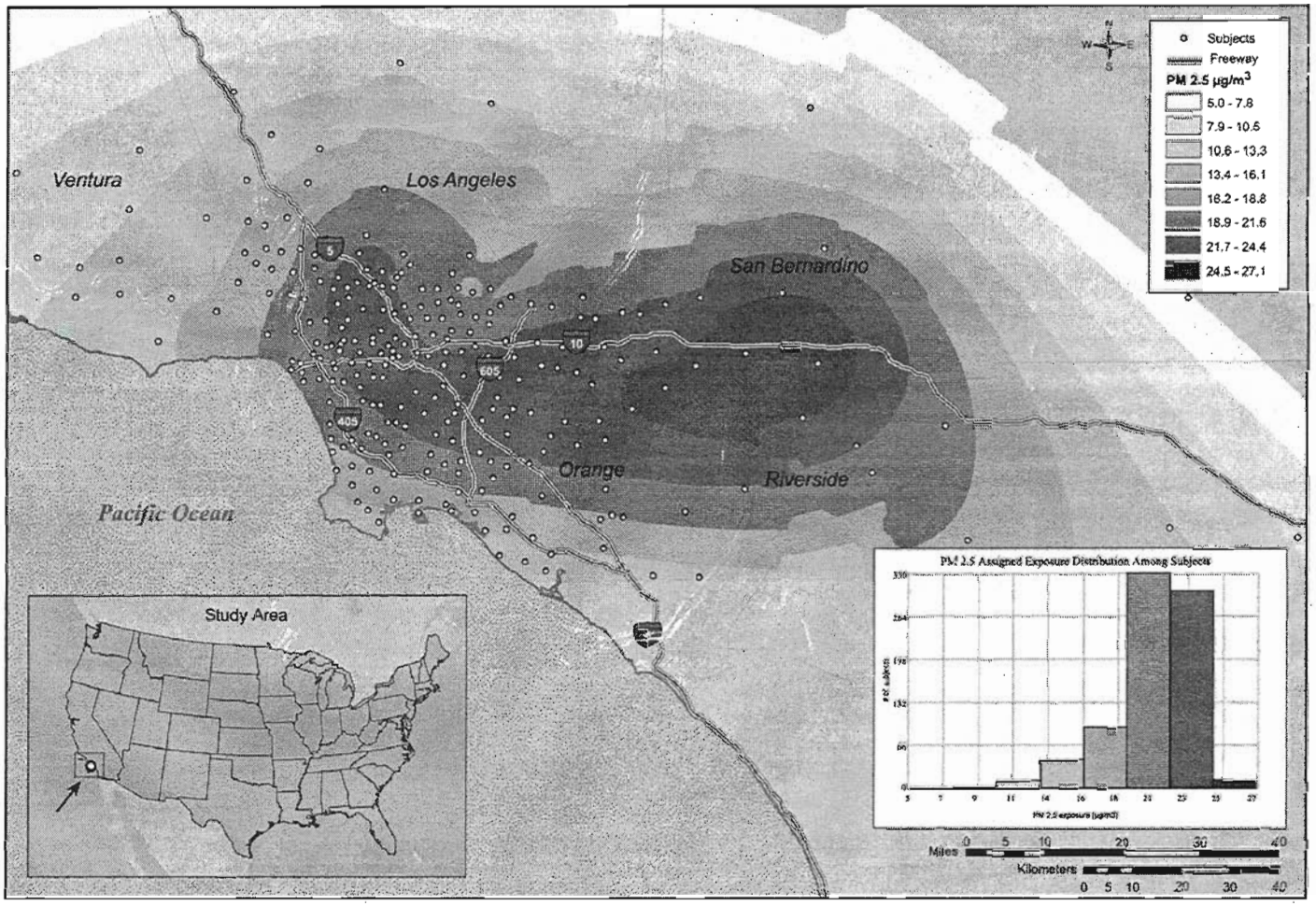

Subjects
Freeway
PM 2.5 µg/m3
5.0 - 7.8
7.9 - 10.6
10.6 - 13.3
13.4 - 16.1
16.2 - 18.8
18.9 - 21.6
21.7 - 24.4
24.5 - 27.1
Ventura
Los Angeles
San Bernardino
Orange
Riverside
Pacific Ocean
Study Area
PM 2.5 Assigned Exposure Distribution Among Subjects
Miles
Kilometers

FIGURE 2

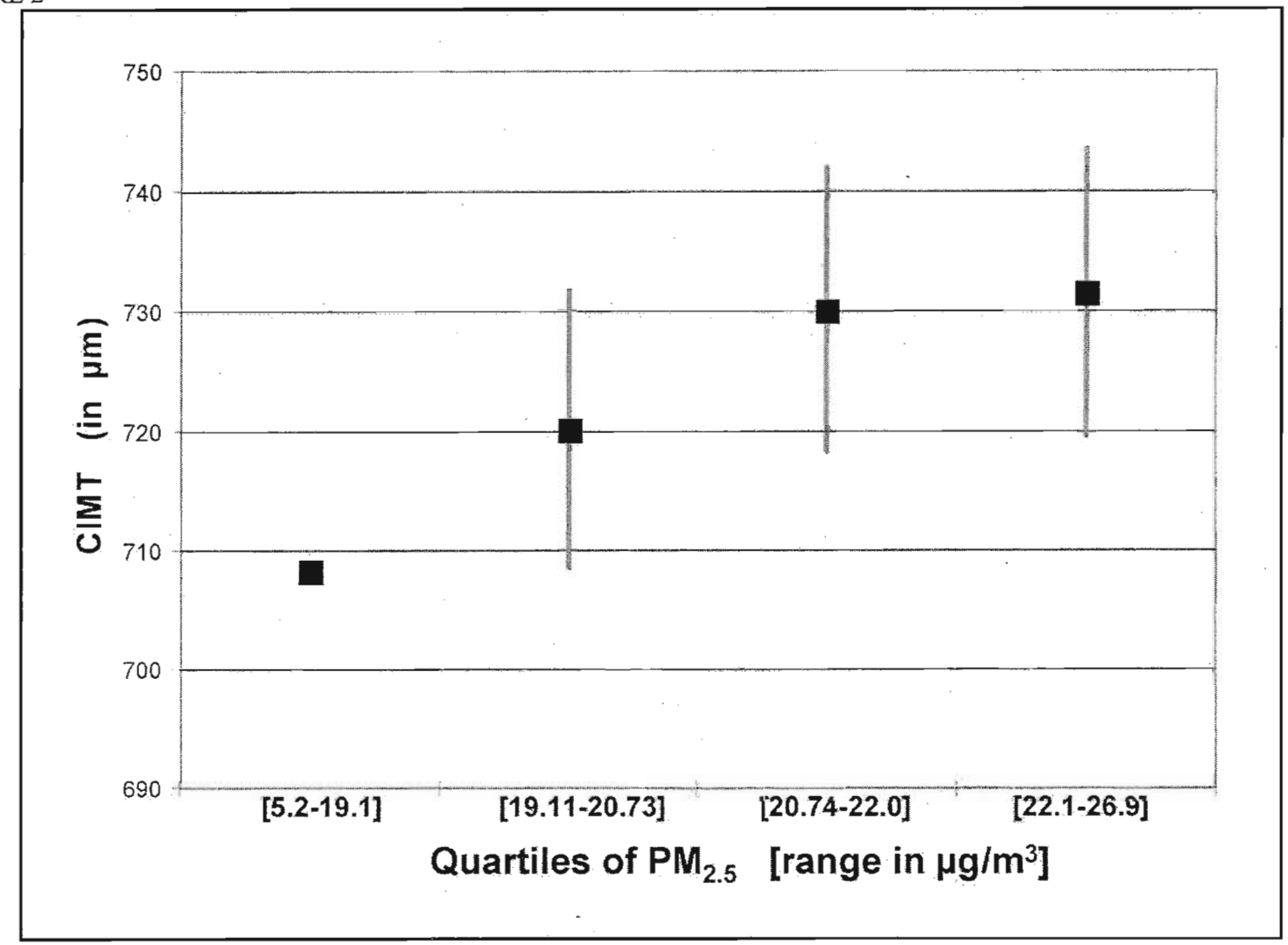
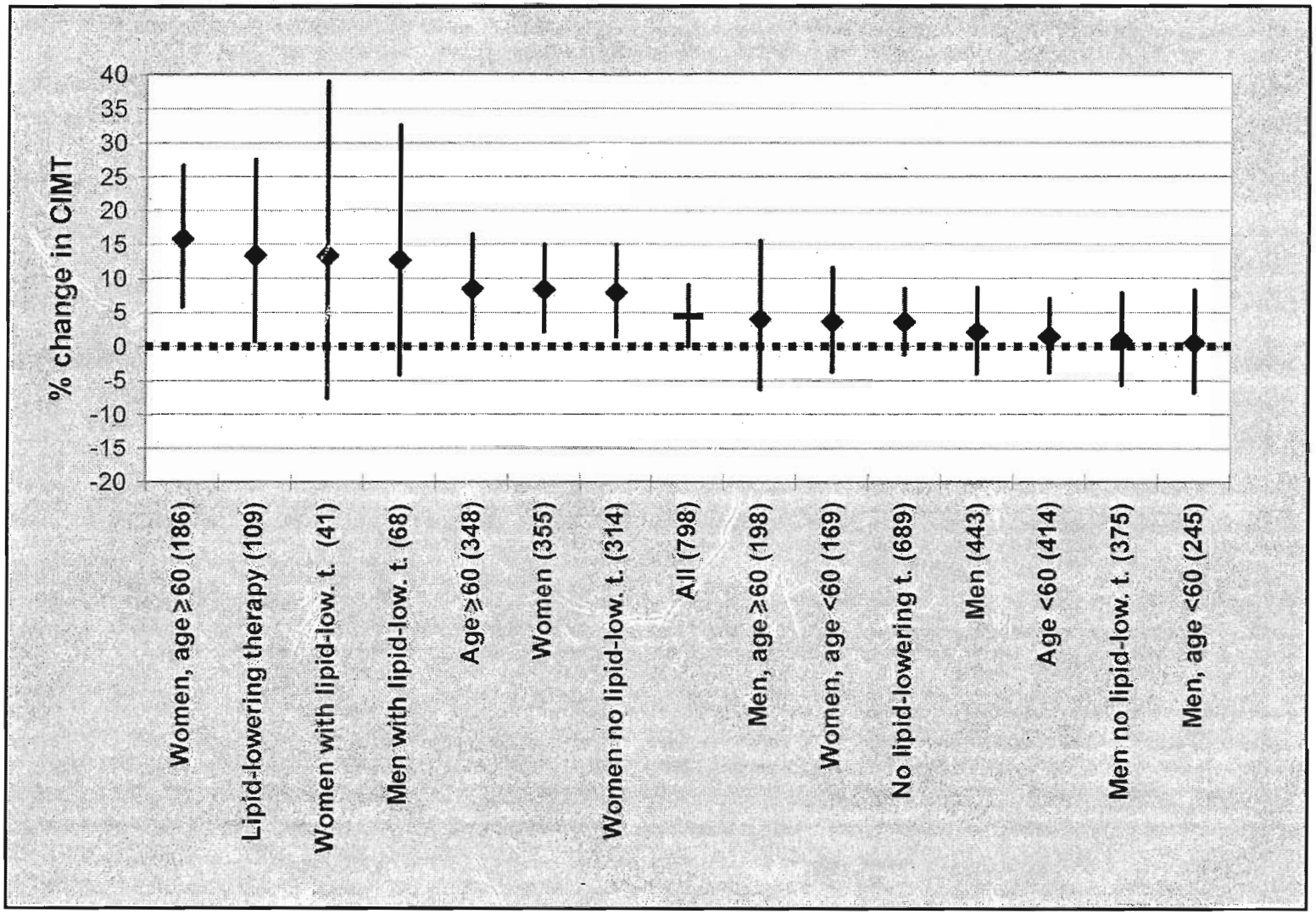

750
740
730
720
710
700
690
CIMT (in µm)
[5.2-19.1]
[19.11-20.73]
[20.74-22.0]
[22.1-26.9]
Quartiles of PM2.5 [range in µg/m3]

FIGURE 3


% change in CIMT
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
Women, age≥60 (186)
Lipid-lowering therapy (109)
Women with lipid-low. t. (41)
Men with lipid-low. t. (68)
Age≥60 (348)
Women (355)
Women no lipid-low. t. (314)
All (798)
Men, age≥60 (198)
Women, age <60 (169)
No lipid-lowering t. (689)
Men (443)
Age <60 (414)
Men no lipid-low. t. (375)
Men, age <60 (245)

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Spatial Analysis of Air Pollution and Mortality in Los Angeles

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AQ: 1

Background: The assessment of air pollution exposure using only community average concentrations may lead to measurement error that lowers estimates of the health burden attributable to poor air quality. To test this hypothesis, we modeled the association between air pollution and mortality using small-area exposure measures in Los Angeles, California.

Methods: Data on 22,905 subjects were extracted from the American Cancer Society cohort for the period 1982–2000 (5,856 deaths). Pollution exposures were interpolated from 23 fine particle ($PM_{2.5}$) and 42 ozone (O_3) fixed-site monitors. Proximity to expressways was tested as a measure of traffic pollution. We assessed associations in standard and spatial multilevel Cox regression models.

Results: After controlling for 44 individual covariates, all-cause mortality had a relative risk (RR) of 1.17 (95% confidence interval = 1.05–1.30) for an increase of 10 $\mu g/m^3$ $PM_{2.5}$ and a RR of 1.11 (0.99–1.25) with maximal control for both individual and contextual confounders. The RRs for mortality resulting from ischemic heart disease and lung cancer deaths were elevated, in the range of 1.24–1.6, depending on the model used. These PM results were robust to adjustments for O_3 and expressway exposure.

Conclusion: Our results suggest the chronic health effects associated with within-city gradients in exposure to $PM_{2.5}$ may be even larger than previously reported across metropolitan areas. We observed effects nearly 3 times greater than in models relying on comparisons between communities. We also found specificity in cause of death, with $PM_{2.5}$ associated more strongly with ischemic heart disease than with cardiopulmonary or all-cause mortality.

(*Epidemiology* 2005;16: 000–000)

A review of the literature on the chronic health effects of ambient air pollution suggests that studies using the American Cancer Society (ACS) cohort to assess the relation between particulate air pollution and mortality rank among the most influential and widely cited. The original study[1] (a reanalysis that introduced new random-effects methods and spatial analytic techniques[2,3]) and more recent studies with longer follow up and improved exposure data have all demonstrated air pollution effects on all-cause and cause-specific mortality.[4,5] As a result of this robust association and a lack of other studies on the long-term effects, the ACS studies together with the Six-Cities study[6] have been important for government regulatory interventions such as the U.S. Environmental Protection Agency's National Air Quality Standard for Fine Particles. The ACS studies have also been used by the World Health Organization as a basis for estimating the burden of mortality attributable to air pollution.[7]

The assessment of air pollution exposure using only community average concentrations likely underestimates the health burden attributable to elevated concentrations in the vicinity of sources.[8,9] Health effects may be larger around sources, and these effects are diminished when using average concentrations for the entire community. Previous ACS studies have relied on between-community exposure contrasts at the scale of a metropolitan area giving all residents of a city the same exposure concentrations. Exposure to air pollution, however, may vary spatially within a city,[10–14] and these variations may follow social gradients that influence suscep-

Submitted 26 August 2004; accepted 23 May 2005.

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Supported by the Health Effects Institute, the National Institute of Environmental Health Sciences (grants 5 P30 ES07048 5P01ES011627), the Verna Richter Chair in Cancer Research, and the NSERC/SSHRC/McLaughlin Chair in Population Health Risk Assessment at the University of Ottawa.

Supplemental material for this article (Article Plus) is available with the online version of the journal at www.epidem.com; click on "Article Plus."

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ISSN: 1044-3983/05/1606-0001
DOI: 10.1097/01.ede.0000181630.15826.7d

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tibility to environmental exposures.[3] Residents of poorer neighborhoods may live closer to point sources of industrial pollution or roadways with higher traffic density.[15] This exposure misclassification along social gradients may explain the finding of effect modification by educational status in earlier ACS studies.[2,16] The spatial correspondence between high exposure and potentially susceptible populations within cities may further bias estimates that rely on central monitors to proxy exposure over wide areas. Theoretically, classic exposure measurement error induced by central monitors may also bias results toward the null.[17]

Given the potential of the metropolitan scale to bias health effect estimates, we have assessed the association between air pollution and mortality at the within-community or intraurban scale. We sought an urban location with sufficient geographic scope, air pollution data, and enough ACS subjects to test the association. Los Angeles (LA), California, met these selection criteria. The region has high pollution levels, large intraurban gradients in exposure over a wide geographic area, and strong public awareness that air pollution has serious public health consequences.[18]

METHODS

Cohort Data

We extracted health data from the ACS Cancer Prevention II survey for metropolitan LA at the zip code-area scale (zip codes are used for U.S. mail delivery; average population per zip code in LA is approximately 35,000, with an average area of approximately 22.5 km^2). We constructed distribution-weighted centroids using spatial boundary files based on 1980 and 1990 definitions. We were able to assign exposure to 267 zip code areas with a total of 22,905 subjects (5856 deaths based on follow up to 2000). Some subjects reported only postal box addresses and were therefore excluded. These subjects had been enrolled in 1982 along with over one million others as part of the ACS II survey. Similar to earlier ACS analyses, availability of air pollution data and other relevant information led to the subset of study subjects to be used in the health effects research. Although the ACS cohort is not representative of the general population, the cohort allows for internally valid comparisons within large samples of the American population. This study was approved by the Ethics Board of the Ottawa General Hospital, Canada. Subjects had given informed consent at enrollment into the study.

Control for Confounding

We used 44 individual confounders identified in earlier ACS studies of air pollution health effects.[4] These variables include lifestyle, dietary, demographic, occupational, and educational factors that may confound the air pollution–mortality association. We had more than 10 variables that measure aspects of smoking. Sensitivity analyses revealed that removal of individual variables had little influence on the estimated pollution coefficients; therefore, to promote comparability with results from earlier studies, we report the results with this standard set of 44 variables.

We also assembled 8 ecologic variables for the zip code areas to control for "contextual" neighborhood confounding. "Contextual" effects occur when individual differences in health outcome are associated with the grouped variables that represent the social, economic, and environmental settings where the individuals live, work, or spend time (eg, poverty or crime rate in a neighborhood).[19–22] These contextual effects often operate independently from (or interactively with) the individual-level variables such as smoking. The ecologic variables used represented constructs identified as important in the population health literature and previously tested as potential confounders with the ACS dataset at the metropolitan scale.[23,24] These include income, income inequality, education, population size, racial composition (black, white, Hispanic), and unemployment.[3] A new variable measuring potential exposure misclassification by the proportion having air conditioning was also tested. Similar variables have been in a metaanalysis of acute effects,[25] on the premise that air-conditioned houses are more tightly sealed and have lower penetration of particles indoors. A recent study of personal exposures in LA reported large reductions in penetration of particles for air-conditioned houses.[26] This variable adds partial control for the impact of air conditioning, which may relate both to health outcomes (through prevention of heat stroke) and to air pollution (because high air pollution concentrations and lower proportions of air conditioning are related in our study area). We thus expected the proportion of air conditioning in the zip code area to correlate with lower PM exposures and effects. We also computed principal components of all 8 variables to provide maximal control for confounding while avoiding multicollinearity among the ecologic variables.[27,28]

Exposure Assessment

To derive exposure assessments, we interpolated $PM_{2.5}$ data from 23 state and local district monitoring stations in the LA basin for the year 2000 using 5 interpolation methods: bicubic splines, 2 ordinary kriging models, universal kriging with a quadratic drift, and a radial basis function multiquadric interpolator. We emphasized kriging interpolation because this stochastic method produces the best linear unbiased estimate of the pollution surface.[29] After crossvalidation, we used a combination of universal kriging and multiquadric models. This approach takes advantage of the local detail in the multiquadric surface and the ability to handle trends in the universal surface. We averaged estimated surfaces based on 25-m grid cells. We conducted sensitivity analysis using only the universal estimate and found the results to be similar; therefore, only the findings from the combined model are

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reported. Sensitivity analyses were also implemented with the kriging variance. Exposure assignments were downweighted with larger errors in exposure estimates in these analyses (ie, weight equal to the inverse of the standard error in the universal kriging estimate).

Although O_3 has had few associations in earlier ACS studies using between-city contrasts,[1,2,4] exposure to this pollutant is considered a health threat in the LA region, which has some of the highest levels in the United States.[18] For O_3, we obtained data at 42 sites in and around the LA basin from the California Air Resources Board database. We interpolated 2 surfaces using a universal kriging algorithm: one based on the average of the 4 highest 8-hour concentrations over the year 2000 and another based on the expected peak daily concentration, which is a statistical measure designed to assess the likely exceedance of the 8-hour average at the site based on the previous 3 years (1999–2001). Both measures are used as a basis for either federal or state designation of nonattainment areas. They both capture extreme events, but the expected peak daily concentration provides more stability for estimation of spatial patterns than the 1-year measures based on the 4 highest days. Few studies of chronic effects have found significant ozone effects, although acute effects of a small magnitude have been observed.[30] Thus, it seems plausible that an ozone effect would be manifest in those areas most likely to experience exceedances.

Finally, we assessed the impact of traffic by assigning buffers that included zip code-area centroids within either 500 or 1000 meters of a freeway. The U.S. Bureau of the Census feature class codes define freeways as having "limited access," a numbered assignment, and a speed limit of greater than 50 miles per hour.[31] This distance from the zip code-area centroid to the freeway-approximated exposure to traffic pollution, which may exert independent effects in addition to pollutants such as $PM_{2.5}$ and O_3 that vary over larger areas.[8]

Complete residential history information was unavailable for the entire cohort, although we do have information on whether respondents moved between enrollment and 1992 or thereafter (approximately 5633 in LA). Of this group, only 16% moved during follow up, and this diminishes the potential for exposure misclassification resulting from residential mobility.

Analytic Approach

We used Cox proportional hazards regression for our main analyses of association between air pollution and mortality.[32] Because the units of analyses were small zip code areas and previous analyses had indicated spatial autocorrelation in the residual variation of some health effects models, we also developed and used a new spatial random effects Cox model as a crossvalidation of the standard model. We have previously shown that survival experience clusters by community and is spatially autocorrelated between communities.[2,3] Lack of statistical control for these factors can bias the estimates of air pollution effects and underestimate associated standard errors.[3,33] To characterize the statistical error structure of survival data, novel statistical methodology and computer software have been developed to incorporate spatial clustering at the zip code area. Our model can be expressed mathematically in the form

$$h_{ij,s}(t) = h_{0,s}(t)\ \eta_j \exp(\beta' x_{ij,s})$$

where h_{ij} is the hazard function or instantaneous hazard probability of death for the ith subject in the jth ZCA, whereas s indicates the stratum (defined by sex, race, and age). Here $h_{0,s}(t)$ is the baseline hazard function. The η_j are positive random effects from the subject level representing the unexplained variation in the response among neighborhoods, in this case zip code areas. Only the moments of the random effects need to be specified within our modeling framework: $E(\eta_j) = 1$ and $Var(\eta_j) = \tau^2$. The vector x_{ij} represents the known risk factors for the response such as air pollution, smoking habits, and diet. The regression parameter vector is denoted by β. Estimates of the regression vector β, random effects, their variance, and correlation parameter are obtained by methods previously used for random-effects survival models.[33] Thaysen polygons, which ensure that all points within the polygon are closer to the centroid of that polygon than to any other centroid, were used to assign first-order nearest neighbor contiguity between the zip code areas. These were derived using ArcView 3.2 (ESRI Corp., Redlands, CA). The standard Moran's I tests of spatial autocorrelation were applied to the random effects.

RESULTS

Figure 1 illustrates the pollution surface used in our main analysis, and the Appendix Figure (available with the

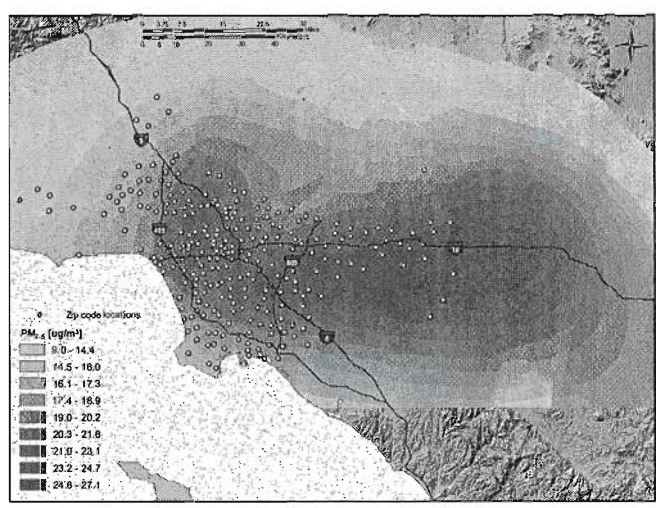

FIGURE 1. $PM_{2.5}$ exposure surface for Los Angeles interpolated with a hybrid universal–multiquartic model.

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TABLE 1. Mortality Relative Risk Associated With a 10-$\mu g/m^3$ Increase of $PM_{2.5}$ Concentrations Based on 267 Zip Code Areas in Los Angeles in the American Cancer Society Cohort (1982–2000 follow up) for Various Causes of Death With Adjustment for Covariates

	Cause of Death*				
Covariates	All Causes (n = 5856) RR (95% CI)	IHD (n = 1462) RR (95% CI)	Cardio Pulmonary (n = 3136) RR (95% CI)	Lung Cancer (n = 434) RR (95% CI)	Digestive Cancer (n = 429) RR (95% CI)
$PM_{2.5}$ only	1.24 (1.11–1.37)	1.49 (1.20–1.85)	1.20 (1.04–1.39)	1.60 (1.09–2.33)	1.29 (0.87–1.90)
44 individual covariates	1.17 (1.05–1.30)	1.39 (1.12–1.73)	1.12 (0.97–1.30)	1.44 (0.98–2.11)	1.18 (0.79–1.75)
Air conditioning	1.17 (1.05–1.31)	1.41 (1.13–1.76)	1.15 (0.99–1.33)	1.42 (0.96–2.08)	1.14 (0.76–1.70)
Percent black	1.16 (1.05–1.29)	1.39 (1.11–1.72)	1.12 (0.97–1.30)	1.45 (0.99–2.13)	1.18 (0.79–1.75)
Percent white	1.15 (1.03–1.28)	1.36 (1.09–1.70)	1.10 (0.95–1.28)	1.51 (1.02–2.23)	1.16 (0.78–1.74)
Percent Hispanic	1.15 (1.02–1.28)	1.33 (1.06–1.67)	1.11 (0.95–1.29)	1.46 (0.98–2.20)	1.12 (0.74–1.71)
Percent unemployed	1.15 (1.03–1.28)	1.37 (1.09–1.71)	1.13 (0.97–1.31)	1.33 (0.90–1.97)	1.18 (0.78–1.77)
Mean income	1.17 (1.05–1.30)	1.39 (1.12–1.73)	1.13 (0.97–1.30)	1.44 (0.98–2.11)	1.19 (0.80–1.76)
Total population	1.17 (1.05–1.30)	1.38 (1.11–1.72)	1.12 (0.96–1.29)	1.45 (0.99–2.12)	1.20 (0.80–1.78)
Income inequality	1.14 (1.02–1.28)	1.31 (1.04–1.64)	1.07 (0.92–1.25)	1.33 (0.90–1.98)	1.21 (0.80–1.81)
Percent postsecondary education	1.16 (1.05–1.29)	1.38 (1.11–1.72)	1.12 (0.97–1.30)	1.42 (0.97–2.08)	1.16 (0.78–1.72)
All social factors (principal component analysis)	1.15 (1.03–1.29)	1.32 (1.05–1.66)	1.10 (0.94–1.28)	1.43 (0.96–2.13)	1.20 (0.80–1.80)
Air conditioning, mean income, percent postsecondary education, social factor (low Latino–high income)	1.11 (0.99–1.25)	1.26 (0.99–1.61)	1.08 (0.92–1.27)	1.20 (0.79–1.82)	1.13 (0.74–1.73)
Parsimonious contextual covariates	1.11 (0.99–1.25)	1.25 (0.99–1.59)	1.07 (0.91–1.26)	1.20 (0.79–1.82)	1.14 (0.74–1.74)
Copollutant control					
44 individual covariates + O_3 (expected peak daily concentration) + $PM_{2.5}$	1.20 (1.07–1.34)	1.45 (1.15–1.82)	1.19 (1.02–1.38)	1.47 (0.98–2.20)	1.16 (0.77–1.77)
44 Individual covariates + O_3 (average of 4 highest 8 h maxima) + $PM_{2.5}$	1.18 (1.06–1.32)	1.42 (1.14–1.78)	1.15 (0.99–1.34)	1.52 (1.02–2.26)	1.17 (0.78–1.76)
44 individual covariates + intersection with freeways within 500 m + $PM_{2.5}$	1.17 (1.05–1.31)	1.38 (1.11–1.72)	1.13 (0.97–1.31)	1.46 (0.99–2.16)	1.21 (0.81–1.80)
Copollutant risk estimates					
O_3 (expected peak daily concentration)	0.98 (0.96–1.01)	0.97 (0.93–1.02)	0.97 (0.94–0.99)	0.99 (0.91–1.07)	1.01 (0.93–1.09)
O_3 (average of 4 highest 8 h maxima)	0.99 (0.98–1.01)	0.98 (0.95–1.02)	0.99 (0.96–1.01)	0.97 (0.91–1.03)	1.01 (0.95–1.07)
Intersection with freeways within 500 m	0.99 (0.88–1.11)	0.90 (0.71–1.14)	0.92 (0.77–1.08)	1.44 (0.94–2.21)	0.84 (0.53–1.35)
Intersection with freeways within 1000 m	0.98 (0.89–1.06)	1.05 (0.89–1.24)	0.98 (0.88–1.11)	0.94 (0.69–1.30)	0.88 (0.63–1.22)

continued on next page

*ICD-9 code for ischemic heart disease (IHD) 410–414; for cardiopulmonary 400–440, 460–519; for lung cancer 162; for digestive cancer 150–159; for other cancers 140–149, 160, 161, 163–239; for endocrine 240–279; for diabetes 250; for digestive 520–579; male accidents 800+; female accidents 800+.

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TABLE 1. Continued

Other Cancers (n = 992) RR (95% CI)	Cause of Death*					
	Endocrine (n = 95) RR (95% CI)	Diabetes (n = 57) RR (95% CI)	Digestive (n = 151) RR (95% CI)	Male Accidents (n = 75) RR (95% CI)	Female Accidents (n = 47) RR (95% CI)	All Others (n = 497) RR (95% CI)
1.09 (0.85–1.40)	3.22 (1.31–7.91)	2.38 (0.76–7.52)	2.17 (1.11–4.26)	1.52 (0.61–3.83)	1.08 (0.35–3.31)	1.11 (0.74–1.67)
1.06 (0.82–1.36)	2.75 (1.10–6.87)	2.10 (0.64–6.87)	1.98 (1.01–3.91)	1.35 (0.53–3.43)	0.86 (0.25–2.94)	1.13 (0.75–1.69)
1.06 (0.82–1.37)	2.73 (1.09–6.84)	2.10 (0.64–6.94)	1.95 (0.98–3.85)	1.50 (0.58–3.89)	1.01 (0.29–3.58)	1.05 (0.69–1.59)
1.05 (0.82–1.36)	2.70 (1.07–6.79)	2.09 (0.63–6.89)	2.02 (1.03–3.98)	1.29 (0.50–3.31)	0.91 (0.27–3.06)	1.10 (0.73–1.66)
1.05 (0.81–1.36)	2.55 (1.00–6.51)	2.05 (0.61–6.82)	1.96 (0.98–3.92)	1.19 (0.46–3.12)	0.93 (0.27–3.23)	1.10 (0.72–1.68)
1.04 (0.80–1.36)	2.60 (1.00–6.75)	2.07 (0.60–7.15)	1.72 (0.85–3.51)	1.41 (0.53–3.76)	0.71 (0.20–2.53)	1.17 (0.76–1.80)
1.01 (0.78–1.31)	2.27 (0.89–5.78)	1.82 (0.55–6.08)	1.83 (0.91–3.65)	1.51 (0.58–3.95)	0.88 (0.25–3.08)	1.10 (0.73–1.67)
1.07 (0.83–1.37)	2.61 (1.07–6.39)	2.06 (0.64–6.65)	1.99 (1.00–3.94)	1.35 (0.53–3.44)	0.80 (0.22–2.83)	1.12 (0.75–1.69)
1.06 (0.83–1.37)	2.76 (1.11–6.86)	2.10 (0.64–6.87)	2.02 (1.02–3.98)	1.35 (0.53–3.44)	0.72 (0.21–2.49)	1.12 (0.74–1.69)
1.08 (0.83–1.40)	2.84 (1.12–7.21)	2.15 (0.64–7.19)	1.98 (0.98–3.99)	1.29 (0.50–3.37)	0.74 (0.20–2.71)	1.15 (0.75–1.75)
1.05 (0.82–1.36)	2.72 (1.10–6.76)	2.07 (0.64–6.70)	1.99 (1.01–3.93)	1.41 (0.55–3.65)	0.89 (0.26–3.12)	1.14 (0.75–1.71)
1.06 (0.82–1.38)	2.50 (0.99–6.32)	2.12 (0.64–7.07)	1.88 (0.92–3.83)	1.17 (0.43–3.20)	0.59 (0.15–2.23)	1.21 (0.79–1.86)
1.04 (0.79–1.38)	2.40 (0.92–6.27)	1.92 (0.55–6.73)	1.55 (0.74–3.26)	1.89 (0.66–5.40)	0.64 (0.15–2.79)	1.11 (0.72–1.72)
1.06 (0.80–1.40)	2.29 (0.88–5.95)	1.79 (0.52–6.21)	1.55 (0.74–3.24)	1.88 (0.66–5.36)	0.70 (0.17–2.86)	1.10 (0.72–1.70)
1.08 (0.83–1.41)	2.59 (1.01–6.63)	2.17 (0.63–7.40)	1.91 (0.94–3.89)	1.35 (0.50–3.61)	1.12 (0.30–4.21)	0.95 (0.64–1.39)
1.07 (0.83–1.39)	2.76 (1.08–7.00)	2.29 (0.68–7.70)	1.82 (0.90–3.67)	1.29 (0.49–3.40)	0.98 (0.28–3.48)	0.98 (0.67–1.43)
1.08 (0.83–1.39)	2.49 (0.98–6.32)	1.82 (0.55–6.02)	2.20 (1.11–4.37)	1.34 (0.53–3.43)	0.73 (0.21–2.54)	1.02 (0.71–1.48)
0.99 (0.94–1.04)	1.05 (0.88–1.24)	0.98 (0.79–1.22)	1.02 (0.90–1.17)	1.00 (0.83–1.21)	0.87 (0.68–1.12)	1.06 (0.99–1.14)
0.99 (0.95–1.03)	1.00 (0.88–1.14)	0.94 (0.79–1.12)	1.06 (0.95–1.17)	1.03 (0.88–1.20)	0.93 (0.77–1.13)	1.04 (0.99–1.10)
1.19 (0.89–1.59)	0.64 (0.26–1.62)	0.45 (0.12–1.70)	2.54 (1.10–5.85)	0.57 (0.17–1.91)	0.87 (0.28–2.70)	0.87 (0.58–1.29)
0.90 (0.72–1.12)	1.55 (0.88–2.75)	1.77 (0.83–3.76)	0.49 (0.24–0.98)	1.05 (0.51–2.15)	2.02 (0.89–4.60)	1.15 (0.87–1.53)

online version of this article) illustrates the absolute and relative standard errors of estimation for the interpolated universal kriging surface. Approximately 50% of the modeled surface has errors that are less than 15% of the monitored value, whereas 67% of the surface lies within 20% of the monitored values. For the most part, absolute standard errors for the densely populated areas of the study region are less than 3 $\mu g/m^3$. Only on the periphery of the study area do

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errors become large compared with monitored values, but these places have very few of our study subjects. Interestingly, the range of exposure within LA (20 $\mu g/m^3$) exceeds what we observed in previous studies based on contrasts among 116 cities (16 $\mu g/m^3$).[4]

Results for all-cause and cause-specific deaths are reported in Table 1. This table shows the $PM_{2.5}$ effect with varying levels of control for confounding. Relative risks (RRs) are expressed as 10 $\mu g/m^3$ exposure contrasts in $PM_{2.5}$ followed by the 95% confidence interval (95% CI). Using the example of all-cause mortality and with each succeeding stage, including the previous individual-level controls, we find that for $PM_{2.5}$ alone and controlling just for age, sex, and race, the RR is 1.24 (95% CI = 1.11–1.37), whereas the RR with the 44 individual confounders[4] is 1.17 (1.05–1.30). All subsequent results include the 44 individual-level control variables and one or more ecologic variables. For example, with 44 individual variables and the ecologic variable of unemployment, the RR of $PM_{2.5}$ is 1.15 (1.03–1.28). When we add 4 social factors extracted from the principal component analysis (and accounting for 81% of the total variance in the social variables), the RR is 1.15 (1.03–1.29). Including all ecologic variables associated with mortality in bivariate models reduces the pollution coefficient to RR of 1.11 (0.99–1.25). Finally, for the parsimonious model that includes ecologic confounder variables that both reduce the pollution coefficient and have associations with mortality, the RR is 1.11 (0.99–1.25).

Comparing these results directly with the earlier analyses using between-community contrasts, the health effects are nearly 3 times greater for this analysis (ie, 17% increase compared with 6% in earlier studies in models that control for the 44 individual confounders). With control for neighborhood confounders, effect estimates are still approximately 50% to 90% higher than in previous analyses.

In models with only individual covariates and $PM_{2.5}$, some residual spatial autocorrelation was present in the random effects from the model clustered on zip code area. We attempted to remove this autocorrelation by fitting a model with a ρ autocorrelation term that used mortality information from nearest neighbors as a predictor of mortality in the ZCA j, but the autocorrelation persisted (results not shown). When contextual socioeconomic status variables were included in the model, however, the Moran's I tests revealed no significant spatial autocorrelation. Table 2 shows the results of the Moran's I test for all-cause and ischemic heart disease mortality. Visual inspection of the random effects, η_j, confirmed the results from the Moran's I testing.

Sensitivity analyses using weighted estimation with weights equal to the inverse of the standard error on the universal kriging exposure model demonstrated that the risk estimates were robust to measurement error in the exposure estimate (results not shown). Point estimates remained elevated.

DISCUSSION

Our results suggest that the chronic health effects associated with intraurban gradients in exposure to $PM_{2.5}$ may be even larger than previously reported associations across metropolitan areas. Using the direct comparison to previous ACS studies, we see effects that are nearly 3 times larger than in models relying on between-community exposure contrasts. We also note convincing evidence of specificity in these health effects, with a stronger association between air pollu-

TABLE 2. Results of the Spatial Autocorrelation Analysis on the Random Effects With Various Levels of Control for Confounding

			First-Order Neighborhood Matrix		Second-Order Neighborhood Matrix	
Model	**PM Effect RR (95% CI)**	**Sigma Squared**	**Spatial Autocorrelation Moran's I**	**Normal *P* Value**	**Spatial Autocorrelation Moran's I**	**Normal *P* Value**
All-cause mortality						
44 individual covariates	—	0.00701	0.078	0.021	0.038	0.812
$PM_{2.5}$ + 44 individual covariates	1.165 (1.027–1.321)	0.00442	0.073	0.030	0.030	0.157
$PM_{2.5}$ + 44 individual covariates + parsimonious contextual covariates	1.120 (0.996–1.260)	0.00050	0.016	0.571	−0.017	0.572
IHD mortality						
44 individual covariates	—	0.00476	0.025	0.419	0.037	0.154
$PM_{2.5}$ + 44 individual covariates	1.391 (1.120–1.726)	0.00182	0.008	0.735	0.017	0.382
$PM_{2.5}$ + 44 individual covariates + parsimonious contextual covariates	1.269 (1.005–1.602)	0.00120	−0.016	0.733	0.010	0.583

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tion and ischemic heart disease than for the more general measures of cardiopulmonary deaths or all-cause mortality (Fig. 2 displays the ordering in the risks presented in the tables). These findings concur with recent studies at the metropolitan level, which again demonstrate that ischemic heart disease drives the cardiopulmonary association with air pollution.[5]

Among the cancer deaths, we also observe ordering in the risks, with decreasing risks as we move from lung cancer to digestive cancer to all cancers. Given that the lung would be most directly affected by air pollution, this finding gives corroborative evidence that the association did not occur by chance.

The larger effects in LA raise the question of whether some underlying aspect of this subcohort differs in characteristics that modify the association between mortality and air pollution. We compared the full cohort with the LA subcohort and found no major differences in attributes likely to modify the air pollution–mortality association, with the exception that the LA cohort was better educated. Based on the findings from the earlier analyses in which subjects with lower education experienced larger health effects,[1,2,4] we would expect the effect size in LA to be smaller than in the full cohort. Thus, differences in underlying characteristics appear unlikely to explain the larger effects we observed in LA.

In comparing our results with the earlier national-level ACS studies, we examined the reduction in $PM_{2.5}$ levels in LA to 50 other metropolitan areas that had data for 1980 and for the year 2000 we used in our study. (See Krewski et al[2] for a description of the data.) The mean reduction was 31%, with a range from 0.4% to 59%. LA experienced a reduction of 24.5%, just above the lowest quartile of 23.5%. $PM_{2.5}$ has therefore declined at a slightly slower rate in LA compared with much of the United States. If we assume that current $PM_{2.5}$ in LA is at 75.5% (ie, accounting for 24.5% reduction) of the 1980 value and the average metropolitan area is at 69% of the 1980 value, some of the increase in the risks may be attributable to the relatively smaller reductions in LA. We tested this scaling effect by computing the ratio of reductions (0.69/75.5 = 0.914) and multiplied our raw coefficients by this factor before estimating the RR. The RR declines for all-cause mortality with the 44 individual variables to just over 15% and with maximal adjustment for confounders to 10%. Although reduced by up to 1.6%, we conclude that the majority of the increase over previous estimates reported by Pope et al[34] is probably not attributable to relative differences in the rate of reduction in ambient air pollution.

The findings for endocrine deaths also reveal another interesting possibility. Chronic air pollution exposure, similar to acute exposures,[34] may adversely affect people with diabetes more than the general population. Alternatively, the finding may indicate some uncontrolled confounding because we expect people with type 2 diabetes to live in neighborhoods with poorer social environments. This possibility appears unlikely because of the extensive control we applied for contextual neighborhood variables. This potential problem appears improbable because we see internal validity in the effects of social confounders measured in the zip code areas.

Although the accidental deaths were unexpectedly elevated in men, subsequent analyses revealed that the risks were attributable to deaths in the early years of the cohort

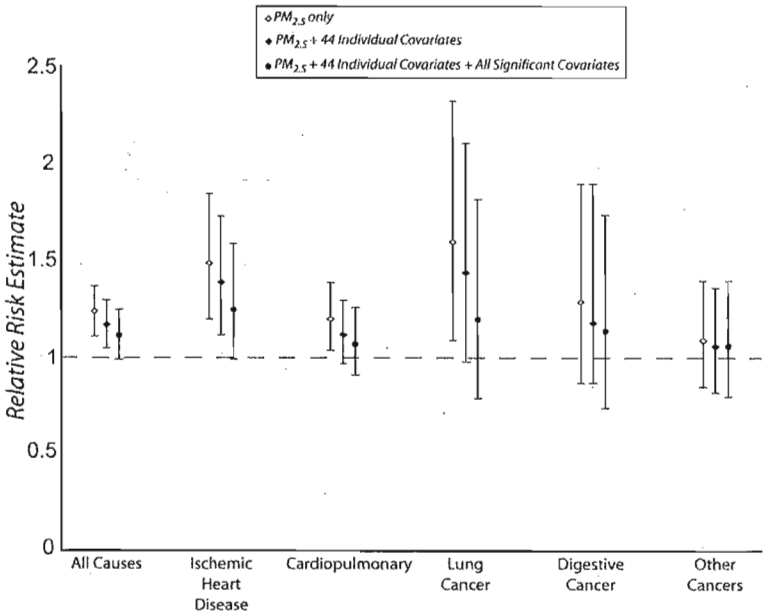

FIGURE 2. Risk plots summarizing mortality relative risks (RR) and 95% CIs associated with a 10-$\mu g/m^3$ increase in ambient $PM_{2.5}$ by cause of death.

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before causes of death were coded in detail. As a result, we were unable to assess specific causes for this elevation.

Ozone had few elevated risks in any of our analyses and did not confound the relationship between particles and mortality. This finding agrees with earlier ACS studies indicating that ozone is not associated with elevated mortality risk,[2,4] but contradicts studies on nonsmoking Adventists in southern California, where associations between lung cancer in males and ozone exposure were detected.[35] Recent national studies have reported elevated acute risks of ozone exposure,[30] but risk estimates were small, as would be expected of a study on acute as compared with chronic effects.[36]

In assessing the association with freeway buffers, point estimates were particularly elevated for lung cancer, endocrine, and digestive mortality. The PM—mortality association remained robust to the freeway buffer, and risk estimates were unchanged when this variable was included in the model. Although imprecision in the freeway exposures resulting from the zip code area assignment of proximity may have biased our results toward the null, we did observe a RR for lung cancer of 1.44, and the other cause-specific mortality metrics indicate that more precise estimation of traffic effects are warranted in future research.

In previous studies based on the ACS cohort, all individuals within the same metropolitan area were assigned the same level of exposure based on the average ambient concentration observed at fixed-site air pollution monitors in that city. We hypothesized that the use of such a broad ecologic indicator of exposure leads to exposure measurement error, which in turn can bias estimates of mortality associated with air pollution exposure. Mallick et al[37] analyzed the effect of this source of exposure measurement error based on plausible assumptions about error magnitude in the Six-Cities Study of air pollution and mortality.[6] This investigation suggested that the RR of mortality resulting from particulate air pollution may be underestimated by a factor of approximately 2- to 3-fold as a consequence of exposure misclassification, a finding consistent with the present results.

We recognize the possibility of exposure measurement error from using recent exposure models for a cohort enrolled in 1982. There are empiric as well as theoretical reasons that prevent this potential problem from seriously limiting the results. Empirically, other ACS analyses done at the metropolitan scale have found that these more recent exposure estimates predicted mortality with results similar to those based on earlier monitoring data.[4] Also, the well-known meteorologic and topographic conditions of LA, along with a dominant on-shore breeze and steep mountains to the north and east, control much of the spatial pattern of pollution in the region. Our results agree with findings of earlier studies on the pattern of spatial variation in PM.[38] Although levels may rise and fall in absolute terms, major changes in the spatial patterns within the region over time appear unlikely, and the rank ordering among assigned exposures should be maintained.

From a theoretical perspective, even if spatially heterogeneous changes to pollution levels within a city occurred as a result of new emissions during the follow up, this would lead to larger exposure measurement error, and a bias toward the null would dominate, assuming a classic error structure. With a Berkson error structure, the variance of the dose–response estimate would be inflated.[17] In either case, with current exposure models, the health effects likely have a lower probability of false-positive error, and we would expect the measurement error to reduce effect sizes and inflate their variance. High dose–response relationships can be caused by underestimation of concentrations in the high-exposure areas, but for these areas, the monitoring networks tend to be dense and the kriging errors were smaller than in most of the study area. Finally, the findings were robust to weighting for errors in the kriging estimate (ie, eastern parts of the LA region), which decreases the likelihood that elevated risks arise as a result of underestimation in the high-exposure groups.

Although we are unable to reconstruct likely exposures to $PM_{2.5}$ for our exposure surface, we have assessed the relationship at 51 central monitors between $PM_{2.5}$ measured in 1980 and those of a period similar to that of our 2000 estimates (ie, 1999–2000). These data were used in previous national studies,[4] in which details on their derivation are available. Figure 3 illustrates the regression scatterplot for the 1999–2000 values on the 1980 measurements. The coefficient of determination is approximately 68%, and overall the latter periods are predicted well by the earlier measurements.

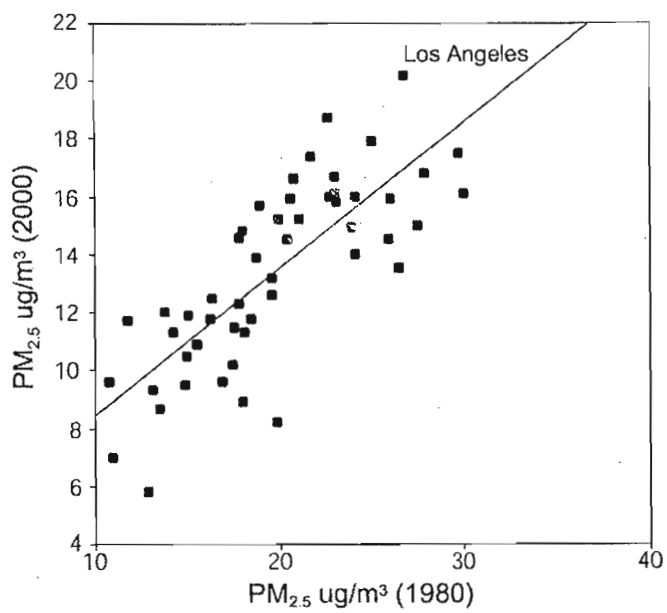

FIGURE 3. 2000 $PM_{2.5}$ regressed onto 1980 $PM_{2.5}$ (n = 51 cities, R^2 = 0.61).

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In addition, we examined the relationship of historical PM_{10} data in the LA area with the 2000 $PM_{2.5}$ estimates used in our analysis. The period of maximal overlap between the sites occurs in 1993, where we had 8 PM_{10} readings at the same locations as the subsequent $PM_{2.5}$ measurements. By regressing the 2000 $PM_{2.5}$ measurements on those PM_{10} measurements in 1993, we observe an R^2 value of 90% (Fig. 4).

In both of these correlation analyses comparing earlier monitoring data with more recent $PM_{2.5}$ measurements, we found evidence that areas with higher particle concentrations in earlier periods were likely to retain their spatial ranking. Those metropolitan areas likely to be high in 1980 also had a similar tendency in 2000.

Only the Norwegian cohort study has used time windows of exposure.[39] In this study, the authors found that timing of the exposure window had little influence on the estimation of health effects; they used exposure windows in the middle of the follow-up period for most of their results. All of the other cohort studies have taken a similar approach to ours and computed the risk based on relatively short-term air pollution monitoring data. A case–control study in Stockholm, Sweden, investigated time windows for lung cancer.[40] This study found that windows of exposure 20 years before disease onset were more strongly associated with cancer than later periods. In our study, we found elevated risks of lung and digestive cancers, even with the more recent exposure model. The likely stability in the spatial pattern of exposure in LA probably accounts for this similarity of our findings to the 2 European studies that have used time windows.

Generally, our results agree with recent evidence suggesting that intraurban exposure gradients may be associated with even larger health effects than reported in interurban studies. Hoek et al[8] reported a doubling of cardiopulmonary mortality (RR = 1.95; 95% CI 1.09–3.52) for Dutch subjects living near major roads. Canadian cohort studies controlling for medical care utilization and preexisting chronic conditions through record linkage have also uncovered large health effects with proximity to major roads at the intraurban scale.[16] Recent results from the cohort in Norway also suggest associations between intraurban gradients in gaseous pollutants and mortality.[40] All of these studies have implicated traffic as the source of pollution associated with the larger observed effects. In LA, the proportion of primary particles attributable to traffic is approximately 3.7%, whereas in the rest of the country, it is 0.75%.[41] Thus, beyond improved precision in the exposure models, the larger health effects reported here may be partly the result of higher proportions of traffic particulate in LA.

No previous studies have assessed associations based on a continuous exposure model with $PM_{2.5}$, which limits the use of the estimates for current policy debates that tend to focus on fine particles. In this study, we used $PM_{2.5}$ with a continuous exposure metric that promotes comparison with previous studies on health effects and contributes to current regulatory debates.

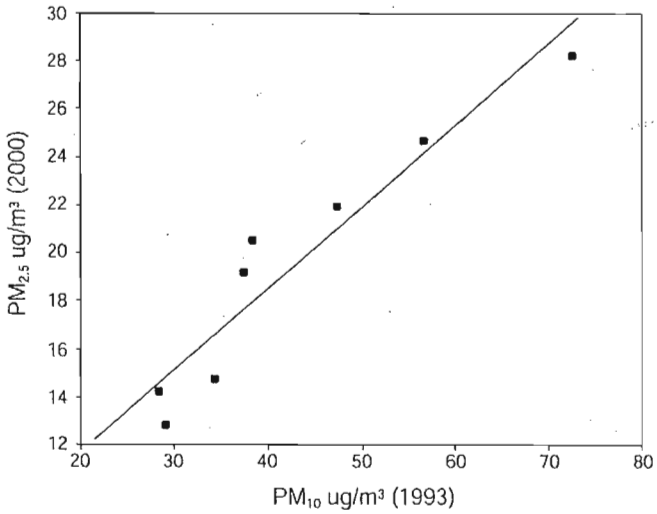

FIGURE 4. 2000 $PM_{2.5}$ regressed onto 1993 PM_{10} (n = 8 sites in LA, R_2 = 0.91).

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The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 OCTOBER 21, 2004 VOL. 351 NO. 17

Exposure to Traffic and the Onset of Myocardial Infarction

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ABSTRACT

BACKGROUND

An association between exposure to vehicular traffic in urban areas and the exacerbation of cardiovascular disease has been suggested in previous studies. This study was designed to assess whether exposure to traffic can trigger myocardial infarction.

METHODS

We conducted a case–crossover study in which cases of myocardial infarction were identified with the use of data from the Cooperative Health Research in the Region of Augsburg Myocardial Infarction Registry in Augsburg, in southern Germany, for the period from February 1999 to July 2001. There were 691 subjects for whom the date and time of the myocardial infarction were known who had survived for at least 24 hours after the event, completed the registry's standardized interview, and provided information on factors that may have triggered the myocardial infarction. Data on subjects' activities during the four days preceding the onset of symptoms were collected with the use of patient diaries.

RESULTS

An association was found between exposure to traffic and the onset of a myocardial infarction within one hour afterward (odds ratio, 2.92; 95 percent confidence interval, 2.22 to 3.83; P<0.001). The time the subjects spent in cars, on public transportation, or on motorcycles or bicycles was consistently linked with an increase in the risk of myocardial infarction. Adjusting for the level of exercise on a bicycle or for getting up in the morning changed the estimated effect of exposure to traffic only slightly (odds ratio for myocardial infarction, 2.73; 95 percent confidence interval, 2.06 to 3.61; P<0.001). The subject's use of a car was the most common source of exposure to traffic; nevertheless, there was also an association between time spent on public transportation and the onset of a myocardial infarction one hour later.

CONCLUSIONS

Transient exposure to traffic may increase the risk of myocardial infarction in susceptible persons.

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N Engl J Med 2004;351:1721-30.
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MYOCARDIAL INFARCTION IS ONE OF the main causes of death from cardiovascular disease. A myocardial infarction has a sudden onset, and factors related to lifestyle have been identified as potential triggers of myocardial infarction. These include strenuous exercise,[1-3] anger,[4] and the use of cocaine[5] and marijuana.[6] Recently, environmental factors such as elevated concentrations of ambient particulate matter have been added to the list of triggers.[7]

Traffic is an important concern in urban areas as a potential risk factor for cardiovascular disease.[8] In a cohort study, the risk of death from cardiopulmonary causes was twice as high among persons living close to a major road or highway, after adjustment for risk factors such as age, sex, and smoking status, than among those living farther from a major road or highway.[9] In addition, case–control studies have indicated that the work environment of professional drivers may contribute to their risk for myocardial infarction.[10,11]

In this study we assessed the association between the onset of a nonfatal myocardial infarction and exposure to traffic. The study assessed the effect of exposure on the basis of a complete case series of survivors of myocardial infarction, with the use of the case–crossover method.[12] The cases were drawn from the complete case series of the Cooperative Health Research in the Region of Augsburg (KORA) Myocardial Infarction Registry in Augsburg, southern Germany, for a period of 2.5 years. A study diary was used to collect information on the four days before the onset of symptoms, including information on the number of hours spent in traffic.

METHODS

STUDY SUBJECTS

We identified 906 cases of nonfatal myocardial infarction in the KORA registry, of which 691 were included in our study. Hospitalized survivors of myocardial infarction who are 25 to 74 years of age are routinely entered into this registry.[13] Cases are identified daily at the Central Hospital and once a week at six hospitals in the city of Augsburg and the two adjacent rural districts and at four hospitals near the study area. The diagnosis of a myocardial infarction was made with use of the algorithm of the World Health Organization's Multinational Monitoring of Trends and Determinants in Cardiovascular Disease (MONICA) project. The criteria of the algorithm include chest pain lasting more than 20 minutes that is not relieved by the administration of nitrates and either Q waves on electrocardiographic examination that suggest an evolving myocardial infarction, subsequent increases in the level of creatine kinase, aspartate aminotransferase, or lactate dehydrogenase to more than twice the upper limit of normal, or both.

All subjects gave written informed consent for participation; the protocol was approved by the KORA review board. Persons were excluded from the study if they were in poor health (e.g., if they had a critical illness or were in a moribund condition) and were unable to communicate with the investigators. Interviews took place on the general ward as soon as possible after the index event (median, nine days). Data on the sociodemographic characteristics, medical history, and smoking status of the subjects were collected by a trained research nurse as part of the registry's routine interview. After the subject's discharge, clinical data were abstracted from the medical records according to a standardized protocol.

The time of onset of the myocardial infarction was defined as the time of the onset of chest pain that lasted at least 20 minutes. In cases of subjects with atypical chest pain (27 subjects) or with other symptoms (17), the time of the severest symptoms was used. Supporting data were retrieved from the patient's medical record (e.g., a history of symptoms recorded by the physician in the ambulance or the emergency room). If the data conflicted, medical reports were considered to be more reliable than information provided by the patient.

DIARY OF ACTIVITIES

The activities of the subjects on the day of the myocardial infarction and during the four days preceding the symptoms were recorded by registry nurses in a standardized, interview-based diary after completion of the registry's routine interview. Information recorded in the diary included time (hours) spent sleeping, levels of activity during the day, periods spent outdoors, means of transportation, location (according to postal codes) within the study area, the presence or absence of symptoms of angina pectoris, the occurrence of extreme anger or joy, and any exposure to dust or solvents. Activities occurring within 0 and 59 minutes after a particular hour were ascribed to that particular hour. The same importance was given to all four days preceding the event.

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During a pilot phase in which the diary was tested, we interviewed 26 patients in the central hospital between October 3 and November 13, 1999, and afterward the diary was revised to improve its clarity, minimize redundancy, and facilitate the statistical analysis. Adherence to standardized procedures for the interview and coding was ensured by careful training of three research nurses, who had extensive clinical experience with cardiovascular disease, subsequent routine supervision of the interviews, and a policy of asking the nurses to contact the study investigators immediately in the event of unforeseen problems.

STATISTICAL ANALYSIS

Conditional logistic-regression models were used to assess the association between transient exposure to various levels and types of traffic and the onset of the myocardial infarction, as proposed by Mittleman and colleagues.[14] With the use of descriptive analyses, we calculated the frequency of exposure to traffic for a particular period of time by dividing the number of person-hours of exposure by the total number of person-hours within that period. For each subject included in the study, one-hour periods during the six hours before the onset were selected as the case periods. A "control period" of exposure was defined as an exposure to traffic by the same subject 24 to 71 hours before the hour of the onset of the myocardial infarction. Thus, each subject represented a matched set of data for case and control exposures, and different case periods were tested against the set of control periods for the same subject. Only subjects for whom there were discordant sets of data on exposure were included in the analysis — that is, either subjects who were exposed to traffic in the case period but not in a control period, or those who were not exposed to traffic in the case period but were exposed in a control period.

RESULTS

PATIENTS

Of 906 persons who had a confirmed myocardial infarction and who survived for at least 24 hours, 215 (23.7 percent) were unable to provide diary information, information on the hour of the onset of the myocardial infarction, or both (Table 1). The remaining 691 patients with a confirmed myocardial infarction, who were included in the diary study, were predominantly male, and 70 percent of them

Table 1. Characteristics of Survivors of Myocardial Infarction (MI) Recruited between February 1999 and July 2001, According to Data from the KORA Myocardial Infarction Registry.*

Characteristic	Diary Data (N=691)	No Diary Data (N=215)	P Value
Mean age — yr	60	62	0.01†
Age group — no. (%)			
25–34 yr	6 (1)	1 (<1)	
35–44 yr	58 (8)	6 (3)	
45–54 yr	141 (20)	43 (20)	
55–64 yr	224 (32)	68 (32)	
65–74 yr	262 (38)	97 (45)	0.04‡
Male sex — no. (%)	532 (77)	172 (80)	0.35‡
German nationality — no. (%)	656 (95)	201 (93)	0.41‡
Employment status — no. (%)			
Employed	280 (41)	60 (28)	
Not employed§	411 (59)	155 (72)	<0.001‡
Educational level — no. (%)			
Low (8 to 11 yr)	532 (77)	155 (72)	
High (>11 yr)	132 (19)	50 (23)	0.17‡
First MI — no. (%)	595 (86)	171 (80)	0.04¶
Survival to 28 days — no. (%)	687 (99)	214 (>99)	1.00¶
Symptoms of MI — no. (%)			
Typical	647 (94)	191 (89)	
Atypical	27 (4)	10 (5)	
Other	17 (2)	14 (7)	0.01‡
History of disease — no. (%)			
Angina pectoris	163 (24)	69 (32)	0.01‡
Hypertension	457 (66)	165 (77)	0.003‡
Diabetes	143 (21)	69 (32)	<0.001‡
None	173 (25)	29 (13)	<0.001‡
Smoking status — no. (%)			
Smoker	248 (36)	51 (24)	
Nonsmoker	235 (34)	78 (36)	
Former smoker	208 (30)	86 (40)	0.002‡
Hospital at which patient was seen — no. (%)			
Central Hospital	559 (81)	164 (76)	
Other	132 (19)	51 (24)	0.14‡
Interval between MI and interview — days			<0.001‖
Median	9	11	
Range	3–54	3–351	

* Data on educational level were missing for 37 subjects — 27 for whom diary data were available and 10 without diary data. Subjects without diary data were not included in the case–crossover study.
† The P value was calculated with the use of Tukey's test.
‡ The P value was calculated with the use of the chi-square test.
§ Retired persons and housewives were included in this group.
¶ The P value was calculated with the use of Fisher's exact test.
‖ The P value was calculated with the use of the Wilcoxon rank-sum test.

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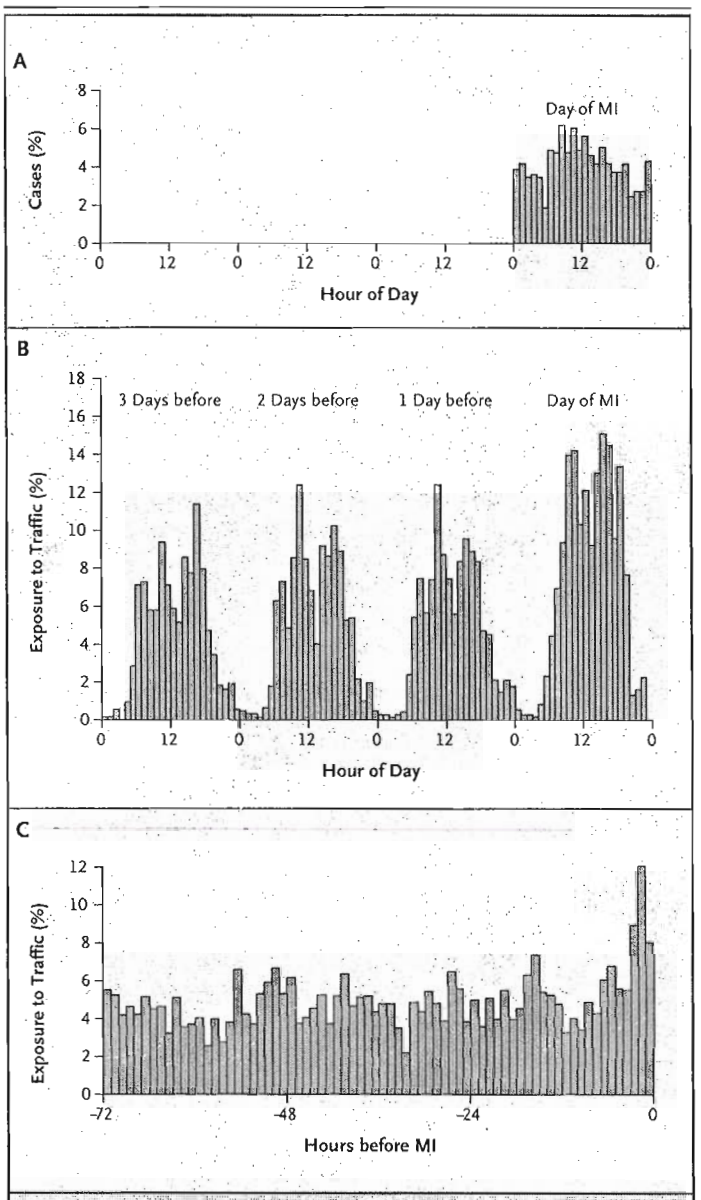

Figure 1. The Onset of 691 Nonfatal Myocardial Infarctions (MI) in Relation to Exposure to Traffic, According to the Amount of Time Spent in Traffic, February 1999 to July 2001, in the Region of Augsburg, Germany.

Panel A shows the distribution of times of onset of the myocardial infarctions over the day of the event, Panel B the time subjects spent in traffic on the day of the event and during the three days before it, and Panel C the time spent in traffic during the 72 hours preceding the onset of the myocardial infarction. The percentages are the proportions of subjects with exposure during the hour in question. Data are from the KORA Myocardial Infarction Registry.

were 55 years of age or older. For most of these subjects, this was their first myocardial infarction, and most of them survived to 28 days.

ASSOCIATION OF EXPOSURE TO TRAFFIC AND ONSET OF MYOCARDIAL INFARCTION

Exposure to traffic was more frequent on the day of the onset of the myocardial infarction (469 person-hours with exposure to traffic out of 8162 person-hours, or 5.7 percent) than during the previous three days (for the day before the onset of the myocardial infarction, 756 person-hours of 15,777 person-hours, or 4.8 percent; for the second day before the onset, 670 person-hours of 14,154 person-hours, or 4.7 percent; and for the third day before the onset, 528 person-hours of 11,478 person-hours, or 4.6 percent) (Fig. 1A and 1B). On the day of the myocardial infarction, of all the hours the subjects spent in traffic, 72 percent were spent in a car, 16 percent on a bicycle, 10 percent on public transportation (buses, trolley cars, and trains), and 2 percent on motorcycles. The percentages of hours spent in a vehicle were similar on the four days preceding the day of the myocardial infarction. One hour before the onset of the myocardial infarction, exposure to traffic was twice as frequent as at any other time (Fig. 1C).

Exposure to traffic was associated with an increase by a factor of 2.60 to 3.94 in the risk of the onset of a myocardial infarction within one hour (Table 2). Such exposure was not rare; for example, of the 625 subjects who reported exposure to traffic in the hours before the onset of the myocardial infarction, 75 who were exposed to traffic one hour before the onset and 375 for whom there were discordant matched sets of exposure were included in the analysis (Table 2). The odds ratio for exposure to traffic one hour before a myocardial infarction was 2.73 (95 percent confidence interval, 2.06 to 3.61) after adjustment for severe exertion, being outside, and getting up in the morning. The odds ratio associated with severe exertion was 6.38 (95 percent confidence interval, 3.89 to 10.46); for being outside, 2.21 (95 percent confidence interval, 1.61 to 3.03); and for getting up in the morning, 1.69 (95 percent confidence interval, 1.24 to 2.30). The odds ratio associated with travel by bicycle was 1.83 (95 percent confidence interval, 0.93 to 3.61) after adjustment for severe exertion, being outside, and getting up in the morning.

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SENSITIVITY ANALYSES

We used sensitivity analyses to assess whether the results depended on the selection of the control period, and we compared the results of the different analyses (Table 2) with the results of the final model (Table 3, model A). The estimate was slightly larger in the sensitivity analysis (Table 3, models B and C) than in the main analysis. Slightly smaller estimates were observed when only one control exposure 24 hours before the onset was included in the analysis (Table 3, model D). The equivalent of model D was the analysis of discordant pairs with the use of McNemar's test. The odds ratio of 2.86 was derived by dividing 60 cases (of exposure to traffic during the case period but not during the control period) by 21 cases (of exposure to traffic during the control period but not during the case period) (P<0.001). The estimated odds ratios were slightly larger if the case–crossover analyses made use of three control periods that were matched with the case period for time of day (Table 3, models E and F).

The patients' differential recall of their activities before the onset of the myocardial infarction was a major concern. Information on exposure to traffic for the period from 0 (the onset of myocardial infarction) to −23 hours was available for 99 percent of the subjects, for −24 to −47 hours for 94 percent, for −48 to −71 hours for 82 percent, and for −72 to −95 hours for 38 percent. To assess the potential for recall bias within the data, we conducted analyses within the nonrisk periods defined a priori. We selected case periods and control periods from the 24 to 96 hours before onset (Table 3, models G through J). No association was observed between exposure to traffic and the onset of the myocardial infarction when case periods 25 hours before onset and control periods 49 hours before onset were considered (model G). A nonsignificant elevation in risk (P=0.13) was observed for the case period of 49 hours before onset and the control period of 73 hours before onset (model H), indicating that recall of activities may be biased 72 to 95 hours before the onset of a myocardial infarction. Models I and J indicate that with the period considered in the main analyses, no evidence of differential recall was found during control periods.

SUBGROUP ANALYSES

Exposure to traffic appeared to be associated with larger risks among women than among men and among patients 60 years of age or older than among

Table 2. Odds Ratios for the Onset of Myocardial Infarction (MI) after Time Spent in Traffic, According to the Means of Transportation.*

Type of Transportation and Hours before MI	No. of Subjects	Frequency of Exposure in Case Period on Day of MI (%)	Odds Ratio (95% CI)	P Value
Any means of transportation†				
Concurrent	585	8.0	1.50 (1.07–2.09)	0.02
1 hr	625	12.1	2.92 (2.22–3.83)	<0.001
2 hr	634	8.9	2.01 (1.49–2.72)	<0.001
3 hr	635	5.5	1.15 (0.79–1.66)	0.47
4 hr	638	5.6	1.27 (0.89–1.83)	0.19
5 hr	639	6.8	1.64 (1.17–2.30)	0.004
6 hr	640	6.1	1.34 (0.93–1.92)	0.11
Cars				
Concurrent	585	5.6	1.33 (0.90–1.99)	0.15
1 hr	625	8.3	2.60 (1.89–3.57)	<0.001
2 hr	634	6.5	1.94 (1.37–2.76)	<0.001
3 hr	635	4.2	1.16 (0.76–1.78)	0.49
4 hr	638	4.0	1.21 (0.79–1.86)	0.38
5 hr	639	5.3	1.73 (1.19–2.54)	0.005
6 hr	640	5.0	1.55 (1.04–2.30)	0.03
Bicycles				
Concurrent	585	1.8	2.59 (1.27–5.29)	0.009
1 hr	625	2.4	3.94 (2.14–7.24)	<0.001
2 hr	634	1.6	2.70 (1.37–5.33)	0.004
3 hr	635	1.0	1.66 (0.74–3.74)	0.22
4 hr	638	0.7	1.16 (0.45–2.96)	0.76
5 hr	639	0.9	1.49 (0.63–3.54)	0.37
6 hr	640	0.7	1.02 (0.36–2.87)	0.97
Public transportation				
Concurrent	585	0.5	1.08 (0.33–3.55)	0.90
1 hr	625	1.2	3.09 (1.41–6.75)	0.005
2 hr	634	0.9	2.13 (0.91–5.23)	0.08
3 hr	635	0.3	0.69 (0.17–2.88)	0.62
4 hr	638	0.9	2.27 (0.95–5.41)	0.06
5 hr	639	0.6	1.54 (0.55–4.37)	0.41
6 hr	640	0.3	0.73 (0.17–3.06)	0.67

* Analyses have been adjusted for the time of day to control for the potential effects of circadian variation with the use of 23 indicator variables. Vulnerable case periods were 0 to 6 hours before the onset of myocardial infarction, and control periods 24 to 71 hours before onset. The analyses were restricted to time (hours) spent within the study area (defined as the city of Augsburg and two adjacent rural districts) during the case periods and the control periods, to exclude time spent in long-distance travel. Data are from the KORA Myocardial Infarction Registry, February 1999 to December 2001. CI denotes confidence interval.

† "Any means of transportation" combines times spent in cars, in public transportation, and on motorcycles or bicycles.

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Table 3. Sensitivity Analyses of the Effect of Different Control-Selection Strategies on the Association of Exposure to Traffic and the Onset of a Myocardial Infarction (MI).*

Sensitivity-Analysis Model	Case Exposure	Control Exposure	No. of Patients	Odds Ratio (95% CI)
		hr before MI		
A†	1	24–71	625	2.92 (2.23–3.84)
B†	1	24–95	625	2.98 (2.27–3.90)
C†‡	1	24–95	404	3.47 (2.51–4.79)
D	1	25	613	2.86 (1.74–4.70)
E	1	25, 49, 73	623	3.11 (2.10–4.60)
F‡	1	25, 49, 73	407	3.50 (2.21–5.53)
G§	25	49	558	0.83 (0.45–1.52)
H§	49	73	451	1.69 (0.85–3.36)
I†§	25	49–72	579	1.20 (0.83–1.74)
J†§	73	25–48	458	0.94 (0.61–1.44)

* Complete sets of data were available for subjects in models C and F. For models B and E, all available data were used, but some values were missing. CI denotes confidence interval. Hour 0 is considered the time of the myocardial infarction.

† The analysis was adjusted for time of day with the use of 23 indicator variables, to control for the possible influence of circadian variation.

‡ There were no missing values in the control periods.

§ The analysis was performed for nonrisk periods (control periods defined a priori) to assess the potential for recall bias; in the absence of bias, the expected odds ratio was 1.00.

those younger than 60 (Table 4). Effect estimates were larger for subjects with diabetes and those who were unemployed, but only employment status significantly modified the association between the risk of a myocardial infarction and exposure to traffic. The frequency of exposure to traffic differed according to the time of day (morning, 8.3 percent; afternoon, 7.1 percent; and night, 0.9 percent; P<0.001) and according to day of the week (Monday, 6.0 percent; Tuesday, 5.8 percent; Wednesday, 5.7 percent; Thursday, 4.7 percent; Friday, 5.7 percent; Saturday, 4.4 percent; and Sunday, 2.9 percent; P<0.001). Only the time of day showed an effect modification of borderline significance (Table 4).

DISCUSSION

We observed an association between exposure to traffic while traveling in cars, buses, and trolley cars and while riding on a bicycle or motorcycle and the onset of a myocardial infarction within one hour afterward. Travel in a car was the most common source of exposure, but travel by public transportation was also associated with the onset of a myocardial infarction within one hour afterward.

We used a case–crossover design that made possible the assessment of transient risk factors — that is, risk factors that may trigger acute events in susceptible patients. These risk factors include strenuous exercise,[1-3] anger,[4] and the use of cocaine[5] or marijuana.[6] Transient risk factors have only a short-term effect, whereas chronic risk factors, such as smoking, the presence of dyslipidemia, and a sedentary lifestyle, which promote atherosclerosis and prothrombotic conditions and may result in an impaired myocardium, have a long-term effect and determine vulnerability to acute coronary events.[15]

By virtue of the case–crossover design, exposure during the case periods and the control periods was determined for the same individual subject. The strategy for selecting the control periods and the potential for recall bias are of primary concern in judging the validity of the analyses. We used data on activities in each hour from the hour of onset of the myocardial infarction up to 71 hours before onset that were collected by means of bedside interviews. We included multiple control periods and controlled for the time of day in multivariate analyses. The restriction of the comparison to periods at the same time of day was designed to control for circadian patterns, but if daily routines are slightly modified, the restriction might result in an underestimation of exposure to traffic during the control periods and might therefore lead to an overestimation of the effect of exposure, as suggested in the sensitivity analyses. The possibility that patients may have better recall of the hours before the onset of the myocardial infarction than of the days before the event cannot be excluded. Consequently, an underestimation of exposure to traffic during the control periods would have inflated the estimates of the effect of such exposure as a trigger in individual cases. Sensitivity analyses in which different control-selection strategies were applied showed remarkably similar results. Comparison analyses of traffic exposures at nonrisk periods (control periods defined a priori) suggested there was no substantial recall bias with regard to the periods 24 to 71 hours before the onset of the myocardial infarction.

In the case–crossover design, conditions that do not vary over time do not induce confounding. Other transient risk factors such as strenuous exercise or stress (e.g., anger) might confound the associations we observed. However, multivariate analyses

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Table 4. Subgroup Analyses of the Association of Exposure to Traffic with the Onset of the Myocardial Infarction (MI) within the Next Hour, with Case–Crossover Analyses Restricted to Activities within the Study Area.*

Characteristic	No. of Subjects (%)	Odds Ratio (95% CI)†	P Value	P Value for Heterogeneity of Subgroups
Total	625 (100)	2.92 (2.22–3.83)	<0.001	—
Male	474 (76)	2.59 (1.90–3.53)	<0.001	—
Female	151 (24)	4.51 (2.55–8.00)	<0.001	0.09
Age				
<60 yr	268 (43)	2.36 (1.59–3.51)	<0.001	—
≥60 yr	357 (57)	3.91 (2.66–5.73)	<0.001	0.07
Employment status				
Employed	246 (39)	2.20 (1.47–3.28)	<0.001	—
Not employed‡	379 (61)	4.20 (2.88–6.12)	<0.001	0.02
First MI	536 (86)	2.93 (2.20–3.92)	<0.001	0.92
Survival >28 days	621 (99)	2.94 (2.24–3.86)	<0.001	1.00
Other conditions				
Diabetes	130 (21)	4.63 (2.57–8.33)	<0.001	0.07
Hypertension	416 (67)	3.34 (2.38–4.67)	<0.001	0.21
Angina	148 (24)	4.07 (2.26–7.32)	<0.001	0.14
None	158 (25)	2.23 (1.31–3.82)	0.003	—
Located in Augsburg§	298 (48)	2.84 (1.88–4.29)	<0.001	0.55
Smoking status				
Current smoker	228 (36)	2.35 (1.47–3.76)	<0.001	—
Former smoker	185 (30)	2.73 (1.66–4.52)	<0.001	—
Nonsmoker	212 (34)	4.04 (2.54–6.43)	<0.001	0.25
Symptoms¶				
Symptoms recorded	152 (24)	2.31 (1.26–4.21)	0.007	—
No symptoms recorded	473 (76)	3.12 (2.30–4.24)	<0.001	0.38
Cold during the wk before MI				
Yes	40 (6)	5.48 (1.92–15.6)	0.002	—
No	585 (94)	2.83 (2.13–3.75)	<0.001	0.23
Time of day				
Morning (6 a.m.–12:59 p.m.)	241 (39)	3.58 (2.38–5.37)	<0.001	—
Afternoon (1 p.m.–8:59 p.m.)	192 (31)	3.03 (1.95–4.70)	<0.001	—
Night (9:00 p.m.–5:59 a.m.)	192 (31)	1.03 (0.36–2.92)	0.96	0.09
Day of MI				
Monday	89 (14)	3.46 (1.69–7.06)	<0.001	—
Tuesday	80 (13)	1.62 (0.55–4.81)	0.38	—
Wednesday	84 (13)	3.63 (1.77–7.42)	<0.001	—
Thursday	85 (14)	2.96 (1.42–6.16)	0.004	—
Friday	101 (16)	2.97 (1.55–5.69)	0.001	—
Saturday	92 (15)	3.77 (2.00–7.14)	<0.001	—
Sunday	94 (15)	2.30 (1.05–5.04)	0.04	0.86

* Exposure to traffic comprises time spent in cars, on public transportation, and on motorcycles and bicycles. CI denotes confidence interval.

† The analyses were adjusted with the use of 23 indicator variables for time of day, to control for the potential influence of circadian variation.

‡ Retired persons and housewives were included in this group.

§ Patients were located within the boundaries of the city of Augsburg at all times in the case and control periods.

¶ Symptoms included angina pectoris, chest pain, cold sweat, dizziness, nausea, shortness of breath, vomiting, and unconsciousness.

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involving information on other triggers did not produce evidence of strong within-person confounding. Strenuous activity was confirmed as a substantial risk factor for the onset of a myocardial infarction in this study, as suggested earlier.[1-3] Riding a bicycle might be considered strenuous activity; indeed, the risk estimates associated with the use of a bicycle were reduced when we controlled for exercise, but there was no change in the overall effect estimate for exposure to traffic. Studies that assessed the role of anger as a trigger for myocardial infarction identified major life events as potential triggers but not moderate levels of psychological stress,[4] which are instead related to an elevation in long-term risk.[16] The estimates for traffic exposure might be confounded by the stress associated with getting up in the morning, which is itself a risk factor for myocardial infarction.[2] Getting up in the morning was an independent risk factor in our study, but it did not confound the association between exposure to traffic and the onset of a myocardial infarction.

The association between exposure to traffic and the onset of a myocardial infarction was stronger in the subgroup of subjects who were unemployed than in the subgroup of those who were employed. This finding indicates that the associations we observed were not due to commuting regularly to work. The subjects in this study used a car for transportation most of the time. We had no data on whether the individual subject had been driving the car or on the reasons for driving. Driving in different volumes of traffic might also be a factor to consider. Unfortunately, data on the circumstances of driving could not be collected reliably in retrospective interviews. However, because the association was also observed for persons who used public transportation, it is unlikely that the effect is entirely attributable to the stress linked with driving a car. No evidence for a statistically significant effect modification according to the day of the week was observed, but the estimated risks were larger for morning and afternoon hours than for night hours, when the density of the traffic is low. When only subjects who had no typical or atypical symptoms during the four days before the onset of the myocardial infarction were considered, no difference in the estimates was observed. Therefore, the possible effects of car trips undertaken to consult a doctor because of an evolving myocardial infarction could be ruled out.

Subjects who had had nonfatal myocardial infarctions were recruited on the basis of the nearly complete records of a myocardial-infarction registry.[13] Of the cases of myocardial infarction included in this study, 8 percent were attributable to exposure to traffic. The subgroup analyses indicated that women, persons 60 years of age or older, and patients with diabetes are at higher risk for the onset of a myocardial infarction after exposure to traffic than are men, persons younger than 60 years of age, and persons without diabetes. These results suggest that other persons in the KORA registry who were unable to provide diary information and who were therefore not included in our study might have been more susceptible to the risk of myocardial infarction after exposure to traffic than the subjects who were included.

A rather crude measure of exposure to traffic was used in this study. Potentially, a combination of different factors, such as stress, noise, and traffic-related air pollution, may contribute to the observed associations. While persons are driving a car, symptoms of a possible arrhythmia may be common among those who are eligible for treatment with an implantable cardiac defibrillator.[17] Chronic exposure to stress and noise is a well-documented risk factor for cardiovascular diseases, since such exposure can lead to elevated stress hormone concentrations.[18] A recently published study from the Netherlands indicates that among people who live near major roads, the risk of death due to cardiopulmonary diseases is nearly twice as high as that among those who do not live near major roads.[9] An increase in the risk of death due to ischemic heart disease has been documented in those whose occupations expose them to traffic, such as police officers who regulate traffic.[19] The short-term health effects of air pollution on the cardiovascular system have been studied intensively in the past decade. Particulate matter is considered to be of primary concern.[20,21] Studies of exposure to ambient particles have indicated that passengers in cars and buses have a greater exposure than is measured at a distance of 100 m or more from vehicular traffic.[22,23] The concentrations of particulate matter varied according to the route and the density of the traffic and might resemble concentrations at urban curbsides. For people traveling by car or bus, exposure to particulates is about two times as high as for cyclists.[22,24-26] Although high rates of ventilation increase the amount of particles deposited in

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the airways,[22,25,26] cyclists may be able to leave congested situations (i.e., polluted microenvironments) more quickly than people in cars or buses.[22]

The disruption of a vulnerable but not necessarily stenotic atherosclerotic plaque in response to hemodynamic stress has been suggested as a mechanism that triggers a myocardial infarction; thereafter, the hemostatic and vasoconstrictive forces determine whether the resultant thrombus will become occlusive.[27] Particulate air pollution has been associated with transient increases in plasma viscosity,[28] acute-phase reactants,[29-31] and endothelial dysfunction,[32] as well as with altered autonomic control of the heart.[33-37] These changes have also been observed in healthy officers of the highway patrol in association with the concentration of particulate matter in their vehicles[38] and might be consistent with an increased risk of a myocardial infarction after a transient elevation in the concentrations of ambient particles in vulnerable subjects.[39]

Given our current knowledge, it is impossible to determine the relative contribution of risk factors such as stress and traffic-related air pollution. Nevertheless, patients who are at risk for acute coronary events are likely to profit from recent efforts to improve the air quality in urban areas with the use of cleaner vehicles and improved city planning.

Supported by a research agreement (98-4) with the Health Effects Institute, Boston, by the GSF–National Research Center for Environment and Health, Neuherberg, Germany, and by a grant (R-827354) from the Environmental Protection Agency (to Drs. Peters and Wichmann).

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AJRCCM Articles in Press. Published on June 7, 2004 as doi:10.1164/rccm.200403-281OC

Title: Traffic-related air pollution near busy roads: the East Bay Children's Respiratory Health Study

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The contents and opinions expressed in this manuscript are those of the authors and do not represent the official position of the Office of Environmental Health Hazard Assessment, the California Environmental Protection Agency, or the California Department of Health Services.

Running title: Traffic and respiratory health

Source of support (grants, gifts, equipment and/or drugs) : not applicable
Subject Category: # 118 (Environmental and Occupational Health: Air Pollution)

Word Count (body):3390

This article has an online data supplement, which is accessible from this issue's table of contents online at www.ats.journals.org.

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Abstract

Recent studies, primarily in Europe, have reported associations between respiratory symptoms and residential proximity to traffic; however, few have measured traffic pollutants or provided information about local air quality. We conducted a school-based cross-sectional study in the San Francisco Bay Area in 2001. Information on current bronchitis symptoms and asthma, home environment, and demographics were obtained by parental questionnaire (n=1,109). Concentrations of traffic pollutants (particulate matter (PM_{10}, $PM_{2.5}$), black carbon (BC), and nitrogen oxides (NO_X and NO_2)) were measured at ten school sites during several seasons. Although pollutant concentrations were relatively low, we observed differences in concentrations between schools nearby versus those more distant (or upwind) from major roads. Using a two-stage multiple logistic regression model, we found associations between respiratory symptoms and traffic-related pollutants. Among those living at their current residence for at least one year, the adjusted odds ratios (OR) for asthma in relation to an interquartile difference in NO_X were OR = 1.07; (95% confidence interval, 1.00-1.14). Thus, we found spatial variability in traffic pollutants and associated differences in respiratory symptoms in a region with good air quality. Our findings support the hypothesis that traffic-related pollution is associated with respiratory symptoms in children.

Word count: 196

Suggested MeSH: Air Pollution, Vehicle Emissions, Asthma, Bronchitis, Epidemiology

Introduction

Numerous epidemiological studies have documented adverse effects of air pollution on health. (1) The majority of these population-based studies have used pollutant concentrations measured at central monitoring sites to estimate exposures and have not, in general, considered local spatial variability in pollutant levels. However, motor vehicle emissions, the principal source of ambient air pollution in most urban areas, are likely to vary substantially within a given community, and researchers have begun to document differences in traffic-related pollutants on a neighborhood scale.(2,3)

Recently, a number of epidemiological studies have reported associations between residential proximity to busy roads and a variety of adverse respiratory health outcomes in children, including respiratory symptoms, asthma exacerbations, and decrements in lung function.(4-10) In some reports, truck traffic has been more strongly associated with these adverse outcomes than total vehicular traffic. (6,7,10) (11)

Most studies have used metrics of proximity to traffic as surrogates of exposure to traffic pollution (e.g., residential proximity to major roads, traffic volume at the nearest road, or modeled levels of traffic pollution). Few have measured pollutant concentrations as part of the exposure assessment or provided information on local air quality. (7,10,12) (11) The majority of studies have been conducted in Europe and Japan, where fleet composition (diesel vs. gasoline), emissions factors, fuel specifications, land use, and population distributions near busy roads differ from those in the U.S. Regional and micro-environmental concentrations of particulate matter may be higher in European

cities compared with many parts of the United States.(13) Therefore, it is important to evaluate the extent to which proximity to traffic may be associated with health impacts in the United States. Previous studies in the U.S. were conducted in areas of Southern California and the Northeast with significant local air quality problems; both used metrics of proximity to traffic, not measured pollutant concentrations.(8) (14)

The objective of this study was to explore associations between respiratory symptoms and exposures to traffic-related air pollutants among children living and attending schools near busy roads in an urban area with high traffic density, but good regional air quality. Some of the results of these studies have been previously reported in the form of abstracts.(15)

Methods: (word count 552)

Study design and health assessment

We conducted a school-based cross-sectional study in the San Francisco metropolitan area (Alameda County, California) in 2001. The study area was comprised of ten neighborhoods that span a busy traffic corridor. School sites were selected to represent a range of locations upwind and downwind of major roads (Figure 1).

In Spring 2001, we enrolled children (Grades 3-5) in participating classes (n=64) using methods similar to those used in other school-based studies. (16)(17,18) We obtained information on health outcomes (bronchitis symptoms in the past 12 months and

physician-confirmed asthma in the past 12 months), demographics, home environmental factors and activity factors using parental questionnaires (English and Spanish).(16-18) For additional information on the study design and health assessment, see the online supplement.

The study protocol was approved by the Committee for the Protection of Human Subjects, California Health and Human Services Agency.

Air Pollution from Traffic:

We measured concentrations of traffic pollutants (particulate matter (PM_{10}, $PM_{2.5}$), black carbon (BC), and nitrogen oxides (NO_X and NO_2)) at the school sites. PM_{10} and $PM_{2.5}$ mass concentrations were measured using filter-based samples, while BC concentrations were determined on the PM_{10} filter samples using an established light attenuation method that we validated for fiberfilm filters.(19) (20) NO_X and NO_2 concentrations were determined with passive diffusion samplers (Ogawa, Inc., USA). Nitric oxide (NO) concentrations were calculated as the difference between NO_X and NO_2.

Pollutant monitoring was conducted simultaneously at all school sites for 11 one-week intervals in the spring (March - June) and for eight weeks in the fall (September-November) of 2001. NO_X and NO_2 were sampled during all weeks at each school. PM_{10} and $PM_{2.5}$ and the BC concentrations were not measured every week. Study-averaged air pollution concentrations were calculated at each school by first normalizing the data to account for occasional missing values. Additional details are described in the

online data supplement and elsewhere.(21)

In preliminary analyses, we also used school location in relation to prevailing winds and proximity to busy roads as an additional traffic metric. .

Data Analysis

We examined associations between pollutants and health outcomes using a two-stage hierarchical modeling strategy. This method has been used in other epidemiological studies of air pollution when pollutants were measured at the group level.(22) (18) In our study, the exposure groups are represented by the neighborhood schools. In the first stage, we initially identified potential confounders (demographic, host, or home environmental variables) associated with health outcomes in this dataset. We then performed exploratory stepwise logistic regressions to develop a model in which individual-level characteristics best predicted the odds of each health outcome. Explanatory variables that remained significant at $p<0.15$ were retained in the model. We then fit a logistic regression model that included an indicator variable for each school in addition to the individual-level covariates.

In the second stage, the adjusted school-level logits or prevalence rates determined in the first stage were regressed on the school-specific ambient pollutant concentrations. In this manner, we obtained the log odds ratios relating asthma or bronchitis symptoms to air pollution, after adjusting for individual-level risk factors.

We calculated adjusted odds ratio(s) (ORs) for a change in measured pollutant

concentration equal to the interquartile ranges (IQR) of the pollutant distributions. Analyses were conducted using SAS version 8.2 for Windows (Cary, NC) and STATA version 8 (College Park, TX).

Results

We distributed 1,574 questionnaires in 64 participating classrooms in the 10 schools. Three children were excluded because their parents spoke neither English nor Spanish. Among the remaining students, there was a response rate of 70.7 % (1,111/1,571). Participation rates across schools ranged from 61 to 83%. Approximately 30% completed the questionnaire in Spanish. Two children with reported cystic fibrosis were excluded from the analysis. The final analysis sample consisted of 1109 questionnaires.

Table 1 summarizes the participants' demographic characteristics, prevalence of selected personal and home environmental characteristics and respiratory health outcomes. Our study population was racially diverse. About 30% of households had incomes below the federal poverty line. Fourteen percent of the parental respondents reported having been told by a doctor that their child had asthma in the preceding 12 months. This represents a measure of period prevalence of asthma and would include some incident cases. Twelve percent of children had bronchitis symptoms in the past year. Of those reporting bronchitis symptoms in the past 12 months, 43% also reported having asthma. Using a slightly different definition of asthma (physician-diagnosed ever, and asthma symptoms, including wheezing, in the past 12 months), 11 % of our study

population had current asthma.

The estimated pollutant concentrations at the schools are summarized in Table 2. Concentrations of several pollutants (i.e., BC, NO_X, NO and, to a lesser extent, NO_2) were higher at schools located within 300 meters downwind of a freeway compared to those at schools upwind or further from major traffic sources. There was less variation in $PM_{2.5}$ and PM_{10}. Concentrations of BC, NO_X, and NO were highly correlated ($r^2 \sim 0.9$ for each inter-pollutant correlation). The study average $PM_{2.5}$ (12 $\mu g/m^3$) was similar to the annual average concentration of $PM_{2.5}$ at the central monitoring station, located approximately 15 kilometers south of the study area. NO_X and NO_2 measurements at the school sites away from traffic were similar to levels measured at the regional site. (21).

Table 3 summarizes the results of the two-stage hierarchical logistic regression models of the odds of asthma and bronchitis symptoms in the previous year in relation to six different pollutants, each examined in separate regressions. Results are shown for all subjects, for long-term residents only (one year or longer at the current address), and for the latter group stratified by gender. In addition to the traffic metric, explanatory variables retained in all the final models for asthma and bronchitis included chest illness before age two, household mold/moisture, and pests observed in the home in the preceding 12 months. The final models for asthma also included maternal history of asthma. Addition of other potential confounders such as race/ethnicity, socioeconomic variables, maternal smoking during pregnancy, current smoker in the home, air conditioning, and gas stove use, yielded similar pollutant effect estimates.

For the full sample, associations were observed between both asthma in the past 12 months and bronchitis symptoms in the past 12 months and the pollutants, especially NO_X, NO, and BC. The effect estimates for $PM_{2.5}$ and PM_{10} were smaller, which may have been due in part to the smaller concentration ranges among the 10 sites for these pollutants. No multi-pollutant models were evaluated because of the high inter-pollutant correlations. Restricting the analysis based on duration of residence (i.e., at least one year at current residence) tended to increase the effect estimates slightly in relation to asthma, especially when the sample was restricted to girls. Stratification by duration of residence or gender did not change the results for bronchitis. Results were similar when non-normalized pollution values were used (data not shown).

We conducted additional sensitivity analyses, including: (1) dropping the one school that was an outlier with respect to the proportion of Hispanic students (89% versus 21% -53% at other schools); (2) using a different definition for current asthma; and (3) stratifying bronchitis by a reported history of asthma. When the "outlier" school was dropped, the magnitude of the odds ratios for bronchitis did not change much, but the confidence intervals were wider. In the asthma analyses, dropping the outlier school resulted in similar or slightly greater effect estimates. Applying different questionnaire-based asthma definitions showed little change but slightly larger confidence intervals. After stratifying students by whether they also "ever" had asthma, the results suggested that those with a history of asthma were driving the results for bronchitis, but the sample size became too small to make clear inferences.

Figures 2 and 3 depict the associations between BC and bronchitis and asthma.

Discussion

To our knowledge, this is the first epidemiological study in the United States to evaluate relationships between measured traffic-related pollutants and respiratory symptoms. For children residing at their current address for at least one year, we found modest but significant increases in the odds of bronchitis symptoms and physician-diagnosed asthma in neighborhoods with higher concentrations of traffic pollutants. These results are consistent with previous reports of positive associations between proximity to traffic and various respiratory outcomes. (4-10) (11).(7,10-12) Furthermore, our findings were observed in a region with relatively clean air (low concentrations of ozone and particulate matter). (See online supplement for details) Although previous epidemiological studies in the United States exploring chronic respiratory effects of air pollution in children have shown inconsistent results, this might be due in part to exposure misclassification as these studies used air quality measurements conducted at single fixed-site monitors in each city. (17,18,22,23)

Our findings were robust to multiple sensitivity analyses using different questionnaire-based definitions of current asthma and wheezing in the past 12 months. The slight increase in effect estimates for associations between asthma after restricting the analysis to those with longer duration at current residence may be due to a reduction in exposure measurement error. Our study population was very mobile (23% had moved in the preceding 12 months, only 32% had lived at the same address since before age

two).

We considered whether there might be bias due to non-response or self-reporting. We saw no significant difference in proportions of questionnaires returned in Spanish versus English by school, but there was a modest inverse correlation between pollution concentrations measured at each school and response rate. However, the response rate for individual classrooms within each school varied as well and appeared to depend on the willingness of teachers to encourage participation. Dropping the school closest to a freeway (which also had the highest measured pollutant concentrations , a high percentage of Hispanic students, and the lowest response rate) did not change the effect estimates for bronchitis and increased the estimates for asthma. This would suggest that knowledge of potential high traffic exposure probably did not affect parental reporting of the children's respiratory histories. This study was not undertaken in response to public concerns about traffic, nor, at the time the study was conducted, was there much local interest in potential health hazards of proximity to traffic. Therefore, reporting and non-response biases were unlikely to have unduly influenced our results.

We found increased association with asthma (but not bronchitis) with exposure to traffic air pollutants for girls who had lived at their current addresses at least one year compared with boys (Table 3). Several investigators have also reported greater traffic-associated effect estimates for girls versus boys.(7,8,10,24,25) Previous air pollution studies examining the gender-specific effects of air pollution on lung function and lung function growth have been mixed (26,27) The reasons for the observations in our study are unclear

and deserve attention in future studies.

Exposures

We found spatial variability in exposure due specifically to roads with heavy traffic within a relatively small geographic area for BC, NO_X, NO, and to a lesser extent, NO_2. There was less variation in $PM_{2.5}$ across schools; this is consistent with previous observations that $PM_{2.5}$ is more likely to reflect regional air quality. (2) The higher effect estimates with BC, NO_X, and NO compared with NO_2 and $PM_{2.5}$, suggest that primary or fresh traffic emissions may play an etiologic role in these relationships. While NO_X, NO, and BC may serve as indicators of exposure to traffic-related pollutant mixtures, they may also act as etiologic agents themselves.(28)

We found that downwind direction was an important determinant of increased exposure to traffic pollutants, and that a simple traffic indicator (school location downwind and <300m from a major road) gave estimates of odds ratios similar to or greater than pollutant measurements in preliminary analyses using a one-stage model (data not shown). Within a geographic area with flat terrain and low-rise buildings, the direction of wind in relation to the traffic source is the most important weather parameter. Other parameters important in air dispersion of traffic pollutants (e.g., atmospheric stability, wind speed, and surface topography) would be relatively similar at the different school sites.

A simple single-stage logistic model using pollutant measurements also yielded positive associations between pollutants and symptoms with a much larger effect estimate

and smaller confidence intervals.

We assumed that traffic-related pollutants measured at the neighborhood schools would be a good proxy for the children's overall exposure to such pollutants. Children attending the schools in this study generally lived within walking distance and did not use school buses. Therefore, pollutant concentrations in the children's neighborhoods probably tracked those at their schools. The most plausible exposure error in an urban setting would be that subjects who attend schools with very high traffic exposures from a nearby freeway would tend to have similar or lower home exposures whereas children with low school exposures would tend to live in homes with similar or only slightly higher traffic exposures. This pattern of measurement error would tend to underestimate the association between exposure and outcome. (29)

Alternatively, repeated daily exposures for 6-8 hours during the school year may themselves represent biologically important influences on some children's respiratory health, analogous to occupational exposures for susceptible adults. In a recent study of proximity to traffic and respiratory health, Janssen et al. found that effect estimates using based on the school-to-highway distance were comparable or greater than those based on residence-to-highway distance. (11)

The average measurements at each school were used to estimate long-term average traffic air pollutant concentrations. We measured pollutants at each of the 10 sites concurrently (to avoid concerns of week-to week variability) in two different periods that reflect the major seasonal wind patterns for the area. We found that the rank order

(relative values) of the schools did not vary from week to week or season to season, supporting the validity of this approach. Additionally, the NO_x and NO_2 concentrations at schools upwind or further from high traffic roads were similar to NO_X and NO_2 concentrations measured at the closest fixed-site monitor (21). Although there may have been some changes in the absolute traffic volume on major roads in recent years, the principal traffic patterns in the area have not changed. Thus, the relative values (rank order) of the site-specific pollutant concentrations measured in our study are likely to be representative of those in recent years.

The cross-sectional nature of our study design is a further limitation on causal inference, but we observed the same or modest increase in effect estimates for current asthma and bronchitis when we restricted our analysis to those who had lived at their present address for at least a year. Most studies on proximity to traffic and respiratory symptoms have been cross-sectional, and further longitudinal studies are needed to elucidate the role of traffic-related air pollution in the development and exacerbation of asthma and other respiratory symptoms.

Another limitation was that the exposures were assigned at the group level (n=10); however, the multi-level analysis allows adjustment for individual confounders in the first stage of analysis. Moreover, in this respect this study is comparable with other epidemiological investigations (e.g., the Harvard Six Cities Study and the Children's Health Study in Southern California (n=12 communities). Another recent cross-sectional study of traffic-related air pollution and respiratory symptoms included 13 schools.(22)

(18,23)

We also lacked information on indoor measurements of traffic-related pollutants. However, recent studies have found high correlations between personal exposures to NO_2 and traffic parameters. (30) Others have found that indoor concentrations and exposure to soot (particulate matter from diesel exhaust) is highly correlated with outdoor levels.(2)

Other covariates.

Maternal asthma, household mold/moisture, pests, and chest illness before age two were important explanatory variables in the final model for current asthma, consistent with previous studies (31).(32,33) We explored whether current levels of traffic pollution could modify the risk of current asthma symptoms depending on past history of chest illness; however, there was not sufficient power to explore interactions based on early medical history. Race/ethnicity and indicators of socioeconomic status were not important predictors of health outcomes in our study. This may be due, in part, to our study design (i.e., the schools were selected to have relatively similar measures of SES).

We did not find associations between exposure to environmental tobacco smoke and current asthma; the results of previous cross-sectional studies in school-aged children have been mixed. (34) The prevalence of current household smokers in our study was small, however, limiting study power. It is possible that there is some under-reporting of household smoking (7 % in our study vs. 19% statewide).(35) Alternatively, a substantial portion of our study population were less acculturated Hispanics (30% of parents

responded in Spanish), and only 3.6% of Hispanic households reported a history of maternal smoking. Other investigators have also observed very low smoking rates (less than 5%) among less acculturated Hispanics (B. Eskenazi, personal communication).(36) If under-reporting does exist, it is possible that residual confounding might have affected our estimates of pollutant/respiratory health outcome relationships. However, the addition to the regression model of variables correlated with exposure to environmental tobacco smoke (ETS) (e.g., SES and race-ethnicity) did not change the pollutant effect estimates, suggesting that significant confounding by ETS was not likely.

In summary, we found associations between traffic-related pollutants and asthma and bronchitis symptoms in the past 12 months in a highly urbanized region of the United States with good regional air quality, where local air pollution is dominated by vehicular sources. Although the cross-sectional study design, exposure assignment at the group level, small geographic area, and possible unmeasured covariates, may limit the generalizability of the study, our findings are consistent with previous investigations in Europe and the United States. (11,14,37) In addition, our results underscore the limitations of using central air monitoring stations for assigning population exposures. Concentrations of air toxics such as diesel exhaust particles or surrogates such as BC or soot should be more widely monitored. Measurement of personal exposures to traffic pollutants is not feasible in large population-based studies; the use of geographic modeling approaches to estimate exposures for individuals may be a good alternative.(38) Future studies that can better characterize exposures to traffic pollutants and their sources (i.e., diesel vs. gasoline engines) will be important to better understand the public health

impacts of motor vehicle emissions.

Acknowledgements:

We thank Jackie Hayes and Donna Eisenhower, Survey Research Center, University of California, Berkeley, for coordinating the survey, Toshifumi Hotchi, Lawrence Berkeley National Laboratories, for work on the air monitoring study, and Bob McLaughlin, California Department of Health Services, for GIS work. Shelley Green, Rob McConnell, Ed Avol, Patricia van Vliet, Bob Gunier, and Paul English provided helpful discussions. We also thank the school administrators and teachers for their support and acknowledge study participants and their families.

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Figure Legends.

Figure 1: East Bay Children's Respiratory Health Study area. The study region is to the east and across the bay from the city of San Francisco.

Figure 2. Adjusted School-Specific Bronchitis Prevalence Rates Versus Black Carbon, Long-term Residents

Figure 3. Adjusted School-Specific Asthma Prevalence Rates Versus Black Carbon, Long Term Residents

Table1. Demographic, family, and home characteristics of the East Bay Children's Respiratory Health Study respondents.

Characteristics	All subjects (N = 1109) %	Subjects attending schools: Near and Downwind of major roads (4 schools, N =402) %	Subjects attending schools: Far or Upwind of major roads (6 schools, N = 707) %
Gender			
Female	52.6	51.8	53.1
Race/Ethnicity			
White	12.6	11.0	13.5
Black, African American	11.1	7.0	13.4
Hispanic	43.5	47.6	41.2
Asian	14.0	15.5	13.1
Other/Multiracial	18.9	18.8	18.9
SES indicators			
Household at/below Federal poverty level	31.3	31.8	31.0
Parent's education: high school or less *	48.7	51.4	47.1

Family history			
Biological mother with asthma	12.2	9.5	13.7
Maternal smoking during pregnancy	10.3	7.8	11.7
Home indoor environment			
Smoker in the household, since child's birth	17.9	13.1	20.6
Smoker in the household, current	7.2	3.2	9.5
Furry pet	37.3	36.0	38.1
Pests, past 12 months	63.1	65.4	61.8
Gas stove	63.1	63.6	62.9
Indicator of mold/mildew presence, past 12 months	44.6	43.5	45.3
Health outcomes			
Chest illness before age 2	23.3	18.8	25.9
Asthma, past 12 months	14.0	13.9	14.1
Bronchitis, past 12 months	12.1	13.2	11.5

*Parent responding to the questionnaire

Table 2: Nearby traffic sources and average pollutant concentrations at ten schools*

School	Major Traffic Source†	AADT (#/day)	Distance‡ (m)	<300 m downwind	PM_{10} µg/m^3	$PM_{2.5}$ µg/m	BC (µg/m^3)	NO_X ppb	NO_2 ppb	NO§ ppb
1	No				30	12	0.7	42	22	19
2	Yes	90,000	230	Yes	29	13	0.9	55	24	31
3	Yes	210,000	360	No	32	12	0.8	49	21	29
4	No				30	12	0.8	41	19	22
5	Yes	210,000	130	Yes	30	12	0.9	62	26	36
6	No				30	12	0.7	39	21	17
7	No				29	11	0.7	33	20	11
8	Yes	130,000	350	No	29	12	0.7	45	23	21
9	Yes	210,000	200	Yes	30	12	0.9	57	26	31
10[11]	Yes	190,000	60	Yes	32	15	1.1	69	31	38
Study average					30	12	0.8	49	23	25

*Estimated average pollutant concentration at each school based on normalized concentrations (see text). Monitoring was conducted for 11 weeks in the spring (March - June) and eight weeks in the fall (September-November) 2001). The number of weeks underlying our estimates of chronic exposure varied for each measured pollutant: NOx (18), NO_2 (19), BC (11), $PM_{2.5}$ (10) and PM_{10} (9).

†Includes roads with annual average daily traffic (AADT) above 50,000 vehicles per day located within 1000 m of school. AADT estimate provided by CA Dept of Transportation (Cal Trans).

‡ Distances were estimated using geographic information systems. Latitude and longitude of the monitors were determined using a global-positioning system (GPS) device (Garmin GPS II). In some cases, distances were estimated using aerial photographs or measured using a distance wheel.

§$NO = NO_X - NO_2$

[11]There are also a shopping center and parking lot abutting the school grounds to the south and a freeway off ramp <50 m to the northwest.

Table 3. Odds ratios (95% Confidence Interval) of respiratory illness by school-based ambient air pollutant concentrations using two-stage model.

		All subjects		LTR subjects‡		LTR-Females‡		LTR-Males‡	
		(N=1109)		(N=871)		(N=462)		(N=403)	
	Exposure	OR	CI	OR	CI	OR	CI	OR	CI
Bronchitis*		N=93/797		N=79/635		N=38/341		N=41/291	
	NO_X	1.05	(1.01, 1.08)	1.06	(1.03, 1.09)	1.07	(1.03, 1.11)	1.03	(0.98, 1.09)
	NO_2	1.02	(0.99, 1.06)	1.03	(1.00, 1.06)	1.04	(1.01, 1.08)	1.02	(0.98, 1.06)
	NO	1.05	(1.02, 1.09)	1.06	(1.03, 1.09)	1.07	(1.03, 1.11)	1.04	(0.98, 1.10)
	PM_{10}	1.03	(0.99, 1.07)	1.02	(0.98, 1.07)	1.04	(1.01, 1.09)	1.01	(0.95,1.06)
	$PM_{2.5}$	1.02	(1.00, 1.05)	1.03	(1.01, 1.05)	1.04	(1.02, 1.05)	1.02	(0.99, 1.05)
	BC	1.04	(1.00, 1.08)	1.05	(1.01, 1.08)	1.06	(1.02, 1.10)	1.03	(0.98, 1.08)
Asthma†		N=101/705		N=78/562		N=42/297		N=36/263	
	NO_X	1.04	(0.97, 1.11)	1.07	(1.00, 1.14)	1.17	(1.06, 1.29)	1.02	(0.93, 1.11)
	NO_2	1.02	(0.97, 1.07)	1.04	(0.98, 1.10)	1.09	(1.03, 1.15)	1.00	(0.94, 1.07)
	NO	1.05	(0.98, 1.12)	1.08	(1.00, 1.15)	1.19	(1.03, 1.36)	1.02	(0.94, 1.12)
	PM_{10}	1.02	(0.96, 1.09)	1.04	(0.97, 1.12)	1.09	(0.92, 1.29)	1.02	(0.94, 1.10)

	$PM_{2.5}$	1.00	(0.97, 1.04)	1.01	(0.97, 1.06)	1.06	(0.99, 1.15)	0.99	(0.95, 1.04)
	BC	1.02	(0.96, 1.09)	1.05	(0.99, 1.13)	1.12	(0.95, 1.33)	1.00	(0.93, 1.09)
Asthma (no outlier, school 5) †		N=96/641		N = 73/507		N = 38/271		N = 35/233	
	NOx	1.08	(1.00, 1.17)	1.10	(1.00, 1.20)	1.14	(1.02, 1.28)	1.07	(0.96, 1.19)
	NO_2	1.06	(0.99, 1.13)	1.07	(0.98, 1.17)	1.09	(0.97, 1.22)	1.05	(0.96, 1.16)
	NO	1.08	(1.00, 1.17)	1.09	(1.00, 1.19)	1.14	(1.03, 1.26)	1.07	(0.96, 1.18)
	PM_{10}	1.06	(0.97, 1.16)	1.08	(0.98, 1.19)	1.09	(0.96, 1.24)	1.08	(0.97, 1.19)
	$PM_{2.5}$	1.04	(0.96, 1.12)	1.03	(0.94, 1.13)	1.03	(0.91, 1.17)	1.03	(0.94, 1.14)
	BC	1.07	(0.98, 1.17)	1.09	(0.99, 1.19)	1.14	(1.02, 1.27)	1.06	(0.95, 1.18)

* First stage model adjusted for: child's respiratory illness before age 2; pests; indicator of mold presence

†First stage model adjusted for: child's respiratory illness before age 2; pests; indicator of mold presence; maternal history of asthma

‡LTR = long term resident (current address for 1 year or more)

Odds ratios are calculated per interquartile range (IQR) of average pollutant concentration as follows:

NOx = 14.9 ppb, NO2 = 3.6 ppb, NO = 11.6 ppb, PM10 = 1.4 μg/m3, PM2.5 = 0.7 μg/m3, BC = 0.15 μg/m3

Figure 1.

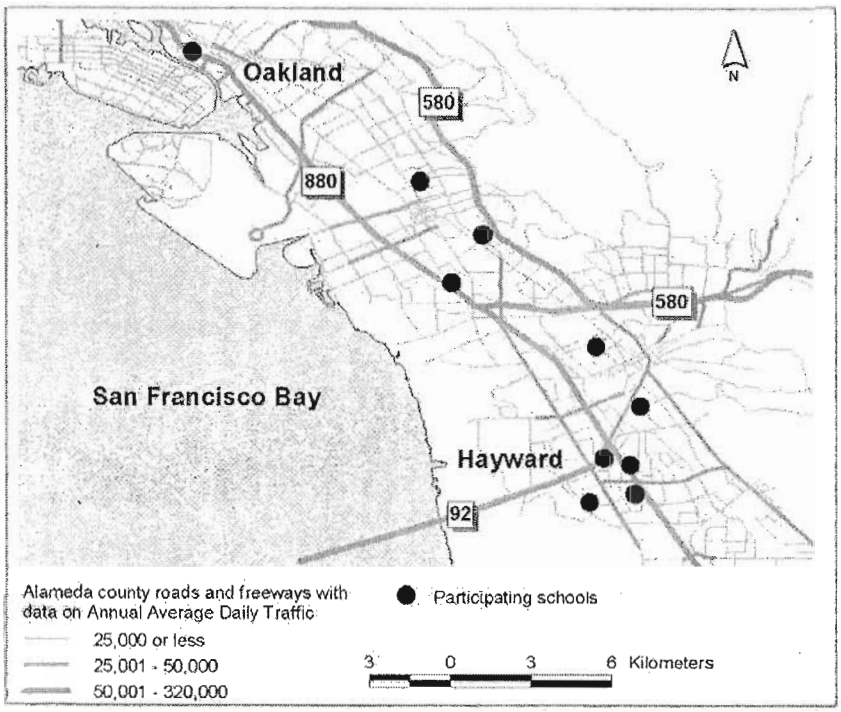

Oakland
580
880
580
San Francisco Bay
Hayward
92
N
Alameda county roads and freeways with data on Annual Average Daily Traffic
25,000 or less
25,001 - 50,000
50,001 - 320,000
Participating schools
3 0 3 6 Kilometers

Figure 2

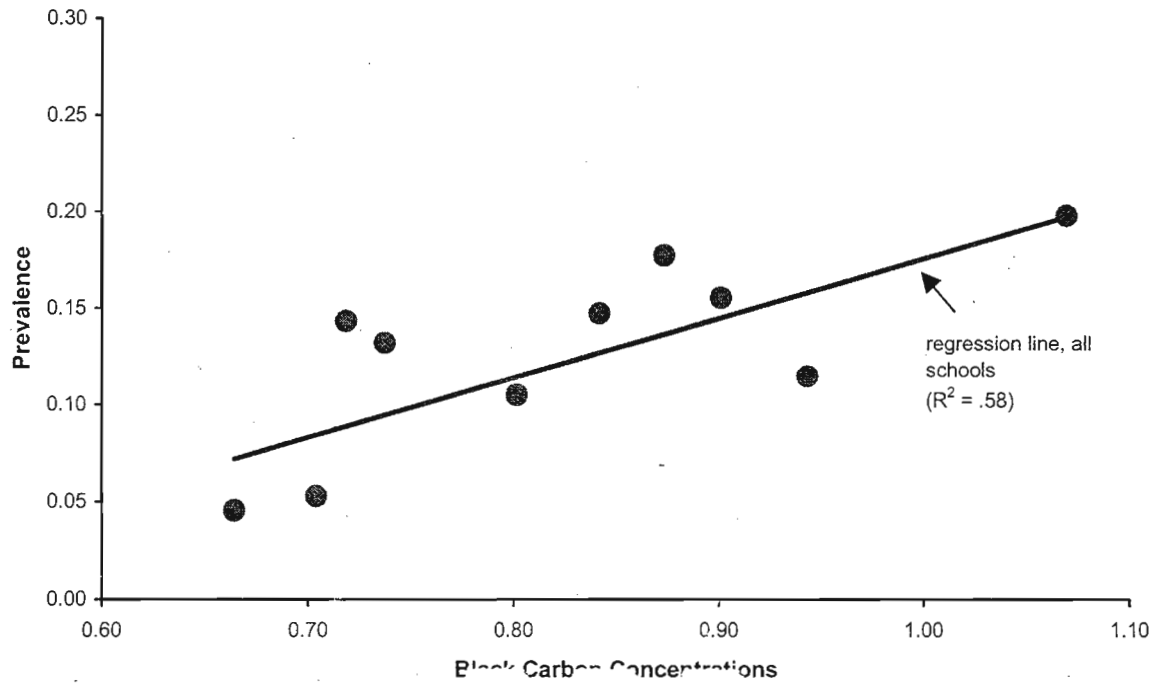
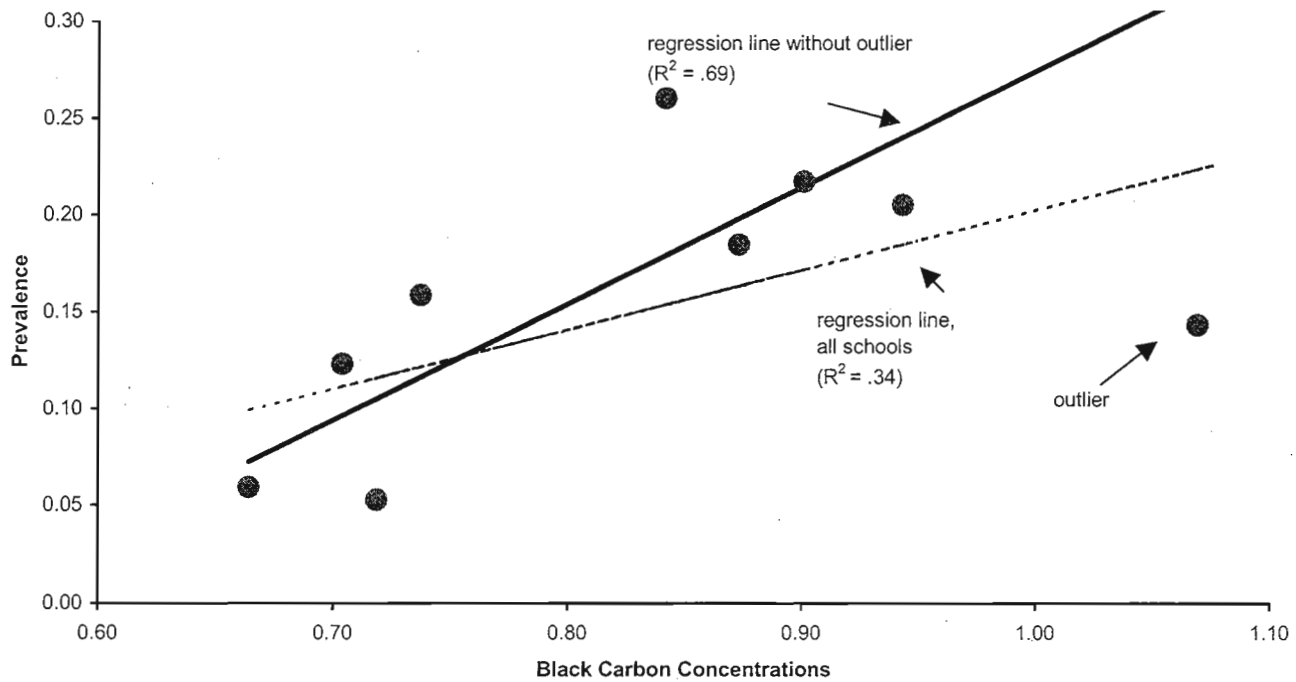

0.30
0.25
0.20
0.15
0.10
0.05
0.00
Prevalence
0.60
0.70
0.80
0.90
1.00
1.10
regression line, all schools
(R^2 = .58)

Figure 3.


0.30
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0.15
0.10
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Prevalence
0.60
0.70
0.80
0.90
1.00
1.10
Black Carbon Concentrations
regression line without outlier
(R^2 = .69)
regression line,
all schools
(R^2 = .34)
outlier

Title: Traffic-related air pollution near busy roads: the East Bay Children's Respiratory Health Study

Authors

Janice J. Kim , Svetlana Smorodinsky , Michael Lipsett , Brett C. Singer , Alfred T. Hodgson , Bart Ostro

Online Data Supplement

Methods :

Study design and study location

The study area (approximately 21 km x 5 km) is across the bay from San Francisco, and includes 10 neighborhood elementary schools that span a busy traffic corridor. The topography is relatively flat and the urban landscape consists primarily of widely spaced, low-level buildings. Traffic congestion in the San Francisco-Oakland area ranks second in the United States,(39) but regional air quality is generally good due to ocean breezes from the southwest or west. At the nearby air quality monitoring station (Fremont), 15 km southeast of the study area, ozone concentrations rarely exceed the national or state standards (0-1days/ year above federal ozone standards for past 3 years). Annual-average concentrations of PM_{10} and $PM_{2.5}$ at the Fremont station were 23.4 and 12.2 $\mu g/m^3$, respectively in 2001. These values are below the PM_{10} and $PM_{2.5}$ National Ambient Air Quality Standards (50 $\mu g/m^3$ and 15 $\mu g/m^3$, respectively) and just above the more stringent California standards (20 $\mu g/m^3$ and 12 $\mu g/m^3$, respectively) .

School site selection

We used a public school database from the California Department of Education (CDE) containing statewide information on school locations, enrollment, and demographics (URL: http://www.cde.ca.gov). A traffic database was obtained from the California Department of Transportation (CalTrans) Highway Performance Monitoring System (HPMS, 1997). Traffic files included statewide freeway and major road network

geography and counts of the annual average daily traffic (AADT) on those roadways. We utilized Geographic Information Systems (GIS) software to integrate, display, and analyze data from these disparate data sources (ArcView 3.2, ESRI, Redlands, CA).

We selected elementary schools for possible recruitment such that the school locations would represent a range of distances upwind and downwind from major roads. Because concentrations of traffic pollutants decrease to background levels within 300 m downwind (40,41) and because several European studies have found adverse health effects in children residing or attending schools in close proximity to roads with AADT of 25,000 or more vehicles (4,9), we used these parameters to guide our selection process.

Briefly, to identify possible school sites for recruitment, school addresses were geo-coded and overlaid with the CalTrans road network. Candidate schools "near" a major road were identified based on a geo-coded location less than 350 m from any road with AADT $\geq$ 90,000 vehicles. Schools "farther" from local or heavy traffic were also identified using GIS (no local road with AADT $\geq$ 20,000 vehicles/day within 300 m and no major highway or freeway within 750 m). We identified eight schools that were "near" freeways and twenty-one schools that were "farther" from local or heavy traffic in the proposed study area. From this list, we sought to recruit schools that were demographically similar and that were likely to have a range of exposure to traffic pollutants based on proximity to major roads and prevailing wind directions.

Ten schools that reflected locations with a range of distances upwind and downwind from major roads were selected. There were no major non-roadway sources of air pollution in

the neighborhoods (CA Air Resources Board, private communication).

Population:

In Spring, 2001, we invited all children in grades 3-5 in participating classes (n=64) to join the study. Packets containing a health questionnaire in English or Spanish, an informed consent form, and study information were distributed in the classroom, completed by parents, and returned to the teacher. An option was available to complete the questionnaire by telephone with trained research staff. Up to three reminder notices were sent to non-responders. We gave a donation towards educational materials to classrooms and provided nominal compensation to parents completing the questionnaire. The study protocol was approved by the Committee for the Protection of Human Subjects, California Health and Human Services Agency.

Health Assessment:

Questions on respiratory symptoms and illnesses were modeled after those used in previous studies on air pollution and children's health.(16) (17,18) Subjects were defined as having current asthma if their parents selected asthma in response to the question, "During the previous 12 months, did a doctor say that your child had any of the following chest illnesses?" (Choices were pneumonia, asthma, reactive airway disease, and other chest illness.) Current bronchitis was defined as: (1) a positive response to the question: "During the past 12 months, did your child have bronchitis?" or (2) a report of cough and chest congestion or phlegm lasting at least three consecutive months of the past 12.

We also asked about personal factors potentially associated with asthma or bronchitis, including demographic variables (race/ethnicity and measures of socioeconomic status (SES) (e.g., parents' education, income, health insurance)); host factors (age, gender, chest illness before age two, maternal smoking during pregnancy, maternal or paternal history of asthma, premature birth, breastfeeding); home environmental factors (current smoker in the home, gas stove, evidence of mold, pets, problem with pests in the past year, carpet in the bedroom; and activity factors (sports participation, commute patterns to school). Pests included cockroaches, mice, rats, termites, spiders, or ants. Those with "chest illness before the age of two" were reported to have seen a doctor before age two for asthma, bronchiolitis, RSV, croup, reactive airway disease, or pneumonia.

Indicator of "mold" was a Yes to any of the following: history of residential water damage, visible mold/yildew, water condensation, or mold/musty smell in the past 12 months. In sensitivity analyses we used a slightly different definition of asthma (physician-diagnosed ever, and asthma symptoms, including wheezing, in the past 12 months), and duration of residence (at least one year at current address Yes/No).

Air Pollution from Traffic:

To estimate the children's overall exposure to traffic pollution, we measured concentrations of traffic-related pollutants at the schools. We also used school location with respect to prevailing winds and proximity to busy roads as a separate exposure metric.

(1) Traffic-related pollutant measurements: We determined PM_{10} and $PM_{2.5}$ mass

concentrations from weeklong filter samples (Pallflex fiberfilm, Pall/Gelman) collected with small sampling pumps (Airchek 2000, SKC, Inc) and size-selective inlets (PEM, MSP Corp). BC concentrations were determined on the PM_{10} filter samples using an established light attenuation method that we validated for the fiberfilm filters.(19) (20) Concentrations of NO_X and NO_2 were determined with passive diffusion samplers (Ogawa, Inc., USA) deployed over a one-week sampling period. The NO concentration was estimated as the difference between NO_X and NO_2. Additional details of the monitoring protocol are described elsewhere.(21)

We estimated chronic exposures to traffic pollutants by measuring pollutant concentrations simultaneously at all schools over several month. Specifically, monitoring was conducted for 11 weeks in the spring (March - June) and eight weeks in the fall (September-November) 2001). NO_X and NO_2 were sampled during all periods at each school.(21) PM_{10} and $PM_{2.5}$ were not measured every week.

Study-averaged air pollution concentrations were calculated at each school by first normalizing the data to account for occasional missing data as follows: Because of missing samples and week-to-week variability at each site, we obtained average site-specific pollutant concentrations as follows: For each week and pollutant, we calculated the ratio of each school's measured pollutant level relative to the mean across all schools sampled that week. Then, for each school, the mean ratio over the entire study period was calculated. The mean ratios are normalized concentrations and represent the relative exposures across school locations. To obtain an estimate of the average pollutant concentration at each school, we multiplied the mean of the school-specific normalized

concentration by the study-average pollutant concentration (averaged across all study sites over the entire study period). This normalization process allowed for an aggregation of data for all sampling periods, including those with an incomplete data set. Only weeks with valid data from at least six schools were included in this process.

(2) Additional traffic metric: Schools were assigned a category for wind direction (upwind or downwind of a freeway) and a category for proximity to traffic (<300 m or >300 m from a major traffic source) as well as the combination of the two (i.e., downwind and close versus all others).

Data Analysis

To explore the extent to which additional covariates would have an effect on the pollutant estimate, we added pollutant values or school location indicators to the model, one at a time and then examined the effect of removing each covariate on the pollutant coefficient(s); if removal of a covariate from the model changed the magnitude of the pollutant coefficient by less than 10%, the covariate was dropped.

In a separate sensitivity analysis, we also initially included variables found to be predictive of respiratory symptoms in other studies even if they did not satisfy the p-value criterion. Other several sensitivity analyses included examining the model using other definitions of asthma and after stratifying the outcome of current bronchitis by asthma status. We also restricted the sample to the subgroup of children who had lived at the given address for more than one year (long-term residents) and performed stratified analysis by gender, both for the full sample and long-term residents. Additionally, we

re-ran the models after dropping one school that was an outlier in terms of race/ethnicity distribution.

Adjusted odds ratio(s) (ORs) were calculated for an interquartile range (IQR) of measured pollutant concentrations (i.e., the odds ratio for a given health outcome given a pollutant concentration at the 75 percentile of the distribution relative to that at the 25th percentile). All analyses were conducted using SAS version 8.2 for Windows and STATA version 8.

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Childhood Asthma and Exposure to Traffic and Nitrogen Dioxide

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Background: Evidence for a causal relationship between traffic-related air pollution and asthma has not been consistent across studies, and comparisons among studies have been difficult because of the use of different indicators of exposure.

Methods: We examined the association between traffic-related pollution and childhood asthma in 208 children from 10 southern California communities using multiple indicators of exposure. Study subjects were randomly selected from participants in the Children's Health Study. Outdoor nitrogen dioxide (NO_2) was measured in summer and winter outside the home of each child. We also determined residential distance to the nearest freeway, traffic volumes on roadways within 150 meters, and model-based estimates of pollution from nearby roadways.

Results: Lifetime history of doctor-diagnosed asthma was associated with outdoor NO_2; the odds ratio (OR) was 1.83 (95% confidence interval = 1.04–3.22) per increase of 1 interquartile range (IQR = 5.7 ppb) in exposure. We also observed increased asthma associated with closer residential distance to a freeway (2.22 per IQR; 1.36–3.63) and with model-based estimates of outdoor pollution from a freeway (1.89 per IQR; 1.19–3.02). These 2 indicators of freeway exposure and measured NO_2 concentrations were also associated with wheezing and use of asthma medication. Asthma was not associated with traffic volumes on roadways within 150 meters of homes or with model-based estimates of pollution from nonfreeway roads.

Conclusions: These results indicate that respiratory health in children is adversely affected by local exposures to outdoor NO_2 or other freeway-related pollutants.

(*Epidemiology* 2005;16: 000–000)

Submitted 12 October 2004; accepted 7 February 2005.

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Supported in part by the California Air Resources Board (Contract A033-186), the National Institute of Environmental Health Sciences (5P30ES07048 and 1P01ES11627), the Southern California Particle Center and Supersite, the Environmental Protection Agency (grant R 82670801), and the Hastings Foundation.

Supplemental material for this article is available with the online version of the journal at www.epidem.com; click on "Article Plus."

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ISSN: 1044-3983/05/1606-0001
DOI: 10.1097/01.ede.0000181308.51440.75

Previous studies have demonstrated a link between outdoor air pollution and the occurrence of symptoms in children already diagnosed with asthma.[1] However, results are not consistent with respect to whether air pollution causes asthma. Most studies have found little evidence to support an association between community-average exposures to air pollution and community asthma prevalence.[2] These study designs failed to account for the variability in exposure resulting from vehicular traffic in urban areas. Asthma has been associated with local variation in traffic patterns within communities in many,[3–7] but not all,[8–11] studies that have examined the impact of local traffic. One possible reason for the inconsistency in these recent studies is the use of different indicators of traffic-related pollution. Some have measured pollutant exposure at home, some have estimated traffic volume near the home, and some have estimated exposure to traffic-related pollutants at home based on dispersion models. Little work has been done to validate estimates of traffic exposure against measured pollution concentrations. Most studies have been conducted in European cities, which differ from U.S. cities in the layout of streets and homes, and also in the relative proportion of diesel- to gasoline-powered vehicles.

We evaluated several commonly available indicators of traffic exposure and compared them with nitrogen dioxide (NO_2) levels measured at the homes of subjects participating in the Children's Health Study. The Children's Health Study was initiated in 1993 with a cohort of school-aged children from 12 southern California communities representing a wide range in air quality. To date, this study has reported associations between air pollution and several outcomes, including lung function,[12–15] respiratory symptoms in asthmatics,[16,17] and asthma incidence.[18] These analyses have relied on com-

parisons of average health across communities in relation to the pollution levels measured at a central site monitor in each community. In 2000, we conducted a study to measure NO_2 levels at a random sample of children's homes within each of the study communities. We examine how local variation in NO_2 and indicators of exposure to traffic-related pollutants are related to each other, and whether they are associated with lifetime prevalence of asthma and asthma-related outcomes.

METHODS

Study Subjects

In calendar year 2000, we measured outdoor NO_2 levels at the homes of randomly selected participants in the Children's Health Study. Eligible children included those who were originally enrolled as fourth graders (average age = 10 years) in 1993 (cohort 1) or 1996 (cohort 2), with the additional criteria that in 2000, they were still actively participating in the study and had lived in the same home since study enrollment. We excluded 2 of the 12 study communities (Lompoc and Lake Arrowhead) from this study, because neither has any major sources of traffic. From the pool of 890 eligible subjects, we randomly sampled 229 children for NO_2 monitoring. Samplers were deployed outside each home for 2-week periods in the summer and fall of 2000. Valid measurements in both seasons were obtained at 208 (91%) of the homes. Reasons for invalid measurements included lost samplers, subjects who moved, and difficulties with field access or deployment. The study protocol was approved by the Institutional Review Board for Human Studies at the University of Southern California, and informed consent was provided by a parent or legal guardian for all study subjects.

Nitrogen Dioxide Sampling

Ambient NO_2 was sampled with Palmes tubes.[19] These diffusion-based samplers have been widely used in several microenvironmental and personal air quality studies.[20–22] We deployed samplers outside the homes of study subjects, thus avoiding previously identified confounders such as indoor nitrous acid formation, gas stoves, or wall heaters. Samplers were attached at the roofline eaves, signposts, or rain gutters at an approximate height of 2 meters above the ground, oriented in a downward position and protected by an oversized paper cup. Duplicate samplers and field travel blanks were randomly assigned to approximately 10% of the subjects' homes. Samplers were deployed for 2-week periods in both summer (mid-August) and fall (mid-November) in all communities. Deployment across communities was accomplished over a 4-day period at the start of the summer and fall field sampling periods. Within any 1 community, samplers at all locations were deployed within a 4-hour period, and 2 weeks later the samplers were retrieved within a 4-hour period. Samplers were transported to and from the field in cooled portable ice chests. The samplers were prepared for field use and analyzed at the Harvard School of Public Health.

Traffic Exposures

We characterized exposure of each study participant to traffic-related pollutants by 3 metrics: (1) proximity of the residence to the nearest freeway; (2) average number of vehicles traveling within 150 meters of the residence each day, including vehicles on freeways, arterials, major collector roads, and (where available) on minor collector roads; and (3) model-based estimates of traffic-related air pollution at the residence, derived from dispersion models that incorporate distance to roadways, vehicle counts, vehicle emission rates, and meteorologic conditions. Methods used to estimate each of these exposure factors are described subsequently.

Residence addresses were standardized and their locations geocoded using the TeleAtlas database and software (Tele Atlas Inc., Menlo Park, CA, www.na.teleatlas.com). We used the TeleAtlas MultiNet USA database, a comprehensive geo-positioning-satellite-accurate database of roadways, for all analyses because it is more accurate than the standard files available from the U.S. Census. To estimate distance to the nearest freeway, we used ERSI ArcGIS Version 8.3 (ESRI, Redland, CA, www.esri.com) software tools to calculate the distance from each residence to the nearest interstate freeway, U.S. highway, or limited access highway. In these calculations, each direction of travel was represented as a separate roadway, and the "distance to nearest freeway" was the shortest distance from the residence to the middle of the nearest set of lanes of the freeway.

To estimate vehicle counts near homes, annual average daily traffic volumes were obtained from the California Department of Transportation (CALTRANS) Highway Performance Monitoring System for the year 2000. The traffic volumes were transferred from the CALTRANS roadway network to the TeleAtlas networks using previously described methods.[23] The hourly traffic volumes on weekdays and weekend days were estimated from the annual average daily traffic volumes and the average diurnal and day-of-week freeway and nonfreeway traffic variations observed in Southern California. These data were used to calculate the daily average number of vehicles traveling within 150 meters of each residence, weighted by inverse distance from the home to each road. This local traffic density was expressed as traffic volume per square meter.

To obtain model-based estimates of traffic-related pollution exposure, we used the CALINE4 line-source air-quality dispersion model.[24] Principal model inputs included roadway link geometry, link traffic volumes, meteorologic conditions (wind speed and direction, atmospheric stability, and mixing heights), and vehicle emission rates. The 5-year

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average joint distributions of wind speeds and directions were obtained from 1 surface-monitoring station in or near each study community. The dispersion model was applied to simulate the transport and dispersion of NO_x as a chemically inert pollutant. Although NO, NO_2, and ozone undergo rapid atmospheric chemical reactions immediately downwind of sources, NO_x can be treated as a chemically inert pollutant for the first hour of transport from sources because the time-scale for NO_x oxidation is 10 to 20 hours in urban atmospheres.[25] Vehicle NO_x emission rates were obtained from the California Air Resources Board's EMFAC2002 vehicle emissions model. Concentrations of NO_2 were estimated by applying the annual average ratio of observed NO_2 to NO_x for each hour of the day (from the community central site monitor) to the CALINE4 model's estimated NO_x concentrations. We estimated the contribution to residential exposure separately for freeway and for nonfreeway traffic.

Ambient NO_2 concentrations in the community are a result of meteorologic transport of pollutants into the community, local point and area source emissions, and local mobile source emissions. The CALINE4 model was used to model NO_2 from local traffic in each community and, therefore, always predicts concentrations lower than the total NO_2 from all sources. Separate regional modeling analysis has indicated that local mobile source emissions contribute 12% to 68% of the average NO_2 in the study communities.[23] For comparison purposes, we also generated exposure assignments based on fine particulate matter (PM) and carbon monoxide (CO) emission factors. Model-based estimates of NO_2, PM, and CO were very highly correlated with one another ($R > 0.90$), indicating that the NO_2-based estimates we use in this article should be considered an estimate of traffic-related pollution in general rather than simply exposure to this specific pollutant.

Questionnaire Data

When we originally enrolled subjects as fourth graders, each subject's parent or legal guardian completed a baseline medical history questionnaire. Asthma was defined as a "yes" response to the question "Has a doctor ever diagnosed your child as having asthma?" This questionnaire was also used to determine whether the child had recently (within the last 12 months) wheezed, recently wheezed during exercise, or was currently using any type of medication to control asthma. Questions about potential risk factors for asthma included parental income or education, environmental tobacco smoke exposure, in utero exposure to maternal tobacco smoking, and presence in the home of mildew, water damage, gas stove, pests, and pets.

Statistical Analysis

We used logistic regression to model the relationship of each traffic measure, including measured NO_2 at the home and the traffic indicators described previously, with baseline asthma prevalence in the 208 study participants. A natural-log transformation of each traffic indicator was used in these analyses, because the distribution of each variable was positively skewed. All models included adjustments for sex, race, Hispanic ethnicity, cohort (whether the subject was enrolled in 1993 or 1996), and indicator variables for study community. We considered separate models for 2-week average NO_2 concentrations measured in summer and in winter and for the 4-week average across seasons. Odds ratios (ORs) for asthma in analyses of measured NO_2 concentrations were scaled to an increase of 5.7 ppb, the average interquartile range (IQR) in 4-week average NO_2 within the 10 communities. ORs for the traffic indicators were also scaled to 1 IQR in exposure (specifically 1.2 km for distance to the nearest freeway; 2720 vehicles per m^2 per day for traffic volumes within 150 meters; and 0.64, 0.49, and 1.27 ppb for model-based estimates of NO_2 from freeways, nonfreeways, and all roads, respectively).

RESULTS

Doctor-diagnosed asthma was reported by 31 (15%) of the 208 children, with variability in prevalence across communities (Table 1). Overall community-average NO_2 levels measured at homes ranged from 12.9 ppb in Atascadero to 51.5 ppb in San Dimas, with similar patterns across communities in summer and winter. The NO_2 levels (average of summer and winter) measured at homes are shown in Figure 1. Within each community, there was substantial variation in NO_2 levels from home to home. Although the amount of variation in NO_2 was generally larger in more polluted communities, there were some exceptions. For example, there was little variation in the relatively high NO_2 community of Mira Loma, whereas there was considerable variation in the lower NO_2 community of Alpine.

The average NO_2 concentration measured at homes was associated with asthma prevalence (Table 2). For each increase of 5.7 ppb in average NO_2, the OR for asthma increased by 1.83 (95% CI = 1.04–3.21). Odds ratios were similar whether based on summer-only (1.55) or winter-only (1.50) measurements. The effect of average NO_2 was of similar magnitude after adjustment for several potential confounders, including socioeconomic status of participants and housing characteristics (Table 2).

Measured NO_2 concentrations at homes were correlated with residential distance from the nearest freeway and with model-based estimates of traffic-related pollution from roadways (Appendix Table, available with the online version of this article). In each community, we observed negative correlations between NO_2 concentration and distance of the home to the freeway. The overall correlation between NO_2 and freeway distance, adjusted for community, was $R = -0.54$. The corresponding correlations of measured NO_2

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TABLE 1. Distribution of Lifetime History of Asthma and Measured NO_2 by Community (n = 208)

Community	No.	Asthma (%)	NO_2 (ppb) Summer	Winter	Average†
Alpine (AL)	24	21	20.1	19.0	19.6
Atascadero (AT)	13	23	12.3	13.6	12.9
Lake Elsinore (LE)	22	5	17.6	27.4	22.5
Lancaster (LN)	16	19	16.9	22.0	19.5
Long Beach (LB)	20	10	34.6	50.5	42.5
Mira Loma (ML)	17	12	37.2	48.4	42.8
Riverside (RV)	30	20	37.9	42.8	40.3
San Dimas (SD)	34	15	52.0	51.0	51.5
Santa Maria (SM)	19	16	12.7	17.9	15.3
Upland (UP)	13	8	46.3	36.0	41.2

*Parent report of doctor-diagnosed asthma in the child.
†Mean in each community of NO_2 concentrations measured at homes for 2 weeks each in summer and winter. Average is the 4-week arithmetic average of summer and winter measurements.

with model-based estimates were 0.56 for pollution from freeways and 0.34 for pollution from nonfreeways. In each community, measured NO_2 was more strongly correlated with estimates of freeway-related pollution than with nonfreeway pollution. Measured NO_2 was less correlated with traffic counts within 150 meters of homes (R = 0.24), with inconsistent patterns of correlations from community to community.

Both distance to the freeway and the model-based estimate of freeway-related pollutants were associated with asthma history (Table 3). Asthma prevalence was higher with decreasing distance from the freeway; specifically when comparing the 25th to 75th percentile of freeway distance, the OR was 1.89 (95% CI = 1.19–3.02). For the comparison of 75th to 25th percentile of model-based pollutant exposure from freeways, the OR was 2.22 (1.36–3.63). Asthma was not associated with traffic volumes or with model-based exposure to nonfreeway roads. The associations observed with freeway distance and model-based pollution from freeways were robust to adjustment for all of the potential confounders shown in Table 2 (data not shown).

Measured NO_2 and the 2 freeway-related traffic indicators were also associated with recent wheeze, recent wheeze with exercise, and current use of asthma medication

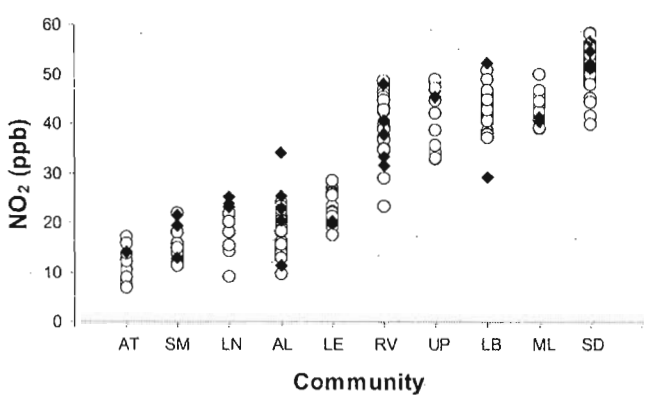

FIGURE 1. Four-week average of nitrogen dioxide measured at homes of asthmatic (solid black diamond) and nonasthmatic (open circle) children in 10 communities. See Table 1 for community abbreviations.

TABLE 2. Association Between 4-Week Average NO_2 at Homes and Asthma History, Adjusted for Several Potential Confounders

Description	OR* (95% CI)
Base model†	1.83 (1.04–3.21)
Base model, with additional adjustment for:	
Environmental tobacco smoke	1.93 (1.09–3.43)
In utero exposure to maternal smoking	1.85 (1.05–3.28)
Parental income	1.99 (1.11–3.57)
Parental education	1.90 (1.07–3.37)
Gas stove	1.87 (1.06–3.30)
Mildew	1.81 (1.01–3.23)
Water damage	1.82 (1.03–3.21)
Cockroaches	1.83 (1.04–3.21)
Pets	1.88 (1.06–3.33)

*Odds ratio per increase of 1 interquartile range (5.7 ppb) in NO_2.
†Base model includes adjustments for sex, race, Hispanic ethnicity, cohort, and community.

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TABLE 3. Associations Between Exposure to Traffic at Home and Asthma History

Exposure Metric	Odds Ratio per IQR OR* (95% CI)
Distance to freeway	1.89 (1.19–3.02)
Traffic volume within 150 meters	1.45 (0.73–2.91)
Model-based pollution from:	
Freeways	2.22 (1.36–3.63)
Other roads	1.00 (0.75–1.33)
Freeways and other roads	1.40 (0.86–2.27)

*Odds ratio per change of 1 IQR. For distance to freeway, OR for the 25th percentile compared with the 75th percentile (ie, living closer compared with farther from the freeway). For remaining traffic variables, OR for the 75th percentile compared with the 25th percentile. All models were adjusted for sex, race, Hispanic ethnicity, cohort, and community.

(Table 4). For example, the OR per increase of 5.7 ppb in measured NO_2 was 1.72 (1.07–2.77) for recent wheeze and was 2.19 (1.20–4.01) for current use of asthma medication.

DISCUSSION

We found robust associations of several indicators of exposure to traffic-related air pollution at homes in southern California with lifetime history of asthma, current asthma medication use, recent wheeze, and recent exercise-induced wheeze. Residential distance to a freeway and model-based estimates of freeway traffic-emission exposure at homes were each associated with the prevalence of asthma. Each of these traffic metrics was also correlated with measured concentrations of NO_2, and measured NO_2 was associated with asthma. Taken as a whole, these results indicate that exposure to outdoor levels of NO_2 or other freeway-related pollutants was a significant risk factor for asthma.

A strength of this asthma study is that it used both measured pollution and multiple indicators of exposure to traffic at the same homes in a large number of communities. The results suggest that measuring NO_2 or another pollutant is important for validation of the use of traffic measures and for selection of the most appropriate indicator of traffic exposure for the population under study. Those few studies that have measured residential exposure or that have validated models of exposure using measurements of pollutants have generally shown associations with asthma,[6,7,26] whereas the failure to validate traffic indicators may explain inconsistent results from several other studies.[8–11] In our study, simple distance to a freeway was as strongly and precisely associated with asthma and wheeze as was NO_2. It remains to be seen whether the association with this simple and widely available indicator is replicable in other studies or could be used for estimating risk in communities without having to make additional measurements of traffic-related pollutants.

We did not find associations between respiratory health and other indicators of traffic near homes, including modeled pollution from nonfreeway roads and traffic volumes within 150 meters of homes. One possible explanation for this lack of association is that the contribution to pollution levels from these smaller roads (where tens or hundreds of vehicles travel each day) is trivial compared with freeways that dominate the transportation grid in southern California with daily average counts in our communities between 50,000 to 270,000 vehicles. In addition, vehicle counts are accurately measured on freeways but are only estimated on smaller roads where participants lived. Our results are in contrast to several recent (mostly European) studies that have reported associations of asthma with traffic counts in close proximity to the home.[6,7,27,28] These differences in results may be partly the result of differences in urban geography and closer proximity of homes in Europe to heavily traveled roadways.

There have been a few other studies of traffic and childhood asthma in the United States. One large study in southern California found no association of asthma prevalence with traffic counts within 550 feet of the home,[9] similar to our finding of no association with traffic volumes within 150 meters of the home. Consistent with our findings related to measured NO_2, a recent study in northern California[29] found an association between measured traffic-related pollutants at schools and childhood asthma.

TABLE 4. Associations Between Measured NO_2 and Asthma-Related Outcomes (n = 208)

Outcome	No.	Measured NO_2 OR* (95% CI)	Distance to Freeway OR* (95% CI)	Model-based Pollution From Freeways OR* (95% CI)
Lifetime history of asthma	31	1.83 (1.04–3.22)	1.89 (1.19–3.02)	2.22 (1.36–3.63)
Recent wheeze†	43	1.72 (1.07–2.77)	1.59 (1.06–2.36)	1.70 (1.12–2.58)
Recent wheeze with exercise†	25	2.01 (1.08–3.72)	2.57 (1.50–4.38)	2.56 (1.50–4.38)
Current asthma medication use	26	2.19 (1.20–4.01)	2.04 (1.25–3.31)	1.92 (1.18–3.12)

*Odds ratio per change of 1 IQR in exposure (see footnotes to Tables 2 and 4).
†Within the last 12 months.

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The observed associations of traffic with asthma are biologically plausible. Increased oxidative and nitrosative stress associated with NO_2 exposure may impair respiratory responses to infection and thus result in lung injury and asthma exacerbation.[20,30] However, the association of NO_2 with asthma prevalence has been extensively evaluated in epidemiologic studies of exposure to indoor sources, often at levels considerably higher than the modest (5.7 ppb) IQR of exposure in our study, and the observed associations have not been consistent.[30,31] It is possible that outdoor NO_2, which occurs in a complex mixture that includes particulate matter and other pollutants known to affect respiratory health, is a marker of some other traffic-related pollutant(s) responsible for increasing asthma risk. For example, some field studies suggest that the concentration of fine particulate matter, especially black smoke (an indicator of diesel exhaust), varies with nearby high-traffic roads and with NO_2.[32–35] It has been hypothesized that particulate matter, especially diesel exhaust particulate, may contribute to the development of allergies and asthma.[36] Additional research is needed to study the health effects of specific pollutants that occur in complex mixtures of traffic emissions.

A possible limitation of this study is the assessment of asthma by questionnaire, which could be affected by access to care and differences in diagnostic practice among physicians.[37] However, we found associations of traffic indicators with recent wheeze and exercise-induced wheeze, 2 symptoms of asthma that are unlikely to be affected by access to care or diagnostic bias. Another limitation is the possibility of poor or biased reporting of asthma by parents. However, self-report of physician-diagnosed asthma has been found to reflect what physicians actually reported to patients, at least in adults, and validity as assessed by repeatability of response is good.[38] Self-report of physician diagnosis has been the main criterion for identifying asthma in epidemiologic studies of children and has been recommended as the epidemiologic gold standard because a more precise identification tool is not available.[39] Reporting bias is unlikely to have explained the observed associations, because parents were not aware of the specific focus of the study on air pollution at the time the questionnaire was completed. Biased participation with respect to disease status in this substudy is also unlikely, because the prevalence of doctor-diagnosed asthma in the sample of 208 children (15%, Table 1) was not very different from the asthma prevalence in the remaining 668 eligible children (13%, $P = 0.56$).

Another potential study limitation is that measured NO_2 and the traffic metrics were determined after the onset of asthma and extrapolated to earlier in life. However, the systems of freeways and other major roadways in the study communities have been in place and essentially unchanged for many years. We thus expect that the spatial pattern of exposure to traffic emissions from home to home was relatively similar over the lifetimes of these children. Bias could also have occurred if the families of asthmatic children had preferentially moved to a home near a freeway, but this seems unlikely. Additionally, our observed associations were robust to adjustment for factors known to be related to population mobility, housing location, and access to care, including race/ethnicity and indicators of socioeconomic status (as well as household characteristics). This robustness further suggests that our results were not the result of these potential confounders.

These results have both scientific and public health implications. They strengthen an emerging body of evidence that air pollution can cause asthma and that traffic-related pollutants that vary within communities are partly responsible for this association. The current regulatory approach that focuses almost exclusively on regional pollutants merits reevaluation in light of this emerging evidence and in light of the enormous costs associated with childhood asthma.[40] In addition, because NO_2 may be a surrogate for the pollutant or pollutants responsible for the observed effects, further study is indicated to identify the specific pollutant(s). In this regard, improved physical and chemical characterization of ambient ultrafine particles (including particle number concentration distributions, as well as more traditional chemical analyses) are topics of specific ongoing research interest in southern California and elsewhere.

ACKNOWLEDGMENTS

We are very grateful for input from the external advisory committee to this study, including David Bates, Morton Lippmann, Jonathan Samet, Frank Speizer, John Spengler, and Scott Zeger. We thank Tami Funk of Sonoma Technology for contributing to the assessment of residential distance to freeways, and Robert Weker of the Harvard School of Public Health for preparing and analyzing the Palmes tubes.

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The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 SEPTEMBER 9, 2004 VOL. 351 NO. 11

The Effect of Air Pollution on Lung Development from 10 to 18 Years of Age

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ABSTRACT

BACKGROUND

Whether exposure to air pollution adversely affects the growth of lung function during the period of rapid lung development that occurs between the ages of 10 and 18 years is unknown.

METHODS

In this prospective study, we recruited 1759 children (average age, 10 years) from schools in 12 southern California communities and measured lung function annually for eight years. The rate of attrition was approximately 10 percent per year. The communities represented a wide range of ambient exposures to ozone, acid vapor, nitrogen dioxide, and particulate matter. Linear regression was used to examine the relationship of air pollution to the forced expiratory volume in one second (FEV_1) and other spirometric measures.

RESULTS

Over the eight-year period, deficits in the growth of FEV_1 were associated with exposure to nitrogen dioxide (P=0.005), acid vapor (P=0.004), particulate matter with an aerodynamic diameter of less than 2.5 μm ($PM_{2.5}$) (P=0.04), and elemental carbon (P=0.007), even after adjustment for several potential confounders and effect modifiers. Associations were also observed for other spirometric measures. Exposure to pollutants was associated with clinically and statistically significant deficits in the FEV_1 attained at the age of 18 years. For example, the estimated proportion of 18-year-old subjects with a low FEV_1 (defined as a ratio of observed to expected FEV_1 of less than 80 percent) was 4.9 times as great at the highest level of exposure to $PM_{2.5}$ as at the lowest level of exposure (7.9 percent vs. 1.6 percent, P=0.002).

CONCLUSIONS

The results of this study indicate that current levels of air pollution have chronic, adverse effects on lung development in children from the age of 10 to 18 years, leading to clinically significant deficits in attained FEV_1 as children reach adulthood.

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N Engl J Med 2004;351:1057-67.
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THERE IS MOUNTING EVIDENCE THAT air pollution has chronic, adverse effects on pulmonary development in children. Longitudinal studies conducted in Europe[1-3] and the United States[4-6] have demonstrated that exposure to air pollution is associated with reductions in the growth of lung function, strengthening earlier evidence[7-12] based on cross-sectional data. However, previous longitudinal studies have followed young children for relatively short periods (two to four years), leaving unresolved the question of whether the effects of air pollution persist from adolescence into adulthood. The Children's Health Study[13] enrolled children from 12 southern California communities representing a wide range of exposures to ambient air pollution. We documented the children's respiratory growth from the ages of 10 to 18 years. Over this eight-year period, children have substantial increases in lung function. By the age of 18 years, girls' lungs have nearly matured, and the growth in lung function in boys has slowed considerably, as compared with the rate in earlier adolescence.[14] We analyzed the association between long-term exposure to ambient air pollution and the growth in lung function over the eight-year period from the ages of 10 to 18 years. We also examined whether any observed effect of air pollution on this eight-year growth period results in clinically significant deficits in attained lung function at the age of 18 years.

METHODS

STUDY SUBJECTS

In 1993, the Children's Health Study recruited 1759 fourth-grade children (average age, 10 years) from elementary schools in 12 southern California communities as part of an investigation of the long-term effects of air pollution on children's respiratory health.[6,12,13] Data on pulmonary function were obtained by trained field technicians, who traveled to study schools annually from the spring of 1993 through the spring of 2001 to perform maximal-effort spirometric testing of the children. Details of the testing protocol have been published previously.[12] We analyzed three measures of pulmonary function: forced vital capacity (FVC), forced expiratory volume in the first second (FEV_1), and maximal midexpiratory flow rate (MMEF). Pulmonary-function tests were not performed on any child who was absent from school on the day of testing, but such a child was still eligible for testing in subsequent years. Children who moved away from their recruitment community were classified as lost to follow-up and were not tested further. From the initial sample of the 1759 children in 1993, the number of children available for follow-up was 1414 in 1995, 1252 in 1997, 1031 in 1999, and 747 in 2001, reflecting the attrition of approximately 10 percent of subjects per year.

A baseline questionnaire, completed at study entry by each child's parents or legal guardian, was used to obtain information on the children's characteristics, including race, presence or absence of Hispanic ethnic background, level of parental education, presence or absence of a history of asthma diagnosed by a doctor, exposure to maternal smoking in utero, and household exposure to gas stoves, pets, and environmental tobacco smoke. Questions administered at the time of annual pulmonary-function testing were used to update information on asthma status, personal smoking status, and exposure to environmental tobacco smoke. The distribution of baseline characteristics of all study subjects and of two subgroups defined according to the length of follow-up (all eight years or less than eight years) is shown in the Supplementary Appendix (available with the full text of this article at www.nejm.org). The length of follow-up was significantly associated with factors related to the mobility of the population, including race, presence or absence of Hispanic ethnic background, presence or absence of exposure to environmental tobacco smoke, and parents' level of education. However, the length of follow-up was not significantly associated with baseline lung function or the level of exposure to air pollution, suggesting that the loss to follow-up did not differ with respect to the primary variables of interest.

The study protocol was approved by the institutional review board for human studies at the University of Southern California, and written informed consent was provided by a parent or legal guardian for all study subjects. We did not obtain assent from minor children, since this was not standard practice when the study was initiated.

AIR-POLLUTION DATA

Air-pollution–monitoring stations were established in each of the 12 study communities and provided continuous data, beginning in 1994. Each station measured average hourly levels of ozone, nitrogen

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dioxide, and particulate matter with an aerodynamic diameter of less than 10 μm (PM_{10}). Stations also collected two-week integrated-filter samples for measuring acid vapor and the mass and chemical makeup of particulate matter with an aerodynamic diameter of less than 2.5 μm ($PM_{2.5}$). Acid vapor included both inorganic acids (nitric and hydrochloric) and organic acids (formic and acetic). For statistical analysis, we used total acid, computed as the sum of nitric, formic, and acetic acid levels. Hydrochloric acid was excluded from this sum, since levels were very low and close to the limit of detection. In addition to measuring $PM_{2.5}$, we determined the levels of elemental carbon and organic carbon, using method 5040 of the National Institute for Occupational Safety and Health.[15] We computed annual averages on the basis of average levels in a 24-hour period in the case of PM_{10} and nitrogen dioxide, and a two-week period in the case of $PM_{2.5}$, elemental carbon, organic carbon, and acid vapor. For ozone, we computed the annual average of the levels obtained from 10 a.m. to 6 p.m. (the eight-hour daytime average) and of the one-hour maximal levels. We also calculated long-term mean pollutant levels (from 1994 through 2000) for use in the statistical analysis of the lung-function outcomes.

STATISTICAL ANALYSIS

The outcome data consisted of the results of 5454 pulmonary-function tests of 876 girls and 5300 tests of 883 boys over the eight-year period. We adopted a two-stage regression approach to relate the longitudinal pulmonary-function data for each child to the average air-pollution levels in each study community.

The first-stage model was a regression of each pulmonary-function measure (values were log-transformed) on age to obtain separate, community-specific average growth curves for girls and boys. To account for the growth pattern during this period, we used a linear spline model[14] that consisted of four straight lines over the age intervals of younger than 12 years, 12 to 14 years, 14 to 16 years, and older than 16 years, constrained to be connected at the three "knot" points. The model included adjustments for log values for height; body-mass index (the weight in kilograms divided by the square of the height in meters); the square of the body-mass index; race; the presence or absence of Hispanic ethnic background, doctor-diagnosed asthma, any tobacco smoking by the child in the preceding year, exposure to environmental tobacco smoke, and exercise or respiratory tract illness on the day of the test; and indicator variables for the field technician and the spirometer. In addition to these covariates, random effects were included to account for the multiple measurements contributed by each subject. An analysis of residual values confirmed that the assumptions of the model had been satisfied. The first-stage model was used to estimate the mean and variance of the growth in lung function over the eight-year period in each of the 12 communities, separately for girls and boys.

The second-stage model was a linear regression of the 24 sex- and community-specific estimates of the growth in lung function over the eight-year period on the corresponding average levels of each air pollutant in each community. Inverses of the first-stage variances were incorporated as weights, and a community-specific random effect was included to account for residual variation between communities. A sex-by-pollutant interaction was included in the model to evaluate whether there was a difference in the effect of a given pollutant between the sexes, and when this value was nonsignificant, the model was refitted to estimate the sex-averaged effect of the pollutant. Pollutant effects are reported as the difference in the growth in lung function over the eight-year period from the least to the most polluted community, with negative differences indicative of growth deficits with increasing exposure. We also considered two-pollutant models obtained by simultaneously regressing the growth in lung function over the eight-year period on pairs of pollutants.

In addition to examining the growth in lung function over the eight-year period, we analyzed the FEV_1 measurements obtained in 746 subjects during the last year of follow-up (average age, 17.9 years) to determine whether exposure to air pollution was associated with clinically significant deficits in attained FEV_1. We defined a low FEV_1 as an attained FEV_1 below 80 percent of the predicted value, a criterion commonly used in clinical settings to identify persons who are at increased risk for adverse respiratory conditions. To determine the predicted FEV_1, we first fitted a regression model for observed FEV_1 (using log-transformed values) with the following predictors: log-transformed height, body-mass index, the square of the body-mass index, sex, race or ethnic group, asthma status, field technician, and interactions between sex and log-transformed height, sex and asthma, and sex and

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race or ethnic group. This model explained 71 percent of the variance in the attained FEV_1 level. For each subject, we then computed the predicted FEV_1 from the model and considered subjects to have a low FEV_1 if the ratio of observed to predicted FEV_1 was less than 80 percent. Linear regression was then used to examine the correlation between the community-specific proportion of subjects with a low FEV_1 and the average level of each pollutant from 1994 through 2000. This model included a community-specific random effect to account for residual variation. Regression procedures in SAS software[16] were used to fit all models. Associations denoted as statistically significant were those that yielded a P value of less than 0.05, assuming a two-sided alternative hypothesis.

RESULTS

From 1994 through 2000, there was substantial variation in the average levels of study pollutants across the 12 communities, with relatively little year-to-year variation in the annual levels within each community (Fig. 1). From 1994 through 2000, the

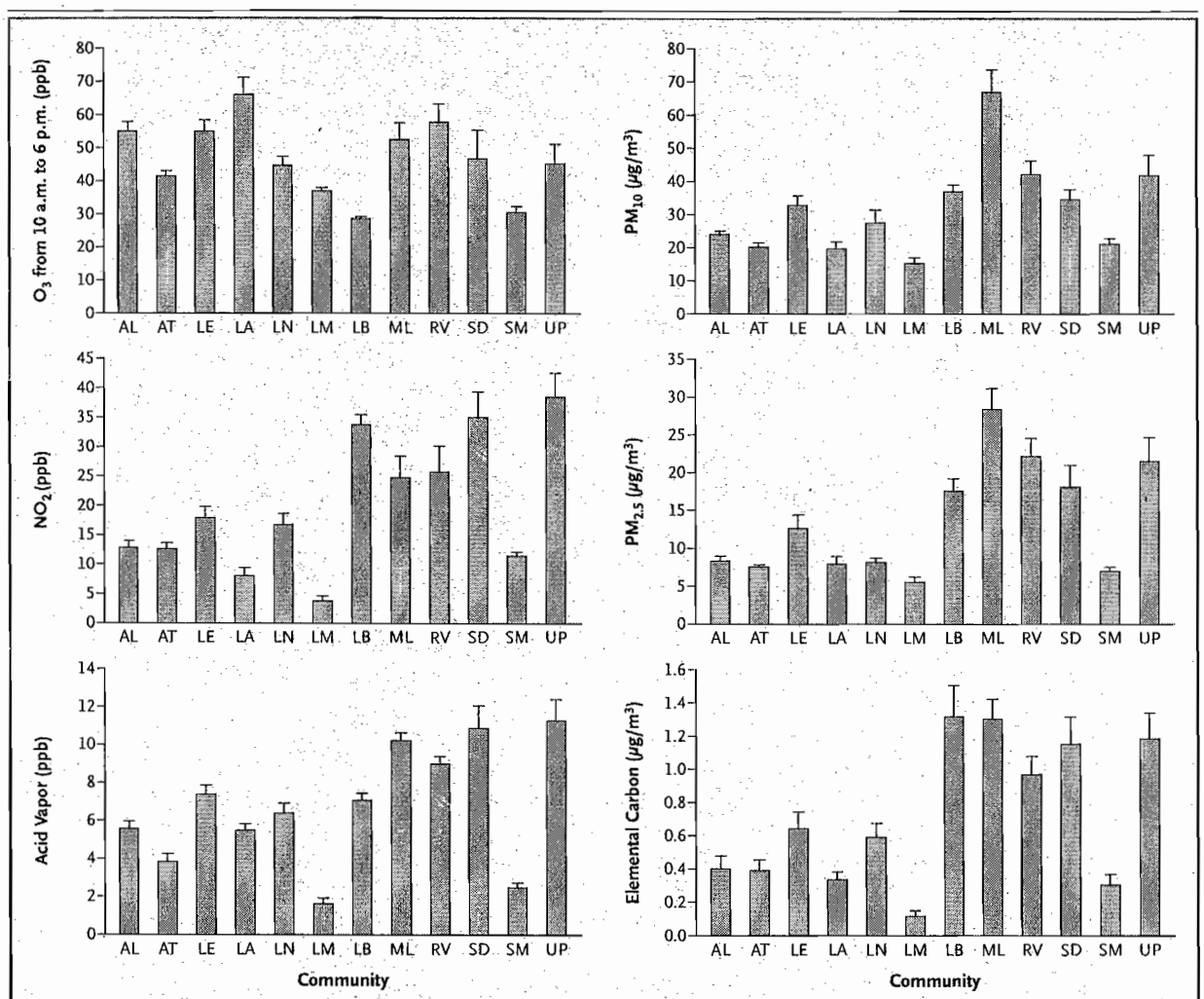

Figure 1. Mean (+SD) Annual Average Levels of Pollutants from 1994 through 2000 in the 12 Study Communities in Southern California. AL denotes Alpine, AT Atascadero, LE Lake Elsinore, LA Lake Arrowhead, LN Lancaster, LM Lompoc, LB Long Beach, ML Mira Loma, RV Riverside, SD San Dimas, SM Santa Maria, and UP Upland. O_3 denotes ozone, NO_2 nitrogen dioxide, and PM_{10} and $PM_{2.5}$ particulate matter with an aerodynamic diameter of less than 10 μm and less than 2.5 μm, respectively.

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average levels of ozone were not significantly correlated across communities with any other study pollutant (Table 1). However, correlations between other pairs of pollutants were all significant, ranging from an R of 0.64 ($P<0.05$) for nitrogen dioxide and organic carbon, to an R of 0.97 ($P<0.001$) for PM_{10} and organic carbon. Thus, nitrogen dioxide, acid vapor, and the particulate-matter pollutants can be regarded as a correlated "package" of pollutants with a similar pattern relative to each other across the 12 communities.

Among the girls, the average FEV_1 increased from 1988 ml at the age of 10 years to 3332 ml at the age of 18 years, yielding an average growth in FEV_1 of 1344 ml over the eight-year period (Table 2). The corresponding averages in boys were 2082 ml and 4464 ml, yielding an average growth in FEV_1 of 2382 ml over the eight-year period. Similar patterns of growth over the eight-year period were observed for FVC and MMEF (Table 2).

Although the average growth in FEV_1 was larger in boys than in girls, the correlations of growth with air pollution did not differ significantly between the sexes, as shown for nitrogen dioxide in Figure 2. The sex-averaged analysis, depicted by the regression line in Figure 2, demonstrated a significant negative correlation between the growth in FEV_1 over the eight-year period and the average nitrogen dioxide level ($P=0.005$). The estimated difference in the average growth in FEV_1 over the eight-year period from the community with the lowest nitrogen dioxide level to the community with the highest nitrogen dioxide level, represented by the slope of the plotted regression line in Figure 2, was −101.4 ml.

Estimated differences in the growth of FEV_1, FVC, and MMEF during the eight-year period with respect to all pollutants are summarized in Table 3. Deficits in the growth of FEV_1 and FVC were observed for all pollutants, and deficits in the growth of MMEF were observed for all but ozone, with several combinations of outcome variables and pollutants attaining statistical significance. Specifically, for FEV_1 we observed significant negative correlations between the growth in this variable over the eight-year period and exposure to acid vapor ($P=0.004$), $PM_{2.5}$ ($P=0.04$), and elemental carbon ($P=0.007$), in addition to the above-mentioned correlation with nitrogen dioxide. As with FEV_1, the effects of the various pollutants on FVC and MMEF did not differ significantly between boys and girls. Significant deficits in FVC were associated with exposure to nitrogen dioxide ($P=0.05$) and acid vapor ($P=0.03$), whereas deficits in MMEF were associated with exposure to nitrogen dioxide ($P=0.02$) and elemental carbon ($P=0.04$). There was no significant evidence that ozone, either the average value obtained from 10 a.m. to 6 p.m. or the one-hour maximal level, was associated with any measure of lung function. In two-pollutant models for any of the measures of pulmonary function, adjustment for ozone did not substantially alter the effect estimates or significance levels of any other pollutant (data not shown). In general, two-pollutant models for any pair of pollutants did not provide a significantly better fit to the data than the corre-

Table 1. Correlation of Mean Air-Pollution Levels from 1994 through 2000 across the 12 Study Communities.*

Pollutant	O_3 (10 a.m.–6 p.m.)	NO_2	Acid Vapor†	PM_{10}	$PM_{2.5}$	Elemental Carbon	Organic Carbon
			R value				
O_3							
1-Hour maximal level	0.98	0.10	0.53	0.31	0.33	0.17	0.25
10 a.m.–6 p.m.		−0.11	0.35	0.18	0.18	−0.03	0.13
NO_2			0.87	0.67	0.79	0.94	0.64
Acid vapor†				0.79	0.87	0.88	0.76
PM_{10}					0.95	0.85	0.97
$PM_{2.5}$						0.91	0.91
Elemental carbon							0.82

* Unless otherwise noted, values are the 24-hour average pollution levels. O_3 denotes ozone, NO_2 nitrogen dioxide, and PM_{10} and $PM_{2.5}$ particulate matter with an aerodynamic diameter of less than 10 μm and less than 2.5 μm, respectively.
† Acid vapor is the sum of nitric, formic, and acetic acid levels.

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Table 2. Mean Levels of Growth in Pulmonary Function during the Eight-Year Study Period, from 1993 to 2001.*

Pulmonary-Function Measure	Girls			Boys		
	Age of 10 yr	Age of 18 yr	Average 8-yr growth	Age of 10 yr	Age of 18 yr	Average 8-yr growth
FVC (ml)	2262	3790	1528	2427	5202	2775
FEV_1 (ml)	1988	3332	1344	2082	4464	2382
MMEF (ml/sec)	2311	3739	1428	2287	4709	2422

* Levels at the ages of 10 and 18 years are derived from the growth model described in the Methods section. FVC denotes forced vital capacity, FEV_1 forced expiratory volume in one second, and MMEF maximal midexpiratory flow rate.

sponding single-pollutant models; this was not surprising, given the strong correlation between most pollutants.

The association between pollution and the growth in FEV_1 over the eight-year period remained significant in a variety of sensitivity analyses (Table 4). For example, estimates of the effect of acid vapor and elemental carbon (model 1 in Table 4) changed little with adjustment for in-utero exposure to maternal smoking (model 2), presence in the home of a gas stove (model 3) or pets (model 4), or parental level of education (model 5). To account for possible confounding by short-term effects of air pollution, we fitted a model that adjusted for the average ozone, nitrogen dioxide, and PM_{10} levels on the three days before each child's pulmonary-function test. This adjustment also had little effect on the estimates of the long-term effects of air pollution (model 6). Table 4 also shows that the effects of pollutants remained large and significant in the subgroups of children with no history of asthma (model 7) and those with no history of smoking (model 8). The effects of pollutants were not significant among the 457 children who had a history of asthma or among the 483 children who had ever smoked (data not shown), although the sample sizes in these subgroups were small. Model 9 demonstrates that the extremes in pollutant levels did not drive the observed associations; in other words, we found similar effect estimates after eliminating the two communities with the highest and lowest levels of each pollutant. Finally, model 10 shows the effects of pollutants in the subgroup of subjects who underwent pulmonary-function testing in both 1993 and 2001 (i.e., subjects who participated in both the first and last year of the study). The magnitudes of effects in this subgroup were similar to those in the entire sample (model 1), suggesting that observed effects of pollutants in the entire sample cannot be attributed to biased losses to follow-up across communities. These sensitivity analyses were also applied to the other pollutants and to FVC and MMEF, with similar results.

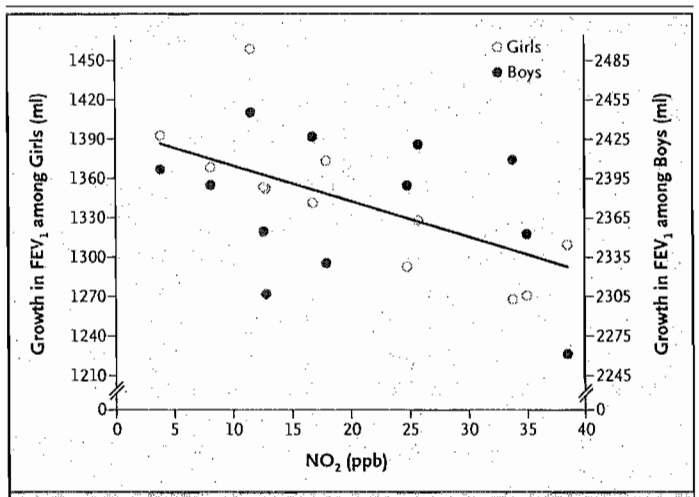

Figure 2. Community-Specific Average Growth in FEV_1 among Girls and Boys During the Eight-Year Period from 1993 to 2001 Plotted against Average Nitrogen Dioxide (NO_2) Levels from 1994 through 2000.

Pollution-related deficits in the average growth in lung function over the eight-year period resulted in clinically important deficits in attained lung function at the age of 18 years (Fig. 3). Across the 12 communities, a clinically low FEV_1 was positively correlated with the level of exposure to nitrogen dioxide ($P=0.005$), acid vapor ($P=0.01$), PM_{10} ($P=0.02$), $PM_{2.5}$ ($P=0.002$), and elemental carbon ($P=0.006$). For example, the estimated proportion of children with a low FEV_1 (represented by the regression line in Fig. 3) was 1.6 percent at the lowest level of exposure to $PM_{2.5}$ and was 4.9 times as great (7.9 percent) at the highest level of exposure to $PM_{2.5}$

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Table 3. Difference in Average Growth in Lung Function over the Eight-Year Study Period from the Least to the Most Polluted Community.*

Pollutant	FVC		FEV_1		MMEF	
	Difference (95% CI)	P Value	Difference (95% CI)	P Value	Difference (95% CI)	P Value
	ml		*ml*		*ml/sec*	
O_3						
10 a.m.–6 p.m.	−50.6 (−171.0 to 69.7)	0.37	−22.8 (−122.3 to 76.6)	0.62	85.6 (−130.0 to 301.1)	0.40
1-Hour maximal level	−70.3 (−183.3 to 42.6)	0.20	−44.5 (−138.9 to 50.0)	0.32	45.7 (−172.3 to 263.6)	0.65
NO_2	−95.0 (−189.4 to −0.6)	0.05	−101.4 (−164.5 to −38.4)	0.005	−211.0 (−377.6 to −44.4)	0.02
Acid vapor	−105.2 (−194.5 to −15.9)	0.03	−105.8 (−168.8 to −42.7)	0.004	−165.0 (−344.8 to 14.7)	0.07
PM_{10}	−60.2 (−190.6 to 70.3)	0.33	−82.1 (−176.9 to 12.8)	0.08	−154.2 (−378.3 to 69.8)	0.16
$PM_{2.5}$	−60.1 (−166.1 to 45.9)	0.24	−79.7 (−153.0 to −6.4)	0.04	−168.9 (−345.5 to 7.8)	0.06
Elemental carbon	−77.7 (−166.7 to 11.3)	0.08	−87.9 (−146.4 to −29.4)	0.007	−165.5 (−323.4 to −7.6)	0.04
Organic carbon	−58.6 (−196.1 to 78.8)	0.37	−86.2 (−185.6 to 13.3)	0.08	−151.2 (−389.4 to 87.1)	0.19

* Values are the differences in the estimated rate of eight-year growth at the lowest and highest observed levels of the indicated pollutant. Differences are scaled to the range across the 12 study communities in the average level of each pollutant from 1994 through 2000 as follows: 37.5 ppb of O_3 (measured from 10 a.m. to 6 p.m.), 46.0 ppb of O_3 (the one-hour maximal level), 34.6 ppb of NO_2, 9.6 ppb of acid vapor, 51.4 μg of PM_{10} per cubic meter, 22.8 μg of $PM_{2.5}$ per cubic meter, 1.2 μg of elemental carbon per cubic meter, and 10.5 μg of organic carbon per cubic meter. CI denotes confidence interval.

(P=0.002). Similar associations between these pollutants and a low FEV_1 were observed in the subgroup of children with no history of asthma and the subgroup with no history of smoking (data not shown). A low FEV_1 was not significantly correlated with exposure to ozone in any group.

DISCUSSION

The results of this study provide robust evidence that lung development, as measured by the growth in FVC, FEV_1, and MMEF from the ages of 10 to 18 years, is reduced in children exposed to higher levels of ambient air pollution. The strongest associations were observed between FEV_1 and a correlated set of pollutants, specifically nitrogen dioxide, acid vapor, and elemental carbon. The effects of these pollutants on FEV_1 were similar in boys and girls and remained significant among children with no history of asthma and among those with no history of smoking, suggesting that most children are susceptible to the chronic respiratory effects of breathing polluted air. The magnitude of the observed effects of air pollution on the growth in lung function during this age interval was similar to those that have been reported for exposure to maternal smoking[17,18] and smaller than those reported for the effects of personal smoking.[17,19]

Cumulative deficits in the growth in lung function during the eight-year study period resulted in a strong association between exposure to air pollution and a clinically low FEV_1 at the age of 18 years. In general, lung development is essentially complete in girls by the age of 18 years, whereas in boys it continues into their early 20s, but at a much reduced rate. It is therefore unlikely that clinically significant deficits in lung function at the age of 18 years will be reversed in either girls or boys as they complete the transition into adulthood. Deficits in lung function during young adulthood may increase the risk of respiratory conditions — for example, episodic wheezing that occurs during a viral infection.[20] However, the greatest effect of pollution-related deficits may occur later in life, since reduced lung function is a strong risk factor for complications and death during adulthood.[21-27]

Deficits in lung function were associated with a correlated set of pollutants that included nitrogen dioxide, acid vapor, fine-particulate matter ($PM_{2.5}$), and elemental carbon. In southern California, the primary source of these pollutants is motor vehicles, either through direct tailpipe emissions or downwind physical and photochemical reactions of vehicular emissions. Both gasoline- and diesel-powered engines contribute to the tons of pollutants exhausted into southern California's air every day, with diesel vehicles responsible for disproportionate amounts of nitrogen dioxide, $PM_{2.5}$, and ele-

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Table 4. Sensitivity Analysis of the Effects of Acid Vapor and Elemental Carbon on Growth in FEV_1 over the Eight-Year Study Period.*

Model	Acid Vapor	Elemental Carbon
	Difference (95% Confidence Interval)	
Main model (model 1)†	−105.8 (−168.8 to −42.7)	−87.9 (−146.4 to −29.4)
Additional covariates‡		
Main model + in-utero exposure to maternal smoking (model 2)	−108.8 (−173.3 to −44.2)	−85.8 (−147.4 to −24.1)
Main model + exposure to gas stove (model 3)	−106.0 (−181.5 to −30.6)	−84.8 (−154.7 to −14.9)
Main model + pets in home (model 4)	−108.4 (−171.6 to −45.2)	−89.8 (−149.1 to −30.6)
Main model + parental level of education (model 5)	−100.7 (−167.2 to −34.2)	−80.9 (−142.7 to −19.0)
Main model + short-term effects of pollution (model 6)§	−112.4 (−201.4 to −23.3)	−103.2 (−181.8 to −24.5)
Subgroup effects		
No history of asthma (model 7)¶	−98.1 (−166.4 to −29.8)	−88.9 (−149.2 to −28.6)
No history of smoking (model 8)‖	−115.6 (−233.7 to 2.5)	−113.3 (−214.9 to −11.6)
After exclusion of communities with lowest and highest levels of pollution (model 9)**	−106.7 (−192.3 to −21.2)	−94.7 (−173.7 to −15.7)
Complete follow-up (model 10)††	−132.4 (−226.2 to −38.7)	−97.4 (−195.6 to 0.9)

* Values are the differences in the estimated rate of eight-year growth at the lowest and highest observed levels of the indicated pollutant. Differences are scaled to the range across the 12 study communities in the average level of each pollutant from 1994 through 2000 as follows: 9.6 ppb of acid vapor and 1.2 μg of elemental carbon per cubic meter.

† Model 1 is equivalent to effect estimates for FEV_1 in Table 3 and is based on data on 1759 children.

‡ The main model was adjusted for each of the covariates listed.

§ Values were adjusted for the average levels of O_3, NO_2, and PM_{10} on the three days before each child's pulmonary-function test.

¶ The analysis includes data on 1302 children with no history of doctor-diagnosed asthma.

‖ The analysis includes data on 1276 children with no history of active tobacco smoking at any time during follow-up.

** The analysis excludes children from the two communities with the lowest and highest levels of each pollutant. This leaves 1507 children (excluding those from Lompoc and Upland) in the analysis of acid vapor and 1484 children (excluding those from Lompoc and Long Beach) in the analysis of elemental carbon.

†† The analysis includes 713 children who underwent pulmonary-function testing in both 1993 and 2001 (i.e., those observed throughout the study).

mental carbon. In the current study, however, we could not discern the independent effects of pollutants because they came from common sources and there was a high degree of intercorrelation among them; similar difficulties have also been encountered in other studies of lung function and air-pollutant mixtures.[1,2,9,28-30] Since ozone is also formed during photochemical reactions involving fuel-combustion products, one might expect ozone to be correlated with the other study pollutants and therefore to show similar associations with lung function. However, the Children's Health Study was specifically designed to minimize the correlation of ozone with other pollutants across the 12 study communities. Thus, although ozone has been convincingly linked to acute health effects in many other studies,[11] our results provide little evidence that ambient ozone at current levels is associated with chronic deficits in the growth of lung function in children. Only a few other studies have addressed the long-term effects of ozone on lung development in children, and results have been inconsistent.[31] Although we found little evidence of an effect of ozone, this result needs to be interpreted with caution given the potential for substantial misclassification of exposure to ozone.[32,33]

The mechanism whereby exposure to pollutants could lead to reduced lung development is unknown, but there are many possibilities. Our observation of associations between air pollution and all three measures of lung function — FVC, FEV_1, and MMEF — suggests that more than one process is involved. FVC is largely a function of the number and size of alveoli, with differences in volume pri-

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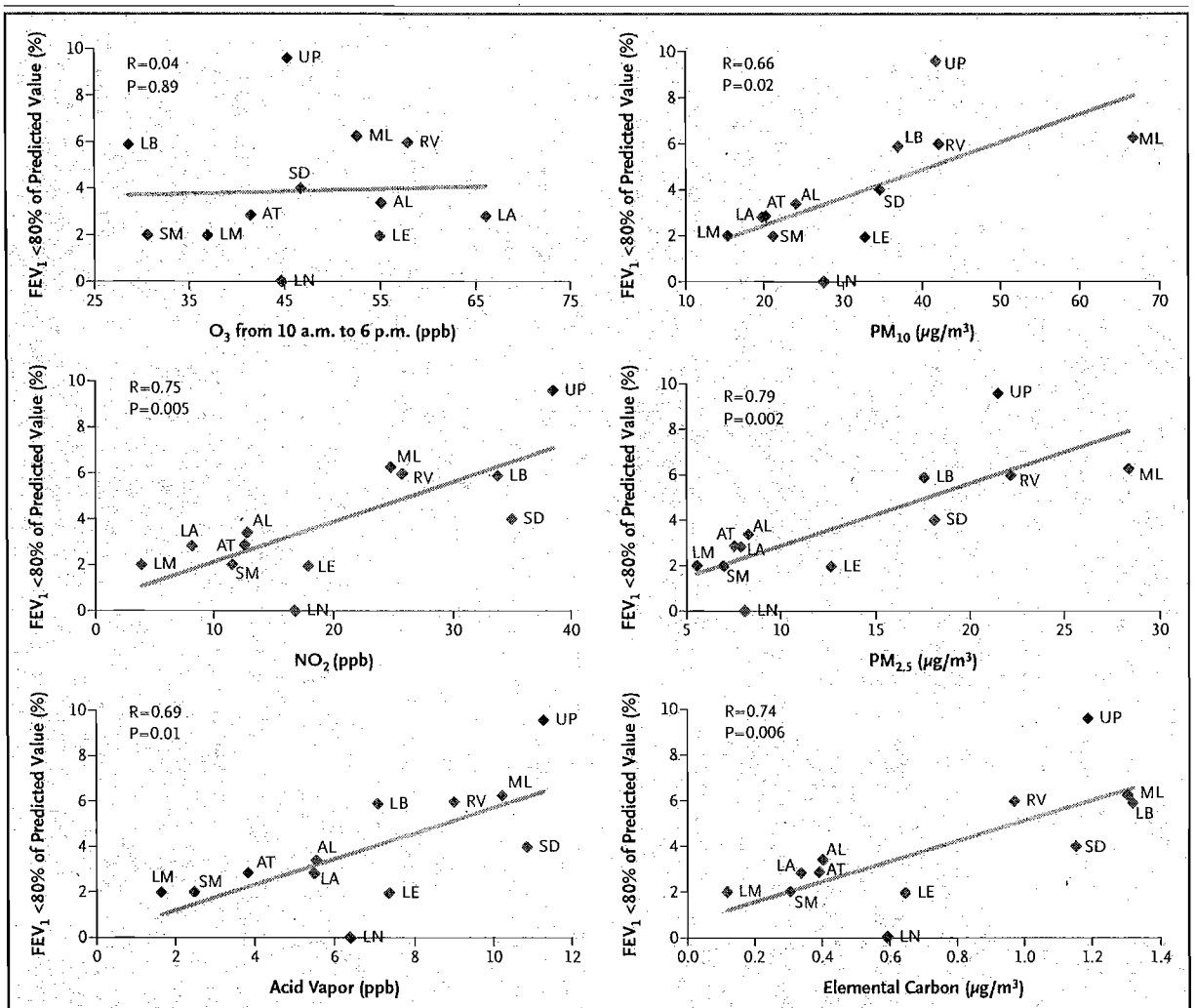

Figure 3. Community-Specific Proportion of 18-Year-Olds with a FEV_1 below 80 Percent of the Predicted Value Plotted against the Average Levels of Pollutants from 1994 through 2000.

The correlation coefficient (R) and P value are shown for each comparison. AL denotes Alpine, AT Atascadero, LE Lake Elsinore, LA Lake Arrowhead, LN Lancaster, LM Lompoc, LB Long Beach, ML Mira Loma, RV Riverside, SD San Dimas, SM Santa Maria, and UP Upland. O_3 denotes ozone, NO_2 nitrogen dioxide, and PM_{10} and $PM_{2.5}$ particulate matter with an aerodynamic diameter of less than 10 μm and less than 2.5 μm, respectively.

marily attributable to differences in the number of alveoli, since their size is relatively constant.[34] However, since the postnatal increase in the number of alveoli is complete by the age of 10 years, pollution-related deficits in the growth of FVC and FEV_1 during adolescence may, in part, reflect a reduction in the growth of alveoli. Another plausible mechanism of the effect of air pollution on lung development is airway inflammation, such as occurs in bronchiolitis; such changes have been observed in the airways of smokers and of subjects who lived in polluted environments.[35,36]

A strength of our study was the long-term, prospective follow-up of a large cohort, with exposure and outcome data collected in a consistent manner throughout the study period. As in any epidemiologic study, however, the observed effects could be biased by underlying associations of the exposure and outcome to some confounding variables. We adjusted for known potential confounders, includ-

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ing personal characteristics and other sources of exposure to pollutants, but the possibility of confounding by other factors still exists. Over the eight-year follow-up period, approximately 10 percent of study subjects were lost to follow-up each year. Attrition is a potential source of bias in a cohort study if loss to follow-up is related to both exposure and outcome. However, we did not see evidence that the loss of subjects was related to either baseline lung function or exposure to air pollution. In addition, we observed significant associations between air pollution and lung growth in the subgroup of children who were followed for the full eight years of the study, with effects that were similar in magnitude to those in the group as a whole, thus making loss of subjects an unlikely source of bias.

We have shown that exposure to ambient air pollution is correlated with significant deficits in respiratory growth over an eight-year period, leading to clinically important deficits in lung function at the age of 18 years. The specific pollutants that were associated with these deficits included nitrogen dioxide, acid vapor, $PM_{2.5}$, and elemental carbon. These pollutants are products of primary fuel combustion, and since they are present at similar levels in many other areas,[37,38] we believe that our results can be generalized to children living outside southern California. Given the magnitude of the observed effects and the importance of lung function as a determinant of morbidity and mortality during adulthood, continued emphasis on the identification of strategies for reducing levels of urban air pollutants is warranted.

Supported in part by a contract (A033-186) with the California Air Resources Board, grants (5P30ES07048 and 1P01ES11627) from the National Institute of Environmental Health Sciences, and the Hastings Foundation.

We are indebted to Morton Lippmann, Jonathan Samet, Frank Speizer, John Spengler, Scott Zeger, Paul Enright, William Linn, and Dane Westerdahl for important advice; to the school principals, teachers, students, and parents in each of the 12 study communities for their cooperation; and especially to the members of the health testing field team for their efforts.

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Northeast States for Coordinated Air Use Management
Indoor/Outdoor School Air Monitoring Pilot Project

September 13, 2002

Indoor/Outdoor School Air Monitoring Pilot Project

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Appreciation

We gratefully acknowledge the funding support by the United States Environmental Protection Agency (US EPA), Region I.

This pilot project and the important data collected during its completion would not have been possible without the generous collaboration of the participating schools. The monitoring team was provided with open access to facilities, and the administration, faculty and students at each school provided a warm welcome and demonstrated intense interest in our work. NESCAUM extends its sincere appreciation to the study participants.

NESCAUM would also like to thank the following members of the Air Quality and Public Health Committee and our project partners from the University of Connecticut Health Center, Center for Indoor Environments and Health who provided technical advice and thoughtful suggestions for the pilot project and this report:

Dave Brown, NESCAUM
Paula Schenck, UCONN
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EXECUTIVE SUMMARY

Northeast States for Coordinated Air Use Management Indoor/Outdoor School Air Monitoring Pilot Project

For over thirty years, the Northeast States for Coordinated Air Use Management (NESCAUM) has been working in the field of air quality control with its members, who include air quality management officials from the New England states, New York and New Jersey. The top priority of state air quality management officials is to protect the public from exposure to unhealthy levels of air pollutants. NESCAUM's greatest concerns in the Northeast are outdoor levels of ozone, particulates, and hazardous air pollutants. More recently, awareness has grown of the importance of indoor air quality, when considering exposure and public health impacts, and of the need for better understanding of the influence of outdoor air pollution on indoor air quality.

This report describes the results of a pilot air quality monitoring project conducted by NESCAUM in nine elementary and middle schools across New England during the summer and fall of 2001. The intent of the pilot project was to develop methods to characterize the impact of ambient air pollution and human activity on the indoor air quality in a variety of schools in the Northeast. The main goal for this study was to use these methods to determine whether ambient air pollution concentrations penetrate indoor environments to establish a baseline of exposure for individuals in these specific environments. A secondary goal was to investigate whether urban areas and areas near heavy roadway traffic have higher indoor concentrations of the targeted ambient air pollutants.

The study focused on schools because of recent attention to the health effects of air pollution on sensitive populations, one of which is children. According to recent reports by the Centers for Disease Control, children have experienced a dramatic increase in asthma, which is exacerbated by air pollution. Consequently, the impact of outdoor air pollution on an indoor environment where children spend time became the subject of this report. Besides their own homes, where studies of this type have been conducted, children spend a vast majority of their time in schools.

The nine schools in the study constitute a diverse set in terms of ambient pollution sources, geographic location, population density, motor vehicle traffic patterns, and building construction types. Given the schools' widely different characteristics, the limited number of monitoring days, and the small sample size, any results should be viewed as a data set targeted to investigate the stated goals and to explore the effectiveness of the monitoring strategy. These data are also expected to be useful to structure future studies. Results from a single school should not be viewed as a conclusive representation of "healthy" or "unhealthy" conditions.

In order to test the hypotheses of this pilot project, it was important to characterize the variability in ambient and indoor pollutant concentrations between urban and rural (or

rural-near roadway) schools. To this end, the methods that were used and developed in this project measured the concentrations of fine respirable particulate matter and several other air pollutants.[1] These pollutants are characterized as lung irritants, which are believed to trigger asthma attacks at moderate to high exposures, and are potential cancer-causing agents, associated with a potential increased risk of certain forms of cancer, following long-term exposures to relatively low concentrations. Fossil fuel combustion, particularly from motor vehicles, is a primary outdoor emissions source of these pollutants.

This project had two phases. Phase One consisted of monitoring during the summer of 2001 to obtain baseline measurements when schools were not in session (referred to as "summer monitoring" throughout this report), in order to minimize the impact of student/faculty occupancy and emissions from school buses. Phase Two involved monitoring during the fall of 2001 when schools were in session (referred to as "fall monitoring" in this report). Summer pollutant concentrations serve as a baseline that was compared with measurements taken during normal building occupancy during the fall.

In this pilot study, NESCAUM employed the ACCESS air monitoring system to evaluate changes in carbon dioxide, criteria air pollutants and meteorology. The ACCESS system senses and records information for each criteria every minute, providing real-time data. NESCAUM was interested in obtaining real-time data because short-term, episodic exposures to a number of air pollutants may be very important when considering non-cancer health effects, and a time-averaged, integrated sample would not provide an adequate level of resolution. For this study, NESCAUM was particularly interested in real-time measurements for carbon dioxide and fine particulate matter ($PM_{2.5}$). Tracking minute-to-minute variations in these two compounds is instrumental to the aims of this and future studies since: 1) measurement of the indoor carbon dioxide concentration is an indicator of the rate of air exchange in the school buildings which will aid in understanding the amount of outdoor air infiltration, and 2) short-term episodic exposures to fine particulate matter ($PM_{2.5}$) are important to characterize because of the potential adverse impact on asthmatics or other individuals susceptible to respiratory irritation. The ACCESS system was used in this pilot study because these multi-pollutant monitoring systems have been used effectively in past NESCAUM projects to provide qualitative evidence of the real-time variations of these and other compounds.

The real-time monitoring techniques were sensitive enough to detect variability in concentrations of pollutants including carbon monoxide, carbon dioxide, sulfur dioxide, nitrogen dioxide, ozone, and particulate matter throughout the monitoring day. The sensitivity and accuracy of the ACCESS monitoring system was not sufficient in many cases to make quantitative conclusions (see Appendix D for details). Despite the limitations of the ACCESS system, data collected during the pilot project demonstrate that specific outside pollutant sources (e.g., carbon monoxide generated by an idling delivery truck) can affect indoor air concentrations if prevailing wind patterns carry

[1] Fine respirable particulate matter has an aerodynamic diameter of less than 2.5 microns. Criteria pollutants and several hazardous air pollutants were measured including a suite of fifteen carbonyls and twenty-eight volatile organic compounds.

pollutants from the sources toward schools. Since the initiation of the pilot project, more accurate and sensitive real-time monitoring systems are now available to NESCAUM for these types of projects. NESCAUM will focus on carbon dioxide and particulate matter monitoring with more state-of-the-art technology in all future work.

NESCAUM also measured carbonyls using Gilian personal sampling pumps, which draw air through an absorbent tube at a constant rate for a specified amount of time. Testing for volatile organic compounds was performed using Summa canisters. Summa canisters are evacuated stainless steel canisters, which were fitted with an orifice calibrated to draw in one liter of air over a period of seven to eight hours. NESCAUM believes these methods collected reliable data. In the body of the report, the strengths and limitations of each of these methods are described in greater detail. The results from the carbonyl and volatile organic compound monitoring are described below.

The pilot project monitoring data suggest that outdoor air concentrations and indoor air concentrations of several pollutants are related. This is most evident when comparing indoor and outdoor concentrations of selected volatile organic compounds, such as benzene, with the degrees of urbanization around the school. The pilot project monitoring data illustrate that the greater the ambient concentration of selected pollutants, in most instances, the greater the indoor concentration. Existing air pollution literature supports this observation and indicates that outdoor and indoor concentrations are indeed related to one another, with urbanized regions demonstrating the highest concentrations. This larger body of evidence also suggests that the infiltration of outdoor concentrations of persistent, low reactivity volatile organic compounds like benzene, often approaches 100%, but varies by conditions during the day of monitoring and the pollutant. The understanding of the impact of ambient concentrations and the infiltration of more reactive compounds, such as acetaldehyde and formaldehyde, is more complicated since the atmospheric formation and destruction of these compounds and their persistence during infiltration into indoor environments is less well understood. Additionally, the indoor concentration of these pollutants is often dominated by indoor sources and activity levels, which makes it difficult to ascertain the degree of ambient infiltration directly.

When considering our primary research interest regarding ambient air infiltration, our limited data suggest that during the summer months of the pilot project, the median indoor concentration of low reactivity volatile organic compounds (such as acetone, benzene, methyl ethyl ketone, and toluene) range from approximately 65% to 90% of the outdoor concentrations. Fall monitoring data indicate median indoor concentrations of these same pollutants range from 130% to 500% of outdoor concentrations, respectively. When considering more reactive pollutants, the summer monitoring data suggest that the median indoor concentrations of acetaldehyde and formaldehyde range from approximately 130% to 375% of the outdoor concentrations, respectively. During the fall, the range of median values for these pollutants increased to approximately 150% to 430%, respectively.

This observation that indoor concentrations of volatile organic compounds and carbonyls often track outdoor concentrations is consistent with studies by other researchers. These

studies underscore the importance of considering seasonality and of the potential contribution of indoor emissions sources and activities when attempting to evaluate infiltration. Further analysis of air exchange rates is needed to more thoroughly investigate infiltration by these pollutants. Additionally, a more detailed survey of indoor sources and their contribution as well as a comprehensive outdoor emissions inventory would help in characterizing the impact of ambient air on indoor air quality.

When considering our secondary research interest regarding the impact of urbanization and motor vehicle traffic on the concentrations of these pollutants, these preliminary data suggest that concentrations of pollutants primarily generated by motor vehicle fuel combustion or evaporation (e.g., benzene and toluene), are higher in urban areas and in areas in close proximity (< 500 meters) to roadways with higher vehicle density. For instance, the highest benzene concentrations were recorded for schools located near roadways with high traffic counts. Importantly, despite the limited data set, this study suggests that rural, near-roadway schools have airborne concentrations of benzene and toluene similar to urban schools. However, the potential association between population density and ambient or indoor concentrations of pollutants generated primarily by industrial sources or personal products such as acetone and methyl ethyl ketone is less clear. For instance, there was no clear association between population density and the levels of acetone or methyl ethyl ketone, unlike the observations for benzene and toluene described above.

NESCAUM's observations of higher concentrations of these pollutants in more urban environments in this pilot are consistent with previous monitoring results in numerous locations across the northeast region.[2] State ambient air monitoring results have consistently shown a substantial difference between urban and rural concentrations for motor vehicle-related pollutants.

The preliminary findings provide initial support for our operating hypotheses and confirm that our study design and methods are generally sound. However, NESCAUM's ability to interpret these data more thoroughly is limited by the degree of variability between sites, the lack of information regarding air exchange rates, and the incomplete emissions inventory inside and outside each of the monitored schools which confound a quantitative assessment at this time. Future studies will need to include more comprehensive emissions inventories for participating schools. Indoor air sources for a number of the compounds evaluated must be more thoroughly characterized in order appropriately interpret the data and to suggest activities to minimize if exposure reduction is warranted. For this pilot project, the research team sought to track product use and the presence of building materials known to emit any of the target compounds. This was a difficult task and additional work is needed in this area.

[2] http://www.nescaum.org/committees/CEPmay99/regnlsumm2.html

NEXT STEPS:

This pilot project demonstrates that it is possible to use available occupational or environmental monitoring methods to evaluate ambient and indoor air concentrations of a number of important air pollutants. With the exception of the ACCESS air monitoring system that was used to monitor for real-time criteria air pollutants, NESCAUM recommends the use of the same monitoring methods for future studies. Instead of the ACCESS system, NESCAUM suggests using other real-time monitoring methods focusing on particulates ($PM_{2.5}$) and carbon dioxide that offer greater reliability and accuracy.

NESCAUM will be completing a follow up study to this pilot in the fall of 2002. The central and secondary hypotheses will be the same: that ambient pollutants penetrate indoor environments to establish a baseline of exposure for individuals in the indoor environment, and that urban areas and areas near heavy roadway traffic have higher indoor concentrations of the targeted pollutants. However, building on our experience with the monitoring equipment and the interpretation of the monitoring results from the pilot project, we will monitor fewer schools using more exhaustive inventory characterization and more comprehensive monitoring strategies. Variability within the dataset will be reduced by:

- Limiting the variability between sites by choosing schools near roadways in distinctly urban vs. rural environments;
- Measuring air exchange rates to help ascertain and verify whether pollutant sources originate outside or inside the building;
- Documenting a comprehensive emissions inventory inside and outside of the monitored schools; and
- Choosing schools near state air monitoring stations that sample for hazardous air pollutants to help verify our monitoring data.

The results of this follow up study will be used to understand and document the infiltration of mobile source pollutants into the indoor environment and the potential public health impact nationwide when considering the combustion of fossil fuel products. It is anticipated that these and other data will help support more effective and appropriately targeted national and regional policy development regarding mobile source pollution.

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Northeast States for Coordinated Air Use Management
Indoor/Outdoor School Air Monitoring Pilot Project

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This report is structured to provide a regional overview of project results and additional resources for interested parties, while maintaining confidentiality for participating schools. It includes a discussion of the impact of ambient and indoor air pollutants on health and a brief overview of the current state of knowledge in this field. The report also provides a general description of sampling and analytical methods used.

BACKGROUND: AMBIENT AIR QUALITY AND PUBLIC HEALTH

The U.S. Environmental Protection Agency (EPA) established a program to control six key air pollutants: ozone, carbon monoxide, lead, sulfur dioxide, nitrogen dioxides and particulate matter over 30 years ago. EPA set standards for ambient (outdoor) air quality and established limits on air emissions from power plants, industries and motor vehicles to protect public health. It targeted these six "criteria pollutants" because scientific evidence showed that adverse health effects, such as heart and lung disease, resulted from exposure to them.[3]

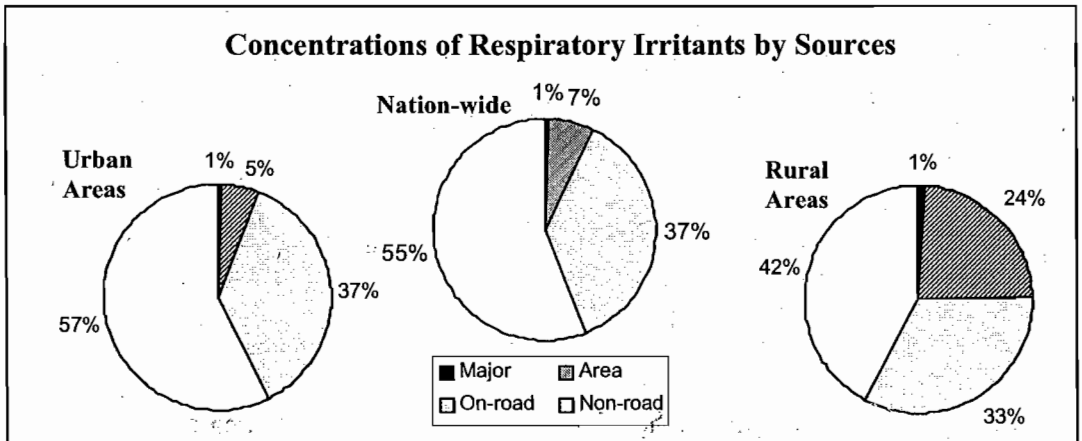
Recently, EPA and the public health community have paid special attention to particulate matter. When the air program began in the 1970s, EPA regulated coarse particulates, or PM_{10}.[4] These particles reach the bronchiolar region of the lung (mid-lung) and have been associated with adverse effects on the lungs for decades by health scientists. The agency developed a new fine particulate, or $PM_{2.5}$,[5] standard in 1997, in response to a growing body of evidence suggesting that these smaller particles – which reach the alveolar (deep-

[3] For more detailed information regarding health effects associated with these pollutants, see Appendix A.
[4] Particulate matter with an aerodynamic diameter of 10 microns (μm) or less.
[5] Particulate matter with an aerodynamic diameter of 2.5μm or less.

lung) region – might be even more toxic than larger particles. A recent review of past studies by Samet *et. al* supports a linkage cited by EPA between increased mortality and $PM_{2.5}$ and PM_{10} levels in 20 major U.S. cities, underscoring the importance of reducing public exposure to particulate matter (Samet, 2000). Additional studies have also suggested that increased levels of particulates may exacerbate asthma symptoms (Pearson, 2000; Kinney, 2000; Yu, 2000; and Freidman, 2001).

In addition to regulating the six criteria pollutants described above, the Northeast states have been controlling emissions of hazardous air pollutants from industrial sources since the early 1980s. Since 1990, EPA has been developing federal regulations to control the emissions of 188 compounds referred to as hazardous air pollutants (HAPs) under the Clean Air Act. Like the toxic air pollutants regulated through state programs, the federal HAPs are targeted because they are associated with adverse health effects, including cancer and respiratory disease. HAPs present in ambient air originate from a variety of sources, including on-road sources such as motor vehicles, non-road vehicles such as construction equipment, "major" industrial sources such as electric utilities and factories, and "area" sources including dry cleaners, gasoline stations, and use of architectural coatings and paints. Control programs focused on HAPs are designed to reduce emissions from this full range of sources. Figure 1 illustrates evidence from a recent national air quality assessment, which identifies on-road and non-road vehicle emissions as a dominant emission source for a number of respiratory irritants.[6]

Figure 1. Important emission sources of potent hazardous air pollutants nationwide.



Irritants include acetaldehyde, acrolein, diesel and formaldehyde.

Data is from the National Air Toxics Screening Assessment, modeled ambient concentration data.

In 1998, the Northeast states reviewed air pollution data and identified a subset of ten HAPs from the federal list of 188 that are presently detectable in the region at levels above thresholds set to protect public health (NESCAUM, 1999b).[7] These ten HAPs are

[6] Please see http://www.epa.gov/ttn/atw/nata

[7] The thresholds or health benchmarks for these pollutants are described in greater detail in Appendix B.

benzene, 1,3-butadiene, formaldehyde, carbon tetrachloride, chloroform, ethylene dibromide, ethylene dichloride, methyl chloride, chromium, and acrolein. Concurrent analyses by the EPA have demonstrated that this subset of HAPs is also present in similar amounts in the ambient air nationwide (Woodruff, 1998). These ten HAPs primarily exceed the benchmark levels for cancer risks. However, acrolein – one of the most potent respiratory irritants currently present in ambient air – has been estimated to exceed health protective thresholds for respiratory irritation in all areas of the country in these assessments (Woodruff, 1998; Caldwell, 1998).

To date, review of available outdoor air monitoring data demonstrates that urban areas and traffic corridors typically have the highest concentrations of these pollutants. Primary sources include motor vehicles, construction equipment and small area sources of air emissions, such as dry cleaners, personal product use, and gasoline stations (NESCAUM, 1999b).

CONNECTIONS BETWEEN OUTDOOR AND INDOOR AIR QUALITY

It is estimated that people spend over 90% of their time indoors.[8] Recent policy development in various offices of the EPA has suggested that assessing ambient air concentrations for many pollutants is insignificant when considering public health impacts, since any exposure will be dwarfed by indoor microenvironmental exposures to these same compounds.[9] NESCAUM and others have argued that ambient pollutant concentrations may, in some cases, establish the baseline for total exposure. As such, indoor emission sources or human activities only add to this baseline when considering total exposure. It should be noted that this baseline is only applicable to pollutants that are generated outdoors, as there are many indoor pollutants that do not have an outdoor baseline.

A review of peer-reviewed published literature and some indoor residential monitoring surveys conducted in rural areas of the Northeast region indicate that ambient concentrations of some volatile organic compounds such as benzene and toluene exhibit infiltration ratios ranging from 0.2 to greater than 1 when considering indoor vs. outdoor concentrations (Lewis, 1991; Gilli, 1996; Wallace, 1996; Lewis, 1992). At a one-to-one ratio, ambient concentrations would establish a baseline for continuous exposure in indoor microenvironments. Indoor concentrations of other HAPs, such as acetaldehyde and formaldehyde, are typically measured at higher concentrations indoors than outdoors, this is likely due to individual residential activities supplementing the airborne concentration. However, it may be due to other factors including nearby outdoor sources. Further characterization of the relative contributions of indoor vs. outdoor sources of these pollutants is fundamental to a thorough understanding of the impact of ambient air on indoor air quality.

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[8] http://www.epa.gov/iaq/

[9] public presentation by EPA staff on 202(l) rulemaking and the 2002 National Scale Assessment activities

In addition to the target compounds assessed during this pilot project, a number of other air pollutants can have significant adverse health effects in exposed populations. One of the most significant indoor air quality concerns involves biological agents such as fungus, bacteria, and plant and animal products. These materials, in addition to some of the chemical compounds identified in this study, are known to serve as respiratory irritants and potential triggers for asthma attacks. Testing for biological contaminants was beyond the scope of this pilot project. However, in an effort to evaluate the potential for biological agent exposure in the schools, the project team attempted to identify and record the presence of water damage or visible mold or mildew during the monitoring days at each facility.[10]

INTRODUCTION TO THE PILOT PROJECT

NESCAUM conducted the Indoor/Outdoor School Air Monitoring Pilot Project to develop methods to characterize the impact of ambient air pollution and human activity on the indoor air quality in a variety of schools in the Northeast. The pollutants targeted by this project include particulate matter, other criteria pollutants, and hazardous air pollutants (HAPs). NESCAUM's primary research interest for this pilot study was in pollutants from motor vehicle fuel combustion. Gasoline and diesel powered vehicles and non-road machines emit up to one-half of smog forming volatile organic compounds (VOCs), particulate matter, and oxides of nitrogen (NO_X) in the Northeast. Furthermore, Northeast regional ambient monitoring and emissions inventory data have concluded that about half of the public health risk from exposure to HAPs (i.e. acetaldehyde, benzene, formaldehyde) is associated with automobile emissions (NESCAUM, 1999a). Thus, the study focused on the aforementioned HAPs, criteria pollutants (particulate matter, ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide), and volatile organic compounds.

The nine schools studied constitute a diverse set in terms of ambient pollution sources, geographic locations, population density, motor vehicle traffic patterns, and building construction types. The first aim of the pilot project was to determine whether federally approved occupational or environmental monitoring techniques[11] could be used to monitor daylong exposures to ambient and indoor air pollutants. The second aim was to test two central hypotheses: (1) ambient air pollution concentrations penetrate indoor environments to establish or contribute to a baseline of exposure for individuals in the indoor environment; and (2) urban areas and areas near heavy roadway traffic have higher outdoor and indoor concentrations of the targeted pollutants than other areas. The study will not provide a definitive estimate of potential health impacts given its limited scope and sample size.

Given the widely varying characteristics of schools included in this pilot project, the limited number of monitoring days, and the small sample size, these initial data alone can

[10] More detailed information and resources available to assist schools in identifying and addressing indoor air quality concerns may be found in Appendix C and E.

[11] The ACCESS system, which measures criteria pollutants in real-time, is not a federally approved monitoring technique.

neither confirm nor reject the central or secondary hypotheses. These data are expected to be useful in refining our central and secondary hypotheses, in method development, and to structure future studies, but not as a conclusive representation of "healthy" or "unhealthy" conditions at any particular school.

Numerous studies analyzing exposure to these pollutants in the outdoor (ambient) environment have been used to support EPA rulemaking activities. Some researchers have sought to evaluate both the outdoor and indoor (home, workplace, school) concentration of pollutants (Woodruff, 1998; Caldwell, 1998; NESCAUM, 1999b; Lewis, 1991; and Gilli, 1996). This pilot project explored the feasibility of methods that combine these past approaches in an effort to more accurately characterize total exposure. Doing so requires consideration of both ambient concentrations and indoor concentrations of these pollutants in selected environments. This juxtaposition illustrates how outdoor pollutant concentrations impact indoor environments, and provides a more complete picture of total exposure for individuals living and working in both indoor and outdoor environments. This study considered daylong exposures, typically eight-hour,[12] in contrast to the 24-hour averages of many previous studies. The purpose for monitoring eight-hour exposure in this pilot project was to assess the typical exposure window for students and teachers in the nine schools studied.

This study focused on characterizing a single microenvironment: schools. NESCAUM thought it was appropriate to look at the impact of outdoor air pollution on an indoor environment where children spend time. Besides their homes, where studies of this type have been conducted, children spend a vast majority of their time in schools. We focused on children because of the recent reports in the dramatic increase in childhood asthma. The Center for Disease Control and Prevention (CDC) has documented that between 1980 and 1994, the prevalence of asthma increased 74% among children 5 to 14 years of age. According to the CDC, asthma now affects nearly 5 million Americans younger than 18 years of age.[13] Children and a majority of adults have been shown to be susceptible to lung irritants that exacerbate asthma symptoms. These lung irritants, mentioned above, are the target compounds monitored in our study.

This project had two phases. The intent of Phase One was to monitor during the summer of 2001 to obtain baseline measurements when schools were not in session (referred to as "summer monitoring" throughout this report), in order to minimize the impact of student/faculty traffic and emissions from school buses. However, summertime maintenance and cleaning activities may have introduced pollutants. Phase Two involved monitoring during the fall of 2001 when schools were in session (referred to as "fall monitoring" in this report), to contrast summer baselines against fall pollutant concentrations measured with heating and ventilation systems operating, normal building occupancy levels, and buses and other vehicular traffic.

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[12] Four-hour samples were also collected for some pollutants in an effort to understand whether short-episodic peak exposures were occurring that might be minimized if averaged over an eight-hour sampling duration.

[13] http://www.cdc.gov/nceh/airpollution/asthma/children.htm

The nine schools studied were selected based on their accessibility, availability, and willingness to participate, as well as their different geographic and demographic characteristics. The schools are characterized and referred to as Schools A through I, moving from urban to rural.[14] Information used to make this characterization is presented in Table 1 below.

Schools A, B and C are all located in a Northeastern inland city. It is a busy commercial and manufacturing center, with a nearby airport, surrounding highways and congested city streets. Students' homes are close to these schools, so most students walk instead of taking the bus. However, nearby traffic from the rest of the city is heavier in this area than it is near rural or suburban schools. School A is located in a commercial area of the city next to a large intersection, so School A's estimated vehicle traffic is higher than Schools B and C, while School A's population density is lower than B and C. School B is located in a mixed residential and commercial area where streets are less busy. School C is located on smaller roads in a mostly residential part of the city and so has less truck and bus traffic.

School D is located in a coastal city in the Northeast, which is generally upwind of a city larger than the town surrounding Schools A, B and C. The school is located in a residential part of the city. There are large city streets near the school, but immediately surrounding the school are smaller streets, houses and a golf course. School E is located inland in a moderately sized city. The school is located on the edge of a residential area, but is also very close to the largest downtown intersection, which is often congested. The city is also located in a valley, which can lead to the potential inversion of pollution (increased concentration and atmospheric residency) under certain meteorological conditions.

School F is located in a coastal town about half a mile from a large interstate highway. Many buses serve this school because students come from a large residential area. School G is also in a coastal town and is only a few yards from a large interstate highway. The area surrounding the school is farmland and largely unsettled. School H is located in a northern inland town that is sparsely settled, although it is only a mile or two from a large interstate highway. The closest city is about 30 miles away, with a population near 35,000. School I is also located in an inland town and its closest large street is a small state highway. The closest urban center is located about 15 miles away from School I, with a population of 22,000.

[14] Urban to rural for this purpose is defined in terms of population density, with the exception of School A, which has a lower population density than Schools B and C, but is much more "urban" in terms of vehicle traffic and is placed ahead of those schools in this ranking.

Table 1. Characterization of Schools A-I

School	City/Town Population*	Population Density (people/sq mile)	Vehicle Count**	Geographic Characteristics
School A	100,000+	4124-6443	41,500	Inland, urban, commercial
School B	100,000+	12840-20257	10,000	Inland, urban, commercial/residential
School C	100,000+	12840-20257	10,000	Inland, urban, residential
School D	50,000	2300-3940	10,000	Coastal, urban, residential
School E	22,000	701-711	26,000	Inland, valley, small urban center
School F	7,500	216-342	2,000	Coastal, Residential
School G	3,500	149-219	25,000	Coastal, rural open space, next to highway
School H	2,400	66	3,500	Inland, very rural, farmland
School I	2,100	45	2,300	Inland, small rural town

* Rounded from Census 2000 to maintain the anonymity of the schools.
** Annual Average Daily Traffic estimates of local school area, from state Department of Transportation offices. (see Appendix G for calculation details)

METHODS AND LIMITATIONS

This study was designed to monitor criteria pollutants, carbonyls, and volatile organic compounds, and also to qualitatively assess the indoor environment by implementing a walkthrough assessment. As mentioned previously, one of the primary sources of these pollutants in the outdoor environment is fossil fuel combustion, particularly from motor vehicles. The methods used for this pilot study include real-time monitoring, four and eight-hour sampling and instantaneous sampling. Except for the real-time monitoring equipment, these are all adapted from standard methods used in ambient monitoring and industrial hygiene practice. Equipment and methods for monitoring each pollutant category are described below, along with limitations of the methods and equipment that were experienced by the monitoring team.

- **Criteria Pollutant Monitoring**

Methods:

The ACCESS air monitoring system was used to monitor criteria pollutants and other atmospheric indicators.[15] The system senses and records information from each sensor every minute, providing real-time data. NESCAUM was interested in obtaining real-time data for selected pollutants since short-term, episodic exposures to a number of air pollutants may be very important when considering non-cancer health effects. For this study, NESCAUM was particularly interested in real-time measurements for carbon dioxide and fine particulate matter ($PM_{2.5}$). Tracking minute-to-minute variations in these two compounds is instrumental to the aims of this and future studies since: 1) measurement of the indoor carbon dioxide concentration indicates the amount of fresh air exchange in the school buildings which aids in understanding the amount of air infiltration and 2) short-term episodic exposures to fine particulate matter ($PM_{2.5}$), are important to characterize because of the potential adverse impact on asthmatics or other individuals susceptible to respiratory irritation. In addition to sensors for carbon dioxide (CO_2) and $PM_{2.5}$, the ACCESS system has been used effectively by NESCAUM in the past to monitor for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and sulfur dioxide (SO_2). In addition to these compounds, the ACCESS system tracks temporal variation in barometric pressure, temperature, and relative humidity. Concentrations of the pollutants measured with the ACCESS system appear to be well within the limits of detection for the different sensors.[16] However, operational limitations and sensor interferences described in more detail in Appendix D will affect the quantitative accuracy of this equipment.

Real-time data provides an important source of information on minute-by-minute fluctuations of pollutants. Because pollutants that are lung irritants can produce acute health effects from high-concentration exposures over very short durations, real-time data is an important component of a multi-pollutant analysis. Without this information, short-term spikes in pollutant levels are obscured when data is collected and averaged over several hours. Accordingly, this study examines real-time data in conjunction with average values from four and eight-hour samples of carbonyls and volatile organic compounds (VOCs).

In schools where two ACCESS systems were available, one system was placed outside and the other system was placed 50 feet inside the main hallway. In cases where the ACCESS system could not be placed outside, one system was placed immediately inside the doorway, and the other was placed approximately fifty feet down the hall. These placements were designed to measure the difference between ambient air and indoor air, and also to track detectable movements of pollution as it traveled into and down the hall.

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[15] For details on the ACCESS system, see Appendix D.

[16] For example, O_3, NO_2, and SO_2 accuracy is ±20 ppb and CO sensor accuracy is ±2 ppb.

Strengths and Limitations:

The main problems experienced in monitoring criteria pollutants with the ACCESS system were variations in placement in each school, differences in the actual machines that were used, and limitations with individual sensors on the machines. Placement issues stemmed from logistical difficulties (such as outlet location, length of power cord, weather conditions and student traffic) and difficulties defining the "main entrance" at some schools: at urban schools such as A, B, and C, a majority of students walked to school, so the small number of buses did not always have a drop-off area at an identified "entrance" for each school. Some other schools had a number of entrances from the bus stop area. In each case, the most commonly used entrance was monitored, but this did not represent all foot traffic entering the school or vehicle traffic near the school. These discrepancies between locations from school to school make it difficult to compare schools, but outside (or immediately inside) measurements and indoor measurements can be compared to each other for a given monitoring day at a single location.[17]

Another factor contributing to the uncertainty of ACCESS monitoring results is the fact that different ACCESS systems were used during summer and fall monitoring. ACCESS systems used during the fall were upgraded and recalibrated by the manufacturer prior to the beginning of fall monitoring. However, despite these upgrades, some problems were experienced with the new equipment. For instance, one system lost part of the computer code, which resulted in difficulties with calibration, datalogging and downloading results. Also, one of the newly installed particulate sensors became temporarily clogged with debris during a monitoring study at one of the project sites. The change in monitoring equipment between the summer and fall monitoring undermines the direct comparison of results between monitoring phases. The ACCESS system results are quantitative in nature only within operational limitations and sensor accuracy, and are most effective when used to track events at a given school during a given time period.[18]

Notwithstanding these issues, however, the ACCESS systems provided a valuable tool during this pilot study. The systems were relatively reliable, and provided excellent qualitative data, as well as quantitative measures within the operational limits of the system. Because levels of uncertainty are relatively constant for specific monitoring periods, trends throughout a day of monitoring are still valid. The primary purpose of real-time monitoring was to track movement and relative trends of criteria pollutants inside and outside of schools. When specific sensors recorded erroneous data, it was evident and that portion of the data was not included during our data analyses efforts, recognizing the effect these outliers may have on our analyses.

[17] The specific locations of the ACCESS systems are specified in each school's attached individual data.
[18] Please review Appendix D, part I, for more information

- Carbonyls

Methods:

Carbonyls were measured with Gilian personal sampling pumps, which draw air through an absorbent tube at a constant rate for a specified amount of time.[19] Each cartridge was analyzed by an EPA approved laboratory for the presence of a suite of fifteen carbonyls, of which the primary compounds of interest for our pilot study were formaldehyde, acetaldehyde and acetone. Acetaldehyde and formaldehyde are of particular concern to air quality and public health professionals of the NESCAUM region due to exceedances of the highly conservative health benchmarks for cancer risks across the nation. These health benchmarks have been used historically in all NESCAUM states to target emissions control efforts through state air toxic control programs. These compounds are also known to be present in certain types of building materials used in schools, such as carpeting (particularly the adhesive that holds the carpeting down) and some pressed plywood.

Samples were taken over four- to eight-hour periods; the results show average pollutant concentrations for the given time period. Eight-hour samples are typically collected in occupational exposure studies and are appropriate for recording average, long-term exposures. Most of the long-term samples taken were from six to eight hours in length. Some four-hour samples were taken to determine whether short-term peaks (which would be diluted in an eight-hour sample volume) could be measured. Short-term peaks are of interest because they are likely to contribute to respiratory irritation. Although the sample volume collected was greater than the minimum required under the monitoring methods selected, the total concentration of carbonyls collected in four hours in the schools during the summer was below the detection level for the analytical method. As a result, during the fall, all samples were collected over six- to eight-hour periods.

On each day of monitoring a total of four to seven samples were taken in various locations around the school. One pump was placed outside to obtain an ambient baseline measurement. A second pump was placed inside and down the main hallway approximately 50 feet inside the entrance. The remaining indoor pumps were placed in "problem" classrooms (as identified by schools and teachers), in classrooms with carpeting, or in rooms close to roadways or bus stops in an effort to characterize the potential range in airborne concentrations in a given school.

Strengths and Limitations:

The main methodological problem experienced in carbonyl monitoring was faulting [i.e. the pumps stopped working] by the Gilian pumps. Faulting is a common problem when using the Sep-pak collection media and the Gilian pumps that were used for this project. Faulting occurs because the pressure drop across the sample bed becomes too extreme with elevated airborne concentrations or high atmospheric humidity, which saturates the absorbent media during sampling. Faulting occurred less frequently during fall

[19] For more detailed information, see Appendix D, part II.

monitoring due to lower humidity levels and because of the use of two Gilian low-flow pumps. These low-low pumps sample for longer duration more reliably because they sample at a significantly slower airflow rate and are less affected by the pressure drop across the Sep-pak cartridges.

- **Volatile Organic Compounds**

Methods:

Testing for volatile organic compounds was performed using Summa canisters. Summa canisters are evacuated stainless steel canisters, which were fitted with an orifice calibrated to draw in one liter of air over a period of seven to eight hours.[20] The sampling duration was set at eight hours in order to provide data for the risk associated with long-term health effects and a comparison with the carbonyl sampling described previously. For each day of monitoring, canisters were co-located with the ACCESS system, with one evacuated canister placed outside near the main entrance and one canister with the ACCESS system inside the school. The canisters were elevated a few feet when possible to more accurately sample the breathing zone for school children. These locations were selected to evaluate relative concentrations of these chemicals in ambient air and in the school environment.

Twenty-eight VOCs were reported by the laboratory that analyzed the samples, including benzene, toluene, and methyl ethyl ketone, which are targeted HAPs under the Clean Air Act. Importantly for this pilot study, benzene and toluene are known to be present in large percentages in evaporating fuel or as fuel combustion products. In addition, methyl ethyl ketone, benzene, and toluene are all emitted by a number of other sources, such as industrial solvents, personal care products, and chemicals used by schools for cleaning, such as floor strippers and waxing products. Because they are emitted from multiple sources, it is difficult to associate ambient or indoor concentrations with a single activity.

These chemicals do not have known acute health effects. However, benzene is a known human carcinogen and toluene and methyl ethyl ketone, although low in potency, may cause other adverse non-cancer health effects such as central nervous system depression and liver damage following long-term exposure.

Strengths and Limitations:

Summa canister monitoring is widely used, is very reliable, and indicates clearly when a full sample has not been collected. The limitations experienced with the Summa cans were due to difficult attachment of the orifices, which only happened on a few occasions. During summer monitoring, two different styles of orifices were used. The two styles varied slightly in design and in ease of use, but both styles facilitated collection of a seven- to eight-hour sample at each school. During fall monitoring, five- to seven-minute grab samples were collected for five schools, and seven to eight-hour samples were

[20] See Appendix D, part III, for more information.

collected for the remaining four schools.[21] Grab samples had to substitute for the seven-eight-hour samples because the calibrated orifices for the Summa canisters were not available on those monitoring days. These grab samples provide a "snapshot" of the ambient air concentration as they do not integrate a sample over a full eight-hour sampling period.

- **Indoor Air Walkthrough Assessment**

As part of this study, NESCAUM developed a walkthrough assessment, partially adapting EPA's Tools for Schools Indoor Air Quality Checklist (see Appendix E), and integrating questions about building layout and surrounding areas.[22] The purpose of the checklist is to identify and describe potential sources of pollution in and around schools that may result in poor indoor air quality. One of the most important topics on the checklist is moisture sources in buildings, which can enhance mold growth. Water infiltration is indicated by evidence of leaks in roofs or pipes, water stains on ceiling or floor tiles, and observable condensation. Available sources of moisture and nutrition create an environment that supports the growth of mold, a common respiratory allergen and irritant. Details such as the number and location of water stains, the number of tiles affected, and musty odors were noted.

Effective ventilation is another important factor in maintaining healthy levels of fresh air in buildings. Thorough inspections of the inner workings of ventilation systems was beyond the scope of this study, but the checklist includes a section that addresses some central aspects of ventilation, including the type of system; areas in which it operates; and the presence of sealed windows and blocked vents. The effectiveness of ventilation systems was also characterized in most schools with instantaneous sampling of carbon dioxide (CO_2) levels, which indicate the amount of fresh air in buildings. A high CO_2 concentration may indicate that the air exchange rate is low or nonexistent, either because only a small amount of fresh air entering the building or due to a high occupancy rate.[23]

When equipment for grab sampling was available, samples were taken outside, at main entrances, and in many rooms within schools, some of which had been identified as possible problem areas by teachers. Samples of CO_2 were taken during summer and fall in order to compare unoccupied and occupied schools. Samples were taken with a Dräger CMS handheld monitor.[24] CO_2 samples were taken in occupied and unoccupied spaces and were collected at different times throughout the day in an effort to qualify the degree of fresh air intake and distribution in schools.

Walkthroughs also attempted to characterize some potentially important indoor pollution sources, such as chemicals used for cleaning and use of photocopiers. Additionally,

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[21] Data is presented in Appendix H.
[22] See Appendix E for EPA's Tools for Schools checklist and Appendix F for the NESCAUM checklist.
[23] These are all comfort criteria; there are no health effects associated with levels of CO_2 which are expected to be found in a school building.
[24] See Appendix D, part IV for more information.

walkthroughs identified whether exhaust hoods and fans were present above combustion appliances and if so, whether they were free of soot and discoloration. The general condition and cleanliness of buildings was also recorded, since dust exposure is known to result in respiratory irritation. Temperature and humidity levels were observed, since these factors often influence the comfort level of buildings, as well as growth of biogenic pollutants such as molds. Outside of buildings the air intake locations, water drainage patterns, and characteristics of surrounding areas were also noted.

FINDINGS

- **Criteria Pollutant Monitoring**

Real-time monitoring results for respirable particulate matter[25] carbon monoxide, carbon dioxide, sulfur dioxide, nitrogen dioxide, and ozone are shown in Figure 2, panels A – H. Figure 2 presents eight panels of representative data (one for each monitoring criteria) from schools in this study. To illustrate temporal variation in target compounds, monitoring results are shown for an entire day. Further, data from a variety of schools is shown to best illustrate the qualitative importance of real-time monitoring. The operational limits of the ACCESS system prevent quantitative interpretation (see Appendix D for details).

In some instances, it is possible to correlate variations in measured concentrations with indoor or outdoor events. In these cases, we have attempted to identify potential sources of the observed variation in measured values as detailed below. These data represent quantitative results only within the operational limitations for the individual sensors.[26] Future NESCAUM analyses will track real-time carbon dioxide and $PM_{2.5}$ concentrations with more sensitive and accurate monitoring equipment now available to researchers.

In the few instances where the ACCESS system recorded levels above EPA standards, they are not definitive exceedances because of the margin of error present in each sensor. Additionally, the standards for criteria pollutants are for 24-hour averages of ambient pollutants, which is very different from episodic peaks recorded by the ACCESS system.

Panel A shows carbon dioxide (CO_2) levels in a school's main entrance and 50 feet down the hallway. Carbon dioxide was measured because it is an indicator of ventilation effectiveness and air exchange rates for buildings. It is not a criteria pollutant and is not associated with any health effect at levels found in schools. At the school shown in Panel A, CO_2 levels at the entry were lower than in the hallway for the entire day. This difference may illustrate the smaller number of occupants in the entrance or a higher rate of ventilation given proximity to an exterior door used throughout the day. The measurements in the two locations changed together: both levels increased when students arrived (around 9:00 a.m.), and then again when they entered the hallway for

[25] The Access System was calibrated to selectively measure particulate matter with a mean aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$).
[26] See Appendix D for more detail.

dismissal (2:30 p.m.). Other smaller spikes throughout the day likely due to indoor activity patterns. The results in Panel A are representative of most carbon dioxide levels recorded at schools during the fall. There was typically some variation during the day due to movement and activity in hallways. Levels in hallways at some schools were slightly higher than those seen in Panel A.

Panel B displays $PM_{2.5}$ levels at a school's entrance and 50 feet down the hallway. The measurements indicate fluctuations occurring throughout the day ranging between 0 - 25 $\mu g/m^3$. Fluctuations in the two locations coincide or closely follow each other, indicating that they may be influenced by the same events, such as movement of students throughout the school (which may re-entrain dust and small particles within the school and which may be reported as $PM_{2.5}$ by the ACCESS system). The additional 10 $\mu g/m^3$ found in entryway versus hallway measurements may be due to calibration of the ACCESS system and not to concentration differences, since the margin of error for the particulate monitor is greater than 10 $\mu g/m^3$. The concentrations of $PM_{2.5}$ shown in Panel B are typical results for schools monitored during the fall, which all varied with the movement of people around the school. Some schools experienced spikes higher than those seen in Panel B during periods of high activity in the hallways. These spikes may be attributed to differences in $PM_{2.5}$ concentrations or measurement artifact from dusts generated by disruption of floor material, school cleaning practices, or calibration and operational limitations of the sensors.

The level of carbon monoxide (CO) detected in one school during the summer is shown in Panel C. Measurements were taken at the main entrance and 50 feet down the hallway. These concentrations varied throughout the day and demonstrate an apparent relationship between outside activity and inside concentrations. The spike around 8:00 a.m. correlates with the observation of the arrival and idling of a delivery truck outside the main entrance of the school during this time. Peak CO levels 50 feet down the hallway occur a few minutes after the peak at the entrance, marking the potential migration of the pollutant into the school. CO levels recorded by the ACCESS monitor 50 feet down the hallway are higher than those at the main entrance. However, this is likely an artifact of differences in zeroing of the sensors or simply a variance within the accuracy of the CO sensor itself. At some other schools, low levels of carbon monoxide were also measured in the building, possibly from the infiltration of carbon monoxide from idling school buses or other traffic in the local area or due to low level release of indoor combustion sources (i.e. a heating system boiler).

Ozone levels detected outside and inside a school during the summer is shown in Panel D. The graph indicates that the levels of ozone outside were higher than the levels detected inside. This is expected during the summer when outdoor ozone is at its highest, due to atmospheric residence. Additionally, one would expect a lower ozone concentration inside a microenvironment because it is a highly reactive, relatively short-lived pollutant indoors. Also ambient ozone typically peaks in the afternoon, around 1:30 p.m. Therefore, the peak of indoor ozone at the same time suggests that the indoor detection may be attributable to the infiltration of ambient ozone. Ozone was detected at many schools over the summer, due in large part to elevated ambient summertime

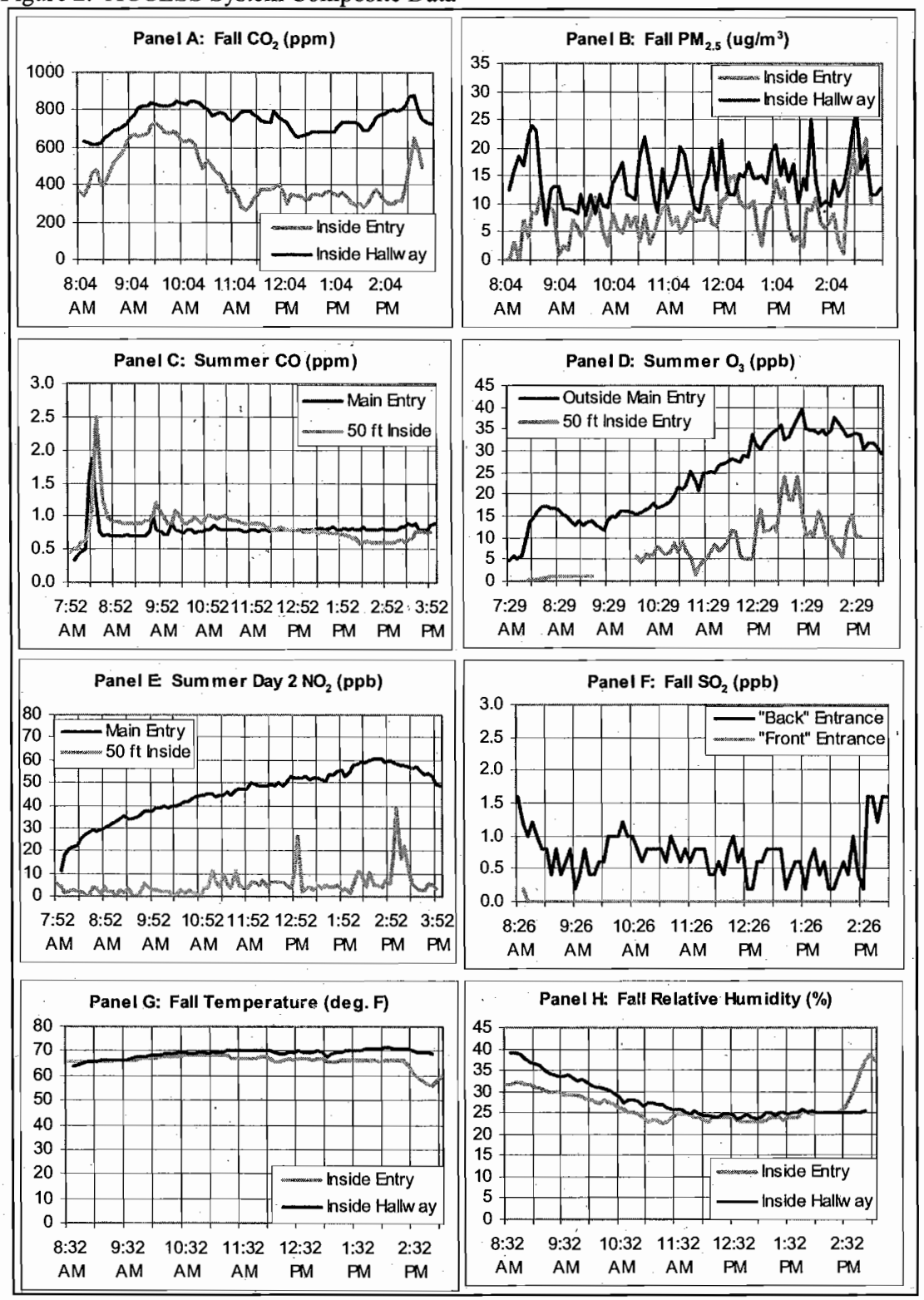
concentrations. In addition, when monitoring was done at the end of the summer while schools were preparing for the start of classes, sources of indoor ozone, such as copiers and printers, may have been detected.

Panel E shows NO_2 concentrations detected at the entrance to a school and 50 feet inside the entrance. Indoor concentrations fluctuated between 0 and 10 ppb, with two spikes of up to 45 ppb during the day. The ACCESS sensor located outside recorded a steady increase from 10 ppb to 60 ppb around 2:45 p.m., with a small decline by the end of the monitoring day. This steady increase may be due to ambient sources or local traffic. At other schools NO_2 was sometimes seen in the fall, but no consistent pattern emerged.

SO_2 concentrations at the "front" and "back" entrance of a school are shown in Panel F. There was almost no detection at the "front" entrance except at the start of monitoring. The fluctuation in the "back" entrance represents a small level of SO_2, which may be due to the fact that this entrance is only a few feet away from a street, and is located near the bus stop.

Temperatures and relative humidity levels at each school were recorded on every day of monitoring to help explain the behavior of pollutants and of sensors on the ACCESS system. The temperature levels shown in Panel G are representative of temperatures seen in most schools during the fall. The humidity levels shown in Panel H are from the same school and same day of monitoring as Panel G and are also representative of levels seen at other schools during the fall.

Figure 2. ACCESS System Composite Data



- **Carbonyls**

Of the suite of fifteen carbonyls monitored during this project, three target compounds for this pilot project – acetaldehyde, formaldehyde, and acetone – were found most consistently and in the highest concentrations. Other peer-reviewed EPA monitoring and modeling studies for hazardous air pollutants have shown these pollutants to be present in high concentrations in ambient air. Thus, the detection of these same compounds in our pilot study lends credibility to our concern over indoor exposure. Also, acetaldehyde and formaldehyde were target compounds for this project due to our focus on fossil fuel combustion, particularly from motor vehicles.

The summary data in Tables 2 - 4 indicate that concentrations of acetaldehyde, formaldehyde and acetone outside schools, 50 feet inside main entrances, and in rooms inside the schools appear to increase as one moves toward the interior of school buildings. Note that where the sample was below the analytical limit of detection, one-half the minimum detection limit was substituted in the calculations for these samples (a total of 13 samples during the entire project). These tables also illustrate that for the most part, concentrations during summer were higher than in fall both inside and outside. This could be due to atmospheric conditions on monitoring days, or to summertime atmospheric conditions that tend to result in greater formation, transport, and residency of these compounds in ambient air, or due to additional, unconsidered variables. Higher ambient concentrations may then have directly influenced indoor concentrations in the schools that were monitored. Additionally, indoor human activity and emission sources such as carpeting may play a critical role in increasing detected concentrations for compounds like formaldehyde.

Table 2. Acetaldehyde Statistics in $\mu g/m^3$ (all samples, separated by sampling location)

	Median Value		75th Percentile		Minimum/Maximum	
	Summer	Fall	Summer	Fall	Summer	Fall
Outside	0.19	0.27	0.37	0.36	0.04/0.90	0.14/0.47
Entry	0.30	0.36	0.49	0.44	0.04/0.69	0.04/0.69
Inside	0.45	0.46	0.63	0.61	0.04/1.16	0.04/1.11

Table 3. Formaldehyde Statistics in $\mu g/m^3$ (all samples, separated by sampling location)

	Median Value		75th Percentile		Minimum/Maximum	
	Summer	Fall	Summer	Fall	Summer	Fall
Outside	0.13	0.21	0.41	0.36	0.03/4.51	0.05/0.51
Entry	1.27	0.60	1.60	0.81	0.36/2.92	0.23/1.51
Inside	1.75	0.91	2.15	1.23	0.03/5.60	0.03/2.71

Table 4. Acetone Statistics in $\mu g/m^3$ (all samples, separated by sampling location)

	Median Value		75th Percentile		Minimum/Maximum	
	Summer	Fall	Summer	Fall	Summer	Fall
Outside	0.55	0.47	0.86	0.72	0.07/2.24	0.26/0.87
Entry	1.25	1.05	1.60	1.85	0.50/78.58	0.65/4.24
Inside	1.45	1.43	2.19	2.16	0.07/39.24	0.21/4.24

Figures 3, 4 and 5 show the ratio by percentage of indoor to outdoor carbonyl concentrations measured at schools over two days of monitoring in the summer and two days in the fall. Note that each percentage figure is a ratio of an indoor to an outdoor concentration. A percentage infiltration above 100% indicates that a higher concentration of the compound was measured indoors. At each school, NESCAUM monitored for carbonyl compounds in two to five indoor locations. As a result between two and five ratios per school per day could be generated (a total of 36 – 90 ratios). Where the samples were below the analytical limit of detection, indoor to outdoor ratios were not calculated or plotted in Figures 3 - 5.

During the summer a total of 52 indoor samples were collected. The total number of monitoring sample site ratios calculated for acetaldehyde, formaldehyde and acetone during the summer was 31, 34, and 36 respectively. This reduction in sample population was due to 5 monitoring days during the summer when no outdoor sample was taken to derive a ratio (loss of 15 potential ratios), and due to no detectable concentration reported for 1 acetone, 3 acetaldehyde, 6 formaldehyde indoor samples.

During the fall, 70 indoor samples were taken at the schools. A total of 59, 60, and 61 ratios were calculated for acetaldehyde, formaldehyde, and acetone respectively. The fall reduction in indoor to outdoor ratios was due to one day with no outdoor measurement at a single school and due to non-detected indoor concentrations of acetaldehyde (2 samples) and formaldehyde (1 sample) during the fall monitoring study.

These Figures suggest a number of interesting relationships. First, indoor to outdoor concentration percentages generally exceed 100% for all three pollutants (acetaldehyde ratios sometimes are at or below 100%); hence, indoor levels of these pollutants were greater than outdoor concentrations at most schools on most of the days that we monitored. Second, ratios varied considerably depending on the day when monitoring took place. For example, in Figures 3 - 5, in the summer at School A on day 1, carbonyl ratios ranged from over 200% to over 1200%, while on day 2, all three carbonyl ratios clustered between just under 100% and 200%. Finally, ratios for the three carbonyls were different. Acetaldehyde percentages were generally between 50 and 300% in summer and 50 and 375% in fall. Acetone ratios ranged between 0 and 300% in summer and 0 and 800% in fall. Ratios for formaldehyde in both summer and fall were more varied than the other two carbonyls and ranged from near 0 to approximately 800% and in some cases, over 2000%.

The higher inside concentrations of carbonyls indicated in Tables 2 - 4 and Figures 3 - 5 may suggest that carbonyls accumulate over the course of the day when air exchange is minimal. Alternatively, they may indicate the presence of critically important indoor sources of these carbonyls, which would supplement the concentration of infiltrating outdoor carbonyls. A more complete assessment is needed to account for building residency, air exchange rates, and interior emission sources in order to determine the actual contribution of ambient pollution to indoor concentrations. In addition, further ambient emissions characterization and monitoring is necessary to adequately evaluate these observations. Typical indoor building materials such as carpeting, modular panel

walls, indoor combustion sources, and some cleaning products have been identified as important indoor sources, particularly for carbonyls like formaldehyde. In this case, carpeting does not appear to be a distinguishing factor among schools.[27]

Figure 3. Acetaldehyde Summer and Fall Inside/Outside Concentrations by Percentage[28]
(line indicates the median value of all 31 and 59 values on the summer and fall charts, respectively)

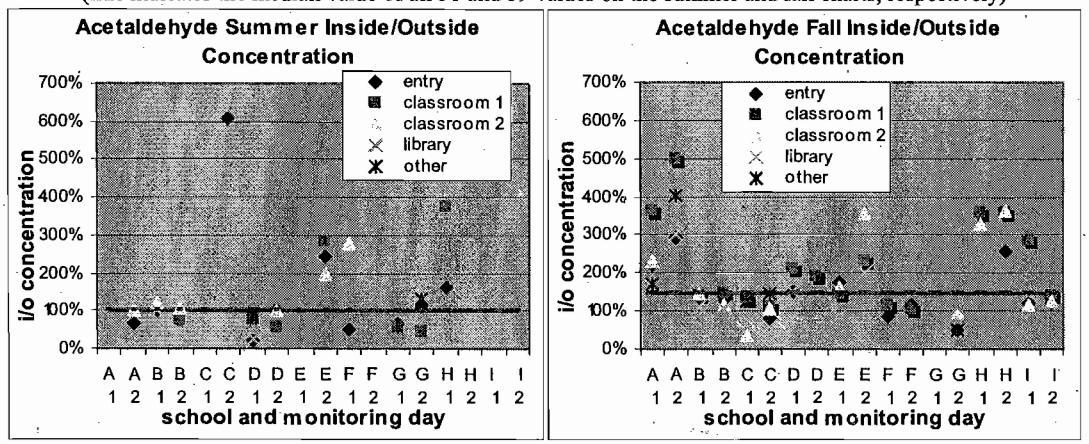
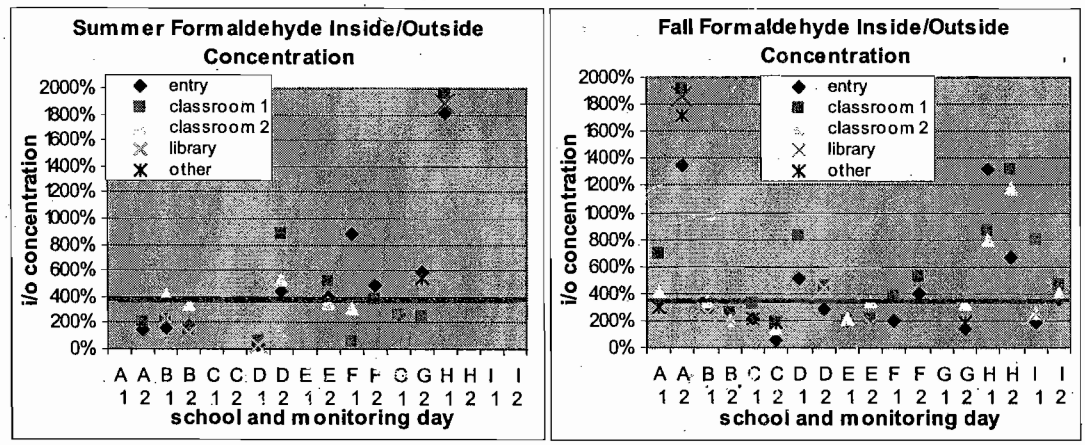
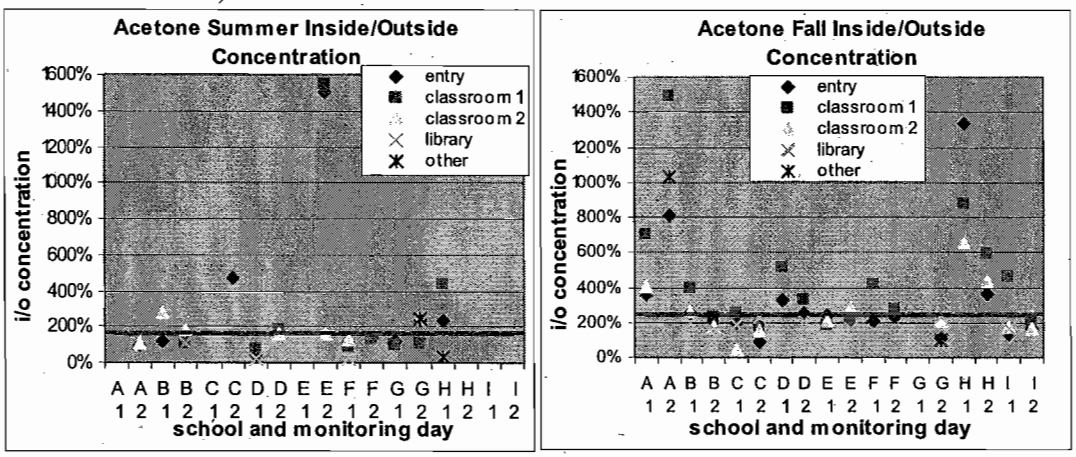


Figure 4. Formaldehyde Summer and Fall Inside/Outside Concentrations by Percentage
(line indicates the median value of all 34 and 60 values on the summer and fall charts, respectively)
(red data points – classroom 1 and library values for Summer School H Day 1 and Fall School A Day 2 – have been reduced to fit on the chart)



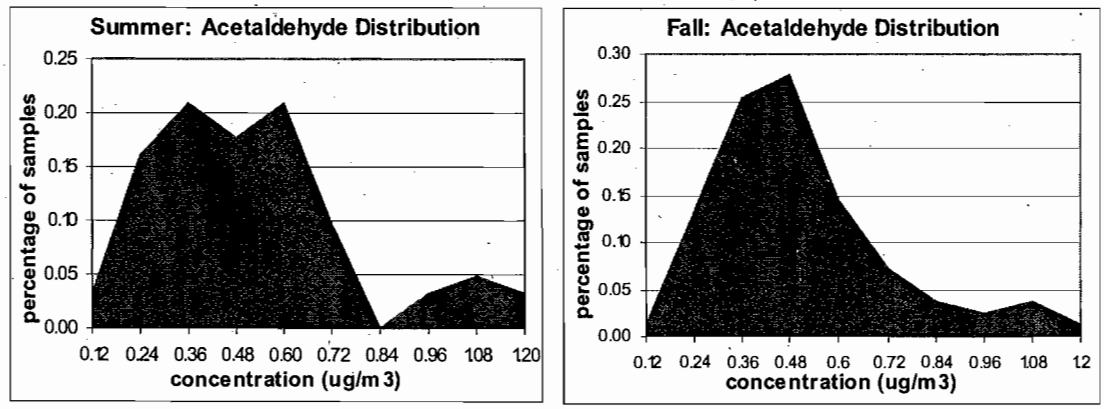
[27] Please see Appendix H for further analyses of subsets of carbonyl samples.
[28] For example, a ratio above 100% demonstrates a higher concentration inside, and a ratio below 100% demonstrates a higher concentration outside.

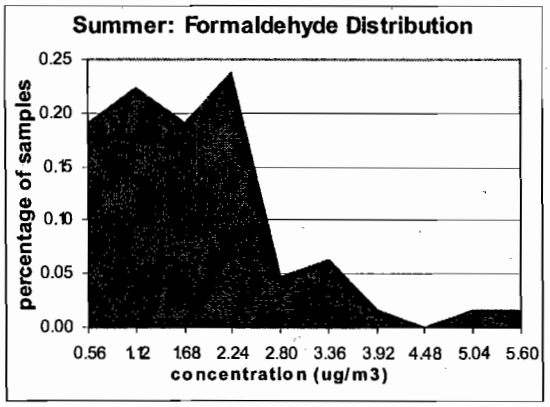
Figure 5. Acetone Summer and Fall Inside/Outside Concentrations by Percentage
(line indicates the median value of all 36 and 61 values on the summer and fall charts, respectively)
(red data points – entry and classroom 1 values for Summer School E Day 2 – have been reduced to fit on the chart)

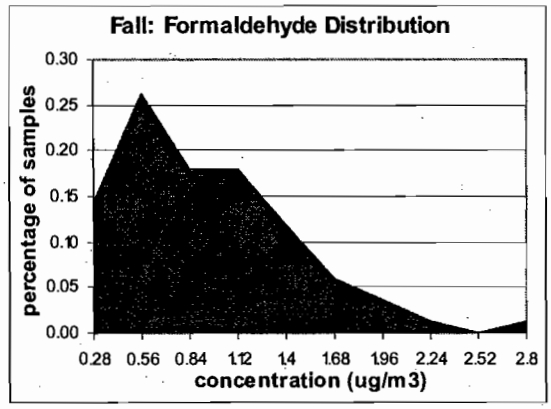


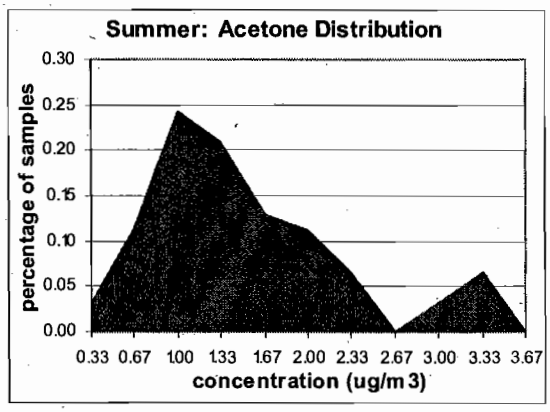
The graphs in Figure 6 below illustrate the distribution of acetaldehyde, formaldehyde and acetone for all carbonyl samples collected. The graphs indicate that carbonyl concentrations inside the school environment do not follow a normal distribution. In fact, a few of the pollutants appear to follow a somewhat biphasic distribution in the summer (where some results cluster around a lower range of concentrations while other results cluster around a higher range of concentrations). The inconsistency and abnormality of the distribution indicate that a number of factors must be considered to appropriately explain the concentrations of pollutants. In future studies it will be important to more carefully track weather conditions, monitoring location within the school building, traffic volume near the school, industrial emissions, and the presence of indoor pollutants that influence concentrations, in order to better interpret the data. However, given the pilot nature of this study, the limited sample size, the number of potential variables, and the range of monitoring conditions, these data are useful to illustrate the wide variability and range of findings across the various locations within a school or between schools participating in the study.

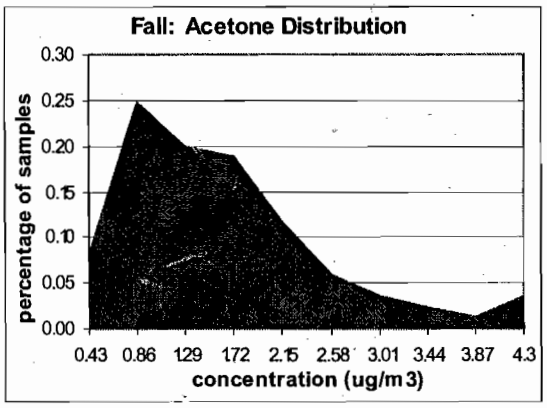
Figure 6. Distribution of All Carbonyl Samples, by the percentage of samples with a given concentration in $\mu g/m^3$











The problem of pumps faulting during sample collection occurred with 30% of our summer samples and 20% of samples during the fall. In some instances, the pumps stopped working when the field monitoring team was not present to note the fault. This pump error (typically due to excessive pressure across the sampling media) results in an uncertain total sample volume. In each of these cases, the time the fault was noted and the potential shortest and longest run time was recorded. We assumed longest possible sample duration, which is the laboratories routine practice, and in each we had adequate sample volume for a positive detection (therefore not less than the limit of analytical detection). Assuming our actual sample duration was between the shortest and longest possible sample period, the ambient concentration could have been greater than that reported by the laboratory. We conducted an analysis to determine the range of potential error in the concentration for these faulted samples, as shown in Appendix I. The potential errors of the faulted samples range from 4 to 56%, with a median value of 21%.

- **Volatile Organic Compounds**

Of the suite of 27 volatile organic compounds monitored during this project, the data presented below show findings for four of the most pervasive and/or potent volatile organic compounds (VOCs): benzene, methyl ethyl ketone (MEK), acetone (also classified and reported as a carbonyl[29]) and toluene. These data represent a limited sample size (a maximum of four days at each school), however, so pollutant levels do not necessarily represent typical conditions at each site.

VOC data are plotted to address the applicability of the methods to explore our central and secondary hypotheses: 1) ambient air pollution concentrations penetrate indoor environments and 2) urban areas or areas near heavy roadway traffic have higher ambient and indoor concentrations of the pollutants.

Figures 7 and 8 examine the ratio of indoor to outdoor pollutants and do not indicate any conclusive relationship. Figures 9 – 13 suggest the range of relative VOC concentrations across the region varying with the level of urbanization and proximity to motor vehicle traffic at each school.

Figure 7 shows the ratio of indoor to outdoor VOC concentrations, as a percentage, measured at schools on both days of monitoring in the summer. In Figure 7, we excluded data from 3 out of 9 schools because the samples were analyzed using a different method and were not comparable. The fall data is shown in Figure 8 using data from four schools. The remainder of the data was excluded in this study because it came from grab samples collected with the Summa canisters rather than eight-hour integrated samples collected during the summer. Additionally, where a data point is missing, VOCs were not detected in either the indoor or outdoor sample, so a ratio could not be calculated.

[29] Acetone is reported as a carbonyl and a volatile organic compound because it is detected under both the sampling and analytical methods employed for this project. However, the accuracy and sensitivity in detection for this compound will differ between these methods, therefore, the results are not directly comparable.

Figure 7. Summer VOCs Inside/Outside (i/o) Concentration Presented as Percentage
(line on graph indicates median value)

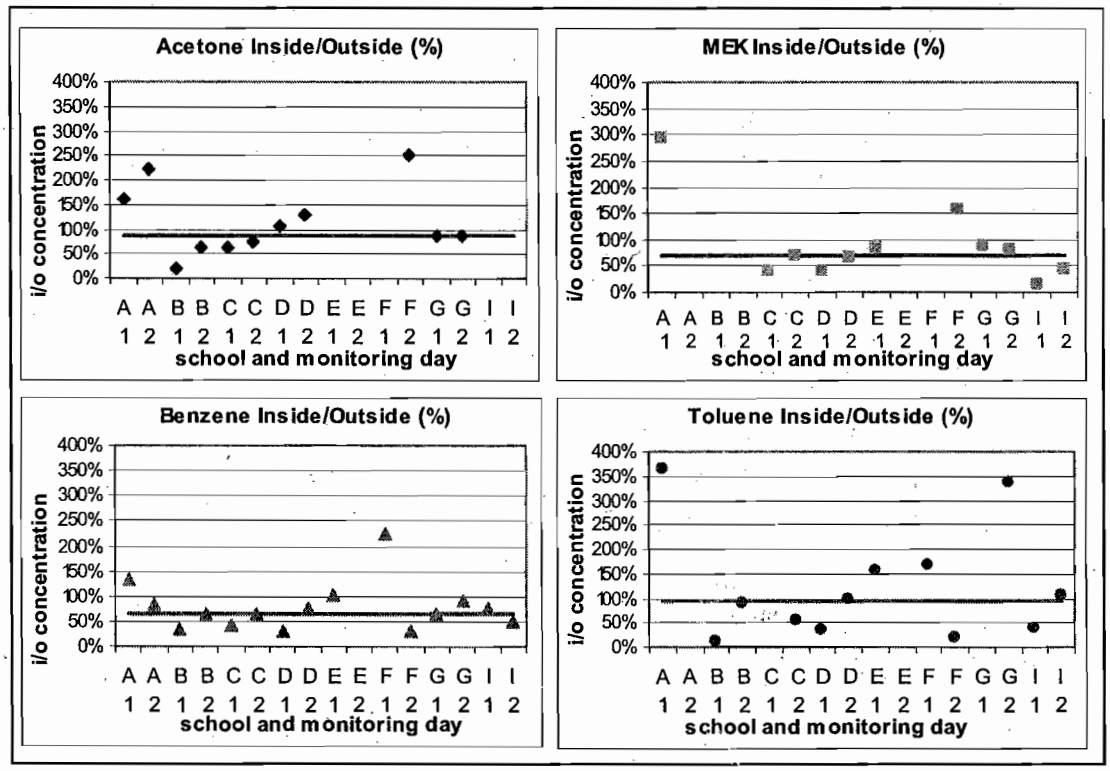
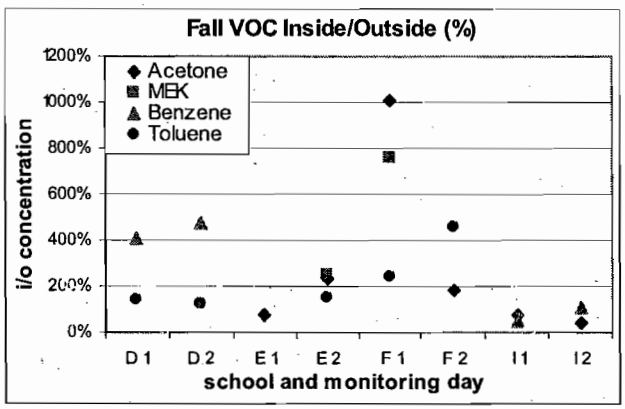


Figure 8. Fall VOCs Inside/Outside (i/o) Concentrations Presented as Percentages



In an attempt to better understand the variability in indoor to outdoor ratios in our sample population, we calculated the average and median percentage infiltration for all nine schools.[30] During the summer months of this study the median indoor concentrations of acetone, benzene, methyl ethyl ketone, and toluene ranged from approximately 60 to 90 % of the outdoor concentrations, respectively. Fall monitoring data for the much smaller integrated sample population (n= 8) suggest a median indoor concentration of these same

[30] This represents a sample size of eighteen samples.

pollutants ranging from approximately 130% to 500% of outdoor concentrations, respectively. Creating these types of comparisons with our pilot project data is illustrative, supports the investigation of our central and secondary hypotheses, and assists us when reviewing our methodology. The sample size is very small, which limits any rigorous statistical analyses of the data at this time.

However, as described previously in this report, these observations are consistent with those made by other researchers previously and underscore the importance of season and of the potential contribution of indoor emissions sources and activities when attempting to evaluate infiltration. Future analyses will aim to more carefully characterize indoor sources and activities in an effort to more appropriately evaluate whether important mobile source pollutants (i.e. benzene and toluene) will infiltrate indoor microenvironments in a manner that approaches 100% to establish a "baseline" of exposure.

Figure 9 examines the influence of urbanization levels on concentrations of VOCs. Figure 9 is a scatter plot of relative inside and outside summer concentrations for the four compounds discussed above, with schools arranged from urban to rural (A to I, as described in Table 1) from left to right along the x-axis.[31] The diagram suggests a general trend of decreasing pollutant concentrations from urban to rural areas. This is most apparent for acetone and benzene, but also occurs to some degree with MEK and toluene.

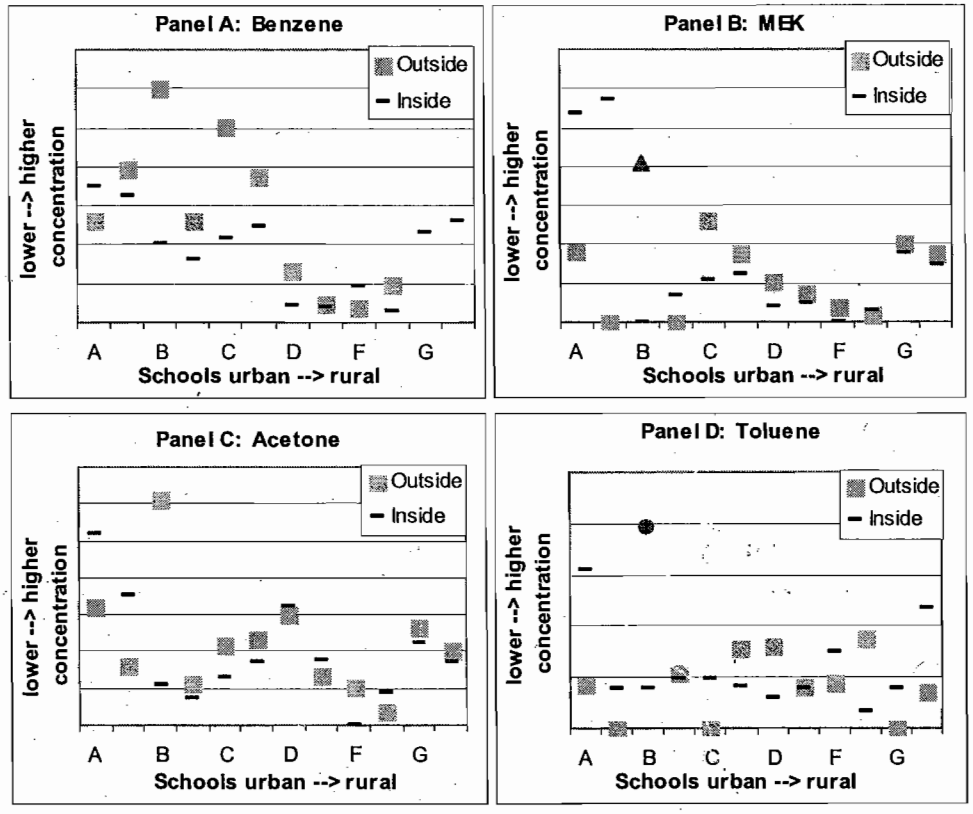
A high degree of variation is evident, and may be explained by meteorological effects, varying either with the seasons or with individual days picked for sampling. In addition, benzene, toluene, acetone and MEK are emitted from numerous sources, including cleaning products. These emissions may be higher in the intense summer cleaning period at schools. Further testing is needed in order to determine the exact nature of these potential impacts.

Another interesting observation is the higher concentration of benzene at school G relative to the other rural schools, D and F. This may be because School G, the most rural school presented in this figure, is located near a road with very heavy traffic volume, and benzene is largely a fuel-related constituent.

[31] Schools E, H and I were not included in these graphs. Data for School H was not available at the time of publication of this report, and the data for Schools E and I were not comparable to the other six schools due to alternate analytical techniques.

Figure 9. Scatter Plots of Relative Inside and Outside Concentrations of VOCs by School

* Triangle in Panel B represents School B Outside concentration divided by 10
* Circle in Panel D represents School B Outside concentration divided by 100, to incorporate these data points on the same graph



Figures 10 through 13 present relative data correlating ambient and indoor concentrations with population density and traffic volume. Figures 10 and 11 illustrate that concentrations of benzene and toluene, which are primarily generated by motor vehicle fuel combustion or evaporation, are relatively higher in areas located in close proximity (< 500 meters) to roadways with higher traffic volume. Note, however, that the relationships between traffic volume and these two pollutants were stronger for inside measurements than for outside measurements.

Relative concentrations for schools B and C in Figure 10A suggest the importance of urban environments as additional considerations to traffic volume.[32] Essentially, these schools are located in the most urbanized environment of our sample population; as a result, we hypothesize that the general ambient "background" concentration for some of the traffic-related pollutants are higher than other less urban locations. These schools were the sites of the highest measured benzene concentrations even though they are located near only moderately trafficked roads. This apparent confounding observation, is

[32] Schools are ranked from most to least urban, with School A being the most urban and School G the least.

probably because traffic volume in the surrounding area (>500 meters from the school) contributed to an elevated benzene baseline for these schools.

In Figures 12 and 13, associations with population density and ambient or indoor concentrations are less clear. Acetone and methyl ethyl ketone are pollutants typically associated with industrial sources or personal product use rather than fuel combustion or evaporation. Accordingly, we graphed relative concentrations of these pollutants in comparison with the broader criterion of population density. No close association is seen in these graphs, likely due to the many potential emission sources of these pollutants and the variability between sampling sites in this study. In Figure 12, levels of MEK measured outside correlate more closely with population density than those measured inside. This same relationship does not hold true for acetone measurements in Figures 13A and B.[33]

Our ability to interpret these data more thoroughly was limited by laboratory error,[34] and a lack of a comprehensive outdoor or indoor emissions inventory during pilot monitoring. Although they represent a limited sample size, these data provide interesting insights for future study design, particularly with respect to sample site selection.

Figure 14 shows the distribution of all VOC measurements collected during summer monitoring. These graphs also suggest the variability and multiphasic nature of the data. As with the carbonyl distributions shown in Figure 6 above, biphasic or multiphasic distributions imply that a number of factors may explain concentrations of pollutants rather than one overriding factor. Thus in a future study it will be important to carefully track weather conditions, location within the school building, traffic volume near the school, industrial emissions, and the presence of indoor pollutants that influence the concentrations in order to interpret the data more comprehensively. A more complete emissions characterization and monitoring program will be necessary to better understand the biphasic nature of the pollutant concentrations. However, given the pilot nature of this study, the limited sample size, the number of potential variables, and the range of monitoring conditions, these data are useful to illustrate the range of findings across the region.

For two pollutants, benzene and formaldehyde, many of the levels found in the pilot study are above the cancer risk thresholds set by the U.S. Environmental Protection Agency. This finding is consistent with recent regional and national studies that have found that **all** locations in the country exceed the conservative thresholds for these pollutants. At this time there is a vigorous public debate regarding scientifically justifiable use of health risk assessment practices for air pollution policy at the regional and national level. The observation that all locations are recording concentrations above the risk thresholds underscores the need for federal consideration of policy changes. It is

[33] The strength of the association of each set of inside and outside data with population density and traffic volume was evaluated statistically; results are shown in the table in Appendix H. Note: the power of these statistical analyses is limited by the small sample size.

[34] The laboratory error produced samples that are relative to each other, but they cannot be analyzed as definitive concentrations.

anticipated that improved public education and public policy will be forthcoming to address the real or potential health risk associated with environmental exposure to widespread pollutants such as benzene and formaldehyde. For further information on how the U.S. EPA establishes these thresholds or ongoing regional and national assessments, see Appendix B.

Figure 10. Benzene Relative to Traffic Data

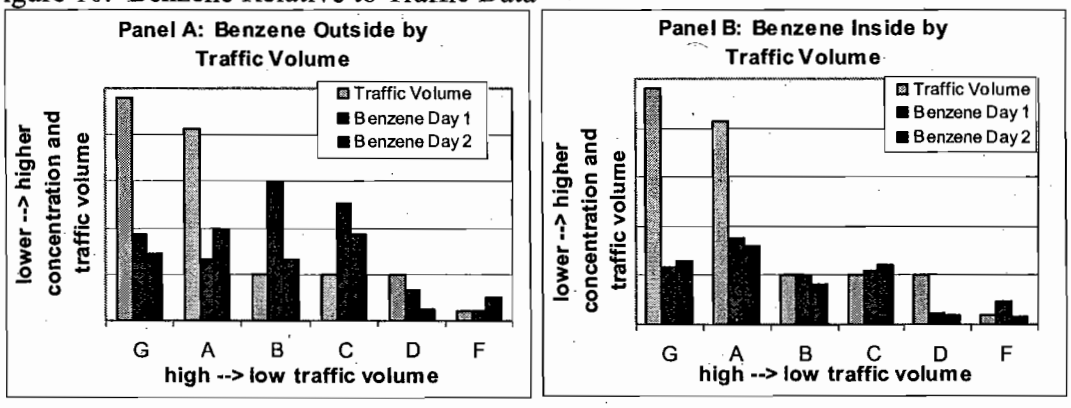
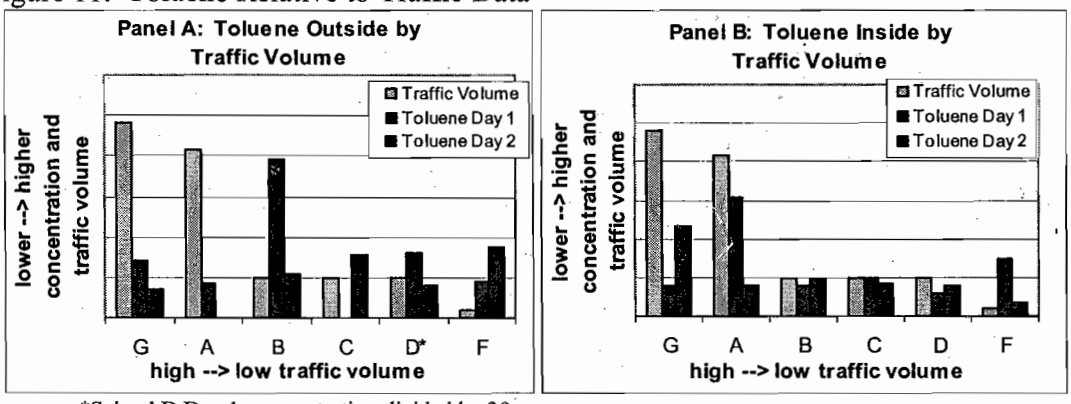
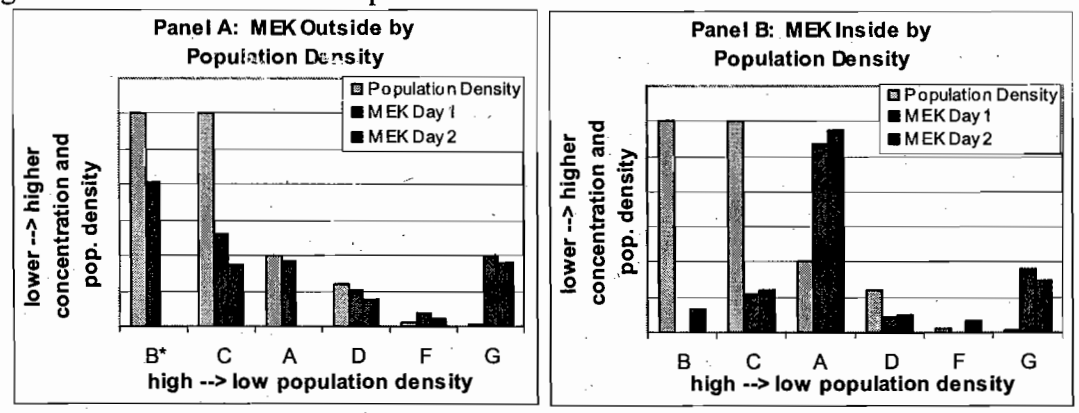


Figure 11. Toluene Relative to Traffic Data



*School D Day 1, concentration divided by 20

Figure 12. MEK Relative to Population Data



*School B Day 1, concentration divided by 10

Figure 13. Acetone Relative to Population Data

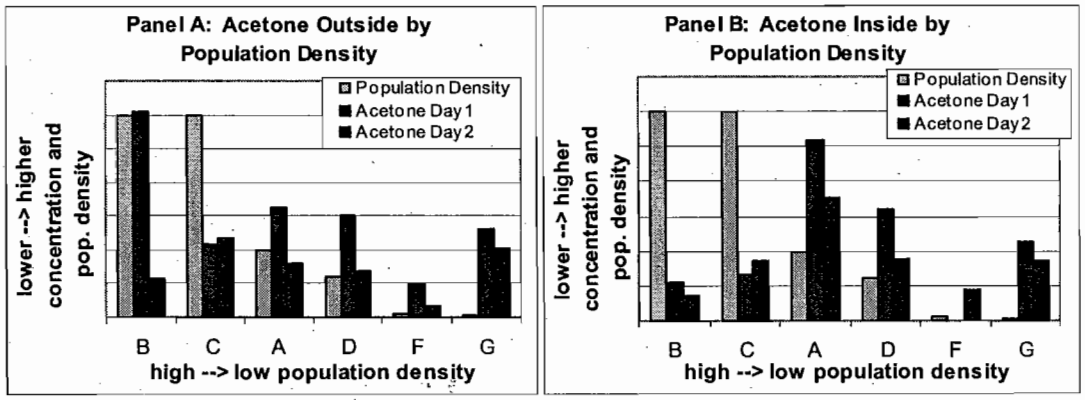
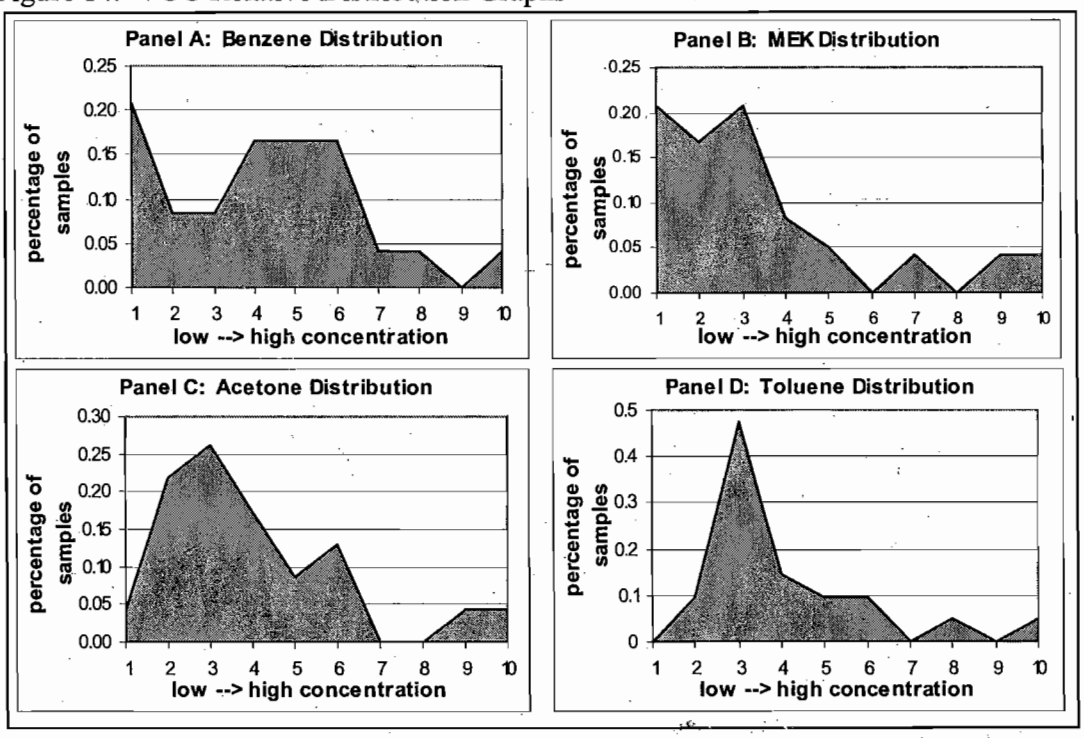


Figure 14. VOC Relative Distribution Graphs



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APPENDIX A: Health Effects of Criteria Pollutants

The federally regulated criteria pollutants are carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, particulate matter and lead. Lead is not included in this appendix because it is beyond the scope of this report. Additionally, this section addresses carbon dioxide, which is an indicator of indoor air quality but not a criteria pollutant.

Carbon Monoxide (CO)

Sources:
CO is a product of fossil fuel combustion, predominantly generated by vehicle emissions. Additional sources include other modes of transportation, as well as wood-burning stoves, incinerators, and industrial sources. The presence of CO in a school indicates the infiltration of vehicle emissions or other outdoor sources, or an inefficient heating system.
Standards and Health Effects:
The EPA's National Ambient Air Quality Standard (NAAQS) for CO is 9 ppm for an eight-hour average and 35 ppm for a one-hour period. Low levels of exposure to CO are thought to contribute to heart disease by reducing the amount of oxygen delivered to the body's organs and tissues. At extremely high concentrations (which are not expected to be found in schools), CO can be lethal.

Nitrogen Dioxide (NO_2)

Sources:
NO_2 is a brownish, highly reactive gas produced when fossil fuels are burned at high temperatures. Sources include transportation vehicles such as diesel buses and trucks, power generating facilities and industrial boilers. Cooking can also be a particularly large contributor in schools.
Standards and Health Effects:
The outdoor annual standard for NO_2 is 50 ppb; there is no indoor standard. NO_2 exposure irritates the lungs, and can aggravate bronchitis and lower resistance to respiratory infections.

Ozone (O_3)

Sources:
O_3 is a highly reactive gas that is the major component of smog. It is not directly emitted into the outside air, but instead is formed through chemical reactions between nitrogen oxides and volatile organic compounds. These two precursors are primarily emitted by transportation and industrial sources. Inside, photocopiers and other office equipment can produce ozone.
Standards and Health Effects:
Ozone can damage the lungs and reduce their function when it is inhaled because of its reactivity. At relatively low levels exposure for several hours can significantly reduce lung function and induce inflammation in healthy people during exercise. The EPA's NAAQS is 120 ppb for a maximum hourly exposure to ozone, and 80 ppb for 8 hours.

Sulfur Dioxide (SO_2)

Sources:
SO_2 is emitted by stationary sources such as coal and oil combustion, steel mills, refineries, and pulp and paper mills. SO_2 is also a contributor to acid rain, and along with particulate matter contributes to decreased visibility.
Standards and Health Effects:
SO_2 can affect breathing and aggravate existing respiratory conditions at high concentrations. EPA's NAAQS for SO_2 is 140 ppb for a 24-hour period, and 500 ppb for a 3-hour period, and the annual mean for SO_2 should not exceed 30 ppb. We would not expect to find high levels of SO_2 in schools.

Particulate Matter ($PM_{2.5}$)

Sources:
Particulate Matter includes dust, dirt, soot, smoke, and liquid droplets. Sources of PM include diesel school buses, factories, power plants, cars, construction vehicles and activity, fires, natural dust and condensation.
Standards and Health Effects:
PM is of interest because as it is inhaled it becomes a lung irritant and causes breathing problems, aggravates existing respiratory and cardiovascular disease, and can damage lung tissue. The smaller the PM, the deeper it is thought to travel into the lungs and contribute to many types of bronchitis. PM is also of concern because toxic substances can collect on the surface of the particulate matter and be absorbed into our bodies after particles are inhaled. EPA's NAAQS for particulate matter with an aerodynamic diameter of less than or equal to 2.5 μm ($PM_{2.5}$) is a maximum 24 hour concentration of 65 $\mu g/m^3$, and an annual concentration less than15 $\mu g/m^3$.

Carbon Dioxide (CO_2)

Sources:
CO_2 is a major component of air. It is the respiration product exhaled by animals and is taken up by plants. High levels of CO_2 in buildings indicate poor ventilation, because they signal that there is not enough fresh air entering the area, or that there are more people (and more exhalation product) in a given area than the ventilation system is able to accommodate.
Standards and Health Effects:
CO_2 is an essential gas that usually has an ambient outdoor concentration around 300 - 350 ppm. When CO_2 concentrations exceed 700 ppm above the ambient concentration, according to the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) standard, occupants of the affected area can experience drowsiness and fatigue. At levels of 2500 ppm and above (which are not expected to be found in school buildings), the resulting low oxygen levels can cause headaches and sometimes more serious symptoms.

APPENDIX B: Benchmark Concentrations for Hazardous Air Pollutants (HAPs)

Benchmarks

The following chart contains a list of 188 hazardous air pollutants (HAPs) identified under the Clean Air Act because of serious adverse health effects associated with exposure, including but not limited to cancer in multiple organ systems and non-cancer effects such as liver damage, respiratory damage, and central nervous system effects. Many of these compounds are target analytes of concern in the pilot project, including acetaldehyde, benzene, and formaldehyde, while several other compounds reported during the pilot monitoring project are not listed under the federal program, including acetone, butyraldehyde, and propionaldehyde.[35] Table 5 below includes concentrations or benchmarks that are estimated to be protective of the public health for cancer, non-cancer (short-term), and non-cancer (long-term) effects. The benchmarks are not necessarily "safe" or no risk levels. Rather, they represent concentrations below which there is believed to be little risk to the population.

Unlike other air pollutants like ozone, carbon monoxide and particulate matter described in Appendix A, less detailed information is available about potential health effects of HAPs. This is largely due to a lack of adequate exposure data and scientific study evaluating human health effects of these pollutants. The likelihood of these pollutants to cause cancer or non-cancer effects has been characterized in animal studies or occupational exposure studies. However, these types of studies involve higher levels of exposure than commonly found in the environment and thus may not be directly relevant. Consequently, the regulatory approach taken by EPA for HAPs relies on extrapolation from higher doses to lower doses to estimate hazards.

For non-cancer effects, this approach uses findings of "no effect" concentrations from relatively high dose animal studies to predict a "no effect" in a low-dose concentration with a safety factor included. This "no effect" level is a concentration to which humans could be safely exposed in the environment throughout a lifetime. The scientific standard for non-cancer benchmarks is that "the concentration represents the value likely to present no appreciable risk of deleterious non-cancer effect during a lifetime of continuous inhalation." For cancer effects, the benchmarks used by EPA reflect the assumption that there is no concentration below which there is no risk (e.g. no threshold). Concentrations that are assumed to present a potential public health concern are derived by estimating a risk concentration for humans from observed tumor incidence in animals. For cancer risk, the scientific standard for the benchmarks denotes "the concentration of a known, probable, or possible human carcinogen that will result in one in a million risk of contracting cancer over a lifetime of exposure."

In addition to the limitations above, most regulatory efforts have addressed a single pollutant at a time. In the atmosphere, many pollutants co-exist, which may significantly alter the potential health effect(s) following exposure to chemical combinations. It is

[35] The latter compounds are typically low-potency materials that are not believed to represent risks to public health at environmental concentrations, and therefore are not currently covered by the federal program.

extremely difficult to predict the effect of multiple pollutant exposures in human populations, but research continues to assist federal, state, and local agencies in developing appropriate regulatory programs to address air pollution concerns.

Table 5 below displays the health effect benchmark concentrations for many of the federally regulated HAPs (Caldwell, 1998). A benchmark concentration represents the atmospheric concentration of a pollutant above which there may be potential public health concerns. Benchmark values essentially serve as "yardsticks" to assess potential threats to public health posed by HAPs. These values represent the current state of scientific understanding about the health effects of pollutants of concern. The benchmarks are a compilation of values used by EPA, the International Agency for Research on Cancer, the National Toxicology Program, the California Environmental Protection Agency, and the Agency for Toxic Substances and Disease Registry when recommending regulatory limits or public health advisory limits. The concentrations shown in the table below are generally similar to the health-based regulatory standards developed by health agencies in the Northeast states.

Benchmarks for short-term exposure are included in the table for comparative purposes. These benchmarks were calculated by dividing the Level of Concern (LOC) values developed for EPA's Superfund program by a safety factor of 1000. The LOC is indicative of levels of airborne concentrations of chemicals for which no serious irreversible health effects are expected to occur after exposure of thirty minutes to the pollutant.

The benchmarks shown here are meant to serve as general indicators of air quality presenting potential risk to public health. It is important to recognize that these values cannot necessarily be used to predict the likelihood of a particular cancer or non-cancer effect.

Table 5. Benchmark Concentrations for Hazardous Air Pollutants (HAPs)

Benchmark values published in Caldwell et al. Toxicology and Industrial Health, Vol 14, No.3, 1998, pp 429-454.

		Published Benchmark Concentrations ($\mu g/m^3$)		
ChemName	**CAS Number**	**ChronicToxicity**	**Acute Toxicity**	**Carcinogenicity**
Acetaldehyde	75-07-0	9	.	0.45
Acetamide	60-35-5	.	.	0.05
Acetonitrile	75-05-8	50	.	.
Acetophenone		.	.	.
Acrolein	107-02-8	0.02	1.2	**
Acrylamide	79-06-1	0.7	.	0.00077
Acrylic acid	79-10-7	1	.	.
Acrylonitrile	107-13-1	2	.	0.015
Allyl chloride	107-05-1	1	.	0.17
Aniline	62-53-3	1	.	0.63
Anisidine	90-04-0	.	.	0.025
Antimony compounds		*	*	*
Arsenic compounds		0.5	.	0.00023

Benzene	71-43-2	71	.	0.12
Benzotrichloride	98-07-7	.	0.7	0.00028
Benzyl chloride	100-44-7	12	5.2	0.02
Beryllium compounds		0.0048	.	0.00042
Biphenyl		.	.	.
Bis(2-ethylhexyl)phthalate	117-81-7	71	.	0.25
Bis(chloromethyl)ether	542-88-1	.	.	0.000016
Bromoform	75-25-2	.	.	0.91
1,3-butadiene	106-99-0	8	.	0.0036
Cadmium compounds		3.5	*	0.00056
Calcium cyanamide		.	.	.
Captan	133-06-2	.	.	1
Carbaryl		.	.	.
Carbon disulfide	75-15-0	700	.	.
Carbon tetrachloride	56-23-5	2.4	.	0.067
Carbonyl sulfide		.	.	.
Catechol		.	.	.
Chloramben		.	.	.
Chlordane	57-74-9	0.018	.	0.0027
Chloroacetic acid	79-11-8	.	1.8	.
Chlorobenzene	108-90-7	70	.	.
Chloroform	67-66-3	35	.	0.043
Chloromethyl methyl ether	107-30-2	.	1.8	0.0014
Chloroprene	126-99-8	1	.	**
Chromium Compounds	18540-29-9	0.002	0.05	0.000083
Cobalt and Compounds	7440-48-4	*	.	.
Cresol		180	.	**
Cumene	98-82-8	.	.	.
Cyanide compounds		*	*	*
D(2,4)		.	.	.
Dibutylphthalate		.	.	.
Dichlorobenzidene(3,3')	91-94-1	.	.	0.0078
Dichloroethyl ether	111-44-4	.	.	0.003
1,3-dichloropropene	542-75-6	20	.	0.027
Dichlorvos	62-73-7	0.5	.	0.012
Diethanolamine		.	.	.
Diethyl sulfate	64-67-5	.	.	**
Dimethoxybenzidine(3,3')	119-90-4	.	.	0.0067
Dimethyl formamide	68-12-2	30	.	**
Dimethyl hydrazine(1,1)	57-14-7	0.022	.	0.0004
Dimethyl phthalate		.	.	.
Dimethyl sulfate	131-11-3	.	5	**
dinitro-o-cresol(4,6)	534-52-1	.	0.5	.
Dinitrophenol(2,4)		.	.	.
Dinitrotoluene(2,4)	121-14-2	7	.	0.0091
dioxane(1,4)	123-91-1	400	.	0.32
Epichlorohydrin	106-89-8	1	.	0.83
Epoxybutane(1,2)	106-88-7	20	.	.
Ethyl acrylate	140-88-5	48	.	0.073
Ethyl carbamate	51-79-6	.	.	0.036
Ethyl benzene	100-41-4	1,000	.	**

Ethyl chloride	75-00-3	10,000	.	**
Ethylene dibromide	106-93-4	0.2	.	0.0045
Ethylene dichloride	107-06-2	95	.	0.038
Ethylene glycol	107-21-1	.	.	.
Ethylene oxide	75-21-8	600	540	0.043
Ethylene thiourea	96-45-7	3	.	0.032
Ethylidenedichloride	75-34-3	.	.	0.63
Formaldehyde	50-00-0	3.6	.	0.077
Glycol ethers		*	.	.
Heptachlor	76-44-8	.	.	0.00077
Hexachlorobenzene	118-74-1	2.8	.	0.0022
Hexachlorobutadiene	87-63-3	90	.	0.045
Hexachlorocyclopentadiene	77-47-4	0.07	0.02	.
Hexachloroethane	67-72-1	80	.	0.25
Hexane	110-54-3	200	.	.
Hydrazine	302-01-2	0.24	.	0.0002
Hydrochloric acid	7647-01-0	20	.	.
Hydrofluoric acid	7664-39-3	5.9	1.6	.
Hydroquinone	123-31-9	.	.	.
Lead compounds		1.5	*	0.013
Lindane	58-89-9	1	.	0.0026
Maleic anhydride	108-31-6	2.4	.	.
Manganese compounds		0.05	*	.
Methyl ethyl ketone	78-93-3	1000	.	.
Mercury compounds		*	.	*
Methanol	67-56-1	620	.	.
Methoxychlor		.	.	.
Methyl bromide	74-83-9	5	.	.
Methyl chloride	74-87-3	.	.	0.56
Methyl chloroform	71-55-6	320	.	.
Methyl hydrazine	60-34-4	.	0.94	0.0032
Methyl iodide	74-88-4	10	.	**
Methyl isobutyl ketone	108-10-1	.	.	.
Methyl isocyanate	624-83-9	0.36	4.7	.
Methyl methacrylate	80-62-6	980	.	.
Methyl tert-butyl ether	1634-04-4	3000	.	6
4,4-Methylene bis(2-chloroaniline)	101-14-4	.	.	0.011
Methylene chloride	75-09-2	3000	.	2.1
Methylene diphenyl diisocyanate	101-68-8	0.02	.	.
Methylenedianiline(4,4')	101-77-9	1.9	.	0.0022
N,N-diethyl/dimethylaniline		.	.	.
Naphthalene	91-20-3	14	.	.
Nickel and Compounds	7440-02-0	0.24	*	0.0042
Nitrobenzene	98-95-3	1.7	.	.
nitrophenol(4)		.	.	.
nitropropane(2)	79-46-9	20	.	**
o-toluidine	95-53-4	.	.	0.18
p-dichlorobenzene	106-46-7	800	.	0.15
p-phenylenediamine		.	.	.
Parathion	56-38-2	.	2	**
PCDD/PCDFs (used TCDD)	(1746-01-6)	0.0000035	.	0.00000003

Pentachloronitrobenzene	82-68-8	.	.	0.014
Pentachlorophenol	87-86-5	0.2	.	0.033
Phenol	108-95-2	45	.	.
Phosgene	75-44-5	0.3	0.8	.
Phthalic anhydride	85-44-9	120	.	.
Polychlorinated biphenyls	1336-36-3	1.2	.	0.002
Polycyclic organic matter		*	.	.
Propionaldehyde		.	.	.
Propoxur	114-26-1	.	.	0.91
Propylene dichloride	78-87-5	4	.	0.053
Propylene oxide	75-56-9	30	.	0.27
1,2-propyleneimine	75-55-8	.	.	0.00015
Quinoline	91-22-5	.	.	0.00029
Quinone		.	.	.
Selenium compounds		0.5	*	.
Styrene	100-42-5	1000	.	**
Styrene oxide	96-09-3	6	.	0.022
1,1,2,2-tetrachloroethane	79-34-5	.	.	0.017
Tetrachloroethylene	127-18-4	35	.	1.7
Toluene	108-88-3	400	.	.
Toluene diamine(2,4)	95-80-7	.	.	0.0011
2,4-toluene diisocyanate	584-84-9	0.07	7	0.091
Trichlorobenzene(1,2,4)	120-82-1	200	.	.
1,1,2-trichloroethane	79-00-5	400	.	0.063
Trichloroethylene	79-01-6	640	.	0.59
Trichlorophenol(2,4,6)	88-06-2	.	.	0.32
Trifluralin	1582-09-8	.	.	0.45
Trimethylpentane(2,2,4)		.	.	.
Vinyl acetate	108-05-4	200	.	**
Vinyl bromide	59-36-02	3	.	0.031
Vinyl chloride	75-01-4	26	.	0.012
Vinylidene chloride	75-35-4	32	.	0.02
Xylenes (mixed)	1330-20-7	300	.	.
** Benchmark identified; however, given uncertainties in benchmark derivation, a comparison is not advised.*				
*** Tier III benchmark available*				

APPENDIX C: Helpful Suggestions to Manage Indoor Air Quality

These suggestions are based on the EPA's Tools For Schools program.[36] Indoor air quality is primarily a function of the effectiveness of ventilation systems and of controls over sources of and exposure to pollutants and bioaerosols. These suggestions are ways to manage indoor air quality. They are intended to help improve indoor air quality in the school, not to fix all possible problems.

- Keep dust and dirt under control in the building
- Use walk-off mats at all entrances, both inside and out
- Be aware of the locations of air intakes and keep the areas surrounding them free of standing water and other sources of pollution (such as dumpsters, fumes from maintenance, and smoking)
- Use cleaning products that do not contain harmful chemicals[37]
- Only use ventilated areas for chemical storage
- When it is necessary to use a harmful chemical, use the smallest amount possible and use it in a well-ventilated area or under a hood
- Move bus loading and unloading areas away from air intakes and try to minimize the amount of time that doors to schools are open when buses are present
- Minimize the amount of time that buses spend idling near schools
- When deliveries are made to schools, do not allow trucks to idle while being unloaded
- Do not allow parents who pick up their children to idle near the school
- Place printers, copiers, and fax machines in well-ventilated areas
- Ensure that all combustion appliances have clean, working hoods over them
- Inspect and clean ventilation systems regularly (indoors and outside)
- Prevent the blocking of vents
- Fix leaks in floors, roofs and pipes as soon as possible, then remove and replace damaged tiles
- Make sure that the ground around foundations slopes away from buildings, to prevent standing water from accumulating around foundations
- Keep all roof drains and gutters clear so that water can drain away from buildings

[36] For further information and references regarding this program see Appendix E.
[37] See Appendix E for more information.

APPENDIX D: Detailed Information on Sampling Equipment and Methods

- **Part I: ACCESS EMS**

The ACCESS Environmental Monitoring system is a single, portable monitoring device comprised of a number of sensors that detect a set of pollutants and register basic meteorology (temperature, barometric pressure, etc.) Carbon monoxide, nitrogen dioxide, ozone, and sulfur dioxide sensors are measured with electrochemical sensors. The particulate sensor uses optical technology. The carbon dioxide sensor is based on infrared technology. The details of these sensors are described below. The temperature sensor is a Type K thermocouple and the relative humidity sensor uses capacitative technology.

All sensors relay data to a specialized computer known as a datalogger, which queries the sensors for current readings every six seconds. The data is averaged over each minute and stored with a date and time stamp for eventual upload to a computer for analysis. For further analysis, data in this study was averaged at five-minute intervals.

An electrochemical sensor uses a chemical reaction between the target gas and a chemical gel in the sensor to detect concentrations of the target gas in the air. When the reaction occurs, it generates a tiny electrical current that is proportional to the concentration. The current is then amplified electronically to a readable level. These sensors can react to other gases, potentially causing the reported value to increase or decrease; this is known as cross-sensitivity. The ACCESS system utilizes the most selective and accurate sensors available. Cross-sensitivity can somewhat affect sensor accuracy. However, each sensor's accuracy is primarily determined by the frequency of calibration and the span gas used to calibrate the sensor. The bottled gas standards used to calibrate the sensor are generally ±10% of the span value. Repeatability is ± 2 % of span.

Because these sensors are measuring small levels of pollutants in the air, it is critical that they be zeroed before use. This helps to maintain the highest degree of accuracy. No sensor in the system has a perfectly linear response curve. As a result, when the gas sensor is calibrated, it is done over the region of greatest interest to the users. In the cases of O_3, NO_2 and SO_2 this is typically between 0 and 300 ppb. When the sensor is calibrated, the slope and offset of the response curve is determined and stored in the datalogger.

The O_3 sensor on the system has a range of 0-1000 ppb. Its minimum detectable limit is 20 ppb. The expected accuracy of the O_3 sensor is ±20 ppb. The resolution of the sensor is 1 ppb. It is cross-sensitive to other oxidants such as Cl_2, Br_2, ClO_2 and F_2, and will respond to these gases with a false positive reading. For example, 50 ppb of chlorine will typically cause a reading of 25 ppb ozone. The NO_2 sensor has a range of 0-1000 ppb. Its minimum detectable limit is 10 ppb and the expected accuracy is ±20 ppb. It is cross-sensitive to other nitrogen oxides such as NO and NO_2. The SO_2 sensor has a range of 0-1000 ppb. Its minimum detectable limit is 10 ppb and the expected accuracy is ±20 ppb. It is cross-sensitive to other sulfur compounds and NO_2. The CO sensor has a range of 0-

100ppm. Its minimum detectable limit is 1 ppm and the expected accuracy is ±2ppm. It does not have any common cross-sensitivities.

The CO_2 sensor is based on infrared technology. It uses a double cell sensor to provide additional signal stability. This sensor has a range of 0-5000ppm. Its minimum detectable limit is 1 ppm and the expected accuracy is ±20 ppb. It does not have any common cross-sensitivities.

On the ACCESS system, particulates are measured through a nephelometor that is built directly into the system. The nephelometer, an AQ-10, is a passive real-time aerosol monitor that utilizes optical light scattering to continuously sense a population of particles as they transverse the sensing chamber. This nephelometric technique is based on the principles of near forward light scattering, at a 45- to 90-degree angle of electromagnetic radiation in the near infrared. The radiation scattered by airborne particles is detected by means of a silicon photocell and particle concentration is directly proportional to its signal output. Signal processing is performed by lock-in synchronous electronic circuitry that enhances performance by canceling detector noise and drift. All electronic circuitry is housed in a RFI protective case. Power is provided by the ACCESS system. A transformer supplies the main sensor board with 8VDC power. Constructed in lightweight aluminum case, the AQ-10 is able to withstand harsh environments. The absence of moving parts and complete semiconductor design make the AQ-10 largely unaffected by shock, vibration, temperature and humidity.

Calibration of the particulate unit is performed using a representative test dust. When aerosolized to factory calibration standards, the mean mass diameter (mmd) equals 10 microns ±0.5 microns and a log normal size distribution. The calibration aerosol has a 50% cutpoint at a 10 microns particle aerodynamic diameter, which has applications for both EPA and OSHA particulate air monitoring. The 10 micro-m cutpoint is consistent with the ACGIH Particulate Size-Selective Criteria for Thoracic Particulate Mass (TPH). ACGIH defines TPM as those particles that are likely to be deposited anywhere within the lung airways (tracheobronchial) or gas exchange (alveolar/respirable) region. The 10 microns cutpoint is also consistent with the EPA PM_{10} reference method for ambient particulate air monitoring. The sensor can also be calibrated to the EPA standard of 2.5 microns. For our pilot study, we used the 2.5 micron calibration.

	Type of sensor	Range	Minimum Detectable Limit	Expected Accuracy	Cross-Sensitivities
CO	Electrochemical	0-100 ppm	1 ppm	± 2 ppm	No
NO_2	Electrochemical	0-1000 ppb	10 ppb	± 20 ppb	Yes (NO, NO_2)
SO_2	Electrochemical	0-1000 ppb	10 ppb	± 20 ppb	Yes (SO_X, NO_2)
O_3	Electrochemical	0-1000 ppb	10 ppb	± 20 ppb	Yes (Cl, Br_2, ClO_2, F_2)
CO_2	Infrared	0-5000 ppm	1 ppm	± 20 ppb	No
$PM_{2.5}$	Nephelometer	0-2000 $\mu g/m^3$	10 $\mu g/m^3$	± 40 $\mu g/m^3$	No

- **Part II: GILIAN PERSONAL SAMPLING PUMPS**

These pumps are designed to measure a four- to eight-hour sample throughout the day for a variety of compounds. They can be calibrated to draw air at different flow rates through a cartridge that reacts with the air being sampled. The cartridge contains different types of media that react and bind to a variety of compounds. Before sampling, each pump in this study was calibrated to 200 ±20 cc/min so that it would draw through a certain amount of air to create the sample. The Gilian pumps pull air through a filter at a specified rate, gathering particles that react with the filter media, but no air sample is collected. The airflow rate and duration of sampling must be used to calculate the amount of substance present in the air. A dinitrophenyl hydrazine (DNPH) media was used in the cartridges to test specifically for carbonyls. In most cases, ozone scrubbers were used because ozone can interfere with the bond between certain carbonyls and the DNPH media. The sampling media must be kept cool (in the freezer or on ice) before sampling and afterwards as they are shipped to the lab, so that the fragile bonds between the carbonyls and the DNPH are retained. In the laboratory they are analyzed using high-performance liquid chromatography, the details of which are described below.

Throughout the process of monitoring the nine schools, two different types of absorbent tubes (both with DNPH media) were used. The first type used was the sep-pak cartridge. The sep-pak cartridge contains DNPH media and an ozone scrubber was attached. These pumps were calibrated to 200±20 cc/min, and had the problem of becoming saturated, particularly in high humidity conditions. Once saturated, it was difficult for the Gilian pumps to pull through a constant flow rate, causing the pumps to fault before the designated four- or eight- hour sampling period was completed.

This faulting problem led us to try a different type of DNPH cartridge, the SKC tube, in the last few schools we tested. The SKC tubes have the DNPH media and an ozone scrubber together inside a glass tube. The SKC media is not as tightly packed, so the cartridges did not get saturated as easily as the sep-pak cartridges. This was favorable because the samples could be of longer duration and the times recorded were more accurate because the pumps did not fault. These tubes were also able to run at a faster rate (500-700 cc/min), which captured a larger sample, but was also much louder, making it hard to use in a classroom or other quiet areas of a school.

- **Part III: EVACUATED SUMMA CANISTERS**

Summa canisters were used to sample volatile organic compounds over an eight-hour period. These one-liter canisters have been evacuated and fitted with an airflow orifice that controls the rate of airflow into the canister. The orifices were calibrated to draw approximately 15 cc/min, and the airflow would automatically stop after drawing in one liter, which was expected to take seven to eight hours. The canisters could also be sealed prior to collecting a full sample, and by recording a starting and ending pressure the amount of air collected could be determined. When the sample was collected it had to be closed and shipped off to a laboratory to be evacuated and analyzed for the presence of volatile organic compounds. In a few cases during the second phase of testing, during which the orifices were not available, the summa canisters were cracked and a five- to

seven-minute sample was obtained. This will be an estimate of the eight-hour sample, but results may be skewed high or low depending on conditions at that time of day.

- **Part IV: INSTANTANEOUS GRAB SAMPLING**

Grab sampling was performed for CO_2 (and CO) with the Dräger CMS (Chip Monitoring System), a digitized handheld monitor that provides an instantaneous, replicable result. The system works with computerized chips which each contain ten capillaries. The tip of one capillary is broken, it draws in air, and a reading is reported. The pumps are calibrated to draw in a constant mass of air, which automatically adjusts to changes in atmospheric pressure. Each capillary contains a chemical reagent that undergoes a color reaction when the reagent contacts the particular gas being monitored. The extent of the color reaction is measured by a photo-optical system that then returns a digital reading with a repeatable accuracy often at ± 5-15%.

APPENDIX E: Additional Resources for Air Quality Assessment

Indoor air quality problems can be caused by a variety of factors. This project evaluates a specific set of factors that affect indoor air quality, but does not address all of them. The goal of the study was to evaluate the effect of outdoor air pollution on the indoor environment. A thorough assessment of indoor air quality in a building would include inspection and evaluation of many factors that were not evaluated in the study. For example, an inspection of the ventilation system and testing for biological sources (molds and mildews) would be included in a comprehensive evaluation of indoor air quality. The resources listed below can help interested readers to learn more about how to evaluate and improve indoor air quality.

The *Indoor Air Quality (IAQ) Tools for Schools* Kit

The Environmental Protection Agency (EPA) has designed the *Indoor Air Quality Tools for Schools* kit. This kit is intended to be used by existing staff in schools, and allows schools to construct and implement plans of action to improve their indoor air quality. It includes fact sheets, checklists to help identify problems, an Indoor Air Quality Problem Solving Wheel, and a guide to the use of the system. For more information see the web sites below.

- http://www.epa.gov/iaq/schools/
- http://www.epa.gov/iaq/schools/tools4s2.html

Indoor Air Quality Information Clearinghouse (IAQ INFO)

EPA created the IAQ INFO to provide a central source of information regarding indoor air quality. It is an excellent resource for EPA publications on all aspects of indoor air quality, from testing to current standards and guidelines. EPA will also refer interested parties to other organizations that may have useful information.

IAQ INFO can be reached toll-free at 1-800-438-4318, from Monday through Friday from 9:00 AM to 5:00 PM EST. During non-business hours voice mail is available. Inquires may also be made via e-mail to the address iaqinfo@aol.com or by fax at 1-(703)-356-5386.

- http://www.epa.gov/iaq/iaqxline.html
- Indoor Air Quality Information Clearinghouse
  IAQ INFO
  P.O. Box 37133
  Washington D.C. 20013-7133
  Direct line: (703) 356-4020

Moisture Control is the Key to Mold Control [EPA Document Number (EPA 402-K-01-001 March 2001]

This EPA publication provides a good overview of the impact that mold can have on indoor air quality. It also includes a section detailing methods of mold control. It is available online at http://www.epa.gov/iaq/molds/toc.html or can be ordered through the Indoor Air Quality Information Clearinghouse.

Occupational Safety and Health Administration (OSHA)

The OSHA website has many links that lead to excellent resources about indoor air quality. http://www.osha-slc.gov/SLTC/indoorairquality/index.html

Consumer Product Safety Commission

The CPSC website has a search engine that allows users to search for information about products that can affect indoor air quality (cleaners, paint strippers, etc.)

- http://www.cpsc.gov
- Mailing Address:
  U.S. Consumer Product Safety Commission
  Washington, D.C. 20207-0001
- Telephone: 1-(301) 504-0990
- Fax: 1-(301) 504-0124 and 1-(301) 504-0025
- E-mail: info@cpsc.gov

American Lung Association

This website has a large amount of information and links about indoor air quality.

- http://www.lungusa.org
- Mailing Address:
  The American Lung Association
  1740 Broadway
  NY, NY 10019
- Phone: 1-(212)-315-8700

These Agencies also have information on indoor air quality:

National Institute for Occupational Safety and Health

- http://www.cdc.gov/niosh/homepage.html
- Phone: 1-800-35-NIOSH (1-800-356-4674)
- Fax: 1-(513)-533-8573

US Department of Energy

- http://www.energy.gov/
- Mailing Address:

U.S. Department of Energy
1000 Independence Ave., SW
Washington, DC 20585

- Phone: 1-800-dial-DOE
- Fax: 1-(202)-586-4403

APPENDIX F: NESCAUM Walkthrough Checklist

Name of School: Location:

Before executing this checklist it is useful to obtain a map of the school and its layout, as well as a small-scale map of the area immediately surrounding the school. If you are unable to obtain these items, draw a map of the building to show problem areas.

Type of Roof: Flat ____ Peaked ____ Combination ___

If the roof is a combination, describe where on the building each type of roofing is used.

Date of original construction:

If the building has had additions, describe the location of the original portion of the building and the location of the additions.

Date(s) of construction of addition(s):

Type(s) of ventilation system(s):

If the building has more then one type of ventilation system, describe which part of the building each system ventilates.

What is the neighborhood like around the school?

Rural ____ Suburban ____ Urban ____

How far away from the road is the school? (If more then one side of the school is adjacent to the road, measure the distance on all sides)

What types of roads are the adjacent roads?

Are the outdoor air intakes obscured? If so, note the locations on a map of the school building.

Where are the outdoor intakes located? If possible, include a diagram of the ventilation system with the intake locations marked.

Are the outdoor air intakes located near any immediate pollution sources? If so, record the locations of the sources in relation to the school building.

Is the roof in good repair? If not, note the damaged locations.

Are there any potential sources of pollution near the building? If yes, note their locations and the type of activity.

Does water drain away from building? If no, note the location of problem areas where water collects.

Are sprinklers in use near the building? If yes, note the location of intake vents that get wet.

Are the outdoor air intakes working? (Use chemical smoke or a small piece of tissue paper to determine if air is moving into the intake vents)

Are there clean walk-off mats at all entrances to the building?

Are there any sign of leaks, mold or mildew growth inside building? If so, please use the following checklists for individual rooms and to document the location and size of the stain.

Room #:
Mold smell: 1 2 3 4 5
Number of wet or stained ceiling tiles:
Please describe:

Carpeting: Yes_____ No_____ Area carpet_____

Fabric walls, fabric chairs: Yes_____ No_____

Evidence of moisture:

Evidence of visible mold:

Ventilation system:

Other comments:

Are there any signs of water damage (e.g, discolored ceiling tiles, or floors)? Use the checklist for individual rooms above to document the location and size of the damaged area.

Have windows that could be important to the airflow system been sealed shut?

Are temperature and humidity levels acceptable?

Is the building generally clean and dust under control?

Have transfer grills between rooms and halls or other rooms been sealed off or blocked?

Does each room have a source of outside air (mechanical or window)?

Have large objects (e.g., blackboards, room partitions) been placed in a position to block airflow in a room?

Have wall vents been covered or blocked by objects (e.g., bookshelves, displays)?

Are the exhaust fans pulling air out of the building?

Do the exhaust fans have enough capacity to cover the area they are designed to exhaust?

Does each bathroom have a working exhaust fan?

Do all drains have traps?

Do trash and chemical storage areas have working exhaust fans?

Are there flumes or exhaust hoods over combustion appliances?

Is there visible soot, leaks, or disconnected flumes or exhaust hoods?

If the building was built before 1980, is there any peeling or flaking paint?

Does the building have chemistry labs? If so, list the chemicals used in the lab.

Does the building have an art room? If so, list the chemicals used in the art area.

Where are the copier machines (or other machines like a fax) located in the building?

Time	Location	Count

Where is the equipment for outdoor maintenance kept? Does it idle near the building?

How is the building heated?

What types of boards are used in the building?

Does the cafeteria cook lunch or defrost prepackaged lunches?

APPENDIX G: Traffic Volume Calculations

Traffic Data was calculated using Annual Average Daily Traffic (AADT) counts from the Department of Transportation of each state in which schools were located. The AADT was calculated by counting the number of cars that pass a particular spot for an entire year, and dividing that number by the number of days in that year. Thus, the AADT value is representative of "a typical day" of traffic for that year. In most cases, the AADT was available for streets bordering schools, and for some of the larger nearby streets as well. The most recent year of data that was available was 2000. In some locations, data was only available from previous years, starting in 1996. Traffic counts of busy streets and major intersections are often calculated every year, but smaller streets are not measured as often.

The traffic counts, shown in Table 1 on page 13, are calculated using the most information available from the most recent years for the area surrounding the school. The area was cut off to a 500m radius, and an approximation was made of the amount of traffic, which is in that area based on the streets for which there was information. For instance, when schools are located near a large intersection, there are typically 4 traffic counts associated with that intersection, one from each direction. Adding these together would overestimate the number of vehicles. Instead, the two points on the same street were averaged to give an estimate of the number of vehicles on that street. Then the traffic counts on the two streets were added to produce a total volume around the intersection. When information was available on a number of streets near the school, the numbers were simply added. However, if there were multiple traffic count numbers on the same street in different locations that were both close to the school, the two were averaged. For schools close to the highway, the total number of cars that passed by was added to the total of smaller streets.

These calculations are imperfect for many reasons, including the fact that the number represents a "typical" 24-hour day. NESCAUM monitoring was representative of four days at each school, which most likely were not "typical" days. The monitoring days also were at most eight hours long, but 24-hour days are used here as a consistent baseline with which to compare the nine schools to each other. When there were other events going on near the school, such as a brush fire or construction, these were noted but not factored into the traffic calculation. Additionally, the difference between the emissions from cars which idle at a stop light, and those which pass by at 70mph on a highway may be significant, but could not be factored into these calculations. Thus, these measurements are only estimates of traffic volume counts. They are not intended to measure the exact quantity of emissions from these vehicles that may be released into the area surrounding the school. Instead, they are intended only to organize the schools according to traffic volume in order to estimate any association with pollutant concentration.

APPENDIX H: Carbonyl Data Summary Information

OUTSIDE MAIN ENTRANCE	SUMMER, 12 samples from 8 schools			FALL, 17 samples from 9 schools		
	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)
Minimum Detected	0.11	0.42	0.09	0.14	0.26	0.05
Maximum	0.90	2.24	4.51	0.47	0.87	0.51
Median Value	0.28	0.76	0.33	0.27	0.48	0.22
Average Value	0.34	0.88	0.65	0.30	0.56	0.26
75th Percentile	0.45	1.05	0.49	0.39	0.78	0.41
Standard Dev.	0.24	0.50	1.23	0.12	0.21	0.15
# Non Detects	1	0	1	0	0	0

INSIDE MAIN ENTRANCE	SUMMER, 16 samples from 9 schools			FALL, 19 samples from 9 schools		
	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)
Minimum Detected	0.11	0.50	0.36	0.23	0.65	0.23
Maximum	0.69	78.58	2.92	0.69	4.24	1.51
Median Value	0.30	1.25	1.27	0.36	1.05	0.60
Average Value	0.35	6.07	1.26	0.36	1.40	0.69
75th Percentile	0.49	1.60	1.60	0.44	1.85	0.81
Standard Dev.	0.17	19.34	0.65	0.16	0.86	0.36
# Non Detects	1	0	0	2	0	0

ALL INSIDE ROOMS	SUMMER, 36 samples from 9 schools			FALL, 51 samples from 9 schools		
	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)
Minimum Detected	0.12	0.23	0.66	0.10	0.21	0.23
Maximum	1.16	39.24	5.60	1.11	4.24	2.71
Median Value	0.45	1.45	1.75	0.46	1.43	0.91
Average Value	0.48	2.73	1.75	0.50	1.69	0.97
75th Percentile	0.63	2.19	2.15	0.61	2.16	1.23
Standard Dev.	0.29	6.37	1.09	0.23	0.94	0.53
# Non Detects	3	1	2	1	0	1

ROOMS WITHOUT CARPET	SUMMER, 16 samples, 6 schools			FALL, 24 samples, 6 schools		
	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)
Minimum Detected	0.12	0.23	0.67	0.10	0.21	0.23
Maximum	1.16	6.21	5.60	1.11	4.24	2.71
Median Value	0.48	1.23	1.77	0.49	1.74	0.89
Average Value	0.55	1.90	1.95	0.50	1.89	0.91
75th Percentile	0.69	2.39	2.81	0.65	2.71	1.14
Standard Dev.	0.34	1.55	1.37	0.24	1.07	0.54
# Non Detects	1	0	1	1	0	1

ROOMS WITH CARPET	SUMMER, 20 samples, 7 schools			FALL, 27 samples, 7 schools		
	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)
Minimum Detected	0.15	0.22	0.67	0.21	0.38	0.33
Maximum	0.85	39.24	3.39	1.05	4.17	2.09
Median Value	0.41	1.51	1.74	0.45	1.35	0.96
Average Value	0.42	3.40	1.59	0.51	1.51	1.03
75th Percentile	0.63	2.18	2.07	0.56	1.74	1.41
Standard Dev.	0.23	8.48	0.82	0.24	0.80	0.52
# Non Detects	2	1	1	0	0	0

ROOMS NEAR TRAFFIC	SUMMER, 14 samples, 8 schools			FALL, 16 samples, 7 schools		
	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)
Minimum Detected	0.12	0.70	0.71	0.29	0.73	0.23
Maximum	0.96	39.24	5.60	0.86	3.87	1.74
Median Value	0.51	2.03	1.75	0.38	1.26	0.91
Average Value	0.53	4.82	2.10	0.49	1.69	0.90
75th Percentile	0.61	2.98	2.45	0.67	2.37	1.10
Standard Dev.	0.22	10.01	1.30	0.19	0.98	0.41
# Non Detects	0	0	0	0	0	0

ROOMS NOT NEAR TRAFFIC	SUMMER, 22 samples, 7 schools			FALL, 35 samples, 8 schools		
	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)	Acetaldehyde (ug/m3)	Acetone (ug/m3)	Formaldehyde (ug/m3)
Minimum Detected	0.15	0.22	0.66	0.10	0.21	0.33
Maximum	1.16	4.04	3.11	1.11	4.24	2.71
Median Value	0.35	1.19	1.52	0.47	1.43	0.91
Average Value	0.45	1.41	1.53	0.51	1.70	1.00
75th Percentile	0.65	1.73	2.12	0.58	2.08	1.30
Standard Dev.	0.32	0.98	0.91	0.25	0.94	0.57
# Non Detects	3	1	2	1	0	1

Appendix I: Faulted Sample Error Calculation Table

Sample ID	Flow Rate Pre-Cal (ml/min)	Total Sample Volume (m^3)- LOW	Total Sample Volume (m^3)- High	Formaldehyde Concentration Reported µg/m^3	*Assuming Low Volume Sampled* - Formaldehyde µg/m^3	% difference
M-003	196.67	29	58	1.28	0.63	50.68%
F-005	206.73	45	61	1.17	0.87	25.60%
F-004	208.37	45	60	4.51	3.34	25.95%
F-003	192.53	41	56	1.38	1.02	25.86%
F-002	210.02	44	60	2.64	1.95	26.32%
F-003	191.37	35	40	0.13	0.11	11.90%
F-006	211.47	49	55	0.59	0.52	11.49%
F-004	206.87	37	42	1.17	1.03	12.32%
F-005	203.8	45	51	2.21	1.96	11.24%
O-005	204.57	59	65	0.13	0.12	9.40%
O-007	224.4	24	38	2.8	1.80	35.71%
O-003	206.97	42	58	0.48	0.35	28.01%
O-002	204.73	40	55	0.12	0.09	27.78%
2M-003	176.07	61	77	0.6	0.48	20.59%
2B-005	187.8	51	75	0.88	0.59	32.42%
2B-002	205.33	49	74	1.56	1.04	33.33%
2B-003	214.93	82	86	0.73	0.70	3.77%
2B-004	211.7	68	82	0.51	0.42	16.88%
2B-002	210.07	53	75	0.44	0.31	29.49%
2B-004	206.77	77	90	0.56	0.48	13.82%
2C-004	199.83	69	93	1.02	0.76	25.81%
2EM-002	206.4	60	74	0.62	0.51	18.16%
2EM-006	214.97	62	76	0.87	0.71	18.41%
2EM-004	200.67	47	59	1.15	0.91	20.48%
2EM-005	195.37	46	57	0.96	0.76	20.48%
2EM-006	226.33	78	91	1.86	1.58	14.89%
2W-004	208.6	24	54	0.33	0.15	55.77%
2W-005	222.4	37	64	0.93	0.54	41.67%
2W-005	225.6	81	87	0.51	0.48	6.48%
2W-003	203.6	75	84	0.57	0.51	10.92%
2W-002	212.9	70	86	0.73	0.59	18.52%
2W-006	187.03	44	61	0.57	0.41	27.61%
					median %:	**20.54%**

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Committee on Environmental Health

Pediatrics 2004;114;1699-1707
DOI: 10.1542/peds.2004-2166

This information is current as of September 13, 2006

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://www.pediatrics.org/cgi/content/full/114/6/1699

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AMERICAN ACADEMY OF PEDIATRICS

POLICY STATEMENT

Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of All Children

Committee on Environmental Health

Ambient Air Pollution: Health Hazards to Children

ABSTRACT. Ambient (outdoor) air pollution is now recognized as an important problem, both nationally and worldwide. Our scientific understanding of the spectrum of health effects of air pollution has increased, and numerous studies are finding important health effects from air pollution at levels once considered safe. Children and infants are among the most susceptible to many of the air pollutants. In addition to associations between air pollution and respiratory symptoms, asthma exacerbations, and asthma hospitalizations, recent studies have found links between air pollution and preterm birth, infant mortality, deficits in lung growth, and possibly, development of asthma. This policy statement summarizes the recent literature linking ambient air pollution to adverse health outcomes in children and includes a perspective on the current regulatory process. The statement provides advice to pediatricians on how to integrate issues regarding air quality and health into patient education and children's environmental health advocacy and concludes with recommendations to the government on promotion of effective air-pollution policies to ensure protection of children's health. *Pediatrics* 2004;114:1699–1707; *air pollution, adverse effects, children, asthma, environmental health.*

ABBREVIATIONS. $PM_{2.5}$, particulate matter with a median aerodynamic diameter less than 2.5 μm; PM_{10}, particulate matter with a median aerodynamic diameter less than 10 μm; EPA, Environmental Protection Agency; HAP, hazardous air pollutant; AQI, air quality index.

INTRODUCTION

Although it has been 3 decades since passage of the Clean Air Act in 1970 (Pub L No. 91–604), the air in many parts of the United States is far from clean. Air quality has improved in some areas but decreased in others.[1] In addition, there are important health effects from air pollutants at levels once considered safe. Children and infants are among the most susceptible to many of the air pollutants.

In 2002, approximately 146 million Americans were living in areas where monitored air failed to meet the 1997 National Ambient Air Quality Standards for at least 1 of the 6 "criteria air pollutants": ozone, particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, and lead (Table 1).[1] Although the standards for ozone and particulate matter were revised in 1997, legal barriers have delayed timely implementation.[2] Recent reports have identified adverse health effects at levels near or below the current standards for ozone, particulate matter, and nitrogen dioxide. Thus, the 1997 federal standards may not adequately protect children. Additionally, numerous other toxic air pollutants are of public health concern.[3]

Outdoor air pollution is also a major problem in developing countries. The World Health Organization found that the air quality in large cities in many developing countries is remarkably poor and that very large numbers of people in those countries are exposed to ambient concentrations of air pollutants well above the World Health Organization guidelines for air quality (www.who.int/ceh/publications/en/11airpollution.pdf).

Scientific understanding of the health effects of air pollution, including effects on children, has increased in the last decade. This statement updates a 1993 American Academy of Pediatrics (AAP) statement titled "Ambient Air Pollution: Respiratory Hazards to Children."[4]

EFFECTS OF AIR POLLUTION ON CHILDREN

Children are more vulnerable to the adverse effects of air pollution than are adults. Eighty percent of alveoli are formed postnatally, and changes in the lung continue through adolescence.[5] During the early postneonatal period, the developing lung is highly susceptible to damage after exposure to environmental toxicants.[5–7]

Children have increased exposure to many air pollutants compared with adults because of higher minute ventilation and higher levels of physical activity.[8] Because children spend more time outdoors than do adults, they have increased exposure to outdoor air pollution.[9,10]

Infants, children, the elderly, and those with cardiopulmonary disease are among the most susceptible to adverse health effects from criteria pollutants.[11–15] Lead is neurotoxic, especially during early childhood. Carbon monoxide interferes with oxygen transport through the formation of carboxyhemoglobin. Other criteria pollutants (ozone, sulfur dioxide, particulate matter, nitrogen dioxide) have respiratory effects in children and adults, including increased respiratory tract illness, asthma exacerbations, and decreased lung function (eg, changes in peak flow).[11–12] In adults, particulate air pollution is associated with respiratory and cardiovascular hos-

doi:10.1542/peds.2004-2166
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TABLE 1. National Ambient Air Quality Standards for Criteria Air Pollutants, 1997

Pollutant	Primary Standards*
Ozone	
1-h average	0.12 ppm (235 $\mu g/m^3$)
8-h average	0.08 ppm (157 $\mu g/m^3$)
PM_{10}	
Annual arithmetic mean	50 $\mu g/m^3$
24-h average	150 $\mu g/m^3$
$PM_{2.5}$	
Annual arithmetic mean	15 $\mu g/m^3$
24-h average	65 $\mu g/m^3$
Sulfur dioxide	
Annual arithmetic mean	0.03 ppm (80 $\mu g/m^3$)
24-h average	0.14 ppm (365 $\mu g/m^3$)
Nitrogen dioxide	
Annual arithmetic mean	0.053 ppm (100 $\mu g/m^3$)
Carbon monoxide	
8-h average	9 ppm (10 mg/m^3)
1-h average	35 ppm (40 mg/m^3)
Lead	
Quarterly average	1.5 $\mu g/m^3$

Additional information on air quality standards are available at www.epa.gov/air/criteria.html.
* People residing in regions with pollutant concentrations above the primary standard may experience adverse health effects from poor air quality.

pitalizations, cardiovascular mortality,[16] and lung cancer.[17] Air pollution also has effects on indirect health indicators such as health care utilization and school absences.[11–13]

Although numerous studies have shown that outdoor air pollution exacerbates asthma, the effect of outdoor air pollution on the development of asthma has been less clear. Recently, a prospective study found that the risk of developing asthma was not greater, overall, in children living in communities with high levels of ozone or particulate air pollution. However, in communities with high levels of ozone, there was an increased risk of developing asthma in a small subset of children involved in heavy exercise (participation in 3 or more team sports per year [relative risk: 3.3; 95% confidence interval: 1.9–5.8]). This increased risk with heavy exercise was not seen in low-ozone communities. Time spent outside was also associated with new cases of asthma in high-ozone communities (relative risk: 1.4; 95% confidence interval: 1.0–2.1) but not in low-ozone communities.[18] Additional studies are needed to define the role of outdoor air pollution in the development of asthma.

Children in communities with higher levels of urban air pollution (acid vapor, nitrogen dioxide, particulate matter with a median aerodynamic diameter less than 2.5 μm [$PM_{2.5}$], and elemental carbon [a component of diesel exhaust]) had decreased lung function growth, and children who spent more time outdoors had larger deficits in the growth rate of lung function.[19,20] Ambient air pollution (especially particulate matter with a median aerodynamic diameter less than 10 μm [PM_{10}]) has also been associated with several adverse birth outcomes, as discussed in the next section.

Levels of ozone and particulate matter are high enough in many parts of the United States to present health hazards to children.[1] Additionally, National Ambient Air Quality Standards for nitrogen dioxide may not be protective. Findings on these pollutants are summarized here.

Ozone

Ambient ozone is formed by the action of sunlight on nitrogen oxides and reactive hydrocarbons, both of which are emitted by motor vehicles and industrial sources. The levels tend to be highest on warm, sunny, windless days and often peak in midafternoon, when children are most likely to be playing outside.

Ozone is a powerful oxidant and respiratory tract irritant in adults and children, causing shortness of breath, chest pain when inhaling deeply, wheezing, and cough.[11] Children have decreases in lung function, increased respiratory tract symptoms, and asthma exacerbations on days with higher levels of ambient ozone.[11,21–23] Increases in ambient ozone have been associated with respiratory or asthma hospitalizations,[24,25] emergency department visits for asthma,[26] and school absences for respiratory tract illness.[27] In Atlanta, Georgia, summertime children's emergency department visits for asthma increased 37% after 6 days when ozone levels exceeded 0.11 ppm.[25] In southern California, school absences for respiratory tract illness increased 63% in association with a 0.02-ppm increase in ozone.[27]

In healthy adults, ozone causes airway inflammation and hyperreactivity, decrements in pulmonary function, and increased respiratory tract symptoms.[11] Ozone exposures at concentrations of 0.12 ppm or higher can result in decrements in lung function after subsequent challenge with aeroallergen.[28] Although most of the controlled studies of ozone exposure have been performed with adults, it is reasonable to believe that the results of these findings could be extended to children.

Ozone may be toxic at concentrations lower than 0.08 ppm, the current federal regulatory standard. Field studies suggest potential thresholds of between 0.04 and 0.08 ppm (1-hour average) for effects on lung function.[29–31] Recent studies of hospitalizations for respiratory tract illness in young children and emergency department visits for asthma suggest that the effects of ozone may occur at ambient concentrations below 0.09 ppm.[32,33] Another study found associations of ozone and respiratory symptoms in children with asthma at levels below the current US Environmental Protection Agency (EPA) standards.[34] If these findings are confirmed, the ozone standards may need additional revision.

In addition to studies on short-term effects, 2 recent studies of college freshmen suggest that increasing cumulative childhood exposure to ozone may affect lung function when exposed children reach young adulthood, particularly in measures of flow in small airways.[35,36] Early childhood exposures may, therefore, be particularly important.[35]

Particulate Matter

PM_{10} is small enough to reach the lower respiratory tract and has been associated with a wide range of serious health effects. PM_{10} is a heterogeneous

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mixture of small solid or liquid particles of varying composition found in the atmosphere. Fine particles ($PM_{2.5}$) are emitted from combustion processes (especially diesel-powered engines, power generation, and wood burning) and from some industrial activities. Coarse particles (diameter between 2.5 and 10 μm) include windblown dust from dirt roads or soil and dust particles created by crushing and grinding operations. Toxicity of particles may vary with composition.[37,38]

Particle pollution contributes to excess mortality and hospitalizations for cardiac and respiratory tract disease.[14,39–41] The mechanism for particulate matter–associated cardiac effects may be related to disturbances in the cardiac autonomic nervous system, cardiac arrhythmias, or increased blood concentrations of markers of cardiovascular risk (eg, fibrinogen).[16,42]

Daily changes in mortality rates and numbers of people hospitalized are linked to changes in particulate air pollution.[14,39–41] These studies and others have estimated that for every 10 $\mu g/m^3$ increase in PM_{10}, there is an increase in the daily mortality rate between 0.5% and 1.6%. Effects were seen even in cities with mean annual PM_{10} concentrations between 25 and 35 $\mu g/m^3$. These recent studies suggest that even the current federal standards for $PM_{2.5}$ (24-hour standard = 65 $\mu g/m^3$; annual standard = 15 $\mu g/m^3$) and PM_{10} (24-hour standard = 150 $\mu g/m^3$; annual standard = 50 $\mu g/m^3$) should be lowered to protect public health. In 2002, California adopted more stringent standards for particulate matter: the annual average standard for $PM_{2.5}$ is 12 $\mu g/m^3$ and for PM_{10} is 20 $\mu g/m^3$.[43]

In children, particulate pollution affects lung function[44–46] and lung growth.[19] In a prospective cohort of children living in southern California, children with asthma living in communities with increased levels of air pollution (especially particulates, nitrogen dioxide, and acid vapor) were more likely to have bronchitis symptoms. In this study, bronchitis symptoms refers to a parental report of "one or more episodes of 'bronchitis' in the past 12 months" or report that, "apart from colds, the child usually seems to be congested in the chest or able to bring up phlegm").[47] The same mix of air pollutants was also associated with deficits in lung growth (as measured by lung function tests).[19] Recent studies in different countries have also found associations between ambient air pollution (especially particulates and/or carbon monoxide) and postneonatal infant mortality (attributable to respiratory causes and possibly sudden infant death syndrome),[48,49] low birth weight,[50–53] and preterm birth.[51,54–56]

The relative contribution of fine versus coarse particles to adverse health effects is being investigated. In studies of cities on the East Coast, fine particles seem to be important.[57] In other areas, coarse particles have a stronger or similar effect.[58] Several studies have found that fine particles from power plants and motor vehicles[59] or industrial sources[60] may be more closely associated with mortality.

Nitrogen Dioxide

Nitrogen dioxide is a gaseous pollutant produced by high-temperature combustion. The main outdoor sources of nitrogen dioxide include diesel and gasoline-powered engines and power plants. Levels of nitrogen dioxide around urban monitors have decreased over the past 20 years. Currently, all areas of the country meet the national air quality standard for nitrogen dioxide of 0.053 ppm (100 $\mu g/m^3$), measured as an annual arithmetic mean. However, national emissions (overall production) of nitrogen oxides have actually increased in the past 20 years because of an increase in nitrogen oxide emissions from diesel vehicles.[1] This increase is of concern, because nitrogen oxide emissions contribute to ground-level ozone (smog) and other environmental problems such as acid rain.[1]

Controlled-exposure studies of people with asthma have found that short-term exposures (30 minutes) to nitrogen dioxide at concentrations as low as 0.26 ppm can enhance the allergic response after subsequent challenge with allergens.[61,62] These findings are of concern, because some urban communities that are in compliance with the federal standards for nitrogen dioxide (annual average) may experience substantial short-term peak concentrations (1-hour average) that exceed 0.25 ppm. Confirmation of these studies is needed.

Epidemiologic studies have reported relationships between increased ambient nitrogen dioxide and risks of respiratory tract symptoms[63,64] and asthma exacerbations.[65] As noted previously, children with asthma living in communities with increased levels of air pollution (especially nitrogen dioxide, acid vapor, and particulates) were more likely to have bronchitis symptoms.[47] The same mix of air pollutants was also associated with deficits in lung growth (as measured by lung function tests).[19] These effects were increased in children who spent more time outdoors.

The epidemiologic studies of health effects associated with nitrogen dioxide should be interpreted with caution. Increased levels of ambient nitrogen dioxide may be a marker for exposure to traffic emissions or other combustion-related pollution. An independent role of nitrogen dioxide cannot be clearly established because of the high covariation between ambient nitrogen dioxide and other pollutants. Nonetheless, these studies illustrate that adverse respiratory tract effects are seen in urban areas where traffic is a dominant source of air pollution.

Traffic-Related Pollution

Motor vehicles pollute the air through tailpipe exhaust emissions and fuel evaporation, contributing to carbon monoxide, $PM_{2.5}$, nitrogen oxides, hydrocarbons, other hazardous air pollutants (HAPs), and ozone formation. Motor vehicles represent the principal source of air pollution in many communities, and concentrations of traffic pollutants are greater near major roads.[66] Recently, investigators (primarily in Europe and Japan) have found increased adverse health effects among those living near busy roads.

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Studies examining associations between adverse respiratory tract health and traffic have been reviewed.[67] Increased respiratory tract complications in children (eg, wheezing, chronic productive cough, and asthma hospitalizations) have been associated with residence near areas of high traffic density (particularly truck traffic).[68–71] Other investigators have linked various childhood cancers to proximity to traffic.[72–74]

Diesel exhaust, a major source of fine particulates in urban areas, is carcinogenic. Numerous studies have found an association between occupational exposure to diesel exhaust and lung cancer.[75] On the basis of extensive toxicologic and epidemiologic evidence, national and international health authorities, including the EPA and the International Agency for Research on Cancer, have concluded that there is considerable evidence of an association between exposure to diesel exhaust and an increased risk of lung cancer.[76,77] Additionally, fine particles in diesel exhaust may enhance allergic and inflammatory responses to antigen challenge and may facilitate development of new allergies.[78,79] Thus, diesel exhaust exposure may worsen symptoms in those with allergic rhinitis or asthma.

School buses operate in proximity to children, and most of the nation's school bus fleets run on diesel fuel. The EPA and some state agencies are establishing programs to eliminate unnecessary school bus idling and to promote use of cleaner buses to decrease children's exposures to diesel exhaust and the amount of air pollution created by diesel school buses (www.epa.gov/cleanschoolbus). A recent pilot study found that a child riding inside a school bus may be exposed to as much as 4 times the level of diesel exhaust as someone riding in a car.[80] These findings underscore the importance of advocating for school districts to replace diesel buses or retrofit them with pollution-reducing devices and limit school bus idling where children congregate as soon as possible.

Other Air Pollutants

Airborne levels of lead, sulfur dioxide, and carbon monoxide have decreased dramatically because of the implementation of control measures. However, levels of these pollutants may still be high near major sources. For example, high lead levels may be found near metals-processing industries, high sulfur dioxide levels may occur near large industrial facilities (especially coal-fired power plants), and high levels of carbon monoxide may occur in areas with heavy traffic congestion.[1]

In addition to criteria air pollutants, there are numerous other air pollutants produced by motor vehicles, industrial facilities, residential wood combustion, agricultural burning, and other sources that are hazardous to children. More than 50000 chemicals are used commercially, and many are released into the air. For most of these chemicals, data on toxicity are sparse.[81] Some pollutants remain airborne or react in the atmosphere to produce other harmful substances. Other air pollutants deposit into and contaminate land and water. Some toxic air pollutants such as lead, mercury, and dioxins degrade slowly or not at all. These pollutants may bioaccumulate in animals at the top of the food chain, including humans. Children can be exposed to toxic air pollutants through contaminated air, water, soil, and food.[3] One example of a persistent pollutant emitted into ambient air that leads to exposure through another route is mercury, a developmental neurotoxicant.[82] Industrial emissions, especially from coal-fired power plants, are the leading source of environmental mercury. Although the levels of airborne mercury may not be hazardous, mercury deposits into soil and surface waters and ultimately accumulates in fish.[82]

The HAPs, often referred to as "toxic air contaminants" or "air toxics," refer to 188 pollutants and chemical groups known or suspected to cause serious health effects including cancer, birth defects, and respiratory tract and neurologic illness.[3,83] The Clean Air Act directs the EPA to regulate HAPs, which include compounds such as polycyclic aromatic hydrocarbons, acrolein, and benzene from fuel or fuel combustion; solvents such as hexane and toluene; hexavalent chromium from chrome-plating facilities; perchloroethylene from dry-cleaning plants; asbestos; metals (eg, mercury and cadmium); and persistent organic pollutants such as polychlorinated biphenyls. In 2001, diesel exhaust was listed as a mobile-source HAP. Many of these compounds are included in a priority list of 33 HAPs that are of special concern because of their widespread use and potential carcinogenicity and teratogenicity.[81] The priority list and general sources of these compounds are available on the EPA Web site (www.epa.gov/ttn/atw/nata).

Limited monitoring data suggest that concentrations of some HAPs may exceed the goals of the Clean Air Act in many cities.[84] Mobile sources (on- and off-road vehicles) account for approximately half of the emissions[3] but may contribute to 90% of the cancer risk (www.scorecard.org/env-releases/hap/us.tcl). A number of studies assessing health risks have found that estimated levels of some of the HAPs are a potential public health problem in many parts of the United States.[3,84–86] For example, estimated concentrations of benzene, formaldehyde, and 1,3-butadiene may contribute to extra cases of cancer (at least 1 extra case per million population exposed) in more than 90% of the census tracts in the contiguous United States. Additionally, the most recent national cancer-risk assessment for HAPs (1996 data) did not include diesel exhaust in the risk estimates.[3] The health risks may also be underestimated, because there is limited information on toxicity values for many of the HAPs,[87] and the risk models did not consider the potential for increased risk in children. These findings underscore the need for better ways to decrease toxic air emissions and assess exposures and risks.

Air-pollution episodes created by disasters (eg, accidents, volcanoes, forest fires, and acts of terrorism) can also create hazards for children. A discussion of these events and of bioaerosols in ambient air (eg, fungal spores and pollen) is beyond the scope of this

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policy statement. Additionally, this statement does not address the hazards of indoor air pollution.

PREVENTION

Public health interventions to improve air quality can improve health at the population level. A decrease in levels of air pollution in former East Germany after reunification was associated with a decrease in parent-reported bronchitis[88] and improved lung function.[89] During the 1996 Summer Olympics in Atlanta, Georgia, extensive programs were implemented to improve mass transportation and decrease anticipated downtown traffic congestion. These programs were successful and were associated with a prolonged decrease in ozone pollution and significantly lower rates of childhood asthma visits during this period.[90] Closure of a steel mill in Utah Valley and resultant reductions in particulate matter were associated with a twofold decrease in hospitalizations for asthma in preschool children.[91,92] Finally, lung function improved in children who moved away from communities with high particulate air pollution, compared with those who remained or moved to communities with comparable particulate air pollution.[93] These studies provide support for continued efforts to decrease air pollution and improve health via decreases in motor vehicle traffic and industrial emissions. Dietary factors may play a role in modulating the effects of air pollution in children. A recent study in Mexico City, Mexico, found that children with asthma given antioxidant supplements were less affected by ozone compared with a control group that did not receive supplementation.[94] Additional studies are needed to explore this issue further.

Air Pollution and the Regulatory Process

The Clean Air Act of 1970 mandated the EPA to establish the National Ambient Air Quality Standards (Table 1). Standards were set for criteria air pollutants because they are common, widespread, and known to be harmful to public health and the environment.[11,12,83,95] The standards are reviewed every 5 years and set to protect public health, including the health of "sensitive" populations such as people with asthma, children, and the elderly. These standards are set without considering the costs of attaining these levels.

The standards for ozone and particulate matter were revised in 1997 on the basis of numerous scientific studies showing that the previous standards were not adequate to ensure health protection. Legal challenges were made by the American Trucking Associations, the US Chamber of Commerce, and other state and local business groups. However, the Supreme Court ultimately supported the EPA and ordered implementation of the standards.[2] Establishing implementation plans will be a lengthy process that will require the coordinated efforts of the EPA, state and local governments, and industry and environmental organizations.

Population exposures to toxic air contaminants may be of substantial public health concern.[84,86] In contrast to criteria pollutants, monitoring of toxic air contaminants is more limited. Exposures are estimated on the basis of reported emissions and may underestimate actual exposures.[87] The EPA is mandated to develop regulations through a lengthy process that first sets standards to control emissions on the basis of best-available technology. After maximum available control technology emission standards are established, the EPA must assess the risk remaining after emission decreases for the source take effect (residual risk).

To date, the EPA has focused primarily on establishing technology-based emission standards,[3] and this has been a slow process for some sources (eg, mobile toxic air contaminants and mercury emissions). Nationwide, emissions of toxic air contaminants have dropped approximately 24% from baseline (1990–1993) because of regulation and voluntary decreases by industry. With the current plans for gradual fleet turnover and implementation of controls for motor vehicles and fuels, the EPA projects that toxic air-contaminant emissions from gasoline-powered and diesel mobile sources will not be decreased to 75% and 90% of baseline (1990–1993) levels, respectively, until the year 2020.[3] However, major decreases could be more rapidly achieved simply from a prompt, wider application of existing technology.

Protecting populations from exposure to the harmful effects of air pollutants will require effective control measures. Industry (eg, coal-burning power plants, refineries, and chemical plants) and motor vehicles (both gasoline- and diesel-powered) are major sources of criteria pollutants and HAPs.[11,12] For example, coal-fired power plants are important sources of nitrogen oxides (precursors of ozone), particulates, and sulfur dioxide and are the largest sources of mercury emission in the United States. Smaller sources such as dry cleaners, auto body shops, and wood-burning fireplaces can also affect air quality locally. Municipal and hospital waste incinerators release toxic air pollutants including mercury, lead, cadmium, and dioxin emissions. Depending on weather conditions and individual physicochemical properties, some pollutants can be carried by air currents to areas many miles from the source.

In numerous cities in the United States, the personal automobile is the single greatest polluter, because emissions from millions of vehicles on the road add up. Despite significant technologic advances that have led to tighter pollution control from vehicles, emissions vary substantially between vehicles, particularly between classes of vehicles, because of differences in fuel-economy standards set by regulatory agencies. For instance, the corporate average fuel-economy standards have less stringent fuel-economy requirements (average: 20.7 miles per gallon) for light-duty trucks, sport utility vehicles, and minivans, compared with passenger cars (average: 27.5 miles per gallon). The former group of vehicles tends to have higher emissions of air pollutants, higher fuel consumption, and higher emissions of greenhouse gases.[96,97] Information on emissions and fuel-economy ratings for recent models and a

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guide for choosing clean, fuel-efficient vehicles are available from the EPA Web site (www.epa.gov/greenvehicles/index.htm). The high levels of particulate emissions from diesel-powered buses and trucks must also be addressed. More than 70% of fine particle emissions from traffic are attributable to diesel-powered buses and trucks.

Driving a private car is probably a typical citizen's most "polluting" daily activity, yet in many cases, individuals have few alternative forms of transportation. Thus, urban planning and smart growth are imperative. Urban sprawl affects land use, transportation, and social and economic development and ultimately has important implications for public health.[98] Ways in which individuals can help to decrease air pollution are available at www.epa.gov/air/actions and www.arb.ca.gov/html/brochure/50things.htm.

Air Quality Index

The air quality index (AQI) provides local information on air quality and potential health concerns at the observed (or forecasted) levels of air pollution and can be a useful tool for educating families about local air quality and health.[99] The AQI is reported daily in metropolitan areas, often as part of local weather forecasts on television or radio or in newspapers. The AQI divides air-pollution levels into 6 categories of risk for 5 common pollutants (ozone, PM_{10}, nitrogen dioxide, carbon monoxide, and sulfur dioxide). Each category has a descriptive name reflecting levels of health concern (ranging from good through very hazardous), an associated color, and an advisory statement. Information about air quality in a specific area can be obtained from www.epa.gov/air/urbanair/index.html, www.scorecard.org, or www.weather.com. Although many states and local air districts actively forecast and disseminate health warnings, the challenge is to have people take actions to protect themselves and decrease activities that cause air pollution.

Pediatric Environmental Health[100] from the AAP provides additional information about the outdoor air pollutants and the use of the AQI.

CONCLUSIONS

Ambient air pollution has important and diverse health effects, and infants and children are among the most susceptible. Currently, levels of ozone and particulates remain unhealthful in many parts of the United States, and the current National Ambient Air Quality Standards may not protect the public adequately. There is a compelling need to move forward on efforts to ensure clean air for all.

The assurance of healthy air for children to breathe is beyond the control of an individual pediatrician, and there are no easy solutions. State chapters of the AAP, as well as individual members, can play an important role as advocates for children's environmental health. Areas of involvement might include working with community coalitions in support of strong pollution-control measures and informing local and national representatives and policy makers about the harmful effects of the environment on children's health. Advocates for children's health are needed in discussions about land use and transportation issues. Pediatricians can also advocate for energy-saving (and pollution-minimizing) lifestyles to their patients' families, especially regarding vehicles driven.

In communities with poor air quality, pediatricians can play a role in educating children with asthma or other chronic respiratory tract disease and their families about the harmful effects of air pollution. Patients and families can be counseled on following the AQI to determine when local air-pollution levels pose a health concern. Ozone levels tend to be highest in the afternoon, and it may be possible to decrease children's exposure by scheduling strenuous outdoor activity earlier in the day.

As pediatricians become better informed about local air quality issues in their communities (eg, ozone, nearby industrial facilities, traffic, diesel buses, wood burning, etc), these local concerns can provide a starting point for discussion and education.

Pediatricians who serve as physicians for schools or for team sports should be aware of the health implications of pollution alerts to provide appropriate guidance to school and sports officials, particularly in communities with high levels of ozone.

RECOMMENDATIONS

1. The National Ambient Air Quality Standards are designed to protect the public. To achieve this, the following points should be addressed:
   - The revised standards for ozone and particulate matter adopted by the EPA in 1997 should be promptly implemented.
   - During implementation, the standards should not be weakened in any way that decreases the protection of children's health.
   - Because recent studies suggest that current standards for PM_{10}, $PM_{2.5}$, ozone, and nitrogen dioxide may not be protecting children, the standards should be promptly reviewed and revised.
   - Because the law requires that the most vulnerable groups be protected when setting or revising the air quality standards, the potential effects of air pollution on the fetus, infant, and child should be evaluated, and all standards should include a margin of safety for protection of children.
2. The current measures to protect children from exposures to HAPs are not effective and should be critically reevaluated. The EPA should focus on prompt implementation of the Clean Air Act Amendments of 1990 (Pub L No. 101–549) to decrease HAPs. Additional monitoring for HAPs should be undertaken to allow more accurate characterization of children's exposures to these compounds. Risk assessments for HAPs should be reviewed to ensure that goals are protective of children. Control measures that specifically protect children's health should be implemented.
3. States and local air districts with air quality concerns should actively implement forecasting and

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dissemination of health warnings in ways that help people take actions to protect themselves and decrease activities that cause air pollution.

4. Children's exposure to diesel exhaust particles should be decreased. Idling of diesel vehicles in places where children live and congregate should be minimized. Ongoing programs to fund conversion of diesel school bus fleets to cleaner alternative fuels and technologies should be pursued.
5. Industrial emissions of mercury should be decreased.
6. Federal and state governments' policies should encourage reductions in mobile and stationary sources of air pollution, including increased support for mass transit, carpooling, retiring or retrofitting old power plants that do not meet current pollution-control standards, and programs that support marked improvements in fuel emissions of gasoline- and diesel-powered vehicles. Additionally, the development of alternative fuel fleets, low-sulfur diesel, and other "low-emission" strategies (eg, retrofit of existing diesel engines) should be promoted. Before promoting new alternative fuels, these alternative fuel sources should be critically evaluated and determined by governmental authorities to have a good safety profile.
7. The same overall fuel-economy standard should apply to all passenger vehicles. Programs that allow certain passenger vehicles to be exempt from the usual fuel-economy standards should be abolished.
8. City and land-use planning should encourage the design and redevelopment of communities to promote mass transit, carpooling, pedestrian walkways, and bicycle use.
9. Siting of school and child care facilities should include consideration of proximity to roads with heavy traffic and other sources of air pollution. New schools should be located to avoid "hot spots" of localized pollution.

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Ambient Air Pollution: Health Hazards to Children
Committee on Environmental Health
Pediatrics 2004;114;1699-1707
DOI: 10.1542/peds.2004-2166

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Inhalation Toxicology, 18:541–547, 2006
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ISSN: 0895-8378 print / 1091-7691 online
DOI: 10.1080/08958370600685640

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Vehicular Air Pollution, Playgrounds, and Youth Athletic Fields

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In spite of epidemiological evidence concerning vehicular air pollution and adverse respiratory/cardiovascular health, many athletic fields and school playgrounds are adjacent to high traffic roadways and could present long-term health risks for exercising children and young adults. Particulate matter (PM_1,0.02–1.0 μm diameter) number counts were taken serially at four elementary school athletic/playground fields and at one university soccer field. Elementary school PM_1 measurements were taken over 17 days; measurements at the university soccer field were taken over 62 days. The high-traffic-location elementary school field demonstrated higher 17-day [PM_1] than the moderate and 2 low traffic elementary school fields (48,890 ± 34,260, 16,730 ± 10,550, 11,960 ± 6680, 10,030 ± 6280, respective mean counts; $p < .05$). The 62-day mean PM_1 values at the university soccer field ranged from 115,000 to 134,000 particles cm^{-3}. Lowest mean values were recorded at measurement sites furthest from the highway (~34,000 particles cm^{-3}) and followed a second-order logarithmic decay ($R^2 = .999$) with distance away from the highway. Mean NO_2 and SO_2 levels were below 100 ppb, mean CO was 0.33 ± 1.87 ppm, and mean O_3 was 106 ± 47 ppb. Ozone increased with rising temperature and was highest in the warmer afternoon hours ($R = .61$). Although the consequence of daily recess play and athletic activities by school children and young athletes in high ambient [PM_1] conditions has not yet been clearly defined, this study is a critical component to evaluating functional effects of chronic combustion-derived PM exposure on these exercising schoolchildren and young adults. Future studies should examine threshold limits and mechanistic actions of real-world particle exposure.

The link between air pollution and adverse respiratory and cardiovascular health is substantial (Dockery, 2001; Kim et al., 2004; Lin et al., 2005; McConnell et al., 2003; Peters et al., 2001; Pope et al., 1991; Romieu et al., 1996). Acute pulmonary responses to short-term particulate matter (PM) exposure (Atkinson et al., 2001; Oberdorster et al., 1995) as well as decrements in resting lung function associated with chronic PM exposure have been reported (Gauderman et al., 2004; Rundell, 2004). Likewise, increased cardiac mortality and morbidity have been related to short-term elevations in air pollution (Dockery, 2001). Most recently, abnormal vascular function after acute PM exposure has been shown in animals (Nurkiewicz et al., 2004) and humans (Brook et al., 2002).

Most studies documenting adverse health effects in relation to outdoor air pollutants have relied on measured concentrations from central monitoring stations, metrics of proximity to roads, or traffic volume estimates. However, Kim et al. (2002) measured ultrafine particles in urban Los Angeles, CA, and found that the major source was diesel and automotive exhaust. Additionally, Li et al. (2003) found that ultrafine particles contain the largest fraction of polycyclic aromatic hydrocarbons, with the highest concentration related to traffic density (Glovsky et al., 1997).

Current investigations suggest that PM toxicity is highly influenced by number concentration and/or particle surface area (Oberdorster, 1996), while ambient particulate matter with median aerodynamic diameter less than 2.5 μm ($PM_{2.5}$) has been associated with lung damage (Gauderman et al., 2004; Kim et al., 2004; McConnell et al., 2003) and cardiovascular events (Burnett et al., 1995; Peters et al., 2001; Ware, 2000). The most common source of $PM_{2.5}$ is found in combustion emissions of fossil-fueled automobiles and diesel-powered trucks, with over 90% of the particle count from diesel aerosol having an aerodynamic diameter of <30 nm (Kittelson et al., 2004).

Although individuals with cardiovascular disease (Burnett et al., 1995) and type 2 diabetes (Zanobetti & Schwartz, 2001) appear to be more sensitive to ambient particle exposure than healthy adults, the developing lung of children may be

Received 6 January 2006; accepted 16 February 2006.
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especially vulnerable to adverse consequences of particle inhalation (Schwartz, 2004). Children may also have higher exposure to air pollutants than adults because of high outdoor physical activity and the resultant increase in minute ventilation. Exercise in high ambient particle conditions may increase risk of lung and vascular damage, since total particle deposition increases in proportion to minute ventilation and deposition fraction nearly doubles from rest to intense exercise (Daigle et al., 2003; Chalupa et al., 2004).

The purpose of this study was to document daily PM number concentrations in recreation and athletic field areas proximal to high automobile and truck traffic. This descriptive study is a first step in characterizing the potential health risk to children and young adults participating in organized and unorganized physical activities in high ambient air pollution.

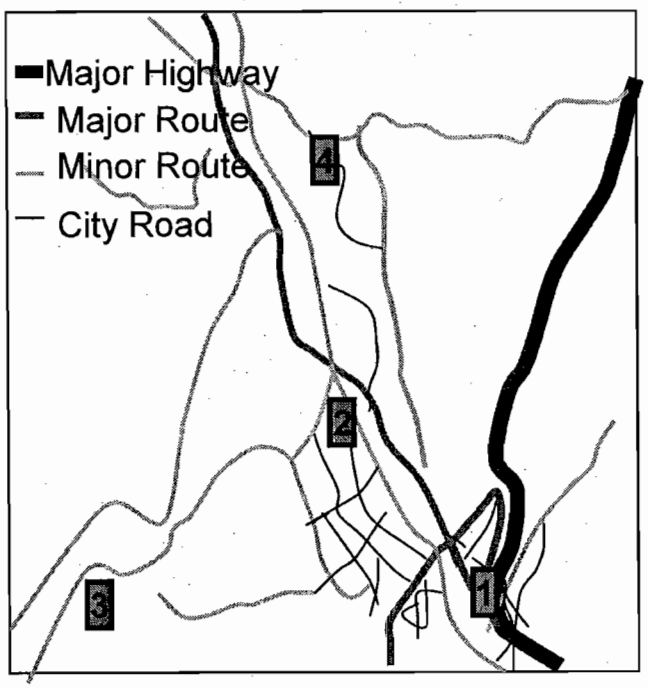
METHODS

Study Design

Number counts of particles in the size range of 0.02–1.0 μm aerodynamic diameter (PM_1) were taken serially at 4 elementary school athletic/playground fields and at 1 university soccer field. Nitrogen dioxide (NO_2), carbon monoxide (CO), and ozone (O_3) were measured at the university soccer field. PM_1 measurements at elementary school sites were taken over 17 days in spring 2005; measurements at the university soccer field were taken over 62 days through spring and summer 2005. PM_1 measurements were taken at early to mid morning during weekdays. Figure 1A depicts the proximity of elementary schools to traffic corridors. Four elementary schools were situated near high-traffic (school 1), moderate–high-traffic (school 2), and low-traffic areas (schools 3 and 4). School 1 was directly adjacent to and east of a major route and approximately 100 m west of a major highway; both roads were characterized by high diesel-fueled truck traffic. School 2 was adjacent to a major village road with moderate truck and automobile traffic. Schools 3 and 4 were located in rural areas characterized by low truck and automobile traffic. All four schools were in the same school district. The university soccer field was situated such that the northeastern sideline was as close as 20 m from a major interstate highway characterized by heavy truck traffic (Figure 1B). Daily air quality measurements were taken at 12 sites spaced across the university soccer field.

Air Quality Measurements

Particulate matter (PM_1) was determined at each study site as previously done (Rundell, 2003). Measurements were made at 1.5 m height using a calibrated condensation particle counter (CPC, P-Trak ultrafine particle counter, model 8525,TSI, Inc., St. Paul MN) at a sampling frequency of 1 Hz and recorded as 10-s means of PM_1 cm^{-3}. Four 10-s readings were taken for each measurement and averaged to provide the most representative particle count for a specific measurement site. Particle counts at elementary schools and the 62-day university soccer field



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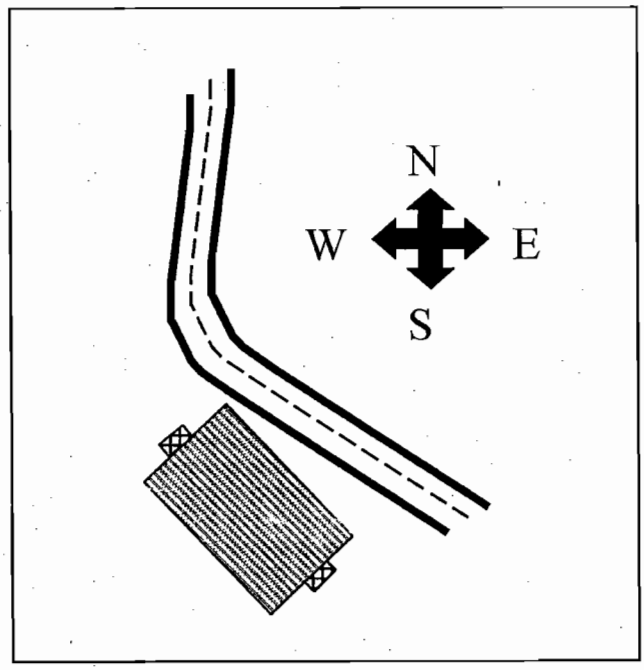


(B)

FIG. 1. (A) Location proximity of four elementary schools to automobile and truck traffic roadways. School 1 is located between a major interstate highway and a heavily traveled state route, school 2 is located proximal to a moderately traveled main road, and schools 3 and 4 are located in rural low traffic settings. (B) Relative location of the university soccer field in relation to a heavily traveled major interstate highway.

particle counts were done at early/mid morning. The P-Trak CPC sensitivity size range is 0.02–1.0 μm diameter; this range includes ultrafine and fine PM, defined as PM_1 in this study. PM_1 has been shown to account for >90% of total particle count and >95% of particle surface area ($\mu m^2/cm^3$) for unit density mass concentration of combustion derived air samples (Oberdorster et al., 1992, 1995). Two hundred and twenty-five measurements of NO_2, CO, and O_3, and temperature (as 10-s mean values) with corresponding PM_1 counts and temperatures were taken at the university soccer field during early morning to midafternoon hours (GrayWolf Direct Sense TOX, Trumbull CT).

Statistical Analysis

Mean values for all measured variables were calculated. Correlations between variables were determined using Pearson product moment correlations. Analysis of variance was used to determine significant differences between elementary school PM_1 counts. Nonlinear regression analysis was used to determine PM_1 decay across the university soccer field from close to far proximity to the major highway. A value of $p < .05$ was considered significant.

RESULTS

High-traffic school 1 demonstrated an approximate four-fold greater 17-day mean [PM_1] than moderate-traffic school 2 and low-traffic rural schools 3 and 4 ($p < .05$), while moderate-traffic school 2 had a significantly greater 17-day mean [PM_1] than low-traffic school 4 (48,890 ± 34,260, 16,730 ± 10,550, 11,960 ± 6680, 10,030 ± 6280, respective mean counts; Figure 2A, $p < .05$). Figure 2B depicts high and low [PM_1] for all four school athletic fields; the high [PM_1] measurement for school 1 was 5.3-, 9.1-, and 8.4-fold higher than that measured at schools 2, 3, and 4, respectively.

Figure 3A depicts [PM_1] at 12 different measurement locations on the university soccer field. Particle concentrations were highest at the 4 measurement sites closest to the highway with mean PM_1 values ranging between 115,000 and 134,000 particles·cm^{-3}. The lowest mean values were recorded at the measurement sites furthest from the highway with PM_1 values of ~34,000 particles·cm^{-3}. Soccer field particle concentrations followed a second order logarithmic decay ($R^2 = .999$) with distance away from the highway (Figure 3B).

Figure 4A presents daily particle counts as mean values of the 12 measurement sites) for the university soccer field; Figure 4B depicts the number of days for categorized particle counts. No significant difference between the number of days in each particle count category was found; however, 18 (29%) of the 62 days had mean particle counts over 100,000 particles cm^{-3} and almost half (30 days) of the 62 days (48%) had mean counts over 60,000 particles cm^{-3}. Only 11 days (18%) had mean counts below 20,000 particles cm^{-3}; this was significantly less than the number of days above 20,000 particles cm^{-3} ($p < .05$).

Wind direction was a critical variable in particle count values. Mean particle counts over 100,000 particles ·cm^{-3} were recorded when the wind direction was from the north and east (101,610 ± 50,370) or calm (103,070 ± 28,590). Lowest mean particle counts were recorded when wind direction was from the south and west (45,590 ± 37,850) and variable (59790 ± 55,300) (Figure 5).

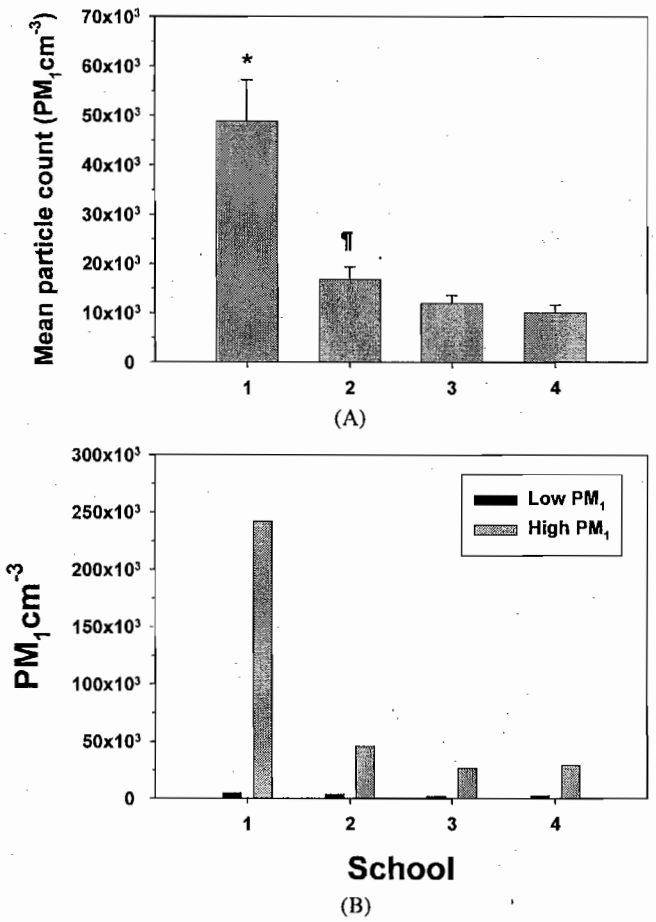
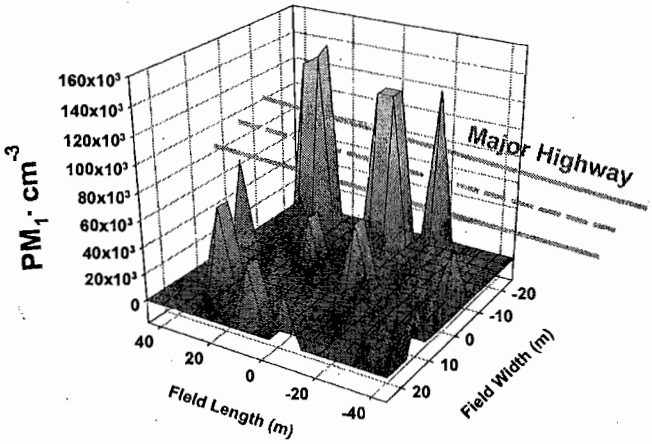


FIG. 2. (A) Elementary school playground 1 (asterisk) demonstrates significantly ($p < .05$) higher 17-day mean [PM_1] than elementary school playgrounds 2, 3, and 4; elementary school playground 2 had significantly higher 17-day mean [PM_1] than elementary school playground 4 (¶ indicates, $p < .05$). Values are presented as mean ± SE). (B) Daily high and low [PM_1] values.

Mean NO_2, and SO_2 levels were below 100 ppb, mean CO was 0.33 ± 1.87 ppm, and mean O_3 was 106 ± 47 ppb. Ozone increased with rising temperature and was highest in the warmer afternoon hours ($R = .61$, Figure 6A). When O_3 levels were grouped according to 5°C temperature increments from 18 to 33°C, the highest temperature group was significantly different than the lower two temperature groups; the middle temperature group was significantly higher than the lower temperature group (Figure 6B).



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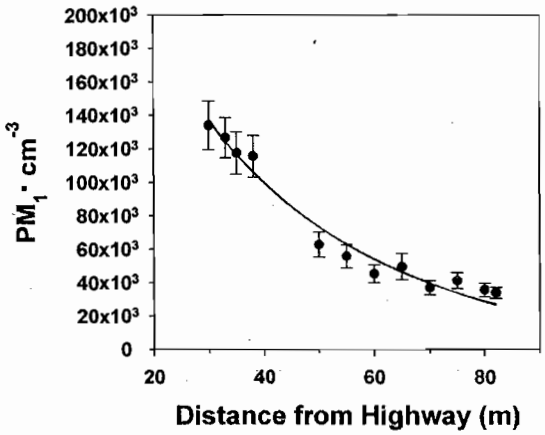
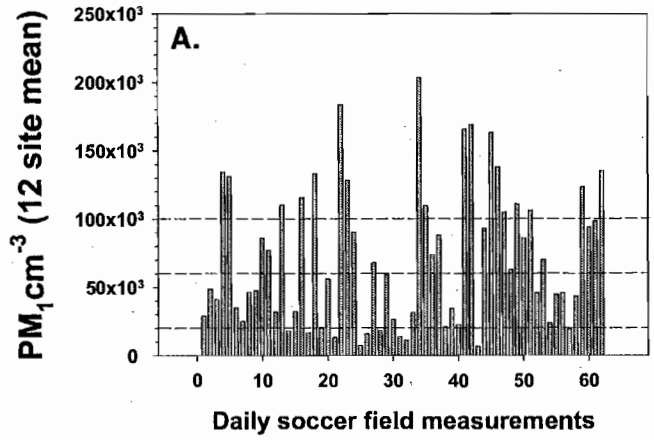


(B)

FIG. 3. (A) Three dimensional depiction of 62-day [PM_1] mean measurements taken at 12 different locations at a university soccer field located next to a major interstate highway. (B) Rate of [PM_1] decay (using 62-day mean values at soccer field measurement sites) in relation to distance from the interstate ($R = -.999$; values are presented as mean ± SE).

DISCUSSION

This study demonstrated strong relationships between ambient [PM_1] and distance from high traffic roads. We documented higher mean ambient [PM_1] at elementary school playground/athletic fields adjacent to high-traffic roads than those in low traffic rural settings. The measured [PM_1] levels at the high traffic study sites were severalfold higher than [PM_1] levels measured in rural areas. Likewise, we documented a mean 62-day PM_1 count of 71,000 ± 51,000 particles cm^{-3} (range: 6500–203,000) for a near-highway university soccer field; mean values were obtained from 3 averaged 10-s [PM_1] recordings at 12 locations distributed across the field. Almost 50% of 62 count-days at the university soccer field had 12-site mean PM_1 counts over 60,000 particles cm^{-3} and 29% of the measurement days had mean counts greater than 100,000 particles cm^{-3}.



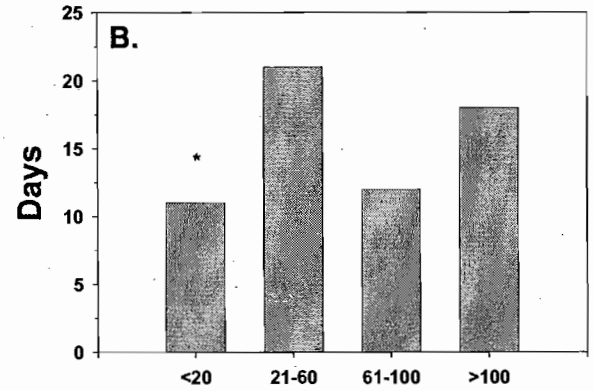


FIG. 4. (A) Daily mean [PM_1] values of 12 measurement sites on the university soccer field. (B) Number of days with mean PM_1 counts below 20,000 particles·cm^{-3} was significantly less than days >20,000 000 particles·cm^{-3}.

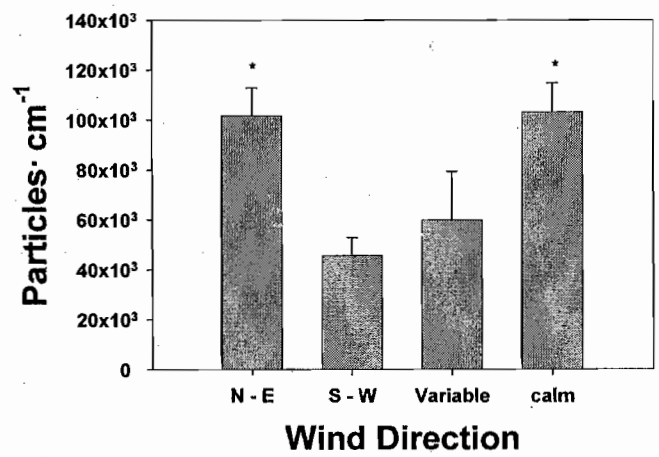


FIG. 5. Particle counts were categorized according to wind direction; northeast wind and calm winds demonstrated significantly higher [PM_1] than southwest winds. Refer to map in Figure 1 (A). Asterisk indicates significantly different than from southwest (S-W), $p < .05$.

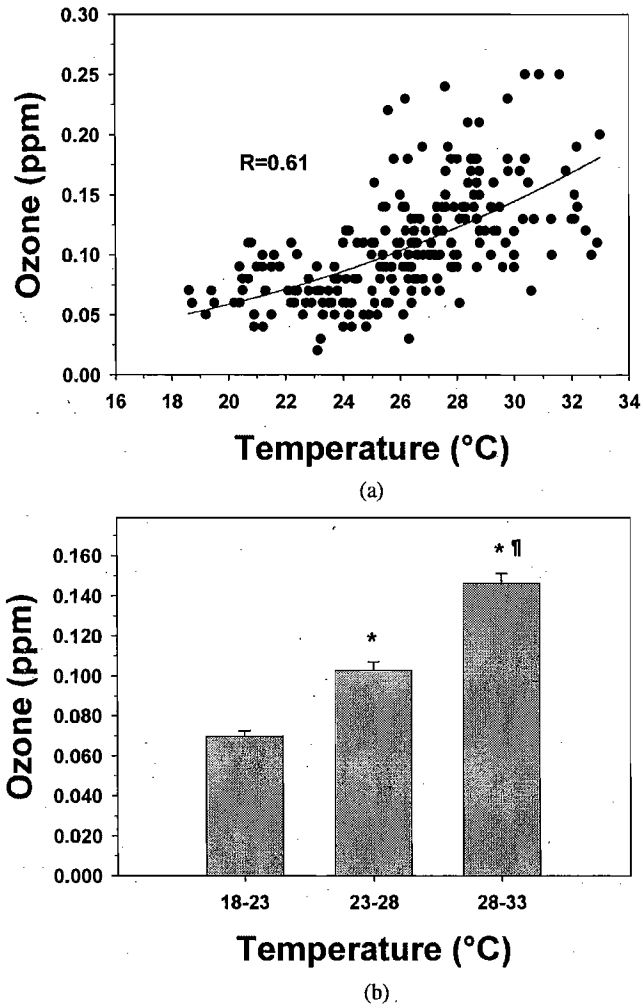


FIG. 6. (A) Significant positive relationship between O_3 and temperature, with more than half of the O_3 measurements greater than 100 ppb. (B) O_3 levels (ppb) grouped according to 5°C temperature categories. Asterisk indicates significantly greater $[O_3]$ than 18–23°C group, $p < .05$; ¶ indicates significantly greater $[O_3]$ than 18–23°C and 23–28°C groups, $p < .05$.

A second-order logarithmic decline in $[PM_1]$ ($R = -.99$) showed that particle number counts at 80 m from a major highway were ~3-fold lower than number counts 30 m from the highway. Particle counts were highly dependent on wind direction in relation to the high-traffic particle source and measurement sites; highest particle counts were measured when the wind direction was from the highway or on days with no measurable wind. This finding was consistent with the exponential decay of ultrafine particles with distance away from a major CA freeway (Zhu et al., 2002).

Of particular importance to the present study is the potential effect of ambient air pollution on exercising children and college athletes. Reduced lung development in children exposed to high levels of ambient air pollution has been found (Gauderman et al., 2004). We have previously shown a significant decline in FEV_1 in women ice hockey players after 3 yr of training in an ice rink with high ice resurfacer emission $[PM_1]$; the largest decrease in lung function occurred after only 3 mo of daily exposure (Rundell, 2004). Kim et al. (2004) found strong correlations between black carbon concentrations and bronchitis ($R = .76$) and asthma prevalence ($R = .83$) in a school-based cross-sectional study using a parental questionnaire. Another study (McConnell et al., 2003) lasting over a 3-yr period identified yearly variability of ambient organic carbon as having the strongest association to bronchial symptoms (odds ratio 1.41/μg/m^3; 95% confidence interval 1.12–1.78). Particulate air pollution has been associated with hospital admissions for asthma (Atkinson et al., 2001; Pope et al., 1991) and decline in peak expiratory flow rates (Romieu et al., 1996). Recently, Lin et al. (2005) identified a relationship between relatively low levels of ambient particulate matter on hospitalization for respiratory infections in children, with the strongest associations to coarse particulate matter.

Total respiratory number deposition fraction during exercise has been found to increase approximately 32% over resting values and to exceed predicted values for exercise by approximately 22% for 26-nm particles (Daigle et al., 2003). Prediction models of particle deposition indicate that particles in the 30-nm size range are predominately deposited in airway generations 19–22 during exercise. Considering that greater than 90% of auto and truck emission particle number is found in the 3–30 nm size range and most of the particle mass is found in the 30–500 nm size range, particle deposition in the alveolar region is most likely high for individuals exercising in high auto emission conditions (ICRP, 1994).

Increased oxidative stress from PM_1 inhalation is likely, as the formation of reactive oxygen species (ROS) has been associated with PM exposure and has been shown to influence mediator release (Ware, 2000; Werz et al., 2000). Li et al. (2003) found that ultrafine particles ($PM_{0.1}$) were more potent than coarse (PM_{10}) or fine ($PM_{2.5}$) particles toward generation of ROS and in depleting intracellular glutathione in lung macrophage and epithelial cells in vitro. Voelkel et al. (2003) demonstrated that ROS and exhaled nitric oxide (eNO) increased from $PM_{0.1}$ exposure. It is likely that PM-initiated ROS increases lipid peroxidation and leukotriene production, since recent reports support 5-lipoxygenase activation by ROS, and contributes to a three- to fourfold increase in leukotriene synthesis in vitro (Werz et al., 2000; Woo et al., 2000).

Additionally, measured ozone levels were positively related to temperature ($R = .61$) with a mean value of 106 ± 47 ppb for 221 measurements. Late-afternoon ozone levels at a temperature range of 28–33°C (146 ± 44 ppb; 63 measurements) exceeded Nation Ambient Air Quality Standards for Criteria Air Pollutants of 120 ppb O_3 for 1-h average, and were significantly higher than morning and early-afternoon measurements at lower temperatures (cf. Figure 6). Ozone is a strong oxidant and has been shown to cause airway inflammation, abnormal

lung function, and respiratory symptoms at levels below those identified in the present study. Ambient ozone is formed from the photochemical reaction of nitrogen oxides found in traffic related pollutants and tends to be highest in the late afternoon. Several studies have shown a causal relationship between O_3 exposure and respiratory-tract symptoms, decreased lung function, and asthma exacerbations (Gent et al., 2003; Kinney et al., 1996). Exposure to O_3 levels below 60 ppb has been shown to affect lung function in amateur cyclists, and it has been speculated that childhood exposure may have detrimental effects on lung function later in life (Galizia & Kinney, 1999).

Although the current study is descriptive in nature, numerous epidemiological studies have identified robust relationships between ambient particle exposure and respiratory conditions. The consequence of daily recess play and athletic activities by school children and young athletes in high ambient [PM_1] conditions has not yet been clearly defined. This study is a critical component in evaluating functional effects of chronic exposure to internal combustion derived particulate matter on exercising school children and young adults. Future studies should examine threshold limits and mechanistic actions of real-world particle exposure.

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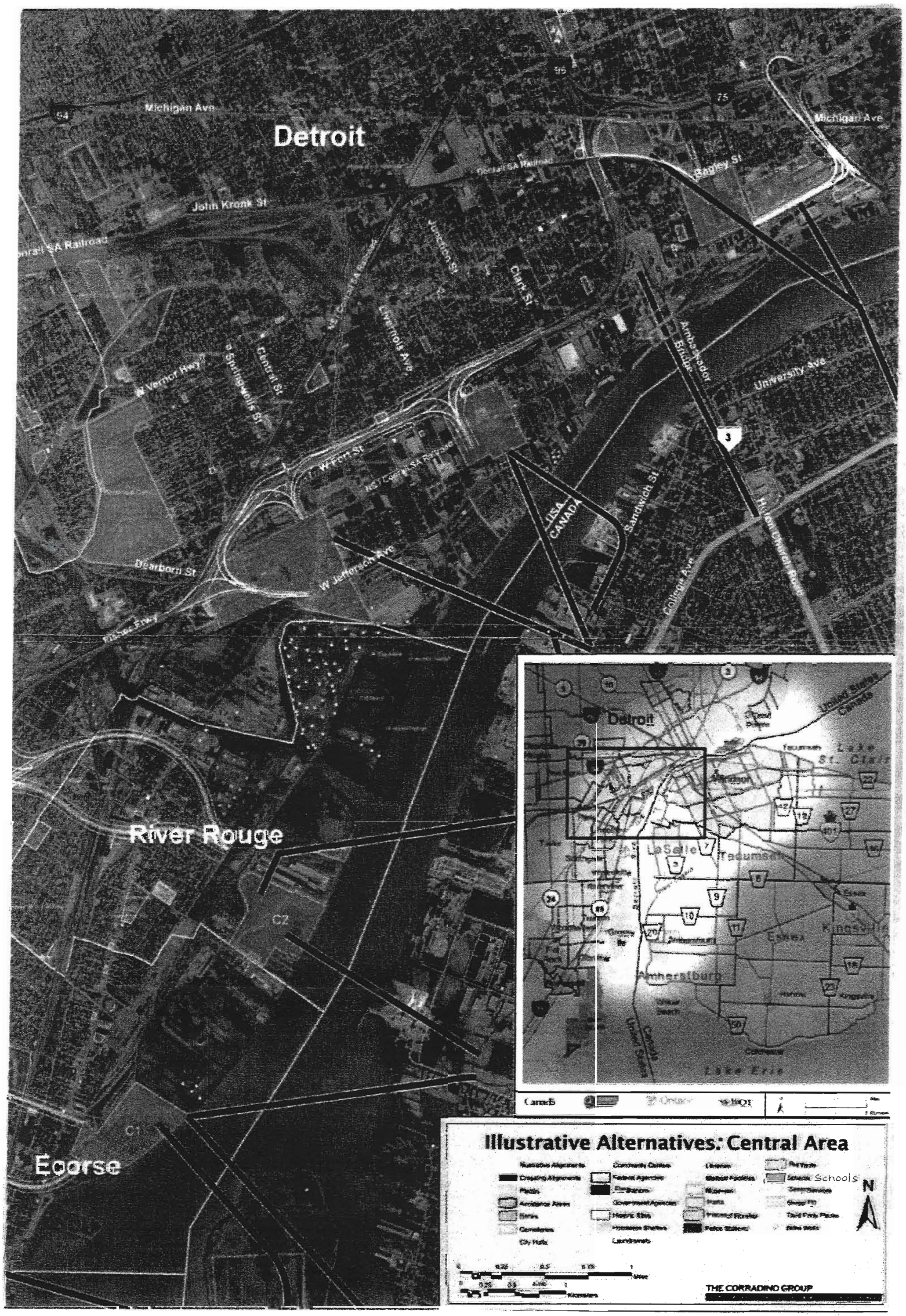

TECHNICAL PAPER

ISSN 1047-3289 *J. Air & Waste Manage. Assoc.* 53:740–748
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The Mobile Source Effect on Curbside 1,3-Butadiene, Benzene, and Particle-Bound Polycyclic Aromatic Hydrocarbons Assessed at a Tollbooth

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ABSTRACT

On-road mobile sources contribute substantially to ambient air concentrations of the carcinogens 1,3-butadiene, benzene, and polycyclic aromatic hydrocarbons (PAHs). The current study measured benzene and 1,3-butadiene at the Baltimore Harbor Tunnel tollbooth over 3-hr intervals on seven weekdays (n = 56). Particle-bound PAH was measured on a subset of three days. The 3-hr outdoor 1,3-butadiene levels varied according to time of day and traffic volume. The minimum occurred at night (12 a.m.–3 a.m.) with a mean of 2 $\mu g/m^3$ (SD = 1.3, n = 7), while the maximum occurred during the morning rush hour (6 a.m.–9 a.m.) with a mean of 11.9 $\mu g/m^3$ (SD = 4.6, n = 7). The corresponding traffic counts were 1413 (SD = 144) and 16,893 (SD = 692), respectively. During the same intervals, mean benzene concentration varied from 3 $\mu g/m^3$ (SD = 3.1, n = 7) to 22.3 $\mu g/m^3$ (SD = 7.6, n = 7). Median PAH concentrations ranged from 9 to 199 ng/m^3. Using multivariate regression, a significant association ($p < 0.001$) between traffic and curbside concentration was observed. Much of the pollutant variability (1,3-butadiene 62%, benzene 77%, and PAH 85%) was explained by traffic volume, class, and meteorology. Results suggest >2-axle vehicles emit 60, 32, and 9 times more PAH, 1,3-butadiene, and benzene, respectively, than do 2-axle vehicles. This study provides a model for estimating curbside pollution levels associated with traffic that may be relevant to exposures in the urban environment.

IMPLICATIONS

Mobile source emissions present a unique public health threat because of toxic emissions and exposure potential resulting from their proximity and integration into U.S. communities. Urban communities are especially susceptible because of population density and dense commuting traffic. The current study provides a quantitative assessment of the relationship between traffic volume and class and the curbside concentration of key environmental carcinogens. This assessment defines an experimental approach and estimate of the mobile source effect on the curbside pollutant concentration under real-world meteorological conditions. The resulting models may be useful for evaluating ambient exposure, risk, and control strategies.

INTRODUCTION

Benzene, 1,3-butadiene, and polycyclic aromatic hydrocarbons (PAHs) are listed by the U.S. Environmental Protection Agency (EPA) among 31 priority mobile source air toxins.[1] Recently, 1,3-butadiene was reclassified as a "known human carcinogen"[2] based on epidemiologic and mechanistic information. Exposure to 1,3-butadiene is associated with lymphosarcoma[3,4] and leukemia[5–8] in occupationally exposed workers. Benzene also has been long established as a known human carcinogen.[9–11] Exposure to benzene is associated with acute nonlymphocytic leukemia and chronic lymphocytic leukemia.[12–19]

Emissions of chemicals such as 1,3-butadiene, benzene, and PAH into the environment by mobile sources are of great public health concern because of their carcinogenicity and heightened exposure potential that results from their proximity and integration into U.S. society at all levels (urban, suburban, and rural). Several epidemiologic studies have observed higher cancer rates among urban compared with suburban populations.[20–23] Air pollution, including benzene, 1,3-butadiene, and PAHs, is believed to be a contributing risk factor.[20]

The potential for exposure to automobile exhaust containing these carcinogenic chemicals is most pronounced in urban locations where heavily commuted roadways transect densely populated communities. Human exposure to these mobile source emissions can be substantial because of increasing (1) traffic volume and congestion, (2) vehicle miles driven, and (3) numbers of heavier, less efficient sport utility vehicles. Increased emissions may be only partially offset by technological gains in emissions control. Based on modeling results from the Assessment System for Population Exposure Nationwide for 1990, Rosenbaum et al.[24] estimate mobile

sources contribute 63, 59, and 63% to total ambient benzene, 1,3-butadiene, and polycyclic organic matter (POM), respectively. (POM is the more comprehensive family of organics that subsumes the carbon and hydrogen-only containing PAHs.) Taking into account point and area sources in addition to mobile sources, for the 60,803 census blocks in the contiguous United States, Rosenbaum et al. estimate median ambient levels of 1.6, 0.099, and 0.18 $\mu g/m^3$ for the three pollutants, respectively. These modeling results are further substantiated by studies indicating large pollution differences between weekends and weekdays attributable to varying traffic levels. In a series of studies, Vukovich[25] identified 27–42% higher VOC levels in the Northeast and in Texas on weekdays relative to weekends. Ilgen et al.[26] reported geometric mean benzene levels of 3.1 and 1.8 $\mu g/m^3$ in German homes located on high- and low-traffic streets, respectively.

Both indoor and outdoor sources factor into human exposure and risk. There are several known indoor sources of benzene and PAHs, such as cleaning products, paints, glues, and tobacco smoke for benzene, and wood burning, cooking, and tobacco smoke for PAHs.[27–30] For 1,3-butadiene, the only known indoor source is tobacco smoke, which can elevate indoor 1,3-butadiene concentrations significantly.[31]

Although there is a growing body of literature identifying a substantial mobile source contribution to ambient pollution, these estimates largely rely on dynamometer emissions testing coupled with estimates of vehicle miles driven. The current study is unique in examining the actual measured association between vehicle volume and class and the resulting curbside ambient pollutant concentration, providing a real-world basis by which to validate models and estimate exposure. The study was conducted at a tollbooth facility where traffic count and type were carefully quantified, providing a basis for a real-world estimate of the mobile source effect on curbside concentration for 1,3-butadiene, benzene, and PAH.

METHODS

Study Site and Sampling

This study was conducted at the Maryland Transportation Authority (MDTA)–operated Baltimore Harbor Tunnel tollbooth facility. This facility has 14 tollbooths evenly divided between northbound and southbound traffic. Sampling was conducted at a single northbound tollbooth (number 3). It was selected because it is open and operator-occupied 24 hr/day. Samplers were placed immediately outside the tollbooth on the south side (vehicles approaching) approximately 3 ft above ground. Sampling was conducted over seven weekdays during the period from June 18 to June 28, 2001.

Three-hour integrated 1,3-butadiene and benzene samples were collected using a Perkin-Elmer STS-25 sequential sampler. Samples were collected sequentially onto stainless-steel Perkin-Elmer Air Toxic Tubes packed with a solid sorbent (Supelco, catalog no. 25051), using an SKC 210 pocket pump (SKC, Inc.) set at a nominal flow rate of 25 mL/min. Pumps were calibrated upon initiation of sampling using a DryCal DC-2 primary standard (BIOS International Corp.). Sample flows were checked after sampling to account for any drift during sampling.

Every 24 hr, the sampled air toxic tubes were removed from the sequential sampler and returned to the laboratory for analysis. Samples were thermally desorbed (Perkin-Elmer ATD-400), separated by gas chromatography (GC), and detected with mass spectrometry (MS) using a Shimadzu GC-17A gas chromatograph and QP-5000 mass spectrometer (Shimadzu Biotech). The conditions used for the ATD-400, GC, and MS were adapted from Kim et al.[32] Chromatographic separation was obtained using Restek Rtx-624 column, 60 m × 0.25 mm ID with 1.4 μm thickness (Restek Corp., catalog no. 10969).

Calibration standards were prepared at six levels by diluting 2 mg/mL 1,3-butadiene stock solution (Accustandard, catalog no. S-406A-10x) and 2 mg/mL custom VOC mix (Accustandard, catalog no. S-2081-R10–10x) in methanol. One-μL injections were made into clean sampling tubes using a modified GC injector port (50 °C, He flow of 80 mL/min for 10 min). The final amount on sampling tubes ranged from 1 to 25 ng and from 1 to 50 ng for benzene and 1,3-butadiene, respectively.

Particle-bound PAH was measured using an Ecochem PAS 2000 PAH Ambient Analyzer (Ecochem Technologies). This is a direct-reading instrument that measures PAH on particles by photoionization. Particles entering the instrument are irradiated with UV light at 222 nm (6.7 eV). Particles containing PAH with photoelectric threshold less than 6.7 eV will loose an outer-shell electron and become positively charged. The charge particles are collected onto a filter, resulting in an electrical current proportional to the ions collected. Therefore, all particles with a photoelectric threshold less than 6.7 eV will be ionized and measured as PAH.[33] Air is sampled at a flow rate of 2 L/min. The inlet is not configured to provide a size-specific classification; however, electrons emitted from larger particles are more likely to be recaptured. Therefore, ionization and instrument response is most effective for particles containing PAH in the size range <1–2 μm in diameter.[34] The Echochem PAS 2000 was placed side-by-side with the STS-25 sequential samplers, and samples were collected continuously for 2 days during the study period. Measurements were logged in 1-min intervals. These data were combined to give 3-hr average

concentrations corresponding to the traffic count intervals.

Hourly traffic count data for both northbound and southbound traffic were obtained from the MDTA (Tollbooth Administration at Baltimore Harbor Tunnel), which maintains an hourly record of total vehicle counts passing through each tollbooth, classified by the number of axles on each vehicle. The axle-based classification was compared with the Federal Highway Administration (FHWA) classification system (Table 1).[35] This table indicates that 2-axle vehicles primarily represent passenger cars, minivans, pickups, and single-unit trucks, whereas >2-axle vehicles are primarily buses, large trucks, and trailers.

Meteorological measurements including temperature, relative humidity, rain, wind speed, and direction were made using a Davis meteorological station (Davis Instrument Corp.). The meteorological station was located in East Baltimore approximately 4 mi due north of the toll plaza near the Johns Hopkins Bloomberg School of Public Health. Field (n = 7) and laboratory (n = 10) blanks were included in all sampling and analytical runs. Reported concentrations have been corrected for mean field blank levels. All samples were analyzed on the same day that they were returned from the field. Measurement precision was determined from a single measurement made in triplicate using side-by-side sampling. Recovery was determined by spiking air toxic tubes (n = 7) with 15 ng of 1,3-butadiene and 5 ng of benzene. Tubes were cleaned for reuse by conditioning in the ATD 400 at 350 °C for 15 min. Conditioned tubes were randomly selected and analyzed to verify that there was no carryover of residual analytes from one sample to the other.

Table 1. Comparison of FHWA vehicle class and the number of axle, with examples.

FHWA Vehicle Class	Average No. of Axles per Vehicle	Vehicle Types
1	2	Motorcycles
2	2	Passenger cars
3	2	Pickups, vans, campers, minibus
4	2.2	Buses
5	2	Six-tire, single-unit trucks, including motor homes
6	3	Three-axle single-unit trucks
7	4	Four-axle single-unit trucks on single frame
8	4	Four or fewer axles consisting of two units
9	5	All five axles consisting of two units
10	6	Vehicles with six or more axles with two units
11	5	Five or fewer axles consisting of three units
12	6	All six-axle vehicles with three or more units
13	7	All vehicles with seven or more axles

Data Analysis

The hourly traffic data were summed in a 3-hr interval corresponding to the 3-hr integrated sampling period. A composite traffic volume for a given day was calculated by adding up the vehicle counts for all 14 tollbooths per 3-hr interval. The traffic volume data were grouped into two classes for analysis: 2-axle and >2-axle vehicles. Meteorological data and PAH data were similarly averaged over the same 3-hr sampling interval. All measured concentrations were corrected for recovery and blanks. Multivariate regression model (eq 1) was used to investigate the relationship between curbside pollution levels, traffic volume, and meteorological conditions using Intercooled Stata, version 7 for Windows (Stata Corp.).

$$C_i = \beta_{0i} + \beta_{1i}\,2\text{-}axle + \beta_{2i} > 2\text{-}axle + \beta_{3i}\,Temp + \beta_{4i}\,Wind\ Speed + \varepsilon_i \quad (1)$$

In this model, C_i is the curbside concentration of pollutant i for the 3-hr sampling interval. The regression coefficient β_{1i} represents an average increase in the curbside concentration of pollutant i (ng/m^3) for a unit increase in 2-axle vehicle number, adjusted for the number of >2-axle vehicles, temperature, and wind speed. Similarly, β_{2i} represents an average increase in the curbside concentration of pollutant i (ng/m^3) for a unit increase in >2-axle vehicle number, adjusted for the number of 2-axle vehicles, temperature, and wind speed. These coefficients have units of ng/m^3/vehicle and provide an indication of the mobile source effect on the curbside pollutant concentration. Hereafter, this effect will be referred to as "the mobile source effect." The method detection limit was calculated following the Code of Federal Regulations (40CFR136 Appendix B) as discussed in EPA Compendium Method TO-17.[36] The limit of detection was obtained by multiplying the SD of the seven spiked samples by the Student's t value associated with the 99% confidence interval and 6° of freedom.

RESULTS

The recovery for 1,3-butadiene and benzene (± SD) averaged 85 ± 12% and 97 ± 8%, respectively, for the seven recovery spike samples analyzed. The analysis of a single sample collected in triplicate yielded a coefficient of variation of 2 and 6% for 1,3-butadiene and benzene, respectively. The limit of detection was determined as 0.46 and 0.58 μg/m^3 for the two respective analytes.

Results from this study relate to traffic levels, vehicle class, and operating conditions at a specific tollbooth facility. The vehicle operating conditions associated with

the tollbooth are varied, with vehicles decelerating and braking upon approach, idling and traveling slowly to the tollbooth attendant, and then accelerating onto the highway. Total vehicle counts (north- and southbound) per 3-hr interval over the seven-weekday sampling period are shown in Figure 1. The diurnal distribution is bimodal, with modes associated with the morning and evening rush hours, as expected. There is an approximate 8-fold difference between minimum counts occurring during the nighttime hours to the maximum recorded during the rush hour. The total morning rush hour traffic exceeds the midafternoon traffic by a factor of approximately 1.5. However, there is a distinct difference in traffic volume patterns between vehicles with 2 axles relative to vehicles with >2 axles. The morning rush hour is caused by an increase in both 2-axle and >2-axle vehicles, whereas >2-axle vehicle counts remain elevated into the early afternoon hours, while the commuting 2-axle vehicles drop precipitously between the morning and afternoon rush hours. Although the number of >2-axle vehicles continues to increase even after rush hour, the overall traffic count goes down after rush hour because >2-axle vehicles account for only 2–9% of the total vehicle counts. Therefore, the overall decrease in total traffic counts during the afternoon is caused by drastic decreases in commuters on the highways during afternoon hours.

The distributions of 1,3-butadiene and benzene 3-hr integrated outdoor measurements made over the 7-day period are shown in Figures 2 and 3. The concentration profiles of 1,3-butadiene and benzene tracked one another and followed a similar bimodal pattern to the traffic counts, with the lowest levels occurring in the early morning hours and peak levels occurring during morning and afternoon rush hours. The lowest 1,3-butadiene levels (median = 2 $\mu g/m^3$; range = 0.8–4.5 $\mu g/m^3$) were

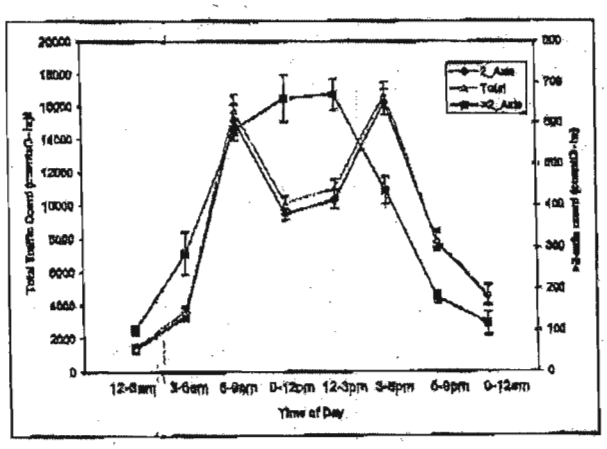

Figure 1. Distribution of 3-hr traffic counts for different vehicle types as a function of time. The mean is plotted with error bars representing the SD.

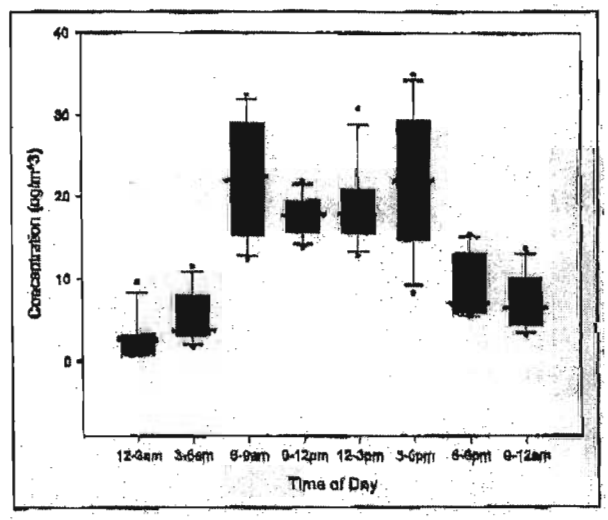

Figure 2. Distribution (n = 7) of outdoor benzene by time of day. The boxes represent 25th and 75th percentiles, whiskers represent 5th and 95th percentiles, and the horizontal bars represent the median value. Individual outliers are represented by the dots.

recorded during the interval 12 a.m.–3 a.m., whereas maximum levels (median = 13.5 $\mu g/m^3$; range = 6–19 $\mu g/m^3$) were recorded during the interval 6 a.m.–9 a.m. The corresponding benzene concentrations were 2.7 $\mu g/m^3$ (0.7–9.6 $\mu g/m^3$) and 22.3 $\mu g/m^3$ (12.5–32.5 $\mu g/m^3$), respectively. PAH levels followed a slightly different pattern, with minimum values observed during the evening interval 9 p.m.–12 a.m. (median = 9.3 ng/m^3; interquartile range [IQR] = 10) and maximum levels observed during the 6 a.m.–9 a.m. interval (median = 199 ng/m^3; IQR = 241). IQRs are reported for the PAH measurements because of the large variability in the 1-min measurements.

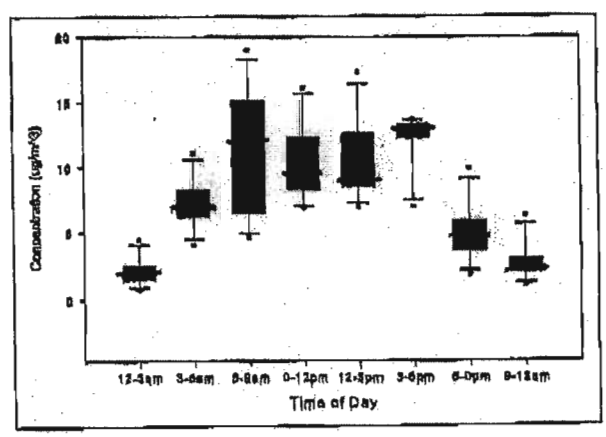

Figure 3. Distribution (n = 7) of outdoor 1,3-butadiene by time of day. The boxes represent 25th and 75th percentiles, whiskers represent 5th and 95th percentiles, and the horizontal bars represent the median value. Individual outliers are represented by the dots.

Meteorological measurements over the 56 3-hr intervals are presented in Table 2. Temperature and humidity ranged from 21.8 to 31.6 °C and from 38.5 to 76%, respectively. Wind speeds ranged from 0.3 to 2.1 m/sec and were in no predominant direction. The association between traffic volume and curbside concentrations of 1,3-butadiene, benzene, and PAH is illustrated by a scatter plot (Figure 4). Simple linear regression of ambient 1,3-butadiene, benzene, and PAH on total traffic volume indicates that 40, 69, and 49% of the pollutant variability is explained by traffic volume.

Table 3 presents a matrix of correlation coefficients for the various pollutant measurements and traffic count and meteorological explanatory variables. As suggested in the concentration profile plots (Figures 2 and 3), 1,3-butadiene and benzene are significantly correlated ($p \leq 0.05$). The meteorological variables humidity and temperature are similarly significantly correlated ($p \leq 0.05$). PAH and 1,3-butadiene showed a stronger correlation with >2-axle vehicles than with 2-axle vehicles, whereas benzene was more strongly correlated with 2-axle vehicles.

The simple linear models were further refined using multivariate analysis that simultaneously took into account vehicle class and meteorological conditions, including temperature, wind speed, and direction. The results of the multivariate analysis are presented in Table 4. In this more complete analysis, traffic volume classified as 2-axle and >2-axle vehicles was significant ($p \leq 0.05$) for both 1,3-butadiene and benzene. In contrast, for PAH, only >2-axle traffic volume was significant. The multivariate models are a significant improvement over the univariate models, as indicated by the increased explained variability in pollutant concentrations: 62, 77, and 85% for 1,3-butadiene, benzene, and PAH, respectively. It is likely that some of the unexplained variability is attributable to spatial differences in wind speed and direction between the toll plaza and the location of the measurements in East Baltimore.

Table 2. Meteorological results (median and range) by sampling interval.

Interval	Temperature (°C)	Relative Humidity (%)	Wind Speed (m/sec)	Dominant Wind Direction
12 a.m.–3 a.m.	23.4 (21.7–26.8)	72.0 (64.2–82.2)	0.3 (0.2–1.2)	NE
3 a.m.–6 a.m.	21.8 (20.2–25.5)	76.0 (70.7–84.7)	0.5 (0.3–1.0)	NNW
6 a.m.–9 a.m.	24.4 (22.7–26.9)	65.5 (60.7–77.0)	0.9 (0.7–1.3)	SE
9 a.m.–12 p.m.	29.3 (28.1–31.3)	45.7 (39.8–58.7)	1.7 (1.1–1.9)	SSE
12 p.m.–3 p.m.	31.6 (27.6–33.6)	38.6 (33.8–53.5)	1.4 (1.2–2.7)	N
3 p.m.–6 p.m.	30.5 (28.3–33.7)	46.3 (41.2–56.8)	2.1 (1.1–3.2)	N
6 p.m.–9 p.m.	27.8 (27.1–31.6)	53.5 (44.2–61.8)	1.9 (0.7–2.8)	E
9 p.m.–12 a.m.	25.5 (22.6–29.1)	58.6 (53.7–60.0)	0.9 (0.1–1.8)	ENE

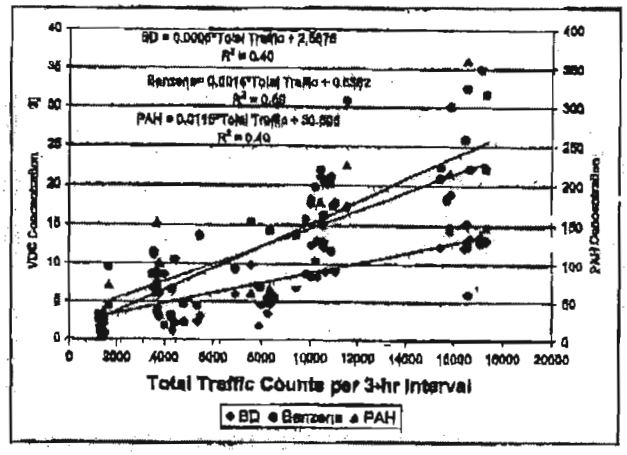

Figure 4. Scatter plot with simple linear regression of 1,3-butadiene, benzene, and PAH vs. total traffic counts per 3-hr interval. PAH concentration in ng/m³.

The traffic volume regression coefficient is indicative of mobile source effect (ng/m³/vehicle) based on 3-hr integrated measurements. Accordingly, a unit increase in 2-axle vehicle increases the curbside concentration of 1,3-butadiene, benzene, and PAH by 0.32, 1, and 4.5 ng/m³, respectively. The >2-axle vehicle mobile source effect of 10.4, 9.5, and 271 ng/m³/vehicle for 1,3-butadiene, benzene, and PAH exceeds that of 2-axle vehicles by factors of 32, 9, and 60, respectively. However, the difference in mobile source effect is partially offset by the traffic volume in each class, with 2-axle vehicles outnumbering >2-axle vehicles by a factor of 29. Therefore, taking both the mobile source effect and vehicle counts into account, the >2-axle vehicle contribution exceeds that of 2-axle vehicles by factors of 1.1 and 2.1 for 1,3-butadiene and PAH, respectively. For benzene, the inverse is true, with the 2-axle vehicle contribution exceeding the >2-axle vehicle contribution by a factor of 3.2.

DISCUSSION

The current study is designed to inform the source to effect continuum for mobile sources and cancer risk by elucidating the association between traffic volume and curbside levels of mobile source-related air pollution. Benzene, 1,3-butadiene, and PAH are of particular concern as environmental carcinogens. Although emission data are available from dynamometer testing[37] and tunnel tests[38,39] and annual ambient estimates have been modeled,[24,40] the current study represents some of the first time-resolved measurements quantifying the association between outdoor curbside pollutant levels and traffic volume and class. An advantage of the current study approach is that it provides actual in situ measurements that

Table 3. Coefficient of determination (R^2).

	2-Axle	>2-Axle	Temp	Wind Speed	Humidity	1,3-Butadiene	Benzene	PAH
2-Axle	1.0							
>2-Axle	0.5	1.0						
Temp	0.3	0.2	1.0					
Wind Speed	0.3	0.1	0.3	1.0				
Humidity	0.2	0.2	0.7	0.3	1.0			
1,3-Butadiene	0.4	0.6	0.2	0.1	0.2	1.0		
Benzene	0.6	0.5	0.4	0.1	0.3	0.7	1.0	
PAH	0.6	0.8	0.0	0.3	0.0	0.6	0.4	1.0

take into account a host of meteorological factors, including wind speed, temperature, and humidity. Furthermore, because the traffic patterns of 2-axle and >2-axle vehicles differed substantively, it has been possible to resolve their relative contribution to ambient levels.

Although the observed tollbooth 1,3-butadiene and benzene concentrations (means ranging from 2 to 11.9 and from 3 to 22.3 $\mu g/m^3$, respectively) are considerably higher than what has been observed even for urban environments, findings from this study may have particular relevance for urban communities built in close proximity to high-traffic arterials as exist in Baltimore. In comparison, the most recent data from the California Air Resource Board[41] indicate annual median 1,3-butadiene levels of 0.60 $\mu g/m^3$ (0.18–2.06) and 0.13 $\mu g/m^3$ (0.04–0.84) for urban and suburban locations, respectively. The corresponding annual median (range) benzene levels are 3.5 $\mu g/m^3$ (1.27–9.54) and 0.95 $\mu g/m^3$ (0.32–4.13). The annual average (range) urban and suburban 1,3-butadiene levels reported for Maryland in 1999 were 0.35 $\mu g/m^3$ (0.07–1.23) and 0.04 $\mu g/m^3$ (0–0.15), respectively. The corresponding values for benzene were 2.2 $\mu g/m^3$ (0.8–5.8) and 0.7 $\mu g/m^3$ (0.3–1.5), respectively.[42] Similar model-based estimates are given by Rosenbaum et al.[24] for all U.S. census tracts showing median annual average benzene and 1,3-butadiene levels of 1.6 and 0.18 $\mu g/m^3$, respectively. Therefore, the high-end tollbooth 1,3-butadiene and benzene levels typically exceed average urban ambient levels by approximately an order of magnitude and by 20–30-fold for the two pollutants, respectively. The observed higher tollbooth levels are caused by the proximity and intensity of the source (i.e., ~70,000 vehicles/day) and provide a valuable laboratory for examining the real-world impact of mobile sources on air quality.

The differences between particle-bound PAH levels previously measured in the urban environment relative to the current tollbooth study are less dramatic than for 1,3-butadiene and benzene. The lowest and highest median concentrations of 9.3 ng/m^3 (IQR = 10.7) and 199.3 ng/m^3 (IQR = 241.3) were observed during 9 p.m.–12 a.m. and 6 a.m.–9 a.m. intervals, respectively. Indoor median concentrations measured in homes without smokers in the Boston region using an Ecochem PAS monitor ranged from 8 to 19 to 31 ng/m^3 at suburban, semiurban, and urban locations, respectively.[43] In the same city during the summer of 1998, Dunbar et al.[44] reported median curbside concentrations over five days that ranged from 10 to 20 ng/m^3 (assuming 1 $fA/ng/m^3$). Based on integrated sampling and laboratory analysis methods, Naumova et al.[45] report outdoor median particle-phase ΣPAH levels ranging from 1 to 4 ng/m^3 for homes in Los Angeles, Houston, and Elizabeth.

Traffic volume was found to be a strong determinant for curbside concentrations of 1,3-butadiene, benzene, and PAH, explaining 62, 77, and 85%, respectively, of the air pollution levels, indicating that of the three pollutants, PAH is most strongly associated with traffic. The observed R^2 for 1,3-butadiene and benzene are consistent with EPA estimates of 56 and 60% of total 1,3-butadiene and benzene emissions attributable to on-road mobile sources.[46] In a recent study where the same model EcoChem instrument was used at a busy Boston intersection, Dunbar et al.[44] attributed 46% of the total particle-bound

Table 4. Multivariate analysis incorporating different VOCs and vehicle types.

Response Vehicle	Covariates	Reg. Coeff.	R^2	*P* value
Outdoor 1,3-butadiene (*n* = 56)	Model		0.62	<0.001
	2-axle	0.00032		0.02
	>2-axle	0.01039		<0.01
	Wind speed	−1.25576		0.08
	Temp	0.24694		0.1
	Intercept	−3.97692		0.27
Outdoor benzene (*n* = 56)	Model		0.77	<0.001
	2-axle	0.00103		<0.01
	>2-axle	0.0095		0.01
	Wind speed	−3.43332		<0.01
	Temp	0.88061		<0.01
	Intercept	−18.8696		<0.01
Outdoor PAH (*n* = 14)	Model		0.85	<0.001
	2-axle	0.00451		0.21
	>2-axle	0.27109		0.02
	Wind speed	40.2166		0.04
	Temp	−14.0235		0.48
	Intercept	370.826		0.04

PAH mass to primary motor vehicle emissions. Of this, 65% of the PAH mass was attributable to buses and trucks and 35% was attributable to cars. Although the basis for vehicle classification differs, these results are comparable to the simple linear regression results that showed 2-axle and >2-axle vehicles explaining 47 and 75% of the particle-bound PAH concentration variability.

Based on 3-hr integrated measurements, the coefficient given by the regression of traffic count on curbside ambient concentration provides an estimate of the mobile source effect on curbside concentration relevant to the location and meteorology of sampling. The magnitude of the source effect varied by pollutant and vehicle class. The highest mobile source effect was 0.2711 ng/m^3/vehicle for particle-bound PAH from >2-axle vehicles. This exceeded the 2-axle mobile source effect of 0.0045 ng/m^3/vehicle by a factor of 60. These results compare with Dunbar et al.,[44] who attributed 65% of the total PAH mass to buses and trucks that comprised 6% of the total traffic volume, suggesting a 29-fold difference in mobile source effect between passenger vehicles and trucks and buses. Additional corroboration for high particulate matter emission of diesel vehicles relative to gasoline vehicles is given by Durbin et al.,[47] indicating diesel light-duty vehicles emit 1–2 orders of magnitude more particulate matter relative to gasoline vehicles.

For 1,3-butadiene and benzene, the current study suggests that >2-axle vehicles have mobile source effects that are 32 and 9 times greater than 2-axle vehicles, respectively. This difference is consistent in direction but higher than the 3- to 4-fold difference in hydrocarbon emissions suggested by EPA[40] for light-duty gasoline powered vehicles (approximately 0.6 g/mi for 1991–1997 vehicles with 50,000 mi) relative to heavy-duty diesel-powered vehicles (2.1 g/mi for 1991–1997 vehicles with 50,000 mi).

The observed difference in mobile source effect by number of vehicle axles is likely attributable to a combination of fuel type and consumption; that is, larger vehicles with >2 axles are likely to burn more fuel per mile and are more likely to have diesel engines. From the current study design, it is not possible to disentangle these two possible contributing effects. However, based on the Federal Highway Administration's (FHA) database of vehicle miles traveled,[35] it is possible to estimate fuel consumption by vehicle type. To compare the vehicle classification from the current study (i.e., by number of axles) to FHA's classification, it is necessary to assign the FHA classification to categories by axle: 2-axle vehicles = motorcycle, light-duty gas, and light-duty diesel; >2-axle vehicles = heavy-duty gas and heavy-duty diesel. Assuming this classification and based on the FHA database for the surrounding vicinity (Baltimore City, Baltimore County, and Anne Arundel County),[48] 99.7% of the gasoline is consumed by 2-axle vehicles whereas 72.2% of diesel fuel is consumed by >2-axle vehicles. These data indicate that although the 2-axle vehicle class is nearly all gasoline-powered, the >2-axle vehicle class is comprised of a mixture of diesel and gas, although predominantly diesel. Therefore, these data provide some substantiation that a difference between the vehicle axle categories considered in this study is caused by type of fuel.

The regression coefficients for wind speed and temperature were significant in explaining pollutant variability; however, a different effect was observed for the gas-phase VOCs relative to particle-bound PAHs. For 1,3-butadiene and benzene, an inverse association was observed, such that increasing wind speed was associated with decreased pollutant levels. This effect is likely caused by horizontal mixing with relatively less polluted regional air. In contrast, for particle-bound PAH, a direct association was observed with wind speed. The reason for this direct association is unclear. However, it may be because of the instrument's inlet configuration and collection bias caused by size. Because PAH adsorption and the instrument's response are both particle size-dependent,[34,49] it follows that alteration of the particle collection efficiency by size will alter the PAH concentration measurement. The observed effect is consistent with a bias of greater efficiency in sampling small particles with increased wind speed. Alternatively, this effect could result from resuspension of surface-deposited particle-bound PAH. It is unlikely that the observed effect was caused by some regional industrial source because no association was observed with wind direction.

CONCLUSIONS

The current study provides unique time-resolved measurements of traffic counts and vehicle class combined with the curbside concentrations of three key mobile source-related environmental carcinogens, that is, benzene, 1,3-butadiene, and particle-bound PAH. An examination of the variability in the source term relative to the resulting pollutant levels using multivariate regression analysis yielded a statistically significant association ($p < 0.001$), providing an empirical model for estimating pollutant levels from traffic volume and class taking into account wind speed and temperature. Because the traffic volume profile between 2-axle and >2-axle vehicles differed, it was possible to tease out a mobile source effect term (ng/m^3/vehicle) for these two classes. For all three pollutants, the mobile source effect of >2-axle vehicles exceeded that of 2-axle vehicles by as much as a factor of 60 for particle-bound PAH to factors of 9 and 32 for benzene and 1,3-butadiene, respectively. However, because 2-axle vehicles outnumber >2-axle vehicles by

29-fold, the overall contribution of 2-axle and >2-axle vehicles to total pollutant levels are within a factor of 1–3.

The current study's findings are based on measurements from a single location and season; therefore, generalization is limited. However, the high pollutant concentrations measured in close proximity to and during times of high traffic may be relevant to the exposure potential along commuting arterials that transect some urban communities. In cities such as Baltimore, the housing stock has been constructed in very close proximity (i.e., 6–10 ft) to these same heavily trafficked roadways. Exposures can be further exacerbated by the custom of stoop sitting and socializing typical in urban communities. Depending on time-activity patterns of urban residents (e.g., frequency, duration, and time of day at home), their exposure may be underestimated relative to estimates given by ambient central-site monitoring[41,42] or modeling.[24] Building on this study and to examine the relevance of extrapolating from the current study to the urban environment, additional studies are being conducted to assess traffic volume/class and indoor and outdoor pollution data on a busy urban arterial.

ACKNOWLEDGMENTS

This study was supported through the Johns Hopkins Education and Research Center Pilot Project Research Training Fund (T42/CCT 310419) with additional support provided by the National Institutes of Environmental Health Sciences (ES 03819), EPA (R 827436), and the Maryland Cigarette Restitution Fund. We are grateful to Dr. Lance Wallace of EPA for the use of the EcoChem PAH monitor and to Timothy Reilly of the Baltimore Harbor Tunnel for giving us access to the tollbooth facility and for providing the traffic count data. We acknowledge D'ann Williams for her assistance in conducting the sampling.

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A review of the evidence for induced travel and changes in transportation and environmental policy in the US and the UK

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Abstract

This paper reviews recent research into the demand inducing effects of new transportation capacity. We begin with a discussion of the basic theoretical background and then review recent research both in the UK and the US. Results of this research show strong evidence that new transportation capacity induces increased travel, both due to short run effects and long run changes in land use development patterns. While this topic has long been debated amongst transportation planners, the fundamental hypothesis and theory has long been apparent in studies of transportation economics and planning that evaluated different issues (e.g. travel time budgets and urban economic development effects). We summarize much of this work and relate the theoretical issues to recent empirical research. We then proceed to examine recent changes in transportation and environmental policy in the US and the UK. The role of the new knowledge of induced travel effects would be expected to lead to changes in the conduct of transportation and environmental policy. Changes in policy and implementation of those policies are still occurring and we provide some suggestions on how to move forward in these areas. © 2001 Elsevier Science Ltd. All rights reserved.

1. Introduction

Transportation policy has normally been influenced by the desire to provide mobility and efficient access to alternative destinations primarily by alleviating traffic congestion. In the US this has focused around construction of the Interstate Highway System and provision of capital assistance for public transport systems in urbanized areas. The UK has followed a similar approach

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PII: S1361-9209(01)00009-8

with a large expansion of the Trunk Road system. [2] Historically the UK has placed great emphasis on cost benefit assessment of road projects to help prioritize projects. In the US, assessment procedures have normally focused on evaluating alternative options, mainly to assess and mitigate environmental impacts. Recent research into induced travel effects, which we review, suggests that these procedures do not fully account for the impact of changes in transportation facilities.

Recently both countries have attempted to move towards more integrated transportation policies. This began in the US with enactment of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and subsequent reauthorization as the Transportation Equity Act for the 21st Century (TEA-21) in 1998. In the UK the central government issued a White Paper in 1998 laying out a strategic direction for transportation policy (Department of Environment, Transport and the Regions, 1998a). The latter reflected research conducted by the Standing Advisory Committee on Trunk Road Assessment (1994), commonly known as SACTRA, on the impacts of induced travel as well as environmental concerns over future growth in travel (Goodwin, 1999). In the US capacity enhancing projects are increasingly being challenged as either ineffective at reducing congestion or as likely to result in the continuation of sprawl development patterns and inefficient land use.

This paper reviews the theoretical and recent empirical evidence for induced travel effects, focusing on the US and the UK. We begin with a review of the behavioural relationships underlying the theory of induced travel and review much of the recent research that documents and empirically measures induced travel effects. We then examine how transportation and environmental policy is changing in response to the empirical findings both in the US and the UK. We suggest areas of improvement in the decision making process to fully recognize the consequences of induced travel behaviour on both transportation and environmental policy.

2. Induced travel: theory and definitions

The underlying theory behind induced travel is based upon the simple economic theory of supply and demand. Any increase in highway capacity (supply) reduces the generalized cost of travel, especially on congested highways, by reducing the time cost of travel. Travel time is the major component of variable costs experienced by those using private vehicles for travel. When any good (in this case travel) is reduced in cost, the quantity demanded of that good increases.

Travel supply and demand and the induced travel effect are illustrated graphically in Fig. 1. The line S1 is supply before a capacity expansion or other changes that lower the generalized cost of travel. The line S2 is supply after the change in capacity, resulting in a lower generalized cost of travel due to lower travel time costs. The quantity of travel demanded increases from Q1 to Q2 as the change in supply lowers the cost of travel from P1 to P2. Fig. 1 assumes no change in underlying demand. For example, population growth is not depicted in Fig. 1. The increase in the quantity of travel from Q1 to Q2 represents the induced travel effect.

[2] Trunk roads in the UK are the responsibility of the central government and carry the bulk of long distance and through traffic.

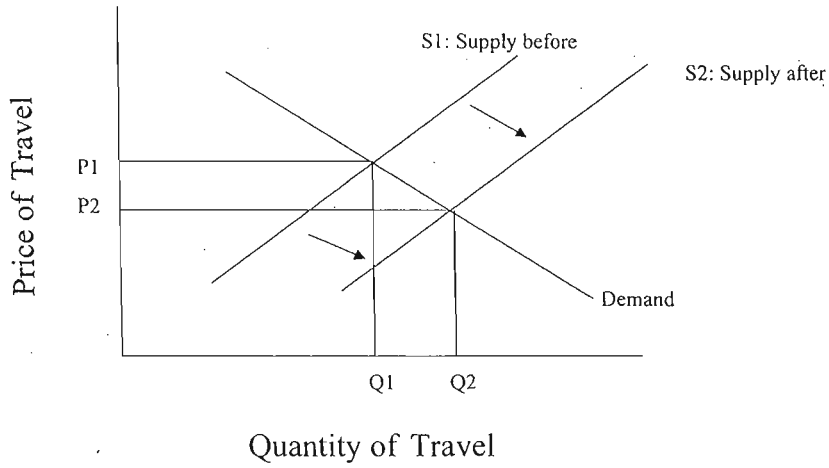

Fig. 1. Induced travel.

In measuring the induced travel effect there are many confounding factors that also drive growth in vehicle miles of travel (VMT). Population growth, increases in income, and other demographic effects, such as increased numbers of women in the workplace, are often cited. Fig. 2 shows how these effects can be graphically illustrated. The demand curve shifts outward from D1 to D2 because total demand for travel is larger at a given price when, for example, population increases in an area. The demand and supply curves shift simultaneously in Fig. 2, and the resulting quantity of travel increases even more than in Fig. 1 (to Q3). Empirically, it is difficult to isolate these two concurrent effects, and the relative contribution to VMT growth of different factors. In Fig. 2, the induced travel effect is measured along the horizontal axis as the difference

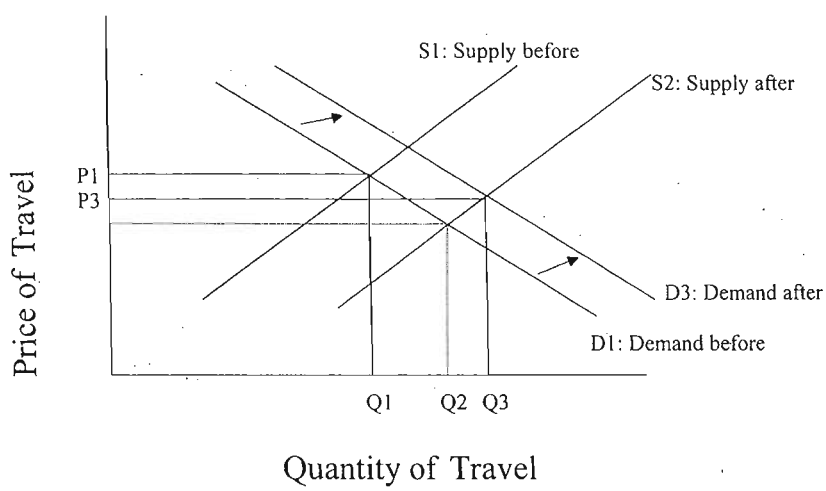

Fig. 2. Induced travel during period of underlying growth in demand.

between Q2 and Q1, while the effect from exogenous growth is the difference between Q3 and Q2. [3]

Induced travel naturally assumes some elasticity of demand associated with travel. That is, as the price (or time cost) of travel changes, the amount of travel demanded changes. Goodwin (1992) reviewed a number of studies of the elasticity of travel with respect to fuel prices. He concludes that elasticities of VMT with respect to gasoline prices range from about −0.16 in the short run up to −0.30 in the long run. [4] However, traffic engineers have traditionally assumed that travel demand has totally inelastic demand implying that total travel will be constant irrespective of changes in the price (or time cost) of travel. This and the attribution of travel growth to exogenous factors is the source of much of the disagreement over the fundamental existence and nature of induced travel effects.

Another common source of disagreement is how to define induced travel. For example, does this just include new trips or should longer trips also be included? Litman (2001), for example, distinguishes between induced traffic and generated traffic, where the latter includes diverted traffic (from other routes), while induced traffic does not include any diverted traffic. We define induced travel to be an increase in VMT, since VMT growth is one of the primary sources of increased environmental and social costs as well as representing the potential benefits of increased mobility. In the simplest terms induced travel (or VMT) can be broadly defined as the increase in VMT attributable to any transportation infrastructure project that increases capacity.

Hills (1996) and Litman (2001) provide a useful categorization of the various behavioural effects one can expect from highway upgrades or capacity expansions. Immediate behavioural effects include: changes in the timing of departure due to rescheduling of trips (Small, 1982); switching of routes to take advantage of new capacity; switches between transportation modes such as switching to private vehicle use from public transport; longer trips; and an increase in total trips taken. The most visible of these effects (as shown by the difficulty of reducing peak period congestion) tends to be rescheduling behaviour that results in travellers returning to their preferred peak travel times. However, this effect does not necessarily result in an increase in VMT and so would not represent induced travel. [5] However, shifts to the peak that free up capacity at other times of the day can result in new trips being made at those times that are now less congested.

Route switching can result in either shorter or longer distances being travelled. If the net effect is more travel this is clearly defined as induced VMT. If speeds are now faster, some additional long trips (perhaps recreational in nature or to more distant shopping centers) are likely to be taken increasing total VMT.

In addition to these short run effects, various longer run effects are hypothesized to have a significant impact on total VMT growth. One long run effect would be increases in household auto ownership levels. Other long run effects occur due to changes in relative accessibility within an urbanized area and can result in the spatial reallocation of activities. If speeds are higher, many

[3] The relative scale of the effects in Fig. 2 does not necessarily represent actual magnitudes.

[4] This is distinct from Goodwin's conclusions on the price elasticity of fuel consumption, which ranges from about −0.25 in the short run up to about −0.8 in the long run.

[5] Peak shifting that does not noticeably reduce aggregate travel times does suggest that the benefits of most projects are not accurately assessed. This suggests that rather than assessing benefits based only on travel times an assessment based on the ability to travel at a preferred time should be done (Small, 1992).

residences, employees, and businesses will tend to relocate over time often resulting in longer distance trips (Gordon and Richardson, 1994). [6] The concentration of retail activities in "big box" stores or auto-dependent regional shopping centers (rather than centrally located business districts) further increases VMT. Finally, increases in highway capacity may lead to changes in land development patterns within a region.

The theory of induced travel is consistent with Downs (1992) theory of "triple convergence". Downs (1992) formulated this theory to explain the difficulty of removing peak-hour congestion from highways. In response to a capacity addition three immediate effects occur. Drivers using alternative routes begin to use the expanded highway, those previously traveling at off-peak times (either immediately before or after the peak) shift to the peak (rescheduling behaviour as defined previously), and public transport users shift to driving their vehicles.

Mogridge et al. (1987) extends this idea to the Downs–Thomson paradox whereby road capacity increases can actually make overall congestion on the road worse. This occurs when the shift from public transport causes a disinvestment in the mode such that the operator either reduces frequency of service or raises fares to cover costs. This shifts additional passengers into cars. Ultimately the public transport system may be eliminated and congestion on the original (expanded) road is worse than before. Arnott and Small (1994) provide a mathematical example of this effect.

Another theoretical framework assumes that total time budgets allocated to travel remain relatively constant over time. This was shown empirically by Zahavi and Ryan (1980) and Zahavi and Talvitie (1980). Gordon and Richardson (1994) have shown that over time, relatively constant average commute travel times are maintained. The travel time savings from increased travel speeds tend to be off-set by increased travel distance, rather than actual travel time savings. Thus, individual travel time budgets tend to remain constant. One could argue that full induced travel effects could actually increase the travel time budget if the generalized cost of travel is reduced. However, even without an increase in the travel time budget, a constant travel budget could result in an increase in VMT from capacity additions and the increased travel speeds that are then possible.

Clearly, the theoretical understanding and the potential behavioural characteristics for induced travel effects are well established. Clear empirical evidence has, until recently, remained elusive. This is partly due to the difficulty of statistically separating the many effects that also increase total VMT and establishing clear causal relationships. These issues and a review of the empirical work is presented next.

3. Induced travel: empirical studies and verification of the theory

Induced travel has been a topic of research in transportation planning and economics for many years. Goodwin (1996) provides a review of some of the historical evidence in the UK going back

[6] While the work of Gordon and Richardson is generally meant to extoll the virtues of suburban land development patterns, their analysis of stability in work travel times while travel speeds increase, provides good empirical evidence for induced travel.

to a report done for the UK Ministry of Transport in 1938 that evaluated a significant increase in traffic on a new road. Much of the historical literature has been based on observational traffic counts within travel corridors. These studies have generally not accounted for other exogenous effects that could also contribute to growth in VMT. Pells (1989) also cited many previous publications to estimate that much of the increase in traffic flows was due to induced traffic.

The Transportation Research Board (1995) also reviewed historical literature. The methods used in many of these studies involved measuring traffic counts before and after the construction of a new facility (e.g. Jorgensen, 1947; Lynch, 1955). Adjustments were then made to control for 'normal' growth in the corridor and the resulting difference was attributed to the new highway capacity. While these studies are suggestive of an effect, statistically it is not possible to explicitly attribute differences in traffic to the new capacity.

While much of this historical literature is suggestive of strong induced travel effects, these studies did not use statistical models to control for other effects that cause VMT growth. In addition, much of the historical research appears within the "grey literature", consisting of consultant reports, conference proceedings, and other sources not normally subjected to academic peer review. [7]

The remainder of this review will focus on two distinct streams of research on induced travel that have been pursued over the last several years. These parallel streams occurred in the UK and the US. We review both strands of research, most of which has been published in academic journals, and which provide persuasive empirical evidence for the existence of induced travel.

3.1. Studies in the UK

The recent spate of empirical work in induced travel was initiated by the Standing Advisory Committee on Trunk Road Assessment (1994) investigation and report to the UK Department of Transport. This study, commonly referred to as the SACTRA report, included a review of relevant theory and empirical studies. It also included a detailed review of traffic growth within specific corridors that had an increase in capacity, concluding that many corridors had seen greater than expected traffic growth and that this growth was probably not solely attributable to other impacts such as increases in income. In addition, the studies reviewed focused on traffic counts, rather than changes in VMT, which may mask the effect of some trips now being longer than they were previously. On average, actual use of a road during the first year after its completion was more than 10% greater than the forecast usage. While some of this may simply be due to inaccuracy in the forecasts (other than the lack of accounting for induced travel effects), these studies also showed that traffic flows on parallel routes that the roads were intended to relieve were also either higher or about the same as before.

The Standing Advisory Committee on Trunk Road Assessment (1994) report indicates that some of the forecast inaccuracy may be due to underestimates of the rate of increase in GDP (as used by the National Road Traffic Forecast). The UK Department of Transport considered this to be the primary effect of the underestimation of traffic growth on the schemes studied and thus discounted the evidence for induced travel occurring. The Standing Advisory Committee on

[7] These reports are not always archived in university libraries, making them difficult to find.

Trunk Road Assessment discounted this argument for several reasons including potential problems with the timing of the measurements (taken only one year after the schemes were completed) and the lack of a broader measurement of total traffic on alternative roads. They also note that forecast traffic on motorways and bypasses was usually larger than for smaller schemes, which would be expected if induced traffic was occurring. The arguments in the SACTRA report also hint at the endogeneity of economic growth and highway capacity additions. The latter may have an impact on overall economic growth as we discuss further below. To some extent, however, the potential forecasting errors could be from numerous factors, including lack of accounting for induced travel, therefore it is difficult to draw firm conclusions from this analysis, other than to demonstrate the weakness of current forecasting procedures.

Rodier and Johnston (2001) analysed errors in various socioeconomic forecasts and the impact on travel forecast error. This was done for the Sacramento, California region. They found that plausible errors in personal income and fuel price forecasts had no significant impact. However, errors in population and employment growth had a significant impact. Therefore it is reasonable to assume that some of the forecast errors reviewed by the Standing Advisory Committee on Trunk Road Assessment (1994) are from these type of errors, though separating the sources of errors in demographic projections and omission of induced travel effects is questionable.

The Standing Advisory Committee on Trunk Road Assessment (1994) and Goodwin (1996) derive travel time elasticities with respect to VMT using fuel price elasticities with respect to VMT. This is done for the elasticity range −0.15 to −0.30 reported by Goodwin (1992). Using an assumption of 6 pence (9 cents) per minute as the value of time, 25 min of average time spent traveling and 50 pence (75 cents) spent per day on fuel, he derives an elasticity range between −0.45 to −0.90 (or as he summarizes, nearly −1.00).

While it is not clear how the assumptions on time spent traveling and fuel costs were derived, it is clear that if we use US prices for gasoline, which are about 4 times less than in the UK and assume somewhat lower average vehicle efficiency, we can easily see that elasticity values in the US must be larger. Assuming a gasoline price of $1.25 per gallon, average speed of 30 mph, and fuel efficiency of 27.5 mpg, then US elasticities would range from −0.56 (short run) to −1.18 (long run). [8] The key result must be that if fuel prices are low, then more of a behavioural response can be expected from changes in travel speeds. That is, highway capacity effects will be larger if travel time accounts for a greater fraction of the total generalized cost of travel.

The Standing Advisory Committee on Trunk Road Assessment (1994) report had been commissioned to answer specific questions regarding induced travel. The first question was whether induced traffic is a "real phenomenon". They concluded that induced traffic "can and does occur, probably quite significantly, though its size and significance are likely to vary widely in different circumstances." They also concluded that induced traffic can affect the economic evaluation of a road scheme, i.e., affirmatively answering the question of whether induced traffic does matter. They also conclude that it matters most under conditions where the network is operating close to capacity, where demand elasticity is high, and in cases where a specific scheme is likely to result in large changes in travel costs. They were not able to draw any conclusions on which elements of travel behaviour are affected more or less (i.e., generation, distribution, mode choice, land use,

[8] Other assumptions used by Goodwin (1996) are held to be the same.

etc.). The SACTRA report also included recommendations on how to improve appraisal and forecasting methodologies to account for induced travel. We address issues related to this below in our discussion of policy implementation.

Cairns et al. (1998) consider additional evidence for induced travel effects. Their study analysed the impact of highway capacity reductions on traffic, essentially the reverse of adding new capacity. This study was commissioned in response to changes in the goals of transportation policy in the UK on finding ways of supporting alternative modes of travel while reducing total vehicle traffic levels. Improvements in public transport, pedestrian and walking facilities often require the reallocation of road space from motor vehicles. Many proposed projects would be avoided due to fears of "traffic chaos" should this occur. Cairns et al. (1998) reviewed both the theoretical evidence and over 40 specific case studies where road space had been either temporarily or permanently removed. The overall conclusion was that traffic chaos did not occur, though there may be short-term transitional impacts. Overall traffic volumes were found to generally be reduced when road capacity was removed.

3.2. Studies in the US

Shortly after the completion of the Standing Advisory Committee on Trunk Road Assessment (1994) report, the Transportation Research Board (1995) examined the issue of induced travel and the implications for air quality and energy use. This report provides extensive detail on the behavioural impacts from expanding road capacity. The primary focus of the report was on the capability of analytical models used for forecasting regional transportation growth and emissions of criteria pollutants to adequately account for induced travel effects. The consensus was that most modelling procedures are deficient and probably do not adequately capture induced travel effects or the behavioural and economic development impacts of road projects. Johnston and Ceerla (1996a,b) verified this conclusion by modelling various infrastructure improvements in the Sacramento region and comparing results with and without feedback of initial travel time changes. They also showed that the lack of fully accounting for feedback effects could result in different rankings of the projects on their congestion reduction potential.

The TRB report was inconclusive on how induced travel may effect air quality. This issue is complicated by the relationship between traffic dynamics (such as changes in speed and acceleration characteristics) and emissions. However, the report clearly concludes that reductions in travel time or generalized costs will result in both increased highway use and have a decentralizing effect on urban development.

Empirical work has attempted to separate the effects of other exogenous variables using econometric techniques. This recent body of work began with the work of Hansen et al. (1993) and Hansen and Huang (1997). They estimated econometric models using time series data on VMT and lane miles for state highways in California, by county and metropolitan area. The key innovation was the use of a fixed effects model specified as follows,

$$\log(\mathrm{VMT}_{it}) = \alpha_i + \beta_t + \sum_k \lambda^k \log\left(X_{it}^k\right) + \sum_{l=0}^{L} \omega^l \log(\mathrm{SHLM}_{it-l}) + \varepsilon_{it}, \tag{1}$$

where VMT_{it} is the VMT in region i in year t, α_i is the fixed effect for region i, β_t is the fixed effect for year t, X_{it}^k is the value of explanatory variable k for region i, and year t, SHLM_{it-l} is state

highway lane miles for region i and time $t - l$, where l is a time lag, λ^k, ω^l are coefficients which are estimated, ε_{it} is an error term, assumed to be normally distributed. Fixed effect models with panel data include dummy (0–1) variables for each cross-sectional unit (less one) and sometimes for each year (again, less one). They are then normally estimated using ordinary least squares regression (OLS). Other variables included by Hansen and Huang (1997) in their analysis are population, personal income, population density, and gasoline prices, all of which are expected to have an effect on VMT growth.

The use of panel data and fixed effects estimation allows estimation of models when the analyst may not have data on all the causal factors that influence the dependent variable (Johnston and DiNardo, 1997). This is of critical importance in the analysis of VMT growth. Many factors have been suggested as drivers of recent growth in VMT. These include increased female participation in the work force, changing lifestyles amongst individuals, changes in family structure, levels of available public transport, spatial patterns of development, and other factors that are either unknown or for which data are not easily available. Many of these factors may also be highly correlated with other variables such as per capita income or overall population growth, which can cause problems in estimating standard errors for the coefficients of interest.

As outlined by Johnston and DiNardo (1997), analysis of simple cross-sectional data using OLS estimation can result in biased estimates due to orthogonality between the independent variables and the time-invariant error term. Panel data allow the time-invariant terms to drop out, thereby removing the bias in estimation. Johnston and DiNardo (1997) point out that "with panel data it is possible to obtain consistent estimates of parameters of interest even in the face of correlated omitted effects when OLS on individuals' cross-sections would fail to do so!".

Hansen and Huang (1997) estimate statistically significant coefficients on their lane mile variable using panel data and both OLS and a Prais–Winsten regression. The latter was done to correct for autocorrelated error terms that they found using OLS regression. Lane mile elasticities (with respect to VMT) between 0.3 and 0.7 were found for models using county-level data. [9] Elasticities of between 0.5 to 0.9 were found for models using metropolitan level data. Various lag structures were also tested and a two to four year lag structure resulted in long run elasticities that were greater than those in the unlagged models.

Noland (2001) estimated a number of similar panel regression models using nationwide data at the state level. In general, Noland finds similar elasticity values ranging from 0.3 to 0.6 in the short run and from 0.7 to 1.0 in the long run. The models estimated by Noland include a disaggregation of the data by road facility type (i.e., interstates, arterials, and collector roads by urban and rural road categories). These are estimated using Zellner's seemingly unrelated regression and with a distributed lag (thereby allowing the derivation of a long run elasticity). Results for one of these models are displayed in Table 1. In addition, Noland (2001) estimates a growth (or difference) model. This has the beneficial effect of removing virtually any multicollinearity in the independent variables. The resulting lane mile coefficient estimates remain similar, ranging from 0.5 to 0.8, all with high levels of statistical significance.

[9] These elasticities represent changes in VMT with respect to lane miles, therefore a positive sign implies that there is an increase in VMT with an increase in lane miles. Alternatively, travel time elasticities, as discussed by Goodwin (1992), will have a negative sign implying an increase in VMT with a decrease in travel times.

Table 1
Seemingly unrelated regression by road type and urban/rural area: distributed lag model[a]

Dependent variable is log of VMT by road type Lane miles are by road type per capita	Urban interstates	Urban arterials	Urban collectors	Rural interstates	Rural arterials	Rural collectors
LN (VMT, lagged one year)	0.464	0.370	0.528	0.669	0.485	0.649
	(17.981)	(12.915)	(20.251)	(30.774)	(16.658)	(21.658)
LN (urban interstate lane miles, per capita)	0.439					
	(17.136)					
LN (urban arterial lane miles, per capita)		0.498				
		(18.002)				
LN (urban collector lane miles, per capita)			0.513			
			(15.097)			
LN (rural interstate lane miles, per capita)				0.234		
				(6.473)		
LN (rural arterial lane miles, per capita)					0.369	
					(10.621)	
LN (rural collector lane miles, per capita)						0.407
						(6.726)
LN (population)	0.625	0.652	0.690	0.250	0.509	0.307
	(9.561)	(10.279)	(6.645)	(4.057)	(8.159)	(2.950)
LN (per capita income)	0.748	0.489	0.328	0.531	0.630	0.313
	(12.227)	(9.788)	(3.545)	(9.858)	(11.450)	(4.387)
LN (cost per BTU of fuel)	−0.085	−0.047	−0.019	−0.064	−0.035	− 0.033
	(−4.191)	(−2.308)	(−0.478)	(−3.590)	(−1.746)	(−1.106)
Constant	−9.149	−5.908	−6.219	−4.702	−7.349	−3.350
	(−9.479)	(−7.864)	(−4.907)	(−6.574)	(−10.093)	(−2.786)
N	583	583	583	583	583	583
Long run elasticities						
Lane miles per capita	0.819	0.790	1.087	0.707	0.717	1.160
Population	1.166	1.035	1.462	0.755	0.988	0.875
Personal income	1.396	0.776	0.695	1.604	1.223	0.892
Gasoline price	−0.159	−0.075	−0.040	−0.193	−0.068	−0.094

[a] *T*-stats are in parentheses.

An analysis of nationwide metropolitan level data by Noland and Cowart (2000) tells the same story. Long run elasticity values of 0.8 to 1.0 are derived using a distributed lag model estimated for VMT and lane miles specific to interstates and arterial road capacity.

One criticism of this work has been that it does not resolve the issue of causality, merely showing a correlation between lane mile expansion and VMT growth. Highway planners argue that since they have accurately forecast where individuals desire to travel they expect roads to fill up with travellers after they are built. However, this ignores the fact that they often become more congested more rapidly than initially planned, as Goodwin (1996) and the Standing Advisory Committee on Trunk Road Assessment (1994) showed for a sampling of projects in the UK. This may partially be a function of analytical forecasting tools that are not accurately capturing induced travel effects. In any case, many planners discount econometric analyses as merely proving that a correlation has been found and that these studies show that planners are putting highways

where people want to travel. On the other hand, these studies certainly do not build a case for rejecting the induced travel hypothesis.

One approach for definitively addressing the issue of causality is to use an instrumental variable in the regression with a two-stage least squares estimation procedure. Noland and Cowart (2000) use a two-stage least squares regression testing several instruments to use for lane miles per capita. Results are shown in Table 2. Urbanized land is tested as an instrument in model (A). This variable is not strongly correlated with per capita VMT but is significantly related to total lane miles per capita (increasing urbanized land area results in lower lane miles per capita). Model (A) has coefficient values very similar to OLS estimates. Model (B) removes population density which tends to interact with the dependent variable which is specified as a per capita variable. This reduces the value of the lane mile coefficient. Model (C) which has population/area as an instrument indicates some instability and lack of robustness in the lane mile coefficient. These results, while relatively weak, do suggest a causal linkage between increasing lane miles and increased VMT.

A study by Fulton et al. (2000) used cross-sectional time series county-level data from North Carolina, Virginia, and Maryland and estimated a two-stage least squares model. Their model is specified as a growth model with growth in VMT as a function of growth in lane miles. As an instrument they find that lane mile growth over either 2 years or 3 years is correlated with 1 year growth in lane miles, but not with 1 year growth in VMT. This is used to estimate individual state models and a model with data from all three states combined. Results are quite robust with an elasticity between 0.3 and 0.5. This model is reproduced in Table 3. Fulton et al. (2000) do not provide an estimate of long-run elasticities but one would expect these to be somewhat higher.

Cervero and Hansen (2001) estimate a two-stage least squares model with instrumental variables using county level data from California. They estimated a statistically significant lane mile

Table 2
Instrumental variable (two-stage least squares) regressions[a]

	(A)	(B)	(C)
LN (VMT per capita)	Insrument = LN (area)	Insrument = LN (area)	Instrument = LN (population/area)
LN (lane miles per capita)	0.760	0.289	1.944
	(18.092)	(2.873)	(6.035)
LN (per capita income)	0.315	0.557	−0.135
	(6.198)	(8.051)	(−0.798)
LN (fuel cost)	−0.005	−0.023	0.135
	(−0.179)	(−0.713)	(2.186)
LN (population density)	−0.160		
	(−7.077)		
Constant	0.476	−3.193	3.595
	(0.887)	(−4.701)	(2.224)
N	1050	1050	1050
Adjusted R^2	0.975	0.967	0.902

[a] T-stats are in parentheses.

Table 3
Instrumental variable regressions (with fixed effects)[a]

Dependent variable: Growth in VMT	All states		Maryland		North Carolina		Virginia	
	Instrument = growth in lane miles over two years	Instrument = growth in lane miles over three years	Instrument = growth in lane miles over two years	Instrument = growth in lane miles over three years	Instrument = growth in lane miles over two years	Instrument = growth in lane miles over three years	Instrument = growth in lane miles over two years	Instrument = growth in lane miles over three years
Growth in lane miles	0.505	0.457	0.397	0.290	0.638	0.479	0.288	0.444
	(4.823)	(2.796)	(1.972)	(0.948)	(6.491)	(3.705)	(4.405)	(4.958)
Growth in population	0.031	0.031	0.251	0.219	0.166	0.387	0.120	0.114
	(0.234)	(0.214)	(0.864)	(0.726)	(0.589)	(1.293)	(1.998)	(1.694)
Growth in per capita income	0.002	− 0.028	0.255	0.292	0.114	0.133	0.088	0.080
	(0.037)	(−0.372)	(1.923)	(2.047)	(1.423)	(1.573)	(2.232)	(1.959)
Constant	−0.003	−0.004	0.009	0.008	0.038	0.038	0.040	0.043
	(−0.148)	(−0.176)	(0.451)	(0.396)	(1.900)	(1.824)	(3.098)	(3.222)
N	1980	1760	598	575	1000	900	2400	2304
Adjusted R^2	0.031	0.024	0.112	0.089	0.060	0.060	0.172	0.199

[a] T-stats are in parentheses; County and time specific constants are omitted for brevity.

elasticity of 0.559, very similar to the results of Fulton et al. (2000). They used various political and demographic variables to help explain the increase in road supply including the party of the governor (lagged by one year) and the proportion of a county's population that was white. They also found that the supply of lane miles can be explained by VMT, but with a smaller coefficient value of 0.328. Therefore their results suggest that causality may run in both directions but that the effect of lane miles on VMT is greater than the opposite effect. They also conducted a Granger test and found the results consistent with their instrumental variable model. Fulton et al. (2000) also conduct a Granger test with Maryland and Virginia data. While this test is not a basis for causality, they do confirm that VMT growth is preceded by lane mile growth, while the reverse cannot be established.

Overall the results of Fulton et al. (2000) and Cervero and Hansen (2001) are the most persuasive at showing a causal linkage between growth in lane miles and growth in VMT.

The work of Noland and Cowart (2000); Fulton et al. (2000) and Cervero and Hansen (2001) using two-stage least squares estimation generally produces lower elasticity values than the studies of Hansen and Huang (1997) and Noland (2001), although the latter overlaps at the low end. This may indicate that there is some upward bias in the estimates from the latter two studies.

The studies mentioned above have all used aggregate data to test for statistical significance and to derive elasticity values. This is common practice in the economics literature, but has been criticized by transportation planners. The basis of this criticism is that we need to understand how individuals respond to changes in capacity to truly capture all the behavioural effects that might occur. A disaggregate analysis of this sort would certainly be of interest and is motivated largely by the desire of transportation planners to understand how specific projects may influence the behaviour of specific categories of individuals. This has been a goal of transportation modelling in

response to criticisms of using aggregate zonal analysis. However, this does not undermine the benefits of aggregate analysis which is intended to look at aggregate effects and can provide valuable information to policy makers on the overall impact of capacity expansion.

Rodier et al. (2001) use disaggregate data from the Sacramento, California region to examine induced travel effects. Their study uses the integrated land use/transportation model, ME-PLAN, to analyse the impact of various scenarios in the Sacramento region. They compare the effect of holding various modelling elements constant, such as changes in land use and trip distribution, as opposed to allowing these to be endogenously determined by the model. What they find is that allowing these inputs to be endogenous results in a large elasticity of VMT with respect to lane miles of 0.8 for a forecast out to 2015 and 1.1 for a forecast out to 2040. If land development is not endogenous, but instead is assumed constant, the elasticity values are reduced to 0.6 and 1.0, respectively. Holding population and employment location constant further reduces these values to 0.4 and 0.6, respectively. This latter is equivalent to the assumptions underlying most state of the art in regional travel demand models where trip distribution is derived through feedbacks and multiple iterations. Without feedback of the trip distribution step, which is more common amongst state of the practice travel demand models, an elasticity of 0.0 (for both future forecast years) is calculated, essentially assuming totally inelastic travel demand.

Rodier et al. (2001) make several major contributions. First, the range of elasticity values derived using a disaggregate regional integrated land use and travel demand model assuming full endogeneity gives elasticities similar to the aggregate studies discussed previously. In fact, their elasticities are even higher than those studies that employ two-stage least squares to account for causality. Second, they show that state of the art improvements to regional travel demand models can capture about 50% of the induced travel effect relative to current practice capturing no effect. Obviously, this latter result has important implications for assessment of alternative projects (which is discussed further below). Lastly, their analysis is based on individual behavioural elements establishing a clear causal link between behaviour and induced travel. Rodier et al. (2001) also show that about 50% of the long-term induced travel effect is not captured by the use of travel demand models; in order to fully account for induced travel, regions would have to capture both travel and land use changes interactively.

Strathman et al. (2000) combined the 1995 Nationwide Personal Transportation Survey (NPTS) data for 12,009 households with the Texas Transportation Institute (TTI) data (Schrank and Lomax, 1997) on road capacity in 48 metropolitan areas in order to produce a system of equations that include both a wide range of exogenous variables and four endogenous variables (commute mode, workplace density, residential density, and VMT). In addition they use three instrumental variables (likelihood of payment for parking at work, commute distance, and vehicle ownership). In this study, per capita roadway capacity was found to have a significant effect upon mode choice, residential density, workplace density, and VMT. Given an increase in roadway capacity, the cross-sectional analysis indicated that persons within the metropolitan area tended to be more likely to drive alone to work, live and work at lower densities, and generate higher VMT.

The direct effect of a 10% increase in per capita roadway capacity is estimated to be a 2.9% increase in VMT, when all other variables are controlled for. This elasticity is consistent with the findings of Noland (2001); Noland and Cowart (2000), and Fulton et al. (2000). In addition to the

direct effect of roadway capacity on VMT, Strathman et al. (2000) also found an indirect effect, through residential density and employment density. The estimations showed that reduced residential density results in higher VMT while reduced employment density results in lower VMT. This latter result may appear counter-intuitive unless one considers that lower density employment locations may in some cases be closer to residential areas than higher density urban cores, though they would also tend to be less accessible by public transport. The net change of these two counteracting forces, was an estimated indirect elasticity of 0.033 between roadway capacity and VMT, which was about one-tenth of the magnitude of the direct effect.

Barr (2000) used disaggregate household data from the 1995 NPTS to examine induced travel effects. His study included 27,409 individuals from the NPTS. His key variable of interest was the amount of time spent traveling by each household. This was calculated by deriving the average travel speeds from the reported length of journeys and their reported duration. The inverse of the speed was used to derive the key variable of interest which was the average travel time. This study uses only a cross-sectional database and can only describe correlation and not causation. The use of reported measures of time and distance may also introduce potential inaccuracies in the data. However, some interesting observations can be drawn from Barr's study. Travel time elasticities ranged between −0.3 and −0.4. This is below the range suggested by Goodwin (1996). Barr (2000) also shows that elasticities are higher in urbanized areas compared to non-urbanized areas. This could be explained by higher congestion in these areas and greater access to alternative modes. While he states that urbanized areas have a higher elasticity (−0.36), it is really not much higher than for non- urbanized areas (−0.32). This may indicate no significant difference and his result that elasticities do not vary with metropolitan area size would tend to support the insignificance of the difference in these elasticities. He does show interesting elasticity differences for different family life cycles but suggests that much of this difference is due to higher income elasticities. Clearly, Barr's work shows that disaggregate analysis can offer additional information to policy makers on how capacity additions will impact various demographic groups.

A similar result on the effect of metropolitan area size was shown by Noland and Cowart (2000). They forecast the contribution of capacity additions to VMT growth for metropolitan areas of different size and areas with different congestion indexes as ranked by the Texas Transportation Institute (Schrank and Lomax, 1997). The forecasts showed that there was no difference in the contribution of capacity additions to new VMT between the different categories. Energy and Environmental Analysis (1999) analysed elasticity differences assuming that the ratio of VMT over lane miles was a good proxy for congestion levels (using the same data as Fulton et al., 2000). They could not show any significant difference in elasticity values for the different models. These results are quite interesting as one would expect more congested areas to have larger elasticities. It is possible that this could indicate that land use and development effects play a larger role than existing congestion in inducing new VMT. Noland and Cowart (2000) suggest that this may be the case by analysing the difference in the contribution of new capacity to forecast VMT growth between metropolitan areas. They conclude that areas with proportionally greater growth in lane miles can attribute more of their VMT growth to induced travel.

Chu (2000) developed a model to try to estimate elasticity changes for different levels of underlying congestion. In deriving his theoretical model of travel demand and highway supply he determines that incremental expansion in highway capacity will have smaller effects on vehicle

travel. In testing this hypothesis, he also uses data from the NPTS and estimates the following model:

$$\log(q/C) = \beta_0 + \beta_1 \log(X^k) + \beta_2 \log(C) + \beta_3(\log(C))^2 + \varepsilon, \tag{2}$$

where q is vehicle travel (VMT), C is a measure of capacity (lane miles), X^k refers to other variables included in the estimation, and ε is an error term. Using a cross-sectional database of metropolitan areas derived from the NPTS, Chu (2000) finds significant coefficients on both the β_2 and β_3 terms. He concludes that capacity does influence total traffic albeit with a diminishing effect as specified in his theoretical model.

Not all the studies cited have been able to show that induced travel is larger or more extensive when congestion is present. Chu's (2000) model provides the most convincing evidence of some correlated effects. While the empirical analysis is weak, theoretically we would generally expect more induced travel when congestion is higher and also more induced travel when land use and development controls are weak thereby allowing the market to respond to changes in the highway network. Standing Advisory Committee on Trunk Road Assessment (1994) came to the conclusion that when large changes in generalized travel costs occur, induced travel is likely to be significant, based largely on theoretical grounds.

Our conclusion from the relevant literature is that the theory of induced travel can certainly not be refuted and is largely confirmed. Table 4 summarizes the elasticity estimates from the studies discussed above. These coefficient values, while estimated with different data sets and different techniques, seem to suggest that lane mile elasticities are in the range 0.3–0.6 with larger elasticities for long run effects.

A major relevant question is how important is induced travel compared to other drivers of VMT growth, or as the SACTRA report asked, "does it matter?". Both Noland (2001) and Noland and Cowart (2000) estimate the relative contribution of induced travel to overall VMT growth. Noland (2001) applies the distributed lag model in Table 1 to forecast VMT growth out to 2001. He finds that if current trends in both lane mile increases and demographic variables continue, VMT will grow at about 2.65% annually. If lane mile growth is set to zero, this reduces VMT growth to about 1.9% annually. In other words, the induced travel effect accounts for about 28% of annualized growth in VMT. Noland and Cowart (2000) estimate this effect to average between 15% and 40% of annualized VMT growth (on interstates and arterials) for metropolitan areas. The lower range is probably more precise as this was derived from the better of the models that they estimated. Heanue (1998) uses data from Milwaukee, Wisconsin to estimate the contribution of induced travel to VMT growth. Using Goodwin (1996) and Hansen and Huang (1997) elasticity estimates, Heanue (1998) determines that between 6% and 22% of VMT growth is due to capacity additions. These results strongly suggest that forecasting VMT growth (and the environmental impacts of that growth) needs to include some measure of transportation infrastructure as a determining factor.

The modelling work of Rodier et al. (2001) shows that the long-term land use development effects can be a large additional source of increased VMT associated with highway expansion. Another stream of research has investigated the impact of road infrastructure on overall development. Amongst these are Boarnet (1998) and Chandra and Thompson (2000) who estimate models that demonstrate that the spatial allocation of development is affected by road infrastructure. In

Table 4
Summary of elasticity estimates

Citation	Travel time elasticity	Lane mile elasticity	Type of model	Data used
Goodwin (1996), SACTRA (1994)	−0.5–1.0			Derived from gasoline price elasticities
Hansen and Huang (1997)		0.3–0.7	Time-series cross-sectional fixed effects	California County-level data
		0.5–0.9		California Metropolitan-level data
Noland (2001)		0.3–0.6 (Short-run) 0.7–1.0 (Long-run)	Time-series cross-sectional fixed effects	State-level data
		0.5–0.8	Difference model with fixed effects	
Noland and Cowart (2000)		0.8–1.0 (Long-run)	Time-series cross-sectional fixed effects	Nationwide metropolitan-level data
		0.3	Two-stage least squares with weak instrument	
Fulton et al. (2000)		0.3–0.5	Two-stage least squares with good instrument	County level data from Maryland, Virginia, North Carolina, and DC
Cervero and Hansen (2001)		0.559	Two-stage least squares with good instrument	County level data from California
Rodier et al. (2001)		0.8–1.1	Disaggregate modelling study	Sacramento regional data and modelling system
Strathman et al. (2000)		0.29	Cross-sectional model	NPTS data, individual-level, nationwide
Barr (2000)	−0.3–0.4		Cross-sectional model	NPTS data, individual-level, nationwide

essence, these studies indicate that development is induced by new road infrastructure. Boarnet and Chalermpong (2001) relates changes in housing values, as an indicator of the increased demand for housing, to increased road infrastructure with the implication that this induces additional VMT. [10]

Boarnet (1997) attempts to reconcile the literature on development impacts from highway projects. He suggests that while from a regional perspective highway projects may have little if any growth inducing impacts, they may have significant impacts within specified corridors or sub-regional areas. The result is that highway projects may simply redistribute existing growth within a metropolitan area. To a large extent, this growth will be in ex-urban areas that are receiving gains in accessibility at the expense of downtown or older suburban areas.

[10] These studies are also consistent with studies that suggest that public investment (which is dominated by investment in transportation infrastructure) increases overall economic productivity (see, for example, Aschauer, 1989; Nadiri and Mamuneas, 1998; as well as critics such as (Tatom, 1991), who questions the methods used to come to this conclusion).

The theory of induced travel, whether by immediate behavioural travel adjustments or longer term land use impacts, appears to be clearly justified. Transportation planners have been reluctant to accept this conclusion that essentially challenges the notion that transportation projects can substantially reduce traffic congestion. However, the implication should not be that transportation projects have no benefit. It merely implies that the benefits cannot be attributed to changes in travel time. Going back to basic urban economic theory, induced travel effects imply that the changes in behaviour are translated through changes in land price valuation (i.e., the bid-rent curves of urban economics, see for example, Mills and Hamilton, 1994). This conclusion changes the context of transportation policy from congestion reduction to one of directing the growth of urbanized areas. We turn to a discussion of these issues and transportation policy in both the UK and the US.

4. Induced travel and changes in transportation and environmental policy

4.1. Transportation and environmental policy in the UK

In 1998 the UK Department of Environment, Transport and the Regions (DETR) established a new direction for UK transportation policy with the publication of the government's White Paper, *A New Deal for Transport: Better for Everyone* (Department of Environment, Transport and the Regions, 1998a). One of the key directives of this policy was that the government would no longer attempt to accommodate traffic growth through a strategy of "predict and provide." That is, road construction would not continue to meet forecast traffic growth. The level of forecast infrastructure needed to meet an unconstrained growth assumption was seen as unsustainable both environmentally and financially.

Goodwin (1999) states that this enabled alternative options, such as increased public transport and non-motorized modes, to be seriously considered. Integration of all modes of transportation was seen as a key goal while simultaneously reducing the need for motorized single-occupant vehicles. An emphasis on maintaining existing road infrastructure, rather than increasing its capacity, was another key element. The recognition that some road pricing options would be desirable, both for moderating demand, and for raising revenue for alternatives was another key conclusion.

Goodwin (1999) outlines much of the historical context and incremental changes that preceded the publication of the White Paper. Growing concerns about the environmental impact of road transportation were seen as a primary driver. These included concerns about the health costs of air pollutants, climate change impacts, acid rain and ecological impacts. The Standing Advisory Committee on Trunk Road Assessment (1994) report on induced traffic played a major role in changing the perspective on whether predict and provide was an economically sensible policy and has led to changes in the process of road appraisal in the UK.

The new appraisal process seeks to simplify the task for the decision maker by summarizing key information in a tabular format (Department of Environment, Transport and the Regions, 1998b). Price (1999) provides an overview of the new appraisal system, the purpose of which is to more clearly highlight environmental concerns (which tended to be lost in the volume of the detailed environmental impact assessments) against traditional cost benefit approaches which

have been used in the UK since the 1970s. The cost benefit approach embodied by the COBA model measures travel time savings, changes in vehicle operating costs, and changes in accident rates. A review of planned trunk road schemes was carried out using the new appraisal methods. Of 68 schemes considered for the Targeted Program of Improvements for trunk roads laid out in Department of Environment, Transport and the Regions (1998c), 37 were withdrawn or deferred for further analysis after the new appraisal methods were applied. Nellthorp and Mackie (2000) analysed how various appraisal factors affected the decision of whether to withdraw a scheme or not. They concluded that many of the environmental factors (excluding air quality) were influential while the cost benefit assessment (from COBA) was not significant in the decisions taken.

The Standing Advisory Committee on Trunk Road Assessment (1994) reported recommended new procedures of cost benefit analysis of road projects to account for induced travel effects. Interim guidance on this was published simultaneously with the SACTRA report (Department of Environment, Transport and the Regions, 1994). These procedures were updated in 1997 with an updated section of the UK Design Manual for Roads and Bridges (Highways Agency, 1997). This provided interim elasticity methods to account for induced travel effects; DETR continues to do research on updating four step modelling procedures for more complex schemes. [11]

Some analysis has been conducted on the differences in cost benefit results with and without the inclusion of induced travel effects. Small induced travel effects of 5–10% have been found to reduce the benefits of a scheme by anywhere from 20% to nearly 40%. [12] It is not clear whether any specific road schemes have either been abandoned or undergone major design changes in response to changes in the appraisal methods. However, the overall policy approach of abandoning a "wish list" of projects and announcement of a Targetted Programme of Improvements outlined in Department of Environment, Transport and the Regions (1998c) undoubtedly are in response to new qualitative knowledge on induced travel effects.

In the area of land use policy the UK has historically been able to better preserve land and avoid the sprawl development patterns of the US (though there are certainly examples of US style sprawl in the UK). Planning Policy Guidance 13 on Transport (Department of the Environment, 1994) was instituted to provide Local Authorities with guidance on better coordinating land use and transport planning. The aim is to reduce reliance on private vehicles, encourage modes with less environmental impact, and reduce both the number and length of motorized journeys. The promotion of development in centralized and accessible areas (by modes other than private cars) is explicitly stated as a goal. These sort of policies are certainly consistent with the goals of the White Paper.

Interestingly, if land use policy were completely effective one would expect capacity enhancements to result in less induced travel. This assumes that land use planning can effectively disconnect the response of developers to changes in the transport network. Induced travel

[11] In the US the National Cooperative Highway Research Program (project number 25-21) is conducting similar research geared at looking at the air quality impacts of changes in traffic flow. The proposed methodologies are quite comprehensive and will be equivalent to updating four step travel demand models and integrating them with land use and modal emissions models to account for induced travel effects and changes in vehicle dynamics.

[12] Parliamentary Record of the House of Commons, Hansard column 808 – 6 December 1996, HMSO: London.

impacts would then be limited to changes in the number of trips, routes, destinations, and modes. Some relocation of activities could still occur, but one would not expect major new sprawl development to occur (unless this is part of the land use plan). In theory, one could argue that effective land use planning would allow capacity enhancements to capture travel time reduction benefits more effectively. As shown previously, Rodier et al. (2001) estimate that 50% of induced travel effects occur if land use does not change in reaction to expanded capacity.

In July 2000 the UK government released a 10-year transport plan (Department of Environment, Transport and the Regions, 2000) following up on many of the policy documents issued in recent years. The plan outlines the proposed investment strategy for surface transport over the next 10 years. While the text of the document is generally consistent with the integrated transport policy of the original White Paper, an analysis of the actual expenditure plan is not quite consistent with the White Paper's policy. Of about £121 Billion of public expenditure proposed over the 10-year period, over 45% is devoted to trunk and local roads and slightly more devoted to rail and public transport (Annex 1 of Department of Environment, Transport and the Regions, 2000). While not all of the road spending is devoted to new capacity, there is an explicit target of widening 5% of the trunk road network, construction of 30 bypasses, and 80 major schemes to reduce congestion. The Transport Plan acknowledges that construction of new road capacity is not the solution to congestion problems, but the overall investment focus appears to disregard potential induced travel effects (including stating that congestion reduction is a specific goal).

Despite this major increase in spending on road projects, the Transport Plan also includes increases in rail and public transport expenditures. Local Authorities will also be required to develop integrated Local Transport Plans to improve planning focused around specific schemes. In addition, these Plans provide a mechanism for using transport funding to help address the needs of Air Quality Improvement Plans also required of Local Authorities.

The Transport Plan also allows Local Authorities to plan and implement congestion charging and/or workplace parking schemes. The Greater London Authority has also been empowered to implement a congestion charging scheme for which active planning is currently in progress. These ideas are consistent with a recognition of the need to price demand to relieve congestion without inducing new travel.

Overall the 10-year Transport Plan attempts to distribute substantial increases in public spending to many beneficiaries. While increases in road spending are significant, public transport and rail systems also are receiving substantial increases. Other than the potential for various congestion charging schemes, the overall plan does not appear to fully integrate much of the knowledge of induced travel effects developed in recent years.

4.2. Transportation and environmental policy in the US

Within the last decade, the general trend in policies of the US Federal government has been to better integrate transportation policy with environmental policy. This trend began with passage of the ISTEA in 1991. Perhaps the two most significant examples of the integration of transportation and environmental policy has been the establishment of the Congestion Mitigation and Air Quality program which dedicates specific funding from the Highway Trust Fund for projects that

improve air quality. In addition, the Clean Air Act Amendments (CAAA) of 1990 strengthened the requirement that metropolitan transportation investment programs "conform" with state implementation plans for achieving the National Ambient Air Quality Standards. This requires that the mobile source emissions "budget" cannot be made worse by the planned transportation system. Naturally this involves forecasting and modelling of transportation systems and has spurred much research into developing models that can actually measure and estimate these effects.

More recently the TEA-21 of 1998 has continued both the CMAQ program and the transportation air quality conformity requirements. In addition this legislation required the US Department of Transportation (DOT) to institute a "streamlined" process for transportation project facilitation and delivery. The DOT has interpreted these "streamlining" provisions as a means to encourage earlier consideration of environmental issues in the transportation planning and project development process.

Review of the environmental impact of Federal projects is one of the Environmental Protection Agency's (EPA) major roles as specified by the National Environmental Policy Act (NEPA) of 1970. Environmental Impact Statements (EIS) for Federal projects are developed by the lead agency (the Federal Highway Administration in the case of highway projects) but reviewed by EPA (as well as the general public). The role of the EIS is to provide information to decision-makers and the public about the environmental impact of projects and possible alternatives. The alternatives analysed are generally minor (e.g. changes in routing or alternative mitigation strategies). Major decisions on project scope have already been pre-determined at earlier phases of the transportation planning process, often without undergoing significant environmental review. Projects are often delayed due to the inadequacy of early stages of decision making that preclude the consideration of a broad range of alternatives. This is the element that the streamlining provisions are aimed at correcting.

An EIS will generally specify and define the goal for the specific project being evaluated. [13] The goal of many transportation projects is to reduce congestion; however, the studies cited above strongly suggest that adding highway capacity will not be an effective solution for achieving long- term congestion reduction goals. Alternative approaches may be far more effective than merely adding more capacity. For example, a more realistic approach to actually controlling congestion would be to propose congestion pricing on existing road capacity (as an alternative to new capacity construction). Provision of public transport services and redevelopment of existing land (e.g. brownfields and infill development) may also lead to less regional congestion, while also serving the needs of economic development (albeit on different parcels of land).

The research reviewed above suggests that adding highway capacity will facilitate development either on previously undeveloped land or more intensive development near the proposed project. The linkage of development impacts to specific transportation projects requires an analysis of the cumulative and secondary impacts of the project. Regulations promulgated by the Council on Environmental Quality (CEQ)(1987) require the assessment of cumulative impacts. Many Envi-

[13] EIS terminology defines project goals under the "purpose and need" of an EIS.

ronmental Impact Statements for highway projects currently do not conduct a high quality analysis of cumulative effects (i.e., the land development impacts that are induced by the project). In addition, many highway projects are analysed in segments, rather than as an entire corridor which would tend to underestimate the potential cumulative effects in the long run.

Long run development impacts from capacity expansion suggest that project goals should be defined exclusively with regard to land development objectives, not congestion reduction. This type of justification is normally avoided by transportation agencies. An assessment of transportation projects based upon their land development impacts obviously creates more political tension in the promotion of transportation projects. The business community and developers are generally very active in promoting projects that increase access to undeveloped land and resulting economic development on that land. A more detailed analysis of how transportation projects interact with land development is essential information that is needed to improve decision-making and the environmental outcomes of specific projects.

If congestion relief is not the stated goal of a project this would also imply that alternatives to capacity expansion might be more appropriate. For example, if broad economic development and sustainability goals are stated as goals within a corridor EIS, then the possible range of solutions may expand well beyond the analysis of highway options or even beyond other transportation options.

As mentioned previously, the CAAA requires transportation plans to be in conformity with State Implementation Plans for meeting the National Ambient Air Quality Standards (NAAQS). What this means is that states and metropolitan planning organizations must forecast the impact of transportation plans (i.e., a collection of many different projects) on total emissions of criteria pollutants (nitrogen oxides, hydrocarbons, carbon monoxide, and particulate matter).

Regional transportation planning agencies (or the states) generally maintain a system of models to forecast and evaluate the impact of transportation projects and plans. These models are usually deficient in accurately forecasting emissions (Transportation Research Board, 1995) partly because they do not adequately account for both short run and long run induced travel effects. This can be partly corrected by building feedback mechanisms into the models to at least account for some of the short-run impacts (Johnston and Ceerla, 1996a). Air quality regulations already require this step for conformity analysis, though actual practice has generally not kept pace with the regulatory requirement.

Some EPA regions are working with metropolitan planning organizations to improve the state of the practice in the modelling of transportation impacts, in particular the impacts on land development. Various modelling packages (none of which are ideal) are available to provide estimates of land development changes induced by transportation and accessibility changes.[14] Improved modelling of these impacts would provide decision makers with far better information on the short-run and long-run emissions impact of alternative transportation plans and are critical for developing State Implementation Plans that will actually help bring a region into attainment of the NAAQS. Project selection criteria would also be vastly improved, as shown by Johnston and Ceerla (1996a,b) and Rodier et al. (2001).

[14] A good review of these models is contained in Parsons Brinckerhoff Quade and Douglas (1999).

The DOT is also incorporating measures of induced travel demand into their Highway Economics Requirement System (HERS) which attempts to determine total financial needs for the US highway system using a cost benefit analysis approach (US Department of Transportation, 1999). This model includes travel demand elasticities of 1.0 in the short run and 1.6 in the long run with respect to total user costs. These are used as elasticities for individual links on the highway network and therefore include route shifts that may not represent induced VMT effects.

The inclusion of these user cost elasticities in the HERS model allows estimated VMT growth to respond to changes in recommended investment levels. For example, average annual VMT growth (over 20 years) for large urbanized areas is estimated to be 1.66% if annual average investments are $46.3 Billion while an investment level of $94.0 Billion could result in VMT growth of 2.06% annually. It is unclear, however, how this analysis actually influences the allocation of investment from the Federal government. While TEA-21 authorized spending levels for transportation, subsequent annual appropriations of funds have been linked to annual gasoline tax revenues with no consideration of how investment levels may affect VMT growth. In fact, US Department of Transportation (1999) suggests that investment needed to maintain current conditions, estimated using the HERS model, is generally higher than actual investment by both the Federal and State governments.

Therefore, while the theoretical basis of induced travel effects appears to be acknowledged by the US DOT, the actual investment of Federal dollars is still largely driven by political imperatives (such as demands for congestion reduction) and the levels of revenue collected by the Federal gasoline tax. US DOT does not make decisions on specific projects since these are made by state Departments of Transportation and sometimes by local Metropolitan Planning Organizations. However, the availability of funding and the incentives this provides to state governments by providing an 80% match to local funding can certainly bias decision making.

Boarnet and Haughwot (2000) suggest that radical reform of the Federal role in highway funding might be an effective policy for changing urban development patterns. They suggest that if local metropolitan areas spent local money (rather than Federal or even state money), that cost benefit analysis would be conducted and that ultimately local decision-makers would choose better projects.

Even without this type of radical reform, the science and economics of induced travel effects are being recognized at the project level through the requirements of NEPA and the CAAA conformity requirements. These statutory and legal requirements are beginning to have an impact on policy for certain specific projects. While Federal money may currently distort decision-making, Federal regulations may be able to improve decision- making (Downing and Noland, 1998).

The US debate on these issues is fundamentally tied to issues of community livability and sprawl development. Suburban congestion has been linked to sprawl development patterns by those promoting "livability". It is clear from much of the induced travel research that increasing road capacity tends to encourage sprawl development while also being ineffective at solving congestion problems. Despite this clear linkage, TEA-21 still authorizes tremendous resources to new highway construction, potentially undermining other efforts to achieve livability goals.

5. Conclusions

The research evidence on induced travel effects clearly shows that behavioural responses are real and can have significant impacts on the congestion reduction benefits of capacity expansion projects. Regardless of the specific impact on congestion, VMT growth is likely to be larger with more highway capacity relative to less highway capacity. Both in the US and the UK research efforts are underway to improve modelling and assessment tools to measure the impacts of these effects.

Transport policy is also gradually changing in both countries. UK policy appears to have been more influenced by this research, primarily through the abandonment of forecasting based on a predict and provide philosophy, though the recently released 10-year Transport Plan appears to be a step backward. In the US, national policy has aimed to be more inter-modal in perspective, but in practice funding incentives and political inertia have made major change difficult. Much of the change in US policy is actually beginning to occur due to more detailed analysis at the project level of induced travel and induced development impacts. In both countries, these changes are being driven by environmental concerns. In the US environmental statutes are enabling much of the change at the project assessment level rather than from directives specified by the Federal government.

Overall, the new knowledge being developed of how infrastructure affects travel behaviour and land use patterns will hopefully lead to actual implementation of improved policies and project selection allowing greater choices for individuals using the transport network while minimizing environmental impacts.

Acknowledgements

We would like to thank those many individuals who have contributed to the debate on these issues and the insights they have provided. In particular we would like to thank Robert Johnston, Todd Litman, Phil Goodwin, Lewis Fulton and Stuart Porter for providing helpful suggestions for improving this paper. The authors take full responsibility for any errors or omissions. The conclusions and opinions expressed in this paper do not necessarily represent the views of the US EPA or the US government.

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VIA FEDERAL EXPRESS

September 13, 2006

Robert W. Bloom, Jr.
Bridge Program Manager
Ninth Coast Guard District
1240 East North Street
Cleveland, Ohio 44199-2060

Re: DIBC Bridge Permit Application, Detroit, Michigan
Public Notice 09-03-06

Dear Mr. Bloom:

We have prepared and are submitting these comments on behalf of the Gateway Communities Development Collaborative and the Delray Community Council with regard to the pending international bridge permit application filed by the Detroit International Bridge Company as described in USCG, Public Notice 09-03-06 (July 28, 2006).

The Gateway Community Development Collaborative (GCDC) was established in 1999 as an association of community-based nonprofit organizations involved in the planning and development of housing and economic development projects in Southwest Detroit. Its mission is to act as a collective voice for its member organizations and enhance their individual development initiatives through joint planning, advocacy and marketing. GCDC Members include:

- Bagley Housing Association
- Bridging Communities
- Greater Corktown Development Corporation
- Mexicantown CDC
- Michigan Avenue Business Association
- Neighborhood Centers Inc.
- Southwest Detroit Business Association
- Southwest Detroit Environmental Vision
- Southwest Solutions/Southwest Housing Corporation

The Delray Community Council is a neighborhood group located in southwest Detroit. The Council is dedicated to the continued life of Delray as a neighborhood, and to promoting development and redevelopment of the area as a

residential neighborhood, and to further improve the quality of life for Delray residents.

We have attached the business address of each of those organizations. (Attachment A) Please add each one to USCG's list of interested parties with regard to the DIBC bridge application.

The Detroit International Bridge Company has applied to the USCG for a permit to construct a new 6-lane international bridge to Canada.[1] Before granting a permit for a new bridge, USCG must conduct an assessment under NEPA of the impact of the subject action on the human environment. As discussed below, while some categories of actions will have so negligible impact that no project specific assessment is required under NEPA, this new bridge is not such a project and a full environmental impact statement is required.

It is the position of GCDC and the Council that an EIS is required before a permit decision is made.

The Proposed Action

The careful and complete definition or description of a proposed action is a necessary prelude to evaluating whether an action is likely to have significant short and long term direct and indirect impacts on the human environment.

Presently the demand for international vehicular crossings between the United States and Canada in the Detroit area is met by the Ambassador Bridge and the Detroit Windsor Tunnel. For trucks (and thus international trade) the Ambassador Bridge is the principal crossing because few trucks can or are permitted to use the tunnel. Assuming border crossing capacity is increased, border crossings will increase 180% over the next 30 years from 9.5 million crossings per year to 17.2 million crossings, with truck traffic increasing by an even greater rate, 230%. DRIC, Travel Demand Forecasts, Working Paper (Sept. 2005), Ex. 5-23.[2] (excerpts at Attachment C) (The DIBC's permit application at p. 15 grossly understates the current traffic growth estimates.)

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[1] The proposed design has wide shoulders which might permit a future widening to eight lanes. The possibility of such a future two-lane expansion to the new bridge should be explored in the scoping phase of the EIS and, if the possibility is real, the impacts of such additional capacity should be considered.

[2] This DRIC report is included in Attachment B, a collection of relevant DRIC reports in electronic form on a CD.

Under the present base travel forecast prepared for the Detroit River International Crossing Study ("DRIC"), the effective capacity (the point at which congestion is so significant that traffic conditions are "unstable") of the Ambassador Bridge is about 3,000 vehicles per hour in one direction and the absolute maximum capacity is about 3,500 vehicles per hour. DRIC, Travel Demand Forecasts. The base forecast travel demand indicates that demand will exceed the effective capacity by about 2011 and reach the absolute maximum capacity by 2020. Thereafter, unless there is a new bridge crossing, traffic will not be able to increase further. However, if additional capacity were available, the base travel forecast for 2035 is 4,500 vehicles per hour, which is 1,000 vehicles per hour above the Ambassador Bridge's maximum capacity.

When expressed on an annual basis, construction of additional river crossing capacity to cater to travel demand after 2020 will permit additional border crossings on the order of 1,780,000 annual auto trips and 2,220,000 annual semi truck trips (a total increase of 3,000,000 trips per year) that could not otherwise occur because of crossing capacity limitations. DRIC, Travel Demand Forecast, Ex. 5-23.

If the Ambassador Bridge is kept in service (and the permit application indicates it will), then a new six-lane bridge crossing will represent an approximate 150% increase in crossing capacity. Even if the Ambassador Bridge were taken out of service, a new bridge will represent a 50% increase in border crossing capacity.

In addition to the absolute increase in travel that an increase in crossing capacity will permit, adequate crossing capacity will reduce the time and cost associated with delays and congestion associated with crossing facilities otherwise operating at or near capacity. Given the forecast that Detroit/Windsor economic activity related to international trade will grow to the extent that international travel across the Detroit River is able to grow, increased border crossing capacity beyond the capacity of the present bridge and tunnel portends major economic and community growth in Detroit and Windsor.

In this context, clearly the proposed action before the Coast Guard is not just the construction of a new six-lane bridge. Rather, the proposed action can be described as "Undertake a new border crossing in order to increase border crossing capacity by 50% to 150% in the vicinity of southwest Detroit in order to permit the additional growth of 3,000,000 trips per year by 2035 beyond current crossing capacity and to permit the expanded growth of Metropolitan Detroit/Windsor as an international trade center."

It is worthwhile considering the alternatives to issuing this specific bridge permit. The "no-action" alternative would be no new border crossing capacity in the Detroit area with the border crossing capacity being reached in the next 15 or so years. Clearly, if an action were proposed to cap crossing capacity so that no border

crossing growth would occur after 2020, everyone would agree that would be a public policy decision with very significant impacts (largely adverse) on the southeast Michigan region, requiring an EIS. The decision to permit a new bridge to expand crossing capacity to permit border crossing growth after 2020 will have analogous impacts, mostly positive, likewise requiring an EIS.

The fact that the proposed action is almost universally desired in order to encourage regional economic growth does not obviate NEPA's requirement that the significant effects of such an action on the human environment be fully considered before a bridge permit is granted. It may well be that the best location for a new border crossing is somewhere other than the vicinity of the Ambassador Bridge.

USCG Needs To Incorporate DRIC Study Into Its Review

The "go-it-alone" DIBC permit application is in marked contrast to the Detroit River International Crossing Study being conducted by a bi-national partnership of transportation agencies (MDOT, FHWA, Transport Canada and the Ontario Minority of Transportation). As part of the DRIC study, the alternatives analyses have identified numerous significant impacts associated with alternative crossing locations including a bridge adjacent to the Ambassador Bridge. The DRIC Study is preparing a draft EIS to insure that such impacts are fully considered. Because nearly everything being done in the DRIC Study is relevant to considering the impacts of the DIBC permit application, we are submitting with our comments numerous DRIC reports in electronic form on a CD (Attachment B). We believe these reports demonstrate that a new river crossing, wherever located, will have significant environmental impacts. Furthermore, we urge the USCG to defer action on the permit application until DRIC has run its course. Otherwise, USCG will have to duplicate a great deal of the alternatives analyses and environmental impact analyses which DRIC is performing. We have attached letters from State Representative Tobocman to the FHWA (May 27, 2005), and the GCDC to FHWA (May 25, 2005) (Attachment D) that make the case for acting on a specific bridge application only after the DRIC Study has been completed.

Analysis of the Bridge Application on a Stand-Alone Basis Will Violate the Prohibitions on Project Segmentation Under NEPA.

CEQ requires that proposed actions be considered in their entirety and that actions not be analyzed as discrete segments that could tend to minimize impacts and avoid preparation of an EIS.

> "The range of actions that must be considered includes not oly the project proposal but all connected and similar actions that could contribute to cumulative effects. Specifically, NEPA requires that all related actions be addressed in the same analysis. For example, the

> expansion of an airport runway that will increase the number of passengers traveling must address not only the effects of the runway itself, but also the expansion of the terminal and the extension of roadways to provide access to the expanded terminal. If there are similar actions planned in the area that will also add traffic or require roadway extensions (even though they are nonfederal), they must be addressed in the same analysis." CEQ, Considering Cumulative Effects Under the National Environmental Policy Act (January, 1997), pp. 1, 2.

This permit application as presented to USCG clearly segments the overall action being undertaken by the DIBC. The overall project is the expansion of the Ambassador Bridge crossing through i) expansion and improvements to the bridge plazas to address needs related to tolls, customs, immigration and security, ii) access improvements to state trunkline highways and the Canadian roadway system, and iii) construction of additional bridge capacity. This application refers only to additional bridge capacity and not the other two related activities.

In addition to the new bridge capacity reflected in the DIBC's permit application, a number of other bridge-related projects are in the offing. For example, DIBC has begun to consider improvements to the plaza and access roads beyond what is included in the Gateway Project. Letter, FHWA to USCG (June 7, 2006) and associated DIBC report, Today and Future (2006) (Attachment E). DIBC also has related plans underway to relocate Fort Street, again not mentioned on the permit application. Letter, DIBC to MDOT (May 17, 2006), Letter, MDOT to DIBC (July 13, 2006); see also Letter, FHWA to American Consulting Engineers of Florida (June 21, 2006). (All in Attachment E) DIBC has recently requested approval for an expansion of the Canadian customs plaza. Letter, Transport Canada to American Consulting Engineers of Florida (April 15, 2005) (Attachment F). We are informed that the General Services Administration has a master plan study underway to identify federal facility needs. That study may prompt further expansion of the bridge plaza. The DRIC Study has identified the need to greatly expand the U.S. and Canadian bridge plazas to meet long-term traffic needs. DRIC, Evaluation of Illustrative Alternatives on U.S. Side of Border, Vol. 1, Summary (November 2005) ("U.S. Summary of Evaluations"), p. S-43, S-46. (Attachment G (excerpts)). None of these activities are reflected in the DIBC's permit application but USCG must take them into consideration in assessing whether the proposed action will have significant impacts.

Note FHWA has already expressed its concern that incremental consideration by federal agencies of DIBC's developing plans will lead to inappropriate segmentation of project impacts from the point of view of NEPA. Letter, FHWA to USCG (June 7, 2006). (Attachment E).

An Action Qualifies For A Categorical Exclusion Only If It Is So Identified in Adopted Agency Procedures And Major New Bridges Are Not So Identified.

In its notice of July 28, the Coast Guard has stated that it has made a tentative determination that the construction of a new 6-lane, mile-long international bridge should be granted a Categorical Exclusion from an analysis of its environmental impacts. USCG, Public Notice 09-03-06 (July 28, 2006). This initial determination is in error because i) the USCG's adopted list of actions which qualify as Categorical Exclusions does not include projects like a new 6-lane international bridge, and ii) the proposed action meets all of the criteria for the conduct of an environmental impact statement. Accordingly the correct determination should be that an environmental impact statement must be prepared before the Coat Guard grants or denies the pending permit request.

The NEPA implementing regulations, 40 C.F.R. 1500 *et seq.*, define "Categorical Exclusion" to be a category of actions which an agency through formally adopted procedures has determined will have no significant effect on the human environment and therefore no environmental assessment or environmental impact statement is required. 40 C.F.R. 1508.4. If a proposed action does not fall within a category or actions classified under adopted agency procedures as a "Categorical Exclusion," either an EA or an EIS is required. 40 C.F.R. 1501.4. The USCG has adopted procedures in compliance with § 1508.4 that define categories of actions that are deemed Categorical Exclusions. NEPA Implementing Procedures and Policy for Considering Environmental Impacts, COMDTINST M16475.1D (series) ("M16475.1D"), Figure 2-1. Figure 2-1 "contains a list of categories of actions that the USCG has determined, both individually and cumulatively, not to have significant environmental impacts." USCG, Office of Civil Engineering, Tools For Decisonmaking: Environmental Considerations (undated), p. 19. "In order to categorically exclude your proposed action, it must fit into one or more of the categorical exclusions listed in [M16475.1D]." *Id.* Even if a project falls within one of the categories on that list, "you should look for circumstances that would make a CE inappropriate." *Id.* Finally, "all aspects of the proposed action must be covered by one or more Categorical Exclusions in order to Categorically Exclude the action." Tools For Decisonmaking, p. 20.

The USCG standard CE form makes this same point because it requires the Environmental Reviewer to specifically identify which CE category from Figure 2-1 covers the proposed action. USCG, Categorical Exclusion Determination Form, Enclosure (3) to M16475.1D. The Public Notice does not identify a specific CE category.

Figure 2-1, the Coast Guard's list of 35 categories of Categorically Excluded projects and actions, does not include any kind of new vehicular bridge, much less a

6-lane mile-long international bridge capable of carrying up to 50,000 vehicles per day. In particular, Category 32(a), modification or replacement of an existing bridge, does not apply. The application obviously does not propose to modify an existing bridge. Nor does the application propose to replace the existing bridge; it specifically states the existing bridge will probably be kept in service. Further, even if the present bridge is taken out of service, the new bridge would not only replace existing lanes but expand capacity by 50%. Finally, this category does not apply to bridges of historic significance and the SHPO has already notified USCG that the Ambassador Bridge has historic significance (as does its contemporary, the Blue Water Bridge.) Letter, Michigan State Historic Preservation Officer to USCG (May 4, 2006). (Attachment H). Accordingly, the action does not qualify as a Categorical Exclusion.

It is clear from the foregoing that even if the proposed action had no significant impacts (an erroneous conclusion on the facts of this proposal), it can not be exempted from environmental review as a Categorical Exclusion because it is not one of the actions which the USCG has formally defined as qualifying for a Categorical Exclusion. Thus the statement in the Public Notice that the proposed new 6-lane international crossing "is a Categorical Exclusion for the purposes of NEPA because it satisfies criteria for such actions" is incorrect as a matter of CEQ regulations and USCG procedures.

However, even if an action falls within a category of actions defined as a Categorical Exclusion, an environmental assessment or environmental impact statement must be prepared if the action will have a significant impact on the human environment. The proposed action here will certainly have very significant impacts on the environment.

The Proposed Action, A New 6-Lane International Border Crossing, Will Have Significant Impacts on the Human Environment, Requiring the Preparation of an Environmental Impact Statement.

An USCG implementing manual advises:

"HOWEVER, if your proposed action:

does not fit into a USCG Categorical Exclusion;

has, or might have, extraordinary circumstances; or

has, or might have, individual or cumulative significant environmental impacts

then you must proceed to a more detailed level of environmental evaluation.... Generally, you should proceed to an EA if you are

> unsure of the potential for significant impacts from your action and proceed to an EIS if you know or suspect your proposed action will have significant impacts." Tools For Decisonmaking, p. 21 (capitalization as in the original).

The CEQ regulations include a list of factors that justify an EIS where significant impacts were expected. 40 C.F.R., 1508.27(b). They include:

- Significant impacts on public health or safety
- Impacts on the quality of the human environment that are likely to be highly controversial in terms of scientific validity or public opinion
- An effect on the human environment that is highly uncertain or involves unique or unknown risks
- Future precedent setting actions with significant effects or a decision in principle about a future consideration
- Individually insignificant, but cumulatively significant, impact when considered along with other past, present, and reasonably foreseeable future actions
- The action involves a structure that is eligible for listing in the National Register of Historic Places
- The action involves an impact that may be both beneficial and adverse. A significant impact may exist requiring an EIS even if it is believed that, on balance, the effect will be beneficial.

Even without considering the above factors, it is clear that a new 6-lane international bridge will have significant direct traffic, land use and air quality impacts flowing from the additional traffic capacity provided by the new bridge and it will generate enormous cumulative indirect impacts because of the economic and community impacts which will flow from a new border crossing with Canada. Common sense dictates that a project with those impacts is exactly the kind of project for which an EIS should be prepared.

The Federal Highway Administration ("FHWA") and the Michigan Department of Transportation ("MDOT") have independently determined that new international bridges, even if adjoining existing bridges, require a full EIS. An EIS was required for the new bridge next to the Blue Water Bridge. The Detroit River International Crossing Study is currently performing an EIS for alternative bridge crossings of the Detroit River in the vicinity of the Ambassador Bridge. As you are aware, the Canadian Government has made a similar determination with regard to the pending DIBC application, that it requires an Environmental Assessment under

the Canadian Environmental Assessment Act. Letter, Transport Canada to USCG (August 30, 2006) (Attachment I).

A discussion of the above factors as applied to the present bridge proposal also reveals that an EIS is required.

1. Significant Effects On Public Health And Safety

(a) Immigration and Customs.

New crossing capacity for 3,000,000 trips per year will have a significant impact on immigration and customs facilities in Detroit and Windsor. Plaza space limitations in Windsor today will require either an expanded bridge plaza or an expanded offsite secondary inspection facility, either which has significant impacts both from a customs and immigration view but also in terms of land acquisition and neighborhood impacts near expanded plazas and inspection areas. DRIC, Generation and Assessment of Illustrative Alternatives Report (Canadian Side) (Draft) (November 2005) p. 10, 105-106 (120 acres required for Canadian plaza) (Attachment J, excerpts).

The situation is the same on the U.S. side. DRIC, U.S. Summary of Evaluations, p. S-49. The DRIC study in consultation with border inspection agencies determined that general plaza space requirements to handle forecast volumes need 80 to 100 acres, *Id.* at p. S-43, but the Ambassador Bridge plaza is only about 30 acres. *Id* at S-41. This suggests that 50 or more acres for the U.S. bridge plaza will be required over the next 30 years.

(b) Issues related to the prevention of terrorism need to be addressed.

As in the case of customs and immigration, border security and terrorism concerns will be greater as traffic increases. We do not have the expertise to comment on these issues in detail but they are perhaps the most significant issues to be considered. An EIS should analyze both how these concerns will affect the bridge plazas and any offsite security areas and how requisite changes to bridge plazas to accommodate border security will affect the surrounding communities.

(c) Redundancy of a crossing if there is catastrophic damage or disruption to one bridge or a plaza serving a bridge.

With every increase of international trade through the Detroit bridge and tunnel crossings, the negative impacts flowing from the disruption of one or both of these crossings becomes more severe. This is particularly true of the Ambassador Bridge because most trucks cannot detour to the tunnel. Under a twinned bridge alternative, all truck traffic must funnel through a common plaza at each end of the

pair bridges. Something as commonplace as a major traffic accident[3] or a severe weather event like a tornado, could stop international trade for an indefinite period. At the Canadian end, the limited access via the Huron Church Road likewise represents a major bottleneck if there is a major accident or fire or other event along that road. Compound these scenarios with a terror threat or action and the impacts of lack of crossing redundancy are clear.

This redundancy concern, in addition to neighborhood impacts, is what prompted the Canadian agencies participating in the DRIC study to remove the twinned bridge crossing from the list of alternatives for further study. U.S. Summary of Evaluations, pp. S-49, 50; Canadian Summary of Evaluations, p. 112. Other organizations have also stated the redundancy of river crossings is essential:

- Detroit Regional Chamber, Border Crossing Policy (October 12, 2005), ("Meanwhile, the threat of terrorism has meant concerns about infrastructure redundancy and broad policy shifts affecting the border....A new crossing should ensure redundancy relative to existing structures.")

- Letter, Daimler Chrysler to MDOT (March 28, 2006), ("Fourth, we favor a site that is removed from existing crossing points for a number of reasons, including flexibility and resultant dependability of freight flows, security and competitive factors.")

- Letter, State Representatives to Representative LaJoy (January 25, 2006), ("Other Crossing proposals were eliminated due to the increased concerns of the Department of Homeland Security that redundancy needs to be created at the Detroit-Windsor border so that crossing alternatives exist in the case of terrorist strike.") (Correspondence at Attachment K.)

A river crossing alternative consisting of a new bridge located elsewhere with its own plazas and access roads would provide a crossing to which traffic could divert in the event that the Ambassador Bridge crossing is shut down.

(d) Traffic Safety and Operations

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3 The author was residing in Sydney when a tanker truck leaked a few hundred gallons of diesel fuel of fuel oil onto the Sydney Harbor Bridge, creating a traffic jam that extend for several square miles on either side of the bridge and lasted 12 hours.

The significant increase in traffic that additional border crossing capacity will bring to Windsor and southwest Detroit will have significant impacts on traffic operations and safety. The traffic studies for DRIC show that access roads in Canada are congested now with Ambassador Bridge traffic. DRIC, Travel Demand Forecasts, pp. 108-111. If no new capacity is provided to accommodate traffic growth, congestion will become severe. A new Canadian freeway connection would greatly improve traffic conditions but at a significant community cost due to home and business property acquisition for right-of-way and attendant disruptions to the community. DRIC, Canadian Summary of Evaluations, §3.5. Because of the Gateway Project on the U.S. side, access traffic impacts will be less in the short term. But the Gateway Project did not look past 2015. MDOT/FHWA, Environmental Assessment & Programmatic Section 4(f) Evaluation, Ambassador Bridge Gateway Project (January, 1997). Accordingly, it did not address access issues and impact beyond what is now the short term horizon. Access issues after 2015 must be addressed in an EIS.

(e) Air Quality

USEPA has identified six priority Mobile Source Air Toxics (MSATs), including benzene, formaldehyde, diesel particulate matter/diesel exhaust organic gases ("PM") and acrolein. Burbank, C., FHWA, Interim Guidance on Air Toxic Analysis in NEPA Documents (Feb. 3, 2006). Most of these are associated with diesel engine emissions. The Interim Guidance identifies projects with the potential for meaningful MSAT differences among project alternatives, including major intermodal freight facilities that have the potential to concentrate high levels of diesel particulate matter in a single location. The Interim Guidance recommends that environmental analyses for such projects should include a quantitative analysis that attempts to measure the level of emissions for the six priority MSATs for each alternative.

MDEQ, Detroit Air Toxics Initiative, Risk Assessment Report, Public Summary (Nov. 2005), reports on a one-year air toxics monitoring study including several monitors in southwest Detroit and several more in nearby communities. Benzene and formaldehyde were identified for risk reductions efforts at each of those locations. Further, although monitoring data were not collected, the Public Summary identifies diesel particulate and acrolein as being of concern at those same locations because they are associated with mobile source emissions. The proposed bridge lies within the area of concern identified in MDEQ's air toxic study.

Research indicates that diesel vehicle emissions are substantially affected by the variability of driving behavior, and that stop-and-go activity produces higher emissions compared to free-flow travel. Clark N., *et al.* Factors Affecting Heavy-Duty Diesel Vehicle Emissions, J. Air & Waste Manage. Assoc. 52, pp. 84–89 (2002). Recent research suggests that the particulate fraction of diesel exhaust is the

dominant contributor to urban air toxic-related health risks (e.g., South Coast Air Quality Management District ("SCAQMD"), Multiple Air Toxics Exposure Study in the South Coast Air Basin: MATES-II. Final Report (and appendices) (2000). Other studies observe that ultra fine PM may be even more toxic than larger size PM, when comparing PM of identical mass and composition. *E.g.*, Zhu Y. *et al.*,. Study Of Ultrafine Particles Near A Major Highway With Heavy-Duty Diesel Traffic. Atmos. Environ. 36, pp. 4323-4335(2002); .Zhu Y. *et al.*, Concentration And Size Distribution Of Ultrafine Particles Near A Major Highway, J. Air & Waste Manage. Assoc. 52, pp. 1032-1042 (2002). "Diesel-powered vehicles produce far more PM, including $PM_{2.5}$, than gasoline-powered vehicles (on a g/mi basis). The degree to which these factors produce microscale problems is a function of the number of heavy-duty vehicles operating in the affected area, the distance to receptors, and the unit risks associated with exposure to diesel exhaust." Tamura, T., *et al.*, Sonoma Technology, Inc., Transportation-Related Air Toxics: Case Study Materials Related to US 95 in Nevada, § 6.5.2. (2003)(prepared for FHWA, Office of Natural Environment).

Clearly an international bridge where thousands of semi-trucks stop, idle, crawl forward, stop again and finally slowly accelerate up the grade to the bridge will be a hotspot of diesel emissions requiring detailed air quality analyses. There have been a number of documented cases in which more that 400 trucks have exited from the Bridge in one hour. The Corradino Group, Ambassador Bridge/Gateway Project, Re-evaluation Report, p. 15 (August, 1999) (prepared for MDOT and SEMCOG). This number will increase with improvements in the plaza on the U.S. and as truck traffic more than doubles over the next 30 years. That is a tremendous amount of stop-and-go truck traffic.

Diesel emissions are a particular concern with regard to a second bridge crossing because southwest Detroit is within the $PM_{2.5}$ nonattainment area. USEPA recently filed environmental objections to the draft EIS for the proposed Detroit Intermodal Freight Terminal which is close to the Ambassador Bridge and requested that the draft EIS be revised to better address fine particulate matter associated with diesel emissions (as well as environmental justice issues) and requested "that the Final EIS more fully describe localized impacts of $PM_{2.5}$ and commit to air quality mitigation strategies." 70 Fed. Reg. 53657 (Sept. 9, 2005). The DIFT, Air Quality Analysis Protocol, Detroit Intermodal Freight Terminal, Environmental Impact Statement (March 2005) (included on Attachment B), is an example of the kind of comprehensive analysis which should be performed for the proposed actions here.

2. Potential for Controversial Effects

(a) The application conflicts with recommendations of DRIC Study which has dropped a second Ambassador Bridge crossing for environmental and community impact reasons.

Although a second bridge crossing at the Ambassador Bridge is an attractive alternative from a number of aspects, as noted elsewhere the affected Canadian agencies dropped it from further consideration in the DRIC study as the result of both adverse community impacts and the fact that the crossing does not address redundancy concerns. Proposing a bridge at a location opposed by the Canadian transportation agencies is by any definition controversial.

(b) Issues over public or private ownership of the river crossing.

There is substantial concern in many quarters with granting a private company a virtual monopoly of border crossings in Detroit. See public comments raising this and other issues collected at Attachment L. This is not the time and place to decide the merits of that issue, but it is exactly the type of issue which will have substantial potential impacts on the human environment, justifying an environmental impact study.

The GCDC's testimony to the State Joint Transportation Committee states the issue well:

> "The fundamental underpinning of this success is the public sector's leadership and involvement – and this must continue. The GCDC firmly supports public ownership and oversight of the next border crossing. The interests of the private sector, while important, are simply too narrow to fully achieve all that the DRIC study sets out to accomplish. The greatest threat to achieving the DRIC study mandate is allowing one party – whether public or private – to wield undue influence and control. The Gateway Communities Development Collaborative has had decades of experience with the challenges of working in an area that hosts the only privately-owned international crossing along the northern U.S. border and know first-hand of the inherent conflicts between the private interest to maximize profits and the public interests of community development, community cohesion, and security. We ask the joint committees to consider that the company that owns the Ambassador Bridge owns an entire transportation conglomerate of shipping, trucking, and freight handling interests may of which are also located in southwest Detroit. We ask you to consider that this conglomerate has an extensive concessionaire privilege on all transportation-related

> projects of the Detroit Wayne County Port Authority. We ask that you consider the proposal, announced last October, to lease the Detroit interests of the Detroit-Windsor tunnel to this conglomerate. Finally, we ask you to consider the motivation and implications of criticisms raised by this conglomerate of the DRIC study. We have considered these issues and have concluded without reservation, that providing a monopoly to a private entity on the control and operations at the Detroit Windsor international border will not result in a more efficient and secure border system, local community and economic development, or mutually beneficial international relations." GCDC Testimony to the Joint House and Senate Transportation Committee DRIC Study – March 30, 2006

A number of other witnesses repeated this point to the Committee during its hearings. Their testimony is included at Attachment L.

A related issue is priority of certain shipments over the bridge in periods of congestion. At present, some trucks are given priority during periods of congestion to avoid disruption of industrial production. In general that makes sense. But, if such a policy is going to be part of the operating practices, what commodities/shippers/customers will be given priority (thereby permitting an analysis of the economic impact of that practice) and how will this be accommodated on the new bridge and its plazas (in order to consider physical impacts)?

(c) AASHTO guidance recognizes that toll facilities raise issues which must be addressed in an EIS.

Any new international bridge will be supported by tolls, just as all existing bridges are. Toll financing of transportation facilities raise a variety of issues which must be considered in the NEPA process. See, AASHTO, Practitioner's Handbook 03: Managing the NEPA Process for Toll Lanes and Toll Roads (July 2003)(Attachment M). We request USCG review the enclosed handbook and incorporate its recommendations into the scoping and conduct of the EIS.

(d) Long standing community controversy and opposition to an expanded river crossing in vicinity of the existing Ambassador Bridge.

> "[S]trong controversy over the environmental impacts of a proposed action can arise among the general public. Again, the EIS should be considered due to the possible significant impacts perceived by the public." Tools for Decision-Making, p 36.

In critiquing DIBC's draft USCG bridge application in 2005, FHWA noted, "The answer to this checklist question F was that no controversy is expected from the new bridge and there will be no negative environmental impacts. The bi-national partnership conducted several public meetings in April of this year...There was substantial controversy demonstrated at these meetings by the public over the twinned bridge proposal." Letter, FHWA to American Consulting Engineers of Florida (June 21, 2005) (Attachment E) (ACE is DIBC's consultant). See also, the public comments included at Attachment L.

The GCDC and its member organizations have worked cooperatively with DIBC to minimize the impacts of the present bridge on the community and generally supported the Gateway Project for that reason. However, the GCDC and the Council and their members and constituencies are opposed to another bridge and to increasing bridge and crossing capacity at this location. Further, the history of DIBC's conflict with the nearby community over bridge-related issues is too long to summarize here. Again, the point here is not whether DIBC or the community have been right or wrong in the past – rather that an action permitting a new bridge to be owned and operated by DIBC will generate the level of controversy that requires an EIS.

(e) No effort has been made to work with a broad base of the affected community or its citizens or businesses.

DIBC has made no showing of community support or involvement related to a new bridge. In fact, its application is counter to the present community involvement effort in support of the DRIC Study. The DRIC Study has had an in-depth community participation during the process. The DRIC Local Advisory Committee has reviewed and scored all of the river crossings evaluated by DRIC. Although the DIBC may wish to avoid this kind of citizen involvement by submitting its "go-it-alone" application, NEPA requires that USCG have the benefit of significant community involvement through the EIS process before it makes its decision on DIBC's permit application.

3. Uncertain and Unknown Effects on the Human Environment

"If there is scientific controversy concerning any aspect of a proposed action, then the occurrence of significant impacts is questionable and an EIS should be considered. Tools for Decision-Making, p. 35.

(a) Difficulty in evaluating mobile source air quality impacts from diesel trucks, where diesel emissions are believed to be the predominant contributor to adverse health effects from mobile source emissions.

The MSAT issue related to diesel emissions is an issue where there is scientific uncertainty as to the full extent of health impacts. This issue was the motivation behind FHWA's recent guidance on mobile source air toxics. Burbank, C., FHWA, Interim Guidance on Air Toxic Analysis in NEPA Documents (Feb. 3, 2006). The proposed action clearly falls within the guidance and is the type of issue which merits a full EIS so that all of the ramifications of this difficult issue can be fully addressed.

4. Precedent For Future Actions With Significant Effects Or A Decision In Principle About A Future Consideration

The proposed action would preempt the ongoing DRIC Study. There is a need over the next 35 years for one new bridge, not two. Regardless whether there are public or private dollars in the new bridge itself, associated facilities will require the expenditure of hundreds of millions of public dollars. There is not enough public money for two bridges. So a permit for a new Ambassador Bridge will foreclose another bridge, which other bridge might be far preferable in the public interest. An EIS is required to consider the impact of foreclosing a better crossing location.

5. Significant Cumulative Impacts When Considered With Other Foreseeable Future Actions

The City of Detroit is seeking to expand its port activities that are within a mile of the bridge. There are active plans to restore Fort Wayne, increasing its role as a generator of traffic. There are numerous other private, public and quasi public entities with plans fro the vicinity of the proposed bridge. How will those plans affect the ability to expand the bridge plaza in the future and how will a new bridge affect current redevelopment plans? The CEQ regulations require USCG to flesh out these issues and evaluate the associated impacts on the human environment. Hence an EIS is required.

6. Impacts on Historic Resources

During the Blue Water Bridge EIS, the original structure of that bridge was considered an historical structure and the visual impact of a new bridge on the existing bridge was addressed in the EIS. The Ambassador Bridge, which has dominated the downriver skyline for many years, is on the National Register of Historic Places and will require the same consideration. Letter, Michigan State Historic Preservation Officer to USCG (May 4, 2006) (Attachment H). Further, since the application raises the possibility of demolishing the Ambassador Bridge, an EIS is further justified.

7. Other Significant Impacts

(a) Any bridge crossing in southwest Detroit will affect low income and minority neighborhoods, requiring consideration of environmental justice and other considerations which may vary substantially depending on where a new crossing is located. We are submitting on Attachment B the Social Cultural Effects Evaluation perfomed for DIFT because the Livernois-Junction Yard impact area approximates the area in the vicinity of the Ambassador Bridge. The socio-economic statistics for that area are provided and substantiate that disproportionately low income and minority neighborhoods will be impacted.

(b) Irreversible and Irretrievable Commitments of Resources. When a proposed action may cause environmental damage that cannot be reversed or mitigated, such damage is likely to be considered significant. Tools for Decision-Making, p. 35. Here there will be but one new bridge crossing for the foreseeable future. Once built, its impacts will continue for a hundred years. USCG must make the best informed decision on this permit application because there will be no going back. An EIS is required to inform that decision.

(c) Issues related to hazardous material transportation need to be considered. What will be the policy for transporting such commodities on the new bridge as opposed to at another crossing, e.g., the current truck ferry?

Transboundary Impacts Require Preparation of an EIS.

The Council on Environmental Quality has directed that:

"[T]he entire body of NEPA law directs federal agencies to analyze the effects of proposed actions to the extent they are reasonably foreseeable consequences of the proposed action, regardless of where those impacts might occur. Agencies must analyze indirect effects, which are caused by the action, are later in time or farther removed in distance, but are still reasonably foreseeable, including growth-inducing effects and related effects on the ecosystem, as well as cumulative effects." Council of Environmental Quality, Guidance on NEPA Analyses For Transboundary Impacts (July 1, 1997).

"[F]ederal agencies should use the scoping process to identify those actions that may have transboundary environmental effects and determine at that point their information needs, if any, for such

> analyses. Agencies should be particularly alert to actions that may affect ... air quality ... as well as to interrelated social and economic effects." *Id.*

As you are aware, Letter, Transport Canada to USCG (August 30, 2006) (Attachment I), the Canadian government has determined this project requires an Environmental Assessment under the Canadian Environmental Assessment Act.

In addition, the DRIC study has undertaken just such an analysis and it makes clear that a twinned Ambassador Bridge will have significant impacts in Canada and the United States, for better and for worse. This is strong support for the need to conduct an EIS for this permit application.

The transportation analyses performed as part of the DRIC Study found that the principal access route to a new Ambassador Bridge (Huron Church Road and Highway 3/Talbot Road) now suffers from congestion during the day, which congestion would increase significantly as traffic grows to reach the existing capacity of the Bridge, and then would be even worse after a second span is constructed because of the additional millions of vehicles flowing as the result of the increase in capacity. DRIC, Travel Demand Forecasts, § 6.1.2. "The current situations where trucks drive through the heart of Windsor's west end community is unsustainable. It's not good for Canadian and U.S. economies, it's not good for the trucks that carry that trade, and it's not good for the local community" Joint Press Release, Ontario Trucking Association, APMA and Ontario Chamber of Commerce (December 7, 2005) (Attachment N).

The DRIC process spent a great deal of time considering the impacts which this increased traffic flow would have at each of the alternative locations for a new bridge crossing, including a new bridge next to the Ambassador Bridge (Alternative X-12 in the DRIC study). The increased roadway and plaza needs to accommodate future crossing traffic made possible by new crossing capacity would require the acquisition of many homes and businesses in Canada. It would have significant impacts on the neighborhoods in Windsor near the bridge. These impacts are made clear in the Canadian study of impacts, DRIC, Canadian Summary of Evaluations, relevant excerpts of which are attached (Attachment J). The second Ambassador Bridge "is eliminated because, in Canada, the plaza and freeway connection leading to a second span would have unacceptable community impacts and the constructability of a six lane freeway along Huron Church Road is doubtful in light of intensity of the surrounding development" DRIC, U.S. Summary of Evaluations, p. S-56. It was eliminated because "maintaining the existing crossing and connections in the border transportation network does not address redundancy needs and, regardless of plaza site selected, it would cause high impacts to neighborhoods." *Id.* at p. S-50. A representative of MDOT met with Canadian representatives on May 16, 2006 and then testified at a Joint Transportation

Committee meeting, "I am authorized to advise you the Canadians had previously rejected the second span of the ambassador Bridge and see no need to change that position." Testimony of M. Alghurabi, DRIC Project Manager for MDOT, Testimony to Joint Transportation Subcommittees of the Michigan Legislature, May 18, 2006. (Attachment O).

Canadian concerns with the impact of a new river crossing are reflected in two public information pieces prepared by the Ontario Ministry of Transportation and Transport Canada. Detroit River International Crossing Study, Air Quality Assessment, Frequently Asked Questions (August 23, 2006); Myth Busters (August 23, 2006) (Attachment P).

Cumulative Impacts

In assessing the environmental impacts of a proposed action, the USCG must consider the cumulative impact of the proposed action. That is, the "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions..." 40 C.F.R. 1508.7. As interpreted by CEQ, this refers to "the cumulative impact of the direct and indirect effects of the proposed action and its alternatives when added to the aggregate effects of past, present and reasonably foreseeable future actions." Memorandum, CEQ to Heads of Federal Agencies, Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (June 24, 2005), p. 2. See generally, CEQ, Consideration Cumulative Effects Under the National Environmental Policy Act (January 1997).

(Note that the concern with the segmentation of actions (discussed above) arises in part because segmentation tends to undercut the consideration of the cumulative impact of a proposed action.)

With regard to the DIBC's permit application for a new bridge crossing, there are a number of past, present and future circumstances which must be considered in evaluating the impacts of this proposed action.

The past actions which need to be considered include the prior expansion of facilities associated with the Ambassador Bridge over the last 30 years and the associated traffic increases. Steadily over time the presence of the Ambassador Bridge and its impacts on the nearby Detroit and Windsor communities have expanded. The Gateway Project is just the latest installment. As mentioned above, DIBC has plans for expansion and road relocation beyond the Gateway Project. The adverse impacts of a new bridge will come on top of prior adverse impacts. The totality of these impacts must be considered.

In terms of present projects, obviously the impacts of the Gateway Project must be considered as part of the cumulative impact.

In terms of reasonably foreseeable impacts from future actions, the proposed Detroit Intermodel Freight Terminal will cause the greatest impact. Its adverse impact - traffic, noise and diesel-related air pollution- are the same as the impacts of the existing Ambassador Bridge and the proposed bridge. These projects are only a mile or so apart. An EIS is needed to determine if they will have overlapping impacts and how such impacts will affect the southwest Detroit community. As another example the Detroit Riverfront Conservancy is planning a river walk from Belle Isle to the Ambassador Bridge. Further, the City of Detroit is about to begin a planning study for the "west" riverfront which includes the bridge area. How will the impacts of these projects be factored in?

A comprehensive scoping effort will undoubtedly identify other past, present and future actions that have direct and indirect impacts which may be cumulative with the impacts of the proposed new bridge.

The Environmental Assessment for the Gateway Project Is Not a Substitute For an EIS for a New Crossing

In 1994, an environmental assessment was performed for roadway improvements between the bridge plaza and connecting state trunkline highways in Michigan (the "Gateway Project"). That project did not consider the environmental impacts of a second bridge nor of the increase traffic capacity which such a facility would provide.

Ambassador Bridge Gateway Project Memorandum of Understanding (July 26, 1996) does not include the certain construction of a second span of the current bridge or a new bridge adjoining the current bridge. It describes the purpose of the Gateway Project as:

- Provide direct access to and from the Ambassador Bridge to and from the trunkline system and provide improved access to local community (roads).
- Accommodate access to meet future border crossing capacity needs and project plans by the DIBC for improvements to the Ambassador Bridge, including the future possibility of a new span.
- Accommodate access to the proposed Travel Information Center ....
- Obtain planning and environmental approvals needed to proceed with transportation improvements to improve access to the Ambassador Bridge.
- Facilitate future project development of an easy and convenient connection from the Ambassador Bridge to Mexicantown and downtown Detroit.....

The report, itself, is clearly limited to access improvements. MDOT & SEMCOG *Environmental Assessment & Programmatic Section 4(f) Evaluation* (January 1997)

> "The action proposed by MDOT is the improvement of access between the Ambassador Bridge and Michigan's trunkline system, notably I-75 and I-96." Preface and p. 6-1.
>
> "These studies are required to determine the best alternative to improving access at the United States end of the Ambassador Bridge...." p. 1-1.
>
> Figure 1-1, "Project Location" delineates a project location which excludes the bridge and is limited to the environs of the current plaza.
>
> "This study; began in September 1995, addressing a broad range of alternatives for access to an egress from the bridge." p. 1-5.

The description of the preferred alternative includes new traffic lanes and a bridge deck built "in such a way that it could align with a future second span to the west of the existing plan." p. 1-7. Notably, that future span which might be built is not part of the preferred alternative which is described in detail on pp. 1-7 & 1-8.

The FHWA has been absolutely clear that the EA for the Gateway Project did not include a second bridge at that location. "For the record, the Gateway EA did not clear a future second span near the existing Ambassador Bridge. This was never the intent of the study of the Gateway EA." Letter, (FHWA to Westlake USEPA (August 22, 2006) (Attachment Q). The FHWA letter then explains in detail the limited scope of the Gateway Project. Accordingly, USCG cannot rely on the EA or the associated FONSI to support a finding that an EIS is not required for a new bridge next to the Ambassador Bridge.

Lack of Present Authority To Construct and Operate

A bridge applicant must establish it has the legal authority to construct the bridge. 33 C.F.R. 115.05. "Especial care will be taken that Federal approval is not granted when there is doubt of the right of the builder to construct and utilize the bridge." *Id.* Under its procedures, USCG will not issue a bridge permit until the applicant can demonstrate it has all other federal, state and local approvals. USCG, Bridge Administration Manual, p. 12 and App. E.

Canadian Approval

U.S. law requires that the USCG's permit approval is subject to approval of the proper authorities in Canada. 33 U.S.C. §535. Given Transport Canada's opposition to this project, such approval seems unlikely.

The DIBC plan appears to call for a new or expanded connector road involving Mill St. and Huron Church Road in Windsor, but the permit application states that "Presently, the DIBC/CTC has no authority or jurisdiction allowing for the construction of connecting roads from the Ambassador Bridge to Highway 401." Permit Application, p. 4. Because such access roads will clearly be required in order to accommodate the traffic with the new bridge capacity will generate, it is questionable whether the USCG can find that the DIBC has all of the permits and authorizations needed to proceed with a new bridge.

State Approval

A privately owned highway toll bridge may not be constructed or operated without prior approval of its location and plans by the state highway department. 33 U.S.C. §525(c). The new bridge will certainly be a toll bridge. MDOT has not approved the proposed location. It is unlikely to approve the location given the decision in the DRIC study to eliminate a second Ambassador Bridge, but in any case, no MDOT decision is likely until the DRIC study is completed.

City Approval

City of Detroit approval is required in a variety of ways. First, the original bridge was approved by a 1927 city ordinance. (Attachment R.) That ordinance clearly did not authorize a second bridge. Presumably, approval by ordinance will again be required. Second, it is not clear that a new bridge span will comply with Detroit's zoning ordinance. Third, the new bridge will span properties owned by Detroit (certain streets and potentially a city park). DIBC must obtain easements to traverse city property. Present information indicates that the easements for the Ambassador Bridge are not wide enough to include a second bridge. The 1927 Ordinance refers to a maximum 75-foot width, which width is fully occupied by the present bridge. A new six-lane bridge is likely to require another easement nearly 200 feet wide (including the space between the bridges). DIBC must demonstrate it has such easements, else it does not have the legal authority to construct the bridge.

In addition, Detroit asserts the right to enforce its building and safety codes with regard to any international bridge in the City. DIBC is presently in litigation with the City of Detroit over the City's ability to regulate the DIBC and its facilities like any other business in Detroit under the City's zoning and building ordinances. *Detroit International Bridge Company v. City of Detroit*, Court of Appeals Docket No.

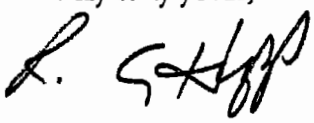
257369. DIBC claims it is immune from the City's zone and building ordinances. Not until that litigation is resolved and then only if it prevails, will DIBC be able to demonstrate that it has all of the City approvals required in order to construct a new bridge.

Lack of Presidential Permit

We understand that there has been a preliminary determination that a new bridge adjacent to the Ambassador Bridge is not required to obtain a Presidential Permit under the procedures required by 33 U.S.C. § 535a and Executive Orders 11423,12847 and 13337. We do not agree with such a conclusion and are unaware of any basis for it. The enabling legislation for the original Ambassador Bridge clearly is limited to a single bridge whose construction was to be completed within seven years after the legislation. Statutes at Large, 66th Cong., Sess. III, ch. 167 (March 4, 1921). On July 19, 2006, we submitted a Freedom of Information Request to the Department of State for its file on the issue. The Department has been untimely in responding to our request. We reserve the right to comment further on this issue once we have possession of the relevant State Department record and determine the Department's position and are able to frame an appropriate comment.

Thank you for considering our comments.

Very truly yours,



R. Craig Hupp

RCH/cmf

cc: Gateway Community Development Collaborative
Delray Community Council
U.S. Senator Carl Levin
U.S. Senator Deborah Stabenow
U.S. Representative John Dingell
U.S. Representative Carolyn Cheeks-Kilpatrick
Jerri Ann Garl, USEPA
James Kirschensteiner , FHWA
State Representative StevenTobocman
Mr. Algurhabi, MDOT

INDEX OF ATTACHMENTS

(All attachments are contained as pdf files on Attachment B and are not reproduced as paper copies except with the copy of the GCDC comments filed with the USCG.)

A. GCDC Member List

B. CD with DRIC Documents

C. DRIC, Travel Demand Forecasts, Working Paper (September 2005)

D. Letter – State Representative Tobocman to FHWA (May 27, 2005)

Letter – GCDC to FHWA (May 25, 2005)

E. Letter – FHWA to USCG (June 7, 2006)

Report, DIBC, Today & Future (2006)

Letter – DIBC to MDOT (May 17, 2006)

Letter – MDOT to DIBC (July 13, 2006)

Letter – FHWA to American Consulting Engineers of Florida (June 21, 2005)

F. Letter – Transport Canada to American Consulting Engineers of Florida (April 15, 2005)

G. DRIC – Evaluation of Illustrative Alternatives on U.S. Side of Border, Vol. 1, Summary (November 2005)

H. Letter – Michigan State Historic Preservation Officer to USCG (May 4, 2006)

I. Letter – Transport Canada to USCG (August 30, 2006)

J. DRIC, Generation and Assessment of Alternatives Report (Canadian Side) (Draft November 2005)

K. Detroit Regional Chamber Border Crossing Policy (October 12, 2005)

Letter – Daimler Chrysler to MDOT (March 28, 2006)

Letter – State Representatives to State Representative LaJoy (January 25, 2006)

L. Public/Private Concerns re Ownership And Other Issues

GCDC Testimony to State House and Senate Joint Transportation Committee Hearing (March 30, 2006)

M. AASHTO, Practitioner's Handbook 03: Managing the NEPA Process for Toll Lanes and Toll Roads (July 2003)

N. Joint Press Release, Ontario Trucking Association, APMA, and Ontario Chamber of Commerce (December 7, 2005)

O. Alghurabi, L., Testimony to Joint Transportation Subcommittees (May 18, 2006)

P. Ontario Ministry of Transportation/ Transport Canada, Air Quality - Frequently Asked Questions

Ontario Ministry of Transportation/ Transport Canada, Myth Busters

Q. Letter – FHWA to USEPA (August 22, 2006)

R. 1927 City of Detroit Ordinance (Ordinance No. 315-B of 1927, Ch. 245, International Bridge of the Compiled Ordinances of the City of Detroit) as amended by Ordinance No. 42-C of 1928

JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

KIRK T. STEUDLE
DIRECTOR

September 14, 2006

Mr. Robert Bloom
Bridge Section
United States Coast Guard
1240 East Ninth Street
Cleveland, OH 44199-2060

RE: Ambassador Bridge Enhancement Project
Notice 09-03-06, Dated 7/28/06 (Type 2 Categorical Exclusion)

Dear Mr. Bloom:

The Michigan Department of Transportation (MDOT) has reviewed the submission and notice for the Ambassador Bridge Enhancement Project which pursues a new crossing of the Detroit River as a private sector initiative. MDOT has no objection to the application before you. Thank you for the opportunity to comment.

Sincerely,

Kirk T. Steudle, P.E.
Director

cc: Dan Stamper, President, Ambassador Bridge

MURRAY D. VAN WAGONER BUILDING • P.O. BOX 30050 • LANSING, MICHIGAN 48909
www.michigan.gov • (517) 373-2090

September 14, 2006

Robert W. Bloom, Jr.
U.S. Coast Guard
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199

RE: Second Fixed Highway Bridge Adjacent to Ambassador Bridge

Dear Mr. Bloom:

I am writing on behalf of the Southwest Detroit Business Association regarding the permit application Due to the complexities, controversy, and potential impacts of this permit application, we respectfully request that the U.S. Coast Guard conduct a public hearing within the host communities.

We are requesting that the U.S. Coast Guard provide a detailed explanation of the basis for the preliminary determination that the proposed project is categorically exempted under the National Environmental Policy Act (NEPA). The Federal Highway Administration, the lead agency, has clearly stated to the Environmental Protection Agency that the environmental assessment completed for the Ambassador Bridge Gateway Project did not review and report on the impacts of a second, twin, or companion bridge structure, including plaza and connections, of the Ambassador Bridge. The Gateway Project environmental assessment was completed over ten years ago in the mid- 1990s and is not entirely applicable to the context at the Ambassador Bridge crossing today. The proposed "Enhancement Project" is not accurately named in that the project will result in a second bridge located adjacent to the existing Ambassador Bridge adding significant border crossing and transportation infrastructure. The construction of a second bridge would increase international border traffic capacity by 50 -150 percent. The impacts are vast and significant and require a full Environmental Impact Statement.

The optimal location for expanded international border crossing capacity within the Detroit and Windsor area is currently being evaluated through the Detroit River International Crossing (DRIC) Study. The GCDC has been actively engaged in discussions and plans regarding the international border and several member organizations serve on the DRIC Local Advisory Council. At the inception of the DRIC Study, the GCDC advocated for a moratorium on governmental actions that would promote any border crossing option until the study is completed. While the DIBC may pursue its plans independent of the DRIC Study, the proper evaluation of the permit application requires review within the context of a bi-national, multi-agency analysis of expanded border crossing capacity in the Detroit and Windsor area. *The DRIC Study evaluated the feasibility and impacts of expanded capacity at the Ambassador Bridge and concluded that it is not feasible and that there are viable alternatives.* The U.S. Guard should consult the data and information gleaned through the DRIC Study process.

GCDC understands that there are outstanding questions regarding the process, requirements, and timeline for processing local, state, and federal governmental permits for expanded and new

international border crossing capacity external to the DRIC Study. The U.S. Coast Guard should conclusively ascertain that the permit application must be processed prior to completion of the DRIC Study. The GCDC would appreciate reviewing any correspondence on this matter.

The GCDC is particularly concerned that the ABEP permit application improperly and inadequately describes the full scope of the expansion that could occur at the Ambassador Bridge location and thereby segments the proposed project disallowable under NEPA. As already indicated, the project consists of the construction of a second bridge – it is not a modification or an enhancement of the existing bridge or plazas. In fact, there are no modifications, enhancements, or other changes to the existing bridge and the application states that there are no modifications to the plazas :

> "This project consists of additional lanes over the Detroit River to the west of the existing span and connecting directly into the existing plazas in both Windsor and Detroit without the need for modification."

However, during the DIBC's presentation to the Detroit City Council on September 14, 2006, they clearly stated their intention to initiate plaza expansions and a relocation of Fort Street to accommodate existing and future traffic processing demands. The DIBC contends that these endeavors are separate and distinct from the construction on a second bridge and therefore are not including these activities in their proposed Enhancement Project. NEPA is clear that cumulative and future contemplated actions are collectively assessed and reported.

Additionally, the DIBC has repeatedly and publicly announced their intention to construct an "international plaza" that would accommodate joint United States and Canadian customs inspections requiring a substantial expansion of the existing U.S. plaza. This international plaza is described as consisting of between 100 to 200 toll booths. The DIBC has presented these plans to local, state, and federal public officials and has had these plans depicted in advertisements published in the *Detroit News*, *Detroit Free Press*, and *Crain's Detroit Business*. In October, 2005 a proposal to sell the Detroit interest in the Detroit-Windsor Tunnel to a DIBC-affiliated company including construction of a joint customs facility and connector road between the Ambassador Bridge and the Detroit-Windsor tunnel, was presented to the Detroit City Council and represented in a document entitled "Binding Agreement." Finally, the DIBC has submitted a request to the Michigan Department of Transportation requesting that Fort Street be reconfigured and relocated to the south to accommodate their expansion plans. Collectively, these actions create a compelling case that the DIBC is misrepresenting the full scope of their intended project and that the permit application segments the project in violation of the National Environmental Protection Act.

In March and May 2006, the joint Michigan Senate and House of Representatives Transportation Committee held four hearings on the DRIC Study. The DIBC testified at each of these hearings directly and through their consultants. The transcripts of these hearings should be considered in the evaluation of the permit application as there were various, and conflicting, representations made by or on behalf of the DIBC with respect to the need and timing of expanded international border crossing capacity, whether state and federal funding would be requested for their border crossing projects, and the capacity of existing plaza facilities to accommodate increased traffic. Today, the DIBC testified that their Enhancement Project will not increase capacity. Traffic infrastructure is one variable that strongly predicts traffic levels. The second proposed bridge will be six lanes with the capacity to go to eight lanes. The existing Ambassador Bridge is four lanes. There is no firm plan for the future of the existing Ambassador Bridge. Today, the DIBC testified that the

Ambassador Bridge would eventually be taken out of service. In their permit application the future of the Ambassador Bridge is predicated on the economic outcomes of leaving it in service or taking it out. They further state that once the second bridge is constructed, the Ambassador Bridge would provide desired redundancy in crossing capacity. The future of the existing Ambassador Bridge under the DIBC's Enhancement Project is anything but clear and therefore should be clarified before a processing the permit application.

The General Services Administration (GSA) is currently undertaking a Master Planning analysis for the Ambassador Bridge inspection facility, expected to be complete in September. The outcome of this planning process may change the location, size, and operation of the plaza facility and therefore the impacts of the project. It would be prudent to delay evaluation of the permit application until the GSA completes its Master Plan.

Under Item 2 – Project Description, the following is stated:

> "The proposed bridge will run roughly parallel to the existing Ambassador Bridge and will tie directly into the existing plaza areas without need for plaza configuration modifications beyond those already approved under the Gateway project approved by FHWA and undertaken by MDOT and DIBC. Once the new structure is completed, the exiting Ambassador Bridge will be taken out of service in order to evaluate and make repairs deemed necessary and economically feasible. Upon completion of the anticipated repairs, the existing bridge will be used to provide redundancy and backup support when necessary to ensure the free flow of traffic at all times. The existing bridge would not be placed back into service before all necessary approvals are obtained."

The Environmental Assessment (EA) conducted for the Gateway Project resulted in a Finding of No Significant Impact (FONSI). Although the Gateway Project was designed to accommodate a second span of the Ambassador Bridge – should that action be studied, mitigated, and undertaken in the future – the impacts of a new six lane bridge or two parallel bridges, representing a doubling of capacity, were not included in the Gateway Project EA. Therefore, a full Environmental Impact Statement should be conducted on the impacts of a new six-lane bridge as well as the operations of two parallel bridges. In addition, the capacity of the plaza, following completion of the Gateway Project, to accommodate the traffic estimates for two bridges, with an appropriate time horizon, must be evaluated and its impacts determined.

One of the objectives of the DRIC Study is to recommend an alternative that will provide redundancy, or other options, for crossing the Detroit and Windsor border. Given that the permit application explicitly discusses the possibility of the project providing redundancy, the U.S. Coast Guard should inquire and secure a clear definition of redundancy from the various agencies and departments participating in the DRIC Study; specifically such a definition should be requested of the Department of Homeland Security. Based on previous commentary and testimony, redundancy is not achieved by the close proximity of two parallel bridges.

The U.S. Coast Guard should ascertain the positions of the Canadian parties as it relates to the permit application. The DRIC Study partners developed several principles that govern the study process and the final recommendations. One principle is that decisions would not be made that disproportionately burden one side of the border. The U.S. Coast Guard evaluation of the permit application should acknowledge that the DRIC Study has already determined that increased capacity

at the Ambassador Bridge location is not feasible due to its impacts on the Canadian border and therefore be denied.

The permit application states that the existing Ambassador Bridge structure will be evaluated to determine the extent of repairs required and its future use. Whether the existing structure will continue to be used is predicated on the economic feasibility of the repair costs. The economic feasibility of repairs is a subjective matter and can be significantly different for a private corporation than for a public entity. Given the importance of the international crossing to the commerce, trade, and security of the United States and Canada, what is the government's role in the evaluation of the conditions of the Ambassador Bridge and the determination of economic feasibility? Since the future use of the existing structure is described in the permit application, the U.S. Coast Guard should require that an independent third party inspection of the Ambassador Bridge is completed and reviewed in evaluating the permit application.

Southwest Detroit hosts extensive transportation infrastructure that primarily benefits the regional and state economies while the host communities shoulder the negative impacts. Expanded transportation infrastructure has not been coordinated within a comprehensive and cumulative framework. In particular, the environmental impacts have not been comprehensively evaluated. The permit application is another example of the piecemeal approach to transportation infrastructure expansion in southwest Detroit. The U.S. Coast Guard should require and participate in a comprehensive analysis of the environmental impacts – including air quality impacts which are not reported in the permit application.

Thank you for the opportunity to comment on the permit application. As the process continues and additional information is disclosed, we are likely to have additional comments. The SDBA is available for additional discussion of this important matter.

Sincerely,

Kathleen H. Wendler, President
Southwest Detroit Business Association

cc: Senator Carl Levin
Senator Debbie Stabenow
Representative Carolyn Cheeks-Kilpatrick
Governor Jennifer Granholm
Representative Steve Tobocman
Senator Buzz Thomas
Senator Hansen Clarke
Mayor Kwame Kilpatrick
Detroit City Council

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September 14, 2006

Delivered by Overnight Courier
Office of Commander (dpw-3)
Ninth Coast Guard District
1240 East Ninth Street
CLEVELAND, Ohio
44199-2060

Attention: Mr. Robert W. Bloom, Jr.
Bridge Program Manager

Dear Sir:

Re: Your Public Notice 09-03-06 – Detroit International Bridge Company/Canadian Transit Company
Application for Approval of Location and Plans for construction of a Second Fixed Highway Bridge Over a Navigable Waterway of the United States (Detroit River) Adjacent to the Existing Ambassador Bridge

SUBMISSION ON BEHALF OF THE CORPORATION OF THE CITY OF WINDSOR, CANADA

Introduction – The City of Windsor's Direct and Substantial Interest in This Matter

We are attorneys for the Corporation of the City of Windsor, Ontario, Canada. This letter, and the various attachments to it which are separately bound in two volumes and which are also enclosed with this letter, constitute the comments on behalf of the City of Windsor to your agency objecting to the grant of the requested permit as well as the objection of the City to the preliminary determination by the U.S. Coast Guard that this application is properly processed as a "categorical exclusion" (CE) from the *National Environmental Policy Act* (NEPA). We ask that this letter and the attachments enclosed form part of the record in this matter.

The application proposes a new international vehicle bridge across the Detroit River between Detroit Michigan and the City of Windsor, Ontario ("Windsor" or "the City").

The proponent describes this as a "new six-lane structure" to be built to the west of the existing 76 year old Ambassador Bridge. As submitted below, in fact this bridge will accommodate eight lanes of traffic and should be considered and environmentally assessed as such.

The proposed second bridge will be partially located within the United States, but a significant portion of the proposed bridge will be located within Canada, and in particular, within the City of Windsor.

The City of Windsor's northern boundary begins at the International Boundary line between Canada and the United States, which is essentially the mid-point of the Detroit River.

Approximately 50 percent of the proposed second bridge structure will be located in Canada and specifically within the City of Windsor.

The current Ambassador Bridge has a structural length within the City of Windsor of about 3,600 feet. Of that length, approximately 2,700 feet cross over the land area of the City of Windsor, not below the river.

The proposed second bridge will have approximately equal horizontal presence within the City of Windsor.

The proponent has filed plans with you for the second bridge which demonstrates that the proposed second bridge would pass over the following City of Windsor streets: Riverside Drive West, University Avenue West, Peter Street, Victoria Street and Wyandotte Street (in fact the proposed bridge would not pass over Victoria Street but instead would pass over Donnelly Street).

For an accurate plan view of how the proposed second bridge would be related to City streets and to the existing Ambassador Bridge within the land area of the City of Windsor, please refer to the enclosed aerial photograph entitled "City of Windsor Zoning By-law 8600 – Existing Zoning Adjacent to the Ambassador Bridge". This aerial photograph has been prepared by City engineering/planning staff from information taken from the plans provided by the proponent to the Coast Guard. **Attachments Vol.1, Part A, Tab 5**

As is clearly illustrated in the above-referenced aerial photograph, the second bridge will pass directly over four blocks of houses on the west side of Huron Church Road. There are approximately 218 dwellings shown on the aerial photograph in the 250 metre area to the west of Huron Church Road illustrated on the aerial photograph. These dwellings house approximately 650 people.

Also within a short distance west of the proposed second bridge, closer to the Detroit River, at 2856 Riverside Drive West, is a 145-unit building which houses almost 200 University of Windsor students.

Within 60 – 180 metres to the east of Huron Church Road, immediately opposite portions of the proposed second bridge, there are three University of Windsor residences. These provide housing for over 800 students.

We are attaching to this submission a letter dated September 13, 2006 from Robert Hayes, MCIP, RPP, City Planner for the Corporation of the City of Windsor addressed to David Estrin,

Gowling Lafleur Henderson LLP, Attorneys for the City of Windsor. **Attachments Vol.1, Part A, Tab 2**

In the letter from Mr. Hayes, the City Planner details the land use conflicts and impacts that would be caused to the City and its residents by this proposed second bridge. That letter provides significant details corroborative not only of the direct interest of the City in this matter but, also, substantiation of the City's concern that this proposed second bridge will have significant adverse environmental and community impacts within the City.

A previous study carried out by the Detroit River International Crossing Project (DRIC) – the so-called "Bi-National Environmental Assessment" being undertaken by the U.S. Federal Highways Administration, the Government of Canada through Transport Canada, the State of Michigan and the Province of Ontario examined the potential environmental and land use impacts of a second Ambassador Bridge as is now being proposed by the proponent to you.

In his September 13th letter, Mr. Hayes quotes directly from the findings of the DRIC "Generation and Assessment of Illustrative Alternatives Report" (November 2005) which is also a report referenced by the proponent in its material submitted to you. **Attachments Vol.1, Part A, Tab 7**

The DRIC study rejected the viability of a second Ambassador Bridge after having carried out an assessment of traffic impacts, potential noise impacts, impacts to community cohesion and character and displacement of population.

The following quotation is taken directly from the DRIC report:

The expansion of the existing plaza at the Ambassador Bridge will have a highly negative impact on the community, particularly the neighbourhood of Sandwich. This area of Sandwich is densely populated and a mature residential area. Over 215 households will be displaced and almost 1000 households disrupted (i.e. within 200m of the plaza) within the established urban neighbourhood. Area businesses are forming an economic development corporation to promote new growth and development opportunities in the Sandwich area. The loss of over 215 households from the immediate vicinity would have a negative effect on the local businesses serving this community.

Other impacts associated with this plaza include: 2 schools displaced (J.L. Forster Secondary School and St. Francis Separate School); 4 institutional uses disrupted, including a day care centre and business school; and 5 social features disrupted, including the University of Windsor, Assumption Church and the Riverfront Park. The plaza would be situated in a residential neighbourhood (highly undesirable from the perspective of border agencies) with little opportunity for expansion to meet future needs without additional community impacts.

The twinning of the Ambassador Bridge will also have impacts on Sandwich community: approximately 75 households displaced and over 310 households disrupted; a student residence would be displaced and the riverfront part would be disrupted.

Overall, the crossing X12 alternative would have a highly negative impact to community and neighbourhood characteristics. (p.108-9)

...

Expanding Huron Church/Talbot Road from Highway 401 to the plaza at Ambassador Bridge will displace approximately 135 homes and over 85 businesses, while over 2100 households and approximately 25 businesses will be disrupted (i.e. are within 250m of the centerline).

Protect Cultural Resources

The crossing X12 alternative has a high negative impact to cultural resources. The community of Sandwich includes one of the oldest settlements in Canada. The original town of Sandwich retains a number of buildings of the pre-confederation era that are of historical significance and/or which exemplify the Neo-classical and Georgian styles of architecture, which were in vogue during the first half of the nineteenth century.

A number of designated heritage properties can be found along the following streets: Russell Street, Sandwich Street, Peter Street, Detroit Street, Mill Street, Brock Street, Chippewa Street, South Street, Watkins Street, Prince Road. The Ambassador Bridge, built in 1929, is listed in the Ontario Heritage Bridge List. Expanding the plaza at the Ambassador Bridge to accommodate a twinning of this structure will affect over 40 built heritage features (disruption impacts) and 3 known archaeological sites. The alternative also impacts a sizeable area of high archaeological potential. (p.109-110)

Moreover, the City Planner's September 13, 2006 letter further documents how the proposed second bridge will conflict with the City of Windsor Official Plan as well as the City of Windsor Zoning By-law.

As the Chief City Planner's letter indicates, the second bridge is proposed to be located west of the current bridge. "This land, west of Huron Church Road, is residential and is designated as such in the City of Windsor Official Plan." Also, the Windsor Official Plan "designates portion of land near the Detroit River around the existing and proposed second bridge as Waterfront Recreation and Waterfront Residential.

Please refer to the attached map – Excerpt from Schedule D "Land Use" from City of Windsor Official Plan which shows, in yellow, how the area proposed for the second bridge and the lands to the west thereof are all designated in the Official Plan as "Residential" except for a small portion at the river which is designated as "Waterfront Recreational". **Attachments Vol.1, Part A, Tab4**

A complete copy of the City of Windsor Official Plan is being filed as an attachment to this submission (on disc). **Attachments Vol.1, Part A, Tab 3**

With respect to zoning, as the Chief City Planner's letter indicates, (page 5) the entire area of the proposed second bridge is currently zoned for residential uses.

Please refer to the above-referenced aerial photographs "City of Windsor Zoning By-law 8600 – Existing Zoning Adjacent to the Ambassador Bridge".

Filed with this submission are a binder of photographs illustrating some of the land uses in close proximity to the proposed second bridge. These photographs illustrate parks,

culturally/historically significant properties, including some from Olde Sandwich Towne and the University of Windsor. **Attachments Vol.1, Part A, Tab 6**

With specific reference to impacts on City parks and recreational and cultural facilities, please refer to the letter dated September 11, 2006 from Mr. Don Sadler, Executive Director, Parks and Facility Operations, City of Windsor, Parks and Recreation Department to Gowling Lafleur Henderson, which is one of the enclosed and attached documents to this submission. **Attachments Vol.1, Part A, Tab 10**

The letter from the Executive Director of the City's Parks and Recreation Department establishes that there are four City parks that are directly located adjacent to or very close to the proposed second bridge.

Contrary to the proponent's assertion in its application to you that parks will not be impacted, Mr. Sadler points out how the second bridge would have negative environmental impacts on the park in that area as well as on the recreational use and capacity of the recreationway easement under the existing and proposed bridge.

Please refer to the enclosed aerial photograph entitled "Proposed River Front Recreation Way Easement Extension". **Attachments Vol.1, Part A, Tab 18**

To quote Mr. Sadler, this area under the bridge is "vital to create a safe, continuous recreation way from Assumption Park to McKee Park to the west. This portion of recreationway is an integral part of our bicycle use Master Plan which connects Windsor by pathway from north, south, east and west ... Our estimate of usage ranges from 100 – 500 per hour past this point dependant on season."

Mr. Sadler indicates that the "increased traffic of six – eight new lanes compared to the existing four will increase the noise and air contaminants in the adjacent parkland space, which is designed for passive and active use by the neighbourhood. Clearly it is not reasonable to conclude that there will be 'no impact' on neighbourhood parkland. Clearly, there will be impacts in the form of landscape growth patterns, increase of noise and air contamination and lack of consideration for historical and cultural significance in the area of the proposed bridge expansion."

He concludes that it is the City Park Department's opinion "that approval of the project will have a significant potential impact on parks, recreation and cultural features in Windsor and we strongly advise that before any approvals are processed for this project, it is vitally important that appropriate studies of these potential impacts are carried out".

Please note that Mr. Sadler's letter has some attached pages providing further details with respect to the history and features of the nearby parks.

Also referenced in the September 13, 2006 letter from the Chief City Planner is a Memo dated September 12, 2006 to the City Planner from the Senior Policy Planner – Heritage of the City (Nancy Morand, MA, MCIP, RPP). **Attachments Vol.1, Part A, Tab 9**

That September 12th memo substantiates "there are a number of properties in the shadow of the Ambassador Bridge that are important heritage resources".

These various heritage resources are depicted on the accompanying map entitled "Heritage Properties: Sandwich Area" – a map which is enclosed with and forms part of this submission. **Attachments Vol.1, Part A, Tab 17**

Ms. Morand's memo points out that "the land in the vicinity of the Ambassador Bridge was the site of the earliest European settlement of the south shore of the Detroit River. It is the site of the Mission of the Our Lady of the Assumption Among the Hurons, established at Detroit in 1728 and moved to this location in 1747. The Hurons established a village adjacent to the Mission and the church also attracted French and British settlers".

She also points out that:

> "Assumption Park bounded by Riverside Drive East, Huron Church Road, University Avenue and Vista Place is designated under the *Ontario Heritage Act* (in 1991) as an archaeological site. The present day church, the magnificent Gothic-style cathedral located just to the south across University Avenue, was built in 1845 ... It was designated under the *Ontario Heritage Act* in 1978."

Her memo references many other designated heritage buildings in the immediate vicinity of the bridge. **Attachments Vol.1, Part A, Tab 6**

Please see the file of photographs being submitted with this submission which include pictures of heritage designated and historical buildings in close proximity to the proposed second bridge.

Ms. Morand's memo also points out that the City of Windsor, Archaeological Master Plan (2005) "the land in the vicinity of the Ambassador Bridge has more potential to contain archaeological resources than any other land in the City. That is because of its close proximity to a major waterway (Detroit River), historic transportation routes, (Huron Church line and Riverside Drive) and the former Huron Village. It is also adjacent to known archaeological sites and unregistered burial sites.

Please note and consider the complete City of Windsor Archaeological Master Plan Study Report (October 2005). **Attachments Vol.1, Part A, Tab 14**

Also, for ease of reference, we have separately enclosed Figure 4 from the Windsor Archaeological Master Plan "Archaeological Potential" which demonstrates that all of the lands on either side of the proposed second bridge are concluded to have "high potential" in respect of archaeological significance. **Attachments Vol.1, Part A, Tab 15**

As well, please see another map which is included in the Archaeological Master Plan entitled "Windsor Archaeological Master Plan – Cultural Factors". This coloured map provides details with respect to the location of the "original Huron reserve" directly in the area proposed for this

second Ambassador Bridge, as well as the same area also being the site of the "Huron Village and Jesuit Mission" as well as "unregistered burial sites". **Attachments Vol.1, Part A, Tab 16**

There will also be potentially significant noise impacts caused by the new bridge and associated increased traffic associated with it.

Please refer to the enclosed letter report dated September 12, 2006 from Dr. A. Lightstone, P. Eng., Acoustical Engineer and President of Valcoustics Canada Limited. **Attachments Vol.1, Part A, Tab 8**

Dr. Lightstone's letter substantiates that there would be a significant and unacceptable increase in noise levels as a result of the operations intended to be carried out on the new bridge. Residential properties and residents residing in proximity of the proposed second bridge would be subjected to noise levels greatly in excess of permitted noise level exposure criteria established by the Ontario Ministry of the Environment.

Dr. Lightstone's letter points out how the proponent has carried out no noise studies and concludes no noise mitigation is required because in its view "noise levels will not substantially increase over the existing volume as a result of the proposed bridge".

Dr. Lightstone finds that:

> "These conclusions are nonsensical. The projected future traffic volumes are understood to be future traffic demands and would materialize at any particular facility providing the capacity is made available. Clearly if the demand exists, an increased number of lanes would result in higher volumes of traffic."

Dr. Lightstone's letter also points out how the proponent's consultant's statement in the materials filed with you that "the closest noise receptor is approximately 1,000 feet away" is erroneous as is the statement "businesses and vacant land immediately surround the project".

Dr. Lightstone points out that "the closest existing homes on Indian Road are about 280 feet from the centre line of the existing bridge and will be about 165 feet from the centre line of the proposed new bridge. The closest facades of the University residences are about 135 feet from the centre line of the existing bridge and will be about 200 feet from the centre line of the new bridge".

In preparing his noise assessment Dr. Lightstone took into account the projected traffic data and demand forecasts carried out for the DRICP in their study entitled "DRIC Study Travel Forecasts, Working Paper, September 2005, prepared by the IBI Group. Please note that this travel forecast Working Paper is one of the enclosures with this submission (on disc). **Attachments Vol.1, Part A, Tab 13**

Dr. Lightstone concludes that by averaging the yearly projected volumes over 365 days to obtain 24 hour volumes, the sound exposures at the row of houses fronting on Indian Road (west side)

will be increased by about 7 dBA, from a projected 66 dBA to about 73 dBA with the new bridge in place. As he states:

> "The result is a relatively significant increase and the resulting sound exposures are well above the normal outdoor criteria 55 dBA for residential uses."

He also points out that current conditions on the bridge are often congested which results in lower travel speeds which produce reduced noise emissions. "That is, current sound exposures at the houses on the west side of Indian Road will be less than 66 dBA." Increasing the traffic speed, which would likely be the result, at least for some time, of the proposed new bridge, which would allow traffic to flow at higher speeds, would therefore increase sound exposures from current conditions.
As he puts it:

> "In such a case, the increased (traffic) volume capacity can result in increases in sound (noise) exposure beyond current conditions by at least 10 dBA. This change is considered very significant."

According to the MOE reference attached to Dr. Lightstone's letter, a 6 to 10 dBA increase above recommended sound levels would produce a "definite noise impact".

Dr. Lightstone concludes that:

> "The proponent's conclusions, that detailed noise studies are not required, are not supported by the evidence (some of which is incorrect) and thus are not warranted."

He further concludes that:

> "Detailed noise studies should be required to address potentially significant increases in sound exposure as is the case for all major projects in Ontario with the potential to impact neighbouring land uses; examining existing, actual traffic flow conditions, as well as future projections and the need for potential noise mitigation is part of the design of the proposed new bridge."

In conclusion with respect to the interest of the City in this matter, the above-referenced documentation clearly and unequivocally demonstrates that the City of Windsor has a substantial and direct interest in the permit application filed with the Coast Guard.

The Coast Guard is Required to Consider the Potential Environmental Effects of its Action on the City of Windsor

The Coast Guard has recognized the obligation to assess the environmental impacts of its actions on the environment of other countries. Pursuant to U.S. Coast Guard Commandant Instructions M16475.1D, "National Environmental Policy Act Implementing Procedures and Policy for Considering Environmental Impacts" (November 29, 2000) it is noted that pursuant to Executive Order 1214, "Environmental Effects Abroad of Major Federal Actions", the requirements of the

Commandant's Order applies to "...(2) major federal actions significantly affecting the environment of a foreign nation not participating in the action or otherwise involved in the action".

The environment of the City of Windsor, located in a "foreign nation", will be affected by the proposed second Ambassador Bridge. The Coast Guard's obligation in addressing NEPA therefore must include an assessment of effects on the environment in Canada and in particular within the City of Windsor.

We also refer you, on this issue, to the letter dated September 14, 2006 from the law firm of Thompson Hine, LLP, American counsel for the City of Windsor. In that letter, authored by attorney Andrew Kolesar, it is further pointed out why the Coast Guard is required under NEPA to include analysis of reasonable foreseeable trans-boundary affects in its analysis of proposed actions in the United States. Those submissions are incorporated by reference in this submission. **Attachments Vol.1, Part A, Tab 1**

We refer you on this issue to the Coast Guard's own "Environmental Procedure Pertaining to Bridge Permit Applications" contained in the U.S. Coast Guard "Bridge Permit Application Guide", COMDTPB P16591.3B".

Among the Coast Guard policies are the following:

1. "Coast Guard policy ensures that efforts are made to improve the relationship between man and his environment and to preserve the natural beauty of the countryside, coastal areas and natural and cultural resources. Coast Guard investigations include consultations with local, state and federal agencies and the public. Recommendations and decisions are based on providing for the reasonable needs for navigation and consideration of these social, economic and environmental goals.

2. Coast Guard environmental considerations extend beyond the bridge and approaches to include causally-related primary and secondary environment impacts of the proposed bridge project. When the Coast Guard is the lead agency in a project involving a bridge, the NEPA jurisdiction extends to the logical terminae on both sides of the bridge or the bridge and road sections having independent utility." (See page 22)

It is clear that the Coast Guard policy requires "investigation" of actual facts (not just acceptance of the proponent's submissions) and "consultation" with the public and local government such as the City of Windsor about such facts and the potential environmental consequences of the proposed action at both sides of the bridge in processing an application pursuant to its own environmental policy.

The City acknowledges that in Canada, pursuant to the *Canadian Environmental Assessment Act*, a form of environmental assessment is to be carried out. In Canada, however, there are only a minimal prescribed requirements for this type of environmental examination. Under the Canadian legislation the examination is called a "screening". While a much more rigorous

"comprehensive study" of a project is a defined term, this "comprehensive study" cannot jurisdictionally be applied to the proposed new bridge and therefore only the minimal "screening" level environmental examination will occur.

A screening level environmental review in Canada is not required to consider the purpose of the project, nor is it required to consider alternative means of carrying out the project that are technically and economically feasible, nor is it required to examine environmental effects of any such alternative means.

A further limitation in Canada is that potentially affected parties such as the Corporation of the City of Windsor and its residents have no ability to determine the "scope of the project" in relation to which a screening level environmental assessment is to be carried out. That decision is entirely a discretionary one in the hands of Canadian federal agencies.

Similarly, as indicated above, the scope of the assessment i.e. factors to be considered, are entirely discretionary and again, the City of Windsor and its residents have no assurance that anything but a very narrow, technically based, environmental screening will be carried out.

There is a Fundamental Factual Error in the Submission by the Proponent and in the Preliminary Determination by the Coast Guard that this Proposed Second Bridge Meets the Criteria of Categorical Exclusion No.32(a) on Figure 2 – 1 of the NEPA Implementing Instructions

This issue is substantially addressed in Andrew Kolesar's September 14, 2006 letter (Thompson Hine LLP). **Attachments Vol.1, Part A, Tab 1**

Further important facts and analysis of this issue having regard to the Coast Guard's checklist for analyzing environmental impacts for their significance are contained in the September 13, 2006 letter from the City of Windsor Chief Planner to Gowlings, which is enclosed with this submission. **Attachments Vol.1, Part A, Tab 2**

See in particular Mr. Hayes' analysis of the 10 issues on the U.S. Coast Guard Environmental Checklist Criteria.

However, one matter not addressed that this relevant to this issue either in Mr. Kolesar's letter or Mr. Hayes' letter is the assertion of the proponent, seemingly accepted by the U.S. State Department in its correspondence filed with you, that there is an alleged "existing corridor" in which the second bridge would be built, thereby supposedly substantiating the conclusion that the second bridge would be "on essentially the same alignment or location".

Gowlings has commissioned extensive historical and archival research with respect to the statutory and executive approvals granted by the Congress of the United States and the Parliament of Canada to the Ambassador Bridge, as well as in respect of the specific plans, drawings and rights-of-way approved by officials of the federal government in the United States and Canada for the current Ambassador Bridge.

We are enclosing with this submission certified copies of original documents obtained from the National Archives of the United States and the National Archives of Canada, as well as documents filed in the Land Registry Office in the City of Windsor, all of which documents demonstrate that the original Congressional approval for the Ambassador Bridge as well as the original Parliamentary approval in Canada are confined to a single bridge. There is no contemplation in the legislation either approved by Congress or by the Parliament of Canada that there would be more than one bridge at this location. The Congressional legislation as well as the Canadian legislation both refer to "a bridge" or "the bridge". There is no contemplation of multiple bridges: See in particular **Attachments Vol.2, Part C, Tab 1** containing the 1921 Act of the Canadian Parliament "to incorporate the Canadian Transit Company" and which authorizes the company to construct and maintain a railway and general traffic bridge across the Detroit River from, at or near Windsor in the province of Ontario to the opposite side of the river in the State of Michigan".

Further, see documents listed in **Attachments Vol.2, Part E, Tabs 1 and 2** i.e. the Acts of Congress originally authorizing the Ambassador Bridge passed in 1921 and the subsequent Acts extending the time for its construction. Note that all of these Acts of Congress refer to "a bridge" across the Detroit River within or near the city limits of Detroit Michigan".

Further, both in the United States and Canada the specific plans for the Ambassador Bridge were required to be approved by senior officials in both countries.

In Canada, pursuant to the Act Incorporating the Canadian Transit Company, the Canadian Cabinet was required to approve the specific plans for the Ambassador Bridge. That approval was finally granted on August 11, 1927 by Order in Council PC1601 which approved "the annexed set of plans of a bridge and of the site thereof" which are then described further in the documents accompanying the Order in Council. Please refer to **Attachments Vol.2, Part B, Tabs 1 -- 11** which list the various plans approved by the Canadian Cabinet and provide surveys and Crown leases from the Province of Ontario and the current lease between the Windsor Harbour Commissioners to the Canadian Transit Company in respect of the strip of land which the Ambassador Bridge is entitled to occupy for the purposes of its bridge.

The various materials being filed with you clearly and unequivocally substantiate that the Canadian Transit Company is entitled to use only a 70-foot wide right-of-way under the Detroit River within the City of Windsor to the International Boundary for the purposes of its bridge. It has no other land under the Detroit River within the City of Windsor or in Canada (except for a slightly wider 100-foot portion near the Canadian shoreline on which a supporting pier for the existing bridge has been erected).

This 70-foot wide strip of land which is leased to the Canadian Transit Company for the purposes of the existing bridge in Canada is most clearly shown on the following documents and plans annexed to them which are found in Part B of our attachments:

- Licence of occupation issued by Province of Ontario, April 30, 1927 for a 70-foot wide strip of land under the Detroit River to the international boundary **Attachments Vol.2, Part B, Tab 8**

- Crown lease from the Province of Ontario to the Canadian Transit Company signed October 7, 1932 in respect of a 70-foot right-of-way under the Detroit River for the purposes of the Ambassador Bridge. **Attachments Vol.2, Part B, Tab 9**

- 1962 Lease between the Windsor Harbour Commissioners of the City of Windsor to the Canadian Transit Company in respect of the 70-foot strip of land and a second smaller parcel under the Detroit River previously leased by the Province of Ontario to the Canadian Transit Company, the major piece of property being a parcel comprising "a strip of land under water 70 feet in width, having a distance of 750 feet more or less from the first parcel to the international boundary". There is a survey/sketch attached illustration these two parcels. **Attachments Vol.2, Part B, Tab 10**

- Plan of survey prepared by Verhaegen Stubberfield Hartley et al, Ontario Land Surveyors (1994) illustrating lands on the Canadian shoreline and under the Detroit River that are leased to the Canadian Transit Company and substantiating that the corridor of the leased lands under the Detroit River have a width of 70 feet to the international boundary. **Attachments Vol.2, Part B, Tab 11**

- Letter report dated September 12, 2006 from Heritage Research Associates (David McConnell), confirming that, as an expert archivist and research historian, his full search of the Library and Archives of Canada and the certified copies of documents and plans from the Archives of Canada and Orders in Council (included in the City Attachments) approving the plans of the Ambassador Bridge confirm that there is only a "70-foot wide corridor of land" under the river that was approved for occupancy by the Ambassador Bridge. **Attachments Vol.2, Part B, Tab 12**

Any second bridge would also require specific approvals and easements for a new corridor within the City of Windsor.

Please see the Canadian Act of Parliament from 1921 found in Part C in the documents/attachments being filed with the Coast Guard "An Act to Incorporate the Canadian Transit Company" which in Section 10 provides that:

> "The company shall not construct or operate any of the works mentioned in section 8 of this Act along any highway, street or public place without first obtaining the consent, expressed by by-law of the municipality having jurisdiction over such highway, street or other public place, and upon terms to be agreed upon with such municipality ..."

In other words, before construction can begin for any bridge in this area, the consent of the City of Windsor is expressly required by this Canadian Act of Parliament.

No application has been made to the City of Windsor for such consent and of course no such consent has been granted.

When the original bridge was constructed the Canadian Transit Company did apply to the then Towne of Sandwich (now incorporated into the City of Windsor) for the specific approvals that it was required to obtain by the Act of Parliament.

Please see the documents/attachments filed with you under Part D of our document book which provides the specific by-law approval of the Towne of Sandwich and granting permission to the Canadian Transit Company to cross over a number of streets within the then Towne of Sandwich, (now the City of Windsor) for the specific structure then being built.

Those documents again corroborate that the Towne of Sandwich Council was approving a very specific structure, having certain specified heights above City streets and that certain very specific locations for anchors and piers were also being approved by Town Council.
Further, the agreement reached between the Canadian Transit Company and the Towne of Sandwich provided for the legal protection and indemnification of the municipality from materials that might fall off the bridge as well as damages caused by smoke and other emissions from the bridge.

The Canadian Transit Company/Detroit International Bridge Company have not applied to the City of Windsor, or even discussed their second bridge proposal with the City of Windsor and therefore until such applications are received and considered by City Council it is again clear that the proponent has no required statutory approvals under which it can assert it would be able to construct a second bridge at any specific location, let alone the location proposed and in respect of which the Coast Guard is being asked to give an approval.

In short, the application pending in front of the Coast Guard is premature. Until the proponent can demonstrate it has obtained the necessary approvals of the City of Windsor to pass through the air space of the City of Windsor and occupy lands within the City of Windsor, it cannot formulate plans for which the Coast Guard should be providing approval.

The City of Windsor asks that the Coast Guard suspend processing of the application made by the Detroit International Bridge Company/Canadian Transit Company until such time as these companies have sought and obtained specific approval for such a bridge both from the Parliament of Canada as well as from the City of Windsor.

In the United States, the specific plans for the Ambassador Bridge were approved both by the Assistant Secretary of War and the Acting Chief of Engineers on March 4, 1921 as well as by an ordinance.

We include in the Attachments to this submission the March 4, 1921 approval issued by the U.S. Assistant Secretary of War and the Acting Chief of Engineers approving the "plans and specifications" for the bridge between Detroit and Windsor "together with such drawings and map of locations thereof as may be required for a full understanding of the subject", which approval was issued pursuant to "an Act to Regulate the Construction of Bridges Over Navigable Waters". This approval was issued to the American Transit Company of Detroit Michigan.

The enclosed document is certified under the seal of the National Archives of the United States. **Attachment Vol.2, Part E, Tab 3**

The document consists of a two-page order approving the location and plans of the bridge and attached general plan, as well as this more specific plan and profile of the proposed bridge.

While no plan of the land area under the river is specifically shown on this plan, the plan does illustrate that the distance between supporting piers on either side of the proposed bridge was approximately 100 feet.

It is clearly beyond doubt that the proposed second bridge could not be constructed within the 1921 approval granted by the Assistant Secretary of War and Acting Chief of Engineers.

Further, the Ordinance passed by the City of Detroit in 1927approved the construction of the approaches to the Ambassador Bridge within the City of Detroit. That ordinance specifically gave approval for the bridge to pass over certain streets within the City of Detroit and refers specifically to a right-of-way width of 75 feet. **Attachments Vol.2, Part E, Tab 4**

In conclusion on this issue, the specific plans approved by federal officials in Canada and the United States by the City of Windsor, as well as by the City of Detroit do not authorize land to be occupied for a second bridge. The approved corridor in Canada under the river is no wider than 70 feet and in Detroit is 75 feet.

Clearly the proponent will be required to obtain federal, state, City of Windsor and City of Detroit approvals for a second corridor before it is entitled to build a new bridge. It has offered no proof that it has even applied for, let alone obtained, such approvals.

There is therefore no "existing corridor" and certainly no "existing approved corridor" for a second bridge.

Clearly this is another reason why a "categorical exclusion" cannot be processed in this matter.

Accordingly, it is imperative that the full rigour of the *National Environmental Policy Act* be applied to this project in order to ensure that, both in Canada and the United States, the full environmental implications of this proposal are examined and to ensure that an alternatives analysis i.e. an analysis and study of alternative locations and the environmental effects of alternative locations, is carried out.

Why an Environmental Impact Statement (EIS) is Required in this Matter

NEPA places an obligation on the USCG to consider every significant impact of its proposed action. *Baltimore Gas and Electic v. NRDC*, 462 U.S. 87, 97 (1983). NEPA and the CEQ regulations unambiguously require the Coast Guard and other federal agencies to prepare an EIS or environmental assessment/finding of no significant impact ("FONSI") for all major federal actions that are not categorically excluded as in this case as discussed above. *Anacostia Watershed Society v. Bobbit,* 871 F.Supp. 475, 481 (D.D.C. 1994). In this case, where there are

clear environmental impacts and the action will generate significant controversy, an EIS is necessary. COMDTINST M16475.1D, Section B, Para. 5, pg. 2-8. *See, also*, USCG, Office of Civil Engineering, "Tools for Decision-making: Environmental Considerations" (undated), p.21 (generally should proceed to an EIS if know or suspect proposed action will have significant impacts); *Audubon Soc. of Cent. Arkansas v. Dailey*, 977 F.2d 428 (8th Cir. 1992) (affirming district court's order of EIS for bridge project where increased traffic and impacts on parks could not support the issuance of an environmental assessment/FONSI); *Mullin v. Skinner*, 756 F. Supp. 904 (D.N.C. 1990) (bridge replacement project had significant environmental effects that required an environmental impact statement, not just an environmental assessment).

As you are aware, when Congress passed NEPA, it determined that one of the primary functions of the legislation was to ensure that "alternatives to the proposed action" be studied and considered.

The proponent's submission would clearly avoid the need for alternatives to a second Ambassador Bridge to be considered. That, however, is clearly inappropriate, particularly given the specific role of U.S. federal agencies, including U.S. Coast Guard, in respect of the on-going Detroit River International Crossing Project Study (DRIC). That Bi-National Environmental Assessment has examined various alternative crossings of the Detroit River and already determined that it would be inappropriate from an environmental and community impact perspective for a second Ambassador Bridge to be pursued.

While it is acknowledged that the Ambassador Bridge as a private company is not strictly speaking bound by that determination of the DRIC study process, nevertheless the Coast Guard, as a federal agency which is required to address the requirements of NEPA, is bound to ensure that alternatives to the proposed action <u>are</u> studied, examined and considered.

Obvious alternatives to constructing a second Ambassador Bridge include the construction of a bridge somewhat downriver from the current Ambassador Bridge in areas of both the City of Detroit and of the City of Windsor where approach roads and traffic accessing that location would cause substantially less environmental and community impact than at the proposed second Ambassador Bridge location.

It is incumbent upon the Coast Guard to ensure that this downriver location identified by the DRIC study, which is similar to the location identified by a study carried out by an internationally renown transportation engineer, Sam Schwartz for the City of Windsor identified as a preferred location for a new crossing. We are enclosing in that regard the Schwartz report (Border Crossing Issues) January 2005 (on disc). **Attachments Vol.1, Part A, Tab 20**

Clearly, this downriver crossing location, sometimes referred to as the "central crossing" area, is required to be examined by the Coast Guard as a reasonable alternative. Another obvious reasonable alternative that must be considered is the rehabilitation of the current bridge for the purposes of extending its life and its continued use in conjunction with a bridge at another location.

The Coast Guard Should Ensure that it Has Carried Out an Independent and Rigorous Examination of Facts in this Matter Before Making any Final Determination as to Whether or Not a Categorical Exclusion is Applicable

The Coast Guard has stated in its public notice that it has made a preliminary determination that a Categorical Exclusion is appropriate based on "the information presented by the proponents". Unfortunately that information is in some cases clearly erroneous, and in other places misleading and inaccurate. (We are referring to the proponent's document "Project Description and Type II Categorical Exclusion Environmental Documentation, Ambassador Bridge Enhancement Project" prepared for the Detroit International Bridge Company and Canadian Transit Company, March 31, 2006.)

Pursuant to the Coast Guard's "Bridge Permit Application Guide" the Coast Guard District Commander is required to make a "rigorous, independent examination to determine the possible impacts of the proposed project on navigation and the human environment". (Page 14) Similarly, the Coast Guard Bridge Administration Program Policy provides that "the Coast Guard is also required by law to ensure that environmental considerations are given careful attention and importance in each bridge permitting decision". (*ibid* Page 4) That careful attention cannot be provided if the Coast Guard relies only on information presented by the proponent, especially where that information is seriously misleading.

The most fundamentally inaccurate and misleading aspect of the proponent's material is its argument that this proposed second bridge is really only an "enhancement" or a "modification" of the current bridge. That argument is clearly specious in that no "modification" of the present structure is in any way proposed in the plans filed with you. Rather, what has been proposed is a completely new structure with a completely different architectural design on a completely new right-of-way (although at either end of the structure the new bridge would connect with the plazas that now exist).

For the reasons indicated elsewhere in this submission, there is no existing "approved corridor" for that second bridge and a completely new right-of-way must be acquired in Canada and the United States for it. This alone substantiates why a second bridge cannot be considered a mere "modification" or "enhancement" of the existing bridge.

A careful reading of the August, 2005 State Department letter in your file that pertains to this issue indicates that the State Department itself was relying on information provided to it by the proponent. There has apparently been no research carried out by the State Department, such as that provided to you with this letter, substantiating that the Act of Congress approving the Ambassador Bridge referred only to the current bridge and that the approval issued subsequently by the Secretary of War approved only a very specific plan and not any expanded corridor. The same situation pertains to the Canadian approvals as indicated elsewhere in this submission.

In short, approvals given by Congress and Parliament, as well as by the City of Detroit and the City of Windsor (former Town of Sandwich) are very site specific. They authorize very specific plans and engineering drawings by which the current structure exists. Therefore the legal approvals pertaining to the Ambassador Bridge allow it only to be built and only to exist as it is today. There is no "approved corridor" other than the existing bridge as it currently exists.

Any widening of the current bridge and certainly any new bridge, requires an approval in the United States under U.S. Code Title 33, Section 535, referencing the *International Bridge Act* of 1972, under which Congress delegated its consent to the construction of such bridges subject to conditions, including "the approval of the proper authorities in the foreign country concerned".

The Parliament of Canada has not been asked to grant nor has it granted consent to a second bridge across the Detroit River between Detroit and Windsor.

Other Misleading and Erroneous "Facts" Submitted by the Proponent to You

The proponent describes its proposed second bridge as having six lanes. In fact, the proposed new bridge will have a total width of 102 feet. Each of the six lanes would have a 12-foot width. However, there would be two outside shoulders, each with a six-foot width, and two inside shoulders, again each with a six-foot width. It can quickly be appreciated that in fact the new bridge could carry eight lanes of traffic, even assuming all lanes were 12 feet in width.

Therefore it is clear that the proposed second bridge is for a structure that is twice as wide than the current bridge (which has a 55-foot wide deck) and will provide twice as many lanes as the current Ambassador Bridge.

Our opinion in this regard is substantiated by the U.S. Department of Transportation, Federal Highway Administration, June 7, 2006 letter to you on this matter, specifically in **Attachment No.2, Item E** to that letter, where it is stated that:

> "The document cross-section shows six through lanes with shoulders, but the shoulders could potentially be converted by the owner to through lanes at some point in the future thereby resulting in an eight-lane cross section. What impact does this have on capacity of the inter-state system at the bridge location?"

Moreover, the proponent does not commit to ensuring that the new eight-lane bridge will be its ultimate goal. It has not committed to taking the existing Ambassador Bridge out of service. As such, what the proponent is proposing is to add a new bridge, having the capacity of ultimately eight lanes to the four lanes on the existing bridge for a total capacity of 12 lanes of bridge traffic.

Although the proponent states that once the new structure is completed the existing bridge would be taken out of service "for some period of time" to effect repairs that are deemed necessary, it goes on to state that: "Once any necessary repairs are completed, the existing structure will be used to provide redundancy and back-up support when necessary to ensure the free flow of traffic between Windsor and Detroit at all times."

This means that the City of Windsor is faced with the proposition that instead of four lanes of international truck traffic on the Ambassador Bridge, with the proposed second bridge in service, there may well be a total of 12 lanes of traffic passing through the City of Windsor.

This is of obvious concern to the City. The Coast Guard needs to ensure that its Environmental Impact Statement considers the project as having that significant capacity and associated environmental impacts.

Another misleading aspect of the proponent's submission to you is that there is no need to be concerned about traffic that will be generated and associated with the new bridge because that is not a matter over which the private sector proponent has jurisdiction.

Of course, that proposition is preposterous. It would be arbitrary and capricious for the Coast Guard to purport to carry out an environmental analysis of this proposal with the blinders suggested by the proponent. This private sector proposal could only be financed based on the tolls from the substantial increase in vehicle traffic that has been projected to use a second crossing in this area when such is built. That additional traffic will in turn create significant adverse environmental effects within the City of Windsor. The addition of eight new lanes would obviously and necessarily exacerbate the critical congestion problems that exist on City of Windsor streets as documented in the Schwartz report (see copy of which is enclosed) as well as documented by the DRIC in its needs assessment for a new crossing. **See Photo, Attachments Vol.1, Part A, Tab 12.**

Other Information Provided to you by the Proponent Which is Misleading and Unreliable

- In the March 31st covering transmittal letter from American Consulting Engineers of Florida LLC addressed to Robert Bloom at the United States Coast Guard and Cathy Hainsworth at the Canadian Environmental Assessment Agency, the statement is made that the new structure "will connect directly to the existing plazas in both Windsor and Detroit without the need for modification to these recently-enhanced plazas".

  However, that is not the case.

  Please find as an Attachment to this submission a letter dated June 6, 2006 from the Director General of the Canada Border Services Agency to Mr. Dan Stamper, President, Canadian Transit Company regarding "Ambassador Bridge Development Plans". **Attachments Vol.1, Part A, Tab 19**

  In this letter the Canada Border Services Agency expresses substantial concerns that new infrastructure will be required on the Canadian side of the border in order to accommodate the proposed Ambassador Bridge second bridge.

  The CBSA points out its concern that:

  > "There are few details around the plans to provide adequate and functional installations for the port of entry functions over an appropriate long-term planning horizon. Implementing the plans as described will result in immediate additional capacity at this location: from the existing four lanes to six lanes with dedicated lanes for trusted travelers, up to possibly ten lanes should you decide to rehabilitate the existing structure rather than demolish it.
  >
  > ....
  >
  > The port of entry facilities are integral to the transportation system and its planning must be integrated in the systems overall planning. Otherwise, as you pointed out, the port of entry and not the bridge company becomes the system's

> bottleneck and capacity constraint with related impacts of trade. Consequently it would be short sighted to plan enhancements to the international crossing in abstraction of the port of entry installations necessary to support it." (emphasis added)

The CBSA letter goes on to point out that it sees it necessary for the proponent to incorporate "a strategy to secure the necessary land and zoning changes" for the further port of entry facilities it requires.

The CBSA also points out it has security concerns with respect to Huron Church Road "dissecting the proposed plaza expansion". As it is put in the letter:

> "This compromises the security and the sterility in the point of entry... . It is essential that adequate measures be taken to secure the plaza and ensure that all traffic from the U.S. cannot co-mingle with local traffic. Further, it splits our operations within the port, an undesirable feature, complicating our management of the site."

The Canadian government's letter also states:

> "There are significant security problems with the current off-site arrangements that jeopardize our ability to discharge adequately the border management mandate.
>
> ...
>
> This issue will be exacerbated in the future with the advent of the additional bridge capacity and the traffic growth at the gateway.
>
> ...
>
> Consequently, the importance that the bridge's enhancement plans incorporate the provision of functional secondary commercial examination installations integral to the port of entry."

Fourthly, the Canadian government's letter points out its concerns in respect of the adequacy of current travelers secondary examination installations.

> "We have concerns over the capacity of the facility and the configuration of the traffic flows around this element of the existing installations."

The letter ends with the observation that:

> "The Windsor-Detroit Gateway is the busiest trade corridor in North America. The aggregate capacity of the transportation system within the gateway has a significant impact on the trade between both partners and their economies. It is crucial that in improving an element of the system, such as the Ambassador

> Bridge, that an end-to-end solution be formulated and implemented such that system-wide improvements are realized." (emphasis added)

The letter concludes that the Canada Border Service Agency is "unable to fully support enhancement plans for the Ambassador Bridge that do not fully integrate the minimum essential operational requirements necessary to discharge the agency's mandate at the border now and in the future". (emphasis added)

These comments must be critically considered by the U.S. Coast Guard in that they indicate that the proponent's plans are again premature. They must change before they are finalized. This again substantiates why the Coast Guard should put processing of this application on hold. This letter also refutes the statement made by the proponent that the proposed construction of the second bridge can proceed "without the need for modification" to the plaza, particularly that in Canada.

- Another highly misleading statement made by the proponent in its March 31st transmittal letter is that:

> "The property required by this project is owned entirely by the Canadian Transit Company and the Detroit International Bridge Company."

However, as indicated elsewhere in this letter and as substantiated by the various plans, leases, title deeds and other documentation attached, the proponent has no property rights under the Detroit River allowing it to occupy any area above the river for the proposed second bridge.

Moreover, the proponent will be required to obtain property easements from the City of Windsor over five City streets, and no application has been made to the City for that purpose. The bridge cannot exist without those property easements.

Similarly, there will be 14 support piers/abutments located within the City of Windsor as drawn on Sheet 8 of the plans submitted to you. The proponent will require permission from the City of Windsor in order to install such piers/abutments even if they are located entirely on private property (which is not clear). Building permits and zoning approvals will be required before any such piers/abutments can be erected.

Although it is not stated, the proponent's plans would require the demolition of a large number of houses to the west of Huron Church Road in order for this proposal to proceed. Again, the proponent has no approval to demolish such houses, which approval must be sought from the City of Windsor. No application has been made.

At page 7 of its submission the proponent makes the statement that it has determined that:

> "The Ambassador Bridge enhancement project is a preferred alternative. Conceptual designs have been completed in accordance with the long-term needs of the Region and consistent with ongoing initiatives in both countries." (Page 7)

This misleadingly implies that the Ambassador Bridge project is consistent with the DRIC study and that it meets "long-term needs of the Region" consistent with that study. However, a careful consideration of the November 2005 Alternatives Analysis Report by the DRIC (excerpted in Mr. Hayes' letter of September 13th enclosed with this submission) makes clear that a second Ambassador Bridge at this location is clearly not consistent with the DRIC analysis and is not consistent with the "long-term needs of the Region" or with "ongoing initiatives in both countries".

- The proponent has also made misleading submissions to you in respect of land use issues. For example, in its discussion of "land use" at pages 8 – 9 of its submission to you, there is no statement acknowledging that the land on which the proposed second bridge would be built is designated for residential use only in the City of Windsor Official Plan and is also zoned residentially in the Windsor Zoning By-law. (Further elaboration and substantiation of this is contained in the September 13th letter from the Chief Planner, Robert Hayes, filed with this submission and the various zoning maps and Official Plan documentation filed with this submission.)

- Further, a highly misleading and inaccurate statement is made at page 9 of the proponent's submission that:

  > "The neighbouring parks, schools and neighbourhoods or industries will not be affected by the project." (Page 9)

  As demonstrated by the letters from the Chief Planner of the City of Windsor, from the Executive Director of the City of Windsor's Parks and Recreation Department and the documents referenced in their letters, that statement by the proponent is entirely misleading and wrong. There is a university, schools, parks, historic and cultural amenities as well as the neighbourhood of Sandwich that all will be significantly affected by the second bridge.

- Another misleading statement by the proponent is:

  > "The land use of the area would not change by the proposed action because the location is within the existing corridor of the similar facility, the Ambassador Bridge." (Page 9)

  Again, that is entirely misleading for the reasons already set out: There is no "existing corridor" that is approved or exists beyond the actual structure of the current Ambassador Bridge. Any widening or addition to that existing corridor would require approval by the Parliament of Canada, approval under U.S. statutes, as well as the approval of the City of Windsor and likely also the City of Detroit.

  Moreover, land use will in fact be changed by this proposed second bridge. A large number of houses will necessarily be demolished in order to accommodate the new bridge and its supporting structures. Land use in the remaining residential part of the area would indeed be affected by noise, emissions and hazards associated with the second

bridge. The demolition of houses will obviously have a negative effect on neighbourhoods and housing stock within the City of Windsor.

- Another misleading statement is made by the proponent under the sub-heading 3.2 "Neighbourhoods":

  "Neighbourhoods will not be negatively impacted by the proposed action".

In fact, quite the opposite is obviously going to occur. Houses will necessarily be required to be demolished in order to accommodate the new bridge. Instead of four lanes of traffic there will be a potential total twelve lanes of traffic which would cause much greater air and noise pollution as well as exposing nearby residents to higher accident rates and spills of toxic contaminants from the aerial right-of-way associated with the new lanes of traffic over their houses.

The proponent acknowledges there is existing congestion on Huron Church Road but it is not proposing to improve that situation nor is any other level of government considering doing so north of the E C Row Expressway. Therefore to add up to eight new lanes to the bridge crossing, linked to wider facilities in the United States, all of which would allow more trucks to funnel through the City of Windsor, would only increase the amount of congestion and therefore increase the amount of air pollution and noise pollution in the surrounding Windsor neighbourhoods as well as exacerbate safety and planning issues.

At page 31 of the Proponent's submission to you, the Proponent further attempts to mislead you and the public about the benign nature of its undertaking.

In addressing a check list question "Is the action likely to have results that are inconsistent with locally desired social, economic or other environmental conditions" the response provided is that:

> "No... . The proposed action would not change traffic patterns or increase traffic volumes. The proposed action is consistent with future land use plans in both Detroit and Windsor."

The September 13, 2006 letter from the Windsor City Planner demonstrates this conclusion is clearly wrong.

Again, the Proponent misleads in answering check list question (e) "Is the action likely to adversely affect a significant aspect of the socio-cultural environment?"

The answer to that question provided is:

> "No. The proposed action consists entirely of a bridge... no churches, or cultural institutions will be affected. ... The university would be materially unaffected. ...The proposed action would not cause changes in the way members in the surrounding community or neighbourhoods live, work and play." (pages 32-33)

Again, this is an incredible misapprehension and speculation on the part of the proponent which has no semblance of reality.

Similarly, in Sections 3.5 "Cumulative Impacts", 3.6 "Visual Quality and Aesthetics", 3.7 "Parklands" and 3.9 "Cultural Resources and Other Protected Areas" the Proponent makes further misleading statements which ignore both fact and statutory requirements. For example, it purports to speculate that "cumulative impacts are not expected to be significant" as the proposed action "is enhancing an existing transportation facility rather than adding a new facility in a new area". (Page 10)

Again, that is a completely improper way of addressing cumulative impacts and fundamentally undermines the whole rationale for how that issue is to be addressed in the carrying out of an environmental assessment, as pointed out by the U.S. EPA on page 6 of its August 30, 2006 letter to you.

Moreover, it ignores the way a cumulative effects analysis is to be done under the *National Environmental Policy Act* and under the *Canadian Environmental Assessment Act*.

As pointed out in the handbook published by the U.S. Council on Environmental Quality: "Considering Cumulative Effects Under the *National Environmental Policy Act*" (January 1997):

> "Although past environmental impact analyses focus primarily on project-specific impacts, NEPA provides a context and carries the mandate to analyze the cumulative effects of federal actions. ... The range of actions that must be considered include not only the project proposal but all connected and similar actions that could contribute to cumulative effects. For example, the expansion of an airport runway that will increase the number of passengers travelling must address not only the effects of the runway itself, but also the expansion of the terminal and the expansion of the roadways to provide access to the expanded terminal. If there are similar actions planned in the area that will also add traffic or require roadway extensions (even though they are non-federal) they must be addressed in the same analysis." (Pages 1-2)

This whole aspect of cumulative effects has been totally ignored in the submission filed with you. The proponent seeks to ignore the fact that roads will have to be widened and neighbourhoods destroyed in order to accommodate the functioning of its proposed new bridge.

Similarly with respect to its "Parklands" analysis the proponent admits that it must address compliance with so-called Section 4(f) of the *DOT Act* providing that the Secretary of Transportation shall not approve any program or project which requires the use of publicly-owned land from a public park, recreation area or land of an historic site of a national, state or local significance unless there is no feasible and prudent alternative for the use of such land. (Page 10)

The proponent admits that two parks exist along the Detroit River in Canada: The Ambassador Park and Assumption Park, both are pedestrian/bicycle parks that follow the river.

The proponent argues that neither of these parks will be impacted by the proposed project as the piers will not be placed within the parks.

However, this is clearly contradicted by the September 11, 2006 letter from Don Sadler, Executive Director, City of Windsor Parks and Recreation, previously referenced and attached.

In Section 3.9 of its submission "Cultural Resources and Other Protected Areas" the proponent refers to the Section 106 of the *National Historic Preservation Act* and the Executive Order "Protection and Enhancement of the Cultural Environment", which require that impacts of federal licensed projects be examined for their impact, particularly on historic districts and structures, particularly and specifically those included in the National Register of Historic Places.

The proponent acknowledges that in 1980 the Ambassador Bridge was added to the National Register of Historic Places but goes on to argue that "the existing Ambassador Bridge will be slightly impacted by the proposed project, but not negatively impacted".

However, the proponent has not complied with the requirements of the *National Historic Preservation Act* or the Commandant Instructions issued by the United States Coast Guard in respect of addressing NEPA which, as you know, requires very specific findings and facts on this issue before you are in a position to authorize any permit having regard to the stringent requirements of that national historic preservation legislation.

In Section 3.12 "Traffic and Circulation" again, an incredible statement is made that "the proposed project would not have a negative impact on traffic and circulation ... the vehicle hours of cars and trucks should likewise decrease with the addition of additional capacity over the river. Pedestrian safety and circulation would not be negatively impacted." [page 15]

Again, this ignores the fact that no new access roads are to be built as part of the proposed Ambassador Bridge project and therefore congestion will be obviously increased with horrifically negative impacts on traffic and circulation, as well as severely negative impacts on pedestrian safety.

The discussion offered by the proponent in conjunction with the Categorical Exclusion checklist contains erroneous and misleading statements.

For example, in response to checklist question (a) "Is the action likely to be consistent with any applicable ... local law, regulation or standard designed to protect any aspect of the environment?" the proponent answers "No" but offers absolutely no reference to Ontario laws or Windsor laws. Both of these regulate air quality and noise as well as land use planning which, as you are aware, is considered part of the "environment" considerations.

Again, with respect to check list question (b) "Is the action likely to have results that are inconsistent with locally desired social, economic or other environmental conditions?"; the Proponent answered the question: "No, ... the proposed action would not change traffic patterns or increase traffic volumes. The proposed action is consistent with future land use plans in both Detroit and Windsor."

We have earlier commented on the incredibly misleading nature of that response.

Checklist question (c) reads: "Is the action likely to result in the use, storage, release and/or disposal of toxic, hazardous or radioactive material, or in the exposure of people to such materials?"

The proponent answers: "No ... the proposed action would not cause people to be exposed to hazardous or toxic materials."

Again, this is a misleadingly untrue statement. There are toxic and hazardous substances carried in vehicles every day in many vehicles across highways and these will include the proposed bridge, an elevated structure over and near many houses and institutions, therefore posing the potential for exposing a wide segment of the population to such toxic/hazardous materials in the event of an accident.

We are attaching a CD ROM containing a Detroit TV new program in which Dan Stamper, President of the Canadian Transit Company, acknowledges his company permits hazardous materials to be transported over the Ambassador Bridge contrary to Michigan laws, in that he takes the position "private property" is not subject to such laws. **Attachments Vol.1, Part A, Tab 21**

Check list question (i) reads: "Is your action part of an ongoing pattern of actions (whether under the control of GSA or others) that are cumulatively likely to have adverse effects on the human environment?

The Proponent answers:

> "No. The proposed action is not part of an ongoing pattern of actions that are expected to have adverse effects on the human environment. The proposed action is in response to, but not a contributor to, on ongoing pattern of increased traffic, population and development in the Detroit – Windsor area and increased trade between the United States and Canada. The proposed projects is meant to alleviate traffic congestion on the existing bridge itself, aid in trade between the United States and Canada and create safer driving conditions in the Detroit – Windsor area."

Obviously the above answers are far from reality. The proposed action will indeed contribute to increased congestion, safety hazards and pollution in the City of Windsor, absent any appropriate new infrastructure required to connect the new bridge to Highway 401. The proposed project will not "alleviate traffic congestion" but rather exacerbate it and exacerbate safety and hazardous driving conditions in the Windsor area.

The proponent, however, continues to have blinders on this issue. In its correspondence dated March 13, 2006 addressed to Kaarina Stiff at Transport Canada, on page 2, item 3, where Transport Canada raises the issue that the documentation submitted, while identifying access road capacity as a key issue, indicates that access to the Ambassador Bridge from Huron Church Road:

> "is expected to reach capacity in the next five years. To establish the scope of the project, we [Transport Canada] need to determine what other physical works are likely to be carried out in relation to your proposal. In particular, we require information concerning any other infrastructure work that may be planned to address these access and capacity issues, or that may be required as a result of the project modifications to bridge access on Huron Church Road will be proposed or considered necessary because of the proposed second span."

Incredibly, the Proponent makes the response that:

> "This project simply involves the connection of two plazas that have already been permitted and approved... Additional lanes across the river are expected to have no negative impact on the approach roadways. ... The new six-lane bridge over the river will ensure the traffic can continue to flow clearly across this vital border crossing. No additional work is anticipated to be required as a result of this project. Huron Church Road currently has and will continue to have more capacity than the proposed bridge crossing."

As you will recognize, this conclusion is patently absurd.

Approval Under U.S. *International Bridge Act* is Required Before Coast Guard Processes Navigable Waters Permit

Chapter 2 of the Coast Guard Bridge Permit Application Guide states that a proponent must include in its application package the legislative authority for international bridge construction.

Specifically, with respect to "international bridges" the following requirement is stated under Section A3E "International Bridges":

> "1. The *International Bridge Act* of 1972, or a copy of the *Special Act of Congress* if constructed prior to 1972, should be cited as the legislative authority for international bridge construction.
>
> 2. Presidential approval should be obtained from the State Department prior to issuing a Coast Guard bridge permit under the *International Bridge Act* of 1972.
>
> **NOTE**: A copy of State Department approval for international bridges must be included in your application package for a Coast Guard permit."

The City of Windsor submits that should the proponent wish to build a second bridge it must present a Presidential approval to the Coast Guard under the *International Bridge Act* of 1972 – and without such approval being presented, it is contrary to the Coast Guard's own procedure for the Coast Guard to be processing any permit application under the *Rivers and Harbours Act*.

The Coast Guard Permitting Guide Requires that Section 4(f) of the *Department of Transportation Act* of 1966 as Amended, Now 49 USC303 be Addressed

Your own Guide states that:

> "A special effort must be made to preserve the natural beauty of the country side, public parks and recreational lands, wildlife and water fowl refuges, and historic sites."

Section 4(f) further states that a project requiring the use of Section 4(f) lands shall not be approved unless:

> "1. There is no feasible and prudent alternative to the use of such lands; and

2. Such use includes all possible planning to minimize harm to such lands resulting from the project."

Pausing here, the proponent has submitted no information whatsoever as to what alternatives, if any, have been canvassed and certainly not substantiated or even attempted to document "no feasible and prudent alternatives to the use of such lands" or that the use "includes all possible planning to minimize harm to such land resulting from the project.

Moreover, the proponent has failed to acknowledge that it will in fact require "taking land" from such protected areas within the City of Windsor, which is prohibited under that legislation unless feasible alternatives have been carefully examined and none have been shown to exist.

Moreover, your guidance document reiterates that "all bridge actions also require compliance with the *National Historic Preservation Act* of 1966, Section 106 – again, the impacts of the new bridge on the historically protected and designated Ambassador Bridge have not been complied with.

Moreover, the requirements Item (k) of Chapter 3 state that with respect to air impacts "the Coast Guard must ensure that projects under its jurisdiction meet the National Ambient Air Quality Standard before issuing a bridge permit".

It goes on to state that:

> "During the bridge permitting process, early coordination and consultation with the state and local air quality agencies is important to determine whether your project is consistent with an approved federal state implementation plan governing the ambient air quality of the proposed bridge project location."

Pausing here, the proponent has not demonstrated it has had any such consultation and has carried out no studies, taking the somewhat incredible position that this project will not increase air pollution.

Similarly, Item (l) of Chapter 3 requires that the Coast Guard ensure that appropriate noise studies be undertaken. As your own guidance document puts it:

> "All authorized bridge construction work must comply with the provisions of the *Noise Control Act* of 1972. Under the *Noise Control Act*, the adverse impacts on existing activities for land uses that may result from the bridge, its related highway sections, or its construction must be considered."

Your guidance document indicates that the information package regarding noise must include such matters as:

> "(a) The anticipated design noise levels for the proposed project;
>
> (b) A description of all possible measures to minimize noise impact if there is no alternative to avoid the adverse effects."

Pausing here, the proponent has taken again the incredible position that it is not required to do any noise studies – a complete flaunting of the requirements of the Coast Guard and of U.S. federal legislation.

Finally, it is relevant to note in considering the requirements of the Coast Guard Bridge Permitting Guidance requirements that the term "bridge", as found in the "glossary" is defined as including "approaches":

> "The term "bridge" includes all integral bridge elements: approaches and appurtenances, regardless of materials used, whether natural or manufactured, or the construction methodology."

Further Elaboration as to Why a "Categorical Exclusion" Cannot be Applicable

In Commandant Instruction M16475.1D, November 29, 2000, being NEPA Implementing Procedures and Policy for Considering Environmental Impacts, Chapter 2 is entitled U.S. C.G. Implementing Instructions, indicates in Part B "Environmental Documentation", indicates that this instruction "applies to all U.S. C.G. actions including the decision to … grant permits … ." [page 2 – 4]

It then proceeds to discuss "Categorical Exclusions" (CEs). It states that a "CE" is meant to be a "category of actions which do not individually or cumulatively have a significant effect on the human environment and for which, therefore, neither an EA nor an EIS is required…. A list of current CEs can be found in Figure 2 – 1".

Pausing here, we have reviewed Figure 2 – 1 entitled "Coast Guard Categorical Exclusions".

There are 35 items listed.

The only one which could possibly be relevant to an application to construct a new international bridge would be Item 32 "Bridge Administration Program Actions" as specifically described as one of the following:

> "(a) modification or replacement of an existing bridge on essentially the same alignment or location. Excluded are bridges with historic significance or bridges providing access to undeveloped barrier islands and beaches."

It is, however, obvious that the application to build a new six-lane bridge while leaving up the current existing four-lane Ambassador Bridge is neither a "modification" nor a "replacement" of an existing bridge.

Nor is it a proposal to do a modification or replacement "on essentially the same alignment or location".

As we have pointed out earlier, the Ambassador Bridge has been given specific approval as it exists today and there is no further alignment or other location for it that has been approved.

Moreover, the Categorical Exclusion, even if it were for a "modification" or "replacement" of an existing bridge, excludes "bridges with historic significance". That certainly applies to the National Register Designated Ambassador Bridge.

Accordingly, the proposed new Ambassador Bridge cannot qualify as a CE in accordance with the Coast Guard's own regulations and policies.

Moreover, Chapter 2 of the Commandant Instructions for Implementing NEPA specifically indicates that there are "limitations on using Categorical Exclusions" even if one was applicable.

Your own policy requires that "responsible personnel should be alert for circumstances that dictate the need to prepare an EA or EIS" or some actions that would be normally categorically excluded in Figure 2 – 1.

Your policy states that:

> "The potential environmental consequences must be evaluated in their context (whether local, state, regional, national or international) and in their intensity by considering whether the action is likely to involve one or more of the following: ...
>
> 2. a site that includes or is near a unique characteristic of the geographic area, such as a historic or cultural resource ... or property requiring special consideration under 49 USC 303(c) [commonly referred to as Section 4(f) of the *Department of Transportation (DOT) Act* which includes any land from a public park ... or historic site.
>
> 3. The quality of the human environment that is likely to be highly controversial in terms of scientific validity or public opinion ....
>
> 7. A district, site, highway, structure or object that is listed in or is eligible for listing in the National Register of historic places ...
>
> 9. A potential or threatened violation of federal, state or local law or requirement imposed for the protection of the environment."

Your policy requires that "the determination of a CE is inappropriate and more environmental analysis is needed, or that an EA or EIS is needed, must be based on the potential significance of the proposed actions affect on the environment. The proposed action must be evaluated in its context (whether local, state, regional, tribal, national or international) and in its intensity by considering the level of possible effects as listed in (1) – (10) above". [page 2-5]

Your policy also states that:

> "However, a CE may not be used if the proposed action is likely to involve any of the circumstances set forth in Section 20.B(2) of DOT Order 5610.1 (enclosure 1). The 10 listed circumstances and those in the DOT Order are addressed in the Environmental Analysis Checklist (enclosure 2). If a CE is not appropriate, an EA or an EIS must be prepared."

Accordingly, your own Commandant Instruction requires that a CE may not be used if the proposed action is likely to involve one of the circumstances set forth in that Environmental Analysis Checklist.

The Environmental Analysis Checklist which is enclosure 2 to the Commandants Order is a different checklist from the one used by the DIBC/CTC in its March 31, 2006 submission to you.

On that "Checklist" there are a number of relevant questions which, if the appropriate facts are addressed, would have to be answered "yes" which in turn would mean that even if there was a CE applicable to this proposed project (which there is not) a CE cannot be used in this particular situation.

In particular, we refer you to Question 1 of the Checklist: "Is there likely to be a significant effect on public health or safety?"

The guidance document requires addressing potential release of toxic materials, accidental spills of oils, hazardous or toxic materials and compliance with the *Clean Air Act* and the *Noise Control Act.*

In this case the Proponent has chosen to ignore the fact that the new bridge would carry vehicles containing hazardous and toxic materials over and adjacent to numerous houses and institutions, and has carried out no noise or air studies.

However, in the absence of such studies indicating no impacts, it is prudent to assume there will be impacts and therefore "there is likely to be significant effect on public health or safety".

Question 2 reads: "Does a proposed action occur on or near a unique characteristic of the geographic area such as a historic or cultural resource, parkland ... or property requiring special consideration under 49 USC 303?"

This in turn requires a consideration of whether or not it is located near a "national historic landmark" or "designated open space, or a designated conservation area, or potentially have "adverse visual, social, atmospheric, traffic or other effects on such a critical area even though it is not located at or near the area; or change the use of parklands.

Again, it is clear from the Proponent's own materials that the proposed bridge is located adjacent to a national historic landmark, that it will have adverse visual, atmospheric and traffic effects in the area, that it will change the use of parklands by putting a new eight-lane bridge through parkland etc. and therefore the answer to that question again is "yes".

Checklist Question 3 reads: "Is there a potential for effects on the quality of the environment that are likely to be highly controversial in terms of scientific validity or public opinion?"

The guidance document indicates that:

> "Environmental controversies can be about a host of things: impact on historic buildings, archaeological sites, and other cultural resources; impacts on traffic or parking on a

> community or neighbourhood; ... to avoid missing a controversial issue that should be addressed under NEPA be sure not to interpret the word "environmental" too narrowly."

Again, the answer to Question No. 3 must be "yes". **See Attachments Vol.1, Part A, Tab 11.**

This project is very controversial.

Question 6 reads: "Are the actions, impacts individually insignificant, but cumulatively significant when considered along with other past, present and reasonably foreseeable future actions?

The guidance on this question states that in order to accurately respond to the checklist the Coast Guard must consider "whether the action is related to other actions (by USCG or others) with impacts that are individually insignificant but that may, taken together, have significant effects.

A specific example provided is relevant:

> "For example, is the action part of an ongoing pattern of pollutant discharge, traffic generation (vehicle or vessel) economic change or land use change in its locality that could collectively affect human health or the condition of the environment?"

Again, the answer to question 6 would be "yes".

Question 7 on the Checklist is: "Is the proposed action likely to have a significant impact on a ... structure ... that is listed in ... the National Register of Historic Places...?"

Clearly, the new bridge will have an impact on the existing historically designated Ambassador Bridge, and therefore the answer to question 7 is "yes".

Similarly it has the potential to have impact on "a place with traditional cultural value in the eyes of a native American group or community" as well as on "the historic/cultural character of communities or neighbourhoods".

Again, the answer to this question must be "yes".

The Proponent acknowledges that there are likely to be native Indian burial sites in the area where the piers and support structures for the new bridge are to be located and that it is to be located nearby the historic old Sandwich part of the City of Windsor.

Again, the answer to question 7 on the Checklist must be "yes".

Question 9 is also relevant: "Is there a potential or a threatened violation of federal, state or local law or requirement imposed for the protection of the environment?"

The guidance on this requires that issues that need to be considered include whether the project is or action is likely to:

- adversely affect the ambient air quality due to dust, vehicle or equipment emissions ...

- result in toxic or unusual air emissions
- adversely affect the ambient air quality due to the operation and/or maintenance of vehicles ...
- significantly increase the ambient noise levels of the area."

Again, clearly the answer to question 9 is "yes".

Finally, Question 10 on the Checklist is as follows: "Is the action likely to have other significant effects on public health and safety or on any other environmental media or resources that are not specifically identified in this checklist?"

The additional concern under question 10 is "socio-economic impacts and environmental justice".

The guidance on this indicates that if the action is likely to:

- change traffic patterns or increase traffic volumes
- require the re-routing of roads, waterways or traffic
- be located near any existing bottleneck in vehicle or vessel traffic (e.g. a bridge intersection ...)
- have access constraints
- affect a congested intersection
- be inconsistent with existing zoning, surrounding land use or the official land use plan for the specific site and/or the delineated area
- be inconsistent with surrounding architecture or landscape
- relocate private residences or businesses
- intrude on residential or business uses in the affected area
- be regarded by burdensome by local or regional officials

then it may well have significant impacts on the socio-economic environment and issues of environmental justice.

Again, in this situation the answer to the question is the action "likely to have other significant effects on public health and safety and on any other environmental media or resources i.e. environmental justice and socio-economic impacts as set out, is "yes".

Please see for substantiation of why "yes" is correct the September 13, 2006 letter from City of Windsor Planner, Robert Hayes at pages 9 – 20. **Attachments Vol.1, Part A, Tab 2**

For all of the above reasons it is clear that the Coast Guard cannot grant a Categorical Exclusion even if the proposed bridge was on the CE list, which it is not.

We refer you also to enclosure 3 to COMDTINST M16475.1D, this enclosure being the form entitled "USCG Categorical Exclusion to Termination".

This form requires certification that the action is "not expected to result in any significant adverse environmental impacts as described in NEPA". Further, it further requires you to certify that the proposed action":

> "..has been thoroughly reviewed by the USCG, and the undersigned have determined this action to be categorically excluded under the current USCG CE(s) No._____. **[indicate specific CE number]** from further environmental documentation in accordance with Section 2.B.2 in Figure 2.1 of NEPA Implementing Procedures and Policy… Since implementation of this action will not result in any:
>
> 1. significant cumulative impacts on the human environment
> 2. substantial controversy or substantial change to existing environmental conditions
> 3. impacts which are more than minimal on properties protected under 4F of the *DOT Act*, and Section 106 of the *National Historic Preservation Act; or*
> 4. inconsistent with any federal, state or local laws or administrative determinations relating to the environment.

The City of Windsor submits that it would be clearly arbitrary and capricious if such a Categorical Exclusion determination was to be made by the USCG at this time based on the information presented by the proponent for the reasons set out above.

With respect to the certification that is required with respect to a "4(f) statement", enclosure 10 to the Commandant Instruction, Document M16475.1D elaborates that under Section 4(f) "the Secretary of Transportation (Commandant) shall not approve any program or project which requires the use of 4(f) lands unless:

(a) there is <u>no feasible and prudent alternative to the use of such lands</u>; and

(b) such program includes <u>all possible planning</u> to minimize harm to 4(f) plans resulting from such use."

In other words, it is incumbent upon the Commandant not to approve any program or project unless the proponent has demonstrated it has objectively met these criteria. These criteria clearly have not been met in this case as there have been no studies of feasible and prudent alternatives.

It is noted that Section 4(f) lands include "any publicly owned land from a park" and that publicly-owned land includes "fee simple or land subject to public easement or other interest in the land by a federal, state or local agency or entity".

Further, "use of land" under Section 4(f) generally means the acquisition of title to "or an easement in land for a transportation program or project".

Further, in unusual circumstance, serious adverse impacts such as severe increases in noise or air pollution, or access disruption may constitute a "constructive use, even where no acquisition is involved and Section 4(f) would apply".

Under the material required to properly address Section 4(f), the proponent must, "include the acreage needed for permanent surface easements, aerial easements, drainage and utility easements etc." – none of which has been done in this particular case by the Proponent DIBC/CTC.

Furthermore, adverse impacts of the project on 4(f) lands must be discussed and should include "detailed information concerning the effects of the project on natural views, local historical values, pedestrian and other access, recreational use, vegetation, wildlife, etc. Care should be undertaken to include a rigorous analysis of aesthetic, air and water pollution and noise impacts on 4(f) lands near and adjacent to the project."

Again, none of this has been submitted by the proponent and therefore the USCG is not in a position to make any determination that Section 4(f) has been complied with.

Further, in order to properly address 4(f) requirements:

> "A statement of the local, state or national significance of the 4(f) lands should be presented. This statement should come from the officials having jurisdiction over the lands when at all possible and should address the significance of the entire area involved and the actual land affected or taken by the project ... Any statement of insignificance from whatever source is subject to review by the USCG for caprice."

Further, Section 10 of this guidance document regarding 4(f) requires:

> "Evidence of concurrence, or a description of efforts to obtain concurrence of officials having jurisdiction of Section 4(f) lands regarding the proposed action and plan to minimize harm should be presented."

In this case there has been no consultation let alone concurrence obtained from the City of Windsor with respect to the impacts and use in taking of the City of Windsor park lands.

Finally, the City submits that the required certification to comply with Section 4(f) cannot be granted by the Coast Guard in this case as set out in Section 11 of the guidance document which requires that the certification provide that:

"Based on this 4(f) statement, I have determined no feasible and prudent alternative to the use of this 4(f) land(s) and that all possible planning to minimize harm to this land(s) has been accomplished."

Closing

The Corporation of the City of Windsor has provided as much documentation, reports and other information as well as legal analysis as it could in the time available to respond to the Coast Guard Public Notice in respect of the application filed by the proponent for a second bridge permit.

Obviously the City of Windsor considers the proposed bridge to be a proposal fraught with significant and adverse environmental consequences for the City and its residents. We believe the materials submitted substantiate that concern.

We close by emphasizing both the desirability and necessity of the Coast Guard ensuring that full consideration of all these facts and information are carefully considered so that its initial preliminary determination is reversed: This project must be processed not by a categorical exclusion but rather only following a full Environmental Impact Statement.

However, for the reasons set out above, it is premature for the Coast Guard to process this application at all, and we ask that its processing be suspended.

We would be please to respond to any supplementary questions you may have.

Yours sincerely,

GOWLING LAFLEUR HENDERSON LLP

David Estrin
Certified Environmental Law Specialist

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DETROIT CITY COUNCIL

COUNCILWOMAN
Sheila M. Cockrel

Fax

To: Ken Dobson **From:** Jeffrey C. Hunt

Fax: 586-755-4899 **Pages** 8

Phone 313-510 **Date:** 9/19/06

Re: DIBC Presentation **CC:**

☐ Urgent ☑ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Comments:

If you have responses please forward.

Jeff

R. CRAIG HUPP
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September 18, 2006

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VIA HAND DELIVERY

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bodman
ATTORNEYS & COUNSELORS

Re: Second "Twin" Ambassador Bridge

Dear Council Members:

I represent the Gateway Communities Development Collaborative and Delray Community Council, I attended the presentation of the Detroit International Bridge Company on Thursday morning, September 14. The GCDC and Council support both of Council's resolutions on the new, second Ambassador Bridge.

In its presentation, the DIBC made several statements which were significantly incomplete or inaccurate. They can be quickly addressed.

DIBC Does Plan To Expand Crossing Capacity.

DIBC claims that its bridge proposal will not be an increase in crossing capacity. Not so.

Council was suitably suspicious as to what DIBC's real plans for bridge capacity are. In the face of your persistent questioning, DIBC refused to state whether it would permanently retire the Ambassador Bridge.

Here is what it has told the Coast Guard.

DIBC told the Coast Guard in its own cover letter to its bridge permit application that "The construction of this new six lane structure will allow traffic to continue to flow unimpeded while the existing bridge is evaluated and rehabilitated if found to be economically feasible. The existing bridge could then continue to provide reserve capacity for any unforeseen event until the end of its useful life." In other words, the Ambassador Bridge will continue in service as long as economically viable.

In the *Project Description and Categorical Exclusion Environmental Documentation*, p.1 (submitted to USCG as part of the permit application), DIBC acknowledged that one purpose of the bridge was to increase crossing capacity. "This project adds new lanes across the Detroit River to provide redundancy as requested by the Binational Partnership . . . in their 'Detroit River Crossing Study.' It also affords additional capacity against a day when increased traffic volumes may require this." The new bridge can only be described as "redundant" only if the existing bridge continues in use.

DIBC may actually have larger plans. In the cover letter from DIBC's attorneys to the USCG transmitting DIBC's application, they described the bridge as consisting "of a total of *no less than* six lanes . . . " The draft bridge design has very wide shoulders that could be converted into two more travel lanes. Hence, DIBC's ultimate plan may very well be a new eight-lane bridge.

When you put all of DIBC's statements together, DIBC's plan appears to be to own and operate two bridges so long as it is profitable to do so.

DIBC's representative told the Council that, "If this were a project to increase capacity, we would have agreed to an EIS." Well, clearly this is a project that will increase bridge capacity. DIBC should be willing to live up to its statement and support the preparation of an EIS.

DIBC representatives told Council an EIS is being performed with regard to GSA/Customs plans to expand their facilities. They also told City Council that an EIS would be performed if they decided to take the Ambassador Bridge out of service permanently. We find it curious that DIBC would agree that an EIS is appropriate when Customs facilities are expanded or when a bridge is taken out of service but not when a new bridge is placed into service.

Increased Bridge Capacity Will Permit Increased Traffic.

DIBC claimed that the volume of crossing traffic demand is independent of bridge capacity. Not so.

Crossing capacity in simple terms is the lower of the capacity of the bridge, the bridge plazas (i.e., toll and inspection facilities), or the access roadways. *Today*, the limiting capacity is the bridge plazas. Therefore adding lanes to the bridge crossing will not increase crossing capacity *today*. The Gateway Project and DIBC's plaza improvements in Canada will expand plaza capacity within a few years and plaza capacity will not longer limit crossing capacity. Then, the limiting capacity will indeed be the bridge itself. Two lanes in each direction can only carry so many cars and trucks.

DRIC has studied the capacity of the present Ambassador Bridge four-lane roadway. Given the present mix of cars and trucks, maximum capacity in each direction is 3,500 vehicles per hour. DRIC, *Travel Demand Forecasts*, Working Paper (2005). One-way peak hour demand will exceed that maximum capacity by 2020. Unless new lanes are added to the crossing before that time, the border crossing capacity will hit a ceiling, preventing further traffic growth - regardless how many toll booths and inspection booths are added to the bridge plazas. A new six-lane bridge will be able to handle traffic volumes in 2020 and beyond because it has more roadway capacity than a four-lane bridge. Therefore, after 2020, a direct effect of the new bridge will be increased traffic, particularly truck traffic.

A Project Given a Categorical Exclusion Is Exempt From NEPA Environmental Review.

Mr. Korpi, the DIBC's spokesperson at the meeting, said that DIBC would have to do some environmental assessment, even if granted a Categorical Exclusion. Not so.

NEPA applies only to federal actions "*significantly* affecting the quality of the human environment." 42 U.S.C. §4332(C). A "Categorical Exclusion" is granted to those classes of projects determined to have no significant impacts on the human environment. Therefore, when a project falls within a Categorical Exclusion, no assessment is done to determine if it has significant impacts because it has been determined in advance that none will occur. Hence, if USCG's determination of a Categorical Exclusion stands, no environmental review of the bridge project will be required.

When is it not clear whether an action will have a significant impact, an Environmental Assessment is performed. An EA consists of the kinds of preliminary environmental analyses Mr. Korpi described to Council in his presentation. It was only after an EA was performed that it was determined the Gateway Project would not have a significant impact. But, DIBC has told the USCG that the EA process should be skipped here.

While there is a Categorical Exclusion for replacement bridges, USCG Exclusion Category 32 (USCG, *NEPA Implementing Procedures and Policy for Considering Environmental Impacts* (2000), Figure 2-1), that does not apply here for three reasons. First, Category 32 expressly does not apply to historical bridges and the Ambassador Bridge is on the National Register of Historic Places. Second, the proposal is for an additional bridge, because DIBC clearly would not commit that the existing bridge would be taken out of service permanently and obviously actually plans to keep it in service. Third, even if the Ambassador Bridge were taken out of service permanently, the new bridge would replace four lanes but also add two (or maybe four) more. That makes it an expansion project, not a replacement project, and ineligible for the Categorical Exclusion.

SEP-19-2006 08:48 FROM: TO:1586 755 4899 P.4/8

The Gateway Project EA Did Not Address the Bridge.

DIBC claims that the Environmental Assessment for the Gateway Project Addressed the Second Bridge. Not so.

- We have attached the Federal Highways Administration's recent letter of August 18, 2006 to USEPA that states expressly that the Gateway EA did not address the impacts of a new bridge but only the impacts of a larger toll plaza and better access roads. Further, the Gateway EA only looked forward to 2015 and did not address traffic impacts after that time. It did not address the doubling of truck traffic which is expected to occur between 2015 and 2030, and that can only occur if new bridge capacity is constructed. Hence, the Finding of No Significant Impacts (FONSI) for the Gateway Project has no application to the current proposal.

Thank you for your attention to this matter.

Very truly yours,

R. Craig Hupp

RCH/cmf/ttv

c: Honorable Kenneth V. Cockrel, Jr.
Honorable Sheila M. Cockrel
Honorable Monica Conyers
Honorable Joann Watson
Honorable Barbara-Rose Collins
Honorable Kwame Kenyatta
Honorable Alberta Tinsley-Talabi
Honorable Martha Reeves
Honorable Brenda Jones
Ms. Karen Kavanaugh
Mr. Robert W. Bloom, Jr.

U.S. Department
of Transportation
**Federal Highway
Administration**

Michigan Division

315 West Allegan Street, Room 201
Lansing, Michigan 48933

August 22, 2006

Mr. Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Science, Ecosystems, and Communities
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard, B-19J
Chicago, IL 60604-3590

Dear Mr. Westlake:

Reference is made to your letter of August 18, 2006, regarding the NEPA evaluation for the Ambassador Bridge Gateway Project (Gateway EA) which the FHWA completed in the mid 1990's, and its relationship to the "Enhancement" project currently being proposed by the Detroit International Bridge Company (DIBC). You pointed out in your letter the US Coast Guard's current public notice regarding the DIBC's proposed second or twin span at the Ambassador Bridge location. Your letter goes on to reference a May 4, 2006 meeting hosted by the US Coast Guard where in the DIBC referenced that the Gateway EA had "cleared" aspects of the current "Enhancement" project espoused by the DIBC. You indicated that it was not clear how the Gateway EA supports the environmental analysis required by NEPA for the "Enhancement" project.

The EPA is seeking clarification on the intent of the Gateway EA and project, how various components of the Gateway project address the needs assessed in the Gateway EA, how the Gateway project is adaptable to the "Enhancement" project, and finally clarification of statements made in the Gateway EA "...accommodate future border crossing capacity needs and potential future second span of the Ambassador Bridge located west of and adjacent to the existing bridge...."

For the record, the Gateway EA did not clear a future second span near the existing Ambassador Bridge. This was never the intent of the study or the Gateway EA. I will elaborate below.

When I-75 and I-96 were constructed they came close to the Ambassador Bridge, but never made direct connections. The reason for this was the lack of a toll agreement between the FHWA and the DIBC required under 23 USC 129(a). As you are aware, the Ambassador Bridge is a toll facility. Over time as traffic increased on the Ambassador Bridge between the US and Canada, especially commercial traffic after the passage of NAFTA, it became very apparent that the

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existing situation, which required all Canada or US bound trucks to exit the Interstate and use city streets to get to the bridge, was not working very well and was causing severe disruptions and impacts on the neighborhoods though which these international trucks traveled. This coupled with the inefficiencies of these movements for commercial and passenger vehicles prompted the Michigan DOT and the FHWA to undertake a study to assess what could be done to improve the connectivity between the Interstate system and the bridge. We quickly encountered the restrictions placed on connections to toll facilities under 23 USC 129(a) and the reluctance on the part of the DIBC to enter into a toll agreement. The DIBC lobbied Congress to get relief from the requirements of 23 USC 129(a) and the following section was contained in the TEA-21 Legislation:

> "Section 1217 Eligibility; (b) AMBASSADOR BRIDGE ACCESS, DETROIT, MICHIGAN.—
> (1) IN GENERAL.—Notwithstanding section 129 of title 23, United States Code, or any other provision of law, improvements to access roads and construction of access roads, approaches, and related facilities (such as signs, lights, and signals) necessary to connect the Ambassador Bridge in Detroit, Michigan, to the Interstate System shall be eligible for funds apportioned under paragraphs (1) and (3) of section 104(b) of such title.
> (2) USE OF FUNDS.—Funds described in paragraph (1) shall not be used for any improvement to, or construction of, the bridge itself."

This legislation made it possible to access the Ambassador Bridge and make connections to it. Please note the restrictions in (2) above.

With this legislation in place, the Gateway EA proceeded toward completion and the FHWA issued a FONSI on October 23, 1997. There are several references in the Gateway EA as you pointed out in your letter regarding accommodating a future second span and accommodating future border crossing capacity. In highway studies and design, it is typical to look into the future twenty years so as to design and size the facilities to accommodate expected growth. This is referred to as the design life. These references were placed in the document so as to anticipate this future growth and to minimize any infrastructure which could not be used if and when the DIBC built a second span. We anticipated that any future second span would be west of or down river from the existing span and that eventually traffic growth would exceed the capacity of the existing four lanes on the bridge. When the DIBC was asked about their plans for a future second span, the DIBC was unwilling to share with the FHWA or the MDOT what their plans were for a second span other than saying someday the DIBC might construct a second bridge. With this as an unknown, it would be impossible to "clear" any second span.

In addition, during the development of the Gateway EA, there was never any coordination or consultation with any Canadian officials to coordinate a new second bridge, nor coordination with the State Department regarding Presidential Permit requirements, nor coordination with the US Coast Guard for a navigation permit as is currently being done for the Detroit River International Crossing study. We did coordinate closely with the General Service Administration (GSA) regarding the plaza and its design.

To summarize, the Ambassador Gateway EA did not clear any second span. Its purpose was to make direct connections to the Bridge, satisfy the identified system linkage needs and traveler demands at this international crossing, and to correct structural and geometric deficiencies in the in I-75 and I-96 at the foot of the Ambassador Bridge.

We trust this helps to address your questions and clarifies what the Gateway EA did and did not do.

Sincerely,

Original signed by:

James A. Kirschensteiner
Assistant Division Administrator

For: James J. Steele
Division Administrator

cc: Sherry Kamke, US EPA
Del Abdalla, FHWA-Michigan
Fred Skaer, FHWA Washington with EPA letter
Robert Bloom, US Coast Guard, Cleveland with EPA letter
Kaarina Stiff, Transport Canada with EPA letter
Geralyn Ayers, MDOT with EPA letter

Project 20177

THE CITY OF WINDSOR

COUNCIL SERVICES DEPARTMENT

BRENDA ANDREATTA
CITY CLERK

IN REPLY, PLEASE REFER
TO OUR FILE NO. _____

ATTACHED HERETO AND CERTIFIED
TO BE A TRUE COPY OF
RESOLUTIONS ADOPTED BY COUNCIL
AT ITS CLOSED MEETING HELD
OCTOBER 10, 2006.

Brenda Andreatta
City Clerk
Date: October 12, 2006

350 City Hall Square West ◆ City Hall ◆ Windsor, Ontario N9A 6S1
E-MAIL: clerks@city.windsor.on.ca ◆ TEL (519) 255-6211 ◆ FAX (519) 255-6868

THE CITY OF WINDSOR

COUNCIL SERVICES DEPARTMENT

BRENDA ANDREATTA
CITY CLERK

IN REPLY, PLEASE REFER
TO OUR FILE NO.

THE COUNCIL OF THE CORPORATION OF THE CITY OF WINDSOR,

Having Regard for the Facts and Concerns in Appendix A to this Resolution:

1. **Requests that the United States Coast Guard carry out an appropriate independent investigation into the facts relative to the application filed by the Detroit International Bridge Company/Canadian Transit Company for a permit for a second Ambassador Bridge, and in that regard to carefully consider all the facts, reports by City officials, expert reports, mapping and photography, and certified copies of government documents provided to the Coast Guard by Gowlings, the City's attorneys, in their submission of September 14, 2006;**

2. **Urges the United States Coast Guard to conclude that having regard for the historical approvals and facts and impacts related to this proposals, there is no basis for maintaining the preliminary determination that the second bridge can be processed as a Categorical Exclusion; and that, when and if the application becomes ripe for processing, the Coast Guard is required to prepare a full environmental impact statement which considers alternatives to the proposed action as well as the transboundary and "foreign" environmental effects of the proposed action within the City of Windsor;**

3. **Requests that the United States Coast Guard apply its procedures for processing bridge permit applications, which require the proponent to demonstrate it possesses the requisite permit under the *International Bridge Act* for a new bridge over an international boundary prior to the Coast Guard processing a bridge permit other federal legislation, and to inform the proponents that the Coast Guard will suspend processing of the current application until an *International Bridge Act* permit has been issued, and all other necessary permissions have been obtained from the Government of Canada, the City of Windsor and the City of Detroit for the proposed second bridge and its required land and air rights, easements and plaza design and other required facilities.**

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Appendix A to Resolution No. 1

(a) The Detroit International Bridge Company/Canadian Transit Company (the proponents) have made an application to the United States Coast Guard seeking a permit for the construction of a second bridge generally parallel to and near the existing Ambassador Bridge;

(b) about 50% of the proposed second bridge (approximately 3,600 feet) will be within the geographic limits of the City of Windsor and 2,700 feet of the new bridge would cross over lands within the City not below the Detroit River;

(c) the proposed bridge is stated to have six but could accommodate eight lanes of traffic, compared to four carried by the existing bridge; with the proponents stating they may continue to operate the current bridge together with the new bridge, thereby providing 12 lanes of for international traffic that would cross through the City of Windsor;

(d) the proposed second bridge would pass over five city streets and four blocks of houses on the west side of Huron Church Road, some of which the proponents will require to be demolished for that purpose;

(e) the proposed second bridge will be located near and affect the City neighbourhood of Olde Sandwich Towne, a diverse community of 7,049 residents and 2,995 households, which is rich in heritage but one which is separated from the rest of Windsor by the current bridge, and has a sensitive economic fabric which must be prevented from suffering any further negative impact as a result of the proposed bridge expansion;

(f) the proposed second bridge will also be located over and near hundreds of people residing within two-three hundred metres of its proposed location, and it will be very close to a university, schools as well as four city parks, the waterfront recreation way, and numerous buildings which have historic designations, as well as in and around areas of high archaeological significance to First Nations;

(g) City Parks and Heritage officials as well as the City Chief planner have issued reports, copies of which are being provided to the Coast Guard, substantiating the negative impacts of the proposed second bridge on City planning, neighbourhoods, parks, schools, recreational, heritage and cultural features

(h) the location of the proposed second bridge conflicts with the provisions of the City Zoning By-law as its proposed location is zoned residential and additionally conflicts with the City's Official Plan, which designate the area of the proposed second bridge as "Residential" and Waterfront Recreation;

(i) although the proponents deny that any extended plaza/inspection facility is required for their proposed second bridge and have undertaken no studies of

further lands and impacts its construction and use would cause, the Canadian Boarder Services Agency will require the proponents to provide a much larger plaza facility than currently exists to allow for security and immigration inspections and other border-related services, which expanded plaza will cause significant further adverse impacts on the City;

(j) the current volume truck traffic using the Ambassador Bridge and therefore Huron Church Road is predicted to increase by 132% if a second bridge is opened; total volumes for all vehicles are predicted in 2035 to be 47,000 vehicles per day;

(k) noise levels from traffic using the new bridge will exceed Ontario Ministry of Environment noise criteria, as documented in the September 12 letter from Dr. A. Lightstone, P. Eng. of Valcoustics Canada Ltd, Acoustical Consultants, submitted by the City to the Coast Guard.

(l) neither the proponents nor any government have studied how Huron Church Road and other cities streets could be modified to service 8-12 lanes of traffic approaching and leaving the new bridge, and the proponents state that no such studies are required;

(m) the Detroit River International Crossing Study (the Bi-national Partnership) has already determined that a second Ambassador bridge will cause significant adverse land use and community impacts on the City of Windsor, as well as determined that "expanding the existing plaza and construction of a new freeway in the Huron Church Road corridor has high potential for disrupting international traffic in this important trade corridor" and concluded that the alternative of a second Ambassador bridge should "not be carried forward due to the high community impact, high potential for disruption to international traffic during construction and the limited ability to provide continuous/ongoing river crossing capacity";

(n) the City of Windsor has not been provided with a copy of the application to the USCG nor have the proponents in any way consulted with the City of Windsor with respect to their proposed plan;

(o) the proponents have not received permission from the City of Windsor to construct the second bridge pursuant to the Act of the Canadian Parliament of 1921 – "An Act to Incorporate the Canadian Transit Company", which provides that that company shall not construct or operate any bridge or associated works "along any highway, street or public place without first obtaining the consent, expressed by bylaw of the municipality having jurisdiction over such highway, street or other public place [*i.e.*, the City of Windsor] and upon terms to be agreed upon with any such municipality";

(p) the proponents have not sought nor received a necessary grant of rights to air easements over City streets and parks for the proposed second bridge

(q) the proponents have not sought nor received a necessary grant of rights to erect a second bridge over the water of the Detroit River from either the Canadian Government, U.S. authorities or the City of Detroit;

(r) the proponents have not applied for nor received authority from the Parliament of Canada or under U.S. legislation to construct a second bridge, their Parliamentary Charter and Congressional authorization limiting them to construct "a bridge" between Windsor and Detroit;

(s) the US Coast Guard is charged with assessing the impacts of a new bridge on the environment both in the US as well as transboundary and foreign effects;

(t) the proponents have submitted to the US Coast Guard that it should process their application as a Categorical Exclusion, which would exclude the preparation of an Environmental Assessment or an Environmental Impact Statement for the proposed new bridge, although the proponents have not conducted studies of air quality, noise impacts, traffic, community disruption, and impacts on cultural and heritage features, archaeological features, utilities and planning;

(u) the Council of the City of Windsor is of the opinion that the proposed second bridge will have significant detrimental impacts on the environment, on the City, and will be inconsistent with the City of Windsor's official plan and zoning by law;

(v) the Council of the City of Windsor asserts there is a need for a full environmental impact review of the proponents' application; and

(w) the Council of the City of Windsor has been advised by its attorneys that the information and material upon which the proponents have sought a Categorical Exemption from the US Coast Guard is misleading, erroneous and forms no appropriate or valid basis for the Coast Guard to maintain a Categorical Exemption from NEPA for the processing of the proponent's bridge application.

Public Hearing

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ATTORNEYS & COUNSELORS

VIA HAND DELIVERY

November 14, 2006

Jeremy Richardson
Land & Water Management Division
MDEQ
27700 Donald Court
Warren, MI 48092

Re: File No. 06-82-0121-P

Dear Mr. Richardson:

I represent the Gateway Communities Development Collaborative and the Delray Community Council. We oppose the proposed permit under Part 301 sought by the Detroit International Bridge Company ("DIBC") for a new bridge adjacent to the Ambassador Bridge for numerous reasons, including those set forth in G.C.D.C.'s prior comment letter of July 19, 2006.

As part of our comments here today, I am submitting comments which G.C.D.C. submitted to the U.S. Coast Guard with regard to DIBC's permit application to the Coast Guard I am also submitting the text of the City of Windsor's comments to the Coast Guard as well. Taken together, they explain the very significant impacts which a new border crossing will have, wherever located – impacts which must be considered before granting a permit for such a bridge.

MDEQ is charged by law with insuring that a project will not adversely affect the public trust or riparian rights before it issues a permit required under Part 301. MDEQ may not grant a permit under Part 301 if the project would impair or destroy natural resources of the state. A permit may not be granted if the project will cause water pollution. M.C.L. 324.30106.

How does MDEQ discharge its duties? It requires permit applicants to describe their projects in sufficient relevant detail so that potential impacts on the public trust, riparian rights, natural resources and water quality can be determined. A failure to make a full disclosure of a project for which a Part 301 permit is sought will defeat MDEQ's attempt to discharge its statutory duties.

MDEQ is confronted with exactly that problem for the subject permit application. DIBC has not submitted an accurate or complete application for the real project which it proposes to undertake. MDEQ should not act until an application describing the real project is before it.

The real project being pursued by DIBC is a huge expansion of a border crossing involving a 150% increase in crossing capacity, an associated expansion of the bridge plaza in the United States by a factor of 6 and a doubling of traffic. The

permit application before you is for only a part of that total project. Before acting on the subject application, "File No. 06-82-0121-P," you must require DIBC to disclose the full project to you so you can truly assess its impacts and determine whether all of the permits it will require should issue and, if so, under what conditions.

DIBC has undertaken a piecemeal approach to permit approval because by segmenting the real project into small pieces, the full impact of the project is never considered. It is as if DIBC planned to build a 50-story building, but submitted applications, one at a time, for a series of permits, each for a small one-story building, without ever disclosing they would be stacked on top of each other.

How can we tell that DIBC is attempting to permit a 50-story building, one floor at a time?

First of all, DIBC has tipped its hand to a few entities by sharing with them its May 2006 Master Plan for the Ambassador Bridge for the year 2011. (See Attachment E to our Coast Guard Comments.) That plan shows a huge expansion of the plaza area as well as a new bridge looming over the existing Ambassador Bridge. Let's call this the Master Project. Traffic projections for the Detroit River International Crossing study state that over the next 30 years total crossing traffic will increase by 180% while truck traffic will increase by 230% The Master Project will handle that traffic. Any associated permit application should be evaluated based on the recognition that it is for such a major transportation activity.

Second, DIBC has been following its segmentation process for a number of years already in order to accomplish its Master Project. For example, in the mid 1990s, it sought approval for an expansion of the existing plaza area known as the Gateway Project (an expansion dwarfed by the latest Master Plan). The plaza expansion was intended to accommodate congestion problems associated with traffic on the present bridge but the plaza was physically configured to serve as a landing from a second bridge if such a bridge were built in the future. This was one step to accomplishing its Master Project. The enviornemental studies conducted by MDOT associated with the Gateway Project expressly stated that they were not considering any environmental impacts associated with another bridge. That did not stop DIBC from telling the Coast Guard this year that the Gateway studies had addressed a new bridge and had concluded there would be no significant impacts.

Third, this permit application deals with the bridge structure for the Master Project. As filed on June 29, the application describes the bridge structure as being accomplished "without the need for plaza configuration modifications beyond those already approved." Notwithstanding that statement, on Septembers 26, just three months later, DIBC filed another Part 301 permit application associated with the creation of a drain district for the Project of approximately 180 acres. Permit Application, File No. 06-82-0174-P. As the Master Plan makes clear, the current plaza expanded by the Gateway Project is far smaller than 180 acres. The 180-acre drain district is required to serve the entire Master Project. This drain district requires a pump station in the floodplain and a new discharges to the Detroit River.

Hence, contrary to the assertions in this permit application, the real project, DIBC's Master Project, does involve activities in the Detroit River flood plain.

Furthermore, in the June 26 application, DIBC asserted that " [T]he issues such as contamination and stormwater collection (from the new bridge) and treatment have already been dealt with and are included in the Gateway Project. The stormwater pump station and collection system for the Gateway project has been sized to accommodate the additional runoff..." This statement raises two troubling points. First of all, clearly the pump station is part of the bridge project because it is purportedly part of the stormwater system for the bridge. Why didn't DIBC include the pump station in this application or at the least indicate it would be in the floodplain and a separate permit application would follow? Second, contrary to the quoted assertion, those matters had not been dealt with previously and are now the subject of the September 26 application. This practice of project segmentation and providing inaccurate statements about the project and its approvals means that MDEQ must be particularly thorough in insuring it has all of the information needed to truly evaluate these permits. Clearly, the statements in the permit applications cannot be taken at face value.

Also on September 26, DIBC filed two NPDES permit applications under Part 31 for the discharge from the pump station to the Detroit River. Although we have not yet obtained copies of those permit applications, we are prepared to wager that they do not disclose all of the activities the DIBC plans for those the 180 acres – activities which will certainly include very substantial truck traffic including trucks containing liquid and hazardous materials (and the record is clear that, notwithstanding regulations, hazardous materials are transported across the bridge with DIBC's approval), fueling stations within the drainage district, and who knows what else.

How do you know that three months from now, DIBC will not submit another permit application for another element of its Master Project, and three months later, another permit application, until it has in fact gotten permits for the equivalent of a 50-story building one-story at a time?

We anticipate that MDEQ's first response is each permit will be considered on its own and that MDEQ has no authority to perform some kind of overall review of a major transportation project. Not only is that answer not correct, if given it would demonstrate exquisite bureaucratic shortsightedness.

A permit applicant is required to define the project for which a permit is requested. MDEQ is not required to accept a partial, piecemeal description of a project in lieu of a definition of the real project. MDEQ can insist that the application describe the Master Project. If that were done, then this permit application, not the one of September 26, would disclose that structures will be constructed in the floodplain and new discharges to the Detroit River would need approval. If that were done, MDEQ would learn today about the other parts of the Master Project for which permits will be required but DIBC has not yet filed permit applications, and MDEQ would learn about future planned activities relevant to issuance of the subject permit. If that were done, DIBC could not argue later that some prior permit

amounted to express or implied approval of some later action requiring approval or argue that the Master Project is too far down the road in reliance on prior approvals to modify or change its course of action.

MDEQ most certainly has internal procedures to coordinate review and approval of major projects, public or private, which affect multiple protected environmental interests and which require multiple permits.

A comprehensive review based on the full disclosure of the Master Project is essential if MDEQ is to carry out is statutory duties, because even without knowing the details, we know the Master Project will have significant impacts on the public trust, riparian rights, natural resources and water quality.

For example, the 230% increase in truck traffic permitted by a new bridge will have a major local impact on air quality – a crucial natural resource for the health of residents of Southwest Detroit. What about noise generated by all those trucks which stop, start and idle on the bridge plaza and the grind through the gears going up the bridge and its ramps or enter I-75 and get up to freeway speed? Is the absence of manmade noise part of the natural resources of this state? Certainly it is. Without traffic forecasts and detailed plans of the project, can MDEQ discharge its duty not to issue a Part 301 permit for a project which will adversely affect natural resources. The obvious answer is "No," because that information is essential to evaluating noise and emissions.

The bridge will occupy air rights which belong to private property owners, the City of Detroit and the State of Michigan. The extensive common law protection of air rights, sunlight and a view make clear these are natural resources of the state. The air rights over the water are also part of that which is protected by the public trust doctrine. Has the State determined it will give up those air rights at all, or without seeking compensation from the public? It does not give its bottom lands away for free.

The new bridge will pass over two parks owned by Detroit and directly over basketball courts and baseball diamonds in those parks. That fact is not disclosed by the permit application. Will the bridge affect users of those parks? Certainly. Are recreational areas part of the natural resources of the state? Most would agree they are.

As to water quality, does MDEQ have enough information to determine where stormwater from the bridge will go or how stormwater contaminated with transportation residues, or, worse yet – a catastrophic release on the new bridge - will impact the quality of the surface water below? Obviously, MDEQ does not have sufficient information now to answer that question.

Does MDEQ know what other activities are going to take place in the 180-acre Master Project area that might impact natural resources, the public trust or water quality? Again, the answer is obviously "No," because no disclosure of those activities has been provided.

The preceding are just a few examples of the significant impacts a new major international bridge crossing and appurtenant facilities will have. Our comments and those of other commenters to the Coast Guard highlight these issues more fully.

The bottom line is clear. The Master Project will have actual or potential impacts on the public trust, riparian rights, natural resources and water quality. Without a complete disclosure of relevant information about the Master Project, MDEQ cannot determine what those impacts are. If MDEQ cannot determine what those impacts are, it cannot make the findings which are a necessary precondition to issuance of a Part 301 permit: that the project will not adversely affect the public trust or riparian rights; that the project will not impair or destroy natural resources of the state; and that the project will not cause water pollution. Accordingly, MDEQ cannot grant the subject permit based on information contained in the present application and must deny the permit application in its present form.

If DIBC files a permit application containing the information needed to permit an appropriate evaluation of the Master Project, then MDEQ should go out for further public comment.

Very truly yours,

R. Craig Hupp

RCH/cmf

cc: Karen Kavanaugh
Delray Community Council
State Representative Steven Tobocman

PUBLIC NOTICE 09-03-06
DIBC BRIDGE PERMIT APPLICATION

1. September 13, 2006 Comments from GCDC

2. September 14, 2006 Comments from the City of Windsor, Canada

Bent

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ATTORNEYS & COUNSELORS

VIA FEDERAL EXPRESS

September 13, 2006

Robert W. Bloom, Jr.
Bridge Program Manager
Ninth Coast Guard District
1240 East North Street
Cleveland, Ohio 44199-2060

Re: DIBC Bridge Permit Application, Detroit, Michigan
Public Notice 09-03-06

Dear Mr. Bloom:

We have prepared and are submitting these comments on behalf of the Gateway Communities Development Collaborative and the Delray Community Council with regard to the pending international bridge permit application filed by the Detroit International Bridge Company as described in USCG, Public Notice 09-03-06 (July 28, 2006).

The Gateway Community Development Collaborative (GCDC) was established in 1999 as an association of community-based nonprofit organizations involved in the planning and development of housing and economic development projects in Southwest Detroit. Its mission is to act as a collective voice for its member organizations and enhance their individual development initiatives through joint planning, advocacy and marketing. GCDC Members include:

- Bagley Housing Association
- Bridging Communities
- Greater Corktown Development Corporation
- Mexicantown CDC
- Michigan Avenue Business Association
- Neighborhood Centers Inc.
- Southwest Detroit Business Association
- Southwest Detroit Environmental Vision
- Southwest Solutions/Southwest Housing Corporation

The Delray Community Council is a neighborhood group located in southwest Detroit. The Council is dedicated to the continued life of Delray as a neighborhood, and to promoting development and redevelopment of the area as a

residential neighborhood, and to further improve the quality of life for Delray residents.

We have attached the business address of each of those organizations. (Attachment A) Please add each one to USCG's list of interested parties with regard to the DIBC bridge application.

The Detroit International Bridge Company has applied to the USCG for a permit to construct a new 6-lane international bridge to Canada.[1] Before granting a permit for a new bridge, USCG must conduct an assessment under NEPA of the impact of the subject action on the human environment. As discussed below, while some categories of actions will have so negligible impact that no project specific assessment is required under NEPA, this new bridge is not such a project and a full environmental impact statement is required.

It is the position of GCDC and the Council that an EIS is required before a permit decision is made.

The Proposed Action

The careful and complete definition or description of a proposed action is a necessary prelude to evaluating whether an action is likely to have significant short and long term direct and indirect impacts on the human environment.

Presently the demand for international vehicular crossings between the United States and Canada in the Detroit area is met by the Ambassador Bridge and the Detroit Windsor Tunnel. For trucks (and thus international trade) the Ambassador Bridge is the principal crossing because few trucks can or are permitted to use the tunnel. Assuming border crossing capacity is increased, border crossings will increase 180% over the next 30 years from 9.5 million crossings per year to 17.2 million crossings, with truck traffic increasing by an even greater rate, 230%. DRIC, Travel Demand Forecasts, Working Paper (Sept. 2005), Ex. 5-23.[2] (excerpts at Attachment C) (The DIBC's permit application at p. 15 grossly understates the current traffic growth estimates.)

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[1] The proposed design has wide shoulders which might permit a future widening to eight lanes. The possibility of such a future two-lane expansion to the new bridge should be explored in the scoping phase of the EIS and, if the possibility is real, the impacts of such additional capacity should be considered.

[2] This DRIC report is included in Attachment B, a collection of relevant DRIC reports in electronic form on a CD.

Under the present base travel forecast prepared for the Detroit River International Crossing Study ("DRIC"), the effective capacity (the point at which congestion is so significant that traffic conditions are "unstable") of the Ambassador Bridge is about 3,000 vehicles per hour in one direction and the absolute maximum capacity is about 3,500 vehicles per hour. DRIC, Travel Demand Forecasts. The base forecast travel demand indicates that demand will exceed the effective capacity by about 2011 and reach the absolute maximum capacity by 2020. Thereafter, unless there is a new bridge crossing, traffic will not be able to increase further. However, if additional capacity were available, the base travel forecast for 2035 is 4,500 vehicles per hour, which is 1,000 vehicles per hour above the Ambassador Bridge's maximum capacity.

When expressed on an annual basis, construction of additional river crossing capacity to cater to travel demand after 2020 will permit additional border crossings on the order of 1,780,000 annual auto trips and 2,220,000 annual semi truck trips (a total increase of 3,000,000 trips per year) that could not otherwise occur because of crossing capacity limitations. DRIC, Travel Demand Forecast, Ex. 5-23.

If the Ambassador Bridge is kept in service (and the permit application indicates it will), then a new six-lane bridge crossing will represent an approximate 150% increase in crossing capacity. Even if the Ambassador Bridge were taken out of service, a new bridge will represent a 50% increase in border crossing capacity.

In addition to the absolute increase in travel that an increase in crossing capacity will permit, adequate crossing capacity will reduce the time and cost associated with delays and congestion associated with crossing facilities otherwise operating at or near capacity. Given the forecast that Detroit/Windsor economic activity related to international trade will grow to the extent that international travel across the Detroit River is able to grow, increased border crossing capacity beyond the capacity of the present bridge and tunnel portends major economic and community growth in Detroit and Windsor.

In this context, clearly the proposed action before the Coast Guard is not just the construction of a new six-lane bridge. Rather, the proposed action can be described as "Undertake a new border crossing in order to increase border crossing capacity by 50% to 150% in the vicinity of southwest Detroit in order to permit the additional growth of 3,000,000 trips per year by 2035 beyond current crossing capacity and to permit the expanded growth of Metropolitan Detroit/Windsor as an international trade center."

It is worthwhile considering the alternatives to issuing this specific bridge permit. The "no-action" alternative would be no new border crossing capacity in the Detroit area with the border crossing capacity being reached in the next 15 or so years. Clearly, if an action were proposed to cap crossing capacity so that no border

crossing growth would occur after 2020, everyone would agree that would be a public policy decision with very significant impacts (largely adverse) on the southeast Michigan region, requiring an EIS. The decision to permit a new bridge to expand crossing capacity to permit border crossing growth after 2020 will have analogous impacts, mostly positive, likewise requiring an EIS.

The fact that the proposed action is almost universally desired in order to encourage regional economic growth does not obviate NEPA's requirement that the significant effects of such an action on the human environment be fully considered before a bridge permit is granted. It may well be that the best location for a new border crossing is somewhere other than the vicinity of the Ambassador Bridge.

USCG Needs To Incorporate DRIC Study Into Its Review

The "go-it-alone" DIBC permit application is in marked contrast to the Detroit River International Crossing Study being conducted by a bi-national partnership of transportation agencies (MDOT, FHWA, Transport Canada and the Ontario Minority of Transportation). As part of the DRIC study, the alternatives analyses have identified numerous significant impacts associated with alternative crossing locations including a bridge adjacent to the Ambassador Bridge. The DRIC Study is preparing a draft EIS to insure that such impacts are fully considered. Because nearly everything being done in the DRIC Study is relevant to considering the impacts of the DIBC permit application, we are submitting with our comments numerous DRIC reports in electronic form on a CD (Attachment B). We believe these reports demonstrate that a new river crossing, wherever located, will have significant environmental impacts. Furthermore, we urge the USCG to defer action on the permit application until DRIC has run its course. Otherwise, USCG will have to duplicate a great deal of the alternatives analyses and environmental impact analyses which DRIC is performing. We have attached letters from State Representative Tobocman to the FHWA (May 27, 2005), and the GCDC to FHWA (May 25, 2005) (Attachment D) that make the case for acting on a specific bridge application only after the DRIC Study has been completed.

Analysis of the Bridge Application on a Stand-Alone Basis Will Violate the Prohibitions on Project Segmentation Under NEPA.

CEQ requires that proposed actions be considered in their entirety and that actions not be analyzed as discrete segments that could tend to minimize impacts and avoid preparation of an EIS.

> "The range of actions that must be considered includes not oly the project proposal but all connected and similar actions that could contribute to cumulative effects. Specifically, NEPA requires that all related actions be addressed in the same analysis. For example, the

> expansion of an airport runway that will increase the number of passengers traveling must address not only the effects of the runway itself, but also the expansion of the terminal and the extension of roadways to provide access to the expanded terminal. If there are similar actions planned in the area that will also add traffic or require roadway extensions (even though they are nonfederal), they must be addressed in the same analysis." CEQ, Considering Cumulative Effects Under the National Environmental Policy Act (January, 1997), pp. 1, 2.

This permit application as presented to USCG clearly segments the overall action being undertaken by the DIBC. The overall project is the expansion of the Ambassador Bridge crossing through i) expansion and improvements to the bridge plazas to address needs related to tolls, customs, immigration and security, ii) access improvements to state trunkline highways and the Canadian roadway system, and iii) construction of additional bridge capacity. This application refers only to additional bridge capacity and not the other two related activities.

In addition to the new bridge capacity reflected in the DIBC's permit application, a number of other bridge-related projects are in the offing. For example, DIBC has begun to consider improvements to the plaza and access roads beyond what is included in the Gateway Project. Letter, FHWA to USCG (June 7, 2006) and associated DIBC report, Today and Future (2006) (Attachment E). DIBC also has related plans underway to relocate Fort Street, again not mentioned on the permit application. Letter, DIBC to MDOT (May 17, 2006), Letter, MDOT to DIBC (July 13, 2006); see also Letter, FHWA to American Consulting Engineers of Florida (June 21, 2006). (All in Attachment E) DIBC has recently requested approval for an expansion of the Canadian customs plaza. Letter, Transport Canada to American Consulting Engineers of Florida (April 15, 2005) (Attachment F). We are informed that the General Services Administration has a master plan study underway to identify federal facility needs. That study may prompt further expansion of the bridge plaza. The DRIC Study has identified the need to greatly expand the U.S. and Canadian bridge plazas to meet long-term traffic needs. DRIC, Evaluation of Illustrative Alternatives on U.S. Side of Border, Vol. 1, Summary (November 2005) ("U.S. Summary of Evaluations"), p. S-43, S-46. (Attachment G (excerpts)). None of these activities are reflected in the DIBC's permit application but USCG must take them into consideration in assessing whether the proposed action will have significant impacts.

Note FHWA has already expressed its concern that incremental consideration by federal agencies of DIBC's developing plans will lead to inappropriate segmentation of project impacts from the point of view of NEPA. Letter, FHWA to USCG (June 7, 2006). (Attachment E).

An Action Qualifies For A Categorical Exclusion Only If It Is So Identified in Adopted Agency Procedures And Major New Bridges Are Not So Identified.

In its notice of July 28, the Coast Guard has stated that it has made a tentative determination that the construction of a new 6-lane, mile-long international bridge should be granted a Categorical Exclusion from an analysis of its environmental impacts. USCG, Public Notice 09-03-06 (July 28, 2006). This initial determination is in error because i) the USCG's adopted list of actions which qualify as Categorical Exclusions does not include projects like a new 6-lane international bridge, and ii) the proposed action meets all of the criteria for the conduct of an environmental impact statement. Accordingly the correct determination should be that an environmental impact statement must be prepared before the Coat Guard grants or denies the pending permit request.

The NEPA implementing regulations, 40 C.F.R. 1500 *et seq.*, define "Categorical Exclusion" to be a category of actions which an agency through formally adopted procedures has determined will have no significant effect on the human environment and therefore no environmental assessment or environmental impact statement is required. 40 C.F.R. 1508.4. If a proposed action does not fall within a category or actions classified under adopted agency procedures as a "Categorical Exclusion," either an EA or an EIS is required. 40 C.F.R. 1501.4. The USCG has adopted procedures in compliance with § 1508.4 that define categories of actions that are deemed Categorical Exclusions. NEPA Implementing Procedures and Policy for Considering Environmental Impacts, COMDTINST M16475.1D (series) ("M16475.1D"), Figure 2-1. Figure 2-1 "contains a list of categories of actions that the USCG has determined, both individually and cumulatively, not to have significant environmental impacts." USCG, Office of Civil Engineering, Tools For Decisonmaking: Environmental Considerations (undated), p. 19. "In order to categorically exclude your proposed action, it must fit into one or more of the categorical exclusions listed in [M16475.1D]." *Id.* Even if a project falls within one of the categories on that list, "you should look for circumstances that would make a CE inappropriate." *Id.* Finally, "all aspects of the proposed action must be covered by one or more Categorical Exclusions in order to Categorically Exclude the action." Tools For Decisonmaking, p. 20.

The USCG standard CE form makes this same point because it requires the Environmental Reviewer to specifically identify which CE category from Figure 2-1 covers the proposed action. USCG, Categorical Exclusion Determination Form, Enclosure (3) to M16475.1D. The Public Notice does not identify a specific CE category.

Figure 2-1, the Coast Guard's list of 35 categories of Categorically Excluded projects and actions, does not include any kind of new vehicular bridge, much less a

6-lane mile-long international bridge capable of carrying up to 50,000 vehicles per day. In particular, Category 32(a), modification or replacement of an existing bridge, does not apply. The application obviously does not propose to modify an existing bridge. Nor does the application propose to replace the existing bridge; it specifically states the existing bridge will probably be kept in service. Further, even if the present bridge is taken out of service, the new bridge would not only replace existing lanes but expand capacity by 50%. Finally, this category does not apply to bridges of historic significance and the SHPO has already notified USCG that the Ambassador Bridge has historic significance (as does its contemporary, the Blue Water Bridge.) Letter, Michigan State Historic Preservation Officer to USCG (May 4, 2006). (Attachment H). Accordingly, the action does not qualify as a Categorical Exclusion.

It is clear from the foregoing that even if the proposed action had no significant impacts (an erroneous conclusion on the facts of this proposal), it can not be exempted from environmental review as a Categorical Exclusion because it is not one of the actions which the USCG has formally defined as qualifying for a Categorical Exclusion. Thus the statement in the Public Notice that the proposed new 6-lane international crossing "is a Categorical Exclusion for the purposes of NEPA because it satisfies criteria for such actions" is incorrect as a matter of CEQ regulations and USCG procedures.

However, even if an action falls within a category of actions defined as a Categorical Exclusion, an environmental assessment or environmental impact statement must be prepared if the action will have a significant impact on the human environment. The proposed action here will certainly have very significant impacts on the environment.

The Proposed Action, A New 6-Lane International Border Crossing, Will Have Significant Impacts on the Human Environment, Requiring the Preparation of an Environmental Impact Statement.

An USCG implementing manual advises:

"HOWEVER, if your proposed action:

does not fit into a USCG Categorical Exclusion;

has, or might have, extraordinary circumstances; or

has, or might have, individual or cumulative significant environmental impacts

then you must proceed to a more detailed level of environmental evaluation.... Generally, you should proceed to an EA if you are

> unsure of the potential for significant impacts from your action and proceed to an EIS if you know or suspect your proposed action will have significant impacts." Tools For Decisonmaking, p. 21 (capitalization as in the original).

The CEQ regulations include a list of factors that justify an EIS where significant impacts were expected. 40 C.F.R., 1508.27(b). They include:

- Significant impacts on public health or safety
- Impacts on the quality of the human environment that are likely to be highly controversial in terms of scientific validity or public opinion
- An effect on the human environment that is highly uncertain or involves unique or unknown risks
- Future precedent setting actions with significant effects or a decision in principle about a future consideration
- Individually insignificant, but cumulatively significant, impact when considered along with other past, present, and reasonably foreseeable future actions
- The action involves a structure that is eligible for listing in the National Register of Historic Places
- The action involves an impact that may be both beneficial and adverse. A significant impact may exist requiring an EIS even if it is believed that, on balance, the effect will be beneficial.

Even without considering the above factors, it is clear that a new 6-lane international bridge will have significant direct traffic, land use and air quality impacts flowing from the additional traffic capacity provided by the new bridge and it will generate enormous cumulative indirect impacts because of the economic and community impacts which will flow from a new border crossing with Canada. Common sense dictates that a project with those impacts is exactly the kind of project for which an EIS should be prepared.

The Federal Highway Administration ("FHWA") and the Michigan Department of Transportation ("MDOT") have independently determined that new international bridges, even if adjoining existing bridges, require a full EIS. An EIS was required for the new bridge next to the Blue Water Bridge. The Detroit River International Crossing Study is currently performing an EIS for alternative bridge crossings of the Detroit River in the vicinity of the Ambassador Bridge. As you are aware, the Canadian Government has made a similar determination with regard to the pending DIBC application, that it requires an Environmental Assessment under

the Canadian Environmental Assessment Act. Letter, Transport Canada to USCG (August 30, 2006) (Attachment I).

A discussion of the above factors as applied to the present bridge proposal also reveals that an EIS is required.

1. Significant Effects On Public Health And Safety

(a) Immigration and Customs.

New crossing capacity for 3,000,000 trips per year will have a significant impact on immigration and customs facilities in Detroit and Windsor. Plaza space limitations in Windsor today will require either an expanded bridge plaza or an expanded offsite secondary inspection facility, either which has significant impacts both from a customs and immigration view but also in terms of land acquisition and neighborhood impacts near expanded plazas and inspection areas. DRIC, Generation and Assessment of Illustrative Alternatives Report (Canadian Side) (Draft) (November 2005) p. 10, 105-106 (120 acres required for Canadian plaza) (Attachment J, excerpts).

The situation is the same on the U.S. side. DRIC, U.S. Summary of Evaluations, p. S-49. The DRIC study in consultation with border inspection agencies determined that general plaza space requirements to handle forecast volumes need 80 to 100 acres, *Id.* at p. S-43, but the Ambassador Bridge plaza is only about 30 acres. *Id* at S-41. This suggests that 50 or more acres for the U.S. bridge plaza will be required over the next 30 years.

(b) Issues related to the prevention of terrorism need to be addressed.

As in the case of customs and immigration, border security and terrorism concerns will be greater as traffic increases. We do not have the expertise to comment on these issues in detail but they are perhaps the most significant issues to be considered. An EIS should analyze both how these concerns will affect the bridge plazas and any offsite security areas and how requisite changes to bridge plazas to accommodate border security will affect the surrounding communities.

(c) Redundancy of a crossing if there is catastrophic damage or disruption to one bridge or a plaza serving a bridge.

With every increase of international trade through the Detroit bridge and tunnel crossings, the negative impacts flowing from the disruption of one or both of these crossings becomes more severe. This is particularly true of the Ambassador Bridge because most trucks cannot detour to the tunnel. Under a twinned bridge alternative, all truck traffic must funnel through a common plaza at each end of the

pair bridges. Something as commonplace as a major traffic accident[3] or a severe weather event like a tornado, could stop international trade for an indefinite period. At the Canadian end, the limited access via the Huron Church Road likewise represents a major bottleneck if there is a major accident or fire or other event along that road. Compound these scenarios with a terror threat or action and the impacts of lack of crossing redundancy are clear.

This redundancy concern, in addition to neighborhood impacts, is what prompted the Canadian agencies participating in the DRIC study to remove the twinned bridge crossing from the list of alternatives for further study. U.S. Summary of Evaluations, pp. S-49, 50; Canadian Summary of Evaluations, p. 112. Other organizations have also stated the redundancy of river crossings is essential:

- Detroit Regional Chamber, Border Crossing Policy (October 12, 2005), ("Meanwhile, the threat of terrorism has meant concerns about infrastructure redundancy and broad policy shifts affecting the border....A new crossing should ensure redundancy relative to existing structures.")

- Letter, Daimler Chrysler to MDOT (March 28, 2006), ("Fourth, we favor a site that is removed from existing crossing points for a number of reasons, including flexibility and resultant dependability of freight flows, security and competitive factors.")

- Letter, State Representatives to Representative LaJoy (January 25, 2006), ("Other Crossing proposals were eliminated due to the increased concerns of the Department of Homeland Security that redundancy needs to be created at the Detroit-Windsor border so that crossing alternatives exist in the case of terrorist strike.") (Correspondence at Attachment K.)

A river crossing alternative consisting of a new bridge located elsewhere with its own plazas and access roads would provide a crossing to which traffic could divert in the event that the Ambassador Bridge crossing is shut down.

(d) Traffic Safety and Operations

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3 The author was residing in Sydney when a tanker truck leaked a few hundred gallons of diesel fuel of fuel oil onto the Sydney Harbor Bridge, creating a traffic jam that extend for several square miles on either side of the bridge and lasted 12 hours.

The significant increase in traffic that additional border crossing capacity will bring to Windsor and southwest Detroit will have significant impacts on traffic operations and safety. The traffic studies for DRIC show that access roads in Canada are congested now with Ambassador Bridge traffic. DRIC, Travel Demand Forecasts, pp. 108-111. If no new capacity is provided to accommodate traffic growth, congestion will become severe. A new Canadian freeway connection would greatly improve traffic conditions but at a significant community cost due to home and business property acquisition for right-of-way and attendant disruptions to the community. DRIC, Canadian Summary of Evaluations, §3.5. Because of the Gateway Project on the U.S. side, access traffic impacts will be less in the short term. But the Gateway Project did not look past 2015. MDOT/FHWA, Environmental Assessment & Programmatic Section 4(f) Evaluation, Ambassador Bridge Gateway Project (January, 1997). Accordingly, it did not address access issues and impact beyond what is now the short term horizon. Access issues after 2015 must be addressed in an EIS.

(e) Air Quality

USEPA has identified six priority Mobile Source Air Toxics (MSATs), including benzene, formaldehyde, diesel particulate matter/diesel exhaust organic gases ("PM") and acrolein. Burbank, C., FHWA, Interim Guidance on Air Toxic Analysis in NEPA Documents (Feb. 3, 2006). Most of these are associated with diesel engine emissions. The Interim Guidance identifies projects with the potential for meaningful MSAT differences among project alternatives, including major intermodal freight facilities that have the potential to concentrate high levels of diesel particulate matter in a single location. The Interim Guidance recommends that environmental analyses for such projects should include a quantitative analysis that attempts to measure the level of emissions for the six priority MSATs for each alternative.

MDEQ, Detroit Air Toxics Initiative, Risk Assessment Report, Public Summary (Nov. 2005), reports on a one-year air toxics monitoring study including several monitors in southwest Detroit and several more in nearby communities. Benzene and formaldehyde were identified for risk reductions efforts at each of those locations. Further, although monitoring data were not collected, the Public Summary identifies diesel particulate and acrolein as being of concern at those same locations because they are associated with mobile source emissions. The proposed bridge lies within the area of concern identified in MDEQ's air toxic study.

Research indicates that diesel vehicle emissions are substantially affected by the variability of driving behavior, and that stop-and-go activity produces higher emissions compared to free-flow travel. Clark N., *et al.* Factors Affecting Heavy-Duty Diesel Vehicle Emissions, J. Air & Waste Manage. Assoc. 52, pp. 84–89 (2002). Recent research suggests that the particulate fraction of diesel exhaust is the

dominant contributor to urban air toxic-related health risks (e.g., South Coast Air Quality Management District ("SCAQMD"), Multiple Air Toxics Exposure Study in the South Coast Air Basin: MATES-II. Final Report (and appendices) (2000). Other studies observe that ultra fine PM may be even more toxic than larger size PM, when comparing PM of identical mass and composition. *E.g.*, Zhu Y. *et al.*,. Study Of Ultrafine Particles Near A Major Highway With Heavy-Duty Diesel Traffic. Atmos. Environ. 36, pp. 4323-4335(2002); .Zhu Y. *et al.*, Concentration And Size Distribution Of Ultrafine Particles Near A Major Highway, J. Air & Waste Manage. Assoc. 52, pp. 1032-1042 (2002). "Diesel-powered vehicles produce far more PM, including $PM_{2.5}$, than gasoline-powered vehicles (on a g/mi basis). The degree to which these factors produce microscale problems is a function of the number of heavy-duty vehicles operating in the affected area, the distance to receptors, and the unit risks associated with exposure to diesel exhaust." Tamura, T., *et al.*, Sonoma Technology, Inc., Transportation-Related Air Toxics: Case Study Materials Related to US 95 in Nevada, § 6.5.2. (2003)(prepared for FHWA, Office of Natural Environment).

Clearly an international bridge where thousands of semi-trucks stop, idle, crawl forward, stop again and finally slowly accelerate up the grade to the bridge will be a hotspot of diesel emissions requiring detailed air quality analyses. There have been a number of documented cases in which more that 400 trucks have exited from the Bridge in one hour. The Corradino Group, Ambassador Bridge/Gateway Project, Re-evaluation Report, p. 15 (August, 1999) (prepared for MDOT and SEMCOG). This number will increase with improvements in the plaza on the U.S. and as truck traffic more than doubles over the next 30 years. That is a tremendous amount of stop-and-go truck traffic.

Diesel emissions are a particular concern with regard to a second bridge crossing because southwest Detroit is within the $PM_{2.5}$ nonattainment area. USEPA recently filed environmental objections to the draft EIS for the proposed Detroit Intermodal Freight Terminal which is close to the Ambassador Bridge and requested that the draft EIS be revised to better address fine particulate matter associated with diesel emissions (as well as environmental justice issues) and requested "that the Final EIS more fully describe localized impacts of $PM_{2.5}$ and commit to air quality mitigation strategies." 70 Fed. Reg. 53657 (Sept. 9, 2005). The DIFT, Air Quality Analysis Protocol, Detroit Intermodal Freight Terminal, Environmental Impact Statement (March 2005) (included on Attachment B), is an example of the kind of comprehensive analysis which should be performed for the proposed actions here.

2. Potential for Controversial Effects

(a) The application conflicts with recommendations of DRIC Study which has dropped a second Ambassador Bridge crossing for environmental and community impact reasons.

Although a second bridge crossing at the Ambassador Bridge is an attractive alternative from a number of aspects, as noted elsewhere the affected Canadian agencies dropped it from further consideration in the DRIC study as the result of both adverse community impacts and the fact that the crossing does not address redundancy concerns. Proposing a bridge at a location opposed by the Canadian transportation agencies is by any definition controversial.

(b) Issues over public or private ownership of the river crossing.

There is substantial concern in many quarters with granting a private company a virtual monopoly of border crossings in Detroit. See public comments raising this and other issues collected at Attachment L. This is not the time and place to decide the merits of that issue, but it is exactly the type of issue which will have substantial potential impacts on the human environment, justifying an environmental impact study.

The GCDC's testimony to the State Joint Transportation Committee states the issue well:

> "The fundamental underpinning of this success is the public sector's leadership and involvement – and this must continue. The GCDC firmly supports public ownership and oversight of the next border crossing. The interests of the private sector, while important, are simply too narrow to fully achieve all that the DRIC study sets out to accomplish. The greatest threat to achieving the DRIC study mandate is allowing one party – whether public or private – to wield undue influence and control. The Gateway Communities Development Collaborative has had decades of experience with the challenges of working in an area that hosts the only privately-owned international crossing along the northern U.S. border and know first-hand of the inherent conflicts between the private interest to maximize profits and the public interests of community development, community cohesion, and security. We ask the joint committees to consider that the company that owns the Ambassador Bridge owns an entire transportation conglomerate of shipping, trucking, and freight handling interests may of which are also located in southwest Detroit. We ask you to consider that this conglomerate has an extensive concessionaire privilege on all transportation-related

> projects of the Detroit Wayne County Port Authority. We ask that you consider the proposal, announced last October, to lease the Detroit interests of the Detroit-Windsor tunnel to this conglomerate. Finally, we ask you to consider the motivation and implications of criticisms raised by this conglomerate of the DRIC study. We have considered these issues and have concluded without reservation, that providing a monopoly to a private entity on the control and operations at the Detroit Windsor international border will not result in a more efficient and secure border system, local community and economic development, or mutually beneficial international relations." GCDC Testimony to the Joint House and Senate Transportation Committee DRIC Study – March 30, 2006

A number of other witnesses repeated this point to the Committee during its hearings. Their testimony is included at Attachment L.

A related issue is priority of certain shipments over the bridge in periods of congestion. At present, some trucks are given priority during periods of congestion to avoid disruption of industrial production. In general that makes sense. But, if such a policy is going to be part of the operating practices, what commodities/shippers/customers will be given priority (thereby permitting an analysis of the economic impact of that practice) and how will this be accommodated on the new bridge and its plazas (in order to consider physical impacts)?

(c) AASHTO guidance recognizes that toll facilities raise issues which must be addressed in an EIS.

Any new international bridge will be supported by tolls, just as all existing bridges are. Toll financing of transportation facilities raise a variety of issues which must be considered in the NEPA process. See, AASHTO, Practitioner's Handbook 03: Managing the NEPA Process for Toll Lanes and Toll Roads (July 2003)(Attachment M). We request USCG review the enclosed handbook and incorporate its recommendations into the scoping and conduct of the EIS.

(d) Long standing community controversy and opposition to an expanded river crossing in vicinity of the existing Ambassador Bridge.

> "[S]trong controversy over the environmental impacts of a proposed action can arise among the general public. Again, the EIS should be considered due to the possible significant impacts perceived by the public." Tools for Decision-Making, p 36.

In critiquing DIBC's draft USCG bridge application in 2005, FHWA noted, "The answer to this checklist question F was that no controversy is expected from the new bridge and there will be no negative environmental impacts. The bi-national partnership conducted several public meetings in April of this year...There was substantial controversy demonstrated at these meetings by the public over the twinned bridge proposal." Letter, FHWA to American Consulting Engineers of Florida (June 21, 2005) (Attachment E) (ACE is DIBC's consultant). See also, the public comments included at Attachment L.

The GCDC and its member organizations have worked cooperatively with DIBC to minimize the impacts of the present bridge on the community and generally supported the Gateway Project for that reason. However, the GCDC and the Council and their members and constituencies are opposed to another bridge and to increasing bridge and crossing capacity at this location. Further, the history of DIBC's conflict with the nearby community over bridge-related issues is too long to summarize here. Again, the point here is not whether DIBC or the community have been right or wrong in the past – rather that an action permitting a new bridge to be owned and operated by DIBC will generate the level of controversy that requires an EIS.

(e) No effort has been made to work with a broad base of the affected community or its citizens or businesses.

DIBC has made no showing of community support or involvement related to a new bridge. In fact, its application is counter to the present community involvement effort in support of the DRIC Study. The DRIC Study has had an in-depth community participation during the process. The DRIC Local Advisory Committee has reviewed and scored all of the river crossings evaluated by DRIC. Although the DIBC may wish to avoid this kind of citizen involvement by submitting its "go-it-alone" application, NEPA requires that USCG have the benefit of significant community involvement through the EIS process before it makes its decision on DIBC's permit application.

3. Uncertain and Unknown Effects on the Human Environment

"If there is scientific controversy concerning any aspect of a proposed action, then the occurrence of significant impacts is questionable and an EIS should be considered. Tools for Decision-Making, p. 35.

(a) Difficulty in evaluating mobile source air quality impacts from diesel trucks, where diesel emissions are believed to be the predominant contributor to adverse health effects from mobile source emissions.

The MSAT issue related to diesel emissions is an issue where there is scientific uncertainty as to the full extent of health impacts. This issue was the motivation behind FHWA's recent guidance on mobile source air toxics. Burbank, C., FHWA, Interim Guidance on Air Toxic Analysis in NEPA Documents (Feb. 3, 2006). The proposed action clearly falls within the guidance and is the type of issue which merits a full EIS so that all of the ramifications of this difficult issue can be fully addressed.

4. Precedent For Future Actions With Significant Effects Or A Decision In Principle About A Future Consideration

The proposed action would preempt the ongoing DRIC Study. There is a need over the next 35 years for one new bridge, not two. Regardless whether there are public or private dollars in the new bridge itself, associated facilities will require the expenditure of hundreds of millions of public dollars. There is not enough public money for two bridges. So a permit for a new Ambassador Bridge will foreclose another bridge, which other bridge might be far preferable in the public interest. An EIS is required to consider the impact of foreclosing a better crossing location.

5. Significant Cumulative Impacts When Considered With Other Foreseeable Future Actions

The City of Detroit is seeking to expand its port activities that are within a mile of the bridge. There are active plans to restore Fort Wayne, increasing its role as a generator of traffic. There are numerous other private, public and quasi public entities with plans fro the vicinity of the proposed bridge. How will those plans affect the ability to expand the bridge plaza in the future and how will a new bridge affect current redevelopment plans? The CEQ regulations require USCG to flesh out these issues and evaluate the associated impacts on the human environment. Hence an EIS is required.

6. Impacts on Historic Resources

During the Blue Water Bridge EIS, the original structure of that bridge was considered an historical structure and the visual impact of a new bridge on the existing bridge was addressed in the EIS. The Ambassador Bridge, which has dominated the downriver skyline for many years, is on the National Register of Historic Places and will require the same consideration. Letter, Michigan State Historic Preservation Officer to USCG (May 4, 2006) (Attachment H). Further, since the application raises the possibility of demolishing the Ambassador Bridge, an EIS is further justified.

7. Other Significant Impacts

(a) Any bridge crossing in southwest Detroit will affect low income and minority neighborhoods, requiring consideration of environmental justice and other considerations which may vary substantially depending on where a new crossing is located. We are submitting on Attachment B the Social Cultural Effects Evaluation perfomed for DIFT because the Livernois-Junction Yard impact area approximates the area in the vicinity of the Ambassador Bridge. The socio-economic statistics for that area are provided and substantiate that disproportionately low income and minority neighborhoods will be impacted.

(b) Irreversible and Irretrievable Commitments of Resources. When a proposed action may cause environmental damage that cannot be reversed or mitigated, such damage is likely to be considered significant. Tools for Decision-Making, p. 35. Here there will be but one new bridge crossing for the foreseeable future. Once built, its impacts will continue for a hundred years. USCG must make the best informed decision on this permit application because there will be no going back. An EIS is required to inform that decision.

(c) Issues related to hazardous material transportation need to be considered. What will be the policy for transporting such commodities on the new bridge as opposed to at another crossing, e.g., the current truck ferry?

Transboundary Impacts Require Preparation of an EIS.

The Council on Environmental Quality has directed that:

"[T]he entire body of NEPA law directs federal agencies to analyze the effects of proposed actions to the extent they are reasonably foreseeable consequences of the proposed action, regardless of where those impacts might occur. Agencies must analyze indirect effects, which are caused by the action, are later in time or farther removed in distance, but are still reasonably foreseeable, including growth-inducing effects and related effects on the ecosystem, as well as cumulative effects." Council of Environmental Quality, Guidance on NEPA Analyses For Transboundary Impacts (July 1, 1997).

"[F]ederal agencies should use the scoping process to identify those actions that may have transboundary environmental effects and determine at that point their information needs, if any, for such

> analyses. Agencies should be particularly alert to actions that may affect ... air quality ... as well as to interrelated social and economic effects." *Id.*

As you are aware, Letter, Transport Canada to USCG (August 30, 2006) (Attachment I), the Canadian government has determined this project requires an Environmental Assessment under the Canadian Environmental Assessment Act.

In addition, the DRIC study has undertaken just such an analysis and it makes clear that a twinned Ambassador Bridge will have significant impacts in Canada and the United States, for better and for worse. This is strong support for the need to conduct an EIS for this permit application.

The transportation analyses performed as part of the DRIC Study found that the principal access route to a new Ambassador Bridge (Huron Church Road and Highway 3/Talbot Road) now suffers from congestion during the day, which congestion would increase significantly as traffic grows to reach the existing capacity of the Bridge, and then would be even worse after a second span is constructed because of the additional millions of vehicles flowing as the result of the increase in capacity. DRIC, Travel Demand Forecasts, § 6.1.2. "The current situations where trucks drive through the heart of Windsor's west end community is unsustainable. It's not good for Canadian and U.S. economies, it's not good for the trucks that carry that trade, and it's not good for the local community" Joint Press Release, Ontario Trucking Association, APMA and Ontario Chamber of Commerce (December 7, 2005) (Attachment N).

The DRIC process spent a great deal of time considering the impacts which this increased traffic flow would have at each of the alternative locations for a new bridge crossing, including a new bridge next to the Ambassador Bridge (Alternative X-12 in the DRIC study). The increased roadway and plaza needs to accommodate future crossing traffic made possible by new crossing capacity would require the acquisition of many homes and businesses in Canada. It would have significant impacts on the neighborhoods in Windsor near the bridge. These impacts are made clear in the Canadian study of impacts, DRIC, Canadian Summary of Evaluations, relevant excerpts of which are attached (Attachment J). The second Ambassador Bridge "is eliminated because, in Canada, the plaza and freeway connection leading to a second span would have unacceptable community impacts and the constructability of a six lane freeway along Huron Church Road is doubtful in light of intensity of the surrounding development" DRIC, U.S. Summary of Evaluations, p. S-56. It was eliminated because "maintaining the existing crossing and connections in the border transportation network does not address redundancy needs and, regardless of plaza site selected, it would cause high impacts to neighborhoods." *Id.* at p. S-50. A representative of MDOT met with Canadian representatives on May 16, 2006 and then testified at a Joint Transportation

Committee meeting, "I am authorized to advise you the Canadians had previously rejected the second span of the ambassador Bridge and see no need to change that position." Testimony of M. Alghurabi, DRIC Project Manager for MDOT, Testimony to Joint Transportation Subcommittees of the Michigan Legislature, May 18, 2006. (Attachment O).

Canadian concerns with the impact of a new river crossing are reflected in two public information pieces prepared by the Ontario Ministry of Transportation and Transport Canada. Detroit River International Crossing Study, Air Quality Assessment, Frequently Asked Questions (August 23, 2006); Myth Busters (August 23, 2006) (Attachment P).

Cumulative Impacts

In assessing the environmental impacts of a proposed action, the USCG must consider the cumulative impact of the proposed action. That is, the "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions..." 40 C.F.R. 1508.7. As interpreted by CEQ, this refers to "the cumulative impact of the direct and indirect effects of the proposed action and its alternatives when added to the aggregate effects of past, present and reasonably foreseeable future actions." Memorandum, CEQ to Heads of Federal Agencies, Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (June 24, 2005), p. 2. See generally, CEQ, Consideration Cumulative Effects Under the National Environmental Policy Act (January 1997).

(Note that the concern with the segmentation of actions (discussed above) arises in part because segmentation tends to undercut the consideration of the cumulative impact of a proposed action.)

With regard to the DIBC's permit application for a new bridge crossing, there are a number of past, present and future circumstances which must be considered in evaluating the impacts of this proposed action.

The past actions which need to be considered include the prior expansion of facilities associated with the Ambassador Bridge over the last 30 years and the associated traffic increases. Steadily over time the presence of the Ambassador Bridge and its impacts on the nearby Detroit and Windsor communities have expanded. The Gateway Project is just the latest installment. As mentioned above, DIBC has plans for expansion and road relocation beyond the Gateway Project. The adverse impacts of a new bridge will come on top of prior adverse impacts. The totality of these impacts must be considered.

In terms of present projects, obviously the impacts of the Gateway Project must be considered as part of the cumulative impact.

In terms of reasonably foreseeable impacts from future actions, the proposed Detroit Intermodel Freight Terminal will cause the greatest impact. Its adverse impact - traffic, noise and diesel-related air pollution- are the same as the impacts of the existing Ambassador Bridge and the proposed bridge. These projects are only a mile or so apart. An EIS is needed to determine if they will have overlapping impacts and how such impacts will affect the southwest Detroit community. As another example the Detroit Riverfront Conservancy is planning a river walk from Belle Isle to the Ambassador Bridge. Further, the City of Detroit is about to begin a planning study for the "west" riverfront which includes the bridge area. How will the impacts of these projects be factored in?

A comprehensive scoping effort will undoubtedly identify other past, present and future actions that have direct and indirect impacts which may be cumulative with the impacts of the proposed new bridge.

The Environmental Assessment for the Gateway Project Is Not a Substitute For an EIS for a New Crossing

In 1994, an environmental assessment was performed for roadway improvements between the bridge plaza and connecting state trunkline highways in Michigan (the "Gateway Project"). That project did not consider the environmental impacts of a second bridge nor of the increase traffic capacity which such a facility would provide.

Ambassador Bridge Gateway Project Memorandum of Understanding (July 26, 1996) does not include the certain construction of a second span of the current bridge or a new bridge adjoining the current bridge. It describes the purpose of the Gateway Project as:

- Provide direct access to and from the Ambassador Bridge to and from the trunkline system and provide improved access to local community (roads).
- Accommodate access to meet future border crossing capacity needs and project plans by the DIBC for improvements to the Ambassador Bridge, including the future possibility of a new span.
- Accommodate access to the proposed Travel Information Center ....
- Obtain planning and environmental approvals needed to proceed with transportation improvements to improve access to the Ambassador Bridge.
- Facilitate future project development of an easy and convenient connection from the Ambassador Bridge to Mexicantown and downtown Detroit.....

The report, itself, is clearly limited to access improvements. MDOT & SEMCOG *Environmental Assessment & Programmatic Section 4(f) Evaluation* (January 1997)

> "The action proposed by MDOT is the improvement of access between the Ambassador Bridge and Michigan's trunkline system, notably I-75 and I-96." Preface and p. 6-1.
>
> "These studies are required to determine the best alternative to improving access at the United States end of the Ambassador Bridge...." p. 1-1.
>
> Figure 1-1, "Project Location" delineates a project location which excludes the bridge and is limited to the environs of the current plaza.
>
> "This study; began in September 1995, addressing a broad range of alternatives for access to an egress from the bridge." p. 1-5.

The description of the preferred alternative includes new traffic lanes and a bridge deck built "in such a way that it could align with a future second span to the west of the existing plan." p. 1-7. Notably, that future span which might be built is not part of the preferred alternative which is described in detail on pp. 1-7 & 1-8.

The FHWA has been absolutely clear that the EA for the Gateway Project did not include a second bridge at that location. "For the record, the Gateway EA did not clear a future second span near the existing Ambassador Bridge. This was never the intent of the study of the Gateway EA." Letter, (FHWA to Westlake USEPA (August 22, 2006) (Attachment Q). The FHWA letter then explains in detail the limited scope of the Gateway Project. Accordingly, USCG cannot rely on the EA or the associated FONSI to support a finding that an EIS is not required for a new bridge next to the Ambassador Bridge.

Lack of Present Authority To Construct and Operate

A bridge applicant must establish it has the legal authority to construct the bridge. 33 C.F.R. 115.05. "Especial care will be taken that Federal approval is not granted when there is doubt of the right of the builder to construct and utilize the bridge." *Id.* Under its procedures, USCG will not issue a bridge permit until the applicant can demonstrate it has all other federal, state and local approvals. USCG, Bridge Administration Manual, p. 12 and App. E.

Canadian Approval

U.S. law requires that the USCG's permit approval is subject to approval of the proper authorities in Canada. 33 U.S.C. §535. Given Transport Canada's opposition to this project, such approval seems unlikely.

The DIBC plan appears to call for a new or expanded connector road involving Mill St. and Huron Church Road in Windsor, but the permit application states that "Presently, the DIBC/CTC has no authority or jurisdiction allowing for the construction of connecting roads from the Ambassador Bridge to Highway 401." Permit Application, p. 4. Because such access roads will clearly be required in order to accommodate the traffic with the new bridge capacity will generate, it is questionable whether the USCG can find that the DIBC has all of the permits and authorizations needed to proceed with a new bridge.

State Approval

A privately owned highway toll bridge may not be constructed or operated without prior approval of its location and plans by the state highway department. 33 U.S.C. §525(c). The new bridge will certainly be a toll bridge. MDOT has not approved the proposed location. It is unlikely to approve the location given the decision in the DRIC study to eliminate a second Ambassador Bridge, but in any case, no MDOT decision is likely until the DRIC study is completed.

City Approval

City of Detroit approval is required in a variety of ways. First, the original bridge was approved by a 1927 city ordinance. (Attachment R.) That ordinance clearly did not authorize a second bridge. Presumably, approval by ordinance will again be required. Second, it is not clear that a new bridge span will comply with Detroit's zoning ordinance. Third, the new bridge will span properties owned by Detroit (certain streets and potentially a city park). DIBC must obtain easements to traverse city property. Present information indicates that the easements for the Ambassador Bridge are not wide enough to include a second bridge. The 1927 Ordinance refers to a maximum 75-foot width, which width is fully occupied by the present bridge. A new six-lane bridge is likely to require another easement nearly 200 feet wide (including the space between the bridges). DIBC must demonstrate it has such easements, else it does not have the legal authority to construct the bridge.

In addition, Detroit asserts the right to enforce its building and safety codes with regard to any international bridge in the City. DIBC is presently in litigation with the City of Detroit over the City's ability to regulate the DIBC and its facilities like any other business in Detroit under the City's zoning and building ordinances. *Detroit International Bridge Company v. City of Detroit*, Court of Appeals Docket No.

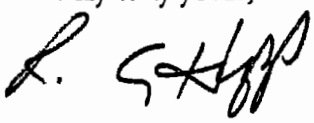
257369. DIBC claims it is immune from the City's zone and building ordinances. Not until that litigation is resolved and then only if it prevails, will DIBC be able to demonstrate that it has all of the City approvals required in order to construct a new bridge.

Lack of Presidential Permit

We understand that there has been a preliminary determination that a new bridge adjacent to the Ambassador Bridge is not required to obtain a Presidential Permit under the procedures required by 33 U.S.C. § 535a and Executive Orders 11423,12847 and 13337. We do not agree with such a conclusion and are unaware of any basis for it. The enabling legislation for the original Ambassador Bridge clearly is limited to a single bridge whose construction was to be completed within seven years after the legislation. Statutes at Large, 66th Cong., Sess. III, ch. 167 (March 4, 1921). On July 19, 2006, we submitted a Freedom of Information Request to the Department of State for its file on the issue. The Department has been untimely in responding to our request. We reserve the right to comment further on this issue once we have possession of the relevant State Department record and determine the Department's position and are able to frame an appropriate comment.

Thank you for considering our comments.

Very truly yours,



R. Craig Hupp

RCH/cmf

cc: Gateway Community Development Collaborative
Delray Community Council
U.S. Senator Carl Levin
U.S. Senator Deborah Stabenow
U.S. Representative John Dingell
U.S. Representative Carolyn Cheeks-Kilpatrick
Jerri Ann Garl, USEPA
James Kirschensteiner , FHWA
State Representative StevenTobocman
Mr. Algurhabi, MDOT

INDEX OF ATTACHMENTS

(All attachments are contained as pdf files on Attachment B and are not reproduced as paper copies except with the copy of the GCDC comments filed with the USCG.)

A. GCDC Member List

B. CD with DRIC Documents

C. DRIC, Travel Demand Forecasts, Working Paper (September 2005)

D. Letter – State Representative Tobocman to FHWA (May 27, 2005)

Letter – GCDC to FHWA (May 25, 2005)

E. Letter – FHWA to USCG (June 7, 2006)

Report, DIBC, Today & Future (2006)

Letter – DIBC to MDOT (May 17, 2006)

Letter – MDOT to DIBC (July 13, 2006)

Letter – FHWA to American Consulting Engineers of Florida (June 21, 2005)

F. Letter – Transport Canada to American Consulting Engineers of Florida (April 15, 2005)

G. DRIC – Evaluation of Illustrative Alternatives on U.S. Side of Border, Vol. 1, Summary (November 2005)

H. Letter – Michigan State Historic Preservation Officer to USCG (May 4, 2006)

I. Letter – Transport Canada to USCG (August 30, 2006)

J. DRIC, Generation and Assessment of Alternatives Report (Canadian Side) (Draft November 2005)

K. Detroit Regional Chamber Border Crossing Policy (October 12, 2005)

Letter – Daimler Chrysler to MDOT (March 28, 2006)

Letter – State Representatives to State Representative LaJoy (January 25, 2006)

L. Public/Private Concerns re Ownership And Other Issues

GCDC Testimony to State House and Senate Joint Transportation Committee Hearing (March 30, 2006)

M. AASHTO, Practitioner's Handbook 03: Managing the NEPA Process for Toll Lanes and Toll Roads (July 2003)

N. Joint Press Release, Ontario Trucking Association, APMA, and Ontario Chamber of Commerce (December 7, 2005)

O. Alghurabi, L., Testimony to Joint Transportation Subcommittees (May 18, 2006)

P. Ontario Ministry of Transportation/ Transport Canada, Air Quality - Frequently Asked Questions

Ontario Ministry of Transportation/ Transport Canada, Myth Busters

Q. Letter – FHWA to USEPA (August 22, 2006)

R. 1927 City of Detroit Ordinance (Ordinance No. 315-B of 1927, Ch. 245, International Bridge of the Compiled Ordinances of the City of Detroit) as amended by Ordinance No. 42-C of 1928

Part

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September 14, 2006

Delivered by Overnight Courier
Office of Commander (dpw-3)
Ninth Coast Guard District
1240 East Ninth Street
CLEVELAND, Ohio
44199-2060

Attention: Mr. Robert W. Bloom, Jr.
Bridge Program Manager

Dear Sir:

Re: Your Public Notice 09-03-06 – Detroit International Bridge Company/Canadian Transit Company
Application for Approval of Location and Plans for construction of a Second Fixed Highway Bridge Over a Navigable Waterway of the United States (Detroit River) Adjacent to the Existing Ambassador Bridge

SUBMISSION ON BEHALF OF THE CORPORATION OF THE CITY OF WINDSOR, CANADA

Introduction – The City of Windsor's Direct and Substantial Interest in This Matter

We are attorneys for the Corporation of the City of Windsor, Ontario, Canada. This letter, and the various attachments to it which are separately bound in two volumes and which are also enclosed with this letter, constitute the comments on behalf of the City of Windsor to your agency objecting to the grant of the requested permit as well as the objection of the City to the preliminary determination by the U.S. Coast Guard that this application is properly processed as a "categorical exclusion" (CE) from the *National Environmental Policy Act* (NEPA). We ask that this letter and the attachments enclosed form part of the record in this matter.

The application proposes a new international vehicle bridge across the Detroit River between Detroit Michigan and the City of Windsor, Ontario ("Windsor" or "the City").

The proponent describes this as a "new six-lane structure" to be built to the west of the existing 76 year old Ambassador Bridge. As submitted below, in fact this bridge will accommodate eight lanes of traffic and should be considered and environmentally assessed as such.

The proposed second bridge will be partially located within the United States, but a significant portion of the proposed bridge will be located within Canada, and in particular, within the City of Windsor.

The City of Windsor's northern boundary begins at the International Boundary line between Canada and the United States, which is essentially the mid-point of the Detroit River.

Approximately 50 percent of the proposed second bridge structure will be located in Canada and specifically within the City of Windsor.

The current Ambassador Bridge has a structural length within the City of Windsor of about 3,600 feet. Of that length, approximately 2,700 feet cross over the land area of the City of Windsor, not below the river.

The proposed second bridge will have approximately equal horizontal presence within the City of Windsor.

The proponent has filed plans with you for the second bridge which demonstrates that the proposed second bridge would pass over the following City of Windsor streets: Riverside Drive West, University Avenue West, Peter Street, Victoria Street and Wyandotte Street (in fact the proposed bridge would not pass over Victoria Street but instead would pass over Donnelly Street).

For an accurate plan view of how the proposed second bridge would be related to City streets and to the existing Ambassador Bridge within the land area of the City of Windsor, please refer to the enclosed aerial photograph entitled "City of Windsor Zoning By-law 8600 – Existing Zoning Adjacent to the Ambassador Bridge". This aerial photograph has been prepared by City engineering/planning staff from information taken from the plans provided by the proponent to the Coast Guard. **Attachments Vol.1, Part A, Tab 5**

As is clearly illustrated in the above-referenced aerial photograph, the second bridge will pass directly over four blocks of houses on the west side of Huron Church Road. There are approximately 218 dwellings shown on the aerial photograph in the 250 metre area to the west of Huron Church Road illustrated on the aerial photograph. These dwellings house approximately 650 people.

Also within a short distance west of the proposed second bridge, closer to the Detroit River, at 2856 Riverside Drive West, is a 145-unit building which houses almost 200 University of Windsor students.

Within 60 – 180 metres to the east of Huron Church Road, immediately opposite portions of the proposed second bridge, there are three University of Windsor residences. These provide housing for over 800 students.

We are attaching to this submission a letter dated September 13, 2006 from Robert Hayes, MCIP, RPP, City Planner for the Corporation of the City of Windsor addressed to David Estrin,

Gowling Lafleur Henderson LLP, Attorneys for the City of Windsor. **Attachments Vol.1, Part A, Tab 2**

In the letter from Mr. Hayes, the City Planner details the land use conflicts and impacts that would be caused to the City and its residents by this proposed second bridge. That letter provides significant details corroborative not only of the direct interest of the City in this matter but, also, substantiation of the City's concern that this proposed second bridge will have significant adverse environmental and community impacts within the City.

A previous study carried out by the Detroit River International Crossing Project (DRIC) – the so-called "Bi-National Environmental Assessment" being undertaken by the U.S. Federal Highways Administration, the Government of Canada through Transport Canada, the State of Michigan and the Province of Ontario examined the potential environmental and land use impacts of a second Ambassador Bridge as is now being proposed by the proponent to you.

In his September 13th letter, Mr. Hayes quotes directly from the findings of the DRIC "Generation and Assessment of Illustrative Alternatives Report" (November 2005) which is also a report referenced by the proponent in its material submitted to you. **Attachments Vol.1, Part A, Tab 7**

The DRIC study rejected the viability of a second Ambassador Bridge after having carried out an assessment of traffic impacts, potential noise impacts, impacts to community cohesion and character and displacement of population.

The following quotation is taken directly from the DRIC report:

The expansion of the existing plaza at the Ambassador Bridge will have a highly negative impact on the community, particularly the neighbourhood of Sandwich. This area of Sandwich is densely populated and a mature residential area. Over 215 households will be displaced and almost 1000 households disrupted (i.e. within 200m of the plaza) within the established urban neighbourhood. Area businesses are forming an economic development corporation to promote new growth and development opportunities in the Sandwich area. The loss of over 215 households from the immediate vicinity would have a negative effect on the local businesses serving this community.

Other impacts associated with this plaza include: 2 schools displaced (J.L. Forster Secondary School and St. Francis Separate School); 4 institutional uses disrupted, including a day care centre and business school; and 5 social features disrupted, including the University of Windsor, Assumption Church and the Riverfront Park. The plaza would be situated in a residential neighbourhood (highly undesirable from the perspective of border agencies) with little opportunity for expansion to meet future needs without additional community impacts.

The twinning of the Ambassador Bridge will also have impacts on Sandwich community: approximately 75 households displaced and over 310 households disrupted; a student residence would be displaced and the riverfront part would be disrupted.

Overall, the crossing X12 alternative would have a highly negative impact to community and neighbourhood characteristics. (p.108-9)

...

Expanding Huron Church/Talbot Road from Highway 401 to the plaza at Ambassador Bridge will displace approximately 135 homes and over 85 businesses, while over 2100 households and approximately 25 businesses will be disrupted (i.e. are within 250m of the centerline).

Protect Cultural Resources

The crossing X12 alternative has a high negative impact to cultural resources. The community of Sandwich includes one of the oldest settlements in Canada. The original town of Sandwich retains a number of buildings of the pre-confederation era that are of historical significance and/or which exemplify the Neo-classical and Georgian styles of architecture, which were in vogue during the first half of the nineteenth century.

A number of designated heritage properties can be found along the following streets: Russell Street, Sandwich Street, Peter Street, Detroit Street, Mill Street, Brock Street, Chippewa Street, South Street, Watkins Street, Prince Road. The Ambassador Bridge, built in 1929, is listed in the Ontario Heritage Bridge List. Expanding the plaza at the Ambassador Bridge to accommodate a twinning of this structure will affect over 40 built heritage features (disruption impacts) and 3 known archaeological sites. The alternative also impacts a sizeable area of high archaeological potential. (p.109-110)

Moreover, the City Planner's September 13, 2006 letter further documents how the proposed second bridge will conflict with the City of Windsor Official Plan as well as the City of Windsor Zoning By-law.

As the Chief City Planner's letter indicates, the second bridge is proposed to be located west of the current bridge. "This land, west of Huron Church Road, is residential and is designated as such in the City of Windsor Official Plan." Also, the Windsor Official Plan "designates portion of land near the Detroit River around the existing and proposed second bridge as Waterfront Recreation and Waterfront Residential.

Please refer to the attached map – Excerpt from Schedule D "Land Use" from City of Windsor Official Plan which shows, in yellow, how the area proposed for the second bridge and the lands to the west thereof are all designated in the Official Plan as "Residential" except for a small portion at the river which is designated as "Waterfront Recreational". **Attachments Vol.1, Part A, Tab4**

A complete copy of the City of Windsor Official Plan is being filed as an attachment to this submission (on disc). **Attachments Vol.1, Part A, Tab 3**

With respect to zoning, as the Chief City Planner's letter indicates, (page 5) the entire area of the proposed second bridge is currently zoned for residential uses.

Please refer to the above-referenced aerial photographs "City of Windsor Zoning By-law 8600 – Existing Zoning Adjacent to the Ambassador Bridge".

Filed with this submission are a binder of photographs illustrating some of the land uses in close proximity to the proposed second bridge. These photographs illustrate parks,

culturally/historically significant properties, including some from Olde Sandwich Towne and the University of Windsor. **Attachments Vol.1, Part A, Tab 6**

With specific reference to impacts on City parks and recreational and cultural facilities, please refer to the letter dated September 11, 2006 from Mr. Don Sadler, Executive Director, Parks and Facility Operations, City of Windsor, Parks and Recreation Department to Gowling Lafleur Henderson, which is one of the enclosed and attached documents to this submission. **Attachments Vol.1, Part A, Tab 10**

The letter from the Executive Director of the City's Parks and Recreation Department establishes that there are four City parks that are directly located adjacent to or very close to the proposed second bridge.

Contrary to the proponent's assertion in its application to you that parks will not be impacted, Mr. Sadler points out how the second bridge would have negative environmental impacts on the park in that area as well as on the recreational use and capacity of the recreationway easement under the existing and proposed bridge.

Please refer to the enclosed aerial photograph entitled "Proposed River Front Recreation Way Easement Extension". **Attachments Vol.1, Part A, Tab 18**

To quote Mr. Sadler, this area under the bridge is "vital to create a safe, continuous recreation way from Assumption Park to McKee Park to the west. This portion of recreationway is an integral part of our bicycle use Master Plan which connects Windsor by pathway from north, south, east and west ... Our estimate of usage ranges from 100 – 500 per hour past this point dependant on season."

Mr. Sadler indicates that the "increased traffic of six – eight new lanes compared to the existing four will increase the noise and air contaminants in the adjacent parkland space, which is designed for passive and active use by the neighbourhood. Clearly it is not reasonable to conclude that there will be 'no impact' on neighbourhood parkland. Clearly, there will be impacts in the form of landscape growth patterns, increase of noise and air contamination and lack of consideration for historical and cultural significance in the area of the proposed bridge expansion."

He concludes that it is the City Park Department's opinion "that approval of the project will have a significant potential impact on parks, recreation and cultural features in Windsor and we strongly advise that before any approvals are processed for this project, it is vitally important that appropriate studies of these potential impacts are carried out".

Please note that Mr. Sadler's letter has some attached pages providing further details with respect to the history and features of the nearby parks.

Also referenced in the September 13, 2006 letter from the Chief City Planner is a Memo dated September 12, 2006 to the City Planner from the Senior Policy Planner – Heritage of the City (Nancy Morand, MA, MCIP, RPP). **Attachments Vol.1, Part A, Tab 9**

That September 12th memo substantiates "there are a number of properties in the shadow of the Ambassador Bridge that are important heritage resources".

These various heritage resources are depicted on the accompanying map entitled "Heritage Properties: Sandwich Area" – a map which is enclosed with and forms part of this submission. **Attachments Vol.1, Part A, Tab 17**

Ms. Morand's memo points out that "the land in the vicinity of the Ambassador Bridge was the site of the earliest European settlement of the south shore of the Detroit River. It is the site of the Mission of the Our Lady of the Assumption Among the Hurons, established at Detroit in 1728 and moved to this location in 1747. The Hurons established a village adjacent to the Mission and the church also attracted French and British settlers".

She also points out that:

> "Assumption Park bounded by Riverside Drive East, Huron Church Road, University Avenue and Vista Place is designated under the *Ontario Heritage Act* (in 1991) as an archaeological site. The present day church, the magnificent Gothic-style cathedral located just to the south across University Avenue, was built in 1845 ... It was designated under the *Ontario Heritage Act* in 1978."

Her memo references many other designated heritage buildings in the immediate vicinity of the bridge. **Attachments Vol.1, Part A, Tab 6**

Please see the file of photographs being submitted with this submission which include pictures of heritage designated and historical buildings in close proximity to the proposed second bridge.

Ms. Morand's memo also points out that the City of Windsor, Archaeological Master Plan (2005) "the land in the vicinity of the Ambassador Bridge has more potential to contain archaeological resources than any other land in the City. That is because of its close proximity to a major waterway (Detroit River), historic transportation routes, (Huron Church line and Riverside Drive) and the former Huron Village. It is also adjacent to known archaeological sites and unregistered burial sites.

Please note and consider the complete City of Windsor Archaeological Master Plan Study Report (October 2005). **Attachments Vol.1, Part A, Tab 14**

Also, for ease of reference, we have separately enclosed Figure 4 from the Windsor Archaeological Master Plan "Archaeological Potential" which demonstrates that all of the lands on either side of the proposed second bridge are concluded to have "high potential" in respect of archaeological significance. **Attachments Vol.1, Part A, Tab 15**

As well, please see another map which is included in the Archaeological Master Plan entitled "Windsor Archaeological Master Plan – Cultural Factors". This coloured map provides details with respect to the location of the "original Huron reserve" directly in the area proposed for this

second Ambassador Bridge, as well as the same area also being the site of the "Huron Village and Jesuit Mission" as well as "unregistered burial sites". **Attachments Vol.1, Part A, Tab 16**

There will also be potentially significant noise impacts caused by the new bridge and associated increased traffic associated with it.

Please refer to the enclosed letter report dated September 12, 2006 from Dr. A. Lightstone, P. Eng., Acoustical Engineer and President of Valcoustics Canada Limited. **Attachments Vol.1, Part A, Tab 8**

Dr. Lightstone's letter substantiates that there would be a significant and unacceptable increase in noise levels as a result of the operations intended to be carried out on the new bridge. Residential properties and residents residing in proximity of the proposed second bridge would be subjected to noise levels greatly in excess of permitted noise level exposure criteria established by the Ontario Ministry of the Environment.

Dr. Lightstone's letter points out how the proponent has carried out no noise studies and concludes no noise mitigation is required because in its view "noise levels will not substantially increase over the existing volume as a result of the proposed bridge".

Dr. Lightstone finds that:

> "These conclusions are nonsensical. The projected future traffic volumes are understood to be future traffic demands and would materialize at any particular facility providing the capacity is made available. Clearly if the demand exists, an increased number of lanes would result in higher volumes of traffic."

Dr. Lightstone's letter also points out how the proponent's consultant's statement in the materials filed with you that "the closest noise receptor is approximately 1,000 feet away" is erroneous as is the statement "businesses and vacant land immediately surround the project".

Dr. Lightstone points out that "the closest existing homes on Indian Road are about 280 feet from the centre line of the existing bridge and will be about 165 feet from the centre line of the proposed new bridge. The closest facades of the University residences are about 135 feet from the centre line of the existing bridge and will be about 200 feet from the centre line of the new bridge".

In preparing his noise assessment Dr. Lightstone took into account the projected traffic data and demand forecasts carried out for the DRICP in their study entitled "DRIC Study Travel Forecasts, Working Paper, September 2005, prepared by the IBI Group. Please note that this travel forecast Working Paper is one of the enclosures with this submission (on disc). **Attachments Vol.1, Part A, Tab 13**

Dr. Lightstone concludes that by averaging the yearly projected volumes over 365 days to obtain 24 hour volumes, the sound exposures at the row of houses fronting on Indian Road (west side)

will be increased by about 7 dBA, from a projected 66 dBA to about 73 dBA with the new bridge in place. As he states:

> "The result is a relatively significant increase and the resulting sound exposures are well above the normal outdoor criteria 55 dBA for residential uses."

He also points out that current conditions on the bridge are often congested which results in lower travel speeds which produce reduced noise emissions. "That is, current sound exposures at the houses on the west side of Indian Road will be less than 66 dBA." Increasing the traffic speed, which would likely be the result, at least for some time, of the proposed new bridge, which would allow traffic to flow at higher speeds, would therefore increase sound exposures from current conditions.
As he puts it:

> "In such a case, the increased (traffic) volume capacity can result in increases in sound (noise) exposure beyond current conditions by at least 10 dBA. This change is considered very significant."

According to the MOE reference attached to Dr. Lightstone's letter, a 6 to 10 dBA increase above recommended sound levels would produce a "definite noise impact".

Dr. Lightstone concludes that:

> "The proponent's conclusions, that detailed noise studies are not required, are not supported by the evidence (some of which is incorrect) and thus are not warranted."

He further concludes that:

> "Detailed noise studies should be required to address potentially significant increases in sound exposure as is the case for all major projects in Ontario with the potential to impact neighbouring land uses; examining existing, actual traffic flow conditions, as well as future projections and the need for potential noise mitigation is part of the design of the proposed new bridge."

In conclusion with respect to the interest of the City in this matter, the above-referenced documentation clearly and unequivocally demonstrates that the City of Windsor has a substantial and direct interest in the permit application filed with the Coast Guard.

The Coast Guard is Required to Consider the Potential Environmental Effects of its Action on the City of Windsor

The Coast Guard has recognized the obligation to assess the environmental impacts of its actions on the environment of other countries. Pursuant to U.S. Coast Guard Commandant Instructions M16475.1D, "National Environmental Policy Act Implementing Procedures and Policy for Considering Environmental Impacts" (November 29, 2000) it is noted that pursuant to Executive Order 1214, "Environmental Effects Abroad of Major Federal Actions", the requirements of the

Commandant's Order applies to "...(2) major federal actions significantly affecting the environment of a foreign nation not participating in the action or otherwise involved in the action".

The environment of the City of Windsor, located in a "foreign nation", will be affected by the proposed second Ambassador Bridge. The Coast Guard's obligation in addressing NEPA therefore must include an assessment of effects on the environment in Canada and in particular within the City of Windsor.

We also refer you, on this issue, to the letter dated September 14, 2006 from the law firm of Thompson Hine, LLP, American counsel for the City of Windsor. In that letter, authored by attorney Andrew Kolesar, it is further pointed out why the Coast Guard is required under NEPA to include analysis of reasonable foreseeable trans-boundary affects in its analysis of proposed actions in the United States. Those submissions are incorporated by reference in this submission. **Attachments Vol.1, Part A, Tab 1**

We refer you on this issue to the Coast Guard's own "Environmental Procedure Pertaining to Bridge Permit Applications" contained in the U.S. Coast Guard "Bridge Permit Application Guide", COMDTPB P16591.3B".

Among the Coast Guard policies are the following:

1. "Coast Guard policy ensures that efforts are made to improve the relationship between man and his environment and to preserve the natural beauty of the countryside, coastal areas and natural and cultural resources. Coast Guard investigations include consultations with local, state and federal agencies and the public. Recommendations and decisions are based on providing for the reasonable needs for navigation and consideration of these social, economic and environmental goals.

2. Coast Guard environmental considerations extend beyond the bridge and approaches to include causally-related primary and secondary environment impacts of the proposed bridge project. When the Coast Guard is the lead agency in a project involving a bridge, the NEPA jurisdiction extends to the logical terminae on both sides of the bridge or the bridge and road sections having independent utility." (See page 22)

It is clear that the Coast Guard policy requires "investigation" of actual facts (not just acceptance of the proponent's submissions) and "consultation" with the public and local government such as the City of Windsor about such facts and the potential environmental consequences of the proposed action at both sides of the bridge in processing an application pursuant to its own environmental policy.

The City acknowledges that in Canada, pursuant to the *Canadian Environmental Assessment Act*, a form of environmental assessment is to be carried out. In Canada, however, there are only a minimal prescribed requirements for this type of environmental examination. Under the Canadian legislation the examination is called a "screening". While a much more rigorous

"comprehensive study" of a project is a defined term, this "comprehensive study" cannot jurisdictionally be applied to the proposed new bridge and therefore only the minimal "screening" level environmental examination will occur.

A screening level environmental review in Canada is not required to consider the purpose of the project, nor is it required to consider alternative means of carrying out the project that are technically and economically feasible, nor is it required to examine environmental effects of any such alternative means.

A further limitation in Canada is that potentially affected parties such as the Corporation of the City of Windsor and its residents have no ability to determine the "scope of the project" in relation to which a screening level environmental assessment is to be carried out. That decision is entirely a discretionary one in the hands of Canadian federal agencies.

Similarly, as indicated above, the scope of the assessment i.e. factors to be considered, are entirely discretionary and again, the City of Windsor and its residents have no assurance that anything but a very narrow, technically based, environmental screening will be carried out.

There is a Fundamental Factual Error in the Submission by the Proponent and in the Preliminary Determination by the Coast Guard that this Proposed Second Bridge Meets the Criteria of Categorical Exclusion No.32(a) on Figure 2 – 1 of the NEPA Implementing Instructions

This issue is substantially addressed in Andrew Kolesar's September 14, 2006 letter (Thompson Hine LLP). **Attachments Vol.1, Part A, Tab 1**

Further important facts and analysis of this issue having regard to the Coast Guard's checklist for analyzing environmental impacts for their significance are contained in the September 13, 2006 letter from the City of Windsor Chief Planner to Gowlings, which is enclosed with this submission. **Attachments Vol.1, Part A, Tab 2**

See in particular Mr. Hayes' analysis of the 10 issues on the U.S. Coast Guard Environmental Checklist Criteria.

However, one matter not addressed that this relevant to this issue either in Mr. Kolesar's letter or Mr. Hayes' letter is the assertion of the proponent, seemingly accepted by the U.S. State Department in its correspondence filed with you, that there is an alleged "existing corridor" in which the second bridge would be built, thereby supposedly substantiating the conclusion that the second bridge would be "on essentially the same alignment or location".

Gowlings has commissioned extensive historical and archival research with respect to the statutory and executive approvals granted by the Congress of the United States and the Parliament of Canada to the Ambassador Bridge, as well as in respect of the specific plans, drawings and rights-of-way approved by officials of the federal government in the United States and Canada for the current Ambassador Bridge.

We are enclosing with this submission certified copies of original documents obtained from the National Archives of the United States and the National Archives of Canada, as well as documents filed in the Land Registry Office in the City of Windsor, all of which documents demonstrate that the original Congressional approval for the Ambassador Bridge as well as the original Parliamentary approval in Canada are confined to a single bridge. There is no contemplation in the legislation either approved by Congress or by the Parliament of Canada that there would be more than one bridge at this location. The Congressional legislation as well as the Canadian legislation both refer to "a bridge" or "the bridge". There is no contemplation of multiple bridges: See in particular **Attachments Vol.2, Part C, Tab 1** containing the 1921 Act of the Canadian Parliament "to incorporate the Canadian Transit Company" and which authorizes the company to construct and maintain a railway and general traffic bridge across the Detroit River from, at or near Windsor in the province of Ontario to the opposite side of the river in the State of Michigan".

Further, see documents listed in **Attachments Vol.2, Part E, Tabs 1 and 2** i.e. the Acts of Congress originally authorizing the Ambassador Bridge passed in 1921 and the subsequent Acts extending the time for its construction. Note that all of these Acts of Congress refer to "a bridge" across the Detroit River within or near the city limits of Detroit Michigan".

Further, both in the United States and Canada the specific plans for the Ambassador Bridge were required to be approved by senior officials in both countries.

In Canada, pursuant to the Act Incorporating the Canadian Transit Company, the Canadian Cabinet was required to approve the specific plans for the Ambassador Bridge. That approval was finally granted on August 11, 1927 by Order in Council PC1601 which approved "the annexed set of plans of a bridge and of the site thereof" which are then described further in the documents accompanying the Order in Council. Please refer to **Attachments Vol.2, Part B, Tabs 1 -- 11** which list the various plans approved by the Canadian Cabinet and provide surveys and Crown leases from the Province of Ontario and the current lease between the Windsor Harbour Commissioners to the Canadian Transit Company in respect of the strip of land which the Ambassador Bridge is entitled to occupy for the purposes of its bridge.

The various materials being filed with you clearly and unequivocally substantiate that the Canadian Transit Company is entitled to use only a 70-foot wide right-of-way under the Detroit River within the City of Windsor to the International Boundary for the purposes of its bridge. It has no other land under the Detroit River within the City of Windsor or in Canada (except for a slightly wider 100-foot portion near the Canadian shoreline on which a supporting pier for the existing bridge has been erected).

This 70-foot wide strip of land which is leased to the Canadian Transit Company for the purposes of the existing bridge in Canada is most clearly shown on the following documents and plans annexed to them which are found in Part B of our attachments:

- Licence of occupation issued by Province of Ontario, April 30, 1927 for a 70-foot wide strip of land under the Detroit River to the international boundary **Attachments Vol.2, Part B, Tab 8**

- Crown lease from the Province of Ontario to the Canadian Transit Company signed October 7, 1932 in respect of a 70-foot right-of-way under the Detroit River for the purposes of the Ambassador Bridge. **Attachments Vol.2, Part B, Tab 9**

- 1962 Lease between the Windsor Harbour Commissioners of the City of Windsor to the Canadian Transit Company in respect of the 70-foot strip of land and a second smaller parcel under the Detroit River previously leased by the Province of Ontario to the Canadian Transit Company, the major piece of property being a parcel comprising "a strip of land under water 70 feet in width, having a distance of 750 feet more or less from the first parcel to the international boundary". There is a survey/sketch attached illustration these two parcels. **Attachments Vol.2, Part B, Tab 10**

- Plan of survey prepared by Verhaegen Stubberfield Hartley et al, Ontario Land Surveyors (1994) illustrating lands on the Canadian shoreline and under the Detroit River that are leased to the Canadian Transit Company and substantiating that the corridor of the leased lands under the Detroit River have a width of 70 feet to the international boundary. **Attachments Vol.2, Part B, Tab 11**

- Letter report dated September 12, 2006 from Heritage Research Associates (David McConnell), confirming that, as an expert archivist and research historian, his full search of the Library and Archives of Canada and the certified copies of documents and plans from the Archives of Canada and Orders in Council (included in the City Attachments) approving the plans of the Ambassador Bridge confirm that there is only a "70-foot wide corridor of land" under the river that was approved for occupancy by the Ambassador Bridge. **Attachments Vol.2, Part B, Tab 12**

Any second bridge would also require specific approvals and easements for a new corridor within the City of Windsor.

Please see the Canadian Act of Parliament from 1921 found in Part C in the documents/attachments being filed with the Coast Guard "An Act to Incorporate the Canadian Transit Company" which in Section 10 provides that:

> "The company shall not construct or operate any of the works mentioned in section 8 of this Act along any highway, street or public place without first obtaining the consent, expressed by by-law of the municipality having jurisdiction over such highway, street or other public place, and upon terms to be agreed upon with such municipality ..."

In other words, before construction can begin for any bridge in this area, the consent of the City of Windsor is expressly required by this Canadian Act of Parliament.

No application has been made to the City of Windsor for such consent and of course no such consent has been granted.

When the original bridge was constructed the Canadian Transit Company did apply to the then Towne of Sandwich (now incorporated into the City of Windsor) for the specific approvals that it was required to obtain by the Act of Parliament.

Please see the documents/attachments filed with you under Part D of our document book which provides the specific by-law approval of the Towne of Sandwich and granting permission to the Canadian Transit Company to cross over a number of streets within the then Towne of Sandwich, (now the City of Windsor) for the specific structure then being built.

Those documents again corroborate that the Towne of Sandwich Council was approving a very specific structure, having certain specified heights above City streets and that certain very specific locations for anchors and piers were also being approved by Town Council.
Further, the agreement reached between the Canadian Transit Company and the Towne of Sandwich provided for the legal protection and indemnification of the municipality from materials that might fall off the bridge as well as damages caused by smoke and other emissions from the bridge.

The Canadian Transit Company/Detroit International Bridge Company have not applied to the City of Windsor, or even discussed their second bridge proposal with the City of Windsor and therefore until such applications are received and considered by City Council it is again clear that the proponent has no required statutory approvals under which it can assert it would be able to construct a second bridge at any specific location, let alone the location proposed and in respect of which the Coast Guard is being asked to give an approval.

In short, the application pending in front of the Coast Guard is premature. Until the proponent can demonstrate it has obtained the necessary approvals of the City of Windsor to pass through the air space of the City of Windsor and occupy lands within the City of Windsor, it cannot formulate plans for which the Coast Guard should be providing approval.

The City of Windsor asks that the Coast Guard suspend processing of the application made by the Detroit International Bridge Company/Canadian Transit Company until such time as these companies have sought and obtained specific approval for such a bridge both from the Parliament of Canada as well as from the City of Windsor.

In the United States, the specific plans for the Ambassador Bridge were approved both by the Assistant Secretary of War and the Acting Chief of Engineers on March 4, 1921 as well as by an ordinance.

We include in the Attachments to this submission the March 4, 1921 approval issued by the U.S. Assistant Secretary of War and the Acting Chief of Engineers approving the "plans and specifications" for the bridge between Detroit and Windsor "together with such drawings and map of locations thereof as may be required for a full understanding of the subject", which approval was issued pursuant to "an Act to Regulate the Construction of Bridges Over Navigable Waters". This approval was issued to the American Transit Company of Detroit Michigan.

The enclosed document is certified under the seal of the National Archives of the United States. **Attachment Vol.2, Part E, Tab 3**

The document consists of a two-page order approving the location and plans of the bridge and attached general plan, as well as this more specific plan and profile of the proposed bridge.

While no plan of the land area under the river is specifically shown on this plan, the plan does illustrate that the distance between supporting piers on either side of the proposed bridge was approximately 100 feet.

It is clearly beyond doubt that the proposed second bridge could not be constructed within the 1921 approval granted by the Assistant Secretary of War and Acting Chief of Engineers.

Further, the Ordinance passed by the City of Detroit in 1927approved the construction of the approaches to the Ambassador Bridge within the City of Detroit. That ordinance specifically gave approval for the bridge to pass over certain streets within the City of Detroit and refers specifically to a right-of-way width of 75 feet. **Attachments Vol.2, Part E, Tab 4**

In conclusion on this issue, the specific plans approved by federal officials in Canada and the United States by the City of Windsor, as well as by the City of Detroit do not authorize land to be occupied for a second bridge. The approved corridor in Canada under the river is no wider than 70 feet and in Detroit is 75 feet.

Clearly the proponent will be required to obtain federal, state, City of Windsor and City of Detroit approvals for a second corridor before it is entitled to build a new bridge. It has offered no proof that it has even applied for, let alone obtained, such approvals.

There is therefore no "existing corridor" and certainly no "existing approved corridor" for a second bridge.

Clearly this is another reason why a "categorical exclusion" cannot be processed in this matter.

Accordingly, it is imperative that the full rigour of the *National Environmental Policy Act* be applied to this project in order to ensure that, both in Canada and the United States, the full environmental implications of this proposal are examined and to ensure that an alternatives analysis i.e. an analysis and study of alternative locations and the environmental effects of alternative locations, is carried out.

Why an Environmental Impact Statement (EIS) is Required in this Matter

NEPA places an obligation on the USCG to consider every significant impact of its proposed action. *Baltimore Gas and Electic v. NRDC*, 462 U.S. 87, 97 (1983). NEPA and the CEQ regulations unambiguously require the Coast Guard and other federal agencies to prepare an EIS or environmental assessment/finding of no significant impact ("FONSI") for all major federal actions that are not categorically excluded as in this case as discussed above. *Anacostia Watershed Society v. Bobbit,* 871 F.Supp. 475, 481 (D.D.C. 1994). In this case, where there are

clear environmental impacts and the action will generate significant controversy, an EIS is necessary. COMDTINST M16475.1D, Section B, Para. 5, pg. 2-8. *See, also*, USCG, Office of Civil Engineering, "Tools for Decision-making: Environmental Considerations" (undated), p.21 (generally should proceed to an EIS if know or suspect proposed action will have significant impacts); *Audubon Soc. of Cent. Arkansas v. Dailey*, 977 F.2d 428 (8th Cir. 1992) (affirming district court's order of EIS for bridge project where increased traffic and impacts on parks could not support the issuance of an environmental assessment/FONSI); *Mullin v. Skinner*, 756 F. Supp. 904 (D.N.C. 1990) (bridge replacement project had significant environmental effects that required an environmental impact statement, not just an environmental assessment).

As you are aware, when Congress passed NEPA, it determined that one of the primary functions of the legislation was to ensure that "alternatives to the proposed action" be studied and considered.

The proponent's submission would clearly avoid the need for alternatives to a second Ambassador Bridge to be considered. That, however, is clearly inappropriate, particularly given the specific role of U.S. federal agencies, including U.S. Coast Guard, in respect of the on-going Detroit River International Crossing Project Study (DRIC). That Bi-National Environmental Assessment has examined various alternative crossings of the Detroit River and already determined that it would be inappropriate from an environmental and community impact perspective for a second Ambassador Bridge to be pursued.

While it is acknowledged that the Ambassador Bridge as a private company is not strictly speaking bound by that determination of the DRIC study process, nevertheless the Coast Guard, as a federal agency which is required to address the requirements of NEPA, is bound to ensure that alternatives to the proposed action <u>are</u> studied, examined and considered.

Obvious alternatives to constructing a second Ambassador Bridge include the construction of a bridge somewhat downriver from the current Ambassador Bridge in areas of both the City of Detroit and of the City of Windsor where approach roads and traffic accessing that location would cause substantially less environmental and community impact than at the proposed second Ambassador Bridge location.

It is incumbent upon the Coast Guard to ensure that this downriver location identified by the DRIC study, which is similar to the location identified by a study carried out by an internationally renown transportation engineer, Sam Schwartz for the City of Windsor identified as a preferred location for a new crossing. We are enclosing in that regard the Schwartz report (Border Crossing Issues) January 2005 (on disc). **Attachments Vol.1, Part A, Tab 20**

Clearly, this downriver crossing location, sometimes referred to as the "central crossing" area, is required to be examined by the Coast Guard as a reasonable alternative. Another obvious reasonable alternative that must be considered is the rehabilitation of the current bridge for the purposes of extending its life and its continued use in conjunction with a bridge at another location.

The Coast Guard Should Ensure that it Has Carried Out an Independent and Rigorous Examination of Facts in this Matter Before Making any Final Determination as to Whether or Not a Categorical Exclusion is Applicable

The Coast Guard has stated in its public notice that it has made a preliminary determination that a Categorical Exclusion is appropriate based on "the information presented by the proponents". Unfortunately that information is in some cases clearly erroneous, and in other places misleading and inaccurate. (We are referring to the proponent's document "Project Description and Type II Categorical Exclusion Environmental Documentation, Ambassador Bridge Enhancement Project" prepared for the Detroit International Bridge Company and Canadian Transit Company, March 31, 2006.)

Pursuant to the Coast Guard's "Bridge Permit Application Guide" the Coast Guard District Commander is required to make a "rigorous, independent examination to determine the possible impacts of the proposed project on navigation and the human environment". (Page 14) Similarly, the Coast Guard Bridge Administration Program Policy provides that "the Coast Guard is also required by law to ensure that environmental considerations are given careful attention and importance in each bridge permitting decision". (*ibid* Page 4) That careful attention cannot be provided if the Coast Guard relies only on information presented by the proponent, especially where that information is seriously misleading.

The most fundamentally inaccurate and misleading aspect of the proponent's material is its argument that this proposed second bridge is really only an "enhancement" or a "modification" of the current bridge. That argument is clearly specious in that no "modification" of the present structure is in any way proposed in the plans filed with you. Rather, what has been proposed is a completely new structure with a completely different architectural design on a completely new right-of-way (although at either end of the structure the new bridge would connect with the plazas that now exist).

For the reasons indicated elsewhere in this submission, there is no existing "approved corridor" for that second bridge and a completely new right-of-way must be acquired in Canada and the United States for it. This alone substantiates why a second bridge cannot be considered a mere "modification" or "enhancement" of the existing bridge.

A careful reading of the August, 2005 State Department letter in your file that pertains to this issue indicates that the State Department itself was relying on information provided to it by the proponent. There has apparently been no research carried out by the State Department, such as that provided to you with this letter, substantiating that the Act of Congress approving the Ambassador Bridge referred only to the current bridge and that the approval issued subsequently by the Secretary of War approved only a very specific plan and not any expanded corridor. The same situation pertains to the Canadian approvals as indicated elsewhere in this submission.

In short, approvals given by Congress and Parliament, as well as by the City of Detroit and the City of Windsor (former Town of Sandwich) are very site specific. They authorize very specific plans and engineering drawings by which the current structure exists. Therefore the legal approvals pertaining to the Ambassador Bridge allow it only to be built and only to exist as it is today. There is no "approved corridor" other than the existing bridge as it currently exists.

Any widening of the current bridge and certainly any new bridge, requires an approval in the United States under U.S. Code Title 33, Section 535, referencing the *International Bridge Act* of 1972, under which Congress delegated its consent to the construction of such bridges subject to conditions, including "the approval of the proper authorities in the foreign country concerned".

The Parliament of Canada has not been asked to grant nor has it granted consent to a second bridge across the Detroit River between Detroit and Windsor.

Other Misleading and Erroneous "Facts" Submitted by the Proponent to You

The proponent describes its proposed second bridge as having six lanes. In fact, the proposed new bridge will have a total width of 102 feet. Each of the six lanes would have a 12-foot width. However, there would be two outside shoulders, each with a six-foot width, and two inside shoulders, again each with a six-foot width. It can quickly be appreciated that in fact the new bridge could carry eight lanes of traffic, even assuming all lanes were 12 feet in width.

Therefore it is clear that the proposed second bridge is for a structure that is twice as wide than the current bridge (which has a 55-foot wide deck) and will provide twice as many lanes as the current Ambassador Bridge.

Our opinion in this regard is substantiated by the U.S. Department of Transportation, Federal Highway Administration, June 7, 2006 letter to you on this matter, specifically in **Attachment No.2, Item E** to that letter, where it is stated that:

> "The document cross-section shows six through lanes with shoulders, but the shoulders could potentially be converted by the owner to through lanes at some point in the future thereby resulting in an eight-lane cross section. What impact does this have on capacity of the inter-state system at the bridge location?"

Moreover, the proponent does not commit to ensuring that the new eight-lane bridge will be its ultimate goal. It has not committed to taking the existing Ambassador Bridge out of service. As such, what the proponent is proposing is to add a new bridge, having the capacity of ultimately eight lanes to the four lanes on the existing bridge for a total capacity of 12 lanes of bridge traffic.

Although the proponent states that once the new structure is completed the existing bridge would be taken out of service "for some period of time" to effect repairs that are deemed necessary, it goes on to state that: "Once any necessary repairs are completed, the existing structure will be used to provide redundancy and back-up support when necessary to ensure the free flow of traffic between Windsor and Detroit at all times."

This means that the City of Windsor is faced with the proposition that instead of four lanes of international truck traffic on the Ambassador Bridge, with the proposed second bridge in service, there may well be a total of 12 lanes of traffic passing through the City of Windsor.

This is of obvious concern to the City. The Coast Guard needs to ensure that its Environmental Impact Statement considers the project as having that significant capacity and associated environmental impacts.

Another misleading aspect of the proponent's submission to you is that there is no need to be concerned about traffic that will be generated and associated with the new bridge because that is not a matter over which the private sector proponent has jurisdiction.

Of course, that proposition is preposterous. It would be arbitrary and capricious for the Coast Guard to purport to carry out an environmental analysis of this proposal with the blinders suggested by the proponent. This private sector proposal could only be financed based on the tolls from the substantial increase in vehicle traffic that has been projected to use a second crossing in this area when such is built. That additional traffic will in turn create significant adverse environmental effects within the City of Windsor. The addition of eight new lanes would obviously and necessarily exacerbate the critical congestion problems that exist on City of Windsor streets as documented in the Schwartz report (see copy of which is enclosed) as well as documented by the DRIC in its needs assessment for a new crossing. **See Photo, Attachments Vol.1, Part A, Tab 12.**

Other Information Provided to you by the Proponent Which is Misleading and Unreliable

- In the March 31st covering transmittal letter from American Consulting Engineers of Florida LLC addressed to Robert Bloom at the United States Coast Guard and Cathy Hainsworth at the Canadian Environmental Assessment Agency, the statement is made that the new structure "will connect directly to the existing plazas in both Windsor and Detroit without the need for modification to these recently-enhanced plazas".

  However, that is not the case.

  Please find as an Attachment to this submission a letter dated June 6, 2006 from the Director General of the Canada Border Services Agency to Mr. Dan Stamper, President, Canadian Transit Company regarding "Ambassador Bridge Development Plans". **Attachments Vol.1, Part A, Tab 19**

  In this letter the Canada Border Services Agency expresses substantial concerns that new infrastructure will be required on the Canadian side of the border in order to accommodate the proposed Ambassador Bridge second bridge.

  The CBSA points out its concern that:

  > "There are few details around the plans to provide adequate and functional installations for the port of entry functions over an appropriate long-term planning horizon. Implementing the plans as described will result in immediate additional capacity at this location: from the existing four lanes to six lanes with dedicated lanes for trusted travelers, up to possibly ten lanes should you decide to rehabilitate the existing structure rather than demolish it.
  >
  > ....
  >
  > The port of entry facilities are integral to the transportation system and its planning must be integrated in the systems overall planning. Otherwise, as you pointed out, the port of entry and not the bridge company becomes the system's

> bottleneck and capacity constraint with related impacts of trade. Consequently it would be short sighted to plan enhancements to the international crossing in abstraction of the port of entry installations necessary to support it." (emphasis added)

The CBSA letter goes on to point out that it sees it necessary for the proponent to incorporate "a strategy to secure the necessary land and zoning changes" for the further port of entry facilities it requires.

The CBSA also points out it has security concerns with respect to Huron Church Road "dissecting the proposed plaza expansion". As it is put in the letter:

> "This compromises the security and the sterility in the point of entry... . It is essential that adequate measures be taken to secure the plaza and ensure that all traffic from the U.S. cannot co-mingle with local traffic. Further, it splits our operations within the port, an undesirable feature, complicating our management of the site."

The Canadian government's letter also states:

> "There are significant security problems with the current off-site arrangements that jeopardize our ability to discharge adequately the border management mandate.
>
> ...
>
> This issue will be exacerbated in the future with the advent of the additional bridge capacity and the traffic growth at the gateway.
>
> ...
>
> Consequently, the importance that the bridge's enhancement plans incorporate the provision of functional secondary commercial examination installations integral to the port of entry."

Fourthly, the Canadian government's letter points out its concerns in respect of the adequacy of current travelers secondary examination installations.

> "We have concerns over the capacity of the facility and the configuration of the traffic flows around this element of the existing installations."

The letter ends with the observation that:

> "The Windsor-Detroit Gateway is the busiest trade corridor in North America. The aggregate capacity of the transportation system within the gateway has a significant impact on the trade between both partners and their economies. It is crucial that in improving an element of the system, such as the Ambassador

> Bridge, that an end-to-end solution be formulated and implemented such that system-wide improvements are realized." (emphasis added)

The letter concludes that the Canada Border Service Agency is "unable to fully support enhancement plans for the Ambassador Bridge that do not fully integrate the minimum essential operational requirements necessary to discharge the agency's mandate at the border now and in the future". (emphasis added)

These comments must be critically considered by the U.S. Coast Guard in that they indicate that the proponent's plans are again premature. They must change before they are finalized. This again substantiates why the Coast Guard should put processing of this application on hold. This letter also refutes the statement made by the proponent that the proposed construction of the second bridge can proceed "without the need for modification" to the plaza, particularly that in Canada.

- Another highly misleading statement made by the proponent in its March 31st transmittal letter is that:

> "The property required by this project is owned entirely by the Canadian Transit Company and the Detroit International Bridge Company."

However, as indicated elsewhere in this letter and as substantiated by the various plans, leases, title deeds and other documentation attached, the proponent has no property rights under the Detroit River allowing it to occupy any area above the river for the proposed second bridge.

Moreover, the proponent will be required to obtain property easements from the City of Windsor over five City streets, and no application has been made to the City for that purpose. The bridge cannot exist without those property easements.

Similarly, there will be 14 support piers/abutments located within the City of Windsor as drawn on Sheet 8 of the plans submitted to you. The proponent will require permission from the City of Windsor in order to install such piers/abutments even if they are located entirely on private property (which is not clear). Building permits and zoning approvals will be required before any such piers/abutments can be erected.

Although it is not stated, the proponent's plans would require the demolition of a large number of houses to the west of Huron Church Road in order for this proposal to proceed. Again, the proponent has no approval to demolish such houses, which approval must be sought from the City of Windsor. No application has been made.

At page 7 of its submission the proponent makes the statement that it has determined that:

> "The Ambassador Bridge enhancement project is a preferred alternative. Conceptual designs have been completed in accordance with the long-term needs of the Region and consistent with ongoing initiatives in both countries." (Page 7)

This misleadingly implies that the Ambassador Bridge project is consistent with the DRIC study and that it meets "long-term needs of the Region" consistent with that study. However, a careful consideration of the November 2005 Alternatives Analysis Report by the DRIC (excerpted in Mr. Hayes' letter of September 13th enclosed with this submission) makes clear that a second Ambassador Bridge at this location is clearly not consistent with the DRIC analysis and is not consistent with the "long-term needs of the Region" or with "ongoing initiatives in both countries".

- The proponent has also made misleading submissions to you in respect of land use issues. For example, in its discussion of "land use" at pages 8 – 9 of its submission to you, there is no statement acknowledging that the land on which the proposed second bridge would be built is designated for residential use only in the City of Windsor Official Plan and is also zoned residentially in the Windsor Zoning By-law. (Further elaboration and substantiation of this is contained in the September 13th letter from the Chief Planner, Robert Hayes, filed with this submission and the various zoning maps and Official Plan documentation filed with this submission.)

- Further, a highly misleading and inaccurate statement is made at page 9 of the proponent's submission that:

  > "The neighbouring parks, schools and neighbourhoods or industries will not be affected by the project." (Page 9)

  As demonstrated by the letters from the Chief Planner of the City of Windsor, from the Executive Director of the City of Windsor's Parks and Recreation Department and the documents referenced in their letters, that statement by the proponent is entirely misleading and wrong. There is a university, schools, parks, historic and cultural amenities as well as the neighbourhood of Sandwich that all will be significantly affected by the second bridge.

- Another misleading statement by the proponent is:

  > "The land use of the area would not change by the proposed action because the location is within the existing corridor of the similar facility, the Ambassador Bridge." (Page 9)

  Again, that is entirely misleading for the reasons already set out: There is no "existing corridor" that is approved or exists beyond the actual structure of the current Ambassador Bridge. Any widening or addition to that existing corridor would require approval by the Parliament of Canada, approval under U.S. statutes, as well as the approval of the City of Windsor and likely also the City of Detroit.

  Moreover, land use will in fact be changed by this proposed second bridge. A large number of houses will necessarily be demolished in order to accommodate the new bridge and its supporting structures. Land use in the remaining residential part of the area would indeed be affected by noise, emissions and hazards associated with the second

bridge. The demolition of houses will obviously have a negative effect on neighbourhoods and housing stock within the City of Windsor.

- Another misleading statement is made by the proponent under the sub-heading 3.2 "Neighbourhoods":

  "Neighbourhoods will not be negatively impacted by the proposed action".

In fact, quite the opposite is obviously going to occur. Houses will necessarily be required to be demolished in order to accommodate the new bridge. Instead of four lanes of traffic there will be a potential total twelve lanes of traffic which would cause much greater air and noise pollution as well as exposing nearby residents to higher accident rates and spills of toxic contaminants from the aerial right-of-way associated with the new lanes of traffic over their houses.

The proponent acknowledges there is existing congestion on Huron Church Road but it is not proposing to improve that situation nor is any other level of government considering doing so north of the E C Row Expressway. Therefore to add up to eight new lanes to the bridge crossing, linked to wider facilities in the United States, all of which would allow more trucks to funnel through the City of Windsor, would only increase the amount of congestion and therefore increase the amount of air pollution and noise pollution in the surrounding Windsor neighbourhoods as well as exacerbate safety and planning issues.

At page 31 of the Proponent's submission to you, the Proponent further attempts to mislead you and the public about the benign nature of its undertaking.

In addressing a check list question "Is the action likely to have results that are inconsistent with locally desired social, economic or other environmental conditions" the response provided is that:

> "No... . The proposed action would not change traffic patterns or increase traffic volumes. The proposed action is consistent with future land use plans in both Detroit and Windsor."

The September 13, 2006 letter from the Windsor City Planner demonstrates this conclusion is clearly wrong.

Again, the Proponent misleads in answering check list question (e) "Is the action likely to adversely affect a significant aspect of the socio-cultural environment?"

The answer to that question provided is:

> "No. The proposed action consists entirely of a bridge... no churches, or cultural institutions will be affected. ... The university would be materially unaffected. ...The proposed action would not cause changes in the way members in the surrounding community or neighbourhoods live, work and play." (pages 32-33)

Again, this is an incredible misapprehension and speculation on the part of the proponent which has no semblance of reality.

Similarly, in Sections 3.5 "Cumulative Impacts", 3.6 "Visual Quality and Aesthetics", 3.7 "Parklands" and 3.9 "Cultural Resources and Other Protected Areas" the Proponent makes further misleading statements which ignore both fact and statutory requirements. For example, it purports to speculate that "cumulative impacts are not expected to be significant" as the proposed action "is enhancing an existing transportation facility rather than adding a new facility in a new area". (Page 10)

Again, that is a completely improper way of addressing cumulative impacts and fundamentally undermines the whole rationale for how that issue is to be addressed in the carrying out of an environmental assessment, as pointed out by the U.S. EPA on page 6 of its August 30, 2006 letter to you.

Moreover, it ignores the way a cumulative effects analysis is to be done under the *National Environmental Policy Act* and under the *Canadian Environmental Assessment Act*.

As pointed out in the handbook published by the U.S. Council on Environmental Quality: "Considering Cumulative Effects Under the *National Environmental Policy Act*" (January 1997):

> "Although past environmental impact analyses focus primarily on project-specific impacts, NEPA provides a context and carries the mandate to analyze the cumulative effects of federal actions. ... The range of actions that must be considered include not only the project proposal but all connected and similar actions that could contribute to cumulative effects. For example, the expansion of an airport runway that will increase the number of passengers travelling must address not only the effects of the runway itself, but also the expansion of the terminal and the expansion of the roadways to provide access to the expanded terminal. If there are similar actions planned in the area that will also add traffic or require roadway extensions (even though they are non-federal) they must be addressed in the same analysis." (Pages 1-2)

This whole aspect of cumulative effects has been totally ignored in the submission filed with you. The proponent seeks to ignore the fact that roads will have to be widened and neighbourhoods destroyed in order to accommodate the functioning of its proposed new bridge.

Similarly with respect to its "Parklands" analysis the proponent admits that it must address compliance with so-called Section 4(f) of the *DOT Act* providing that the Secretary of Transportation shall not approve any program or project which requires the use of publicly-owned land from a public park, recreation area or land of an historic site of a national, state or local significance unless there is no feasible and prudent alternative for the use of such land. (Page 10)

The proponent admits that two parks exist along the Detroit River in Canada: The Ambassador Park and Assumption Park, both are pedestrian/bicycle parks that follow the river.

The proponent argues that neither of these parks will be impacted by the proposed project as the piers will not be placed within the parks.

However, this is clearly contradicted by the September 11, 2006 letter from Don Sadler, Executive Director, City of Windsor Parks and Recreation, previously referenced and attached.

In Section 3.9 of its submission "Cultural Resources and Other Protected Areas" the proponent refers to the Section 106 of the *National Historic Preservation Act* and the Executive Order "Protection and Enhancement of the Cultural Environment", which require that impacts of federal licensed projects be examined for their impact, particularly on historic districts and structures, particularly and specifically those included in the National Register of Historic Places.

The proponent acknowledges that in 1980 the Ambassador Bridge was added to the National Register of Historic Places but goes on to argue that "the existing Ambassador Bridge will be slightly impacted by the proposed project, but not negatively impacted".

However, the proponent has not complied with the requirements of the *National Historic Preservation Act* or the Commandant Instructions issued by the United States Coast Guard in respect of addressing NEPA which, as you know, requires very specific findings and facts on this issue before you are in a position to authorize any permit having regard to the stringent requirements of that national historic preservation legislation.

In Section 3.12 "Traffic and Circulation" again, an incredible statement is made that "the proposed project would not have a negative impact on traffic and circulation ... the vehicle hours of cars and trucks should likewise decrease with the addition of additional capacity over the river. Pedestrian safety and circulation would not be negatively impacted." [page 15]

Again, this ignores the fact that no new access roads are to be built as part of the proposed Ambassador Bridge project and therefore congestion will be obviously increased with horrifically negative impacts on traffic and circulation, as well as severely negative impacts on pedestrian safety.

The discussion offered by the proponent in conjunction with the Categorical Exclusion checklist contains erroneous and misleading statements.

For example, in response to checklist question (a) "Is the action likely to be consistent with any applicable ... local law, regulation or standard designed to protect any aspect of the environment?" the proponent answers "No" but offers absolutely no reference to Ontario laws or Windsor laws. Both of these regulate air quality and noise as well as land use planning which, as you are aware, is considered part of the "environment" considerations.

Again, with respect to check list question (b) "Is the action likely to have results that are inconsistent with locally desired social, economic or other environmental conditions?"; the Proponent answered the question: "No, ... the proposed action would not change traffic patterns or increase traffic volumes. The proposed action is consistent with future land use plans in both Detroit and Windsor."

We have earlier commented on the incredibly misleading nature of that response.

Checklist question (c) reads: "Is the action likely to result in the use, storage, release and/or disposal of toxic, hazardous or radioactive material, or in the exposure of people to such materials?"

The proponent answers: "No ... the proposed action would not cause people to be exposed to hazardous or toxic materials."

Again, this is a misleadingly untrue statement. There are toxic and hazardous substances carried in vehicles every day in many vehicles across highways and these will include the proposed bridge, an elevated structure over and near many houses and institutions, therefore posing the potential for exposing a wide segment of the population to such toxic/hazardous materials in the event of an accident.

We are attaching a CD ROM containing a Detroit TV new program in which Dan Stamper, President of the Canadian Transit Company, acknowledges his company permits hazardous materials to be transported over the Ambassador Bridge contrary to Michigan laws, in that he takes the position "private property" is not subject to such laws. **Attachments Vol.1, Part A, Tab 21**

Check list question (i) reads: "Is your action part of an ongoing pattern of actions (whether under the control of GSA or others) that are cumulatively likely to have adverse effects on the human environment?

The Proponent answers:

> "No. The proposed action is not part of an ongoing pattern of actions that are expected to have adverse effects on the human environment. The proposed action is in response to, but not a contributor to, on ongoing pattern of increased traffic, population and development in the Detroit – Windsor area and increased trade between the United States and Canada. The proposed projects is meant to alleviate traffic congestion on the existing bridge itself, aid in trade between the United States and Canada and create safer driving conditions in the Detroit – Windsor area."

Obviously the above answers are far from reality. The proposed action will indeed contribute to increased congestion, safety hazards and pollution in the City of Windsor, absent any appropriate new infrastructure required to connect the new bridge to Highway 401. The proposed project will not "alleviate traffic congestion" but rather exacerbate it and exacerbate safety and hazardous driving conditions in the Windsor area.

The proponent, however, continues to have blinders on this issue. In its correspondence dated March 13, 2006 addressed to Kaarina Stiff at Transport Canada, on page 2, item 3, where Transport Canada raises the issue that the documentation submitted, while identifying access road capacity as a key issue, indicates that access to the Ambassador Bridge from Huron Church Road:

> "is expected to reach capacity in the next five years. To establish the scope of the project, we [Transport Canada] need to determine what other physical works are likely to be carried out in relation to your proposal. In particular, we require information concerning any other infrastructure work that may be planned to address these access and capacity issues, or that may be required as a result of the project modifications to bridge access on Huron Church Road will be proposed or considered necessary because of the proposed second span."

Incredibly, the Proponent makes the response that:

> "This project simply involves the connection of two plazas that have already been permitted and approved... Additional lanes across the river are expected to have no negative impact on the approach roadways. ... The new six-lane bridge over the river will ensure the traffic can continue to flow clearly across this vital border crossing. No additional work is anticipated to be required as a result of this project. Huron Church Road currently has and will continue to have more capacity than the proposed bridge crossing."

As you will recognize, this conclusion is patently absurd.

Approval Under U.S. *International Bridge Act* is Required Before Coast Guard Processes Navigable Waters Permit

Chapter 2 of the Coast Guard Bridge Permit Application Guide states that a proponent must include in its application package the legislative authority for international bridge construction.

Specifically, with respect to "international bridges" the following requirement is stated under Section A3E "International Bridges":

> "1. The *International Bridge Act* of 1972, or a copy of the *Special Act of Congress* if constructed prior to 1972, should be cited as the legislative authority for international bridge construction.
>
> 2. Presidential approval should be obtained from the State Department prior to issuing a Coast Guard bridge permit under the *International Bridge Act* of 1972.
>
> **NOTE**: A copy of State Department approval for international bridges must be included in your application package for a Coast Guard permit."

The City of Windsor submits that should the proponent wish to build a second bridge it must present a Presidential approval to the Coast Guard under the *International Bridge Act* of 1972 – and without such approval being presented, it is contrary to the Coast Guard's own procedure for the Coast Guard to be processing any permit application under the *Rivers and Harbours Act*.

The Coast Guard Permitting Guide Requires that Section 4(f) of the *Department of Transportation Act* of 1966 as Amended, Now 49 USC303 be Addressed

Your own Guide states that:

> "A special effort must be made to preserve the natural beauty of the country side, public parks and recreational lands, wildlife and water fowl refuges, and historic sites."

Section 4(f) further states that a project requiring the use of Section 4(f) lands shall not be approved unless:

> "1. There is no feasible and prudent alternative to the use of such lands; and

2. Such use includes all possible planning to minimize harm to such lands resulting from the project."

Pausing here, the proponent has submitted no information whatsoever as to what alternatives, if any, have been canvassed and certainly not substantiated or even attempted to document "no feasible and prudent alternatives to the use of such lands" or that the use "includes all possible planning to minimize harm to such land resulting from the project.

Moreover, the proponent has failed to acknowledge that it will in fact require "taking land" from such protected areas within the City of Windsor, which is prohibited under that legislation unless feasible alternatives have been carefully examined and none have been shown to exist.

Moreover, your guidance document reiterates that "all bridge actions also require compliance with the *National Historic Preservation Act* of 1966, Section 106 – again, the impacts of the new bridge on the historically protected and designated Ambassador Bridge have not been complied with.

Moreover, the requirements Item (k) of Chapter 3 state that with respect to air impacts "the Coast Guard must ensure that projects under its jurisdiction meet the National Ambient Air Quality Standard before issuing a bridge permit".

It goes on to state that:

> "During the bridge permitting process, early coordination and consultation with the state and local air quality agencies is important to determine whether your project is consistent with an approved federal state implementation plan governing the ambient air quality of the proposed bridge project location."

Pausing here, the proponent has not demonstrated it has had any such consultation and has carried out no studies, taking the somewhat incredible position that this project will not increase air pollution.

Similarly, Item (l) of Chapter 3 requires that the Coast Guard ensure that appropriate noise studies be undertaken. As your own guidance document puts it:

> "All authorized bridge construction work must comply with the provisions of the *Noise Control Act* of 1972. Under the *Noise Control Act*, the adverse impacts on existing activities for land uses that may result from the bridge, its related highway sections, or its construction must be considered."

Your guidance document indicates that the information package regarding noise must include such matters as:

> "(a) The anticipated design noise levels for the proposed project;
>
> (b) A description of all possible measures to minimize noise impact if there is no alternative to avoid the adverse effects."

Pausing here, the proponent has taken again the incredible position that it is not required to do any noise studies – a complete flaunting of the requirements of the Coast Guard and of U.S. federal legislation.

Finally, it is relevant to note in considering the requirements of the Coast Guard Bridge Permitting Guidance requirements that the term "bridge", as found in the "glossary" is defined as including "approaches":

> "The term "bridge" includes all integral bridge elements: approaches and appurtenances, regardless of materials used, whether natural or manufactured, or the construction methodology."

Further Elaboration as to Why a "Categorical Exclusion" Cannot be Applicable

In Commandant Instruction M16475.1D, November 29, 2000, being NEPA Implementing Procedures and Policy for Considering Environmental Impacts, Chapter 2 is entitled U.S. C.G. Implementing Instructions, indicates in Part B "Environmental Documentation", indicates that this instruction "applies to all U.S. C.G. actions including the decision to … grant permits … ." [page 2 – 4]

It then proceeds to discuss "Categorical Exclusions" (CEs). It states that a "CE" is meant to be a "category of actions which do not individually or cumulatively have a significant effect on the human environment and for which, therefore, neither an EA nor an EIS is required…. A list of current CEs can be found in Figure 2 – 1".

Pausing here, we have reviewed Figure 2 – 1 entitled "Coast Guard Categorical Exclusions".

There are 35 items listed.

The only one which could possibly be relevant to an application to construct a new international bridge would be Item 32 "Bridge Administration Program Actions" as specifically described as one of the following:

> "(a) modification or replacement of an existing bridge on essentially the same alignment or location. Excluded are bridges with historic significance or bridges providing access to undeveloped barrier islands and beaches."

It is, however, obvious that the application to build a new six-lane bridge while leaving up the current existing four-lane Ambassador Bridge is neither a "modification" nor a "replacement" of an existing bridge.

Nor is it a proposal to do a modification or replacement "on essentially the same alignment or location".

As we have pointed out earlier, the Ambassador Bridge has been given specific approval as it exists today and there is no further alignment or other location for it that has been approved.

Moreover, the Categorical Exclusion, even if it were for a "modification" or "replacement" of an existing bridge, excludes "bridges with historic significance". That certainly applies to the National Register Designated Ambassador Bridge.

Accordingly, the proposed new Ambassador Bridge cannot qualify as a CE in accordance with the Coast Guard's own regulations and policies.

Moreover, Chapter 2 of the Commandant Instructions for Implementing NEPA specifically indicates that there are "limitations on using Categorical Exclusions" even if one was applicable.

Your own policy requires that "responsible personnel should be alert for circumstances that dictate the need to prepare an EA or EIS" or some actions that would be normally categorically excluded in Figure 2 – 1.

Your policy states that:

> "The potential environmental consequences must be evaluated in their context (whether local, state, regional, national or international) and in their intensity by considering whether the action is likely to involve one or more of the following: ...
>
> 2. a site that includes or is near a unique characteristic of the geographic area, such as a historic or cultural resource ... or property requiring special consideration under 49 USC 303(c) [commonly referred to as Section 4(f) of the *Department of Transportation (DOT) Act* which includes any land from a public park ... or historic site.
>
> 3. The quality of the human environment that is likely to be highly controversial in terms of scientific validity or public opinion ....
>
> 7. A district, site, highway, structure or object that is listed in or is eligible for listing in the National Register of historic places ...
>
> 9. A potential or threatened violation of federal, state or local law or requirement imposed for the protection of the environment."

Your policy requires that "the determination of a CE is inappropriate and more environmental analysis is needed, or that an EA or EIS is needed, must be based on the potential significance of the proposed actions affect on the environment. The proposed action must be evaluated in its context (whether local, state, regional, tribal, national or international) and in its intensity by considering the level of possible effects as listed in (1) – (10) above". [page 2-5]

Your policy also states that:

> "However, a CE may not be used if the proposed action is likely to involve any of the circumstances set forth in Section 20.B(2) of DOT Order 5610.1 (enclosure 1). The 10 listed circumstances and those in the DOT Order are addressed in the Environmental Analysis Checklist (enclosure 2). If a CE is not appropriate, an EA or an EIS must be prepared."

Accordingly, your own Commandant Instruction requires that a CE may not be used if the proposed action is likely to involve one of the circumstances set forth in that Environmental Analysis Checklist.

The Environmental Analysis Checklist which is enclosure 2 to the Commandants Order is a different checklist from the one used by the DIBC/CTC in its March 31, 2006 submission to you.

On that "Checklist" there are a number of relevant questions which, if the appropriate facts are addressed, would have to be answered "yes" which in turn would mean that even if there was a CE applicable to this proposed project (which there is not) a CE cannot be used in this particular situation.

In particular, we refer you to Question 1 of the Checklist: "Is there likely to be a significant effect on public health or safety?"

The guidance document requires addressing potential release of toxic materials, accidental spills of oils, hazardous or toxic materials and compliance with the *Clean Air Act* and the *Noise Control Act.*

In this case the Proponent has chosen to ignore the fact that the new bridge would carry vehicles containing hazardous and toxic materials over and adjacent to numerous houses and institutions, and has carried out no noise or air studies.

However, in the absence of such studies indicating no impacts, it is prudent to assume there will be impacts and therefore "there is likely to be significant effect on public health or safety".

Question 2 reads: "Does a proposed action occur on or near a unique characteristic of the geographic area such as a historic or cultural resource, parkland ... or property requiring special consideration under 49 USC 303?"

This in turn requires a consideration of whether or not it is located near a "national historic landmark" or "designated open space, or a designated conservation area, or potentially have "adverse visual, social, atmospheric, traffic or other effects on such a critical area even though it is not located at or near the area; or change the use of parklands.

Again, it is clear from the Proponent's own materials that the proposed bridge is located adjacent to a national historic landmark, that it will have adverse visual, atmospheric and traffic effects in the area, that it will change the use of parklands by putting a new eight-lane bridge through parkland etc. and therefore the answer to that question again is "yes".

Checklist Question 3 reads: "Is there a potential for effects on the quality of the environment that are likely to be highly controversial in terms of scientific validity or public opinion?"

The guidance document indicates that:

> "Environmental controversies can be about a host of things: impact on historic buildings, archaeological sites, and other cultural resources; impacts on traffic or parking on a

> community or neighbourhood; ... to avoid missing a controversial issue that should be addressed under NEPA be sure not to interpret the word "environmental" too narrowly."

Again, the answer to Question No. 3 must be "yes". **See Attachments Vol.1, Part A, Tab 11.**

This project is very controversial.

Question 6 reads: "Are the actions, impacts individually insignificant, but cumulatively significant when considered along with other past, present and reasonably foreseeable future actions?

The guidance on this question states that in order to accurately respond to the checklist the Coast Guard must consider "whether the action is related to other actions (by USCG or others) with impacts that are individually insignificant but that may, taken together, have significant effects.

A specific example provided is relevant:

> "For example, is the action part of an ongoing pattern of pollutant discharge, traffic generation (vehicle or vessel) economic change or land use change in its locality that could collectively affect human health or the condition of the environment?"

Again, the answer to question 6 would be "yes".

Question 7 on the Checklist is: "Is the proposed action likely to have a significant impact on a ... structure ... that is listed in ... the National Register of Historic Places...?"

Clearly, the new bridge will have an impact on the existing historically designated Ambassador Bridge, and therefore the answer to question 7 is "yes".

Similarly it has the potential to have impact on "a place with traditional cultural value in the eyes of a native American group or community" as well as on "the historic/cultural character of communities or neighbourhoods".

Again, the answer to this question must be "yes".

The Proponent acknowledges that there are likely to be native Indian burial sites in the area where the piers and support structures for the new bridge are to be located and that it is to be located nearby the historic old Sandwich part of the City of Windsor.

Again, the answer to question 7 on the Checklist must be "yes".

Question 9 is also relevant: "Is there a potential or a threatened violation of federal, state or local law or requirement imposed for the protection of the environment?"

The guidance on this requires that issues that need to be considered include whether the project is or action is likely to:

- adversely affect the ambient air quality due to dust, vehicle or equipment emissions ...

- result in toxic or unusual air emissions
- adversely affect the ambient air quality due to the operation and/or maintenance of vehicles ...
- significantly increase the ambient noise levels of the area."

Again, clearly the answer to question 9 is "yes".

Finally, Question 10 on the Checklist is as follows: "Is the action likely to have other significant effects on public health and safety or on any other environmental media or resources that are not specifically identified in this checklist?"

The additional concern under question 10 is "socio-economic impacts and environmental justice".

The guidance on this indicates that if the action is likely to:

- change traffic patterns or increase traffic volumes
- require the re-routing of roads, waterways or traffic
- be located near any existing bottleneck in vehicle or vessel traffic (e.g. a bridge intersection ...)
- have access constraints
- affect a congested intersection
- be inconsistent with existing zoning, surrounding land use or the official land use plan for the specific site and/or the delineated area
- be inconsistent with surrounding architecture or landscape
- relocate private residences or businesses
- intrude on residential or business uses in the affected area
- be regarded by burdensome by local or regional officials

then it may well have significant impacts on the socio-economic environment and issues of environmental justice.

Again, in this situation the answer to the question is the action "likely to have other significant effects on public health and safety and on any other environmental media or resources i.e. environmental justice and socio-economic impacts as set out, is "yes".

Please see for substantiation of why "yes" is correct the September 13, 2006 letter from City of Windsor Planner, Robert Hayes at pages 9 – 20. **Attachments Vol.1, Part A, Tab 2**

For all of the above reasons it is clear that the Coast Guard cannot grant a Categorical Exclusion even if the proposed bridge was on the CE list, which it is not.

We refer you also to enclosure 3 to COMDTINST M16475.1D, this enclosure being the form entitled "USCG Categorical Exclusion to Termination".

This form requires certification that the action is "not expected to result in any significant adverse environmental impacts as described in NEPA". Further, it further requires you to certify that the proposed action":

> "..has been thoroughly reviewed by the USCG, and the undersigned have determined this action to be categorically excluded under the current USCG CE(s) No._____. **[indicate specific CE number]** from further environmental documentation in accordance with Section 2.B.2 in Figure 2.1 of NEPA Implementing Procedures and Policy… Since implementation of this action will not result in any:
>
> 1. significant cumulative impacts on the human environment
> 2. substantial controversy or substantial change to existing environmental conditions
> 3. impacts which are more than minimal on properties protected under 4F of the *DOT Act*, and Section 106 of the *National Historic Preservation Act; or*
> 4. inconsistent with any federal, state or local laws or administrative determinations relating to the environment.

The City of Windsor submits that it would be clearly arbitrary and capricious if such a Categorical Exclusion determination was to be made by the USCG at this time based on the information presented by the proponent for the reasons set out above.

With respect to the certification that is required with respect to a "4(f) statement", enclosure 10 to the Commandant Instruction, Document M16475.1D elaborates that under Section 4(f) "the Secretary of Transportation (Commandant) shall not approve any program or project which requires the use of 4(f) lands unless:

(a) there is <u>no feasible and prudent alternative to the use of such lands</u>; and

(b) such program includes <u>all possible planning</u> to minimize harm to 4(f) plans resulting from such use."

In other words, it is incumbent upon the Commandant not to approve any program or project unless the proponent has demonstrated it has objectively met these criteria. These criteria clearly have not been met in this case as there have been no studies of feasible and prudent alternatives.

It is noted that Section 4(f) lands include "any publicly owned land from a park" and that publicly-owned land includes "fee simple or land subject to public easement or other interest in the land by a federal, state or local agency or entity".

Further, "use of land" under Section 4(f) generally means the acquisition of title to "or an easement in land for a transportation program or project".

Further, in unusual circumstance, serious adverse impacts such as severe increases in noise or air pollution, or access disruption may constitute a "constructive use, even where no acquisition is involved and Section 4(f) would apply".

Under the material required to properly address Section 4(f), the proponent must, "include the acreage needed for permanent surface easements, aerial easements, drainage and utility easements etc." – none of which has been done in this particular case by the Proponent DIBC/CTC.

Furthermore, adverse impacts of the project on 4(f) lands must be discussed and should include "detailed information concerning the effects of the project on natural views, local historical values, pedestrian and other access, recreational use, vegetation, wildlife, etc. Care should be undertaken to include a rigorous analysis of aesthetic, air and water pollution and noise impacts on 4(f) lands near and adjacent to the project."

Again, none of this has been submitted by the proponent and therefore the USCG is not in a position to make any determination that Section 4(f) has been complied with.

Further, in order to properly address 4(f) requirements:

> "A statement of the local, state or national significance of the 4(f) lands should be presented. This statement should come from the officials having jurisdiction over the lands when at all possible and should address the significance of the entire area involved and the actual land affected or taken by the project ... Any statement of insignificance from whatever source is subject to review by the USCG for caprice."

Further, Section 10 of this guidance document regarding 4(f) requires:

> "Evidence of concurrence, or a description of efforts to obtain concurrence of officials having jurisdiction of Section 4(f) lands regarding the proposed action and plan to minimize harm should be presented."

In this case there has been no consultation let alone concurrence obtained from the City of Windsor with respect to the impacts and use in taking of the City of Windsor park lands.

Finally, the City submits that the required certification to comply with Section 4(f) cannot be granted by the Coast Guard in this case as set out in Section 11 of the guidance document which requires that the certification provide that:

"Based on this 4(f) statement, I have determined no feasible and prudent alternative to the use of this 4(f) land(s) and that all possible planning to minimize harm to this land(s) has been accomplished."

Closing

The Corporation of the City of Windsor has provided as much documentation, reports and other information as well as legal analysis as it could in the time available to respond to the Coast Guard Public Notice in respect of the application filed by the proponent for a second bridge permit.

Obviously the City of Windsor considers the proposed bridge to be a proposal fraught with significant and adverse environmental consequences for the City and its residents. We believe the materials submitted substantiate that concern.

We close by emphasizing both the desirability and necessity of the Coast Guard ensuring that full consideration of all these facts and information are carefully considered so that its initial preliminary determination is reversed: This project must be processed not by a categorical exclusion but rather only following a full Environmental Impact Statement.

However, for the reasons set out above, it is premature for the Coast Guard to process this application at all, and we ask that its processing be suspended.

We would be please to respond to any supplementary questions you may have.

Yours sincerely,

GOWLING LAFLEUR HENDERSON LLP

David Estrin
Certified Environmental Law Specialist

DE:tp

TOR_LAW\ 6390735\1

U.S. Department of Homeland Security

United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2019
Cleveland, OH 44199-2060

Phone: (216) 902-6084
FAX: (216) 902-6088

16590
Ser. B-008/sms
January 30, 2007

Jo Lynn Traub
Director – Water Division
U. S. Environmental Protection Agency – Region V
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Re: Detroit Ambassador Bridge Enhancement Project,
Detroit River, Detroit, Wayne County, Michigan

Dear Ms. Traub:

This is in regard to the issuance of Section 401 Water Quality Certification (WQC) issued by Michigan Department of Environmental Quality for the construction of six additional lanes over the Detroit River adjacent to the existing Ambassador Bridge.

WQC certification was provided by permit dated January 17, 2007. Your office was included in our Public Notice mailing list for this project. The Public Notice was dated July 28, 2006 with an original comment expiration date of August 30, 2006, which was subsequently extended to September 5, 2006.

Please contact me at (216) 902-6085 with any questions. Thank you.

Sincerely,

Robert W. Bloom Jr.

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

American
Consulting Professionals of New York, PLLC
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Tel 716.362.1116 • Fax 716.362.1166
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TELEPHONE CALL RECORD

Date: February 7, 2007 **Date Issued:** February 7, 2007

Time: 1000 hrs **Issued by:** Arthur K. Marks

Contact: Cathie Ballard **Phone #:** 517-335-3456

Company: Michigan Dept. of Env. Quality, CZM Program

Project: Detroit Ambassador Bridge Enhancement Project

Subject: CZM Certification

The following notes reflect our understanding of the discussions and decisions made during this telephone conversation. If you have any questions, additions or comments, please contact us at the above address. We will consider the record to be accurate unless written notice is received within 10 working days of the date issued.

1. I explained to Ms. Ballard that Detroit International Bridge Company (DIBC) applied for a DEQ permit for the project that involves construction of a bridge adjacent to the existing Ambassador Bridge and they received a permit on January 17th, 2007 (Parts 301 and 31). I stated that the DIBC signed the CZM certification on the application and I asked if permit issuance constitutes the State's concurrence that the project is consistent with the CZM program. She stated that permit issuance does grant their concurrence on consistency.
2. I also asked if this permit issuance conveys their concurrence on the Federal consistency level since DIBC is applying for a U.S. Coast Guard bridge permit. She stated that issuance of the state permit does mean that they concur on a federal consistency basis also. She also said she believes that permit issuance conveys water quality certification.
3. If we have any further concerns about this or other projects related to CZM she said we could call Chris Antieau of her staff at 517-373-3894.

American Project #: 5049964

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February 19, 2007

Winnay Wemigwase
Little Traverse Bay Band of Odawa
7500 Odawa Circle
Harbor Springs, Michigan 49740

Re: Ambassador Bridge Enhancement Project

Dear Ms. Wemigwase:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

If at any time during the course of this project artifacts or other archeologically significant remains are discovered, work will be stopped immediately. You as well as the appropriate representative of SHPO, Mr. Brian D. Conway, will be notified to provide direction as to how to proceed. In the case that human remains are discovered, the police will also be contacted.

We welcome the opportunity to meet with you to discuss the project in greater detail. Should you have any objection to the commencement of this project, please notify me within 30 days of the issuance of this letter. If you have are interested in arranging a meeting or have further questions or comments, please feel free to contact me at your convenience.

Sincerely,

Donald V. Kolb
Urban Planner/GIS Specialist
American Consulting Professionals of New York, PLLC

Enclosure: Project Location Map

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February 19, 2007

Dan Shepard
Little River Band of Ottawa, Planning Department
375 River Street
Manistee, Michigan 49660

Re: Ambassador Bridge Enhancement Project

Dear Mr. Shepard:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

If at any time during the course of this project artifacts or other archeologically significant remains are discovered, work will be stopped immediately. You as well as the appropriate representative of SHPO, Mr. Brian D. Conway, will be notified to provide direction as to how to proceed. In the case that human remains are discovered, the police will also be contacted.

We welcome the opportunity to meet with you to discuss the project in greater detail. Should you have any objection to the commencement of this project, please notify me within 30 days of the issuance of this letter. If you have are interested in arranging a meeting or have further questions or comments, please feel free to contact me at your convenience.

Sincerely,

Donald V. Kolb
Urban Planner/GIS Specialist
American Consulting Professionals of New York, PLLC

Enclosure: Project Location Map

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american@acp-ny.com • www.acp-ny.com

February 19, 2007

D.K. Sprague, Tribal Chairman
Match-E-Be-Nash-She-Wish Band of Potawatomi Indians, Gun Lake Tribe
P.O. Box 218
Dorr, Michigan 49323

Re: Ambassador Bridge Enhancement Project

Dear Mr. Sprague:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

Gerald F. Parish, Superintendent
Michigan Agency
2901.5 I-75 Business Spur
Sault Ste. Marie, Michigan 49783

Re: Ambassador Bridge Enhancement Project

Dear Mr. Parish:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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We welcome the opportunity to meet with you to discuss the project in greater detail. Should your agency have any objection to the commencement of this project, please notify me within 30 days of the issuance of this letter. If you have are interested in arranging a meeting or have further questions or comments, please feel free to contact me at your convenience.

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February 19, 2007

Mr. Charles Todd, Chief
Ottawa Tribe of Oklahoma
811 Third Avenue NE, P.O. Box 110
Miami, Oklahoma 74355

Re: Ambassador Bridge Enhancement Project

Dear Mr. Todd:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

Mr. Tom Topash
Pokagon Band of Potawatomi
58620 Sink Rd, P.O. Box 180
Dowagiac, Michigan 49047

Re: Ambassador Bridge Enhancement Project

Dear Mr. Topash:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

William Johnson
Saginaw Chippewa Indian Tribe of Michigan
6650 E. Broadway Road
Mt. Pleasant, Michigan 48858

Re: Ambassador Bridge Enhancement Project

Dear Mr. Johnson:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

Cecil E. Pavlat Sr.
Sault Ste. Marie Tribe of Chippewa
523 Ashmun Street
Sault Ste. Marie, Michigan 49783

Re: Ambassador Bridge Enhancement Project

Dear Ms. Pavlat Sr.:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

Ms. Wanda Perron, History Department
Bay Mills Indian Community
12099 W. Lakeshore Drive
Brimley, Michigan 49715

Re: Ambassador Bridge Enhancement Project

Dear Ms. Perron:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

Mr. Curtis Chambers, Tribal Chair
Burt Lake Band of Ottawa and Chippewa Indians
6461 Brutus Rd
Brutus, Michigan 49716

Re: Ambassador Bridge Enhancement Project

Dear Mr. Chambers:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

Mr. Giiwegiizhigookway
Lac Vieux Desert Band of Lake Superior Chippewa Indians
P.O. Box 249
Watersmeet, Michigan 49969

Re: Ambassador Bridge Enhancement Project

Dear Mr. Giiwegiizhigookway:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

Harold G. Frank, Chairperson
Forest County Potawatomi Community of Wisconsin
P.O. Box 340
Crandon, Wisconsin 54520

Re: Ambassador Bridge Enhancement Project

Dear Mr. Frank:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

Ms. Clarice M. Werle, NAGPRA Contact
Forest County Potawatomi Community of Wisconsin
P.O. Box 340
Crandon, Wisconsin 54520

Re: Ambassador Bridge Enhancement Project

Dear Ms. Werle:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

Robert Kewaygoshkum
Grand Traverse Band of Ottawa and Chippewa Indians
2605 NW Bayshore Drive
Peshawbetown, Michigan 49682

Re: Ambassador Bridge Enhancement Project

Dear Mr. Kewaygoshkum:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

Ronald Yob, Chairperson
Grand River Bands of Ottawa Indians
1251 Plainfield, N.E., Suite B
Grand Rapids, Michigan 49501

Re: Ambassador Bridge Enhancement Project

Dear Mr. Yob:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

Mr. Kenneth Meshiguad, Chairperson
Hannahville Indian Community Council
N14911 Hannahville B1 Rd.
Wilson, Michigan 49896-9728

Re: Ambassador Bridge Enhancement Project

Dear Mr. Meshiguad:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

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February 19, 2007

Ms. Laura Spurr, Chairperson
Huron Potawatomi, Inc.
2221 - 1 1/2 Mile Rd
Fulton, Michigan 49052

Re: Ambassador Bridge Enhancement Project

Dear Ms. Spurr:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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February 19, 2007

Ms. Sharon Teeple, Executive Director
Inter-Tribal Council of Michigan, Inc.
2956 Ashmun Street
Sault Ste Marie, Michigan 49783

Re: Ambassador Bridge Enhancement Project

Dear Ms. Teeple:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

If at any time during the course of this project artifacts or other archeologically significant remains are discovered, work will be stopped immediately. You as well as the appropriate representative of SHPO, Mr. Brian D. Conway, will be notified to provide direction as to how to proceed. In the case that human remains are discovered, the police will also be contacted.

We welcome the opportunity to meet with you to discuss the project in greater detail. Should your committee have any objection to the commencement of this project, please notify me within 30 days of the issuance of this letter. If you have are interested in arranging a meeting or have further questions or comments, please feel free to contact me at your convenience.

Sincerely,

Donald V. Kolb
Urban Planner/GIS Specialist
American Consulting Professionals of New York, PLLC

Enclosure: Project Location Map

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American
Consulting Professionals of New York, PLLC
70 Niagara Square, Suite 410, Buffalo, New York 14202
Tel 716.362.1116 • Fax 716.362.1166
american@acp-ny.com • www.acp-ny.com

February 19, 2007

Summer Sky Cohen
Keweenaw Bay Indian Community
16429 Beartown Road
Baraga, Michigan 49908

Re: Ambassador Bridge Enhancement Project

Dear Mr. Cohen:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

If at any time during the course of this project artifacts or other archeologically significant remains are discovered, work will be stopped immediately. You as well as the appropriate representative of SHPO, Mr. Brian D. Conway, will be notified to provide direction as to how to proceed. In the case that human remains are discovered, the police will also be contacted.

We welcome the opportunity to meet with you to discuss the project in greater detail. Should you have any objection to the commencement of this project, please notify me within 30 days of the issuance of this letter. If you have are interested in arranging a meeting or have further questions or comments, please feel free to contact me at your convenience.

Sincerely,

Donald V. Kolb
Urban Planner/GIS Specialist
American Consulting Professionals of New York, PLLC

Enclosure: Project Location Map

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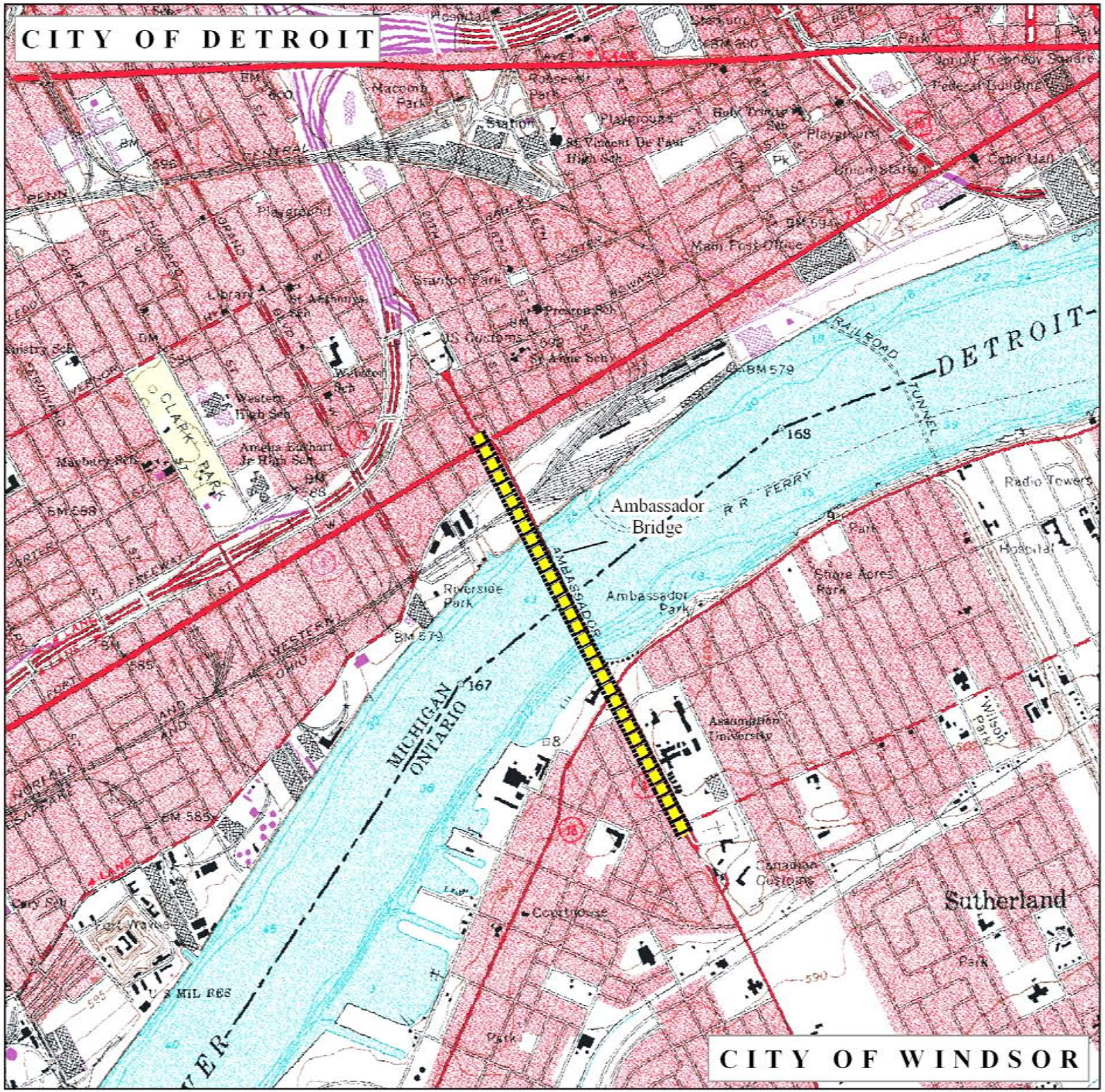
Project Location



U.S. Department of Homeland Security
United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2019
Cleveland, OH 44199-2060

Phone: (216) 902-6085
FAX: (216) 902-6088

16590
B-015/sms
February 20, 2007

Mr. Craig A. Czarnecki
United States Fish and Wildlife Service
East Lansing Field Office (ES)
2651Coolidge Road – Suite 101
East Lansing, Michigan 48823-6316

Dear Mr. Czarnecki,

I am writing in regards to your letter dated August 29, 2006, and the ongoing permit process for the proposed second structure to the existing Ambassador Bridge across Detroit River in Wayne County, Detroit, Michigan.

The applicant for this proposed project, the Detroit International Bridge Company, has received a permit from Michigan Department of Environmental Quality (MDEQ), dated January 17, 2007, to construct six additional lanes over Detroit River adjacent to the west side of the existing bridge and connect directly into the existing plazas. The permit does not list any state-listed threatened or endangered species that may be affected by the proposed project. The permit does not specifically identify any expected impacts to the northern riffleshell mussel, which was identified by your office as a federally listed endangered species that may occur in the vicinity of the project. The applicant is required to employ siltation barriers during construction, but there are no other significant impacts or requirements in the MDEQ permit.

The United States Coast Guard, as lead federal agency for a possible federal Bridge Permit for this project, does not believe that the project, as proposed, will impact any federally or state listed threatened or endangered species. This determination is based on the documentation received and the fact that the proposed project would not require the placement of piers in Detroit River.

I am writing to obtain your concurrence with this determination to conclude coordination pursuant to Section 7 of the Endangered Species Act of 1973, or for you to provide additional information regarding this proposed project.

Thank you for your consideration of this matter. Please contact Scot Striffler of this staff by calling (216) 902-6087 for further discussion.

Sincerely,

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

Little Traverse Bay Bands of Odawa Indians
Archives, Records and Cultural Preservation Department
7500 Odawa Circle, Harbor Springs, Michigan 49740
(231) 242-1450 phone (231) 242-1455 fax

February 22, 2007

Mr. Donald Kolb, Urban Planner/GIS Specialist
American Consulting Professionals of New York, PLLC
70 Niagara Square, Suite 410
Buffalo, New York 14202

Re: Ambassador Bridge Enhancement Project.

Dear Mr. Kolb:

At this time, we do not have any information concerning the presence of any Indian Traditional Cultural Properties, Sacred Sites, or Other Significant Properties in the designated area of the proposed construction site in Detroit, Michigan. This is not to say that such a site does not exist, just this office does not have any available information indicating that a site is present using our current documentation of the area.

However, this office would be more then willing to assist, if in the future or during construction, there is an inadvertent discovery of Native American human remains or burial objects. I have enclosed a Site Reference Form that our office uses in the event of a discovery in order to speed the process. Please contact me if you have any further questions or requests. I can be reached at (231) 242-1453.

We thank you for including our tribe in your plans.

Miigwetch (thank you)

Winnay Wemigwase

Winnay Wemigwase
Director
Archives/Records and Cultural Preservation
Little Traverse Bay Band of Odawa Indians

Site Reference Form

Date of Discovery:_____ Today's Date:_____

Owner/Site Representative:_____
Street Address: _____
City: _____State:_____Zip:_____
Location: _____
Phone:_____Fax:_____

Site Information:
Street Address:_____
City:_____State:_____Zip:_____

Location and Circumstance of Discovery: Time of Discovery:_____am/pm

_____
_____
_____
_____

Contacts Made:
Law Enforcement Department:_____
Investigating Officer:_____
Phone:_____Fax:_____
Date of police report:_____Time on report:_____am/pm

Other contacts (w/phone #):

_____
_____

Native American Burial (please circle) yes_____ no_____
Confirmed by:_____ Phone:_____Fax:_____
Release Status:_____

Little Traverse Bay Bands of Odawa Indians Tribal NAGPRA Contacts:

Leonard J. Mitchell
Cultural Preservation Coordinator
(231) 242-1451ph / jmitchell@ltbbodawa.org

Winnay Wemigwase
Director, Archives/Records & Cultural Preservation
(231) 242-1453ph/ wwemigwase@ltbbodawa.org

7500 Odawa Circle, Harbor Springs, Michigan 49740

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Michigan Agency
2901.5 I-75 Business Spur
Sault Ste. Marie, Michigan 49783-3519
(906) 632-6809 Phone (906) 632-0689 Fax
877-659-5028 TOLL FREE

IN REPLY REFER TO:

Administration

February 23, 2007

Donald V. Kolb
Urban Planner/GIS Specialist
American Consulting Professionals of New York, PLLC
70 Niagara Square, Suite 410
Buffalo, New York 14202

Dear Mr. Kolb:

We are unable to conduct a review of the Ambassador Bridge Enhancement Project for potential impacts to known native religious sites because we have no records which pertain to the area. Our responsibility is only for lands which are held in trust for the twelve federally recognized tribes in the Michigan service area. As such, our land records are restricted to those lands. There are no trust lands within the project site.

Unless the State Historical Preservation Office is able to respond, your only course of action may be to proceed subject to the possible discovery of artifacts or other archeologically significant remains that may be discovered.

Thank you for your cooperation in notifying us of your intent.

Sincerely,

Gerald F. Parish
Superintendent

TAKE PRIDE IN AMERICA

American
Consulting Professionals of New York, PLLC
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Tel 716.362.1116 • Fax 716.362.1166
american@acp-ny.com • www.acp-ny.com

TELEPHONE CALL RECORD

Date: February 27, 2007 **Date Issued:** February 27, 2007

Time: 0945 hrs **Issued by:** Arthur K. Marks

Contact: Barbara Hosler **Phone #:** 517-351-6326

Company: U.S. Fish and Wildlife Service, East Lansing, MI 48823-6316

Project: Ambassador Bridge Enhancement Project (ABEP)

Subject: Federally endangered species.

The following notes reflect our understanding of the discussions and decisions made during this telephone conversation. If you have any questions, additions or comments, please contact us at the above address. We will consider the record to be accurate unless written notice is received within 10 working days of the date issued.

1. This telephone call was made by Anna Peterfreund and Art Marks to discuss federally endangered species impacts.
2. Ms. Hosler is the threatened and endangered species point of contact for the East Lansing Field Office of the U.S. Fish and Wildlife Service (USFWS). We called to follow-up on the August 29, 2006 letter from USFWS to Robert Bloom, Chief, Bridge Program Manager, U.S. Coast Guard, Cleveland, OH.
3. We advised that in our opinion the project will have no impact on the federally endangered northern riffleshell mussel because there will be no work or structures within the Detroit River, barges will only be used to deliver materials, and the closest structure (support tower) will be constructed upland over 100 feet from the river bank. We explained that erosion and sediment control systems will be used for the tower construction and no impacts from siltation are anticipated. Delivery barges must meet USCG marine safety standards.
4. Ms. Hosler stated that she received a letter last week from the U.S. Coast Guard (USCG) that was sent pursuant to Section of the Endangered Species Act of 1973, as amended. The letter from the USCG stated that the ABEP would have no effect. We inquired about the USFWS response and Ms. Hosler said there is no requirement for USFWS to respond or concur unless they disagree. She advised that they do not disagree with the USCG assessment.
5. In regard to the Michigan threatened and endangered species program, Ms. Hosler stated this is a program under state law and we should call Ms. Lori Sargent of MDNR to discuss their concerns.

American Project #: 5049964_Detroit

Copies To: Peterfreund, Korpi, File

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American

American Consulting Engineers of Florida, LLC
4111 Land O' Lakes Boulevard, Suite 210
Land O' Lakes, Florida 34639
Tel 813.996.2800 • Fax 813.996.1908
american@ace-fla.com • www.ace-fla.com

TELEPHONE CALL RECORD

Date: February 27, 2007 **Date Issued:** March 1, 2007

Time: 4:00 **Issued by:** Anna Peterfruend

Contact: Carmen Palambo **Phone #:** 313-961-4266

Company: SEMCOG

Project: Ambassador Bridge Enhancement Project

Subject: LRTP

The following notes reflect our understanding of the discussions and decisions made during this telephone conversation. If you have any questions, additions or comments, please contact us at the above address. We will consider the record to be accurate unless written notice is received within 10 working days of the date issued.

Carmen Palambo of SEMCOG was contacted to discuss the process required for a project to be entered on the Long Range Transportation Plan.

Carmen stated that a copy of the EA or other environmental documentation would be required including the geometrics of the new roadway, estimates of vehicles and types so that they could conduct an air quality analysis.

Once the project is listed on the LRTP, it will also be included in the TIP and SIP for air quality.

Carmen also suggested that if we could turn in an application by the first of April, it would go in front of the Transportation Advisory Council that month. They currently meet on the 4th Wednesday of each month. The Executive Committee meets on the 3rd Friday of every month.

American Project #: 5049964, B.9

Copies To: File, Korpi, C. Stamper

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DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231-1027

February 28, 2007

IN REPLY REFER TO

Engineering & Technical Services
Regulatory Office
File No. 2006-1171-7

Craig Stamper
Detroit International Bridge Company
12225 Stephens Road
Warren, Michigan 48089

Dear Mr. Stamper:

Reference your application for a Department of the Army permit to place an outfall structure in the Detroit River, offshore the property located at 2791 West Jefferson, Detroit, Michigan.

We have verified that the project is authorized by nationwide permit as published in the Federal Register. As indicated on the enclosed plans, the following work is authorized under NW07:

Place temporary fence or other erosion control measures around the bulkhead area to be cut. Cut and remove the existing bulkhead. Material behind the bulkhead will be excavated and pilings will be placed. Place one (1) - 9 foot diameter concrete outfall through the bulkhead. Remove all temporary structures.

This authorization is contingent upon compliance with the following terms and conditions:

a. The enclosed nationwide permit(s) and the general conditions.

b. The following special conditions:

1. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

We also direct your attention to Paragraph D.2 under Further Information, which states, "NWPs do not obviate the need to obtain other Federal, state, or local permits, approvals, or authorizations required by law." We suggest that you contact the Michigan Department of Environmental Quality, Lansing, Michigan, telephone 517-373-9244, to determine if state approval is required. Work should not commence until State approval is obtained.

Any construction activity other than that shown on the plans may not qualify for the authorization. If you contemplate any changes or additional activities from those depicted on the plans, please submit them to this office for authorization review prior to any construction. Upon completion of the work, fill in and return the enclosed COMPLETION REPORT.

This verification is valid until the NWP is modified, reissued, or revoked. All existing NWPs are scheduled to be modified, reissued, or revoked prior to March 18, 2007. It is incumbent on you to remain informed of changes to the NWPs. We will issue a public notice when the NWPs are reissued. If you commence or are under contract to commence this activity before the date that the relevant nationwide permit is modified or revoked, you will have twelve (12) months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this NWP. If you have any questions on this matter, contact me at (313) 226-5383 and refer to File Number: 2006-1171-7.

Sincerely,

Gina R. Nathan
Permit Evaluation Branch B
Regulatory Office

Enclosures

Copy Furnished

MDEQ, Southeast Michigan District Office (06-82-174-P)
NOAA, w/print
Hubbell, Roth & Clark, Inc.
Enforcement Section

American

American Consulting Engineers of Florida, LLC
4111 Land O' Lakes Boulevard, Suite 210
Land O' Lakes, Florida 34639
Tel 813.996.2800 • Fax 813.996.1908
american@ace-fla.com • www.ace-fla.com

TELEPHONE CALL RECORD

Date: March 1, 2007 **Date Issued:** March 2, 2007

Time: 2:00 **Issued by:** Anna Peterfruend

Contact: Lori Sargent **Phone #:** 517-373-9418

Company: MDNR

Project: Ambassador Bridge Enhancement Project

Subject: Mussel survey

The following notes reflect our understanding of the discussions and decisions made during this telephone conversation. If you have any questions, additions or comments, please contact us at the above address. We will consider the record to be accurate unless written notice is received within 10 working days of the date issued.

ACE received a letter from the MDNR regarding threatened and endangered species concerns for the ABEP project that stated a letter of no effect would be required from MDNR and a survey by a biologist would be required due to the potential presence of mussels in the Detroit River. We called Lori to explain that the project will not require work within the Detroit River nor will any piers be placed in the River.

Lori explained that she did not realize this at the time the letter was sent out. Once she received that information, she realized that the project would not have an effect on mussels or other threatened and endangered species. She will be sending a letter of no effect for our records.

American Project #: 5049964, B.9

Copies To: File, Korpi, C. Stamper

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JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN

DEPARTMENT OF NATURAL RESOURCES

LANSING

REBECCA A. HUMPHRIES
DIRECTOR

RECEIVED BY
NOV 03 2008
AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC

March 1, 2007

Mr. Scott Korpi, PE SE
American Consulting Engineers of Florida, LLC
4111 Land O'Lakes Blvd., Suite 210
Land O'Lakes, FL 34639

Dear Mr. Korpi:

Information received regarding the impacts of the proposed Ambassador Bridge Enhancement in Wayne County (section 19, T2S R12E), has been reviewed. The information was found

_X_ to adequately address the concerns for potential threatened and endangered species at the site in question.

____ not adequately address the concerns for potential threatened and endangered species at the site in question.

Based on the provided information,

_X_ The proposed project should have no direct impacts on known special natural features at the location(s) specified if it proceeds according to the plans provided. Please contact me for an evaluation if the project plans are changed.

____ The following special features may occur on the site(s) and should be avoided and protected from harm from all activities associated with the project and in perpetuity from any future activities on the property.

NATURAL RESOURCES COMMISSION
Keith J. Charters, Chair • Mary Brown • Hurley J. Coleman, Jr. • Darnell Earley • John Madigan • J. R. Richardson • Frank Wheatlake

STEVENS T. MASON BUILDING • P.O. BOX 30028 • LANSING, MICHIGAN 48909-7528
www.michigan.gov/dnr • (517) 373-2329

Great Lakes, Great Times, Great Outdoors!

_X_ An endangered species permit is required if activities will harm the species that are present, including transplanting them to another location.

____ The project may proceed with recommendations listed below. You are advised to minimize or eliminate impacts on endangered and threatened species and to report observations to this office.

____ Other recommendations:

Thank you for your cooperation in addressing the protection of Michigan's Natural Resource Heritage. If you have further questions I can be reached at 517-373-9418.

Sincerely,

Lori G. Sargent
Endangered Species Specialist
Wildlife Division
SargentL@michigan.gov

cc: Mr. Craig Czarnecki, US Fish & Wildlife Service
Mr. Walter Gauthier, US Army Corps of Engineers
Planning Division, Michigan Department of Transportation

ZIIBIWING CENTER
of Anishinabe Culture & Lifeways

THE SAGINAW CHIPPEWA INDIAN TRIBE
6650 E. Broadway • Mt. Pleasant, Michigan 48858

March 7, 2007

Donald V. Kolb, Urban Planner/GIS Specialist
American Consulting Professionals of New York, PLLC
70 Niagra Square, Suite 410
Buffalo, New York 14202

RE: Ambassador Bridge Enhancement Project

Dear Donald V. Kolb,

This letter is in response to the above referenced project(s).

At this time we do not have any information concerning the presence of any Indian Traditional Cultural Properties, Sacred Sites, or other Significant Properties to the projected project area(s). This is not to say that such a site may not exist, just that this office does not have any available information of the area(s) at this time.

This office would be willing to assist if in the future or during the construction there is a discovery of Native American human remains or burial objects. Feel free to call my office if you have any questions or requests at 989-775-4730.

Thank you for including this Tribe in your plans.

Sincerely,

William Johnson
Curator/Historic Preservation Contact

PHONE (989) 775-4750 or (800) 225-8172, Ext. 1-54750 • FAX (989) 775-4770 • www.sagchip.org/ziibiwing

American

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Land O' Lakes, Florida 34639
Tel 813.996.2800 • Fax 813.996.1908
american@ace-fla.com • www.ace-fla.com

March 21, 2007

Carmen Palambo
Southeast Michigan Council of Governments
535 Griswold Street, Suite 300
Detroit, MI 48226-3602

Re: **Ambassador Bridge Enhancement Project**

Dear Carmen Palambo:

Enclosed please find a brief project description and the preliminary construction plans for the Ambassador Bridge Enhancement Project for your review. The major components of the Ambassador Bridge Enhancement project include the construction of a 6-lane cable stayed, toll bridge connecting Detroit, Michigan, United States with Windsor, Ontario, Canada adjacent to the existing Ambassador Bridge. The bridge will connect directly into the existing bridge and plaza in Detroit and into the existing plaza in Windsor. No modifications will be required in the plazas or the existing roadway infrastructure, instead the new bridge will connect directly to the plazas constructed by the ongoing Ambassador Bridge Gateway and Windsor Plaza Expansion Projects. The existing Ambassador Bridge would then be taken out of service for necessary repairs and would provide reserve capacity in the event of an emergency.

The proposed bridge will provide four full service traffic lanes plus two lanes dedicated to low risk commercial travelers (FAST). The entire project is a bridge approximately 6200 feet (1890 m) in length with approximately 2200 feet (670 m) traversing the Detroit River from tower to tower. The bridge will be a minimum of 152 feet (46 m) above the Detroit River, which meets the minimum vertical clearance requirements for deep draft navigation.

In the United States, an environmental assessment, including an air quality study, is currently underway and will be submitted to the United States Coast Guard, the lead agency for this project, in April. The Coast Guard will then publish the EA for comments at the end of April. We plan to submit the final environmental assessment at the end of June. A public workshop for this project was held in Detroit on March 1, 2007.

An environmental assessment screening report (EASR) will also be required by the Canadian Environmental Assessment Agency. The scope for this document is currently out for public comment and the environmental assessment is underway in accordance with that scope. A public workshop in Windsor is being planned for April.

As part of the bridge permit application and environmental assessment required by the United States Coast Guard, the Ambassador Bridge Enhancement Project needs to be added to the Long Range Transportation Plan and State Implementation Plan. We would like to set up a meeting with your office at your earliest convenience to go over the project in more detail and determine the necessary steps to

add the project to the LRTP. Please call with a suitable time to meet, or if you have any questions or need additional information. You can reach me directly at 813-996-2800 ext. 5567.

Sincerely,
American Consulting Engineers of Florida, LLC

Scott Korpi
Project Manager

cc: Dan Stamper - DIBC, Craig Stamper -DIBC, Skip McMahon – CTC, Bob Bloom - USCG, Pat Holland, file B.04

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American

American Consulting Engineers of Florida, LLC
4111 Land O' Lakes Boulevard, Suite 210
Land O' Lakes, Florida 34639
Tel 813.996.2800 • Fax 813.996.1908
american@ace-fla.com • www.ace-fla.com

March 30, 2007

Carmine Palombo
Southeast Michigan Council of Governments
535 Griswold Street, Suite 300
Detroit, MI 48226-3602

Re: **Ambassador Bridge Enhancement Project**

Dear Carmine Palombo:

Enclosed please find a brief project description and the preliminary construction plans for the Ambassador Bridge Enhancement Project for your review. The major components of the Ambassador Bridge Enhancement project include the construction of a 6-lane cable stayed, toll bridge connecting Detroit, Michigan, United States with Windsor, Ontario, Canada adjacent to the existing Ambassador Bridge. No modifications will be required in the plazas or the existing roadway infrastructure. The new bridge will connect directly to the plazas constructed by the ongoing Ambassador Bridge Gateway in Detroit and the Plaza Expansion Projects in Windsor. The existing Ambassador Bridge would then be taken out of service for necessary repairs and would provide reserve capacity in the event of an emergency.

The proposed bridge will provide four full service traffic lanes plus two lanes dedicated to low risk commercial travelers (FAST). The entire project is a bridge approximately 6200 feet (1890 m) in length with approximately 2200 feet (670 m) traversing the Detroit River from tower to tower. The bridge will be a minimum of 152 feet (46 m) above the Detroit River, which meets the minimum vertical clearance requirements for deep draft navigation.

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add the project to the LRTP. Please call with a suitable time to meet, or if you have any questions or need additional information. You can reach me directly at 813-996-2800 ext. 5567.

Sincerely,
American Consulting Engineers of Florida, LLC

Scott Korpi
Project Manager

cc: Dan Stamper - DIBC, Craig Stamper -DIBC, Skip McMahon – CTC, Bob Bloom - USCG, Pat Holland, file B.04

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RTP Project Amendment Proposal

Project Details

County:	Wayne County
Project Name:	Ambassador Bridge Enhancement Project
Project Limits:	Project connects to the plazas in Detroit and Windsor (see attached)
Proposed Work:	Four full service traffic lanes plus two lanes dedicated to low risk commercial travelers over the Detroit River between Detroit and Windsor in the same corridor as the existing Ambassador Bridge
Project Deficiency:	The existing bridge does not provide safety shoulders, is nearly 80 years old and does not have adequate width to provide dedicated lanes for low risk truck travelers who have been pre-approved under the FAST program. The existing structure contains fracture critical members and does not provide alternative means of crossing in case of emergencies.
Project Length:	Approximately 6,200 feet
Urban Area:	Southwest Detroit
Jurisdiction:	Agency with financial responsibility for maintaining transportation facility: N/A. The Detroit International Bridge Company and Canadian Transit Company (both private companies) will pay for all design and construction costs as well as maintaining the structure
Community:	Communities in which the project is located: Southwest Detroit Hubbard/Richard District
Project Submitter:	Agency, contact person, and contact information, including address, phone, and e-mail: Dan Stamper, President Detroit International Bridge Company 12225 Stephens Warren, MI 48089 Tel 586-939-7000 Fax 586-755-8924 Email laura@ambassadorbridge.com Thomas "Skip" McMahon, Special Projects Canadian Transit Company 780 Huron Church Road, Suite 202 Windsor, Ontario N9C 2K2 Tel 519-977-0700 Fax 519-977-1262 Email: skip@canadiantransit.com
Public Involvement:	Describe how the public was involved in development of this project: A Public Hearing was held on November 14, 2006 conducted by MDEQ. A public workshop was held on March 1, 2007 to solicit input Numerous stakeholder meetings have been conducted and will continue
Justification Statement:	Describe why this project is needed and how it will improve the transportation system in Southeast Michigan: The Ambassador Bridge Enhancement Project will more efficiently process commercial vehicles, promote economic growth and development, and is expected to improve air quality while the existing bridge will provide a redundant resource in the event of an emergency. The cable stayed bridge also provides greater structural security than the existing suspension bridge.

Funding Details

Fiscal Year	Phase	Federal Funds		Non-Federal Funds	
		Source	Amount	Source	Amount
	Study/Preliminary Engineering	The Detroit International Bridge Company and its Canadian subsidiary, The Canadian Transit Company, will finance the costs of constructing the second span of the Ambassador Bridge through the issuance of debt securities. The companies have retained Citigroup Global Markets Inc., ("Citigroup") to act as their financial advisors with respect to developing the plan for financing the construction of the second span. Citigroup is assisting both companies in identifying the best source of funds for this project and structuring the terms and conditions of the financing so as to maximize the creditworthiness and marketability of the debt securities to be issued by the SPES. The companies are currently in the process of seeking approvals from the Michigan Strategic Fund ("MSF") and the United States Department of Transportation ("DOT") to issue United States income tax exempt "Private Activity Bonds" to finance construction of the second span. The Private Activity Bonds would be issued pursuant to Section 11143 of Title XI of the Safe, Accountable, Flexible, Efficient Transportation Act, commonly referred to as "SAFETEA_LU".			
	Engineering/Design				
	Right-of-way				
	Construction				
	Other				
Total					

1.0 Project Description

1.1 Purpose, Need and Benefits

Existing international border crossings in the Detroit River area include the Ambassador Bridge, the Detroit-Windsor Tunnel, two railroad tunnels, and a ferry crossing. The Ambassador Bridge connects Detroit, Michigan, United States and Windsor, Ontario, Canada. The main span of the existing Ambassador Bridge was the longest in the world when it was completed in 1929 and is currently the busiest international border crossing in North America. The Detroit International Bridge Company (DIBC) and Canadian Transit Company (CTC) own and operate the existing Ambassador Bridge as well as the connecting plazas.

The project identified as the "Ambassador Bridge Enhancement Project" submitted in this document will provide four full service traffic lanes plus two lanes dedicated to low risk commercial travelers over the Detroit River between Detroit and Windsor in the same corridor as the existing Ambassador Bridge. This project is not a part of the ongoing "Ambassador Bridge Gateway Project" being completed by the Michigan Department of Transportation and the DIBC/CTC scheduled to open in 2009, nor is it a part of the "Windsor Plaza Expansion Project" being completed by the DIBC/CTC on the Canadian side with the east expansion completed in January, 2006 and the west expansion scheduled to be completed in mid 2007. The Ambassador Bridge Enhancement Project is the construction of a new state of the art cable stayed bridge that will connect directly to the Canadian and U.S. plazas owned by DIBC/CTC. The Ambassador Bridge Enhancement Project will be constructed entirely within the limits of the current operations of the DIBC/CTC.

This project includes the construction of new replacement lanes across the Detroit River and provides the redundancy desired by the governments on both sides of the border. By constructing a new state of the art structure across the Detroit River, the existing structure will be freed up to allow it to be rehabilitated and to then serve as a backup redundant resource in case of an emergency or another impediment against the free flow of people and goods across the new structure.

Lack of access to international border crossings, delays, and congestion on border crossings, can have an impact on trade between the United States and Canada and therefore impact the economies of both countries. In response to this, the Ambassador Bridge Gateway Project was developed and is currently underway to provide direct access between the Ambassador Bridge and the United States interstate system (I-75, I-96). The Ambassador Bridge Gateway Project was originally approved with an Environmental Assessment and a Finding of No Significant Impact (FONSI) in a letter from the U.S. Department of Transportation Federal Highway Department on October 23, 1997. The Environmental Assessment was subsequently reevaluated and the FONSI was reaffirmed on two different occasions; first on September 9, 1999 and secondly on January 15, 2004. The Environmental Assessment and Programmatic Section 4(F) Evaluation documents that were prepared and approved for this project included

"construction of a new deck that will accommodate a future second span bridge to Canada". Three primary objectives are cited on page 1-1 of the Final Environmental Assessment for the Ambassador Bridge Gateway Project including *"Accommodate future border crossing capacity needs and a potential future second span of the Ambassador Bridge located west of and adjacent to the existing bridge"*. The new improvements under this project are scheduled to be opened to traffic in 2009 and will eliminate problems with access to the Ambassador Bridge in the United States.

The Ambassador Bridge Enhancement Project would seamlessly integrate with the Ambassador Bridge Gateway Project transportation plan already underway in the Detroit River area by building a new bridge adjacent to the existing Ambassador Bridge. This will reduce congestion, promote economic growth and development, and likely improve air quality. The DIBC/CTC has identified several design option alternatives for this bridge and has determined that the option discussed in Section 1.3 is the most feasible.

1.1.1 National Interest and Security Considerations

The purpose of the project is to ensure that the free flow of trade and people can continue to occur unimpeded at the busiest border crossing in North America. With trade between the United States and Canada being vital to the economic health of both countries, it is critical that this border crossing continue to function efficiently even though the existing span across the river is approaching 80 years of age. By constructing a new state of the art structure adjacent to the existing structure, the efficient function of the entire facility will be assured for the next century.

Construction of the second span adjacent to the existing structure will allow almost all of the construction to take place without impacting the traffic on the existing facility. Once the new structure is complete, all traffic will be shifted onto the new structure to allow the existing bridge to be evaluated and rehabilitated without impact to the traffic flow. By constructing the project in such a fashion, the national interest of both countries will be well served by the continued promotion of the economies of both countries by ensuring that the free flow of international trade can continue unabated.

Once the second span has been constructed and the existing bridge has been repaired and rehabilitated, it will be made available as a redundant resource should there be an emergency on the new structure in which traffic is impeded. This redundancy will ensure that this vital border crossing be functional even if a major problem were created on the new structure.

The construction of a cable stayed structure rather than a suspension bridge will greatly improve the structural redundancy of the span. On the existing suspension bridge, the superstructure is supported in its entirety by the two main catenary cables. Should one of these cables be severed, a catastrophic failure would almost certainly occur. Conversely, the superstructure of the proposed bridge will be supported by numerous cables and the elimination of one or even more cables will not result in a catastrophic failure. The selection of such a structural type will greatly improve the security of the facility.

1.1.2 Support for the Project

Interest in building a bridge between the United States and Canada within the Ambassador Bridge corridor was advanced during the Environmental Assessment stage for the Ambassador Bridge Gateway project. One of the three primary objectives of the Gateway plaza expansion project was to "Accommodate future border crossing capacity needs and a potential future second span of the Ambassador Bridge located west of and adjacent to the existing bridge."

The Detroit River International Crossing (DRIC) study also showed support for a crossing at the existing Ambassador Bridge. The DRIC study ranked the Ambassador Bridge site (X12/II-4) as number 1 using the Citizen Weighted Score and number 2 using the Technical Team Weight Score out of 37 possible locations to place a new bridge. This ranking was due few impacts on neighborhoods and the natural environment and because of its improvements to regional mobility.

The general consensus among the public and local businesses is in favor of an additional span in the same corridor as the Ambassador Bridge in order to maintain the current operations and allow for the improvement of operations through the construction of dedicated FAST Truck lanes for low risk travelers. Nearly 40 businesses with operations in both the Detroit area and Southern Ontario and labor groups representing both public and private sector employees have expressed their strong support for the Ambassador Bridge Enhancement Project.

There are many reasons why the local community supports this effort with the economic benefits derived from the project heading the list. Several companies expressed that the improvement in the operations and functionality of the facility would support their plans for the future as well. The United States Chamber of Commerce, Michigan Chamber of Commerce and Canada Chamber of Commerce all express support for the project stating that additional infrastructure capacity is vital to meet the demands of trade between the United States and Canada. They further state that if additional infrastructure capacity is not provided, a loss of jobs, and increase in congestion and delays will result. The addition of the FAST lanes, as proposed in the Ambassador Bridge Enhancement Project, was also cited by many local businesses as expediting the border crossing process which would thus increase the production of those businesses.

Funding and the creation of jobs are other reasons often cited by the public and local agencies as the reason for their support for the Ambassador Bridge Enhancement Project. The bridge is estimated to cost approximately $500 million to design and build. By being privately funded, tax payer dollars could instead be spent repairing and improving existing government owned streets as well as employment development programs. In addition, credits for USDOT matching grants for regional transportation projects will be generated for the region due to the construction of this project without the need to spend local or state monies.

The Ambassador Bridge Gateway plaza expansion and construction and maintenance on the new bridge would also create much needed jobs in both Detroit and Windsor. Current

investments by the DIBC/CTC have already created over 500 new jobs in the past two years in Southwest Detroit which is now cited as the only section of the city with a population growth.

Lastly, the public and local businesses support the Ambassador Bridge Enhancement Project for environmental reasons. Building a bridge adjacent to the Ambassador Bridge and tying into an existing plaza has the least environmental affects of any other location being studied in the DRIC study. The proposed bridge would not disrupt or segregate the community, no piers will be placed in the Detroit River, nor will construction take place in the River, air quality and noise pollution are expected to remain the same or improve with decreased idling time, no residential relocations would be required, no wetland or floodplain impacts would occur, and no threatened or endangered species or habitat of threatened or endangered species would be impacted.

Additional public support for the Ambassador Bridge Enhancement Project occurred at a public workshop held on March 1, 2007. As with any transportation project, public involvement is an important aspect of the Ambassador Bridge Enhancement Project. The intent of public involvement is to fully inform and involve all interested public officials, citizens, and special interest groups in the development of transportation projects. The workshop was held at the Earhart Middle School in Detroit and was attended by approximately 53 people.

Twelve comments were received at the workshop. The general consensus of the public at this workshop was in favor of the proposed improvements for the reasons stated above, however, several commenter's did express concern regarding several potential environmental impacts that are addressed in this Draft EA.

1.1.3 Trade Considerations

More trade goods cross the United States/Canadian border through this corridor than any other land crossing in North America. It is critical to the economic health of both countries that this crossing remain fully functional. A study commissioned by the Border Transportation Partnership indicated that if "no improvements were made to border crossing capabilities in the Detroit River area by 2030, the two nations will realize the loss of up to 70,000 Canadian jobs and 80,000 U.S. jobs. The combined annual loss of production is forecast to be CAN$21.5 billion or US$13.4 billion."

Booths have been constructed in each plaza that are dedicated to the processing of low risk truck travelers in the FAST program. The Free and Secure Trade (FAST) program is a joint U.S.-Canadian initiative involving the Canada Border Services Agency (CBSA) and the United States Customs and Border Protection (CBP), however, it can best be described as a commercial process offered to pre-approved importers, carriers and registered drivers. Approved companies using approved carriers and registered drivers experience shipments being cleared with greater speed, certainty and at lower costs. Participants in the program must meet the requirements of Canada's Partners in Protection (PIP) program or the United States Customs Trade Partnership Against Terrorism (C-TPAT) program.

Without having dedicated lanes for such purposes, the advantages of such a program cannot be fully implemented since the flow of FAST trucks are greatly impeded by backups in the general purpose lanes. The construction of a new structure with lanes dedicated for such purposes will significantly improve the operation of the entire facility and encourage more travelers to become approved for the program.

The addition of a new state of the art bridge in the Ambassador Bridge Corridor adds much needed redundancy to the regional transportation system. While the existing Ambassador Bridge is closed for evaluation and rehabilitation, the proposed bridge will be available to provide access to the international border. The current bridge will then be used for redundancy if there is an occasion when the new span needs to be taken out of service for an extended period of time. This redundancy will allow shipments to continue to move efficiently across the border, thus reducing potential adverse impacts to the local, regional and national economy.

1.1.4 Spin-off Benefits and Interrelated Projects

The Project is not expected to create any spin-off development. It is not intended to draw additional traffic to the bridge or the region. The spin-off benefits, however, will be related to the preservation of an historic structure and the provision of a redundant transportation corridor on the original bridge. The goal of the Ambassador Bridge Enhancement Project is to more efficiently move the existing traffic while protecting the structural integrity of the existing Ambassador Bridge, a historic structure. The existing bridge will also be made available for internal operational needs as well as providing pedestrian and bicyclist amenities. Greater efficiency in processing the commercial traffic would be achieved by the using the two dedicated FAST Truck lanes on the new bridge to more effectively organize the commercial traffic to support the newly configured plaza (Ambassador Plaza Gateway Plaza Expansion) and FAST lane operations previously approved for construction and operation. This traffic lane organization is expected to reduce the amount of idling time for trucks while waiting for customs approval.

Projects that are related to the Enhancement Project are the rehabilitation of the existing bridge, the Canadian Plaza Expansion and the Ambassador Bridge Gateway Project which provides an upgrade of the U.S. plaza and direct connections to the interstate system. The existing Ambassador Bridge will be repaired and rehabilitated once the Ambassador Bridge Enhancement Project is complete. The plaza is being upgraded to conform to current security standards and more efficient traffic flow with the existing infrastructure already in place and is not part of the Ambassador Bridge Enhancement Project.

1.2 Current Facilities

The existing Ambassador Bridge is a suspension bridge that spans 9000 feet (2743 m) in length, with 1850 feet (564 m) over the Detroit River. The height of the two towers is 363 feet (111 m) tall. The vertical clearance of the bridge structure is 152 feet (46 m) over the Detroit River. The structure consists of a 55-foot (17 m) wide deck including four highway lanes of traffic, with two lanes traversing eastbound and two lanes traversing westbound. The maximum grade of the bridge is 5%. The Ambassador Bridge also contains a sidewalk that is currently closed.

The Ambassador Bridge lands in the United States near the Corktown Historic District of Detroit, Michigan directly into the tolls, primary and secondary customs, and duty free facilities. The facilities are bounded by I-75 on the west, St. Anne Street on the east, Fort Street on the south, and Porter Street on the north. Once cars exit the Ambassador Bridge, they enter the primary customs facility and then the tolls facility and then have direct access to I-75 and I-96 or can exit onto local streets. Trucks exiting the Ambassador Bridge bypass the customs and tolls plazas for cars and enter their primary and secondary customs and tolls plazas located east of the car plaza. If the trucks pass the primary and secondary customs, they travel west on Fort Street and gain access to the interstate system by heading north on Clark Street. There is also local access to the duty free shops for outbound traffic from I-75, East Service Drive, and Porter Street.

The Ambassador Bridge lands in Canada near the University of Windsor in Windsor, Ontario directly into the tolls and primary customs plazas. The facilities are bounded by Huron Church Road on the west, Northway Avenue on the east, Tecumseh Road on the north, and College Avenue on the south. Once cars exit the Ambassador Bridge, they enter the primary customs and tolls facilities and then exit onto Huron Church Road. The secondary customs facility and duty free shops are found in a separate facility to the southeast. Trucks exiting the Ambassador Bridge also enter primary customs and tolls, exit onto Huron Church Road, and proceed to the secondary customs facility. From the secondary customs facility, the trucks have access to Highway 401 via Huron Church Road. There is local access to the bridge from Wyandotte Street and Huron Church Road.

1.3 Proposed Enhancements

The DIBC/CTC has determined that the enhancement of the existing Ambassador Bridge crossing is feasible and desirable. The enhancement would include a new six lane cable stayed bridge located in the same corridor and adjacent to the existing Ambassador Bridge, consistent with the approved and ongoing Ambassador Bridge Gateway Project. This bridge would simply tie directly into the existing plazas in both Canada and the United States without the need for modification to their currently approved and permitted configuration. The proposed bridge would run roughly parallel to the existing Ambassador Bridge. The width of the proposed bridge is set to allow transition directly into the connection points in both the United States and Canadian Plazas and to provide the necessary safety shoulders that are not present on the existing structure.

The proposed bridge consists of 6 lanes of traffic with three in each direction. The outside lanes primary use would be as dedicated FAST truck exit ramps to the tolls and primary and secondary customs facilities in the United States and Canada. The inside lanes primary use would be for automobiles to the tolls and primary customs with flexibility preserved for all types of vehicular operations. The use of the center lane would depend on the traffic needs of the moment and could be for both trucks and cars or trucks only depending on the traffic mix at any given time. Once the new structure is completed, the existing Ambassador Bridge will be taken out of service to effect repairs that are deemed necessary. Once any necessary repairs are completed, the existing structure will be used to provide for bridge internal operational needs, pedestrian and bicyclist amenities, and/or to provide redundancy and backup support when necessary to ensure the free flow of traffic between Windsor and Detroit at all times.

All existing roads and streets in both the United States and Canada would remain open and will continue to function as they currently operate.

1.4 Complementary Enhancements

1.4.1 Gateway - MDOT and DIBC/CTC

The Michigan Department of Transportation (MDOT) has completed design plans for the reconstruction of the entire Ambassador Bridge Interchange to provide direct access to I-75 and I-96, termed the Ambassador Bridge Gateway project. This project has been approved by the U.S. Department of Transportation, Federal Highway Administration and includes provisions ensuring that the design will accommodate a second span adjacent to the existing bridge. The Ambassador Bridge Gateway project is scheduled to be completed and opened to traffic in 2009 and will dramatically improve the existing connections between the bridge and the freeway system. The project will also prohibit trucks from exiting onto the local streets around the plaza area and instead require them to enter the interstate system; this will improve the United States customs facilities associated with the Ambassador Bridge. As part of the ongoing Ambassador Bridge Gateway expansion project, the DIBC/CTC will reconfigure the plaza operations. Some plaza activities prior to entering the Ambassador Bridge will be relocated to the west of the bridge. The location of the tolls and customs plaza will remain near the same location

for traffic heading into the United States. The revised plaza configuration is bounded by the interstate system to the north, Fort Street to the south, 25th Street to the west, and the Ambassador Bridge to the east. Under the Ambassador Bridge Gateway project, truck traffic will exit the Ambassador Bridge using a right exit ramp and enter the primary and secondary customs and toll plaza currently in use. If they pass the customs inspection, the truck traffic will exit the plaza onto a proposed new road that parallels Fort Street and circles around the proposed new bridge plaza and connects to the interstate system. Automobile traffic will exit the Ambassador Bridge using a three-lane, left exit ramp and enter the primary customs and toll plaza currently in use. If they pass, the automobile traffic will proceed to either local roads or an entrance ramp to the interstate system. Traffic entering the proposed bridge would enter through the proposed toll plaza and access an on-ramp that circles around the toll and bridge plaza and connects to the proposed bridge.

1.4.2 Windsor Bridge Plaza Expansion

Likewise, congestion is also being addressed on and around the Ambassador Bridge through the Windsor Bridge Plaza Expansion to the east and the west. Currently in Windsor, the main road connecting the border with Highway 401 is Huron Church Road (Highway 3), though it is not designated as an international thoroughfare. Neighboring residents are concerned with the increased noise levels, and health and safety concerns associated with congestion on Huron Church Road. Improvements associated with the Windsor Bridge Plaza Expansion include the approved and permitted additional customs facilities on the west side of Huron Church Road to process trucks and cars crossing the border more quickly. Accordingly, additional exit ramps are being added from the Ambassador Bridge to the new facility. Three “wide lane” customs facilities are also being added on the east side Huron Church Road next to the existing customs facilities. The existing tolls and customs plaza on the east side of Huron Church Road are remaining the same, as will the associated secondary customs facility and duty free shops. Access to reach the Ambassador Bridge from local roads will also remain the same. The cause of truck backups on Huron Church Road and around the Canadian Plaza can be attributed in part to the lack of direct access to the United States Interstate System. Therefore, the construction of the Gateway Project in the United States as described in Section 1.4.1, which will provide such direct connections as well as improving the plaza function and operation, should help to reduce truck backups in the Canadian Plaza for vehicles bound for the United States. Presently, the DIBC/CTC has no authority or jurisdiction allowing for the construction of connecting roads from the Ambassador Bridge to Highway 401.

1.5 Compatibility with Transportation and Comprehensive Plans

The existing facility has been in service for nearly 80 years and has grown to become the busiest commercial land border crossing between the United States and Canada. The primary purpose of the proposed Ambassador Bridge Enhancement Project is to ensure that current operations can continue for the 21st century even as the existing bridge has provided service for most of the 20th century. In addition, the project will provide dedicated lanes for low risk truck travelers that are important to both countries. Construction of such lanes completes the vision and plans developed as part of the Ambassador Bridge Gateway Project which provides direct connections to the United States Interstate and improves the operations of the plaza. Further, the project integrates seamlessly with the Ambassador Bridge Gateway Project and ties directly into the plaza, as reconstructed by the Ambassador Bridge Gateway Project without need for any additional modifications to the operations.

1.6 Land Ownership

The DIBC/CTC owns most of the property required for the construction of the Ambassador Bridge Enhancement Project and is currently in the process of acquiring the necessary remaining property rights for the project. All property or rights will be acquired before construction is begun. No residences will be relocated in the United States.

1.7 Finance Plan

The Detroit International Bridge Company and its Canadian subsidiary, The Canadian Transit Company, will finance the costs of constructing the second span of the Ambassador Bridge through the issuance of debt securities. The companies have retained Citigroup Global Markets Inc., ("Citigroup") to act as their financial advisors with respect to developing the plan for financing the construction of the second span. Citigroup is assisting both companies in identifying the best source of funds for this project and structuring the terms and conditions of the financing so as to maximize the creditworthiness and marketability of the debt securities to be issued by the SPES. The companies are currently in the process of seeking approvals from the Michigan Strategic Fund ("MSF") and the United States Department of Transportation ("DOT") to issue United States income tax exempt "Private Activity Bonds" to finance construction of the second span. The Private Activity Bonds would be issued pursuant to Section 11143 of Title XI of the Safe, Accountable, Flexible, Efficient Transportation Act, commonly referred to as "SAFETEA_LU". The federal, provincial and state governments of both countries will not be expected to contribute funds towards the design or construction of the Ambassador Bridge Enhancement Project.

1.8 Contacts

Proponents Name

The proponent to this project is the Detroit International Bridge Company and the Canadian Transit Company.

Project Contacts

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Fax 519-977-1262
Email: skip@canadiantransit.com

CITY OF DETROIT, MICHIGAN, UNITED STATES
CITY OF WINDSOR, ONTARIO, CANADA

CONTRACT PLANS

DETROIT INTERNATIONAL BRIDGE COMPANY
CANADIAN TRANSIT COMPANY

INDEX OF PLANS

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4	AMBASSADOR BRIDGE ENHANCEMENT PROJECT- WINDSOR PLAZA CONNECTOR DETAILS
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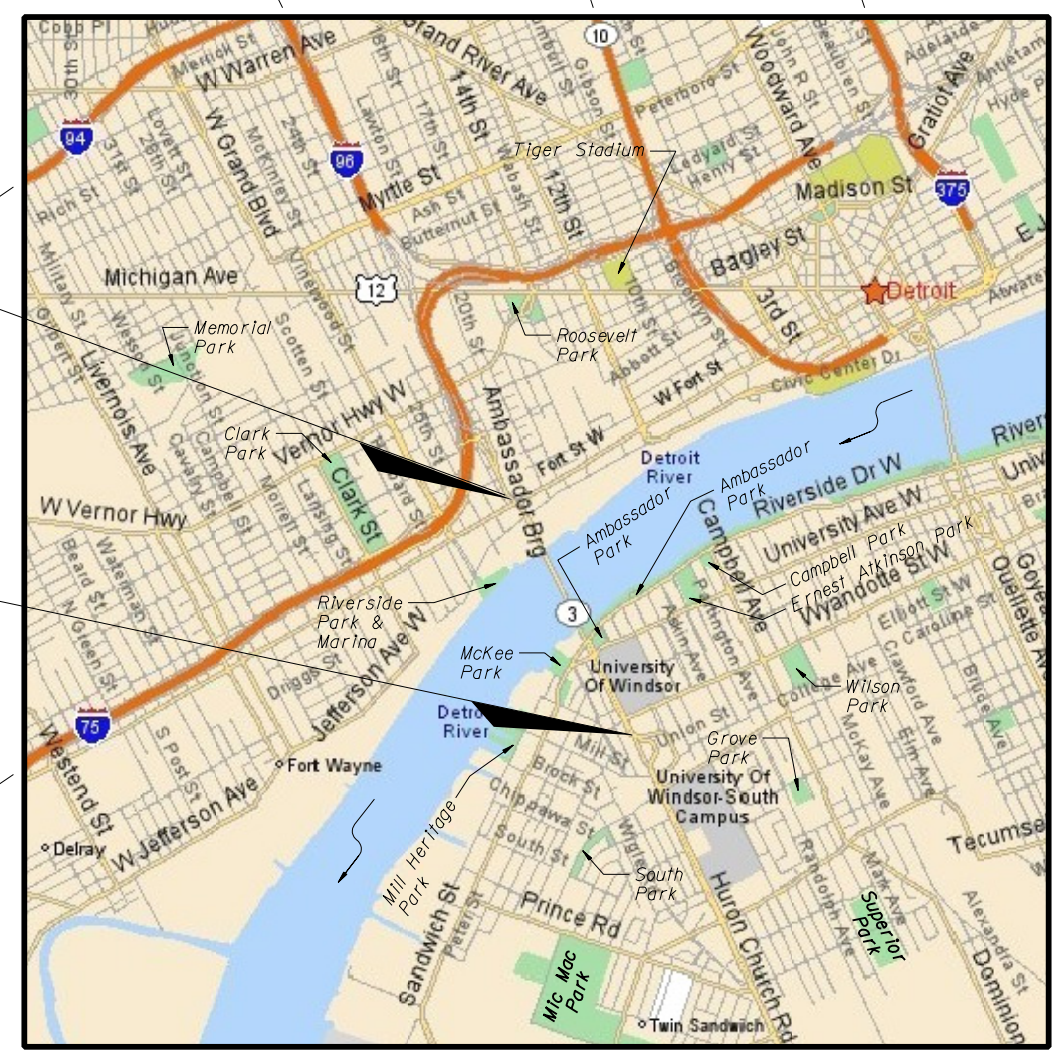
7	PLAN AND ELEVATION (2 OF 3)
8	PLAN AND ELEVATION (3 OF 3)
9	TOWER PIERS 5 & 6
10	PIER DETAILS



PLANS PREPARED BY:

American
Consulting Professionals of Michigan

NOTE: THE SCALE OF THESE PLANS MAY HAVE CHANGED DUE TO REPRODUCTION.

ENGINEER OF RECORD: _____

P.E. NO.: _____

PROJECT LENGTH IS BASED ON ℄ CONSTRUCTION

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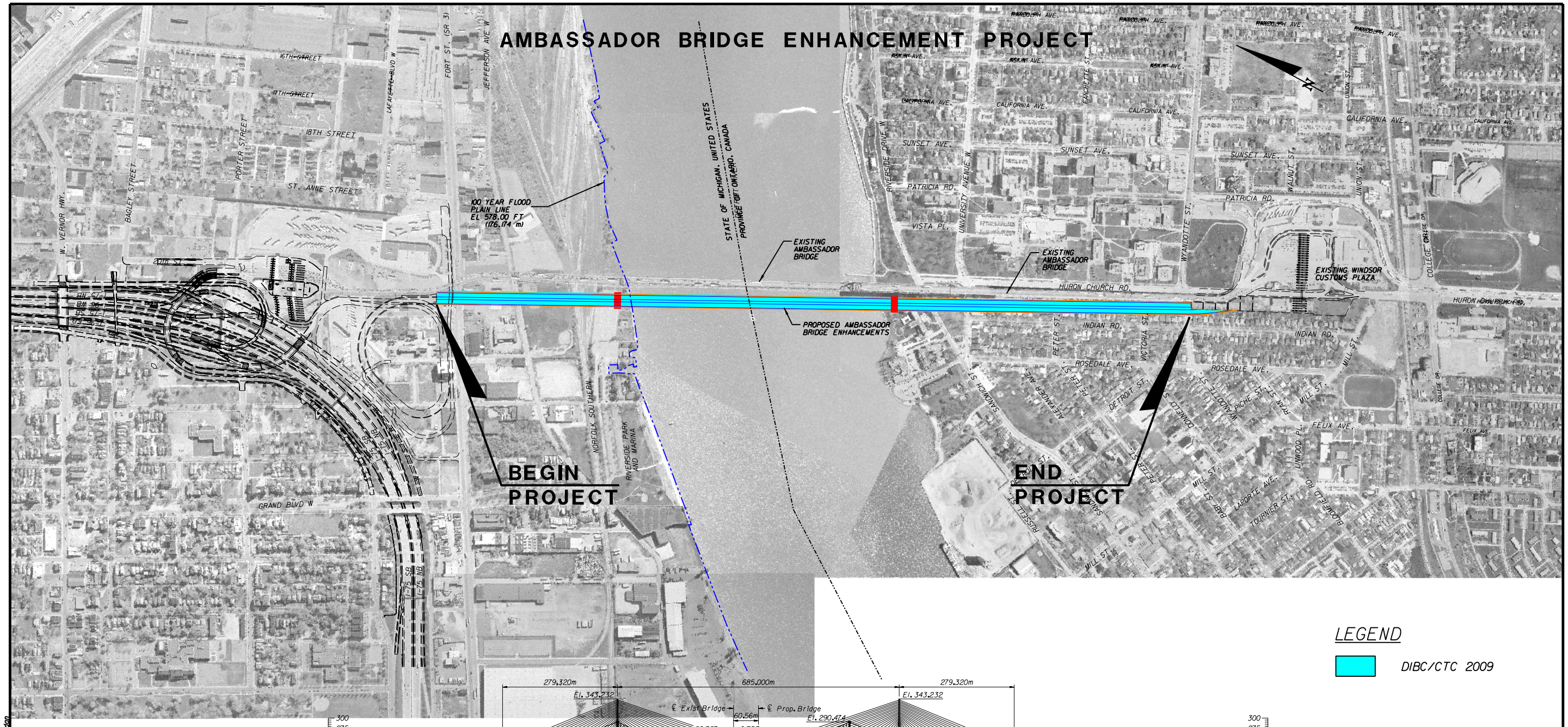
ROADWAY		
BRIDGES	1891.0	2.0
NET LENGTH OF PROJECT	1891.0	2.0
EXCEPTIONS		
GROSS LENGTH OF PROJECT	1891.0	2.0

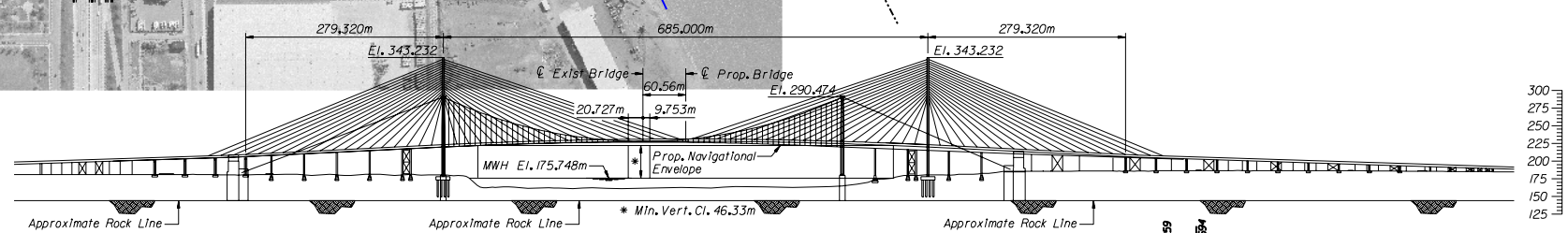
SHEET NO.
1

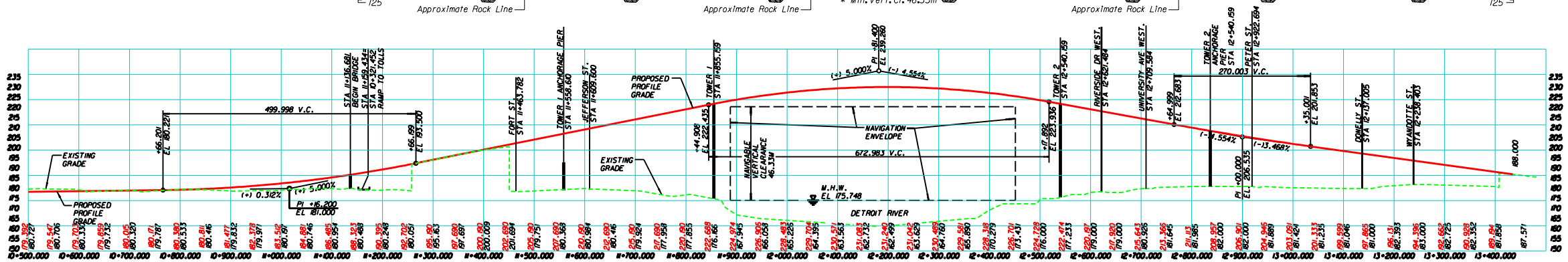
AMBASSADOR BRIDGE ENHANCEMENT PROJECT



LEGEND

DIBC/CTC 2009





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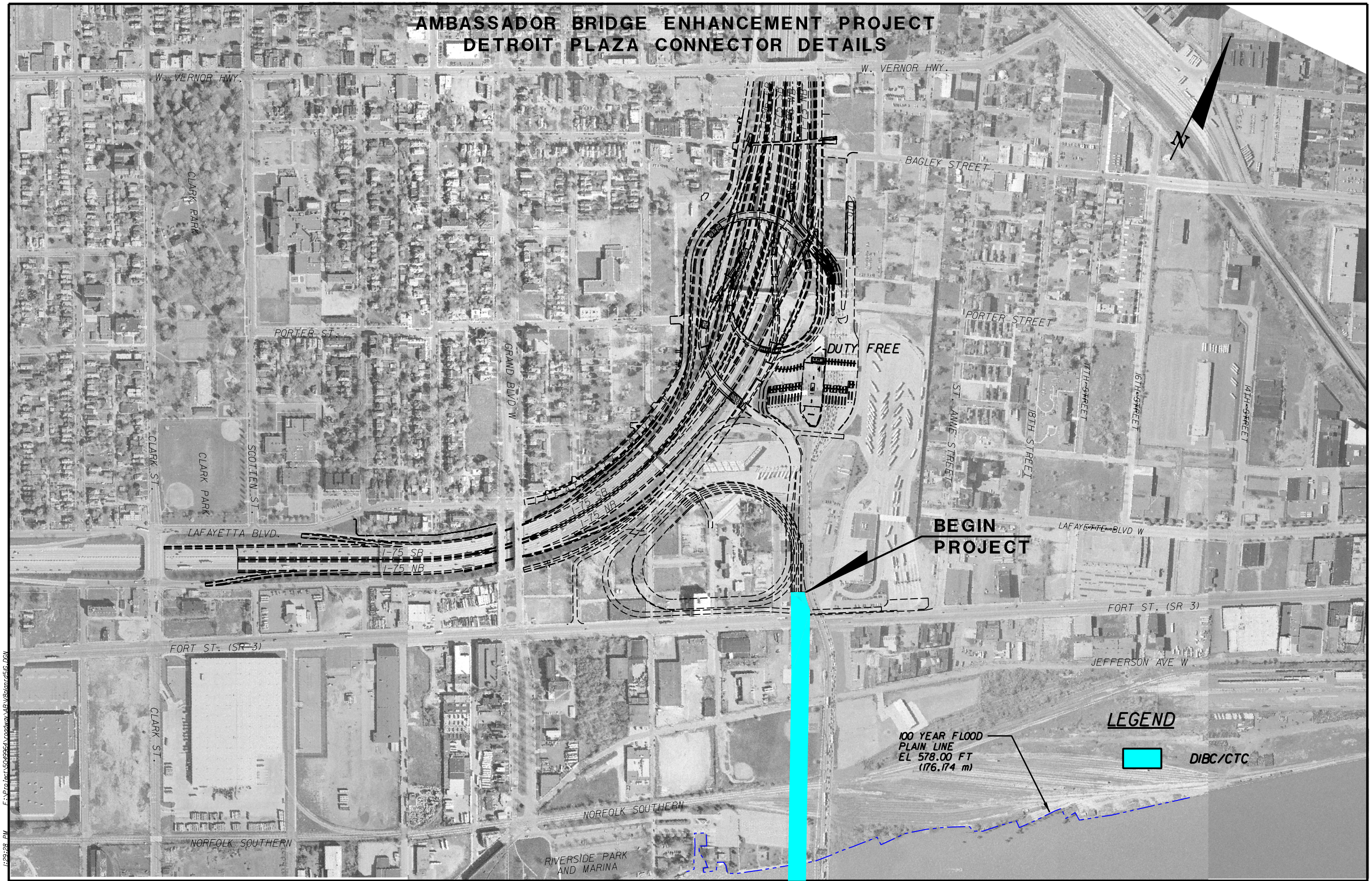
AMBASSADOR BRIDGE

AMBASSADOR BRIDGE ENHANCEMENT PROJECT

SHEET NO.

2 OF 10

AMBASSADOR BRIDGE ENHANCEMENT PROJECT
DETROIT PLAZA CONNECTOR DETAILS



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AMBASSADOR BRIDGE

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DETROIT PLAZA CONNECTOR DETAILS

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3 OF 10

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AMBASSADOR BRIDGE ENHANCEMENT PROJECT
WINDSOR PLAZA CONNECTOR DETAILS

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AMBASSADOR BRIDGE

AMBASSADOR BRIDGE ENHANCEMENT PROJECT
WINDSOR PLAZA CONNECTOR DETAILS

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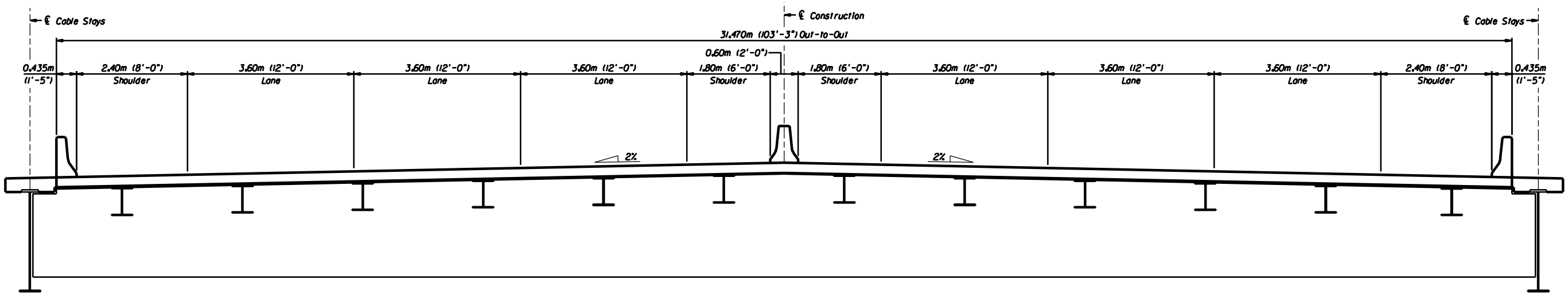

TYPICAL SECTION

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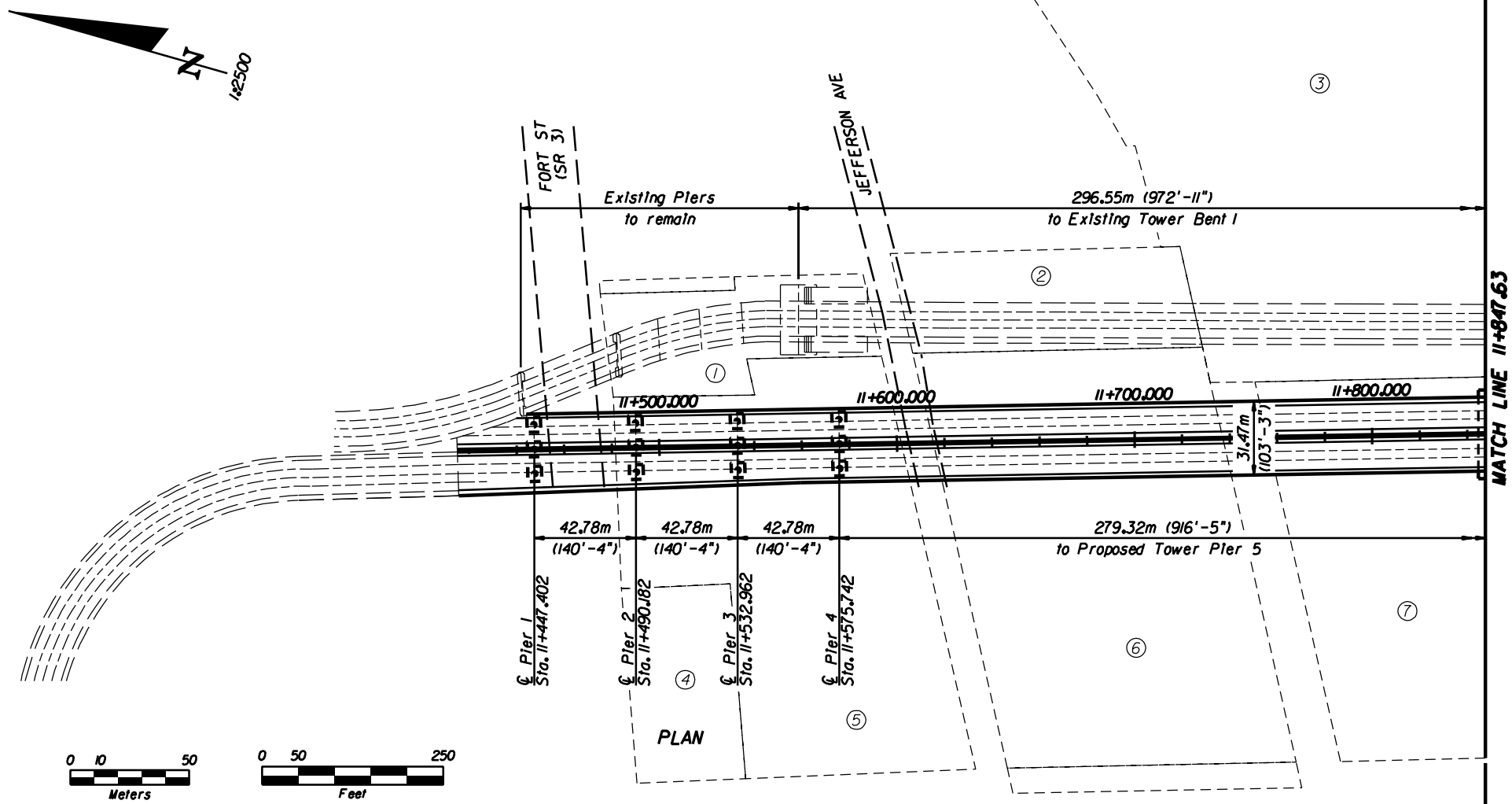
AMBASSADOR BRIDGE

PROPOSED BRIDGE OVER DETROIT RIVER
DETROIT, MICHIGAN - WAYNE COUNTY
WINDSOR, ONTARIO - ESSEX COUNTY

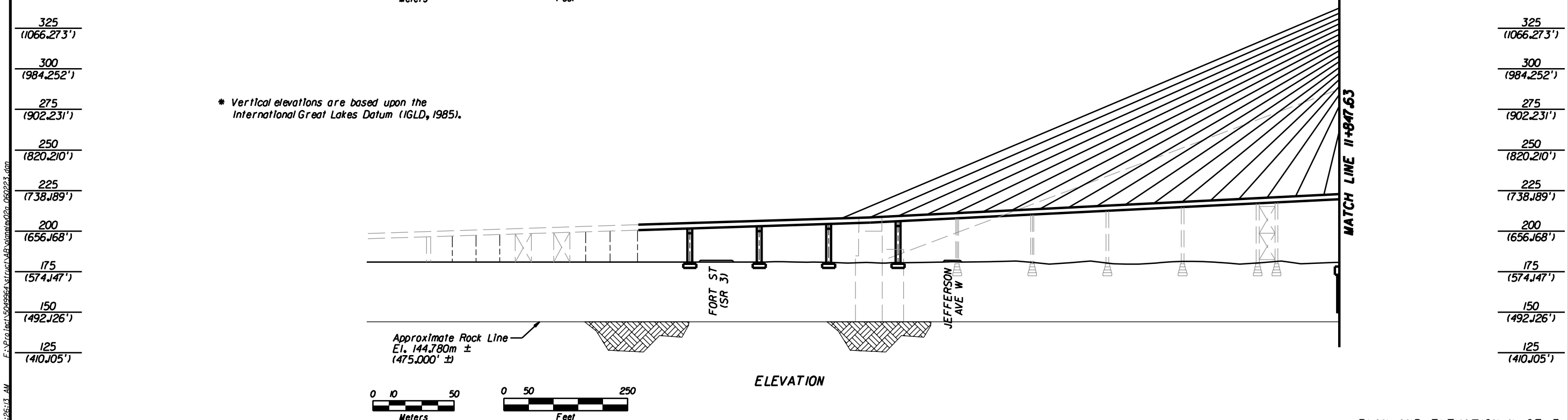
SHEET NO.
5

PROPERTY OWNERS:

1. Detroit International Bridge Company
2. CSX Transportation
3. CSX Transportation
4. Mexican Town Real Estate
5. Mexican Town Real Estate
6. City of Detroit Recreation Department
7. City of Detroit Recreation Department



* Vertical elevations are based upon the International Great Lakes Datum (IGLD, 1985).



PLAN AND ELEVATION (1 OF 3)

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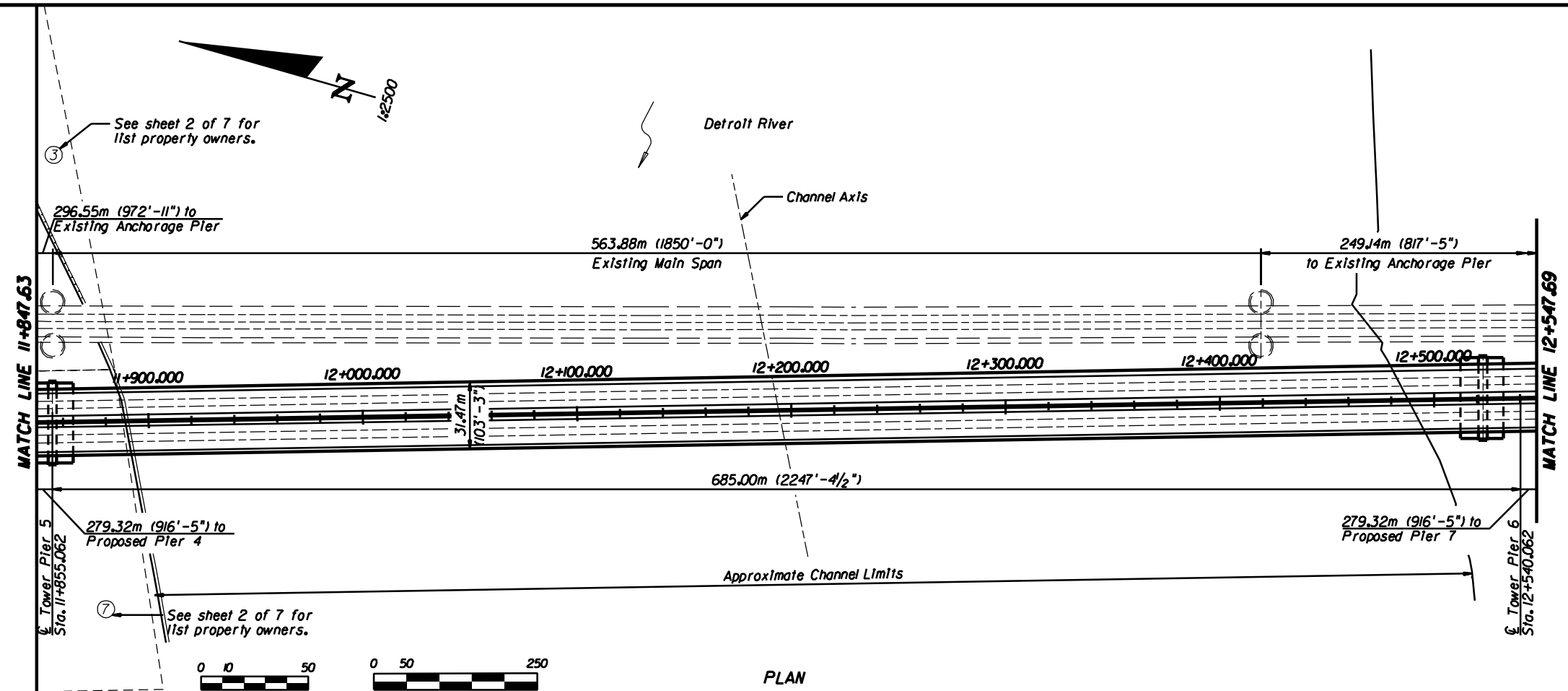
AMBASSADOR BRIDGE

PROPOSED BRIDGE OVER DETROIT RIVER
DETROIT, MICHIGAN - WAYNE COUNTY
WINDSOR, ONTARIO - ESSEX COUNTY

SHEET NO. 6



* Vertical elevations are based upon the International Great Lakes Datum (IGLD, 1985).

PLAN AND ELEVATION (2 OF 3)

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AMBASSADOR BRIDGE

PROPOSED BRIDGE OVER DETROIT RIVER
DETROIT, MICHIGAN - WAYNE COUNTY
WINDSOR, ONTARIO - ESSEX COUNTY

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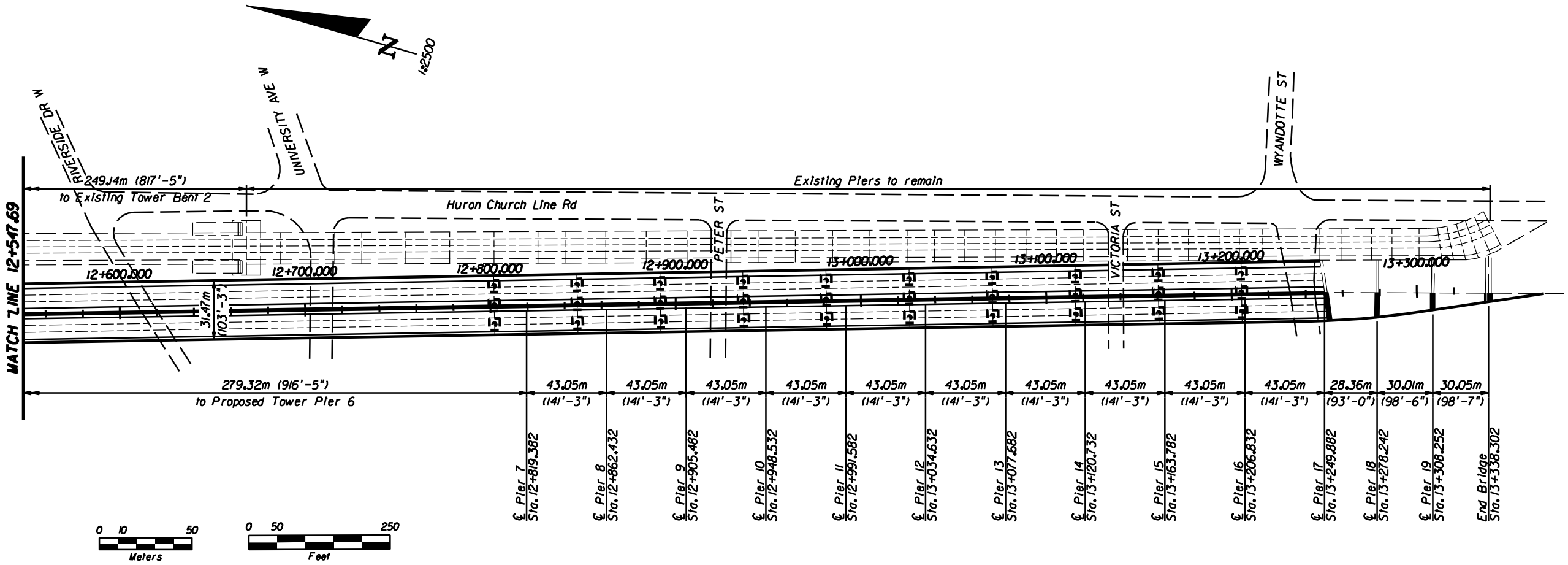
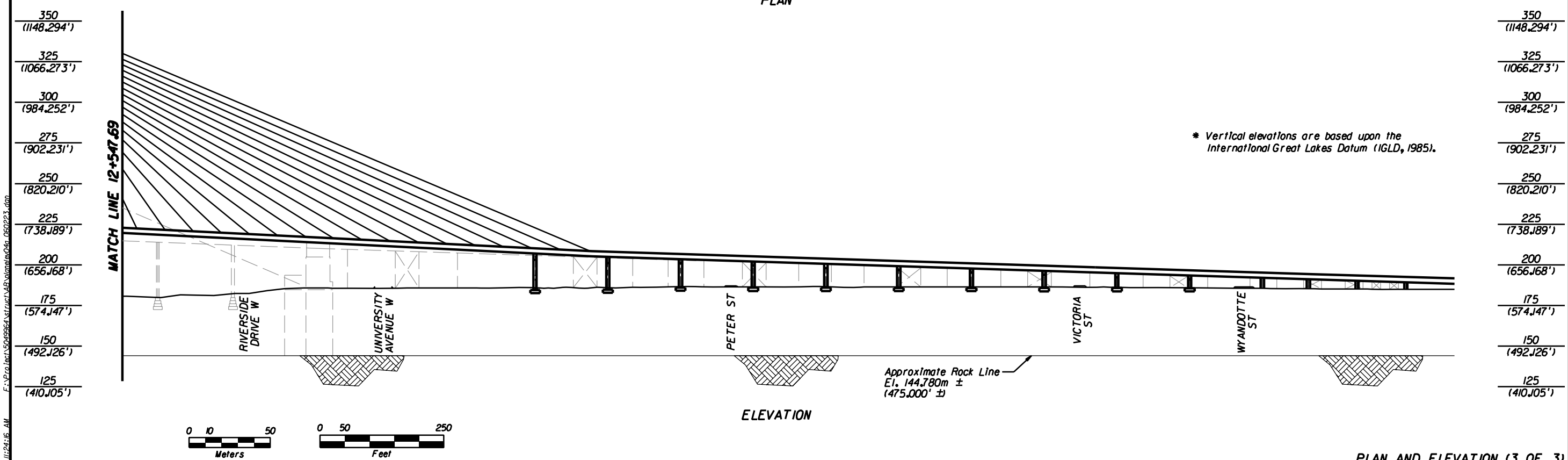


PLAN



ELEVATION

PLAN AND ELEVATION (3 OF 3)

American Consulting Professionals of Michigan, PLLC

AMBASSADOR BRIDGE

PROPOSED BRIDGE OVER DETROIT RIVER
DETROIT, MICHIGAN - WAYNE COUNTY
WINDSOR, ONTARIO - ESSEX COUNTY

SHEET NO. 8

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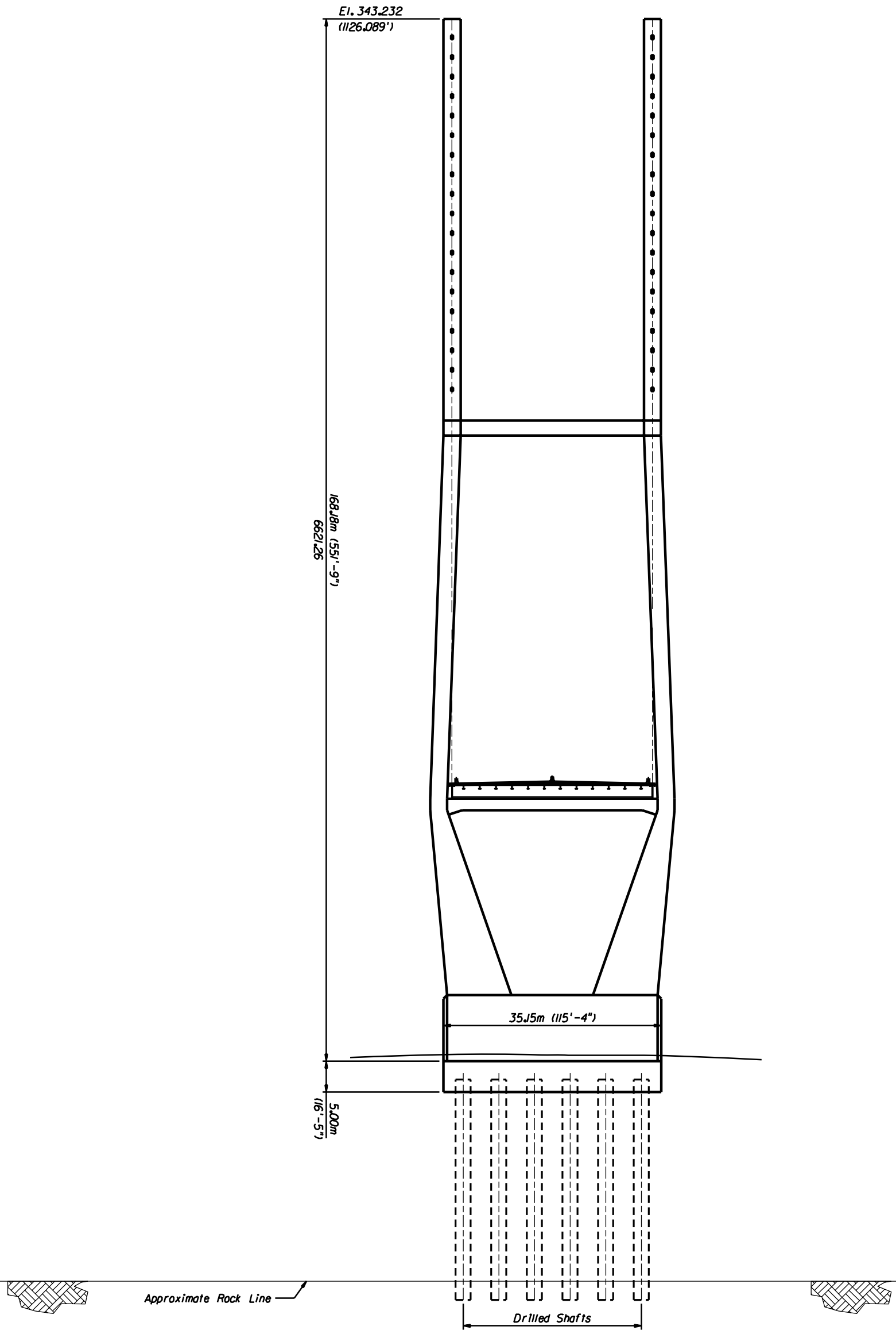
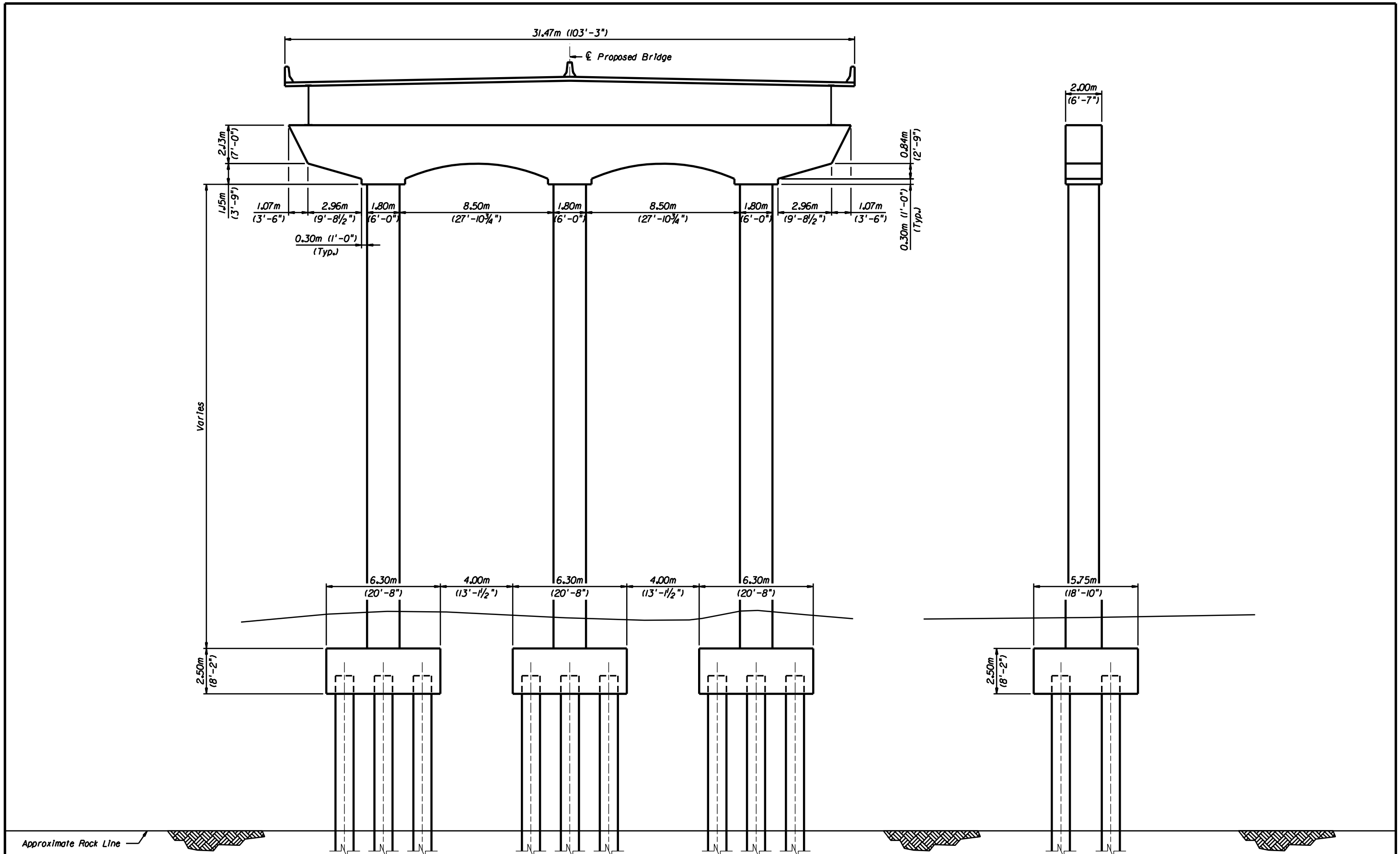


ELEVATION

American Consulting Professionals of Michigan, PLLC

PROPOSED BRIDGE OVER DETROIT RIVER
DETROIT, MICHIGAN - WAYNE COUNTY
WINDSOR, ONTARIO - ESSEX COUNTY

SHEET NO.
9



American Consulting Professionals of Michigan, PLLC

AMBASSADOR BRIDGE

PROPOSED BRIDGE OVER DETROIT RIVER
DETROIT, MICHIGAN - WAYNE COUNTY
WINDSOR, ONTARIO - ESSEX COUNTY

SHEET NO.
10

3/13/2007

U.S. Department of Transportation
Federal Highway Administration

Michigan Division

315 W. Allegan, Room 201
Lansing, Michigan 48933

April 4, 2007

Ms. Susan P. Mortel, Director
Bureau of Transportation Planning (B340)
Michigan Department of Transportation
Lansing, Michigan

Dear Ms. Mortel:

The Federal Highway Administration (FHWA) has reviewed the re-evaluation of the Environmental Assessment (EA) for the I-75 Ambassador Bridge/Gateway Project (C.S. 82194, J.N. 37795) including the re-evaluation of seven projects that were reviewed and cleared as Categorical Exclusions. FHWA concurs in the re-evaluation recommendation that there are no significant changes that would warrant preparation of a new EA or supplemental EA (see attachment).

Sincerely,

James J. Steele
Division Administrator

Attachment
Profile No. P-21235

MOVING THE AMERICAN ECONOMY

American

American Consulting Engineers of Florida, LLC

4111 Land O' Lakes Boulevard, Suite 210
Land O' Lakes, Florida 34639
Tel 813.996.2800 • Fax 813.996.1908
american@ace-fla.com • www.ace-fla.com

April 23, 2007

Commander
Ninth Coast Guard District
1240 East 9th Street
Cleveland, Ohio 44199-2060

Re: Application of Detroit International Bridge Company for the Ambassador Bridge Enhancement Project

Dear Sir:

Pursuant to the Bridge Act of 1906, Application is hereby made by the Detroit International Bridge Company ("DIBC"), a Michigan corporation headquartered at 12225 Stephens Road, Warren, Michigan 48089, for approval by the Commandant, U .S. Coast Guard ("USCG"), of the location and plans for the construction of a cable-stayed second span to be constructed across the Detroit River, just west of, and adjacent to, the current Ambassador Bridge, linking Detroit, Michigan with Windsor, Ontario. The new span would be constructed by DIBC in coordination with its commonly-owned Canadian counterpart, The Canadian Transit Company ("CTC"), an Ontario corporation. Both DIBC and CTC are owned by Centra, Inc., a Michigan corporation.

The Ambassador Bridge was completed in 1929, and currently serves as the busiest international crossing between the U.S. and Canada. The bridge was constructed pursuant to a 1921 federal statute authorizing the American Transit Company, a legal predecessor to DIBC, to build a bridge at that location. DIBC became the assignee of the rights under this federal authorization in 1927, and has controlled the U.S. portion of the Ambassador Bridge since that time. DIBC has determined that in light of the age of the existing span and the demands of modern traffic and security needs that the public would benefit from a new span.

The project identified as the "Ambassador Bridge Enhancement Project" or "Proposed Project" described in this document consists of the construction of an adjacent span to the Ambassador Bridge, just west of the existing span. The second span will provide four full service traffic lanes plus two lanes dedicated to low risk commercial travelers. The second span will be a new state-of-the-art cable stayed bridge that will connect directly to the Canadian and U.S. plazas owned by DIBC/CTC. The Ambassador Bridge Enhancement Project will be constructed entirely within the limits of the current operations of the DIBC/CTC. By constructing a new state of the art span across the Detroit River, the existing span will be freed up to allow it to be rehabilitated and to then serve as a backup, redundant resource in case of an emergency or another impediment against the free flow of people and goods across the new span as well as serve as a pedestrian and bicycle facility.

DIBC believes that its proposal for a new crossing over the Detroit River offers the best location and highway connections for a new span. The area where the second span would be located already accommodates the existing bridge and thus construction of a new span would result in minimal disruption to the local community. Substantial public and private resources have been devoted to improving and expanding the plaza areas at the foot of the Ambassador Bridge (the so-called Gateway Project) in anticipation of the construction of a second span. These improvements, already approved by federal and state authorities and now under construction, will enhance the efficiency of the clearance

process and improve access between the bridge and I-75, which runs very close to the Ambassador Bridge and links the Bridge to the Interstate Highway System. The new span will share these same links.

In addition, construction of a second span by DIBC will be undertaken entirely with private funds. Thus, public resources can be devoted to other projects and the construction will not be dependent on federal or state appropriations. This will also enhance the speed with which the second span can be constructed. In that regard, DIBC anticipates that the bridge could be constructed and operating by 2010.

U.S. legal authority for the proposed second span is found in the 1921 Congressional authorization to construct the Ambassador Bridge, as well as in the authorization sought by this application under the Bridge Act of 1906. Further, by the attached letter, the U.S. State Department has confirmed that a Presidential Permit is not needed for the construction of the second span. Since the second span would be an international bridge, the laws of the State of Michigan do not require DIBC to obtain a state permit for this work.

Apart from the approval sought by this application from the U.S. Coast Guard, DIBC is not aware of any other U.S. federal agencies that must grant approvals, easements or take other actions for this project to proceed. DIBC has consulted, and will continue to consult with, other federal agencies that would have an interest in the project, including the Federal Highway Administration, Department of Homeland Security (including the Bureau of Customs and Border Protection), U.S. Fish and Wildlife Service, General Services Administration and the U.S. Army Corps of Engineers. DIBC has previously submitted a water quality application to the Michigan Department of Environmental Quality under Section 401 of the Clean Water Act, and a copy of this permit has been previously supplied to USCG. In addition, DIBC and CTC are consulting with Canadian Government entities and are seeking appropriate approvals as is required from Canadian agencies.

With respect to environmental impacts, DIBC, through its consultants, has previously provided USCG with a March 31, 2006 document entitled, “Project Description and Type 2 Categorical Exclusion Environmental Documentation” (“March 31 Environmental Document”). This Document precedes the enclosed Environment Assessment which describes the environmental impacts of the second span, which are expected to be minimal. The EA explains the basis on which USCG might determine that the construction of a second span meets the requirements for a Finding of No Significant Impact. DIBC is also working with the Canadian Environmental Assessment Agency and has begun consultations with that agency and others on environmental review in Canada.

A letter dated May 26, 2007 from the SHPO stated that the Proposed Project would have an adverse affect on the Ambassador Bridge because “the undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling or association.” Specifically, the SHPO was concerned with visual impacts and any archaeological resources at the project sites. DIBC/CTC are currently in consultation with the State Historic Preservation Officer.

Other environmental impacts are expected to be minimal to none and will be mitigated appropriately. The project will not result in displacements or relocations (residences, businesses, people) in the United States and will not disproportionately affect minority or low-income populations under Environmental Justice requirements.

We look forward to your response to this Application letter and the other materials previously submitted by DIBC in connection with it. We also understand that notice of the Application will be published in the Federal Register. We have also published this EA on our website (www.ambassadorbridge.com). Should you have any questions or require more information, please contact me at 813-996-2800 ext. 5567.

Sincerely,
American Consulting Engineers of Florida, LLC

Scott Korpi, PE
Project Manager

cc: Dan Stamper, Craig Stamper, David Coburn, Pat Holland
City of Detroit
Federal Highway Administration (FHWA)
International Joint Commission (IJC)
Michigan Department of Environmental Quality (MDEQ)
Michigan Department of Natural Resources (MDNR)
Michigan Department of Transportation (MDOT)
Michigan State Historical Preservation Office (SHPO)
National Park Service (NPS)
Southeast Michigan Council of Governments (SEMCOG)
United States Army Corps of Engineers (USACE)
United States Coast Guard (USCG)
United States Customs and Border Protection (CBP)
United States Environmental Protection Agency (USEPA)
United States Fish and Wildlife Services (FWS)
United States National Marine Fisheries Service
General Services Administration
U.S. Department of Homeland Security
City of Windsor
Canadian Environmental Assessment Agency
Transport Canada

F:\PROJECT\5049964\File Cabinet\B. Correspondence\B.04 INTERNAL TEAM CORRESPONDENCE OUT\070423 LET SKorpi USCG Application for Permit.DOC

U.S. Department of Homeland Security
United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2019
Cleveland, OH 44199-2060

Phone: (216) 902-6085
FAX: (216) 902-6088

16590
B-043/sms
May 2, 2007

RECEIVED BY
MAY 07 2007
AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC

Advisory Council on Historic Preservation
Old Post Office Building
1100 Pennsylvania Avenue, NW, Suite 809
Washington, D.C. 20004

Dear Mr. Sir or Madam,

In accordance with 36 CFR 800.6(a)(1), I am writing to advise you of an adverse effect determination made by the Michigan State Historic Preservation Officer (MI-SHPO) for the proposed Ambassador Bridge Enhancement Project in Detroit, Michigan. A copy of the March 26, 2007, MI-SHPO letter is enclosed. The U.S. Coast Guard is the federal agency of record for this proposed project.

A subsequent phone conference was conducted on April 16, 2007 among the applicant, U.S. Coast Guard, and MI-SHPO. The phone conference resulted in MI-SHPO requesting additional information from the applicant regarding the purpose of the project and possible alternatives. The MI-SHPO has requested this information, along with additional archeological studies, to complete their review of the project. The applicant will perform the additional studies and supply the requested data. Additionally, a public workshop has been scheduled for May 24, 2007 to expand public involvement in the process. An announcement has been published in the Detroit Free Press and Detroit News regarding this workshop.

The applicant has also released a Draft Environmental Assessment (EA) for the project, including a description of the project and efforts taken so far to address historical and cultural impacts. The portions of the EA that describe these efforts are enclosed. The Coast Guard has also issued a press release to the same Detroit newspapers announcing the adverse effect determination made by SHPO, and to request additional comments from the public.

The Coast Guard will continue coordination and consultation with the applicant and MI-SHPO to satisfy the requirements of Section 106 of the National Historic Preservation Act.

Please contact me at (216) 902-6085 if you have any questions or require additional information. Thank you.

Sincerely,

Robert W. Bloom, Jr.

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

Copy: Detroit Ambassador Bridge Company, Detroit, Michigan
Michigan State Historical Preservation Officer, Lansing, Michigan

12th House District
Southwest Detroit
H-153 CAPITOL
P.O. BOX 30014
LANSING, MI 48909-7514

Rcvd (dpb)
10 May 2007

STEVE TOBOCMAN

MICHIGAN HOUSE OF REPRESENTATIVES
MAJORITY FLOOR LEADER

(517) 373-0823
1-877-STEVE-12
FAX: (517) 373-5993
stevetobocman@house.mi.gov

May 8, 2007

Robert W. Bloom, Jr., Bridge Program Manager
U.S. Coast Guard
Office of Commander (dpw 3)
Ninth Coast Guard District
1240 E. Ninth Street
Cleveland, OH 44199-2060

Dear Mr. Bloom:

As the State Representative for the 12th District located in Southwest Detroit, I am writing to request a 90 day extension on the comment period on the Draft Environmental Assessment (EA) for the Ambassador Bridge Enhancement Project proposed by the Detroit International Bridge Company. An extension of the comment period on the proposed Ambassador Bridge Enhancement Project is certainly with precedent. Following the U.S. Coast Guard notice for public comment on the preliminary determination that the proposed project qualified for a categorical exclusion last summer, an extension of the comment period was requested and granted. As you are well aware, the proposed project continues to cause confusion and significant controversy in the 12th District where there are two competing border crossing projects. Finally, each of the permits processed thus far for the proposed project have required public notice and comment; and each associated comment period has been extended to accommodate and encourage full discussion and debate on such a critical project – not only to the 12th District – but to the relationship with one of our strongest trading partners. A thirty-day comment period is simply not sufficient to accommodate a thorough and proper review of the Draft EA.

Please do not hesitate to contact me if you have any questions or would like to discuss this matter.

Sincerely,

Steve Tobocman
House Majority Floor Leader
State Representative, 12th District – Detroit

cc: Senator Carl Levin
Senator Debbie Stabenow
Congressman John Dingell

Gateway Communities Development Collaborative

C/o Southwest Detroit Business Association
7752 W. Vernor Hwy.
Detroit, MI 48209
(313) 842-0986 (phone)
(313) 842-6350 (fax)

Member Organizations

Bagley Housing Association

Bridging Communities, Inc.

Greater Corktown Development Corporation

Mexicantown Community Development Corporation

Michigan Avenue Business Association

Neighborhood Centers, Inc.

Southwest Detroit Business Association

Southwest Detroit Environmental Vision

Southwest Housing Solutions

May 8, 2007

RECEIVED
MAY 10 2007

Mr. Robert Bloom
U.S. Coast Guard
Office of Commander (dpw-3)
Ninth Coast Guard District
1240 E. Ninth Street
Cleveland, OH 44199

Re: Request for 90-day Extension of Comment Period for Draft Environmental Assessment for the Detroit International Bridge Company's Proposed Second International Border Crossing

Dear Mr. Bloom:

This letter is on behalf of the nine member organizations of the Gateway Communities Development Collaborative (GCDC), the Delray Community Council (Delray), People's Community Services (PCS) and the Hubbard Farms Neighborhood Association (Hubbard Farms). We are writing to request a 90-day extension for the comment period on the draft Environmental Assessment for the Detroit International Bridge Company's Proposed Second International Border Crossing.

GCDC is an association of nine non-profit community development organizations that are working to improve the quality of life in Southwest Detroit. All are engaged in housing, economic development or environmental work to create a community where people want to live, work, shop and play. Over the last five years, GCDC member organizations and their partners have invested nearly $22 million in commercial and economic development projects, over $92 million in housing development projects, and $18.5 million in infrastructure, parks and greenway improvements. GCDC also works in partnership with other community organizations like Delray and Hubbard Farms to be actively involved in the discussions regarding a second international border crossing.

GCDC requires the full 90 day period to properly analyze the materials provided to the public in the draft EA document, as well as to address issues that were entirely neglected by the EA, but which legally should have been part of it. We believe that our request for a 90-day extension of the comment period is warranted in light of the scope, complexity, and controversial nature of the proposed project, which will have a myriad of environmental, historical, economic, and developmental impacts on our Southwest Detroit community. Further, the requested extension is consistent with the National Environmental Policy Act (NEPA)'s purpose of ensuring full public participation and an open review process for NEPA documents. Given the scope and controversy of the twinning of the Ambassador Bridge, a full 90 day comment period is necessary to enable the public in general, and GCDC in particular, to review this project.

We appreciate your sincere consideration of this request. Please feel free to contact Mr. Richard Cannon at (810) 359-2566 or at rcannonir@netzero.net if you have any questions or to communicate your decision regarding our request.

Sincerely,

Alison Benjamin

Alison Benjamin
Southwest Detroit Environmental Vision
GCDC Executive Committee Member

Tom Cervenak

Tom Cervenak
People's Community Services

John M Nagy

John M. Nagy
Delray Community Council

Cc U.S. Senator Carl Levin
U. S. Senator Debbie Stabenow
Cong. John Dingell
Cong. John Conyers
Rep. Steve Tobocman

CARL LEVIN
MICHIGAN

RUSSELL SENATE OFFICE BUILDING
WASHINGTON, DC 20510-2202
(202) 224-6221

COMMITTEES:
ARMED SERVICES
GOVERNMENTAL AFFAIRS
SMALL BUSINESS
INTELLIGENCE

United States Senate

WASHINGTON, DC 20510-2202

Rcvd (dpb)
5/16/07

May 11, 2007

Mr. Robert Bloom, Commander
U.S. Coast Guard, Ninth District
1240 East Ninth Street
Cleveland, OH 44199

Dear Commander Bloom:

I am writing in reference to the draft Environmental Assessment (EA) for the Detroit International Bridge Company's proposal to build a second span to the Ambassador Bridge.

I understand the Gateway Communities Development Collaborative has contacted you to request a 90-day extension to the comment period for the draft EA. The community has many questions regarding this proposal and an extension of the comment period will allow them more time to analyze the documents associated with the draft EA. In the interest of providing the public sufficient time to study and comment on a complicated issue, I encourage you to consider this request and grant the 90-day extension.

Thank you in advance for your assistance.

Sincerely,

Carl Levin

CL/gag

STATE OFFICES

DETROIT
477 MICHIGAN AVENUE
SUITE 1860
DETROIT, MI 48226
(313) 226-6020

ESCANABA
624 LUDINGTON STREET
SUITE UL-103
ESCANABA, MI 49829
(800) 765-0062

GRAND RAPIDS
FEDERAL BUILDING
SUITE 720
110 MICHIGAN STREET, N.W.
GRAND RAPIDS, MI 49503
(616) 456-2531

LANSING
124 WEST ALLEGAN STREET
SUITE 1810
LANSING, MI 48933
(517) 377-1508

SAGINAW
ROOM 402
510 NORTH WASHINGTON AVENUE
SAGINAW, MI 48607
(989) 754-2494

TRAVERSE CITY
107 CASS STREET
SUITE E
TRAVERSE CITY, MI 49684
(231) 947-9505

WARREN
30500 VAN DYKE AVENUE
SUITE 208
WARREN, MI 48093
(586) 573-9146

The Wyandot of Anderdon Nation
P.O. 68 Trenton Michigan
48183

Rcvd (dpb) 5/18/07

Received by email August 27/07

May 11th 2007
United States Coast Guard 9th District
1240 E. Ninth St. Room 2025
Cleveland, Ohio
41999-2060
Attn: Chief of Staff Captain Joseph R. Castillo

RE: Ambassador Bridge project Sandwich Ontario site

Kwe (Hello) Captain Castillo,

The Wyandot Nation is very concerned by the potential impact and destruction to our ancestral burial grounds on Sandwich Ontario lands due to future development of the proposed Ambassador Bridge project.

We also agree with and are in support of the local Windsor residents who have voiced concerns on environmental and cultural issues in this area as well due to this pending project.

Having documented proof of Wyandot ancestral remains in the very area of proposed development; we are requesting these burial sites not be disturbed as these remains of our ancestors are sacred to our way of life.

We anticipate in short order your response on how this unfortunate situation will be handled going forward.

Grand Chief / CEO
The Wyandot of Anderdon Nation
Taywanoka (Flying Arrow) Steve A. Gronda

Steve A. Gronda

CC:
Detroit River Wyandot Nation
Director Gert Free
Project Manager Michel Gros Louis

Grand Chief of Wendake Nation
Max Gros Louis
Grand Chief of Wyandotte - Oklahoma Nation
Leaford Bearskin
Chief of Wyandot - Kansas Nation
Jan English

Rcvd (dpb)
5/22/07

Commander (dpb)
Ninth Coast Guard District
1240 E. 9th Street - Room 2025
Cleveland, Ohio 44199-2060

May 14, 2007

Dear Sir,

Pursuant to your Public Notice requesting comments on the proposed construction of an additional bridge span next to the Ambassador Bridge:

We oppose the project for the following reasons:

1) Additional lanes (six vs. the present four) will ultimately lead to additional traffic volume which would have an unacceptable impact on our neighborhood in terms of deterioration of roads, noise level, and travel difficulties, which we are already experiencing and which will only get worse.

2) Homeland security should dictate that a redundant river crossing should not be immediately alongside the existing crossing, but far enough away that an incident at one bridge would not affect the other.

3) The DRIC has ruled out this location as viable and their study should not be ignored.

4) The appearance of the proposed bridge will detract from the historical look of the old bridge and negatively impact the historic communities around it.

5) A new crossing should be publicly owned rather than owned by a private company with a track record as a bad corporate citizen that holds itself above the law and disregards the people of the community, the building and safety department of the City of Detroit, and which only wants to protect its monopoly power.

Sincerely,

W.C. & A. Gourlay

William C. and Ann Gourlay
homeowners,
1162 Vinewood, Detroit

RAYMOND E. BASHAM
8TH DISTRICT
P.O. BOX 30036
LANSING, MICHIGAN 48909-7536
PHONE: (517) 373-7800
FAX: (517) 373-9310
senrbasham@senate.michigan.gov

THE SENATE
STATE OF MICHIGAN

SENATE STANDING COMMITTEES:
NATURAL RESOURCES AND ENVIRONMENTAL AFFAIRS, MINORITY VICE CHAIR
TRANSPORTATION, MINORITY VICE CHAIR
LOCAL, URBAN AND STATE AFFAIRS
SENIOR CITIZENS AND VETERANS AFFAIRS

May 15, 2007

Admiral John E. Crowley, Jr.
Ninth Coast Guard District
1240 East 9th Street – Room 2023
Cleveland, OH 44199-2060

Dear Commander Crowley:

I am writing to express my serious concerns about the Detroit International Bridge Company's proposed twin spanning of the Ambassador Bridge. Knowing of U.S. Coast Guard's obligation to consider both the environmental and socioeconomic impact of this project, I respectfully request the denial of the Company's pending application for permit.

As you should know well, there is significant opposition to this new span, which would continue as a privately-owned international crossing. Complaints about the company's all too common disregard for bridge's impact on neighboring communities, for compliance with local regulations, and for the protection of the public's interest would likely worsen under such a proposal. Furthermore, by twinning the existing Ambassador Bridge this new crossing fails to address homeland security issues and possibly only makes them a greater concern.

According to the information I have received the U.S. Coast Guard is expected to issue a decision on the permit sometime this summer. As part of the permit process, a Coast Guard sponsored public hearing was previously held. Unfortunately the public notice given for the hearing was questionable as was the manner in which it was conducted. I would, therefore, argue that at the very least, an additional, more appropriately publicized hearing should be scheduled.

Thank you in advance for your consideration. I look forward to your response.

Sincerely,

RAYMOND E. BASHAM
State Senator
8th District

RECEIVED
MAY
DCS

Recycled Paper

Mr. William A Grabowski
42389 Crestview
Northville, MI 48168

Dear Commander (dpb), United States Coast Guard, May19, 2007

I would like to express my opposition to the proposed building a second span parallel to the current Ambassador bridge by a private company. I have concerns about the national security of such a proposal as well as a private company continuing to operate one of the most important border crossings in North America if not the world. At a minimum, a competitive bidding process should be enacted with public input on the proposed designs. As it stands, the current owners monopolize the crossings in Detroit and Windsor. An independent, bi-national commissioned study concluded with recommendations that should be respected and followed, but differ greatly from the proposed private plan.

Starting in 2002, the joint governments of Ontario, Michigan, Canada, and the United States commissioned this bi-national study to determine the best way to handle the increased traffic flow. Significant tax dollars have been spent ($4.5M) to protect the best interests of all of the citizens of the US and Canada. The administration's suggestion was to construct a separate bridge crossing south and west of the current structure, outside the downtown districts of both Windsor and Detroit.

They have made this recommendation based on environmental, economic, security, congestion, and other quality of life factors that would impact the region as a whole. The Detroit International Bridge Company have not used the same factors in their proposal, instead theirs is primarily a revenue protection and growth plan.

A few other points:

The security of the bridge crossing should be the highest concern. Placing two spans next to each other would be illogical and unsafe. Where is the Department of Homeland Security on this issue? (As an aside, currently there are no vehicle security checks until after the border crossing is made – this is beyond comprehension!)

The Bridge Company's proposed use as a pedestrian and bicycle path for the old span is specious at best. Given the security, maintenance, costs to operate the construction project, and the low volume of expected users, the owners would be hard pressed to make a business case to keep this arch open. Although it will create good politics, it will never actually happen. Instead, this span would be better suited to handle passenger vehicle traffic only to promote commerce between Detroit and Windsor, while truck and transport traffic would be routed to the downriver facility and onto I-75 at that point to ease congestion in the downtown areas.

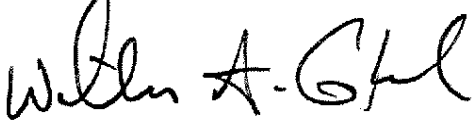
I do see where the Detroit International Bridge Company's revenues and survival would be greatly at risk if they were to lose truck traffic to the downriver bridge. I suspect they would spend any amount they have to in order to block competition.

According to the study, ultimately two bridges will be required to handle the increased traffic volume sometime after 2010. The short term conclusion by the Detroit International Bridge Company, that a second bridge may not even be required, is self serving and misleading. The demand may be delayed somewhat due to the recent economic performance in the region, but population and national economic growth trends overall will continue and a second bridge will be required. If anything, the current conditions allow for more thoughtful consideration of where and what to build. This should not be a "race"; it's a strategy for growth in this region.

The congestion on the Windsor side of the bridge is magnitudes worse than in Detroit. I have witnessed the gradual increase of traffic (we have a cottage in Leamington, Canada), and the hundreds of trucks that wait to clear Customs, sometimes three or four miles back on Huron Church. The traffic, thick with diesel fumes and noise, disrupts the everyday life of the residents of the surrounding region. The residents of Windsor have a right to be concerned with this private plan which will have significant impact on their already interrupted quality of life. As their international neighbors, we should be in support of a solution that benefits us all.

I strongly believe that government should be left out of most aspects of our free market economy, as private industry has always proven to be more efficient in profit making and benefiting society in most areas. But in areas of security, defense, infrastructure and road building, the government should be held responsible and accountable to serve our needs. The verdict on where and when to build the additional border crossing should be made by the governments of the United States and Canada with ownership being retained by both. A decision on the location for a second span, that will affect this region for many future generations, should not be abdicated by our political leadership, made for expediency and convenience, and certainly shouldn't be left to a private concern as an exercise in growth and profiteering. Our lawmakers need to be visible on this issue and held accountable to act in the best interests of their constituents.

Sincerely,



William A. Grabowski

Northville, Michigan
Leamington, Ontario

SEMCOG . . . *Local Governments Advancing Southeast Michigan*

Southeast Michigan Council of Governments • 535 Griswold Street, Suite 300 • Detroit, Michigan 48226-3602 • 313-961-4266 • Fax 313-961-4869
www.semcog.org

May 23, 2007

RECEIVED BY
MAY 29 2007
AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC

Mr. Scott Korpi, P.E. SE, Principal/Project Manager
American Consulting
Engineers of Florida, LLC
4111 Land O'Lakes Boulevard, Suite 210
Land O'Lakes, Florida 34639

Dear Mr. Korpi:

Thank you for making a presentation to SEMCOG staff to help us understand the Ambassador Bridge Enhancement Project. I believe that with the materials you submitted on March 30, 2007, along with your request to amend the *2030 Regional Transportation Plan for Southeast Michigan* (2030 RTP) and the additional information included with the Draft Environmental Assessment Document, that we have enough information to begin our review of your request to include the proposed project in the 2030 RTP. We will contact you should we have additional questions or need additional information that you can provide.

As we indicated at the meeting, the process for amending the proposed enhancement project to the 2030 RTP will follow the following schedule, assuming that all necessary information for SEMCOG to complete our analysis is available:

- Consideration by the Transportation Advisory Council – August 22, 2007.
- Consideration by the Executive Committee – September 28, 2007.
- Consideration by the General Assembly – October 25, 2007.
- Submission of Action by General Assembly to MDOT – October 26, 2007.
- Approval of the Air Quality Conformity Finding by FHWA/FTA/EPA – generally 30 days after submission by MDOT to Federal Agencies.

Please contact me if you have any questions.

Sincerely,

Carmine Palombo, P.E.
Director of Transportation Programs
SEMCOG

cc: Skip McMahon

John F. Jones Chairperson *Supervisor, Ira Township*
William T. Roberts First Vice Chair *Mayor, City of Walled Lake*
Mary Blackmon Vice Chairperson *President, Wayne County Regional Education Service Agency*
Robert J. Cannon Vice Chairperson *Supervisor, Clinton Township*
Philip M. Cavanagh Vice Chairperson *Commissioner, Wayne County Board of Commmissioners*
Robert Hison Vice Chairperson *Mayor, City of St. Clair Shores*
Paul E. Tait Executive Director

Commander (dpb)
Ninth Coast Guard District
1240 E. 9th Street – Room 2025
Cleveland, OH 44199 2060

May 24, 2007

Dear Commander:

I am a resident of the Hubbard Farms Community in Detroit and strongly oppose the construction of a twin span of the Ambassador Bridge. This neighborhood has to contend with enough noise, congestion, and pollution from the bridge truck traffic the way it is. Also, I see a second span as a security risk.

I am in favor of the alternate, government-planned/studied proposed plan for a new bridge in the Delray area, however. That community wants it there due to the possible spin-off business that could result. This is the plan that the DIBC wishes to kill, and it is widely felt that the sole reason is that they wish to maintain their monopoly. I can't believe that the US Department of Homeland Security would have a hand in this—and especially with the security concerns of having two bridges side-by-side.

Well, you asked for my input, and now you have it.

Sincerely,

Curtis M. Truitt
359 West Grand Blvd.
Detroit, MI 48216

U.S. Department of Transportation
Federal Highway Administration

Michigan Division

315 W. Allegan, Room 201
Lansing, Michigan 48933

May 24, 2007

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶ 5

To	From
David Coburn	Bob Bloom
Dept./Agency	Phone #
Fax #	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Commander (dpb)
Ninth Coast Guard District
1240 E. 9th Street, Room 2025
Cleveland, Ohio 44199-2060

Dear Sir:

The Michigan Division of the Federal Highway Administration (FHWA) has reviewed the Environmental Assessment prepared for the proposed Enhancement Project at the Ambassador Bridge in Detroit, Michigan. Our comments are submitted in the attachment for your review and consideration. Should you have any questions regarding our comments, please feel free to contact me at 517-702-1835.

Sincerely,

J. A. Kirschensteiner

James A. Kirschensteiner
Assistant Division Administrator

For: James J. Steele
Division Administrator

Attachment

cc: Robert Bloom, US Coast Guard, Ninth District
Fred Skaer, FHWA
Jill Hochman, FHWA
Doug Hecox, FHWA

Profile No. P-21461

MOVING THE AMERICAN ECONOMY

Subject: Comments to the U.S. Coast Guard
Ambassador Bridge Enhancement Environmental Assessment
May 21, 2007

By: Federal Highway Administration, Michigan Division

General Comments and Observations:

- The document is still largely a qualitative document and does not perform a rigorous quantitative analysis of several topical areas.

- The Detroit International Bridge Company (DIBC) philosophy and presentation has changed since earlier characterizations of the proposed project presented over the years. Now the Enhancement project is portrayed as a large maintenance project. Statements made by the Bridge Company during public meetings in Canada have said, "… the Ambassador Bridge Enhancement Project, which can essentially be viewed as a large maintenance project. The cost of carrying out maintenance while the Bridge is under load is very high and given the current economic and bond markets it makes sense to construct a new bridge now, take the current bridge out of service and assess its long term maintenance needs." While the statement concerning maintenance under traffic is true, it raises the question as to what the Ambassador Bridge Enhancement Project really is. It has been characterized as different things over time. It also begs the question concerning the fate of the current bridge. Realistically, why would an owner of the existing bridge maintain it and leave it sit empty or use it for international pedestrian or bicycle traffic which the U.S. Customs discourages? Who would ensure the existing bridge is adequately maintained? Would it become a hazard to navigation, or will it be re-opened to through traffic once all necessary maintenance is completed, and the current controversy is forgotten?

- DIBC reiterated that DIBC/CTC will fund the entire project. No federal funds are needed, yet the DIBC intends to use Private Activity Bonds approved by the federal government.

- The analysis draws on data from the DRIC study, specifically the traffic data for border crossing trips. This is the extent of the traffic analysis performed. In our review of the document, it appears that the traffic was only analyzed for the air quality analysis in Appendix K. No attempt is made to refine the DRIC traffic data for the future proposed enhancement bridge. A refinement would include the eventual operation of a new bridge at the DRIC location to address future capacity needs and show projected future traffic at the Ambassador location. No analysis of current or future traffic could be found.

- This project is a regionally significant transportation project and should be in the South East Michigan Council of Governments (SEMCOG) Long Range Transportation Plan and undergo an air quality conformity analysis by SEMCOG before a Finding of No Significant Impact is made.

- The proposed cable-stayed bridge main span, at 685 m or 2,247', is significantly longer than any current bridge in North America. The longest cable-stayed span currently in use in the world is 2,920' (Japan), in North America is 1,525' (BC, Canada), and in the US is 1,300' (FL). China has 2 cable-stayed bridges proposed with spans over 3,000', so the span-length proposed may be reasonable. However, there is no indication that an engineering consultant experienced in such a record setting long-span cable-stayed structure was involved in determining the feasibility of the proposed bridge.

- There are very significant structural security vulnerabilities associated with suspension and cable-stayed bridges. The opportunity exists to mitigate some of these vulnerabilities when designing new bridges of these types. This opportunity should not be ignored for such a critical structure.

- The height of the proposed support tower could interfere with operations of the Windsor Airport. There is no analysis of this in the document.

- Transboundary effects and impacts per the CEQ guidance of July 1, 1997, should be considered in the analysis. Impacts in Canada from the proposed enhancement project will be studied by Transport Canada and need to be considered in the U.S. Coast Guard's analysis before a decision is reached.

Specific Comments:

- Page 17: The EA indicates that full rehabilitation of the bridge to continue indefinitely with current and future day-to-day truck traffic is expected to require the full replacement of many of the primary load carrying structural elements of the superstructure. This statement is not born out by the bridge inspection reports and information the FHWA has seen. Repairs are currently underway to structural elements which, when completed, will improve the load rating.

- Page 26: A statement is made that there is no need to alter plaza or local roadway networks. If this is true, then why is expansion of the truck cargo inspection facility with requisite relocation of Fort Street being investigated by the GSA and DIBC?

- Page 55: Historic Structures; A statement is made, "The architect also reviewed and identified historic structures in the area of potential effect and determined no adverse effect." The proposed enhancement bridge will have an adverse effect on the historic Ambassador Bridge per the Michigan SHPO's determination. There was no draft Memorandum of Understanding between the SHPO and the Coast Guard per Section 106, found in the EA document.

- Page 66: Mitigation; it is indicated that runoff from the proposed new bridge may be directed into the existing storm water collection system. Detroit has combined sewers and adding the bridge runoff to the combined sewer may result in undesirable overflows to the Detroit River. No analysis was performed of this in the EA.

- Page 78: Noise Mitigation; It is indicated that an assessment of noise and vibration impacts will be conducted for the proposed project alignments. This implies a future analysis will be done for the EA. The noise analysis was done and is presented in Appendix L and should be referenced on page 78.

- Air Quality Discussion:

  - Page 75: Wayne County is a maintenance area for carbon monoxide not an attainment area as referenced. Parts of Wayne County are also maintenance areas for PM_{10}, not attainment areas as referenced.

  - Page 75: Impacts; comparing the emissions from the proposed project to Wayne County emissions is a meaningless comparison. Also the air quality analysis performed in Appendix K (not J) used Mobile 6 version 24. This is not the currently approved emissions factor model. Mobile 6.2, released on May 19, 2004, is the current, approved model. Mobile 6.2 made significant improvements to emission factors over Mobile 6 for $PM_{2.5}$ and PM_{10}. If the FHWA was required to approve this analysis it could not, due to the analysis not using the current, approved emissions model.

  - Page 76: The analysis adds together all criteria pollutants, both those that that the SEMCOG region is in attainment for and those pollutants that are designated as maintenance. What is this supposed to demonstrate? It's is like adding apples and oranges.

  - Page 76: The statement is made that the proposed project will not significantly contribute to the non-attainment status of ozone in Wayne County. Only a system wide conformity analysis can draw this conclusion (SEMCOG).

  - Page 76: The statement is made that the proposed project will be added to the State Implementation Plan (SIP). The project will not be added to the SIP. Only transportation control measures go into SIPs.

- Air quality is a transboundary impact. The analysis needs to be done right.

- Appendix A contains correspondence in support of the proposed project. It was noted in our review that many of these letters say almost exactly the same thing, word for word. They appear to be a form letter prepared by the DIBC to support the proposed project and provided to the groups to send back to the DIBC.

Conclusions:

The analysis of the proposed Ambassador Bridge Enhancement project presented in the Environmental Assessment appears to demonstrate that the proposed project will have little significant social impacts or impacts on the natural or man made environment with the exception of the significant impact on the existing Ambassador Bridge listed on the National Register of Historic Places. It appears that it will have a positive economic impact on the operation of the border crossing.

The analysis is too narrow, however, in its scope in that it only looks at the proposed bridge and ignores other improvements discussed and publicly presented by the DIBC such as further expansion of the U.S. plaza beyond the foot print of the Ambassador Gateway plaza. The General Services Administration in conjunction with the DIBC is currently scoping an expansion of the Cargo Inspection Facility which would expand the Ambassador Gateway plaza cleared by the FHWA's FONSI of October 23, 1997. It is anticipated that construction will begin this summer on the Gateway plaza. The proposed additional plaza expansion work should be analyzed under NEPA along with the proposed new bridge to avoid segmentation as is currently being done by the DIBC. There are several testimonial letters provided in the Environmental Assessment, Appendix A, which state; "We support your plans to move the truck inspection plaza south of Fort Street and away from the residential area and historic Ste. Anne's Church." Most of these letters are dated April 28, 2006. These letters came about as a result of DIBC interaction with various community groups where DIBC presented what it planned to do. The DIBC may argue that the proposed new bridge and future plaza expansion have independent utility and logical termini under NEPA, but the context in which these two proposed projects have been presented publicly would argue otherwise.

Profile No. P-21426

Please note that (I have lived near the bridge on and off for twenty years. I am currently at the address listed above while I await the purchase agreement for the next property that I will be redeveloping in the Hubbard-Richard Neighborhood.

Sincerely,

Allan J. Barnes

Rcvd (dpb)
5/31/07

Allan Barnes
19459 Kinloch
Detroit MI 48240
info@allanbarnes.com

Commander (dpb)
Or Robert W. Bloom, Jr.
Ninth Coast Guard District
1240 E. 9th St.
Room 2025
Cleveland OH 44199-2060

May 27, 2007

Dear Sir,

I am writing to express my utmost opposition to the DIBC proposal to construct a 6 lane cable stayed bridge over the Detroit River just west of the existing bridge.

I have several reasons for opposing this plan.

1. Our neighbors in Windsor lack the needed infrastructure to support it and have repeatedly declared their opposition to the project.

2. Concentration of all shipping lanes represents a grave security risk to our city and our nation's economy. Imagine the damage that could be done both in terms of lives and dollars, if the proposed hyperconcentrated facilities were the target of a terrorist attack. Why on earth would you allow an entire international border crossing to be controlled by *one individual*?

3. The company that owns and operates the current facility has a long record of lying to the residents of the neighborhood about their intentions. Over ten years ago, they promised to restore the long vacant Michigan Central Depot, which has been *open to trespass* for all of the years that they have owned it. They have repeatedly begun construction projects without even bothering to pull permits, and are currently in litigation with the city of Detroit for repeated violations of building and construction codes. They have shown themselves to be terrible neighbors and completely untrustworthy. They own a number of buildings in the area, and their buildings can be distinguished by the lack of windows and the fact that all are open to trespassers.

DETROIT - WINDSOR TRUCK FERRY, INC.

ROBERT W. BLOOM, JR.
Bridge Program Manager
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199-

May 29, 2007

Re: Ambassador Bridge Enhancement Project

Dear Sir:

The lack of clear federal authority over safety and security issues at privately owned international bridges increases the risk potential for security and environmental incidents to occur and impact the Marine Transportation System. On this basis I oppose the issuance of the Coast Guard bridge permit for the twinning of the Ambassador Bridge.

The National Hazardous Material Routing Registry (NHMRR) restricts certain hazard classes of material from crossing the privately owned Ambassador Bridge. The Michigan State Police confirm the routing restrictions are valid. In a direct challenge to government authority, the owners of the privately owned Ambassador Bridge give out permission letters to certain companies to transport restricted goods across their facility in/out of Canada.

Please review the attached Congressional testimony from February 15, 2007 before the Subcommittee on Coast Guard and Maritime Transportation where this issue is detailed on pages 5-7 under the header HAZARDOUS MATERIALS and in attachments A-G.

Thank you for considering my comments.

Sincerely,

Gregg M. Ward
Vice President

P.O. Box 09033 • Detroit, MI 48209
Phone 313-842-2088 • Fax 313-842-2091

DETROIT-WINDSOR TRUCK FERRY, INC.
P.O. BOX 09033
DETROIT, MI 48209
PHONE: 313-842-2088

THE DEVELOPMENT OF SHORT SEA SHIPPING IN THE UNITED STATES

SUBCOMMITTEE ON COAST GUARD AND MARITIME TRANSPORTATION
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
U.S. HOUSE OF REPRESENTATIVES

EXECUTIVE SUMMARY

STATEMENT OF GREGG M. WARD, VICE PRESIDENT
DETROIT-WINDSOR TRUCK FERRY

FEBRUARY 15, 2007

Short Sea Shipping provides a genuine opportunity to relieve congestion in certain freight corridors and at border crossings, expand national highway freight capacity and improve the security and safety of our transportation system in a environmentally sustainable manner.

Challenges holding back the development of Short Sea Shipping in the United States include:

- Harbor Maintenance Fee
- APHIS AQI Fees
- Binational Issues such as Canada Customs Cost Recovery Fees, Canadian Icebreaking Fees and Highway signage.
- Lack of enforcement of existing National Hazardous Materials Route Registry (NHMRR) restrictions.

The following actions are being asked of Congress to promote the development of Short Sea Shipping in the United States:

- Support H.R. 891, the Great Lakes Short Sea Shipping Act
- Enforce the NHMRR at the border.
- End preferential tax treatment of land border crossings.
- Harmonize NAFTA border security, safety and tax policies.
- Demand from all operators of international border crossing transparency, accountability and compliance with federal security priorities.

DETROIT-WINDSOR TRUCK FERRY, INC.
P.O. BOX 09033
DETROIT, MI 48209
PHONE: 313-842-2088

THE DEVELOPMENT OF SHORT SEA SHIPPING IN THE UNITED STATES

SUBCOMMITTEE ON COAST GUARD AND MARITIME TRANSPORTATION
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
U.S. HOUSE OF REPRESENTATIVES

STATEMENT OF GREGG M. WARD, VICE PRESIDENT
DETROIT-WINDSOR TRUCK FERRY

FEBRUARY 15, 2007

It is a true honor to come before you today to speak about Short Sea Shipping.

On Earth Day 1990 the Detroit-Windsor Truck Ferry service was started by my father and me. We chose this start up date 16 years ago to symbolize our commitment to environmental stewardship and a belief that marine transportation can help reduce highway congestion, air pollution and the consumption of finite fossil fuels. The company operates a border crossing between Detroit, Michigan and Windsor, Ontario. Using a flat deck barge and a tugboat, trucks roll-on, cross the river and roll off again on the other side. We transport mainly hazardous material laden trucks that are restricted by US regulations from crossing the Ambassador Bridge and the Detroit-Canada Tunnel. The alternative legal crossing for these vehicles requires a detour of 165 miles. The types of hazardous materials crossing our facilities include flammables, acids, radioactive materials and explosives. We also move those transports too large or heavy for the other crossings. At times of significant congestion at the bridge, we provide surge capacity to vehicles carrying critical automotive freight. With a one-mile crossing of the Detroit River, we are natural extension of the highway.

My comments today will refer mostly to the Great Lakes region and as a point of reference, the Detroit area. Establishing a freight border crossing is filled with many obstacles and learning experiences. The challenges our company has faced and some yet overcome, may help chart a course for developing of Short Sea Shipping in the United States. I am cautiously optimistic about the opportunities to establish a robust, self-sustaining marine highway program. With regulatory coordination between the US Department of Transportation, Customs and Border Protection, and our neighbors North and South, Short Sea Shipping can develop into an important part of the North American Transportation System.

Short Sea Shipping is an opportunity to relieve congestion on certain highways, expand national highway freight capacity and potentially reduce travel times. Heavily congested routes along the coast and at border crossings can be served with marine alternatives to

keep freight moving and provide redundancy to critical infrastructure. Marine assets can be put into service in a relatively short period of time.

NATIONAL SECURITY: A tremendous amount of U.S. and Canada trade moves by truck mostly over bridges. In Detroit alone 10,000-12,000 trucks cross the bridge each day. Borders are vital conduits of trade as well as symbolic and economic targets for those who wish our nation harm. The loss of a single cross border bridge because of a terrorist action, serious accident or natural disaster would have a devastating and cascading affect on our national economy. The Department of Homeland Security national strategy to prevent, protect and respond to all hazards is integrally linked with the word recovery. For our nation to overcome any breakdown in the Northern border system there needs to be alternate systems in place for the seamless transfer of cargo and people.

Short Sea Shipping can add significant and immediate redundancy and resiliency to our transportation network. Within the Great Lakes, we can establish water routes parallel to North-South trade corridors and most obviously near fixed border crossings.

A recent DOT study confirmed short sea shipping has significant potential to carry hazardous material shipments. Removal of this cargo from high availability/high consequence critical infrastructure and trade corridors helps protect system integrity, improves anomaly detection for law enforcement and decreases potential public exposure.

TRANSPARENCY: Three Port Security grants have allowed our company to design and develop an advanced notification system software application for law enforcement to know all critical data elements of what is being moved before entry into the country. Even as a private company, our operations are transparent to law enforcement – from cameras in our terminals and offices to detailed customer and traffic information. The cycling of vessel arrivals allows enforcement authorities time to analyze vessel manifest and invoice data – which includes detailed driver, passenger, cargo and vehicle information, make critical pre-arrival decisions and physically examine 100% of all inbound and outbound transports. This high-level of security and domain awareness is not possible at fixed crossings. At the land border, law enforcement's primary interaction with vehicles occurs after they have already crossed the bridge and tunnel.

HIGHER LEVEL OF GOVERNMENT OVERSIGHT: Another reason for dangerous cargoes to move by water is the higher level of government oversight. Unlike the privately owned and operated Ambassador Bridge, a private marine operator like the truck ferry is subject to extensive government oversight and actual physical inspection of vessels and facilities from both the United States and Canadian authorities. Soon the Transportation Worker Identification Card will add another layer of security to marine operations that is absent at the fixed border crossings.

ENVIRONMENT: The environmental benefits of marine transportation are immediate and well-defined by research. In 16 years of operation, our small truck ferry service has

removed tens of millions of miles off the route of hazardous material laden and oversize transports - reducing the risk of accidents, highway congestion, wear-and tear to roads, consumption of finite fossil fuels and air emissions. Operations are as simple as a parking lot on each side of the river and a floating platform to carry trucks across. Located on an industrial brownfield site, we are removed from population centers and close to the highway system. To expand the service requires only adding a second vessel, the terminal footprint remains the same.

SURGE CAPACITY: The experience of September 11 proved the value of redundancy in cross-border transportation options. In particular, the merit of cross border marine links was evident by the success of the Detroit-Windsor Truck Ferry in helping to avert post 9/11 plant closings in the automotive industry.

With back ups at the Ambassador Bridge and the Blue Water Bridge exceeding 14 hours, it was incumbent on logistic managers to identify and implement alternative transportation plans for meeting the just-in-time requirements. Beginning September 11, the auto companies used the ferry to carry low risk/critical freight across the border as well. Working cooperatively, automotive companies and suppliers, transporters and the truck ferry managers were able to prioritize shipments based on need. The impromptu ranking assessment was as simple as which production line would be halted or which plant would close without a shipment. That shipment was then moved to the front of the line.

General Motors, in a letter to US Customs following September 11, stated, "The Detroit-Windsor Truck Ferry became our only alternative that would enable General Motors to continue operation of the Detroit/Hamtramck Assembly Plant." (Over 3,400 employees)

At the border, diverse crossing options are essential if manufactures are to continue operations during crisis. The marine industry is a viable substitute for a portion of the traffic that moves on rubber down the highway.

CHALLENGES:

THE SINGLE MOST IMPORTANT IMPEDIMENT TO THE DEVELOPMENT OF SHORT SEA SHIPPING IN THE UNITED STATES IS THE HARBOR MAINTENANCE FEE (HMF)

The HMF applies, with limited exceptions, to domestic and foreign marine cargo unloaded at a U.S. port, including waterborne cargo arriving from our NAFTA partners. The HMF is not assessed on the harbor or port, nor is it assessed on the vessel's operator or owner. The tax is set on the value of the cargo, and is to be paid by the shipper or importer of the cargo.

Not subject to the HMF is domestic highway freight and imported cargoes arriving in the U.S. by a land border - highway, bridge or tunnel.

So when you think of SSS as a viable transportation alternative, you must consider the added cost element of the HMF. The tax is $125 for every $100,000 in (domestic) merchandise or import value. Because of the HMF, the seamless diversion of traffic from congested highways and bridges to waterborne services will be unlikely, expensive and require extraordinary coordination among the carrier, shipper and import community.

To use a SSS carriage alternative, the highway carrier must contact every shipper with freight in the trailer to seek permission to subject each shipment to the HMF at the expense of the shipper or importer. The domestic shipper/importer will calculate the added cost (HMF) of shipping by water and make a business decision whether the time and money saved on the congestion avoidance route (SSS) is worth the added tax and document filing obligation. If it agrees to incur the added costs associated with the HMF, the domestic shipper/importer will need to declare accurately the shipment contents and value of the merchandise shipped. Shippers of freight and carriers are business operators, not social engineers. They make shipping decisions based on convenience, price and service.

For example, most of freight transports crossing the truck ferry from Canada are empty hazardous material shipments which are still subject to the National Hazardous Materials Routing Registry restrictions. These empty transports have zero declared value, so they are not charged the HMF. Depending on the value of the hazardous material shipment, it is sometimes less expensive for shippers to detour 4-5 hours and 165 miles to a bridge than take the 20 minute crossing of the truck ferry and pay HMF. Even during severe border congestion at the Ambassador Bridge, some companies remain idling in long queues, to the detriment of the environment and transportation efficiency, instead of diverting to the truck ferry for a scheduled crossing of the river. Time and again the coordination and cost burden of the HMF are identified as the problem.

Unless the issue of the Harbor Maintenance Fee is addressed, a robust SSS system <u>will not develop</u> in the United States.

APHIS: US Department of Agriculture, Animal and Plant Health Inspection Service will begin in March 2007 requiring payment of Agriculture and Quarantine Inspection fees from commercial vessels, trucks and railroad cars entering the United States from Canada. Because we operate a truck ferry service, APHIS AQI fees are collected twice – once on the vessel ($490.00) and then again on the truck ($5.25). If a truck crosses a bridge or tunnel, the fee only applies to the truck ($5.25).

BINATIONAL ISSUES

Canada Customs: A serious challenge to developing Short Sea Shipping within the Great Lakes region will be the Canadian government policy of charging any new international marine operation the full cost recovery of customs services. These identical services are provided to bridges and tunnels without charge. Until late 2005, the Detroit-Windsor Truck Ferry was the only freight border crossing in Canada subject to these fees. It was only after extensive litigation that our company no longer pays these fees which

averaged about $10 for every truck transported by ferry. Any new operation is subject to these same fees - only at a higher rate.

Canadian Icebreaking Fees: The Detroit-Windsor Truck Ferry is in litigation with the Canadian government over icebreaking fees. To make a one-mile crossing of the Detroit River, (which has the international boundary in the middle) the Canadian government charges a $3,100 transit fee for ice breaking services. These fees are capped at three transits a month per vessel. It does not matter if there is ice in the river or the fact that our privately owned truck ferry service in not legally eligible to receive dock to dock icebreaking transit assistance. Further, ice breaking in the Detroit River is a shared responsibility of the United States Coast Guard and the Canadian Coast Guard. Thus we are being charged fees by Canada for icebreaking services conducted by the United States government and funded by US taxpayers. During the four month ice season, these fees equal about $17 a truck transported.

Signage: On the Canadian side of the border, directional signage to the ferry exists on highways as well as county and local roadways. These signs identify the **U.S.** hazardous material restrictions at the border and provide excellent trailblazing to the truck ferry terminal. On the U.S. side of the border before the entrance to the bridge and tunnel, not a single sign exists on the state, county or local roadways providing information on the US National Hazardous Materials Route Registry restrictions or the alternate hazardous material crossing of the Detroit-Windsor Truck Ferry.

HAZARDOUS MATERIALS

The final and most important challenge to the Detroit-Windsor Truck Ferry is the lack of transparency for hazardous materials crossing the border between Detroit and Windsor. Security of movement and the safety of infrastructure are imperiled without continuous and effective situational awareness of hazardous material. Unfortunately there is no coordinated regional policy for the enforcement of existing regulations when they apply to a privately owned bridge.

To illustrate this point please consider the following:

- Since 1929, hazardous material routing restrictions have been in place to restrict certain hazardous materials from crossing the Ambassador Bridge and Detroit-Canada Tunnel. [Attachment A – National Hazardous Materials Route Registry for Detroit]
- The Detroit-Windsor Truck Ferry was established in 1990 to eliminate the circuitous detour route trucks took when transporting restricted cargoes to avoid the local bridge and tunnel.
- Following September 11, 2001, the Detroit media showed video footage of 13,000 gallon fuel tankers and trucks with hazardous materials illegally crossing the Ambassador Bridge – a critical lifeline for the US economy.
- The National Hazardous Materials Route Registry is enforced by the State in which the restrictions take place. However the Michigan Department of

Transportation wrote to me on October 18, 2001 about the restriction of hazardous materials on the Ambassador Bridge and said, *"The state does not have jurisdiction concerning the transport of hazardous materials across a privately owned bridge, that is the responsibility of the private owner/operator."* The letter went on further to state, *"Jurisdiction over transport of hazardous material across a city street may either be under the jurisdiction of the MSP (Michigan State Police) and/or local enforcement agencies such as the City of Detroit."*

- According to media reports, the Ambassador Bridge, a privately owned and operated international border crossing, informed the Michigan State Police it does not have "the authority to determine what crosses a private piece of property." [Attachment B]
- USDOT legal council states the Hazardous Material Regulations apply to private bridges. [Attachment C]
- The Ambassador Bridge distributes letters allowing certain privileged companies to transport restricted hazardous material across the bridge in contravention of the routing restrictions. [Attachment D] The Michigan State Police state these letters are illegal. [Attachment B]
- For hazardous material restricted routes throughout the US, highway signage is used to inform the commercial vehicle operators of route restrictions. No such signs are in place at the Michigan border crossings. Only one such sign exists on the Ambassador Bridge, seen by trucks after toll collection. [Attachment E]
- In Canada there is no signage on the plaza of the Ambassador Bridge notifying truckers with hazardous materials that the facility is route restricted. On the Canadian side of the border there are no toll booth operators to stop a vehicle from illegally crossing the bridge with restricted hazardous materials.
- In Canadian law there is no hazardous material routing restrictions at the border however in Windsor, Ontario signage has been installed to inform drivers of the US restrictions. [Attachment F]
- From the FMCSA Guide to Developing an Effective Security Plan for Highway Transportation of Hazardous Materials. Part D En Route Components: "Explosives, poisons, and flammables all represent significant potential consequences for weapons conversion in a tunnel scenario. Long-span bridges, such as suspension bridges, are targets for both their iconic and economic value."
- In December 2001, the Ontario Ministry of Transport reported to the media that over 9,000 hazardous material vehicles a year illegally crossed the privately owned bridge. [Attachment G]
- In the March 2006 GAO report, Review of Undeclared Hazmat Entering the United States, according to officials, undeclared hazmat shipments occur for two main reasons: (1) Lack of knowledge: Domestic and foreign shippers may be unfamiliar with hazmat regulations and laws. (2) Economics: Shippers may not declare hazmat to avoid additional costs. This generally occurs because declared hazmat shipments require special placarding, packaging, additional training, carrier surcharges, and insurance.

Following September 11, 2001, it became clear the agenda of those with the intent to do harm to our nation anticipated the use of hazardous material laden vehicles as weapons of

destruction. It is not difficult to imagine how those with the intent to do harm to an important trade corridor could exploit the absence of authority and the lack of a consistent hazardous material policy to permanently disable this critical NAFTA transportation link. One cannot assume that our enemies have taken this modus operandi off their agenda. Protection of our international borders requires a consistent enforcement plan based upon transparent rules and regulations.

Canada: International Bridge and Tunnels Act

Until recently the Canadian government as well had no clear authority to regulate matters concerning approvals for the constructing new, or altering existing, international bridges or tunnels; approvals for changes in ownership, operation or control; and issues about maintenance, operations, safety and security.

To resolve this problem, the Canadian government recently enacted into law the **International Bridge and Tunnels Act**. This legislation provides the federal government with legislative authority to ensure effective oversight of the existing 24 international vehicular bridges and tunnels and nine international railway bridges and tunnels, as well as any new international bridges or tunnels built in the future. The Minister, through the governor-in-council, has the power to regulate the safety, security, operation and use of international bridges and tunnels. The Minister will have the authority to issue an emergency directive in response to a potential threat to the safety or security of any international bridge or tunnel. To help protect the safety, security and efficiency of the transportation system, Ministerial approval will be required for transactions that result in changes in ownership or the operation of any international bridge or tunnel.

In the United States there is no similar authority or oversight when it comes to privately owned international border crossings. This is a danger for our national security. Even after September 11, 2001, our company, a transporter of dangerous cargoes across the border, has not been formally interviewed to ask how we finance operations, who beneficially owns our company or what other companies do we control and operate.
As these questions have not been asked of our company, I guarantee you there has not been any vetting of other privately owned border crossings.

This Congress should consider the dire national consequences of not having a clearly defined authority over our international borders.

CONCLUSION

The value of a Short Sea Shipping system in the United States, particularly at the northern border, is integrally linked to the condition and vulnerability of our aging transportation infrastructure. Again referring to the Detroit-Windsor border, about 25% of our nation's trade with Canada, our largest trading partner, crosses a bridge built in 1929. Over $300 million in trade is trucked each day across the Ambassador Bridge. If

that facility failed, there is no ready replacement plan; the economy of the entire United States will be harmed.

When a section of the I-495 Beltway around Washington DC closes, traffic snarls and delays abound, but the system continues to operate through the use of secondary roads that absorb the temporary excess traffic demand. At the U.S. and Canada border, this will not happen. If the Ambassador Bridge closes, US bound freight would have to divert either 100 miles to the nearest international bridge crossing in Sarnia, Ontario or 250 miles to Fort Erie, Ontario. Such delays would cripple the automotive industry, its suppliers and our economy overnight.

To mitigate this risk, we must build, without delay, a versatile and flexible multimodal transportation system that includes Short Sea Shipping. The Congress of the United States is being asked today to take a leadership role in this necessary expansion of our transportation network. The following actions are required:

1. Support the reintroduced Great Lakes Short Sea Shipping Act, H.R. 981, to exempt shippers paying the Harbor Maintenance Tax on non-bulk shipments on the Great Lakes and St. Lawrence Seaway System between a port in Canada to a U.S. port. This is the most critical action to be taken for development of Short Sea Shipping in the Great Lakes region.
2. Enforce the Hazardous Material Routing Restriction at the Detroit border and select the Detroit-Windsor Truck Ferry as the prescribed route for high-risk and hazardous materials. The public depends on government to enforce rules and regulations that are put in place to protect people, property and commerce. The continued inconsistent application and enforcement of the NHMRR weakens the overall regulation and emboldens those who wish to harm our nation.
3. End preferential tax treatment of land border crossings. This practice protects incumbent operations, discourages competition and reduces the development of alternative modes of transportation. Be it crossing a lake or an inland river, a Short Sea Shipping vessel should be seen for what it is, a valuable extension of the highway, replacing bridges and tunnels where not practible.
4. Harmonize NAFTA border security, safety and tax policies so there is a consistent and equitable regulatory framework for freight entering this country by either land or marine.
5. Demand from all operators of international border crossings transparency, accountability and compliance with federal security priorities.

With a border transportation system unable to recover from catastrophe, we leave our jugular exposed to the enemies who gather, prepare and plan to destroy our nation. The establishment of a sustainable marine highway system is not only desirable - it must become a national security priority.

Thank you for this opportunity to appear before you today.

ATTACHMENT A: National Hazardous Materials Route Registry - Detroit

The National Hazardous Materials Route Registry

Report Date 2/12/2007

Report Type: Verbose
States: Michigan
Categories: All Categories

STATE: Michigan

Agency:	Michigan DOT	FMCSA:	MI FMCSA Field Office
POC:	Mr. Gregory Rosine, Director	POC:	Motor Carrier State Director
Address:	425 West Ottawa P.O. Box 30050 Lansing, Michigan 48909	Address:	Federal Building, Room 205 315 West Allegan Street Lansing, Michigan 48933
Phone:	(517) 373-1884	Phone:	(517) 377-1866
Fax:	(517)-373-0176		

RESTRICTED ROUTES

Designation Date	Route Description	Restriction
1/1/1929	Ambassador Bridge [Detroit] From Porter St. to Canada [Windsor] [Phone (313)-849-5244]	- 1 - 3 - - - 7 8 - - - - - - - - -
3/8/1995	Blue Water Bridge [I69] [Port Huron, MI to Sarnia, Ontario. NOTE: In addition to the listed restrictions, Pyrophoric Liquids prohibited. Contact Michigan Dept. of Transportation for specific restrictions. (810)-984-3131]	- 1 - - - 5 - 7 - 9 - - - - - -
1/1/1990	Interstate 696 [County of Oakland] From State Route M-10 to Interstate 75	- 1 - 3 - - - - - - - - - - - - -
3/8/1995	International Bridge [I75] [All placarded vehicles require an escort. Contact Operations Supervisor at (906)-635-5255	0 - - - - - - - - - - - - - - - - -

	before crossing. Sault Ste. Marie, MI to Sault Ste. Marie, Ontario.]	
3/8/1995	Mackinac Bridge [I75] [Mackinac City to St. Ignace. All placarded loads require an escort by the Mackinac Bridge Authority. Phone (906) 643-7600.]	0 - - - - - - - - - - - - - - - - -
1/1/1958	State Route M-10 [Detroit] From Howard St. to Woodward Ave. [Under Cobo Hall (approx 1 mile)]	- 1 - 3 - - - - - - - - - - - - - - - - -
1/1/1964	State Route M-10 [Detroit] From 8 Mile Rd [South] to Wyoming Rd	- 1 - 3 - - - - - - - - - - - - - - - - -
10/3/1998	State Route M-59 [Utica] [1.1 mile from either direction of the Mound Rd exit]	- 1 - 3 - - - - - - - - - - - - - - - - -
1/1/1930	Windsor Tunnel [Detroit] From Jefferson Ave. to Canada [Windsor] [Phone: (313)-567-4422]	- 1 - 3 - - - 7 8 - - - - - - - - - - -

Restriction / Designation Key

Restrictions Prohibited for the indicated hazmat	*Designations* Recommended for indicated hazmat
0 - ALL Hazmats 1 - Class 1 - Explosives 2 - Class 2 - Gas 3 - Class 3 - Flammable 4 - Class 4 - Flammable Solid/Combustible 5 - Class 5 - Organic 6 - Class 6 - Poison 7 - Class 7 - Radioactive 8 - Class 8 - Corrosives 9 - Class 9 - Dangerous (Other) i - Poisonous Inhalation Hazard (PIH)	A - *Prescribed Route* ALL NRHM Hazmats B - *Prescribed Route* Class 1 - Explosives P - *Preferred Route* Class 7 - HRCQ Radioactive I - *Prescribed Route* Poisonous Inhalation Hazard (PIH) M - *Prescribed Route* Medical Waste

ATTACHMENT B: Media report

Hazmat Trucks On Bridge Leads To Crackdown
Local 4 Investigation Uncovers Suspect Hauling Practice
Posted: 10:22 p.m. EST January 10, 2002
Updated: 11:18 p.m. EST January 10, 2002

DETROIT-- If trade is America's lifeline, then the Ambassador Bridge is the main artery. Every day more than 32,000 vehicles cross over -- trucks carrying precious cargo and something else. The Defenders have discovered hazardous materials are being carried illegally across. The Ambassador Bridge is restricted by federal regulations, prohibiting corrosives, explosives, radioactives and flammable loads.

Gregg Ward, Detroit /Windsor Ferry: "I think the public takes the assumption the law is enforced. So they assume that they're safely crossing these facilities."

In our three-month investigation, defender cameras catch truckers carrying over illegal loads. On this day, a fuel truck crosses the bridge. A flammable sign warns of dangerous cargo. But no one stops the truck, a clear violation of the law.

Gary Percy, Windsor Fire Department: "As far as a fuel vehicle, I don't even want to think about it, but we would have a real problem." If a situation did occur, Windsor firefighters would be one of several agencies to respond. That's why Assistant Fire Chief Gary Percy supports regulations prohibiting hazardous materials crossing the bridge. Percy: "There is no water supply on the bridge. If it actually burst into flame, I'd have a real problem and concern with the actual structure of the bridge."

Defender cameras roll as this truck with flammable signs exits the bridge. Surprised? It happens more often than you think. In fact, a Canadian government report reveals 9,000 truck drivers every year are illegally driving hazardous materials over the Ambassador Bridge.

So how are trucks carrying hazardous materials supposed to cross the river? The ferry. It costs $100 – at times, more than twice the cost of using the bridge, but it's legal. Trucker Mike Zelco takes the ferry, plays by rules and wishes others would follow. Zelco: " I don't think it's fair having hazmat cross the bridge because it's a cable-suspended bridge and they're diesel fuel. When you're sitting up there who knows what is going to happen?"

How is this happening? Sources tell the Defenders some truck drivers actually take the signs off their trucks and then sneak across the bridge, hoping not to get caught.

But the Defenders discovered the companies who own the bridge actually know and allow certain trucks to cross, even though their loads are illegal.

Company letterhead shows they're from the Detroit International Bridge Company and Canadian Tranist Company, private businesses that own the bridge. The documents are dated as far back as 1996 and as recent as two months ago. In this letter, the bridge company gives one trucking company permission "to cross the bridge even though they (the commodities) are placarded as hazardous." This letter allows the same company to transport empty alcohol tankers, still considered flammable, a violation of the law. This letter allows another company to transport illegal materials across. And so does this document. The memo reads "Do not prohibit access to our facility for this vehicle." Those documents are not legal.

We took the paperwork to the Michigan State Police Motor Carrier Unit. The agency monitors commercial traffic on the bridge. Sgt. Susan Fries, Michigan State Police Motor Carrier Unit: "Even though the bridge is a private structure, Michigan Department of Transportation says that it is a restricted route and those items cannot cross."

We went to the bridge company to get answers. Dan Stamper, the man in charge of the bridge,

would not talk to us on camera. By telephone he admits some trucks carrying hazardous material are allowed to cross the bridge. He also admits handing out memos identifying the companies that have been granted permission. Stamper: " We have a number of letters like this that have been issued to customers of the bridge who have explained what they are hauling."

Karen Drew: "I showed those documents to state police and they say those documents are illegal. Those types of trucks carrying those types of commodities should not cross on the bridge."

Stamper: "We don't believe the state has the authority to determine what crosses a private piece of property."

Fries: "They maintain there is an underlying agreement that they don't have to comply with those regulations. We maintain that they do."

Drew: "Now the bridge companies tells me that they will continue to hand out those letters giving truck drivers permission to cross with their illegal loads. Michigan State Police says they were just alerted to this problem. They are going to start to crack down on these illegal drivers. They have already handed out three tickets. One went to a fuel truck who was crossing the bridge with his load of fuel."

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ATTACHMENT C: USDOT LETTER

U.S. Department
of Transportation

**Research and
Special Programs
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

APR - 5 2001

Mr. Otis T. Eanes
Bridge Tunnel Patroller
Monitor-Merrimac Memorial Bridge Tunnel
P.O. Box 6570
Portsmouth, Virginia 23703

Ref. No. 01-0058

Dear Mr. Eanes:

Thank you for your February 8, 2001 letter to Secretary of Transportation Norman Mineta. Your letter has been referred to this office for response. You ask about state and local routing requirements for the transportation of hazardous materials and specifically about restrictions on the transportation of certain hazardous materials through tunnels.

The Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) set forth requirements for persons who offer hazardous materials for transportation or transport hazardous materials in commerce. The HMR explain how to class and package a hazardous material and how the package must be marked and labeled. The HMR also tell how to complete the shipping papers and emergency response information that must accompany a hazardous material shipment. In addition, the HMR tell whether the vehicle in which a hazardous materials shipment is being transported must be placarded and the specific placards that must be used. Finally, the HMR explain training requirements for persons who transport hazardous materials or prepare hazardous materials for shipment.

Hazardous materials transported in commerce, including on state- or privately-owned bridges and tunnels, must conform to all applicable requirements of the HMR. In addition, regulations issued by the Federal Motor Carrier Safety Administration (FMCSA) at 49 CFR Part 397 provide general routing standards for states and Indian tribes that wish to establish highway routing designations for non-radioactive hazardous materials (NRHM). Generally, these regulations require a state or tribal government to make a public finding that NRHM routing designations enhance public safety in both the area subject to its jurisdiction and other areas that are directly affected by the routing designation. In establishing routing designations, a state or Indian tribe must consider a number of factors, including the population potentially exposed to an NRHM release; the characteristics of the highway; the types and quantities of NRHM expected to be transported on the designated route; emergency response capabilities; and exposure and other risk factors. So long as states and Indian tribes comply with these general standards, they have broad discretion to develop routing designations for NRHM. State officials are better positioned than is the federal government to assess local bridge or tunnel conditions, accident histories, emergency

172.701

01-0058

response capabilities, alternative routes, and exposure and other risk factors in making such decisions. Similarly, we believe state authorities should be responsible for enforcing any bridge or tunnel restrictions and for training their employees to enforce the restrictions. You should discuss any concerns you may have about hazardous materials transported through the Monitor-Merrimac Memorial Bridge Tunnel with your supervisor.

I hope this information is helpful. If you have further questions, please do not hesitate to contact this office.

Sincerely,

Edward T. Mazzullo

Edward T. Mazzullo, Director
Office of Hazardous Materials Standards

ATTACHMENT D: Ambassador Bridge Letters

DETROIT INTERNATIONAL BRIDGE COMPANY
P. O. BOX 32868 Detroit, Michigan 48232
AMBASSADOR BRIDGE

October 7, 1996

TO: ALL SCALE AND TOLL EMPLOYEES

The bearer of this letter Gorski Bulk Transport Inc., has the permission of the Bridge Company to transport empty alcohol tankers. This letter, upon presentation, covers only this empty alcohol tanker and no others.

Sincerely,
Detroit International Bridge Company
Canadian Transit Company

Joe Polak

Joe Polak
Superintendent Of Operations

JP/vs

DETROIT INTERNATIONAL BRIDGE COMPANY
P. O. BOX 32666 Detroit, Michigan 48232
AMBASSADOR BRIDGE

NOTICE

TO: ALL TOLL COLLECTORS
FROM: DAVID JOLLY
GENERAL MANAGER
DETROIT INTERNATIONAL BRIDGE COMPANY
RE: COMPANY: GORSKI BULK TRANSPORT INC
DATE: 11/06/98

The commodities carried in this trailer have been exempted to cross the bridge even though they are placarded as "hazardous". Do not prohibit access to our facility for this vehicle.

David Jolly

THE CANADIAN TRANSIT COMPANY
760 HURON CHURCH ROAD, SUITE 202 Windsor, Ontario N9C 2K2
AMBASSADOR BRIDGE

NOTICE

DATE: July 30, 1998

TO: All Toll Collectors

FROM: Tom (Skip) McMahon
General Manager
The Canadian Transit Company

RE: **Company: TST Overland Express**

The commodities carried in this trailer have been exempted to cross the bridge even though they are placarded as "dangerous". Do not prohibit access to our facility for this vehicle.

T. McMah

Tom (Skip) McMahon

NOTICE

DATE: September 09, 1999

TO: All Toll Collectors

FROM: Tom (Skip) McMahon
General Manager
The Canadian Transit Company

RE: Company: Morrice Transportation

The commodities carried in this trailer have been exempted to cross the bridge even though they are placarded. Do not prohibit access to our facility for this vehicle.

T. McMahon

Tom (Skip) McMahon

DETROIT INTERNATIONAL BRIDGE COMPANY
P. O. BOX 32666 Detroit, Michigan 48232
AMBASSADOR BRIDGE

To: Carriers

Re: Hazardous Materials

Detroit International Bridge Company and The Canadian Transit Company owns and operates the Ambassador Bridge and prohibits the hauling of acidic, caustic, flammable, explosive and radio-active material across the Ambassador Bridge.

Scalemen are instructed to check bulk tank trucks, bulk tank trailers as well as regular semi-trailers which appear to be carrying hazardous materials. Carriers must have on file with this Company a notarized affidavit on company stationery, addressed to this Company acknowledging that its tank trucks, tank trailers and/or regular equipment do not and will not haul any cargoes that are acidic, caustic, flammable, explosive or radio-active in nature.

Such affidavit must accompany each crossing unless the carrier is prepared to file a permanent notarized affidavit to cover all of its equipment.

Yours very truly,

DETROIT INTERNATIONAL BRIDGE COMPANY
THE CANADIAN TRANSIT COMPANY

Joe Polak

Joe Polak
Superintendent of Operations

JP/em

DETROIT INTERNATIONAL BRIDGE COMPANY

P. O. BOX 32886 Detroit, Michigan 48232

To: All DIB & CTC Scale & Toll Employees

Date: November 1, 2001

Re: **General Chemical Corporation**

The bearer of this letter, General Chemical Corp. has permission to transport the commodity **"ALUM"** across our bridge. This is a "mild" corrosive and the truck will be placarded as such. This letter covers only **"ALUM"** and no other corrosive or otherwise prohibited commodity. This transport is scheduled to run indefinitely, however, the carrier must obtain a updated letter after 90 days which will be February 1, 2002

Sincerely,

DETROIT INTERNATIONAL BRIDGE CO.
THE CANADIAN TRANSIT CO.

David Jolly
General Manager

DJ/ah

DETROIT INTERNATIONAL BRIDGE COMPANY
P. O. BOX 32886 Detroit, Michigan 48232
AMBASSADOR BRIDGE

TO: DIBC TOLL COLLECTORS

DATE: December 6, 2005

RE: **GENERAL CHEMICAL CORPORATION**

The bearer of this letter, General Chemical Corporation, has permission to transport the commodity **"ALUM"** across The Ambassador Bridge. This is a "mild" corrosive and the truck will be placarded as such. This letter covers only **"ALUM"** and no other corrosive or otherwise prohibited commodity. These crossings are scheduled to run on a routine nature, seven days per week. However, this letter is good only until March 1, 2006, when an updated letter must be obtained.

Sincerely,

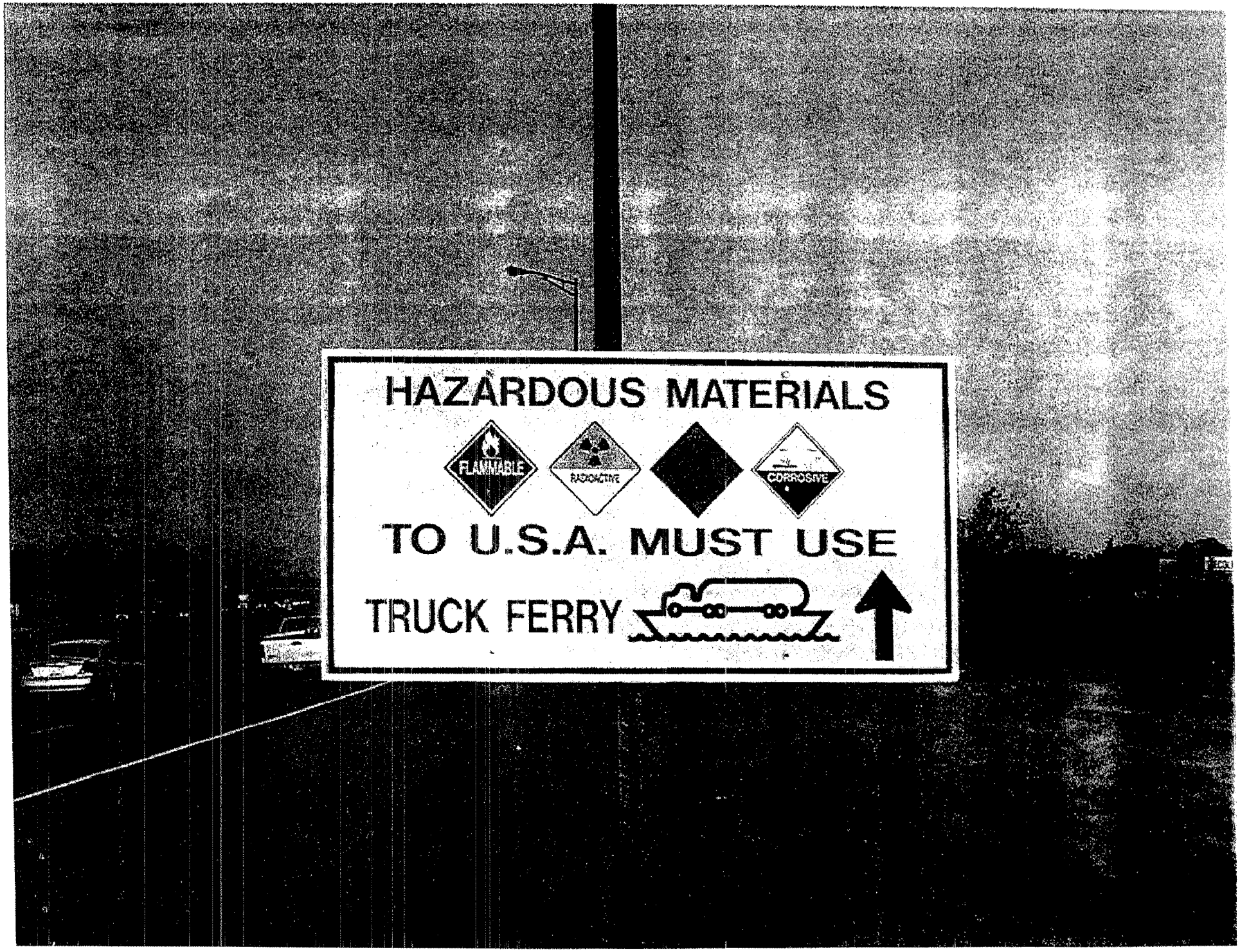
DETROIT INTERNATIONAL BRIDGE COMPANY
THE CANADIAN TRANSIT COMPANY

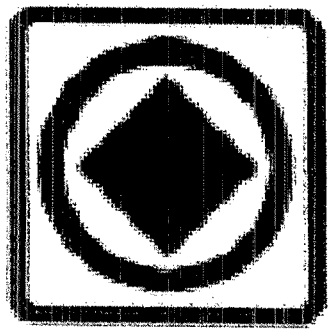
Dave Jolly,
General Manager

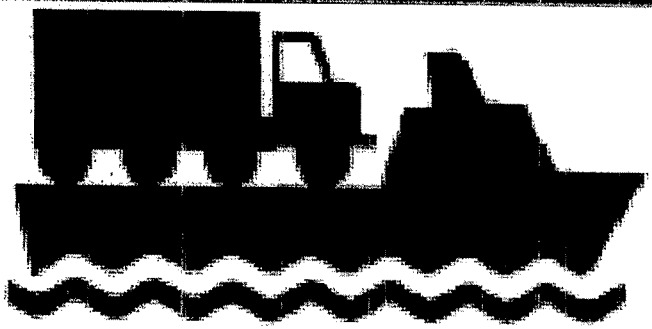
DBJ/em

ATTACHMENT E: NHMRR sign at the Ambassador Bridge

ATTACHMENT F: Windsor Sign 1 and 2


HAZARDOUS MATERIALS
FLAMMABLE
RADIOACTIVE
CORROSIVE
TO U.S.A. MUST USE
TRUCK FERRY





Dangerous Goods To U.S.A.
Must Use Truck Ferry

FOLLOW

ATTACHMENT G: Media reports – Illegal Hazmat Crossings

Unclaimed hazardous materials brought over

December 18, 2001

BY EMILIA ASKARI
FREE PRESS STAFF WRITER

The scene is repeated about 25 times a day on the side streets of Detroit near the foot of the Ambassador Bridge:

A large semi truck pulls over to the curb and stops. The driver hops out of the cab and quickly removes a placard reading "Hazardous Materials." Then the driver steers the rig across the busiest crossing between Canada and the U.S., flaunting a rule that prohibits most hazardous materials from the bridge.

A report by the Ontario Ministry of Transportation recently concluded that about 9,000 truck drivers a year follow this scenario. It is unknown how many pull their hazardous materials placards on the streets of Windsor, before crossing into the United States.

In response to the report, which will be released in its entirety next year, customs officials on both sides of the border are talking about better ways to catch and punish truck drivers who ignore the no-hazardous-materials rule.

The trucks carrying the prohibited hazardous materials represent about one quarter of 1 percent of the traffic on the bridge, Ontario Transportation Ministry Bob Nichols said Monday. The ministry reached its conclusions following a periodic survey of truck drivers on Canadian highways. Some of the drivers carrying hazardous materials indicated to official surveyors that they had entered the country via the Ambassador Bridge, Nichols said.

The materials include things that are explosive, flammable or lethal when breathed in small doses.

Hauling hazardous materials without appropriate placards is a violation of federal law in the U.S. and Canada. Neither U.S. nor Canadian law prohibits hazardous materials from crossing the Ambassador Bridge. But the private company that owns the bridge – the Detroit International Bridge Company -- doesn't allow trucks carrying hazardous materials.

David Jolly, the bridge company's general manager, said Monday that he is reviewing the bridge's hazardous-materials policy with various officials. He declined to comment further.

The company that owns the Detroit-Windsor tunnel also prohibits hazardous materials from crossing through it. The preliminary Ontario Transportation report did not address whether trucks are carrying hazardous materials through the tunnel.

"It makes no sense in this time of heightened security to permit this," said Gregg Ward, who runs a ferry that legally shuttles trucks carrying hazardous materials between the cities.

The drivers have an economic incentive to hide their hazardous materials placards. Ward's ferry costs between $50 and $100, depending on the truck's weight. The bridge costs between $15 and $45.

The Hon. Herb Gray, deputy prime minister of Canada, is seeking a meeting with officials from both sides of the border.

Contact EMILIA ASKARI at 248-586-2606 or askari@freepress.com.

THE ONLINE EDITION WINDSOR STAR

Bridge barricade draws fire; Hazardous shipment exemptions put on shelf

'What they're proposing is radical, it's extreme,' mayor says

By Doug Schmidt Star Staff Reporter

With Michigan state troopers staring them down at the American end, the owners of the Ambassador Bridge have suspended their practice of issuing permits allowing some commercial carriers to truck dangerous goods across the international span.

A consultant has been hired to "look over the situation," says Dave Jolly, general manager of the Detroit International Bridge Company and a report is expected by the end of this month. Meanwhile, all trucks sporting dangerous goods placards have been banished.

"The Michigan State Police are defining it as an illegal route ... the problem is, it's our bridge -- how can a state entity say what can or cannot cross private property?" says Jolly. Company permits were issued primarily to carriers of explosive charges used by the automotive sector for air-bag and seat belt devices.

After the years-old practice was brought to light in recent reports by The Star and other media, Michigan was advised by federal transportation authorities that the U.S. highways leading to the American side of the bridge were identified decades ago as restricted routes forbidding the carrying of a number of categories of dangerous cargo.

'Not legal'

"They maintain the bridge is private and should not be restricted ... that's their position. It's not legal for a load of explosives, flammables, corrosives or radioactive materials to cross that bridge -- that's a violation," says Sgt. Susan Fries of the hazardous materials unit of the Michigan State Police motor carrier division.

Officers from Fries's unit were stationed on the Detroit side of the bridge to help U.S. Customs identify and intercept such shipments.

Carrying restricted dangerous goods on Michigan highways is a federal violation subject to a fine of up to $500 US.

Dangerous goods continue to cross the Ambassador Bridge in commercial trucks that aren't required to carry hazard placards.

"I think it's a very dangerous situation, I really think it's a serious problem going up and down our highways," says David Hawkes, a Richmond Hill firefighter whose five-days-on/five-days-off shifts allow him to work part-time as a commercial trucker.

Most people don't realize, he says, that there are few restrictions on transporting dangerous goods packaged as consumer products for household use.

"Here I was crossing the Ambassador Bridge with 40,000 pounds of highly flammable, combustible barbecue lighter fluid and I didn't even need to be placarded," says Hawkes, who worries the practice could some day put his firefighting colleagues in a dangerous situation.

Private individuals are similarly not bound by dangerous-goods restrictions. On top of that, a recent Ministry of Transportation Ontario study estimated about 9,000 illegal truckloads of hazardous cargo cross the Ambassador Bridge annually.

"It's very wide open now ... you or I can rent a truck, load it up with explosives (and drive on to the bridge) – it always has been a concern of ours," says Windsor Fire Chief Dave Fields.

Doug Schmidt can be reached at 255-5777, ext. 586.

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Gmail BETA

Gregg Ward <ward.gregg@gmail.com>

Inspectors: Security lags when traffic jams

1 message

GREGGWARD@aol.com <GREGGWARD@aol.com> Wed, Mar 29, 2006 at 8:02 AM
To: greggward@truckferry.com

Detroit Free Press
www.freep.com

Home | Back

Inspectors: Security lags when traffic jams

SPECIAL REPORT: Bridge operator pushes to keep border travel moving. Government officials deny cutting corners.

BY TAMARA AUDI
FREE PRESS STAFF WRITER

March 29, 2006

On a weekend night earlier this month, 12 big rigs from Detroit were lined up on the Canadian side of the Ambassador Bridge, waiting to be searched by inspectors who were on the lookout for a produce truck thought to be carrying drugs.

Traffic crosses the Ambassador Bridge earlier this month. Amid heightened terror concerns, about 9.4 million vehicles crossed the bridge in 2005, bridge officials said. (KATHLEEN GALLIGAN/Detroit Free Press)

But before the Canadians could scan the trucks, their supervisor received a call from the U.S. company that owns the bridge. The trucks were snarling traffic. And the bridge's owner wanted traffic cleared quickly, an inspector working that night said.

What happened next, according to customs inspectors and security experts, is what routinely happens on the U.S.-Canadian border when security clashes with commerce: Commerce wins.

"We stopped the inspection," a Canadian inspector said, and let the trucks pass.

Despite fears of terrorism and other security concerns at U.S. ports and border crossings since Sept. 11, 2001, U.S. and Canadian inspectors on the Ambassador Bridge and elsewhere say they are routinely told by supervisors to wave vehicles through checkpoints without scrutiny to satisfy commercial interests.

Though government officials in the United States and Canada deny safety is compromised, inspectors say security lapses are a particular problem at the Ambassador Bridge -- the busiest northern border crossing, and one of only two along the U.S.-Canadian border that are privately owned.

In one practice known as lane flushing, inspectors at the bridge -- owned by the Detroit International Bridge Co. -- say supervisors force them to wave through long lines of cars and trucks to ease congestion, without asking even cursory questions of drivers or passengers.

"When the traffic backs up to a certain point, you know the call is going to come" from the bridge company, one bridge inspector told the Free Press. "Then management jumps like lapdogs."

Robert Perez, port director of Detroit for U.S. Customs and Border Protection, an agency of the Department of Homeland Security, denied lane flushing takes place. Perez said his office tries to cooperate with bridge and tunnel operators, and that inspectors might view that cooperation as caving in to commercial interests.

"The people in the community, both in Detroit and Windsor, should feel good about the fact that their border crossings are safer than ever before," Perez said.

The Free Press interviewed more than a dozen inspectors, former inspectors, Homeland Security officials, customs supervisors, politicians and border security experts -- including six inspectors assigned to the Detroit-Windsor border. All but one of the inspectors -- a Canadian union leader -- spoke on condition of anonymity, noting agency restrictions on media interviews and saying they feared job reprisals if named.

The allegations come as U.S. border security has faced its closest scrutiny since the 2001 terrorist attacks.

Congressional opposition recently scuttled a plan to have a Dubai-owned firm manage six U.S. ports. And Tuesday, as Congress debated tougher border security as part of an immigration package, a Senate subcommittee was investigating how undercover agents drove into the United States from Canada and Mexico with nuclear material.

Technology touted

U.S. and Canadian customs officials, and representatives from the bridge company -- owned by trucking magnate Manuel (Matty) Moroun -- insist security is never compromised for commerce and say, in fact, the reverse is true: Better technology, improved facilities and better cooperation between business and government make the border more secure and efficient.

Perez noted that the bridge and Detroit-Windsor Tunnel now feature high-tech surveillance -- invisible to travelers -- such as radiation detectors and electronic prescreening programs. And customs agents in Detroit seized more than 5,000 pounds of drugs last year, an eightfold increase over the previous year, he said.

Dan Stamper, president of the bridge company, said it has spent millions to expand facilities since 9/11 and would never ask inspectors to "give up any of their security initiatives to move traffic faster."

Bridge inspectors concede that, even under the best of circumstances, they could not fully inspect every vehicle entering the United States without crippling trade. Thus, they say, it is not unusual for drivers to pass inspection with only a few questions asked.

What they object to, they say, are orders from supervisors to wave through long lines of cars and trucks with no questioning at all. Sometimes, inspectors say, they have been told to stop inspecting a particular vehicle to open more booths when traffic backs up.

"They call and say, 'You're holding us up too much.' And they always win that argument," said Charles Showalter, national president of one of the two unions representing U.S. Customs and Border Protection officers. He said when inspectors or the union object, Homeland Security officials "call it 'acceptable risk.' It's 'Hurry up, hurry up, hurry up, hurry up.' Nobody wants to slow down commerce."

Bridge inspectors say this can happen once a week or more at the Ambassador Bridge -- one of two privately owned crossings on the U.S.-Canadian border. The other is a bridge in International Falls, Minn. However, they also say that inspectors are also pressured to speed traffic at government-owned crossings that are run by private companies.

The Detroit-Windsor Tunnel, for example, is run by a private company but owned by the City of Detroit on one

side and Windsor on the other. Toll profits are shared with the cities.

Tolls collected at the Ambassador Bridge go to the bridge company, owned by Moroun of Grosse Pointe Shores.

Keeping the wait down

Since 9/11, traffic has declined about 30% at Detroit's border crossings.

To counter memories of long delays in the months after Sept. 11, the Detroit-Windsor Tunnel tries to keep waits under 20 minutes. Both the tunnel and bridge post wait times on their Web sites. During rush hour on an evening this week, bridge travel to and from Canada was under 15 minutes. The tunnel wait was under 6 minutes.

Neal Belitsky, executive vice president of the Detroit & Canada Tunnel Corp., which operates the tunnel, said he considers a 20-minute wait as "the outer limits for acceptability" for the roughly 29,000 vehicles that pass through daily.

"When we see traffic getting to that threshold, we will start calling customs and saying we need more lanes," he said. "That's a standard part of the business and we all do it."

He added there are times when customs denies his request and he backs off.

Danny Yen, spokesman for the Canadian Border Services Agency in Windsor, said, "We've had our challenges" with the bridge company, but "we never compromise security for trade. It's a balance."

Haste makes risk, some say

But inspectors say the rush to speed traffic has spawned practices -- such as lane flushing -- that put security at risk.

"Lane flushing happens all over the place, at every crossing," Showalter said. "The traffic backs up. The supervisor gets a call" from private border businesses. "They run an officer with a canine through the line of cars, and the officers on the primary inspection lanes are told not to ask questions."

About 9.4 million vehicles crossed the Ambassador in 2005, according to bridge officials. Collectively, the bridge, tunnel and a commercial train tunnel account for nearly a quarter of all U.S. trade with Canada, the bulk of it by trucks crossing the bridge. When trade is delayed at the border, Michigan's automobile-reliant economy suffers most, a recent Ontario Chamber of Commerce study shows. Automakers use a "just-in-time" delivery system that depends on parts crossing promptly. A delay of even a few hours can cost millions.

A difficult balance

Perez, the Detroit port director, said changes intended to balance trade and security issues mean that some vehicles don't have to be checked as frequently. The government's so-called trusted traveler programs, for instance, allow prescreened businesses to cross faster and with fewer inspections, though critics say terrorists could exploit such efforts.

Colleen Kelley, president of the National Treasury Employees Union, a union representing 150,000 federal workers, including inspectors, said that pressure to speed trade means "something's got to give." What usually gives, she said, is thorough inspection work.

"The balance of trade and security became a battle that we really lost to trade years ago," said Joseph King, a professor and terrorism expert at John Jay College of Criminal Justice in New York who worked for U.S. Customs for 37 years. "Customs has become an honor system where the industry controls it, and periodically

the government comes in and monitors."

And yet, ask Moroun -- whose company gets a reported $60 million annually in bridge revenue and spent $645,000 on lobbying and consulting over the past nine years -- about inspectors and he says, "They're very independent."

On the other side of the river, Marie-Claire Coupal, a Canadian customs inspector and local union leader, said she doesn't feel very independent lately. Of Moroun, she says, "He calls the shots around here."

The bridge company's Stamper responds that his firm has a duty to keep trade moving. And he notes that a recent study rated the Ambassador's travel times "clearly superior" to six other crossings.

Sept. 11, Stamper said, was a wake-up call for him, too. After the attacks, heightened security led to 14-hour bridge delays. Choking the economy was, after all, a major goal of the terrorists, he said.

So the main threat Stamper sees is not a dirty bomb, or suicide bombers. "Our biggest threat is our own government's reaction to the border."

*Contact **TAMARA AUDI** at 313-222-6582 or audi@freepress.com.*

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http://www.freep.com/apps/pbcs.dll/article?AID=2006603290449&template=printart

Bridge OKs risky cargo
Letter of permission given to chemical company

Doug Schmidt
Windsor Star

Wednesday, April 12, 2006

The Ambassador Bridge is telling its toll collectors to wave through trucks carrying hazardous cargo in violation of a U.S. ban, according to a document obtained by The Star.

A copy of a permission letter, signed Dec. 6 by Detroit International Bridge Company general manager Dave Jolly, advises bridge employees that trucks carrying a corrosive material for General Chemical Corp. were free to cross the international link seven days per week.

The letter informs the bridge's toll collectors that "the bearer of this letter ... has permission to transport the commodity 'Alum' across The Ambassador Bridge."

'MILD' CORROSIVE

The letter advises bridge employees that "this is a 'mild' corrosive and the truck will be placarded as such." Jolly's letter states passage is permitted seven days per week until March 1, 2006, "when an updated letter must be obtained."

Bridge spokesman Skip McMahon claimed last week he was unaware of any such shipments.

But a representative of another firm, Harold Marcus Ltd., a Bothwell-based transportation company, said it uses the crossing almost daily to import alum. The representative said the company did so with the bridge's blessing and said other companies are also granted permission to haul hazardous cargo across the bridge.

Windsor West MP Brian Masse is calling on federal Public Safety Minister Stockwell Day to investigate the reports that restricted hazardous materials are being permitted to cross the privately owned span.

"Should an accident occur it will have grave consequences to people, the environment, and trade. It is without doubt the status quo is completely unacceptable," Masse wrote in a letter demanding Ottawa investigate "this urgent matter."

Messages left Monday and Tuesday with spokesmen for the bridge were not returned. Likewise, Day's office did not respond to requests for comment.

Masse said Tuesday he spoke with Day in the House of Commons on Monday and that the minister said he would look into the matter.

The driver of a Harold Marcus tanker truckload of alum delivered Tuesday to Windsor's Lou Romano Water Reclamation Plant wouldn't say how he crossed the border. As part of a $1-million 2006 city contract with the Cambridge-based Kissner Group, such loads are sourced in the U.S.

Kit Woods, the city's environmental services executive director, said last week he would investigate how those loads to two sewage treatment plants are being delivered. The

approved area border crossings for hazardous materials are the Windsor-Detroit truck barge or Sarnia's Blue Water Bridge.

"The plant manager here got in touch with the (Kissner) sales rep and reminded him we expect them to comply with all appropriate legislation. They said they understood -- we left it at that," Woods said Tuesday.

General Chemical had the city contract to supply alum in 2005.

Masse said he's heard from truckers who simply remove their hazardous materials placards in order to cross the Ambassador, which is quicker and cheaper than the truck barge or Blue Water Bridge. In the past, the owners of the bridge have argued they can determine what should or shouldn't cross over their private property.

"It's pretty scary stuff. Some trucks can sneak by, and there's nothing Customs can do -- we can't enforce that law," said Marie-Claire Coupal, Windsor branch president for the Customs Excise Union.

Hazardous goods shipments on local roads are the responsibility of the Ontario Ministry of Transportation (MTO), but deciding what's allowed onto the bridge from the Canadian side is left to the bridge's owners.

"Although it is not an offence to transport dangerous goods across the bridge, the bridge authority prohibits access to trucks carrying hazardous material," MTO spokeswoman Emna Dhahak stated in an e-mailed response to questions by The Star.

Masse said it's "complete hypocrisy" for Canada not to have the same safety regulations in place as the American authorities have on their side of the Ambassador. Allowing the bridge company to issue special permission to some carriers of hazardous materials "shows how lax we are ... it's why I'm asking for a full investigation."

An interim report issued last summer in Ottawa by the Senate Security and Defence Committee sounded an ominous warning of how fragile the most important commercial border link is between Canada and the U.S.

"If somebody really wanted to tear into Canada's political and economic future and wound the Americans at the same time, an optimal target might well be the Ambassador Bridge in Windsor," stated the report, entitled Borderline Insecure.

The senators said that disabling that cross-border link between Windsor and Detroit "would have a devastating and long-lasting effect on Canada's economy."

BANNED GOODS

Corrosives, explosives, flammables and radioactive goods are all banned from the Ambassador Bridge under the U.S. federal government's national hazardous materials route registry. Alum, or aluminum sulfate, is a corrosive which can form sulfuric acid when mixed with water.

Michigan state police are generally banned from bridge property but enforce the rules on Detroit access streets.

Ran with fact box "Banned Goods" which has been appended tothe story.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
East Lansing Field Office (ES)
2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823-6316

IN REPLY REFER TO:

May 31, 2007

OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL # of pages ▶ 2

To David Coburn	From Bob Bloom
Dept./Agency	Phone #
Fax #	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATIO

Commander (dpb)
Ninth Coast Guard District
1240 East Ninth Street – Room 2025
Cleveland, Ohio 44199-2060

Re: Public Notice No. 09-03-07, applicant Detroit International Bridge Company

Dear Mr. Bloom:

We have reviewed the Public Notice for the above referenced file, concerning the availability of the draft Environmental Assessment (EA) for the Ambassador Bridge between Detroit, Michigan and Windsor, Ontario, Canada. We submit these comments in accordance with the National Environmental Policy Act of 1969, as amended (NEPA).

General Comments

The draft EA identifies the six-lane cable stayed bridge on the western alignment as the preferred alternative. The draft EA provides a fairly thorough discussion of the environmental consequences from construction of the preferred alternative.

Specific Comments

Section 3.9.2 Avian: This section provides an analysis of the potential impacts to migratory birds from collisions with a new bridge structure. The draft EA correctly points out that few studies of avian mortality from collisions with bridges are available. This section states that focusing the lighting downward on the bridge will be considered as a means to minimize nighttime collisions. We support this measure but recommend the draft EA discuss other potential impacts and mitigation measures for lighting on the bridge. For example, studies of avian collisions with other structures (e.g., buildings, communication towers) indicate that bird kills appear to be correlated with the type of lighting, including color (e.g., red, white, green) and duration (e.g., continuously lit, variously flashing, strobe). In general, white strobe lights are believed to be the least dangerous to birds. We recommend the draft EA discuss the type of lighting that would be installed on the bridge and measures to minimize potential bird collisions.

We appreciate the opportunity to review the subject document. Please direct any questions to Barbara Hosler of this office at 517/351-6326 or the above address.

Sincerely,

Craig A. Czarnecki
Field Supervisor

cc: MDNR, Wildlife Division, Lansing, MI (Attn: Lori Sargent)
USEPA, Region 5, B-19J, Chicago, IL (Attn: Sherry Kamke)

RECEIVED 1 JUNE 2007

SIERRA CLUB
FOUNDED 1892

Commander (dpb)
Ninth Coast Guard District
1240 E. 9th Street – Room 2025
Cleveland, Ohio 44199-2060

May 31, 2007

Dear Sir:

Thank you for the opportunity to comment on the Draft Environmental Assessment (EA) prepared by the Detroit International Bridge Company ("DIBC") for its application to build a second span of the Ambassador Bridge ("Bridge"). The Sierra Club is a nation-wide grassroots environmental organization dedicated to protecting our communities. The Sierra Club and its members in the Detroit metropolitan area are concerned about the environmental impacts of a second span of the Ambassador Bridge.

The proposed "Ambassador Bridge Enhancement Project" involves a second bridge span between Detroit, MI and Windsor, Ontario, adding six lanes to the existing four. We are focusing these comments on two sets of impacts which would result from this project which the Draft EA does not adequately consider. They are (1) Air Quality and (2) Environmental Justice Issues. We urge the Coast Guard to complete a full and thorough analysis of these impacts and to incorporate that analysis into its further consideration of the proposed bridge project.

Air Quality Impacts

The Draft EA does not adequately consider all of the standards and requirements set by the Environmental Protection Agency for $PM_{2.5}$ non-attainment areas. When an area is designated in non-attainment, certain transportation projects must undergo a review for localized impact for $PM_{2.5}$ also known as a "HotSpot" analysis.[1] This standard was developed by the Environmental Protection Agency to ensure that areas that have failed to attain national standards are reviewing projects that may exacerbate the negative impact of that pollutant on air quality and human health. This standard should not be ignored in the Coast Guard's Draft EA for the expansion of the Ambassador Bridge. Due to the 150% increase in the size of the existing Bridge and the correlation between traffic and $PM_{2.5}$, the Coast Guard must consider the

[1] 71 Fed. Reg 12467.

potential impact of $PM_{2.5}$ emissions from the project on nearby communities, not solely Wayne County as a whole. The federal $_{2.5}$ hotspot analysis is a relevant standard to apply.

The discussion of air quality impacts in the Draft EA is incomplete. The science regarding localized air quality impacts is replete with conclusions regarding the adverse effect of car and truck emissions on human health. In light of this science, the Coast Guard Draft EA does not sufficiently evaluate the potential air quality impacts of six added lanes to the existing traffic corridor, a 150% increase in the roadway capacity of the existing Ambassador Bridge

The connection between air pollution from traffic and human health is undeniable. The environmental impact of highways has been a source of concern since the 1960s and was even cited as a major factor behind the enactment of NEPA.[2] Air pollution from transportation sources includes a toxic mixture of particulate matter measuring 2.5 microns in diameter ($PM_{2.5}$), carbon monoxide, nitrogen oxides (NOx), volatile organic compounds (VOCs), and mobile source air toxics including diesel particulate matter. $PM_{2.5}$ is often linked to increased mortality, hospitalization for respiratory problems, decreased lung function, and increased respiratory symptoms[3] as well as cardiovascular and pulmonary causes of death.[4] Exposure to this toxic mixture from exposure to vehicular traffic in urban areas may increase the risk of a heart attack in susceptible persons.[5] Fine particulates are more likely to be mixtures of chemicals and metals that result from combustion sources (such as gasoline or diesel engines) and can penetrate deeper into lung tissue and even enter the blood stream. $PM_{2.5}$ and mobile source air toxics are the subject of a growing body of scientific evidence linking these pollutants to substantial adverse human health impacts.

The impact of mobile source air pollution on children is particularly acute. Some studies have shown a correlation between asthma and attending school near major roadways. A study in California's East Bay was designed to determine the relationship of the proximity of middle schools to freeways and adverse health effects.[6] The study found that the closer the schools were to the freeways, the higher the concentrations of $PM_{2.5}$ and diesel exhaust. Also higher, was the prevalence of asthma and bronchitis among students at the schools most affected by motor vehicle emissions.[7] Another study followed school children in 12 California communities, finding large deficits in lung function among those students living in communities with high pollutant concentrations.[8] Reductions in lung function and other health complications connected

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[2] Bob Yuhnke, *NEPA's Uncertainty Principle in the Federal Legal Scheme Controlling Air Pollution From Motor Vehicles*, 35 E.L.R 10273 (2005).

[3] N. Kunzli, et al, *Ambient Air Pollution and Atherosclerosis in Los Angeles, National Institute of Environmental Health Sciences* (Nov 2004). Exhibit B.

[4] Michael Jerrett, et. al., *Spatial analysis of Air Pollution and Mortality in Los Angeles*, Epidemiology, Vol. 16 No. 6 (Nov. 2005). Exhibit C.

[5] Annete Peters, et. al, *Exposure to Traffic and the Onset of Myocardial Infarction*, N. Engl. J. Med Vol 351 No. 17 (Oct. 21, 2004). Exhibit D.

[6] Janice J. Kim et al., *Traffic-Related Air Pollution Near Busy Roads: The East Bay Children's Respiratory Health Study*, 170 Am. J. Respiratory & Critical Care Med. 520 (2004). Exhibit E.

[7] See also W. James Gauderman et. al., Childhood Asthma and Exposure to Traffic and Nitrogen Dioxide, Epidemiology, Vol. 16 No.6 (Nov 2005) (examining the association between traffic-related pollution and childhood asthma) Exhibit F.

[8] J.W. Gauderman et al., *The Effect of Air Pollution on Lung Development From 10-18 Years of Age*, 351 New Eng. J. Med. 1057 (2004). Exhibit G.

to exposure to air pollution were expected to impact those children for the remainder of their lifetimes. Yet another important study found that preliminary data suggested that concentrations of pollutants primarily generated by motor vehicle fuel combustion were higher in areas of close proximity to roadways with higher vehicle density.[9]

The U.S. Environmental Protection Agency ("EPA") recognizes that air pollution levels near major roadways are significantly higher than at locations farther away:

> Urban-scale assessments done in Houston, TX and Portland, OR illustrated steep gradients of air toxic concentrations along major roadways, as well as better agreement with monitor data. Results of the Portland study show average concentrations of motor vehicle-related pollutants are ten times higher at 50 meters from a road than they are at greater than 400 meters a road. These findings are consistent with pollutant dispersion theory, which predicts that pollutants emitted along roadways will show highest concentrations nearest a road, and concentrations exponentially decrease with increasing distance downwind. These near-road pollutant gradients have been confirmed by measurements of both criteria pollutants and air toxics, and they are discussed in detail in Chapter 3 of the RIA.[10]

Studies show that these elevated levels of ambient air pollution near major roadways result in a commensurate increase in indoor air pollution near roadways. Citing a leading study that assessed children's exposure to traffic-related air pollution while attending schools near roadways, the EPA notes:

> Overall results indicate that indoor pollutant concentrations are significantly correlated with traffic density and composition, percentage of time downwind, and distance from major roadways.[11]

The American Academy of Pediatrics has warned that children and infants are among the most susceptible to the harmful effect of air pollution.[12] The AAP notes:

> In addition to associations between air pollution and respiratory symptoms, asthma exacerbations, and asthma hospitalizations, recent studies have found links between air pollution and preterm birth, infant mortality, deficits in lung growth, and possibly, development of asthma.[13]

The AAP reports that these harmful health effects result in large part, from motor vehicle pollution:

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[9] Northeast States for Coordinated Air Use Management, Indoor/Outdoor School Air Monitoring Pilot Project. (Sept. 13, 2002). Exhibit H.
[10] 71 Fed. Reg. 15804 (citations omitted).
[11] 71 Fed. Reg. 15804 (citations omitted).
[12] American Academy of Pediatrics (AAP), *Ambient Air Pollution: Health Hazards to Children. Committee on Environmental Health,*Pediatrics Vol. 114 Pp 1699-1707 (2004). Exhibit I.
[13] AAP, *Ambient Air Pollution: Health Hazards to Children. Committee on Environmental Health,*Pediatrics Vol. 114 Pp 1699-1707 (2004).

Motor vehicles represent the principal source of air pollution in many communities, and concentrations of traffic pollutants are greater near major roads.[14]

Air quality impacts on children's respiratory health are often compounded when these pollutants are present in high concentrations on playgrounds and athletic fields, where children are at even higher risk during physical activity.[15]

The connection between adverse health impacts in children and mobile source air pollution is especially relevant to the Ambassador Bridge Enhancement Project. The Border Transportation Partnership, a group proposing another bridge across the Detroit River, has published a map locating all of the schools in southwest Detroit.[16] This map shows half a dozen schools located at the foot of the existing Ambassador Bridge. These schools range from elementary through high schools, with the presence of children from the ages of roughly 5 through 18 who will be exposed to ambient concentrations of these harmful pollutants from increased traffic resulting from the new span of the Ambassador Bridge. This is in addition to the many children who may be living nearby who would be subject to these impacts in their neighborhood.

In addition to the risks to children and developing respiratory function, serious cancer risk is attributed to mobile source air pollution. A 2000 study done in the Los Angeles air basin measured exposures to 30 toxic air pollutants a 22 locations in the basin.[17] This study, known as MATES II, found that 90% of cancer risk attributed to air pollutants came from mobile sources. Logically, this risk was more pronounced near freeways and other locations dominated by mobile sources.[18] [19]

Detroit already has its fair share of air quality problems. The Detroit area is currently a non-attainment area for the National 8-hour ozone standards, as well as for National standards for $PM_{2.5}$, two criteria pollutants that carry serious human health concerns.[20] In addition to air quality problems, the city has identified capacity problems associated with the projected increases in vehicle and truck traffic over the next 30 years. Health related air quality impacts must be considered within this context. An additional six lane bridge, coupled with the necessary infrastructure to manage the increased vehicle capacity will lead to increased mobile source air pollution in southwest Detroit.

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[14] AAP, *Ambient Air Pollution: Health Hazards to Children. Committee on Environmental Health,* Pediatrics Vol. 114 Pp 1699-1707 (2004).

[15] Kenneth W. Rundell, et. al., *Vehicular Air Pollution, Playgrounds, and Youth Athletic Fields,* Inhalation Toxicology, Vol. 18 Page 541-547 (2006). Exhibit J.

[16] See Central Area Alternatives Map. Exhibit K. *Also available at* www.partnershipborderstudy.com.

[17] South Coast Air Quality Management District, *Multiple Air Toxics Exposure Study-II* (March 2000), *available at* http://www.aqmd.gov/matesiidf/matestoc.htm.

[18] See also Amir Sapkota and Timothy J. Buckly, *The Mobile Source Effect on Curbside 1,3-Butadiene, Benzene, and Particle-Bound Polycyclic Aromatic Hydrocarbons Assessed at a Tollbooth,* Journal of the Air & Waste Management Association, Vol. 53 (June 2003) (examining traffic counts and vehicle class combined with curbside concentrations of environmental carcinogens). Exhibit L.

[19] See Also, AAP(2004) noting the cancer risk resulting from diesel exhaust.

[20] 69 Fed. Reg 56697 (Marginal non-attainment for 8-hour ozone); 70 Fed. Reg. 943 (non-attainment for $PM_{2.5}$)

The Draft EA asserts that an increase in traffic is not anticipated as a result of the construction of additional lanes across the river. However, there is evidence to the contrary, suggesting that increased lane miles actually does result in an overall increase in traffic, and therefore, an increase in mobile source pollution.[21] NEPA analysis is required to ascertain how the proposed project would effect traffic levels. Rather than summarily concluding that a 150% increase in capacity will not result in an increase in traffic, the agency must perform appropriate modeling to quantify anticipated traffic levels. This modeling must account for the phenomenon of induced travel.[22]

The air quality and resulting health impacts of this bridge cannot be ignored. Increased lane miles lead to increased traffic. Increased traffic will lead to increases in mobile source air pollution including $PM_{2.5}$ and other air toxics which have been repeatedly linked to reduced lung function in developing children, heart attacks in susceptible populations, certain cancers as well as lasting health impacts from this exposure. The consensus among the environmental health professionals about the seriousness of this problem suggests that a six lane increase to a Bridge that has several schools positioned near its base is a project that has potentially significant, potentially life threatening impacts on human health and should be analyzed for those impacts.

Environmental Justice Issues

In addition to investigating the locally desired social, economic, or other environmental conditions, it is important for the Coast Guard to take into consideration their legal mandate to give consideration to the issues of environmental justice. The Coast Guard, as a federal agency, shall make achieving environmental justice part of its mission by identifying and addressing "disproportionately high and adverse human health or environmental effects" on low-income or minority populations resulting from its programs and activities.[23]

The area of southwest Detroit is already burdened by the adverse environmental impacts of the existing Ambassador Bridge and the infrastructure that surrounds it, and the Draft EA does not provide conclusive evidence that this project will not exacerbate an existing problem. In addition to the air pollution attributable to the traffic corridor, Wayne County is one of the dirtiest counties in the Country.[24] The list of existing sources of pollution is long and includes oil, automobile, steel, wastewater and power industries to name a few. Southwest Detroit is made up of African American, Hispanic and low-income neighborhoods. The Draft EA asserts that the project will have no impact on environmental justice considerations. It fails, however, to include any assessment of the very important health considerations associated with the cumulative effects of a new source of air pollution on surrounding neighborhoods as a result of a significant increase in highway use. This issue is deserving of special attention as the Coast Guard assesses the burdensome environmental impacts a new bridge will produce on top of a long legacy of environmental devastation.

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[21] Robert B. Noland and Lewison L. Lem, *A Review of the Evidence for Induced Travel and Changes in Transportation and Environmental Policy in the US and the UK,* Transportation Part D, 7 (2002). Exhibit M.
[22] See Id.
[23] Exec. Order No.12,898, 59 Fed. Reg. 7629 (Feb. 11, 1994).
[24] www.scorecard.org.

Conclusion

In conclusion, the Sierra Club and its members in the Detroit metropolitan area urge the Coast Guard to revise its environmental analysis based on the above information and to provide the public further opportunity to comment on that revised analysis.

Thank you for your consideration of the Sierra Club's comments.

Alison Horton

Midwest Region Staff Director
Sierra Club
400 W. Front Street, Suite 204
Traverse City, MI 49684
231.922.2201
231.922.2909 (Fax)

LORRAINE PERLMAN
1071 VINEWOOD
DETROIT MICHIGAN 48216

June 7, 2007

Commander (dpb)
Ninth Coast Guard District
1240 E. 9th St., Room 2025
Cleveland, OH 44199

Dear Commander,

The crush of traffic caused by the location of the Ambassador Bridge is unhealthy for truck drivers, residents of Windsor and residents of this part of Detroit. Shipping the enormous tonnage of freight through urban areas--where none of it remains--is outrageous and irrational. I recognize that a sensible solution is not obvious, but a second span ~~on~~ next to the existing bridge is the worst alternative I can imagine.

I attended the Public Workshop on May 24, 2007 where cheerleaders for the bridge addition asked for our opinions about esthetic matters. Substantive issues were never addressed.

For 33 years I have lived in homes on tree-lined streets two or three blocks from the bridge. The environmental impact of the bridge has caused some deterioration of the neighborhood; another span of ~~the~~ bridge would sound the death knell for our pleasant part of the city. I urge that the proposal for a second span be denied.

Your decision on this issue will affect our lives crucially.

Sincerely,

Lorraine Perlman

Lorraine Perlman

Detroit River Wyandot's
6662 Thornberry Crescent
Windsor Ontario
N8T 2X2

Recieved by email August 27/07

June 10, 2007

Mr. Scot Striffler
External Affairs
U.S. Coast Guard
1240 E. 9th Street
Suite 2073
Cleveland, OH 44199

Dear Mr. Scot Striffler

We are the Detroit River Wyandots (DRW) and descendents of the former band of Anderdon. We are a tribal organization in Windsor Ontario. The board of Directors and our members of the DRW are formed of Wyandot Indian descendents.

We are opposed to building a bridge that will cause any destruction of the sacred ground surrounding the historical area in Sandwich Ontario.

We would like to be kept informed of any development that may affect our native sites and offer any support possible to stop the building of a bridge that will cause great destruction of this very sacred site. These grounds mean so much to so many different people, especially to the Wyandot Indians of Anderdon, Ontario.

Sincerely

Gertrude Free

Gertrude Free, Director DRW
25885 Sierra Dr
Novi, Michigan 48374-2335

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c.c. Michel Gros-Louis
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64700 E. Hwy 60
Wyandotte, OK 74370

WYANDOTTE NATION

Billy Friend
2nd Chief

Phone: 918-678-2297
Fax: 918-678-2944

June 12, 2007

Untied States Coast Guard 9th District
Captain Joseph R. Castillo, Chief of Staff
1240 E. Ninth St. 2025
Cleveland, OH 41999-2060

4 - FORAC

Dear Captain Castillo;

The Wyandotte Nation would like to address the project:

Ambassador Bridge, Sandwich Ontario Site.

The Wyandotte Nation has a great concern in the project due to the cultural impact on scared burial sites.
The site involved is a known burial site of many tribal ancestral graves. These graves would be impacted by any future development on the proposed site.

The Wyandotte Nation is in support of local Windsor residents who have expressed their concerns on the environmental and cultural in this area due to this pending project.

After documenting proof of ancient Wyandotte burial sites in the proposed project area, we are requesting these sites not be disturbed as these remains of our ancestors are scared to our way of life. In short, we anticipate a response of how this unfortunate situation will be handled going forward.

Sincerely,

Sherri L. Clemons

Sherri L. Clemons, N.A.G.P.R.A. Representative, Wyandotte Nation

Donovan's Pub
3003 West Vernor
Detroit, MI 48216
(313) 964-2267

June 13, 2007

Mr. Robert Bloom Jr.
Chief Bridge Branch
United States Coast Guard
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199-2060

Dear Mr. Bloom:

I find the myriad of roadblocks continually put in front of the Ambassador Bridge to be a serious infringement on the rights of residents, private business owners, employees and customers not necessarily represented by "community groups"

We have been in business for approximately twenty years and in all of that time, I have heard nothing but in-fighting and petty jealousies espoused by these community groups. The planned walkway across I-75 for example, has been discussed ad nauseam for twenty plus years that I know of. Please do not make the Ambassador Bridge Enhancement Project another example of Southwest Detroit's lack of cohesiveness.

The "Bridge" has been a fantastic neighbor of ours. I personally am totally in favor of their planned improvements. I am neither jealous nor envious of the accomplishments of "Matty" Moroun. I applaud his determination and steadfastness in the face of opposition from the self-anointed "few".

If only the gloves would come off, then just maybe, the twenty years already consumed by in-fighting could be replaced by advancement beneficial to the citizens of Southwest Detroit.

I truly believe the proponents of this project far outnumber those in opposition.

Talk to the people on the street, in the bars, restaurants, bakeries, and stores. It will be an enlightening experience, I assure you.

Sincerely,

Chris Compean

Chris Compean
Corporate Officer

cc: Steve Tobocman, State Representative
United States Senator Carl Levin
Gateway Collaborative

June 24, 2007

Commander (dpb)
Ninth Coast Guard District
1240 E 9th St – Room 2025
Cleveland OH 44199-2060

RE: Proposed Ambassador Bridge Enhancement Project
Environmental Assessment

Dear Commander:

I live practically in the shadows of the Ambassador Bridge, in southwest Detroit, Michigan, at 359 W Grand Blvd. I am strongly opposed to the building of a second bridge span next to the existing Ambassador Bridge.

First, I do not believe such an important international trade and security crossing should be in private hands, as it is now. I believe the current owner has refused previous attempts by government to have any oversight regarding the Bridge's safety and/or security, which is unacceptable in the world we live in today. The government should have total control over this crossing.

Second, a second span will most definitely increase the amount of car and truck traffic, noise, pollution, and general congestion in this neighborhood and on the highways here, which I strongly oppose.

Third, the DRIC study has found that the better location for the new crossing should be downriver, in the Delray, Michigan area, as the distance over the river is shorter, and the socioeconomic impact on both sides of the river would be more tolerable than at the current Ambassador sight.

I support the DRIC process. Do not destroy the southwest Detroit and the Windsor, Ontario, Canada communities!

Sincerely,

Douglas G. Wahl
359 W Grand Blvd
Detroit MI 48216

June 27, 2007

Commander
Ninth Coast Guard District
1240 E. 9th Street - Room 2025
Cleveland, Ohio 44199-2060

RE: Proposed Second Span of Ambassador Bridge

Dear Commander:

The purpose of this letter is to express opposition to the plans of the Detroit International Bridge Company to build a second twin-span directly west of the Ambassador Bridge.

I am writing as a resident of Hubbard Farms Historical District which is located directly west of the present Ambassador Bridge--an area seriously negatively impacted by health concerns caused by air pollution and lead contamination, economic hardships caused by rapid deterioration of home foundations that crack under the weight of the 9,000 to11,000 industrial trucks that barrel through the neighborhood every day in order to cross the Ambassador Bridge since NAFTA and the opening of the Detroit Intermodal Freight Terminal. Great decisions, great costs to citizens!

Please understand that city and state planners and commissions, along with nonprofit organizations have dumped hundreds of millions of dollars into this area in the past twenty years and because of that southwest Detroit continues to thrive and even grow despite the economic challenges facing Detroit and Michigan.

Isn't it a travesty to have residents now face the very real possibility of obliteration in order to satisfy the plans of one man, Mr. Matty Maroun, and his Detroit International Bridge Company. If anyone has learned anything about where we are at now, the State of Michigan Department of Transportation's Detroit International River Crossing study, at least acknowledges there needs to be an expansive buffer area between industrial traffic and residential areas. This study will be ongoing through 2008. Of the fourteen proposed sites for a second bridge, the one closest to the existing bridge was eliminated early on, for the obvious reasons stated above, and especially due to the reality of terrorist attacks in a post 9/11 world.

The neighborhood is more tolerant of a publicly-owned rather than a privately-owned bridge, especially in light of international and national security. In your position, do you know of a weaker "link" in our nation's northern border security than that of the Ambassador Bridge? There is much concern and consternation among area residents that neighbor the bridge,

and one wonders why the laws of imminent domain don't seem to apply when they should now more than ever before!

So, in response to your call for input from the community regarding the aesthetics of the new bridge next to a historic landmark such as the Ambassador Bridge, I have to say as I shake my head, who is their right mind would put another bridge up next to an existing one anyway?

How can the Bridge Company move forward when the Canadian side opposes the plan, and the State of Michigan is in the midst of negotiations via the MDOT study?

Therefore, I cannot fathom any reason for this question being brought to your attention at this time.

Sincerely,

Virginia Zeigler

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June 28, 2007

Mr. Tom Topash
Pokagon Band of Potawatomi
58620 Sink Rd, P.O. Box 180
Dowagiac, Michigan 49047

Re: Ambassador Bridge Enhancement Project

Dear Mr. Topash:

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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If at any time during the course of this project artifacts or other archeologically significant remains are discovered, work will be stopped immediately. You as well as the appropriate representative of SHPO, Mr. Brian D. Conway, will be notified to provide direction as to how to proceed. In the case that human remains are discovered, the police will also be contacted.

If you have are interested in arranging a meeting or have further questions or comments, please feel free to contact me at your convenience.

Sincerely,

Anna Peterfreund

Anna Peterfreund
Environmental Scientist

Enclosure: Project Location Map

cc: USCG, File, Dan Stamper, Craig Stamper, Scott Korpi,

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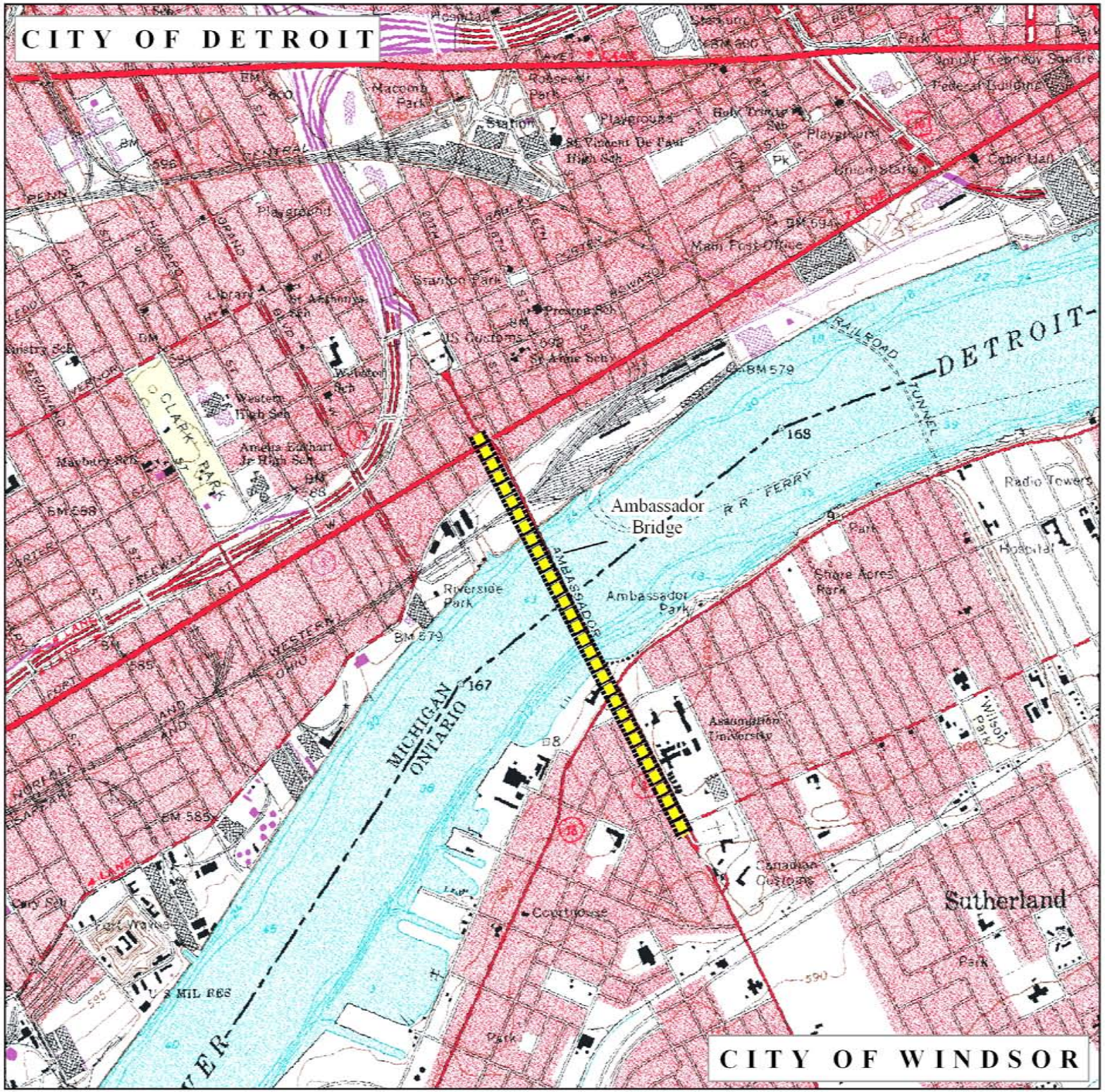
Project Location



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June 28, 2007

Ms. Clarice M. Werle, NAGPRA Contact
Forest County Potawatomi Community of Wisconsin
P.O. Box 340
Crandon, Wisconsin 54520

Re: Ambassador Bridge Enhancement Project

Dear Ms. Werle:

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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Anna Peterfreund

Anna Peterfreund
Environmental Scientist

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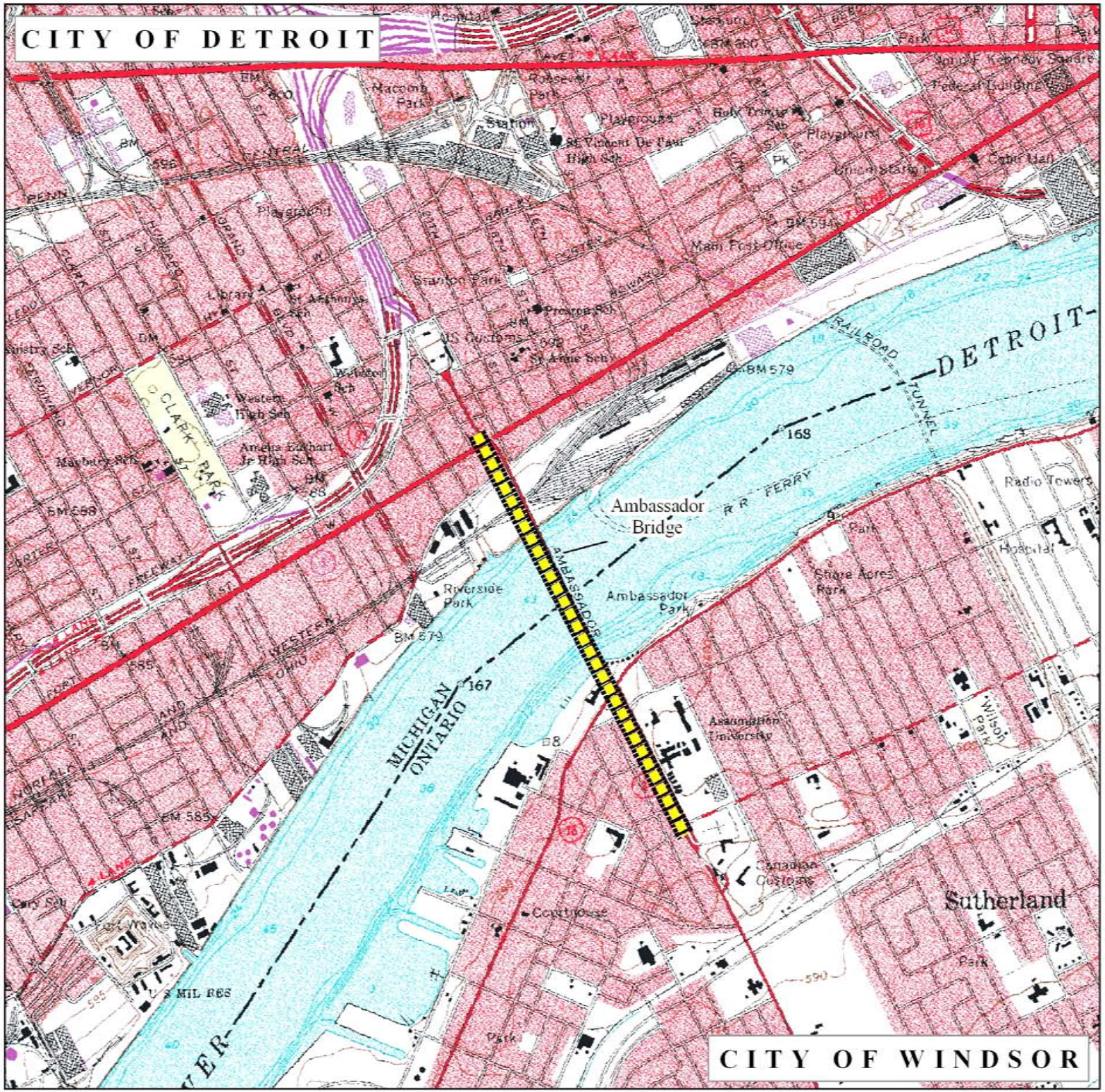

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June 28, 2007

Harold G. Frank, Chairperson
Forest County Potawatomi Community of Wisconsin
P.O. Box 340
Crandon, Wisconsin 54520

Re: Ambassador Bridge Enhancement Project

Dear Mr. Frank:

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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Environmental Scientist

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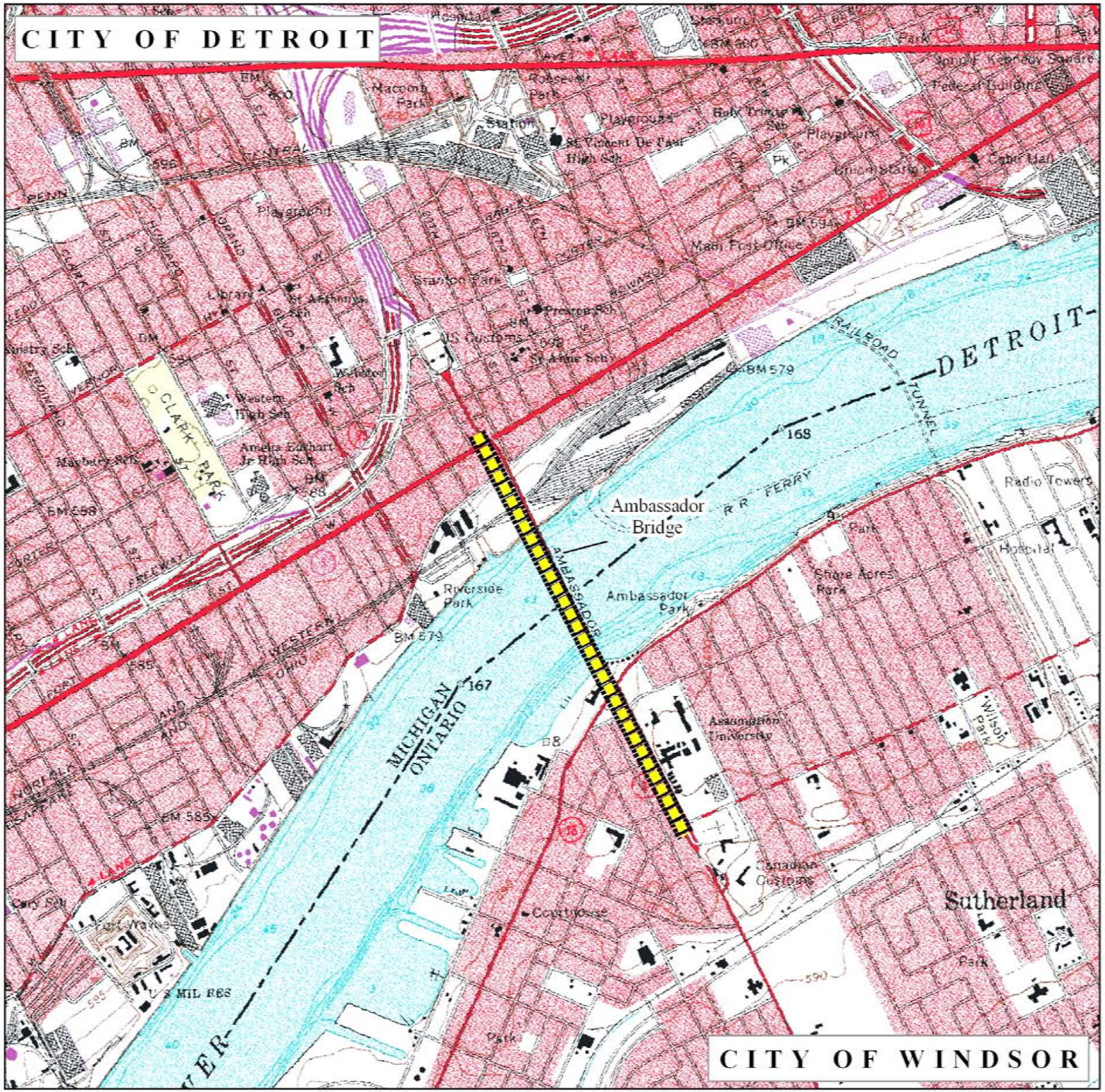

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June 28, 2007

D.K. Sprague, Tribal Chairman
Match-E-Be-Nash-She-Wish Band of Potawatomi Indians, Gun Lake Tribe
P.O. Box 218
Dorr, Michigan 49323

Re: Ambassador Bridge Enhancement Project

Dear Mr. Sprague:

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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Anna Peterfreund

Anna Peterfreund
Environmental Scientist

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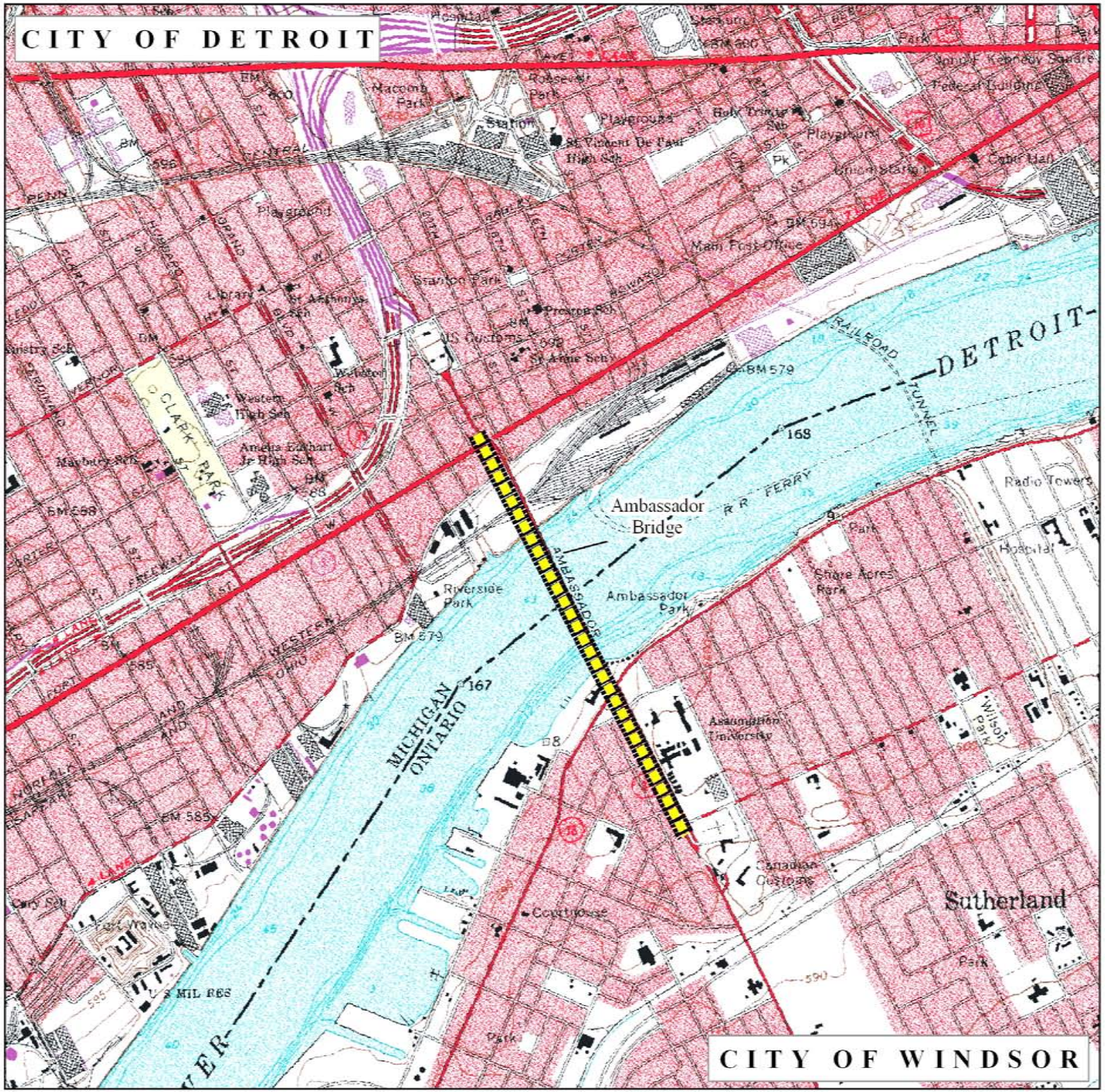

Copy C
Dave C
Scott K
Scott W.
Pam
Jim
File

LAW OFFICES OF
OLSON, BZDOK & HOWARD
A Professional Corporation

James M. Olson *
Christopher M. Bzdok
Scott W. Howard
Tracy J. "TJ" Andrews ‡
Jeffrey L. Jocks
Michael C. Grant
William Rastetter, Of Counsel ∘

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Facsimile: (231) 946-4807
www.envlaw.com

* Admitted in Colorado
‡ Admitted in Texas
∘ Admitted in Indiana

June 29, 2007

Mr. Bob Bloom
Commander, Ninth Coast Guard District (dpb)
1240 East 9th Street
Cleveland, OH 44199-2060

Via Fax No. (216) 902-6088

Re: Request for Consulting Party Status in Section 106 Process for Proposed Twinning of the Ambassador Bridge
Our File No. 5550.00

Dear Mr. Bloom:

Our firm represents the Gateway Communities Development Collaborative (GCDC). We are submitting this request on behalf of GCDC to request that, in your review of the proposed twinning of the Ambassador Bridge project, GCDC be recognized as a Consulting Party under Section 106 of the National Historic Preservation Act.

BACKGROUND AND LEGAL CONTEXT

The Detroit International Bridge Company (DIBC) submitted an application to the United States Coast Guard (USGC) for authorization to build a new bridge between Windsor, Canada, and Detroit, Michigan. The new bridge is proposed as a "twin" of the historic Ambassador Bridge: it would be located immediately adjacent to the west of the existing Ambassador Bridge.

As part of USCG's navigational permitting process, you are presently reviewing the proposed new twin bridge under both the National Environmental Protection Act (NEPA) and also under the Section 106 of the National Historic Preservation Act (NHPA).[1] Under NEPA, DIBC submitted a proposed Draft Environmental Assessment (EA) document to USCG, which USCG has adopted and published for public comment. While we will certainly provide timely comments on the draft EA, this letter addresses the Section 106 process.

The Advisory Council on Historic Preservation (ACHP) regulations for implementing Section 106 identifies several consulting parties that the federal agency is to include in the Section 106 process, including:

[1] Section 4(f) of the Department of Transportation Act (49 USC § 303) also applies to this project. When the USCG was transferred from the Department of Transport (DOT) to the Department of Homeland Security (DHS), Congress made clear that it was transferring all of the USCG duties that it had while it was housed under DOT, which includes its Section 4(f) duties. *See* 6 USC § 468(b). Further, the USCG regulations acknowledge that Section 4(f) is a relevant and potentially applicable statute in USCG bridge permitting determinations, even though the USGC is housed in the DHS. *See* 33 CFR 1.01-60(a)(1)(ii).

> Certain individuals and organizations with a demonstrated interest in the undertaking may participate as consulting parties due to the nature of their legal or economic relation to the undertaking or affected properties, or their concern with the undertaking's effects on historic properties.

36 CFR 800.2(c)(5). GCDC seeks recognition as a Consulting Party under this provision.

GCDC'S AND ITS MEMBERS' INTERESTS

GCDC was established in 1999 as an association of community-based non-profit organizations involved in the planning and development of housing and economic development projects in Southwest Detroit. GCDC's mission is to act as a collective voice for its member organizations and enhance their individual development initiative through joint planning, advocacy, and marketing. Its members include:

- Bagley Housing Association
- Bridging Communities
- Greater Corktown Development Corporation
- Mexicantown Community Development Corporation
- Michigan Avenue Business Association
- Neighborhood Centers, Inc.
- Southwest Detroit Business Association
- Southwest Detroit Environmental Vision
- Southwest Solutions/Southwest Housing Corporation

Attached as Exhibit A is a list of each member's address.

The mission of GCDC and its member organizations includes revitalizing and preserving the cultural, economic, and historical interests of the neighborhoods that lie around the Detroit-side base of the Ambassador Bridge, which are among the oldest neighborhoods in Detroit. Our members represent the people that live in the shadow of the Ambassador Bridge, and the mission of our member organizations is to promote these neighborhoods in various ways. We work on a variety of community projects, including undertaking historic housing redevelopment projects, providing redevelopment grants in historic neighborhoods, providing low income loans to encourage people to move to these neighborhoods, and promoting commerce and development in these historic regions.

By way of example only, the Bagley Housing Association (BHA) works in the historic districts located just east of the Ambassador Bridge, between West Grand Boulevard and Clark Park with Vernor Highway representing as its main street. Among other projects, BHA has worked with the local community that lives around historic Saint Anne's Catholic Church (founded in 1701) on a neighborhood revitalization project. Southwest Solutions/Southwest Housing Corporation has been building and rehabilitating hundreds of housing options in the area, as well as helping people buy houses and relocate to this area.

Historic Corktown, which is just north of the Ambassador Bridge, is the oldest surviving neighborhood in Detroit. The Greater Corktown Development Corporation works to preserve and revitalize this historic neighborhood by providing low-income home purchase loans, home repair grants, and many other projects to promote the residential and commercial development of the historic neighborhood.

Mexicantown is another historic neighborhood just a block north of the Ambassador Bridge, near Porter and Bagley Streets. Mexicantown CDC works to promote small business development in Mexicantown, and to promote and celebrate the cultural and historic values of the neighborhood.

Mexicantown and Corktown are both leaders in the cultural tourism movement: an economic development tool based on promoting the historical aspects of the community. Tours of these communities necessarily include discussion of the Ambassador Bridge, which is an integral part of the communities' historic landscape.

New housing developments in these historic neighborhoods are being designed to fit the historic character of the neighborhoods, and several projects, including projects by Southwest Detroit Business Association and Southwest Solutions, have received historic tax credits for their historic preservation projects.

The communities around the Ambassador Bridge are rich in history, and GCDC and its members are actively working to preserve that history and revitalize these neighborhoods. The Ambassador Bridge is a key visual and historic icon and an important economic landmark in these neighborhoods. As such, the bridge is part of the neighboring communities' history.

The proposal to twin the historic bridge with a new, bigger modern bridge directly next to the historic Ambassador Bridge will destroy the historic visual value of the bridge, and thus also harm the historic and redeveloping neighborhoods around the bridge. The photographs included in DIBC's Visual Quality and Aesthetics Report (Appendix F to the proposed Environmental Assessment) amply demonstrates this: the new bridge would literally dwarf and swallow the historic bridge. The new bridge will bring more traffic through the neighborhoods, increase the levels noise in the neighborhoods, add air pollution to the neighborhoods, and fundamentally alter the historic view and landscape of the neighborhoods.

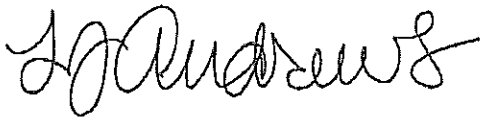
In sum, the historic value of neighborhoods around the Ambassador Bridge will be significantly and negatively impacted by the proposed twin bridge project.

CONCLUSION

Because GCDC and its members have a demonstrated economic and legal interest in preserving, enhancing, and promoting the historic neighborhoods around the Ambassador Bridge, which interests will be significantly impacted by the proposed twinning project, we request that GCDC be recognized as a Consulting Party under Section 106 of the NHPA.

Please contact me if you have questions or concerns about this request or our member organizations. Thank you in advance for your consideration, I look forward to hearing from you.

Sincerely,



Tracy J. "TJ" Andrews
TJ@envlaw.com

TJA:mnm
Enclosure: Exhibit A

xc: Gateway Community Development Cooperative (via email: alison_swdev@flash.net)
Michigan Historic Preservation Office (via fax: (517) 335-0348))
Advisory Council on Historic Preservation (via fax: (202) 606-8647))
US Dept of Transportation, Federal Highway Administration (via fax: (517) 377-1804))
Michigan Department of Transportation (via fax: (517) 373-8841))
The Detroit International Bridge Company (via fax: (586) 755-4899))
Detroit Historic Designation Advisory Board (via fax: (313) 224-6110))
Detroit International Bridge Company (via fax: (586) 755-4899))
Rep. Steve Tobocman (via email: stevetobocman@house.mi.gov)
Sen. Carl Levin (via fax: (313) 226-6948))

Members of Gateway Communities Development Collaborative

Bagley Housing Association
2715 Bagley
Detroit, Michigan 48216

Bridging Communities
6900 McGraw
Detroit, Michigan 48210

Greater Corktown Development Corporation
2411 14th Street
Suite 200
Detroit, Michigan 48216

Mexicantown Community Development Corporation
2810 Bagley
Detroit, Michigan 48216

Michigan Avenue Business Association
7012 Michigan Avenue
Detroit, Michigan 48210

Neighborhood Centers, Inc.
8300 Longworth
Detroit, Michigan 48209

Southwest Detroit Business Association (also use for GCDC address)
7752 W. Vernor
Detroit, Michigan 48209

Southwest Detroit Environmental Vision
PO Box 9400
Detroit, Michigan 48209

Southwest Housing Corporation
3627 W. Vernor
Detroit, Michigan 48209

EXHIBIT A

American
Consulting Professionals of New York, PLLC
70 Niagara Square, Suite 410, Buffalo, New York 14202
Tel 716.362.1116 • Fax 716.362.1166
american@acp-ny.com • www.acp-ny.com

July 3, 2007

Laura Spurr, Chairperson
Huron Potawatomi, Inc.
2221- 1½ Mile Road
Fulton, Michigan 49052

Re: Ambassador Bridge Enhancement Project

Dear Ms. Spurr:

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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If you have are interested in arranging a meeting or have further questions or comments, please feel free to contact me at your convenience.

Sincerely,

Anna Peterfreund

Anna Peterfreund
Environmental Scientist

Enclosure: Project Location Map

cc: USCG, File, Dan Stamper, Craig Stamper, Scott Korpi,

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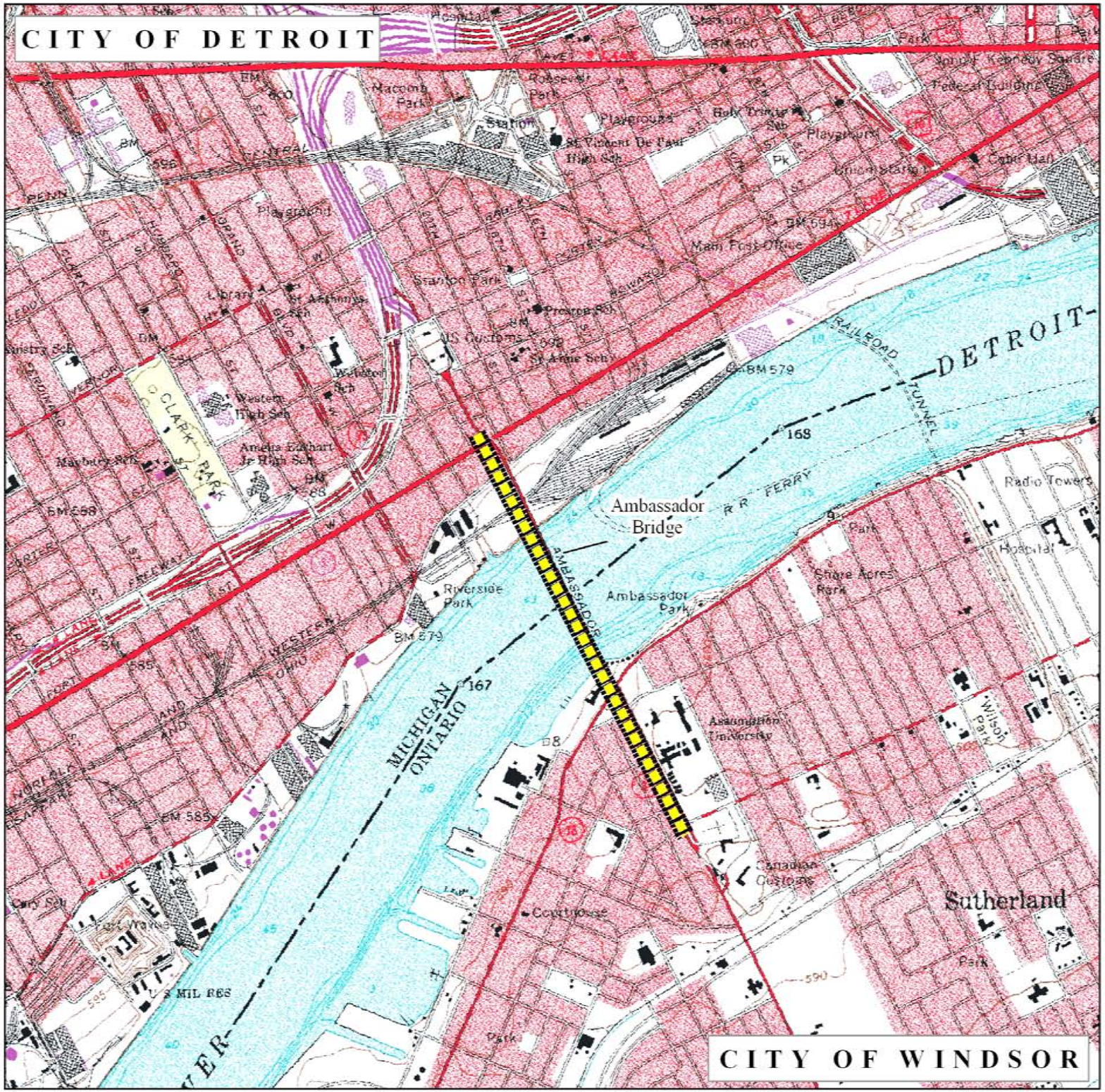
Project Location



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July 3, 2007

Kenneth Meshiguad, Chairperson
Hannahville Potawatomi Indian Community
N-15019 Hannahville
B-1 Road
Wilson, MI 49896-9717

Re: Ambassador Bridge Enhancement Project

Dear Mr. Meshiguad:

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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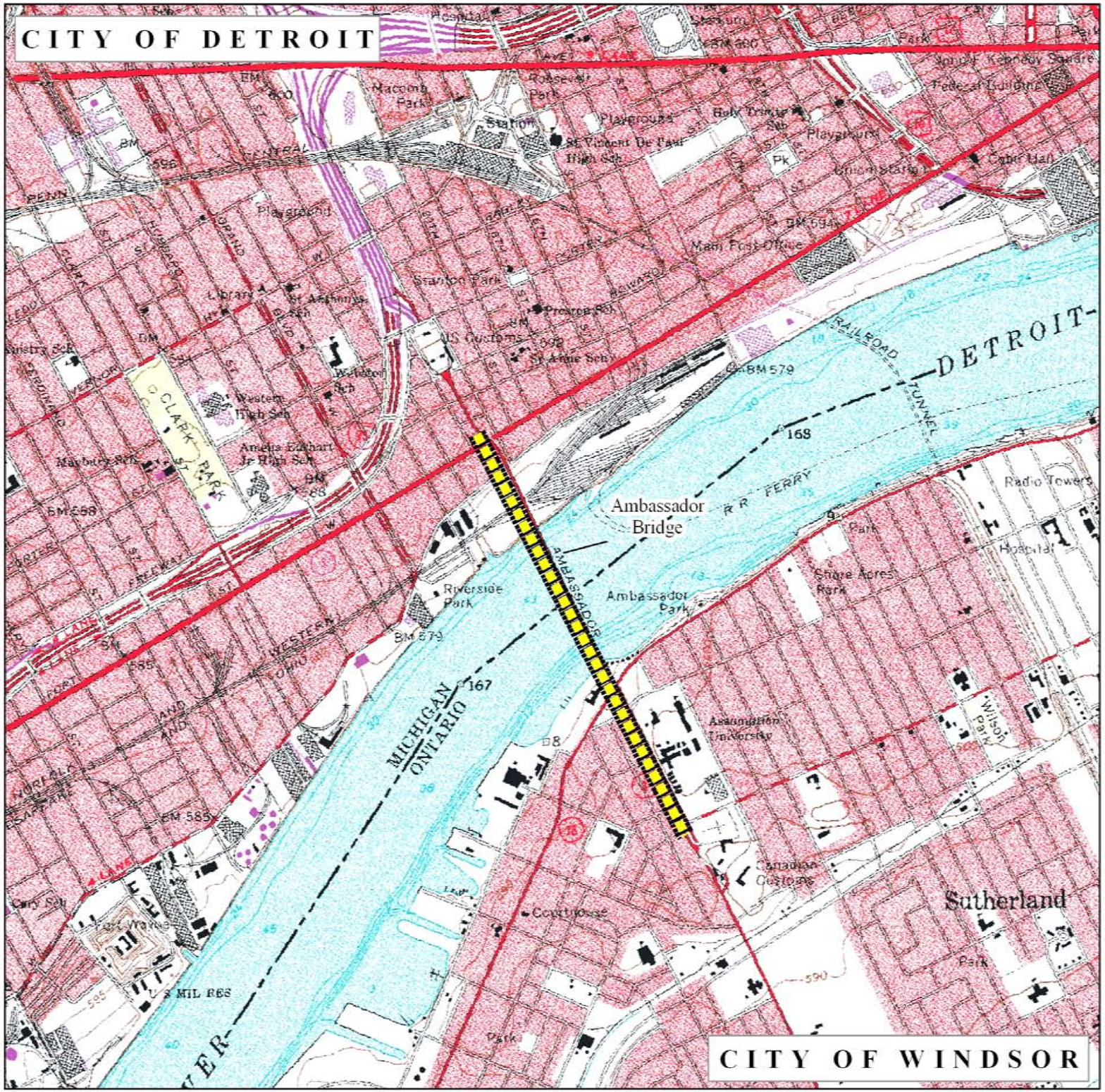

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July 3, 2007

Chief Greg Pyle
Choctaw Nation of Oklahoma Citizen Potawatomi
16th and Locust
Durant, OK 74702-1210

Re: Ambassador Bridge Enhancement Project

Dear Greg Pyle:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

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Environmental Scientist

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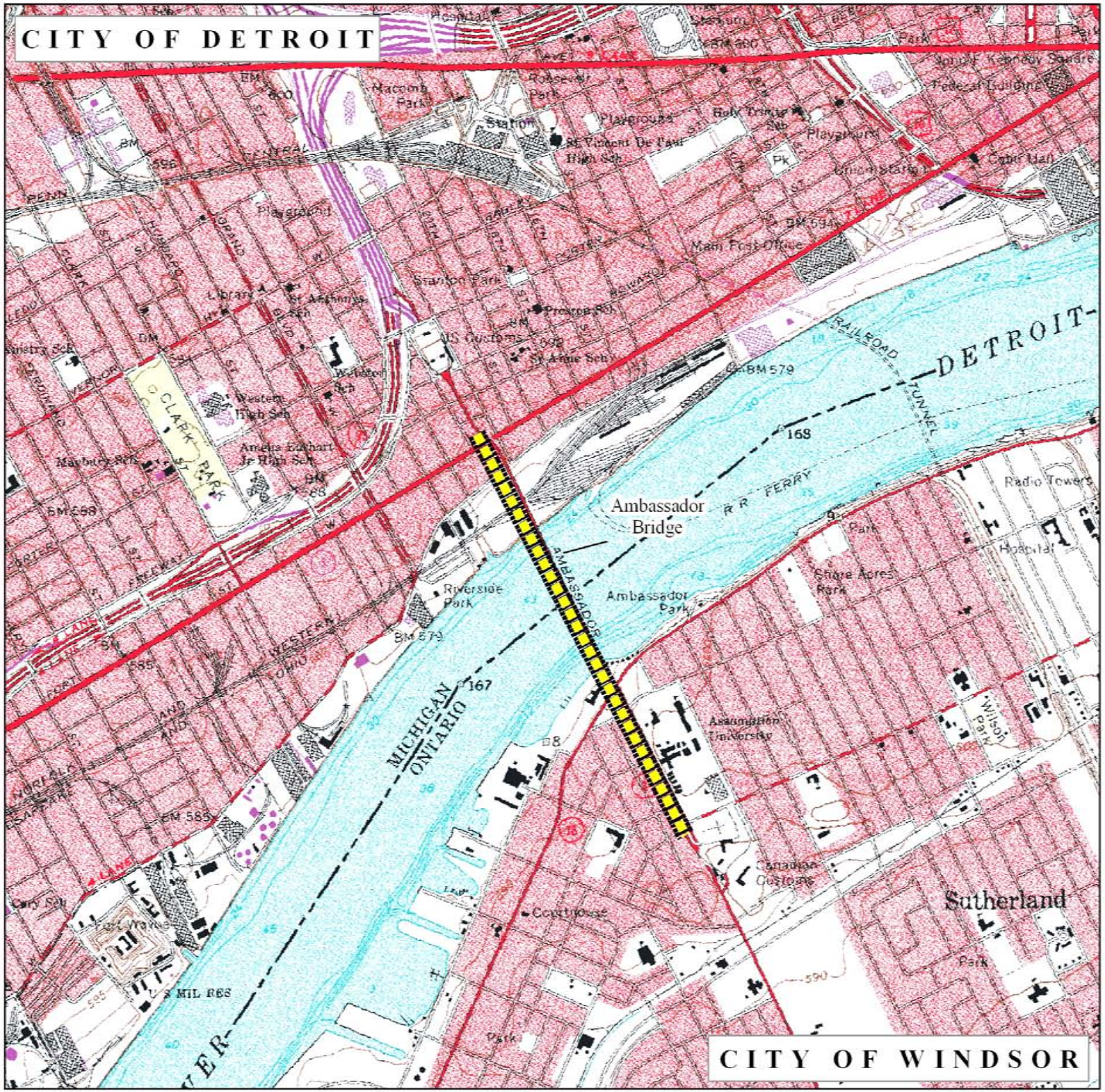

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July 3, 2007

Tracy Stanhoff, Chairperson
Prairie Band of Potawatomi Indians
16281 Q Road
Mayetta, Kansas 66509-8970

Re: Ambassador Bridge Enhancement Project

Dear Tracy Stanhoff:

This letter serves as a request for a review for potential impacts resulting from the above-referenced project on any known native religious sites.

The Detroit International Bridge Company and Canadian Transit Company propose to construct and operate a new six-lane cable-stayed bridge across the Detroit River between the City of Detroit, Wayne County, Michigan, United States and the City of Windsor, Ontario, Canada. The proposed project, located in the same corridor as the Ambassador Bridge, would tie into the existing plazas without modification to their currently permitted configurations. The project site has been highlighted on the portion of the Detroit, Michigan USGS 7.5 Minute Quadrangle Sheet (enclosed) for your review.

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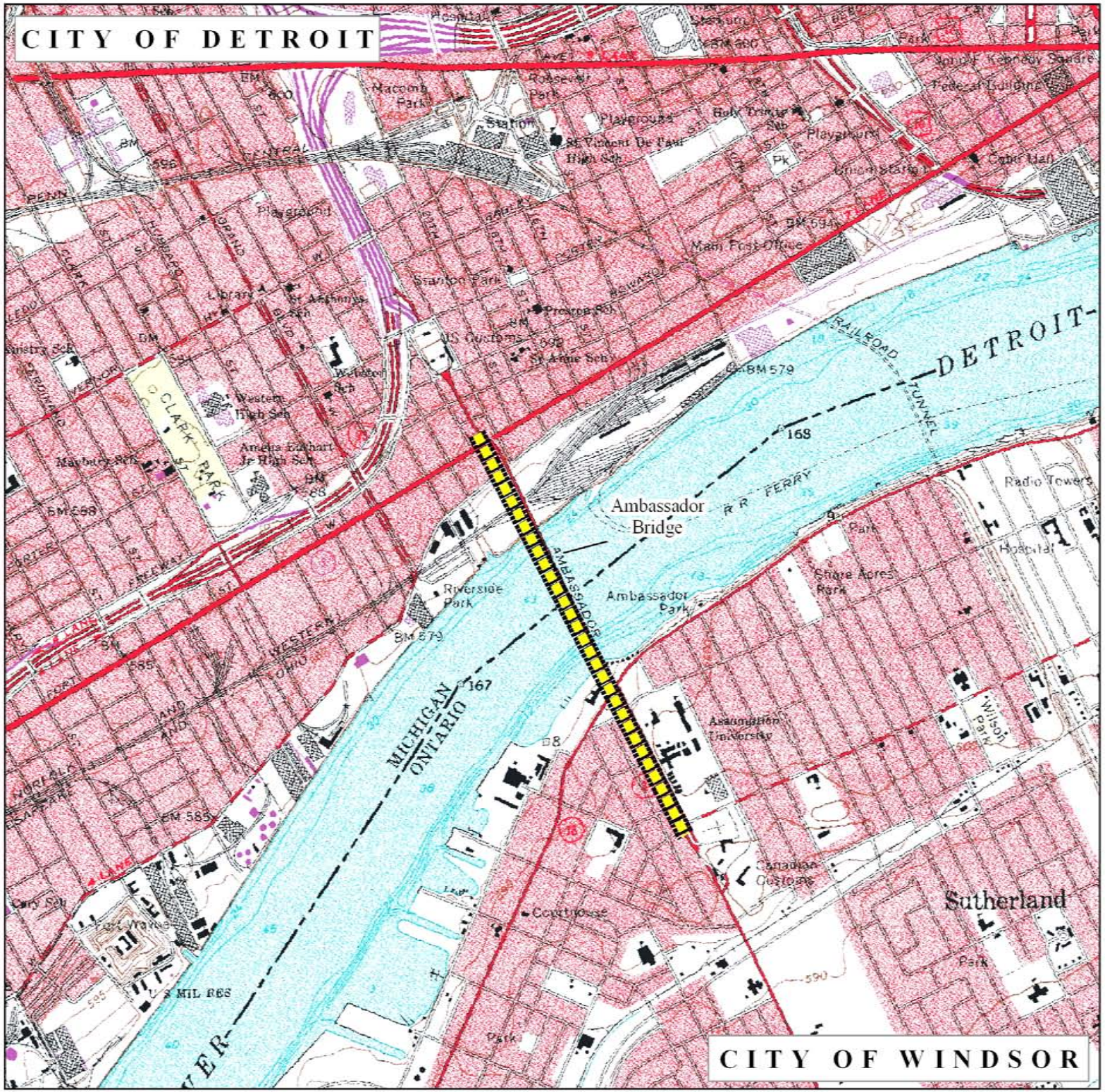
Environmental Scientist

Enclosure: Project Location Map

cc: USCG, File, Dan Stamper, Craig Stamper, Scott Korpi,

F:\PROJECT\5049964\File Cabinet\E. Environmental\E.02 CULTURAL\Consultation_PrairieBand1_070703.doc

Project Location



Peterfreund, Anna L.

From: Dean Anderson [DeanA@michigan.gov]
Sent: Tuesday, July 03, 2007 10:05 AM
To: Brian Grennell; Lis Knibbe
Cc: Peterfreund, Anna L.; Korpi, Scott M.; Craig Stamper; Dan Stamper; David Coburn; Kurt Carlson; Robert Bloom; Scot Striffler
Subject: Re: Potowatomi Indians

Lis,

There are four federally recognized Potawatomi tribes in Michigan. I would suggest that you contact all of them. Their addresses are below. I suggest that you add a line to each address - beneath the tribal name - directing your correspondence to the "Cultural Preservation Officer." Otherwise it will probably go to the tribal Chair, which may add considerably to the response time.

Hannahville Potawatomi Indian Community
N-15019 Hannahville
B-1 Road
Wilson, MI 49896-9717

Huron Potawatomi-Nottawaseppi Huron Band of Potawatomi
2221-1 1/2 Mile Road
Fulton, MI 49052

Match-e-be-nash-she-wish Band of Potawatomi Indians of Michigan
P.O. Box 218
1743 142nd Avenue
Dorr, MI 49323

Pokagon Band of Potawatomi Indians
901 Spruce Street
P.O. Box 180
Dowagiac, MI 49047

Some Potawatomi ended up out on the Plains during the removal period. Whether or not some of those people have Michigan roots is hard to say. If you want to really cover all your bases, you may want to contact them as well. I am aware of two federally recognized tribes:

Prairie Band of Potawatomi Indians
16281 Q Road
Mayetta, Kansas 66509-8970

Choctaw Nation of Oklahoma Citizen Potawatomi
16th and Locust
P.O. Drawer 1210
Durant, OK 74702-1210

Hope this helps you out.

Dean

Dean L. Anderson, Historical Archaeologist
Michigan Historical Center
Box 30740
702 West Kalamazoo Street

Lansing, MI 48909-8240
E-mail: deana@michigan.gov
Phone: (517) 373-1618
Fax: (517) 241-4738

Plan a Pure Michigan vacation filled with Michigan history when you discover your connections at www.michiganhistory.org.

>>> "Lis Knibbe" <eknibbe@QUINNEVANS.com> 7/2/2007 5:11 PM >>>
We want to make sure that we try to contact the branch of the Potowatomi
Indians that may be associated with the Village that is noted on the Archeology map on the site adjacent to the Bridge. Do you have any records of who that might be, or who we could contact to make sure that
all bases are covered on this issue?

Lis

QUINN EVANS | ARCHITECTS

Lis Knibbe, AIA

219 1/2 N. Main Street
Ann Arbor, MI 48104
eknibbe@quinnevans.com
www.quinnevans.com
v 734 663 5888
f 734 663 5044

U.S. Department of Homeland Security

United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2019
Cleveland, OH 44199-2060

Phone: (216) 902-6085
FAX: (216) 902-6088

16590
B-054/rwb

JUL 0 5 2007

The Honorable Raymond E. Basham
Michigan Senate
8th District
P.O. Box 30036
Lansing, Michigan 48909-7536

Dear Mr. Basham:

I am writing in response to your letter of May 15, 2007 concerning the Detroit International Bridge Company's proposal to construct a second bridge adjacent to the existing Ambassador Bridge, Detroit, Michigan. I sincerely appreciate your concern and the comments you have provided concerning the proposed project.

The Coast Guard is the lead federal agency for issuance of the federal bridge permit and the permit process is published in 33 CFR 114-115. As you have mentioned, the Coast Guard will not issue a permit unless the proposed project meets the navigational, safety and waterway management requirements in the regulations and all of the environmental, historic and socio-economic impacts have been addressed in compliance with the National Environmental Policy Act (NEPA).

Public comment and input to the permitting and NEPA process is very important to the Coast Guard. Our initial notice to the public and cooperating agencies was released as Public Notice 09-03-06 on July 28, 2006 and the accompanying comment period ended on August 30, 2006. That notice provided the location and plan and elevation views of the proposed bridge and the initial determination that the proposed project would be a Categorical Exclusion under the provisions of NEPA. However, due to the issues and concerns brought to our attention during the comment period, the Coast Guard subsequently initiated a more expansive Environmental Assessment (EA) in order to address those concerns and meet our NEPA obligations.

On May 10, 2007 the Coast Guard gave notice of the availability of the draft EA through issuance of Public Notice 09-03-07. The original comment period was scheduled to close on June 1, 2007. At the request of concerned parties, we extended that comment period until July 17, 2007.

On May 24, 2007, a public meeting was held at the Amelia Earhart School in Detroit in order to receive public comments on the draft EA and to provide an opportunity for the public to provide comments to the applicant relative to the preferred design and color of the proposed bridge. This meeting in May was announced by the Coast Guard through a press release to the Detroit media and through publication in our *Ninth Coast Guard District Local Notice to Mariners*. In addition, both meetings were listed on the Ambassador Bridge internet web page at www.AmbassadorBridge.com. The meeting was attended by approximately 30 local residents.

This meeting was in addition to a public meeting hosted by the applicant, the Detroit International Bridge Company, at the same location on March 1, 2007.

We have no established time frame for the permitting decision. After completion of the NEPA process and upon receipt of all of the public input, there will be an extensive study and review performed by my bridge staff personnel and a permitting recommendation will be made. Although the Coast Guard bridge permit application is processed by my staff here in Cleveland, permits for proposed international bridge crossings are issued by our bridge administration office at Coast Guard Headquarters in Washington, D.C. However, the applicant is required to satisfy all of the local and state permitting requirements before we can forward our permitting recommendations to Headquarters for consideration.

We expect the security needs for the additional span to be met by the existing local, state and federal agencies who share this responsibility. The proposed location of the additional span right adjacent to the existing bridge is expected to minimize the need for additional resources.

If you have any remaining questions, please contact Mr. Robert Bloom of my staff at (216) 902-6085.

Sincerely,

JOHN E. CROWLEY, JR.
Rear Admiral, U.S. Coast Guard
Commander, Ninth Coast Guard District

SEMCOG . . . *Local Governments Advancing Southeast Michigan*

Southeast Michigan Council of Governments • 535 Griswold Street, Suite 300 • Detroit, Michigan 48226-3602 • 313-961-4266 • Fax 313-961-4869
www.semcog.org

July 10, 2007

Commander
Ninth Coast Guard District
1240 E. 9th Street, Room 2025
Cleveland, Ohio 44199-2060

Dear Sir:

The Southeast Michigan Council of Governments (SEMCOG) has reviewed the Environmental Assessment prepared for the proposed Enhancement Project at the Ambassador Bridge in Detroit, Michigan.

The proposed Ambassador Bridge Enhancement Project is a regionally significant project. The border crossing is vital piece of the regional transportation system and represents an important international link to Canada. Because it is regionally significant, the proposed project is also being considered for inclusion in the adopted *2030 Regional Transportation Plan for Southeast Michigan* (RTP).

After reviewing the Environmental Assessment, we have the following general comments with additional specific comments after.

1. It is stated several times in the Environmental Assessment that no modification to the Ambassador Bridge Gateway Project on the U.S. side or the Windsor Plaza Expansion Project on the Canadian side are necessary to accommodate the second span. Some confirmation of this conclusion from the Michigan Department of Transportation (MDOT) and Ontario Transport Ministry should be provided in the document.
2. The U.S. Coast Guard is the lead federal agency for the U.S. environmental clearance process. However, there are numerous other federal and state agencies that will affect and be affected by the proposed project. Most notably, there appears to be very little coordination occurring with Homeland Security, Customs and Border Protection, Federal Highway Administration, and MDOT. The argument is made in the Environmental Assessment that the proposed project is necessary for security reasons, but there is no documentation of an analysis of security conditions/requirements or any possible impacts (either positive or negative) on the relative impact of this border crossing.
3. The document states that the selection of a preferred alternative must consider both US and Canadian impacts, yet the Canadian impacts are not quantified in this document. This appears to suggest that the environmental assessment is incomplete and premature in that a preferred alternative is identified in the document.

William T. Roberts Chairperson *Mayor, City of Walled Lake*
Mary Blackmon First Vice Chair *Trustee, Wayne County Regional Education Service Agency*
Robert J. Cannon Vice Chairperson *Supervisor, Clinton Township*
Philip M. Cavanagh Vice Chairperson *Commissioner, Wayne County Board of Commmissioners*
Robert Hison Vice Chairperson *Mayor, City of St. Clair Shores*
Michael Sedlak Vice Chairperson *Clerk, Green Oak Township*
John F. Jones Immediate Past Chair *Supervisor, Ira Township*
Paul E. Tait Executive Director

Specific comments on the Environmental Assessment document are as follows.

- Section 1.3, Proposed Enhancements, page 7 refers to the Ambassador Bridge Enhancement Project as the "Project," while Section 1.4.1 Gateway - DOT and DIBC/CTC, page 8 refers to the Ambassador Bridge Gateway Project as the "Project." This is confusing and should be clarified.
- Section 2.1.3, Construction Plan, page 13, 1st paragraph — Protection of the aquatic environment during construction is discussed. Are there also potential disruptions to shipping/bridge traffic or community impacts during construction?
- Section 2.1.6, Cost and Scheduling, page 13 — A breakdown of costs by phase and timeframe is necessary. It is stated that design has begun and will take 24 months to complete, with construction taking another 36 months. When did design begin and when is construction expected to begin and end? Why has design begun before the Environmental Assessment is finalized?
- Section 2.2, No-Build Alternative
  - Page 15, fourth paragraph — It is stated that traffic backups due to incidents on the bridge will continue to grow. The document should include data that support this statement. Are statistics on vehicle flow, incidents, and the frequency and duration of related congestion available? Was any projection of future traffic volumes and crashes conducted? This information should also be included in the final document.
  - Page 15, fifth paragraph — It is stated that under the No-Build alternative, private funding cannot be leveraged thereby eliminating the opportunity to divert public funds to other projects. Are public funds currently being used in any capacity for the Ambassador Bridge? This should be clarified in the final document.
  - Page 16, second paragraph — It is stated that the No-Build alternative did not rank high among the array of alternatives studied and did not meet the needs of the study. What are these other alternatives? Is there any analysis/ranking of the results for all the alternatives? The final document should clarify the alternatives considered and the ranking of the alternatives that were considered.
- Section 2.3, Corridors under Consideration, page 16, second paragraph — It is stated that the DRIC study is designed to investigate alternatives for additional capacity and there is no need to do that simply to replace existing lanes. Section 1.1.2, Support for the Project, page 3, fourth paragraph states that the Chambers of Commerce in the U.S. and Canada recognize that additional capacity is needed to meet trade demands. This calls into question whether or not the enhancement project is supported by the U.S. and Canada Chambers of Commerce, given that the documents states that this project will not increase capacity.
- Section 2.5, Basis for Choice, page 22 — It is not entirely clear what alternatives were considered using what criteria. The description of the alternative comparisons is inconsistent with the figures, e.g., the text refers to Figure 2-4 while discussing the 6-lane and 3-lane alternatives, but Figure 2-4 actually compares the suspension/cable-

stayed/tunnel alternatives. There is no definition of the ranking criteria or how/when the data were collected and analyzed (e.g., there is no reference to life cycle costs except in Figure 2-3). There is no quantification at all for the No-Build and corridor alternatives. The final document should address these issues.

- Section 2.6, Benefits of Preferred Alternative, page 26, last bullet — The assessment indicates that there will be no increase in traffic volumes associated with the implementation of this proposed project. Was a traffic study conducted? The final report should include documentation of this position.
- Section 3.0, Affected Environment and Expected Impacts, page 35 — A project of this size should not only take steps to protect the environment but also improve the environment where possible.
- Section 3.1.1, Neighborhood Setting, page 36 — Would the project lead to additional condemnations and demolitions within the surrounding neighborhoods? Could the project contribute to loss of character of the neighborhood or trigger a decline in the quality of life of the area? These types of impacts should be addressed in the final document.
- Section 3.1.3, Local and Regional Economy, page 38 — It is stated that there are no negative impacts associated with this proposed project. However, the potential positive impacts are referenced elsewhere but never quantified. The final document should quantify these benefits.
- Section 3.1.5, Environmental Justice Concerns
  - Page 39, Setting — Native Americans are identified as one of the specific racial/ethnic populations covered under Environmental Justice regulations. The final document should reference all of the protected populations, not just Native Americans. It is stated that if a particular group is overly represented in an area, as compared to the rest of the population within the region, then the level of impact is considered to be disproportionate. This is not consistent with current procedures to identify a disproportionate impact. A comparison between the study area and the rest of the region is used to determine if there are significant proportions of EJ communities in the area. A conclusion of disproportionate impacts can only be made once the impacts are quantified.
  - Page 40, Minority Population — There are additional racial/ethnic populations that need to be considered beyond Black and Hispanic.
  - Page 40, Impacts — Why is St. Anne's Church specifically referenced here?
- Section 3.2.1, Land Use, page 40 — There is a lot of discussion of historical land use here. The final document should identify future plans and consistency of the proposed project with those future plans.
- Section 3.2.2, Utilities, page 42 — It is stated that if conflicts are found, utilities will be relocated. The final document should identify how utilities will be relocated and at whose expense.

- Section 3.2.4, Traffic & Circulation, page 42 — It is stated that the two new FAST lanes do not represent additional capacity because they will be reserved for pre-approved trucks. Removing those trucks from the four general-purpose lanes will increase traffic flow (an argument made for the proposed project) and allow more vehicles to traverse the bridge in the same amount of time, increasing its capacity. It is our opinion that the proposed project does increase capacity over the existing crossing. The final report should include the traffic analysis that was used for the above referenced statement to be made.
- Section 3.4, Visual Quality & Aesthetics, Other Considerations, page 49 — There is no reference in this section to the current span being on the National Register of Historic Places. The final document should provide the specific reference so the discussion of the Secretary of the Interior's Standards can be reviewed within the context of the reference.
- Section 3.5, Cultural & Archeological Resources, page 51 — The text should address what would happen if archeological remains are encountered during construction. Are the Phase 1B investigations complete? If so, what are the findings? Why are archeological impacts addressed twice? The final document should answer these questions.
- Section 3.6.5, Natural Landmarks, page 58 — Why is Haven Hill State Natural Area defined as being within the vicinity of the project if it's 45 miles away? This landmark is outside the study area as identified in Figure 3-1.
- Section 3.7.3, Water Quality, page 60 — Stormwater mitigation is discussed here, then followed by a separate stormwater section. Are any RAP permits/coordination required? Section 3.7.3 states the project will not discharge to the Detroit River so no water quality certification is required; but Section 3.7.4 states that there will be an impact to stormwater flow. Section 3.7.4 states that it is anticipated that the stormwater pump station/collection system designed for the project will accommodate runoff (page 63), but Section 3.7.3 states the favorable option is to tie into the existing stormwater/drainage facilities (page 61).
- Section 3.7.4, Stormwater, page 62 — Are there opportunities for onsite detention or retention stormwater ponds that could incorporated into an onsite landscaping plan to reduce impervious surfaces?
- Section 3.8, Aquatic Ecology, page 65 — The fourth paragraph states that the Detroit River has one of the highest diversities of fish and is a major fish corridor; the fifth paragraph states there are no essential fish habitats. The Detroit River is recognized as an ecosystem having one of the highest diversities of wildlife and fish and this apparent conflict should be addressed in the final document. In order to improve the river's shoreline as habitat for fish and wildlife, softshore engineering practices are being implemented at various locations. Opportunities for softshore engineering projects in the vicinity of the project area should be considered. They would be beneficial to the area's residents as well as fish and wildlife.

- Section 3.10, Air Quality, page 74
  - The Environmental assessment should look at the entire project, not just the portion in U.S. territory. It is meaningless to only include the portion of the bridge that is on the U.S. side of the border. Air emissions do not stop at the border.
  - Using the percentage of total Wayne County emissions that the project is expected to generate as the determinant of the air quality significance of a project is not meaningful. No single project is going to contribute a high percentage of total county emissions. More importantly, this has nothing to do with how an area's attainment status is determined. If a project will increase emissions to a level that will cause a new violation at any given monitor in the seven-county nonattainment area, or increase the number or severity of existing violations, it will significantly affect the attainment status of the region. This is because all monitors in a nonattainment area must meet the national standard in order for the region to come into attainment. See Section 176(c)(1) of the U.S. Clean Air Act Amendment of 1990 for more information on what constitutes a significant impact.
  - In order to fully understand the potential environmental impact of the proposed project, the Environmental Assessment should include an analysis of a maximum capacity scenario. This would assume 10 lanes of traffic (both new and current bridges in operation) as well as the maximum number of customs booths provided for in the Ambassador Bridge Gateway Project and the Windsor Plaza Expansion Project. SEMCOG's regional air quality conformity analysis will be conducted using this maximum capacity scenario.
  - The analysis should include the impact of idling emissions due to queuing at the toll plazas. While Mobile6 does not directly generate idling emission factors, the accepted practice is to multiply the grams/mile emission factor generated for a speed of 2.5 mph by 2.5. This yields a grams/hour idling emissions factor that can then be applied to minutes of idling delay. Emissions from truck delay should be computed separately from passenger car delay as the former is likely to be significantly higher.
  - While the predominant wind direction may be from the southwest, the wind does blow from other directions as well. Thus, the potential for the project to impact areas other than those to the northeast should be considered.
  - The Mobile6 inputs for the Environmental Assessment used national default data for a number of parameters. Local data are available for a number of these. Use of these local data would provide more accurate emissions projections.
    - In particular, the distribution of VMT by vehicle class ought to be drawn from bridge traffic count data because the proportion of bridge VMT that is attributable to trucks is significantly higher than the national average. The national average is approximately 10 percent while the average for the Ambassador Bridge is around 30 percent. This difference would have a significant impact on the amount of NOx and particulate emissions.

  - SEMCOG also uses localized data for other Mobile6 inputs, including fuel parameters and age distribution of light-duty vehicles. Use of these data in the Environmental Assessment air quality analysis would provide more accurate emissions estimates.

- Section 3.12, Hazardous Waste & Brownfield Sites, page 78 — How many state or federally listed contaminated sites are located within the project area? How many sites could potentially discharge contaminated sediment to the Detroit River or the DWSD sewer system during wet weather events if the soil is disturbed by the construction activities? These determinations should be included in the final document.
- Section 3.13.3, Potential Impacts in Canada from the Enhancement Project
  - Page 82, Air Quality — It is stated there are no unacceptable emissions levels based on current traffic volumes. The analysis should be expanded to include future volumes.
  - Page 84, Land Use — When will the impacts to the land use plan/zoning be assessed? When will impacts to the parks be assessed?
  - Page 84, Traffic — It is stated that the new span should result in reduced delay. The document being developed in Canada should document this statement.
- Section 5.0, Required Authorizations, page 98 — The project needs to be in the 2030 RTP because it is a regionally significant project.
- General Comment — References to appendices need to be corrected.

We want to thank you for the opportunity to review and provide comments on this Environmental Assessment. We look forward to working with the Coast Guard and representatives of the Ambassador Bridge as the region continues to address the needs for additional border crossings as identified in the adopted 2030 RTP. If you have any questions or require additional information, please contact me or Mr. Carmine Palombo, Director, Transportation Programs.

Sincerely,

Paul E. Tait

Paul E. Tait. C.A.E.
Executive Director
SEMCOG

PT:je

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CITY OF DETROIT
DEPARTMENT OF ENVIRONMENTAL AFFAIRS

July 10, 2007

Commander (dpb)
9th Coast Guard District
1240 E. 9th Street - Room 2025
Cleveland, OH 44199-2060

Subject: DEA's Opinion of the Detroit International Bridge Company Ambassador Bridge Enhancement Project Environmental Assessment Detroit, Michigan

This memo provides a technical opinion on the Detroit International Bridge Company (DIBC)-Ambassador Bridge Enhancement Project, Draft Environmental Assessment Report, dated April, 2007. The Department of Environmental Affairs (DEA) received the report on May 12, 2007. The United States Coast Guard (USCG) is the lead federal agency for the proposed project. The objective of the DIBC project is to construct an additional bridge span (i.e., second span) capable of supporting six (6) lanes located west of the existing Ambassador Bridge. The proposed construction will be a Cable Stay bridge. The Environmental Assessment (EA) was developed pursuant to the National Environmental Policy Act (NEPA) process.

DIBC General Assumption

According to DIBC, the second span will not "significantly" contribute to adverse impacts in any category except for those that are not applicable, such as farmland. These facts are based on the premise that the existing Ambassador Bridge "will be rehabilitated and then serve as a backup, redundant resource in case of an emergency or another impediment against the free flow of people and goods, as well as serve as a pedestrian and/or bicycle facility." The idea is that the existing bridge will be replaced by or in lieu of the second span, whereby eliminating the need to assess cumulative impacts for air, noise, traffic, etc.

An EA, or more appropriately an Environmental Impact Statement (EIS), is required due to significant environmental impacts. The difference between an EA and an EIS rely on the significance and complexity of the proposed project and related environmental impacts. The EIS is the most comprehensive documentation of the NEPA analysis. DEA believes that due to the magnitude of the DIBC project and the potential for cumulative impacts that an EIS should be conducted.

An EIS would be able to discern the nature and extent of potential impacts of the second span as: 1) a single source from the construction and operation activities; 2) comparison of impacts with the existing span; and 3) cumulative effects of the existing and second span operations.

Overview of the Environmental Assessment

The DEA assessment of the EA is that it fails to provide substantive analysis of air, noise, and traffic data, among others. A study was not conducted to determine whether the outcome of the EA's many assertions are validate and accurate. It appears that the DIBC relied heavily on data developed for the Detroit River International Crossing (DRIC) as well as the EA and Finding of No Significant Impact (FONSI) conducted on behalf of the Gateway Project. In most cases, topics appear to be glanced over without quantitative analyses and or assessments. Phrases such as "if necessary", "minimal", "indirect", "not significantly contribute", "does not anticipate", "not expected", " minor increases", and "minor inconvenience" are stated throughout the document. Where these phrases are used there are no benchmarks to reference their significance. Furthermore, as these phrases are used, they alleviate the need for mitigation options.

In general, how can one improve traffic flow unless an expansion is created? The current bridge as referenced in the EA consists of four (4) highway lanes of traffic, with two lanes traversing northbound and two lanes traversing southbound. The second span will consist of six (6) lanes of traffic with three in each direction. In essence, the second span, once constructed will be larger than the existing bridge, however, no increase in traffic volume, no change in use or character of the study area, and no adverse impacts on the local population were anticipated in the study.

Specific Observations of Concern:

- No agency for the city of Detroit or city of Windsor was notified?
- No adverse impacts to land use and topography are anticipated from the construction or operation of the proposed project – No vibration study was conducted.
- Will any roads (e.g., W. Jefferson Avenue, Fort Street, etc.) be altered in any way due to the proposed project?
- The statement, "the proposed project will not directly impact Riverside Park," did not elaborate on the effects to the park as a result of construction and subsequent operations of the proposed project.
- Description of soil management was not clear and ambiguous in content.
- Compliance with federal state and local regulations were mentioned with no specificity as to what regulations, permits, and authorizations would be required in the event that mitigation measures are necessary.

- The EA needs to elaborate in detail on all topics under section 4.0 Mitigation of Impacts.

- Impacts to air quality are expected both during and after construction and operations of the proposed project in Detroit, but are not expected in Windsor. How can this be?

In conclusion, the technical review did not yield sufficient information to substantiate a FONSI and therefore DEA requests that a comprehensive study, EIS, be conducted in order to validate the EA findings.

Respectfully yours,

Vincent R. Nathan, PhD, MPH
Director

VRN/ras

cc: Honorable Kwame M. Kilpatrick, Mayor
George W. Jackson, Chief Development Officer
Marcell R. Todd, Director – City Planning Commission
Kandia Milton, Legislative Liaison
file

U.S. Department of Homeland Security
United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2025
Cleveland, OH 44199-2060

Phone: (216) 902-6085
FAX: (216) 902-6088

16590
B-065/sms
July 11, 2007

Ms. Tracy J. Andrews
Law Offices of Olson, Bzdok & Howard
420 Front Street
Traverse City, Michigan 49686

Dear Ms. Andrews:

I am responding to your letter dated June 29, 2007, on behalf of your client, Gateway Communities Development Collaborative (GCDC), and your request for that organization to be included as a Consulting Party in the Section 106 process conducted by this office regarding the proposed Ambassador Bridge Enhancement Project in Detroit, Michigan.

We would welcome representatives of GCDC to participate as a consulting party in the Section 106 process for this proposed project. We would appreciate the designation of representatives, or a single representative, directly from the GCDC membership. Please provide the name(s) and contact information for GCDC representatives.

Within your letter you state that you will be providing comments regarding the Draft EA that is currently available for public comment. Please submit these comments under separate letter. The coordination in which GCDC is invited to participate will be to address the adverse effect as outlined in Michigan State Historic Preservation Officer letter dated March 26, 2007. We look forward to constructive participation in this process.

If you have questions, please contact Scot Striffler of this staff at (216) 902-6087. Thank you.

Sincerely,

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

Copy: Michigan State Historical Preservation Office (via fax: (517) 335-0348)
Advisory Council on Historic Preservation (via fax: (202) 606-8647)
Federal Highway Administration (via fax: (517) 377-1804)
Michigan Department of Transportation (via fax: (517) 373-8841)
Detroit Historic Designation Advisory Board (via fax: (313) 224-6110)
Sen. Carl Levin (via fax: (313) 226-6948)
Rep. Steve Tobocman (via email: stevetobocman@house.mi.gov)

13 July 2007

Mr. Bob Bloom
Commander, Ninth Coast Guard District
1240 East 9th St
Cleveland, OH 44199-2060
Robert.W.Bloom@uscg.mil

Re: Draft Environmental Assessment for a twin span to the Ambassador Bridge

Dear Mr. Bloom:

I am a resident of Hubbard Farms community, a designated historic district within the borders of West Grand Boulevard, West Lafayette, Clark St and West Vernor. I have made great investments in the community by renovating two homes of unique architectural style. We were drawn to this area because of the stable and growing urban community and the proximity to the Detroit River and the Ambassador Bridge. I am opposed to the construction of a twin span for the following reasons.

First, I agree with the State Office of Historic Preservation that a modern, larger twin span will have adverse visual impact to the Ambassador Bridge. I am also concerned with The Detroit International Bridge Company's future plans for the Ambassador Bridge based on current conditions of other property owned by Mr. Maroun of DIBC (i.e. the neglect of The Michigan Central Rail Station).

The neighborhood currently struggles with truck traffic, pollution and noise. Increasing the trucking capacity with a new large span will only add to this existing problem. I have great concerns regarding the feasibility of the new bridge using the existing custom plazas efficiently and am worried about The DIBC's future plans for the area and the possibility of increasing the footprint of the trucking plazas. This will only have great negative impact on the community. The lack of transparency in DIBC's plans is worrisome.
This community is a shining example of both rehabilitation and growth with a dense and diverse population, many active non-profit and development associations, and strong commercial districts—all of which will be adversely affected by increases in trucking.

Sincerely,

Matthew Blake
1015 Vinewood
Detroit, MI 48216
313 737 9099

276 W. Grand Blvd.
Detroit, MI 48216

July 15, 2007

Robert W. Bloom, Jr.
Commander, Ninth Coast Guard District (dpb)
1240 East 9th Street – Room 2025
Cleveland, OH 44199-2060

Re: Comments on the New Ambassador Bridge Draft Environmental Assessment

Dear Mr. Bloom:

As a resident in the Hubbard Farms neighborhood adjacent to the Ambassador Bridge, I am writing to express my deep concerns about the Environmental Assessment process conducted by the Coast Guard on the Detroit International Bridge Company's (DIBC) proposal to build a second span.

I am concerned about the environmental consequences of building a second span of the Ambassador Bridge. The southwestern portion of the City of Detroit is an area that has seen considerable residential and commercial revitalization and is the only part of the city experiencing population growth. There has been significant private and public investment in new housing and commercial developments, renovations of vacant buildings, and individuals rehabbing their homes. Examples of this development include the nearly 100 Homes at Ste. Anne's built by Bagley Housing, the nearly 200 renovated apartment units by Southwest Housing Solutions, and the 43,000 square foot Mexicantown International Welcome Center & Mercado recently completed by Mexicantown CDC, among many other current and proposed development projects. Yet this community has continued to bear the burden of the region's transportation and industrial infrastructure without any community benefits. Over 10,000 trucks currently cross the Ambassador Bridge each day and that number will surely only grow if the bridge's capacity was to be expanded. Much of this investment would be jeopardized by the construction and operation of a 2nd span of the Ambassador Bridge.

Many of these projects have been constructed in spite of the DIBC's active opposition to them. This has been demonstrated many times as the DIBC has purchased lots in the development areas of these nonprofits and as it has acquired private residences that have disappeared soon thereafter, sometimes in the middle of the night. And it has persistently failed to build three (three!) new homes for senior citizens it promised the community at least five years ago.

In addition to those concerns, the DIBC has often supplied misinformation to the media and the public. It has simultaneously argued for the need of a 2nd span while presenting the opposite argument to other audiences. It has presented grandiose plans for redevelopment of properties it owns in order to gain trust and public support, and not completed much if any of the proposals. Another example is the DIBC claiming that the state will save money in its tight budget because no public funding would go towards the construction of a 2nd span, and then the DIBC

submitting an application to the Michigan Strategic Fund for $1 billion of Private Activity Bonds. In addition, DIBC's owner, Matty Maroun, has continued to own the Michigan Central Depot while willfully allowing it to become derelict and possibly beyond repair. In short, the DIBC has shown absolutely no concern for the surrounding community and has been a terrible corporate citizen.

I am extremely disturbed that the only environmental concerns identified in regards to the construction of a second span of the Ambassador Bridge would be the aesthetic impact on the current bridge identified by the Michigan State Historic Preservation Office. How can an increase in the number of trucks in this neighborhood not negatively contribute to the already poor air quality in the area? Was the impact considered in light of the myriad other current and proposed other industrial and transportation-related uses in Southwest Detroit, such as the many freeways, steel plants, cement silos, the Detroit Intermodal Freight Terminal, and others? There would also be serious noise and safety concerns brought about by this proposal. The results of the Environmental Assessment are dubious at best.

Additionally, the Coast Guard's handling of public meetings to solicit input on the project has been abysmal. The "Public Workshop" on March 1, 2007 was not advertised to the community. I live within ¼ mile of the Bridge and had no knowledge of the meeting until a neighborhood resident noticed the posting on the DIBC's website a few days before the meeting. This meeting should not count as part of the public input process since the public wasn't even aware of it until the last minute. The Coast Guard's lack of outreach should be an embarrassment to the organization. A "Public Workshop" held in April was better advertised, and I attended a portion of the meeting. However, at the very beginning of the meeting, a representative of the Coast Guard spoke and completely stifled public comment on the project except for design-related issues of a new bridge. Therefore, the community has had absolutely no opportunity to comment on other issues and, therefore, this process has essentially been a charade leading to approval for the DIBC to build 2nd span of the Ambassador Bridge. Until a true community meeting is held, the seriousness of the impacts of this process dictate that the process to-date should not even be considered valid.

Lastly, there are a number of other outstanding concerns related to the overall project.
The DIBC has made no mention of the current bridge being in need for repairs before this application. How is it that suddenly it needs to build a second span in order to shut down the Ambassador Bridge for these studies? Even if true, the Gateway Project, while allegedly designed to accommodate a second span, did not analyze the environmental consequences of a second span, simply the connections between the Ambassador Bridge and the interstate freeway system. In addition, the DIBC has well-documented plans to significantly expand its plaza far beyond what was anticipated in the Gateway study and even beyond what has been revealed in its Coast Guard or Michigan Department of Environmental Quality permit applications, including adding primary inspection booths and the reconfiguration of Fort Street. And is there really a need for a new span at all? The July 14, 2007 edition of The Detroit News discussed the drop in passenger trips to Canada due to a number of factors and the decline in truck traffic is well-documented, even by the DIBC itself. It seems to me that the Coast Guard is fronting the efforts of the DIBC to continue its monopolistic hold on border traffic between the US and Canada.

Sincerely,

Victor Abla

cc: Gateway Communities Development Collaborative
State Representative Steven Tobocman
Federal Highway Administration
Michigan Department of Transportation
City of Detroit Historic Designation Advisory Board
Senator Carl Levin
Senator Debbie Stabenow
Representative John Conyers, Jr.
Michigan State Historic Preservation Office
Detroit City Council
City of Detroit City Planning Commission
City of Detroit Planning and Development Department

1051 Vinewood
Detroit, MI 48216

July 15, 2007

Robert W. Bloom, Jr.
Commander, Ninth Coast Guard District (dpb)
1240 East 9th Street – Room 2025
Cleveland, OH 44199-2060

Re: Comments on the New Ambassador Bridge Draft Environmental Assessment

Dear Mr. Bloom:

As a life long Detroiter and a decade long resident of Hubbard Farms, I feel that it is necessary to express my concerns and am hoping that you will listen to reason, when it comes to burdening Southwest Detroit with another headache. I do not want another bridge in my backyard.

I am concerned about the environmental consequences of building a second span of the Ambassador Bridge. The Southwestern portion of the City of Detroit is an area that has seen considerable residential and commercial revitalization and is the only part of the city experiencing population growth. There has been significant private and public investment in new housing and commercial developments, renovations of vacant buildings, and individuals rehabbing their homes. Much of this investment would be jeopardized by the construction and operation of a 2nd span of the Ambassador Bridge.

I am extremely disturbed that the only environmental concerns identified in regards to the construction of a second span of the Ambassador Bridge would be the aesthetic impact on the current bridge identified by the Michigan State Historic Preservation Office. There would also be serious noise and safety concerns brought about by this proposal. As a runner and frequent user of our local park, I am already disturbed by the noise and pollution in our neighborhood and do not see how doubling the "cause" reduces the "effect"; in other words, by adding another bridge, certainly, the noise and pollution must be increased also. I have invested a great deal of time and money in my property here and plan to live here for a long time. I hope that as decisions are made, the authorities making them would consider people like myself.

Sincerely,

Alycia Meriweather

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUL 17 2007

REPLY TO THE ATTENTION OF:
B-19J

Mr. Robert W. Bloom Jr.
United States Coast Guard
Office of Commander (dpw-3)
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199

RE: Comments on Environmental Assessment for Construction of Second Fixed Highway Bridge over the Detroit River Known as the Ambassador Bridge Enhancement Project (ABEP)

Dear Mr. Bloom:

The United States Environmental Protection Agency (U.S.EPA) has responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act to review and comment on major federal activities subject to the National Environmental Policy Act (NEPA). EPA is submitting comments to you regarding the Ambassador Bridge Enhancement Project (ABEP) environmental assessment issued by the Coast Guard and the NEPA evaluation done by the Detroit International Bridge Company (DIBC) for the ABEP.

On August 30, 2006, we submitted comments on the Project Description and Type 2 Draft Categorical Exclusion Environmental Documentation Public Notice 09-03-06 for the approval of location and plans for the construction of a second fixed highway bridge over the Detroit River for the ABEP project. In those comments, we suggested that more detailed analysis be done, above and beyond what was done for the Draft Categorical Exclusion (CATX). The primary reasons for this recommendation were: 1) the need to provide information on the relationship of the project to other international crossing projects; 2) uncertainty regarding status of the existing bridge and ultimate bridge build-out capacity; 3) the lack of analysis regarding consistency with local government land use plans; and 4) air quality, stormwater, endangered species, historic resources and cumulative effects concerns.

Although the Environmental Assessment (EA) provides more information than what was presented in the Draft CATX, a number of issues remain. We continue to have concerns environmentally and procedurally. We recommend that the Coast Guard address these concerns before reaching a permit decision. Those issues are discussed in the enclosed detailed comments.

Thank you for the opportunity to comment on the EA. If you have any questions on our comments, please contact Sherry Kamke, of my staff. Sherry can be reached by phone at (312) 353-5794 and by e-mail at: kamke.sherry@epa.gov.

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Sincerely yours,

Kenneth A. Westlake
Supervisor, NEPA Implementation
Office of Enforcement and Compliance Assurance

Enclosure

cc: Dan Stamper, DIBC
Jim Kirschensteiner, FHWA
Dave Wresinksi, MDOT
Mohammad Murtaza, CEAA
Kaarina Stiff, Transport Canada
Martha MacFarlane-Faes, Michigan SHPO
Jerry Fulcher, Michigan DEQ

Detailed United States Environmental Protection Agency (U.S. EPA) Comments on the Ambassador Bridge Enhancement Project (ABEP) Environmental Assessment (EA) Prepared by the Detroit International Bridge Company

Relationship of ABEP to Other DIBC Proposals – U.S. EPA is concerned how the ABEP project relates to other proposals that the Detroit International Bridge Company has put before the Federal Highway Administration (FHWA) and Michigan Department of Transportation (MDOT). We understand that DIBC has discussed other projects such as additional plaza work and local roadway modifications (Fort Street relocation). If these projects will be triggered by this proposal or if these other projects are interdependent on the ABEP project, they should be considered connected actions and analyzed along with the ABEP proposal. This point is an important one to consider because it relates to the scope of the NEPA analysis. We recommend that the Coast Guard address this in their NEPA evaluation.

Uncertainty Regarding Status of Existing Bridge and Ultimate Bridge Capacity - As stated in the documentation, the ABEP would simply tie the existing plazas in both Canada and the U.S. together via a new 6-lane bridge including two new lanes for trucks using the FAST system. The EA indicates that once the new structure is completed, the existing bridge will be taken out of service and evaluated, then placed back in service for either bicycle/pedestrian use or to be used as a redundant structure. Provisions for bicycle/pedestrian plaza facilities were not discussed in the EA. Further, we understand that repairs are in process on the existing structure that will bring the bridge up to standard. We question whether such a large investment in infrastructure would be left to sit idle without vehicle traffic. It is more likely that there would be economic and traffic pressures to use the maximum amount of bridge capacity for vehicular traffic. Therefore, we believe a reasonable assumption could be made that 10 lanes of bridge capacity would be present at this location. Environmental analyses depicting the vehicular use of all 10 lanes should be undertaken as part of this EA.

Coordination With CEAA on Canadian Concerns – The EA includes a discussion of the Canadian environmental process used to evaluate the ABEP proposal on the Canadian side. At this stage in that environmental assessment process, it is not clear what the results of the Canadian process will be or if there are issues that could make the current ABEP proposal inconsistent with locally desired social, economic, or environmental conditions. The EA isn't clear how Canadian concerns regarding impacts would be considered in the Coast Guard's decision. We recommend that the Coast Guard coordinate with the Canadian Environmental Assessment Agency (CEAA) to determine how the NEPA process should consider the Canadian environmental evaluation and decision. We are aware of the reasons why the Bi-national Transportation Partnership involved in the Detroit River International Crossing (DRIC) project considered and then eliminated from further consideration a new crossing structure in the area of the existing Ambassador Bridge. The EA does not include any information about how those concerns would be addressed in the ABEP proposal. Even though the ABEP proposal is different than the DRIC proposal, the issues associated with providing a new structure in the area of the existing Ambassador Bridge should be discussed. Issues such as existing and future plaza capacity, existing and future connecting

roadway capacity, and community impacts need to be discussed thoroughly in the Coast Guard's EA for both the United States and Canada.

Environmental Concerns

The Draft CATX document and the Coast Guard public notice indicate that footprint impacts from constructing the bridge may be largely avoided, since there are no structures planned to be placed in the Detroit River, or in any wetlands or floodplains. However, operational impacts - those impacts associated with six to ten lanes of traffic across the Detroit River - have not been completely assessed. The EA states that the new bridge would simply replace the existing structure. As we stated above in our capacity comment, the ultimate bridge capacity is uncertain, but we assume that 10 lanes of vehicular traffic (8 through lanes and 2 FAST lanes) could use the bridge structures. The additional traffic volume would have measurable impacts on the environment, such as stormwater runoff from additional impervious surface and air quality from additional mobile source emissions. Discussion of construction impacts and mitigation should also be included. A complete assessment of environmental impacts from the project should be done before a NEPA decision is made. The key environmental aspects that require additional analysis are listed below.

Air Quality – This project will be located in an ozone nonattainment area, a carbon monoxide (CO) maintenance area, fine particulate (PM2.5) nonattainment area, and coarse particulate (PM10) maintenance area. We expect that the additional bridge capacity would contribute to an increase in vehicle miles traveled (VMT) and would therefore have an effect on air quality. Heavy-duty diesel vehicles represent around half of all projected traffic of the ABEP. Emissions from idling diesel trucks in the area at plaza operations and from traffic on the bridge and surrounding highway systems are a human health concern. Even with more stringent heavy-duty highway engine standards taking effect over the next decade, during the next twenty years millions of diesel engines already in use will continue to emit large amounts of nitrogen oxides and particulate matter, both of which contribute to serious public health problems.

Long-term (i.e., chronic) inhalation exposure to diesel exhaust is likely to pose a lung cancer hazard to humans, as well as damage the lung in other ways depending on exposure. Diesel exhaust is listed as a human carcinogen in California and a likely human carcinogen by U.S. EPA. Short-term (i.e., acute) exposures can cause irritation and inflammatory symptoms of a transient nature, these being highly variable across the population. The assessment also indicates that evidence for exacerbation of existing allergies and asthma symptoms is emerging. U.S. EPA recognizes that diesel exhaust, as a mixture of many constituents, also contributes to ambient concentrations of several criteria air pollutants, including nitrogen oxides and fine particles, as well as other air toxics.

To address these issues, we recommend that analyses should be conducted to assess air quality impacts from this project. First, FHWA has indicated to you that ABEP would be a regionally significant transportation project that should be included in the Detroit Metropolitan Long Range Transportation Plan and undergo an air quality conformity analysis. The Mobile 6.2 model should be used to assess regional air quality for criteria pollutants. Second, a qualitative hot spot analysis

for PM2.5 and PM10 should be done and included in the Coast Guard's NEPA documentation. Guidance is available at http://www.fhwa.dot.gov/environment/conformity/pmhotspotguid.pdf. Additionally, the American Association of State Highway and Transportation Officials project report entitled, "Analyzing, Documenting, and Communicating the Impacts of Mobile Source Air Toxic Emissions in the NEPA Process," March 2007, (found at http://www.trb.org/NotesDocs/25-25(18)_FR.pdf) provides information and guidelines on available analytical methods to assess mobile source air toxics in a NEPA context. We believe this document should be consulted and considered for use by the Coast Guard because of the project's effect on diesel particulate matter. The project should include an analysis for mobile source air toxics (MSAT) and diesel particulate matter. At the very minimum, an inventory burden analysis should be conducted for the various years.

Ultimately, we are interested in seeing that the proposal mitigates for diesel emissions to the maximum amount possible. We are concerned that no air quality mitigation is proposed or discussed in the EA. Various mitigation actions and strategies should be considered for this project, including those that reduce diesel emissions during construction and operation. Mitigation measures that should be considered include shifting transportation corridors to avoid residential areas, anti-idling measures and efficient management of truck traffic.

We recommend that the project proponents consider a construction emissions reduction plan which includes Best Available Diesel Retrofit Control Technology (BACT) and other measures to minimize emissions during construction. Measures could include but are not limited to: the retrofit of all diesel powered equipment with diesel oxidation catalysts or diesel particulate filters, and other strategies or technologies (for example, cleaner burning fuels or anti-idling policies). EPA is available to participate in discussions to determine how to address this emerging issue.

Stormwater – The City of Detroit utilizes combined sewers. The new bridge will increase impervious surface area by 6 lanes. This additional load to the existing stormwater collection and treatment should be analyzed. Enough information should be presented in the EA to determine whether adverse impacts to the Detroit River will occur from stormwater runoff from the new bridge structure.

Historic Resources – The existing Ambassador Bridge structure is listed on the National Register of Historic Places. We understand that the Michigan State Historical Preservation Officer (SHPO) has determined, in a letter to the project applicant dated March 26, 2007, that the proposed project would result in an adverse effect to the existing Ambassador Bridge. The EA does not include any draft memorandum of agreement regarding these impacts or propose any potential mitigation for possible effects. It would appear that Section 106 of the NHPA is applicable to this project and is being addressed under the NEPA process, as indicated in the draft public notice announcing the availability of the EA. If the NEPA process and Section 106 are being undertaken at the same time, consultation should begin with the Michigan SHPO and the Advisory Council on Historic Preservation, and documentation of this should be included in the EA.

The historic nature of the existing bridge is a critical factor. We recommend that information that shows that the Section 106 process is progressing and or completed to the satisfaction of the SHPO should be included in the EA. It is important for the Coast Guard's NEPA evaluation and decision documents to show that any adverse effects to historic properties, and feasible mitigation measures for those effects, are identified and taken into consideration when selecting the preferred alternative. These effects and mitigation measures could determine whether or not a Finding of No Significant Impact could be signed for this project.

Transboundary and Cumulative Impacts Analysis – We note that the Coast Guard's EA includes information about the Canadian environmental analysis of this project. However, the EA does not discuss cumulative effects or transboundary effects of the key environmental resources listed above. We encourage the Coast Guard to continue to coordinate with the CEAA in the determination and disclosure of transboundary effects.

JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

KIRK T. STEUDLE
DIRECTOR

July 17, 2007

Mr. Robert Bloom, Commander "OBR"
U.S. Coast Guard
Ninth Coast Guard District
1240 E. Ninth Street
Cleveland, Ohio 44199-2060

Dear Commander Bloom:

Subject: Ambassador Bridge Enhancement Project Environmental Assessment

Thank you for the opportunity to review the Ambassador Bridge Enhancement Project Environmental Assessment (EA). The Michigan Department of Transportation (MDOT) has an interest in the transportation future of the Ambassador Bridge given that the bridge spans a roadway under our jurisdiction (Fort Street) and will soon connect directly to I-75. We have the following comments on the Ambassador Bridge Enhancement Project EA:

- The EA makes the argument that many environmental topics were discussed in the Gateway Project environmental documentation. However, the Gateway Project primarily focused on the impacts of connecting I-75 directly to the Ambassador Bridge plaza. As part of the Gateway study, MDOT assumed that a second span would be built in the future so the proposed design for the freeway connection would not interfere with the installation of a second span. MDOT accommodated the second span; however, we did not analyze the environmental impacts of building a second span because this was proposed as an independent action by the Detroit International Bridge Company (DIBC).

- The EA should more fully address the environmental areas of storm water runoff, contaminated site information, impacts to parks, noise analysis, utility relocations, right-of-way impacts, identification of environmental justice populations and impacts, information on rehabilitating the existing structure, and archaeological impacts. The impact of the second span on the existing historic bridge, including mitigation measures to avoid, minimize, or mitigate adverse effects should be addressed.

- The secondary and cumulative impact analysis should identify and analyze other projects in the immediate area that also affect the riverfront and southwest Detroit neighborhoods, such as the proposed Detroit Intermodal Freight Terminal and the reconstruction of Fort Street.

- The EA should discuss connected or similar actions and their associated impacts. For example, there are proposed changes to the plaza in the draft General Services Administration Master Plan for the Ambassador Bridge, as well as plans by the DIBC to make long-term changes. The DIBC has proposed a relocation of Fort Street to accommodate the expansion of the plaza. Additionally, the DIBC has plans to build a pump station, and the West Riverfront initiative proposes to establish right-of-way for a multi-use trail below the Ambassador Bridge. How do all of these actions relate to each other?

- From a transportation perspective, the study has no quantitative traffic information. Even though the EA contends there will be no increase in traffic, we would like to see a discussion of the modeling used to arrive at this conclusion. We would also like to see the traffic technical report supporting this conclusion. Traffic modeling is essential to the purpose and need for the proposed project and is the underpinning for the air quality and noise analyses.

- Finally, on another transportation-related topic, will the new span accommodate the transport of hazardous materials?

Again, thank you for the opportunity to comment on the Ambassador Bridge Enhancement Project EA. Should you need further clarification of our comments, please contact me at 517-373-2316.

Sincerely,

David E. Wresinski, Administrator
Project Planning Division

July 17, 2007
1438 Hubbard Street
Detroit, MI 48209

Robert W. Bloom, Jr.
Commander, Ninth Coast Guard District (dpb)
1240 East 9th Street – Room 2025
Cleveland, OH 44199-2060
VIA FAX 216-902-6088

Re: Comments on the New Ambassador Bridge Draft Environmental Assessment

Dear Commander Bloom,

I am writing to strongly oppose the application of the Detroit International Bridge Company ("DIBC") to the Coast Guard for the construction of a second span of the Ambassador Bridge. I write this letter as a resident of Hubbard Farms in Southwest Detroit. Our neighborhood is located in the shadow of the existing Ambassador Bridge.

The construction of a second Ambassador Bridge would have adverse effects on a part of Detroit that is recognized as a neighborhood undergoing revitalization. Southwest Detroit is one of the few areas of the city that is experiencing a rise in population. Nonprofit organizations and private entrepreneurs have invested hundreds of millions of dollars to build or substantially renovate hundreds of homes and apartments, create and expand businesses. There are many examples but one of the strongest is to walk in the Hubbard Richard neighborhood near St. Anne's Church. There Bagley Housing Association, a nonprofit organization, has been working over the last ten years to rebuild the neighborhood. Over 140 new single-family homes and townhomes have been built because of their efforts. Bagley Housing has also contributed to the development of a new senior housing complex, the renovation of a historic church building into a charter school, and the opening of an art gallery.

Commercial development has followed the boom in housing. Mexicantown and its restaurants have expanded, with the business owners citing the housing construction as an impetus for their new businesses or expansions. Two new commercial buildings with a total of 45,000 square feet were just completed by the Mexicantown Community Development Corporation. One building will house a State of Michigan Welcome Center and the other will lease space to a mix of local retail businesses. Other gems in Hubbard Richard include the Matrix Theater and Honeybee Market, a long-standing family owned business that expanded its small grocery store into an important 15,000 square foot supermarket. A new tortilla factory was recently built and several banks have opened branches nearby. Clearly Southwest Detroit is a thriving community for its residents to live, work and play, and a community that has wonderful resources for the city and Metro Detroit region.

It should be noted that the revitalization of Southwest Detroit has been recognized by the City, County, State, foundations and Federal Government in a number of important efforts. The City of Detroit has consistently awarded grants through federal programs to support the development activity. The Mayor's Office of Commercial Revitalization has approved two commercial areas for inclusion in its RE$TORE Detroit initiative. The State of Michigan has approved two Cool Cities sites in the Southwest Detroit area. The State has also designated a considerable amount of resources through the Michigan State Housing Development Authority (MSHDA) to support neighborhood improvement strategies. For example, MSHDA's program to administer federal low income housing tax credits have provided funding for the substantial renovation of over ten buildings into more than 200 apartments and 17,500 square feet of commercial space through the work of Southwest Solutions Nonprofit Housing Corporation. Two foundations (Skillman and the Local Initiatives Support Corporation) have designated Southwest Detroit as one of a small number of communities in Detroit through which they will target their efforts at supporting neighborhood revitalization.

The Federal Government should be a partner that supports the economic revitalization of the City of Detroit with strong support for the redevelopment of the city's neighborhoods. A second Ambassador Bridge would be the antithesis of neighborhood development and would be the wrong choice to solve what are clearly important issues affecting trade at the border.

Unfortunately, the Ambassador Bridge is privately owned and as a result the DIBC has not had a level of accountability that almost all other international border crossings have in the U.S. (I say almost because I believe there is only one other international crossing that is not publicly controlled). The DIBC has many times not supported the revitalization of the community as I described earlier; in fact their actions ran contrary to these efforts. They have purchased property and razed homes and businesses, leaving vacant land sitting for many years. They have proposed construction large trucking facilities right in the middle of residential neighborhoods.

In addition to those concerns, the DIBC has often supplied misinformation to the media and the public. It has simultaneously argued for the need of a 2nd span while presenting the opposite argument to other audiences. It has presented grandiose plans for redevelopment of properties it owns in order to gain trust and public support, and not completed much if any of the proposals. Another example is the DIBC claiming that the state will save money in its tight budget because no public funding would go towards the construction of a 2nd span, and then the DIBC submitting an application to the Michigan Strategic Fund for $1 billion of Private Activity Bonds. In addition, DIBC's owner, Matty Maroun, has continued to own the Michigan Central Depot while willfully allowing it to become derelict and possibly beyond repair. In short, the DIBC has shown absolutely no concern for the surrounding community and has been a terrible corporate citizen.

Support for a second Ambassador Bridge is logically inconsistent with the work of the bi-national Detroit River International Crossing ("DRIC") Study which has invested

significant public dollars and resources in determining, through an open and transparent process, the optimal location for increased international crossing capacity. Increasing capacity at the Ambassador Bridge was analyzed by the DRIC Study and determined not optimal based upon several variables including community impact and inability to meet redundancy objectives. An affirmative action by the MSF Board on the PAB application will harm Michigan's credibility in the DRIC process and relations with Canada.

I am extremely disturbed that the only environmental concerns identified in regards to the construction of a second span of the Ambassador Bridge would be the aesthetic impact on the current bridge identified by the Michigan State Historic Preservation Office. The operations of the DIBC have resulted in an inordinate amount of truck traffic along the local streets of Southwest Detroit. How can an increase in the number of trucks in this neighborhood not negatively contribute to the already poor air quality in the area? Was the impact considered in light of the myriad other current and proposed other industrial and transportation-related uses in Southwest Detroit, such as the many freeways, steel plants, cement silos, the Detroit Intermodal Freight Terminal, and others? The level of air quality is one of the worst in the State and the location of the Ambassador Bridge plays a role in that. There would also be serious noise and safety concerns brought about by this proposal. The results of the Environmental Assessment are dubious at best.

Additionally, the Coast Guard's handling of public meetings to solicit input on the project has been abysmal. The "Public Workshop" on March 1, 2007 was not advertised to the community. I live within half a mile of the Bridge and had no knowledge of the meeting until a neighborhood resident noticed the posting on the DIBC's website a few days before the meeting. This meeting should not count as part of the public input process since the public wasn't even aware of it until the last minute. The Coast Guard's lack of outreach should be an embarrassment to the organization. A "Public Workshop" held in April was slightly better advertised, and I attended a portion of the meeting. However, at the very beginning of the meeting, a representative of the Coast Guard spoke and completely stifled public comment on the project except for design-related issues of a new bridge. Therefore, the community has had absolutely no opportunity to comment on other issues and, therefore, this process has essentially been a charade leading to approval for the DIBC to build 2nd span of the Ambassador Bridge. Until a true community meeting is held, the seriousness of the impacts of this process dictate that the process to-date should not even be considered valid.

Lastly, there are a number of other outstanding concerns related to the overall project. The DIBC has made no mention of the current bridge being in need for repairs before this application. How is it that suddenly it needs to build a second span in order to shut down the Ambassador Bridge for these studies? Even if true, the Gateway Project, while allegedly designed to accommodate a second span, did not analyze the environmental consequences of a second span, simply the connections between the Ambassador Bridge and the interstate freeway system. In addition, the DIBC has well-documented plans to significantly expand its plaza far beyond what was anticipated in the Gateway study and even beyond what has been revealed in its Coast Guard or Michigan Department of Environmental Quality permit applications, including adding primary inspection booths and

the reconfiguration of Fort Street. And is there really a need for a new span at all? The July 14, 2007 edition of The Detroit News discussed the drop in passenger trips to Canada due to a number of factors and the decline in truck traffic is well-documented, even by the DIBC itself.

It is not just our neighborhood that opposes a second Ambassador Bridge. Government at all levels in Canada is opposed to a second span. The opposition of Canada, the undoing of strong neighborhood redevelopment progress, respecting the DRIC process, the lack of a comprehensive review of environmental impacts, weak community notification by the Coast Guard and poorly operated community meetings are all solid reasons that justify a rejection of any approvals required by the Coast Guard for the construction of a second Ambassador Bridge by the Detroit International Bridge Company.

Sincerely,

Mitchel Alexander

Mitchel Alexander

Cc: Gateway Communities Development Collaborative
Governor Jennifer Granholm
Senator Carl Levin
Senator Debbie Stabenow
Representative John Conyers, Jr.
Representative Carolyn Cheeks-Kilpatrick
State Representative Steve Tobocman
State Senator Hanson Clarke
James Steele, Federal Highway Administration
Mohammed Alghurabi, Michigan Department of Transportation
Detroit City Council President Ken Cockerel
Marcell Todd, Jr., City of Detroit Planning Commission
Vincent Nathan, City of Detroit Department of Environmental Affairs

July 17, 2007

Robert Bloom, Commander
U.S. Coast Guard
Ninth Coast Guard District
1240 E. Ninth Street
Cleveland, Ohio 44199-2060

Subject: Ambassador Bridge Enhancement Project Environmental Assessment

Dear Commander Bloom:

I am writing to provide comments on the Draft Environmental Assessment (Draft EA) submitted by the Detroit International Bridge Company (DIBC) for the proposed Ambassador Bridge Enhancement Project. Since 2003, I have represented the 95,000 residents of the 12th State House District, which hosts the Ambassador Bridge, in the Michigan House of Representatives. I have attached my previous submissions to the U.S. Coast Guard (USCG) and the Michigan Department of Environmental Quality regarding the proposed Ambassador Bridge Enhancement Project.

I. The U.S.Coast Guard Should Postpone the Draft EA and Await the Completion of the DRIC Study

I have repeatedly stated my strong objection to government action, at any level, that would promote an international border crossing outside of the binational Detroit River International Crossing (DRIC) Study. Governmental actions, including the USCG's processing of the DIBC's permit application for the Ambassador Bridge Enhancement Project, that would promote one of the eliminated alternatives of the DRIC Study represents exceptionally dysfunctional public policy-making. Approving a project lacking the support of the binational parties involved in the DRIC Study undermines the U.S. relationship with Canada, its largest trading partner. I continue to have a difficult time responding to questions from my constituents regarding why a public agency, particularly a DRIC Study partner, would consider promoting a border crossing alternative that was eliminated almost two years ago though the DRIC Study process.

The DRIC Study is in the process of completing an Environmental Impact Statement (EIS) for alternatives designed to expand border crossing capacity at the Detroit Windsor corridor. The USCG is a partner in the DRIC Study and should be thoroughly engaged and familiar with the ongoing process, relevant data, and the various alternatives studied. As previously stated, the Ambassador Bridge Enhancement Project represents an alternative already studied, evaluated,

and eliminated through the DRIC Study. What is the public policy rationale for consideration of any border crossing alternative through a less rigorous analysis than an Environmental Impact Statement (EIS) when the binational process is engaged in a full EIS for the same project? **The USCG should require a full EIS for the Ambassador Bridge Enhancement Project.**

DIBC claims that the proposed project will not increase capacity and, therefore, is distinct from the goals of the DRIC Study, are patently false. If this were accurate, why would the DIBC characterize the DRIC Study as a competitor? The Ambassador Bridge Enhancement Project includes the construction of six bridge lanes an increase of two additional lanes compared to the existing Ambassador Bridge. Describing the proposed project as a maintenance project is illogical given the construction of these additional lanes which, according to the Draft EA, will be used as dedicated throughways for low-risk trucks.

In fact, the support letters submitted as Attachment A include at least three letters that support the project based solely upon its ability to increase capacity. The July 26, 2006 letter from the U.S. Chamber of Commerce opens with "I am writing to express our strong support for investment in additional infrastructure capacity to meet the growing demand so trade across the U.S. Canadian border in the Detroit region." A September 9, 2006 letter from the Michigan Chamber of Commerce similarly states "the Michigan Chamber strongly supports efforts to increase needed capacity, including private sector initiatives such as proposed by the Detroit International Bridge Company for an additional span at the Ambassador Bridge." Finally, the Michigan Teamsters Joint Council 43 write in a June 19, 2006 letter: "Additional capacity will ensure that Detroit Windsor is the border crossing of choice." Expanding transportation infrastructure, such as building additional crossing lanes here, has empirically created increased traffic growth.

II. The USCG Should Reject the Draft EA on Homeland Security Grounds

Security issues must play a predominant role in expanding international border crossing capacity. The U.S. Department of Homeland Security (DHS) and the U.S. Customs and Border Protection (USCBP) are among the federal agencies partnering with the DRIC Study. The Draft EA lacks any discussion of security clearances beyond an unsubstantiated allegation that the proposed project is in the national interest and security of the U.S. and Canada. Moreover, there is no commentary from the DHS or the USCBP. There also should be substantive commentary from the General Services Administration (GSA), the landlord for USCBP, given that they recently completed a Master Plan for the expansion of the Ambassador Bridge primary cargo inspection facility. Several expansion options contingent on expanded capacity at the Detroit Windsor border are considered viable by the GSA and are depicted in the Master Plan. **The USCG must solicit comments from the GSA, DHS, USCBP, and other critical federal agencies before it can properly analyze the Draft Environmental Assessment.**

Creating redundancy is one of the primary homeland security objectives of expanding international border crossing capacity at the Detroit Windsor border. Any discussion of redundancy must focus on the entire system, specifically including all three components of border crossing infrastructure: bridge structure; bridge plaza; and roadway connections. *One* of the reasons that a twinning of the Ambassador Bridge was eliminated from further consideration

by the DRIC Study is that it did not perform well on redundancy criteria in the U.S. or in Canada. DRIC analyzed 37 crossings and rated each system for its effectiveness on route, plaza, and crossing. Redundancy was one variable amongst several used in the rating criteria. The Ambassador Bridge ranked second on the U.S. side, but the spread between the highest ranked crossing and the Ambassador Bridge was significant – 24.52 and 18.92 respectively. It is imperative that the USCG coordinate its review of the Draft EA with the DHS's analysis of the proposed project.

While the Draft EA correctly notes that redundancy in the regional transportation system is "much needed" (page 5), its claims of "structural" redundancy (pages 15 and 21) miss the mark. Redundancy within the regional transportation system can only occur when all three levels of the system are addressed and the DRIC Study correctly points out that a separate route for trucks to cross the central industrial corridor between Detroit and Windsor does that. The Ambassador Bridge Enhancement Project is only relevant to the Ambassador Bridge structure, not its plazas or freeway connections. Nor is it redundant in the system's overall context. That is why it was rejected by the DRIC Study. In the wake of the September 11, 2001 terrorist attacks, these homeland security concerns should not be ignored as they are in the Draft EA.

A related homeland security concern is the routing and transport of hazardous materials across international boundaries. The USCG should include a thorough analysis of the existing regulations and laws governing hazardous materials transport and any changes required by the DHS. There have been various claims and allegations regarding the regulation and enforcement of hazardous material transport across the Ambassador Bridge including media exposes alleging that the DIBC has violated hazardous materials transport regulations. Additionally, law enforcement and other relevant government agencies should be consulted including the Michigan State Police, Detroit Police Department, and the Detroit Fire Department.

III. The Draft EA Raises Serious U.S. Environmental Law Issues, including Segmentation

The proposed Ambassador Bridge Enhancement Project is described within the initial USCG permit application, as well as the subsequent Draft EA, as involving the construction of a six-lane, cable-stayed bridge just west of the existing Ambassador Bridge. The description states that there are no additional plaza, roadway, or interstate freeway connections required. Throughout the Draft EA, however, the DIBC claims project benefits that come instead from actions being undertaken as part of the MDOT Gateway Project. **In response to the USCG's July 2006 request for public comment on this project, I, along with multiple parties, identified that the Ambassador Bridge Enhancement Project misrepresents the full scope of the proposed changes and, as such, segments the project. Segmentation of a project is a violation of the National Environmental Policy Act.**

Additional segmentation appears to be underway with regards to DIBC's plaza expansion plans. The DIBC has gone on record stating that they plan to expand the U.S. side of the Ambassador Bridge plaza south of Fort Street and have requested that the MDOT evaluate the impacts of relocating Fort Street. In fact, several of the support letters provided in Attachment A of the Draft EA, use language nearly identical to the April 28, 2006 letter from the Detroit Hispanic Development Corporation noting their support for "(DIBC) plans to move the truck inspection

plaza south of Fort Street." The DIBC also has proposed an international plaza that would eventually accommodate joint U.S. and Canadian customs and inspection activities. This proposed expansion is detailed in DIBC documents ("A Model Border Crossing for the 21st Century," November 2001; "Ambassador Bridge Today and Future") and was depicted in advertisements in the Detroit daily newspapers and Crain's Detroit Business. Another letter, dated April 19, 2006, and signed by ten individuals, provides twice as much commentary on the proposed "International Center" (sic), as the Enhancement Project. This letter provides equal commentary on the Gateway Project.

Therefore, the project and its impacts, as described in the Draft EA, are significantly deficient. In a summary of air quality impacts, Weston Solutions even states that "it should be noted that the proposed project does not include any changes to the existing U.S. inspection plaza." Based on the information presented above, their estimates would be incomplete. The USCG should require that the DIBC fully disclose, describe, and record the impacts of the expansion plans for the bridge, plaza, and roadway system.

IV. USGC Should Reject Draft Environmental Assessment and Require a Full Environmental Impact Statement (EIS)

All of the environmental impacts of the Enhancement Project, including air, noise and vibrational impacts, should be evaluated under federal Environmental Justice standards. In addition to the fact that the Draft EA notes that 60 percent of the surrounding community is Hispanic and significant numbers are black, the area has significant poverty rates. Trying to deny these facts by stating that Detroit has higher minority and low-income numbers than the immediate neighborhood is no defense to not following the Environmental Justice regulations prescribed by Executive Order 12898 issued on February 11, 1994. If indeed this project inflicts significant environmental impacts on these protected populations, it should be rejected
Pollution Concerns – These should be evaluated as Environmental Justice concerns

Air Quality

The Draft EA should include an air quality analysis of transboundary impacts. Based on a conference call with the USCG (conference call with Robert Bloom, June 4, 2007), it is my understanding that transboundary impacts are typically included in the analysis of the Draft EA for an international border crossing. Page 76 of the Draft EA states that "the emissions from the Proposed Project represent an insignificant source of air emissions in the area." This is a meaningless and inappropriate standard for determining air quality impacts and subsequent mitigation initiatives. If every project that accounted for only a thousandth of Wayne County's air pollution were exempt from regulation, air quality controls and standards would be rendered entirely meaningless.

Despite a recognition that air quality impacts will occur during both the construction and operation of the proposed project, no mitigation activities are described beyond a statement that pollution controls will be employed during the construction of the proposed project. The Draft EA does not include an analysis of the air quality impacts of operationalizing a new six lane bridge, along with the existing four lane bridge, and U.S. and Canadian plaza operations. The

USCG should require such an analysis as there are repeated descriptions within the Draft EA of this potential scenario.

Any legitimate analysis of air quality impacts also must account for the increase in truck traffic the project will generate. While the Draft EA asserts that the project will not increase traffic volumes, such a contention does not pass a reasonableness standard. Why would the DIBC spend money for six lanes instead of four if it were not handling more traffic? At least the project's supporters believe it will attract more traffic. Nearly half of the letters of support in Appendix A say as much. Finally, the DRIC traffic projections used in the analysis support more traffic.

The Southeast Council of Governments (SEMCOG) comments on the Draft EA raise several important issues related to the methodology used to assess air quality impacts particularly the need to use local available data to ensure a higher level of accuracy in emissions projections.

Noise

The Draft EA only includes an analysis of noise impacts on the areas east and immediately south of the proposed project. All areas surrounding the proposed project should be evaluated for noise impacts including the neighborhoods to the west. The Draft EA should be rejected for its negative noise impacts on this minority community. First, it is not clear how the analysis picked the area to study. It is true that there are a "few residences mixed with vacant land, and one church" immediately *adjacent* to the Ambassador Bridge plaza as described on Page ii of Appendix L. Yet, to state that there are no schools near the project area suggests that the project area is defined as two blocks at most, since Webster Elementary School is located two blocks west of the north end of the Ambassador Bridge Plaza. Noise impacts from tens of thousands of vehicles and trucks, particularly when elevated on a bridge, travel farther than the so-called "project area" and the Noise Analysis Study should be rejected out of hand.

In essence, the Draft EA suggests that, because traffic noise is already excessive and exceeds the NAC, nothing needs to be done to mitigate noise concerns. Similar to the air quality analysis that seeks project exemption from federal standards because Wayne County is out of attainment, the noise analysis seeks exemption because of the undesirable present conditions. In the present context, the exact project being contemplated *is carrying the vehicles that are producing the noise!* **The USCG must demand that reasonable analysis and mitigation be undertaken to address noise concerns that will result from the proposed project.**

The Draft EA needs to utilize a larger scope of noise sites. No sites were picked to the west, north, northwest or north east of the Ambassador Bridge Plaza or the new span. In fact, a reasonable person would conclude that the Draft EA selected only the least populous areas to study for noise, exactly the areas where USCG should be least, not most, concerned.

The noise data sets are from a small sample of time periods and conditions. Despite the reports analysis that measurements were taken "during morning and/or afternoon rush-hour," Appendix A shows the complete opposite of this characterization with all measurement times falling between 12:02 p.m. and 2:54 p.m. Indeed a new analysis with morning and/or afternoon rush

hour should be ordered, as well as a more robust data set that includes other days of the week and other weather conditions, rather than just a day with 80 percent humidity. This analysis is particularly critical when the report notes conditions exceed the NAC at numerous sites.

Historic and Visual Impacts

The ultimate use of the existing Ambassador Bridge, should the Enhancement Project go forward, is anything but clear. The Draft EA includes a scenario under which the existing structure is removed from service, repaired, and used for pedestrian and bicycling purposes. Another scenario is uses the existing Ambassador Bridge for backup traffic relief. It is imperative that a final conclusion on the ultimate use of the Ambassador Bridge is reached, then studied and reported on in an environmental assessment. There are dramatically different impacts depending on whether the Ambassador Bridge remains in service, is removed from service, or is demolished. **The USCG should require a final determination on the future of the existing Ambassador Bridge within the context of the construction of the Enhancement Project. Such a determination must include appropriate budgets and timelines.**

The Draft EA indicates that the State Historic Preservation Office (SHPO) has determined that there are adverse effects on the historical integrity and views of the Ambassador Bridge from the proposed Enhancement Project (March 2007 SHPO letter to DIBC). This would be especially significant if DIBC were to dismantle the existing span or leave it in disrepair. A surface reading of the Draft EA supports that DIBC would have every financial incentive to not repair the existing span, especially if the new span contains additional lanes of traffic and DIBC is to be believed that the project will not increase usage. One only needs to look at DIBC's unkept nearby Michigan Central Depot to realize that the physical and aesthetic deterioration of the existing span are real possibilities. The impacts of the views of the existing span in Riverside identified below must be given due consideration by SHPO's letter.

Riverside Park

The Draft EA recognizes potential adverse impacts from the proposed project to Riverside Park including potential long-term visual impacts and shading of park land. The Draft EA understates the historic value of this impact. The view of the Ambassador Bridge from Riverside Park is breathtaking and a true cultural asset to the city of Detroit. The picture used is from the farthest corner of Riverside Park and grossly understates its appeal.

The West Riverfront revitalization plan will provide, for the first time in decades, direct public access to the riverfront as it transitions and limits industrial uses to residential, commercial, and recreational. Moreover, the West Riverfront plan connects the neighborhoods of Southwest Detroit to the east riverfront. The USCG should require evaluation of the Enhancement Project on the West Riverfront plan.

V. Draft EA Is Flawed

The DIBC has repeatedly stated that there is no need for expanded international crossing capacity and has widely criticized the DRIC Study traffic growth estimates. Yet, the DIBC has not included any traffic forecasts, current or future, to rationalize the proposed project or to back up the claim that traffic is decreasing rather than increasing. If additional traffic is not expected at the Detroit Windsor border, USCG should question why the DIBC would build a larger bridge structure, and how future toll revenues will cover the construction costs of the new bridge, as well as the rehabilitation of the existing span. It is extremely puzzling that the DIBC used the DRIC Study traffic estimates to describe the air quality impacts of Ambassador Bridge Enhancement Project.

The Draft EA contains substantial inaccuracies and/or confusing claims. First, the Draft EA claims that no public money will be used, that the construction costs are $500 million, that no additional property will be required, and that no one will be relocated. All of these claims are contradicted in fact or elsewhere in the Draft EA.

The DIBC has repeatedly claimed that the Ambassador Bridge Enhancement Project costs would be completely privately financed. In fact, the DIBC has argued that this should elevate the ranking of their proposal when compared to DRIC Study alternatives because federal and state transportation resources could be used for other critical projects. However, in February 2007, the DIBC submitted an application for the use of $1 billion in Private Activity Bond financing for their portion of the MDOT Gateway Project and the Ambassador Bridge Enhancement Project.

The application stated that total project costs for constructing the Ambassador Bridge Enhancement Project are approximately $800 million and that no additional land was required in the U.S. or Canada. The Draft Environmental Assessment states that the total project costs are $500 million. **Given that a federal action is required and that the use of federal funds and/or federal tax benefits may be requested for the proposed project, the USCG should require a specific line-time budget delineating total project costs.**

Second, the document contradicts itself with regard to the project's land needs and ownership status. Page 9 of the Draft EA states "the DIBC/CTC owns *most of* the property required for the construction of the Ambassador Bridge Enhancement Project and are currently in the process of acquiring the necessary remaining property rights for the project." Inexplicably, however, on page 22 of the Draft EA the following appears: "the only relocations required in Canada are those renters occupying short term temporary housing near the University of Windsor." **The Private Activity Bond application stated that all land required for the project had been acquired. The application was silent on the need for relocation. The USCG should identify the remaining land needed for the proposed project and whether relocation, other than residential, is required.**

Southwest Detroit hosts the most extensive array of transportation land uses in the state. Four Class one railroads, acres of intermodal and rail facilities (including the largest intermodal yard in the region), an international rail tunnel, three interstate freeways, and the Ambassador Bridge are located in Southwest Detroit. The community, and particularly the neighborhood adjacent to the Ambassador Bridge, has experienced significant residential and commercial regeneration,

and increased population. There is little discussion of secondary and cumulative impacts of the proposed project. The Draft EA should include such an analysis and consider the cumulative impacts of other proposed projects such as the development plans of the Detroit Wayne County Port Authority, the Detroit Intermodal Freight Terminal, Systematic Recycling, and the possible expansion of Marathon Petroleum Refinery.

A full EIS would provide the kind of analysis that is critically needed for this important project. Our nation's most valuable international border crossing deserves such consideration. Our homeland security deserves such consideration. Southwest Detroit's growing residential and business communities, environment, and historic character deserve such consideration.

Thank you for the opportunity to comment on the DIBC's proposed Ambassador Bridge Enhancement Project. As always, I am available for additional discussion on this critical matter.

Sincerely,

Steve Tobocman
House Majority Floor Leader
12th District, Detroit

cc: Senator Carl Levin
Senator Debbie Stabenow
Representative Carolyn Cheeks-Kilpatrick

MDOT
Michigan Department of Transportation

FAX

Number of pages: 3 (including this cover sheet)

Date: July 17, 2007

Attention: YN3 Racutt

For: Mr. Robert Bloom, Commander "OBR"
U.S. Coast Guard, Ninth Coast Guard District
(Prevention, Bridge Program Section, Room 2025)

Phone/fax: **216-902-6059** – Fax
216-902-6047 -- Phone

From: Judy Baker
Michigan Department of Transportation

Phone: 517-335-6879
E-Mail: bakerj@michigan.gov

Subject: Ambassador Bridge Enhancement Project Environmental Assessment

Forthcoming is a copy of a letter addressed to you in reference to the Ambassador Bridge Enhancement Project Environmental Assessment. The original letter is being delivered to you by overnight express.

JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

KIRK T. STEUDL
DIRECTOR

July 17, 2007

Mr. Robert Bloom, Commander "OBR"
U.S. Coast Guard
Ninth Coast Guard District
1240 E. Ninth Street
Cleveland, Ohio 44199-2060

Dear Commander Bloom:

Subject: Ambassador Bridge Enhancement Project Environmental Assessment

Thank you for the opportunity to review the Ambassador Bridge Enhancement Project Environmental Assessment (EA). The Michigan Department of Transportation (MDOT) has an interest in the transportation future of the Ambassador Bridge given that the bridge spans a roadway under our jurisdiction (Fort Street) and will soon connect directly to I-75. We have the following comments on the Ambassador Bridge Enhancement Project EA:

- The EA makes the argument that many environmental topics were discussed in the Gateway Project environmental documentation. However, the Gateway Project primarily focused on the impacts of connecting I-75 directly to the Ambassador Bridge plaza. As part of the Gateway study, MDOT assumed that a second span would be built in the future so the proposed design for the freeway connection would not interfere with the installation of a second span. MDOT accommodated the second span; however, we did not analyze the environmental impacts of building a second span because this was proposed as an independent action by the Detroit International Bridge Company (DIBC).

- The EA should more fully address the environmental areas of storm water runoff, contaminated site information, impacts to parks, noise analysis, utility relocations, right-of-way impacts, identification of environmental justice populations and impacts, information on rehabilitating the existing structure, and archaeological impacts. The impact of the second span on the existing historic bridge, including mitigation measures to avoid, minimize, or mitigate adverse effects should be addressed.

- The secondary and cumulative impact analysis should identify and analyze other projects in the immediate area that also affect the riverfront and southwest Detroit neighborhoods, such as the proposed Detroit Intermodal Freight Terminal and the reconstruction of Fort Street.

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- The EA should discuss connected or similar actions and their associated impacts. For example, there are proposed changes to the plaza in the draft General Services Administration Master Plan for the Ambassador Bridge, as well as plans by the DIBC to make long-term changes. The DIBC has proposed a relocation of Fort Street to accommodate the expansion of the plaza. Additionally, the DIBC has plans to build a pump station, and the West Riverfront initiative proposes to establish right-of-way for a multi-use trail below the Ambassador Bridge. How do all of these actions relate to each other?

- From a transportation perspective, the study has no quantitative traffic information. Even though the EA contends there will be no increase in traffic, we would like to see a discussion of the modeling used to arrive at this conclusion. We would also like to see the traffic technical report supporting this conclusion. Traffic modeling is essential to the purpose and need for the proposed project and is the underpinning for the air quality and noise analyses.

- Finally, on another transportation-related topic, will the new span accommodate the transport of hazardous materials?

Again, thank you for the opportunity to comment on the Ambassador Bridge Enhancement Project EA. Should you need further clarification of our comments, please contact me at 517-373-2316.

Sincerely,

David E. Wresinski, Administrator
Project Planning Division

U.S. ENVIRONMENTAL PROTECTION AGENCY - REGION 5
77 WEST JACKSON, CHICAGO, IL 60604

OFFICE OF ENORCEMENT AND COMPLIANCE ASSURANCE

FACSIMILE TRANSMITTAL SHEET

TO:	FROM:
Bob Bloom	Sherry Karnke NEPA Implementation Section (B-19J)
COMPANY:	DATE:
United States Coast Guard	~~7/17/2007~~ 7/18/07
FAX NUMBER:	FAX NUMBER:
216-902-6088	
PHONE NUMBER:	PHONE NUMBER:
	(312) 353-5794

RE:

NOTES/COMMENTS:

Please see EPA's letter on the Ambassador Bridge Enhancement Project. I would be happy to discuss these comments with you if you have any questions or concerns. Thanks.

total no. of pages, including cover: 7 + 1 (Confirmation of fax for 7/17/07, in case you need it)

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ► 7

To	From
David Coburn	Bob Bloom
Dept./Agency	Phone # 216-902-6085
Fax # 202-261-0565	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUL 1 7 2007

REPLY TO THE ATTENTION OF
B-19J

Mr. Robert W. Bloom Jr.
United States Coast Guard
Office of Commander (dpw-3)
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199

RE: Comments on Environmental Assessment for Construction of Second Fixed Highway Bridge over the Detroit River Known as the Ambassador Bridge Enhancement Project (ABEP)

Dear Mr. Bloom:

The United States Environmental Protection Agency (U.S.EPA) has responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act to review and comment on major federal activities subject to the National Environmental Policy Act (NEPA). EPA is submitting comments to you regarding the Ambassador Bridge Enhancement Project (ABEP) environmental assessment issued by the Coast Guard and the NEPA evaluation done by the Detroit International Bridge Company (DIBC) for the ABEP.

On August 30, 2006, we submitted comments on the Project Description and Type 2 Draft Categorical Exclusion Environmental Documentation Public Notice 09-03-06 for the approval of location and plans for the construction of a second fixed highway bridge over the Detroit River for the ABEP project. In those comments, we suggested that more detailed analysis be done, above and beyond what was done for the Draft Categorical Exclusion (CATX). The primary reasons for this recommendation were: 1) the need to provide information on the relationship of the project to other international crossing projects; 2) uncertainty regarding status of the existing bridge and ultimate bridge build-out capacity; 3) the lack of analysis regarding consistency with local government land use plans; and 4) air quality, stormwater, endangered species, historic resources and cumulative effects concerns.

Although the Environmental Assessment (EA) provides more information than what was presented in the Draft CATX, a number of issues remain. We continue to have concerns environmentally and procedurally. We recommend that the Coast Guard address these concerns before reaching a permit decision. Those issues are discussed in the enclosed detailed comments.

Thank you for the opportunity to comment on the EA. If you have any questions on our comments, please contact Sherry Kamke, of my staff. Sherry can be reached by phone at (312) 353-5794 and by e-mail at: kamke.sherry@epa.gov.

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Sincerely yours,

Kenneth A. Westlake
Supervisor, NEPA Implementation
Office of Enforcement and Compliance Assurance

Enclosure

cc: Dan Stamper, DIBC
Jim Kirschensteiner, FHWA
Dave Wresinksi, MDOT
Mohammad Murtaza, CEAA
Kaarina Stiff, Transport Canada
Martha MacFarlane-Faes, Michigan SHPO
Jerry Fulcher, Michigan DEQ

Detailed United States Environmental Protection Agency (U.S. EPA) Comments on the Ambassador Bridge Enhancement Project (ABEP) Environmental Assessment (EA) Prepared by the Detroit International Bridge Company

Relationship of ABEP to Other DIBC Proposals – U.S. EPA is concerned how the ABEP project relates to other proposals that the Detroit International Bridge Company has put before the Federal Highway Administration (FHWA) and Michigan Department of Transportation (MDOT). We understand that DIBC has discussed other projects such as additional plaza work and local roadway modifications (Fort Street relocation). If these projects will be triggered by this proposal or if these other projects are interdependent on the ABEP project, they should be considered connected actions and analyzed along with the ABEP proposal. This point is an important one to consider because it relates to the scope of the NEPA analysis. We recommend that the Coast Guard address this in their NEPA evaluation.

Uncertainty Regarding Status of Existing Bridge and Ultimate Bridge Capacity - As stated in the documentation, the ABEP would simply tie the existing plazas in both Canada and the U.S. together via a new 6-lane bridge including two new lanes for trucks using the FAST system. The EA indicates that once the new structure is completed, the existing bridge will be taken out of service and evaluated, then placed back in service for either bicycle/pedestrian use or to be used as a redundant structure. Provisions for bicycle/pedestrian plaza facilities were not discussed in the EA. Further, we understand that repairs are in process on the existing structure that will bring the bridge up to standard. We question whether such a large investment in infrastructure would be left to sit idle without vehicle traffic. It is more likely that there would be economic and traffic pressures to use the maximum amount of bridge capacity for vehicular traffic. Therefore, we believe a reasonable assumption could be made that 10 lanes of bridge capacity would be present at this location. Environmental analyses depicting the vehicular use of all 10 lanes should be undertaken as part of this EA.

Coordination With CEAA on Canadian Concerns – The EA includes a discussion of the Canadian environmental process used to evaluate the ABEP proposal on the Canadian side. At this stage in that environmental assessment process, it is not clear what the results of the Canadian process will be or if there are issues that could make the current ABEP proposal inconsistent with locally desired social, economic, or environmental conditions. The EA isn't clear how Canadian concerns regarding impacts would be considered in the Coast Guard's decision. We recommend that the Coast Guard coordinate with the Canadian Environmental Assessment Agency (CEAA) to determine how the NEPA process should consider the Canadian environmental evaluation and decision. We are aware of the reasons why the Bi-national Transportation Partnership involved in the Detroit River International Crossing (DRIC) project considered and then eliminated from further consideration a new crossing structure in the area of the existing Ambassador Bridge. The EA does not include any information about how those concerns would be addressed in the ABEP proposal. Even though the ABEP proposal is different than the DRIC proposal, the issues associated with providing a new structure in the area of the existing Ambassador Bridge should be discussed. Issues such as existing and future plaza capacity, existing and future connecting

roadway capacity, and community impacts need to be discussed thoroughly in the Coast Guard's EA for both the United States and Canada.

Environmental Concerns

The Draft CATX document and the Coast Guard public notice indicate that footprint impacts from constructing the bridge may be largely avoided, since there are no structures planned to be placed in the Detroit River, or in any wetlands or floodplains. However, operational impacts - those impacts associated with six to ten lanes of traffic across the Detroit River - have not been completely assessed. The EA states that the new bridge would simply replace the existing structure. As we stated above in our capacity comment, the ultimate bridge capacity is uncertain, but we assume that 10 lanes of vehicular traffic (8 through lanes and 2 FAST lanes) could use the bridge structures. The additional traffic volume would have measurable impacts on the environment, such as stormwater runoff from additional impervious surface and air quality from additional mobile source emissions. Discussion of construction impacts and mitigation should also be included. A complete assessment of environmental impacts from the project should be done before a NEPA decision is made. The key environmental aspects that require additional analysis are listed below.

Air Quality – This project will be located in an ozone nonattainment area, a carbon monoxide (CO) maintenance area, fine particulate (PM2.5) nonattainment area, and coarse particulate (PM10) maintenance area. We expect that the additional bridge capacity would contribute to an increase in vehicle miles traveled (VMT) and would therefore have an effect on air quality. Heavy-duty diesel vehicles represent around half of all projected traffic of the ABEP. Emissions from idling diesel trucks in the area at plaza operations and from traffic on the bridge and surrounding highway systems are a human health concern. Even with more stringent heavy-duty highway engine standards taking effect over the next decade, during the next twenty years millions of diesel engines already in use will continue to emit large amounts of nitrogen oxides and particulate matter, both of which contribute to serious public health problems.

Long-term (i.e., chronic) inhalation exposure to diesel exhaust is likely to pose a lung cancer hazard to humans, as well as damage the lung in other ways depending on exposure. Diesel exhaust is listed as a human carcinogen in California and a likely human carcinogen by U.S. EPA. Short-term (i.e., acute) exposures can cause irritation and inflammatory symptoms of a transient nature, these being highly variable across the population. The assessment also indicates that evidence for exacerbation of existing allergies and asthma symptoms is emerging. U.S. EPA recognizes that diesel exhaust, as a mixture of many constituents, also contributes to ambient concentrations of several criteria air pollutants, including nitrogen oxides and fine particles, as well as other air toxics.

To address these issues, we recommend that analyses should be conducted to assess air quality impacts from this project. First, FHWA has indicated to you that ABEP would be a regionally significant transportation project that should be included in the Detroit Metropolitan Long Range Transportation Plan and undergo an air quality conformity analysis. The Mobile 6.2 model should be used to assess regional air quality for criteria pollutants. Second, a qualitative hot spot analysis

for PM2.5 and PM10 should be done and included in the Coast Guard's NEPA documentation. Guidance is available at http://www.fhwa.dot.gov/environment/conformity/pmhotspotguid.pdf. Additionally, the American Association of State Highway and Transportation Officials project report entitled, "Analyzing, Documenting, and Communicating the Impacts of Mobile Source Air Toxic Emissions in the NEPA Process," March 2007, (found at http://www.trb.org/NotesDocs/25-25(18)_FR.pdf) provides information and guidelines on available analytical methods to assess mobile source air toxics in a NEPA context. We believe this document should be consulted and considered for use by the Coast Guard because of the project's effect on diesel particulate matter. The project should include an analysis for mobile source air toxics (MSAT) and diesel particulate matter. At the very minimum, an inventory burden analysis should be conducted for the various years.

Ultimately, we are interested in seeing that the proposal mitigates for diesel emissions to the maximum amount possible. We are concerned that no air quality mitigation is proposed or discussed in the EA. Various mitigation actions and strategies should be considered for this project, including those that reduce diesel emissions during construction and operation. Mitigation measures that should be considered include shifting transportation corridors to avoid residential areas, anti-idling measures and efficient management of truck traffic.

We recommend that the project proponents consider a construction emissions reduction plan which includes Best Available Diesel Retrofit Control Technology (BACT) and other measures to minimize emissions during construction. Measures could include but are not limited to: the retrofit of all diesel powered equipment with diesel oxidation catalysts or diesel particulate filters, and other strategies or technologies (for example, cleaner burning fuels or anti-idling policies). EPA is available to participate in discussions to determine how to address this emerging issue.

Stormwater – The City of Detroit utilizes combined sewers. The new bridge will increase impervious surface area by 6 lanes. This additional load to the existing stormwater collection and treatment should be analyzed. Enough information should be presented in the EA to determine whether adverse impacts to the Detroit River will occur from stormwater runoff from the new bridge structure.

Historic Resources – The existing Ambassador Bridge structure is listed on the National Register of Historic Places. We understand that the Michigan State Historical Preservation Officer (SHPO) has determined, in a letter to the project applicant dated March 26, 2007, that the proposed project would result in an adverse effect to the existing Ambassador Bridge. The EA does not include any draft memorandum of agreement regarding these impacts or propose any potential mitigation for possible effects. It would appear that Section 106 of the NHPA is applicable to this project and is being addressed under the NEPA process, as indicated in the draft public notice announcing the availability of the EA. If the NEPA process and Section 106 are being undertaken at the same time, consultation should begin with the Michigan SHPO and the Advisory Council on Historic Preservation, and documentation of this should be included in the EA.

The historic nature of the existing bridge is a critical factor. We recommend that information that shows that the Section 106 process is progressing and or completed to the satisfaction of the SHPO should be included in the EA. It is important for the Coast Guard's NEPA evaluation and decision documents to show that any adverse effects to historic properties, and feasible mitigation measures for those effects, are identified and taken into consideration when selecting the preferred alternative. These effects and mitigation measures could determine whether or not a Finding of No Significant Impact could be signed for this project.

Transboundary and Cumulative Impacts Analysis – We note that the Coast Guard's EA includes information about the Canadian environmental analysis of this project. However, the EA does not discuss cumulative effects or transboundary effects of the key environmental resources listed above. We encourage the Coast Guard to continue to coordinate with the CEAA in the determination and disclosure of transboundary effects.

David H. Coburn
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1330 Connecticut Avenue, NW
Washington, DC 20036-1795
Tel 202.429.3000
Fax 202.429.3902

DRAFT/PRIVILEGED AND CONFIDENTIAL

July 26, 2007

Commander
Ninth Coast Guard District
1240 East 9th Street
Cleveland, Ohio 44199-2060

Re: Application of Detroit International Bridge Company for Construction of Second Span to Ambassador Bridge

Dear Sir:

Pursuant to the Bridge Act of 1906, Application is hereby made by the Detroit International Bridge Company ("DIBC"), a Michigan corporation headquartered at 12225 Stephens Road, Warren, Michigan 48089, for approval by the Commandant, U .S. Coast Guard ("USCG"), of the location and plans for the construction of a cable-stayed second span to the Ambassador Bridge to be constructed across the Detroit River, just west of, and adjacent to, the current Ambassador Bridge, linking Detroit, Michigan with Windsor, Ontario. The new span would be constructed by DIBC in coordination with its commonly-owned Canadian counterpart, The Canadian Transit Company ("CTC"), an Ontario corporation. Both DIBC and CTC are owned by Centra, Inc., a Michigan corporation.

The Ambassador Bridge was completed in 1929, and currently serves as the busiest international crossing between the U.S. and Canada. The bridge was constructed pursuant to a 1921 federal statute authorizing the American Transit Company, a legal predecessor to DIBC, to build a bridge at that location. DIBC became the assignee of the rights under this federal authorization in 1927, and has controlled the U.S. portion of the Ambassador Bridge since that time. DIBC has determined that in light of the age of the existing span and the demands of modern traffic and security needs, that the public would benefit from a new span. That new span, which will consist of a total of no less than six lanes, would provide dedicated truck lanes for commercial traffic being transported under the FAST and NEXUS programs, which programs are designed to enhance the flow of cross-border traffic consistent with modern security demands. The new span will thus improve efficiency and security, while serving the commercial demands for vital cross-border U.S.-Canada traffic for decades to come.

DIBC believes that its proposal for a new crossing of the Detroit River offers the best location and highway connections for a new span across the Detroit River. The area where the second span would be located already accommodates the existing bridge and thus construction of a new span would result in minimal disruption to the local community. Substantial public and private resources have been devoted to improving and expanding the plaza areas at the foot of the Ambassador Bridge (the so-called Gateway Project) in anticipation of the construction of a second span. These improvements, already approved by federal and state authorities and now under construction, will enhance the efficiency of the clearance process and improve access between the bridge and I-75, which runs very close to the Ambassador Bridge and links the Bridge to the Interstate Highway System. The new span will share these same links.

In addition, construction of a second span by DIBC will be undertaken entirely with private funds. Thus, public resources can be devoted to other projects and the construction will not be dependent on federal or state appropriations. This will also enhance the speed with which the second span can be constructed. In that regard, DIBC anticipates that the bridge could be constructed and operating by 2009.

U.S. legal authority for the proposed second span is found in the 1921 Congressional authorization to construct the Ambassador Bridge, as well as in the authorization sought by this application under the Bridge Act of 1906. Further, by the attached letter, the U.S. State Department has confirmed that no Presidential Permit need to be sought for the construction of the second span. Since the second span would be an international bridge, the laws of the State of Michigan do not require DIBC to obtain a state permit for this work.

Apart from the approval sought by this application from the U.S. Coast Guard, DIBC is not aware of any other U.S. federal agencies that must grant approvals, easements or take other actions for this project to proceed. DIBC has consulted, and will continue to consult with, other federal agencies that would have an interest in the project, including the Federal Highway Administration, Department of Homeland Security (including the Bureau of Customs and Border Protection), U.S. Fish and Wildlife Bureau, General Services Administration and the U.S. Army Corps of Engineers. DIBC has previously submitted a water quality application to the Michigan Department of Environmental Quality under Section 401 of the Clean Water Act, and a copy of this has been previously supplied to USCG. In addition, DIBC and CTC are consulting with Canadian Government entities and are seeking appropriate approvals as is required from Canadian agencies.

With respect to environmental impacts, DIBC, through its consultants, has previously provided USCG with a March 31, 2006 document entitled, “Project Description and Type 2 Categorical Exclusion Environmental Documentation” (“March 31 Environmental Document”). This Document describes the environmental impacts of the second span, which are expected to be minimal. The Document also explains the basis on which USCG might determine that the construction of a second span meets the requirements for a categorical exclusion from further environmental review under the National Environmental Policy Act of 1969, as amended. Should USCG determine that any further environmental documentation is required for the project, DIBC will work with USCG to prepare that

documentation. DIBC is also working with the Canadian Environmental Assessment Agency and has begun consultations with that agency and others on environmental review in Canada.

There are no publicly owned lands from a park, recreational area, or wildlife or waterfowl refuge, or any land from an historic (including archaeological) site, that are either in the way of, or that would be significantly impacted by, the proposed second span in either the vicinity or the approaches of the structure in the United States. The March 31 Environmental Document further addresses these matters. DIBC intends to consult with the State Historic Preservation Office concerning its project, and has already supplied information to the SHPO. The project will not result in displacements or relocations (residences, businesses, people) in the United States and will not disproportionately affect minority or low-income populations under Environmental Justice requirements.

We look forward to your response to this Application letter and the other materials previously submitted by DIBC in connection with it. We also understand that notice of the Application will be published in the Federal Register. Of course, should you have any questions or require more information, please advise.

Respectfully,

David H. Coburn
Attorney for Detroit International
Bridge Company

cc: Mr. Nick Mpras, USCG
Mr,. Dan Stamper, DIBC
Mr. Scott Korpi, American Consulting Group

POTAWATOMI
KEEPER OF THE FIRE

HANNAHVILLE
INDIAN COMMUNITY
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Administration: (906) 466-2932 Fax: (906) 466-2933
Accounting Office: (906) 466-9933 Fax: (906) 466-2001

BROTHERHOOD PEACE UNITY NESHNABE

August 9, 2007

American Consulting
Anna Peterfreund
70 Niagara Square, Suite 410
Buffalo, NY 14202

RE: Ambassador Bridge

Dear Ms. Peterfreund:

On behalf of the Hannahville Indian Community I would like to thank American for your inquiry as to whether your above cited project may come into conflict with the National Environmental Policy Act (NEPA), Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001 et seq., and the applicable regulations at 47 CFR § 1.1307. The burial grounds and artifacts of our ancestors are very dear to our community and we take all construction projects that may affect our ancestors and tribal history very seriously.

After a review of the specifications of your project, it is the belief of my staff and myself that your project does not affect any Indian religious site or burial ground of the Hannahville Indian Community and would not offend any federal law in place. We do ask that your firm give the tribe notice if any burial ground or artifacts are uncovered during the construction process.

If you have any other questions please do not hesitate to call me at (906) 466-2934. Once again I would like to thank you for taking to time to contact my office on this matter.

Sincerely,

Kenneth Meshigaud TC

Kenneth Meshigaud
Tribal Chairperson

KENNETH MESHIGAUD
Tribal Chairperson

ELAINE MESHIGAUD
Vice Chairperson

ANN SABOO
Secretary

LISA MESHIGAUD
Treasurer

Council Members: Robin Halfaday, John Meshigaud, Henry Philemon, Jr., Lois Tovar, Loretta Wandahsega, Earl Meshigaud, Anna Larson, Henry Williams

Prairie Band Potawatomi Nation
Government Center

AUG 20 2007

August 13, 2007

Attn: Anna Peterfreund
Consulting Professionals of New York, PLLC
70 Niagara Square, Suite 410
Buffalo, NY 14202

Dear Ms. Peterfreund:

I am writing to inform you that I am in receipt of your recent National Historic Preservation Act (NHPA), Section 106 and Section 110 correspondence.

After reviewing the contents of your recent mailing we would like to inform that we have no objections to the following project(s):

Project(s): Ambassador Bridge Enhancement

At this time we are unaware of any historical cultural resources in the proposed development area. However, we do request to be immediately contacted if any inadvertent discoveries are uncovered at anytime throughout the various phases of the project.

Please feel free to call me at (785) 966-4007 or additional information can be faxed to (785) 966-4009. We look forward to working with you.

Respectfully,

FOR Rey Kitchkumme
Acting Tribal Chair
NAGPRA Representative
Prairie Band Potawatomi Nation

RK/ssh

16281 Q Road • Mayetta, KS 66509 • 785.966.4000 • Fax: 785.966.4002 • Toll Free: 877.715.6789

Prairie Band Potawatomi Nation
Office of the Tribal Chair
NAGPRA Representative
16281 Q Road
Mayetta, KS 66509

AUG 20 2007

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Attn: Anna Peterfreund
Consulting Professionals of New York, PLLC
70 Niagara Square, Suite 410
Buffalo, NY 14202

14202+3329-70 C030

U.S. Department of Homeland Security
United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2019
Cleveland, OH 44199-2060

Phone: (216) 902-6085
FAX: (216) 902-6088

16590
B-083/sms
August 28, 2007

Mr. Kenneth A. Westlake, Chief
NEPA Implementation Section
U.S. Environmental Protection Agency – Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Westlake:

I am writing to extend an invitation to you or your representative to attend a meeting at the Southeast Michigan Council of Governments offices on September 20, 2007 between 9:00 a.m. and 12:00 p.m. at 535 Griswold, Suite 300, in Detroit, Michigan, to discuss the Ambassador Bridge Enhancement Project.

The meeting will be attended by Coast Guard personnel, as federal permitting agency and lead federal agency for NEPA in this project, and representatives from Detroit International Bridge Company, the applicant in the project.

Please contact Scot Striffler of this staff to advise whether you or your representative can attend this meeting. He may be reached by calling (216) 902-6087. Thank you in advance for your attention to this matter.

Sincerely,

Robert W. Bloom Jr.

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

Copy: Southeast Michigan Council of Governments, Detroit, Michigan

GOWLINGS

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david.estrin@gowlings.com

via overnight courier

August 30, 2007

United States Coast Guard
Commander (dpb)
Ninth Coast Guard District
1240 East 9th Street - Room 2025
Cleveland, Ohio
44199-2060

Attn: Robert W. Bloom, Jr., Bridge Program Manager

Dear Sir:

Re: Submission on Behalf of the City of Windsor, Canada
Ambassador Bridge Enhancement Project Draft Environmental Assessment - Public Notice 090-04-07

Introduction and Summary

We are attorneys for the City of Windsor, Canada ("the City" or "Windsor"). As you are aware from our 2006 submission and meeting with you concerning this project (at that time Public Notice 09-03-06) the City has a substantial and direct interest in the above matter (the "new bridge" or "project").

Our current submission has two major themes:

Part 1 – NEPA Deficiencies in the draft EA

The draft Environmental Assessment (EA), which is the subject of the current notice, is substantively deficient. The draft EA excludes from analysis many key matters which will cause significant environmental impacts and, in other instances, summarily concludes there are no impacts, without providing a transparent or objective rationale for that conclusion. The draft EA therefore does not comply with the requirements of the *National Environmental Policy Act* (NEPA).

NEPA Deficiencies in the draft EA are discussed under the following headings:

a) **Failure to comply with U.S. Council on Environmental Quality Guidance on NEPA Analyses for Transboundary Impacts (CEQ Transboundary Guidance)**

b) **Lack of Canadian/tranboundary Air Contaminant Analysis Violates NEPA s. 102(2)F requirement to recognize and provide appropriate support for measures to avoid risks that would likely cause significant transboundary air pollution, and Article V of the U.S.-Canada Air Quality Agreement**

c) **Failure to Comply with Executive Order 12114 "Environmental Effects Abroad of Major Federal Actions"**

d) **Failure to Consider Related Actions Required for this Project and to Assess Indirect Environmental "Effects" and Cumulative Impacts, as well as Failure to Conform to NEPA Requirements to support a Finding of No Significant Impact**

e) **Failure to Consider and Assess Appropriate Alternatives**

Part 2 – An EIS, not an EA, is Required to Properly Assess the Significant Impacts of this Major Action (Part 2 begins at page 44.)

Even if deficiencies in the draft EA were rectified, given the magnitude of this project, the clearly significant environmental impacts it will cause in the United States, in Canada, as transboundary impacts, and its controversial nature, NEPA requires that the Coast Guard must ensure an Environmental Impact Statement (EIS) is prepared and considered prior to the Coast Guard determining the bridge permit application.

Previous City Submissions to Coast Guard to be Read with this Submission and Incorporated by Reference

On September 14, 2006 Gowlings, on behalf of Windsor, filed with the Coast Guard a 35-page letter accompanied by two separate volumes of materials, all of which provided substantial details as to how the proposed Ambassador Bridge Enhancement Project ('the Enhancement Project" or "new bridge" would cause significantly negative environmental, social, economic and cultural impacts on the City of Windsor.

Subsequent to receiving that submission, you invited the City to meet with you in Cleveland. On November 21, 2006, acting on that invitation, Gowlings and senior City staff, as well as our traffic consultant, Sam Schwartz, met with senior Coast Guard personnel. The president of the proponent Detroit International Bridge Company/Canadian Transit Company and its attorney were also present. During that meeting we presented a power point submission, and after the meeting we provided you with an electronic copy of the power point materials.

Earlier in July, 2007, prior to preparing this submission, we spoke by telephone with Mr. Bloom, to inquire as to whether our 2006 filings, described above, would be understood as part of the record before the Coast Guard regarding the new bridge, and Mr. Bloom confirmed that those materials are part of the Coast Guard record in response to Public Notice 090-04-07 and need not be re-filed, for which we thank you.

The 2006 Gowlings submission to the Coast Guard was made in response to an earlier preliminary determination by the Coast Guard that would have allowed you to process the Ambassador Bridge permit application pending before you without any substantive application of NEPA. Your preliminary determination was that this project was entitled to a Categorical Exemption from NEPA which determination, if not modified, would have allowed you to process the permit application without an EA, let alone an EIS.

While subsequent to the 2006 submissions you received from the City and others the Coast Guard concluded it was not appropriate to process the bridge application using a Categorical Exemption from NEPA and that at least an EA was required, we are writing, as indicated at the outset of this letter, to advise you that the City disagrees. Not only is the draft EA submitted by the proponent substantively deficient, but a full EIS is required.

In respect of the current issues, i.e. the inadequacy of the draft EA and the requirement for an EIS, the City relies on its 2006 submissions to the Coast Guard as well as this letter, and various attachments specified in this letter.

Although this letter and its attachments are new, they must be read with, and we ask that you review, the City's previous 2006 filings with the Coast Guard. Although our current 2007 submission provides further facts on impacts to be caused by this project in Windsor, the 2006 filings provide clear evidence of the City's direct interest in this matter and why the natural environment of the City of Windsor will be significantly impacted by the new bridge project and that additionally the project will cause serious community and economic impacts.

For convenience, a list of 2006 City of Windsor filings with the Coast Guard is provided as an **Attachment Volume 1, Tab 11** to this submission.

Part 1 <u>The Draft EA is Fundamentally Deficient as to NEPA Compliance</u>

a) Failure to comply with U.S. Council on Environmental Quality Guidance on NEPA Analyses for Transboundary Impacts (CEQ Transboundary Guidance)

The draft EA is fundamentally deficient with respect to CEQ Transboundary Guidance requirements.[1]

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[1] http://www.nepa.gov/nepa/regs/transguide.html

First, the draft EA fails to acknowledge there is an existing significant environmental and public health issue in this geographic area, which includes both Detroit and Windsor, based on the presence and transboundary movement of particulate matter.

Second, the draft EA ignores the fact that the project will significantly contribute to and exacerbate the transboundary particulate contamination problem.

In the result, the draft EA fundamentally fails to comply with the CEQ Transbounary Guidance as to NEPA requirements and provides no environmental assessment of this issue.

The CEQ 1997 Guidance on NEPA Analyses for Transboundary Impacts states that:

> "NEPA requires agencies to include analysis of reasonably foreseeable transboundary effects or proposed actions in their analysis of proposed actions in the United States. Such effects are best identified during the scoping stage, and should be analyzed to the best of the agency's ability using reasonably available information. Such analysis should be included in the EA or EIS prepared for the proposed action."

The CEQ Guidance emphasizes that neither NEPA nor the CEQ regulations define an agency's obligation to analyze effects of actions by administrative boundaries.

> "Rather, the entire body of NEPA law directs federal agencies to analyze the effects of proposed actions to the extent they are reasonably foreseeable consequences of the proposed action, regardless of where those impacts might occur."[2]

Further, the CEQ Guidance states:

> "Agencies must analyze indirect effects, which are caused by the action, are later in time or farther removed in distance, but still reasonably foreseeable, including growth-inducing effects and related effects on the ecosystem, as well as cumulative effects."

The CEQ Guidance continues:

> "Case law interpreting NEPA has reinforced the need to analyze impacts regardless of geographic boundaries within the United States, and has also assumed that NEPA requires analysis of major federal actions to take place entirely outside of the United States but could have environmental effects within the United States."

The Guidance document states:

> "In sum, based on legal and policy considerations, CEQ has determined that agencies must include analysis of reasonably foreseeable transboundary effects of proposed actions in their analysis of proposed actions in the United States."

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[2] Emphasis added.

The CEQ Guidance goes on, in discussing "practical considerations" to advise as follows:

> "Agencies should be particularly alert to actions that may affect ... air quality ... and other components of the natural ecosystem that cross borders as well as to interrelated social and economic effects... . Agencies do have a responsibility to undertake a reasonable search for relevant, current information associated with an identified potential effect."

Unfortunately, the draft EA fails in every way to meet these NEPA requirements.

There is a fundamental linkage between the Coast Guard's proposed approval of this project and increased transboundary air impacts that would be caused both in Canada and the United States. That linkage is based on the large number of diesel powered as well as other vehicles that will be channelled into the new bridge corridor in Detroit and Windsor while travelling to and from the international border.

Estimates provided by the proponent in its draft EA indicate that while a daily average of 26,000 vehicles crossed the Ambassador Bridge in 2004, that number will rise to 44,000 per day in 2030. And while commercial vehicles (most of which are powered by diesel engines) comprised only about 36% of the daily traffic in 2004, by 2030 commercial vehicles are expected to comprise 44% of daily bridge traffic.[3]

The transboundary air impact linkage to this project arises from NOx and particulate matter (PM) that is discharged into the environment as a result of vehicles which will travel on the new bridge and its approach roads. The specific form of particulate matter of concern is PM 2.5. PM 2.5 is a recognized health hazard to humans, and NOx is a precursor to particulate deposition.

The 1991 U.S. – Canada Air Quality Agreement[4] and the Canada- United States Transboundary PM Science Assessment Report[5]

In 1991 the Government of the United States of America and the Government of Canada entered into an agreement on air quality which focuses attention on contaminants which are involved in transboundary air pollution so as to ensure that emissions of air pollutants from sources within their countries not result in significant transboundary air pollution.

Under this agreement "air pollution" is defined as "the introduction by man, directly or indirectly, of substances into the air resulting in deleterious effects of such a nature as to endanger human health, harm living resources and eco systems and material property and impair or interfere with amenities and other legitimate uses of the environment, and 'air pollutants' shall be construed accordingly".

"Transboundary air pollution" is defined as "air pollution whose physical origin is situated

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[3] Draft EA, Appendix K, Table 1.
[4] http://www.epa.gov/airmarkets/progsregs/usca/agreement.html#aqa
[5] http://www.msc-smc.ec.gc.ca/saib/smog/transboundary/transboundary_e.pdf

wholly or in part with the area under the jurisdiction of one party and which has adverse effects, other than effects of a global nature, in the area under the jurisdiction of the other party."

The Canada-U.S. Air Quality Agreement was established to provide "a practical and effective instrument to address shared concerns regarding transboundary air pollution". Initially, the Agreement was intended to address the primary pollutants responsible for acid rain. However, the Agreement also confirmed the commitment of the United States and Canada to consult on, and develop, the means to address other transboundary air pollution issues, including particulate matter.

Under the Agreement, a Subcommittee on Scientific Cooperation of the Air Quality Committee, was charged to summarize and understand the current knowledge of the transboundary transport of PM and PM precursors between Canada and the United States in a scientific assessment.

The resulting report of this committee, entitled Canada – United States Transboundary PM Science Assessment Report, was published in 2004. **Attachment Volume 1, Tab 10** to this submission provides an electronic copy of this report. The report contains the following key findings:

> "The results of the Canada-United States Transboundary PM Assessment indicate that there is a significant relationship between the emissions of PM and PM precursors and elevated PM levels in both Canada and the United States. The transboundary transport of PM and PM precursors can be significant enough in some regions to potentially compromise the attainment of national standards. The information presented in this assessment provides the scientific foundation to support the future development of joint strategies under a PM Annex pursuant to the Agreement."

Chapter 2 of this report sets out the "Foundation for the Transboundary PM Issues in North America" as follows:

> "Seven key features of the PM issue have provided the impetus for this Transboundary PM Science Assessment. These key features are listed below and explored in greater detail in this chapter:
>
> • PM is recognized as an important health concern.
> • High ambient levels of PM and its precursors are observed in North America.
> • Precursors of PM generally contribute to the acidification of ecosystems.
> • PM and its precursors are a significant cause of visibility impairment.
> • PM and its precursors can be transported long distances.
> • PM and its precursors are transported between the United States and Canada.
> • Reductions in SO2 are likely to result in reductions in PM2.5, acid deposition, and visibility impairment."[6]

[6] Emphasis added.

Section 2.1 of the report is headed "PM is Recognized as an Important Health Concern" and it begins as follows:

> "PM has been recognized as an important health concern in both the United States and Canada. Recent health studies in both countries indicate an association between adverse health outcomes, especially of the cardio-respiratory system, and short-term and long-term exposure to ambient PM, particularly PM 2.5. In recognition of these health outcomes, both countries have committed to addressing the PM air quality problem within their own territories (e.g., Canada-wide standard for PM 2.5 U.S. *Clean Air Act*). Furthermore, Canada and the United States have developed objectives and standards for ambient PM."

Other key findings of the Canada – United States Transboundary PM Science Assessment Report are as follows[7]:

"THE TRANSBOUNDARY TRANSPORT OF PM CAN CONTRIBUTE TO ABOVE AVERAGE PM LEVELS IN BOTH CANADA AND THE U.S.

- Current ambient levels of $PM_{2.5}$ in the border regions exceed the standards set for $PM_{2.5}$ in several regions of both Canada and the United States. In the United States, these sites are primarily in urban areas. <u>The eastern portion of the border domain (i.e., northeastern United States, Industrial Midwest, and the Windsor-Quebec City corridor) exhibits levels that exceed the 15 $\mu g/m^3$ annual standard in the United States and the 30 $\mu g/m^3$ 98th percentile three-year average Canadian standard for the time periods evaluated.</u>
- <u>$PM_{2.5}$ is transported across the border region between Canada and the United States, leading to elevated concentrations of $PM_{2.5}$ in both countries</u>. Most of the analyses point to sulphur dioxide as a primarily regional contributor and nitrogen oxides as both a local and regional contributor to $PM_{2.5}$, while organic/black carbon and other PM constituents tend to be more local in nature.
- Canadian provinces have been found to contribute to $PM_{2.5}$ measured at several Class 1 areas in the United States, while the transport of $PM_{2.5}$ and PM precursors across the border region leads to 'above average' $PM_{2.5}$ concentrations in eastern Canada.

PM LEVELS VARY SIGNIFICANTLY OVER GEOGRAPHIC REGIONS

- <u>Elevated concentrations of $PM_{2.5}$ are found more often in the following regions: northeastern United States, Industrial Midwest, southwestern Ontario</u> and the northwestern United States. Most areas of both Canada and the United States are subject to elevated concentrations during episodic conditions.
- Urban concentrations of $PM_{2.5}$ are higher than rural concentrations in all regions of both Canada and the United States; however, rural sites can exhibit very high $PM_{2.5}$ levels during large-scale PM episodes.

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[7] http://www.msc-smc.ec.gc.ca/saib/smog/transboundary/pg1_e.html#1, emphasis added.

- The highest particle sulphate and nitrate concentrations are found in areas with high sulphur dioxide and nitrogen oxide emissions. Such areas include the northeastern United States and southwestern Ontario.

THERE ARE LINKAGES BETWEEN PM AND OTHER AIR QUALITY ISSUES

- Ambient levels of PM precursors also contribute to the wet deposition of nitrate and sulphate, and resulting ecosystem acidification. The highest levels of deposition are located in the northeastern United States and eastern Canada, particularly in the border regions.
- Co-benefits of emission reduction scenarios include reduced ground-level ozone levels, reductions in nitrate and sulphate deposition, and improved visibility."

The U.S. EPA, Health Canada and Environment Canada recognize the transboundary nature of particulate matter and NOx emissions in the Detroit-Windsor area and their relationship to health impacts. See **Attachment Volume 1, Tab 9**, materials from the U.S. EPA, Health Canada and Environment Canada websites as to studies they have undertaken on this issue.

In October 2006 the U.S. Environmental Protection Agency released revised national ambient air quality standards for particulate matter.[8] In its "Final Rule" providing background and justification for making more stringent regulatory requirements with regard to PM 2.5, the U.S. EPA stated the following:

> "Many more U.S. and Canadian studies are now available that provide evidence of associations between short-term exposure to PM 2.5 and serious health effects in areas with air quality at and above the level of the current annual PM 2.5 standard (15 ug/m^3). Moreover, a few newly available short-term exposure mortality studies provide evidence of statistically significant associations with PM 2.5 in areas with air quality levels below the levels of the current PM 2.5 standards."[9]

The EPA also refers to the following:

> "Three studies, conducted in Phoenix, Santa Clara County, California and eight Canadian cities report statistically significant associations between short-term PM 2.5 exposure and total or cardiovascular mortality in areas in which long-term average PM 2.5 concentrations ranged between 13 and 14 ug/m^3 and 98th percentile 24-hour concentrations ranged between 32 and 59 ug/m^3.
>
> In also considering the new epidemiological evidence available from U.S. and Canadian studies of long-term exposure to fine particles, the Criteria Document noted that new studies have built upon studies available in the last review and concluded that these studies have confirmed and strengthened the evidence of associations for both mortality and respiratory morbidity … . For morbidity, the criteria document found that new

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[8] Federal Register, Vol.71, No.200, Oct.16, 2006, p.61144.
[9] *Ibid*, p.61153.

> studies of a cohort of children in southern California have built upon earlier limited evidence to provide fairly strong evidence that long-term exposure to fine particles is associated with development of chronic respiratory disease and reduced lung function growth. In addition to strengthening the evidence of association, the new extended ACS Mortality Study observed statistically significant associations with cardio-respiratory mortality (including lung cancer mortality) across a range of long-term mean PM 2.5 concentrations that was lower than was reported in the original ACS Study available in the last review."[10]

Recently the U.S. – Canada Air Quality Agreement Progress Report, 2006 was published.[11] **Attachment Volume 1, Tab 10** to this submission provides an electronic copy of this report. This Progress Report references further health evidence concerns related to PM 2.5:

> "Recent epidemiological studies have continued to report associations between short-term exposures to fine particles and effects such as premature mortality, hospital admissions, or emergency department visits for respiratory disease and effects on lung function and symptoms. In addition, recent epidemiological studies have provided some new evidence linking short-term fine particle exposures to effects on the cardiovascular system, including cardiovascular hospital admissions and more subtle indicators of cardiovascular health. Long-term exposure to PM 2.5 in sulphates has also been associated with mortality from cardiopulmonary diseases and lung cancer and effects on the respiratory system, such as decreased lung function or the development of chronic respiratory disease.
>
> ...
>
> There are several groups that may be susceptible or vulnerable to PM – related effects. These include individuals with pre-existing heart and lung disease, older adults and children."[12]

On April 12, 2007 the United States and Canada acted to more specifically deal with particulate matter as a transboundary air pollution issue between the two countries pursuant. The Canadian Minister of the Environment and the U.S. EPA Administrator published a joint statement announcing both countries will start negotiations on a "Particulate Matter Annex" to the 1991 U.S. – Canada Air Quality Agreement.[13]

Their joint statement agreed:

> "Particulate matter can cause significant health effects in adults and children, and is linked to other environmental problems such as haze in national parks and acidic deposition."

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[10] *Ibid*, at pages 61153-54.
[11] http://www.msc-smc.ec.gc.ca/saib/smog/transboundary/pg1_e.html#1
[12] U.S. – Canada Air Quality Agreement, 2006 Progress Report, Ibid, p. 50.
[13] http://www.epa.gov/airmarkets/progsregs/usca/jointstatement.html

...

> "Minister Baird and Administrator Johnson underscored their strong commitment to reducing cross-border air pollution. Both countries have already achieved emission reductions in sulphur dioxide and oxides of nitrogen sooner than expected. However, levels of fine particles still exceed Canadian and U.S. standards in some urban areas near the eastern border and contribute to elevated levels in haze and other areas along the western and central border regions."

Their statement also provided the following information:

> "They agreed with the bi-national Air Quality Committee's assessment that the joint technical and scientific analyses published in 2004 provide scientific foundation for a Particulate Matter Annex that would help in developing the necessary programs and strategies to address the serious environmental and health problems associated with the transboundary transport of particulate matter.

These official American and Canadian agreements, documents and studies demonstrate:

- the clearly acknowledged and serious health implications of PM 2.5 and NOx emissions
- that current levels of PM 2.5 are a serious environmental issue in the Detroit-Windsor area and that PM 2.5 is an acknowledged transboundary contaminant which moves between these jurisdictions
- that vehicles and vehicle emissions are a significant contributor to PM 2.5 concentrations.

These documents and findings clearly establish that the requirements of NEPA, as most particularly elaborated by the CEQ Guidance on Transboundary Impacts, are not met by the draft EA in respect of air contaminants.

NEPA requirements pertaining to this issue will not be met unless a careful and appropriate analysis of emissions from vehicles using the new bridge and from its approach roads, both in the Detroit and Windsor areas, is carried out.

This missing analysis is particularly crucial in the context of this project, which will provide the potential for between a 100 percent to 200 percent increase in vehicle crossing capacity in the cities of Detroit and Windsor with obviously consequent additional air emissions associated therewith.

Moreover, because there are already problematic traffic conditions in Windsor on the approaches to and from the Ambassador Bridge, and because the Ambassador Bridge proposal does not contemplate any rectification of those serious queuing issues, and the project will undoubtedly cause more serious queuing as demonstrated later in this submission, the potential for exacerbated emissions of PM 2.5 and NOx is all the more serious.

<u>EPA Concerns About PM 2.5</u>

In Detroit, the PM 2.5 problem is already serious. In its August 30, 2006 letter to Robert Bloom of the United States Coast Guard[14], the U.S. EPA provided the following clear concerns:

> "The project area already has serious air pollution problems. EPA has recently designated Southeast Michigan as a non-attainment area for the fine particulate standard, referred to here as particulate matter 2.5 microns or less (PM 2.5). We are concerned that local controls may be necessary in order for this area to attain the National Ambient Air Quality Standards (NAAWS) for PM 2.5. This issue should be thoroughly evaluated. Cost effective mitigation strategy should be implemented wherever possible to minimize impacts. We are specifically concerned with the lack of information presented regarding particulate matter. Idling and moving diesel trucks in the area at plaza operations, on the bridge and surrounding freeway systems are a concern from a human health perspective. Hot spot analyses for fine particulate (PM 2.5) and carbon monoxide (CO) should be done and included in the Coast Guard's NEPA documentation."[15]

The fact that in Detroit there is already an exceedance of the air quality criteria for PM 2.5 is of substantial concern to Canada, given the mobility of and transboundary impacts caused by PM 2.5.

Similarly, there should be a concern in the United States about emissions from the Canadian component of the project insofar as a report prepared for the City of Windsor, which is being transmitted with this submission, indicates that the new bridge project will result in significant ambient concentrations of PM 2.5 affecting residential and commercial areas adjacent to the new bridge and its Windsor access corridor. Particulate emissions in Canada can affect Detroit as emissions from Detroit can affect Windsor.

As recently as July, 2007 the U.S. EPA reiterated its concern about this issue and the lack of its analysis in the draft EA. In a letter dated July 17, 2007 to Robert Bloom, U.S. Coast Guard, the EPA said:

> "This project will be located in an ozone nonattainment area, a carbon monoxide (CO) maintenance area, fine particulate (PM 2.5) nonattainment area, and coarse particulate (PM10) maintenance area. We expect that the additional bridge capacity would contribute to an increase in vehicle miles traveled (VMT) and would therefore have an effect on air quality. Heavy-duty diesel vehicles represent around half of all projected traffic of the ABEP. Emissions from idling diesel trucks in the area at plaza operations and from traffic on the bridge and surrounding highway systems are a human health concern. Even with more stringent heavy-duty highway engine standards taking effect over the next decade, during the next twenty years millions of diesel engines already in use will continue to emit large amounts of nitrogen oxides and particulate matter, both of which contribute to serious public health problems.

Further, the EPA pointed out:

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[14] Obtained in 2006 from the Coast Guard file
[15] Emphasis added.

> "Long term (i.e. chronic) inhalation exposure to diesel exhaust is likely to pose a lung cancer hazard to humans, as well as damage the lung in other ways, depending on exposure. Diesel exhaust is listed as a human carcinogen in California and a likely human carcinogen by U.S. EPA. Short-term (i.e. acute) exposures can cause irritation and inflammatory symptoms of a transient nature, those being highly variable across the population. The assessment also indicates that evidence for exacerbation of existing allergies and asthma symptoms is emerging. U.S. EPA recognizes that diesel exhaust, has a mixture of many constituents, also contributes to ambient concentrations of several criteria air pollutants, including nitrogen oxides and fine particulates, as well as other air toxics."

To address these issues, the EPA recommended:

> "...that analyses should be conducted to assess air quality impacts from this project. First, FHWA has indicated to you that ABEP would be a regionally significant transportation project that should be included in the Detroit Metropolitan Long Range Transportation Plan and undergo an air quality conformity analysis. The Mobile 6.2 model should be used to assess regional air quality for criteria pollutants. Second, a qualitative hot spot analysis for PM 2.5 and PM 10 should be done and included in the Coast Guard's NEPA documentation. Guidance is available at http://www.fhwa.dog.gov/environment/conformity/pmhotspotguid.pdf. Additionally, the American Association of State Highway and Transportation Officials project report entitled, "Analyzing, Documenting and Communicating the Impacts of Mobile Source Air Toxic Emissions in the NEPA Process", March 2007, (found at http://www.trb.org/NotesDocs/25-25(18_FR.pdf) provides information and guidelines on available analytical methods to assess mobile source air toxics in a NEPA context. We believe this document should be consulted and considered for use by the Coast Guard because of the project's effect on diesel particulate matter. The project should include an analysis for mobile source air toxics (MSAT) and diesel particulate matter. At the very minimum, an inventory burden analysis should be conducted for the various years.
>
> Ultimately, we are interested in seeing that the proposal mitigates for diesel emissions to the maximum amount possible. We are concerned that no air quality mitigation is proposed or discussed in the EA. Various mitigation actions and strategies should be considered for this project, including those that reduce diesel emissions during construction and operation. Mitigation measures that should be considered include shifting transportation corridors to avoid residential areas, anti-idling measures and efficient management of truck traffic."[16]

The EPA also observed that "...the EA does not discuss cumulative effects or transboundary effects of the key environmental resources listed above" and the EPA recommended that

> "Analysis should be conducted to assess air quality impacts from this project."

AMEC Earth & Environmental, Ambassador Bridge Enhancement Project, Preliminary Air

[16] Emphasis added.

Quality Impact Study (July, 2007)

Given the draft EA's omission of any Windsor air impact analysis, the City of Windsor, through Gowlings, retained AMEC Earth and Environmental consultants to carry out a preliminary examination of the issue.

Please refer to the **AMEC Earth and Environmental consulting firm report "Ambassador Bridge Enhancement Project – Preliminary Air Quality Impact Study"** (cover letter dated July 16, 2007) which is provided as Attachment in **Volume 1, Tab 3** to this submission.

This study by air quality engineering experts quantified the impact of specific contaminant emissions from current traffic volumes crossing the Ambassador Bridge and traveling along the Huron Church corridor. It also examined the impact of future traffic volume increases on pollutant impact rates, and on the impact at ground levels, using existing background concentrations for PM 2.5 and NOx.

The AMEC Study predicts that areas adjacent to the Ambassador Bridge Canadian Plaza and to Huron Church Road will experience air quality impacts from travelling and idling traffic associated with the bridge, including exceedances of the Ontario Ambient Air Quality Criteria/Canada-Wide Standard for fine Particulate Matter PM 2.5, which are health-based criteria.

Some of the specific findings in this report are the following:

> "1. In the time period considered, 2006 – 2035, areas in Windsor adjacent to both Huron Church Road and the Ambassador Bridge Canadian Plaza will experience air contaminant impacts from nitrogen oxide (NOx) and fine particulates (PM 2.5) from travelling and idling traffic, including potential exceedances of the PM 2.5 Ontario Ambient Air Quality Criteria/Canada Wide Standard of 30 ug/m^3 averaged over 24 hours. These air contaminant impacts are largely caused by diesel trucks.
>
> 2. Under queuing conditions, the PM 2.5 impacts can extend onto residential properties located proximate to Huron Church Road and to the Ambassador Bridge Canadian Primary Inspection Plaza, with particulate concentrations exceeding the PM 2.5 standard on properties that abut the road.
>
> 3. Air contaminant impacts would likely be greater than indicated by the modelling....
>
> 4. By 2025 areas adjacent to the Canadian Plaza will experience impacts from the PM 2.5 releases from idling vehicles (mainly trucks) with particulate concentrations exceeding the PM 2.5 standard by approximately 40 percent when considered in conjunction with background levels.
>
> ...
>
> 6. With respect to the Huron Church Road vicinity, the formation of a truck queue in the northbound direction (towards the bridge) during the weekday peak travel period results in a significant increase in the ground level concentration of PM 2.5 and NOx adjacent to

Huron Church Road, compared with the free-flowing traffic conditions.

For particulate matter, the queue results in concentrations in excess of the 30 ug/m3 limit, with the impacts increasing between 2006 and 2035. These exceedances of the PM 2.5 standard are predicted for up to 20 metres on either side of Huron Church Road (houses on the west side and school grounds on the east side in the area modelled.)"

We note that the draft EA does contain as Appendix K an "Air Quality Study" which is limited to the U.S. side of the project. This relatively brief document does indicate that there will be emissions of PM 2.5 and NOx among other contaminants associated with new bridge traffic. However, this report fails to provide any measurements of either current background levels for these contaminants and also fails to provide any calculations of future ambient concentration of these contaminants at nearby receptors. The only numerical output provided is estimated annual emissions in pounds per year on an annual basis. This is an obvious and clear deficiency in that both the U.S. EPA and Canadian governments regulate these contaminants not on mass but rather on the ambient concentration over a time-weighted basis.

In summary, with respect to the CEQ Transboundary NEPA Guidance, the proponent has provided absolutely no relevant information to satisfy the requirement on the U.S. Coast Guard to ensure that there is an analysis of transboundary air contaminant impacts from bridge traffic.

Because significant amounts of PM 2.5 and other particulates, as well as NOx will be emitted from this project, the Coast Guard must ensure that there is an analysis of reasonably foreseeable transboundary effects of such emissions. The CEQ directive is that "NEPA requires agencies to include analysis of reasonably foreseeable transboundary effects of proposed actions" in their analysis of proposed actions in the United States.

We are enclosing as an unbound separate **Attachment: wind rose plot showing the frequency distribution of wind direction measured at the Detroit Metropolitan Airport for a three-year period.** This airport is located west of the City of Windsor. The wind rose indicates that approximately 40 percent of the time during the year winds are blowing from the west, northwest or north, i.e., from areas in Detroit towards the City of Windsor. The remainder of the year, winds are blowing from Windsor to Detroit. This corroborates the concern about transboundary movement of particulate matter.

Given the clear recognition that PM 2.5 and NOx are transboundary contaminants and having regard to the EPA and AMEC findings and the CEQ Guidance on the required NEPA analysis for transboundary impacts, it is concluded that there has been a complete failure by the proponent to comply with these guidelines and therefore the EA is fundamentally deficient in that regard.

b) Lack of any Canadian/tranboundary air contaminant analysis from this project violates NEPA s. 102(2)F requirement to recognize and provide appropriate support for measures to avoid risks that would likely cause significant transboundary air pollution, and Article V of the U.S.-Canada Air Quality Agreement

As NEPA must be addressed for this project, the Coast Guard is obligated to carry out an assessment of significant environment impacts of its action that may affect the environment of

another country. Equally, pursuant to the U.S.-Canada 1991 Air Quality Agreement, there is an obligation on the U.S., which in this case would be on the Coast Guard, to "take measures to avoid or mitigate the **potential risk** posed by actions, activities or projects that would be likely to cause or may be causing significant transboundary air pollution."

The NEPA requirement exists regardless of whether there are environmental assessment requirements in other countries that will be affected, such as Canada. That is so because the objective of NEPA is to ensure that American decision makers, such as the Coast Guard, are aware of the potential environmental impacts that their decision may cause both in the United States and to the environment of other countries as part of, so as to prevent a decline in the quality of humanity's world environment.

Specifically, Congress mandated the following in enacting NEPA:

> Section 102
> "The Congress authorizes and directs that, to the fullest extent possible:
> (1) The policies, regulations and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this Act; and
> (2) **All agencies of the federal government shall**:
> ...
> (F) **recognize the worldwide and long-range character of environmental problems** and, where consistent with the foreign policy of the United States, **lend appropriate support to** initiatives, resolutions and **programs assigned to maximize international cooperation in anticipating and preventing a decline in the quality of mankind's world environment**". [emphasis added]

The requirement of NEPA has not been carried out by the draft EA.

Moreover, the 1991 Air Quality Agreement between Canada and the United States, in Article V, Section 5, provides:

> "Each Party, shall, as appropriate, take measures to avoid or mitigate the potential risk posed by actions, activities or projects that would be likely to cause or may be causing significant transboundary air pollution."

Cleary, based on the documents, studies and agreements previously referenced pertaining to PM 2.5, both countries are agreed that PM 2.5 is a significant transboundary issue with serious health consequences. Article V, section 5 of the 1991 Agreement requires the U.S. to at least assess and, if necessary, avoid or mitigate, "potential risks" posed by the Coast Guard approval in permitting this new bridge with its associated emissions of significant transboundary air pollution.

Again, the failure to comply with this obligation constitutes another demonstration of fundamental deficiency in the draft EA.

c) Failure to Comply with Executive Order 12114 "Environmental Effects Abroad of Major Federal Actions"

Even if the EA being prepared by the proponent were sufficient to meet domestic NEPA requirements (which as submitted it does not) Executive Order 12114 "Environmental Effects Abroad of Major Federal Actions" applies to a federal U.S. agency where there is to be a "major Federal action significantly affecting the environment of a foreign nation not participating with the United States and not otherwise involved in the action".

Under this Executive Order federal agencies such as the Coast Guard are required to ensure they have for their consideration prior to issuing the requested bridge permit, "bilateral or multilateral environmental studies, relevant or related to the proposed action, by the United States or one of more foreign nations, or by an international body or organization in which the United States is a member or participant or as determined by the agency."

Therefore even if the proponent's EA were otherwise compliant with NEPA, (which for the reasons set out in this submission it is not), the Coast Guard cannot proceed to make a decision on the bridge permit unless and until "bilateral" environmental studies related to this action, i.e., studies by the U.S. and Canada, have been prepared regarding the project's environmental effects in Canada.

It is clear that the Executive Order applies in this case, despite opinions to the contrary by the proponent and possibly by Coast Guard officials.

First, by the Coast Guard's agreeing to carry out an EA under NEPA, the Coast Guard has acknowledged its permitting activity is a "major Federal action". Beyond that, it must be recognized this is a "once in a century" project, with an estimated cost of $500 million.

In the absence of any other new bridge being built in the Windsor-Detroit corridor (arguably another bridge as is being studied by DRIC being redundant if the new Ambassador Bridge is constructed first) the projected numbers of vehicles crossing this bridge by 2035 is expected to increase by 80% (from about 9.5 million to 17.2 million annually). This does not account for induced traffic from other crossings attracted by the new bridge's capacity. Based on the width of the proposed new Ambassador Bridge and other considerations, this project will provide a 100 to 200 per cent increase in vehicle crossing capacity between the U.S. and Canada.

Second, it is clear based on a number of factors that the Coast Guard's action in permitting the construction, and corollary use of the bridge for its intended purpose, will "significantly" affect the environment as that NEPA term has been construed by CEQ regulations and the courts. The factors and opinions of the U.S. EPA as set out in their 2006 and 2007 comments to the Coast Guard on this project, particularly with respect to air emissions, are corroborative of that, as well as the cumulative impacts that will arise from the project, i.e. the 100-200% increase in border crossing capacity largely to be used by diesel trucks, with their various impacts on traffic congestion, neighbourhoods and communities.

Third, this major Federal action will *prima facie* cause significant environmental effects for a part of a foreign nation, i.e., Windsor, Canada. The "natural" environment impacts will occur

from air contaminants and noise and other significant impacts, such as impacts on health, safety and community cohesion, are also documented in materials being provided to you with this submission.

Please refer to the following Attachments to this submission which provides *prima facie* evidence that the permitting of this project by the Coast Guard will constitute a major action significantly affecting the environment of a "foreign nation", i.e. Windsor, Canada:

Attachment Volume 1, Tab 3 "Ambassador Bridge Enhancement Project – Preliminary Air Quality Impact Study" (July 2007) AMEC Earth & Environmental Limited. This report substantiates that the new bridge project will result in significant ambient concentrations of hazardous air contaminant – PM 2.5 – which will affect residential areas and school yard adjacent to the Bridge and its Windsor access corridor, Huron Church Road. Predicted concentrations of PM 2.5 will exceed health standards. Both Canada and the U.S. recognize PM 2.5 as a substance hazardous to human health.

Attachment Volume 1, Tab 2, "Traffic Impact Analysis of the Ambassador Bridge Enhancement Project on City of Windsor Roads", (July 2007) by Sam Schwartz Engineering, PLLC (SSC). This report, by one of America's leading traffic engineering consultants, documents a number of critical facts, including:

- "The Huron Church Road corridor extending through Windsor to the Ambassador Bridge will be operating beyond its capacity at many locations in the future years 2015, 2025, and 2035, particularly in the PM peak hour, even without the addition of Ambassador Bridge-induced demand. In lay terms, this means traffic will be jammed at many intersections, long queues will form and trucks will be idling for long periods in residential and retail neighbourhoods.

- The construction of a new bridge with additional capacity and improved operations will induce additional traffic, which in turn would create additional impacts on the roadways leading up to the new facility.

- As a result of the heavy congestion, City traffic engineers will be presented with the dilemma of moving traffic on Huron Church Road or providing enough crossing time for pedestrians. There is concern about the safety of pedestrians and cyclists along Huron Church Road.

- Where an environmental assessment of a project such as the new Ambassador Bridge is required, it would be unreasonable to ignore the impacts the new bridge's capacity would cause to local roads and neighbourhoods, and possibly also to air and noise pollution.

- Based on over 36 years of traffic engineering experience, it is the professional opinion of SSC that without an appropriate traffic analysis which refutes (if possible) the high likelihood that such impacts will occur from the new bridge, and having regard to the predicted future traffic problems on this corridor even without the traffic

that would be induced, it is unreasonable to conclude that there would be no environmental impacts arising from this new bridge. In our experience, the most reasonable conclusion is that there would be significant impacts."

Attachment Volume 1, Tab 4, "Environmental Noise Impacts – Ambassador Bridge Enhancement Project, Draft Environmental Assessment", Valcoustics Canada Ltd., July, 2007. Although there is no noise assessment contained in the draft EA for the Canadian portion of the project, the City, through Gowlings, retained Dr. Al Lightstone, P. Eng., a highly regarded acoustical engineer with 40 years experience in assessing noise from a variety of sources, including roadways, bridges and vehicle facilities similar to this one (his experience includes assessing noise and advising the Peace Bridge, located between Buffalo, New York and Fort Erie, Ontario on noise mitigation measures).

Dr Lightstone's letter indicates that "based on our experience with similar projects, we remain concerned that there are likely to be significant environmental noise impacts for people residing in both houses and university residences near to the proposed bridge and plaza" in Windsor and that a noise assessment is required both for noise from the Canadian portion of the bridge and Canadian Plaza operations.

Attachment Volume 1, Tab 1 Letter dated August 29, 2007 from City of Windsor General Manager of Public Works to Gowlings, which provides City of Windsor staff comments on the project and draft EA. The City staff comments are extensive, but a summary of the concerns are set out near the beginning of the letter, as follows:

> "City staff review of the April 2007 draft EA leaves us with serious concerns that the draft EA essentially ignores and therefore fails to assess plainly obvious environmental impacts that this project will cause to the City of Windsor. Our comments are based on review of the draft EA by City professional engineers, registered land use planners and other qualified City staff as well as advice from retained professional consultants.
>
> Our review indicates there will be significant impacts caused in Windsor by this project from air and noise emissions, and that it will produce public safety risks, impact on community cohesion and cause social displacement.
>
> Despite the seriousness of these potential impacts for the City, these issues are not even acknowledged, let alone assessed, in the draft EA. The proponent has avoided discussing these impacts by taking a highly unusual, unrealistic, and unhelpful approach to its project It wishes to ignore the fact that a new bridge will channel large volumes of international traffic on city streets and residential neighbourhoods. It claims it is merely moving existing traffic onto a new bridge which is an "enhancement" of the current bridge.
>
> This is a self-serving and misleading approach to determining the true impacts of a proposal which would create 100-200% greater vehicle crossing capacity for traffic which must use Huron Church Road, and result in Windsor residents being exposed to increased air and noise contaminants as well as safety, community and economic impacts for the lifetime of this new bridge, at least 75 years or more."

> We find this attempt to avoid assessment of impacts to be contrary to common sense as well as our understanding of what is required by an objective environmental assessment process such as that embodied in the *National Environmental Policy Act*. We trust that the U.S. Coast Guard will not accept the proponent's attempt to avoid appropriate analysis of the clear effects and impacts this proposal will have."

In summary with respect to the third aspect of what is required to apply Executive Order 12114, it is clear that the range of environmental impacts associated with this project as documented in the attachments enclosed and by earlier submissions regarding PM 2.5 clearly substantiate that the bridge project has clear potential to "significantly affect" the environment in Windsor, Canada, a "foreign nation".

Fourth, it is equally clear that Canada is "not participating with the United States and not otherwise involved in the action"; this means that all the preconditions for Executive Order 12114 being applied are present in this case.

The Ambassador Bridge is a privately owned company and this project is being advanced by the owners of that company. Neither the U.S. Government nor Canadian Government are "participating" in this undertaking. Indeed, the proponent consistently emphasizes how this project is a purely a private sector initiative not involving and not burdening the taxpayer of either country.

In contrast, the term "participating" would be applicable to the involvement of the Canadian Government with that of the United States and the State of Michigan and the Province of Ontario in the bi-national environmental assessment these governments are engaged in for the purpose of identifying a new border crossing through the Detroit River International Crossing Project (DRICP) study.

Nor is Canada "otherwise involved in the action", "action" being the permitting of the new bridge in the U.S. by the U.S. Coast Guard. The term "action" has precise meaning under NEPA, as defined by the CEQ Regulations. See section 1508.18. While the Canadian Government is being asked to issue permits for this undertaking required under Canadian laws, the Canadian Government has no role whatsoever in determining whether the U.S. Coast Guard will issue the requested American Bridge Permit. Canada is not involved in "the action" under consideration by the Coast Guard.

As a practical matter, the Coast Guard is being required to make a decision on this project well prior to the time when Canada could offer any environmental analysis, as the Canadian government has only just this week finalized the guidelines the proponent will be required to address in carrying out environmental studies in Canada.

In conclusion with respect to the requirements of Executive Order 12114, for the above reasons the Coast Guard is required to ensure that the environmental impacts of this project in Canada are assessed. To satisfy the Executive Order, such studies must be carried out by the United States, or by Canada, or by both countries.

No such studies have been carried out. It would be clearly contrary to the Coast Guard's NEPA

obligations for it to issue a permit unless this deficiency is cured.

d) Failure to Consider Related Actions Required for this Project and to Assess Indirect Environmental "Effects" and Cumulative Impacts, as well as Failure to Conform to NEPA Requirements to Support a Finding of No Significant Impact

The draft EA further fails to conform to NEPA requirements insofar as it arbitrarily refuses to consider direct and indirect environmental effects and cumulative impacts that will occur in Windsor. The draft EA:

(a) omits any recognition that the project will provide a 100-200% increase in border crossing capacity in Windsor which will induce new border crossing traffic to be channelled through the only Windsor road leading to and from the new bridge, under-capacity Huron Church Road;

(b) omits recognition and consideration of impacts to be caused in Windsor from physical works required to allow the new bridge to have utility, such as new bridge approach roads and significantly larger border inspection plaza requirements; and

(c) omits any recognition or assessment of serious economic and social impacts arising from congestion and consequent public safety issues and impacts on community cohesion that will occur in Windsor without such new physical works.

The omission to recognize and assess such impacts also results in the draft EA fundamentally failing to provide a basis for the Coast Guard to make a Finding of No Significant Impact.

<u>NEPA CEQ EA Requirements Not Met</u>

Pursuant to CEQ Regulations for implementing NEPA, an "environmental assessment" is defined as being a document for which a federal agency is responsible that serves to:

(1) briefly provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement or a finding of no significant impact;

(2) aid an agency's compliance with the Act when no Environmental Impact Statement is necessary;

(3) facilitate preparation of a statement when one is necessary. [Section 1508.9]

An environmental assessment is necessarily the basis for an agency to base a "finding of no significant impact". [CEQ Regulation, section 1508.13].

In order to reach a "finding of no significant impact" there must be environmental documents which conclude that there will not be a "significant effect on the human environment". [CEQ Regulation, section 1508.13]

"Human Environment" is required to be interpreted "comprehensively", to include the natural and physical environment and the relationship of people with that environment. [CEQ

Regulation, section 1508.14]

"Effects" is defined to include:

(a) direct effects, which are caused by the action and occur at the same time and place;

(b) indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

"Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including eco systems."

"Effects" is also given further definition by the CEQ Regulation:

> "Effects and impacts as used in these Regulations are synonymous. Effects include ecological (such as the effect on natural resources and on the components, structures and functioning of affected eco-systems), aesthetic, historic, cultural, economic, social or health, whether direct, indirect or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial." [CEQ Regulation, section 1508.8]
>
> "Cumulative impact" is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." [CEQ Regulation, section 1508.7]

It is important to note that these definitions of "effects" and "human environment" as well as other provisions of the CEQ Regulations are applicable to the preparation of an environmental assessment and not just to an Environmental Impact Statement. That is made clear by section 1500.3 of the CEQ Regulations which state:

> "These Regulations, unlike the predecessor guidelines, are not confined to Section 102(2)(c) (Environmental Impact Statements). The Regulations apply to the whole of Section 102(2)."

Further, the draft EA engages in improperly narrow scoping of the action and alternatives which are required to be considered pursuant to CEQ Regulations.

Under s. 1508.25 of the CEQ Regulations, the Coast Guard is required to ensure that the EA considers the following:

(a) actions (other than unconnected single actions) which may be:

1. Connected actions, which means that they are closely related and therefore should be discussed in the same impact statement. Actions are connected if they:

   (i) Automatically trigger other actions which may require environmental impact statements.

   (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously.

   (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.

2. Cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement.
3. Similar actions, which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. An agency may wish to analyze these actions in the same impact statement. It should do so when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement.

Because of the definitions of these terms and the requirement that before a "finding of no significant impact" is made there must be an objective basis to conclude that there will not be a "significant effect on the human environment", it is incumbent upon the Coast Guard to ensure :

(i) that the environmental assessment actually includes an assessment of these various actions, alternatives and effects; and

(ii) demonstrates on an objective basis that none of these effects will occur or be significant.

Clearly, when it comes to either considering these requirements of "action" or assessing these project effects in Windsor, the draft EA is woefully deficient. Indeed, analysis of such alternative "actions" and effects is completely lacking from the draft EA. Again, it fails to fundamentally comply with NEPA.

We set out some important examples of connected and cumulative actions and indirect effects which are ignored by the draft EA:

<u>Failure to Recognize and Assess Significant Changes to Windsor Bridge Approach Roads and Larger Bridge Inspection Plaza Requirement for Windsor</u>

The draft EA is fundamentally deficient in:

(a) refusing to recognize that there will necessarily be a much bigger and more

impactive Canadian plaza required for the operation of the new bridge and that new bridge approach roads within Windsor will be required; and

(b) failing to assess the impacts of these fundamentally necessary components required to allow the proposed bridge to carry its planned traffic and prevent chaos on Windsor streets and havoc in Windsor neighbourhoods.

On these topics please refer to

Attachment Volume 1, Tab 1, August 29, 2007 Letter from the Windsor General Manager of Public Works, Dev Tyagi, P. Eng. and **Volume 1, Tab 2, "Traffic Impact Analysis of the Ambassador Bridge Enhancement Project on City of Windsor Roads"**, by Sam Schwartz Engineering, PLLC (which is summarized subsequently).

The August 29, 2007 letter from City of Windsor General Manager of Public Works, states that City professional engineers, registered land use planners and other qualified City staff, as well as retained professional consultants reviewed the draft EA. This review concluded "there will be significant impacts caused in Windsor by this project from air and noise emissions, and that it will produce serious traffic congestion, public safety risks, impact on community cohesion, and cause social displacement".

However, and despite the seriousness of these potential impacts for the City, these issues are not even acknowledged, let alone assessed in the draft EA. The proponent has avoided discussing these impacts by taking a highly unusual, unrealistic and unhelpful approach to its project. It wishes to ignore the fact that a new bridge will channel large volumes of international traffic on City streets in residential neighbourhoods. It claims it is merely moving existing traffic onto a new bridge which is an enhancement of the current bridge. However, this is a self-serving and misleading approach to determining the true impacts of a proposal which would create a 100 percent – 200 percent greater vehicle crossing capacity for traffic which must use Huron Church Road, with the result in Windsor that residents will be exposed to increased air and noise contaminants as well as safety, community and economic impacts for the lifetime of this new bridge, at least 75 years or more.

In its draft EA the proponent in effect acknowledges that its draft EA would have been required to include environmental assessment of the new bridge's relationship to and impacts arising from new American access roads and the required expansion of the Detroit plaza, but that such discussion and analysis is not required because, at least in the proponent's view, these were aspects already subject to EA in the "Gateway Project". The proponent justifies omission of these aspects in its draft EA by arguing that "the Ambassador Bridge Enhancement Project would seamlessly integrate with the Ambassador Bridge Gateway Project already underway in the Detroit River area by building a new bridge adjacent to the existing Ambassador Bridge. [Page 2]

The proponent also acknowledges that access roads for the new bridge are critical, but argues that, at least in the U.S., the U.S. Plaza is "bounded by I-75 on the west" and "Once cars exit the Ambassador Bridge (on the U.S. side) they enter into the primary customs facility and then the toll facility and then have direct access to I-75 and I-96…" (page 6, draft EA).

Again the proponent recognizes the importance of having high quality access between an international border crossing and the interstate or provincial freeway system where it makes the following statements:

> "Poor quality access to international border crossings and congestion at border crossings can have an adverse impact on trade between the United States and Canada and therefore adversely impact the economies of both countries. In response to this, the Gateway Project was developed and is currently underway [in Michigan] to provide direct and improved access between the Ambassador Bridge and the United States Interstate system (I-75, I-96)." (page 1 of draft EA)

The proponent also points out:

> "The Ambassador Bridge Gateway Project is scheduled to be completed and opened to traffic in 2009 and will dramatically improve the existing connections between the bridge and the U.S. freeway system. The Proposed Project will also prohibit trucks from exiting onto the local streets surrounding the plaza area and instead require them to enter the interstate system as they exit from the inspection stroke toll plaza." (page 8)

In these comments the proponent has recognized the advisability, indeed the necessity, of its proposed new bridge being adequately serviced by an appropriate plaza which in turn has direct connection to the interstate freeway system. The proponent emphasizes that an environmental assessment for this enhanced plaza and the improvements to the interstate system has already been carried out in the United States.

However, in Windsor, Canada the situation is substantially different and unacceptable. As described by the proponent:

> "The Ambassador Bridge terminates in Canada near the University of Windsor in Windsor, Ontario, directly into the tolls and primary customs plaza. The facilities are bounded by Huron Church Road on the west, Northway Avenue on the east, Tecumseh Road on the north, and College Avenue on the south."

These City streets do not have the capacity to handle current volumes of traffic, let alone the substantially increased volume of traffic that will occur over the next 30-year period and which will also be induced to use this route because of an enhanced Ambassador Bridge project.

Moreover, there are no plans to build an expanded freeway link from Highway 401 to the Ambassador Bridge. The EA is fundamentally deficient for failing to recognize in Canada, as it has recognized in the United States, the necessity of having the new bridge directly connected to an inter-provincial highway system and the consequent environmental impacts associated therewith, if such a connection must be provided in order to service the bridge.

The proponent DIBC/CTC is clearly aware that there is a fundamental problem for border traffic in Windsor, which requires a new access road between interprovincial highway 401 and the Ambassador Bridge, but the draft EA avoid any discussion of this essential requirement.

In May, 2006 testimony to a Canadian Parliamentary Committee, Dan Stamper, the President of the proponent, recognized that the current access road network in Windsor is deficient and that substantial road improvements are needed between the Ambassador Bridge and Highway 401 to overcome congestion on the only current link to the Bridge, Huron Church Road.

In the very words of the President of the proponent, "Windsor roads from the border to the 401 remain deficient and will impede trade in this corridor … . There is a serious underdeveloped road system surrounding the border crossing."… "The main impediment at the border is the lack of any adequate surface roads and a thoroughfare from the Ambassador Bridge to Highway 401 on the Canadian side of the border…."

Despite the proponent knows and admits this access road issue is critical, it omits any discussion of it in its draft EA.

Here is more of what Dan Stamper said in 2006:

> "It is not my desire to be offensive but the truth does need to be told. As mentioned earlier with regard to Huron Church Road, the fact is, there are problems at the border. The main impediment at the border is the lack of any adequate surface roads and a thoroughfare from the Ambassador Bridge to Highway 401 on the Canadian side of the border for use by not only international traffic but Windsorites as well. The fact is that Michigan has invested $184 million federal and state tax dollars for the Ambassador Bridge Gateway infrastructure. Michigan has streamlined and maximized border investment with the Gateway and the Ambassador Bridge has invested nearly $500 million private dollars preparing for additional lanes between Windsor and Detroit. Windsor roads from the border to the 401 remain deficient and will impede trade in this corridor.
>
> Despite all of the public and private dollars invested on the U.S. side of the Bridge…despite the $300 million Canada's federal and provincial governments announced in 2001 allocated to improve access to current border facilities…Canada has failed to solve their well known problem: a road from 401 to the border. Also, there is a serious under developed road system surrounding the border crossing. We will stand in line first to support improvements to the Canadian connections to the Ambassador Bridge and urge you to focus efforts in this direction. In our view, public monies that would be devoted to a new crossing, which will disrupt communities not now impacted by a bridge, would be better spent on improvements to the existing corridor."[17]

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[17] Ambassador Bridge Testimony, Dan Stamper, President, House of Commons Committee Hearings May 2006, emphasis added

While the draft EA states that the new bridge would improve cross-border traffic operations by adding capacity, it does not address the issue of induced traffic from other time periods or other crossing locations, nor does it address how this added traffic would affect Windsor roadways leading up to the bridge and the problems these would create for various neighbourhoods along the route.

Sam Schwartz Traffic Impact Analysis – Technical Memo

Because the proponent has failed to reference or discuss the substantial impact the Coast Guard's permitting of a new span would have on Windsor roads, the City retained Sam Schwartz Engineering, PLLC to provide a highly experienced professional traffic engineering and traffic planning opinion on the matter.

Sam Schwartz is an internationally recognized expert in transportation engineering, with 35 years experience including,

- for the City of New York, during the period 1971-1990, being director of planning, assistant commissioner responsible for EIS reviews, traffic commissioner, chief engineer and bridge commissioner.
- 1990-1995, senior vice president of the Hayden-Wegman consulting firm
- since 1995, president of his own traffic engineering consulting firm composed of engineers, designers, architects and planners working interdependently to improve urban environment, with expertise in transportation, civil engineering and urban and architectural planning

Attachment Volume 1, Tab 2, "Traffic Impact Analysis of the Ambassador Bridge Enhancement Project on City of Windsor Roads", by Sam Schwartz Engineering, PLLC (SSC) and in particular the Conclusions which are set out below, clearly substantiate that the permitting of this new bridge will cause serious environmental, economic and community cohesion problems in Windsor.

While we urge the Coast Guard to have regard to the full report, the report's conclusions, set out below, usefully provide a summary of the traffic-related effects and cumulative impacts the draft EA fails to recognize.

Ambassador Bridge Enhancement Project - Traffic Impact Analysis Conclusions prepared by Sam Schwartz Engineering PLLC

1. Current international truck traffic on the City of Windsor Huron Church Road corridor, providing access to the Ambassador Bridge, can be as high as 20 to 30 percent of total traffic volumes during the peak hours. Truck percentages on the approach to the Ambassador Bridge are even higher during off-peak hours, sometimes reaching up to 60 percent of total traffic volumes.

2. International car and truck traffic on Huron Church Road is expected to grow in future years, while domestic vehicles are expected to decrease somewhat in volume, resulting in

an overall growth in traffic passing through the Huron Church Road corridor leading to the Ambassador Bridge. This increase in traffic volumes would have an impact on traffic operations on the Huron Church Road corridor and surrounding roads, even before any enhancements are made to the Ambassador Bridge. Enhancements made to the bridge that would act to induce additional traffic would exacerbate these deteriorated traffic operations.

3. The Ambassador Bridge Enhancement Project would add crossing capacity by introducing a new span that would increase the number of vehicular lanes from four (two in each direction) to at least six (three in each direction plus shoulders). As a result of this increased crossing capacity and other bridge operational improvements, traffic that once used other crossings, traveled during off-peak periods, or didn't travel at all will be enticed to use the new Ambassador Bridge span. In traffic engineering terms, the added capacity on the new Ambassador Bridge would cause *induced demand* on the bridge as well as on the roadways leading up to the bridge.

4. As the proposed Ambassador Bridge span will be nearly double the width of the current Ambassador Bridge span, the proposed bridge would have sufficient width to be converted to four lanes in each direction, which would constitute a 100 percent increase in capacity from the existing bridge deck. Further, there is no plan to demolish the existing bridge; in fact, there are plans to rehabilitate it. If the current bridge were used in the future in addition to the new bridge, the Enhancement Project could ultimately result in a total of six lanes in each direction, a 200 percent increase from the existing capacity.

5. The Huron Church Road corridor extending through Windsor to the Ambassador Bridge will be operating beyond its capacity at many locations in the future years 2015, 2025, and 2035, particularly in the PM peak hour, even without the addition of Ambassador Bridge-induced demand. In lay terms, this means traffic will be jammed at many intersections, long queues will form and trucks will be idling for long periods in residential and retail neighbourhoods.

6. As a result of the heavy congestion, City traffic engineers will be presented with the dilemma of moving traffic on Huron Church Road or providing enough crossing time for pedestrians. There is concern about the safety of pedestrians and cyclists along Huron Church Road.

7. The DRIC traffic studies predict significant problems for Windsor streets that would occur in the future even without the induced traffic from the new Ambassador Bridge:

> "As road traffic volumes increase, local and regional traffic may find it easier to use adjacent arterial roads and avoid Huron Church Road congestion as it moves within and across Windsor and LaSalle. The result of this diversion is increased traffic infiltration to adjacent arterials and an overall heightened neighbourhood-level sensitivity towards traffic intrusion. The projected increase in traffic would serve to encourage more domestic travel to divert from Huron Church Road and into the surrounding neighbourhoods."[18]

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[18] Detroit River International Crossing Environmental Assessment Study, Draft Level 2 Traffic Operations Analysis of Practical Alternatives, November 2006 (p.59).

8. Induced traffic from the new Ambassador Bridge will result in peak hour volumes on roadways to and from the bridge that are higher than the DRIC projections. Given that peak hour traffic operations on the Huron Church Road corridor leading to and from the Ambassador Bridge will already be at, or well beyond, their capacity at many locations in future years, the addition of more traffic induced by the new Ambassador Bridge would exacerbate existing and future Windsor road capacity and level of service problems.

9. While the draft Environmental Assessment recognizes that the Ambassador Bridge Enhancement Project would improve traffic operations on the bridge by adding capacity, it does not address the issue of induced traffic from other time periods or other crossing locations, nor does it address how this added traffic would affect Windsor roadways leading up to the bridge and the problems these would create for various neighbourhoods along the route.

10. Traffic impacts on the Huron Church Road corridor and other City streets and neighbourhoods would be even greater than predicted by the DRIC if future improvements assumed in the DRIC study do not occur (e.g. widening of EC Row Expressway to six lanes). In that case, vehicles assumed by the DRIC to use new or expanded alternative routes would have only four lanes of capacity on EC Row (two in each direction), creating a greater chance of congestion, particularly on the section to the northeast of Huron Church Road where several EC Row Expressway on- and off-ramps are closely spaced together. SSC is also concerned about a back-up from the EC Row exit ramp to Huron Church Road that would affect the safety of the expressway as traffic, at highway speeds, would suddenly encounter stopped vehicles. This scenario will also cause short weaving sections, due to the short spacing of interchanges, between traffic accelerating to highway speeds crossing traffic that is slowing to a stop.

11. The draft Environmental Assessment for the Ambassador Bridge Enhancement Project does not include a traffic impact study of the roadways in Windsor leading to the bridge, claiming that "the impact of the proposed project is confined within the Project limits and there would be no impact to traffic flow outside of the respective Plazas" because "the movement of traffic at this international crossing is limited by the toll collection/customs inspection process."[19]

    This claim is unreasonable. The construction of a new bridge with additional capacity and improved operations will induce additional traffic, which in turn would create additional impacts on the roadways leading up to the new facility. Toll collections have been vastly sped up by electronic collections used widely in the U.S., Canada and abroad. It is unreasonable to think that if volumes approaching customs' plazas increase significantly that no action will be taken by either government. The pressure by industry and the public has resulted in dramatic increases in customs stations and officers at the Ambassador Bridge in the past two years.

12. Where an environmental assessment of a project such as the new Ambassador Bridge is required, it would be unreasonable to ignore the impacts the new bridge's capacity would cause to local roads and neighbourhoods, and possibly also to air and noise pollution.

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[19] Ambassador Bridge Enhancement Project, draft Environmental Assessment, prepared by the Detroit International Bridge Company and the Canadian Transit Company for the United States Coast Guard, April 2007(p.43).

13. The DRIC study reached clear conclusions, with which SSC agrees, that there will be significant problems on the Huron Church Road corridor and other City streets in future years even without further induced border traffic from a new Ambassador Bridge.

14. As the new Ambassador Bridge will provide more crossing capacity and improved bridge operations that will draw vehicles from other crossings, and additionally entice vehicles that were traveling in off-peak times, or not at all, to travel during the peak hour, it is clear that the Ambassador Bridge Enhancement Project will cause traffic, neighbourhood, and potential air pollution problems in Windsor beyond any that would be caused if this project were not constructed.

15. Based on over 36 years of traffic engineering experience, it is the professional opinion of SSC that without an appropriate traffic analysis which refutes (if possible) the high likelihood that such impacts will occur from the new bridge, and having regard to the predicted future traffic problems on this corridor even without the traffic that would be induced, it is unreasonable to conclude that there would be no environmental impacts arising from this new bridge. In our experience, the most reasonable conclusion is that there would be significant impacts.

16. In our professional opinion these issues are required to be addressed in any document which describes itself as an Environmental Assessment, particularly one that is being carried out pursuant to the provisions of the *National Environmental Policy Act*, with which we have had considerable experience.

    Unfortunately, none of these predictable impacts on Windsor roads and neighbourhoods are documented or considered in the draft Ambassador Bridge Enhancement Environmental Assessment.

Failure to Assess Other Effects and Impacts

Environmental Impacts – Spills of Toxic Materials[20]

The new bridge would cross over five City streets and four blocks of residential lands on the west side of Huron Church Road. There are approximately 200 dwellings in the 250 metre area to the west of Huron Church Road in this area, housing approximately 600 people. Also, within 60-180 metres to the east of Huron Church Road, immediately opposite portions of the proposed second bridge, there are three University of Windsor residences which provide housing for over 800 students.

The City is concerned about significant effects on the environment as well as public health and safety arising from accidental spills of fuel, hazardous or toxic materials from the increased numbers of trucks projected to cross the new bridge in the period to 2035. This is a highly significant potential environmental impact that the proponent has failed to address in any way.

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[20] This information is largely taken from the August 29, 2007 letter from Dev Tyagi, P. Eng., City of Windsor General Manager of Public Works, contained in the Attachments to this submission.

The proponent is aware that toxic materials pass over its bridge, and indeed permits that to occur, as corroborated by documents already in the Coast Guard file in this matter.[21]

Further, in a Site Plan Control agreement between the Canadian Transit Company and the City approved January 16, 2006, which dealt with new inspection booths and elevated approaches from the Bridge to be located on the west side of Huron Church Road, CTC agreed to indemnify the City in respect of damage claims against the City arising from "loss of life or injury or damage to persons or destruction of, injury to or loss caused to property of persons on or passing along any highway of street **by reason of the emission, spilling or depositing of contaminants as defined under the and regulated by the Environmental Protection Act (Ontario), from vehicles, machinery or other objects allowed on or passing over the works and structures**" which were to be built pursuant to this Site Plan Control agreement.

While in this agreement CTC clearly recognizes the potential for such spills, and while the agreement gives some legal protection to the City in the event of claims by others against it for spills from the Ambassador Bridge, the agreement does nothing to prevent such spills, protect the environment or make the proponent legally responsible for remediating environmental spills.

As recently as August 21, 2007, Windsor City Police reported a fuel spill occurred on the Windsor side of the Ambassador Bridge, when the metal foot step of a tractor-trailer unit pulling up to a toll booth caught the toll booth and ripped into the diesel saddle tank of the truck causing fuel to spill onto the bridge roadway. City police reported that the truck proceeded over 50 metres past the booth with fuel pouring out of the gash in the fuel tank. Officers estimated that any fuel in the top half of the tank would have been spilled. It took about three hours to clean up the spill.

Noise Impacts Will Occur in Windsor from Bridge Traffic, and from the Bridge Inspection/Commercial Vehicle Processing Facilities, But No Noise Impact Study Has Been Done

The City[22] is also very concerned that traffic from the new bridge and the Canadian plaza will produce noise exposure for nearby houses and university residences in excess of Ontario Ministry of Environment (MOE) noise criteria, a concern raised by the reports prepared by Dr. Lightstone, P. Eng., Valcoustics Acoustical Consultants (See **Attachment Volume 1, Tab 4** to this submission).

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[21] See the DVD found at tab A 21 of Volume 1 of the Letters and Attachments Filed by the City of Windsor with the U.S. Coast Guard September 14, 2006, being an except from a Detroit Television News Program, as well as the U.S. Coast Guard Releasable documents page numbers 0617-0644 related to the Ambassador Bridge Expansion Project provided by the Coast Guard FOIA response dated August 15, 2007 to Ms. Emily Huggins, Thompson Hine, LLP, FOIA D9-27/07

[22] See August 29, 2007 letter from Dev Tyagi, P. Eng., City of Windsor Manager of Public Work, in Attachments to this submission.

The City has previously expressed its concern about potential noise impacts from current activities to the proponent, and the proponent apparently accepted that such concerns are reasonable, in that it agreed with the City in the course of obtaining approval to install some inspection booths on the west side of Huron Church road to register a warning on title to adjacent properties, which the proponent owned or controlled, and to use the following language: **"Purchasers/tenant/occupants are advised that due to increasing road traffic in the Ambassador Bridge Plaza West, noise levels may occasionally interfere with some activities of the dwelling occupants."**

That language was agreed as being sufficient by the City not for the purpose of mitigating or warning about noise impacts from a proposed new bridge, but only regarding noise from vehicles that would be using six new inspection booth on the west side of Huron Church Road in the immediate future as part of the existing Ambassador Bridge. Clearly, if a new bridge providing 100% more crossing capacity than the existing bridge is built, further noise on the nearby lands associated with the new bridge traffic will occur, and these impacts cannot be ignored, and must be assessed.

Dr. Lightstone's most recent letter report to you dated July 16, 2007 references the express concern objection by the Canadian Border Services Agency (CBSA) that the current Canadian bridge plaza is too small and is not configured appropriately from the perspective of the CBSA. Dr. Lightstone notes that new or modified commercial vehicle inspection facilities required at a comparable international bridge crossing between Canada and the United States - the Peace Bridge between Fort Erie, Ontario and Buffalo, New York -- and other changes required in roadway providing access to that facility - were found to require substantial noise attenuation in order to ensure noise emissions were within MOE criteria.

Dr. Lighstone's report raises the serious concern, which City staff share, that substantial changes to the Canadian bridge plaza will be required to accommodate the new bridge and that a noise assessment must be carried out which is based on an enlarged plaza configuration which has been accepted both by the CBSA and the City. It would be highly arbitrary for any regulatory charged with assessment environmental impacts to exclude noise impacts from the new bridge and its required inspection plaza reconfiguration from an EA, yet that is the approach that the proponent is asking the Coast Guard to take. City staff find that unacceptable and we hope so too would the Coast Guard.

Air Quality Issues – No Air Impact Study for Windsor, Yet Significant Impacts Will Occur

The City[23] is also concerned about effects on air quality from the proposed new bridge which, because of its width, could provide up to 100% more crossing capacity than the existing bridge (four lanes in each direction) and which, together with the current bridge, could result in up to a 200% increase in crossing capacity (six lanes in each direction).

Of particular note is that there was no study in the draft EA of the proposal's impacts on Windsor air quality.

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[23] Ibid.

The AMEC Engineering Consultants report, **Attachment Volume 1, Tab 3**, commissioned for the City, provides a Preliminary Air Quality Assessment of Ambassador Bridge Enhancement Project air impacts in Windsor. This report substantiates City staff concerns, in that it predicts that areas adjacent to the Bridge Canadian Plaza and to residential areas adjacent to Huron Church Road will experience air quality impacts from vehicles associated with the Bridge project, including exceedences of Ontario Air Quality Criteria.

AMEC used the DRIC traffic information regarding peak hour vehicle travel on Huron Church Road which indicates queuing will occur on various segments of this corridor, and modelled the air quality impacts.

The AMEC air modelling shows that the DRIC predicted queuing of vehicles on Huron Church Road, in an area south of the Bridge Plaza and north of the EC Row Expressway, would produce concentrations of toxic particulates, specifically PM 2.5[24], in concentrations exceeding Ontario Air Quality Criteria.

The predicted exceedances of air quality criteria for PM 2.5, fine particulates, is of particular concern not only to residents but to numerous children who attend schools located along Huron Church Road.

Eight schools as well as St Clair College and the University of Windsor are located along Huron Church Road. The school/college facilities include student residences. a stadium and a track and field facility.

These schools/colleges are as follows:

> Between the Ambassador Bridge and E.C. Row Expressway: University of Windsor; Assumption College Catholic High School, Century High School, Forster Secondary School.
> South of E.C. Row Expressway: Bellwood Public School, Oakwood Elementary School, Mount Carmel Elementary School, Academie Ste Cecile, Ecole Monseigneur Jean-Noel, and St. Clair College

Importantly, the AMEC report also shows that if free flow traffic conditions could be maintained along Huron Church Road, there would not be concentrations of PM 2.5 exceeding permissible criteria.

In other words, future truck volumes associated with the new bridge capacity will expose Windsor residents in the vicinity of Huron Church Road, including many children attending the numerous schools along that route, to excessive concentrations of toxic air contaminants from truck queuing – an exposure which could be avoided if, for example, another location for a new crossing was chosen that had adequate road capacity or an

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[24] PM 2.5 is considered "toxic" by Environment Canada and Health Canada: see their 2000 "Priority Substance List Assessment Report, Respirable Particulate Matter Less Than of Equal to 10 Microns", pg. 2.

alternative new access route to the new bridge were provided, so that traffic queuing on City streets did not occur.

In short, very significant environmental and health impacts will occur if this project proceeds, which impacts could be avoided if the proponent were required to study and utilize either another crossing location where no residents would be exposed to queuing trucks, or the proponent were to provide its own dedicated access route to the new bridge, so that queuing of traffic on City streets did not occur.

In fact, as elaborated below, in 2003-2004 the proponent proposed to do exactly that - build its own dedicated access route to the Ambassador Bridge from the E. C. Row Expressway – an alternative which the proponent has conveniently omitted from its materials submitted to the Coast Guard – but it is an example of an alternative that is reasonably one which the proponent should be required to consider, as it proposed it itself.

Impacts on City Neighbourhoods and Cultural Features

City staff are also concerned with respect to the project's potential for effects on the human environment. There will be direct, indirect and cumulative effects on environmental quality, health, safety, neighbourhoods and archaeological features. The area by the Detroit River proposed for the new bridge is recognized in the City of Windsor Official Plan as an area of high cultural and historical significance. It has a very high potential for finding further Native burials and Native artifacts, in that this area is part of a former Indian Reserve (Windsor Archaeological Master Plan).

The new bridge requires 14 supporting structures in/around an area where Native American burials are found. The entire area west of Huron Church Road / south of Detroit River – is rated as "high potential" (Windsor Archaeological Master Plan, Archaeological Potential); and this area contains part of the original Native American Huron Village and was formerly the site of the Jesuit Mission. There are designated cultural and historic features to the east and south-west.

From a social cohesion standpoint we note that lands along the Huron-Church Road connection to Highway 401 are largely residential in designation, including historic areas and active and passive parkland. Secondary routes to the bridge (Wyandotte, Tecumseh, College) are also largely residential in designation. Land west of Huron-Church Road is designated as "Residential", with a small portion at the river designated "Waterfront Recreational" The entire area of the proposed new bridge is zoned for residential uses. The new bridge is, from a land use perspective, incompatible with land used for residential purposes or designated to be so used in future.

City staff find that environmental as well as community and social impacts from the proposed project are likely to be individually and cumulatively significant. Required plaza expansions and expanded highway connections are part of on-going future actions contributing to adverse environmental effects. Studies of required impacts from the whole system in Windsor should be considered in the Coast Guard's NEPA documentation.

The City staff also are concerned that the proposed project will have a significant effect on species or habitats protected by regional, provincial and federal Agencies. In particular, the proponent offers no studies /professional opinions from qualified ornithologists that the "cable-stayed" design of the new bridge, which in effect provides "walls" of cable on both sides at close-spaced intervals, will not be have impacts on migratory bird species which are prevalent in the Detroit River corridor.

City staff also have concerns regarding the project's impact on Olde Sandwich Towne, located in close proximity to the proposed new bridge. In this neighbourhood the average cost for housing is lower than the Windsor average and it is important to preserve the number of affordable housing units. A comprehensive EA process is required due to the sensitive nature of the community to ensure no further negative impacts.

All changes, impacts, inconsistencies, intrusions and demands listed in the Coast Guard document as indicators of socio-economic and environmental justice impacts are likely to occur in Windsor as a result of the 80% + increase in traffic on city streets from the second bridge, particularly when induced traffic is considered.
The proposed project also occurs on or near unique characteristic of the geographic area, such as historic and cultural resources and parkland. We note that the Ambassador Bridge is on the U.S. National Register of Historic Places. Parks, recreation facilities, and unique features historically designated and culturally significant within the City will be negatively impacted.

<u>Failure to consider other actions required to implement this project and make it functional and the environmental impacts of those actions – substantial enlargement and possible relocation of Windsor inspection plaza for truck coming from the U.S.</u>

The existing Ambassador Bridge Windsor plaza is totally inadequate and inappropriately configured for use in conjunction with the proposed enhancement project. Substantial enlargement of and changes to this plaza are required to make the new bridge functional, but these requirements are not mentioned in the draft EA and the environmental impacts are not considered. This is a further fundamental NEPA deficiency for the draft EA.

The Canadian Border Services Agency (CBSA) --the Canadian equivalent in part to the Homeland Security Agency in the U.S.-- both in 2006 and 2007 has clearly stated in letters to the President of the Canadian Transit Company that the CBSA has fundamental concerns with the proponent's assertion that there is no need to modify the existing Canadian plaza in connection with the proposed new bridge. The CBSA June 6, 2006 letter to the proponent regarding these concerns is found at Tab 19 of Volume 1 of the City's September 14, 2006 submissions to the Coast Guard.

Attachment Volume 1, Tab 7 to this submission is the June 1, 2007 letter from the CBSA to the CTC. It states that "CBSA's concerns about the Ambassador Bridge twinning plans remain as follows:

> "(a) The lack of a detailed and integrated plan to provide adequate, functional and complete point of entry facilities

> commensurate with both current traffic needs as well as the forecast traffic growth over a reasonable planning horizon.
>
> (b) Having Huron Church Road physically dissect the point of entry plaza compromises CBSA's border security operations and therefore unnecessarily compromises national security and public safety. This aspect of your proposal remains unacceptable to the CBSA.
>
> (c) The current location of the commercial secondary processing facility (about 1.5 miles from the bridge plaza) is unsustainable from a national security and public safety prospective. It is essential to the CBSA that this function be relocated entirely within the port of entry plaza.
>
> (d) The capacity of the existing travelers secondary processing installations to accommodate current and foreseeable traffic growth over a reasonable planning horizon."

In other words, the existing plaza is inadequate and the area available for these inspections is totally insufficient to provide the necessary facilities required under Canadian federal law in order to allow the Canadian Border Services Agency to carry out its statutory responsibilities.

In a memorandum dated August 1, 2005 prepared by Stantec Consultant Services for URS, the prime consultant of the Detroit River International Crossing Project, Stantec provided the following facts:

> "The current Ambassador Bridge, Canadian point of entry, currently occupies approximately 40 acres with all primary inspection, passenger secondary inspection and toll collection on one site of approximately 20 acres, and commercial secondary inspection, located at another site, again approximately 20 acres." (this commercial secondary inspection site is the one which the Canadian Borders Services Agency June 1, 2007 letter states must be relocated to the primary inspection facility).
>
> CBSA have indicated that the current plaza is significantly undersized to accomplish the inspection requirements now in place at the border and to accommodate secondary inspection of commercial shipments on the plaza. Based on discussions with CBSA, a plaza area of 80 acres is currently required at the Ambassador Bridge. (The Ambassador Bridge US Plaza is currently undergoing expansion from 39 acres to 158.7 acres to meet the future traffic and inspection needs)."

Attachment Volume 1, Tab 6 provides the Stantec memo. The Stantec memo goes on to point out that if there was to be a twining of the Ambassador Bridge (i.e., in effect what is now being proposed as the Enhancement Project) a point of entry facility of 120 acres will be required.

"The increased sized reflects the future commercial auto traffic projected to use this crossing, with commercial secondary inspection being carried on-site at the plaza." (Stantec memo, pages 8 and 9)

Importantly, the Ambassador Bridge has prepared its draft EA without recognizing the clear necessity that its existing plaza is wholly inadequate and will need to be substantially expanded. The failure to recognize this reality also means that it has failed to assess the impacts of such an expansion (e.g., from the current 40 acres to 120 acres, the estimate required by Stantec and which is still smaller than the 158-acre plaza that has been constructed in Detroit).

Despite these clear requirements as to the need for a significantly increased and reconfigured Canadian plaza, made known by the CBSA on repeated occasions to the Ambassador Bridge, these requirements have been ignored in the draft EA. The proponent fails to acknowledge that its current facility must be expanded to 120 acres.

The substantial reconfiguration and enlargement required for the proponent's Windsor plaza will obviously cause both adverse land use impacts as well as new noise impacts. It will cause land use impacts because the lands surrounding the current Windsor plaza are either zoned and used for residential purposes or zoned and used for University of Windsor teaching facilities and student residences.

Expansion of the plaza and necessary reconfiguration of access roads to the plaza, together with the expanded inspection facilities this new bridge traffic will require, will also produce significant noise impacts for other landowners and residents. No noise impact study has been submitted by the proponent.

However, **Attachment Volume 1, Tab 4** the letter report **"Environmental Noise Impacts – Ambassador Bridge Enhancement Project, Draft Environmental Assessment"** from Valcoustics Canada Ltd., July 16, 2007 clearly provides a professional basis to conclude noise impacts may be significant.

The opinion, by Dr. Lightstone, one of Canada's senior acoustical consulting engineers, who has had directly applicable experience in assessing noise impacts associated with the Peace Bridge between Fort Erie, Ontario and Buffalo, New York, concludes:

- "There are a large number of noise sensitive receptors in the City of Windsor in close proximity to the proposed new bridge

- As we noted in our September, 2006 letter, immediately to the east of the existing bridge, on the other side of Huron Church Road, is the University of Windsor. Two university residence buildings, one four-storeys, and the other ten-storeys, are immediately beside Huron Church Road. There is a third university residence (ten storeys) in close proximity. Other university facilities, including a park, extend east from Huron Church Road. The closest facades of the university residences are about 135 feet from the centreline of the existing bridge and will be about 200 feet from the centreline of the new bridge.

- Immediately to the west of the proposed bridge is a low density residential development. The closest existing homes are about 285 feet from the centreline of the existing bridge and will be about 165 feet from the centreline of the proposed new bridge.

- Both the Stantec study and the letter from the CBSA indicate that in order for the new bridge to function, important plaza changes and expansion are likely required. Setting aside the question of how the plaza can be expanded significantly in view of the surrounding existing development, expanded and reconfigured plaza operations, especially including secondary truck inspection, has significant potential to increase noise impact on the existing University of Windsor residences and other facilities (generally to the north and east) as well as the existing residential subdivision to the west.

- A study of noise impacts for Windsor must include not only predicted traffic noise but noise from vehicles using the inspection plaza. Based on our experience with the Peace Bridge Commercial Vehicle Processing Centre and associated plaza facility changes, movements of vehicles accessing, moving and leaving a bridge inspection plaza will result in a noise source with significant potential for causing off-site impacts. A noise assessment of plaza operations must include those changes to plaza size and configuration required to meet the recent stipulations of the Canadian Border Services Agency.

- Certainly for the new and reconfigured Peace Bridge facilities in Fort Erie, including the plaza and a new Commercial Vehicle Inspection Centre with primary and secondary inspection facilities, predicted noise levels were such as to require a significant length and height of sound barrier to adequately buffer the sensitive receptors from the various noise components including truck inspection and staging facilities and to ensure that the Ontario Ministry of Environment (MOE) stationary source noise guidelines were met.[25] At the Fort Erie Peace Bridge plaza, even with the presence of significant ambient noise due to the interprovincial QEW freeway, significant noise mitigation measures were required to properly buffer neighbouring sensitive uses.

- Thus, our experience is that the border crossing facilities of the nature being proposed in the Ambassador Bridge EA have the potential for significant noise impact on neighbouring lands unless properly mitigated. For example, in the Peace Bridge case, mitigation (noise reduction) of up to about 12-14 dBA was required for some sources in order to achieve compliance with the MOE noise criteria."

These predicted noise impacts arising from the plaza are "effects" within the definition of that term provided by s. 1508.8 of the CEQ Regulations. They are potentially a "direct effect" or at least an "indirect effect", which term includes effects "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." These effects or impacts are required to be assessed by the Coast Guard.

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[25] "Sound Level Limits for Stationary Sources in Class 1 and 2 Areas (URBAN)", Ontario Ministry of Environment, Publication NPC-205, October 1995.

As previously mentioned, the proponent, in a Site Plan Agreement with the City, acknowledged that there would likely be significant noise associated with its future activities. The proponent agreed to register a "warning clause" on title of each dwelling on the east side of Indian Road (i.e. on the west side of Huron Church Road) and also include the following warning clause in all leases and offers/agreements of purchase and sale of the said lots:

> **"Purchasers/tenants/occupants are advised that due to increasing road traffic in the Ambassador Bridge Plaza west, noise levels may occasionally interfere with some activities of the dwelling occupants."**

It would be highly arbitrary and inappropriate for the Coast Guard to base decisions on an EA that excluded consideration of noise impacts in Windsor from the new bridge and the required inspection plaza reconfiguration. Under NEPA, that is not acceptable.

Indeed, the proponent has not been forthright on the issue of the need for expansion of the Windsor plaza. Its draft EA fails to mention the substantial changes an enlargement the CBSA has repeatedly stipulated. Rather than referring to these requirements and its on-going discussions with the CBSA, it has limited its comments on this issue to the equally unhelpful suggestion that, with the recent addition of three "wide lane" customs facilities on the east side of Huron Church Road next to existing customs facilities and five other customs inspection lanes being added on the west side of Huron Church Road, not only the current inspection but future inspection demands are entirely satisfied. It states on page 8 of its draft EA, "the remaining portions of the customs plaza on the east side of Huron Church Road remain unchanged, as will the associated secondary customs facilities and duty-free shops."

However, the CBSA position is clear. Even if the proponent were allowed to use these new facilities in conjunction with the new bridge, they are far from what is required.

What is not made clear by the proponent, however, is that the proponent has no legal authority from the City of Windsor to use the recently added five customs inspection lanes on the west side of Huron Church Road or other infrastructure it has recently constructed or is in the course of constructing on the west side of Huron Church Road for the purposes of a new or second Ambassador Bridge.

Although the City approved a Site Plan Agreement in 2006 for these inspection booths and other works on the west side of Huron Church Road, that approval was subject to the condition and proviso that it did "not constitute an endorsement by the City of the proposal by the owner to twin the existing Ambassador Bridge ... or otherwise object to or deny the City's approval for the second Ambassador Bridge span or twinning (including any works undertaken or to be used for that purpose)".

Accordingly, the proponent will need to potentially obtain other means of access and egress to its proposed new bridge, as well as another location for the inspection facilities insofar as they would serve a second Ambassador Bridge.

The Coast Guard cannot reasonably allow an EA for this project to be used which ignores the plaza reconfiguration requirement. The DRICP rejected the proposal for a second Ambassador Bridge at this location based on the clear need to substantially expand the current Canadian

inspection plaza in Windsor, finding that the expansion of the plaza would in turn cause significant impacts.

Specifically, after carrying out an assessment of traffic impacts, potential noise impacts, impacts to community cohesion and character and displacement of population, the DRICP study concluded that:

> *... The expansion of the plaza at the foot of the Ambassador Bridge was considered a high negative impact to land use (refer to Exhibit 3.17). A bridge plaza serving the busiest border crossing in North America adjacent to the University of Windsor and the residential community of Sandwich is highly inconsistent with existing and planned land use in this area of the city.*
>
> ...
>
> *"The expansion of the existing plaza at the Ambassador Bridge will have a highly negative impact on the community, particularly the neighbourhood of Sandwich. This area of Sandwich is densely populated and a mature residential area. Over 215 households will be displaced and almost 1000 households disrupted (i.e., within 200m of the plaza) within the established urban neighbourhood. Area businesses are forming an economic development corporation to promote new growth and development opportunities in the Sandwich area. The loss of over 215 households from the immediate vicinity would have a negative effect on the local businesses serving this community." (p.108-9)*
>
> ...
>
> *Expanding the existing plaza and construction of a new freeway in the Huron Church Road corridor has high potential for disrupting international traffic in this important trade corridor. With the Crossing X12 alternative, the entire length of Huron Church up to the Ambassador Bridge would require reconstruction.*
>
> ...
>
> *"A number of designated heritage properties can be found along the following streets: Russell Street, Sandwich Street, Peter Street, Detroit Street, Mill Street, Brock Street, Chippewa Street, South Street, Watkins Street, Prince Road. The Ambassador Bridge, built in 1929, is listed in the Ontario Heritage Bridge List. <u>Expanding the plaza at the Ambassador Bridge to accommodate a twinning of this structure will affect over 40 built heritage features (disruption impacts) and 3 known archaeological sites</u>. The alternative also impacts a sizeable area of high archaeological potential." (p.109-110)*

The Coast Guard is a Cooperating Agency in the DRICP, a project which is sponsored in the U.S. by the Federal Highway Administration (FHWA) and the Michigan Department of Transportation.

These DRICP conclusions are therefore highly relevant, in that from this work the Coast Guard must be taken to know (a) that public agencies in the U.S., which include FHWA, have previously concluded that a second Ambassador Bridge at this location will have significant environmental impacts, which in turn mandates that the Coast Guard ensure an EIS, not an EA,

is used in processing the Ambassador Bridge application; and (b) the Coast Guard must be particularly concerned to ensure that alternative locations, not just alternative designs, for the new bridge are considered as well as alternative access routes – particularly given the DRICP conclusions as to the impacts of using the current Huron Church Corridor combined with the fact that the Ambassador Bridge previously advocated a new Bridge Parkway.

In summary on this issue of the new bridge Windsor inspection plaza issue:

i) it is clear that substantial changes to and enlargement of this plaza will be required as result of the proponent's new bridge;

(ii) the necessary reconfiguration has not been agreed to at this time;

(iii) the EA cannot be completed in accordance with NEPA requirements until the need for plaza reconfiguration is acknowledged by the proponent and it includes impact assessment of plaza reconfiguration options and operational impacts from the plaza in its EA.

Regardless of any environmental assessment process which may be carried out in Canada, NEPA requires that the Coast Guard consider an EA that includes an assessment of impacts associated with such a substantial expansion of the current plaza in an area that is surrounded by residential and University of Windsor property, including numerous student residences, as well as public parks and significant Aboriginal (Indian) burial sites.

e) The draft EA is Deficient in its consideration of Alternatives

The draft EA confines discussion of alternatives to "design" alternatives for a new bridge, i.e., to architectural alternatives and whether the new span should be located on one side of the current bridge, or the other. It does not discuss substantive alternatives, such as alternative locations, i.e. up-river or down-river alternative locations for a new span; equally it does not consider the potential for rehabilitating the existing bridge in place, nor does it provide consideration of alternative access routes for bridge traffic accessing the new bridge, so as to avoid exacerbating already problematic congestion on Huron Church Road.

NEPA requires an analysis of alternative locations and/or new access routes to the new bridge through Windsor so as to avoid bridge traffic being required to access and leave the new bridge via Huron Church Road, which would also avoid causing the predictable air, noise and other significant impacts to Windsor.

The Coast Guard should be requiring an EIS to examine other reasonable crossing location options (not simply variations on whether the new bridge should be immediately on one side or the other of the current bridge, which are not alternative locations, but rather alternative designs) as well as alternative access road facilities to the new bridge which could be provided by the proponent.

The City submits it is reasonable for the Coast Guard to be requiring the proponent to examine other down-river and up-river locations for a new bridge. This was the approach taken to comply with NEPA by the Federal Highway Administration and Michigan Department of

Transportation as proponents, and the U.S. Coast Guard as a Cooperating Agency, in connection with adding capacity to the Blue Water Bridge crossing of the St. Clair River between Sarnia, Ontario and Port Huron, Michigan.

The Blue Water Bridge and Plaza Final Environmental Impact Statement and Section 4(f) Analysis (approved October 12, 1983) indicates that in the "evaluation of alternatives" in the draft EIS four basic alternatives were identified to address the area's border crossing capacity deficiencies.

> These included:
> 1. Do nothing;
> 2. Low capital expenditure alternative (i.e. minor improvements to the bridge and plaza);
> 3. Alternative modes of transportation;
>
> (a) Major reconstruction:
> "This alternative involved major reconstruction of the Bridge Plaza and construction of a second bridge to remedy existing congestion at the U.S. inspection booths' future lack of capacity of the bridge.
> Several alternatives for major reconstruction were assessed (e.g. alternative bridge locations)."
>
> Three feasible locations were identified as possible future sites for construction of an additional crossing over the St. Clair River.
>
> These were:
> • Port Huron – Point Edwards (adjacent to the existing bridge);
> • Marysville – Sarnia (six miles downstream); and
> • Marine City – Sombra (20 miles downstream).
>
> Each alternative location was analyzed to determine the anticipated traffic diversion, transportation network compatibility, construction costs and potential social, economic and environmental impacts as well as influences on development trends. The existing corridor was selected as the most feasible corridor. [page 73]
>
> Also "assessment of the new crossing at the Port Huron – Point Edwards area considered both a bridge and a tunnel". [page 73]
>
> In addition "five alternative plaza configurations that would be compatible with a south new bridge location were developed and evaluated". [page 74]

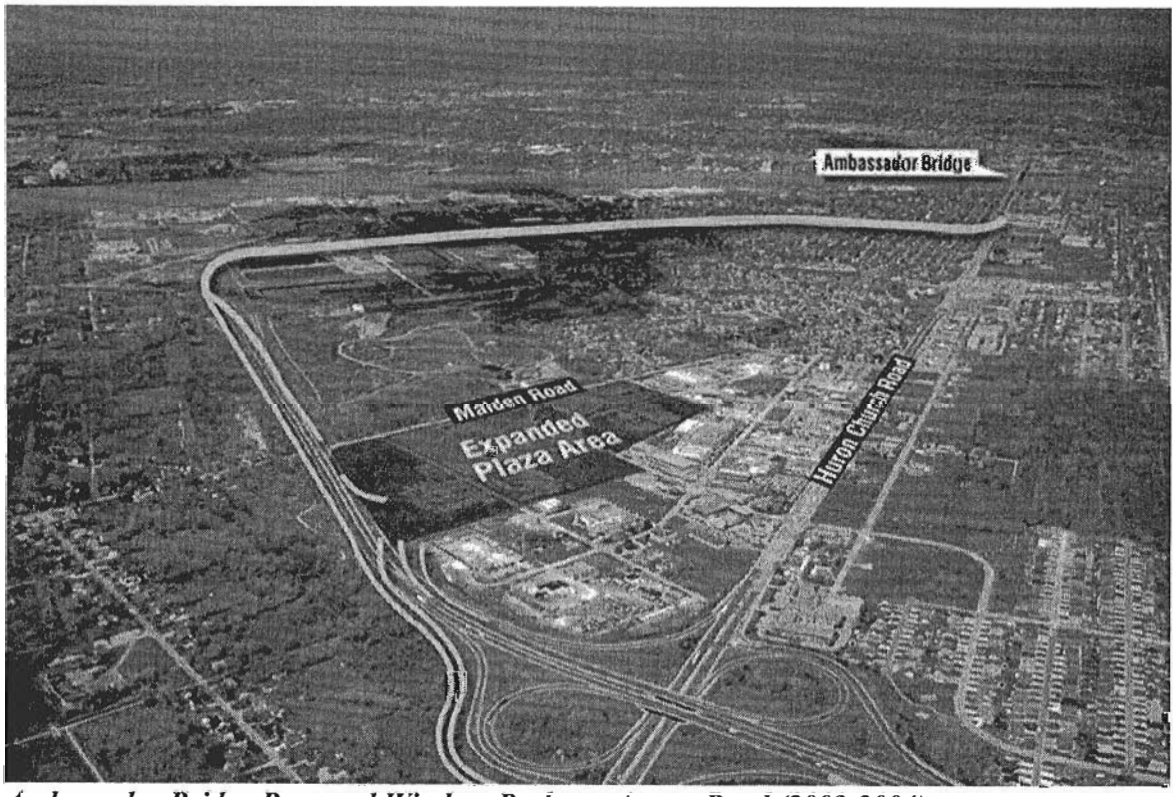
The Bluewater Bridge EIS therefore provides a clear precedent as to why alternative locations must be addressed in this case too.

Further, newspaper articles in the U.S. and Canada report that CenTra Inc. (the parent company of DIBC/CTC) and its various subsidiary corporations own or control extensive lands along the American and Canadian shore of the Detroit River in the City of Detroit and in the City of Windsor. They clearly have the option of building another bridge in a location that is not

immediately adjacent to the existing Ambassador Bridge. The Proponent should therefore be required to examine other alternative crossing locations in any EA.

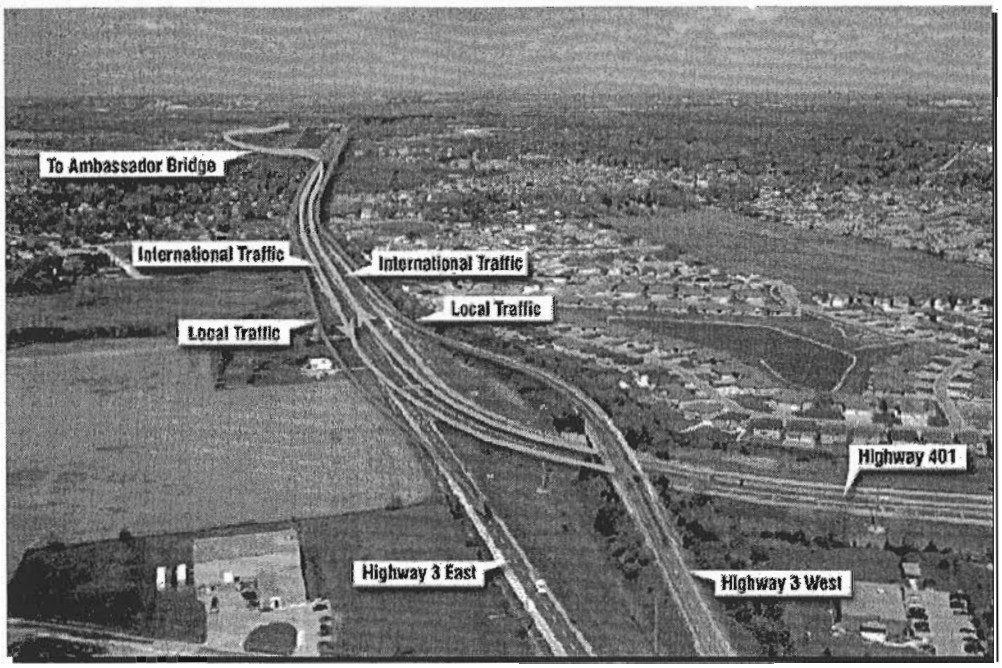
City staff also submit it is reasonable that the proponent be required to include in its NEPA analysis a component dealing with reasonable alternative access routes for traffic using the new bridge – something which the proponent has already studied and once proposed to undertake in Windsor – but which the proponent failed to include in information submitted to the Coast Guard.

See the following pictures prepared by the proponent in 2003-2004 illustrating their proposed Ambassador Bridge Parkway access road.



Ambassador Bridge Proposed Windsor Parkway Access Road (2003-2004)

Ambassador Bridge Parkway Concept



Looking North down the 10 km Parkway, this illustrates the dedicated proposed Parkway route from the end of the 401 to E.C. ROW with provisions for local access.

Although the proponent previously recognized the need for an alternative access to its bridge, as illustrated above, it has failed to proposed such an alternative access in its draft EA.

Without an alternative access route, all international traffic to and from the new Ambassador Bridge north of the E.C. Row Expressway will necessarily be required to use Huron Church Road. That in turn would cause major traffic chaos as well as unacceptable air and noise emissions in Windsor.

Importantly, the DRICP rejected the viability of another bridge next to the Ambassador Bridge location which did not have an alternative access road.

Specifically, after carrying out an assessment of traffic impacts, potential noise impacts, impacts to community cohesion and character and displacement of population, the DRICP study concluded that:

> *Expanding Huron Church/Talbot Road from Highway 401 to the plaza at Ambassador Bridge will displace approximately 135 homes and over 85 businesses, while over 2100 households and approximately 25 businesses will be disrupted (i.e. are within 250m of the centerline).*

> *Expanding the existing plaza and construction of a new freeway in the Huron Church Road corridor has high potential for disrupting international traffic in this important trade corridor. With the Crossing X12 alternative, the entire length of Huron Church up to the Ambassador Bridge would require reconstruction.*

The Coast Guard is a Cooperating Agency in the DRICP, a project which is sponsored in the U.S. by the Federal Highway Administration (FHWA) and the Michigan Department of Transportation. These DRICP conclusions are therefore highly relevant, in that from this work the Coast Guard must be taken to know (a) that public agencies in the U.S., which include FHWA, have previously concluded that a second Ambassador Bridge at this location will have significant environmental impacts, which in turn mandates that the Coast Guard ensure an EIS, not an EA, is used in processing the Ambassador Bridge application; and (b) the Coast Guard must be particularly concerned to ensure that alternative locations, not just alternative designs, for the new bridge are considered as well as alternative access routes– particularly given the DRICP conclusions as to the impacts of using the current Huron Church Corridor combined with the fact that the Ambassador Bridge previously advocated a new Bridge Parkway.

Part 2

An EIS, not an EA, is Required to Properly Assess the Significant Impacts of this Major Action

There are a number of reasons why an EIS, not an EA, is required for the Coast Guard to satisfy its NEPA obligations in this case.

a) This Project is highly controversial because of its effect on the human environment; Coast Guard Commandant Instructions provide that "actions which normally require an EIS include...(f) actions which generate significant controversy because of effects on the human environment".[26]

There Will be Effects of the Project on the Human Environment – Despite the Draft EA

According to the draft EA this project would cause little if any effects on the environment. However, we suggest that the draft EA provides no credible basis to reach that conclusion and that Coast Guard reliance on it for that purpose would be clearly misplaced.

The proponent makes the misleading assumption that its project will not increase border traffic, and does not include a traffic impact study of Windsor roadways leading to and from the bridge, claiming that "the impact of the proposed project is confined within the project limits and there would be no impact to traffic flow outside of the respective Plazas".

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[26] Coast Guard Commandant Instruction M16475.ID, Chapter 2, pages 2-8 and 2-9.

However, as this submission and other have shown, this is a misguided and unrealistic perspective.

Based on the CEQ Regulation definition of the term "human environment", previously referenced, and having regard to the various air, noise, traffic, planning, and community impacts this project will cause, as described earlier in this submission and the Attachments enclosed, and the various impacts of concern to relevant U.S. agencies such as the EPA and others on file with the Coast Guard, there can be no doubt this project and its necessarily related components, will have impacts on the human environment.

The new bridge has already generated and continues to generate significant controversy because of effects on the human environment

There can be no doubt that this project has already generated and continues to generate increasing significant controversy because of effects on the human environment.

The concern and controversy come from highly credible sources, including the City of Detroit, the City of Windsor and other public agencies, as well as from well respected and experienced environmental organizations and community groups.

Position of City of Windsor

With respect to the City of Windsor, the project is clearly controversial as evidenced in a resolution passed by Windsor City Council on October 10, 2006. Please see **Attachment Volume 1, Tab 5** to this submission, being a certified true copy of that resolution, certified by the City Clerk October 12, 2006.

The October 10, 2006 resolution recites a number of facts generating the concern of City Council and making the project controversial. Please see Appendix A to that resolution which sets out a number of facts which were important to City Council at that time and continue to make the project controversial for the City of Windsor and would make it controversial to any other objective observer.

Among these are the following:

> "(u) The Council of the City of Windsor is of the opinion that the proposed second bridge will have significant detrimental impacts on the environment, on the City and will be inconsistent with the City of Windsor's Official Plan and Zoning By-law.

In the body of the resolution City Council resolves that the Coast Guard should conclude there is no basis for maintaining its original preliminary determination that the second bridge can be processed as a "categorical exclusion"; and goes on to state that "when and if the application becomes ripe for processing, the Coast Guard is required to prepare a full environmental impact statement which considers alternatives to the proposed action as well as the transboundary and "foreign" environmental effects of the proposed action within the City of Windsor".

Accordingly the Coast Guard now has in its files a formal position from the City of Windsor substantiating its concerns as well as calling upon the Coast Guard to undertake a full

environmental impact statement.

The controversial nature of the proposal as it affects the City of Windsor is also substantiated in **Attachment Volume 1, Tab 1** being the August 29, 2007 letter from the City of Windsor's General Manager of Public Works.

The Position of the City of Detroit City Council, EPA and Other Agencies Substantiate the Controversial Nature of This Project

Both in September 2006 and on July 16, 2007 City Council of the City of Detroit affirmed that it had substantial concerns with this project. The wording used in Detroit's resolutions clearly substantiate that Detroit finds this project to be worrisome from the perspective of impacts on the human environment and that it is "controversial" for that U.S. municipal government.

Similarly, letters that the Coast Guard has received in 2007 from the United States Environmental Protection Agency (letter dated July 17, 2007) from Kenneth A. Westlake providing detailed U.S. EPA comments) and as well as comments from the Federal Highway Administration, Michigan Division and the Southeast Michigan Council of Governments (SEMCOG) all provide insightful and substantive comments with respect to potentially significant environmental impacts of this project that could occur and which have not been properly evaluated at all or in any way consistent with NEPA.

b) An EIS is required because, based on objective answers to the Coast Guard's own Guidance Document (Commandant Instructions Environmental Checklist) there will be significant impacts and/or that the project is controversial.

The U.S. Coast Guard's Commandant Instruction M16475.1D (November 29, 2000), a manual which "establishes policy and prescribes responsibilities and procedures for Coast Guard implementation of" NEPA, contains (Enclosure 2) 10 questions which comprise "the analysis portion of the Environmental Checklist".

The environmental analysis references specific pages under the heading "Considering Environmental Consequences" to obtain guidance before the checklist is applied. The manual states that each question calls for judgment about the likelihood that a particular kind of environmental consequence will result from the proposed action. It states further that:

> "The purpose of this checklist is to service a tool for the decision maker and/or Environmental Protection Specialist to determine the proper level of NEPA analysis with which to begin and to identify areas of potential problems and concern."

Please refer to the letter dated September 13, 2006 from Robert Hayes the then City Planner for the City of Windsor, contained at Tab 2 of Volume 1 of the City of Windsor September 14, 2006 filing with the Coast Guard. Mr. Hayes, a professional land use planner with over 35 years experience, who has participated in the preparation of numerous environmental impact statements/assessments for projects such as roads, bridges, grade separations and land use master plans and who states in his letter he has had considerable opportunities to use criteria such as are found within the Coast Guard Checklist in order to reach preliminary determinations of potential land use and environmental impacts, sets out in that letter, at page, at pages 10 – 19, his analysis

and answers to those questions.

As you will see from a review of Mr. Hayes' submissions to the Coast Guard, objective answers to the Coast Guard Environmental Checklist questions clearly demonstrates there are likely to be significant impacts from this project and that it is controversial.

c) An EIS is required because it is clear that the Coast Guard approval of this project would be a "major federal action significantly affecting the quality of the human environment" as set out in Section 102(2)(C) of NEPA, as further interpreted by Section 1508.18 of the CEQ Regulations as including "actions with effects that may be major and which are potentially subject to federal control and responsibility".

The conclusion an EIS is required is also based on the definition of "significantly" provided in Section 15 08.27 of the CEQ Regulations. The CEQ Regulations provide that this term requires consideration of both context and intensity:

> "'Significantly' as used in NEPA requires considerations of both context and intensity:
>
> (a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the affects in the locale, rather than in the world as a whole. Both short and long-term effects are relevant."

Pausing here, it can be clearly discerned that this project has significance when consideration is given to the context. This project will transport both local and international vehicles and be an essential component of one of the most major traffic arteries in North America. It also channels significant traffic through major urban areas, including the City of Windsor where such traffic is already causing significant problems and where land uses adjoining the corridor are already affected by such traffic.

The project has the potential, as indicated elsewhere in this submission, to cause transboundary air impacts that transfer hazardous contaminants between Canada and the United States and which would affect the health of local persons.

The project clearly is significant for all of these reasons.

> (b) Intensity. This refers to the severity of impact... . The following should be considered in evaluating intensity.
>
> 2. *The degree to which the proposed action affects public health or safety.*

Pausing here it is clear that this project has the potential to affect both public health and safety. The Sam Schwartz engineering analysis clearly indicates that the project has the potential to affect public safety particularly on Windsor streets. The AMEC Air Impact Analysis previously referenced clearly provides evidence as to how the project could affect public health both in

Canada as well as in the United States.

The U.S. EPA, the Canadian Health Department and Environment Canada are agreed that emissions of PM 2.5 are health impactive.

As indicated earlier in this submission, on July 12, 2007 the U.S. EPA wrote to the Coast Guard repeating its 2006 concerns that the project would have an affect on air quality. The EPA reminded the Coast Guard that "Emissions from idling diesel trucks in the area at plaza operations and from traffic on the bridge and surrounding highway systems are a human health concern," and the EPA recommended that

> "Analysis should be conducted to assess air quality impacts from this project."

Certainly no such analysis has been actually provided by the proponent in terms of U.S. air quality criteria and no attempt has been made by the proponent to assess these impacts in Windsor. Again, there has been no attempt to assess transboundary impacts – another concern of the EPA. (See the last page of their detailed comments.)

There is also the real potential for toxic spills of contaminants from this bridge which have not been assessed. The City has earlier presented in its submission facts with regard to a spill which occurred as recently as within 10 days prior to this letter being drafted. The proposed new bridge would take thousands of vehicles loaded with materials as well as fuelled by oil and diesel over the roofs of hundreds of houses and proximate to University of Windsor residences and the impact of spills has not been addressed, let alone assessed.

Returning to the U.S. CEQ definition of "significant" and that "intensity" is relevant to be evaluated, the CEQ Regulations state as follows:

> "4. The degree to which the effects on the quality of the human environment are likely to be controversial."

This project is certainly controversial. The DRIC report findings by four governments – indicate that it is wholly inappropriate to locate a new crossing at this location because of the substantial negative impacts that this project would cause on the City of Windsor – yet this proponent takes the view it can ignore any such findings. We have outlined earlier other reasons why this project is clearly and highly controversial.

Also, the CEQ Regulations indicate that in assessing "intensity" it is necessary to assess another factor "cumulative impacts".

The CEQ statement is as follows:

> "7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts, it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts."

However, that is exactly what the proponent has sought to do in its application and in its draft

EA. It has attempted to avoid any discussion of access roads that would need to be substantially improved, plazas that would need to be expanded, and equally importantly, it has avoided any analysis of existing air, noise or other problems being created by the existing bridge in Windsor and simply seeks to suggest that because it is merely a small "enhancement" of the current bridge, the new project will not cause additional impacts (again without any reference to current impacts).

In effect, the Proponent has sought to completely avoid an assessment of cumulative impacts. It has arbitrarily approached the matter by seeking to avoid any discussion of anything other than impacts from the bridge itself – as if the bridge existed in a vacuum without any access roads and without traffic impacts from the use of those roads.

This is clearly a violation of basic NEPA principles.

Under NEPA, federal agencies are mandated to assess the environmental impacts of major federal actions significantly affecting the quality of the human environment. 42 U.S.C. § 4332(C). Specifically, agencies must prepare an EIS for any proposed federal action that may significantly affect the human environment. NEPA places an obligation on federal agencies to consider every significant aspect of the environmental impact of a proposed action and to inform the public through the EIS that it had considered environmental concerns in the decision making process. *Baltimore Gas and Electric v. NRDC*, 462 U.S. 87, 97 (1983).

Courts have consistently required the agencies to conduct an EIS under similar circumstances; any attempt to satisfy NEPA with a FONSI based on an EA will not survive scrutiny. *See Ocean Advocates v. United States Army Corps of Eng'rs*, 402 F. 3d 846 (9th Cir. 2004) (EIS required, and EA/FONSI inappropriate, where traffic to pier in question doubled, creating environmental effects that required study); *Davis v. Mineta*, 302 F. 3d 1104 (10th Cir. 2002) (project that involved the widening and construction of five-lane highway and new bridge mandated EIS due to increases in traffic and noise levels, therefore an EA and FONSI were improper); *Audubon Soc. of Cent. Arkansas v. Dailey*, 977 F. 2d 428 (8th Cir. 1992) (affirming district court's order of EIS for bridge project where increased traffic and impacts on parks could not support the issuance of an EA/FONSI); *Citizen Advocates for Responsible Expansion (I-CARE) v. Dole*, 770 F. 2d 423 (5th Cir. 1985) (highway expansion from four to eight lanes that included impact on historical sites required preparation of EIS, not a negative environmental declaration, the predecessor to EA and FONSI); *Mountaineers v. United States Forest Serv.*, 445 F. Supp. 2d 1235 (D. Wash. 2006) (EIS required and FONSI inappropriate for new bridge project, where construction of bridge created, among other impacts, increased traffic flow); *Ark. Nature Alliance, Inc.*, 266 F. Supp. 2d 876 (E.D. Ark. 2003) (Corps of Engineers violated NEPA when it did not conduct EIS for modification to low-water bridge where, among other things, new bridge was twice as large); *Mullin v. Skinner*, 756 F. Supp. 904 (E.D.N.C. 1990) (bridge replacement project which could significantly increase traffic required EIS, not FONSI).

According to the U.S. Supreme Court, all federal agencies must take a hard look at the potential environmental effects of major federal actions. *Kleppe v. Sierra Club*, 427 U.S. 390. Under NEPA, the Coast Guard must take a hard look at the proposed project and identify potential impacts. Where the impacts may be significant, the Coast Guard must prepare an EIS. The Coast Guard has substantial evidence before it of the numerous significant impacts from this

project. The Coast Guard cannot reasonably conclude that the construction of a six to eight lane international bridge to be located in the heart of two major cities would not have any potential significant impacts. The complexities of the project, the level of coordination still required between governments, remaining environmental questions, the possibility of unevaluated connected actions, and the controversial nature of the project preclude a FONSI. Thus, the Coast Guard must conduct an EIS.

d) It Would be Arbitrary and Capricious Not to Use an EIS for This Project

Case Study: The Goethals Bridge

The City submits that there is a direct precedent for the Coast Guard to use an EIS in respect of this particular type of project insofar as the Coast Guard has been engaged in ensuring that an appropriate EIS is carried out for the Goethals Bridge Replacement Project.

The Goethals Bridge spans the Arthur Kill between Staten Island, New York and Elizabeth, New Jersey. The Port Authority of New York and New Jersey is the proponent of the replacement project.

The Goethals Bridge project and the Ambassador Bridge project are, in essence, exactly the same. Both projects will replace aging four-lane bridges with new six-lane bridges.

In particular, **both projects share the following key characteristics**:

- Both projects involve the replacement of old bridges (the Goethals Bridge opened in 1928; the Ambassador Bridge opened the following year) with new ones – rather than the construction of new bridges in entirely new footprints
- Both projects will increase the number of vehicle lanes – in both cases, there will be six lanes (three in each direction) of 12 feet in width, plus shoulders (the existing bridges have only four narrower lanes and no shoulders)
- Neither project involves increasing capacity on connecting roadways
- Both projects are similar in size: the current Goethals Bridge has a total span of 7,100 feet and the current Ambassador Bridge has a total span of 9,000 feet
- Both projects are in developed urban areas
- Both projects are integral pieces of major transportation corridors (the Goethals Bridge is part of I-278, while the Ambassador Bridge is the busiest Canada-US crossing) and are very heavily used by trucks and passenger vehicles
- The Coast Guard is the lead federal agency on both projects

In view of these striking similarities between the two bridge projects, **the City submits that <u>there is no principled basis for requiring an EIS for one but not the other</u>**. And yet that is

what the Coast Guard has done. As the Coast Guard indicated in its Notice of Intent published in the Federal Register on August 10, 2004:

> "Based on available information, the Coast Guard has determined that an EIS would be the appropriate level of environmental documentation for assessing the potential impacts of the proposed project under Section 102(2)(C) of the National Environmental Policy Act (NEPA) of 1969, as amended."

The Notice of Intent further specified that the EIS would need to consider alternatives to the proposed replacement project:

> "In addition to the no-build alternative (no action), the selection of alternatives to be evaluated in the DEIS [Draft EIS] may include: alternative alignments within the existing bridge corridor; alternative bridge designs; provision of high-occupancy vehicle or express bus lanes; intelligent vehicular highway system options; congestion pricing options; consideration of transit alternatives such as potential light rail, commuter rail, bus and/or ferry routes and services; as well as other reasonable alternatives identified by the public."

Fifteen preliminary alternatives were identified and considered:

- Six new-crossing alternatives
- Two transit alternatives
- Three freight-movement alternatives
- Four travel demand-management alternatives

Subsequently that list has been narrowed down to four bridge-replacement alternatives, which will be subjected to detailed evaluation:

- Single six-lane bridge replacement – south of the existing Goethals Bridge
- Single six-lane bridge replacement – north of the existing Goethals Bridge
- Twin parallel three-lane bridge replacements – one south of the existing Goethals Bridge and one in the existing alignment
- Twin parallel three-lane bridge replacements – one north of the existing Goethals Bridge and one in the existing alignment

The EIS will also examine the following alternatives:

- "Special use lanes" for express buses and high-occupancy vehicles
- Congestion pricing on the replacement bridge(s)

- The "no-build" alternative

In addition to the usual noise and air issues, the EIS will consider potential environmental issues such as "traffic and transportation", "land use", "cultural resources", "socio-economics", "environmental justice", "neighbourhood character and cohesion", as well as "hazardous materials".

The EIS will examine the environmental impacts well beyond those that are immediately adjacent to the proposed project. Traffic and traffic-related impacts, such as air quality and noise, will be assessed in two study areas. One regional traffic study area encompasses the major roadways in a 28-county area in New Jersey, New York and Connecticut. Another local traffic study area encompasses the communities in close proximity to the Goethals Bridge, including Manhattan and Brooklyn.

The "Draft Scoping Document for EIS Preparation in Conjunction with Proposed Replacement of the Goethals Bridge" (2004) specifies that:

> "Analyses will be conducted to estimate the following:
>
> - Pollutant levels near heavily traveled roadways and congested intersections that may be affected by the proposed alternatives under existing and future No Action conditions;
>
> - Pollutant levels near heavily traveled roadways and congested intersections that may be affected by the proposed alternatives under future conditions with the proposed project alternatives, and the potential localized impacts associated with project-generated changes in traffic volumes of traffic patterns;
>
> - Changes in the amounts of vehicular emissions generated in the NY and NJ portions of the study area under each of the proposed alternatives, with respect to the requirements of each State Implementation Plan (SIP); and
>
> - Potential impacts associated with the construction phase of the proposed alternatives.
>
> The pollutants to be considered in this analysis include:
>
> - Carbon monoxide (CO), particulate matter less than 10 microns (PM10) and less than 2.5 microns (PM2.5) for the localized (microscale) mobile source analyses; and
>
> - CO, PM10 and ozone precursors [i.e., nitrogen oxides (NO_x) and hydrocarbons (HCs)] for the regional (mesoscale) analysis."

Please see **Attachment Volume 2** to this submission, being a copy of the Federal Register of August 10, 2004 as well as materials from the Goethals Bridge Replacement EIS website.

It is difficult if not impossible to differentiate the Goethals Bridge Replacement Project from the Ambassador Bridge Enhancement Project. They share many similar characteristics and there cannot be any rational reason why one would merit an EIS and the other one would not. In our submission it would be arbitrary and capricious for the Coast Guard not to require an EIS for the Ambassador Bridge Enhancement Project where the EIS process is being applied to the Goethals Bridge Replacement Project.

Other Precedents for an EIS

Besides the Goethals Bridge project, there are many examples of bridge projects that have been required to undergo an EIS. These include the following bridge projects, some of which are illustrated in material on file with the Coast Guard.[27]:

The Blue Water Bridge Additional Capacity Project (Michigan/Ontario)

This project involved the twinning of the Blue Water Bridge spanning the St. Clair River from Port Huron, Michigan to Point Edward, Ontario. A new three-lane span was built alongside the existing three-lane span, which was then refurbished. Both spans are just over 6,000 feet long.

The second span was recommended in an EIS completed by the Michigan Department of Transportation in co-operation with the Federal Highway Administration in 1983. The EIS examined four alternatives:

- Do-Nothing
- Low-Capital Expenditure Alternative (i.e. minor improvements to the bridge and plaza without physically increasing capacity)
- Alternative Modes of Transportation (e.g. mass transit, car ferry)
- Major Reconstruction (i.e. construction of a second span and major reconstruction of the plaza; within this alternative, several possible locations were evaluated, and a tunnel option was also considered)

In 1994, the Michigan Department of Transportation in co-operation with the Federal Highway Administration, in co-operation with the Coast Guard, issued an "Environmental Report (and Re-Evaluation of 1983 Environmental Impact Statement)". This report "concluded that the details of the project have not changed significantly and that project impacts assessed and reported on in the 1983 E.I.S. reflect those of the current project."

The second span opened in 1997. Currently, proposed improvements to the Port of Entry Plaza on the US side are being scrutinized under a separate EIS process.

The Cooper River Bridge Replacement Project (South Carolina)

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[27] See FOIA response D9 27/07 pp.0279 and 0281.

The new Arthur J. Ravenel, Jr Bridge over the Cooper River replaced two deficient bridges, the Grace Memorial and Silas Pearman bridges, which together had five lanes of traffic. It connects Charleston with the town of Mount Pleasant. The new bridge accommodates eight lanes of traffic, plus a sidewalk. It is 2.7 miles long.

An EIS for the project was completed in 1998. The following alternatives were considered:

- No new crossing
- Crossing replacement at existing corridor
- Crossing replacement at new corridor
- New crossing alternatives

The crossing replacement at a new corridor, which was found to have less environmental impacts including better flow for surrounding traffic, became the Preferred Alternative. The Preferred Alternative was evaluated in terms of environmental consequences, socioeconomic impacts, compatibility with local planning goals, and public opinion. Studies evaluated the effects on surrounding traffic and found the new bridge would increase flow and safety.

The EIS was re-evaluated in 2001 due to revisions to the design scrutinized in the Final EIS. The Federal Highway Administration and the South Carolina Department of Transportation determined that the revisions did not represent significant new impacts and a Supplemental EIS was not required.

The new Cooper River Bridge opened in July 2005, a year ahead of schedule.

Carquinez Bridge Project (California)

The Carquinez Bridge consists of two parallel spans crossing the Carquinez Straight in the San Francisco Bay Area. The first span was built in 1927 and the second in 1958. In 2003, the 1927 span was replaced largely on account of seismic problems. The 1927 span is currently being demolished and removed.

The replacement bridge alignment is west of the two existing bridges and provides for three mixed-flow plus one high-occupancy vehicle lane and a bicycle/pedestrian lane. It is 0.66 miles long.

The U.S. Department of Transportation Federal Highway Administration was the lead agency on this project with the US Coast Guard as a co-operating agency. The project underwent an EIS which analyzed the following alternatives:

- No build
- Retrofit and rehabilitation of the existing bridges
- Replacement bridge on a western, eastern, and central alignment

Technical studies undertaken for the EIS included traffic forecasting and operations, air quality, noise, biology, socioeconomic and land use, right-of-way, visual, marine operations, geology/seismically, hydraulics, currents and sedimentation, water quality, hazardous wastes, historic/cultural resources and construction traffic impacts.

The New Mississippi River Bridge Project (Illinois/Missouri)

This project refers to the development of transportation improvements connecting Illinois and Missouri and features a new bridge just north of downtown St. Louis. The new bridge will accommodate eight lanes of traffic and will have a length of just over 2,000 feet. The project aims to provide safer travel, reduced delays and less pollution for those living and travelling in the region.

In 2001 a Final EIS was completed. The EIS considered and evaluated alternatives, including:

- Downtown traffic monitoring measures to modulate the flow of traffic
- A transit pricing option that would reduce the cost of public transit during peak periods to encourage transit use between Illinois and downtown St. Louis
- A preferred alignment for a new bridge on the north side of downtown
- Further investigation of tolls as a possible new bridge financing method

Although a Record of Decision was issued in 2001, the project was subsequently re-evaluated, and some components of the project have been deferred until funding becomes available. The bridge has not yet been built.

Summary

The parallels between the Blue Water Bridge Additional Capacity Project and the Ambassador Bridge Enhancement Project are apparent. Above all, both involve the doubling of lane capacity on a busy Canada-US crossing. It is logically and legally inconsistent to require an EIS for the former but not the latter.

The Cooper River Bridge, Carquinez Bridge and Mississippi River Bridge projects illustrate that bridge projects both larger and smaller in scope than the Ambassador Bridge Enhancement Project have required an EIS. Consistency with these precedents demands that the Ambassador Bridge Enhancement Project submit an EIS.

Closing

As indicated at the outset, the City has a direct interest in this matter as evidenced by all of its previous and current submissions. There is a clear rationale as to why only an EIS would satisfy the requirements of NEPA in this case. The submitted draft Environmental Assessment is fundamentally deficient. We ask that the Coast Guard act to fulfill the requirements of NEPA and to protect the interests of the environment both in the United States and Canada.

Although we submit an EIS is required, should the Coast Guard determine to only request the proponent to carry out supplementary studies and/or do a further or amended EA, the City requests the opportunity to comment on any such new studies or drafts of the EA.

If you have any questions or require any further information, please advise.

Yours sincerely,

GOWLING LAFLEUR HENDERSON LLP

David Estrin
Certified Environmental Law Specialist

DE:tp

Attachments:

Volume 1 and Volume 2

Wind rose plot – Detroit/Metropolitan Airport

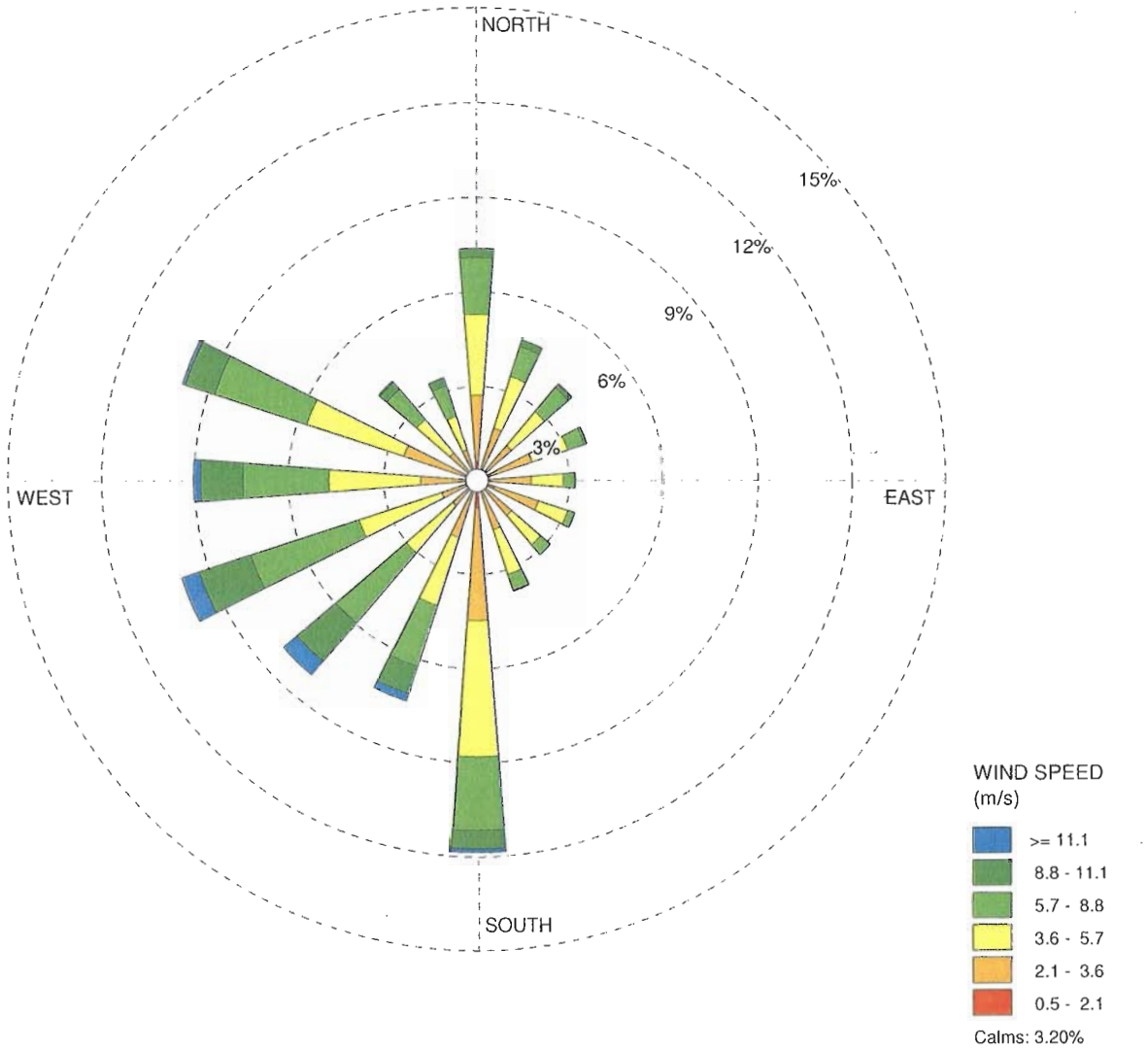
TOR_LAW\ 6677083\1

WIND ROSE PLOT:

Station #94847 - DETROIT/METROPOLITAN ARPT, MI

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	1990 1989 1988 **Jan 1 - Dec 31** **00:00 - 23:00**	MODELER:	
	CALM WINDS: **3.20%**	TOTAL COUNT: **26300 hrs.**	
	AVG. WIND SPEED: **5.18 m/s**	DATE: **8/30/2007**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Gateway Community Development Cooperative's
Comments to the U.S. Coast Guard
Regarding the
Ambassador Bridge Expansion Project
08-30-2007

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August 30, 2007

Robert Bloom
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Ninth Coast Guard District
1240 E. 9th Street - Room 2025
Cleveland, OH 44199-2060

UPS OVERNIGHT DELIVERY

Re: Draft Environmental Assessment for Ambassador Bridge Enhancement Project
Our File No. 5550.00

Dear Mr. Bloom:

Our firm represents the Gateway Communities Development Collaborative (GCDC), and these comments on the Draft Environmental Assessment (DEA) for the Ambassador Bridge Enhancement Project are submitted on behalf of GCDC and its members.[1] We respectfully request that the United States Coast Guard (USCG) complete a full Environmental Impact Statement (EIS) for the project, for the reasons that follow.

I. GCDC'S INTERESTS

The Gateway Communities Development Collaborative was established in 1999 as an association of community based nonprofit organizations involved in the planning and development of housing and economic development projects in Southwest Detroit. Our members include:

- Bagley Housing Association
- Bridging Communities
- Greater Corktown Development Corporation
- Mexicantown Community Development Corporation
- Michigan Avenue Business Association
- Neighborhood Centers, Inc.
- Southwest Detroit Business Association
- Southwest Detroit Environmental Vision
- Southwest Solutions/Southwest Housing Corporation

Attached (**Exhibit 1**) is a list of each member's address. Also attached (**Exhibit 2**) are letters and comments by GCDC's member-organizations. Those letters confirm that the project is likely to impact local tourism, local economic endeavors (such as redevelopment and affordable housing projects), and the quality of life in the neighborhoods from noise, trucks, odors, and air pollution.

GCDC and its member organizations serve the people who live in the shadow of the Ambassador Bridge, and the residents and community representatives serve on the boards of and guide all the GCDC member organizations. GCDC's mission is to promote the interests of these residents and organizations in Southwest Detroit in various ways, including undertaking residential redevelopment projects, advancing economic development projects, and creating liveable communities in these historic regions. We are uniquely qualified to comment upon DIBC's proposal to create a twin bridge next to the Ambassador Bridge because of our physical proximity to the

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[1] The USGC extended the comment period for GCDC until August 31, 2007.

bridges, the disproportionate local impacts the new bridge would have on the people that live and work around it, and the distinct historic role of the Ambassador Bridge in our communities. As local community-based and controlled organizations that work daily with the people most directly and personally impacted by the twin bridge proposal, we trust USCG will give our comments due weight.

We note that many other agencies and entities have already commented on the DEA, and most of those comments raise significant deficiencies with the DEA. Rather than reiterating all of those comments, we simply incorporate by reference into these comments all of the comments, arguments, data, and exhibits raised or submitted to the USCG on the draft Categorical Exclusion and the DEA. This also includes, without limitation, all of the documents and materials related to the Section 106 consulting process under the National Historic Preservation Act (NHPA).

II. THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) PROCESS

The issuance of a bridge navigation permit under 33 U.S.C. § 401 is a major federal action that triggers the procedures mandated by the National Environmental Policy Act (NEPA) process.[2] NEPA requires agencies to consider whether a project may significantly affect the human environment, and, if it may, then to thoroughly analyze its relative merits before deciding how to act. An agency may do an Environmental Assessment (EA) to determine whether a Finding of No Significant Impact (FONSI) or a full EIS is appropriate. The EA must demonstrate, through sufficient evidence and analysis, that the agency studied the issues and properly considered the possible environmental impacts of the project.[3]

In deciding whether a project may significantly impact the quality of the human environment, the USCG must evaluate a range of factors, including ecological, aesthetic, historic, cultural, economic, social, and health impacts, whether direct or indirect, and their cumulative impacts.[4] The "significance" inquiry requires consideration of: effects upon public health and safety; unique characteristics of the geographic area such as proximity to historic or cultural resources; environmental effects that are likely to be highly controversial; effects that are highly uncertain or involve unique or unknown risks; whether the decision may establish a precedent for future actions with significant effects; whether the action is related to other actions with individually insignificant but cumulatively significant impacts; adverse effects upon highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places; and whether the action threatens a violation of environmental protection law.[5] In sum, an EA may be a permissible first step to evaluate the impacts of a project, but it must be comprehensive enough to understand whether the impacts may be "significant," as that term is defined under the NEPA regulations. If the impacts *may* be significant, the agency *must* do a full EIS.

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[2] 42 U.S.C. § 4332; 40 C.F.R. 1508.18(b)(4).

[3] 40 C.F.R. § 1508.9(a)(1).

[4] 40 C.F.R. §§ 1508.8, 1508.27.

[5] 40 C.F.R. § 1508.27(b)(2)-(10).

In addition, to fully consider the significance of a project's impacts, agencies must integrate required analyses under other statutes into their EA and/or EIS.[6] Pertinent to this project are Section 4(f) of the Department of Transportation Act, 49 U.S.C. § 303, Sections 106 and 402 of the National Historic Preservation Act, 16 U.S.C. § 460f, and the Michigan Environmental Protection Act, M.C.L. § 324.1701 *et seq*; we discuss these below. These other statutory obligations may inform the agency decision whether the project impacts may be significant.

NEPA is intended as a comprehensive process mandated by federal law to ensure the conduct of federal agencies is protective of human health and the environment.[7] When an agency properly follows the NEPA process, the agency has an opportunity to take the required "hard look" at the environmental consequences of – and alternatives to – its actions. The "hard look" is informed by the comments and concerns of the public: NEPA mandates that the people affected by a proposal must have a meaningful opportunity to understand and comment both on the project itself and on the agency's proposed course of action.[8]

If at the end of the EA process it is apparent the project may have significant impacts on the quality of the human environment, then the agency must undertake a full EIS, with all the attendant evaluation, notice, and comment procedures that entails. In other words, an EA (even a long and comprehensive EA) cannot substitute for an EIS where the impacts of a project may be significant.[9] The EA may be a short-cut around the EIS process for insignificant projects (in terms of impacts to the human environment); it may simply procrastinate the EIS process for a project with significant impacts.[10] The proposal to twin the Ambassador Bridge will have significant impacts on the quality of the human environment, so a full EIS is required.

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[6] 40 C.F.R. §§ 1502.25, 1506.2.

[7] 42 U.S.C. § 4331.

[8] 40 C.F.R. §§ 1500.1(b), 1506.6, 1501.4(b), 1501.4(e)(2); *Fund For Animals v. Norton*, 281 F.Supp.2d 209, 225-29 (D.D.C. 2003).

[9] *See Sierra Club v. Marsh*, 769 F.2d 868, 875 (1st Cir. 1985) ("[U]nder NEPA and its implementing regulations, we cannot accept the EA's as a substitute for an EIS-despite the time, effort, and analysis that went into their production-because an EA and an EIS serve very different purposes. An EA aims simply to identify (and assess the 'significance' of) potential impacts on the environment; it does not balance different kinds of positive and negative environmental effects, one against the other; nor does it weigh negative environmental impacts against a project's other objectives, such as, for example, economic development. This latter balancing job belongs to the officials who decide whether to approve the project; and (where there are 'significant effects') those officials should make the decision in light of an EIS. An EIS helps them make their decision by describing and evaluating the project's likely effects on the environment. The purpose of an EA is simply to help the agencies decide if an EIS is needed..").

[10] *See id.*

III. PURPOSE OF THE AMBASSADOR BRIDGE ENHANCEMENT PROJECT

Under all applicable regulations, the USCG analysis of this project should begin by properly defining the purpose and need for the project. We therefore address this up front, too.

The USCG[11] identifies the proposed project as building a new crossing between the United States (in Detroit) and Canada (in Windsor). The DEA would benefit from a more clear statement of the intended purpose and need for this project, but from what we gather, the stated need appears to be to increase trade efficiency between Detroit and Windsor (or the U.S. and Canada). The DEA states the purpose is "to ensure the free flow of trade and people can continue to occur unimpeded at the busiest border crossing in North America."[12] Another clue into the identified need and purpose can be found in the conclusion that twinning the Ambassador Bridge is the best option to "reduce congestion, promote economic growth and development, and likely improve air quality."[13]

It is noteworthy that the USCG does *not* claim the purpose of the twin bridge project is to be able to retire the existing Ambassador Bridge for physical or structural reasons. If the need for the twin project were that the integrity of the existing bridge is in jeopardy, the DIBC and USCG should have made this clear in the DEA, as the stated need for the project significantly impacts the alternatives available to meet that need. To the contrary, it appears the existing bridge is in fine shape and that DIBC intends to use the existing bridge in some fashion indefinitely.[14]

Nor does the USCG identify real security threats associated with the existing bridge, though it implies the twin bridge will improve security.[15] Again, if the purpose of the project really is to improve the security of the Ambassador Bridge crossing, then the DEA must explain the point (*i.e.*, explain the threats and how this will resolve them), and also include this factor among the criteria for comparing it to alternatives. The DEA does neither.

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[11] As a threshold matter, we acknowledge that the Draft Environmental Assessment (DEA) was actually drafted by DIBC's consultants. However, because the USCG presented DIBC's document as its own DEA, the USGC is responsible for the positions, arguments, and analyses (or lack thereof) in the DEA, and we assume the USCG either did or will at some point review and approve those positions, arguments, and analyses as its own. *See* COMMANDANT INSTRUCTION M16475.9D p 3-4 (Nov. 29 2000).

[12] DEA, p. 2.

[13] *Id.*

[14] If this is not the case — *i.e.*, if the bridge is deteriorating — or if for security or other reasons the twinning project may result in the demise or demolition of the existing protected historic Ambassador Bridge, this would be a "significant" impact under NEPA and other statutes. As part of its hard look at the impacts of the project, the USCG must nail down how the twin bridge would impact the fate of historic bridge.

[15] The only identified security threat associated with the existing bridge is the fact that it has two main catenary cables, and that if one were severed, "a catastrophic failure would almost certainly occur." DEA, p. 2.

Additionally, although the project would add two to eight traffic lanes between Detroit and Windsor (depending on how the current bridge is used), the DEA specifically states that the purpose of the project is *not* to increase traffic capacity over the Detroit River.[16] For multiple reasons, this statement is highly suspect and not credible and is discussed in more depth in the impacts analysis section below. For now, we note that the true purpose may be to increase capacity, and if so, then this must be acknowledged by the USCG in the EA and the project and alternatives must be evaluated and compared from this perspective.

While the stated purpose of the proposed project appears to be to promote more efficient crossings between Detroit and Windsor as a means to promote the economic interests of both countries, it is not at all clear that this is the true purpose of the project. For an EA to be sufficient under NEPA, the USCG would need to consider what the needs really are at this border crossing, evaluate whether or not the proposed project will meet those needs, and evaluate all alternatives in the same manner. Further, if the purpose changes substantively, the integrity of the NEPA process — particularly the opportunity for meaningful public comment — would require the USCG to reissue the DEA for comment.

IV. DEFICIENCIES IN THE USCG'S DRAFT ENVIRONMENTAL ASSESSMENT

The DEA suffers multiple deficiencies, starting with and arguably tracing back to, the lack of any independent analysis by the USCG. These deficiencies include insufficient consideration of the scope and extent of impacts; inadequate consideration of alternatives; and inadequate or no analysis under the National Historic Preservation Act, the Department of Transportation Act, and Michigan Environmental Protection Act.

A. Lack of Independent Analysis

The USCG has not undertaken an independent review of the proposed project, but has simply presented DIBC's consultant's document as the DEA. The Council on Environmental Quality (CEQ) regulations are clear that an agency must make "its own evaluation" of the impacts and alternatives,[17] and courts reviewing EAs prepared by an applicant are particularly careful to ensure the agency maintains this independence.[18] The fact that the USCG has presented the DIBC's DEA

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[16] DEA, p. 26.

[17] 40 C.F.R. § 1506.5(b) ("If an agency permits an applicant to prepare an environmental assessment, the agency, besides fulfilling the requirements of paragraph (a) of this section, *shall make its own evaluation* of the environmental issues and take responsibility for the scope and content of the environmental assessment.") (emphasis added).

[18] *See e.g., Davis v. Mineta*, 302 F.3d 1104 (10th Cir. 2002) (federal agency must conduct independent review of applicant's submittal to avoid appearance of prejudice); *Burkholder v. Peters*, 58 Fed.Appx. 94 (6th Cir. 2003) (not selected for publication) (requiring independent oversight by federal agency); *Florida Wildlife Federation v. U.S. Army Corps of Engineers*, 401 F.Supp.2d 1298, 1323 (S.D. Fla. 2005) (EA's conclusion of "independent utility" was arbitrary and

(continued...)

as its own puts it in the position of either adopting a legally deficient final EA, or changing it substantially to meet the NEPA "hard look" mandate, but at the same time compromising NEPA's public participation mandate.

For all the reasons described below, DIBC's document is inadequate under NEPA: it is limited in the scope of the project and its impacts, is limited in its consideration of alternatives, fails to effectively evaluate environmental and other impacts of the project, and (unsurprisingly) makes conclusory assertions that the project will not have significant adverse impacts. If the USCG simply adopts the DIBC document as its final EA (or with minimal tweaks), then the EA will be legally insufficient, and the USCG will have neglected its duties under NEPA. Further, by simply adopting the applicant's conclusory document as its own, the USCG compromises its impartiality and risks losing the deference it might otherwise be entitled to by a reviewing court.[19]

Alternatively, the USCG may instead evaluate the public comments received to date, engage in the further studies and analyses that are presently deficient or missing, and then synthesize all that into a document that meets the NEPA "hard look" requirement. If the USCG follows the NEPA process and creates the thorough and studied document that NEPA requires (which we hope it will), it will necessarily result in amendments to the purpose, need, impacts, and alternatives analyses in the DEA. Because NEPA mandates *meaningful* public participation, there must be a participation opportunity *after* the agency makes available sufficiently detailed information about the project and alternatives for the public to understand the project, impacts, and alternatives.[20] At this point, with only DIBC's conclusory DEA and no supporting data and no real consideration of alternatives, the public has not yet had the participation opportunity that NEPA requires. If the USCG engages in a real NEPA analysis as we and other commentors have requested, then it must re-notice it for public review and comment.[21]

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[18] (...continued)
capricious where it was based on "[r]epresentations by the applicant alone, who clearly has an interest in obtaining the permit").

[19] *See Davis*, 302 F.3d at 1113.

[20] 40 C.F.R. 1500.1(b); *see also Fund for Animals*, 281 F.Supp.2d at 227-29 ("[The agency] provided the public with insufficient information regarding the proposed action and its potential environmental impacts and insufficient time in which to comment on the Draft EA. Accordingly, the agency's approach to public involvement and consideration of what public input it did receive do not support a finding that it took a "hard look" at the problem and alternative means of addressing it"); *Sierra Nevada Forest Protection Campaign v. Weingardt*, 376 F.Supp.2d 984 (E.D.Cal. 2005) ("[W]hat seems fairly drawn from the case law and the CEQ regulations is that the agency must offer significant pre-decisional opportunities for informed public involvement in the environmental review process by releasing sufficient environmental information about the various topics that the agency must address in the EA, such as cumulative impacts, *before the EA is finalized*.") (citations omitted, emphasis added).

[21] 40 C.F.R. 1500.1(b) ("NEPA procedures must insure that environmental information is available to public officials and citizens *before decisions are made* and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and
(continued...)

B. Insufficient Impacts Analysis

1. Failure to Evaluate Cumulative Impacts

In evaluating the significance of the impacts of a project to decide whether to conduct an EIS, the lead NEPA agency must assess "[w]hether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment."[22] The DEA does not consider the cumulative impacts that will result not only from building a second span of the bridge, but also from numerous related projects.

The CEQ's NEPA regulations define "cumulative impact" as:

> the impact on the environment which results from the incremental impact of the action when added to **other past, present, and reasonably foreseeable future actions** regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.[23]

Further, "the consistent position in the case law is that . . . the agency's EA must give a realistic evaluation of the total impacts and cannot isolate a proposed project, viewing it in a vacuum."[24]

The DEA ignores this requirement by assessing the impacts of a second span alone — impermissibly "viewing it in a vacuum." Reasonably foreseeable future projects include, but are not limited to, the Ambassador Bridge Gateway Project (plaza and access improvements in Detroit), the Windsor Bridge Plaza Expansion project (plaza and road improvements in Windsor), the Detroit Intermodal Freight Terminal (DIFT),[25] DIBC's proposal to relocate Fort Street to accommodate

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21 (...continued)
public scrutiny are essential to implementing NEPA. Most important, NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail.") (emphasis added).

22 40 C.F.R. § 1508.27(b)(7).

23 40 C.F.R. § 1508.7 (emphasis added).

24 *Grand Canyon Trust v. F.A.A.*, 290 F.3d 339, 342 (D.C.Cir. 2002).

25 *See* Michigan Department of Transport's Detroit Intermodal Freight Terminal webpage at http://www.michigan.gov/mdot/0,1607,7-151-9621_11058_26215---,00.html description and details of the project. *See also* **Ex 3**, MDOT's Frequently Asked Questions about the DIFT; **Ex 4**, EPA's Comments on the Draft Environmental Impact Statement for the DIFT project.

future traffic demands, Marathon's plans to expand its refinery in Southwest Detroit,[26] and the down river bridge crossing being studied by the Detroit River International Crossing (DRIC) Project.

By analyzing the bridge span in isolation from these other projects, the DEA does not account for the cumulative impacts, including air pollution, noise impacts in the local community, the extent of additional traffic through the neighborhoods, and other such impacts. Without including the cumulative impacts of the proposed project together with these other projects, the DEA is defective under NEPA, and the conclusion that the project will *not* have significant impacts is arbitrary and unsupported.

2. Lack of Traffic Volume and Impacts Analysis

The impacts analysis in the DEA is heavily based on the unsupported assumption that there will not be an increase in traffic volume at the site resulting from the proposed project.[27] But the actual result of the twinning project, together with related improvements from the plaza and road projects, realistically is an increase in traffic volume. Even if the purpose of the project is not to increase traffic capacity, as the DIBC now claims,[28] that will be the obvious result.

Given the available traffic data and studies, the claim that traffic volume will not increase over time due to this project and the related projects is not credible. The new bridge would include at least six and possibly eight new lanes of traffic.[29] Additionally, the existing and new bridge may be in use at the same time, allowing a total of up to twelve lanes, whereas now there are only four lanes. This represents at least a 50%, and possibly up to 200%, increase in capacity. This will necessarily increase traffic at the Ambassador Bridge site.[30] As one court has said: "the effect of interstate highways in attracting traffic is by now well established. It seems that such highways not

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[26] **Ex 5**, newspaper articles explaining the planned Marathon expansion.

[27] DEA, p. 26.

[28] In their Categorical Exclusion (CE) application to USCG, DIBC expressly stated (at page 1) that "this project adds new lanes across the Detroit River to provide redundancy . . . [and] also affords additional capacity against a day when increased traffic volumes may require this." Without substantively changing the project plans between issuing the CE document and the DEA, DIBC simply changes its position regarding the increase in traffic capacity at this border crossing.

[29] The planned shoulders are wide enough to add another lane in each direction in the future if there is a demand for it. *See* DEA, p. 11.

[30] Studies show that increasing capacity induces increased travel. *See, e.g.,* Robert B. Noland and Lewison L. Lem, *A review of the evidence for induced travel and changes in transportation and environmental policy in the US and the UK*, TRANSPORTATION RESEARCH PART D 7 (2002). (The USCG is already in possession of this study, it is part of the record in this case provided to GCDC with its FOIA request, Bates No. 433 *et seq.*).

only attract automobiles, but breed them."[31] The increased capacity is likely to lead to other projects such as relocating Fort Street, improvements to access roads to the bridge, changes at the plazas, etc.

In addition, the new bridge may pull vehicles from other crossings (such as the tunnel, the new DRIC crossing, and even the Sarnia-Port Huron crossing), depending on its efficiency, customs operations, and other enticements. Even without the twin bridge, a study by the IBI Group projected an increase in travel demand of 43% for passenger cars and 118% for commercial vehicles between 2000 and 2030 over the Ambassador Bridge.[32] Some of that traffic may be diverted to a new bridge, but the new crossing may also induce traffic from other crossings. A full traffic analysis is necessary to predict how the improvements already under way and proposed by this project will affect travel demand, and what the result will be in terms of traffic volume at this border crossing.

Not only is the increase in number of lanes likely to increase the number of vehicles crossing the bridge at this location each day, but it will also increase the number of vehicles driving through neighborhoods to get to the bridge. There are likely to be significant impacts to local traffic patterns on both sides of the bridge as a result of this project, with adverse impacts such as increased congestion, public safety concerns, increased costs to maintain streets, and other impacts that necessarily result from increased traffic. The DEA ignores these impacts entirely.

The actual result of a the proposed second span, together with related improvements from the plaza and road projects, will realistically lead to an increase in truck volume. The assumptions in the DEA are not supported by any evidence, and are in fact contrary to available evidence. Further, these assumptions lead to skewed analyses of other impacts, including impacts to air quality, noise, and cultural resources. The DEA must properly study and quantify the likely increase in traffic volume at this border crossing, due to both an increase in demand and an increase in capacity, to fully understand the impacts to the environment.

3. Failure to Consider Impacts in Canada

The impacts of the proposed project will undoubtedly be felt in Canada as well as the United States, and all of these impacts must be at least considered before deciding whether they may be significant under NEPA. NEPA requires federal agencies to "recognize the worldwide and long-range character of environmental problems and, where consistent with the foreign policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind's world environment."[33] Nothing in NEPA or its regulations limits its scope to impacts in the United States; to the contrary, the human environment that NEPA seeks to protect is to "be interpreted comprehensively to include the natural and physical environment and the relationship of

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[31] *Society for Protection of New Hampshire Forests v. Brinegar*, 381 F.Supp. 282, 285 (D.N.H. 1974).

[32] **Ex 6**, CD-ROM of DRIC Studies, EXISTING AND FUTURE TRAVEL DEMAND WORKING PAPER, p. 208 (Jan 2004).

[33] 42 U.S.C. § 4332(2)(F).

people with that environment."[34] In short, the impacts felt abroad must be considered in the NEPA process.[35]

The USCG expressly notified DIBC in November 2006 that they must include transboundary impacts of the project in the EA.[36] Again in July 2007, USCG acknowledged that the CEQ Guidance on NEPA Analyses for Transboundary Impacts requires assessment of transboundary impacts.[37] Instead of analyzing transboundary impacts, the DEA claims that because "an analysis in Canada is being reported in an Environmental Assessment Screening Report prepared under Canadian Authorities," the USCG does not need to do its own evaluation of the impacts this project will have in Canada.[38] This position contravenes the requirement that the direct, indirect, and cumulative impacts of the project must be considered.[39] Whatever analysis of Canadian impacts may be conducted by Canadian agencies, NEPA requires a full analysis to decide whether the project may have significant impacts, without regard to whether those impacts are felt in the US or in Canada.

It is contrary to NEPA to conclude the project will not have significant impacts where only the domestic impacts are considered. The submissions by Canadian entities, available meteorological data,[40] as well as the given reality that emissions travel without regard to national borders, indicate there will be impacts in Canada from this project, even from activities on the US side of the border.[41] The USCG cannot reasonably conclude that the impacts of the project will not be significant simply because some of them will occur outside the United States.

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[34] 40 C.F.R. § 1508.14.

[35] *Environmental Defense Fund, Inc. v. Massey*, 986 F.2d 528, 536 (D.C.Cir. 1993) ("Section 102(2)(C), on its face, is clearly not limited to actions of federal agencies that have significant environmental effects within U.S. borders. This Court has repeatedly taken note of the sweeping scope of NEPA and the EIS requirement.") (citations omitted)..

[36] Ex7, letter from USCG to Steptow & Johnson, LLP (redacted in FOIA response from USCG; Bates No. 0001).

[37] July 2, 2007 email printed by Scot Strifler, Bates No. 0019 in FOIA response documents from USCG.

[38] DEA, p. 35.

[39] *See* 40 C.F.R. § 1508.25(c).

[40] *See* **Ex 6**, CD-ROM of DRIC Studies, Canadian Studies, *DRIC Quarterly Monitoring Report No. 1, October to December, 2006*, (March 2007), and *DRIC Quarterly Monitoring Report No. 2, January 1, 2007, to March 31, 2007* (July 2007).

[41] The November 20, 2006, letter from Steptoe and Johnson (Bates No. 0002 *et seq* in the FOIA response from USCG) ignores the fact that use of the bridge and plaza on the US side *will* have direct impacts in Canada, in part as a result of prevailing wind patterns.

4. Deficient Analysis of Air Quality Impacts

The air quality impacts analysis is insufficient for multiple reasons. First, as noted above, it is based on the assumption that there will be no increase in traffic at the location, which is an untenable assumption.

Second, the analysis does not evaluate the cumulative impacts of the twinned bridge with gateway crossings, gateway expansions, a new down-river bridge, relocated Fort Street, expanding the plazas for truck traffic, the DIFT project, expansions at the Marathon plant, and so on. These are all cumulative sources of potentially significant air emissions, particularly particulate emissions.

Third, the air quality analysis focuses on whether the new twin bridge would significantly add pollutants to the Wayne County region. This analysis is meaningless to the question of whether and how the project will impact the air quality in the neighborhoods near it.

Fourth, the analysis incorrectly focuses on the incremental change to the status quo from a new bridge span – the status quo being an already-heavily-polluted condition. Rather than assessing the incremental change in impact from the project, an EA must assess the overall impact on the area from this project in conjunction with other present or reasonably foreseeable future activities that impact the area.[42]

Fifth, the analysis ignores the fact that the area is designated as a non-attainment area for particulate matter under 2.5 microns in size ($PM_{2.5}$) and a maintenance area for particulate matter under 10 microns in size (PM_{10}) and ozone. As such, and because it is a regionally significant transport project, a conformity analysis is required to determine whether the project would be acceptable under the Clean Air Act standards. This analysis would need to be *done* before the USCG could reasonably conclude the impacts of the project will not be significant.[43]

Sixth, the air quality analysis does not include a hotspot analysis for either $PM_{2.5}$ or ozone, nor does it use the current version of the MOBILE model for estimating vehicle emissions. Doing the relevant analysis and using the current model are obviously necessary to understanding the significance of the project's impacts.

Seventh, there is no analysis of air quality impacts in Canada at all.

Finally, this project will pollute the air and impact the public health. The technical reports attached to these comments confirm that. Dr. Goodarz Ahmadi[44] and Hojjat Nasr[45] of the Department of Mechanical and Aeronautical Engineering at Clarkson University evaluated particle

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[42] *See Grand Canyon Trust*, 290 F.3d at 345.

[43] *See, e.g.*, **Ex 23**, FHWA FONSI for Gateway Project (noting that conformity analysis had already been performed before FHWA concluded air impacts would not be significant).

[44] **Ex 8**, Resume of Dr. Goodarz Ahmadi.

[45] **Ex 9**, Resume of Hojjat Nasr.

transport and dispersion from the U.S. side of the Ambassador Bridge and the U.S. customs plaza.[46] They found that significant fractions of the particulate emissions from those locations disperse into populated areas near the bridge. Under some of the relatively common wind conditions, *over 55-60 %* of the particulate emissions from the plaza area are deposited in the neighborhoods to the north and east.

Detroit-based air consultant Lawrence Hands[47] calculated future traffic volumes and emission factors for vehicles at the bridge and plaza using realistic assumptions and the current version of the MOBILE model.[48] Using the EPA-approved SCREEN3 dispersion model, Mr. Hands calculated a maximum hourly particulate pollution impact from trucks idling for just 12 minutes at the plaza to be 70 $\mu g/m^3$ over an hourly period and 28 $\mu g/m^3$ over a 24-hour period. Added to the existing background level of 40 $\mu g/m^3$, this 24-hour impact is *almost double* the National Ambient Air Quality Standard (NAAQS) for $PM_{2.5}$ of 35 $\mu g/m.^{3.}$

Finally, Dr. George Thurston[49] of the Department of Environmental Medicine at New York University Medical School submitted a report on the public health impacts of $PM_{2.5}$ pollution.[50] Dr. Thurston explains that even short-term exposures to $PM_{2.5}$ can cause respiratory and cardiac health problems, and long-term exposures decrease life expectancy by years. He also documents adverse health effects even from $PM_{2.5}$ concentrations below the NAAQS. He concludes that "the proposed additional span at the Ambassador Bridge, if approved and built, will indeed have both acute and chronic adverse effects on the public health" for residents of the gateway neighborhoods, residents of Windsor, Ontario, and potentially others.

5. Deficient Analysis of Noise Impacts

NEPA also requires consideration of the noise impacts, and the DEA takes a cursory stab at analyzing these impacts. The noise analysis in the DEA is insufficient for multiple reasons. First, the project does not consider the cumulative or combined noise impacts resulting from the new bridge combined with the use of the plazas, and existing background noises. Reports from Valcoustics,[51] who have previously studied noise impacts from bridges, document that traffic moving

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46 **Ex 10**, H. Nasr and G. Ahmadi, TRANSPORT, DISPERSION, AND DEPOSITION OF NANO- AND MICO-PARTICLES EMITTED FROM TRAFFIC ON THE AMBASSADOR BRIDGE CONNECTING DETROIT AND WINDSOR (August 29, 2007); *see also,* attached Air Pollution Simulation Video CD, **Ex 11** (these videos can also be viewed at http://extrapain.camp.clarkson.edu/home/ahmadi/Ambassador%20Bridge/).

47 **Ex 12**, Resume of Lawrence Hands.

48 **Ex 13**, Report of L. Hands, together with attachments.

49 **Ex 14**, Resume of Dr. George Thurston.

50 **Ex 15**, Thurston Letter Report.

51 These reports are already part of the record, submitted with the City of Windsor's (continued...)

through the plaza may result in potentially significant off-site noise impacts. The noise analysis ignores these impacts entirely.

Second, the scope or area of impact studied in the noise analysis is too small and constrained, it does not account for likely residential noise impacts beyond the immediate shadow of the bridge.

Third, the analysis is faulty in that the noise sampling data documents are not representative of likely noise impact conditions. For example, none of the samples or analysis analyze noise during rush hour traffic. Further, although the bridge will operate all day and night, and although there are residential neighborhoods around the bridge, the noise analysis does not discuss or analyze impacts from the bridge during the late night hours, when the background noise is quietest and impacts to residents are most significant.

Finally, the noise analysis completely ignores noise impacts in Canada.

6. Deficient Analysis of Environmental Justice Impacts

This is a project involving federal action (permitting) and also federal funding (federally-backed private equity bond financing).[52] Therefore, both Title VI of the Civil Rights Act of 1964[53] and the Michigan Elliot Larsen Civil Rights Act[54] require the USCG to specially evaluate the potential impacts of the project on protected populations. In particular, Executive Order 12898 requires each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States."[55] This requirement is specifically incorporated into the USCG's review of this project under NEPA through Commandant Instruction 5810.3 (May 2003).

Census data confirms that the Gateway neighborhoods around the Ambassador Bridge[56] include significant populations of protected minority and low-income populations.[57] Even the DEA

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51 (...continued)
comments on the original Categorical Exclusion and also the pending DEA.

52 **Ex 16**, Crain's Detroit Business, *Ambassador Bridge Owner Wants Bonds for New Span* (April 2, 2007).

53 42 U.S.C. § 2000d *et seq.*

54 MCL 37.2101 *et seq.*

55 Executive Order 19898 (Feb. 11, 1994).

56 **Ex 17**, map showing area of impact from which census data was collected (Census Tracts 5207, 5208, 5209, 5211, 5213, 5215, 5231, 5232, 5233, 5234, and 5235).

57 **Ex 18**, Population, income, and other 2000 Census Data for Census Tracts 5207,
(continued...)

(pages 39 and 40) acknowledges that the area around the bridge has a higher poverty population and Hispanic population than the rest of Wayne County.[58] The Southwest Detroit area is already an area with poor air quality, particularly for particulates.[59] The particulates dispersion and deposition modeling analysis by Mr. Nasr and Dr. Ahmadi, together with the analysis by Mr. Hands, confirm that the particulates emissions from the use of the existing bridge and plaza will have a significant *local* impact. In fact, Mr. Hands' analysis concludes the project may cause the Fort Street monitor (and hence the air quality in the residential neighborhood around it) to exceed the NAAQS for $PM_{2.5}$.[60] And Dr. Thurston's report concludes that this impact will have both acute and chronic adverse effects on the public health of persons living or working in the communities in the vicinity of the bridge.[61]

The Executive Order, Commandant Instruction, and environmental justice principals require the USCG to conduct a robust assessment to be sure the twin bridge does not have a disproportionate impact on these populations. To start with, a proper environmental justice analysis must quantify impacts from the twin bridge, together with impacts from other projects and the existing air quality, noise, traffic, and cultural conditions, on the protected populations as well as sensitive sub-populations within the area (*e.g.*, children, elderly, homes without air conditioners, households without health insurance coverage). It would then compare those quantitative impacts to the impacts to the region, to make sure the impacts to protected populations are not disproportionate. The DEA is incomplete until it has quantified the noise, air, traffic, economic, and historic/cultural impacts to these populations, and compared these impacts to the regional impacts, to ensure there is no disproportionate impact. Even without the required comparative analysis, available data shows there are protected populations, existing air quality is already degraded, and particulate emissions from the plaza and bridge will have a high local deposition rate. This alone indicates the project may have a disproportionate impact on protected populations, significant enough to require at least an EIS.

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57 (...continued)
5208, 5209, 5211, 5213, 5215, 5231, 5232, 5233, 5234, 5235.

58 The DEA then inexplicably concludes that impacts will not be disproportionate to these populations, and neither the air nor noise appendices attempt to quantify the impacts to the local protected populations.

59 *See* **Ex 16,** Dr. Thurston's Letter Report (describing existing poor quality in the immediate area of the bridge); **Ex 19**, 2005 ANNUAL AIR QUALITY REPORT FOR MICHIGAN (excerpted pages; full report available at http://www.michigan.gov/deq/0,1607,7-135-3310_4195-79055--,00.html) (showing that the Fort Street monitor often records some of the highest particulates and sulfur dioxide levels – second only to the Dearborn monitor – in Michigan).

60 *See* **Exs 10, 13,**

61 **Ex 16.**

7. Failure to Consider Impacts to Local Community

To decide whether a project may have significant impacts, NEPA requires consideration of impacts cultural and economic resources.[62] This includes impacts to existing and planned redevelopment and revitalization projects, impacts to property values, impacts to local tourism and to local historic structures, and so on. These are impacts that GCDC's member organizations and other residents have brought to the USCG's attention,[63] but which are entirely missing from the DEA. There is also the concern that the project would require demolition of homes and other structures, on both the Detroit and Windsor sides of the bridge. This is a significant concern to both the residents and to the community as whole, yet the DIBC has yet to confirm whether, which, and how this may happen. This is another point the USCG must clarify to understand the scope of impacts of the project. In addition, there may be significant cultural and archeological resources impacted by the project, and both United States and Canadian Wyandot representatives have raised concerns that these impacts have not been studied yet. And there are unresolved issues that the project may not comply with the City of Detroit's zoning and bridge ordinances, may usurp public lands without replacing them, and may require acquisition of the City's air rights.[64] None of these issues have been addressed. The DEA is incomplete and inadequate without any analysis of these local impacts, let alone their significance.

8. Deficient Analysis of Impacts to the Historic Structures

NEPA requires consideration of impacts to historic places, independent of the Section 106 process. As USCG is aware, the Ambassador Bridge is listed on or eligible for listing on the National Register of Historic Places, so analyzing the impacts to the historic existing bridge is a vital part of your NEPA analysis. There are two separate aspects to the impact to the historic bridge: the fate of the existing bridge, and the visual impact to the bridge.

There is a significant concern that the twin bridge will force the demise of the historic Ambassador Bridge. This may come as the result of lack of active maintenance, or it may be a requirement for national security purposes. The DIBC has been particularly vague about the predicted future of the bridge, at times indicating it will continue to maintain the bridge for temporary backup and pedestrian and bicycle traffic[65] (though it is not clear that sound economic sense would support this), other times indicating it will continue to use the historic bridge (*e.g.*, there is commentary that the new bridge could carry three lanes of traffic one-way, with the historic bridge carrying three lanes of traffic the other way). The State Office of Historic Preservation has raised the question about what will happen to the historic bridge on multiple occasions, yet to date there is no clear understanding as to what would happen to the existing bridge and whether it would be

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[62] 40 C.F.R. §§ 1508.8, 1508.27.

[63] **Ex 2**, Comments submitted by GCDC member organizations; **Ex 20**, DETROIT NEWS, *Bridge Plan Splits Communities* (Aug. 22, 2007).

[64] *See* **Ex 21**, Letter from M. Todd to Detroit City Council (June 27, 2007) (noting apparent need for rezoning and other municipal concerns about the twin bridge project).

[65] *See, e.g.*, DIBC's Cover Letter to USCG with bridge permit application

maintained in the long-term.[66] As long as the destruction of this historic bridge is a potential outcome of constructing a twin bridge, the impacts must be considered significant, triggering a full EIS analysis.

Even if the historic bridge is maintained in the long term, the proposed twin promises to destroy the aesthetic value of the historic Ambassador Bridge. While it is certainly difficult to quantify or objectively analyze aesthetic impacts, the DIBC's own Visual Quality and Aesthetics report makes the point: every photograph that shows the historic bridge alone and then with the new twin bridge superimposed into the image confirms that the new bridge will dwarf, dominate, and destroy the visual value of the historic bridge. In fact, the new bridge, with its massive 544' high towers, will dominate the entire Detroit and Windsor skylines.

Further, the DEA does not analyze impacts to local historic structures and archeological sites. For example, the historic structure of Ste. Anne's Catholic Church sits directly in the shadow of the expanded bridge. There is only a conclusory statement that the expanded bridge will not impact this structure. NEPA requires actual analysis, such as noise impacts, impacts to the accessibility of the church resulting from increased traffic, the likely changes to the character of the surrounding area, and the potential for people to move away from this otherwise revitalizing area. Some analysis is also required to understand impacts to ancient Wyandot burial grounds in Windsor.

9. The Project is Controversial and Complex

In deciding whether a project may significantly impact the environment, NEPA requires the federal agency to consider whether it is controversial.[67] This project has raised controversy in both the United States and Canada. This controversy is documented in the multiple articles in local press, letters from community organizations, inquiries and comments from elected officials, and other materials in the record and in the public domain.

In part, the controversy arises from the fact that the bridge would be owned by a private company with no public accountability and a history of flouting governmental authorities. The project is also competing with the DRIC study, which appears to be seeking a way to increase efficiency in crossings and trade, while ensuring national security interests such as having redundant crossing points (both bridge expanse and crossing plaza). And the project promises to have significant impacts on the local communities in the shadow of the bridge, which host the bridge and suffer its negative (traffic, noise, pollution) consequences without the trade and travel benefits the bridge promises. There are the also environmental justice issues raised above, related to the fact that this community with higher minority and low-income populations would be forced to bear a disproportionate burden from the bridge. While the DEA does not consider any of the issues, the fact remains that proposed twin bridge *is* controversial, triggering NEPA's EIS analysis requirement.

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[66] In addition to potentially affecting security and its historic value failure to maintain the historic bridge may also impact navigability of the local waterway. *See* **Ex 22**, Emails from James Pugsley, Counsel to Detroit Windsor Truck Ferry (Aug. 24, 2007).

[67] *See* COMMANDANT INSTRUCTION M16465.1D, § 2(B)(5)(f).

This project requires the USCG to analyze and quantify traffic, air, and noise impacts, which impacts are inherently complex. This further supports that a full EIS is warranted. The CEQ regulations note that EAs should be short (less than 15 pages), and that "a lengthy EA indicates that an EIS is needed."[68] The DEA for this project approaches 100 pages, and it doesn't begin to address many of the real issues associated with the impacts of this project. Several agencies who routinely quantify and analyze air quality and transport project (SEMCOG, EPA, FHWA) have also raised substantial deficiencies in the DEA, which underscores the need for additional studies and analysis.[69] The fact that other projects potentially impacting air quality in the area (*e.g.*, DRIC, DIFT) are engaging in a full EIS review, with proper air impacts and SIP conformity analyses, further demonstrates that this is not a project for which a short and simple EA will suffice.[70]

B. Inadequate Scope of Alternatives

As part of an Environmental Assessment, NEPA requires the lead federal agency to "study, develop, and describe" alternatives to the project and the environmental impacts of those alternatives.[71] The purpose of the alternatives analysis is to "present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public."[72] This step "force[s] consideration of consequences and alternatives, and thus ensure[s] that . . . [the project] will [be] done in a way that minimizes unnecessary negative environmental effects."[73]

The alternatives considered in the EA should meet the purpose and objectives of the project.[74] As discussed above, DIBC identifies the purpose of this project as reducing congestion, promoting economic growth and development, improving air quality, and it also implies it would improve security. Stated another way, the purpose is to ensure efficiency in trade and transport. Putting aside whether this is the true purpose of the project and also whether the twin bridge even fulfills this purpose, we limit our comments on the alternatives analysis to the stated purpose and note that if the

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[68] *See Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*, 46 Fed.Reg. 18026 (1981).

[69] *See Silva v. Lynn*, 482 F.2d 1282, 1285-86 (1st Cir. 1973) (finding EIS inadequate where proposal "drew heavy fire" from three federal agencies "with expertise ... equal to or greater than that of [the lead agency]"); *Sierra Club v. Marsh*, 769 F.2d 868 (1st Cir. 1985).

[70] *See Sierra Club v. Marsh*, 769 F.2d at 874-76 (explaining why even a long and complex EA will not substitute for and EIS).

[71] 42 U.S.C. § 4331(E); 40 C.F.R. § 1508.9(b).

[72] 40 C.F.R. § 1502.14.

[73] *U.S. v. City of Detroit*, 329 F.3d 515, 530 (6th Cir. 2003) (citation omitted).

[74] *See Save Our Cumberland Mountains v. Kempthorne*, 453 F.3d 334, 342 (6th Cir. 2006).

purpose and need were adequately defined in the DEA, there would be different and more alternatives to evaluate.

The DEA only really compares various design and operating alternatives for a twin span of the Ambassador Bridge.[75] By so limiting the scope of the alternatives, the USCG fails to consider other alternatives that could meet the objectives of the project. For example, the DRIC Study Group has identified alternative locations for an international bridge that meet the purpose of increased crossing efficiency and will likely have fewer and less significant environmental and other impacts.[76] These alternatives include the additional important security benefit of being publically owned, which is a factor the USCG must consider in determining what is the best way to meet the purpose of the proposed project.

In addition, the DEA does not seriously analyze the available alternative of maintaining and improving the existing Ambassador Bridge. DIBC can likely redesign the bridge and plazas to meet its stated purpose of reducing congestion and increasing efficiency, particularly if a new bridge down river takes some of the traffic volume. This alternative certainly would have less of a visual impact, as well less chance for destruction of the historic bridge. It also would have less of an impact to the air quality and on the noise levels in this already highly impacted area of Detroit.

The USCG cannot decide that the pending project best "minimizes unnecessary negative environmental effects" without engaging in a true comparative analysis, which also depends on full air impact and travel volume analyses. The USCG must study the actual need for a new crossing, other projects that are being considered or may be in the future, and the full impacts of each alternative. Without an adequate consideration of all the available alternatives it is arbitrary for the USCG to conclude that the proposed project is the one with the least significant impacts.

C. Inadequate Analysis under Other Statutory Schemes

1. Analysis Under the National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies, before issuing any permit or license, to "take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register."[77] The federal regulations require the agency involved in projects such as the present one to consult with SHPOs and other interested parties, make reasonable and good faith efforts to identify historic properties, and assess the effects of a project on such properties.[78] The goal of this Section 106 process — once adverse impacts to historic properties have been identified — is to

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[75] DEA, p. 17.

[76] **Ex 6** (CD-ROM that includes a complete set of DRIC studies and reports available to date). Most of these are also available at the DRIC website: www.partnershipborderstudy.com.

[77] 16 U.S.C. § 460f.

[78] *See* 36 C.F.R. § 800 *et seq.*

"seek ways to avoid, minimize or mitigate any adverse effects on historic properties."[79] Section 106 recommends the consulting process be incorporated into the NEPA process as early and efficiently as possible.[80] The Commandant Instructions clearly anticipate that the Section 106 process will be complete *before* the NEPA document (EA or EIS) is released for public comment and finalized.[81]

In this case, the Section 106 process is still in its relative infancy, with the parties still working on defining the scope and purpose of the project, let alone what alternatives and mitigation measures may apply. Further, through the Section 106 process, the Michigan SHPO and other consulting parties are considering expanding the scope of adverse impacts associated with the proposal. For example, the project is likely to have adverse impacts in the historic Gateway neighborhoods surrounding the bridge. These are precisely the types of impacts that NEPA requires the federal coordinating agency to consider in deciding whether a project's impacts are "significant" or not. In other words, the range of adverse impacts that the SHPO identifies as part of the Section 106 process may further demonstrate the impacts of the twin bridge project will be significant under NEPA.[82] The USGC cannot conclude the impacts of the twin bridge project will *not* be significant until after Section 106 process has at least finished identifying the adverse effects and (if possible) outlining mitigation. Because the Section 106 process has not advanced substantively, and because it has the potential to alter the NEPA outcome, the DEA is premature.

Another deficiency in the DEA under the NHPA involves Section 402 of the Act, which requires agencies to consider the impacts of actions taken outside the U.S. on historical sites in the foreign country.[83] This section directs that the lead agency "shall take into account the effect of the undertaking on such property for purposes of avoiding or mitigating any adverse effects."[84] The City of Windsor has expressed concern over the impacts that the proposed project will have on over 40 heritage features and three known archeological sites in Windsor[85]. One site of particular concern is the Assumption Park and Church, which has been designated under the *Ontario Heritage Act* as a historical site. As noted above, there may also be significant impacts to historic Wyandot burial sites. The DEA is legally deficient under Section 402 of the NHPA because it ignores the impacts this project will have on these historic sites in Canada.

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79 36 C.F.R. § 800.1(a).

80 36 CFR 800.8(a)(1).

81 *See* COMMANDANT INSTRUCTION M16475.1D §2(d)(1)(c).

82 *See* 36 CFR 800.8(a)(1) ("The determination of whether an undertaking is a 'major Federal action significantly affecting the quality of the human environment,' and therefore requires preparation of an environmental impact statement (EIS) under NEPA, should include consideration of the undertaking's likely effects on historic properties.").

83 16 U.S.C. § 470a-2.

84 *Id.*

85 Letter from David Estrin, Gowlings, to Robert Bloom, p.4-8 (September 14, 2006) (part of the redacted FOIA documents submitted by USCG, Bates Nos. 0168-0203, and attachments).

2. Analysis Under Section 4(f) of the DOTA

Section 4(f) of the Department of Transportation Act (DOTA) requires that:

> the Secretary may approve a transportation program or project . . . requiring the use of publicly owned land of a public park . . . of national, State, or local significance, or land of an historic site of national, State, or local significance . . . only if--
> (1) there is no prudent and feasible alternative to using that land; and
> (2) the program or project includes all possible planning to minimize harm to the park . . . or historic site resulting from the use.[86]

Until 2002, when the USCG became a part of the Department of Homeland Security (DHS)[87], the USCG was a agency within the Department of Transportation (DOT) and thus required to do a Section 4(f) analysis for all bridge permits it was considering.[88] The USCG is now apparently taking the position that it is not required to do a Section 4(f) analysis for the DIBC proposal because it is no longer within the DOT. However, the Department of Homeland Security Act (DHSA) specifically calls for the maintenance of the Coast Guard's mission and functions upon transfer to the DHS:

> There are transferred to the Department [of Homeland Security] the authorities, functions, personnel, and assets of the Coast Guard, which shall be maintained as a distinct entity within the Department, **including the authorities and functions of the Secretary of Transportation relating thereto.**
> . . .
> Notwithstanding any other provision of this chapter, the authorities, functions, and capabilities of the Coast Guard to perform its missions **shall be maintained intact and without significant reduction** after the transfer of the Coast Guard to the Department, except as specified in subsequent Acts.[89]

The DHSA makes it clear that the USCG's role did not change when it transferred departments, including the performance of functions that the Secretary of Transportation had delegated to it. Therefore, just as the USCG's authority to approve bridge permits, which was

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86 49 U.S.C. § 303.

87 *See* Department of Homeland Security Act, 6 U.S.C. § 468.

88 *See* 33 C.F.R. § 114.01 (delegating authority to approve bridge permits to the USCG); *see also ACORN v. US Army Corp. Of Eng'rs*, 2000 U.S. Dist. Lexis 5408 (E.D.L.A. 2000) (holding that the USCG would be doing the 4(f) analysis for the bridge permit); *Citizens Committee for Environmental Protection v. U.S. Coast Guard*, 456 F.Supp. 101 (D.N.J. 1978) (USCG had done the 4(f) analysis for this project).

89 6 U.S.C. § 468(b) and (c) (emphasis added).

delegated to USCG by the DOT, was transferred with them to the DHS,[90] their duties under Section 4(f) also transferred.[91]

The Section 4(f) analysis only allows the USCG to approve the subject permit if there are *no other* prudent and feasible alternatives.[92] Because the twin span of the Ambassador Bridge will impact a historical site and use public park land, under Section 4(f) the USCG may approve the proposal if it is the only prudent and feasible option for fulfilling the project purpose (ensuring efficiency in trade and transport across the Detroit River). If there are no other prudent and feasible alternatives, the USCG must look at ways to minimize impacts.[93]

As the SHPO has already concluded, the proposed twin span will have adverse impacts on the historic Ambassador Bridge. Additionally, the project will "constructively use" Riverside Park in Detroit. Even though the project may not physically use the park land, there is constructive use under Section 4(f) when "the project's proximity impacts are so severe that the protected activities, features or attributes that qualify a resource for protection under section 4(f) are substantially impaired."[94] Impacts to Riverside Park from the proposed project include increased noise levels—this is the area of highest noise impact in the United States[95] — and extinguishing the view of the historic Ambassador Bridge, for which the park is known.[96]

Because the USCG carried its Section 4(f) duties with it to the DHS, and because the twin bridge project will use or impair public resources protected by Section 4(f), the USCG has the legal obligation to consider impacts and alternatives under the DOTA. There are alternatives available that would meet the purpose of this project (discussed above). The USCG must do this analysis, and it appears from available data that the proposed project should be rejected because of available alternatives that do not have such significant impacts on historical sites and park land.

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90 *See* 33 C.F.R. § 114.01.

91 *See also* COMMANDANT INSTRUCTION M16475.D, p. 2-21 (expressly requiring USCG to comply with Section 4(f) requirements).

92 49 U.S.C. § 303(c)(1).

93 49 U.S.C. § 303(c)(2).

94 *Neighborhood Ass'n of The Back Bay, Inc. v. Federal Transit Admin.*, 407 F.Supp.2d 323, 339 (D.Mass. 2005).

95 *See* DEA, Appendix L.

96 "Its lure is its glorious view. Looking upriver, the Ambassador Bridge frames a panorama of the Detroit and Windsor downtown skylines." http://www.marygrove.edu/ids/Riverside_Park.asp.

3. Analysis under Michigan Environmental Protection Act

NEPA requires the lead Federal agency to "cooperate with State and local agencies to the fullest extent possible to reduce duplication between NEPA and comparable State and local requirements."[97] The goal is "that one document will comply with all applicable laws."[98] NEPA further requires that environmental impact statements "shall discuss any inconsistency of a proposed action with any ... State ... laws (whether or not federally sanctioned). Where an inconsistency exists, the statement should describe the extent to which the agency would reconcile its proposed action with the ... law."[99]

One such state law, the Michigan Environmental Protection Act (MEPA) imposes a duty on public and private entities to consider, determine, and prevent any likely harmful environmental impacts from the project, and also to consider reasonable and available alternatives.[100] As described above, the proposed twin bridge would create additional air pollution and other impacts in the neighborhoods surrounding the bridge, thus triggering MEPA's obligations.

MEPA essentially requires decision-makers to consider and determine the environmental impacts of proposed activities. "[MEPA] imposes a duty on individuals and organizations both in the public and private sectors to prevent or minimize degradation of the environment which is caused or is likely to be caused by their activities."[101] Specifically applicable to the proposed twin bridge project, Section 1705(2) of MEPA provides:

> In administrative, licensing, or other proceedings...the alleged pollution, impairment, or destruction of the air, water, or other natural resources, or the public trust in these resources, shall be determined, and conduct shall not be authorized or approved that has or is likely to have such an effect if there is a feasible and prudent alternative consistent with the reasonable requirements of the public heath, safety, and welfare.

Genesco Inc. v. Mich. DEQ confirms that the MEPA standards must be met in the permit review process.[102]

MEPA prohibits activities that will likely pollute, impair, or destroy natural resources unless there is a strong showing that "there is no feasible and prudent alternative" to the activity and that

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97 40 C.F.R. § 1506.2(c).

98 *Id.*

99 40 C.F.R. § 1506.2(d).

100 M.C.L. § 324.1701 *et seq.*

101 *Ray v. Mason Co. Drain Comm'r*, 393 Mich. 294; 224 N.W.2d 883, 888 (1975).

102 250 Mich. App. 45, 55; 645 N.W.2d 319 (2002).

the activity is in the public interest.[103] A party seeking to show that there is no feasible and prudent alternative to a proposed activity carries a "heavy burden of environmental justification."[104] They must show that any less environmentally harmful alternatives are entirely cost prohibitive or involve circumstances of an "extraordinary magnitude."[105] NEPA anticipates these impacts and alternatives analyses should be considered during the NEPA process. So far, the DEA has not addressed the impacts and alternatives analyses required by MEPA.

V. THIS PROJECT REQUIRES AN ENVIRONMENTAL IMPACT STATEMENT

After rectifying the unsupported assumptions and expanding the EA to consider the full scope of impacts, it is clear this project will significantly impact the environment as defined by NEPA regulations. This is reason alone to conduct a full EIS.

Another reason an EIS is required for this project is that there is significant precedent for doing an EIS for major bridge projects. The CEQ Regulations provide that "in determining whether to prepare an environmental impact statement the Federal agency shall . . . determine . . . whether the proposal is one which normally requires an environmental impact statement."[106] Federal agencies historically have required or conducted an EIS for major international and domestic bridge enhancements, replacements, construction, and additions similar to the proposed twin Ambassador Bridge. Some examples of USCG bridge EIS's include the Goethals Bridge Replacement and the Lake Washington Ship Canal Bridge/Modification of the Duwamish Waterway Bridge. Examples of EIS's conducted by other federal agencies for bridge projects include the Buffalo-Fort Erie Peace Bridge, the St. Croix River Bridge Replacement, the Knik Arm Bridge, the Portal Bridge Enhancement, Sellwood Bridge Replacement, the Tappan Zee Bridge Enhancement, the Powder River Basin Rail Bridge, and the San Francisco-Oakland Bay Bridge (SFOBB) East Span retrofit or replacement, among others. The precedent of doing a full EIS for major bridge proposals similar to the Ambassador Bridge project demonstrates that the USCG should be doing an EIS simply by virtue of the type of project at hand and clear consensus that these projects are major federal actions significantly affecting the quality of the human environment.[107]

Finally, a full EIS is the most efficient way to address the impacts and alternatives analyses imposed on the USCG by Sections 106 and 402 of the NHPA, Section 4(f) of the DOTA, and MEPA.

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[103] M.C.L. § 324.1703.

[104] *Wayne Co. Dep't of Health, Air Pollution Control Division v. Olsonite Corp*, 79 Mich. App. 668, 701; 263 N.W.2d 778 (1977).

[105] *Id.* at 705 (citation omitted).

[106] 40 C.F.R. § 1501.4(a)(1).

[107] *See also* Commandant Instruction M16475.1D, p 2-8 (noting EIS should be prepared for the establishment of major new installations, for project that generate significant controversy, and actions with a significant impact on significant cultural and historical resource).

For all these reasons, consistent with the comments submitted by most every agency that has reviewed and commented on the DEA to date, we respectfully request that the USCG treat the document as simply the starting point for its own, independent, and complete Environmental Impact Statement.

On behalf of the people that live in the shadow of Ambassador Bridge and who are most personally and directly impacted by this project, we sincerely appreciate that you will engage in the full process that NEPA, the NHPA, DOTA, and MEPA impose upon you with respect to this project, and we look forward to an opportunity to engage the USCG further once an independent and complete EIS is completed and circulated for public comment.

Sincerely,

Christopher M. Bzdok

Tracy J. Andrews

CMB/TJA:mnm
Enclosures: (as stated)
xc: clients (comments and exhibits via .pdf)

G:\WPFILES\MNM\GCDC-5550\OBH-GCDC EA Comments\5550.00 8.30.07 OBH Cmts.wpd

Members of Gateway Communities Development Collaborative

Bagley Housing Association
2715 Bagley
Detroit, Michigan 48216

Bridging Communities
6900 McGraw
Detroit, Michigan 48210

Greater Corktown Development Corporation
2411 14th Street
Suite 200
Detroit, Michigan 48216

Mexicantown Community Development Corporation
2810 Bagley
Detroit, Michigan 48216

Michigan Avenue Business Association
7012 Michigan Avenue
Detroit, Michigan 48210

Neighborhood Centers, Inc.
8300 Longworth
Detroit, Michigan 48209

Southwest Detroit Business Association (also use for GCDC address)
7752 W. Vernor
Detroit, Michigan 48209

Southwest Detroit Environmental Vision
PO Box 9400
Detroit, Michigan 48209

Southwest Housing Corporation
3627 W. Vernor
Detroit, Michigan 48209

EXHIBIT 1

August 9, 2007

Ms. TJ Andrews
Olson, Bzkok and Howard
420 East Front Street
Traverse City, MI 49686

Dear Ms. Andrews:

We write to express our concern with DIBC proposed second span adjacent to the present Ambassador Bridge. Bridging Communities has served the elderly of Southwest Detroit for the past 25 years. Originally a mission of the congregations in Southwest Detroit that ensured that they had adequate food, medicines, transportation and social supports, the mission expanded as its founders came to understand the relationship between the quality of life of an elder to the quality of the community in which they lived, to address the need to totally stabilize aging urban neighborhoods. Today, Bridging Communities continues is social service ministry and is actively involved in creating quality communities through comprehensive planning and revitalization, building two senior housing complexes, creating three distinct neighborhood revitalization plans (**Springwells Village, Claytown and *48217***) and works on creating greenways and parks. Our newest project under development is 24 units of new townhomes that will provide housing for the rapidly growing population of grandparents raising grandchildren.

Needless to say we are extremely concerned over the impact on the quality of life of the 8000 elders whose roots and memories along with their life investment is in this community. We anticipate that many will be forced to leave as their homes are taken, others will be forced to stay to suffer the disruption, crime, traffic, air and noise pollution, when the reimbursement will not buy them comparable living elsewhere. And remember, it is impossible for an elderly person to pack up and move themselves anywhere.

BRIDGING COMMUNITIES, INC.
Seek and Visit the Elderly • Parkside Intergenerational Center • Pablo Davis Elder Living Center
6900 McGRAW DETROIT, MICHIGAN 48210 PHONE 313.361.6377 FAX 313.361.6378
email: bridgingcommunities@hotmail.com

EXHIBIT 2

As we move through this process, we would express our concerns on behalf of our vulnerable at risk elderly population regarding the blight that the present Ambassador Bridge will become and on the actual impact of the footprint of the project including customs plazas will be on the community. For ourselves and the total community we question the actual future for the neighborhoods and the millions of dollars of investment that has been made not just by Bridging Communities but by all community stakeholders over the past 20 years.

Thank you for your time and consideration.

Sincerely,

Marion Bloye

Marion Bloye
Special Projects Coordinator

GREATER CORKTOWN
DEVELOPMENT CORPORATION

July 16, 2007

Mr. Bob Bloom, Commander
Ninth Coast Guard District
1240 East 9th Street
Cleveland, Ohio 44199-2060

Dear Mr. Bloom,

My name is Timothy J. McKay. I work for the Greater Corktown Development Corporation as their Executive Director. I live and work in Detroit, Michigan in a neighborhood known as Corktown. Corktown is Detroit's oldest neighborhood. Corktown is named for the Irish who came from Cork Ireland and settled here in the 1830's. My community is located just west of Downtown Detroit and east of the Ambassador Bridge. Corktown is home to 6,000 residents and is adjoining the Mexicantown district which is located next to the Ambassador Bridge entrance to Canada. I have lived in Corktown for 26 years.

The Ambassador Bridge has long been an icon for Corktown. "The Bridge" is visible from every part of Corktown. For over seven decades Corktown has lived with the view, the noise, the diesel fumes/pollution and the traffic, day and night, and every day of every year.

The DBIC has not engaged the community in its effort regarding the proposed new twin bridge, certainly not Corktown. The Bridge Co. has not communicated to our community in a meaningful a way. Their communication has been outside of the community groups. This process for approval even consideration has been removed from our community. A lack of public meetings and a short comment period has put our community in a disadvantaged position. We have not been allowed to fully comment on the problems that we have about this project.

The DIBC and the Trucking industry located in the area, share the same ownership and some personnel. The tactics and methods used by these companies in conducting business display an alarming lack of concern for the impact of their business on the citizens in this area.

I have serious concern that the lack of real information from the DIBC to the public has not fostered any participation by the very people who will have to live with the affects of the twin expansion. Many residents have said they feel hopeless that the Bridge Co. is somehow allowed to do what they wish! The DIBC is also ignoring the wishes of the City

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Phone: 313·965·5853 Fax: 313·965·9822
www.greatercorktown.org

EQUAL HOUSING OPPORTUNITY

EQUAL OPPORTUNITY EMPLOYER

of Windsor and the Government of Ontario, Canada. Windsor and the Government of Ontario have stated that they do not want a new bridge built next to the existing Ambassador Bridge. Canada shares our concerns. This arrogance feeds the fear of our citizens. Yet the DIBC continues to pursue their plans as if nothing else matters. How can a company/business, engaged in international port of entry, expand without due process?

We agree that the Coast Guard should have more information in order to make a decision. Studies and reviews for this project have been minimal at best. The DIBC has not been up front with how this project will be funded and the DIBC recently failed at an attempt to access funds from the Michigan Strategic Fund. The Bridge is not a new business and it certainly is not going to move away.

The twin bridge will definitely impact Corktown in a negative way. Corktown has been struggling with the expansion of the truck traffic on the existing bridge. The trucking industry that is located around our area has expanded due to recent trade agreements. Also, a truck driving school has been located in our area, adding even more trucks onto our streets. The increase truck traffic on our streets is a very real threat to our quality of life.

The vacant Michigan Central Railroad Station, located in the Corktown and Mexicantown communities is also owned by the DIBC. The crumbling ruin of the Michigan Central can be seen from the Ambassador Bridge and for many miles around the City of Detroit. The DIBC has not made any attempt to clean up the area around the Station. Yet our communities are building new houses and cleaning up our streets all around the station. Some of our Residents received fines for weeds in the alleys behind their houses, yet the mess at the Michigan Central continues to be an eyesore. The DIBC seems to be above the law. How? Why? The Michigan Central Station has become a symbol of destruction of our City. Yet our communities surrounding the Station are rebuilding.

The DIBC has consistently displayed a high disregard for the citizens in Corktown, Mexicantown, the City of Detroit and Michigan. I realize the DIBC and related trucking industry creates jobs and taxes, but at what expense? There is a real lack of trust operating here. I fear that there may be national security issues with an international port of entry in the hands of a company such as the DIBC. What kind of business decisions are being made that could affect our national security? We will never know because it is a private company.

It is very difficult for me to support anything that the DIBC proposes. The residents of Corktown live in a delicate balance; between quality of life issues for thousands of residents and a major trucking/bridge industry owned by one man; a man who has shown only contempt for our community.

Sincerely,

Timothy J. McKay

Timothy J. McKay
Executive Director

Community Development Corporation

July 16, 2007

Mr. Bob Bloom
Commander, Ninth Coast Guard District
1240 E. 9th Street
Cleveland, OH 44199-2060

Dear Mr. Bloom,

I am writing to express our opposition to a twin span for the Ambassador Bridge because it will have a devastating impact on the immediate neighborhood surrounding the existing bridge. Mexicantown Community Development Corporation is completing the construction of the Mexicantown International Welcome Center and Mercado located two short blocks north of the bridge.

We are creating a regional destination site for local and distant travelers.
Above all, we are creating an oasis for the community, a public plaza for families, they can either walk their from their homes or drive.
There is new housing in the immediate area, the local businesses are re-investing theirproperty and businesses, a first for many of them.
Ste. Anne's Church is the second oldest Roman Catholic parish in the country and is an anchor in our community we look forward to further development in this neighborhood.

One of two anchor tenants is the State of Michigan Welcome Center a first of its kind in the state that is located in an urban setting that will service 800,000 people annually. In addition, we have a DTE Energy Customer Service office that just opened to the public approximately three weeks ago that draws at least 100 people daily. In addition, the Mercado (marketplace) is a much needed venue that is truly an economic development tool that give many residents an opportunity open their own business.

We are delighted to finally bring a 32 plus year dream to fruition, a dream that was created because of the devastation created in the late '60's, early '70s by the freeways that were built in our neighborhood, something we are still reeling from.

To add another span at this location is not something that we support, although we want to welcome the world and benefit from global trade we do not want to continue to be its doormat.

Best regards,

Maria Elena Rodriguez

2835 Bagley Avenue, Suite 200 Detroit, MI 48216 Phone: (313) 967-9898 Fax: (313) 967-9903

Michigan Avenue Business Association

7012 Michigan Avenue
Detroit, MI 48210

July 30th 2007

To: Bob Bloom
Commander 9th Coast Guard
1240 East 9th st
Cleveland, Ohio 44199-2060

From: Matt Prochaska
Michigan Avenue Business Association

Commander Bloom,
The Michigan Avenue Business Association (MABA) is an organization that serves to enhance the Michigan avenue commercial corridor. We represent area business owners, residents and area stakeholders.

MABA Board of Directors and members wish to express their concern over the addition of a second bridge span being proposed for in Southwest Detroit. The concern rises from the potential of increased truck traffic on Michigan Avenue as well as the effects this will have on the air quality of the area.

We that more studies on the effects upon our community is needed before a dission of this magnitude is made.

Please feel free to call with any questions or to speak on the matter in more detail. -313-841-1870

Sincerely,

Matt Prochaska
Executive Director of MABA

NEIGHBORHOOD CENTERS INC.
Building Blocks for Better Lives

8300 Longworth - Detroit, MI 48209 - Phone: (313) 841-4447 - Fax: (313) 841-7926 - E Mail: ncinc@aol.com
Board of Directors:Michael Boettcher, George Gaines, Morris Goodman, Sr. Marcia Haggins OSM, Oscar Hernandez, Carlos Lomeña, Felipe Martinez, Albert Pedrosi, Steven Pejuan, Charles Pryde, Br. Vincent Reyes OFM, Lea Schefsky, Carita Sledge, Mary Wallace, Donald Wortham, Rev. Edward Zaorski

August 9, 2007

Mr. Robert Bloom
US Coast Guard
1240 E. 9th St.
Cleveland, OH 44199

RE: Detroit International Bridge Company's Proposal to Twin Ambassador Bridge

Dear Mr. Bloom:

I have participated and been a leader in community development activities in southwest Detroit over the past 10 years. I am chiefly opposed to the Detroit International Bridge Company's proposal to "twin" Ambassador Bridge with a second span sharing support infrastructure on the grounds that it does not address our need for redundancy in the event of a terrorist strike or other disaster. Since 9/11, I have been deeply concerned about the vulnerability of the Ambassador Bridge to terrorist attack and about the devastating consequences that this could have for the economy of our region and of the nation. I think that we are desperately in need of a second bridge that would be located sufficiently distant from Ambassador Bridge so that there would be no chance of a single attack wiping out both spans. Secondly, a second span should not be dependent on any shared infrastructure so that there would be true redundancy in the case of an attack. Neither criteria are addressed by the proposed plan.

By allowing the International Bridge Company to proceed now, it would make the development of another span that would provide true redundancy economically unfeasible, thus blocking alternate means of addressing the needed redundancy.

I am also concerned about the environmental impact of the proposed "white elephant" role for the existing span so close to the our City's other notorious white elephant, the nearby multi-storied windowless railroad station which happens to have the same owner as the Ambassador Bridge.

Sincerely,

Dennis Nordmoe
Executive Director

SOUTHWEST DETROIT
BUSINESS ASSOCIATION

July 16, 2007

Mr. Bob Bloom
Commander, Ninth Coast Guard District(dpb)
1240 East 9th St.
Cleveland, OH 44199-2060

Dear Mr. Bloom:

We are writing to comment on the Detroit International Bridge Company's proposal to build a bridge across the Detroit River. The Southwest Detroit Business Association is a nonprofit community development corporation, 50 years old in 2007, in the business of building community----combating community deterioration and removing blight with a comprehensive approach to community based economic development.

First and foremost, we believe that any international border crossing impacts vehicular traffic and truck traffic, and the safety and well being of communities on both sides of the border. Because of the public purposes involved in the ownership and operation of an international border crossing, we believe that any new crossing must be publicly controlled.

Secondly, the span as proposed by the DIBC is immediately west of the current Ambassador Bridge. Our understanding from our counterparts in Windsor, Ontario, Canada, is that there is no place for the proposed bridge to land on the Canadian side of the border. They have examined other possible alternatives, and what is acceptable is 2-3 miles west of the proposed DIBC site. Half a bridge is no solution.

The Mexicantown Mercado and state of Michigan Welcome Center are designed and intended to welcome visitors and travelers to the U.S., the state of Michigan, the metro Detroit area, and the Hubbard Richard neighborhood. Expanded truck queuing, customs inspection, and 24/7 operations cause increased noise, traffic congestion, diminished air quality, and odors, and do not enhance the new and renovated housing, the new and renovated retail and the Mexicantown restaurant district's plans for the future. Transportation development must be balanced with residential and commercial development. No study has been done to measure the impact of increased use of the customs plaza.

Government is accountable to the public. The private sector is not. The private sector is obligated to maximize profit for its investors. Minimal review has been done(there is an

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t 313 842 0986 f 313 842 6359 www.southwestdetroit.com

appalling lack of information to date, and the information that is available now is not the same as the information available initially, i.e., a twinned span vs. a replacement span; how will the new span be financed) and minimal review will be the rule because there is simply not the same obligation to the public in the private sector.

We are curious as to the fate of the existing bridge. No concrete information is available. It is a national historic landmark, and little has been said regarding its future.

We would suggest that the Detroit River International Crossing, engaging governments on both sides of the border, engaging the Department of Homeland Security, engaging the communities that are most impacted by a bridge development, is a far better process to determine how and where a new border crossing should be built. It is by far a better alternative to a private business initiative, given the impact to the people who live, work, play, shop and invest in southwest Detroit.

Sincerely,

Kathleen Wendler

Kathleen H. Wendler
President

Southwest Solutions
Answers for a healthy community

August 1, 2007

Mr. Robert Bloom
Ninth Coast Guard District
1240 East 9th Street
Cleveland, Ohio 44199-2060

RE: Ambassador Bridge Enhancement Project

Dear Mr. Bloom:

Southwest Housing Solutions, a non-profit corporation, is the largest developer of multifamily housing units in Southwest Detroit. Over $60 million has been invested in numerous buildings and projects throughout the community. Several of our developments are located in close proximity to the Ambassador Bridge and as a result, residents in our buildings are directly affected by any increase in traffic or new construction at the Bridge or Plaza.

We have concerns about the lack of clarity and openness in how the Detroit International Bridge Company carried out the public process for its proposal to build a second span across the Detroit River. Meetings were not well publicized and few residents participated. Given the brevity of the presentations, it's unlikely that those in attendance could comprehend the effect of a towering cable stay bridge dominating the skyline.

Additionally, many of the residents we serve live in supportive housing units often relative to a disability and any incremental increase in things such as truck traffic, noise or pollution tend to significantly disturb and impact their quality of life. Furthermore, our work has included a distinct appreciation of and commitment to the preservation of historic buildings which similarly can be adversely impacted by traffic vibrations and pollution.

Southwest Housing Solutions has worked for more than twenty years to improve housing opportunities for all Southwest Detroit residents. A land use project of this size and the addition of two more lanes of traffic will certainly jeopardize many of the investments made so far, as well limit what we can accomplish in the future. We request that the Coast Guard deny the Bridge Company's request for a permit for the proposed second span.

Thank you very much.

Yours truly,

Timothy S. Thorland
Executive Director

Southwest Housing Solutions
1920 25th Street
Detroit, MI 48216
313.841.3727 main
313. 841.3734 fax
www.swsol.org

Equal Opportunity Housing

Equal Opportunity Employer

Document3

Southwest Detroit Environmental Vision
P.O. Box 9400
Detroit, MI 48209

Phone: (313) 842-1961
FAX: (313) 842-2158
Email: swdev@flash.net

July 16, 2007

Mr. Robert Bloom
Commander, Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199-2060

RE: Detroit Ambassador Bridge Enhancement Project

Dear Mr. Bloom:

On behalf of Southwest Detroit Environmental Vision (SDEV) a non-profit environmental organization representing residents, business and industry in Southwest Detroit, I am writing to express our concerns on the Ambassador Bridge Enhancement Project currently under permit review with the US Coast Guard. SDEV has a fifteen year history of working to improve the environment and the quality of life in this community. Staff and Board members have experience as participants in several long term environmental impact studies with the Michigan Department of Transportation and the agency is currently facilitating a two year EPA CARE grant.

Throughout the last year we have followed the efforts of the Detroit International Bridge Company to obtain permits to build a six lane second span next to the Ambassador Bridge, constructively adding two additional lanes of international border traffic to its existing facilities. Attendance at the two public meetings held on the Enhancement Project did little to clear up questions on environmental and traffic issues associated with a second span. (One meeting dealt solely with design criteria.) The Environmental Assessment posted on the applicant's website is simplistic and fails to adequately address significant air quality impacts such as: 1) increased emissions due to additional traffic lanes 2) increased levels of particulates because of the high percentage of trucks using the border crossing and the potential for idling 3) the total burden of air impacts for a community that already struggles with pollution from numerous mobile and point sources.

In addition, we feel that a second span at this location will be detrimental to revitalization efforts that are successfully transforming the community near the Ambassador Bridge with new homes, new retail development and even a State of Michigan Welcome Center. A six lane bridge could discourage homeowners from investing in the neighborhood as noise, congestion, truck traffic and pollution increase. The proposed second span, which dwarfs the Ambassador Bridge, will create monolithic transportation infrastructure as the iconic image of Southwest Detroit, instead of the diverse, exciting community that we are all working to create and sustain.

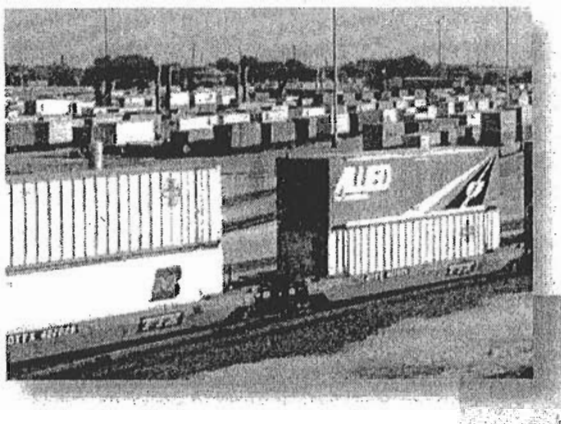
Thank you for the chance to review and provide comments on this Environmental Assessment. We hope that that the USCG will request further data that will indicate the environmental and social costs of the project more completely. A permit request for a new international border crossing by any unit of government would require a long and intense period of public scrutiny. Surely the residents of Southwest Detroit and Windsor deserve the same level of review and accountability when the permit request comes from a private company.

Yours truly,

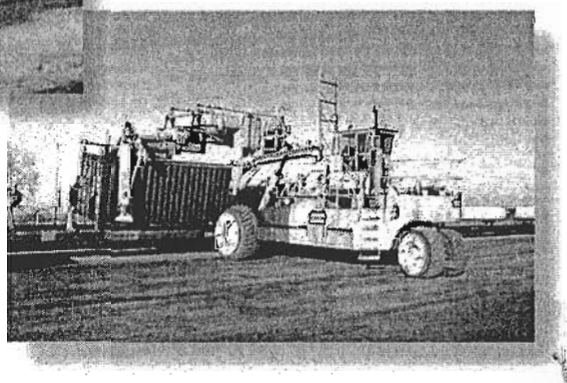
Lisa Goldstein

Lisa Goldstein
Executive Director

Detroit Intermodal Freight Terminal Project Study



Frequently Asked Questions



Q: What is the purpose of this study?

A: The purpose of the Detroit Intermodal Freight Terminal Project is to help Detroit and Southeast Michigan remain competitive in the freight transportation business. The goal is to develop a regional facility or facilities with enough capacity to handle current and future intermodal freight shipments needed by businesses and industries.

Q: What is "intermodal"?

A: Intermodal freight is a shipping method used to send products from manufacturers to where people buy them. It is called "intermodal" because it uses two "modes," trucks and trains, using special containers and trailers. Trucks take the product from the factory to a rail yard and trains move the products across the country. Finally, trucks take the products from a rail yard to their final destination.

This is an efficient method of transportation because shippers move their containers from the trucks to the trains and back again without having to repack the products. This method also can be less expensive. That is why more companies are using it more often.

However, there is a problem in Southeast Michigan. The rail yards in the Detroit area simply do not have enough room. Some companies are sending their shipments through other cities, like Chicago, Cincinnati, and Toledo. As more companies ship through other cities, jobs are lost in Detroit.

Q: Who is doing this study?

A: The Michigan Department of Transportation and its consultant, The Corradino Group, are working with four major railroads. They are CSX, Norfolk Southern (NS), Canadian National (CN), and Canadian Pacific (CP). The team also is working with local governments, businesses, churches, neighborhood groups, and residents.

EXHIBIT 3

Q: What are you studying?

A: The study is looking at four intermodal terminals and the surrounding areas. The terminals are NS/CSX-Livernois Junction Yard in Southwest Detroit, CP-Expressway in Corktown, CP-Oak in Grandmont and CN-Moterm in Ferndale. Norfolk Southern Railroad, co-owner of the Livernois-Junction Yard already intends to relocate the intermodal activity from three of its other terminals to the Livernois-Junction Yard.

A Draft Environmental Impact Statement identified a Preferred Alternative. The study looks closely at things such as jobs gained and lost. It also looks at noise, air quality and traffic in the neighborhoods. The results of the study will be shared with residents. MDOT seeks public comment before it makes decisions.

Q: How long will the study take?

A: The study should be finished by the end of 2007.

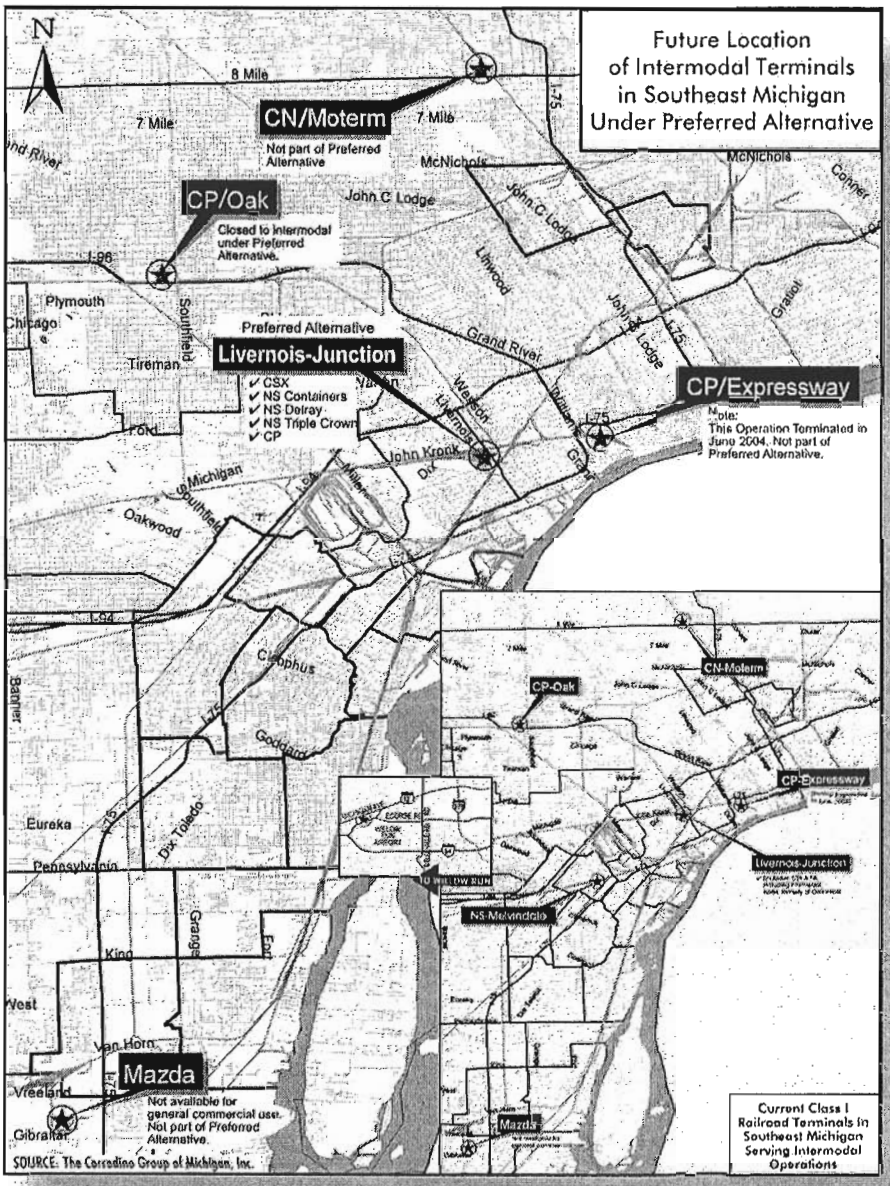
Q: Why are you looking at only the Livernois-Junction Yard for consolidation?

A: The Livernois-Junction Yard is different from the other intermodal terminals. At Livernois-Junction, the tracks are set up in such a way that all four major railroads can get to the site. This is not true at the other yards.

Q: How is this going to help me, one of the taxpayers helping to pay for all of this?

A: This project will increase the competitiveness of Michigan's businesses and industries in the global marketplace. This translates into more jobs, and more secure jobs, in southeast Michigan. Local residents also will benefit from lower transportation costs for consumer goods.

The four railroads and major shippers see this project as an opportunity for more business in Southeast Michigan. The project could mean new or larger businesses around the intermodal terminal(s). For example, the drivers and trucks that visit the yard(s) will need services. This project also could mean changes that make the neighborhoods better. These include giving trucks other routes besides neighborhood streets. It also could mean repairs for streets, bridges, sidewalks, streetlights, and other things.



Q: Does the public have a say in this?

A: Yes! MDOT always strives to keep the public informed and ask for as much public input as they can get on studies like this.

Announcements for major public meetings are mailed to thousands of area residents. The announcements are printed in English, Spanish and Arabic. Translators attend the large public meetings so that everyone has an opportunity to learn about this project. To make sure you are on the mailing list, call 248.799.0140. MDOT also works with the local media to announce the meetings.

Input from residents has helped shaped the study at every step. For example, several local organizations requested that MDOT expand the study to look at more than just consolidation versus no action. This type of input helps create a more complete review of area residents' concerns and questions, as well as their vision for the neighborhood and job market in the future.

Q: Is it true that because of this project, people and businesses may need to move?

A: Yes, the Preferred Alternative will require the state to buy some property. MDOT has already started talking to residents and business owners so they know what to expect if the state needs to buy their property. There are very strict laws in place to protect landowners, business owners and tenants.

The most important thing to remember is that the government cannot just take your home or business. If your property is needed, MDOT is required to help you find a new place to live and to pay fair market value for your house. MDOT also must look at how the project affects businesses. The study will look at the impact of jobs gained and lost through this project.

Q: How many trucks might come into the neighborhood?

A: Fewer than 100 in a day, when you consider all the trucks relocated by the project. And, the increase in trips will be on Wyoming and Livernois.

Q: Where can I get more information?

A: If you would like more information, call 248.799.0140, or visit the project Web site at **www.michigan.gov/mdotstudies.**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

AUG 1 6 2005

REPLY TO THE ATTENTION OF

B-19J

Mr. Abdelmoez Abdalla
Environmental Program Manager
Federal Highway Administration
315 West Allegan Street, Room 201
Lansing, Michigan 48933

Re: Comments on the Draft Environmental Impact Statement (DEIS) for the Detroit Intermodal Freight Terminal (DIFT), Wayne and Oakland Counties, Michigan, EIS No. 20050190

Dear Mr. Abdalla:

I am providing comments on the Draft Environmental Impact Statement (DEIS) for the Detroit Intermodal Freight Terminal (DIFT), consistent with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act.

The DIFT includes the proposed enhancement of intermodal operations by four Class I railroad companies [Norfolk Southern (NS), Canadian Pacific (CP), Canadian National (CN), and CSX]. In the Detroit area, four terminals handle intermodal operations: the Livernois-Junction Yard owned/operated by CSX and NS; CP/Expressway; CP/Oak; and, CN/Moterm. The purpose of the DIFT is to improve freight handling efficiency and increase capacity in the Detroit area. Four alternatives are evaluated in detail in the DEIS:

Alternative 1 – the No-Action Alternative,
Alternative 2 – Improve and expand existing terminals,
Alternative 3 – Consolidate all intermodal operations at Livernois-Junction yard, and,
Alternative 4 – Consolidate the intermodal operations of CSX, Norfolk Southern and Canadian Pacific at Livernois-Junction Yard while improving/expanding the existing CN/Moterm terminal.

The Federal Highway Administration (FHWA) and Michigan Department of Transportation (MDOT) have not identified a preferred alternative.

The U.S. Environmental Protection Agency (EPA) understands that the proposed enhancement would have a number of economic efficiency improvements and would benefit the local economy. We offer our comments below because we believe that FHWA and MDOT can make several small but important adjustments to maintain economic gains while improving air quality relative to the current alternatives.

EPA is concerned about the quality of the analysis regarding air impacts of this project. It appears that the project has the potential to improve regional air quality but also to concentrate

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EXHIBIT 4

truck/locomotive/handling equipment emissions in area(s) of Detroit that already have serious air pollution problems. EPA has recently designated Southeast Michigan as a non-attainment area for the fine particulate standard, referred to here as particulate matter 2.5 microns or less (PM2.5). Because of their impact on human health, EPA has emphasized the need to address PM2.5 and diesel emissions through the National Clean Diesel Campaign and various regional and local initiatives. Work is currently underway to develop and implement national, regional, and local control programs that will assist in bringing this area into attainment of the health-based PM2.5 standard as expeditiously as practicable. Preliminary analyses indicate, however, that despite implementation of national air pollution control programs, additional local controls will likely be necessary for this area to reach attainment of the National Ambient Air Quality Standard (NAAQS) for PM2.5. As a result, the state may need to consider significant local emissions reductions beyond current levels in order to attain the PM2.5 standard. It is from this perspective that we have evaluated the proposed project and note that it has the potential to make it more difficult to attain the PM2.5 NAAQS. For example, using information provided in Section 4.1 (Table 4-3 and Figure 4-1d), Alternative 3 could increase truck traffic at the Livernois-Junction Yard, near the highest violating PM2.5 monitor in Region 5, four to six times above current levels. Any increase in the emissions in this area is cause for concern and will make the state's task of developing a control strategy for bringing the area into attainment more challenging.

At this point in the process, we believe that the DEIS does not adequately describe impacts. Further, there are unexplored opportunities for FHWA and MDOT to consider air quality mitigation strategies. In order to establish that all practical, cost-effective mitigation options are being considered, EPA recommends that additional evaluations be done. Specifically, additional information is needed to better understand pollution coming from sources at these facilities, especially for PM2.5, including diesel emissions. Given the existing nonattainment status of the Southeast Michigan area and the high pollution levels being monitored near the terminal areas, we believe it is important that pollution be reduced through available, cost-effective mitigation strategies in order to assist in attainment of the health-protective PM2.5 standards.

We encourage FHWA and MDOT to assess how to minimize these emissions while achieving the project's goals consistent with MDOT's policy of context sensitive solutions. That policy includes the principles of achieving environmental sensitivity and stewardship, reflecting community values, and insuring safe and feasible integrated solutions. Particularly, FHWA should evaluate transportation corridors for each alternative that have the potential to shift truck traffic away from residential areas. In addition, EPA recommends that the agencies evaluate diesel emission reduction strategies for terminal operations such as retrofits, electrification, alternative fuels, and anti-idling in order to reduce environmental impacts associated with PM2.5. We believe these mitigation efforts can produce reductions in the 40 to 60 percent range for a cost that can be small relative to other local controls and likely are justified by the public health improvements. We encourage a comprehensive evaluation of the impacts on the community, including an environmental justice evaluation. We recommend that FHWA and MDOT undertake an analysis of mitigation options, and commit to them to the extent possible, so that an alternative with low environmental impact to the regional and local communities can be selected.

Based on our review of the information provided in the DEIS and the detailed comments we have enclosed on air quality and environmental justice, we have rated the DEIS as "Environmental Objections-Insufficient Information" (EO-2). The "EO" means that EPA identified significant environmental impacts that can be cost-effectively reduced in order to attain the PM2.5 NAAQS and provide adequate protection for public health, and the "2" indicates that additional information needs to be provided in the Final Environmental Impact Statement (FEIS) to alleviate these public health issues. Our rating applies to each of the build alternatives presented in the DEIS. We have enclosed a summary of EPA's rating system under NEPA.

Thank you for the opportunity to comment on this DEIS. We are available to discuss these comments. We are confident that these issues will be addressed and reflected in the forthcoming FEIS. If you have any questions, please contact me. The staff person assigned to this project is Sherry Kamke; she can be reached at (312) 353-5794 or via email at kamke.sherry@epa.gov.

Very truly yours,

Thomas V. Skinner
Regional Administrator

Enclosures (2)

1) EPA's Detailed Comments on the DEIS
2) EPA's Summary of NEPA Rating Definitions and Followup Actions

cc: Robert Parsons, Michigan Department of Transportation

Detailed Comments on Detroit Intermodal Freight Terminal (DIFT)
Draft Environmental Impact Statement (DEIS)

Mitigation

EPA is concerned that no mitigation is proposed or discussed in the DEIS for air quality impacts. There are numerous mitigation actions and strategies that should be discussed and applied to the alternatives for construction and for terminal operational activity. These are actions that complement EPA's National Clean Diesel Campaign to reduce diesel emissions. EPA is available to assist in efforts to select mitigation strategies that would be included in the final project. EPA has found that there are multiple cost effective measures to reduce PM2.5 emissions. Mitigation measures appropriate for consideration at the terminals include, but are not limited to:

- Evaluation of transportation corridors for each alternative that have the potential to shift truck traffic away from residential areas.
- Anti-idling measures and efficient management for the movement of trucks and locomotives to limit idling.
- Use of auxiliary power units for trains.
- Use of on-road fuels for trucks and equipment in the yards.
- Retrofit and control technology for trucks and equipment in the yards.
- Use of hybrid utility locomotive engines for rail yard movements.
- Implementation of a construction emissions reduction plan. Several states' Departments of Transportation have developed and implemented such plans. There are a number of action options to choose from to reduce overall construction emissions, including:
  - Retrofitting off-road construction equipment,
  - Using ultra low sulfur fuels for all equipment,
  - Limiting the age of on-road vehicles used in construction projects to 1998 and newer vehicles and engines,
  - Fugitive dust control plans,
  - Diesel particulate traps and oxidation catalysts,
  - Use of existing power sources or clean fuel generators rather than temporary power generators.

We recommend that the FEIS include an evaluation of these mitigation measures and commitments to the maximum extent possible.

Air Quality

While several options may reduce total regional emissions of PM2.5 by 2025, EPA is concerned about the potential for localized impacts of particulate matter of 2.5 microns or smaller (PM2.5), especially from diesel equipment, trucks, and locomotives, and the potential for regional emission increases prior to 2025. Throughout the DEIS scoping and development process, EPA

has advocated quantifying emissions and local ambient concentrations of PM2.5, including a breakout of diesel PM, in order to identify possible local areas of concern, to inform the design and selection of alternatives, and to inform mitigation.

National Ambient Air Quality Standards (NAAQS) Concerns

On January 5, 2005, EPA designated the seven-county Detroit Metropolitan area as nonattainment for the PM2.5 National Ambient Air Quality Standard (NAAQS). This designation became effective on April 5, 2005. The State of Michigan is required to develop a plan by April 5, 2008 to address the PM2.5 NAAQS. The State of Michigan's plan will need to incorporate any additional activity in the nonattainment area.

The Livernois-Junction yard area in Wayne County is near the Dearborn PM2.5 monitor site. This monitor is registering the highest PM2.5 levels in EPA Region 5 and some of the highest in the eastern United States. There are additional monitored violations of the air quality standards in the surrounding areas near the other DIFT terminal sites. Preliminary analyses indicate that it will be difficult for the State to reach attainment for the PM2.5 NAAQS. The State may need to consider significant local emissions reduction programs, including those targeting diesel emissions in order to attain. Without significant mitigation, the additional activity from this project will greatly affect the State's ability to attain the PM2.5 standard.

Air Emissions Estimates

EPA has had ongoing dialogue with FHWA and MDOT regarding air pollution impacts of this project. We acknowledge the efforts made by FHWA and MDOT to address the issues. However, EPA has identified some concerns regarding the analysis provided in the DEIS:

- There is no build-out or completion year designated in the DEIS.
- The construction plan and construction emissions estimates are not included in the DEIS
- No air emissions information is presented for interim years. Section 4.8.4 of the DEIS and Appendix E section 7.0 state that terminal pollutant emission burden estimates were calculated for the year 2015. These emissions estimates are not included in the DEIS. Air emissions information is only presented for 2004 and 2025, bracketing a twenty-one year span. The State is required to submit a plan in April 2008 that will ensure attainment of the standards as expeditiously as practicable. States are to attain the PM2.5 standard by April 2010 but EPA may provide up to a five year extension to 2015 in certain cases. Since the State plan will need to demonstrate attainment of the PM2.5 standard as expeditiously as practicable, it is especially important to provide emissions information for modeling years earlier than 2025.
- The public roadway network is depicted by link segments in maps in the DEIS for the build alternatives, but there is no description of what the truck volume will be and what routes trucks will use under each of the alternatives.

In particular, EPA is concerned about estimates for PM2.5. Due to the elevated PM2.5 monitoring values existing in the area, the non-attainment status of the area, and the increase in intermodal activity associated with the build alternatives, a local assessment of PM2.5 ambient concentrations from the yard and traffic should be performed. The information should include estimates of PM2.5, including a breakout of diesel PM, to optimize the project design and minimize the local impacts. Models and methods that are widely accepted and used in regulatory contexts are appropriate for these analyses. EPA has worked with other agencies to conduct analyses of PM2.5, including the diesel PM component, for truck stops and other projects using tools that are appropriate for application to the DIFT. EPA is available to assist FHWA and MDOT in this analysis.

We have overall concerns about potential increases in PM2.5 emissions for each of the project alternatives. We realize that some of the project alternatives also have potential regional decreases in PM2.5 emissions. As noted above, several alternatives potentially impact violating PM2.5 monitors. Based on information presented in the DEIS, the number of freight container lifts will increase dramatically in the build scenarios (especially under Alternative #3, the Consolidate option). This information indicates that the number of lifts will increase up to four times from current levels. Using the number of additional lifts and the lift/truck ratio used in the DEIS, the number of truck movements through the DIFT area is expected to increase up to six times from current levels. EPA is concerned about the potential impacts given that the activity will be occurring near the Dearborn monitor, which is already a heavily burdened area with respect to PM2.5. Maps in the DEIS (Figure 4-8c for example) show predicted traffic volume to roadway capacity ratios exceed 1.00 (full capacity) in several locations near the violating Dearborn PM2.5 monitor. In some cases, volume-to-capacity ratios nearly double. This suggests that substantial congestion will occur at a number of intersections and roadway segments adjacent to terminals. This is true for each of the build alternatives, but is most notable for Alternative 3.

It is unclear why the DEIS predicts the public roadway burden for diesel PM should go down for Alternatives 3 and 4 compared with No Action 2025 (Table 4.22) when the number of trucks in those scenarios appears to increase by at least four times. The public roadway network is only partially described in the document. There are maps that show the links that constitute the roadways in the near-terminal areas that factor into the calculations, but there is no description of how much truck traffic will use specific routes to get onto those roadways identified, especially for the Livernois-Junction yard (Fig. 4-41a). The Final EIS should provide a more robust discussion of traffic patterns for each build alternative and what specific actions will be undertaken to optimize traffic flows and reduce impacts.

The DEIS states that road/soil dust represents a significant part of the total PM emissions, although it is not clear if the road dust number reflects the proposed paving of the yards (Table 4.21b). The DEIS suggests that rail yards will be paved and asserts that paving the yards will greatly reduce the PM2.5 impacts of this project. Air quality data from speciation monitors in the area show that road dust contributes a small percentage of PM2.5 to ambient concentrations.

Consequently, while control of road dust at this facility may be warranted, such efforts do not address what are likely to be the most significant impacts of this proposed facility. Focusing primarily on control for the road dust category may overlook more significant and cost-effective mitigation options.

We are pleased that an air toxics burden analysis is presented. However, the DEIS does not offer any discussion about the air toxics estimations presented for the various build alternatives and source category activities. Table 4-21b indicates that the various toxic pollutants, including diesel PM, are trending upward for all build alternatives compared with No Action. It would be helpful if FHWA could share its interpretation of the data that is included in the DEIS.

The DEIS includes some language regarding limitations of the existing science to understand the health impacts from PM2.5 and air toxics which is not representative of current practices. The limitations mentioned include inadequate tools and unusually large degrees of uncertainty. We believe that proven methods are available, which are routinely used in regulatory contexts. The DEIS presented the lack of a pass/fail test as the reason why PM2.5 analyses, including diesel PM, were not done. The existence of the PM2.5 annual and 24-hour NAAQS provide sufficient justification for performing PM2.5 analysis, regardless of the DEIS's assessment of the limitations of the existing science.

General Conformity

This project will need to address the General Conformity requirements if applicable. The purpose of the General Conformity Rule is to ensure that Federal activities do not interfere with the clean air quality goals as contained in the State Implementation Plan. General Conformity is required for all National Ambient Air Quality Standard nonattainment and maintenance areas. The Detroit metropolitan area is nonattainment for ozone and PM2.5, and maintenance for carbon monoxide. We would like to note that any General Conformity documentation would need to have a public comment review period. The General Conformity determination must be competed by FHWA prior to signing a Record of Decision.

Environmental Justice

The DEIS provided much of the necessary demographic information showing the population of key groups around the terminal areas. For example, the DEIS included information stating that in the year 2000, the Livernois-Junction/CP Expressway area was 52.5% minority and more than 25% of the people in the area live below the poverty level. The African American, Hispanic and Arab populations represent at least two-thirds of the people living in the three terminal areas. The DEIS correctly states that when all populations covered by the Environmental Justice Executive Order are combined, each terminal area is dominated by these groups.

Under each build scenario, the EJ section of the DEIS states, "Compared to the No Action condition in 2025, terminal pollutant burdens are expected to increase due to the forecast

increase in intermodal activity" and "The 2025 pollution burdens of the roadways around the terminals are forecast to be virtually the same as today (or slightly less for Alternative 3). The regional mobile source pollutant burdens are expected to be reduced due to diversion of freight shipments from truck to rail and the use of cleaner fuels and engines." This information is used as the basis for drawing conclusions on the proportionality/disproportionality of impacts. It appears that adverse air quality impacts are being counterbalanced with positive effects projected for land use, economic impacts, and water quality because the EJ section (under the evaluation of the effects of Alternative 2 on the Livernois-Junction Yard/CP-Expressway) provides the statement "On balance, there will be no disproportionate adverse effect on populations covered by the EJ Executive Order in the Livernois-Junction/CP-Expressway terminal area as a result of Alternative 2's proposed terminal expansion." Similar statements are made for each of the terminals under each build alternative. The DEIS provides little supporting information to indicate how FHWA analyzed impact areas to determine if there were disproportionately high and adverse effects on minority and low-income populations. We believe that this analysis is important for all the impact categories identified by FHWA in its EJ section. Based on the rest of the comments in our letter, we emphasize the need to do an analysis on air quality impacts.

There is no separate evaluation of impacts in the context of ensuring compliance with Title VI of the Civil Rights Act of 1964. To the extent that there is such an evaluation, it is included only under Section 4.3.1. We recommend that a separate determination be made regarding Title VI compliance, particularly given that there is a significant population (Arabs) that is protected under Title VI but is not within the scope of the definition of "minority" used to implement Executive Order 12898. This recommendation is consistent with FHWA Order 6640.23.

As stated elsewhere in these comments, we are concerned that additional pollutant burden from terminal activity will be occurring in an area that is already impacted by poor air quality. Part of the reason for conducting a robust Environmental Justice analysis is to determine if an adverse effect on a low income or minority population significantly exceeds that of a comparable reference area or population. A qualitative evaluation of possible synergistic effects or exposures should be considered in this analysis. There may be areas of vulnerability to consider such as increased sensitivity of sub-populations based on age (children and elderly), attributes of households (lack of air conditioning), and lack of insurance coverage (lack of routine health care).

We recommend that the FEIS provide more detailed information regarding whether or not air quality impacts are disproportionately high and adverse on minority populations and low-income populations. Discussion of regional reduction in pollutant levels is not sufficient, without a discussion of pollutant levels in the specific areas raising environmental justice concerns, to adequately evaluate the potential for disproportionately high and adverse impacts from air pollutants. The FEIS should detail what course of action (avoidance, minimization, and mitigation) will be considered to address any possible EJ effects.

Cumulative Impacts

The cumulative impact section in the DEIS and the Indirect and Cumulative Impacts Analysis Technical Report addressed several resource categories namely: mobility, economic impacts, land use, air quality, community effects, noise, cultural resources, and water. EPA's review focused primarily on the air quality category. We note that the cumulative effects section of the DEIS concluded that increased development would increase pollution but increases would not cause standards to be violated.

The analysis in the technical report does not appear to consider any more activities than what was considered for the direct air quality analysis. The burden analysis included in the DEIS was segregated by terminal burden and roadway burden. The combined burden from terminal activities and roadway activities was not assessed. Direct effects from construction activities were not assessed in the air quality analysis or the cumulative effects section. Cumulative impacts to air quality from infrastructure projects (e.g., new border crossings, changes to Ambassador Bridge, and rehabilitation of I-94) and other pollution sources could be significant, if not regionally, then locally. The DEIS did not provide support for the statement made that standards will not be violated if development is properly located and if governmental actions are consistent with planning processes. We recommend that the FEIS address cumulative effects to air quality from these other activities.

Purpose & Need and Alternatives Analysis

It is clear that Detroit's intermodal network could be improved by providing the necessary infrastructure to support current and future distribution needs, reducing truck vehicle miles traveled, removing intermodal terminal truck traffic from local streets and buffering intermodal facilities from nearby neighborhoods. EPA supports these goals. Although the data in the DEIS indicates that there is a need to provide additional terminal capacity, it isn't clear how capacity deficiencies were calculated for the Detroit region and what the target capacity is for the DIFT project. The Commodity Flow Model Report provides additional information about capacity projections. These are based on a set of assumptions, and they consider a subset of factors that affect freight demand. The purpose and need section could be improved by including a more complete explanation of how capacity targets were determined, how factors affecting freight demand were determined, and how sensitive the capacity projections are to other assumptions and factors.

The DEIS's purpose and need discussed the role of switching operations, signaling, route conflicts, length of trains and train speeds in intermodal connectivity needs, but no information was presented regarding how alternatives would address these issues. Since some key environmental effects such as relocations depend on the size of the terminal facilities, it is important to answer the question of what effect fixing the other intermodal connectivity needs would have on the capacity without increasing terminal footprint. We recommend that the FEIS address this point.

SUMMARY OF RATING DEFINITIONS AND FOLLOW UP ACTION*

Environmental Impact of the Action

LO-Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC-Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impacts. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS sate, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1-Adequate
The EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alterative and those of the alternatives reasonably available to the project or action. No further analysis or data collecting is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information
The draft EIS does not contain sufficient information for the EPA to fully assess the environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640 Policy and Procedures for the Review of the Federal Actions impacting the Environment

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DETROIT -- Marathon Petroleum Co. is targeting its Detroit refinery for a $1 billion upgrade that would allow the facility to process Canadian crude oil. Such a move would add 135 jobs at the refinery and increase gasoline supplies in Michigan, the company said.

The project would create up to 1,200 construction jobs and would be completed in 2010.

Marathon officials met Thursday with the Detroit Brownfield Redevelopment Authority to discuss tax credits in exchange for building the expansion on a 17-acre brownfield site adjacent to the 200-acre Southwest Detroit refinery.

Commuters along I-75 are familiar with the refinery's location just west of the freeway, near the city's southern border.

Marathon is also considering refineries in Minnesota and Illinois, but Detroit's proximity to Canada and key pipelines gives it an advantage, company spokeswoman Chris Fox said Thursday.

"We are trying to stabilize the supply source for Michigan's only refinery," she said. "We feel Canada is a very good option because they are second only to Saudi Arabia in terms of proven reserves."

Marathon officials expect to make a decision by year's end.

The state is offering up to $10 million in tax credits to the oil company, according to the Brownfield Redevelopment Authority. That agency will hold public hearings on the proposed project before the end of the month.

Plan would ease shortages

A key source for the oil used by Marathon's Detroit refinery is the Gulf Coast. That leaves the state vulnerable to shortages and price fluctuations when hurricanes or pipeline problems disrupt supply.

The project would expand the refinery's capacity to 115,000 barrels per day, from 100,000 barrels. Alterations would be needed to handle the heavier, more viscous crude pumped from Canada's oil fields. Also, a 29-mile strip of pipeline through Monroe County would need to be expanded to handle the Canadian oil.

A larger refinery that can tap into more than one source of oil helps address some of the capacity concerns that were blamed for skyrocketing gas prices earlier this summer, said Doug MacIntyre, senior oil market analyst for the U.S. Energy Information Administration.

"Having more flexibility and capacity is a good thing," he said. "Especially since Canadian crude is expected to be looking for places to go from many years to come."

Hurdles must be cleared

Fc aid internal approvals, plus obtaining the brownfield tax credits and clearing regulatory hurdles stand in the way of Michigan securing the project.

The project requires approval of the Brownfield Redevelopment Authority. Then the Detroit City Council and state

EXHIBIT 5

economic development officials must sign off in order for Marathon to secure the tax credits. The company also must get approval from the state Department of Environmental Quality and possibly other regulators.

Marathon got the OK from the Michigan Public Service Commission last month to build and operate the expanded pipeline for the project. The firm filed air quality permits with DEQ in April.

In addition to government hearings, Marathon plans community open houses and also has established a Web site, www.detroithoup.com, to detail the project's progress.

Environmental activists have raised concerns about expanding a refinery in an area already with a high concentration of industry.

"It's another straw on the camel's back for the folks in southwest Detroit, who are largely lower income and minority folks," said Hugh McDiarmid, spokesman for the Michigan Environmental Council. "Already they are saddled with childhood asthma rates, health problems and pollution problems that are way beyond the norm. It's unfair that folks have to put up with that."

You can reach Eric Morath at (313) 222-2504 or emorath@detnews.com.

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Marathon plans to expand Detroit refinery

$1-billion project would create more than 900 new jobs

August 27, 2007

By ALEJANDRO BODIPO-MEMBA

FREE PRESS BUSINESS WRITER

Officials at Marathon Petroleum Co.'s refinery in Detroit plan to announce a $1-billion expansion proposal that would boost oil production 15,000 barrels a day by 2010 and add more than 900 jobs to the local economy.

Michigan's only refinery is seeking approval from the board of directors of Marathon Oil Corp. to increase refinery production from 100,000 barrels to 115,000 barrels a day. Marathon Petroleum Co. is a unit of Houston-based Marathon Oil Corp.

A rtisement

The proposed project would also allow for the refinery to process heavy crude oil that comes from Canada's tar sands, primarily in northern Alberta.

Heavy crude oil has a higher sulfur content and is more difficult to process than lighter sweet crude.

Canada and Venezuela control about 75% of the world's tar sands reserves.

Canada is also the largest supplier of oil to the United States with 2.3 million barrels a day, representing 17% of U.S. imports and 11% of U.S. consumption.

"If the project is approved the refinery will create about 135 new jobs on top of an average of 800 construction jobs throughout the three-year period," said Angelia Graves, a spokeswoman for Marathon. "We hope to get approval by the fourth quarter of this year and construction could start by the end of the year or early next year."

At 3:30 p.m. today, Marathon officials plan to brief the news media about the project. The company also plans to host two open house functions this week for the southwest Detroit residents who live near the refinery.

Marathon will host an open house from 6:30 to 8:30 tonight at Odd Fellows Hall, 8701 West Vernor Highway. The second public meeting will is set for 6:30 p.m. to 8:30 p.m. Tuesday at St. Andrew & Benedict Church, 2450 S. Beatrice St.

"T urpose of the open houses is to let the community know what we're doing and answer any questions they may have about the project," Graves said.

For more information, residents can call Suzanne Konkle at 313-297-6304 or log onto www.DetroitHOUP.com.

*Contact **ALEJANDRO BODIPO-MEMBA** at 313-222-5008 or abodipo@freepress.com.*

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U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

2100 Second Street, S.W.
Washington, DC 20593-0001
Staff Symbol: CG-3PWB
Phone: (202) 372-1511
Fax: (202) 372-1914

16591
November 22, 2006

M[redacted]
Steptoe & Johnson, LLP
1330 Connecticut Avenue, NW
Washington, DC 20036-1795

Dear Mr.[redacted]

This is in response to your letter dated November 20, 2006, in which you disagreed with the Coast Guard's obligation to consider potential transboundary impacts to the City of Windsor, Ontario, as a result of the proposed Ambassador Bridge project. As defined by the *Council on Environmental Quality (CEQ) Guidance on NEPA Analyses for Transboundary Impacts*, dated July 1, 1997, the National Environmental Policy Act (NEPA) "requires agencies to include analysis of reasonably foreseeable transboundary effects of proposed actions in their analysis of proposed actions in the United States". As you outlined in your letter, the Coast Guard permits only the portion of a bridge within the borders of United States, however, the portion of the bridge in the United States would not be constructed without the portion in Canada. Therefore, analysis of the impacts on Windsor must be included in the Environmental Assessment.

Should you have additional questions concerning this matter, please contact me.

Sincerely,

[redacted]

Chief, Office of Bridge Administration
U. S. Coast Guard
By direction of the Commandant

Copy: [redacted]D-9(dpb)

0001

EXHIBIT 7

Hojjat Nasr

Department of mechanical and Aeronautical Engineering, Clarkson University,
Potsdam, NY 13699-5725
(315)-212-6003
nasrh@clarkson.edu

EDUCATIONAL BACKGROUND:

Ph.D., Mechanical Engineering: Clarkson University, Potsdam, NY, (2008 Expected)
Thesis: Direct Numerical Simulation of Particle-Laden Flows.

Master of Science, Mechanical Engineering: IUT, Iran, (2004)
Thesis: Particle tracking in turbulent flows.

Bachelor of Science, Mechanical Engineering: IUT, Iran, (2001)
Research topic: Finite element solution of Navier-Stokes equations using FEATFLOW code.

RESEARCH INTRETS:

- Computational Fluid Dynamics
- Direct Numerical Simulation of Particle-Laden Flows
- Numerical Modeling of Gas-Liquid Flows in Micro-channels, Fabrics, and etc.
- Numerical Modeling of Self-healing Materials.
- Environmental and Industrial Applications of Multiphase Flows
- Aerosol Dynamics, Particle Adhesion and Removal

COMPUTER SKILLS

- Programming Languages: Parallel Programming with MPI, Visual Basic, C++, FORTRAN and Java
- Numerical Packages: FLUENT, NISA, ANSYS, FEATFLOW, STARPIC, MATLAB and Maple
- Graphical and Post–processing: Tecplot and Adobe Photoshop
- CAD Packages: AutoCAD, Gambit and Mechanical Desktop
- Operating Systems: Linux, UNIX, DOS, Mac OS, Windows 9x/NT/2000/XP

JOURNAL PAPERS:

1) Nasr, H., and Ahmadi, G., "The effect of two-way coupling and inter-particle collisions on turbulence modulation in a vertical channel flow, Int. J. Heat and Fluid Flow, 2007 (in press).

EXHIBIT 8

2) Nasr, H., Ahmadi, G., and McLaughlin, J.B., "Effects of particle-particle collisions and two-way coupling on dispersed and carrier phase fluctuations in a turbulent channel flow, 2007 (In preparation).

3) Nasr, H., Ahmadi, G., and McLaughlin, J.B., "Direct numerical simulation of particle-laden turbulent channel flow", 2007 (In preparation).

REFEREED CONFERENCE PAPERS:

1) Nasr, H., Ahmadi, G., McLaughlin, J.B. and Jia,. X., "Motion of a Drop through a Fabric in Presence of Wettability Gradient," In Proceedings of the 2007 International Conference on Multiphase Flow (ICMF) , Leipzig, Germany, July 2007.

2) Nasr, H., Ahmadi, G., and McLaughlin, J.B., "Effects of inter-particle collisions and two-way coupling on particle deposition velocity in a turbulent channel flow," In Proceedings of the 2007 International Conference on Multiphase Flow (ICMF) , Leipzig, Germany, July 2007.
Paper No S3_Tue_C_21.

3) Nasr, H., and Ahmadi, G. "Turbulence Modification by Particles in A Vertical Channel Flow," 7th International Aerosol Conference, St Paul, MN, September 10-15, 2006.

4) Nasr, H., Ahmadi, G., and McLaughlin, J.B., "Effects of particle-particle collisions on particle concentration in a turbulent channel flow," In Proceedings of the 2006 ASME Joint U.S. – European Fluids Engineering Division Summer Meeting, Miami, FL, July 2006. ASME-FEDSM2006-98175.

5) Nasr, H., Ahmadi, G., McLaughlin, J.B. and Jia,. X., "Drop motion simulation on a surface due to wettability gradient," In Proceedings of the 2006 ASME Joint U.S. – European Fluids Engineering Division Summer Meeting, Miami, FL, July 2006. ASME-FEDSM2006-98198.

6) Nasr, H., Ahmadi, G., and McLaughlin, J.B., "Direct Numerical Simulation of Particle Deposition in Turbulent Channel Flow," 24th Annual Conference of the American Association for Aerosol Research, AAAR 2005, Austin, TX, October 17-21, 2005.

7) Nasr, H., Ahmadi, G. and Emami, M.D., "Numerical Simulation of Particle-Surface Interaction in a Turbulent Channel Flow," 79th ACS Colloid and Surface Science Symposium, Clarkson University, Potsdam, NY, June 12-15, 2005.

8) Emami, M.D., Nasr, H., and Ahmadi, G., "Transport and Deposition of Spherical Solid Particles in a Turbulent Channel Flow", 8th International and 12th Annual Mechanical Engineering Conference,Tehran, Iran, May 2005.

9) Emami, M.D., Nasr, H., and Ahmadi, G., "Transport and Deposition of Nano- and Micro- Particles in a Turbulent Channel Flow", The 10th Asian Congress of Fluid Mechanics (ACFMX), Sri Lanka, May 2004.

10) Emami, M.D., Nasr, H., and Ahmadi, G., "The Effects of Different Turbulence Models on Two-Phase Flow Systems", 8th Conference of Fluid Mechanics, Tabriz, Iran, September 2003.

RESUME

GOODARZ AHMADI

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http://www.clarkson.edu/projects/fluidflow/ga/ResumeIndex.htm
http://www.clarkson.edu/cares/

PRESENT POSITION

Clarkson Distinguished Professor
Robert R. Hill '48 Professor of Department of Mechanical and Aeronautical Engineering,
Interim Dean of Engineering
Coulter School of Engineering
Clarkson University, Potsdam, New York 13699
Associated Director, Center for Air Resources Engineering and Science (CARS)
Member of Faculty Advisory Board, Center for Advanced Materials Processing, CAMP

EDUCATION

B.S., Tehran University, 1965
M.S., Purdue University, 1968
Ph.D., Purdue University, 1970

RESEARCH INTERESTS

Aerosols, Multiphase Gas-Solid and Gas–Liquid Flows, Particle Resuspension, Lung and Nose Deposition, Modeling, Environmental Multiphase Flows, Air Pollution, Granular Flows, Turbulence Spray, Hot-Gas Filtration, Nonlinear Random Vibrations, Vibration Control, Air Flow Management, Tribology, Continuum Mechanics, Stochastic Stability, Base Isolation, Earthquake Engineering.

PROFESSIONAL EXPERIENCE

Interim Dean of Coulter School of Engineering, Clarkson University (Since 2005)

Interim Vice Provost for Research, Clarkson University (2004-2005)

EXHIBIT 9

Associate Dean of Engineering for Research and Graduate Studies, Clarkson University (2004-2005)

Robert R. Hill '48 Professor of Mechanical and Aeronautical Engineering, Clarkson University (Since 2003).

Clarkson Distinguished Professor, Clarkson University (Since 2001).

Professor of Mechanical and Aeronautical Engineering, Clarkson University (Since 1981).

Chairman, Department of Mechanical and Aeronautical Engineering, Clarkson University (1991-1994).

Vice-Chairman of Fluid Mechanics and Thermal Science Group, Clarkson University (1983-1988).

Chairman of Graduate Committee, Department of Mechanical and Aeronautical Engineering, Clarkson University (1985-1991, 1997-2005).

"Faculty Research Participant at Federal Energy Technology Center (DOE-FETC)," Morgantown, WV (Several weeks in summers of 1999-2007)

"Senior National Research Council Research Associate at Federal Energy Technology Center (DOE-FETC)," Morgantown, WV (1995, Summer of 1996)

Vice-Chairman of Fluid Mechanics and Thermal Science Group, Clarkson University (1983-1988).

Visiting Professor, Department of Mechanical Engineering, University of Calgary, Calgary (Feb.-Dec. 1981).

Professor of Engineering, Shiraz (formerly Pahlavi) University (1976-1981).

Dean of Engineering, Shiraz University (1979-1980).

Associate Dean of Engineering, Shiraz University (1975-1977).

Academic Visitor, School of Mathematics and Department of Mechanical Engineering, University of Newcastle Upon Tyne, Newcastle (Summer, 1978).

Academic Visitor, Department of Civil Engineering, Northwestern University (Summer, 1977).

Visiting Professor, Department of Aeronautics, Imperial College, London (Summer, 1976).

Visiting Scholar, Department of Civil and Geological Engineering, Princeton University (Summer of 1975).

Visiting Scientist, Department of Physics, University of Saskatchewan, Saskatoon (1974-1975).

Associate Professor of Engineering, Shiraz University (1972-1976).

Assistant Professor of Engineering, Shiraz University (1970-1972).

TEACHING EXPERIENCE

Undergraduate (Clarkson, Shiraz & Calgary):
Fluid Mechanics, Intermediate Fluid Mechanics, Statics, Rigid Body Dynamics, Gas Dynamics, Thermodynamics, Engineering Mathematics, Mechanical Vibrations.

Graduate (Clarkson & Shiraz):
Particle Transport, Deposition and Removal, Stochastic Processes for Engineers, Advanced Fluid Mechanics, Theory of Boundary Layer, Mathematical Theory of Turbulence, Theoretical Acoustics, Theoretical Methods in Engineering, Numerical Solution of PDE, Advanced Vibrations, Random Vibrations, Multiphase Flow Modeling, Fluid Mechanics of Aerosols.

Short Courses Given:
Random Vibration (Worcester, July 1987)
Fluid Mechanics of Aerosols (San Diego, August 1990)
Introduction to Fluid Mechanics of Aerosols with Application to Microcontamination Control (San Jose, August 1991), (Las Vegas, July 1992), (Chicago, August 1993), (East Brunswick, August 1994)
Mechanics of Aerosols (Sharif University of Technology, June 1992)
Random Vibrations with Application to Earthquake Engineering (International Institute for Earthquake Engineering and Seismology, June 1992)
Mechanics of Aerosols, (University of Science and Technology of Iran, May-June 1995)
Random Vibrations with Applications to Earthquake Engineering, (Sharif University of Technology, May-June, 1996, and May-June, 1998)
Risk Assessment with Applications to Earthquake Engineering, (Sharif University of Technology, April-May, 1997)
Turbulence, Aerosols and Two-phase Flows, (Lappeenranta University of Technology, Lappeenranta, Finland, January, 1999.
Two-Phase Flow with Application to Sediment Transport (Sharif University of Technology, April-May 1999)
Random Vibrations with Applications to Earthquake Engineering (Sharif University of Technology, April-May, 2000)
Particle Transport Processes in Turbulent Flows - Particle Dispersion and Deposition (Aalborg University, Aalborg, Denmark, May 2-4, 2001)

Random Vibrations with Applications to Earthquake Engineering (Sharif University of Technology, May, 2001)
Introduction to Turbulent Flows (Sharif University of Technology, June 2002)
Turbulence Modeling (Shiraz University, May 2003)
Turbulence and Turbulence Modeling (ISME, May 2004)
From Instability to Chaos and Turbulence (Khajeh Nasir Tousi University, May 2005)
Particle Transport and Deposition, (Lappeenranta University of Technology, Lappeenranta, Finland, (December 2005).
Turbulence Modeling (ISME, May 2007)

PROFESSIONAL ACTIVITIES

Editorial Advisory Board, International Journal of Engineering Science (1997-2007).

Editorial Advisory Board, Particulate Science and Technology.

Editorial Advisory Board, Asian Journal of Structure.

Regional Editor, Iranica Scientia.

Member of Editorial Advisory Board, Journal of Seismology and Earthquake Engineering

Editorial Advisory Board, Asian Journal of Civil Engineering

Editorial Advisory Board, The Uncertainties in Engineering Mechanics

Editorial Advisory Board, Iranian Journal of Science and Technology.

Editor, Iranian Journal of Science and Technology (1973-1974), and (1978-1980).

Associate Editor, Iranian Journal of Science and Technology (1971-1973) and (1975-1978).

Guest Editor of Aerosol Science and Technology for Special Issue on Hot-Gas Filtration, (September 1998)

CONSULTANTSHIP

Consultant, Structural Vibrations and Earthquake Engineering (1976-1980).
Consultant to the Northland Company, Watertown, NY (Summer 1982).
Consulting for different projects, DOE-NETL (1996-2003)

SOCIETY AFFILIATION

American Society of Mechanical Engineers (Fellow)

American Society of Engineering Education
American Association for Aerosol Research
Society of Engineering Science
Iranian Society of Mechanical Engineers (Fellow)
Iranian Society of Civil Engineers (Fellow)
Fine Particle Society (Until 1995)
Earthquake Engineering Research Institute (Until 1992)
International Association for Structural Mechanics in Reactor Technology (Until 1990)

ADMINISTRATIVE ACTIVITIES

Interim Dean of Coulter School of Engineering, Clarkson University (Since 2005)

Interim Vice Provost for Research, Clarkson University (2004-2005)

Associate Dean of Engineering for Research and Graduate Studies, Clarkson University (2004-2005)

Chair, Search Committee for Director of Research, Clarkson University (2004-2005)

Chair, Search Committee for Shulman Chair and Director of Center for Rehabilitation Engineering, School of Engineering, Clarkson University (2004-2005)

Chair, Dean Search Committee, School of Engineering, Clarkson University (2000-2003)

Chairman, Department of Mechanical and Aeronautical Engineering, Clarkson University (1991-1993).

Chairman, Graduate Committee, Department of Mechanical and Aeronautical Engineering, Clarkson University (1985-1991, 1997- Present).

Chair, University Graduate Committee (GERIP) (1997-1999)

Vice-Chairman, Fluid Mechanics and Thermal Sciences Group, Clarkson University (1983-1988).

Dean of Engineering, Shiraz University, Shiraz (1979-1980).

Associate Dean of Engineering, Shiraz University, Shiraz (1975-1977).

Member of the Engineering Committee, Research Council of the Ministry of Science and Higher Education of Iran (1977-1979).

Head of Administration and Job Evaluation, Shiraz University, Shiraz (1973-1974).

THESES SUPERVISED

On the Random Vibration of Beams, J. Hashemi, M.S. Thesis (1972).

Rapid Drainage From an Unconfined Aquifer in the Vicinity of a River, H. Mostofi, M.S. Thesis (1974).

A Modified Quasi-Normal Theory of Turbulence, M. Murgusan, M.S. Thesis (1978).

Applications of Truncated Wiener-Hermite Expansion to Nonlinear Random Vibration with Application to Nonlinear Plate, A.V. Jahedi, M.S. Thesis (1980).

Stochastic and Deterministic Response of Structures: Applications to Containment Structures of Nuclear Power Plants, A.H. Yusefzai, M.S. Thesis (1980).

A Model for Turbulent Flows in Closed Conduits, P. Koppolu, M.S. Thesis (1984).

Thermohydrodynamic Analysis of Wide Thrust Bearings Operating in Laminar and Turbulent Flow Regimes, S.J. Chowdhury, M.S. Thesis (1985).

Stability Analysis of Deterministic and Random Dynamic Linear Systems, S. Abdel-Rahman, Ph.D. Thesis (1986).

A Functional Series Expansion Method for Response Analysis of Nonlinear Systems Subjected to Random Excitations, I.I. Orabi, Ph.D. Thesis (1986).

A Study on the Mechanics of Friction Noise, M.A.S. Mohamed, Ph.D. Thesis (1987).

Kinetic and Turbulence Models for Granular and Two-Phase Flows, D. Ma, Ph.D. Thesis (1987).

The Influence of Grain Size, Grain Shape and Sample Fabric on the Static Liquefaction Behavior of Saturated Granular Materials, V.B. DeGregorio, Ph.D. Thesis (1988) (Co-advisor with S. Motan).

Base Isolation of a Multi-Story Structure - A Comparison of Performances of Various Systems Under Harmonic and Earthquake Ground Motions, F.G. Fan, M.S. Thesis (1988).

Computer Modeling of Transient Three-Dimensional Boiling Enhanced Mixed Convection, K.A. Elrais, Ph.D. Thesis (1988) (Co-advisor with W. Eckerle).

Deterministic and Probabilistic Comparative Studies of Performances os Various Aseismic Base Isolation Systems, Lin Su, Ph.D. Thesis (1989).

Thermodynamically Consistent Rate-Dependent Models for Turbulence, S.J. Chowdhury,

Ph.D. Thesis (1990). (Currently with Bangladesh University of Engineering and Technology, Dhaka, Bangladesh)

Analysis of Dispersion of Small Suspended Particles in Isotropic and Sheared Turbulent Flows, H. Ounis, Ph.D. Thesis (1992). (Currently with Ali7 Incorp, Albany, NY.)

Thermodynamically Consistent Modeling for Rapid Granular and Turbulent Multiphase Flows, S. Abu-Zaid, Ph.D. Thesis (1990).

Experimental Investigation of Dust Particle Deposition in a Turbulent Channel Flow, W. Kvasnak, M.S. Thesis (1991).

Stochastic Response of Secondary Systems in Base-Isolated Structures, Y. Chen, M.S. Thesis (1991).

Passive and Active Vibration Control in a Microgravity Environment, J. Ellison, M.S. Thesis (1992).

Analysis of Deposition of Spherical and Ellipsoidal Particles in Turbulent Flows, F.G. Fan, Ph.D. Thesis (1994).

Experimental Analysis of Granular Simple Shear Flows, K.E. Elliott, M.S. Thesis (1991).

Mechanisms of Particle Removal Due to Turbulent Flow or Substrate Acceleration, M. Soltani, M.S. Thesis (1993). (Currently with Bechtel, Baltimore, MD.)

Transport and Deposition of Pericles in a Turbulent Pipe Flows with and without Sudden Expansion, Q. Chen, M.S. Thesis (1994).

Computational Modeling of Particle Transport and Deposition - Microelectronic and Pharmaceutical Applications, Amy Li, Ph.D. Thesis (1994).

Vibration Control of Spacecraft and Space Structures from Lift-Off to On-Orbit Environments, G. Lee-Glauser, Ph.D. Thesis (1994). (Currently with Syracuse University, Syracuse, NY)

Dispersion of Deforming Fuel Droplets in Single Stage to Orbit Combustors, W. Kvasnak, Ph.D. Thesis (1996). (Currently with GE, Schenectady, NY.)

Analysis of Transport, Deposition and Removal of Particles and Fibers in Turbulent Flows, M. Soltani, Ph.D. Thesis (1998). (Currently with Bechtel, Baltimore, MD.)

Computer Modeling of Granular and Two-Phase Turbulent Flows, J. Cao, Ph.D. Thesis (1999).

Particle Transport and Deposition - An Experimental Study, J. Gayne, M.S. Thesis (1998).

Effect of Electrostatic and Capillary Forces on Smooth and Bumpy Particle Adhesion and Detachment, S. Guo, M.S. Thesis (1999).

Computational Modeling of Aerosol Transport and Deposition - Thermophoresis and Electrophoresis Effects, C. He, Ph.D. Thesis (2000). (currently with Corning, Corning NY.)

Computational Modeling of Particle and Fiber Transport, Deposition and Resuspension, H. Zhang, Ph.D. Thesis (2001). (Currently at Seagate Inc., Minneapolis-St Paul, MN.)

Vibration Control in Microgravity Environment with Use of Smart Materials, J. Shimmel, M.S. Thesis (2000).

Numerical Computation for natural Gas Production from In-situ Hydrate Reservoir, C. Ji, M.S. Thesis (2001).

From Flow and Particle Transport Modeling to Vibration Isolation, J. Ellison, Ph.D. Thesis (2001). (Currently with Corning Inc., Corning NY.)

Active Vibration Control of Space Structures during Lift-Off, M. Pausley, M.S. Thesis (2002). (Co-Advisor with R. Jha.)

Particle Removal in Cryogenic Surface Cleaning, C. Toscano, M.S. Thesis (2001). (Currently with ExxonMobil, Houston, TX.)

Stochastic Modeling of Turbulent Liquid Spray Formation in Free Shear Flow Fields, D. Schmidt (2002). (Currently with ExxonMobil, Houston, TX.)

An Experimental Setup for Propane Hydrate Formation and Dissociation within Porous Media, T.K. White, M.S. Thesis (2003).

Fundamentals of Gas-Solid and Gas-Liquid Flows in Porous Media, Ali Reza Mazaheri, Ph.D. Thesis (2003). (Currently with AMA Inc., NASA Langley Research Center, Hampton, VA.)

Combined Active and Passive Vibration Control during Space Shuttle Lift-off, Allison Bailey, M.S. Thesis (2003). (Co-Advisor with R. Jha.)

Exploration of Rheology and Environmental Impact of Bauxite Residue, Elaine Humiston, M.E. Project (2003).

Fundamentals of Chemical-Mechanical Polishing (CMP) Wear Mechanisms, M. Bastaninejad, M.S. Thesis (2004).

Experimental Study of Immiscible Two-Phase Flow through Porous Media under the Influence of Viscous, Capillary, and Gravitational Forces, Josh Cook, M.S. Thesis (2004).

Structural Health Monitoring Based on EMD and the Hilbert Transform, Feng Yan, M.S. Thesis (2005)

BiFunctional Compounds for Copper CMP Slurries, Shravanthi Manikonda, M.S. Thesis (2005). (Co-Advisor with Y. Li.)

Pneumonic Alveolar Cavity Transport and Deposition during Inhalation, Il-soo Chang, M.E. Project (2005).

A Novel Copper CMP Slurry Based on a Mixed Surfactant Passivating System, Deensh Bundi, M.S. Thesis (2005). (Co-Advisor with Y. Li.)

Particle Focusing with Aerodynamic Lenses, Ravi S. Chavali, M.S. Thesis (2006).

Analysis of Aerosol Particle Transport and Deposition in Environmental Applications, Chaoshing Liu, M.S. Thesis (2006).

Fundamentals and Applications of Environmental and Geophysical Multiphase Flows, Kambiz Nazridoust, Ph.D. Thesis (2006). (Currently at CIIT, Triangle Park, NC.)

Rheological Behavior of Bauxite Residue and Bauxite Residue Derivatives, Elaine Humiston, Ph.D. Thesis (2006). ((Currently at Lydall, Schenectady, NY.)

Fundamentals of Gas-Liquid and Gas-Liquid-Solid Flow in a Bubble Column and in a Simple Shear Flow Device Wei Chen, Ph.D. Thesis (2006). (Currently at Bristol-Myers Squibb,
New Brunswick, NJ.)

Electrohydrodynamics and Particle Transport in Corotrons – Airflow and Particle Transport in Human Nasal System, Parsa Zamankhan, Ph.D. Thesis (2007). (Currently, Postdoctoral Fellow at City University, NY)

Three-Phase Flows in Slurry Reactors with Application to Coal Liquefaction Processes, Xinyu Zhang, Ph.D. Thesis (In Progress).

Particle Transport and Deposition in Environmental and industrial Applications, Chaoshing Liu, Ph.D. Thesis (In Progress).

Fundamentals of Multiphase Gas-Liquid Flows in Rock Fractures, Dustin Crandall, Ph.D. Thesis (In Progress).

A Study of Multiphase Flow through Porous Media with Applications to Carbon Dioxide

Sequestration, Mellissa Richards, M.S. Thesis (2006).

Hilbert Transform and Structural Identification, Shaoqing Xun, M.S. Thesis (In Progress).

Copper CMP Slurry, Vivek Duvvuru, M.S. Thesis (In Progress). (Co-Advisor with Y. Li.)

Fundamentals of Multiphase Flows in Nanotechnology, Protective Clothing, and Self-Healing Materials, Hojat Nasr, Ph.D. Thesis (In Progress).

Carbon Dioxide Leakage from Underground Reservoirs, Eric Gessner, M.S. Thesis (In Progress).

Biological fluid flows, Kevin Shanley, Ph.D. Thesis (In Progress).

Particle Resuspension from Floors, Daniel Wante, M.S. Thesis (In Progress).

RECENT RESEARCH EXPERIENCES FOR UNDERGRADUATES (Since 1998)

Vibrations Control of Aerospace Structures, J. Shimmel, (DOE, NASA) (1997, 1998)

Computational and Experimental Studies of Hot-Gas Filtration, T. White, (DOE, NSF-REU) (1998, 1999)

Cryogenic Surface Cleaning, C. Toscano, (NSF-REU) (1998,1999)

Vibration Control of Structures during Earthquakes, M. Pausley, (NSF-REU) (2000)

Experimental Study of Particle Transport, Deposition and Removal, L. Kenney, (NSF-REU) (2001)

Experimental Centrifugal Air Filtration Device, Scott M. Delivio (Honor Student) (2001-2002)

Experimental Centrifugal Air Filtration Device, Matthew A. Kotylo (2002)

Wind Flow and Pollutant Transport due to Barrel Burning, Joe Rocca, (McNair Scholar) (2002-2003)

A Model For Droplet Distortion Effects In Aerodynamic Particle Sizing Instruments, Eric Gessner (2004-2005)

Experimental Study of Particle Resuspension form Flooring, Robert Colatutto (2007).

RESEARCH GRANTS AND CONTRACTS

"Noise Reduction," Ministry of Science and Higher Education of Iran, $5,000 (1972-1974).

"Turbulent Flow in a Confined Wake," Shiraz University Research Council, $2,500 (1973-1977).

"Design and Construction of an Automatic Machine for Cleaning, Weighing, and Boxing Raisin," Ministry of Science and Higher Education of Iran, $6,000 (1975-1977).

"Stability Analysis of Mechanical Systems," Ministry of Science and Higher Education of Iran, $6,500 (1976-1978).

"Vibration Induced by Earthquake, Applications: To Nuclear Reactor Structural Safety and Design," Atomic Energy Organization of Iran, $300,000 (1976-1980).

"Darrieus Turbine and Aeroelastic Engines," Shiraz University Research Council, $4,000 (1977-1978).

"Investigation of a Solar Pond for Power Production," Ministry of Power of Iran, Solar Energy Research Center of Shiraz University, and Shiraz University Research Council, $25,000 (1978-1980).

"Aeroelastic Wind Energy Converter," Division of Research, Clarkson University, $8,000 (1982-1983).

"Bounds on Earthquake Responses of Structures," NSF, CEE-8319036, $42,397 (1984-1985).

"Fellowship," Union Carbide, $9,800 (1986-1987).

"Protective Systems and Retrofit of Building Structures for Earthquake Hazard Mitigation," SNYR, NCEER 2863021F, $49,133 (1986-1987).

"Optimized Base Isolation Systems," SNYR, NCEER 872007, $49,000 (1987-1988).

"Analysis of Transient Three-Dimensional Granular and Two-Phase Flows," NSF, MSM-8714687, 40 Service Units CPU Time on Supercomputer Facilities at Cornell University (1987-1989).

"Optimized Base Isolation Systems," SNYR, NCEER 88-2012, $21,000 (1988-1989). $4,226 (1990-1991).

"Contamination Avoidance and Removal," New York State Science and Technology Foundation, CAMP, $27,000 (1989-1990), $30,000 (1990-1991), $30,981 (1991-1992),

$43,232 (1992-1993), $28,116 (1993-1994).

"Fundamental Study of Dust Particles Adhesion to Electrical Contact of Card Edge Connector Systems," IBM-Endicott, $150,000 (1990-1991).

"Weld Process Modeling," United Technologies Corporation, $50,000 (1990-1992), Co-PI with D. Aidun.

"Microgravity," NSF Creativity Award EID-9017552, $90,000 (1990-1993).

"Fundamental Study of the Mobility of Dust Particles on Surfaces of Electrical and Fiber Optic Connector Systems," IBM-Endicott, $73,023 (1992-1993).

"A Computational Model for Coal Transport and Combustion," US Department of Energy (DOE-PETC) DE-FG22-91PC91297, $200,000 (1991-1995).

"Vibration of Equipment on Board Space Structures with Passive and Active Mechanisms," NASA Grant NGT-50825, $66,000 (1991-1994).

"Hybrid Fuel Dispersion and Combustion for Applications in Rocket Engines" NASA Grant NGT-51130, $66,000 (1993-1996).

"Vibration Control of Airborne Equipment Using Smart Materials," NASA Grant NGT-51314, $66,000 (1994-1997).

"Particle Mobility, Adhesion and Removal & Targeted Inhalation Drug Delivery," New York State Science and Technology Foundation, CAMP, $54,250 (1994-1995).

"Particle and Fiber Transport, Adhesion and Removal," New York State Science and Technology Foundation, CAMP, $52,000 (1995-1996).

"Ash and Pulverized Coal Deposition in Combustors & Gasifiers," US Department of Energy (DOE-FETC) DE-FG22-94PC94213, $200,000 (1994-1998).

"Charged Particle and Fiber Transport, Adhesion and Removal," New York State Science and Technology Foundation, CAMP, $48,000 (1996-1997).

"Particle Transport and Dispersion in a Triboelectric Separator," University of Kentucky/DOE, $64,000 (1995-1998).

"Fiber Modeling and Removal," Xerox Corporation, $72,000 (1995-1997).

"Charged and Magnetized Particle Deposition and Removal," New York State Science and Technology Foundation, CAMP, $30,000 (1997-1998).

"Cryogenic CO2 Snow flake Surface Cleaning," New York State Science and Technology Foundation, CAMP, $30,000 (1997-1998).

"Computational Modeling of Fluid Flow and Soot Buildup in High Purity Fused Silica Furnace," Corning Corporation, $285,614 (1997-2001)

"Particle Transport and Deposition in Hot-Gas Filter Vessels - A Computational and Experimental Modeling Approach," DOE DE-FC26-98FT40447, $164,745 (1998-2002)

"Time Dependent Particle Image Velocimetry (PIV) Measurements Via Linear Stochastic Estimation (LSE)," NSF CTS-9809784, $85,000 (1998-2000), Co-PI with M. Glauser

"Computer Code for a Thermodynamic Model of Gas-Hydrate Decomposition in a Porous Media during Pressure Release," DOE, NETL, DE-AP26-98FT01813, $25,000 (1998-1999)

"Computational Modeling of Chemical-Mechanical Polishing (CMP)," New York State Science and Technology Foundation, CAMP, $47,500 (1998-2000)

"Microgravity Equipment Vibrations - A Sensitivity and Control Study," NASA Grant NGT8-52849, $44,000 (1998-2000)

"Computational Modeling of Fuel Spray Formation in Rocket Engines" NASA Grant NGT8-52853, $66,000 (1998-2001)

"Computer Modeling of Ash Particle Transport to Boiler Surfaces," DOE, NETL DE-AP26-99FT00308, $25,000 (1998-2000)

"Experimental Study of Gas-Hydrate Formation and Decomposition," DOE/NETL (through University of Pittsburgh), 001060-8, $60,000 (1999-2001)

"Advanced Computational Model for Three-Phase Slurry Reactors," US Department of Energy (DOE-NETL) DE-FG26-99FT40584, $200,000 (1999-2002)

"Dispersion of Powder by Shear, Turbulence and Impaction in Inhalation Drug Delivery Systems," Dura Pharmaceuticals, $47,000 (1999-2000)

"Bearing Technology for Exo-Skeletal Engine Concept," Alpha Star Corp. $15,000 (1999-2000), Co-PI with L. Minnetyan and C. Cetinkaya

"Two-Phase Flow Measurements," DOE/NETL (Partnership Program through University of Pittsburgh), 001060-8, $30,000 (2000-2001)

"CO2 Sequestration," DOE/NETL (Partnership Program through University of Pittsburgh), 001060-8, $30,000 (2000-2001)

"Fundamentals of Natural Gas and Species Flows from Hydrate Dissociation- Applications to Safety and Sea Floor Instability," US Department of Energy (DOE-NETL) DE-FC26-00NT40916, $278,183 (2000-2006)

"Heat Transfer Effects in Hot-Gas Filtration," DOE/NETL (Partnership Program through University of Pittsburgh), 001060-8, $30,000 (2000-2001)

"Transport models for nano-scale MOS devices with applications to CAD for next-generation ICs," NYSTAR (through CAMP), $10,000 (2001-2002) Co-PI with M.C. Cheng and V. Privman.

"Physical transport models for nano-scale MOS devices, with applications to CAD for next generation ICs," NRC, $35,000 (2001-2002) Co-PI with M.C. Cheng, J.J. Liou and V. Privman.

"Computational Modeling of CO2 Sequestration," DOE/NETL (Partnership Program Through University of Pittsburgh), 400960-2, $35,000 (2001-2002)

"Experimental Modeling of CO2 Sequestration," DOE/NETL (Partnership Program through University of Pittsburgh), 400960-2, $35,000 (2001-2002)

"Hot-Gas Filtration," DOE/NETL (Partnership Program through University of Pittsburgh), 400960-2, $35,000 (2001-2002)

"Hydrate," DOE/NETL (Partnership Program through University of Pittsburgh), 400960-2, $35,000 (2001-2002)

"Thermal modeling SOI devices," NYSTAR (through CAMP), $18,000 (2002-2003) Co-PI with M.C. Cheng.

"Particle Transport, Deposition and Removal: Combined Research-Curriculum Development," NSF EEC-0087873, $400,000 (2001-2006), (Co-PIs, C. Cetinkaya, M. McLaughlin, S. Doheny-Farina, J. Taylor, S. Dhaniyala)

"NYSTAR Center for Environmental Quality System (NY-EQS)," NYSTAR (though Syracuse University), $1,892,000 (2003-2006) Co-PI with P. Hopke, T. Holsen, J. McLaughlin, and K. Visser

"REU: Particle Transport, Deposition and Removal: Combined Research-Curriculum Development," NSF, $12,000 (2002-2006).

"Computational Modeling Tools for Corona Devices Used in Electophotographic Machines," Xerox Corporation, $60,000 (2001-2005).

"Computational Fluid Dynamic Modeling of Fiber Transport and Deposition in the Respiratory Tract," NIOSH (through LRRI-F), $404,677 (2002-2006) Co-PI with P. Hopke

"Aerodynamic lens modeling," Kodak Corporation, $12,000 (2002-2003).

"Nanoparticle Transport, aerodynamic lens and CMP modeling," NYSTAR (through CAMP), $35,000 (2003-2004)

"Heat flow modeling of SOI devices & integrated circuits," NYSTAR (through CAMP), $6,800 (2003-2004) Co-PI with M.C. Cheng.

"Computational Modeling of Hot Gas Filtration with Heat Transfer," DOE/NETL (Partnership Program through University of Pittsburgh), (C. Liu Fellowship), $70,000 (2002-2004)

"Computational Modeling of CO2 Sequestration," DOE/NETL (Partnership Program through University of Pittsburgh), $70,000 (2002-2004)

"Computational Modeling of CO2 Sequestration," DOE/NETL (Partnership Program through University of Pittsburgh), (J. Cook Fellowship), $56,605 (2002-2005)

"Geomechanical Modeling of Fractured Reservoirs," DOE/NETL (Partnership Program through University of Pittsburgh), (D. Crandall Fellowship), $70,000 (2003-2005)

"Transport, Deposition and Removal of Charged Nanoparticles and Aerodynamic Lens For Nano-particles," NYSTAR (through CAMP), $40,000.00 (2003-2005)

"NY STAR Center for Environmental Quality System/EPA Indoor Environmental Research Program Collaboration," EPA through Syracuse University, $300,000 (2004-2007) Co-PI with A. Ferro, P. Hopke, S. Dhaniyala, J. Taylor.

"Smart Responsive Nanocomposite for Soldier Protection," US-ARO, $169,250 (2005-2007) Co-PI with J. McLaughlin.

"Smart Responsive Nanocomposite for Soldier Protection," US-ARO, $55,291 (2005-2007) Co-PI with R. Jha and C. Cetinkaya.

"Developing Supersonic Impactor and Aerodynamic Lens for Separation and Handling of Nano-sized Particles," DOE, $50,000 (2006-2007)

"Strategically Targeted Research In Intelligent Built Environmental Systems - Phase 2," EPA through Syracuse University, $510,000, (2005-2008) Co-PI with P. Hopke and A. Ferro.

"Intelligent Control via Wireless Sensor Networks for Advanced Coal Combustion Systems" DOE, $50,000 (2006-2007) Co-PI with A. Behal and S. Kumar.

"Computational and Experimental Techniques for Human Health and Security in Indoor Environments," EPA, through CoE Syracuse University, CARTI, $180,000 (2006-2008) Co-PI with J.B. McLaughlin and B. Helenbrook.

"Computational and Experimental Study of Airflow and Particulate Pollutant Transport and Concentration around the Center of Excellence Building," EPA, Through CoE Syracuse University, CARTI, $100,000 (2007-2008) Co-PI with Douglas Bohl.

HONORS AND AWARDS

"Research Medal" for promotion of research, Iran (1975).

"Alborz Foundation Award" for the Distinguished Scientist of Iran (1976).

"Ministry of Science and Higher Education Award" for Excellence in Research, Tehran, Iran (1978).

"Research Medal," Tehran, Iran (1978).

"Pi Tau Sigma Distinguished Faculty Award," Clarkson University (1984).

"University Outstanding Advisor Award," Clarkson University (1986).

"Pi Tau Sigma Distinguished Faculty Teaching Award," Clarkson University (1986).

"Personal Computer Curriculum Development Award," Clarkson University (1987)

"Pi Tau Sigma Distinguished Faculty Teaching Award," Clarkson University (1988).

"Honorable Mention for Personal Computer Curriculum Development," Clarkson University (1988)

"University Outstanding Advisor Award," Clarkson University (1988).

"University Distinguished Teaching Award," Clarkson University (1988).

"Pi Tau Sigma Distinguished Faculty Teaching Award," Clarkson University (1990).

"Powder Technology of Japan Award," Tsukuba, Japan (1991)

"First Honorary Member of Iranian Academy of Science," (1996).

"First Honorary Fellow of Iranian Society of Mechanical Engineers (ISME)," (1996).

"Fellow of American Society of Mechanical Engineers (ASME)," (1997)

"Fellow of Iranian Society of Civil Engineers (ISCE)," (1999)

"First Clarkson Distinguished Professor" (2001)

"University Outstanding Advisor Award," Clarkson University (2002).

"Robert R. Hill '48 Professor of Mechanical and Aeronautical Engineering" (2002)

"Elected Prominent Figures of Iran - in Mechanical Engineering" (2003)

"Membership to Five Million Dollar Club" Clarkson University (2006)

"Omar Khyam Plaque of Honor" Scientia, Iranica, Sharif University (2006)
http://www.scientiairanica.ir/Omar_Khayyam_Plaque_of_honor.asp

PATENTS

Aeroelastic Wind Energy Converter, Iranian Patent No. 20923 (1979) (G. Ahmadi).

Methods for Cleaning Surfaces Substantially Free of Contaminants, US Patent 6,530,823 B1 (2003) (G. Ahmadi, P.E. Lewis, A.G. Tannous, K. Makhamreh and K.H. Compton).

Apparatus for Cleaning Surfaces Substantially Free of Contaminants, US Patent 6,543,462 B1 (2003) (P.E. Lewis, G. Ahmadi, A.G. Tannous, K. Makhamreh and K.H. Compton).

Methods for Cleaning Surfaces Substantially Free of Contaminants Utilizing Filtered Carbon Dioxide, US Patent 6,719,613 (2004) (G. Ahmadi, P.E. Lewis, A.G. Tannous, K. Makhamreh and K.H. Compton).

Methods for Cleaning Utilizing Multi-Stage Filtered Carbon Dioxide, US Patent 6,945,853 B2 and (2005) (G. Ahmadi, P.E. Lewis, A.G. Tannous, K. Makhamreh).

SYNERGISTIC ACTIVITIES

- Served as the PI for NSF CRCD project and developed a series of on-line course on particle transport, deposition and removal. http://www.clarkson.edu/projects/crcd/index.php
- Developed an efficient computational model for Brownian diffusion of particles in laminar and turbulent flows. The method is now being used in FLUENT commercial code.
- Contributed to the development of practical method for dilute two-phase flow analysis. The

approach is being used to improve operation and design of engineering systems in several companies (e.g., Xerox, Corning, Dura Pharmaceutical, Southern).

- Contributed to the understanding of the mechanism that controls particle deposition, transport, dispersion and removal in turbulent flows.
- Gave many short courses on aerosols, two-phase flows, turbulence, random vibrations and vibration control in the US and abroad.

PUBLICATIONS

Two books, 400 archival papers, 500 technical conference presentations and 100 Invited presentations.

BOOKS

A. Razani and G. Ahmadi, "Mathematical Methods in Engineering and Science," Vol. 1, Shiraz University Press No. 87 (1977).

G. Ahmadi and A. Razani, "Mathematical Methods in Engineering and Science," Vol. 2, Shiraz University Press No. 90 (1977).

1969

Ahmadi, G. and Goldschmidt, V.W., Kinematic Computer Simulation of the Turbulent Dispersion of Neutrally Buoyant Particles, Developments in Mechanics, Vol. 5, 201-213 (1969).

1970

Ahmadi, G. and Goldschmidt, V.W., Dynamic Simulation of the Turbulent Diffusion of Small Particles, Hydrotransport Vol. 1, 69 (1970).

Ahmadi, G. Koh, S.L. and Goldschmidt, V.W., A Theory of Nonsimple Microfluids, Recent Advances in Engineering Science, Vol. 5 Goldon and Breach, 9-20 (1970).

1971

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Ahmadi, G. and Farshad, M., Perturbation Solution to the Problem of General Orthotropic Rectangular Plate, 1983 Iranian J. Sci. Tech. Vol. 1, 147-162 (1971).

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1973

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Ahmadi, G. and Shahinpoor, M., Decay of the Kinetic Energy of Compressible Micropolar Fluids, Int. J. Engng. Sci. Vol. 11, 885-889 (1973).

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Ahmadi, G. and Shahinpoor, M., Universal Stability of Magneto-Cosserat Fluid Motions, Rend. Sci. Vol. A 107, 343-352 (1973).

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Microstructure-Reflection of Plane Waves at a Free Plane Boundary, Bull. Seismol. Soc. Amer. Vol. 63, 1507-1514 (1973).

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1974

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Ahmadi, G., Dispersion of a Solute in Magneto-Hydrodynamic Channel Flows, Pakistan J. Sci. Indust. Res. Vol. 17, 189 (1974).

1975

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Satter, M.A and Ahmadi, G., Analysis of Noise Reduction Obtainable From the Redesign of a Mechanical Assembly, J. Mech. Engng. Sci. Vol. 17, 155-162 (1975).

Ahmadi, G., Optical Properties of Polarizable Linear Magneto-Micropolar Fluid, Int. J. Engng. Sci. Vol. 13, 209-215 (1975).

Ahmadi, G., Micropolar Thermoelastic Stability, Lett. Appl. Engng. Sci. Vol. 3, 265-277 (1975).

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Ahmadi, G., Turbulent Flow of a Cosserat Fluid, Iranian J. Sci. Tech. Vol. 5, 75-81 (1976).

Ahmadi, G., Universal Stability of Thermo-Diffusive-Magneto-Micropolar Fluid Motions, Acta Technica CSAV Vol. 6, 623-633 (1976).

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Ahmadi, G., Nonlocal Heat Conducting Fluids, Journal of Scientific and Industrial Research, Vol. 35, 435-438 (1976).

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1977

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1978

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X. Jia, J.B. McLaughlin, and G. Ahmadi, "Computational Modeling of Contaminant Transport in Indoor Air," 6th Annual Syracuse CoE Symposium, Innovative Built Environments – Design with Nature, Syracuse, NY, October 30-31, 2006.

A. Alavinasab, R. Jha, I. Sokolov, G. Ahmadi, and C. Cetinkaya, "Modeling and Characterization of Nanostructured Glass Fibers," ASME International Mechanical Engineering Congress and Exposition, Chicago, Illinois, November 5-10, 2006.

X. Jia, J.B. McLaughlin and G. Ahmadi, "Simulation of Particle Transport in Indoor with different Air Ventilation System," Center for Environment Meeting, Potsdam, NY, February 2, 2007.

X. Zhang, G. Ahmadi, J. Qian, and A. Ferro, "Particle Resuspension Due to Human Activity," Center for Environment Meeting, Potsdam, NY, February 2, 2007.

M. Salmanzadeh and G. Ahmadi, "Particle Transport and Deposition in an Office and a Hospital Patient Room," Center for Environment Meeting, Potsdam, NY, February 2, 2007.

K. Shanley and G. Ahmadi, "Numerical Simulations of Inertial Particle Deposition in a Realistic Human Nasal Cavity," Thousand Island Fluids Mechanics Meeting, Glen House Resort, Gananoque, Ontario, April 20-22, 2007.

D. Crandall, G. Ahmadi, and D.H. Smith, "Two-Phase Flow within Porous Media Analogies: Application Towards CO_2 Sequestration," Thousand Island Fluids Mechanics Meeting, Glen House Resort, Gananoque, Ontario, April 20-22, 2007.

E. Gessner, G. Ahmadi, G. Bromhal, and D.H. Smith, "Modeling of Perforated Pipe in Connection with Leakage of Sequestered Carbon Dioxide" Thousand Island Fluids Mechanics Meeting, Glen House Resort, Gananoque, Ontario, April 20-22, 2007.

G. Ahmadi, (Keynote Presentation), "Computational Modeling of Carbon Dioxide Sequestration in Fractured and Porous Media," 15$^{th.}$ Annual (International) Conference on Mechanical Engineering-ISME2007, Amirkabir University of Technology, Tehran, Iran, May 15-17, 2007.

G. Ahmadi, (Keynote Presentation), "Computational Modeling of Particle Transport and Deposition in Human Respiratory Tracts," 15$^{th.}$ Annual (International) Conference on Mechanical Engineering-

ISME2007, Amirkabir University of Technology, Tehran, Iran, May 15-17, 2007.

Y. Hidarian, M. Shams, R. Ebrahimi and G. Ahmadi, "Computational Modeling of Two-component Fluids over a Step," 15$^{th.}$ Annual (International) Conference on Mechanical Engineering-ISME2007, Amirkabir University of Technology, Tehran, Iran, May 15-17, 2007.

M. Rostami, A. Ardeshir and G. Ahmadi, "Evaluation of the Hydrodynamic Forces on Low-Reynolds Number Particles in Fluids," 15$^{th.}$ Annual (International) Conference on Mechanical Engineering-ISME2007, Amirkabir University of Technology, Tehran, Iran, May 15-17, 2007.

M. Rostami, A. Ardeshir and G. Ahmadi, "Assessment of White Light PIV to Measure Flow Velocity in Comparison to UVP Technique," 15$^{th.}$ Annual (International) Conference on Mechanical Engineering-ISME2007, Amirkabir University of Technology, Tehran, Iran, May 15-17, 2007.

G. Ahmadi, "Developing Supersonic Impactor and Aerodynamic Lens for Separation and Handling of Nano-Sized particles" University Coal Research/HBCU Contractors Review Conference, NETL/DOE, Pittsburgh, PA, June 5-6, 2007.

G. Ahmadi, J. McLaughlin, and S. Doheny-Farina, "A CRCD Course Sequence – Technology Serving Humanity Applications" 2007 ASEE Annual Conference and Exposition, Honolulu, HI, June 24-28, 2007.

J.B. McLaughlin, G. Ahmadi, R. Baltus, C.K. Aidun, and E-M.U. Egertsdotter, "Development of a Remote Laboratory for a Multiscale Biotransport Course–Technology Serving Humanity Applications," 2007 ASEE Annual Conference and Exposition, Honolulu, HI, June 24-28, 2007.

D. Crandall, G. Ahmadi and D.H. Smith, "Two-Phase Flow Simulations through Experimentally Studied Porous Media Analogies," 6th International Conference on Multiphase Flow, ICMF 2007, Leipzig, Germany, July 9-13, 2007.

H. Nasr, G. Ahmadi, and J.B. McLaughlin, "Effects of Inter-Particle Collisions and Two-Way Coupling on Particle Deposition Velocity in a Turbulent Channel Flow," 6th International Conference on Multiphase Flow, ICMF 2007, Leipzig, Germany, July 9-13, 2007.

P. Zamankhan, K.T. Shanley, G. Ahmadi, and P.K. Hopke, "Numerical Simulations of Particle Deposition in a Realistic Human Nasal Cavity, 6th International Conference on Multiphase Flow, ICMF 2007, Leipzig, Germany, July 9-13, 2007.

H. Nasr, G. Ahmadi, J.B. McLaughlin, and X. Jia, "Motion of a Drop through a Fabric in Presence of Wettability Gradient," 6th International Conference on Multiphase Flow, ICMF 2007, Leipzig, Germany, July 9-13, 2007.

L. Tian, G. Ahmadi, Z. Wang and P.K. Hopke, "Transport and Deposition of Ellipsoidal Fibers in Laminar Flows," 6th International Conference on Multiphase Flow, ICMF 2007, Leipzig, Germany, July 9-13, 2007.

X. Zhang and G. Ahmadi, "Simulations of Three-Phase Liquid-Bubble-Solid Flows under Variable Gravity Conditions," 6th International Conference on Multiphase Flow, ICMF 2007, Leipzig, Germany, July 9-13, 2007.

X. Zhang, G. Ahmadi, J.Qian and A. Ferro, "Particle Resuspension and Transport due to Human Walking in Indoor Environment," 6th International Conference on Multiphase Flow, ICMF 2007, Leipzig, Germany, July 9-13, 2007.

B. Tavakoli, O. Abouali and G. Ahmadi, "Numerical Simulation of Nano-Particles Deposition in Human Upper Oral Airways," 6th International Conference on Multiphase Flow, ICMF 2007, Leipzig, Germany, July 9-13, 2007.

Z. Mansoori, M. Saffar-Avval, F. Behzad, P. Ramezani, and G. Ahmadi, "Turbulent Thermal Field Simulation in Two Phase Flows Using Statistical Particle Collision Model," 6th International Conference on Multiphase Flow, ICMF 2007, Leipzig, Germany, July 9-13, 2007.

M. Shams and G. Ahmadi, "A Numerical Scheme for Micro-Bubble Collisions," 6th International Conference on Multiphase Flow, ICMF 2007, Leipzig, Germany, July 9-13, 2007.

G. Ahmadi, "On Two-Way and Four-Way Coupling in Gas-Solid Flows," US Department of Energy, National Energy Technology Laboratory, Morgantown, WV, July 26, 2007.

G. Ahmadi, "Particle Resuspension Model for Indoor Air Quality Applications," Strategically Targeted Research in Intelligent Built Environmental Systems, Science Advisory Committee Review, Syracuse University, July 31 - August 1, 2007

X. Zhang, G. Ahmadi, J. Qian and A. Ferro, "A Practical Model for Indoor Particle Resuspension Due to Human Walking," Strategically Targeted Research in Intelligent Built Environmental Systems, Science Advisory Committee Review, Syracuse University, July 31 - August 1, 2007

X. Zhang and G. Ahmadi, "Particle Rolling Detachment in Turbulent Flows with Capillary and Deformation," Strategically Targeted Research in Intelligent Built Environmental Systems, Science Advisory Committee Review, Syracuse University, July 31 - August 1, 2007

M. Salmanzadeh and G. Ahmadi, "Transport and Deposition of Evaporating Droplets in Indoor Environment," Strategically Targeted Research in Intelligent Built Environmental Systems, Science Advisory Committee Review, Syracuse University, July 31 - August 1, 2007

K. Shanley, G. Ahmadi, P.K. Hopke and Y-S. Cheng, "Particle Deposition in a Realistic Nasal Cavity," Strategically Targeted Research in Intelligent Built Environmental Systems, Science Advisory Committee Review, Syracuse University, July 31 - August 1, 2007

D. Wante, R. Colatutto, and G. Ahmadi, "Particle Resuspension From Rough Flooring - An Experimental and Computational Study," Strategically Targeted Research in Intelligent Built Environmental Systems, Science Advisory Committee Review, Syracuse University, July 31 -

August 1, 2007.

INVITED LECTURE PRESENTATIONS (SINCE 1987)

"Granular and Two-Phase Flow Modeling," DOE Morgantown Energy Technology Center, Morgantown, WV (June 1987).

"Introduction to Random Vibration," Short Course given at Worcester Polytechnic Institute, Worcester, MA (July 1987).

"Modeling Multiphase Flows," CELANES Company, Morristown, NJ (April 1989).

"Recent Developments in Modeling Granular Flows, Turbulent Flows and Two-phase Multiphase Flows," DOE Pittsburgh Energy Technology Research Center, Pittsburgh, PA (July 1989).

"Earthquakes and Base Isolation against Ground Motion," in the CARL GUNNARD JOHNSON Colloquium Series at Worcester Polytechnic Institute, Worcester, MA (October 1989).

"Continental Drift, Plate Tectonic and Earthquake Engineering," SUNY-Binghamton (March 1990).

"Review of Base Isolation Techniques Against Earthquakes," International Institute of Earthquake Engineering and Seismology, Shiraz, Iran (May 16, 1990).

"Recent Developments in Aseismic Base Isolation Design Strategy," University of Science and Technology, Tehran, Iran (May 29, 1990).

"Seismicity of Iran and New Techniques for Earthquake Resisting Design" Sharif University of Technology, Tehran, Iran (May 30, 1990).

"Potential Base Isolation Techniques for Masonry and Adobe Structures," Tehran University, Tehran, Iran (June 11, 1990).

"Earthquake Risk Assessment of Iran and Base Isolation Techniques," Society of Structural Engineers, Tehran, Iran (June 13, 1990).

"Research Methodology in Science and Engineering" Sharif University of Technology, Tehran, Iran (June 19, 1990).

"Recent Developments in Thermodynamical Modeling of Granular, Single and Multiphase Turbulent Flows," University of Poitier, Poitier, France (June 25, 1990).

"Fluid Mechanics of Aerosol Dispersion," Short Course AHE-2, 21st Annual Meeting of the Fine Particle Society, San Diego, CA (August 21, 1991).

"Earthquakes and Base Isolation Design Strategy," Alfred University, Alfred, NY (September 20,1990).
"On Thermodynamical Modeling of Single and Multiphase Turbulent Flows," NASA-MARSHALL Space Flight Center, Hunsville, AL (October 9, 1990).

"Recent Developments in Simulation Methods for Particle Transport," University of Alabama, Tuscaloosa, AL (October 11, 1990).

"On Thermodynamically Consistent Turbulence Modeling," University of Pittsburgh, Pittsburgh, PA (February 19, 1991).

"Numerical Experiments on Mechanics of Aerosols," DOE Pittsburgh Energy Technology Research Center, Pittsburgh, PA (February 20, 1991).

"From Mechanics of Aerosols to Simulation of Microcontamination Process," Twentieth Annual Corporate Contamination Control Seminar, IBM Technical Educational Center, Thornwood, NY (April 22, 1991).

"Two-Phase Flow Analysis," Shiraz University, Shiraz, Iran (June 12, 1991).

"Base Isolation Systems," Sharif University of Technology, Tehran, Iran (June 17, 1991).

"Introduction to Fluid Mechanics of Aerosols with Applications to Microcontamination Control," Short Course CCR-14, 22nd Annual Meeting of the Fine Particle Society, San Jose, CA (August 1, 1991).

"Overview of Aerosol Transport in Turbulent Flows," DOE Pittsburgh Energy Technology Research Center, Pittsburgh, PA (August 13, 1991).

"Overview of Dust Particles Migration and Deposition Processes," IBM-Endicott, Endicott, NY (September 17, 1991).

"Overview of Computational Modeling of Aerosols Dispersion and Deposition in Turbulent Flows," University of Nagoya, Nagoya, Japan. Co-Sponsored with the Japan Society of Powder Technology and the Information Center of Powder Technology of Japan. (September 30, 1991).

"Particle Transport and Deposition in Complex Turbulent Flows," DOE Pittsburgh Energy Technology Research Center, Pittsburgh, PA (April 23, 1992).

"Mechanics of Aerosols," Short Course given at Sharif University of Technology, Tehran, Iran (June 13-16, 1992).

"Trend of Engineering Research in the Next Decade," Panel Discussion, Academy of Science of Iran, Tehran, Iran (June 21, 1992).

"Random Vibrations with Applications to Earthquake Engineering, Recent Developments in Passive and Active Control," Short Course given at the International Institute for Earthquake Engineering and Seismology, Tehran, Iran (June 23-26, 1992).

"Introduction to Fluid Mechanics of Aerosols with Applications to Microcontamination Control," Short Course CCR-4, 23nd Annual Meeting of the Fine Particle Society, Las Vegas, Nevada (July 13, 1992).

"Aerosol Transport in Turbulent Flows - A Computational Modeling Approach," Illinois Institute of Technology, Chicago, IL. Co-Sponsored by the Chemical and Mechanical Engineering Departments. (October 7, 1992).

"The Role of Computational Methods in Engineering," Panel Chairman, Closing Ceremony of the International Congress on Computational Methods in Engineering, Shiraz University, Shiraz, Iran, May 2-6, 1993.

"Overview of Computational Modeling of Particle Transport and Deposition Processes," Amir Kabir University (Tehran Polytechnic), Tehran, Iran (May 17, 1993).
"Passive Control Strategies for Aseismic Design," Tarbiat Modars University, Tehran, Iran (May 23, 1993).

"Overview of Base Isolation Design Strategy," Amir Kabir University (Tehran Polytechnic), Tehran, Iran (May 24, 1993).

"On Computational Modeling of Granular and Dense Turbulent Two-Phase Flows," DOE Pittsburgh Energy Technology Research Center, Pittsburgh, PA (August 24, 1993).

"Introduction to Fluid Mechanics of Aerosols with Applications to Microcontamination Control," Short Course CCR-2, The 24th Annual Meeting of the Fine Particle Society, and First International Conference on Pharmaceutical Sciences and Technology, Chicago, Illinois, (August 27, 1993).

"Particle Transport, Deposition and Resuspension in Turbulent Flows, 1966-1993," Purdue University, W. Lafayette, IN (October 14, 1993).

"Engineering Education in 21 Century," University of Toledo, Toledo, OH, (April 4, 1994).

"Recent Advances in Particle Transport Analysis - Dilute and Dense Flows," Morgantown Energy Technology Center, U.S. Department of Energy, Morgantown, WV (June 10. 1994).

"Computational Modeling of Particle and Fiber Transport and Deposition," Xerox Corporation, Rochester, NY (August 19, 1994).

"Computational Modeling of Particle Transport, Deposition and Removal," IBM Corporation, Burlington, VT (August 29, 1994).

"Recent Development in Computer Simulation of Particle Transport and Deposition in the Upper Tracheobronchial Tree," Symposium on Pharmaceutical Aspect of Drug Delivery to Lungs, Wyeth-Ayerst Pharmaceutical Sciences, SUNY-Plattsburgh College Center, Plattsburgh, NY (October 11, 1994).

"Flow-Induced Resuspension of Rigid-Link Fibers from Surfaces," Xerox Corporation, Rochester, NY (May 3, 1995).

"Research Techniques in Engineering," Sharif University of Technology, Tehran, Iran, (May 23, 1995).

"Recent Development on Vibration Control of Equipment Aboard Spacecraft," Amir Kabir University, (Dept. of Mechanical Engineering), Tehran, Iran, (May 30, 1995).

"Base Isolation and Active Control Techniques for Earthquake Protection of Structures," Amir Kabir University, (Dept. of Civil Engineering), Tehran, Iran, (May 31, 1995).

"Recent Development on Computational Modeling of Particle Transport, Deposition and Resuspension," Shiraz University, Shiraz, Iran, (June 6, 1995).

"Recent Trends in Engineering Education and Engineering Research" Shiraz University, Shiraz, Iran, (June 7, 1995).

"Passive and Active Vibration Control Strategies for Earthquake Resisting Structural Design," Iran University of Science and Technology, Tehran, Iran, (June 10, 1995).

"Vibration Control of Equipment-From Lift-Off to Orbit," Iran University of Science and Technology, Tehran, Iran, (June 12, 1995).

"Aerosols - Computational and Experimental Techniques," Iran University of Science and Technology, Tehran, Iran, (June 14, 1995).

"Particle - Turbulence Interactions - Part I, Dilute Flows," Morgantown Energy Technology Center, U.S. Department of Energy, Morgantown, WV (September 13, 1995).

"Particle - Turbulence Interactions - Part II, Dense Flows," Morgantown Energy Technology Center, U.S. Department of Energy, Morgantown, WV (September 20, 1995).

"Modeling of Granular and Dense Two-Phase Flows," Department of Mechanical Engineering, University of Pittsburgh, Pittsburgh, PA (October 26, 1995).

"Particles Transport and Deposition in Turbulent Flows," Department of Mechanical Engineering, West Virginia University, Morgantown, WV (November 29, 1995).

"Computational Modeling of Particles Deposition in Human Lung," NIOSH, Morgantown, WV

(November 30, 1995).

"Recent Advances in Computational Modeling of Particle Transport, Deposition and Resuspension," Center for Applied Energy Research, University of Kentucky, Lexington, KY (December 18, 1995).

"Random Vibrations with Applications to Earthquake Engineering," Short Course given at Sharif University of Technology, Tehran, Iran (May 15-June 8, 1996)

"Modeling Dilute and Dense Two-Phase Flows," Department of Mechanical Engineering, Tehran University, Tehran, Iran (May 25, 1996).

"On Research Techniques in Engineering," Sharif University of Technology, Tehran, Iran, (June 1, 1996).

"Future Trends in Engineering Research and Engineering Education," Academy of Science Honorary Lecture Presentation, Tehran University, Tehran, Iran, (June 12, 1996).

"Risk Assessment with Applications to Earthquake Engineering," Short Course given at Sharif University of Technology, Tehran, Iran (April 14-May 12, 1997)

"Recent Advances in Computational Modeling of Particles Transport Deposition and Resuspension - Industrial Applications," Amir Kabir University, Tehran, Iran, (May 11, 1997).

"New Research Trends in Engineering," Sharif University of Technology, Tehran, Iran, (May 13, 1997).

"Computational Modeling of Particles Transport, Deposition and Resuspension in Industrial Systems," MEMC, St Louis, MO, (June 27, 1997).

"Some Ideas for Computational Modeling of Dilute and Dense Turbulent Two-Phase Flows," FLUENT Inc., Lebanon, NH, (July 17, 1997).

"On Computational Modeling of Particles Transport and Deposition in Hot-Gas Filter Vessels," Federal Energy Technology Center, Morgantown, WV (August 6, 1997).

"Recent Advances in Particle Transport, Deposition and Removal," ASYST Technologies Inc., Fremont, CA (October 13, 1997).

"Computational Modeling of Particles Transport and Soot Buildup in Furnaces, " Corning Corporation, Corning, NY (April 17, 1998).

"Random Vibrations with Applications to Earthquake Engineering," Short Course given at Sharif University of Technology, Tehran, Iran (May 13-June 3, 1998).

"Computational Modeling of Dilute Two-Phase Flows," Amir Kabir University, Tehran, Iran, (May

24, 1998).

"Computational Modeling of Dense Two-Phase Flows," Amir Kabir University, Tehran, Iran, (May 26, 1998).

"Industrial Application of Particle Transport and Deposition," Iranian Society of Mechanical Engineers, Tehran, Iran, (May 27, 1998).

"Recent Advances in Direct Numerical Simulation of Two-Phase Flows," Amir Kabir University, Tehran, Iran, (May 31, 1998).

"Experimental Study of Particle Deposition and Transport in Dilute and Dense Two-Phase Flows," Amir Kabir University, Tehran, Iran, (June 2, 1998).

"Research Approach in Mechanical and Aeronautical Engineering," Sharif University of Technology, Tehran, Iran, (May 27, 1998).

"Thermodynamics of Turbulence and Modeling," University of Darmstadt, Darmstadt, Germany (June 15, 1998).

"Thermodynamics of Granular Flows and Kinetic Models," University of Darmstadt, Darmstadt, Germany (June 15, 1998).

"Thermodynamics of Turbulent Multiphase Flows," University of Darmstadt, Darmstadt, Germany (June 16, 1998).

"Computational Modeling of Dilute and Dense Turbulent Multiphase Flows, and Applications," University of Darmstadt, Darmstadt, Germany (June 16, 1998).

"On Computer Modeling of Deposition in Hot-Gas Filter Vessel," CONSOL Inc., Pittsburgh, PA, (August 10, 1998).

"Overview of Computational Modeling of Particle Transport, Deposition and Removal," MEMC, St Louis, MO, (August 10, 1998).

"Particle Transport and Deposition in Turbulent Flows - Industrial and Environmental Applications," Worcester Polytechnic Institute, Worcester, MA (October 8, 1998).

"Turbulence, Aerosols and Two-phase Flows," Short Course, Lappeenranta University of Technology, Lappeenranta, Finland, January 12-15, 1999.

"Computational Modeling of Fused Silica Furnace," Corning, Corning, NY (March 12, 1999).

"Multiphase Flows and Aerosols," Short Course given at Sharif University of Technology, Tehran, Iran (April 15-May 12, 1999).

"Computational Modeling of Two-Phase Flows," Ferdousi University, Mashad, Iran, (April 28, 1999).

"Computational Modeling of Spray Formation," Shiraz University, Shiraz, Iran, (May 3, 1999).

"Industrial Application of Particle Transport and Deposition," Iranian Society of Mechanical Engineers, Tehran, Iran, (May 27, 1998).

"Multiphase Flows and Spray," Amir Kabir University, Tehran, Iran, (May 4, 1999).

"Base Isolation with Applications to Earthquake Engineering," Sharif University of Technology, Tehran, Iran (May 3, 1999).

"Research Techniques in Engineering," Sharif University of Technology, Tehran, Iran, (May 10, 1999).

"Industrial Applications of Particle Transport and Deposition in Turbulent Flows," Lockheed Martin, Atlanta, GA, July 2, 1999.

"A Simple Model for Natural Gas Production from Hydrate Decomposition by Depressurization," Federal Energy Technology Center (FETC), U.S. Department of Energy, Morgantown, WV (July 7, 1999).

"Recent Advances in Particle Transport and Deposition in Industrial Applications," McDermott Technology, Alliance, OH, (August 16, 1999).

"Particle Transport and Deposition in the Wilsonville Hot-Gas Filtration System," Federal Energy Technology Center (FETC), U.S. Department of Energy, Morgantown, WV (August 20, 1999).

"Ash Transport, Deposition in the Kellog (PCD) Filter Vessel at Wilsonville," Southern Company Services, Wilsonville , AL (January 7, 2000).

"Overview of Research Techniques in Engineering and Sciences," Sharif University of Technology, Tehran, Iran, (May 1, 2000).

"Protection of Seconday Systems in Structures Against Earthquakes," Center for Research for Electric Power Plants (MTN), Tehran, Iran, (May 6, 2000).

"Application of Particle Transport and Deposition in Industry," Amir Kabir University, Tehran, Iran, (May 13, 2000).

"Computational Modeling of Dilute and Dense Two-Phase Flows - Applications to Hot-Gas Cleaning and Coal Processing," NETL, Pittsburgh, PA (July 14, 2000).

"Fundamentals of Natural Gas and Species Flows From Hydrate Dissociation," NETL, Morgantwon, WV (January 10, 2001).

"Simulation of Gas Flow in Siemens-Westinghouse Filter Vessel at PSDF - Modified Designs," Southern Company Services, Wilsonville, AL (January 26, 2001).

"Computational Modeling of Soot Transport in Fused Silica Furnaces," Corning Corporation, Corning, NY (April 12, 2001).

"Particle Transport Processes in Turbulent Flows," Aalborg University, Aalborg, Denmark, (May 2-4, 2001).

"Computational Modeling of Two-Phase Flows," Amir Kabir University, Tehran, Iran, (May 18, 2001).

"Computer Simulation of Gas Flow and Particle Transport in Siemens-Westinghouse PCD at PSDF," Southern Company Services, Wilsonville, AL (October 12, 2001).

"Applications of Gas-Solid and Gas-Liquid Multiphase Flows," North Carolina State University, Raleigh, NC (March 19, 2002).

"Computational Modeling of Multiphase Flows," Shiraz University, Shiraz, Iran (June 10, 2002).

"Computational Modeling of Air Pollution," Amir Kabir University, Tehran, Iran (May 19, 2003)

"Turbulence and Turbulence Modeling," Short Course, Center for Computational Mechanics, Shiraz University, Shiraz, Iran (May 21, 2003).

"Particle Transport, Deposition and Removal," University of Darmstadt, Darmstadt, Germany (May 31, 2003).

Experimental and Numerical Studies of Gas-Liquid Displacement in Flow Cells, with Application to Carbon Dioxide Sequestration in Brine Fields, National Energy Technology Laboratory (NETL), US Department of Energy, July 15, 2003

"Environmental Applications of Multiphase Flows" Syracuse University, Syracuse, NY (October 3 2003)
"Applications of Multiphase Gas-Solid and Gas-Liquid Flows" Case Western Reserve University, Cleveland, OH October 17, 2003).

"Computational Modeling of Particle Transport, Deposition and Entrainment in Turbulent Flows – Environmental Applications," University of Virginia, Charlottesville, VA (November 13, 2003).

"Computational Modeling of Particle Transport, Deposition and Entrainment in Turbulent Flows," Xerox Corporation, Webster, NY (November 17, 2003).

"Applications of Multiphase Flows" Semnan University, Semnan, Iran (May 14, 2004).

"Turbulence," Short Course, ISME, Tehran, Iran (May 25-28, 2004).

"Particle Resuspension in Turbulent Flows" Sharif University, Tehran, Iran (May 30, 2004).

"Computational Modeling of Multiphase Flows" Kerman University, Kerman, Iran (June 1, 2004).

"Multiphase Flows" Petrochemical Research Center, Arak, Iran (June 6, 2004).

"Modeling of Smart Clothing," Army Natick Research Center (November 16, 2004) (With McLaughlin).

"Modeling of Self healing Agents into Cracks," Army Natick Research Center (November 16, 2004) (With McLaughlin).

"Effect of Human Activities on Exposure to Gaseous and PM Pollutants in the Personal Microenvironment," EPA, Triangle Park, NC (November 24, 2004).

New Challenges for Chemical Mechanical Polishing-A Model for Surface Removal, Workshop, presented at Nanomaterials 2004: Nanoelectronics, Nanophotonics, and Nanomagnetics Conference, Stamford , CT (October 14-17, 2004) (With S.S. Babu)

"Introduction to Nanotechnology," United Defense, York, PA (February 23, 2005).

"From Flow Stability to Chaos, and Turbulence" Khajeh-Nasir Tosi University, Tehran, Iran (May 22, 2005)

"Particle Resuspension and Indoor Air Pollution," Shiraz University, Shiraz, Iran (May 24, 2005)

"Particle Transport, Deposition and Removal," Short Course, Lappeenranta University of Technology, Lappeenranta, Finland, December 15-20, 2005.

"Recent Advances in Multiphase Flows through Porous and Fractured Media," Khajeh-Nasir Tosi University, Tehran, Iran (May 2, 2006).

"Particle Transport, Deposition and Removal," Short Course, Lappeenranta University of Technology, Lappeenranta, Finland, December 15-20, 2005.

"Nano particle transport, deposition and removal," in Production, Transport and Application of Nanoparticles Workshop/Lecture Series, von Karman Institute for Fluid Dynamics, Brussels, Belgium, February 26 - March 1, 2007.

"Environmental and Biological Modeling Applications," in Production, Transport and Application of Nanoparticles Workshop/Lecture Series, von Karman Institute for Fluid Dynamics, Brussels, Belgium, February 26 - March 1, 2007.

"Applications to Supersonic and Hypersonic Impactors and Aerodynamic Lenses," in Production, Transport and Application of Nanoparticles Workshop/Lecture Series, von Karman Institute for Fluid Dynamics, Brussels, Belgium, February 26 - March 1, 2007.

"Turbulence," Short Course, ISME, Tehran, Iran (May 19-20, 2007).

"Computational Modeling of Particle Transport and Deposition in Human Respiratory Tracts,," Shiraz University, Shiraz, Iran (May 19, 2007)

Transport, Dispersion and Deposition of Nano- and Micro-Particles Emitted from Traffic on the Ambassador Bridge at Detroit – Windsor Crossing

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ABSTRACT

Dispersion, transport and deposition of PM pollutants emitted from traffic on Ambassador Bridge connecting Detroit, Michigan, U.S, and Windsor, Ontario, Canada is studied. A computational model for evaluating the wind flow in the region and the corresponding transport and dispersion of vehicular emissions was developed. An unstructured computational grid of the area near the Ambassador Bridge was generated and the mean airflow was simulated by the standard k-ε model of FLUENT™ code. A Discrete Random Walk (DRW) was used for simulating the instantaneous turbulence fluctuating velocity. A Lagrangian particle-tracking model was used for simulating the transport and dispersion of particulate emissions from the motor vehicle exhausts. The particle transport model accounts for the drag and Brownian forces acting on the particle, as well as the gravitational sedimentation effects. For particulate emissions in the size range of 1nm to 10 μm from the Ambassador Bridge, the particle transport and dispersion were evaluated and the corresponding deposition rate (capture efficiency) for different regions was described.

EXHIBIT 10

INTRODUCTION

Emissions from motor vehicles are known to be a prominent source of air pollution in urban areas (Fenger, 1999; Sharma and Khare, 2001; Bogo *et al.*, 2001; Perrino *et al.*, 2002). The Ambassador Bridge connects Detroit, Michigan, in the United States, with Windsor, Ontario, in Canada. Since the feasibility of expanding the Ambassador Bridge and/or adding a second bridge in the area is under consideration, it is of interest to understand the transport of pollutants in the nearby urban area to assure the public health of the community.

Studies related to experimental and theoretical analyses of particle transport and deposition in turbulent flows were presented by Hinze (1975), Hinds (1982), Wood (1981), and Papavergos and Hedley (1984). Li and Ahmadi (1992,1993), and Li *et al.* (1994) performed a series of computer simulation on deposition of aerosols of various sizes from point sources and initially uniform concentration in turbulent duct flows with and without obstructions. Wang *et al.* (1997) examined the effect of the lift force on particle deposition in vertical turbulent channel flow. Ahmadi and Chen (1998) studied the particle dispersion and deposition in a turbulent pipe flow with sudden expansion. Deposition of neutral and charged particles in nearly developed turbulent duct flows was evaluated by He and Ahmadi (1999). Particle transport and deposition in industrial filter vessel were studied by Ahmadi and Smith (1999) and Zhang and Ahmadi (2001).

A number of authors considered experimental studies of pollutant transport in urban area. Namdeo *et al.* (1999) measured levels of airborne fine and coarse particles in an urban street canyon in Nottingham, UK in order to investigate dispersion of traffic-related particulate pollution. Particle number size distributions from 3 to 800 nm in an urban area in Germany were observed and were compared with simple numerical simulations by Wehner *et al.* (2002). In addition to site measurements of pollutants, extensive series of wind tunnel experiments were conducted by various authors. Mirzai *et al.* (1994) and Higson *et al.* (1994) performed wind tunnel experiments concerning dispersion of gaseous pollutants around an isolated building. Gerdes and Olivari (1999) investigated pollutant dispersion in an urban street canyon in a wind tunnel. A series of

wind tunnel tests to investigate the dispersion of pollutants in a model of an urban area were conducted by Pearce and Baker (1999). Baker and Hargreaves (2001) performed a wind tunnel study of pollution dispersion in the wake of a moving vehicle in a cross-wind and used the results to assess the validity of a numerical model. Results from wind tunnel simulations of gaseous tracer dispersion in the convective boundary layer capped by a temperature inversion were presented by Fedorovich and Thäter (2002).

Considerable effort has been made by various authors on computational modeling of pollutant transport in urban areas. Yamartino and Wiegand (1986) developed and evaluated simple models for the flow, turbulence and pollutant concentration fields within an urban street canyon. Pollutant transport and dispersion in urban street canyons were analyzed by Baik and Kim (1999, 2002). Leuzzi and Monti (1998) performed particle trajectory simulations of dispersion around a building using a Lagrangian stochastic (LS) model. Computer simulations of particle transport and deposition near a small isolated building were reported by Ahmadi and Li (2000) and Liu and Ahmadi (2005). Chang and Meroni (2001) performed numerical and physical modeling of the bluff body flow and dispersion in urban street canyons. Baker (2001) considered the flow velocities and the dispersion of pollutants in the wake of a number of different types of ground vehicles. A series of simulations for different street canyons were reported by Anquetin *et al.* (1999), Walton *et al.* (2002) and Walton and Cheng (2002). Recently Nazridoust and Ahmadi (2005) compared the predictions of different computational models with the experimental data for street canyons. Liu and Ahmadi (2005) performed a numerical simulation of the airflow and particle deposition in the Peace Bridge area. Ferro and Jacques (2004) reported particle number concentration measurements within a 1 kilometer down wind areas to the east of the Peace Bridge area.

In the present work, the transport and dispersion of particulate pollutants that are emitted from motor vehicle exhausts in the Ambassador Bridge area are studied using a computational simulation model. To assess the personal exposure, particular attention was given to pollutant deposition on the buildings and the ground level in the residential areas that are located downstream of the Ambassador Bridge Custom Plaza. The mean turbulent airflow conditions are evaluated using the standard k-ε model of the

FLUENT™ code. The instantaneous fluctuating turbulent velocity field is generated by a Discrete Random Walk (DRW) model. The particle equation of motion used includes drag, lift and Brownian forces, in addition to the gravitational sedimentation effects. The Brownian force is simulated as a white noise process. Several computer simulations concerning the transport and deposition of particles near the Ambassador Bridge are performed.

FLOW FIELD SIMULATION

The equations of continuity and balance of momentum for the mean motion of incompressible fluid are given as

$$\frac{\partial \bar{u}_i}{\partial x_i} = 0, \tag{1}$$

$$\frac{\partial \bar{u}_i}{\partial t} + \bar{u}_j \frac{\partial \bar{u}_i}{\partial x_j} = -\frac{1}{\rho}\frac{\partial \bar{p}}{\partial x_i} + \nu \frac{\partial^2 \bar{u}_i}{\partial x_j \partial x_j} - \frac{\partial}{\partial x_j} R_{ij}, \tag{2}$$

where, $\bar{u}_i$ is the mean velocity, x_i is the position, t is the time, $\bar{p}$ is the mean pressure, ρ is the constant mass density, ν is the kinematic viscosity, and $R_{ij} = \overline{u_i' u_j'}$ is Reynolds stress tensor. Here, $u_i' = u_i - \bar{u}_i$ is the *i*th fluctuation velocity component.

The turbulent stresses are related to the mean velocity field with use of an eddy viscosity assumption. That is,

$$-R_{ij} = -\overline{u_i' u_j'} = -\frac{2}{3} k \delta_{ij} + \nu_T \left(\frac{\partial \bar{u}_i}{\partial x_j} + \frac{\partial \bar{u}_j}{\partial x_i}\right) \tag{3}$$

where $k = \frac{1}{2}\overline{u_i' u_i'}$ is the kinetic energy of turbulence and ν_T is turbulence (eddy) viscosity.

Standard k-ε Model

The k-ε model involves the calculation of the turbulent kinetic energy, k, and the turbulence dissipation rate, ε, via two differential transport equations. The k-transport equation is given as

$$\left(\frac{\partial}{\partial t}+\bar{u}_k\frac{\partial}{\partial x_k}\right)k=\frac{\partial}{\partial x_k}\left[\left(\nu+\frac{\nu_T}{\sigma^k}\right)\frac{\partial k}{\partial x_k}\right]-\overline{u_i'u_j'}\frac{\partial \bar{u}_i}{\partial x_j}-\varepsilon\ , \tag{4}$$

Here $\sigma^k = 1.0$ is an empirical constant. The terms on the right-hand side of equation (4) are, respectively, diffusion, production and dissipation of turbulence kinetic energy.

The turbulence dissipation rate, ε, satisfies the following transport equation:

$$\left(\frac{\partial}{\partial t}+\bar{u}_k\frac{\partial}{\partial x_k}\right)\varepsilon=\frac{\partial}{\partial x_k}\left[\left(\nu+\frac{\nu_t}{\sigma^\varepsilon}\right)\frac{\partial \varepsilon}{\partial x_k}\right]-C^{\varepsilon 1}\frac{\varepsilon}{k}R_{ij}\frac{\partial \bar{u}_i}{\partial x_k}-C^{\varepsilon 2}\frac{\varepsilon^2}{k}. \tag{5}$$

The values of constants are given as (Rodi, 1984)

$$\sigma^\varepsilon = 1.3, \qquad C^{\varepsilon 1} = 1.44, \qquad C^{\varepsilon 2} = 1.92. \tag{6}$$

The terms on the right-hand side of equations (4) are, respectively, diffusion, generation and distribution of turbulence dissipation rate. The eddy viscosity is then given as

$$\nu_T = C_\mu\frac{k^2}{\varepsilon}, \quad \text{and} \qquad C_\mu = 0.09. \tag{7}$$

Simulation of Turbulent Flow Field

In this study, the instantaneous turbulence fluctuating velocity is simulated by a Discrete Random Walk (DRW) model. In the Discrete Random Walk model, the interaction of a particle with a succession of discrete stylized fluid phase turbulent eddies is simulated. Each eddy is characterized by a zero mean random velocity fluctuation u_i' and a time scale τ_e. The ith component of instantaneous fluid velocity u_i and the ith fluctuation velocity u_i' are given as:

$$u_i = \bar{u}_i + u_i^{'}, \tag{8}$$

$$u_i^{'} = \zeta\sqrt{\overline{u_{\underline{i}}^{'2}}}, \tag{9}$$

where ζ is a normally distributed random number, $\overline{u_{\underline{i}}^{'2}}$ is the mean square of the *i*th fluctuation velocity, and the summation convention on underlined indices is suspended.

The characteristic lifetime of the eddy is defined as:

$$\tau_e = -T_L \log(r), \tag{10}$$

where r is a uniform random number between 0 and 1, T_L is the fluid Lagrangian integral time-scale and can be given as:

$$T_L \approx C_L \frac{k}{\varepsilon}, \tag{11}$$

where the constant $C_L \approx 0.15$ (Daly and Harlow, 1970) for the k-ε model and its variants.

The particle is assumed to interact with the fluid phase eddy over the eddy lifetime τ_e. When τ_e is reached, a new value of the instantaneous velocity is obtained by applying a new value of ζ in equation (9). Additional details of the procedure for simulating the instantaneous velocity may be found in the FLUENT User Guide (1998).

PARTICLE EQUATION OF MOTION

The equation of motion of a small aerosol particle is given by

$$\frac{du_i^p}{dt} = \frac{C_D\, Re_P}{24}\frac{1}{\tau}\left(u_i - u_i^p\right) + f_i^L + g_i + n_i(t), \tag{12}$$

and

$$\frac{dx_i}{dt} = u_i^p, \tag{13}$$

where, u_i^p is the velocity of the particle, x_i is its position, t is the time, g_i is the acceleration of body force (gravity), $n_i(t)$ is the Brownian force per unit mass, and u_i is the instantaneous air velocity.

In equation (12), τ is the particle relaxation time define as

$$\tau = \frac{Sd^2C_c}{18\nu}, \tag{14}$$

where ν is the kinematic viscosity, d is the particle diameter, S is the ratio of particle density to fluid density, and C_c is the Stokes-Cunningham slip correction given by

$$C_c = 1 + \frac{2\lambda}{d}\left(1.257 + 0.4e^{-1.1d/2\lambda}\right), \tag{15}$$

where λ is the molecular mean free path of the gas.

The first term on the right-hand side (RHS) of Equation (10) is the drag force due to the relative motion between particles and fluid. C_D is the drag coefficient, which varies with particle Reynolds number, Re_p. According to Hinds (1982), the drag coefficient is given as

$$C_D = \frac{24}{Re_p}, \text{ for } Re_p < 1, \tag{16}$$

and

$$C_D = \frac{24}{Re_p}\left(1 + \frac{1}{6}Re_p^{\frac{2}{3}}\right), \quad \text{for } 1 < Re_p < 1{,}000 \tag{17}$$

where the particle Reynolds number is defined as,

$$Re_p = \frac{d\left|u_i^p - u_i\right|}{\nu}. \tag{18}$$

The second term on the RHS of equation (12) is the lift force which is given by,

$$f_i^L = \frac{2K\nu^{\frac{1}{2}} d_i}{Sd(d_{lk}d_{kl})^{\frac{1}{4}}}\left(u - u^p\right). \tag{19}$$

In equation (19) the summation on *j* is dropped and the deformation rate tensor is defined as $d_{ij} = \frac{1}{2}\left(u_{i,j} + u_{j,i}\right)$, and K = 2.594 is the constant coefficient of Saffman's lift force. Equation (19) is a generalization of the expression provided by Saffman (1965, 1968) to three-dimensional shear field.

The third and fourth terms on the RHS of Equation (12) are gravitational force and Brownian force, respectively. The Brownian force significantly affects the motion of submicron particles. Brownian motion is simulated as a Gaussian white noise random process with appropriate spectral intensity (Ounis *et al.*, 1991 and Li and Ahmadi, 1992). The corresponding power spectrum of Brownian force S_{ij}^n, is given by

$$S_{ij}^n = S_0 \delta_{ij}, \tag{20}$$

with

$$S_0 = \frac{216\nu\kappa T}{\pi^2 \rho d^5 S^2 C_c}, \tag{21}$$

where $\kappa = 1.38 \times 10^{-23}\, J/K$ is the Boltzmann constant, and T is the absolute temperature of gas. The amplitude of $n_i(t)$ at every time step is given as

$$n_i(t) = G_i \sqrt{\frac{\pi S_0}{\Delta t}}, \tag{22}$$

where G_i is a zero-mean, unit variance independent Gaussian random number and Δt is the time step used in the simulation. Each entire time sample is then shifted randomly between 0 to Δt to generate an appropriate white noise time history.

SIMULATION RESULTS

In this study, the entire Ambassador Bridge and the residential areas in Detroit, Michigan are modeled. The size of the computational domain is 7(km)×5(km)×0.5(km). The GAMBIT code is used to generate an unstructured grid for Ambassador Bridge and its vicinity for the present computer simulation. A total of 1,000,000 tetrahedral cells are used in these simulations.

Figure 1 shows map of the Ambassador Bridge area at Detroit-Windsor crossing used as the computational domain in the present study. Figure 2 shows the computational surface grid of the Ambassador Bridge and the Custom Plaza on the US side. The details of the grids near the river bank are shown in Figure 3.

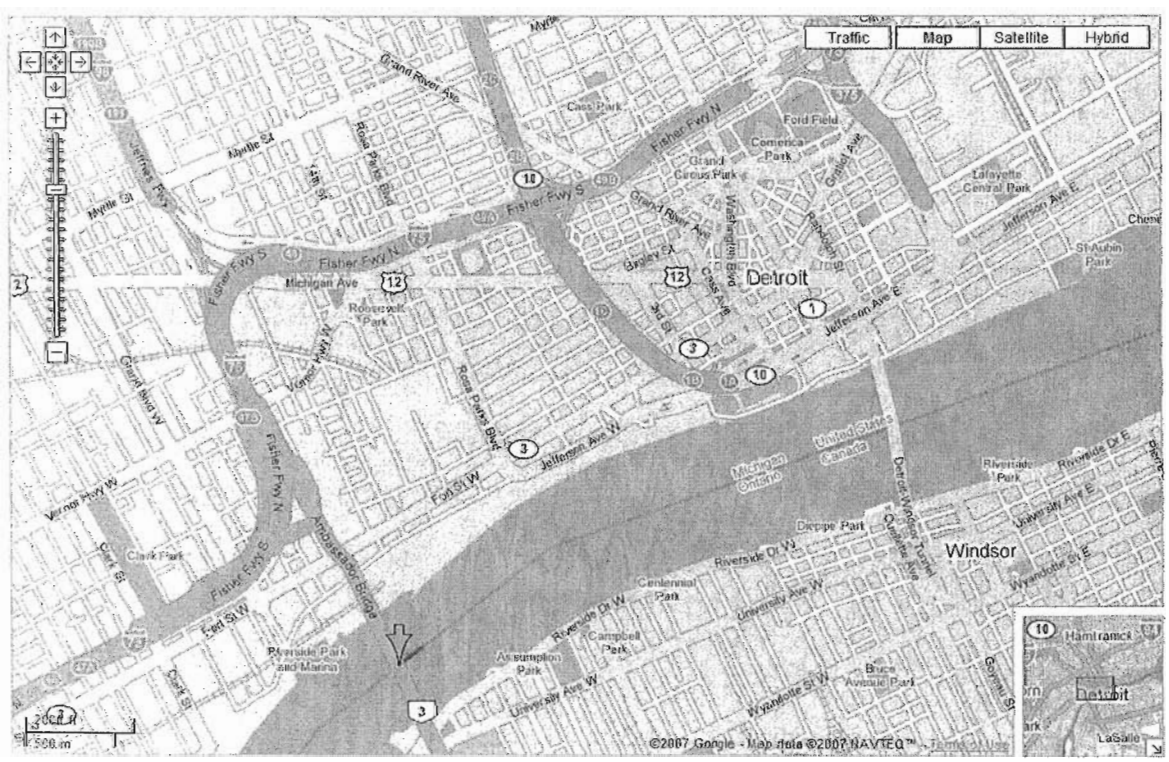


Figure 1. Map of the Ambassador Bridge area at Detroit-Windsor crossing

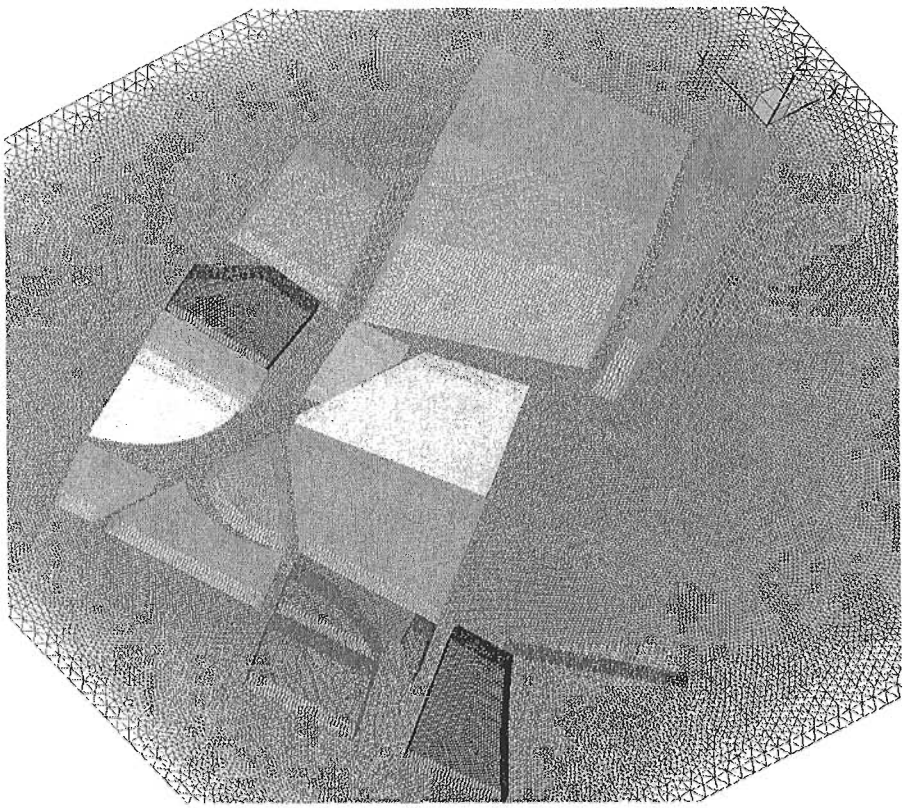


Figure 2. Computational grid.

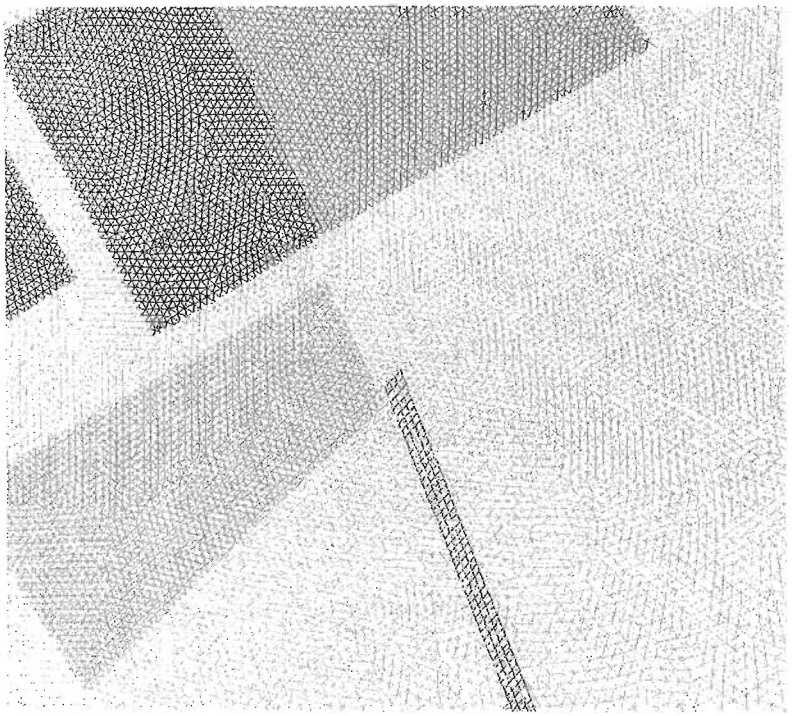


Figure 3. Some details of the computational grid.

The velocity vector plot is shown in Figure 4. The recirculation zones in the wake of the buildings are clearly observed in Figures 4 and 5.

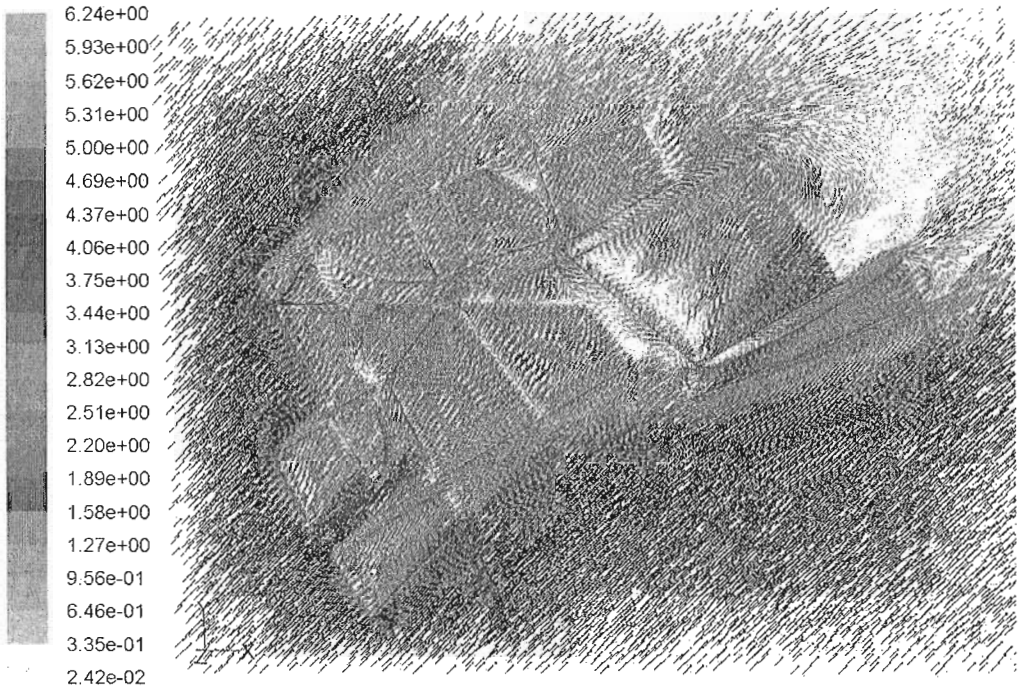


Figure 4. Velocity vector plot for a wind velocity of 4.24 m/s (u=3 m/s and v=3 m/s).

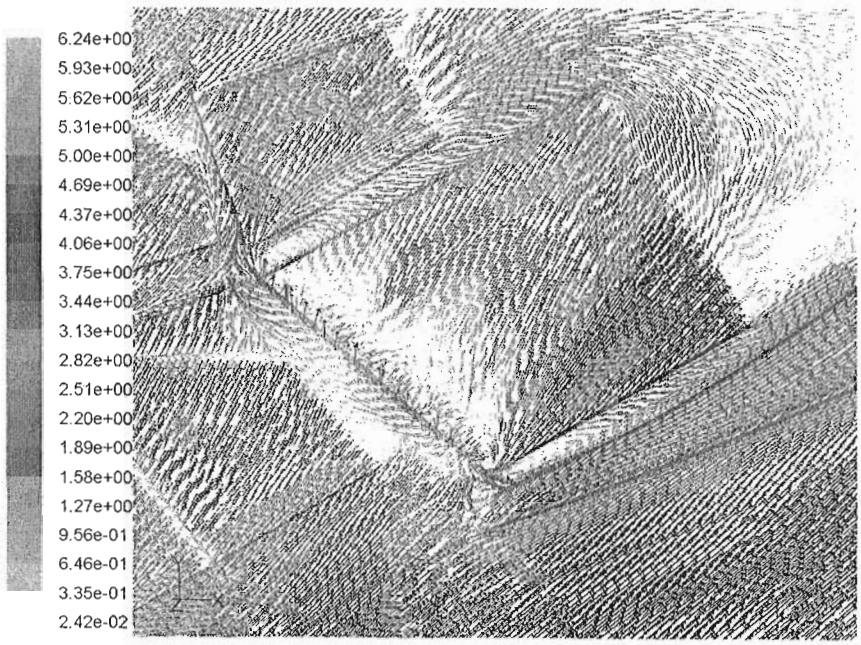


Figure 5. Velocity vector plot around the downtown area for a wind velocity of 4.24 m/s (u=3 m/s and v=3 m/s).

The spatial distribution of 0.01 μm particles at different times are shown in Figures 6 and 7. In these analysis the x- and y- velocities are both equal to 3 m/s .

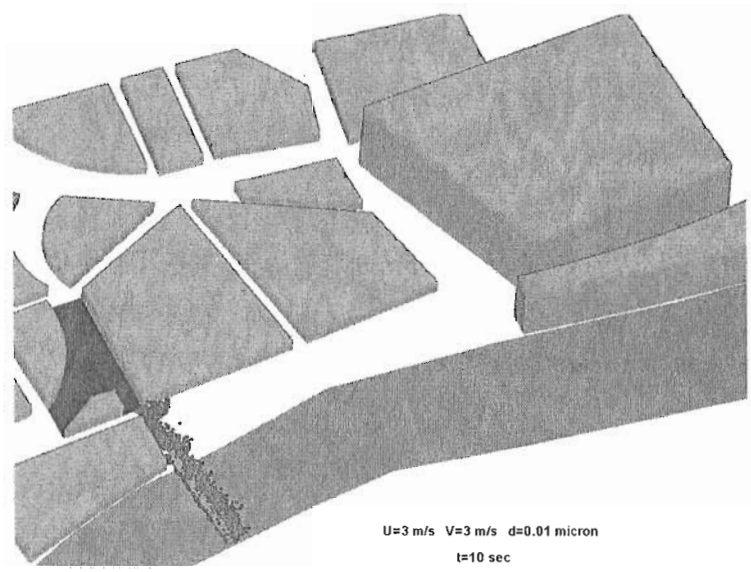


Figure 6. Spatial distribution of 0.01 micrometer particles emitted from the bridge at t=10 sec for a wind velocity of 4.24 m/s (u=3 m/s and v=3 m/s).

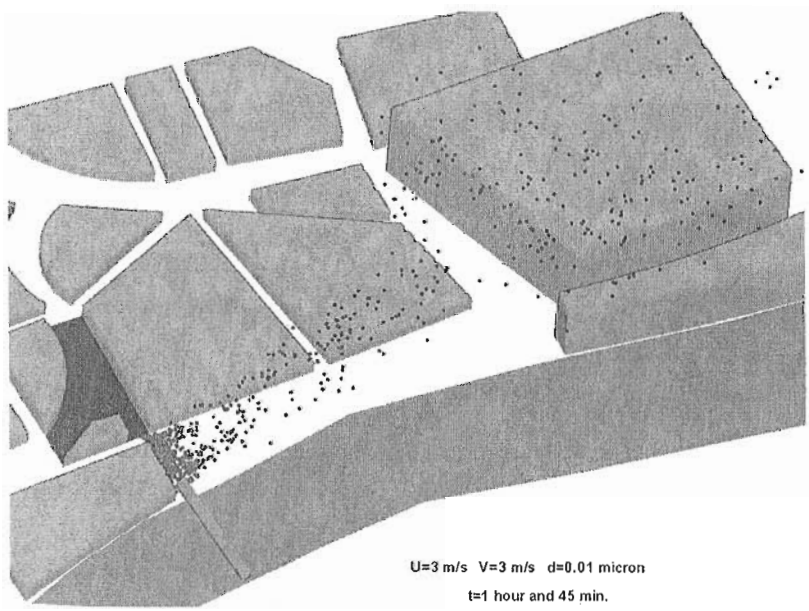


Figure 7. Spatial distribution of 0.01 micrometer particles emitted from the bridge at t=1 hour and 45 min. for a wind velocity of 4.24 m/s (u=3 m/s and v=3 m/s)

A sample spatial distribution of 10 μm particles is shown in Figure 8. In this case the x- and y- wind velocities, respectively, equal to 2 and 4 m/s. It is seen that as the northward component of the wind velocity increases, fewer particles deposit on the downtown area, but larger amount deposit in the residential area near the custom plaza.

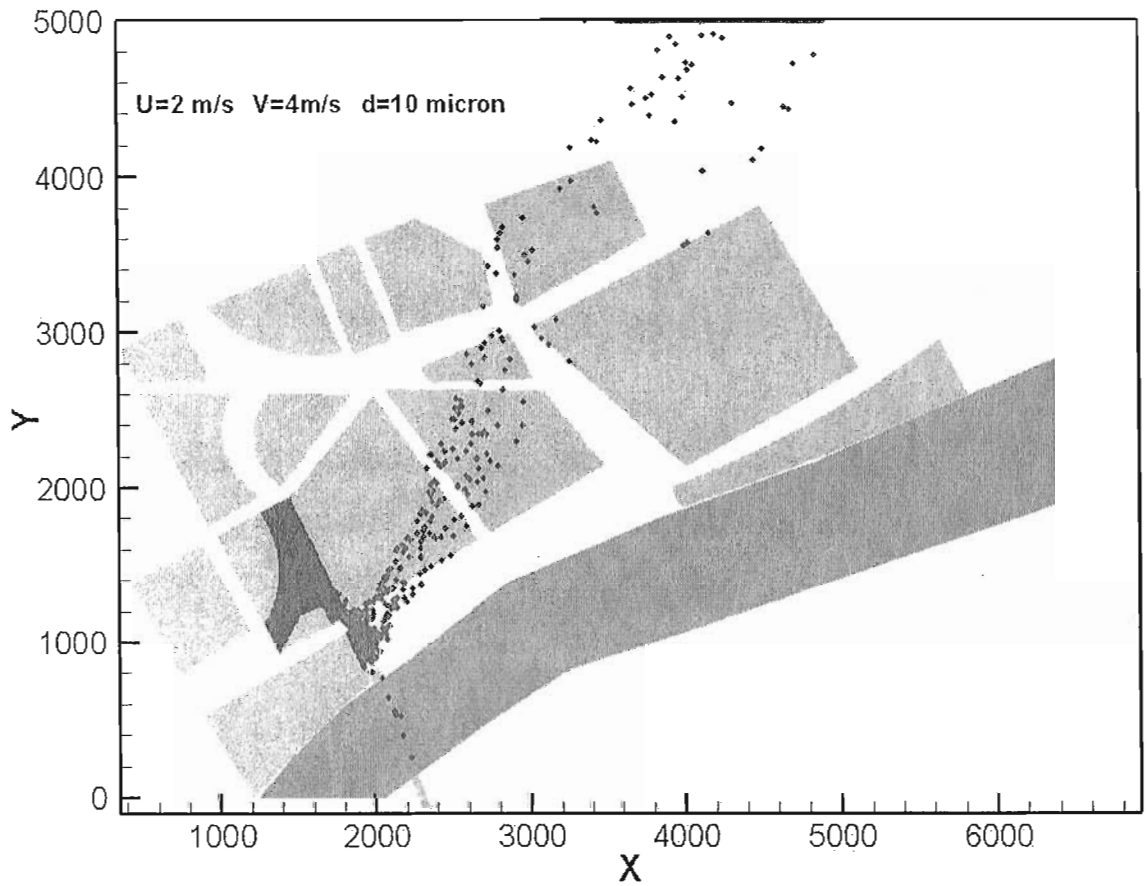


Figure 8. Spatial distribution of 10 micrometer particles emitted from the bridge at t=1 hour and 30 min. for a wind velocity of 4.47 m/s (u=2 m/s and v=4 m/s)

The spatial distribution of 1 μm particles at t=350 s is shown in Figure 9. In this case the x- and y- velocities are, respectively, 4 and 2 m/s. It is seen that as the y-velocity decreases and x-velocity increases, particles mostly deposit on the ground and river areas.

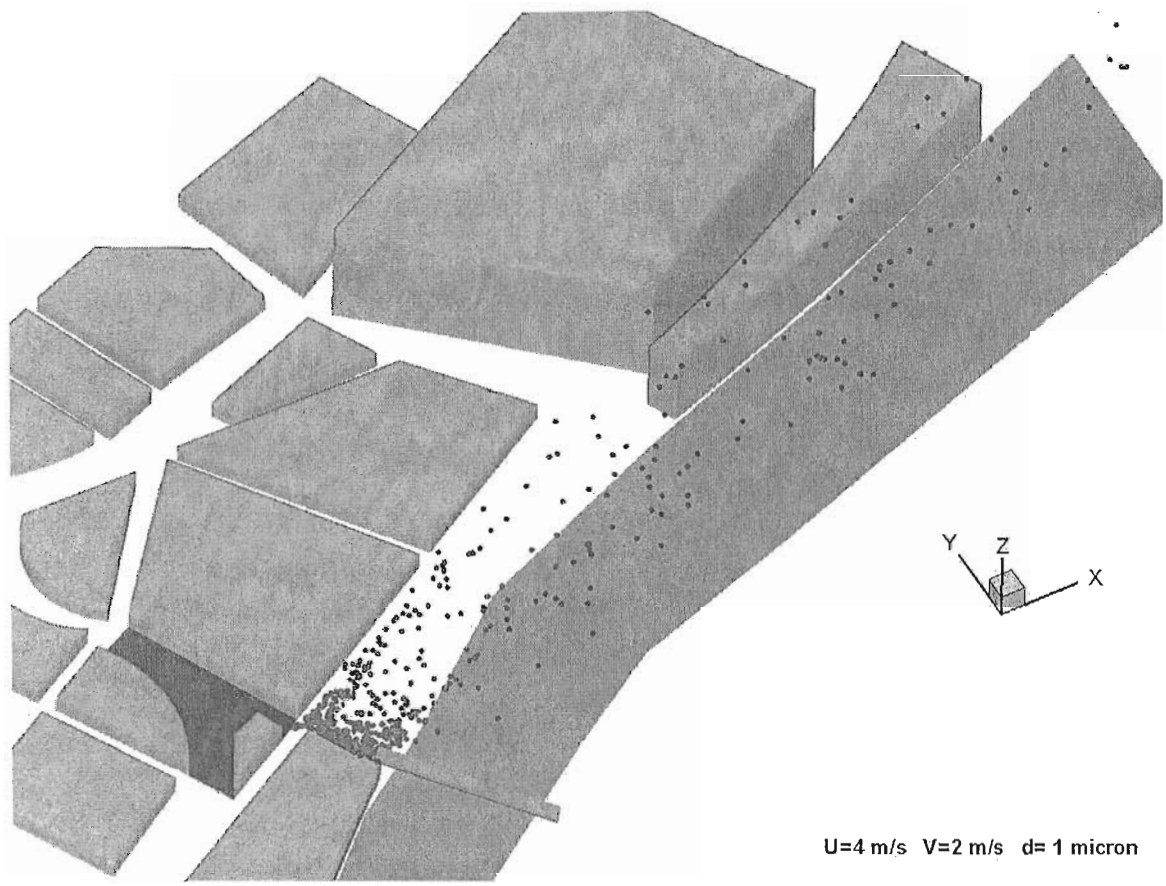


Figure 9. Spatial distribution of 1 micrometer particles emitted from the bridge at t=350s for a wind velocity of 4.24 m/s (u=4 m/s and v=2 m/s).

The spatial distribution of 10 μm particles emitted from the traffic in the custom plaza is shown in Figure 10. In this case the x- and y- velocities are, respectively, 2 and 4 m/s. It is observed that a large number of particles which are released from the custom plaza deposit on the neighboring residential areas.

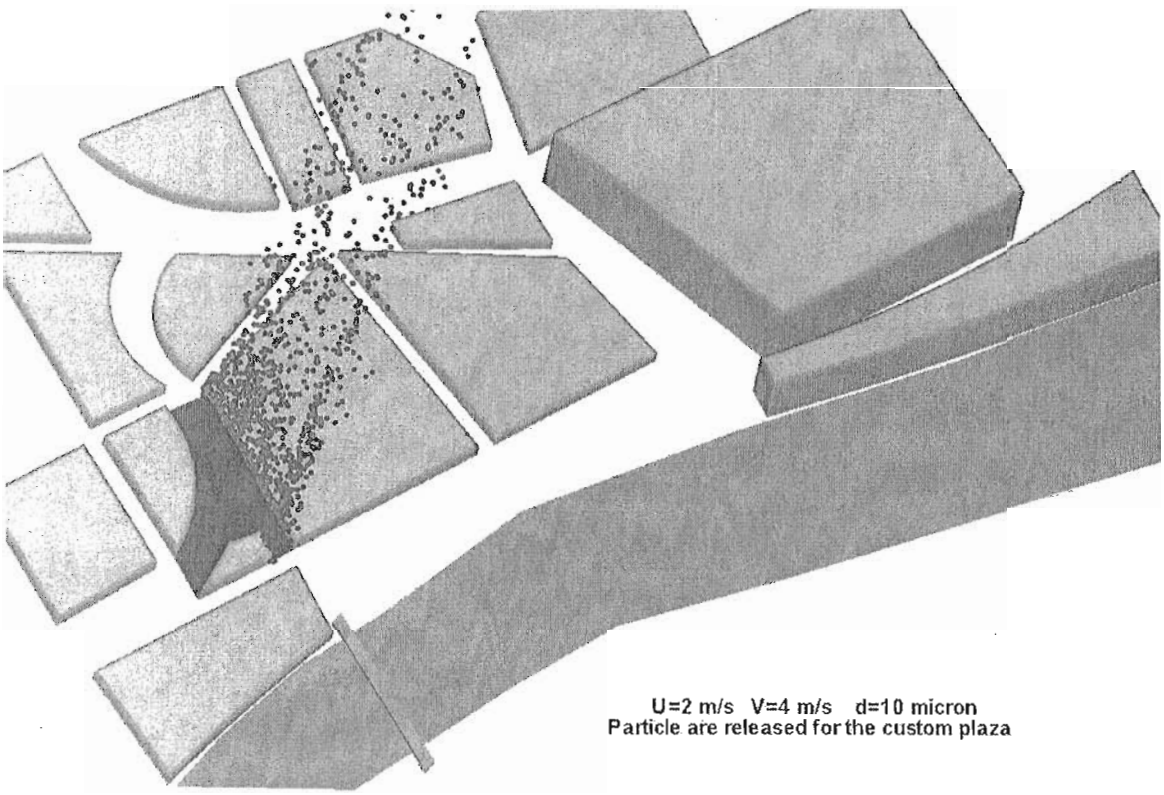


Figure 10. Spatial distribution of 10 μm particles emitted from the traffic in the custom plaza at t=350s for a wind velocity of 4.24 m/s (u=2 m/s and v=4 m/s).

The spatial distribution of 1 μm particles emitted from the traffic in the custom plaza is shown in Figure 11. In this case the x- and y- velocities are, respectively, 4 and 2 m/s. It is observed that a large number of particles which are released from the custom plaza deposit on the neighboring residential areas as well as the downtown area.

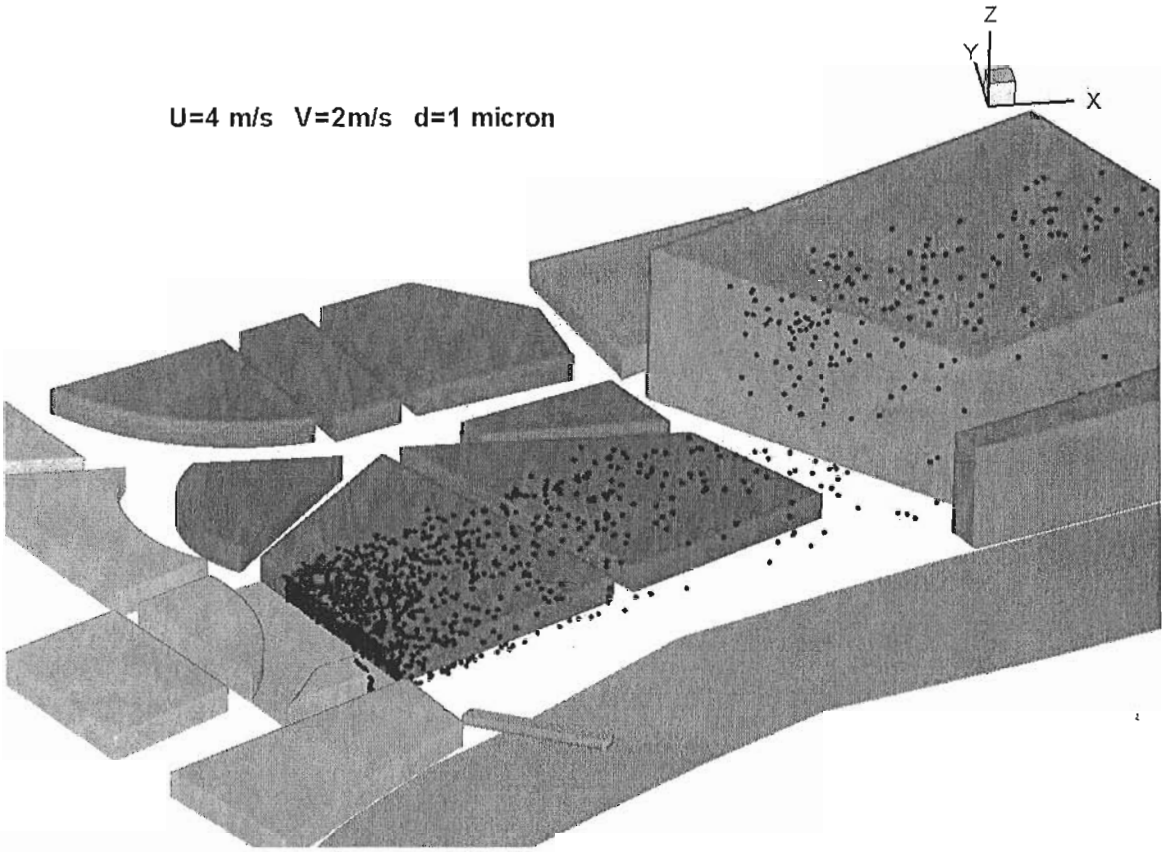


Figure 11. Spatial distribution of 1 μm particles emitted from the traffic in the custom plaza for a wind velocity of 4.24 m/s (u=4 m/s and v=2 m/s).

Figure 12 shows the schematic of Area 1, Area 2, and Area 3 that are used for evaluating the percentages of particle deposition. Note that Area 3 is the ground near the bridge.

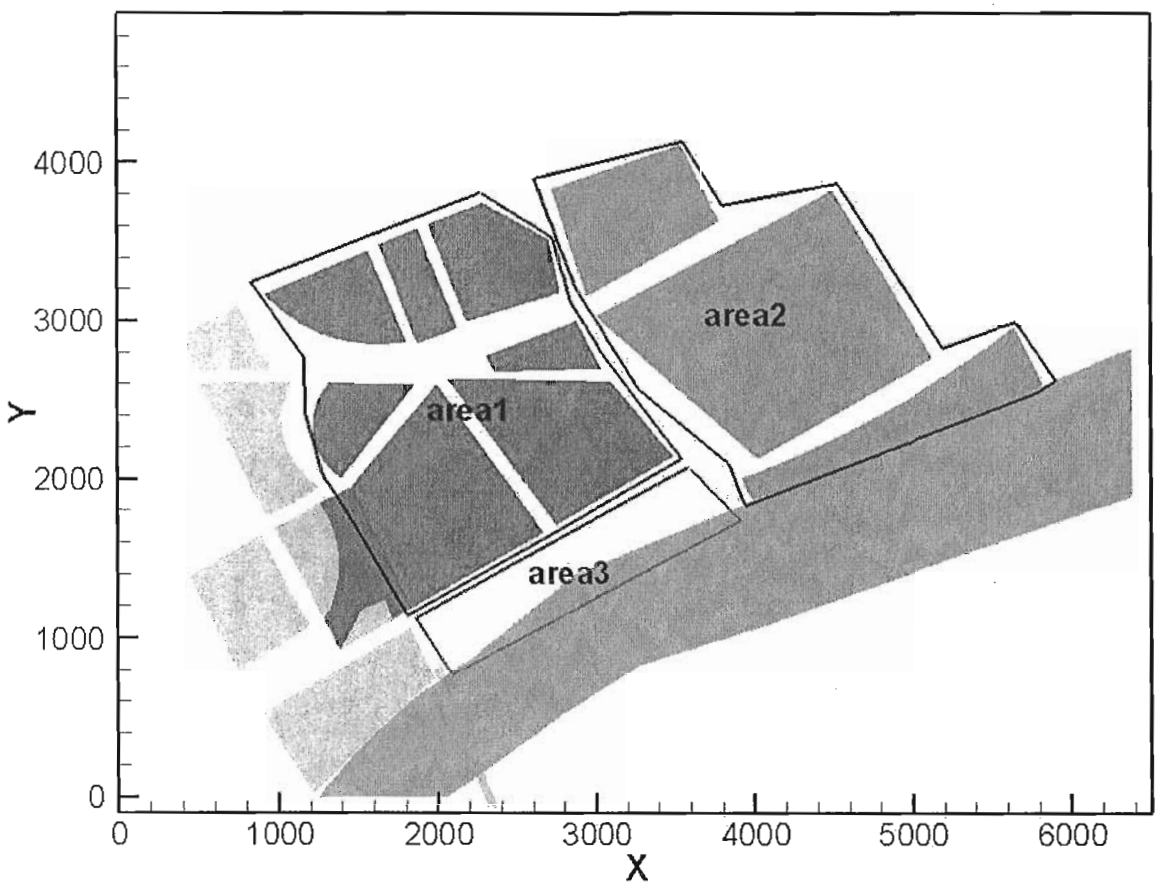
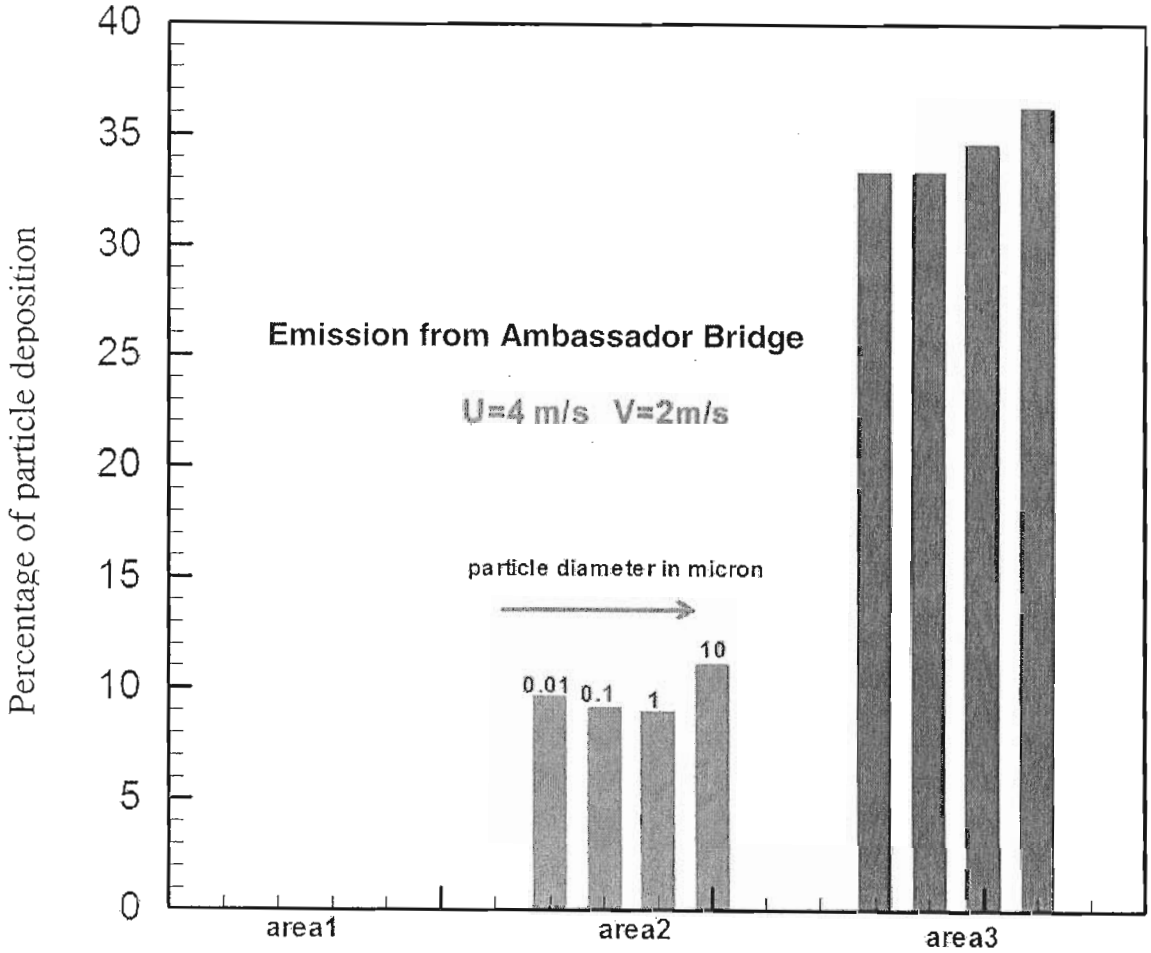
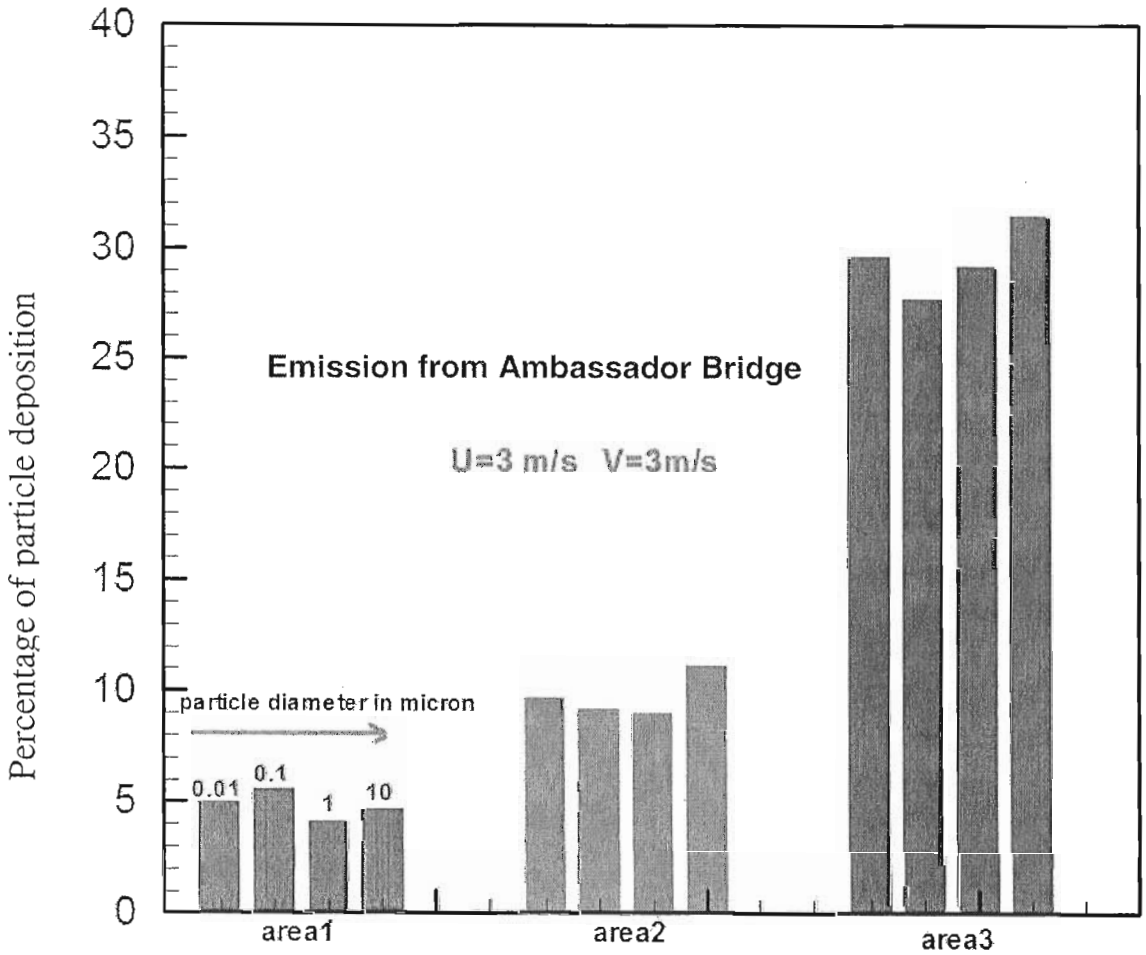


Figure 12. Schematics of the areas studied.

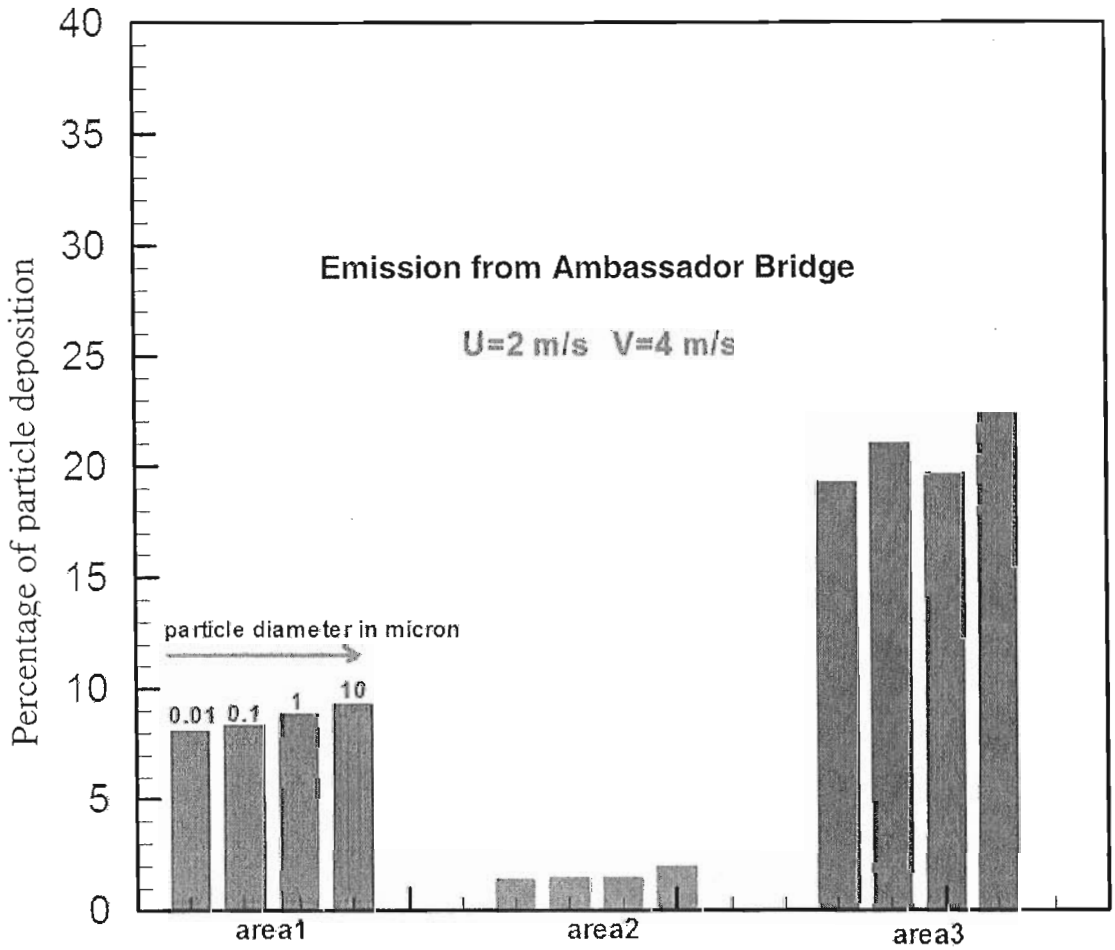
For emission from the traffic on Ambassador Bridge, Figures 13, 14 and 15 show the percentage of particle deposition on different areas for different particle diameters and wind velocities.



Figures 13: The percentage of particle deposition on different areas for a wind velocity of 4.47 m/s (u=4 m/s and v=2 m/s) for emission from the traffic on Ambassador Bridge.

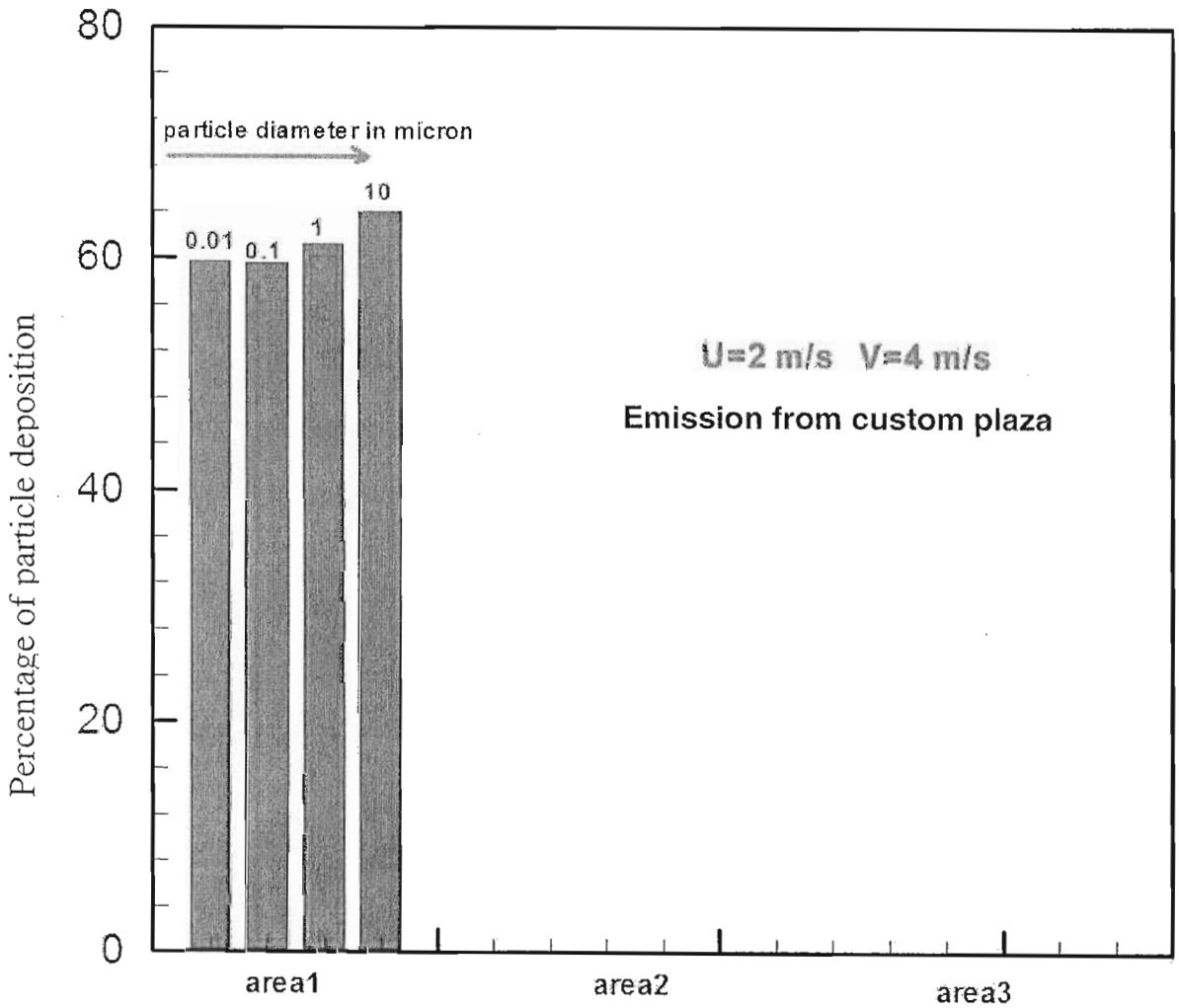


Figures 14: The percentage of particle deposition on different areas for a wind velocity of 4.24 m/s (u=3 m/s and v=3 m/s) for emission from the traffic on Ambassador Bridge.



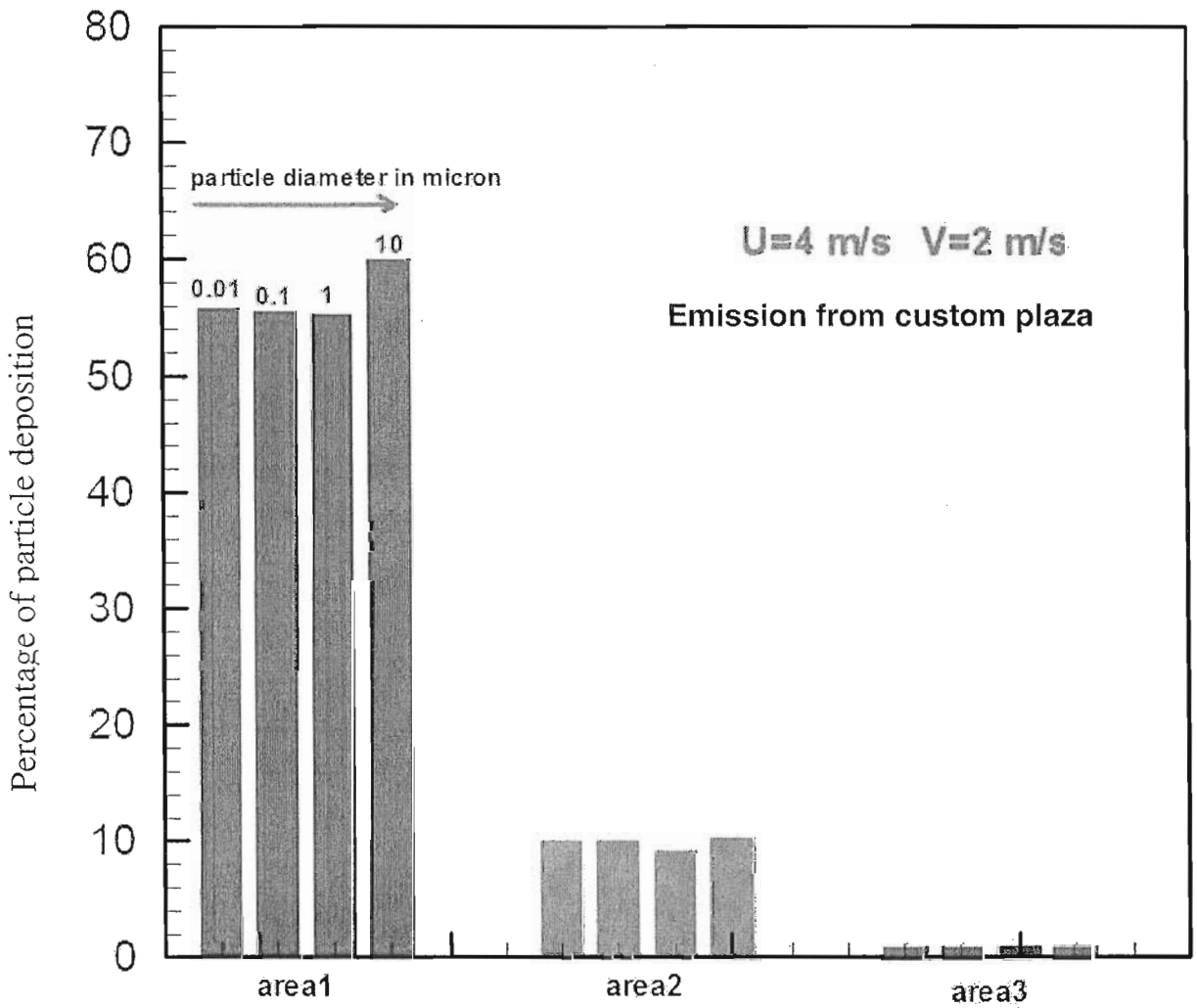
Figures 15: The percentage of particle deposition on different areas for a wind velocity of 4.47 m/s (u=2 m/s and v=4 m/s) for emission from the traffic on Ambassador Bridge.

For emission form the custom plaza, Figure 16 show the percentage of particle deposition on different areas for different particle diameters for a wind velocity of 4.24 m/s (u=2 m/s and v=4 m/s). It is observed that around 60 % of the particles deposit on Area 1 and the amount of particle deposition on Area 2 and Area 3 is negligible.



Figures 16: The percentage of particle deposition on different areas for a wind velocity of 4.47 m/s (u=2 m/s and v=4 m/s), for emission from the custom plaza.

For a wind velocity of 4.24 m/s (u=4 m/s and v=2 m/s) and for emission form the custom plaza, Figure 17 show the percentage of particle deposition on different areas for different particle diameters. It is observed that around 55 % of the particles deposit on Area 1 and around 10% of the particles deposit on Area2 (downtown area).



Figures 17: The percentage of particle deposition on different areas for a wind velocity of 4.47 m/s (u=4 m/s and v=2 m/s), for emission from the custom plaza.

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BIOGRAPHICAL INFORMATION

LAWRENCE M. HANDS, P.E.

REGISTRATION

- Registered Professional Engineer: State of Michigan
- Diplomate in the Specialty of Air Pollution Control as certified by the American Academy of Environmental Engineers. A Diplomate is a licensed professional engineer with a minimum of 8 years experience certified as a specialist by a board of experts.

EXPERIENCE

In 1993, Mr. Hands formed Hands & Associates, Inc. a consulting firm specializing in air quality services. Since that time, Hands & Associates, Inc. has grown and expanded under his leadership and is now providing a wide range of services to customers in environmental consulting.

He started working in the air-quality field in 1975 and soon moved from managing a stack-testing program to designing waste-to-energy facilities. He worked on National Environmental Policy Act (NEPA) issues, performed permitting, design, construction management, and boiler performance testing. He has developed complex air quality permit applications for new sources and Federal Energy Regulatory Agency air and noise reports for gas transmission capacity investments.

He has special expertise in air quality permitting, community noise, odor mitigation and indoor-air issues. He also works with customers on environmental impact statements, environmental assessments, environmental management issues, contingency planning, process safety management, and environmental site assessments. He helped develop File-Logic™ and *e*File-Logic™, structured filing systems offered by Hands & Associates, Inc. that provide a method for storing and finding valuable compliance-related documents.

Mr. Hands has participated in numerous environmental management forums including serving as chairperson for the Engineering Society of Detroit's Society for Environmental Sciences. He also represented the Air and Waste Management Association as a People-to-People delegate to study environmental issues in China.

Mr. Hands is affiliated with the following organizations:

- Air and Waste Management Association (25 year member)
- Southeast Michigan Sustainable Business Forum
- Michigan Association of Environmental Professionals
- Transportation Riders United

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- Southeast Michigan Sustainable Business Forum
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- Transportation Riders United

Typical projects have included:

- Dispersion modeling study to protect ambient air in and around a hospital from pollutants from boilers and emergency generators at the hospital
- Peer review of dispersion modeling study for thermal decomposition of Army ammunition plant.
- Environmental assessment for Federal transfer of land and buildings to a non-profit organization in Detroit.
- Environmental permitting and environmental consulting for United Solar Ovonic's photovoltaic plant including air and wastewater permit acquisition, air quality dispersion modeling and air toxic analysis.
- Review and comments on draft and final environmental impact statements for a number of road projects in Greater Detroit.
- Air and Stormwater permitting for ethanol plant in Ohio including fugitive emission estimation and air quality dispersion modeling meeting Ohio Engineering Guide 69.
- Clean Air Act regulatory review for maintenance activities at City of Detroit power plant.
- Environmental consulting including integrated contingency plan preparation and air emissions determinations for specialty steel mill.
- Receptor dispersion modeling for law suit involving cement plant in Dundee, MI.
- Expert witness services and community noise evaluation for concrete batch plant.
- Odor investigation and mitigation work to determine source of odors at a number of facilities including an auto assembly plant and chemical processing plant. Determined source of odors and provided recommendations for mitigation including scrubber design specifications.
- Acquiring a prevention of significant deterioration (PSD) permit for a 440-megawatt combined-cycle gas-turbine-based power project. This facility will have the lowest emissions of any power plant in the Midwest and will use cost effective dry, low nitrogen oxide (NO_X) combustors that employ pollution-prevention technology.
- Acquiring permits for a number of industrial clients with VOC-emitting processes including plastic forming, parts coating, solvent blending, and chemical processing. Each application included a best available control technology (BACT) determination and a review of ambient air impacts for air toxics.
- Developing installation registration application documentation for Ohio EPA for facility with over forty emission points which handles wide range of materials including particulates, VOCs, corrosives and toxics.
- Performing dispersion modeling studies in accordance with EPA guidelines for waste water treatment facility incinerator.
- Performing dispersion modeling studies for four natural-gas compressor stations. The studies took into account the atmospheric reaction of NO to NO_2. Three of the four facilities had undersized stacks resulting in modeled excursions of the National Ambient Air Quality Standards (NAAQS). Modeling results were used to determine the minimum height for the stacks.
- Preparing reports that outlined the impact of the Clean Air Act Amendments on a specific business. Topics covered included impact on NO_X emissions in non-attainment areas, accidental release regulations, estimate of costs due to operating permit fees, and enforcement impacts.

- Establishing system to maintain emissions records for client with volatile organic compound (VOC) emissions following the requirements of Michigan Rule 632.
- Acquiring PSD permits for modifications to two gas compressor stations. Showed through the BACT analysis that the proposed combustion turbines would not require add-on pollution-control equipment.
- Assisting a number of hazardous-waste treatment, storage, or disposal facilities in the acquisition of waste permits and air-use permits.
- Worked with a pharmaceutical company on preparation of applications for air-use permits, emergency-release analyses and dispersion-modeling studies. Developed inventory of emergency release devices at facility. Used the results of the dispersion modeling along with estimates of emissions to show compliance with the Michigan proposed air-toxic rules for numerous chemicals.
- Preparing Federal Energy Regulatory Commission (FERC) Resource Reports on air and noise quality for natural gas compressor stations. These reports include air-quality dispersion modeling to characterize each facility, baseline community noise field surveys, and estimates of the noise impact due to the additional unit. Mitigation measures for both air-quality and noise impacts are included. These reports meet FERC's NEPA requirements. A FERC staff member commented that the well prepared reports facilitated agency review and the granting of project approval.
- Designing a dust-control project for a major Michigan cement facility consisting of the installation of approximately 15 baghouse systems and control of numerous dust sources.
- Design of and permitting for waste-to-energy facilities. Tasks included:
  - Preparing and consulting on the environmental permit applications (environmental impact statements, PSD, non-attainment, solid waste, and wastewater) for three facilities. Permits were issued for all three projects.
  - Writing specifications, analyzing the bids, and reviewing the construction documents for air-quality control systems, continuous-emission monitoring systems, stacks, truck scales, cooling-water and boiler-water treatment.
  - Designing the installation of a selective non-catalytic reduction (SNCR) system to control NO_X emissions, and during construction, managing all drawing revisions and field inquiries.
- Managing a stack testing program for a central New York environmental consulting firm. In addition, participated in the development of the industrial hygiene service group and performed both wet-chemical and gas-chromatography laboratory analyses.

EMPLOYMENT

1993-present	Hands & Associates, Inc., Detroit, President
1989-1992	WW Engineering & Science, (now EarthTech), Livonia, Sr. Air Quality Specialist
1985-1989	BEI Engineers, Detroit, Sr. Environmental Engineer
1981-1982	Black & Veatch, Detroit, Environmental Engineer
1975-1980	Galson Corporation, Syracuse, Manager, Stack Testing Group

EDUCATION

M.S.E.	Mechanical Engineering, University of Michigan, 1983
B.S.	Environmental Engineering, Syracuse University, 1974
B.A.	Chemistry, Syracuse University, 1974

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Air Emission Factors and Hot Spot Analysis
2nd Detroit River Bridge Span Traffic
July 26, 2007
Amended August 30, 2007

In this paper, Hands & Associates, Inc. summarizes how we developed site specific air emission factors for mobile emissions due to traffic on a new bridge across the Detroit River and used these emission factors to determine the air quality impact on the surrounding area for idling trucks.

Air Emission Factors

We used Mobile6.2 to develop these emission factors, and modified the input files of Mobile6.2 for the mix of passenger and commercial vehicles expected to cross the bridge in different years.

From our July 12, 2007 paper, we predicted that a new crossing would take half of the predicted Ambassador Bridge traffic and half of the increase in tunnel traffic so that total traffic would be as follows:

		Volume by Year, million vehicles/yr		
Port	**Vehicle Type**	**2015**	**2025**	**2035**
New Bridge	Passenger	5.36	5.90	6.48
	Commercial	2.51	3.24	3.96
	Total	7.87	9.14	10.44

If the new bridge is a replacement for the Ambassador Bridge, with the existing bridge put under standby status, the volumes of this replacement bridge would be twice as high as follows:

		Volume by Year, million vehicles/yr		
Port	**Vehicle Type**	**2015**	**2025**	**2035**
Replacement Bridge	Passenger	10.7	11.8	13.0
	Commercial	5.0	6.5	7.9
	Total	15.7	18.3	20.9

This mix of traffic is somewhat heavier in proportion of commercial traffic than that predicted in the default values of Mobile6.2. We adjusted the default vehicle mix to take this into account. The adjusted factors are presented in vehicle ratios.xls.

We calculated individual average vehicle emission factors for three different future years and two different speeds (25 mph and 44 mph). We used the current requirements for ultra-low sulfur diesel fuel (15 ppm sulfur) and the summertime fuel limit of a RVP of 7.0. We used a summertime temperature range of 72 to 92 degrees F.

EXHIBIT 13

The summary of results is presented below:

Pollutant Name	2015		2025		2035	
	25 mph	44 mph	25 mph	44 mph	25 mph	44 mph
PM 2.5 (gms/mi)	0.0291	0.0291	0.0181	0.0181	0.0163	0.0162
PM 10 (gms/mi)	0.0490	0.0490	0.0375	0.0374	0.0358	0.0358
Total VOC (gms/mi)	0.524	0.421	0.363	0.278	0.347	0.264
Running VOC (gms/mi)	0.291	0.226	0.231	0.175	0.221	0.166
Carbon monoxide (gms/mi)	4.515	4.672	3.623	3.736	3.417	3.519
Oxides of nitrogen (gms/mi)	1.255	1.336	0.492	0.504	0.342	0.343
Benzene (mg/mi)	14.01	12.04	10.29	8.81	9.49	8.1
MTBE (mg/mi)	3.11	2.73	2.23	1.96	1.99	1.76
1,3 Butadiene (mg/mi)	2.05	1.61	1.62	1.25	1.54	1.18
Formaldehyde (mg/mi)	11.69	7.8	10.23	6.71	10.21	6.65
Acetaldehyde (mg/mi)	4.84	3.35	4.15	2.81	4.1	2.76
Acrolein (mg/mi)	0.51	0.34	0.45	0.29	0.45	0.29

Note that the 2035 vehicle emission factors for PM 2.5 and PM 10 are somewhat higher than what we used in our July 12 paper that came from the published reports from the 2nd span project. These are compared below:

Year 2035 emission factor comparison

	MDOT published factor	Mobile6.2 factor calculated by Hands & Associates, Inc.
PM 2.5, gm/mi	0.0135	0.0162
PM 10, gm/mi	0.0283	0.0358

In addition, we obtained particulate emissions due to idling for heavy duty diesel trucks. These are listed below:

Heavy Duty Diesel Truck Idling emission factors

Truck Idling	2015	2025	2035
PM 2.5 (gms/hr)	0.9428	0.9237	0.9237
PM 10 (gms/hr)	1.0244	1.004	1.004

The full file of emission factors is attached as ambbrid.pdf.

The factors summarized in this paper along with estimates of segment length, vehicle miles traveled per day per segment and average vehicle speeds can be used to determine the emission rate input to air dispersion models to predict air impacts at sensitive receptors.

Hot-Spot Analysis

For the Ambassador Bridge project, the sponsors are proposing to use the existing toll and customs plaza but build a bridge with greater capacity. We performed a hot-spot analysis around the truck customs plaza on the United States side of the bridge. This customs plaza is

directly west of the St Anne Church and surrounding residential areas centered at Lafayette St and St Anne Street.

This bridge would be predicted to handle 6.5 million trucks per year in the year 2025; half of these trucks would be entering the United States and processed through the customs plaza that exits on Fort Street. The other half of the vehicles would be entering Canada and processed at the Canadian customs plaza. We assumed that the daily US Customs Plaza truck traffic was 10,000 trucks per day or 600 per hour. Idling emissions are 0.9237 grams PM2.5 per hour per truck.

We used the EPA approved SCREEN3 dispersion model and assumed that idling trucks acted as an area source. We allocated space for each truck of 22 meters long and 3 meters wide. The emissions of 0.9237 gm/hr can then be determined to be an area-wide emission rate of 4.0E-6 grams/m^2-second. A backup of 10 trucks wide and 5 long (50 trucks) would cover an area of 30 meters by 115 meters. Based on 600 trucks per hour, this corresponds to a 12 minute backup per truck. During certain hours, the backup could be much higher, as much as 30 minutes, which would result in a much larger area source, resulting in potentially higher impacts in the neighborhoods.

The results of the SCREEN3 model show that the maximum hourly impact is 70 ug/m3 of PM2.5. (See attached file Plazabackup 10 5.pdf) Using the Michigan Air Quality Division factor of 0.4 to estimate 24-hour impacts from hourly impacts results in an impact of 28 ug/m3 of PM2.5 averaged over a 24-hour period. The National Ambient Air Quality Standard for PM2.5 is 35 ug/m3 on a 24-hr basis. The MDEQ operates a number of ambient monitoring stations near by. The most appropriate monitor to use is the Fort Street Monitor. The background level at the Fort Street Monitor of 40 ug/m3 of PM2.5 based on a 24-hour average period. Adding the local hot-spot impact of 28 ug/m3 to the 40 ug/m3 results in a maximum PM2.5 concentration at neighborhood hot spots of 68 ug/m3 for a 24-hour period. This is almost two times the standard and indicates that residential areas around the Ambassador Bridge Plaza would be adversely impacted by the new bridge and the resulting truck traffic. Based on work by Hojjat Nasr and Goodarz Ahmadi, most of the diesel exhaust from the trucks at the plaza would be deposited in this "Area 1" neighborhood during certain wind conditions.

Please note that we have only reviewed PM 2.5 emissions. Using U.S. EPA's revised draft 1999 Guidelines for Carcinogen Risk Assessment (U.S. EPA, 1999), diesel exhaust (DE) is likely to be carcinogenic to humans by inhalation from environmental exposures. From EPA's Integrated Risk Information System, diesel exhaust has a reference concentration of 5 ug/m^3 which is much lower than the PM 2.5 standard.

Please note that this analysis is a simple screening model that did not take into account specific geography or meteorological data, nor did it include all PM 2.5 emissions from the bridge. It only addressed idling trucks, not automobiles or moving trucks. The analysis shows that there is a significant basis for concern that should be addressed more thoroughly through an Environmental Impact Study.

Attachments:
Vehicle ratios.xls
Ambbrid.pdf
PlazaBackup 10 5.pdf (SCREEN3 Output file)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Scenario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDGV	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
2	1	2015	2.5	44.3	VMT	0	VMT	0.2376	0.1953	0.1302	0.0666	0.0443	0.0241	0.0086	0.003	0	0	0	0	0
3	1	2015	2.5	44.3	1	11	Lead	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	2015	2.5	44.3	1	10	GASPM	0.0037	0.0035	0.0035	0.0036	0.0036	0.0181	0.018	0.0187	0.0465	0.0465	0.0465	0.0212	0
5	1	2015	2.5	44.3	1	9	ECARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6	1	2015	2.5	44.3	1	8	OCARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7	1	2015	2.5	44.3	1	7	SO4	0.0002	0.0004	0.0004	0.0004	0.0004	0.0019	0.0019	0.0018	0	0	0	0.0017	0
8	1	2015	2.5	44.3	9	14	Brake	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0	0	0	0.0053	0
9	1	2015	2.5	44.3	10	15	Tire	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0	0	0	0.009	0
10	1	2015	2.5	44.3	1	12	SO2	0.0068	0.0088	0.0088	0.0115	0.0115	0.0158	0.0171	0.0173	0	0	0	0.023	0
11	1	2015	2.5	44.3	1	13	NH3	0.1017	0.1017	0.1017	0.1017	0.1017	0.0451	0.0451	0.0451	0	0	0	0.0451	0
12	1	2015	2.5	44.3	1	17	PM Idle	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Scena	CY	Part S	Avg S	EType	Pol #	Pol Name	LDGV	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
14	1	2015	2.5	44.3	VMT	0	VMT	0.2376	0.1953	0.1302	0.0666	0.0443	0.0241	0.0086	0.003	0	0	0	0	0
15	1	2015	2.5	44.3	1	1	VOC	0.379	0.431	0.461	0.837	0.872	0.471	0.688	1.132	0	0	0	1.364	0
16	1	2015	2.5	44.3	1	2	CO	5.741	5.752	6.394	8.927	9.108	4.133	4.869	4.866	0	0	0	6.626	0
17	1	2015	2.5	44.3	1	3	NOX	0.36	0.369	0.473	0.771	0.987	1.192	1.214	1.458	0	0	0	2.045	0
18	1	2015	2.5	44.3	3	1	Hot Soak	0.078	0.09	0.09	0.177	0.177	0.123	0.097	0.314	0	0	0	0.352	0
19	1	2015	2.5	44.3	4	1	Diurnal	0.009	0.01	0.01	0.02	0.02	0.017	0.014	0.041	0	0	0	0.046	0
20	1	2015	2.5	44.3	5	1	Resting	0.043	0.055	0.055	0.113	0.113	0.083	0.064	0.217	0	0	0	0.244	0
21	1	2015	2.5	44.3	6	1	Running	0.045	0.04	0.04	0.07	0.07	0.06	0.052	0.083	0	0	0	0.09	0
22	1	2015	2.5	44.3	7	1	Crankcase	0.008	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0.01	0
23	1	2015	2.5	44.3	8	1	Refueling	0.016	0.031	0.031	0.074	0.074	0.1	0.377	0.38	0	0	0	0.502	0
24	1	2015	2.5	44.3	11	1	Total Evap	0.198	0.236	0.236	0.464	0.464	0.393	0.615	1.046	0	0	0	1.245	0
25	Scena	CY	Part S	Avg S	EType	Pol #	Pol Name	LDGV	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
26	1	2015	2.5	44.3	VMT	0	VMT	0.2376	0.1953	0.1302	0.0666	0.0443	0.0241	0.0086	0.003	0	0	0	0	0
27	1	2015	2.5	44.3	1	16	Benzene (mg/mi)	12.99	14.07	16.25	26.61	29.14	3.98	3.74	3.9	0	0	0	5.41	0
28	1	2015	2.5	44.3	1	17	MTBE (mg/mi)	3.06	3.25	3.71	6.67	7.29	0.68	0.64	0.82	0	0	0	1.15	0
29	1	2015	2.5	44.3	1	18	1,3 Butadiene (mg/mi)	1.34	1.43	1.65	2.81	3.07	0.2	0.19	0.36	0	0	0	0.52	0
30	1	2015	2.5	44.3	1	19	Formaldehyde (mg/mi)	2.73	2.96	3.43	5.56	6.09	2.33	2.19	2.91	0	0	0	4.07	0
31	1	2015	2.5	44.3	1	20	Acetaldehyde (mg/mi)	1.6	1.69	1.95	3.23	3.53	0.89	0.83	0.97	0	0	0	1.35	0
32	1	2015	2.5	44.3	1	21	Acrolein (mg/mi)	0.12	0.13	0.15	0.25	0.27	0.04	0.04	0.17	0	0	0	0.25	0
33	1	2015	2.5	44.3	3	16	Benzene Hot Soak (mg/mi)	0.93	1.08	1.08	2.13	2.13	1.47	1.16	3.77	0	0	0	4.22	0
34	1	2015	2.5	44.3	4	16	Benzene Diurnal (mg/mi)	0.1	0.11	0.11	0.22	0.22	0.19	0.16	0.46	0	0	0	0.51	0
35	1	2015	2.5	44.3	6	16	Benzene Running (mg/mi)	0.54	0.48	0.48	0.84	0.84	0.72	0.63	1	0	0	0	1.08	0
36	1	2015	2.5	44.3	5	16	Benzene Resting (mg/mi)	0.48	0.61	0.61	1.27	1.27	0.93	0.72	2.43	0	0	0	2.73	0
37	1	2015	2.5	44.3	8	16	Benzene Refueling (mg/mi)	0.18	0.35	0.35	0.84	0.84	1.14	4.29	4.32	0	0	0	5.71	0
38	1	2015	2.5	44.3	3	17	MTBE Hot Soak (mg/mi)	7.31	8.49	8.49	16.64	16.64	11.51	9.11	29.5	0	0	0	33.03	0
39	1	2015	2.5	44.3	4	17	MTBE Diurnal (mg/mi)	0.69	0.8	0.8	1.55	1.55	1.32	1.09	3.26	0	0	0	3.61	0
40	1	2015	2.5	44.3	6	17	MTBE Running (mg/mi)	2.28	2.01	2.01	3.5	3.5	3.01	2.62	4.17	0	0	0	4.54	0
41	1	2015	2.5	44.3	5	17	MTBE Resting (mg/mi)	3.35	4.31	4.31	8.92	8.92	6.53	5.07	17.12	0	0	0	19.22	0
42	1	2015	2.5	44.3	8	17	MTBE Refueling (mg/mi)	1.55	3.08	3.08	7.37	7.37	9.98	37.54	37.81	0	0	0	49.99	0
43	2	2015	2.5	24.6	VMT	0	VMT	0.2376	0.1953	0.1302	0.0666	0.0443	0.0241	0.0086	0.003	0	0	0	0	0
44	2	2015	2.5	24.6	1	11	Lead	0	0	0	0	0	0	0	0	0	0	0	0	0
45	2	2015	2.5	24.6	1	10	GASPM	0.0036	0.0034	0.0034	0.0035	0.0035	0.0183	0.0183	0.019	0.0465	0.0465	0.0465	0.0215	0
46	2	2015	2.5	24.6	1	9	ECARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
47	2	2015	2.5	24.6	1	8	OCARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
48	2	2015	2.5	24.6	1	7	SO4	0.0004	0.0005	0.0005	0.0005	0.0005	0.0015	0.0015	0.0014	0	0	0	0.0014	0

	A	B	C	D	E	F	G	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
1	Scen ario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDDV	LDDT12	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B	MC	GAS BUS	URB BUS	COM BUS
2	1	2015	2.5	44.3	VMT	0	VMT	0.0002	0	0.0072	0.0227	0.0283	0	0	0	0.1108	0.1108	0.004	0	0.0045	0.0001
3	1	2015	2.5	44.3	1	11	Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	NA	NA
4	1	2015	2.5	44.3	1	10	GASPM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0142	0.0301	NA	NA
5	1	2015	2.5	44.3	1	9	ECARBON	0.0172	0	0.0136	0.01	0.0175	0	0	0	0.0341	0.0522	NA	NA	0.0478	0.1506
6	1	2015	2.5	44.3	1	8	OCARBON	0.0048	0	0.0141	0.0104	0.0182	0	0	0	0.0268	0.0165	NA	NA	0.0375	0.1183
7	1	2015	2.5	44.3	1	7	SO4	0.0002	0	0.0005	0.0006	0.0007	0	0	0	0.001	0.0011	0.0001	0.0013	0.0015	0.0011
8	1	2015	2.5	44.3	9	14	Brake	0.0053	0	0.0053	0.0053	0.0053	0	0	0	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053
9	1	2015	2.5	44.3	10	15	Tire	0.002	0	0.002	0.003	0.003	0	0	0	0.009	0.009	0.001	0.003	0.003	0.003
10	1	2015	2.5	44.3	1	12	SO2	0.0029	0	0.0073	0.0081	0.0093	0	0	0	0.0144	0.0151	0.0033	0.0254	0.0218	0.0153
11	1	2015	2.5	44.3	1	13	NH3	0.0068	0	0.027	0.027	0.027	0	0	0	0.027	0.027	0.0113	0.0451	0.027	0.027
12	1	2015	2.5	44.3	1	17	PM Idle	0	0	0.9452	0.9333	0.9553	0	0	0	0.9391	0.9444	0	0	0.9335	1.0124
13	Scena	CY	Part S	Avg S	EType	Pol #	Pol Name	LDDV	LDDT12	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B	MC	GAS BU	URB BU	COM BU
14	1	2015	2.5	44.3	VMT	0	VMT	0.0002	0	0.0072	0.0227	0.0283	0	0	0	0.1108	0.1108	0.004	0	0.0045	0.0001
15	1	2015	2.5	44.3	1	1	VOC	0.082	0	0.095	0.101	0.137	0	0	0	0.233	0.273	1.793	1.755	0.184	0.341
16	1	2015	2.5	44.3	1	2	CO	0.57	0	0.197	0.194	0.338	0	0	0	0.559	0.728	8.362	7.636	1.061	0.862
17	1	2015	2.5	44.3	1	3	NOX	0.142	0	1.065	0.981	1.85	0	0	0	3.347	4.422	1.168	4.418	6.335	5.775
18	1	2015	2.5	44.3	3	1	Hot Soak	0	0	0	0	0	0	0	0	0	0	0.145	0.405	0	0
19	1	2015	2.5	44.3	4	1	Diurnal	0	0	0	0	0	0	0	0	0	0	0.002	0.052	0	0
20	1	2015	2.5	44.3	5	1	Resting	0	0	0	0	0	0	0	0	0	0	0.355	0.28	0	0
21	1	2015	2.5	44.3	6	1	Running	0	0	0	0	0	0	0	0	0	0	0	0.231	0	0
22	1	2015	2.5	44.3	7	1	Crankcase	0	0	0	0	0	0	0	0	0	0	0	0.009	0	0
23	1	2015	2.5	44.3	8	1	Refueling	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0.551	NA	NA
24	1	2015	2.5	44.3	11	1	Total Evap	0	0	0	0	0	0	0	0	0	0	0.502	1.529	0	0
25	Scena	CY	Part S	Avg S	EType	Pol #	Pol Name	LDDV	LDDT12	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B	MC	GAS BU	URB BU	COM BU
26	1	2015	2.5	44.3	VMT	0	VMT	0.0002	0	0.0072	0.0227	0.0283	0	0	0	0.1108	0.1108	0.004	0	0.0045	0.0001
27	1	2015	2.5	44.3	1	16	Benzene (mg/mi)	1.64	0	1.04	1.11	1.51	0	0	0	2.56	3	43.78	9.44	2.03	3.75
28	1	2015	2.5	44.3	1	17	MTBE (mg/mi)	0	0	0	0	0	0	0	0	0	0	22.97	2.24	0	0
29	1	2015	2.5	44.3	1	18	1,3 Butadiene (mg/mi)	0.74	0	0.6	0.65	0.88	0	0	0	1.49	1.74	14.43	1.16	1.18	2.18
30	1	2015	2.5	44.3	1	19	Formaldehyde (mg/mi)	3.16	0	7.75	8.28	11.26	0	0	0	19.09	22.35	39.2	8.07	15.1	27.95
31	1	2015	2.5	44.3	1	20	Acetaldehyde (mg/mi)	1.01	0	2.86	3.05	4.15	0	0	0	7.03	8.23	13.86	2.53	5.56	10.29
32	1	2015	2.5	44.3	1	21	Acrolein (mg/mi)	0.29	0	0.35	0.37	0.5	0	0	0	0.85	1	0.83	0.63	0.68	1.25
33	1	2015	2.5	44.3	3	16	Benzene Hot Soak (mg/mi)	0	0	0	0	0	0	0	0	0	0	1.74	4.85	0	0
34	1	2015	2.5	44.3	4	16	Benzene Diurnal (mg/mi)	0	0	0	0	0	0	0	0	0	0	0.02	0.58	0	0
35	1	2015	2.5	44.3	6	16	Benzene Running (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	2.77	0	0
36	1	2015	2.5	44.3	5	16	Benzene Resting (mg/mi)	0	0	0	0	0	0	0	0	0	0	3.97	3.14	0	0
37	1	2015	2.5	44.3	8	16	Benzene Refueling (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	6.26	0	0
38	1	2015	2.5	44.3	3	17	MTBE Hot Soak (mg/mi)	0	0	0	0	0	0	0	0	0	0	13.62	38.02	0	0
39	1	2015	2.5	44.3	4	17	MTBE Diurnal (mg/mi)	0	0	0	0	0	0	0	0	0	0	0.14	4.1	0	0
40	1	2015	2.5	44.3	6	17	MTBE Running (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	11.6	0	0
41	1	2015	2.5	44.3	5	17	MTBE Resting (mg/mi)	0	0	0	0	0	0	0	0	0	0	27.95	22.08	0	0
42	1	2015	2.5	44.3	8	17	MTBE Refueling (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	54.86	0	0
43	2	2015	2.5	24.6	VMT	0	VMT	0.0002	0	0.0072	0.0227	0.0283	0	0	0	0.1108	0.1108	0.004	0	0.0045	0.0001
44	2	2015	2.5	24.6	1	11	Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	NA	NA
45	2	2015	2.5	24.6	1	10	GASPM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0142	0.0303	NA	NA
46	2	2015	2.5	24.6	1	9	ECARBON	0.0172	0	0.0136	0.01	0.0175	0	0	0	0.0341	0.0522	NA	NA	0.0478	0.1506
47	2	2015	2.5	24.6	1	8	OCARBON	0.0048	0	0.0141	0.0104	0.0182	0	0	0	0.0268	0.0165	NA	NA	0.0375	0.1183
48	2	2015	2.5	24.6	1	7	SO4	0.0002	0	0.0005	0.0006	0.0007	0	0	0	0.001	0.0011	0.0001	0.001	0.0015	0.0011

	A	B	C	D	E	F	G	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY
1	Scen ario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDDT34	ALL VEH	Month	Altitude	TMin	Tmax	Nom RVP	Gas Sulfur	Dsl Sulfur	I/M?		NGV?	E200	E300	Arom	Olef	Benz
2	1	2015	2.5	44.3	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
3	1	2015	2.5	44.3	1	11	Lead	NA	0	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
4	1	2015	2.5	44.3	1	10	GASPM	NA	0.0031	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
5	1	2015	2.5	44.3	1	9	ECARBON	0.0122	0.0106	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
6	1	2015	2.5	44.3	1	8	OCARBON	0.0176	0.0059	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
7	1	2015	2.5	44.3	1	7	SO4	0.0003	0.0006	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
8	1	2015	2.5	44.3	9	14	Brake	0.0053	0.0053	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
9	1	2015	2.5	44.3	10	15	Tire	0.002	0.0036	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
10	1	2015	2.5	44.3	1	12	SO2	0.0056	0.0102	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
11	1	2015	2.5	44.3	1	13	NH3	0.0068	0.0779	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
12	1	2015	2.5	44.3	1	17	PM Idle	0	0.268	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
13	Scena	CY	Part S	Avg S	EType	Pol #	Pol Name	LDDT34	ALL VEH	Month	Altitude	TMin	Tmax	Nom R	Gas Su	Dsl Su	I/M?		NGV?	E200	E300	Arom	Olef	Benz
14	1	2015	2.5	44.3	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
15	1	2015	2.5	44.3	1	1	VOC	0.259	0.421	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
16	1	2015	2.5	44.3	1	2	CO	0.475	4.672	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
17	1	2015	2.5	44.3	1	3	NOX	0.396	1.336	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
18	1	2015	2.5	44.3	3	1	Hot Soak	0	0.073	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
19	1	2015	2.5	44.3	4	1	Diurnal	0	0.008	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
20	1	2015	2.5	44.3	5	1	Resting	0	0.045	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
21	1	2015	2.5	44.3	6	1	Running	0	0.034	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
22	1	2015	2.5	44.3	7	1	Crankcase	0	0.007	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
23	1	2015	2.5	44.3	8	1	Refueling	NA	NA	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
24	1	2015	2.5	44.3	11	1	Total Evap	0	0.195	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
25	Scena	CY	Part S	Avg S	EType	Pol #	Pol Name	LDDT34	ALL VEH	Month	Altitude	TMin	Tmax	Nom R	Gas Su	Dsl Su	I/M?		NGV?	E200	E300	Arom	Olef	Benz
26	1	2015	2.5	44.3	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
27	1	2015	2.5	44.3	1	16	Benzene (mg/mi)	5.2	12.04	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
28	1	2015	2.5	44.3	1	17	MTBE (mg/mi)	0	2.73	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
29	1	2015	2.5	44.3	1	18	1,3 Butadiene (mg/mi)	2.34	1.61	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
30	1	2015	2.5	44.3	1	19	Formaldehyde (mg/mi)	10.03	7.8	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
31	1	2015	2.5	44.3	1	20	Acetaldehyde (mg/mi)	3.2	3.35	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
32	1	2015	2.5	44.3	1	21	Acrolein (mg/mi)	0.91	0.34	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
33	1	2015	2.5	44.3	3	16	Benzene Hot Soak (mg/mi)	0	0.87	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
34	1	2015	2.5	44.3	4	16	Benzene Diurnal (mg/mi)	0	0.09	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
35	1	2015	2.5	44.3	6	16	Benzene Running (mg/mi)	0	0.4	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
36	1	2015	2.5	44.3	5	16	Benzene Resting (mg/mi)	0	0.51	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
37	1	2015	2.5	44.3	8	16	Benzene Refueling (mg/mi)	0	0.33	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
38	1	2015	2.5	44.3	3	17	MTBE Hot Soak (mg/mi)	0	6.84	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
39	1	2015	2.5	44.3	4	17	MTBE Diurnal (mg/mi)	0	0.65	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
40	1	2015	2.5	44.3	6	17	MTBE Running (mg/mi)	0	1.69	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
41	1	2015	2.5	44.3	5	17	MTBE Resting (mg/mi)	0	3.55	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
42	1	2015	2.5	44.3	8	17	MTBE Refueling (mg/mi)	0	2.87	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
43	2	2015	2.5	24.6	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
44	2	2015	2.5	24.6	1	11	Lead	NA	0	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
45	2	2015	2.5	24.6	1	10	GASPM	NA	0.0031	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
46	2	2015	2.5	24.6	1	9	ECARBON	0.0122	0.0106	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
47	2	2015	2.5	24.6	1	8	OCARBON	0.0176	0.0059	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
48	2	2015	2.5	24.6	1	7	SO4	0.0003	0.0006	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5

	A	B	C	D	E	F	G	AZ	BA	BB	BC	BD	BE	BF	BG	BH
1	Scenario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	MTBE vol%	MTBE MktFrac	ETBE vol%	ETBE MktFrac	ETOH vol%	ETOH MktFrac	TAME vol%	TAME MktFrac	
2	1	2015	2.5	44.3	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
3	1	2015	2.5	44.3	1	11	Lead	*****	0.5	*****	0.05	*****	0.45	6	0	
4	1	2015	2.5	44.3	1	10	GASPM	*****	0.5	*****	0.05	*****	0.45	6	0	
5	1	2015	2.5	44.3	1	9	ECARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
6	1	2015	2.5	44.3	1	8	OCARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
7	1	2015	2.5	44.3	1	7	SO4	*****	0.5	*****	0.05	*****	0.45	6	0	
8	1	2015	2.5	44.3	9	14	Brake	*****	0.5	*****	0.05	*****	0.45	6	0	
9	1	2015	2.5	44.3	10	15	Tire	*****	0.5	*****	0.05	*****	0.45	6	0	
10	1	2015	2.5	44.3	1	12	SO2	*****	0.5	*****	0.05	*****	0.45	6	0	
11	1	2015	2.5	44.3	1	13	NH3	*****	0.5	*****	0.05	*****	0.45	6	0	
12	1	2015	2.5	44.3	1	17	PM Idle	*****	0.5	*****	0.05	*****	0.45	6	0	
13	Scena	CY	Part S	Avg S	EType	Pol #	Pol Name	MTBE v	MTBE Mk	ETBE vo	ETBE Mk	ETOH	ETOH Mk	TAME v	TAME MktFrac	
14	1	2015	2.5	44.3	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
15	1	2015	2.5	44.3	1	1	VOC	*****	0.5	*****	0.05	*****	0.45	6	0	
16	1	2015	2.5	44.3	1	2	CO	*****	0.5	*****	0.05	*****	0.45	6	0	
17	1	2015	2.5	44.3	1	3	NOX	*****	0.5	*****	0.05	*****	0.45	6	0	
18	1	2015	2.5	44.3	3	1	Hot Soak	*****	0.5	*****	0.05	*****	0.45	6	0	
19	1	2015	2.5	44.3	4	1	Diurnal	*****	0.5	*****	0.05	*****	0.45	6	0	
20	1	2015	2.5	44.3	5	1	Resting	*****	0.5	*****	0.05	*****	0.45	6	0	
21	1	2015	2.5	44.3	6	1	Running	*****	0.5	*****	0.05	*****	0.45	6	0	
22	1	2015	2.5	44.3	7	1	Crankcase	*****	0.5	*****	0.05	*****	0.45	6	0	
23	1	2015	2.5	44.3	8	1	Refueling	*****	0.5	*****	0.05	*****	0.45	6	0	
24	1	2015	2.5	44.3	11	1	Total Evap	*****	0.5	*****	0.05	*****	0.45	6	0	
25	Scena	CY	Part S	Avg S	EType	Pol #	Pol Name	MTBE v	MTBE Mk	ETBE vo	ETBE Mk	ETOH	ETOH Mk	TAME v	TAME MktFrac	
26	1	2015	2.5	44.3	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
27	1	2015	2.5	44.3	1	16	Benzene (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
28	1	2015	2.5	44.3	1	17	MTBE (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
29	1	2015	2.5	44.3	1	18	1,3 Butadiene (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
30	1	2015	2.5	44.3	1	19	Formaldehyde (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
31	1	2015	2.5	44.3	1	20	Acetaldehyde (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
32	1	2015	2.5	44.3	1	21	Acrolein (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
33	1	2015	2.5	44.3	3	16	Benzene Hot Soak (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
34	1	2015	2.5	44.3	4	16	Benzene Diurnal (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
35	1	2015	2.5	44.3	6	16	Benzene Running (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
36	1	2015	2.5	44.3	5	16	Benzene Resting (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
37	1	2015	2.5	44.3	8	16	Benzene Refueling (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
38	1	2015	2.5	44.3	3	17	MTBE Hot Soak (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
39	1	2015	2.5	44.3	4	17	MTBE Diurnal (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
40	1	2015	2.5	44.3	6	17	MTBE Running (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
41	1	2015	2.5	44.3	5	17	MTBE Resting (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
42	1	2015	2.5	44.3	8	17	MTBE Refueling (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
43	2	2015	2.5	24.6	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
44	2	2015	2.5	24.6	1	11	Lead	*****	0.5	*****	0.05	*****	0.45	6	0	
45	2	2015	2.5	24.6	1	10	GASPM	*****	0.5	*****	0.05	*****	0.45	6	0	
46	2	2015	2.5	24.6	1	9	ECARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
47	2	2015	2.5	24.6	1	8	OCARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
48	2	2015	2.5	24.6	1	7	SO4	*****	0.5	*****	0.05	*****	0.45	6	0	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Scenario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDGV	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
49	2	2015	2.5	24.6	9	14	Brake	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0	0	0	0.0053	0
50	2	2015	2.5	24.6	10	15	Tire	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0	0	0	0.009	0
51	2	2015	2.5	24.6	1	12	SO2	0.0068	0.0088	0.0088	0.0115	0.0115	0.0159	0.0172	0.0174	0	0	0	0.0231	0
52	2	2015	2.5	24.6	1	13	NH3	0.1017	0.1017	0.1017	0.1017	0.1017	0.0451	0.0451	0.0451	0	0	0	0.0451	0
53	2	2015	2.5	24.6	1	17	PM Idle	0	0	0	0	0	0	0	0	0	0	0	0	0
54	2	2015	2.5	24.6	VMT	0	VMT	0.2376	0.1953	0.1302	0.0666	0.0443	0.0241	0.0086	0.003	0	0	0	0	0
55	2	2015	2.5	24.6	1	1	VOC	0.451	0.497	0.529	0.961	1.002	0.643	0.847	1.335	0	0	0	1.619	0
56	2	2015	2.5	24.6	1	2	CO	5.177	5.219	5.822	8.183	8.36	6.729	7.927	7.922	0	0	0	10.787	0
57	2	2015	2.5	24.6	1	3	NOX	0.374	0.369	0.474	0.773	0.996	1.022	1.041	1.25	0	0	0	1.754	0
58	2	2015	2.5	24.6	3	1	Hot Soak	0.078	0.09	0.09	0.177	0.177	0.123	0.097	0.314	0	0	0	0.352	0
59	2	2015	2.5	24.6	4	1	Diurnal	0.009	0.01	0.01	0.02	0.02	0.017	0.014	0.041	0	0	0	0.046	0
60	2	2015	2.5	24.6	5	1	Resting	0.043	0.055	0.055	0.113	0.113	0.083	0.064	0.217	0	0	0	0.244	0
61	2	2015	2.5	24.6	6	1	Running	0.099	0.085	0.085	0.142	0.142	0.127	0.112	0.172	0	0	0	0.186	0
62	2	2015	2.5	24.6	7	1	Crankcase	0.008	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0.01	0
63	2	2015	2.5	24.6	8	1	Refueling	0.016	0.031	0.031	0.074	0.074	0.1	0.377	0.38	0	0	0	0.502	0
64	2	2015	2.5	24.6	11	1	Total Evap	0.252	0.281	0.281	0.537	0.537	0.46	0.675	1.135	0	0	0	1.34	0
65	2	2015	2.5	24.6	VMT	0	VMT	0.2376	0.1953	0.1302	0.0666	0.0443	0.0241	0.0086	0.003	0	0	0	0	0
66	2	2015	2.5	24.6	1	16	Benzene (mg/mi)	14.3	15.58	17.89	30.27	33.22	9.3	8.74	9.1	0	0	0	12.63	0
67	2	2015	2.5	24.6	1	17	MTBE (mg/mi)	3.38	3.61	4.1	7.62	8.35	1.58	1.49	1.91	0	0	0	2.68	0
68	2	2015	2.5	24.6	1	18	1,3 Butadiene (mg/mi)	1.47	1.59	1.82	3.2	3.51	0.46	0.43	0.85	0	0	0	1.2	0
69	2	2015	2.5	24.6	1	19	Formaldehyde (mg/mi)	3	3.28	3.77	6.32	6.94	5.45	5.12	6.79	0	0	0	9.51	0
70	2	2015	2.5	24.6	1	20	Acetaldehyde (mg/mi)	1.77	1.87	2.15	3.67	4.03	2.07	1.94	2.27	0	0	0	3.16	0
71	2	2015	2.5	24.6	1	21	Acrolein (mg/mi)	0.13	0.15	0.17	0.29	0.31	0.1	0.1	0.4	0	0	0	0.58	0
72	2	2015	2.5	24.6	3	16	Benzene Hot Soak (mg/mi)	0.93	1.08	1.08	2.13	2.13	1.47	1.16	3.77	0	0	0	4.22	0
73	2	2015	2.5	24.6	4	16	Benzene Diurnal (mg/mi)	0.1	0.11	0.11	0.22	0.22	0.19	0.16	0.46	0	0	0	0.51	0
74	2	2015	2.5	24.6	6	16	Benzene Running (mg/mi)	1.19	1.02	1.02	1.71	1.71	1.52	1.35	2.06	0	0	0	2.23	0
75	2	2015	2.5	24.6	5	16	Benzene Resting (mg/mi)	0.48	0.61	0.61	1.27	1.27	0.93	0.72	2.43	0	0	0	2.73	0
76	2	2015	2.5	24.6	8	16	Benzene Refueling (mg/mi)	0.18	0.35	0.35	0.84	0.84	1.14	4.29	4.32	0	0	0	5.71	0
77	2	2015	2.5	24.6	3	17	MTBE Hot Soak (mg/mi)	7.31	8.49	8.49	16.64	16.64	11.51	9.11	29.5	0	0	0	33.03	0
78	2	2015	2.5	24.6	4	17	MTBE Diurnal (mg/mi)	0.69	0.8	0.8	1.55	1.55	1.32	1.09	3.26	0	0	0	3.61	0
79	2	2015	2.5	24.6	6	17	MTBE Running (mg/mi)	4.97	4.27	4.27	7.14	7.14	6.38	5.64	8.62	0	0	0	9.32	0
80	2	2015	2.5	24.6	5	17	MTBE Resting (mg/mi)	3.35	4.31	4.31	8.92	8.92	6.53	5.07	17.12	0	0	0	19.22	0
81	2	2015	2.5	24.6	8	17	MTBE Refueling (mg/mi)	1.55	3.08	3.08	7.37	7.37	9.98	37.54	37.81	0	0	0	49.99	0
82	3	2015	10	44.3	VMT	0	VMT	0.2376	0.1953	0.1302	0.0666	0.0443	0.0241	0.0086	0.003	0	0	0	0	0
83	3	2015	10	44.3	1	11	Lead	0	0	0	0	0	0	0	0	0	0	0	0	0
84	3	2015	10	44.3	1	10	GASPM	0.004	0.0038	0.0038	0.0039	0.0039	0.0199	0.0199	0.0215	0.0518	0.0518	0.0518	0.0243	0
85	3	2015	10	44.3	1	9	ECARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
86	3	2015	10	44.3	1	8	OCARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
87	3	2015	10	44.3	1	7	SO4	0.0002	0.0004	0.0004	0.0004	0.0004	0.0019	0.0019	0.0018	0	0	0	0.0017	0
88	3	2015	10	44.3	9	14	Brake	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0	0	0	0.0125	0
89	3	2015	10	44.3	10	15	Tire	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0	0	0	0.036	0
90	3	2015	10	44.3	1	12	SO2	0.0068	0.0088	0.0088	0.0115	0.0115	0.0158	0.0171	0.0173	0	0	0	0.023	0
91	3	2015	10	44.3	1	13	NH3	0.1017	0.1017	0.1017	0.1017	0.1017	0.0451	0.0451	0.0451	0	0	0	0.0451	0
92	3	2015	10	44.3	1	17	PM Idle	0	0	0	0	0	0	0	0	0	0	0	0	0
93	4	2015	10	24.6	VMT	0	VMT	0.2376	0.1953	0.1302	0.0666	0.0443	0.0241	0.0086	0.003	0	0	0	0	0
94	4	2015	10	24.6	1	11	Lead	0	0	0	0	0	0	0	0	0	0	0	0	0
95	4	2015	10	24.6	1	10	GASPM	0.0039	0.0037	0.0037	0.0038	0.0038	0.0203	0.0202	0.0218	0.0518	0.0518	0.0518	0.0246	0

	A	B	C	D	E	F	G	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
1	Scenario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDDV	LDDT12	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B	MC	GAS BUS	URB BUS	COM BUS
49	2	2015	2.5	24.6	9	14	Brake	0.0053	0	0.0053	0.0053	0.0053	0	0	0	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053
50	2	2015	2.5	24.6	10	15	Tire	0.002	0	0.002	0.003	0.003	0	0	0	0.009	0.009	0.001	0.003	0.003	0.003
51	2	2015	2.5	24.6	1	12	SO2	0.0029	0	0.0073	0.0081	0.0093	0	0	0	0.0144	0.0151	0.0033	0.0255	0.0218	0.0153
52	2	2015	2.5	24.6	1	13	NH3	0.0068	0	0.027	0.027	0.027	0	0	0	0.027	0.027	0.0113	0.0451	0.027	0.027
53	2	2015	2.5	24.6	1	17	PM Idle	0	0	0.9452	0.9333	0.9553	0	0	0	0.9391	0.9444	0	0	0.9335	1.0124
54	2	2015	2.5	24.6	VMT	0	VMT	0.0002	0	0.0072	0.0227	0.0283	0	0	0	0.1108	0.1108	0.004	0	0.0045	0.0001
55	2	2015	2.5	24.6	1	1	VOC	0.114	0	0.157	0.168	0.228	0	0	0	0.387	0.453	2.276	2.282	0.306	0.567
56	2	2015	2.5	24.6	1	2	CO	0.782	0	0.34	0.333	0.581	0	0	0	0.962	1.254	13.978	12.431	1.825	1.484
57	2	2015	2.5	24.6	1	3	NOX	0.141	0	1.055	0.972	1.833	0	0	0	3.072	4.01	1.017	3.788	6.266	5.717
58	2	2015	2.5	24.6	3	1	Hot Soak	0	0	0	0	0	0	0	0	0	0	0.145	0.405	0	0
59	2	2015	2.5	24.6	4	1	Diurnal	0	0	0	0	0	0	0	0	0	0	0.002	0.052	0	0
60	2	2015	2.5	24.6	5	1	Resting	0	0	0	0	0	0	0	0	0	0	0.355	0.28	0	0
61	2	2015	2.5	24.6	6	1	Running	0	0	0	0	0	0	0	0	0	0	0	0.457	0	0
62	2	2015	2.5	24.6	7	1	Crankcase	0	0	0	0	0	0	0	0	0	0	0	0.009	0	0
63	2	2015	2.5	24.6	8	1	Refueling	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0.551	NA	NA
64	2	2015	2.5	24.6	11	1	Total Evap	0	0	0	0	0	0	0	0	0	0	0.502	1.755	0	0
65	2	2015	2.5	24.6	VMT	0	VMT	0.0002	0	0.0072	0.0227	0.0283	0	0	0	0.1108	0.1108	0.004	0	0.0045	0.0001
66	2	2015	2.5	24.6	1	16	Benzene (mg/mi)	2.27	0	1.73	1.85	2.51	0	0	0	4.26	4.99	60.68	22.04	3.37	6.24
67	2	2015	2.5	24.6	1	17	MTBE (mg/mi)	0	0	0	0	0	0	0	0	0	0	31.84	5.24	0	0
68	2	2015	2.5	24.6	1	18	1,3 Butadiene (mg/mi)	1.02	0	1.01	1.07	1.46	0	0	0	2.48	2.9	20	2.71	1.96	3.62
69	2	2015	2.5	24.6	1	19	Formaldehyde (mg/mi)	4.39	0	12.89	13.75	18.71	0	0	0	31.73	37.14	54.33	18.85	25.1	46.45
70	2	2015	2.5	24.6	1	20	Acetaldehyde (mg/mi)	1.4	0	4.75	5.07	6.89	0	0	0	11.69	13.68	19.21	5.9	9.24	17.11
71	2	2015	2.5	24.6	1	21	Acrolein (mg/mi)	0.4	0	0.58	0.62	0.84	0	0	0	1.42	1.66	1.15	1.47	1.12	2.08
72	2	2015	2.5	24.6	3	16	Benzene Hot Soak (mg/mi)	0	0	0	0	0	0	0	0	0	0	1.74	4.85	0	0
73	2	2015	2.5	24.6	4	16	Benzene Diurnal (mg/mi)	0	0	0	0	0	0	0	0	0	0	0.02	0.58	0	0
74	2	2015	2.5	24.6	6	16	Benzene Running (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	5.48	0	0
75	2	2015	2.5	24.6	5	16	Benzene Resting (mg/mi)	0	0	0	0	0	0	0	0	0	0	3.97	3.14	0	0
76	2	2015	2.5	24.6	8	16	Benzene Refueling (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	6.26	0	0
77	2	2015	2.5	24.6	3	17	MTBE Hot Soak (mg/mi)	0	0	0	0	0	0	0	0	0	0	13.62	38.02	0	0
78	2	2015	2.5	24.6	4	17	MTBE Diurnal (mg/mi)	0	0	0	0	0	0	0	0	0	0	0.14	4.1	0	0
79	2	2015	2.5	24.6	6	17	MTBE Running (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	22.93	0	0
80	2	2015	2.5	24.6	5	17	MTBE Resting (mg/mi)	0	0	0	0	0	0	0	0	0	0	27.95	22.08	0	0
81	2	2015	2.5	24.6	8	17	MTBE Refueling (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	54.86	0	0
82	3	2015	10	44.3	VMT	0	VMT	0.0002	0	0.0072	0.0227	0.0283	0	0	0	0.1108	0.1108	0.004	0	0.0045	0.0001
83	3	2015	10	44.3	1	11	Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	NA	NA
84	3	2015	10	44.3	1	10	GASPM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0205	0.0356	NA	NA
85	3	2015	10	44.3	1	9	ECARBON	0.0187	0	0.0148	0.0109	0.019	0	0	0	0.037	0.0567	NA	NA	0.0519	0.1637
86	3	2015	10	44.3	1	8	OCARBON	0.0053	0	0.0154	0.0113	0.0198	0	0	0	0.0291	0.0179	NA	NA	0.0408	0.1286
87	3	2015	10	44.3	1	7	SO4	0.0002	0	0.0005	0.0006	0.0007	0	0	0	0.001	0.0011	0.0001	0.0013	0.0015	0.0011
88	3	2015	10	44.3	9	14	Brake	0.0125	0	0.0125	0.0125	0.0125	0	0	0	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
89	3	2015	10	44.3	10	15	Tire	0.008	0	0.008	0.012	0.012	0	0	0	0.036	0.036	0.004	0.012	0.012	0.012
90	3	2015	10	44.3	1	12	SO2	0.0029	0	0.0073	0.0081	0.0093	0	0	0	0.0144	0.0151	0.0033	0.0254	0.0218	0.0153
91	3	2015	10	44.3	1	13	NH3	0.0068	0	0.027	0.027	0.027	0	0	0	0.027	0.027	0.0113	0.0451	0.027	0.027
92	3	2015	10	44.3	1	17	PM Idle	0	0	1.0273	1.0144	1.0384	0	0	0	1.0208	1.0266	0	0	1.0146	1.1004
93	4	2015	10	24.6	VMT	0	VMT	0.0002	0	0.0072	0.0227	0.0283	0	0	0	0.1108	0.1108	0.004	0	0.0045	0.0001
94	4	2015	10	24.6	1	11	Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	NA	NA
95	4	2015	10	24.6	1	10	GASPM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0205	0.0357	NA	NA

	A	B	C	D	E	F	G	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY
1	Scen ario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDDT34	ALL VEH	Month	Altitude	TMin	Tmax	Nom RVP	Gas Sulfur	Dsl Sulfur	I/M?		NGV?	E200	E300	Arom	Olef	Benz
49	2	2015	2.5	24.6	9	14	Brake	0.0053	0.0053	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
50	2	2015	2.5	24.6	10	15	Tire	0.002	0.0036	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
51	2	2015	2.5	24.6	1	12	SO2	0.0056	0.0102	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
52	2	2015	2.5	24.6	1	13	NH3	0.0068	0.0779	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
53	2	2015	2.5	24.6	1	17	PM Idle	0	0.268	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
54	2	2015	2.5	24.6	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
55	2	2015	2.5	24.6	1	1	VOC	0.354	0.524	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
56	2	2015	2.5	24.6	1	2	CO	0.641	4.515	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
57	2	2015	2.5	24.6	1	3	NOX	0.393	1.255	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
58	2	2015	2.5	24.6	3	1	Hot Soak	0	0.073	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
59	2	2015	2.5	24.6	4	1	Diurnal	0	0.008	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
60	2	2015	2.5	24.6	5	1	Resting	0	0.045	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
61	2	2015	2.5	24.6	6	1	Running	0	0.072	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
62	2	2015	2.5	24.6	7	1	Crankcase	0	0.007	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
63	2	2015	2.5	24.6	8	1	Refueling	NA	NA	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
64	2	2015	2.5	24.6	11	1	Total Evap	0	0.233	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
65	2	2015	2.5	24.6	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
66	2	2015	2.5	24.6	1	16	Benzene (mg/mi)	7.1	14.01	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
67	2	2015	2.5	24.6	1	17	MTBE (mg/mi)	0	3.11	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
68	2	2015	2.5	24.6	1	18	1,3 Butadiene (mg/mi)	3.2	2.05	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
69	2	2015	2.5	24.6	1	19	Formaldehyde (mg/mi)	13.71	11.69	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
70	2	2015	2.5	24.6	1	20	Acetaldehyde (mg/mi)	4.37	4.84	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
71	2	2015	2.5	24.6	1	21	Acrolein (mg/mi)	1.24	0.51	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
72	2	2015	2.5	24.6	3	16	Benzene Hot Soak (mg/mi)	0	0.87	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
73	2	2015	2.5	24.6	4	16	Benzene Diurnal (mg/mi)	0	0.09	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
74	2	2015	2.5	24.6	6	16	Benzene Running (mg/mi)	0	0.86	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
75	2	2015	2.5	24.6	5	16	Benzene Resting (mg/mi)	0	0.51	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
76	2	2015	2.5	24.6	8	16	Benzene Refueling (mg/mi)	0	0.33	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
77	2	2015	2.5	24.6	3	17	MTBE Hot Soak (mg/mi)	0	6.84	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
78	2	2015	2.5	24.6	4	17	MTBE Diurnal (mg/mi)	0	0.65	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
79	2	2015	2.5	24.6	6	17	MTBE Running (mg/mi)	0	3.59	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
80	2	2015	2.5	24.6	5	17	MTBE Resting (mg/mi)	0	3.55	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
81	2	2015	2.5	24.6	8	17	MTBE Refueling (mg/mi)	0	2.87	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
82	3	2015	10	44.3	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
83	3	2015	10	44.3	1	11	Lead	NA	0	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
84	3	2015	10	44.3	1	10	GASPM	NA	0.0034	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
85	3	2015	10	44.3	1	9	ECARBON	0.0133	0.0116	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
86	3	2015	10	44.3	1	8	OCARBON	0.0191	0.0064	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
87	3	2015	10	44.3	1	7	SO4	0.0003	0.0006	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
88	3	2015	10	44.3	9	14	Brake	0.0125	0.0125	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
89	3	2015	10	44.3	10	15	Tire	0.008	0.0145	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
90	3	2015	10	44.3	1	12	SO2	0.0056	0.0102	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
91	3	2015	10	44.3	1	13	NH3	0.0068	0.0779	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
92	3	2015	10	44.3	1	17	PM Idle	0	0.2913	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
93	4	2015	10	24.6	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
94	4	2015	10	24.6	1	11	Lead	NA	0	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
95	4	2015	10	24.6	1	10	GASPM	NA	0.0034	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5

	A	B	C	D	E	F	G	AZ	BA	BB	BC	BD	BE	BF	BG	BH
1	Scenario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	MTBE vol%	MTBE MktFrac	ETBE vol%	ETBE MktFrac	ETOH vol%	ETOH MktFrac	TAME vol%	TAME MktFrac	
49	2	2015	2.5	24.6	9	14	Brake	*****	0.5	*****	0.05	*****	0.45	6	0	
50	2	2015	2.5	24.6	10	15	Tire	*****	0.5	*****	0.05	*****	0.45	6	0	
51	2	2015	2.5	24.6	1	12	SO2	*****	0.5	*****	0.05	*****	0.45	6	0	
52	2	2015	2.5	24.6	1	13	NH3	*****	0.5	*****	0.05	*****	0.45	6	0	
53	2	2015	2.5	24.6	1	17	PM Idle	*****	0.5	*****	0.05	*****	0.45	6	0	
54	2	2015	2.5	24.6	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
55	2	2015	2.5	24.6	1	1	VOC	*****	0.5	*****	0.05	*****	0.45	6	0	
56	2	2015	2.5	24.6	1	2	CO	*****	0.5	*****	0.05	*****	0.45	6	0	
57	2	2015	2.5	24.6	1	3	NOX	*****	0.5	*****	0.05	*****	0.45	6	0	
58	2	2015	2.5	24.6	3	1	Hot Soak	*****	0.5	*****	0.05	*****	0.45	6	0	
59	2	2015	2.5	24.6	4	1	Diurnal	*****	0.5	*****	0.05	*****	0.45	6	0	
60	2	2015	2.5	24.6	5	1	Resting	*****	0.5	*****	0.05	*****	0.45	6	0	
61	2	2015	2.5	24.6	6	1	Running	*****	0.5	*****	0.05	*****	0.45	6	0	
62	2	2015	2.5	24.6	7	1	Crankcase	*****	0.5	*****	0.05	*****	0.45	6	0	
63	2	2015	2.5	24.6	8	1	Refueling	*****	0.5	*****	0.05	*****	0.45	6	0	
64	2	2015	2.5	24.6	11	1	Total Evap	*****	0.5	*****	0.05	*****	0.45	6	0	
65	2	2015	2.5	24.6	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
66	2	2015	2.5	24.6	1	16	Benzene (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
67	2	2015	2.5	24.6	1	17	MTBE (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
68	2	2015	2.5	24.6	1	18	1,3 Butadiene (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
69	2	2015	2.5	24.6	1	19	Formaldehyde (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
70	2	2015	2.5	24.6	1	20	Acetaldehyde (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
71	2	2015	2.5	24.6	1	21	Acrolein (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
72	2	2015	2.5	24.6	3	16	Benzene Hot Soak (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
73	2	2015	2.5	24.6	4	16	Benzene Diurnal (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
74	2	2015	2.5	24.6	6	16	Benzene Running (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
75	2	2015	2.5	24.6	5	16	Benzene Resting (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
76	2	2015	2.5	24.6	8	16	Benzene Refueling (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
77	2	2015	2.5	24.6	3	17	MTBE Hot Soak (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
78	2	2015	2.5	24.6	4	17	MTBE Diurnal (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
79	2	2015	2.5	24.6	6	17	MTBE Running (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
80	2	2015	2.5	24.6	5	17	MTBE Resting (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
81	2	2015	2.5	24.6	8	17	MTBE Refueling (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
82	3	2015	10	44.3	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
83	3	2015	10	44.3	1	11	Lead	*****	0.5	*****	0.05	*****	0.45	6	0	
84	3	2015	10	44.3	1	10	GASPM	*****	0.5	*****	0.05	*****	0.45	6	0	
85	3	2015	10	44.3	1	9	ECARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
86	3	2015	10	44.3	1	8	OCARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
87	3	2015	10	44.3	1	7	SO4	*****	0.5	*****	0.05	*****	0.45	6	0	
88	3	2015	10	44.3	9	14	Brake	*****	0.5	*****	0.05	*****	0.45	6	0	
89	3	2015	10	44.3	10	15	Tire	*****	0.5	*****	0.05	*****	0.45	6	0	
90	3	2015	10	44.3	1	12	SO2	*****	0.5	*****	0.05	*****	0.45	6	0	
91	3	2015	10	44.3	1	13	NH3	*****	0.5	*****	0.05	*****	0.45	6	0	
92	3	2015	10	44.3	1	17	PM Idle	*****	0.5	*****	0.05	*****	0.45	6	0	
93	4	2015	10	24.6	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
94	4	2015	10	24.6	1	11	Lead	*****	0.5	*****	0.05	*****	0.45	6	0	
95	4	2015	10	24.6	1	10	GASPM	*****	0.5	*****	0.05	*****	0.45	6	0	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Scenario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDGV	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
96	4	2015	10	24.6	1	9	ECARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
97	4	2015	10	24.6	1	8	OCARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
98	4	2015	10	24.6	1	7	SO4	0.0004	0.0005	0.0005	0.0005	0.0005	0.0015	0.0015	0.0014	0	0	0	0.0014	0
99	4	2015	10	24.6	9	14	Brake	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0	0	0	0.0125	0
100	4	2015	10	24.6	10	15	Tire	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0	0	0	0.036	0
101	4	2015	10	24.6	1	12	SO2	0.0068	0.0088	0.0088	0.0115	0.0115	0.0159	0.0172	0.0174	0	0	0	0.0231	0
102	4	2015	10	24.6	1	13	NH3	0.1017	0.1017	0.1017	0.1017	0.1017	0.0451	0.0451	0.0451	0	0	0	0.0451	0
103	4	2015	10	24.6	1	17	PM Idle	0	0	0	0	0	0	0	0	0	0	0	0	0
104	5	2025	2.5	44.3	VMT	0	VMT	0.2053	0.1943	0.1295	0.0662	0.0442	0.0269	0.0097	0.0032	0	0	0	0	0
105	5	2025	2.5	44.3	1	11	Lead	0	0	0	0	0	0	0	0	0	0	0	0	0
106	5	2025	2.5	44.3	1	10	GASPM	0.0037	0.0035	0.0035	0.0035	0.0035	0.0091	0.0095	0.0096	0.0474	0.0474	0.0474	0.0127	0
107	5	2025	2.5	44.3	1	9	ECARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
108	5	2025	2.5	44.3	1	8	OCARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
109	5	2025	2.5	44.3	1	7	SO4	0.0002	0.0004	0.0004	0.0004	0.0004	0.002	0.002	0.002	0	0	0	0.002	0
110	5	2025	2.5	44.3	9	14	Brake	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0	0	0	0.0053	0
111	5	2025	2.5	44.3	10	15	Tire	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0	0	0	0.009	0
112	5	2025	2.5	44.3	1	12	SO2	0.0068	0.0088	0.0088	0.0115	0.0115	0.0158	0.0171	0.0171	0	0	0	0.0229	0
113	5	2025	2.5	44.3	1	13	NH3	0.1017	0.1017	0.1017	0.1017	0.1017	0.0451	0.0451	0.0451	0	0	0	0.0451	0
114	5	2025	2.5	44.3	1	17	PM Idle	0	0	0	0	0	0	0	0	0	0	0	0	0
115	5	2025	2.5	44.3	VMT	0	VMT	0.2053	0.1943	0.1295	0.0662	0.0442	0.0269	0.0097	0.0032	0	0	0	0	0
116	5	2025	2.5	44.3	1	1	VOC	0.251	0.274	0.308	0.476	0.504	0.232	0.555	0.607	0	0	0	0.745	0
117	5	2025	2.5	44.3	1	2	CO	4.851	4.909	5.502	7.161	7.346	3.99	5.051	4.987	0	0	0	6.774	0
118	5	2025	2.5	44.3	1	3	NOX	0.23	0.259	0.324	0.515	0.667	0.359	0.416	0.414	0	0	0	0.565	0
119	5	2025	2.5	44.3	3	1	Hot Soak	0.044	0.045	0.045	0.073	0.073	0.053	0.053	0.083	0	0	0	0.083	0
120	5	2025	2.5	44.3	4	1	Diurnal	0.004	0.004	0.004	0.007	0.007	0.007	0.007	0.012	0	0	0	0.012	0
121	5	2025	2.5	44.3	5	1	Resting	0.016	0.016	0.016	0.027	0.027	0.024	0.024	0.038	0	0	0	0.038	0
122	5	2025	2.5	44.3	6	1	Running	0.037	0.032	0.032	0.045	0.045	0.042	0.042	0.044	0	0	0	0.044	0
123	5	2025	2.5	44.3	7	1	Crankcase	0.008	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0.01	0
124	5	2025	2.5	44.3	8	1	Refueling	0.011	0.022	0.022	0.038	0.038	0.05	0.377	0.378	0	0	0	0.5	0
125	5	2025	2.5	44.3	11	1	Total Evap	0.119	0.13	0.13	0.2	0.2	0.186	0.513	0.566	0	0	0	0.688	0
126	5	2025	2.5	44.3	VMT	0	VMT	0.2053	0.1943	0.1295	0.0662	0.0442	0.0269	0.0097	0.0032	0	0	0	0	0
127	5	2025	2.5	44.3	1	16	Benzene (mg/mi)	9.54	10.42	12.89	19.58	21.56	2.41	2.21	2.13	0	0	0	2.97	0
128	5	2025	2.5	44.3	1	17	MTBE (mg/mi)	2.16	2.36	2.88	5.1	5.61	0.41	0.38	0.38	0	0	0	0.52	0
129	5	2025	2.5	44.3	1	18	1,3 Butadiene (mg/mi)	0.96	1.05	1.3	2.1	2.31	0.12	0.11	0.12	0	0	0	0.17	0
130	5	2025	2.5	44.3	1	19	Formaldehyde (mg/mi)	2.01	2.2	2.72	4.06	4.47	1.41	1.29	1.3	0	0	0	1.81	0
131	5	2025	2.5	44.3	1	20	Acetaldehyde (mg/mi)	1.17	1.24	1.54	2.37	2.61	0.54	0.49	0.48	0	0	0	0.67	0
132	5	2025	2.5	44.3	1	21	Acrolein (mg/mi)	0.09	0.1	0.12	0.18	0.2	0.03	0.02	0.03	0	0	0	0.05	0
133	5	2025	2.5	44.3	3	16	Benzene Hot Soak (mg/mi)	0.52	0.54	0.54	0.88	0.88	0.63	0.63	0.99	0	0	0	0.99	0
134	5	2025	2.5	44.3	4	16	Benzene Diurnal (mg/mi)	0.04	0.05	0.05	0.07	0.07	0.08	0.08	0.13	0	0	0	0.13	0
135	5	2025	2.5	44.3	6	16	Benzene Running (mg/mi)	0.44	0.39	0.39	0.54	0.54	0.51	0.51	0.53	0	0	0	0.53	0
136	5	2025	2.5	44.3	5	16	Benzene Resting (mg/mi)	0.18	0.18	0.18	0.3	0.3	0.27	0.27	0.43	0	0	0	0.43	0
137	5	2025	2.5	44.3	8	16	Benzene Refueling (mg/mi)	0.12	0.25	0.25	0.43	0.43	0.57	4.28	4.3	0	0	0	5.69	0
138	5	2025	2.5	44.3	3	17	MTBE Hot Soak (mg/mi)	4.1	4.24	4.24	6.86	6.86	4.95	4.95	7.77	0	0	0	7.77	0
139	5	2025	2.5	44.3	4	17	MTBE Diurnal (mg/mi)	0.31	0.33	0.33	0.52	0.52	0.55	0.55	0.91	0	0	0	0.91	0
140	5	2025	2.5	44.3	6	17	MTBE Running (mg/mi)	1.86	1.63	1.63	2.27	2.27	2.13	2.13	2.23	0	0	0	2.23	0
141	5	2025	2.5	44.3	5	17	MTBE Resting (mg/mi)	1.24	1.29	1.29	2.12	2.12	1.9	1.9	2.99	0	0	0	2.99	0
142	5	2025	2.5	44.3	8	17	MTBE Refueling (mg/mi)	1.07	2.21	2.21	3.8	3.8	4.99	37.5	37.66	0	0	0	49.81	0

	A	B	C	D	E	F	G	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
1	Scenario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDDV	LDDT12	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B	MC	GAS BUS	URB BUS	COM BUS
96	4	2015	10	24.6	1	9	ECARBON	0.0187	0	0.0148	0.0109	0.019	0	0	0	0.037	0.0567	NA	NA	0.0519	0.1637
97	4	2015	10	24.6	1	8	OCARBON	0.0053	0	0.0154	0.0113	0.0198	0	0	0	0.0291	0.0179	NA	NA	0.0408	0.1286
98	4	2015	10	24.6	1	7	SO4	0.0002	0	0.0005	0.0006	0.0007	0	0	0	0.001	0.0011	0.0001	0.001	0.0015	0.0011
99	4	2015	10	24.6	9	14	Brake	0.0125	0	0.0125	0.0125	0.0125	0	0	0	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
100	4	2015	10	24.6	10	15	Tire	0.008	0	0.008	0.012	0.012	0	0	0	0.036	0.036	0.004	0.012	0.012	0.012
101	4	2015	10	24.6	1	12	SO2	0.0029	0	0.0073	0.0081	0.0093	0	0	0	0.0144	0.0151	0.0033	0.0255	0.0218	0.0153
102	4	2015	10	24.6	1	13	NH3	0.0068	0	0.027	0.027	0.027	0	0	0	0.027	0.027	0.0113	0.0451	0.027	0.027
103	4	2015	10	24.6	1	17	PM Idle	0	0	1.0273	1.0144	1.0384	0	0	0	1.0208	1.0266	0	0	1.0146	1.1004
104	5	2025	2.5	44.3	VMT	0	VMT	0.0002	0	0.0079	0.0251	0.0316	0	0	0	0.1228	0.1228	0.0037	0	0.005	0
105	5	2025	2.5	44.3	1	11	Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	NA	NA
106	5	2025	2.5	44.3	1	10	GASPM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0142	0.0472	NA	NA
107	5	2025	2.5	44.3	1	9	ECARBON	0.0072	0	0.0039	0.0033	0.0053	0	0	0	0.0108	0.0161	NA	NA	0.0132	0
108	5	2025	2.5	44.3	1	8	OCARBON	0.002	0	0.0041	0.0035	0.0055	0	0	0	0.0085	0.0051	NA	NA	0.0104	0
109	5	2025	2.5	44.3	1	7	SO4	0.0002	0	0.0005	0.0006	0.0007	0	0	0	0.001	0.0011	0.0001	0	0.0015	0
110	5	2025	2.5	44.3	9	14	Brake	0.0053	0	0.0053	0.0053	0.0053	0	0	0	0.0053	0.0053	0.0053	0	0.0053	0
111	5	2025	2.5	44.3	10	15	Tire	0.002	0	0.002	0.003	0.003	0	0	0	0.009	0.009	0.001	0	0.003	0
112	5	2025	2.5	44.3	1	12	SO2	0.0029	0	0.0073	0.0081	0.0093	0	0	0	0.0144	0.0151	0.0033	0	0.0217	0
113	5	2025	2.5	44.3	1	13	NH3	0.0068	0	0.027	0.027	0.027	0	0	0	0.027	0.027	0.0113	0	0.027	0
114	5	2025	2.5	44.3	1	17	PM Idle	0	0	0.9237	0.9237	0.9237	0	0	0	0.9237	0.9237	0	0	0.9237	0
115	5	2025	2.5	44.3	VMT	0	VMT	0.0002	0	0.0079	0.0251	0.0316	0	0	0	0.1228	0.1228	0.0037	0	0.005	0
116	5	2025	2.5	44.3	1	1	VOC	0.04	0	0.078	0.088	0.109	0	0	0	0.199	0.224	1.793	0	0.174	0
117	5	2025	2.5	44.3	1	2	CO	0.477	0	0.085	0.088	0.15	0	0	0	0.224	0.277	8.362	0	0.269	0
118	5	2025	2.5	44.3	1	3	NOX	0.028	0	0.307	0.297	0.593	0	0	0	0.88	1.128	1.168	0	1.135	0
119	5	2025	2.5	44.3	3	1	Hot Soak	0	0	0	0	0	0	0	0	0	0	0.145	0	0	0
120	5	2025	2.5	44.3	4	1	Diurnal	0	0	0	0	0	0	0	0	0	0	0.002	0	0	0
121	5	2025	2.5	44.3	5	1	Resting	0	0	0	0	0	0	0	0	0	0	0.355	0	0	0
122	5	2025	2.5	44.3	6	1	Running	0	0	0	0	0	0	0	0	0	0	0	0	0	0
123	5	2025	2.5	44.3	7	1	Crankcase	0	0	0	0	0	0	0	0	0	0	0	0	0	0
124	5	2025	2.5	44.3	8	1	Refueling	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	NA	NA
125	5	2025	2.5	44.3	11	1	Total Evap	0	0	0	0	0	0	0	0	0	0	0.502	0	0	0
126	5	2025	2.5	44.3	VMT	0	VMT	0.0002	0	0.0079	0.0251	0.0316	0	0	0	0.1228	0.1228	0.0037	0	0.005	0
127	5	2025	2.5	44.3	1	16	Benzene (mg/mi)	0.8	0	0.86	0.97	1.19	0	0	0	2.2	2.47	43.78	0	1.92	0
128	5	2025	2.5	44.3	1	17	MTBE (mg/mi)	0	0	0	0	0	0	0	0	0	0	22.97	0	0	0
129	5	2025	2.5	44.3	1	18	1,3 Butadiene (mg/mi)	0.36	0	0.5	0.57	0.69	0	0	0	1.28	1.43	14.43	0	1.11	0
130	5	2025	2.5	44.3	1	19	Formaldehyde (mg/mi)	1.55	0	6.43	7.25	8.9	0	0	0	16.35	18.36	39.2	0	14.28	0
131	5	2025	2.5	44.3	1	20	Acetaldehyde (mg/mi)	0.49	0	2.37	2.67	3.28	0	0	0	6.02	6.76	13.86	0	5.26	0
132	5	2025	2.5	44.3	1	21	Acrolein (mg/mi)	0.14	0	0.29	0.32	0.4	0	0	0	0.73	0.82	0.83	0	0.64	0
133	5	2025	2.5	44.3	3	16	Benzene Hot Soak (mg/mi)	0	0	0	0	0	0	0	0	0	0	1.74	0	0	0
134	5	2025	2.5	44.3	4	16	Benzene Diurnal (mg/mi)	0	0	0	0	0	0	0	0	0	0	0.02	0	0	0
135	5	2025	2.5	44.3	6	16	Benzene Running (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
136	5	2025	2.5	44.3	5	16	Benzene Resting (mg/mi)	0	0	0	0	0	0	0	0	0	0	3.97	0	0	0
137	5	2025	2.5	44.3	8	16	Benzene Refueling (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
138	5	2025	2.5	44.3	3	17	MTBE Hot Soak (mg/mi)	0	0	0	0	0	0	0	0	0	0	13.62	0	0	0
139	5	2025	2.5	44.3	4	17	MTBE Diurnal (mg/mi)	0	0	0	0	0	0	0	0	0	0	0.14	0	0	0
140	5	2025	2.5	44.3	6	17	MTBE Running (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
141	5	2025	2.5	44.3	5	17	MTBE Resting (mg/mi)	0	0	0	0	0	0	0	0	0	0	27.95	0	0	0
142	5	2025	2.5	44.3	8	17	MTBE Refueling (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	A	B	C	D	E	F	G	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY
1	Scenario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDDT34	ALL VEH	Month	Altitude	TMin	Tmax	Nom RVP	Gas Sulfur	Dsl Sulfur	I/M?		NGV?	E200	E300	Arom	Olef	Benz
96	4	2015	10	24.6	1	9	ECARBON	0.0133	0.0116	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
97	4	2015	10	24.6	1	8	OCARBON	0.0191	0.0064	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
98	4	2015	10	24.6	1	7	SO4	0.0003	0.0006	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
99	4	2015	10	24.6	9	14	Brake	0.0125	0.0125	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
100	4	2015	10	24.6	10	15	Tire	0.008	0.0145	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
101	4	2015	10	24.6	1	12	SO2	0.0056	0.0102	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
102	4	2015	10	24.6	1	13	NH3	0.0068	0.0779	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
103	4	2015	10	24.6	1	17	PM Idle	0	0.2913	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
104	5	2025	2.5	44.3	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
105	5	2025	2.5	44.3	1	11	Lead	NA	0	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
106	5	2025	2.5	44.3	1	10	GASPM	NA	0.0027	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
107	5	2025	2.5	44.3	1	9	ECARBON	0.0046	0.0037	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
108	5	2025	2.5	44.3	1	8	OCARBON	0.0066	0.002	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
109	5	2025	2.5	44.3	1	7	SO4	0.0003	0.0006	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
110	5	2025	2.5	44.3	9	14	Brake	0.0053	0.0053	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
111	5	2025	2.5	44.3	10	15	Tire	0.002	0.0038	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
112	5	2025	2.5	44.3	1	12	SO2	0.0056	0.0105	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
113	5	2025	2.5	44.3	1	13	NH3	0.0068	0.0754	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
114	5	2025	2.5	44.3	1	17	PM Idle	0	0.2911	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
115	5	2025	2.5	44.3	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
116	5	2025	2.5	44.3	1	1	VOC	0.13	0.278	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
117	5	2025	2.5	44.3	1	2	CO	0.317	3.736	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
118	5	2025	2.5	44.3	1	3	NOX	0.168	0.504	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
119	5	2025	2.5	44.3	3	1	Hot Soak	0	0.034	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
120	5	2025	2.5	44.3	4	1	Diurnal	0	0.003	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
121	5	2025	2.5	44.3	5	1	Resting	0	0.014	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
122	5	2025	2.5	44.3	6	1	Running	0	0.025	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
123	5	2025	2.5	44.3	7	1	Crankcase	0	0.006	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
124	5	2025	2.5	44.3	8	1	Refueling	NA	NA	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
125	5	2025	2.5	44.3	11	1	Total Evap	0	0.103	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
126	5	2025	2.5	44.3	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
127	5	2025	2.5	44.3	1	16	Benzene (mg/mi)	2.6	8.81	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
128	5	2025	2.5	44.3	1	17	MTBE (mg/mi)	0	1.96	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
129	5	2025	2.5	44.3	1	18	1,3 Butadiene (mg/mi)	1.17	1.25	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
130	5	2025	2.5	44.3	1	19	Formaldehyde (mg/mi)	5.02	6.71	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
131	5	2025	2.5	44.3	1	20	Acetaldehyde (mg/mi)	1.6	2.81	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
132	5	2025	2.5	44.3	1	21	Acrolein (mg/mi)	0.46	0.29	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
133	5	2025	2.5	44.3	3	16	Benzene Hot Soak (mg/mi)	0	0.41	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
134	5	2025	2.5	44.3	4	16	Benzene Diurnal (mg/mi)	0	0.04	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
135	5	2025	2.5	44.3	6	16	Benzene Running (mg/mi)	0	0.3	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
136	5	2025	2.5	44.3	5	16	Benzene Resting (mg/mi)	0	0.15	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
137	5	2025	2.5	44.3	8	16	Benzene Refueling (mg/mi)	0	0.23	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
138	5	2025	2.5	44.3	3	17	MTBE Hot Soak (mg/mi)	0	3.23	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
139	5	2025	2.5	44.3	4	17	MTBE Diurnal (mg/mi)	0	0.25	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
140	5	2025	2.5	44.3	6	17	MTBE Running (mg/mi)	0	1.25	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
141	5	2025	2.5	44.3	5	17	MTBE Resting (mg/mi)	0	1.09	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
142	5	2025	2.5	44.3	8	17	MTBE Refueling (mg/mi)	0	1.98	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5

	A	B	C	D	E	F	G	AZ	BA	BB	BC	BD	BE	BF	BG	BH
1	Scen ario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	MTBE vol%	MTBE MktFrac	ETBE vol%	ETBE MktFrac	ETOH vol%	ETOH MktFrac	TAME vol%	TAME MktFrac	
96	4	2015	10	24.6	1	9	ECARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
97	4	2015	10	24.6	1	8	OCARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
98	4	2015	10	24.6	1	7	SO4	*****	0.5	*****	0.05	*****	0.45	6	0	
99	4	2015	10	24.6	9	14	Brake	*****	0.5	*****	0.05	*****	0.45	6	0	
100	4	2015	10	24.6	10	15	Tire	*****	0.5	*****	0.05	*****	0.45	6	0	
101	4	2015	10	24.6	1	12	SO2	*****	0.5	*****	0.05	*****	0.45	6	0	
102	4	2015	10	24.6	1	13	NH3	*****	0.5	*****	0.05	*****	0.45	6	0	
103	4	2015	10	24.6	1	17	PM Idle	*****	0.5	*****	0.05	*****	0.45	6	0	
104	5	2025	2.5	44.3	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
105	5	2025	2.5	44.3	1	11	Lead	*****	0.5	*****	0.05	*****	0.45	6	0	
106	5	2025	2.5	44.3	1	10	GASPM	*****	0.5	*****	0.05	*****	0.45	6	0	
107	5	2025	2.5	44.3	1	9	ECARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
108	5	2025	2.5	44.3	1	8	OCARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
109	5	2025	2.5	44.3	1	7	SO4	*****	0.5	*****	0.05	*****	0.45	6	0	
110	5	2025	2.5	44.3	9	14	Brake	*****	0.5	*****	0.05	*****	0.45	6	0	
111	5	2025	2.5	44.3	10	15	Tire	*****	0.5	*****	0.05	*****	0.45	6	0	
112	5	2025	2.5	44.3	1	12	SO2	*****	0.5	*****	0.05	*****	0.45	6	0	
113	5	2025	2.5	44.3	1	13	NH3	*****	0.5	*****	0.05	*****	0.45	6	0	
114	5	2025	2.5	44.3	1	17	PM Idle	*****	0.5	*****	0.05	*****	0.45	6	0	
115	5	2025	2.5	44.3	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
116	5	2025	2.5	44.3	1	1	VOC	*****	0.5	*****	0.05	*****	0.45	6	0	
117	5	2025	2.5	44.3	1	2	CO	*****	0.5	*****	0.05	*****	0.45	6	0	
118	5	2025	2.5	44.3	1	3	NOX	*****	0.5	*****	0.05	*****	0.45	6	0	
119	5	2025	2.5	44.3	3	1	Hot Soak	*****	0.5	*****	0.05	*****	0.45	6	0	
120	5	2025	2.5	44.3	4	1	Diurnal	*****	0.5	*****	0.05	*****	0.45	6	0	
121	5	2025	2.5	44.3	5	1	Resting	*****	0.5	*****	0.05	*****	0.45	6	0	
122	5	2025	2.5	44.3	6	1	Running	*****	0.5	*****	0.05	*****	0.45	6	0	
123	5	2025	2.5	44.3	7	1	Crankcase	*****	0.5	*****	0.05	*****	0.45	6	0	
124	5	2025	2.5	44.3	8	1	Refueling	*****	0.5	*****	0.05	*****	0.45	6	0	
125	5	2025	2.5	44.3	11	1	Total Evap	*****	0.5	*****	0.05	*****	0.45	6	0	
126	5	2025	2.5	44.3	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
127	5	2025	2.5	44.3	1	16	Benzene (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
128	5	2025	2.5	44.3	1	17	MTBE (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
129	5	2025	2.5	44.3	1	18	1,3 Butadiene (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
130	5	2025	2.5	44.3	1	19	Formaldehyde (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
131	5	2025	2.5	44.3	1	20	Acetaldehyde (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
132	5	2025	2.5	44.3	1	21	Acrolein (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
133	5	2025	2.5	44.3	3	16	Benzene Hot Soak (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
134	5	2025	2.5	44.3	4	16	Benzene Diurnal (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
135	5	2025	2.5	44.3	6	16	Benzene Running (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
136	5	2025	2.5	44.3	5	16	Benzene Resting (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
137	5	2025	2.5	44.3	8	16	Benzene Refueling (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
138	5	2025	2.5	44.3	3	17	MTBE Hot Soak (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
139	5	2025	2.5	44.3	4	17	MTBE Diurnal (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
140	5	2025	2.5	44.3	6	17	MTBE Running (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
141	5	2025	2.5	44.3	5	17	MTBE Resting (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
142	5	2025	2.5	44.3	8	17	MTBE Refueling (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Scenario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDGV	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
143	6	2025	2.5	24.6	VMT	0	VMT	0.2053	0.1943	0.1295	0.0662	0.0442	0.0269	0.0097	0.0032	0	0	0	0	0
144	6	2025	2.5	24.6	1	11	Lead	0	0	0	0	0	0	0	0	0	0	0	0	0
145	6	2025	2.5	24.6	1	10	GASPM	0.0035	0.0034	0.0034	0.0034	0.0034	0.0095	0.0099	0.01	0.0474	0.0474	0.0474	0.0131	0
146	6	2025	2.5	24.6	1	9	ECARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
147	6	2025	2.5	24.6	1	8	OCARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
148	6	2025	2.5	24.6	1	7	SO4	0.0004	0.0005	0.0005	0.0005	0.0005	0.0016	0.0016	0.0016	0	0	0	0.0016	0
149	6	2025	2.5	24.6	9	14	Brake	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0	0	0	0.0053	0
150	6	2025	2.5	24.6	10	15	Tire	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0	0	0	0.009	0
151	6	2025	2.5	24.6	1	12	SO2	0.0068	0.0088	0.0088	0.0115	0.0115	0.0159	0.0172	0.0173	0	0	0	0.023	0
152	6	2025	2.5	24.6	1	13	NH3	0.1017	0.1017	0.1017	0.1017	0.1017	0.0451	0.0451	0.0451	0	0	0	0.0451	0
153	6	2025	2.5	24.6	1	17	PM Idle	0	0	0	0	0	0	0	0	0	0	0	0	0
154	6	2025	2.5	24.6	VMT	0	VMT	0.2053	0.1943	0.1295	0.0662	0.0442	0.0269	0.0097	0.0032	0	0	0	0	0
155	6	2025	2.5	24.6	1	1	VOC	0.31	0.328	0.363	0.559	0.592	0.344	0.661	0.714	0	0	0	0.874	0
156	6	2025	2.5	24.6	1	2	CO	4.439	4.471	5.028	6.602	6.782	6.496	8.224	8.118	0	0	0	11.029	0
157	6	2025	2.5	24.6	1	3	NOX	0.241	0.26	0.324	0.514	0.669	0.308	0.357	0.355	0	0	0	0.485	0
158	6	2025	2.5	24.6	3	1	Hot Soak	0.044	0.045	0.045	0.073	0.073	0.053	0.053	0.083	0	0	0	0.083	0
159	6	2025	2.5	24.6	4	1	Diurnal	0.004	0.004	0.004	0.007	0.007	0.007	0.007	0.012	0	0	0	0.012	0
160	6	2025	2.5	24.6	5	1	Resting	0.016	0.016	0.016	0.027	0.027	0.024	0.024	0.038	0	0	0	0.038	0
161	6	2025	2.5	24.6	6	1	Running	0.083	0.07	0.07	0.095	0.095	0.093	0.093	0.097	0	0	0	0.097	0
162	6	2025	2.5	24.6	7	1	Crankcase	0.008	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0.01	0
163	6	2025	2.5	24.6	8	1	Refueling	0.011	0.022	0.022	0.038	0.038	0.05	0.377	0.378	0	0	0	0.5	0
164	6	2025	2.5	24.6	11	1	Total Evap	0.165	0.168	0.168	0.25	0.25	0.237	0.563	0.618	0	0	0	0.74	0
165	6	2025	2.5	24.6	VMT	0	VMT	0.2053	0.1943	0.1295	0.0662	0.0442	0.0269	0.0097	0.0032	0	0	0	0	0
166	6	2025	2.5	24.6	1	16	Benzene (mg/mi)	10.5	11.56	14.1	21.98	24.29	5.62	5.16	4.98	0	0	0	6.94	0
167	6	2025	2.5	24.6	1	17	MTBE (mg/mi)	2.38	2.63	3.16	5.75	6.35	0.96	0.88	0.88	0	0	0	1.22	0
168	6	2025	2.5	24.6	1	18	1,3 Butadiene (mg/mi)	1.06	1.17	1.42	2.36	2.61	0.28	0.26	0.28	0	0	0	0.39	0
169	6	2025	2.5	24.6	1	19	Formaldehyde (mg/mi)	2.21	2.44	2.98	4.56	5.04	3.29	3.02	3.04	0	0	0	4.23	0
170	6	2025	2.5	24.6	1	20	Acetaldehyde (mg/mi)	1.29	1.38	1.68	2.66	2.94	1.25	1.15	1.13	0	0	0	1.57	0
171	6	2025	2.5	24.6	1	21	Acrolein (mg/mi)	0.1	0.11	0.13	0.21	0.23	0.06	0.06	0.08	0	0	0	0.11	0
172	6	2025	2.5	24.6	3	16	Benzene Hot Soak (mg/mi)	0.52	0.54	0.54	0.88	0.88	0.63	0.63	0.99	0	0	0	0.99	0
173	6	2025	2.5	24.6	4	16	Benzene Diurnal (mg/mi)	0.04	0.05	0.05	0.07	0.07	0.08	0.08	0.13	0	0	0	0.13	0
174	6	2025	2.5	24.6	6	16	Benzene Running (mg/mi)	0.99	0.84	0.84	1.14	1.14	1.11	1.11	1.16	0	0	0	1.16	0
175	6	2025	2.5	24.6	5	16	Benzene Resting (mg/mi)	0.18	0.18	0.18	0.3	0.3	0.27	0.27	0.43	0	0	0	0.43	0
176	6	2025	2.5	24.6	8	16	Benzene Refueling (mg/mi)	0.12	0.25	0.25	0.43	0.43	0.57	4.28	4.3	0	0	0	5.69	0
177	6	2025	2.5	24.6	3	17	MTBE Hot Soak (mg/mi)	4.1	4.24	4.24	6.86	6.86	4.95	4.95	7.77	0	0	0	7.77	0
178	6	2025	2.5	24.6	4	17	MTBE Diurnal (mg/mi)	0.31	0.33	0.33	0.52	0.52	0.55	0.55	0.91	0	0	0	0.91	0
179	6	2025	2.5	24.6	6	17	MTBE Running (mg/mi)	4.14	3.54	3.54	4.76	4.76	4.65	4.65	4.85	0	0	0	4.85	0
180	6	2025	2.5	24.6	5	17	MTBE Resting (mg/mi)	1.24	1.29	1.29	2.12	2.12	1.9	1.9	2.99	0	0	0	2.99	0
181	6	2025	2.5	24.6	8	17	MTBE Refueling (mg/mi)	1.07	2.21	2.21	3.8	3.8	4.99	37.5	37.66	0	0	0	49.81	0
182	7	2025	10	44.3	VMT	0	VMT	0.2053	0.1943	0.1295	0.0662	0.0442	0.0269	0.0097	0.0032	0	0	0	0	0
183	7	2025	10	44.3	1	11	Lead	0	0	0	0	0	0	0	0	0	0	0	0	0
184	7	2025	10	44.3	1	10	GASPM	0.004	0.0038	0.0038	0.0038	0.0038	0.01	0.0105	0.0106	0.0521	0.0521	0.0521	0.014	0
185	7	2025	10	44.3	1	9	ECARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
186	7	2025	10	44.3	1	8	OCARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
187	7	2025	10	44.3	1	7	SO4	0.0002	0.0004	0.0004	0.0004	0.0004	0.002	0.002	0.002	0	0	0	0.002	0
188	7	2025	10	44.3	9	14	Brake	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0	0	0	0.0125	0
189	7	2025	10	44.3	10	15	Tire	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0	0	0	0.036	0

	A	B	C	D	E	F	G	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
1	Scen ario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDDV	LDDT12	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B	MC	GAS BUS	URB BUS	COM BUS
143	6	2025	2.5	24.6	VMT	0	VMT	0.0002	0	0.0079	0.0251	0.0316	0	0	0	0.1228	0.1228	0.0037	0	0.005	0
144	6	2025	2.5	24.6	1	11	Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	NA	NA
145	6	2025	2.5	24.6	1	10	GASPM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0142	0.0472	NA	NA
146	6	2025	2.5	24.6	1	9	ECARBON	0.0072	0	0.0039	0.0033	0.0053	0	0	0	0.0108	0.0161	NA	NA	0.0132	0
147	6	2025	2.5	24.6	1	8	OCARBON	0.002	0	0.0041	0.0035	0.0055	0	0	0	0.0085	0.0051	NA	NA	0.0104	0
148	6	2025	2.5	24.6	1	7	SO4	0.0002	0	0.0005	0.0006	0.0007	0	0	0	0.001	0.0011	0.0001	0	0.0015	0
149	6	2025	2.5	24.6	9	14	Brake	0.0053	0	0.0053	0.0053	0.0053	0	0	0	0.0053	0.0053	0.0053	0	0.0053	0
150	6	2025	2.5	24.6	10	15	Tire	0.002	0	0.002	0.003	0.003	0	0	0	0.009	0.009	0.001	0	0.003	0
151	6	2025	2.5	24.6	1	12	SO2	0.0029	0	0.0073	0.0081	0.0093	0	0	0	0.0144	0.0151	0.0033	0	0.0217	0
152	6	2025	2.5	24.6	1	13	NH3	0.0068	0	0.027	0.027	0.027	0	0	0	0.027	0.027	0.0113	0	0.027	0
153	6	2025	2.5	24.6	1	17	PM Idle	0	0	0.9237	0.9237	0.9237	0	0	0	0.9237	0.9237	0	0	0.9237	0
154	6	2025	2.5	24.6	VMT	0	VMT	0.0002	0	0.0079	0.0251	0.0316	0	0	0	0.1228	0.1228	0.0037	0	0.005	0
155	6	2025	2.5	24.6	1	1	VOC	0.057	0	0.13	0.147	0.18	0	0	0	0.331	0.372	2.276	0	0.289	0
156	6	2025	2.5	24.6	1	2	CO	0.659	0	0.147	0.151	0.258	0	0	0	0.385	0.477	13.978	0	0.462	0
157	6	2025	2.5	24.6	1	3	NOX	0.028	0	0.304	0.294	0.588	0	0	0	0.843	1.075	1.017	0	1.124	0
158	6	2025	2.5	24.6	3	1	Hot Soak	0	0	0	0	0	0	0	0	0	0	0.145	0	0	0
159	6	2025	2.5	24.6	4	1	Diurnal	0	0	0	0	0	0	0	0	0	0	0.002	0	0	0
160	6	2025	2.5	24.6	5	1	Resting	0	0	0	0	0	0	0	0	0	0	0.355	0	0	0
161	6	2025	2.5	24.6	6	1	Running	0	0	0	0	0	0	0	0	0	0	0	0	0	0
162	6	2025	2.5	24.6	7	1	Crankcase	0	0	0	0	0	0	0	0	0	0	0	0	0	0
163	6	2025	2.5	24.6	8	1	Refueling	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	NA	NA
164	6	2025	2.5	24.6	11	1	Total Evap	0	0	0	0	0	0	0	0	0	0	0.502	0	0	0
165	6	2025	2.5	24.6	VMT	0	VMT	0.0002	0	0.0079	0.0251	0.0316	0	0	0	0.1228	0.1228	0.0037	0	0.005	0
166	6	2025	2.5	24.6	1	16	Benzene (mg/mi)	1.14	0	1.44	1.62	1.99	0	0	0	3.65	4.1	60.68	0	3.19	0
167	6	2025	2.5	24.6	1	17	MTBE (mg/mi)	0	0	0	0	0	0	0	0	0	0	31.84	0	0	0
168	6	2025	2.5	24.6	1	18	1,3 Butadiene (mg/mi)	0.51	0	0.83	0.94	1.15	0	0	0	2.12	2.38	20	0	1.85	0
169	6	2025	2.5	24.6	1	19	Formaldehyde (mg/mi)	2.19	0	10.69	12.06	14.78	0	0	0	27.17	30.52	54.33	0	23.73	0
170	6	2025	2.5	24.6	1	20	Acetaldehyde (mg/mi)	0.7	0	3.94	4.44	5.44	0	0	0	10.01	11.24	19.21	0	8.74	0
171	6	2025	2.5	24.6	1	21	Acrolein (mg/mi)	0.2	0	0.48	0.54	0.66	0	0	0	1.22	1.37	1.15	0	1.06	0
172	6	2025	2.5	24.6	3	16	Benzene Hot Soak (mg/mi)	0	0	0	0	0	0	0	0	0	0	1.74	0	0	0
173	6	2025	2.5	24.6	4	16	Benzene Diurnal (mg/mi)	0	0	0	0	0	0	0	0	0	0	0.02	0	0	0
174	6	2025	2.5	24.6	6	16	Benzene Running (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	6	2025	2.5	24.6	5	16	Benzene Resting (mg/mi)	0	0	0	0	0	0	0	0	0	0	3.97	0	0	0
176	6	2025	2.5	24.6	8	16	Benzene Refueling (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177	6	2025	2.5	24.6	3	17	MTBE Hot Soak (mg/mi)	0	0	0	0	0	0	0	0	0	0	13.62	0	0	0
178	6	2025	2.5	24.6	4	17	MTBE Diurnal (mg/mi)	0	0	0	0	0	0	0	0	0	0	0.14	0	0	0
179	6	2025	2.5	24.6	6	17	MTBE Running (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	6	2025	2.5	24.6	5	17	MTBE Resting (mg/mi)	0	0	0	0	0	0	0	0	0	0	27.95	0	0	0
181	6	2025	2.5	24.6	8	17	MTBE Refueling (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
182	7	2025	10	44.3	VMT	0	VMT	0.0002	0	0.0079	0.0251	0.0316	0	0	0	0.1228	0.1228	0.0037	0	0.005	0
183	7	2025	10	44.3	1	11	Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	NA	NA
184	7	2025	10	44.3	1	10	GASPM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0205	0.052	NA	NA
185	7	2025	10	44.3	1	9	ECARBON	0.0078	0	0.0042	0.0036	0.0057	0	0	0	0.0118	0.0175	NA	NA	0.0143	0
186	7	2025	10	44.3	1	8	OCARBON	0.0022	0	0.0044	0.0038	0.006	0	0	0	0.0093	0.0055	NA	NA	0.0113	0
187	7	2025	10	44.3	1	7	SO4	0.0002	0	0.0005	0.0006	0.0007	0	0	0	0.001	0.0011	0.0001	0	0.0015	0
188	7	2025	10	44.3	9	14	Brake	0.0125	0	0.0125	0.0125	0.0125	0	0	0	0.0125	0.0125	0.0125	0	0.0125	0
189	7	2025	10	44.3	10	15	Tire	0.008	0	0.008	0.012	0.012	0	0	0	0.036	0.036	0.004	0	0.012	0

	A	B	C	D	E	F	G	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY
1	Scen ario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDDT34	ALL VEH	Month	Altitude	TMin	Tmax	Nom RVP	Gas Sulfur	Dsl Sulfur	I/M?		NGV?	E200	E300	Arom	Olef	Benz
143	6	2025	2.5	24.6	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
144	6	2025	2.5	24.6	1	11	Lead	NA	0	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
145	6	2025	2.5	24.6	1	10	GASPM	NA	0.0026	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
146	6	2025	2.5	24.6	1	9	ECARBON	0.0046	0.0037	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
147	6	2025	2.5	24.6	1	8	OCARBON	0.0066	0.002	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
148	6	2025	2.5	24.6	1	7	SO4	0.0003	0.0007	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
149	6	2025	2.5	24.6	9	14	Brake	0.0053	0.0053	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
150	6	2025	2.5	24.6	10	15	Tire	0.002	0.0038	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
151	6	2025	2.5	24.6	1	12	SO2	0.0056	0.0105	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
152	6	2025	2.5	24.6	1	13	NH3	0.0068	0.0754	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
153	6	2025	2.5	24.6	1	17	PM Idle	0	0.2911	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
154	6	2025	2.5	24.6	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
155	6	2025	2.5	24.6	1	1	VOC	0.179	0.363	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
156	6	2025	2.5	24.6	1	2	CO	0.438	3.623	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
157	6	2025	2.5	24.6	1	3	NOX	0.166	0.492	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
158	6	2025	2.5	24.6	3	1	Hot Soak	0	0.034	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
159	6	2025	2.5	24.6	4	1	Diurnal	0	0.003	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
160	6	2025	2.5	24.6	5	1	Resting	0	0.014	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
161	6	2025	2.5	24.6	6	1	Running	0	0.054	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
162	6	2025	2.5	24.6	7	1	Crankcase	0	0.006	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
163	6	2025	2.5	24.6	8	1	Refueling	NA	NA	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
164	6	2025	2.5	24.6	11	1	Total Evap	0	0.132	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
165	6	2025	2.5	24.6	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
166	6	2025	2.5	24.6	1	16	Benzene (mg/mi)	3.58	10.29	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
167	6	2025	2.5	24.6	1	17	MTBE (mg/mi)	0	2.23	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
168	6	2025	2.5	24.6	1	18	1,3 Butadiene (mg/mi)	1.61	1.62	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
169	6	2025	2.5	24.6	1	19	Formaldehyde (mg/mi)	6.9	10.23	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
170	6	2025	2.5	24.6	1	20	Acetaldehyde (mg/mi)	2.2	4.15	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
171	6	2025	2.5	24.6	1	21	Acrolein (mg/mi)	0.63	0.45	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
172	6	2025	2.5	24.6	3	16	Benzene Hot Soak (mg/mi)	0	0.41	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
173	6	2025	2.5	24.6	4	16	Benzene Diurnal (mg/mi)	0	0.04	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
174	6	2025	2.5	24.6	6	16	Benzene Running (mg/mi)	0	0.65	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
175	6	2025	2.5	24.6	5	16	Benzene Resting (mg/mi)	0	0.15	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
176	6	2025	2.5	24.6	8	16	Benzene Refueling (mg/mi)	0	0.23	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
177	6	2025	2.5	24.6	3	17	MTBE Hot Soak (mg/mi)	0	3.23	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
178	6	2025	2.5	24.6	4	17	MTBE Diurnal (mg/mi)	0	0.25	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
179	6	2025	2.5	24.6	6	17	MTBE Running (mg/mi)	0	2.71	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
180	6	2025	2.5	24.6	5	17	MTBE Resting (mg/mi)	0	1.09	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
181	6	2025	2.5	24.6	8	17	MTBE Refueling (mg/mi)	0	1.98	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
182	7	2025	10	44.3	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
183	7	2025	10	44.3	1	11	Lead	NA	0	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
184	7	2025	10	44.3	1	10	GASPM	NA	0.0029	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
185	7	2025	10	44.3	1	9	ECARBON	0.005	0.004	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
186	7	2025	10	44.3	1	8	OCARBON	0.0072	0.0022	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
187	7	2025	10	44.3	1	7	SO4	0.0003	0.0006	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
188	7	2025	10	44.3	9	14	Brake	0.0125	0.0125	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
189	7	2025	10	44.3	10	15	Tire	0.008	0.0152	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5

	A	B	C	D	E	F	G	AZ	BA	BB	BC	BD	BE	BF	BG	BH
1	Scenario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	MTBE vol%	MTBE MktFrac	ETBE vol%	ETBE MktFrac	ETOH vol%	ETOH MktFrac	TAME vol%	TAME MktFrac	
143	6	2025	2.5	24.6	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
144	6	2025	2.5	24.6	1	11	Lead	*****	0.5	*****	0.05	*****	0.45	6	0	
145	6	2025	2.5	24.6	1	10	GASPM	*****	0.5	*****	0.05	*****	0.45	6	0	
146	6	2025	2.5	24.6	1	9	ECARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
147	6	2025	2.5	24.6	1	8	OCARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
148	6	2025	2.5	24.6	1	7	SO4	*****	0.5	*****	0.05	*****	0.45	6	0	
149	6	2025	2.5	24.6	9	14	Brake	*****	0.5	*****	0.05	*****	0.45	6	0	
150	6	2025	2.5	24.6	10	15	Tire	*****	0.5	*****	0.05	*****	0.45	6	0	
151	6	2025	2.5	24.6	1	12	SO2	*****	0.5	*****	0.05	*****	0.45	6	0	
152	6	2025	2.5	24.6	1	13	NH3	*****	0.5	*****	0.05	*****	0.45	6	0	
153	6	2025	2.5	24.6	1	17	PM Idle	*****	0.5	*****	0.05	*****	0.45	6	0	
154	6	2025	2.5	24.6	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
155	6	2025	2.5	24.6	1	1	VOC	*****	0.5	*****	0.05	*****	0.45	6	0	
156	6	2025	2.5	24.6	1	2	CO	*****	0.5	*****	0.05	*****	0.45	6	0	
157	6	2025	2.5	24.6	1	3	NOX	*****	0.5	*****	0.05	*****	0.45	6	0	
158	6	2025	2.5	24.6	3	1	Hot Soak	*****	0.5	*****	0.05	*****	0.45	6	0	
159	6	2025	2.5	24.6	4	1	Diurnal	*****	0.5	*****	0.05	*****	0.45	6	0	
160	6	2025	2.5	24.6	5	1	Resting	*****	0.5	*****	0.05	*****	0.45	6	0	
161	6	2025	2.5	24.6	6	1	Running	*****	0.5	*****	0.05	*****	0.45	6	0	
162	6	2025	2.5	24.6	7	1	Crankcase	*****	0.5	*****	0.05	*****	0.45	6	0	
163	6	2025	2.5	24.6	8	1	Refueling	*****	0.5	*****	0.05	*****	0.45	6	0	
164	6	2025	2.5	24.6	11	1	Total Evap	*****	0.5	*****	0.05	*****	0.45	6	0	
165	6	2025	2.5	24.6	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
166	6	2025	2.5	24.6	1	16	Benzene (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
167	6	2025	2.5	24.6	1	17	MTBE (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
168	6	2025	2.5	24.6	1	18	1,3 Butadiene (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
169	6	2025	2.5	24.6	1	19	Formaldehyde (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
170	6	2025	2.5	24.6	1	20	Acetaldehyde (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
171	6	2025	2.5	24.6	1	21	Acrolein (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
172	6	2025	2.5	24.6	3	16	Benzene Hot Soak (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
173	6	2025	2.5	24.6	4	16	Benzene Diurnal (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
174	6	2025	2.5	24.6	6	16	Benzene Running (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
175	6	2025	2.5	24.6	5	16	Benzene Resting (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
176	6	2025	2.5	24.6	8	16	Benzene Refueling (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
177	6	2025	2.5	24.6	3	17	MTBE Hot Soak (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
178	6	2025	2.5	24.6	4	17	MTBE Diurnal (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
179	6	2025	2.5	24.6	6	17	MTBE Running (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
180	6	2025	2.5	24.6	5	17	MTBE Resting (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
181	6	2025	2.5	24.6	8	17	MTBE Refueling (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
182	7	2025	10	44.3	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
183	7	2025	10	44.3	1	11	Lead	*****	0.5	*****	0.05	*****	0.45	6	0	
184	7	2025	10	44.3	1	10	GASPM	*****	0.5	*****	0.05	*****	0.45	6	0	
185	7	2025	10	44.3	1	9	ECARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
186	7	2025	10	44.3	1	8	OCARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
187	7	2025	10	44.3	1	7	SO4	*****	0.5	*****	0.05	*****	0.45	6	0	
188	7	2025	10	44.3	9	14	Brake	*****	0.5	*****	0.05	*****	0.45	6	0	
189	7	2025	10	44.3	10	15	Tire	*****	0.5	*****	0.05	*****	0.45	6	0	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Scenario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDGV	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
190	7	2025	10	44.3	1	12	SO2	0.0068	0.0088	0.0088	0.0115	0.0115	0.0158	0.0171	0.0171	0	0	0	0.0229	0
191	7	2025	10	44.3	1	13	NH3	0.1017	0.1017	0.1017	0.1017	0.1017	0.0451	0.0451	0.0451	0	0	0	0.0451	0
192	7	2025	10	44.3	1	17	PM Idle	0	0	0	0	0	0	0	0	0	0	0	0	0
193	8	2025	10	24.6	VMT	0	VMT	0.2053	0.1943	0.1295	0.0662	0.0442	0.0269	0.0097	0.0032	0	0	0	0	0
194	8	2025	10	24.6	1	11	Lead	0	0	0	0	0	0	0	0	0	0	0	0	0
195	8	2025	10	24.6	1	10	GASPM	0.0038	0.0037	0.0037	0.0037	0.0037	0.0104	0.0109	0.011	0.0521	0.0521	0.0521	0.0144	0
196	8	2025	10	24.6	1	9	ECARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
197	8	2025	10	24.6	1	8	OCARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
198	8	2025	10	24.6	1	7	SO4	0.0004	0.0005	0.0005	0.0005	0.0005	0.0016	0.0016	0.0016	0	0	0	0.0016	0
199	8	2025	10	24.6	9	14	Brake	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0	0	0	0.0125	0
200	8	2025	10	24.6	10	15	Tire	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0	0	0	0.036	0
201	8	2025	10	24.6	1	12	SO2	0.0068	0.0088	0.0088	0.0115	0.0115	0.0159	0.0172	0.0173	0	0	0	0.023	0
202	8	2025	10	24.6	1	13	NH3	0.1017	0.1017	0.1017	0.1017	0.1017	0.0451	0.0451	0.0451	0	0	0	0.0451	0
203	8	2025	10	24.6	1	17	PM Idle	0	0	0	0	0	0	0	0	0	0	0	0	0
204	9	2035	2.5	44.3	VMT	0	VMT	0.1977	0.187	0.1247	0.0638	0.0425	0.0287	0.0104	0.0034	0	0	0	0	0
205	9	2035	2.5	44.3	1	11	Lead	0	0	0	0	0	0	0	0	0	0	0	0	0
206	9	2035	2.5	44.3	1	10	GASPM	0.0037	0.0035	0.0035	0.0035	0.0035	0.0071	0.0075	0.0074	0.0475	0.0475	0.0475	0.0107	0
207	9	2035	2.5	44.3	1	9	ECARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
208	9	2035	2.5	44.3	1	8	OCARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
209	9	2035	2.5	44.3	1	7	SO4	0.0002	0.0004	0.0004	0.0004	0.0004	0.0021	0.0021	0.0021	0	0	0	0.0021	0
210	9	2035	2.5	44.3	9	14	Brake	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0	0	0	0.0053	0
211	9	2035	2.5	44.3	10	15	Tire	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0	0	0	0.009	0
212	9	2035	2.5	44.3	1	12	SO2	0.0068	0.0088	0.0088	0.0115	0.0115	0.0158	0.0171	0.0171	0	0	0	0.0228	0
213	9	2035	2.5	44.3	1	13	NH3	0.1017	0.1017	0.1017	0.1017	0.1017	0.0451	0.0451	0.0451	0	0	0	0.0451	0
214	9	2035	2.5	44.3	1	17	PM Idle	0	0	0	0	0	0	0	0	0	0	0	0	0
215	9	2035	2.5	44.3	VMT	0	VMT	0.1977	0.187	0.1247	0.0638	0.0425	0.0287	0.0104	0.0034	0	0	0	0	0
216	9	2035	2.5	44.3	1	1	VOC	0.248	0.27	0.305	0.429	0.448	0.206	0.54	0.584	0	0	0	0.719	0
217	9	2035	2.5	44.3	1	2	CO	4.809	4.851	5.419	6.71	6.884	3.941	5.09	5.041	0	0	0	6.848	0
218	9	2035	2.5	44.3	1	3	NOX	0.222	0.25	0.309	0.437	0.553	0.172	0.223	0.202	0	0	0	0.276	0
219	9	2035	2.5	44.3	3	1	Hot Soak	0.044	0.046	0.046	0.074	0.074	0.049	0.049	0.075	0	0	0	0.075	0
220	9	2035	2.5	44.3	4	1	Diurnal	0.004	0.004	0.004	0.006	0.006	0.006	0.006	0.009	0	0	0	0.009	0
221	9	2035	2.5	44.3	5	1	Resting	0.016	0.016	0.016	0.026	0.026	0.022	0.022	0.034	0	0	0	0.034	0
222	9	2035	2.5	44.3	6	1	Running	0.037	0.033	0.033	0.045	0.045	0.042	0.042	0.044	0	0	0	0.044	0
223	9	2035	2.5	44.3	7	1	Crankcase	0.008	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0.01	0
224	9	2035	2.5	44.3	8	1	Refueling	0.011	0.021	0.021	0.028	0.028	0.039	0.377	0.378	0	0	0	0.5	0
225	9	2035	2.5	44.3	11	1	Total Evap	0.119	0.13	0.13	0.19	0.19	0.168	0.507	0.552	0	0	0	0.674	0
226	9	2035	2.5	44.3	VMT	0	VMT	0.1977	0.187	0.1247	0.0638	0.0425	0.0287	0.0104	0.0034	0	0	0	0	0
227	9	2035	2.5	44.3	1	16	Benzene (mg/mi)	9.34	10.16	12.71	17.02	18.41	1.95	1.73	1.64	0	0	0	2.33	0
228	9	2035	2.5	44.3	1	17	MTBE (mg/mi)	2.1	2.29	2.82	4.26	4.59	0.33	0.29	0.28	0	0	0	0.4	0
229	9	2035	2.5	44.3	1	18	1,3 Butadiene (mg/mi)	0.94	1.03	1.27	1.79	1.94	0.1	0.09	0.08	0	0	0	0.12	0
230	9	2035	2.5	44.3	1	19	Formaldehyde (mg/mi)	1.97	2.14	2.68	3.55	3.84	1.14	1.01	0.96	0	0	0	1.36	0
231	9	2035	2.5	44.3	1	20	Acetaldehyde (mg/mi)	1.15	1.21	1.51	2.05	2.21	0.43	0.38	0.37	0	0	0	0.52	0
232	9	2035	2.5	44.3	1	21	Acrolein (mg/mi)	0.09	0.09	0.12	0.16	0.17	0.02	0.02	0.02	0	0	0	0.03	0
233	9	2035	2.5	44.3	3	16	Benzene Hot Soak (mg/mi)	0.52	0.55	0.55	0.89	0.89	0.59	0.59	0.9	0	0	0	0.9	0
234	9	2035	2.5	44.3	4	16	Benzene Diurnal (mg/mi)	0.04	0.04	0.04	0.07	0.07	0.07	0.07	0.1	0	0	0	0.1	0
235	9	2035	2.5	44.3	6	16	Benzene Running (mg/mi)	0.44	0.39	0.39	0.54	0.54	0.51	0.51	0.53	0	0	0	0.53	0
236	9	2035	2.5	44.3	5	16	Benzene Resting (mg/mi)	0.17	0.18	0.18	0.29	0.29	0.25	0.25	0.39	0	0	0	0.39	0

	A	B	C	D	E	F	G	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
1	Scen ario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDDV	LDDT12	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B	MC	GAS BUS	URB BUS	COM BUS
190	7	2025	10	44.3	1	12	SO2	0.0029	0	0.0073	0.0081	0.0093	0	0	0	0.0144	0.0151	0.0033	0	0.0217	0
191	7	2025	10	44.3	1	13	NH3	0.0068	0	0.027	0.027	0.027	0	0	0	0.027	0.027	0.0113	0	0.027	0
192	7	2025	10	44.3	1	17	PM Idle	0	0	1.004	1.004	1.004	0	0	0	1.004	1.004	0	0	1.004	0
193	8	2025	10	24.6	VMT	0	VMT	0.0002	0	0.0079	0.0251	0.0316	0	0	0	0.1228	0.1228	0.0037	0	0.005	0
194	8	2025	10	24.6	1	11	Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	NA	NA
195	8	2025	10	24.6	1	10	GASPM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0205	0.052	NA	NA
196	8	2025	10	24.6	1	9	ECARBON	0.0078	0	0.0042	0.0036	0.0057	0	0	0	0.0118	0.0175	NA	NA	0.0143	0
197	8	2025	10	24.6	1	8	OCARBON	0.0022	0	0.0044	0.0038	0.006	0	0	0	0.0093	0.0055	NA	NA	0.0113	0
198	8	2025	10	24.6	1	7	SO4	0.0002	0	0.0005	0.0006	0.0007	0	0	0	0.001	0.0011	0.0001	0	0.0015	0
199	8	2025	10	24.6	9	14	Brake	0.0125	0	0.0125	0.0125	0.0125	0	0	0	0.0125	0.0125	0.0125	0	0.0125	0
200	8	2025	10	24.6	10	15	Tire	0.008	0	0.008	0.012	0.012	0	0	0	0.036	0.036	0.004	0	0.012	0
201	8	2025	10	24.6	1	12	SO2	0.0029	0	0.0073	0.0081	0.0093	0	0	0	0.0144	0.0151	0.0033	0	0.0217	0
202	8	2025	10	24.6	1	13	NH3	0.0068	0	0.027	0.027	0.027	0	0	0	0.027	0.027	0.0113	0	0.027	0
203	8	2025	10	24.6	1	17	PM Idle	0	0	1.004	1.004	1.004	0	0	0	1.004	1.004	0	0	1.004	0
204	9	2035	2.5	44.3	VMT	0	VMT	0.0002	0	0.0084	0.0267	0.0337	0	0	0	0.1312	0.1312	0.0035	0	0.0054	0
205	9	2035	2.5	44.3	1	11	Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	NA	NA
206	9	2035	2.5	44.3	1	10	GASPM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0142	0.0475	NA	NA
207	9	2035	2.5	44.3	1	9	ECARBON	0.0065	0	0.0026	0.0026	0.0026	0	0	0	0.0074	0.01	NA	NA	0.0116	0
208	9	2035	2.5	44.3	1	8	OCARBON	0.0018	0	0.0027	0.0027	0.0027	0	0	0	0.0058	0.0032	NA	NA	0.0091	0
209	9	2035	2.5	44.3	1	7	SO4	0.0002	0	0.0005	0.0006	0.0007	0	0	0	0.001	0.0011	0.0001	0	0.0015	0
210	9	2035	2.5	44.3	9	14	Brake	0.0053	0	0.0053	0.0053	0.0053	0	0	0	0.0053	0.0053	0.0053	0	0.0053	0
211	9	2035	2.5	44.3	10	15	Tire	0.002	0	0.002	0.003	0.003	0	0	0	0.009	0.009	0.001	0	0.003	0
212	9	2035	2.5	44.3	1	12	SO2	0.0029	0	0.0073	0.0081	0.0093	0	0	0	0.0144	0.0151	0.0033	0	0.0217	0
213	9	2035	2.5	44.3	1	13	NH3	0.0068	0	0.027	0.027	0.027	0	0	0	0.027	0.027	0.0113	0	0.027	0
214	9	2035	2.5	44.3	1	17	PM Idle	0	0	0.9237	0.9237	0.9237	0	0	0	0.9237	0.9237	0	0	0.9237	0
215	9	2035	2.5	44.3	VMT	0	VMT	0.0002	0	0.0084	0.0267	0.0337	0	0	0	0.1312	0.1312	0.0035	0	0.0054	0
216	9	2035	2.5	44.3	1	1	VOC	0.038	0	0.076	0.087	0.102	0	0	0	0.193	0.212	1.793	0	0.174	0
217	9	2035	2.5	44.3	1	2	CO	0.469	0	0.065	0.074	0.086	0	0	0	0.164	0.179	8.362	0	0.218	0
218	9	2035	2.5	44.3	1	3	NOX	0.025	0	0.187	0.215	0.251	0	0	0	0.475	0.522	1.168	0	0.694	0
219	9	2035	2.5	44.3	3	1	Hot Soak	0	0	0	0	0	0	0	0	0	0	0.145	0	0	0
220	9	2035	2.5	44.3	4	1	Diurnal	0	0	0	0	0	0	0	0	0	0	0.002	0	0	0
221	9	2035	2.5	44.3	5	1	Resting	0	0	0	0	0	0	0	0	0	0	0.355	0	0	0
222	9	2035	2.5	44.3	6	1	Running	0	0	0	0	0	0	0	0	0	0	0	0	0	0
223	9	2035	2.5	44.3	7	1	Crankcase	0	0	0	0	0	0	0	0	0	0	0	0	0	0
224	9	2035	2.5	44.3	8	1	Refueling	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	NA	NA
225	9	2035	2.5	44.3	11	1	Total Evap	0	0	0	0	0	0	0	0	0	0	0.502	0	0	0
226	9	2035	2.5	44.3	VMT	0	VMT	0.0002	0	0.0084	0.0267	0.0337	0	0	0	0.1312	0.1312	0.0035	0	0.0054	0
227	9	2035	2.5	44.3	1	16	Benzene (mg/mi)	0.76	0	0.84	0.96	1.12	0	0	0	2.12	2.33	43.78	0	1.92	0
228	9	2035	2.5	44.3	1	17	MTBE (mg/mi)	0	0	0	0	0	0	0	0	0	0	22.97	0	0	0
229	9	2035	2.5	44.3	1	18	1,3 Butadiene (mg/mi)	0.34	0	0.49	0.56	0.65	0	0	0	1.23	1.35	14.43	0	1.11	0
230	9	2035	2.5	44.3	1	19	Formaldehyde (mg/mi)	1.46	0	6.25	7.14	8.34	0	0	0	15.79	17.35	39.2	0	14.28	0
231	9	2035	2.5	44.3	1	20	Acetaldehyde (mg/mi)	0.47	0	2.3	2.63	3.07	0	0	0	5.82	6.39	13.86	0	5.26	0
232	9	2035	2.5	44.3	1	21	Acrolein (mg/mi)	0.13	0	0.28	0.32	0.37	0	0	0	0.71	0.78	0.83	0	0.64	0
233	9	2035	2.5	44.3	3	16	Benzene Hot Soak (mg/mi)	0	0	0	0	0	0	0	0	0	0	1.74	0	0	0
234	9	2035	2.5	44.3	4	16	Benzene Diurnal (mg/mi)	0	0	0	0	0	0	0	0	0	0	0.02	0	0	0
235	9	2035	2.5	44.3	6	16	Benzene Running (mg/mi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
236	9	2035	2.5	44.3	5	16	Benzene Resting (mg/mi)	0	0	0	0	0	0	0	0	0	0	3.97	0	0	0

	A	B	C	D	E	F	G	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY
1	Scen ario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDDT34	ALL VEH	Month	Altitude	TMin	Tmax	Nom RVP	Gas Sulfur	Dsl Sulfur	I/M?		NGV?	E200	E300	Arom	Olef	Benz
190	7	2025	10	44.3	1	12	SO2	0.0056	0.0105	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
191	7	2025	10	44.3	1	13	NH3	0.0068	0.0754	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
192	7	2025	10	44.3	1	17	PM Idle	0	0.3164	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
193	8	2025	10	24.6	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
194	8	2025	10	24.6	1	11	Lead	NA	0	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
195	8	2025	10	24.6	1	10	GASPM	NA	0.0029	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
196	8	2025	10	24.6	1	9	ECARBON	0.005	0.004	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
197	8	2025	10	24.6	1	8	OCARBON	0.0072	0.0022	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
198	8	2025	10	24.6	1	7	SO4	0.0003	0.0007	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
199	8	2025	10	24.6	9	14	Brake	0.0125	0.0125	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
200	8	2025	10	24.6	10	15	Tire	0.008	0.0152	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
201	8	2025	10	24.6	1	12	SO2	0.0056	0.0105	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
202	8	2025	10	24.6	1	13	NH3	0.0068	0.0754	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
203	8	2025	10	24.6	1	17	PM Idle	0	0.3164	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
204	9	2035	2.5	44.3	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
205	9	2035	2.5	44.3	1	11	Lead	NA	0	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
206	9	2035	2.5	44.3	1	10	GASPM	NA	0.0025	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
207	9	2035	2.5	44.3	1	9	ECARBON	0.0034	0.0025	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
208	9	2035	2.5	44.3	1	8	OCARBON	0.0049	0.0014	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
209	9	2035	2.5	44.3	1	7	SO4	0.0003	0.0006	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
210	9	2035	2.5	44.3	9	14	Brake	0.0053	0.0053	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
211	9	2035	2.5	44.3	10	15	Tire	0.002	0.0039	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
212	9	2035	2.5	44.3	1	12	SO2	0.0056	0.0106	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
213	9	2035	2.5	44.3	1	13	NH3	0.0068	0.0737	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
214	9	2035	2.5	44.3	1	17	PM idle	0	0.3109	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
215	9	2035	2.5	44.3	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
216	9	2035	2.5	44.3	1	1	VOC	0.087	0.264	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
217	9	2035	2.5	44.3	1	2	CO	0.273	3.519	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
218	9	2035	2.5	44.3	1	3	NOX	0.111	0.343	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
219	9	2035	2.5	44.3	3	1	Hot Soak	0	0.033	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
220	9	2035	2.5	44.3	4	1	Diurnal	0	0.003	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
221	9	2035	2.5	44.3	5	1	Resting	0	0.013	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
222	9	2035	2.5	44.3	6	1	Running	0	0.024	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
223	9	2035	2.5	44.3	7	1	Crankcase	0	0.006	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
224	9	2035	2.5	44.3	8	1	Refueling	NA	NA	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
225	9	2035	2.5	44.3	11	1	Total Evap	0	0.098	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
226	9	2035	2.5	44.3	VMT	0	VMT	0.0016	1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
227	9	2035	2.5	44.3	1	16	Benzene (mg/mi)	1.75	8.1	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
228	9	2035	2.5	44.3	1	17	MTBE (mg/mi)	0	1.76	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
229	9	2035	2.5	44.3	1	18	1,3 Butadiene (mg/mi)	0.79	1.18	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
230	9	2035	2.5	44.3	1	19	Formaldehyde (mg/mi)	3.37	6.65	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
231	9	2035	2.5	44.3	1	20	Acetaldehyde (mg/mi)	1.07	2.76	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
232	9	2035	2.5	44.3	1	21	Acrolein (mg/mi)	0.31	0.29	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
233	9	2035	2.5	44.3	3	16	Benzene Hot Soak (mg/mi)	0	0.4	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
234	9	2035	2.5	44.3	4	16	Benzene Diurnal (mg/mi)	0	0.03	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
235	9	2035	2.5	44.3	6	16	Benzene Running (mg/mi)	0	0.29	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5
236	9	2035	2.5	44.3	5	16	Benzene Resting (mg/mi)	0	0.15	1	1	72	92	7	30	15	No		No	50	85	25	15	1.5

	A	B	C	D	E	F	G	AZ	BA	BB	BC	BD	BE	BF	BG	BH
1	Scen ario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	MTBE vol%	MTBE MktFrac	ETBE vol%	ETBE MktFrac	ETOH vol%	ETOH MktFrac	TAME vol%	TAME MktFrac	
190	7	2025	10	44.3	1	12	SO2	*****	0.5	*****	0.05	*****	0.45	6	0	
191	7	2025	10	44.3	1	13	NH3	*****	0.5	*****	0.05	*****	0.45	6	0	
192	7	2025	10	44.3	1	17	PM Idle	*****	0.5	*****	0.05	*****	0.45	6	0	
193	8	2025	10	24.6	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
194	8	2025	10	24.6	1	11	Lead	*****	0.5	*****	0.05	*****	0.45	6	0	
195	8	2025	10	24.6	1	10	GASPM	*****	0.5	*****	0.05	*****	0.45	6	0	
196	8	2025	10	24.6	1	9	ECARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
197	8	2025	10	24.6	1	8	OCARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
198	8	2025	10	24.6	1	7	SO4	*****	0.5	*****	0.05	*****	0.45	6	0	
199	8	2025	10	24.6	9	14	Brake	*****	0.5	*****	0.05	*****	0.45	6	0	
200	8	2025	10	24.6	10	15	Tire	*****	0.5	*****	0.05	*****	0.45	6	0	
201	8	2025	10	24.6	1	12	SO2	*****	0.5	*****	0.05	*****	0.45	6	0	
202	8	2025	10	24.6	1	13	NH3	*****	0.5	*****	0.05	*****	0.45	6	0	
203	8	2025	10	24.6	1	17	PM Idle	*****	0.5	*****	0.05	*****	0.45	6	0	
204	9	2035	2.5	44.3	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
205	9	2035	2.5	44.3	1	11	Lead	*****	0.5	*****	0.05	*****	0.45	6	0	
206	9	2035	2.5	44.3	1	10	GASPM	*****	0.5	*****	0.05	*****	0.45	6	0	
207	9	2035	2.5	44.3	1	9	ECARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
208	9	2035	2.5	44.3	1	8	OCARBON	*****	0.5	*****	0.05	*****	0.45	6	0	
209	9	2035	2.5	44.3	1	7	SO4	*****	0.5	*****	0.05	*****	0.45	6	0	
210	9	2035	2.5	44.3	9	14	Brake	*****	0.5	*****	0.05	*****	0.45	6	0	
211	9	2035	2.5	44.3	10	15	Tire	*****	0.5	*****	0.05	*****	0.45	6	0	
212	9	2035	2.5	44.3	1	12	SO2	*****	0.5	*****	0.05	*****	0.45	6	0	
213	9	2035	2.5	44.3	1	13	NH3	*****	0.5	*****	0.05	*****	0.45	6	0	
214	9	2035	2.5	44.3	1	17	PM Idle	*****	0.5	*****	0.05	*****	0.45	6	0	
215	9	2035	2.5	44.3	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
216	9	2035	2.5	44.3	1	1	VOC	*****	0.5	*****	0.05	*****	0.45	6	0	
217	9	2035	2.5	44.3	1	2	CO	*****	0.5	*****	0.05	*****	0.45	6	0	
218	9	2035	2.5	44.3	1	3	NOX	*****	0.5	*****	0.05	*****	0.45	6	0	
219	9	2035	2.5	44.3	3	1	Hot Soak	*****	0.5	*****	0.05	*****	0.45	6	0	
220	9	2035	2.5	44.3	4	1	Diurnal	*****	0.5	*****	0.05	*****	0.45	6	0	
221	9	2035	2.5	44.3	5	1	Resting	*****	0.5	*****	0.05	*****	0.45	6	0	
222	9	2035	2.5	44.3	6	1	Running	*****	0.5	*****	0.05	*****	0.45	6	0	
223	9	2035	2.5	44.3	7	1	Crankcase	*****	0.5	*****	0.05	*****	0.45	6	0	
224	9	2035	2.5	44.3	8	1	Refueling	*****	0.5	*****	0.05	*****	0.45	6	0	
225	9	2035	2.5	44.3	11	1	Total Evap	*****	0.5	*****	0.05	*****	0.45	6	0	
226	9	2035	2.5	44.3	VMT	0	VMT	*****	0.5	*****	0.05	*****	0.45	6	0	
227	9	2035	2.5	44.3	1	16	Benzene (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
228	9	2035	2.5	44.3	1	17	MTBE (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
229	9	2035	2.5	44.3	1	18	1,3 Butadiene (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
230	9	2035	2.5	44.3	1	19	Formaldehyde (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
231	9	2035	2.5	44.3	1	20	Acetaldehyde (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
232	9	2035	2.5	44.3	1	21	Acrolein (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
233	9	2035	2.5	44.3	3	16	Benzene Hot Soak (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
234	9	2035	2.5	44.3	4	16	Benzene Diurnal (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
235	9	2035	2.5	44.3	6	16	Benzene Running (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	
236	9	2035	2.5	44.3	5	16	Benzene Resting (mg/mi)	*****	0.5	*****	0.05	*****	0.45	6	0	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Scenario	CY	Part Size	Avg Spd	E Type	Pol #	Pol Name	LDGV	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
237	9	2035	2.5	44.3	8	16	Benzene Refueling (mg/mi)	0.12	0.24	0.24	0.32	0.32	0.44	4.28	4.3	0	0	0	5.69	0
238	9	2035	2.5	44.3	3	17	MTBE Hot Soak (mg/mi)	4.09	4.29	4.29	6.96	6.96	4.61	4.61	7.05	0	0	0	7.05	0
239	9	2035	2.5	44.3	4	17	MTBE Diurnal (mg/mi)	0.31	0.32	0.32	0.49	0.49	0.47	0.47	0.74	0	0	0	0.74	0
240	9	2035	2.5	44.3	6	17	MTBE Running (mg/mi)	1.86	1.63	1.63	2.27	2.27	2.13	2.13	2.23	0	0	0	2.23	0
241	9	2035	2.5	44.3	5	17	MTBE Resting (mg/mi)	1.22	1.27	1.27	2.05	2.05	1.77	1.77	2.71	0	0	0	2.71	0
242	9	2035	2.5	44.3	8	17	MTBE Refueling (mg/mi)	1.07	2.12	2.12	2.83	2.83	3.83	37.5	37.66	0	0	0	49.81	0
243	10	2035	2.5	24.6	VMT	0	VMT	0.1977	0.187	0.1247	0.0638	0.0425	0.0287	0.0104	0.0034	0	0	0	0	0
244	10	2035	2.5	24.6	1	11	Lead	0	0	0	0	0	0	0	0	0	0	0	0	0
245	10	2035	2.5	24.6	1	10	GASPM	0.0035	0.0034	0.0034	0.0034	0.0034	0.0074	0.0079	0.0077	0.0475	0.0475	0.0475	0.011	0
246	10	2035	2.5	24.6	1	9	ECARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
247	10	2035	2.5	24.6	1	8	OCARBON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
248	10	2035	2.5	24.6	1	7	SO4	0.0004	0.0005	0.0005	0.0005	0.0005	0.0016	0.0016	0.0016	0	0	0	0.0016	0
249	10	2035	2.5	24.6	9	14	Brake	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0	0	0	0.0053	0
250	10	2035	2.5	24.6	10	15	Tire	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0	0	0	0.009	0
251	10	2035	2.5	24.6	1	12	SO2	0.0068	0.0088	0.0088	0.0115	0.0115	0.0159	0.0172	0.0173	0	0	0	0.023	0
252	10	2035	2.5	24.6	1	13	NH3	0.1017	0.1017	0.1017	0.1017	0.1017	0.0451	0.0451	0.0451	0	0	0	0.0451	0
253	10	2035	2.5	24.6	1	17	PM Idle	0	0	0	0	0	0	0	0	0	0	0	0	0
254	10	2035	2.5	24.6	VMT	0	VMT	0.1977	0.187	0.1247	0.0638	0.0425	0.0287	0.0104	0.0034	0	0	0	0	0
255	10	2035	2.5	24.6	1	1	VOC	0.307	0.324	0.359	0.507	0.53	0.306	0.635	0.678	0	0	0	0.831	0
256	10	2035	2.5	24.6	1	2	CO	4.402	4.421	4.955	6.195	6.364	6.416	8.287	8.207	0	0	0	11.15	0
257	10	2035	2.5	24.6	1	3	NOX	0.234	0.251	0.309	0.435	0.553	0.147	0.192	0.173	0	0	0	0.237	0
258	10	2035	2.5	24.6	3	1	Hot Soak	0.044	0.046	0.046	0.074	0.074	0.049	0.049	0.075	0	0	0	0.075	0
259	10	2035	2.5	24.6	4	1	Diurnal	0.004	0.004	0.004	0.006	0.006	0.006	0.006	0.009	0	0	0	0.009	0
260	10	2035	2.5	24.6	5	1	Resting	0.016	0.016	0.016	0.026	0.026	0.022	0.022	0.034	0	0	0	0.034	0
261	10	2035	2.5	24.6	6	1	Running	0.083	0.07	0.07	0.095	0.095	0.093	0.093	0.097	0	0	0	0.097	0
262	10	2035	2.5	24.6	7	1	Crankcase	0.008	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0	0.01	0
263	10	2035	2.5	24.6	8	1	Refueling	0.011	0.021	0.021	0.028	0.028	0.039	0.377	0.378	0	0	0	0.5	0
264	10	2035	2.5	24.6	11	1	Total Evap	0.165	0.167	0.167	0.24	0.24	0.219	0.557	0.604	0	0	0	0.726	0
265	10	2035	2.5	24.6	VMT	0	VMT	0.1977	0.187	0.1247	0.0638	0.0425	0.0287	0.0104	0.0034	0	0	0	0	0
266	10	2035	2.5	24.6	1	16	Benzene (mg/mi)	10.3	11.3	13.91	19.08	20.71	4.55	4.03	3.84	0	0	0	5.44	0
267	10	2035	2.5	24.6	1	17	MTBE (mg/mi)	2.33	2.55	3.11	4.8	5.19	0.77	0.68	0.65	0	0	0	0.93	0
268	10	2035	2.5	24.6	1	18	1,3 Butadiene (mg/mi)	1.04	1.14	1.4	2.01	2.18	0.23	0.2	0.19	0	0	0	0.27	0
269	10	2035	2.5	24.6	1	19	Formaldehyde (mg/mi)	2.17	2.38	2.94	3.97	4.32	2.67	2.36	2.25	0	0	0	3.19	0
270	10	2035	2.5	24.6	1	20	Acetaldehyde (mg/mi)	1.27	1.35	1.66	2.29	2.49	1.01	0.9	0.85	0	0	0	1.21	0
271	10	2035	2.5	24.6	1	21	Acrolein (mg/mi)	0.09	0.11	0.13	0.18	0.2	0.05	0.04	0.04	0	0	0	0.06	0
272	10	2035	2.5	24.6	3	16	Benzene Hot Soak (mg/mi)	0.52	0.55	0.55	0.89	0.89	0.59	0.59	0.9	0	0	0	0.9	0
273	10	2035	2.5	24.6	4	16	Benzene Diurnal (mg/mi)	0.04	0.04	0.04	0.07	0.07	0.07	0.07	0.1	0	0	0	0.1	0
274	10	2035	2.5	24.6	6	16	Benzene Running (mg/mi)	0.99	0.84	0.84	1.14	1.14	1.11	1.11	1.16	0	0	0	1.16	0
275	10	2035	2.5	24.6	5	16	Benzene Resting (mg/mi)	0.17	0.18	0.18	0.29	0.29	0.25	0.25	0.39	0	0	0	0.39	0
276	10	2035	2.5	24.6	8	16	Benzene Refueling (mg/mi)	0.12	0.24	0.24	0.32	0.32	0.44	4.28	4.3	0	0	0	5.69	0
277	10	2035	2.5	24.6	3	17	MTBE Hot Soak (mg/mi)	4.09	4.29	4.29	6.96	6.96	4.61	4.61	7.05	0	0	0	7.05	0
278	10	2035	2.5	24.6	4	17	MTBE Diurnal (mg/mi)	0.31	0.32	0.32	0.49	0.49	0.47	0.47	0.74	0	0	0	0.74	0
279	10	2035	2.5	24.6	6	17	MTBE Running (mg/mi)	4.14	3.54	3.54	4.76	4.76	4.65	4.65	4.85	0	0	0	4.85	0
280	10	2035	2.5	24.6	5	17	MTBE Resting (mg/mi)	1.22	1.27	1.27	2.05	2.05	1.77	1.77	2.71	0	0	0	2.71	0
281	10	2035	2.5	24.6	8	17	MTBE Refueling (mg/mi)	1.07	2.12	2.12	2.83	2.83	3.83	37.5	37.66	0	0	0	49.81	0
282	11	2035	10	44.3	VMT	0	VMT	0.1977	0.187	0.1247	0.0638	0.0425	0.0287	0.0104	0.0034	0	0	0	0	0
283	11	2035	10	44.3	1	11	Lead	0	0	0	0	0	0	0	0	0	0	0	0	0

08/28/07
15:08:08

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

Plaza Backup, 10 trucks wide, 5 long

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                =        AREA
   EMISSION RATE (G/(S-M**2)) =     .400000E-05
   SOURCE HEIGHT (M)          =      2.0000
   LENGTH OF LARGER SIDE (M)  =    115.0000
   LENGTH OF SMALLER SIDE (M) =     30.0000
   RECEPTOR HEIGHT (M)        =      1.0000
   URBAN/RURAL OPTION         =       URBAN
THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
20.	54.80	6	1.0	1.0	10000.0	2.00	0.
100.	44.51	6	1.0	1.0	10000.0	2.00	0.
200.	14.30	6	1.0	1.0	10000.0	2.00	0.
300.	6.956	6	1.0	1.0	10000.0	2.00	0.
400.	4.206	6	1.0	1.0	10000.0	2.00	0.
500.	2.871	6	1.0	1.0	10000.0	2.00	1.
600.	2.114	6	1.0	1.0	10000.0	2.00	0.
700.	1.642	6	1.0	1.0	10000.0	2.00	0.
800.	1.324	6	1.0	1.0	10000.0	2.00	0.
900.	1.097	6	1.0	1.0	10000.0	2.00	0.
1000.	.9302	6	1.0	1.0	10000.0	2.00	0.
1100.	.8028	6	1.0	1.0	10000.0	2.00	2.
1200.	.7031	6	1.0	1.0	10000.0	2.00	0.
1300.	.6233	6	1.0	1.0	10000.0	2.00	0.
1400.	.5583	6	1.0	1.0	10000.0	2.00	0.
1500.	.5044	6	1.0	1.0	10000.0	2.00	0.
1600.	.4592	6	1.0	1.0	10000.0	2.00	0.
1700.	.4208	6	1.0	1.0	10000.0	2.00	0.
1800.	.3878	6	1.0	1.0	10000.0	2.00	0.
1900.	.3591	6	1.0	1.0	10000.0	2.00	0.
2000.	.3341	6	1.0	1.0	10000.0	2.00	0.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 20. M:

```
63.    69.76        6      1.0     1.0 10000.0     2.00       0.

     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION          MAX CONC     DIST TO    TERRAIN
  PROCEDURE          (UG/M**3)     MAX (M)     HT (M)
---------------     -----------    -------    -------
SIMPLE TERRAIN        69.76           63.         0.


***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

passenger or commercial	p	p	p	c	p	p	c	p									
	LDGV	LDGT12	LDGT34	HDGV	LDDV	LDDT	HDDV	MC	sum	P	C	check sum					
2015 std	0.3068	0.4203	0.1433	0.0358	0.0003	0.0021	0.0862	0.0052	1	0.878	0.122	1					
2025-35 std	0.279	0.44	0.15	0.0363	0.0003	0.0022	0.0872	0.005	1	0.8765	0.1235	1					
2025-35 std	0.279	0.44	0.15	0.0363	0.0003	0.0022	0.0872	0.005	1	0.8765	0.1235	1					
Adjusted 2015	0.2376	0.3255	0.1110	0.0939	0.0002	0.0016	0.2261	0.0040	1.0000	0.6800	0.3200	1.0000					
Adjusted 2025	0.2053	0.3238	0.1104	0.1043	0.0002	0.0016	0.2507	0.0037	1.0000	0.6450	0.3550	1.0000					
Adjusted 2035	0.1977	0.3117	0.1063	0.1114	0.0002	0.0016	0.2676	0.0035	1.0000	0.6210	0.3790	1.0000					
	LDV	LDT1	LDT2	LDT3	LDT4	HDV2b	HDV3	hdv4	hdv5	hdv6	hdv7	hdv8a	hdv8b	hdbs	hdbt	mc	sum
Adjusted 2015	0.2378	0.1953	0.1302	0.0676	0.0450	0.0313	0.0313	0.0313	0.0000	0.0000	0.0000	0.1108	0.1108	0.0000	0.0045	0.0040	1.0000
Adjusted 2025	0.2055	0.1943	0.1295	0.0672	0.0448	0.0348	0.0348	0.0348	0.0000	0.0000	0.0000	0.1228	0.1228	0.0000	0.0050	0.0037	1.0000
Adjusted 2035	0.1979	0.1870	0.1247	0.0647	0.0431	0.0371	0.0371	0.0371	0.0000	0.0000	0.0000	0.1311	0.1311	0.0000	0.0054	0.0035	1.0000
Note that values have to add up to 1.00000 for model to run.																	

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
George D. Thurston	Associate Professor
eRA COMMONS USER NAME THURSTON	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Brown University, Providence, RI	Sc.B.	1974	Environ. Engineering
Brown University, Providence, RI	A.B.	1974	Environ. Studies
Harvard University, Cambridge, MA	M.S.	1978	Environ. Health Sci.
Harvard University, Cambridge, MA	Sc.D.	1983	Environ. Health Sci.

A. Positions and Honors

Positions and Employment

1974-1977 Engineer, Hittman Associates, Inc., Energy and Environmental Systems Department, Columbia, MD
1978-1982 Researcher, Harvard University School of Public Health, Dept. of Environ. Health, Boston, MA
1982-1984 Research Fellow, Harvard University, Kennedy School of Government, Health & Environmental Policy Center, Cambridge, MA
1984-1987 Research Assistant Professor, Department of Environmental Medicine, New York University School of Medicine, New York, NY
1987-1993 Assistant Professor, Department of Environmental Medicine, New York University School of Medicine, New York, NY
1993-pres Associate Professor (Tenured), Department of Environmental Medicine, New York University School of Medicine, New York, NY
2002-pres Deputy Director, NYU Particulate Matter Center, NYU School of Medicine, New York, NY
1995-2004 Director, Community Outreach and Education Program, NIEHS Center of Excellence, New York University School of Medicine, New York, NY
2007-pres Full Professor (Tenured), Department of Environmental Medicine, New York University School of Medicine, New York, NY

Other Experience and Professional Memberships

American Thoracic Society (Environ. and Occup. Health Program Committee)
International Society for Environmental Epidemiology
International Society of Exposure Analysis (Associate Editor: J. Exp. Anal. Environ. Epidemiol. (1993-present)
National Academy of Sciences, Committee on Health Effects of Waste Incineration (1/95-1/2000)
ATS/ALA National Air Conservation Commission Member (1997-2000) and National Clean Air Committee (2005-present).
Chairman, Health and Environmental Impact Assessment Panel, Joint Canadian Industry/Government Study of Sulphur in Gasoline and Diesel Fuels (9/96-6/97)

B. Selected peer-reviewed publications

Spengler, J.D. and G.D. Thurston. Mass and elemental composition of fine and coarse particles in six U.S. cities. J. Air Poll. Control Assoc. 33: 1162-1171 (1983).

Thurston, G.D. and Laird, N. Letters: Tracing aerosol pollution. Science 227:1406-1408 (1985).

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C. Research Support

"Health Effects Institute (HEI)(PI: Lippmann)	01/07-12/10	25%
"Characteristics of PM Associated with Health Effects"	$991,233	

his research aims to conduct a coordinated program of toxicological (tox) and epidemiological (epi) research that will identify and characterize specific source-related and individual chemical components of ambient air particulate matter (PM) in the fine (FPM), coarse thoracic (CTPM), and ultrafine (UPM) size ranges responsible for excess acute and chronic mortality and morbidity in contemporary human populations. **Dr. Thurston is P.I. on the Epidemiology Research Project 2, entitled: "Study Of Pm Components And U.S. Human Mortality In The ACS Cohort"**, which follows up on Dr. Thurston's previously funded NIH study (5R01 ES09560) of this nationwide American Cancer Society cohort.

5P30 ES00260-38 (Costa)	04/00-03/05	10%
NIH/NIEHS "Research in Environmental Health Sciences"	$950,000	

This is a Center Grant 5P30 ES00260-38 which supports programs and shared resources for the members of the NIEHS Center Effects

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Tuxedo, NY 10987

Christopher M. Bzdok
Tracy J. Andrews
OLSON, BZDOK & HOWARD, P.C.
420 East Front Street
Traverse City, MI 49686

August 28, 2007

Re: Human Health Effects of the Proposed Ambassador Bridge Expansion

Dear Mr. Bzdok,

I am a full Professor at the New York University School of Medicine in the Department of Environmental Medicine. I received my Doctorate of Science (Sc.D.) in Environmental Health Sciences from the Harvard University School of Public Health in 1983. I have served on the New York State Department of Environmental Conservation's Air Management Advisory Committee from 1991 to 1996, and was Chairman of the Health and Environment Panel of the Canadian Joint Industry/Government Study of Sulfur in Gasoline and Diesel Fuels in 1997. I also served on the National Academy of Science's Committee on the Health Effects of Incineration from January 1995 through November 1999. I have published extensively regarding the health effects of inhaled air pollutants on humans, particularly as it relates to asthma attacks, hospital admissions, and mortality. I have been called upon by both the U.S. House of Representatives and the U.S. Senate in recent years to provide testimony before them regarding the human health effects of air pollution. I presently serve as an advisor to the U.S. EPA regarding the human health effects of air pollution as a member of the Clean Air Scientific Advisory Committee (CASAC) panel on Sulfur Oxides and Nitrogen Oxides. A copy of my professional curriculum vitae is attached to this letter, and it accurately represents my relevant education, training, and experience.

I was retained to review and analyze relevant reports, data, and other information in order to understand probable health effects resulting from particulate matter exposures in the vicinity of the Ambassador Bridge that is the subject of this lawsuit. In addition to publicly available reports and documents relevant to the subject matter of this lawsuit and this letter, I have reviewed the reports submitted by Dr. Ahmadi and Mr. Hands.

Dr. Goodarz Ahmadi's particle transport modeling report graphically demonstrates the added fine particle impacts that will result from this proposed bridge expansion. In addition, the Lawrence Hands air quality impact analysis report, using an EPA-approved "screening" model, confirms that there will, in fact, be the potential for increases in the fine particle mass ($PM_{2.5}$, or the mass of particles less than 2.5 micrometers in diameter) air pollution exposures to the public living or working near the proposed facility. Indeed, Mr. Hands' screening analysis reports that a maximum 24-hour concentration impact from the bridge addition could be as high as 28 ug/m^3. This would, in turn, indicate that the maximum annual impacts caused by the bridge addition could potentially be as high as 8 ug/m^3 as an annual average (based upon factors provided in Equation 5.12 of the U.S. EPA, *Workbook of Atmospheric Dispersion Estimates*, AP-26, 1974). Thus, Drs. Ahmadi's and Hands' analyses

EXHIBIT 15

indicate that the proposed bridge addition could result in a potentially substantial increase to the particulate matter air pollution breathed by the bridge's surrounding populations.

In this letter, I am addressing the public health impacts of emissions of fine particulate matter ("$PM_{2.5}$") generally and, specifically, the public health impacts of $PM_{2.5}$ emissions from vehicles driven on roads and bridges like the Ambassador Bridge, which Mr. Ahmadi's analyses has indicated will worsen if a second bridge is built, affecting a wide area of local residents living in multiple communities surrounding the bridge.

The adverse human health consequences of breathing such air pollution, even at levels below the current U.S. National Ambient Air Quality Standards (NAAQS), are serious and well documented. This documentation includes impacts demonstrated by controlled chamber exposures and by observational epidemiology showing consistent associations between particulate matter air pollution and adverse impacts across a wide range of human health outcomes (e.g., see: Air Quality Criteria for Particulate Matter (October, 2004) EPA/600/P-99/002aF). Amongst this evidence, observational epidemiology studies, such as the ones I have conducted, have shown some the most compelling and consistent evidence of adverse effects by air pollution below the current U.S. standards. Such epidemiological studies statistically evaluate changes in the incidence of adverse health effects in a single population as it undergoes varying real-life exposures to pollution over time, or across multiple populations experiencing different exposures from one place to another. These studies have shown confirmatory associations between ambient air pollution exposures and increased adverse health impacts, including, but not limited to:

- decreased lung function (a measure of our ability to breathe freely);
- more frequent asthma symptoms;
- increased numbers of asthma attacks;
- more frequent emergency department visits;
- additional hospital admissions, and;
- increased numbers of daily and annual deaths.

The fact that these effects have both been shown so consistently across outcomes and from place to place across the nation and around the world indicates these associations to be causal.

One of the ambient air pollutants most carefully studied in recent years is particulate matter (PM). Fine particles ($PM_{2.5}$, or those less than 2.5 micrometers in diameter) such as those that result from vehicular emissions, including from automobiles and trucks, can bypass the defensive mechanisms of the lung, and become lodged deep in the lung where they can cause a variety of health problems. Indeed, the latest evidence indicates that short-term exposures can cause not only respiratory damage, but also cardiac effects, including heart attacks. Moreover, long-term exposure to fine particles increases the risk of death, and has been estimated to take years from the life expectancy of people living in the most polluted cities, relative to those living in cleaner cities. PM air pollution is composed of two major components: primary particles (including black carbon, or "soot") emitted directly into the atmosphere by pollution sources such as diesel cars, trucks, and buses, and; "secondary particles" formed in the atmosphere from gaseous pollutants such as sulfur dioxide (SO_2) and nitrogen oxides (NO_X).

In my own research, I have found that acute increases in ambient air pollution are associated with increases in the number of daily asthma attacks, hospital admissions, and mortality. In particular, I have found that particulate matter (PM) air pollution is associated with increased numbers of respiratory hospital admissions in New York City, Buffalo, NY, and Toronto, Ontario, as well as with mortality in cities such as Chicago, IL and Los Angeles, CA, even at levels below the current standards. My results have been confirmed by other researchers considering locales elsewhere in the U.S. and throughout the world (e.g., see: Schwartz, J. (1997). Health effects of air pollution from traffic: ozone and particulate

matter. Health at the Crossroads: Transport Policy and Urban Health, T. Fletcher and A.J. McMichael Eds., John Wiley and Sons Ltd., New York, NY).

In addition, the U.S. EPA's most recent reanalysis of the issue of the potential for the impacts of fine particles on human health by the U.S. EPA has reconfirmed that fine particles, such as those that result from the air emissions from vehicles that travel over the Ambassador Bridge, are significantly adverse to human health (U.S. EPA. Air Quality Criteria for Particulate Matter, 2004. EPA/600/P-99/002aF, Office of Research and Development, Washington, DC.). This fact caused the U.S. EPA to further tighten the legal limit on the daily allowable concentration from 60 ug/m^3 down to 35 ug/m^3. This EPA decision reflects the increasing public health concern over human exposures to $PM_{2.5}$ such as that emitted by vehicles that travel over the Ambassador Bridge.

In particular, there is growing scientific evidence indicating that particulate matter (PM) air pollution emitted by traffic is among the more important contributors to the toxicity of PM. An increasing body of evidence indicates that traffic-related exposures and residential proximity to vehicular traffic are associated with increased respiratory conditions and symptoms in children, including increased prevalence of asthma, wheezing, recurrent respiratory illnesses, and hospital admissions for asthma. In my own research of elementary children in the South Bronx in New York City (which is an area adjacent to the Major Deegan Interstate highway and to the Triboro Bridge) indicates that there is a statistically significant increase in children's asthma symptoms, as well as a reduction in their lung function, on days with elevated levels of elemental carbon soot (such as that emitted by diesel vehicles). This particular research has led to a recent article on the effects of diesel pollution on children with asthma in the New York Times (October 29, 2006) entitled "A Study Links Trucks' Exhaust to Schoolchildren's Asthma" and a subsequent New York Times editorial (11/19/06) entitled "Black Soot and Asthma" in which the editors called upon policymakers to reduce this problem by "declaring war on poisonous diesel fumes."

Among the particulate matter (PM) that is emitted by vehicles and other sources, the smaller "fine" particles have been indicated to be of the greatest health significance. Nasal hairs, sneezing, and the lung's mucocilliatory clearance system are among the lung's natural defenses against particles. But small particles can get past these defenses, and penetrate into the deepest recesses of the lung, making them especially dangerous to human health. The United States Environmental Protection Agency ("EPA") recognized the adverse health effects of small particulate pollution as early as 1987 when, pursuant to its authority under the Clean Air Act, it promulgated a National Ambient Air Quality Standard ("NAAQS") for particulate matter that is 10 micrometers in diameter or smaller (PM10). The NAAQS promulgated by EPA are required for certain air pollutants "that may reasonably be anticipated to endanger public health and welfare." The NAAQS' air criteria must be "requisite to protect the public health" with an "adequate margin of safety." Under the particulate matter NAAQS, states must reduce PM10 concentrations in their ambient atmosphere to no more than 50 micrograms per cubic meter on an annual average basis, and to no more than 150 micrograms per cubic meter on an average 24-hour period. Prior to 1987, EPA's particulate NAAQS had only regulated total suspended particulate matter. Its focus in 1987 on smaller particles -- that is, 10 micrometers or less -- resulted from increasing scientific evidence that human inhalation of smaller particles had more serious respiratory effects than larger particles.

In 1994, EPA began the process of again reviewing its particulate matter standards. In 1996, EPA proposed a new NAAQ for even smaller particles -- those that are 2.5 micrometers in diameter or smaller (so-called $PM_{2.5}$). This new proposed standard was based on an increasing scientific consensus that the current NAAQS for PM10 was not sufficiently protective of human health. EPA's scientific review concluded that fine particles, in the 2.5 micrometer and smaller range, penetrate more deeply into the lungs, and may be more likely than coarse particles to contribute to the health effects (e.g., premature mortality and hospital admissions) found in a number of recently published community epidemiological studies at concentrations that extend well below those allowed by the current PM10 standards. As EPA

stated in its proposed regulation, a greatly expanded body of community epidemiological studies provide "evidence that serious health effects (mortality, exacerbation of chronic disease, increased hospital admissions, etc.) are associated with exposures to ambient levels of PM, even in concentrations below current U.S. PM standard."

$PM_{2.5}$ particulate matter concentrations in the vicinity of the Ambassador Bridge already exceed the federal allowable legal limits for this air pollutant (i.e., 15 ug/m^3 maximum annual average, and 35 ug/m^3 maximum 98th percentile 24-hr. daily concentration). The nearest U.S. air monitor is located at 6921 West Fort Street, Detroit, Michigan (Site 261630015), which is located approximately 1.5 miles from the Ambassador Bridge. From 1999 to 2005, the annual average $PM_{2.5}$ concentration, as reported by the State of Michigan, was: 17.7; 18.1; 18.3; 17.4; 16.63; 15.39; 17.21, with a 2003-2005 average of 16.4 ug/m^3 (Michigan's 2005 Annual Air Quality Report, Michigan State Air Quality Division, Lansing, Mi). Indeed this station was one of only two sites in the entire State of Michigan that have continually exceeded the 15 ug/m^3 legal limit during every year since $PM_{2.5}$ began being measured in 1999. This site also already experiences exceedances of the 35 ug/m^3 $PM_{2.5}$ daily limit, as well, with the 98th percentile concentrations of: 50.2, 44.5, 42.9, 38.2, 33.6, 36.0, and 49.7 for the years 1999-2005, respectively, with a 2003-2005 year average of the 98th perentile of 39.8 ug/m^3 (Michigan's 2005 Annual Air Quality Report, Michigan State Air Quality Division, Lansing, Mi). These ambient data collected near the proposed facility indicate that the proposed increase in traffic and pollution from the bridge addition would occur in (and be superimposed upon) air pollution that is already well into the range of fine particle pollution concentrations where severe adverse health effects have been well documented.

Therefore, any action that increases the amount and dispersion of PM, and $PM_{2.5}$ emissions from fossil fuel combustion in particular, have the potential to cause an adverse impact on human health. The particles involved in the emissions associated with the Ambassador Bridge would fall into the especially toxic $PM_{2.5}$ component of vehicular emissions. As a result, these added PM emissions would have been of the type that would have especially adverse health effects if breathed.

While the adverse human health impacts of breathing these increases in traffic PM emissions would occur even if the ambient levels of PM were below the PM ambient air quality standards (since a threshold below which no effects occur has yet to be identified), the impacts are even more onerous when added to the already existing pollution insults. As noted above, Wayne County, where this proposed bridge is to be located, is already out-of-compliance with the U.S. EPA $PM_{2.5}$ standard. Thus, the pollution levels are already relatively high and have violated the PM standards in the past, indicating that the health impacts of the proposed increases in traffic emissions worsen a pre-existing air pollution problem in the vicinity of this proposed bridge.

I therefore conclude that any added fine particle exposures to the public from the proposed additional span at the Ambassador Bridge, if approved and built, will indeed have both acute and chronic adverse effects on the public health of persons living or working in communities in the vicinity of the bridge in the Detroit, MI metropolitan area, as well as across the river in Windsor, Ontario, Canada.

Sincerely,

Dr. George D. Thurston, Sc.D.
3 Catherine Court
Chester, NY 10918

Crain's
April 2, 2007

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Ambassador Bridge owner wants bonds for new span

BY ANDREW DIETDERICH
CRAIN'S DETROIT BUSINESS

The **Detroit International Bridge Co.** wants to pay for a twin span to the Ambassador Bridge by selling $1 billion in federally backed bonds, but the proposal needs the endorsement of the state of Michigan and **U.S. Federal Highway Administration**, both of which are working on plans for a different border crossing.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act was signed Aug. 10, 2005. The act provides for $15 billion in government-backed private equity bonds until the money runs out. Before the act, the method of funding was available only for publicly owned projects.

Private companies from across the U.S. are jockeying for a piece of the $15 billion, said Nancy Singer, communications manager for the highway administration, the agency that oversees the bonding process. So far about $1.9 billion has been allocated for a project in Texas, Singer said. She didn't want to say how many applications have been received.

The **Michigan Strategic Fund** must approve the plan first as part of the criteria for receiving the federal money that requires state support for projects.

> *"For the state to slow down or deny this request is adding to or ensuring the demise of the state."*
>
> **Dan Stamper, president, Detroit International Bridge co.**

However, a consortium of agencies from the U.S. and Canada, including the **Michigan Department of Transportation** nd the highway administration is working on the Detroit River International Bridge Project, which is focused on a public/private-owned bridge originating from one of three possible sites in the Brighton Beach area of Windsor across from Zug Island.

The bridge company applied to the strategic fund and made a presentation to its executive committee three weeks ago, Stamper said.

Stamper said the strategic fund is expected to make a decision at its April 25 meeting.

"For the state to slow down or deny this request is adding to or ensuring the demise of the state," said Dan Stamper, president of the bridge company, which owns and operates the Ambassador Bridge. "It doesn't make any sense."

Mike Shore, chief communications officer for the **Michigan Economic Development Corp.**, and Liz Boyd, Gov. Jennifer Granholm's press secretary, both referred calls to MDOT.

Bill Schreck, MDOT communications manager, said it was too early to tell how or if the Detroit River International Bridge project would affect the bridge company's application.

The Michigan Strategic Fund board consists of 11 members including George Jackson Jr., president and CEO of the **Detroit Economic Growth Corp.**; Richard Rassel Jr., director of global client relations at **Butzel Long P.C.**; and Robert Kleine, Michigan state treasurer.

If approved at the state and federal level, Stamper said the bonds would be repaid through operational revenue in about 20 years.

Stamper said he expects the entire process of going through the Michigan Strategic Fund and federal highway administration to be completed within six months and that construction of a twin span will begin early next year.

Andrew Dietderich: (313) 446-0318; adietderich@crain.com

Blues to raise rates on 12 health plans

BY ANDREW DIETDERICH
CRAIN'S DETROIT BUSINESS

Detroit-based **Blue Cross Blue Shield of Michigan** plans to increase rates on 12 of its 24 individual health plans May 1 and has asked the state to increase rates on seven purchased by people who have never had employer-sponsored health insurance or for those who once had benefits through an employer and are under 65.

Stolic said the nonprofit requested the increases because premiums collected for individual vidual health plan options are far below the cost of the medical services delivers in these plans. The new rates would bring the premiums closer to the actual cost of care provided, but not all the way."

The Blues requested increases

EXHIBIT 16

U.S. Census Bureau
American FactFinder

Choose a selection method

list name search address search map geo within geo

Legend

Boundaries
- State
- '00 County
- '00 Census Tract
- '00 Block Group
- '00 Block
- '00 Place
- '00 Place
- '00 Urban Area
- '00 Urban Area

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody

Items in gray text are not visible at this zoom level

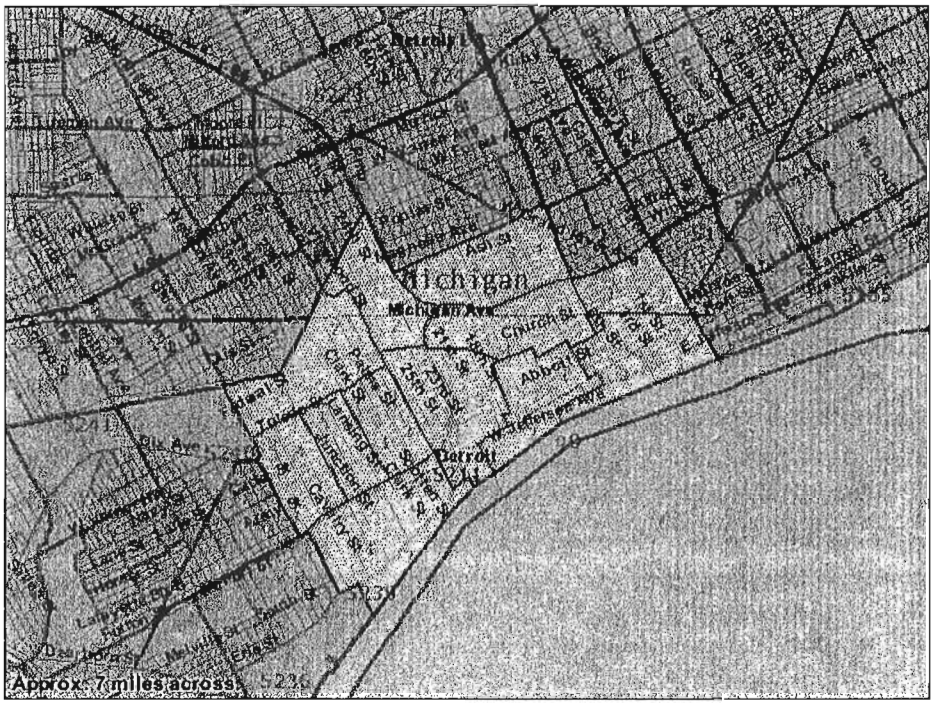


EXHIBIT 17

RACE [8] - Universe: Total population
D. Set: Census 2000 Summary File 3 (SF 3) - Sample Data
NOTE: Data based on a sample except in P3, P4, H3, and H4.
For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

	Wayne County, Michigan	Census Tract 5207, Wayne County, Michigan	Census Tract 5208, Wayne County, Michigan	Census Tract 5209, Wayne County, Michigan	Census Tract 5211, Wayne County, Michigan	Census Tract 5213, Wayne County, Michigan	Census Tract 5214, Wayne County, Michigan	Census Tract 5215, Wayne County, Michigan	Census Tract 5231, Wayne County, Michigan	Census Tract 5232, Wayne County, Michigan	Census Tract 5233, Wayne County, Michigan	Census Tract 5234, Wayne County, Michigan	Census Tract 5235, Wayne County, Michigan
Total:	2,061,162	1,747	1,104	0	2,001	949	1,195	1,971	1,984	4,647	3,933	2,886	1,060
White alone	1,064,497	363	318	0	735	141	646	402	833	2,347	1,823	1,349	668
Black or African American alone	866,622	1,323	680	0	303	790	327	1,429	320	241	143	369	176
American Indian and Alaska Native alone	8,231	8	0	0	115	18	21	0	14	43	0	38	9
Asian alone	35,273	22	42	0	25	0	0	0	0	0	31	8	4
Native Hawaiian and Other Pacific Islander alone	495	0	0	0	9	0	0	0	0	8	0	0	0
Some other race alone	32,873	0	10	0	802	0	139	50	742	1,647	1,754	992	151
Two or more races	53,171	31	54	0	12	0	62	90	75	361	182	130	52

U.S. Census Bureau
Census 2000

P37. SEX BY EDUCATIONAL ATTAINMENT FOR THE ULATION 25 YEARS AND OVER [35] - Universe: Population 25 years and over
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data
NOTE: Data based on a sample except in P3, P4, H3, and H4.
For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

	Wayne County, Michigan	Census Tract 5207, Wayne County,	Census Tract 5208, Wayne County,	Census Tract 5209, Wayne County,	Census Tract 5211, Wayne County,	Census Tract 5213, Wayne County,	Census Tract 5214, Wayne County,	Census Tract 5215, Wayne County,	Census Tract 5231, Wayne County,	Census Tract 5232, Wayne County,	Census Tract 5233, Wayne County,	Census Tract 5234, Wayne County,	Census Tract 5235, Wayne County,
Total:	1,305,288	1,513	880	0	1,335	560	846	1,138	1,023	2,499	2,086	1,672	599
Male:	604,939	772	467	0	755	219	472	521	556	1,244	1,120	910	360
No schooling completed	9,519	6	0	0	13	6	6	8	55	162	86	53	9
Nursery to 4th grade	2,768	0	0	0	6	6	4	13	25	50	47	22	0
5th and 6th grade	8,368	19	0	0	47	6	21	6	99	132	159	68	42
7th and 8th grade	18,397	25	0	0	56	0	21	24	46	91	92	43	32
9th grade	17,125	70	0	0	34	5	25	19	31	67	94	35	67
10th grade	26,972	79	7	0	66	7	34	16	42	65	67	70	34
11th grade	28,457	58	14	0	42	32	16	67	29	87	77	57	0
12th grade, no diploma	31,865	71	17	0	42	50	42	54	40	86	124	109	0
High school graduate (includes equivalency)	178,967	92	40	0	218	59	120	144	107	362	238	247	63
Some college, less than 1 year	44,391	39	19	0	48	0	32	36	9	22	29	40	18
Some college, 1 or more years, no degree	94,381	122	81	0	60	39	19	67	49	75	63	41	71
Associate degree	32,014	33	27	0	45	0	5	25	24	11	0	32	0
Bachelor's degree	69,175	73	147	0	31	9	64	28	0	23	30	51	4
Master's degree	28,342	66	29	0	25	0	54	5	0	0	6	35	20

EXHIBIT 18

Professional school degree	10,178	19	74	0	15	0	9	0	0	0	0	7	0
Doctorate degree	4,020	0	12	0	7	0	0	9	0	11	8	0	0
Female:	700,349	741	413	0	580	341	374	617	467	1,255	966	762	239
No schooling completed	10,251	14	0	0	13	14	36	18	58	82	93	21	18
Nursery to 4th grade	3,031	13	0	0	11	0	5	0	5	45	37	21	0
5th and 6th grade	7,697	21	0	0	19	7	11	6	30	111	132	76	17
7th and 8th grade	20,297	12	0	0	76	7	27	36	52	67	72	66	19
9th grade	18,025	6	0	0	34	19	5	23	59	121	63	26	14
10th grade	29,664	89	0	0	35	37	0	37	6	46	88	35	6
11th grade	33,952	40	0	0	45	16	13	33	14	89	24	37	36
12th grade, no diploma	34,118	31	12	0	30	17	21	23	46	59	37	68	4
High school graduate (includes equivalency)	220,918	125	49	0	124	116	68	206	100	365	217	212	58
Some college, less than 1 year	59,317	69	14	0	32	20	13	60	24	71	26	57	12
Some college, 1 or more years, no degree	105,762	129	66	0	41	20	46	86	33	89	84	59	29
Associate degree	44,240	70	24	0	60	30	30	17	22	32	4	21	6
Bachelor's degree	72,691	98	91	0	36	31	37	54	18	65	55	13	8
Master's degree	31,378	9	104	0	11	7	47	13	0	13	3	15	2
Professional school degree	6,673	15	24	0	5	0	11	0	0	0	10	21	10
Doctorate degree	2,335	0	29	0	8	0	4	5	0	0	21	14	0
U.S. Census Bureau Census 2000													
P53. MEDIAN HOUSEHOLD INCOME IN 1999 (DOLLARS) [1] - Universe: Households													
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data													
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.													
	Wayne County, Michigan	Census Tract 5207, Wayne County,	Census Tract 5208, Wayne County,	Census Tract 5209, Wayne County,	Census Tract 5211, Wayne County,	Census Tract 5213, Wayne County,	Census Tract 5214, Wayne County,	Census Tract 5215, Wayne County,	Census Tract 5231, Wayne County,	Census Tract 5232, Wayne County,	Census Tract 5233, Wayne County,	Census Tract 5234, Wayne County,	Census Tract 5235, Wayne County,
Median household income in 1999	40,776	15,000	50,388	0	28,333	17,037	23,897	16,000	24,250	27,614	32,292	27,353	18,529
U.S. Census Bureau Census 2000													
P88. RATIO OF INCOME IN 1999 TO POVERTY LEVEL [10] - Universe: Population for whom poverty status is determined													
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data													
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.													
	Wayne County, Michigan	Census Tract 5207, Wayne County,	Census Tract 5208, Wayne County,	Census Tract 5209, Wayne County,	Census Tract 5211, Wayne County,	Census Tract 5213, Wayne County,	Census Tract 5214, Wayne County,	Census Tract 5215, Wayne County,	Census Tract 5231, Wayne County,	Census Tract 5232, Wayne County,	Census Tract 5233, Wayne County,	Census Tract 5234, Wayne County,	Census Tract 5235, Wayne County,

Total:	2,029,232	1,747	1,081	0	1,995	934	1,195	1,961	1,978	4,620	3,926	2,881	1,030
Under .50	166,923	261	85	0	300	238	158	394	476	625	540	592	144
.50 to .74	84,493	251	29	0	140	37	217	208	149	315	191	183	74
.75 to .99	81,182	122	9	0	208	134	72	188	128	303	324	208	149
1.00 to 1.24	86,758	149	27	0	195	95	82	246	230	358	187	237	70
1.25 to 1.49	85,866	95	21	0	37	9	14	104	129	486	252	90	91
1.50 to 1.74	81,379	90	0	0	249	99	44	103	106	383	318	69	54
1.75 to 1.84	34,081	0	11	0	27	23	30	25	19	156	94	49	8
1.85 to 1.99	46,044	11	15	0	39	0	25	75	9	142	164	174	0
2.00 and over	1,362,506	768	884	0	800	299	553	618	732	1,852	1,856	1,279	440
U.S. Census Bureau Census 2000													
PCT25. SEX BY AGE BY EDUCATIONAL ATTAINMENT FOR THE POPULATION 18 YEARS AND OVER [83] - Universe: Population 18 years and over													
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data													
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.													
	Wayne County, Michigan	Census Tract 5207, Wayne County,	Census Tract 5208, Wayne County,	Census Tract 5209, Wayne County,	Census Tract 5211, Wayne County,	Census Tract 5213, Wayne County,	Census Tract 5214, Wayne County,	Census Tract 5215, Wayne County,	Census Tract 5231, Wayne County,	Census Tract 5232, Wayne County,	Census Tract 5233, Wayne County,	Census Tract 5234, Wayne County,	Census Tract 5235, Wayne County,
Total:	1,484,130	1,651	985	0	1,507	677	947	1,361	1,238	3,264	2,633	2,087	758
Male:	694,299	837	524	0	844	283	518	623	690	1,690	1,416	1,155	460
18 to 24 years:	89,360	65	57	0	89	64	46	102	134	446	296	245	100
Less than 9th grade	3,651	0	0	0	4	0	0	5	20	131	71	47	53
9th to 12th grade, no diploma	26,953	19	0	0	25	26	20	27	40	166	118	122	15
High school graduate (includes equivalency)	29,389	18	11	0	42	28	6	35	38	66	97	56	32
Some college, no degree	23,496	22	15	0	18	10	20	35	22	83	10	16	0
Associate degree	2,007	0	0	0	0	0	0	0	9	0	0	4	0
Bachelor's degree	3,548	6	31	0	0	0	0	0	5	0	0	0	0
Graduate or professional degree	316	0	0	0	0	0	0	0	0	0	0	0	0
25 to 34 years:	145,668	197	116	0	203	34	120	79	200	419	390	393	112
Less than 9th grade	5,015	0	0	0	45	0	0	0	76	152	109	79	37
9th to 12th grade, no diploma	22,091	35	7	0	59	9	14	31	34	125	135	115	35
High school graduate (includes equivalency)	45,468	8	8	0	57	11	31	21	55	107	122	117	30
Some college, no degree	36,211	94	30	0	9	14	9	18	22	35	17	44	4
Associate degree	8,345	0	15	0	7	0	3	0	13	0	0	10	0
Bachelor's degree	20,279	26	23	0	10	0	46	9	0	0	7	28	0
Graduate or professional degree	8,259	34	33	0	16	0	17	0	0	0	0	0	6
35 to 44 years:	157,424	123	144	0	248	86	108	161	166	354	245	195	81
Less than 9th grade	5,477	16	0	0	12	6	0	7	78	80	110	21	10
9th to 12th grade, no diploma	24,769	32	18	0	46	26	32	65	54	82	81	49	30
High school graduate (includes equivalency)	49,313	16	9	0	105	26	28	58	16	126	24	59	19
Some college, no degree	38,616	7	28	0	36	19	23	31	18	33	7	22	12
Associate degree	9,934	15	8	0	26	0	0	0	0	11	0	14	0
Bachelor's degree	18,571	20	32	0	16	9	2	0	0	16	23	0	0

duate or professional degree	10,744	17	49	0	7	0	23	0	0	6	0	30	10
64 years:	203,213	295	169	0	236	59	180	232	140	312	375	242	139
Less than 9th grade	10,899	19	0	0	42	0	17	24	46	138	113	54	36
9th to 12th grade, no diploma	31,488	126	13	0	58	48	63	60	39	55	119	82	18
High school graduate (includes equivalency)	58,420	47	17	0	56	11	53	50	26	101	69	51	4
Some college, no degree	49,310	57	42	0	49	0	6	54	18	13	68	15	73
Associate degree	11,943	13	0	0	12	0	2	25	11	0	0	5	0
Bachelor's degree	23,137	17	73	0	5	0	16	14	0	0	0	23	4
Graduate or professional degree	18,016	16	24	0	14	0	23	5	0	5	6	12	4
65 years and over:	98,634	157	38	0	68	40	64	49	50	159	110	80	28
Less than 9th grade	17,661	15	0	0	23	12	35	20	25	65	52	32	0
9th to 12th grade, no diploma	26,071	85	0	0	21	11	8	0	15	43	27	25	18
High school graduate (includes equivalency)	25,766	21	6	0	0	11	8	15	10	28	23	20	10
Some college, no degree	14,635	3	0	0	14	6	13	0	0	16	0	0	0
Associate degree	1,792	5	4	0	0	0	0	0	0	0	0	3	0
Bachelor's degree	7,188	10	19	0	0	0	0	5	0	7	0	0	0
Graduate or professional degree	5,521	18	9	0	10	0	0	9	0	0	8	0	0
Female:	789,831	814	461	0	663	394	429	738	548	1,574	1,217	932	298
18 to 24 years:	89,482	73	48	0	83	53	55	121	81	319	251	170	59
Less than 9th grade	2,800	0	0	0	10	0	0	0	14	85	69	13	6
9th to 12th grade, no diploma	22,171	21	16	0	54	14	36	48	34	93	86	56	25
High school graduate (includes equivalency)	26,925	24	8	0	19	29	0	26	0	97	60	63	28
Some college, no degree	29,296	14	24	0	0	10	10	47	33	44	36	38	0
Associate degree	2,780	0	0	0	0	0	5	0	0	0	0	0	0
Bachelor's degree	5,048	14	0	0	0	0	4	0	0	0	0	0	0
duate or professional degree	462	0	0	0	0	0	0	0	0	0	0	0	0
to 34 years:	157,041	79	92	0	153	76	83	188	157	351	307	202	62
Less than 9th grade	3,714	0	0	0	18	0	0	7	29	92	82	22	14
9th to 12th grade, no diploma	21,830	4	6	0	54	20	4	25	53	95	76	51	4
High school graduate (includes equivalency)	43,818	7	6	0	21	31	30	72	42	105	64	64	10
Some college, no degree	44,204	51	6	0	22	6	7	57	23	41	50	32	34
Associate degree	11,185	12	7	0	17	7	13	0	10	8	0	11	0
Bachelor's degree	23,977	5	35	0	16	5	9	27	0	10	35	7	0
Graduate or professional degree	8,313	0	32	0	5	7	20	0	0	0	0	15	0
35 to 44 years:	166,125	136	88	0	172	62	107	130	136	330	254	189	80
Less than 9th grade	4,326	5	0	0	8	0	19	0	62	26	111	60	0
9th to 12th grade, no diploma	21,149	39	0	0	16	14	18	32	24	100	46	42	41
High school graduate (includes equivalency)	49,639	19	0	0	62	23	17	54	12	109	58	50	26
Some college, no degree	46,171	44	17	0	28	10	18	32	13	33	35	6	7
Associate degree	14,794	8	12	0	43	6	3	0	12	20	4	5	6
Bachelor's degree	20,823	21	26	0	15	9	14	12	13	42	0	6	0
Graduate or professional degree	9,223	0	33	0	0	0	18	0	0	0	0	20	0
45 to 64 years:	225,936	276	191	0	148	94	104	234	87	339	271	266	78
Less than 9th grade	9,878	0	0	0	39	7	10	23	16	80	114	76	32
9th to 12th grade, no diploma	32,571	66	0	0	62	26	5	59	31	66	51	49	15
High school graduate (includes equivalency)	74,828	47	34	0	24	25	21	60	26	95	59	58	11
Some college, no degree	54,840	79	49	0	17	16	34	57	9	75	16	68	0
Associate degree	15,274	42	5	0	0	17	10	12	0	4	0	0	0
Bachelor's degree	21,215	27	30	0	0	3	14	15	5	13	20	0	8
Graduate or professional degree	17,330	15	73	0	6	0	10	8	0	6	11	15	12
years and over:	151,247	250	42	0	107	109	80	65	87	235	134	105	19
Less than 9th grade	23,358	55	0	0	54	21	50	30	38	107	27	26	8

9th to 12th grade, no diploma	40,209	57	6	0	12	29	12	0	17	54	39	24	0
[illegible] school graduate (includes equivalency)	52,633	52	9	0	17	37	0	20	20	56	36	40	11
Some college, no degree	19,864	24	8	0	6	8	0	0	12	11	9	10	0
Associate degree	2,987	8	0	0	0	0	4	5	0	0	0	5	0
Bachelor's degree	6,676	45	0	0	5	14	0	0	0	0	0	0	0
Graduate or professional degree	5,520	9	19	0	13	0	14	10	0	7	23	0	0
U.S. Census Bureau Census 2000													

L : Profile of Selected Economic Characteristics: 2000		
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
Geographic Area: United States		
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on		
EMPLOYMENT STATUS		
Population 16 years and over	217,168,077	100
In labor force	138,820,935	63.9
Civilian labor force	137,668,798	63.4
Employed	129,721,512	59.7
Unemployed	7,947,286	3.7
Percent of civilian labor force	5.8	(X)
Armed Forces	1,152,137	0.5
Not in labor force	78,347,142	36.1
Females 16 years and over	112,185,795	100
In labor force	64,547,732	57.5
Civilian labor force	64,383,493	57.4
Employed	60,630,069	54
Own children under 6 years	21,833,613	100
All parents in family in labor force	12,787,501	58.6
COMMUTING TO WORK		
ers 16 years and over	128,279,228	100
Car, truck, or van -- drove alone	97,102,050	75.7
Car, truck, or van -- carpooled	15,634,051	12.2
Public transportation (including taxicab)	6,067,703	4.7
Walked	3,758,982	2.9
Other means	1,532,219	1.2
Worked at home	4,184,223	3.3
Mean travel time to work (minutes)	25.5	(X)
Employed civilian population 16 years and over	129,721,512	100
OCCUPATION		
Management, professional, and related occupations	43,646,731	33.6
Service occupations	19,276,947	14.9
Sales and office occupations	34,621,390	26.7
Farming, fishing, and forestry occupations	951,810	0.7
Construction, extraction, and maintenance occupations	12,256,138	9.4
Production, transportation, and material moving occupations	18,968,496	14.6
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	2,426,053	1.9
Construction	8,801,507	6.8
Manufacturing	18,286,005	14.1
Wholesale trade	4,666,757	3.6
Retail trade	15,221,716	11.7
T sportation and warehousing, and utilities	6,740,102	5.2
mation	3,996,564	3.1
nance, insurance, real estate, and rental and leasing	8,934,972	6.9

ssional, scientific, management, administrative, and waste management services	12,061,865	9.3
Educational, health and social services	25,843,029	19.9
Arts, entertainment, recreation, accommodation and food services	10,210,295	7.9
Other services (except public administration)	6,320,632	4.9
Public administration	6,212,015	4.8
CLASS OF WORKER		
Private wage and salary workers	101,794,361	78.5
Government workers	18,923,353	14.6
Self-employed workers in own not incorporated business	8,603,761	6.6
Unpaid family workers	400,037	0.3
INCOME IN 1999		
Households	105,539,122	100
Less than $10,000	10,067,027	9.5
$10,000 to $14,999	6,657,228	6.3
$15,000 to $24,999	13,536,965	12.8
$25,000 to $34,999	13,519,242	12.8
$35,000 to $49,999	17,446,272	16.5
$50,000 to $74,999	20,540,604	19.5
$75,000 to $99,999	10,799,245	10.2
$100,000 to $149,999	8,147,826	7.7
$150,000 to $199,999	2,322,038	2.2
$200,000 or more	2,502,675	2.4
Median household income (dollars)	41,994	(X)
With earnings	84,962,743	80.5
Mean earnings (dollars)	56,604	(X)
With Social Security income	27,084,417	25.7
Mean Social Security income (dollars)	11,320	(X)
With Supplemental Security Income	4,615,885	4.4
Mean Supplemental Security Income (dollars)	6,320	(X)
With public assistance income	3,629,732	3.4
Mean public assistance income (dollars)	3,032	(X)
With retirement income	17,659,058	16.7
Mean retirement income (dollars)	17,376	(X)
Families	72,261,780	100
Less than $10,000	4,155,386	5.8
$10,000 to $14,999	3,115,586	4.3
$15,000 to $24,999	7,757,397	10.7
$25,000 to $34,999	8,684,429	12
$35,000 to $49,999	12,377,108	17.1
$50,000 to $74,999	16,130,100	22.3
$75,000 to $99,999	9,009,327	12.5
$100,000 to $149,999	6,936,210	9.6
$150,000 to $199,999	1,983,673	2.7
$200,000 or more	2,112,564	2.9
Median family income (dollars)	50,046	(X)
capita income (dollars)	21,587	(X)
ledian earnings (dollars):		

M full-time, year-round workers	37,057	(X)
Female full-time, year-round workers	27,194	(X)
POVERTY STATUS IN 1999 (below poverty level)		
Families	6,620,945	(X)
Percent below poverty level	(X)	9.2
With related children under 18 years	5,155,866	(X)
Percent below poverty level	(X)	13.6
With related children under 5 years	2,562,263	(X)
Percent below poverty level	(X)	17
Families with female householder, no husband present	3,315,916	(X)
Percent below poverty level	(X)	26.5
With related children under 18 years	2,940,459	(X)
Percent below poverty level	(X)	34.3
With related children under 5 years	1,401,493	(X)
Percent below poverty level	(X)	46.4
Individuals	33,899,812	(X)
Percent below poverty level	(X)	12.4
18 years and over	22,152,954	(X)
Percent below poverty level	(X)	10.9
65 years and over	3,287,774	(X)
Percent below poverty level	(X)	9.9
Related children under 18 years	11,386,031	(X)
Percent below poverty level	(X)	16.1
Related children 5 to 17 years	7,974,006	(X)
Percent below poverty level	(X)	15.4
Unrelated individuals 15 years and over	10,721,935	(X)
Percent below poverty level	(X)	22.7
(X) Not applicable.		
DP-3: Profile of Selected Economic Characteristics: 2000		
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
Geographic Area: Census Tract 5207	Wayne County	Michigan
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on		
EMPLOYMENT STATUS		
Population 16 years and over	1,670	100
In labor force	877	52.5
Civilian labor force	871	52.2
Employed	730	43.7
Unemployed	141	8.4
Percent of civilian labor force	16.2	(X)
Armed Forces	6	0.4
Not in labor force	793	47.5
Females 16 years and over	821	100
In labor force	372	45.3
Civilian labor force	372	45.3

[loyed	337	41
Own children under 6 years	24	100
All parents in family in labor force	24	100
COMMUTING TO WORK		
Workers 16 years and over	720	100
Car, truck, or van -- drove alone	319	44.3
Car, truck, or van -- carpooled	49	6.8
Public transportation (including taxicab)	186	25.8
Walked	166	23.1
Other means	0	0
Worked at home	0	0
Mean travel time to work (minutes)	23.3	(X)
Employed civilian population 16 years and over	730	100
OCCUPATION		
Management, professional, and related occupations	189	25.9
Service occupations	174	23.8
Sales and office occupations	243	33.3
Farming, fishing, and forestry occupations	0	0
Construction, extraction, and maintenance occupations	55	7.5
Production, transportation, and material moving occupations	69	9.5
NDUSTRY		
culture, forestry, fishing and hunting, and mining	0	0
Construction	15	2.1
Manufacturing	51	7
Wholesale trade	14	1.9
Retail trade	34	4.7
Transportation and warehousing, and utilities	61	8.4
Information	21	2.9
Finance, insurance, real estate, and rental and leasing	46	6.3
Professional, scientific, management, administrative, and waste management services	116	15.9
Educational, health and social services	121	16.6
Arts, entertainment, recreation, accommodation and food services	82	11.2
Other services (except public administration)	33	4.5
Public administration	136	18.6
CLASS OF WORKER		
Private wage and salary workers	475	65.1
Government workers	248	34
Self-employed workers in own not incorporated business	7	1
Unpaid family workers	0	0
INCOME IN 1999		
Households	1,258	100
Less than $10,000	468	37.2
$10,000 to $14,999	161	12.8
$ 000 to $24,999	178	14.1
,000 to $34,999	150	11.9
35,000 to $49,999	129	10.3

$)00 to $74,999	116	9.2
$75,000 to $99,999	17	1.4
$100,000 to $149,999	25	2
$150,000 to $199,999	3	0.2
$200,000 or more	11	0.9
Median household income (dollars)	15,000	(X)
With earnings	754	59.9
Mean earnings (dollars)	31,548	(X)
With Social Security income	445	35.4
Mean Social Security income (dollars)	6,721	(X)
With Supplemental Security Income	227	18
Mean Supplemental Security Income (dollars)	5,479	(X)
With public assistance income	163	13
Mean public assistance income (dollars)	860	(X)
With retirement income	246	19.6
Mean retirement income (dollars)	21,121	(X)
Families	206	100
Less than $10,000	38	18.4
$10,000 to $14,999	21	10.2
$15,000 to $24,999	27	13.1
$25,000 to $34,999	45	21.8
$35,000 to $49,999	16	7.8
$50,000 to $74,999	29	14.1
$75,000 to $99,999	12	5.8
$100,000 to $149,999	10	4.9
$150,000 to $199,999	3	1.5
$200,000 or more	5	2.4
Median family income (dollars)	30,417	(X)
Per capita income (dollars)	19,910	(X)
Median earnings (dollars):		
Male full-time, year-round workers	26,786	(X)
Female full-time, year-round workers	35,000	(X)
POVERTY STATUS IN 1999 (below poverty level)		
Families	59	(X)
Percent below poverty level	(X)	28.6
With related children under 18 years	38	(X)
Percent below poverty level	(X)	40.9
With related children under 5 years	15	(X)
Percent below poverty level	(X)	71.4
Families with female householder, no husband present	45	(X)
Percent below poverty level	(X)	36.3
With related children under 18 years	28	(X)
Percent below poverty level	(X)	53.8
With related children under 5 years	5	(X)
Percent below poverty level	(X)	100
Individuals	634	(X)

F ent below poverty level	(X)	36.3
18 years and over	588	(X)
Percent below poverty level	(X)	35.6
65 years and over	126	(X)
Percent below poverty level	(X)	31
Related children under 18 years	46	(X)
Percent below poverty level	(X)	47.9
Related children 5 to 17 years	23	(X)
Percent below poverty level	(X)	34.8
Unrelated individuals 15 years and over	465	(X)
Percent below poverty level	(X)	37.4
(X) Not applicable.		
DP-3: Profile of Selected Economic Characteristics: 2000		
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
Geographic Area: Census Tract 5208	Wayne County	Michigan
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on		
EMPLOYMENT STATUS		
Population 16 years and over	994	100
In labor force	734	73.8
Civilian labor force	734	73.8
Employed	725	72.9
nployed	9	0.9
Percent of civilian labor force	1.2	(X)
Armed Forces	0	0
Not in labor force	260	26.2
Females 16 years and over	461	100
In labor force	299	64.9
Civilian labor force	299	64.9
Employed	290	62.9
Own children under 6 years	6	100
All parents in family in labor force	0	0
COMMUTING TO WORK		
Workers 16 years and over	695	100
Car, truck, or van -- drove alone	457	65.8
Car, truck, or van -- carpooled	62	8.9
Public transportation (including taxicab)	65	9.4
Walked	42	6
Other means	25	3.6
Worked at home	44	6.3
Mean travel time to work (minutes)	17.6	(X)
Employed civilian population 16 years and over	725	100
C CUPATION		
agement, professional, and related occupations	458	63.2
ervice occupations	60	8.3

s and office occupations	135	18.6
Farming, fishing, and forestry occupations	0	0
Construction, extraction, and maintenance occupations	19	2.6
Production, transportation, and material moving occupations	53	7.3
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	0	0
Construction	6	0.8
Manufacturing	63	8.7
Wholesale trade	0	0
Retail trade	15	2.1
Transportation and warehousing, and utilities	40	5.5
Information	7	1
Finance, insurance, real estate, and rental and leasing	101	13.9
Professional, scientific, management, administrative, and waste management services	137	18.9
Educational, health and social services	195	26.9
Arts, entertainment, recreation, accommodation and food services	47	6.5
Other services (except public administration)	59	8.1
Public administration	55	7.6
CLASS OF WORKER		
Private wage and salary workers	529	73
Government workers	148	20.4
Self-employed workers in own not incorporated business	48	6.6
Unpaid family workers	0	0
INCOME IN 1999		
Households	753	100
Less than $10,000	91	12.1
$10,000 to $14,999	13	1.7
$15,000 to $24,999	43	5.7
$25,000 to $34,999	40	5.3
$35,000 to $49,999	176	23.4
$50,000 to $74,999	200	26.6
$75,000 to $99,999	71	9.4
$100,000 to $149,999	78	10.4
$150,000 to $199,999	26	3.5
$200,000 or more	15	2
Median household income (dollars)	50,388	(X)
With earnings	664	88.2
Mean earnings (dollars)	59,575	(X)
With Social Security income	101	13.4
Mean Social Security income (dollars)	11,840	(X)
With Supplemental Security Income	16	2.1
Mean Supplemental Security Income (dollars)	6,363	(X)
With public assistance income	13	1.7
Mean public assistance income (dollars)	3,400	(X)
With retirement income	116	15.4
Mean retirement income (dollars)	24,125	(X)
Families	202	100

L than $10,000	21	10.4
$10,000 to $14,999	5	2.5
$15,000 to $24,999	0	0
$25,000 to $34,999	7	3.5
$35,000 to $49,999	32	15.8
$50,000 to $74,999	55	27.2
$75,000 to $99,999	31	15.3
$100,000 to $149,999	28	13.9
$150,000 to $199,999	8	4
$200,000 or more	15	7.4
Median family income (dollars)	65,294	(X)
Per capita income (dollars)	41,022	(X)
Median earnings (dollars):		
Male full-time, year-round workers	47,813	(X)
Female full-time, year-round workers	51,510	(X)
POVERTY STATUS IN 1999 (below poverty level)		
Families	21	(X)
Percent below poverty level	(X)	10.4
With related children under 18 years	6	(X)
Percent below poverty level	(X)	8.6
With related children under 5 years	6	(X)
Percent below poverty level	(X)	100
..ilies with female householder, no husband present	12	(X)
Percent below poverty level	(X)	20.7
With related children under 18 years	6	(X)
Percent below poverty level	(X)	16.7
With related children under 5 years	6	(X)
Percent below poverty level	(X)	100
Individuals	123	(X)
Percent below poverty level	(X)	11.4
18 years and over	117	(X)
Percent below poverty level	(X)	11.9
65 years and over	0	(X)
Percent below poverty level	(X)	0
Related children under 18 years	6	(X)
Percent below poverty level	(X)	6.3
Related children 5 to 17 years	0	(X)
Percent below poverty level	(X)	0
Unrelated individuals 15 years and over	81	(X)
Percent below poverty level	(X)	13.1
(X) Not applicable.		
DP-3: Profile of Selected Economic Characteristics: 2000		
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
C graphic Area: Census Tract 5209	Wayne County	Michigan
E: Data based on a sample except in P3, P4, H3, and H4. For information on		

EMPLOYMENT STATUS		
Population 16 years and over	0	(X)
In labor force	0	(X)
Civilian labor force	0	(X)
Employed	0	(X)
Unemployed	0	(X)
Percent of civilian labor force	(X)	(X)
Armed Forces	0	(X)
Not in labor force	0	(X)
Females 16 years and over	0	(X)
In labor force	0	(X)
Civilian labor force	0	(X)
Employed	0	(X)
Own children under 6 years	0	(X)
All parents in family in labor force	0	(X)
COMMUTING TO WORK		
Workers 16 years and over	0	(X)
Car, truck, or van -- drove alone	0	(X)
Car, truck, or van -- carpooled	0	(X)
Public transportation (including taxicab)	0	(X)
Walked	0	(X)
Other means	0	(X)
Worked at home	0	(X)
Mean travel time to work (minutes)	(X)	(X)
Employed civilian population 16 years and over	0	(X)
OCCUPATION		
Management, professional, and related occupations	0	(X)
Service occupations	0	(X)
Sales and office occupations	0	(X)
Farming, fishing, and forestry occupations	0	(X)
Construction, extraction, and maintenance occupations	0	(X)
Production, transportation, and material moving occupations	0	(X)
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	0	(X)
Construction	0	(X)
Manufacturing	0	(X)
Wholesale trade	0	(X)
Retail trade	0	(X)
Transportation and warehousing, and utilities	0	(X)
Information	0	(X)
Finance, insurance, real estate, and rental and leasing	0	(X)
Professional, scientific, management, administrative, and waste management services	0	(X)
Educational, health and social services	0	(X)
Arts, entertainment, recreation, accommodation and food services	0	(X)
Other services (except public administration)	0	(X)
Public administration	0	(X)

CLASS OF WORKER		
Private wage and salary workers	0	(X)
Government workers	0	(X)
Self-employed workers in own not incorporated business	0	(X)
Unpaid family workers	0	(X)
INCOME IN 1999		
Households	0	(X)
Less than $10,000	0	(X)
$10,000 to $14,999	0	(X)
$15,000 to $24,999	0	(X)
$25,000 to $34,999	0	(X)
$35,000 to $49,999	0	(X)
$50,000 to $74,999	0	(X)
$75,000 to $99,999	0	(X)
$100,000 to $149,999	0	(X)
$150,000 to $199,999	0	(X)
$200,000 or more	0	(X)
Median household income (dollars)	0	(X)
With earnings	0	(X)
Mean earnings (dollars)	(X)	(X)
With Social Security income	0	(X)
Mean Social Security income (dollars)	(X)	(X)
Supplemental Security Income	0	(X)
Mean Supplemental Security Income (dollars)	(X)	(X)
With public assistance income	0	(X)
Mean public assistance income (dollars)	(X)	(X)
With retirement income	0	(X)
Mean retirement income (dollars)	(X)	(X)
Families	0	(X)
Less than $10,000	0	(X)
$10,000 to $14,999	0	(X)
$15,000 to $24,999	0	(X)
$25,000 to $34,999	0	(X)
$35,000 to $49,999	0	(X)
$50,000 to $74,999	0	(X)
$75,000 to $99,999	0	(X)
$100,000 to $149,999	0	(X)
$150,000 to $199,999	0	(X)
$200,000 or more	0	(X)
Median family income (dollars)	0	(X)
Per capita income (dollars)	0	(X)
Median earnings (dollars):		
Male full-time, year-round workers	0	(X)
Female full-time, year-round workers	0	(X)
POVERTY STATUS IN 1999 (below poverty level)		
Families	0	(X)

I ent below poverty level	(X)	(X)
With related children under 18 years	0	(X)
Percent below poverty level	(X)	(X)
With related children under 5 years	0	(X)
Percent below poverty level	(X)	(X)
Families with female householder, no husband present	0	(X)
Percent below poverty level	(X)	(X)
With related children under 18 years	0	(X)
Percent below poverty level	(X)	(X)
With related children under 5 years	0	(X)
Percent below poverty level	(X)	(X)
Individuals	0	(X)
Percent below poverty level	(X)	(X)
18 years and over	0	(X)
Percent below poverty level	(X)	(X)
65 years and over	0	(X)
Percent below poverty level	(X)	(X)
Related children under 18 years	0	(X)
Percent below poverty level	(X)	(X)
Related children 5 to 17 years	0	(X)
Percent below poverty level	(X)	(X)
Unrelated individuals 15 years and over	0	(X)
ent below poverty level	(X)	(X)
Not applicable.		
DP-3: Profile of Selected Economic Characteristics: 2000		
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
Geographic Area: Census Tract 5211	Wayne County	Michigan
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on		
EMPLOYMENT STATUS		
Population 16 years and over	1,555	100
In labor force	871	56
Civilian labor force	871	56
Employed	748	48.1
Unemployed	123	7.9
Percent of civilian labor force	14.1	(X)
Armed Forces	0	0
Not in labor force	684	44
Females 16 years and over	679	100
In labor force	232	34.2
Civilian labor force	232	34.2
Employed	198	29.2
children under 6 years	142	100
parents in family in labor force	46	32.4

(MUTING TO WORK		
Workers 16 years and over	717	100
Car, truck, or van -- drove alone	355	49.5
Car, truck, or van -- carpooled	169	23.6
Public transportation (including taxicab)	102	14.2
Walked	44	6.1
Other means	47	6.6
Worked at home	0	0
Mean travel time to work (minutes)	26.8	(X)
Employed civilian population 16 years and over	748	100
OCCUPATION		
Management, professional, and related occupations	114	15.2
Service occupations	134	17.9
Sales and office occupations	159	21.3
Farming, fishing, and forestry occupations	16	2.1
Construction, extraction, and maintenance occupations	133	17.8
Production, transportation, and material moving occupations	192	25.7
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	16	2.1
Construction	107	14.3
Manufacturing	177	23.7
Wholesale trade	14	1.9
il trade	119	15.9
sportation and warehousing, and utilities	16	2.1
Information	6	0.8
Finance, insurance, real estate, and rental and leasing	7	0.9
Professional, scientific, management, administrative, and waste management services	89	11.9
Educational, health and social services	91	12.2
Arts, entertainment, recreation, accommodation and food services	69	9.2
Other services (except public administration)	14	1.9
Public administration	23	3.1
CLASS OF WORKER		
Private wage and salary workers	646	86.4
Government workers	67	9
Self-employed workers in own not incorporated business	26	3.5
Unpaid family workers	9	1.2
INCOME IN 1999		
Households	680	100
Less than $10,000	177	26
$10,000 to $14,999	38	5.6
$15,000 to $24,999	72	10.6
$25,000 to $34,999	149	21.9
$35,000 to $49,999	78	11.5
$50,000 to $74,999	88	12.9
$75,000 to $99,999	55	8.1
,000 to $149,999	6	0.9
,000 to $199,999	0	0
$200,000 or more	17	2.5

M an household income (dollars)	28,333	(X)
With earnings	491	72.2
Mean earnings (dollars)	61,704	(X)
With Social Security income	195	28.7
Mean Social Security income (dollars)	9,016	(X)
With Supplemental Security Income	55	8.1
Mean Supplemental Security Income (dollars)	6,909	(X)
With public assistance income	37	5.4
Mean public assistance income (dollars)	2,735	(X)
With retirement income	125	18.4
Mean retirement income (dollars)	13,092	(X)
Families	370	100
Less than $10,000	43	11.6
$10,000 to $14,999	17	4.6
$15,000 to $24,999	39	10.5
$25,000 to $34,999	81	21.9
$35,000 to $49,999	56	15.1
$50,000 to $74,999	86	23.2
$75,000 to $99,999	30	8.1
$100,000 to $149,999	6	1.6
$150,000 to $199,999	0	0
$200,000 or more	12	3.2
ian family income (dollars)	35,658	(X)
Per capita income (dollars)	18,144	(X)
Median earnings (dollars):		
Male full-time, year-round workers	28,649	(X)
Female full-time, year-round workers	18,056	(X)
POVERTY STATUS IN 1999 (below poverty level)		
Families	70	(X)
Percent below poverty level	(X)	18.9
With related children under 18 years	52	(X)
Percent below poverty level	(X)	22.9
With related children under 5 years	29	(X)
Percent below poverty level	(X)	28.4
Families with female householder, no husband present	48	(X)
Percent below poverty level	(X)	53.9
With related children under 18 years	43	(X)
Percent below poverty level	(X)	64.2
With related children under 5 years	29	(X)
Percent below poverty level	(X)	69
Individuals	648	(X)
Percent below poverty level	(X)	32.5
18 years and over	532	(X)
ent below poverty level	(X)	35.3
years and over	62	(X)
ercent below poverty level	(X)	35.4

F ed children under 18 years	116	(X)
Percent below poverty level	(X)	23.8
Related children 5 to 17 years	83	(X)
Percent below poverty level	(X)	25.1
Unrelated individuals 15 years and over	410	(X)
Percent below poverty level	(X)	61.6
(X) Not applicable.		
DP-3: Profile of Selected Economic Characteristics: 2000		
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
Geographic Area: Census Tract 5213	Wayne County	Michigan
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on		
EMPLOYMENT STATUS		
Population 16 years and over	684	100
In labor force	318	46.5
Civilian labor force	318	46.5
Employed	270	39.5
Unemployed	48	7
Percent of civilian labor force	15.1	(X)
Armed Forces	0	0
Not in labor force	366	53.5
.ales 16 years and over	401	100
In labor force	168	41.9
Civilian labor force	168	41.9
Employed	139	34.7
Own children under 6 years	57	100
All parents in family in labor force	57	100
COMMUTING TO WORK		
Workers 16 years and over	270	100
Car, truck, or van -- drove alone	143	53
Car, truck, or van -- carpooled	37	13.7
Public transportation (including taxicab)	55	20.4
Walked	15	5.6
Other means	0	0
Worked at home	20	7.4
Mean travel time to work (minutes)	17.1	(X)
Employed civilian population 16 years and over	270	100
OCCUPATION		
Management, professional, and related occupations	18	6.7
Service occupations	77	28.5
Sales and office occupations	103	38.1
Farming, fishing, and forestry occupations	0	0
C struction, extraction, and maintenance occupations	29	10.7
oduction, transportation, and material moving occupations	43	15.9

I STRY		
Agriculture, forestry, fishing and hunting, and mining	0	0
Construction	17	6.3
Manufacturing	33	12.2
Wholesale trade	7	2.6
Retail trade	49	18.1
Transportation and warehousing, and utilities	20	7.4
Information	12	4.4
Finance, insurance, real estate, and rental and leasing	32	11.9
Professional, scientific, management, administrative, and waste management services	41	15.2
Educational, health and social services	35	13
Arts, entertainment, recreation, accommodation and food services	17	6.3
Other services (except public administration)	7	2.6
Public administration	0	0
CLASS OF WORKER		
Private wage and salary workers	242	89.6
Government workers	19	7
Self-employed workers in own not incorporated business	9	3.3
Unpaid family workers	0	0
INCOME IN 1999		
Households	376	100
Less than $10,000	136	36.2
$ 000 to $14,999	30	8
,000 to $24,999	86	22.9
$25,000 to $34,999	44	11.7
$35,000 to $49,999	40	10.6
$50,000 to $74,999	17	4.5
$75,000 to $99,999	9	2.4
$100,000 to $149,999	11	2.9
$150,000 to $199,999	3	0.8
$200,000 or more	0	0
Median household income (dollars)	17,037	(X)
With earnings	214	56.9
Mean earnings (dollars)	27,782	(X)
With Social Security income	131	34.8
Mean Social Security income (dollars)	8,756	(X)
With Supplemental Security Income	49	13
Mean Supplemental Security Income (dollars)	5,973	(X)
With public assistance income	63	16.8
Mean public assistance income (dollars)	1,390	(X)
With retirement income	69	18.4
Mean retirement income (dollars)	6,743	(X)
Families	206	100
Less than $10,000	44	21.4
$10,000 to $14,999	4	1.9
000 to $24,999	64	31.1
,000 to $34,999	32	15.5
35,000 to $49,999	29	14.1

$)00 to $74,999	13	6.3
$75,000 to $99,999	9	4.4
$100,000 to $149,999	11	5.3
$150,000 to $199,999	0	0
$200,000 or more	0	0
Median family income (dollars)	24,167	(X)
Per capita income (dollars)	9,992	(X)
Median earnings (dollars):		
Male full-time, year-round workers	16,818	(X)
Female full-time, year-round workers	20,859	(X)
POVERTY STATUS IN 1999 (below poverty level)		
Families	63	(X)
Percent below poverty level	(X)	30.6
With related children under 18 years	52	(X)
Percent below poverty level	(X)	46.8
With related children under 5 years	25	(X)
Percent below poverty level	(X)	64.1
Families with female householder, no husband present	52	(X)
Percent below poverty level	(X)	37.4
With related children under 18 years	52	(X)
Percent below poverty level	(X)	59.8
With related children under 5 years	25	(X)
Percent below poverty level	(X)	64.1
Individuals	409	(X)
Percent below poverty level	(X)	43.8
18 years and over	247	(X)
Percent below poverty level	(X)	36.5
65 years and over	64	(X)
Percent below poverty level	(X)	43
Related children under 18 years	162	(X)
Percent below poverty level	(X)	63
Related children 5 to 17 years	135	(X)
Percent below poverty level	(X)	66.8
Unrelated individuals 15 years and over	147	(X)
Percent below poverty level	(X)	57.4
(X) Not applicable.		
DP-3: Profile of Selected Economic Characteristics: 2000		
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
Geographic Area: Census Tract 5214	Wayne County	Michigan
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on		
EMPLOYMENT STATUS		
Population 16 years and over	963	100
In labor force	626	65
Civilian labor force	626	65

[illegible]oyed	493	51.2
Unemployed	133	13.8
Percent of civilian labor force	21.2	(X)
Armed Forces	0	0
Not in labor force	337	35
Females 16 years and over	439	100
In labor force	285	64.9
Civilian labor force	285	64.9
Employed	233	53.1
Own children under 6 years	94	100
All parents in family in labor force	75	79.8
COMMUTING TO WORK		
Workers 16 years and over	481	100
Car, truck, or van -- drove alone	368	76.5
Car, truck, or van -- carpooled	54	11.2
Public transportation (including taxicab)	25	5.2
Walked	24	5
Other means	4	0.8
Worked at home	6	1.2
Mean travel time to work (minutes)	17.5	(X)
[illegible]loyed civilian population 16 years and over	493	100
[illegible]UPATION		
Management, professional, and related occupations	234	47.5
Service occupations	75	15.2
Sales and office occupations	118	23.9
Farming, fishing, and forestry occupations	1	0.2
Construction, extraction, and maintenance occupations	25	5.1
Production, transportation, and material moving occupations	40	8.1
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	0	0
Construction	12	2.4
Manufacturing	38	7.7
Wholesale trade	11	2.2
Retail trade	62	12.6
Transportation and warehousing, and utilities	16	3.2
Information	15	3
Finance, insurance, real estate, and rental and leasing	27	5.5
Professional, scientific, management, administrative, and waste management services	76	15.4
Educational, health and social services	132	26.8
Arts, entertainment, recreation, accommodation and food services	57	11.6
Other services (except public administration)	13	2.6
Public administration	34	6.9
CLASS OF WORKER		
[illegible]te wage and salary workers	386	78.3
[illegible]vernment workers	80	16.2
Self-employed workers in own not incorporated business	27	5.5

[illegible]id family workers	0	0
INCOME IN 1999		
Households	573	100
Less than $10,000	144	25.1
$10,000 to $14,999	62	10.8
$15,000 to $24,999	88	15.4
$25,000 to $34,999	48	8.4
$35,000 to $49,999	90	15.7
$50,000 to $74,999	59	10.3
$75,000 to $99,999	51	8.9
$100,000 to $149,999	9	1.6
$150,000 to $199,999	13	2.3
$200,000 or more	9	1.6
Median household income (dollars)	23,897	(X)
With earnings	418	72.9
Mean earnings (dollars)	41,495	(X)
With Social Security income	129	22.5
Mean Social Security income (dollars)	10,856	(X)
With Supplemental Security Income	73	12.7
Mean Supplemental Security Income (dollars)	6,382	(X)
With public assistance income	12	2.1
Mean public assistance income (dollars)	3,292	(X)
[illegible] retirement income	68	11.9
[illegible]n retirement income (dollars)	122,066	(X)
Families	210	100
Less than $10,000	27	12.9
$10,000 to $14,999	22	10.5
$15,000 to $24,999	30	14.3
$25,000 to $34,999	17	8.1
$35,000 to $49,999	23	11
$50,000 to $74,999	41	19.5
$75,000 to $99,999	32	15.2
$100,000 to $149,999	9	4.3
$150,000 to $199,999	0	0
$200,000 or more	9	4.3
Median family income (dollars)	40,455	(X)
Per capita income (dollars)	23,460	(X)
Median earnings (dollars):		
Male full-time, year-round workers	31,316	(X)
Female full-time, year-round workers	30,481	(X)
POVERTY STATUS IN 1999 (below poverty level)		
Families	52	(X)
Percent below poverty level	(X)	24.8
With related children under 18 years	39	(X)
[illegible]ent below poverty level	(X)	31.7
[illegible] related children under 5 years	22	(X)
[illegible]ercent below poverty level	(X)	38.6

Families with female householder, no husband present	36	(X)
Percent below poverty level	(X)	46.8
With related children under 18 years	29	(X)
Percent below poverty level	(X)	49.2
With related children under 5 years	17	(X)
Percent below poverty level	(X)	85
Individuals	447	(X)
Percent below poverty level	(X)	37.4
18 years and over	324	(X)
Percent below poverty level	(X)	34.2
65 years and over	33	(X)
Percent below poverty level	(X)	22.9
Related children under 18 years	123	(X)
Percent below poverty level	(X)	49.6
Related children 5 to 17 years	81	(X)
Percent below poverty level	(X)	50
Unrelated individuals 15 years and over	223	(X)
Percent below poverty level	(X)	44.4
(X) Not applicable.		
DP-3: Profile of Selected Economic Characteristics: 2000		
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
Geographic Area: Census Tract 5215	Wayne County	Michigan
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on		
EMPLOYMENT STATUS		
Population 16 years and over	1,428	100
In labor force	726	50.8
Civilian labor force	722	50.6
Employed	612	42.9
Unemployed	110	7.7
Percent of civilian labor force	15.2	(X)
Armed Forces	4	0.3
Not in labor force	702	49.2
Females 16 years and over	768	100
In labor force	409	53.3
Civilian labor force	409	53.3
Employed	364	47.4
Own children under 6 years	169	100
All parents in family in labor force	128	75.7
COMMUTING TO WORK		
Workers 16 years and over	590	100
Car, truck, or van -- drove alone	420	71.2
Car, truck, or van -- carpooled	78	13.2
Public transportation (including taxicab)	52	8.8

V ed	20	3.4
Ou er means	11	1.9
Worked at home	9	1.5
Mean travel time to work (minutes)	27.7	(X)
Employed civilian population 16 years and over	612	100
OCCUPATION		
Management, professional, and related occupations	163	26.6
Service occupations	105	17.2
Sales and office occupations	192	31.4
Farming, fishing, and forestry occupations	0	0
Construction, extraction, and maintenance occupations	19	3.1
Production, transportation, and material moving occupations	133	21.7
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	0	0
Construction	23	3.8
Manufacturing	80	13.1
Wholesale trade	4	0.7
Retail trade	48	7.8
Transportation and warehousing, and utilities	35	5.7
Information	31	5.1
Finance, insurance, real estate, and rental and leasing	45	7.4
Professional, scientific, management, administrative, and waste management services	51	8.3
Ed cational, health and social services	115	18.8
entertainment, recreation, accommodation and food services	107	17.5
Other services (except public administration)	45	7.4
Public administration	28	4.6
CLASS OF WORKER		
Private wage and salary workers	490	80.1
Government workers	97	15.8
Self-employed workers in own not incorporated business	25	4.1
Unpaid family workers	0	0
INCOME IN 1999		
Households	714	100
Less than $10,000	253	35.4
$10,000 to $14,999	94	13.2
$15,000 to $24,999	72	10.1
$25,000 to $34,999	75	10.5
$35,000 to $49,999	98	13.7
$50,000 to $74,999	54	7.6
$75,000 to $99,999	50	7
$100,000 to $149,999	5	0.7
$150,000 to $199,999	7	1
$200,000 or more	6	0.8
Median household income (dollars)	16,000	(X)
W earnings	484	67.8
M n earnings (dollars)	36,532	(X)
/ith Social Security income	141	19.7

M	n Social Security income (dollars)	10,577	(X)
With Supplemental Security Income		100	14
Mean Supplemental Security Income (dollars)		6,413	(X)
With public assistance income		66	9.2
Mean public assistance income (dollars)		1,571	(X)
With retirement income		55	7.7
Mean retirement income (dollars)		12,816	(X)
Families		451	100
Less than $10,000		106	23.5
$10,000 to $14,999		73	16.2
$15,000 to $24,999		46	10.2
$25,000 to $34,999		57	12.6
$35,000 to $49,999		75	16.6
$50,000 to $74,999		43	9.5
$75,000 to $99,999		38	8.4
$100,000 to $149,999		0	0
$150,000 to $199,999		7	1.6
$200,000 or more		6	1.3
Median family income (dollars)		25,036	(X)
Per capita income (dollars)		11,389	(X)
Median earnings (dollars):			
Male full-time, year-round workers		27,054	(X)
Female full-time, year-round workers		22,250	(X)
POVERTY STATUS IN 1999 (below poverty level)			
Families		158	(X)
Percent below poverty level		(X)	35
With related children under 18 years		147	(X)
Percent below poverty level		(X)	45.2
With related children under 5 years		56	(X)
Percent below poverty level		(X)	48.3
Families with female householder, no husband present		119	(X)
Percent below poverty level		(X)	47.6
With related children under 18 years		108	(X)
Percent below poverty level		(X)	52.7
With related children under 5 years		42	(X)
Percent below poverty level		(X)	60.9
Individuals		790	(X)
Percent below poverty level		(X)	40.3
18 years and over		508	(X)
Percent below poverty level		(X)	37.3
65 years and over		40	(X)
Percent below poverty level		(X)	35.1
Related children under 18 years		278	(X)
Percent below poverty level		(X)	46.6
F ted children 5 to 17 years		225	(X)
Percent below poverty level		(X)	49.3
Unrelated individuals 15 years and over		247	(X)

F ent below poverty level	(X)	56.7
(X) Not applicable.		
DP-3: Profile of Selected Economic Characteristics: 2000		
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
Geographic Area: Census Tract 5231	Wayne County	Michigan
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on		
EMPLOYMENT STATUS		
Population 16 years and over	1,335	100
In labor force	710	53.2
Civilian labor force	710	53.2
Employed	639	47.9
Unemployed	71	5.3
Percent of civilian labor force	10	(X)
Armed Forces	0	0
Not in labor force	625	46.8
Females 16 years and over	587	100
In labor force	233	39.7
Civilian labor force	233	39.7
Employed	202	34.4
children under 6 years	277	100
All parents in family in labor force	113	40.8
COMMUTING TO WORK		
Workers 16 years and over	615	100
Car, truck, or van -- drove alone	237	38.5
Car, truck, or van -- carpooled	332	54
Public transportation (including taxicab)	6	1
Walked	14	2.3
Other means	18	2.9
Worked at home	8	1.3
Mean travel time to work (minutes)	35.5	(X)
Employed civilian population 16 years and over	639	100
OCCUPATION		
Management, professional, and related occupations	31	4.9
Service occupations	184	28.8
Sales and office occupations	62	9.7
Farming, fishing, and forestry occupations	0	0
Construction, extraction, and maintenance occupations	198	31
Production, transportation, and material moving occupations	164	25.7
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	0	0
C truction	172	26.9
ufacturing	111	17.4
holesale trade	33	5.2

F l trade	36	5.6
Transportation and warehousing, and utilities	33	5.2
Information	5	0.8
Finance, insurance, real estate, and rental and leasing	17	2.7
Professional, scientific, management, administrative, and waste management services	82	12.8
Educational, health and social services	39	6.1
Arts, entertainment, recreation, accommodation and food services	73	11.4
Other services (except public administration)	38	5.9
Public administration	0	0
CLASS OF WORKER		
Private wage and salary workers	584	91.4
Government workers	35	5.5
Self-employed workers in own not incorporated business	20	3.1
Unpaid family workers	0	0
INCOME IN 1999		
Households	514	100
Less than $10,000	121	23.5
$10,000 to $14,999	36	7
$15,000 to $24,999	112	21.8
$25,000 to $34,999	74	14.4
$35,000 to $49,999	69	13.4
$50,000 to $74,999	67	13
000 to $99,999	17	3.3
,000 to $149,999	5	1
$150,000 to $199,999	6	1.2
$200,000 or more	7	1.4
Median household income (dollars)	24,250	(X)
With earnings	380	73.9
Mean earnings (dollars)	30,811	(X)
With Social Security income	124	24.1
Mean Social Security income (dollars)	8,783	(X)
With Supplemental Security Income	51	9.9
Mean Supplemental Security Income (dollars)	8,135	(X)
With public assistance income	80	15.6
Mean public assistance income (dollars)	2,455	(X)
With retirement income	78	15.2
Mean retirement income (dollars)	10,513	(X)
Families	399	100
Less than $10,000	93	23.3
$10,000 to $14,999	47	11.8
$15,000 to $24,999	63	15.8
$25,000 to $34,999	63	15.8
$35,000 to $49,999	52	13
$50,000 to $74,999	55	13.8
$75,000 to $99,999	14	3.5
,000 to $149,999	5	1.3
00,000 to $199,999	0	0
200,000 or more	7	1.8

M an family income (dollars)	24,757	(X)
Per capita income (dollars)	9,602	(X)
Median earnings (dollars):		
Male full-time, year-round workers	26,053	(X)
Female full-time, year-round workers	22,188	(X)
POVERTY STATUS IN 1999 (below poverty level)		
Families	139	(X)
Percent below poverty level	(X)	34.8
With related children under 18 years	133	(X)
Percent below poverty level	(X)	42.9
With related children under 5 years	83	(X)
Percent below poverty level	(X)	53.5
Families with female householder, no husband present	61	(X)
Percent below poverty level	(X)	59.2
With related children under 18 years	61	(X)
Percent below poverty level	(X)	71.8
With related children under 5 years	39	(X)
Percent below poverty level	(X)	73.6
Individuals	753	(X)
Percent below poverty level	(X)	38.1
18 years and over	417	(X)
Percent below poverty level	(X)	33.7
65 years and over	6	(X)
Percent below poverty level	(X)	4.4
Related children under 18 years	304	(X)
Percent below poverty level	(X)	42.9
Related children 5 to 17 years	177	(X)
Percent below poverty level	(X)	36.1
Unrelated individuals 15 years and over	192	(X)
Percent below poverty level	(X)	56.5
(X) Not applicable.		
DP-3: Profile of Selected Economic Characteristics: 2000		
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
Geographic Area: Census Tract 5232	Wayne County	Michigan
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on		
EMPLOYMENT STATUS		
Population 16 years and over	3,395	100
In labor force	1,899	55.9
Civilian labor force	1,899	55.9
Employed	1,621	47.7
Unemployed	278	8.2
Percent of civilian labor force	14.6	(X)
Armed Forces	0	0
Not in labor force	1,496	44.1

Females 16 years and over	1,645	100
In labor force	727	44.2
Civilian labor force	727	44.2
Employed	570	34.7
Own children under 6 years	399	100
All parents in family in labor force	191	47.9
COMMUTING TO WORK		
Workers 16 years and over	1,607	100
Car, truck, or van -- drove alone	714	44.4
Car, truck, or van -- carpooled	613	38.1
Public transportation (including taxicab)	50	3.1
Walked	40	2.5
Other means	159	9.9
Worked at home	31	1.9
Mean travel time to work (minutes)	22.4	(X)
Employed civilian population 16 years and over	1,621	100
OCCUPATION		
Management, professional, and related occupations	200	12.3
Service occupations	338	20.9
Sales and office occupations	210	13
Farming, fishing, and forestry occupations	15	0.9
Construction, extraction, and maintenance occupations	264	16.3
Production, transportation, and material moving occupations	594	36.6
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	0	0
Construction	294	18.1
Manufacturing	500	30.8
Wholesale trade	51	3.1
Retail trade	117	7.2
Transportation and warehousing, and utilities	35	2.2
Information	31	1.9
Finance, insurance, real estate, and rental and leasing	13	0.8
Professional, scientific, management, administrative, and waste management services	125	7.7
Educational, health and social services	184	11.4
Arts, entertainment, recreation, accommodation and food services	192	11.8
Other services (except public administration)	69	4.3
Public administration	10	0.6
CLASS OF WORKER		
Private wage and salary workers	1,448	89.3
Government workers	120	7.4
Self-employed workers in own not incorporated business	45	2.8
Unpaid family workers	8	0.5
INCOME IN 1999		
Households	1,340	100
Less than $10,000	199	14.9

$ 00 to $14,999	196	14.6
$15,000 to $24,999	219	16.3
$25,000 to $34,999	197	14.7
$35,000 to $49,999	263	19.6
$50,000 to $74,999	156	11.6
$75,000 to $99,999	45	3.4
$100,000 to $149,999	30	2.2
$150,000 to $199,999	19	1.4
$200,000 or more	16	1.2
Median household income (dollars)	27,614	(X)
With earnings	1,026	76.6
Mean earnings (dollars)	37,628	(X)
With Social Security income	340	25.4
Mean Social Security income (dollars)	9,732	(X)
With Supplemental Security Income	118	8.8
Mean Supplemental Security Income (dollars)	5,536	(X)
With public assistance income	129	9.6
Mean public assistance income (dollars)	2,367	(X)
With retirement income	138	10.3
Mean retirement income (dollars)	55,637	(X)
Families	1,014	100
Less than $10,000	154	15.2
$10,000 to $14,999	128	12.6
$ 000 to $24,999	120	11.8
$25,000 to $34,999	178	17.6
$35,000 to $49,999	212	20.9
$50,000 to $74,999	131	12.9
$75,000 to $99,999	32	3.2
$100,000 to $149,999	33	3.3
$150,000 to $199,999	10	1
$200,000 or more	16	1.6
Median family income (dollars)	29,536	(X)
Per capita income (dollars)	11,520	(X)
Median earnings (dollars):		
Male full-time, year-round workers	24,647	(X)
Female full-time, year-round workers	25,559	(X)
POVERTY STATUS IN 1999 (below poverty level)		
Families	257	(X)
Percent below poverty level	(X)	25.3
With related children under 18 years	214	(X)
Percent below poverty level	(X)	34.3
With related children under 5 years	97	(X)
Percent below poverty level	(X)	36.3
Families with female householder, no husband present	70	(X)
Percent below poverty level	(X)	24.7
With related children under 18 years	64	(X)
Percent below poverty level	(X)	37

related children under 5 years	15	(X)
Percent below poverty level	(X)	53.6
Individuals	1,243	(X)
Percent below poverty level	(X)	26.9
18 years and over	760	(X)
Percent below poverty level	(X)	23.3
65 years and over	75	(X)
Percent below poverty level	(X)	19
Related children under 18 years	483	(X)
Percent below poverty level	(X)	35.6
Related children 5 to 17 years	336	(X)
Percent below poverty level	(X)	34.3
Unrelated individuals 15 years and over	274	(X)
Percent below poverty level	(X)	39.3
(X) Not applicable.		
DP-3: Profile of Selected Economic Characteristics: 2000		
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
Geographic Area: Census Tract 5233	Wayne County	Michigan
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on		
MPLOYMENT STATUS		
lation 16 years and over	2,816	100
In labor force	1,549	55
Civilian labor force	1,549	55
Employed	1,356	48.2
Unemployed	193	6.9
Percent of civilian labor force	12.5	(X)
Armed Forces	0	0
Not in labor force	1,267	45
Females 16 years and over	1,265	100
In labor force	452	35.7
Civilian labor force	452	35.7
Employed	432	34.2
Own children under 6 years	417	100
All parents in family in labor force	140	33.6
COMMUTING TO WORK		
Workers 16 years and over	1,327	100
Car, truck, or van -- drove alone	677	51
Car, truck, or van -- carpooled	445	33.5
Public transportation (including taxicab)	32	2.4
Walked	33	2.5
Other means	104	7.8
Worked at home	36	2.7
Mean travel time to work (minutes)	28.7	(X)

Census Data2

F oyed civilian population 16 years and over	1,356	100
OCCUPATION		
Management, professional, and related occupations	191	14.1
Service occupations	197	14.5
Sales and office occupations	207	15.3
Farming, fishing, and forestry occupations	9	0.7
Construction, extraction, and maintenance occupations	263	19.4
Production, transportation, and material moving occupations	489	36.1
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	9	0.7
Construction	251	18.5
Manufacturing	419	30.9
Wholesale trade	34	2.5
Retail trade	94	6.9
Transportation and warehousing, and utilities	22	1.6
Information	14	1
Finance, insurance, real estate, and rental and leasing	34	2.5
Professional, scientific, management, administrative, and waste management services	140	10.3
Educational, health and social services	176	13
Arts, entertainment, recreation, accommodation and food services	84	6.2
Other services (except public administration)	63	4.6
Public administration	16	1.2
CLASS OF WORKER		
te wage and salary workers	1,219	89.9
Government workers	89	6.6
Self-employed workers in own not incorporated business	30	2.2
Unpaid family workers	18	1.3
INCOME IN 1999		
Households	1,098	100
Less than $10,000	126	11.5
$10,000 to $14,999	152	13.8
$15,000 to $24,999	173	15.8
$25,000 to $34,999	133	12.1
$35,000 to $49,999	237	21.6
$50,000 to $74,999	127	11.6
$75,000 to $99,999	58	5.3
$100,000 to $149,999	78	7.1
$150,000 to $199,999	0	0
$200,000 or more	14	1.3
Median household income (dollars)	32,292	(X)
With earnings	931	84.8
Mean earnings (dollars)	45,616	(X)
With Social Security income	223	20.3
Mean Social Security income (dollars)	12,962	(X)
With Supplemental Security Income	103	9.4
M n Supplemental Security Income (dollars)	6,524	(X)
public assistance income	119	10.8
ean public assistance income (dollars)	3,062	(X)

\ retirement income	137	12.5
Mean retirement income (dollars)	47,112	(X)
Families	867	100
Less than $10,000	102	11.8
$10,000 to $14,999	96	11.1
$15,000 to $24,999	104	12
$25,000 to $34,999	142	16.4
$35,000 to $49,999	203	23.4
$50,000 to $74,999	109	12.6
$75,000 to $99,999	52	6
$100,000 to $149,999	45	5.2
$150,000 to $199,999	0	0
$200,000 or more	14	1.6
Median family income (dollars)	34,153	(X)
Per capita income (dollars)	14,067	(X)
Median earnings (dollars):		
Male full-time, year-round workers	21,548	(X)
Female full-time, year-round workers	25,000	(X)
POVERTY STATUS IN 1999 (below poverty level)		
Families	210	(X)
Percent below poverty level	(X)	24.2
With related children under 18 years	181	(X)
Percent below poverty level	(X)	32
With related children under 5 years	126	(X)
Percent below poverty level	(X)	41.6
Families with female householder, no husband present	76	(X)
Percent below poverty level	(X)	51.4
With related children under 18 years	71	(X)
Percent below poverty level	(X)	65.7
With related children under 5 years	42	(X)
Percent below poverty level	(X)	84
Individuals	1,055	(X)
Percent below poverty level	(X)	26.9
18 years and over	537	(X)
Percent below poverty level	(X)	20.4
65 years and over	63	(X)
Percent below poverty level	(X)	25.8
Related children under 18 years	502	(X)
Percent below poverty level	(X)	39.9
Related children 5 to 17 years	333	(X)
Percent below poverty level	(X)	38.7
Unrelated individuals 15 years and over	153	(X)
Percent below poverty level	(X)	30.6
(X) Not applicable.		
DP-3: Profile of Selected Economic Characteristics: 2000		

Census Data2

[Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
Geographic Area: Census Tract 5234	Wayne County	Michigan
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on		
EMPLOYMENT STATUS		
Population 16 years and over	2,134	100
In labor force	1,278	59.9
Civilian labor force	1,278	59.9
Employed	1,144	53.6
Unemployed	134	6.3
Percent of civilian labor force	10.5	(X)
Armed Forces	0	0
Not in labor force	856	40.1
Females 16 years and over	949	100
In labor force	479	50.5
Civilian labor force	479	50.5
Employed	419	44.2
Own children under 6 years	334	100
All parents in family in labor force	202	60.5
COMMUTING TO WORK		
' -kers 16 years and over	1,053	100
truck, or van -- drove alone	575	54.6
Car, truck, or van -- carpooled	264	25.1
Public transportation (including taxicab)	115	10.9
Walked	34	3.2
Other means	22	2.1
Worked at home	43	4.1
Mean travel time to work (minutes)	35.9	(X)
Employed civilian population 16 years and over	1,144	100
OCCUPATION		
Management, professional, and related occupations	183	16
Service occupations	291	25.4
Sales and office occupations	165	14.4
Farming, fishing, and forestry occupations	0	0
Construction, extraction, and maintenance occupations	127	11.1
Production, transportation, and material moving occupations	378	33
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	0	0
Construction	105	9.2
Manufacturing	328	28.7
Wholesale trade	47	4.1
Retail trade	81	7.1
Transportation and warehousing, and utilities	10	0.9
mation	4	0.3
ance, insurance, real estate, and rental and leasing	83	7.3
Professional, scientific, management, administrative, and waste management services	148	12.9

F ational, health and social services	115	10.1
A , entertainment, recreation, accommodation and food services	127	11.1
Other services (except public administration)	68	5.9
Public administration	28	2.4
CLASS OF WORKER		
Private wage and salary workers	1,006	87.9
Government workers	94	8.2
Self-employed workers in own not incorporated business	38	3.3
Unpaid family workers	6	0.5
INCOME IN 1999		
Households	990	100
Less than $10,000	266	26.9
$10,000 to $14,999	79	8
$15,000 to $24,999	118	11.9
$25,000 to $34,999	161	16.3
$35,000 to $49,999	177	17.9
$50,000 to $74,999	121	12.2
$75,000 to $99,999	28	2.8
$100,000 to $149,999	40	4
$150,000 to $199,999	0	0
$200,000 or more	0	0
Median household income (dollars)	27,353	(X)
earnings	764	77.2
Mean earnings (dollars)	32,690	(X)
With Social Security income	146	14.7
Mean Social Security income (dollars)	9,811	(X)
With Supplemental Security Income	72	7.3
Mean Supplemental Security Income (dollars)	5,671	(X)
With public assistance income	114	11.5
Mean public assistance income (dollars)	2,366	(X)
With retirement income	130	13.1
Mean retirement income (dollars)	7,688	(X)
Families	582	100
Less than $10,000	124	21.3
$10,000 to $14,999	39	6.7
$15,000 to $24,999	54	9.3
$25,000 to $34,999	120	20.6
$35,000 to $49,999	109	18.7
$50,000 to $74,999	80	13.7
$75,000 to $99,999	24	4.1
$100,000 to $149,999	32	5.5
$150,000 to $199,999	0	0
$200,000 or more	0	0
Median family income (dollars)	32,125	(X)
P capita income (dollars)	10,974	(X)
an earnings (dollars):		
ale full-time, year-round workers	26,813	(X)

F ale full-time, year-round workers	22,212	(X)
POVERTY STATUS IN 1999 (below poverty level)		
Families	176	(X)
Percent below poverty level	(X)	30.2
With related children under 18 years	147	(X)
Percent below poverty level	(X)	37.1
With related children under 5 years	73	(X)
Percent below poverty level	(X)	36.7
Families with female householder, no husband present	109	(X)
Percent below poverty level	(X)	63
With related children under 18 years	100	(X)
Percent below poverty level	(X)	70.4
With related children under 5 years	53	(X)
Percent below poverty level	(X)	71.6
Individuals	983	(X)
Percent below poverty level	(X)	34.1
18 years and over	637	(X)
Percent below poverty level	(X)	30.5
65 years and over	19	(X)
Percent below poverty level	(X)	10.3
Related children under 18 years	339	(X)
Percent below poverty level	(X)	43.1
ted children 5 to 17 years	251	(X)
Percent below poverty level	(X)	49.2
Unrelated individuals 15 years and over	354	(X)
Percent below poverty level	(X)	49.2
(X) Not applicable.		
DP-3: Profile of Selected Economic Characteristics: 2000		
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data		
Geographic Area: Census Tract 5235	Wayne County	Michigan
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on		
EMPLOYMENT STATUS		
Population 16 years and over	809	100
In labor force	514	63.5
Civilian labor force	514	63.5
Employed	473	58.5
Unemployed	41	5.1
Percent of civilian labor force	8	(X)
Armed Forces	0	0
Not in labor force	295	36.5
Females 16 years and over	307	100
I bor force	154	50.2
ian labor force	154	50.2
mployed	142	46.3

Own children under 6 years	77	100
All parents in family in labor force	56	72.7
COMMUTING TO WORK		
Workers 16 years and over	473	100
Car, truck, or van -- drove alone	196	41.4
Car, truck, or van -- carpooled	183	38.7
Public transportation (including taxicab)	42	8.9
Walked	44	9.3
Other means	8	1.7
Worked at home	0	0
Mean travel time to work (minutes)	30.6	(X)
Employed civilian population 16 years and over	473	100
OCCUPATION		
Management, professional, and related occupations	91	19.2
Service occupations	142	30
Sales and office occupations	71	15
Farming, fishing, and forestry occupations	3	0.6
Construction, extraction, and maintenance occupations	37	7.8
Production, transportation, and material moving occupations	129	27.3
INDUSTRY		
[illegible]riculture, forestry, fishing and hunting, and mining	3	0.6
[illegible]struction	29	6.1
Manufacturing	70	14.8
Wholesale trade	11	2.3
Retail trade	51	10.8
Transportation and warehousing, and utilities	0	0
Information	0	0
Finance, insurance, real estate, and rental and leasing	31	6.6
Professional, scientific, management, administrative, and waste management services	117	24.7
Educational, health and social services	51	10.8
Arts, entertainment, recreation, accommodation and food services	42	8.9
Other services (except public administration)	66	14
Public administration	2	0.4
CLASS OF WORKER		
Private wage and salary workers	453	95.8
Government workers	20	4.2
Self-employed workers in own not incorporated business	0	0
Unpaid family workers	0	0
INCOME IN 1999		
Households	368	100
Less than $10,000	118	32.1
$10,000 to $14,999	34	9.2
$15,000 to $24,999	79	21.5
$[illegible]000 to $34,999	30	8.2
$[illegible],000 to $49,999	34	9.2
$50,000 to $74,999	49	13.3

$)00 to $99,999	10	2.7
$100,000 to $149,999	8	2.2
$150,000 to $199,999	6	1.6
$200,000 or more	0	0
Median household income (dollars)	18,529	(X)
With earnings	230	62.5
Mean earnings (dollars)	37,809	(X)
With Social Security income	54	14.7
Mean Social Security income (dollars)	8,513	(X)
With Supplemental Security Income	68	18.5
Mean Supplemental Security Income (dollars)	7,943	(X)
With public assistance income	87	23.6
Mean public assistance income (dollars)	2,257	(X)
With retirement income	32	8.7
Mean retirement income (dollars)	7,838	(X)
Families	222	100
Less than $10,000	43	19.4
$10,000 to $14,999	14	6.3
$15,000 to $24,999	47	21.2
$25,000 to $34,999	30	13.5
$35,000 to $49,999	46	20.7
$50,000 to $74,999	18	8.1
$[illegible] 000 to $99,999	24	10.8
$[illegible],000 to $149,999	0	0
$150,000 to $199,999	0	0
$200,000 or more	0	0
Median family income (dollars)	26,944	(X)
Per capita income (dollars)	10,845	(X)
Median earnings (dollars):		
Male full-time, year-round workers	27,250	(X)
Female full-time, year-round workers	14,798	(X)
POVERTY STATUS IN 1999 (below poverty level)		
Families	73	(X)
Percent below poverty level	(X)	32.9
With related children under 18 years	69	(X)
Percent below poverty level	(X)	43.9
With related children under 5 years	27	(X)
Percent below poverty level	(X)	50
Families with female householder, no husband present	50	(X)
Percent below poverty level	(X)	58.8
With related children under 18 years	50	(X)
Percent below poverty level	(X)	72.5
With related children under 5 years	8	(X)
Percent below poverty level	(X)	66.7
Individuals	367	(X)
Percent below poverty level	(X)	35.6

1 ars and over	226	(X)
Percent below poverty level	(X)	29.8
65 years and over	24	(X)
Percent below poverty level	(X)	51.1
Related children under 18 years	128	(X)
Percent below poverty level	(X)	49.4
Related children 5 to 17 years	94	(X)
Percent below poverty level	(X)	51.4
Unrelated individuals 15 years and over	137	(X)
Percent below poverty level	(X)	43.2
(X) Not applicable.		

QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: United States			
NOTE: Data based on a sample except in P3, P4, H3, and H4.			
	Both sexes	Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	27,067,510	13,831,586	13,235,924
Less than high school graduate	6,834,627	3,950,530	2,884,097
High school graduate (incl. equivalency)	7,737,771	4,180,581	3,557,190
Some college or associate degree	10,380,591	4,821,009	5,559,582
Bachelor's degree or higher	2,114,521	879,466	1,235,055
Population 25 years and over	182,211,639	87,077,686	95,133,953
Less than 5th grade	4,007,472	1,966,059	2,041,413
5th to 8th grade	9,748,005	4,709,276	5,038,729
9th to 12th grade, no diploma	21,960,148	10,655,123	11,305,025
High school graduate (incl. equivalency)	52,168,981	24,031,288	28,137,693
Some college credit, less than 1 year	12,884,843	5,650,895	7,233,948
1 or more years of college, no degree	25,466,752	12,281,914	13,184,838
Associate degree	11,512,833	5,058,006	6,454,827
Bachelor's degree	28,317,792	14,029,287	14,288,505
Master's degree	10,770,947	5,248,166	5,522,781
Professional degree	3,619,535	2,245,107	1,374,428
Doctorate degree	1,754,331	1,202,565	551,766
Percent of population 25 years and over	100	100	100
Less than 5th grade	2.2	2.3	2.1
5th to 8th grade	5.3	5.4	5.3
9th to 12th grade, no diploma	12.1	12.2	11.9
High school graduate (incl. equivalency)	28.6	27.6	29.6
Some college credit, less than 1 year	7.1	6.5	7.6
1 or more years of college, no degree	14	14.1	13.9
Associate degree	6.3	5.8	6.8
Bachelor's degree	15.5	16.1	15
Master's degree	5.9	6	5.8
Professional degree	2	2.6	1.4
Doctorate degree	1	1.4	0.6
Percent high school graduate or higher	80.4	80.1	80.7
Percent bachelor's degree or higher	24.4	26.1	22.8
PERCENT OF AGE GROUP			
High school graduate or higher			
25 to 34 years	83.9	81.9	85.9
35 to 44 years	85	83.4	86.6
45 to 64 years	83.2	82.9	83.4
65 years and over	65.5	66.4	64.9
Bachelor's degree or higher			
25 to 34 years	27.5	25.7	29.4
35 to 44 years	25.9	25.8	26
45 to 64 years	26.4	29.3	23.7

65 years and over	15.4	20.5	11.8
(X) Not applicable.			
QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: Census Tract 5207	Wayne County	Michigan	
NOTE: Data based on a sample except in P3, P4, H3, and H4.			
		Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	138	65	73
Less than high school graduate	40	19	21
High school graduate (incl. equivalency)	42	18	24
Some college or associate degree	36	22	14
Bachelor's degree or higher	20	6	14
Population 25 years and over	1,513	772	741
Less than 5th grade	33	6	27
5th to 8th grade	77	44	33
9th to 12th grade, no diploma	444	278	166
High school graduate (incl. equivalency)	217	92	125
Some college credit, less than 1 year	108	39	69
1 or more years of college, no degree	251	122	129
Associate degree	103	33	70
Bachelor's degree	171	73	98
Master's degree	75	66	9
Professional degree	34	19	15
Doctorate degree	0	0	0
Percent of population 25 years and over	100	100	100
Less than 5th grade	2.2	0.8	3.6
5th to 8th grade	5.1	5.7	4.5
9th to 12th grade, no diploma	29.3	36	22.4
High school graduate (incl. equivalency)	14.3	11.9	16.9
Some college credit, less than 1 year	7.1	5.1	9.3
1 or more years of college, no degree	16.6	15.8	17.4
Associate degree	6.8	4.3	9.4
Bachelor's degree	11.3	9.5	13.2
Master's degree	5	8.5	1.2
Professional degree	2.2	2.5	2
Doctorate degree	0	0	0
Percent high school graduate or higher	63.4	57.5	69.5
Percent bachelor's degree or higher	18.5	20.5	16.5
PERCENT OF AGE GROUP			
High school graduate or higher			
25 to 34 years	85.9	82.2	94.9
35 to 44 years	64.5	61	67.6
45 to 64 years	63	50.8	76.1
65 years and over	47.9	36.3	55.2

Bachelor's degree or higher			
25 to 34 years	23.6	30.5	6.3
35 to 44 years	22.4	30.1	15.4
45 to 64 years	13.1	11.2	15.2
65 years and over	20.1	17.8	21.6
(X) Not applicable.			
QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: Census Tract 5208	Wayne County	Michigan	
NOTE: Data based on a sample except in P3, P4, H3, and H4.			
		Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	105	57	48
Less than high school graduate	16	0	16
High school graduate (incl. equivalency)	19	11	8
Some college or associate degree	39	15	24
Bachelor's degree or higher	31	31	0
Population 25 years and over	880	467	413
Less than 5th grade	0	0	0
5th to 8th grade	0	0	0
9th to 12th grade, no diploma	50	38	12
High school graduate (incl. equivalency)	89	40	49
Some college credit, less than 1 year	33	19	14
1 or more years of college, no degree	147	81	66
Associate degree	51	27	24
Bachelor's degree	238	147	91
Master's degree	133	29	104
Professional degree	98	74	24
Doctorate degree	41	12	29
Percent of population 25 years and over	100	100	100
Less than 5th grade	0	0	0
5th to 8th grade	0	0	0
9th to 12th grade, no diploma	5.7	8.1	2.9
High school graduate (incl. equivalency)	10.1	8.6	11.9
Some college credit, less than 1 year	3.8	4.1	3.4
1 or more years of college, no degree	16.7	17.3	16
Associate degree	5.8	5.8	5.8
Bachelor's degree	27	31.5	22
Master's degree	15.1	6.2	25.2
Professional degree	11.1	15.8	5.8
Doctorate degree	4.7	2.6	7
Percent high school graduate or higher	94.3	91.9	97.1
Percent bachelor's degree or higher	58	56.1	60
PERCENT OF AGE GROUP			
High school graduate or higher			

25 to 34 years	93.8	94	93.5
35 to 44 years	92.2	87.5	100
45 to 64 years	96.4	92.3	100
65 years and over	92.5	100	85.7
Bachelor's degree or higher			
25 to 34 years	59.1	48.3	72.8
35 to 44 years	60.3	56.3	67
45 to 64 years	55.6	57.4	53.9
65 years and over	58.8	73.7	45.2
(X) Not applicable.			
QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: Census Tract 5209	Wayne County	Michigan	
NOTE: Data based on a sample except in P3, P4, H3, and H4.			
		Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	0	0	0
Less than high school graduate	0	0	0
High school graduate (incl. equivalency)	0	0	0
Some college or associate degree	0	0	0
Bachelor's degree or higher	0	0	0
Population 25 years and over	0	0	0
Less than 5th grade	0	0	0
5th to 8th grade	0	0	0
9th to 12th grade, no diploma	0	0	0
High school graduate (incl. equivalency)	0	0	0
Some college credit, less than 1 year	0	0	0
1 or more years of college, no degree	0	0	0
Associate degree	0	0	0
Bachelor's degree	0	0	0
Master's degree	0	0	0
Professional degree	0	0	0
Doctorate degree	0	0	0
Percent of population 25 years and over	(X)	(X)	(X)
Less than 5th grade	(X)	(X)	(X)
5th to 8th grade	(X)	(X)	(X)
9th to 12th grade, no diploma	(X)	(X)	(X)
High school graduate (incl. equivalency)	(X)	(X)	(X)
Some college credit, less than 1 year	(X)	(X)	(X)
1 or more years of college, no degree	(X)	(X)	(X)
Associate degree	(X)	(X)	(X)
Bachelor's degree	(X)	(X)	(X)
Master's degree	(X)	(X)	(X)
Professional degree	(X)	(X)	(X)
Doctorate degree	(X)	(X)	(X)
Percent high school graduate or higher	(X)	(X)	(X)

Percent bachelor's degree or higher	(X)	(X)	(X)
PERCENT OF AGE GROUP			
High school graduate or higher			
25 to 34 years	(X)	(X)	(X)
35 to 44 years	(X)	(X)	(X)
45 to 64 years	(X)	(X)	(X)
65 years and over	(X)	(X)	(X)
Bachelor's degree or higher			
25 to 34 years	(X)	(X)	(X)
35 to 44 years	(X)	(X)	(X)
45 to 64 years	(X)	(X)	(X)
65 years and over	(X)	(X)	(X)
(X) Not applicable.			
QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: Census Tract 5211	Wayne County	Michigan	
NOTE: Data based on a sample except in P3, P4, H3, and H4.			
		Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	172	89	83
Less than high school graduate	93	29	64
High school graduate (incl. equivalency)	61	42	19
Some college or associate degree	18	18	0
Bachelor's degree or higher	0	0	0
Population 25 years and over	1,335	755	580
Less than 5th grade	43	19	24
5th to 8th grade	198	103	95
9th to 12th grade, no diploma	328	184	144
High school graduate (incl. equivalency)	342	218	124
Some college credit, less than 1 year	80	48	32
1 or more years of college, no degree	101	60	41
Associate degree	105	45	60
Bachelor's degree	67	31	36
Master's degree	36	25	11
Professional degree	20	15	5
Doctorate degree	15	7	8
Percent of population 25 years and over	100	100	100
Less than 5th grade	3.2	2.5	4.1
5th to 8th grade	14.8	13.6	16.4
9th to 12th grade, no diploma	24.6	24.4	24.8
High school graduate (incl. equivalency)	25.6	28.9	21.4
Some college credit, less than 1 year	6	6.4	5.5
1 or more years of college, no degree	7.6	7.9	7.1
Associate degree	7.9	6	10.3
Bachelor's degree	5	4.1	6.2
Master's degree	2.7	3.3	1.9

Professional degree	1.5	2	0.9
Doctorate degree	1.1	0.9	1.4
Percent high school graduate or higher	57.4	59.5	54.7
Percent bachelor's degree or higher	10.3	10.3	10.3
PERCENT OF AGE GROUP			
High school graduate or higher			
25 to 34 years	50.6	48.8	52.9
35 to 44 years	80.5	76.6	86
45 to 64 years	47.7	57.6	31.8
65 years and over	37.1	35.3	38.3
Bachelor's degree or higher			
25 to 34 years	13.2	12.8	13.7
35 to 44 years	9	9.3	8.7
45 to 64 years	6.5	8.1	4.1
65 years and over	16	14.7	16.8
(X) Not applicable.			
QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: Census Tract 5213	Wayne County	Michigan	
NOTE: Data based on a sample except in P3, P4, H3, and H4.			
		Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	117	64	53
Less than high school graduate	40	26	14
High school graduate (incl. equivalency)	57	28	29
Some college or associate degree	20	10	10
Bachelor's degree or higher	0	0	0
Population 25 years and over	560	219	341
Less than 5th grade	26	12	14
5th to 8th grade	20	6	14
9th to 12th grade, no diploma	183	94	89
High school graduate (incl. equivalency)	175	59	116
Some college credit, less than 1 year	20	0	20
1 or more years of college, no degree	59	39	20
Associate degree	30	0	30
Bachelor's degree	40	9	31
Master's degree	7	0	7
Professional degree	0	0	0
Doctorate degree	0	0	0
Percent of population 25 years and over	100	100	100
Less than 5th grade	4.6	5.5	4.1
5th to 8th grade	3.6	2.7	4.1
9th to 12th grade, no diploma	32.7	42.9	26.1
High school graduate (incl. equivalency)	31.3	26.9	34
Some college credit, less than 1 year	3.6	0	5.9

1 or more years of college, no degree	10.5	17.8	5.9
Associate degree	5.4	0	8.8
Bachelor's degree	7.1	4.1	9.1
Master's degree	1.3	0	2.1
Professional degree	0	0	0
Doctorate degree	0	0	0
Percent high school graduate or higher	59.1	48.9	65.7
Percent bachelor's degree or higher	8.4	4.1	11.1
PERCENT OF AGE GROUP			
High school graduate or higher			
25 to 34 years	73.6	73.5	73.7
35 to 44 years	68.9	62.8	77.4
45 to 64 years	47.1	18.6	64.9
65 years and over	51	42.5	54.1
Bachelor's degree or higher			
25 to 34 years	10.9	0	15.8
35 to 44 years	12.2	10.5	14.5
45 to 64 years	2	0	3.2
65 years and over	9.4	0	12.8
(X) Not applicable.			
QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: Census Tract 5214	Wayne County	Michigan	
NOTE: Data based on a sample except in P3, P4, H3, and H4.			
		Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	101	46	55
Less than high school graduate	56	20	36
High school graduate (incl. equivalency)	6	6	0
Some college or associate degree	35	20	15
Bachelor's degree or higher	4	0	4
Population 25 years and over	846	472	374
Less than 5th grade	51	10	41
5th to 8th grade	80	42	38
9th to 12th grade, no diploma	156	117	39
High school graduate (incl. equivalency)	188	120	68
Some college credit, less than 1 year	45	32	13
1 or more years of college, no degree	65	19	46
Associate degree	35	5	30
Bachelor's degree	101	64	37
Master's degree	101	54	47
Professional degree	20	9	11
Doctorate degree	4	0	4
Percent of population 25 years and over	100	100	100
Less than 5th grade	6	2.1	11

5th to 8th grade	9.5	8.9	10.2
9th to 12th grade, no diploma	18.4	24.8	10.4
High school graduate (incl. equivalency)	22.2	25.4	18.2
Some college credit, less than 1 year	5.3	6.8	3.5
1 or more years of college, no degree	7.7	4	12.3
Associate degree	4.1	1.1	8
Bachelor's degree	11.9	13.6	9.9
Master's degree	11.9	11.4	12.6
Professional degree	2.4	1.9	2.9
Doctorate degree	0.5	0	1.1
Percent high school graduate or higher	66.1	64.2	68.4
Percent bachelor's degree or higher	26.7	26.9	26.5
PERCENT OF AGE GROUP			
High school graduate or higher			
25 to 34 years	91.1	88.3	95.2
35 to 44 years	67.9	70.4	65.4
45 to 64 years	66.5	55.6	85.6
65 years and over	27.1	32.8	22.5
Bachelor's degree or higher			
25 to 34 years	45.3	52.5	34.9
35 to 44 years	26.5	23.1	29.9
45 to 64 years	22.2	21.7	23.1
65 years and over	9.7	0	17.5
(X) Not applicable.			
QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: Census Tract 5215	Wayne County	Michigan	
NOTE: Data based on a sample except in P3, P4, H3, and H4.			
		Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	223	102	121
Less than high school graduate	80	32	48
High school graduate (incl. equivalency)	61	35	26
Some college or associate degree	82	35	47
Bachelor's degree or higher	0	0	0
Population 25 years and over	1,138	521	617
Less than 5th grade	39	21	18
5th to 8th grade	72	30	42
9th to 12th grade, no diploma	272	156	116
High school graduate (incl. equivalency)	350	144	206
Some college credit, less than 1 year	96	36	60
1 or more years of college, no degree	153	67	86
Associate degree	42	25	17
Bachelor's degree	82	28	54
Master's degree	18	5	13
Professional degree	0	0	0

Doctorate degree	14	9	5
Percent of population 25 years and over	100	100	100
Less than 5th grade	3.4	4	2.9
5th to 8th grade	6.3	5.8	6.8
9th to 12th grade, no diploma	23.9	29.9	18.8
High school graduate (incl. equivalency)	30.8	27.6	33.4
Some college credit, less than 1 year	8.4	6.9	9.7
1 or more years of college, no degree	13.4	12.9	13.9
Associate degree	3.7	4.8	2.8
Bachelor's degree	7.2	5.4	8.8
Master's degree	1.6	1	2.1
Professional degree	0	0	0
Doctorate degree	1.2	1.7	0.8
Percent high school graduate or higher	66.3	60.3	71.5
Percent bachelor's degree or higher	10	8.1	11.7
PERCENT OF AGE GROUP			
High school graduate or higher			
25 to 34 years	76.4	60.8	83
35 to 44 years	64.3	55.3	75.4
45 to 64 years	64.4	63.8	65
65 years and over	56.1	59.2	53.8
Bachelor's degree or higher			
25 to 34 years	13.5	11.4	14.4
35 to 44 years	4.1	0	9.2
45 to 64 years	9	8.2	9.8
65 years and over	21.1	28.6	15.4
(X) Not applicable.			
QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: Census Tract 5231	Wayne County	Michigan	
NOTE: Data based on a sample except in P3, P4, H3, and H4.			
		Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	215	134	81
Less than high school graduate	108	60	48
High school graduate (incl. equivalency)	38	38	0
Some college or associate degree	64	31	33
Bachelor's degree or higher	5	5	0
Population 25 years and over	1,023	556	467
Less than 5th grade	143	80	63
5th to 8th grade	227	145	82
9th to 12th grade, no diploma	267	142	125
High school graduate (incl. equivalency)	207	107	100
Some college credit, less than 1 year	33	9	24
1 or more years of college, no degree	82	49	33

Associate degree	46	24	22
Bachelor's degree	18	0	18
Master's degree	0	0	0
Professional degree	0	0	0
Doctorate degree	0	0	0
Percent of population 25 years and over	100	100	100
Less than 5th grade	14	14.4	13.5
5th to 8th grade	22.2	26.1	17.6
9th to 12th grade, no diploma	26.1	25.5	26.8
High school graduate (incl. equivalency)	20.2	19.2	21.4
Some college credit, less than 1 year	3.2	1.6	5.1
1 or more years of college, no degree	8	8.8	7.1
Associate degree	4.5	4.3	4.7
Bachelor's degree	1.8	0	3.9
Master's degree	0	0	0
Professional degree	0	0	0
Doctorate degree	0	0	0
Percent high school graduate or higher	37.7	34	42.2
Percent bachelor's degree or higher	1.8	0	3.9
PERCENT OF AGE GROUP			
High school graduate or higher			
25 to 34 years	46.2	45	47.8
35 to 44 years	27.8	20.5	36.8
45 to 64 years	41.9	39.3	46
65 years and over	30.7	20	36.8
Bachelor's degree or higher			
25 to 34 years	0	0	0
35 to 44 years	4.3	0	9.6
45 to 64 years	2.2	0	5.7
65 years and over	0	0	0
(X) Not applicable.			
QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: Census Tract 5232	Wayne County	Michigan	
NOTE: Data based on a sample except in P3, P4, H3, and H4.			
		Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	765	446	319
Less than high school graduate	475	297	178
High school graduate (incl. equivalency)	163	66	97
Some college or associate degree	127	83	44
Bachelor's degree or higher	0	0	0
Population 25 years and over	2,499	1,244	1,255
Less than 5th grade	339	212	127
5th to 8th grade	401	223	178

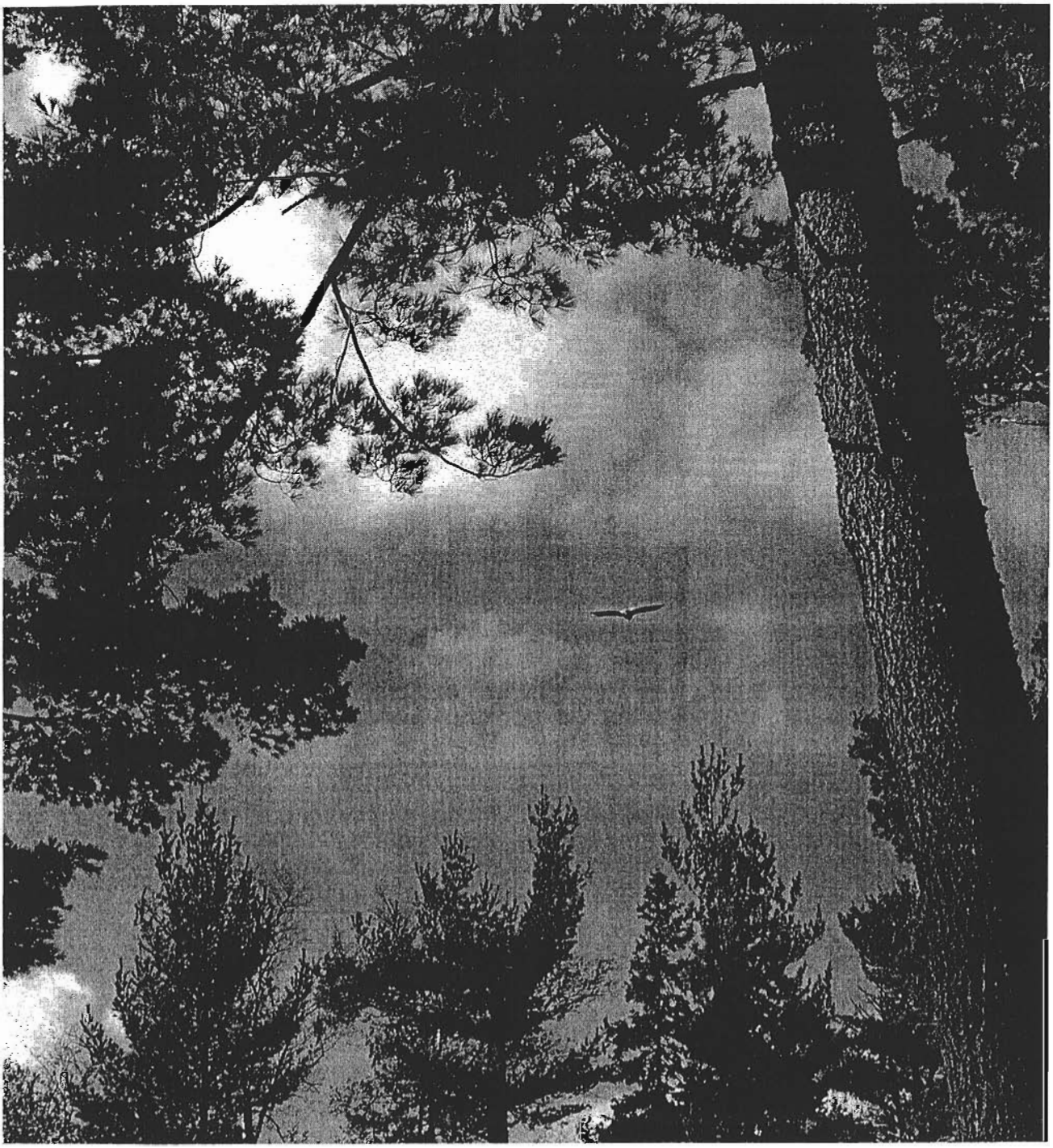
9th to 12th grade, no diploma	620	305	315
High school graduate (incl. equivalency)	727	362	365
Some college credit, less than 1 year	93	22	71
1 or more years of college, no degree	164	75	89
Associate degree	43	11	32
Bachelor's degree	88	23	65
Master's degree	13	0	13
Professional degree	0	0	0
Doctorate degree	11	11	0
Percent of population 25 years and over	100	100	100
Less than 5th grade	13.6	17	10.1
5th to 8th grade	16	17.9	14.2
9th to 12th grade, no diploma	24.8	24.5	25.1
High school graduate (incl. equivalency)	29.1	29.1	29.1
Some college credit, less than 1 year	3.7	1.8	5.7
1 or more years of college, no degree	6.6	6	7.1
Associate degree	1.7	0.9	2.5
Bachelor's degree	3.5	1.8	5.2
Master's degree	0.5	0	1
Professional degree	0	0	0
Doctorate degree	0.4	0.9	0
Percent high school graduate or higher	45.6	40.5	50.6
Percent bachelor's degree or higher	4.5	2.7	6.2
PERCENT OF AGE GROUP			
High school graduate or higher			
25 to 34 years	39.7	33.9	46.7
35 to 44 years	57.9	54.2	61.8
45 to 64 years	47.9	38.1	56.9
65 years and over	31.7	32.1	31.5
Bachelor's degree or higher			
25 to 34 years	1.3	0	2.8
35 to 44 years	9.4	6.2	12.7
45 to 64 years	3.7	1.6	5.6
65 years and over	3.6	4.4	3
(X) Not applicable.			
QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: Census Tract 5233	Wayne County	Michigan	
NOTE: Data based on a sample except in P3, P4, H3, and H4.			
		Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	547	296	251
Less than high school graduate	344	189	155
High school graduate (incl. equivalency)	157	97	60
Some college or associate degree	46	10	36
Bachelor's degree or higher	0	0	0

Population 25 years and over	2,086	1,120	966
Less than 5th grade	263	133	130
5th to 8th grade	455	251	204
9th to 12th grade, no diploma	574	362	212
High school graduate (incl. equivalency)	455	238	217
Some college credit, less than 1 year	55	29	26
1 or more years of college, no degree	147	63	84
Associate degree	4	0	4
Bachelor's degree	85	30	55
Master's degree	9	6	3
Professional degree	10	0	10
Doctorate degree	29	8	21
Percent of population 25 years and over	100	100	100
Less than 5th grade	12.6	11.9	13.5
5th to 8th grade	21.8	22.4	21.1
9th to 12th grade, no diploma	27.5	32.3	21.9
High school graduate (incl. equivalency)	21.8	21.3	22.5
Some college credit, less than 1 year	2.6	2.6	2.7
1 or more years of college, no degree	7	5.6	8.7
Associate degree	0.2	0	0.4
Bachelor's degree	4.1	2.7	5.7
Master's degree	0.4	0.5	0.3
Professional degree	0.5	0	1
Doctorate degree	1.4	0.7	2.2
Percent high school graduate or higher	38.1	33.4	43.5
Percent bachelor's degree or higher	6.4	3.9	9.2
PERCENT OF AGE GROUP			
High school graduate or higher			
25 to 34 years	42.3	37.4	48.5
35 to 44 years	30.3	22	38.2
45 to 64 years	38.5	38.1	39.1
65 years and over	40.6	28.2	50.7
Bachelor's degree or higher			
25 to 34 years	6	1.8	11.4
35 to 44 years	4.6	9.4	0
45 to 64 years	5.7	1.6	11.4
65 years and over	12.7	7.3	17.2
(X) Not applicable.			
QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: Census Tract 5234	Wayne County	Michigan	
NOTE: Data based on a sample except in P3, P4, H3, and H4.			
		Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	415	245	170

Less than high school graduate	238	169	69
High school graduate (incl. equivalency)	119	56	63
Some college or associate degree	58	20	38
Bachelor's degree or higher	0	0	0
Population 25 years and over	1,672	910	762
Less than 5th grade	117	75	42
5th to 8th grade	253	111	142
9th to 12th grade, no diploma	437	271	166
High school graduate (incl. equivalency)	459	247	212
Some college credit, less than 1 year	97	40	57
1 or more years of college, no degree	100	41	59
Associate degree	53	32	21
Bachelor's degree	64	51	13
Master's degree	50	35	15
Professional degree	28	7	21
Doctorate degree	14	0	14
Percent of population 25 years and over	100	100	100
Less than 5th grade	7	8.2	5.5
5th to 8th grade	15.1	12.2	18.6
9th to 12th grade, no diploma	26.1	29.8	21.8
High school graduate (incl. equivalency)	27.5	27.1	27.8
Some college credit, less than 1 year	5.8	4.4	7.5
1 or more years of college, no degree	6	4.5	7.7
Associate degree	3.2	3.5	2.8
Bachelor's degree	3.8	5.6	1.7
Master's degree	3	3.8	2
Professional degree	1.7	0.8	2.8
Doctorate degree	0.8	0	1.8
Percent high school graduate or higher	51.7	49.8	54.1
Percent bachelor's degree or higher	9.3	10.2	8.3
PERCENT OF AGE GROUP			
High school graduate or higher			
25 to 34 years	55.1	50.6	63.9
35 to 44 years	55.2	64.1	46
45 to 64 years	48.6	43.8	53
65 years and over	42.2	28.8	52.4
Bachelor's degree or higher			
25 to 34 years	8.4	7.1	10.9
35 to 44 years	14.6	15.4	13.8
45 to 64 years	9.8	14.5	5.6
65 years and over	0	0	0
(X) Not applicable.			
QT-P20: Educational Attainment by Sex: 2000			
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data			
Geographic Area: Census Tract 5235	Wayne County	Michigan	
NOTE: Data based on a sample except in P3, P4, H3, and H4.			

		Male	Female
EDUCATIONAL ATTAINMENT (highest level)			
Population 18 to 24 years	159	100	59
Less than high school graduate	99	68	31
High school graduate (incl. equivalency)	60	32	28
Some college or associate degree	0	0	0
Bachelor's degree or higher	0	0	0
Population 25 years and over	599	360	239
Less than 5th grade	27	9	18
5th to 8th grade	110	74	36
9th to 12th grade, no diploma	161	101	60
High school graduate (incl. equivalency)	121	63	58
Some college credit, less than 1 year	30	18	12
1 or more years of college, no degree	100	71	29
Associate degree	6	0	6
Bachelor's degree	12	4	8
Master's degree	22	20	2
Professional degree	10	0	10
Doctorate degree	0	0	0
Percent of population 25 years and over	100	100	100
Less than 5th grade	4.5	2.5	7.5
5th to 8th grade	18.4	20.6	15.1
9th to 12th grade, no diploma	26.9	28.1	25.1
High school graduate (incl. equivalency)	20.2	17.5	24.3
Some college credit, less than 1 year	5	5	5
1 or more years of college, no degree	16.7	19.7	12.1
Associate degree	1	0	2.5
Bachelor's degree	2	1.1	3.3
Master's degree	3.7	5.6	0.8
Professional degree	1.7	0	4.2
Doctorate degree	0	0	0
Percent high school graduate or higher	50.3	48.9	52.3
Percent bachelor's degree or higher	7.3	6.7	8.4
PERCENT OF AGE GROUP			
High school graduate or higher			
25 to 34 years	48.3	35.7	71
35 to 44 years	49.7	50.6	48.8
45 to 64 years	53.5	61.2	39.7
65 years and over	44.7	35.7	57.9
Bachelor's degree or higher			
25 to 34 years	3.4	5.4	0
35 to 44 years	6.2	12.3	0
45 to 64 years	12.9	5.8	25.6
65 years and over	0	0	0
(X) Not applicable.			

2005 Annual Air Quality Report



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Printed by authority of the Michigan Department of Environmental Quality.
Total number of copies printed: 200 Total Cost: $ 1,460.26 Cost Per Copy: $7.30

DEQ **Michigan Department of Environmental Quality**

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MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

MICHIGAN'S 2005 ANNUAL AIR QUALITY REPORT

AIR QUALITY DIVISION
P.O. BOX 30260
LANSING, MI 48909

August 2006

AQD homepage: http://www.michigan.gov/deqair

ACKNOWLEDGMENTS

This publication was prepared utilizing information provided by the Air Quality Evaluation Section (AQES) and other staff of the Michigan Department of Environmental Quality (MDEQ), Air Quality Division (AQD). Copies can be obtained on-line at: http://www.michigan.gov/deqair, under "Spotlight," "Air Publications," "Reports," then "Annual Air Quality Reports," or call 517-373-7023 to request a hard copy.

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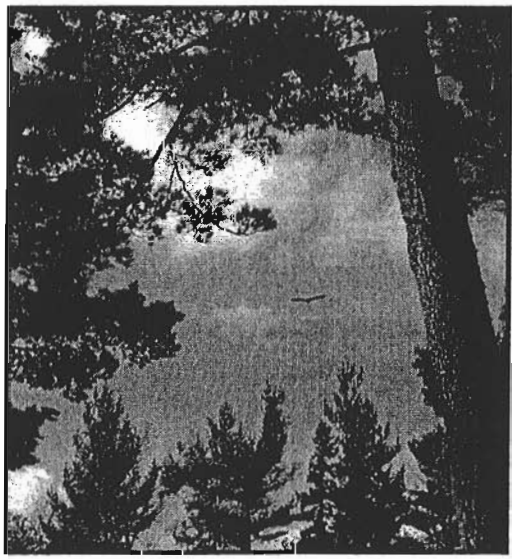
The AQD also wishes to acknowledge the significant contributions that were provided by Mark Bird and William Endres of the **City of Grand Rapids, Air Pollution Control Division**, which operates and maintains air monitoring equipment in West Michigan.



Cover Photo: An American bald eagle soaring in Michigan's Upper Peninsula at Van Riper State Park (October 2005). Photo courtesy of Sheila Blais, AQD.

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EXECUTIVE SUMMARY

The federal Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to the public and the environment. These standards define the maximum permissible concentration of criteria pollutants in the air. Other hazardous air pollutants (HAPs) that can affect human health or the environment are called "air toxics."[1]

One or more NAAQS have been established for the six criteria pollutants that are monitored by the Michigan Department of Environmental Quality's (MDEQ's) Air Quality Division (AQD). These criteria pollutants are carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM) less than or equal to ($\leq$) 10 or 2.5 microns in diameter (PM_{10} and $PM_{2.5}$, respectively), and sulfur dioxide (SO_2). The purpose of this report is to provide a summary of the 2005 air quality data, along with air quality trends in Michigan.[2] In addition, this report:

- Describes the NAAQS and how compliance is determined,
- Assesses the trends of the six criteria pollutants,
- Identifies the types of ambient air quality monitoring that's conducted throughout Michigan,
- Describes the air toxic monitoring program,
- Discusses special projects such as the Air Quality Index (AQI), *Ozone Action!*, EnviroFlash program, etc.,[3] and
- Provides a modeling and meteorological summary of data.

Ozone and $PM_{2.5}$:

The focus in 2005 was on Michigan's 8-hour O_3 and $PM_{2.5}$ nonattainment areas. In 2004, EPA announced nonattainment designations for these two criteria pollutants. A nonattainment designation means that an area does not meet the NAAQS for that pollutant or that the area contributes towards the nonattainment designation of a surrounding area and a timeframe is given to bring that area into attainment. Michigan made requests to EPA for nonattainment reconsiderations for both 8-hour O_3 and $PM_{2.5}$.

For nonattainment areas, States are required to develop state implementation plans (SIPs) consisting of legally enforceable measures designed to reduce that criteria pollutant's levels below the NAAQS within the specified timeframe. The states must then provide EPA with an evaluation of a number of potential control measures to be implemented along with an implementation schedule. Unfortunately, EPA did not release its proposed implementation rules for either of these pollutants until December 2005, thereby making the SIP process difficult.

Detailed background information on Michigan's air quality endeavors can be reviewed on-line by accessing the AQD's *About the Air* newsletter. This newsletter is produced on a bi-monthly basis and is available electronically from the AQD's website at http://www.michigan.gov/deqair under "Air Publications." Current air quality activities and other information are also available on the AQD's website. Information on O_3 is provided in **Chapter 2.4** and $PM_{2.5}$ is in **Chapter 2.5** of this report.

[1] A fact sheet entitled What is an Air Contaminant/Pollutant? is available on the MDEQ's website at http://www.deq.state.mi.us/documents/deq-ead-caap-airconfs.pdf.

[2] On-line information about criteria pollutants and air toxics along with this and previous annual air quality reports are available via the AQD's website at http://www.michigan.gov/deqair under "Spotlight."

[3] AQI readings and real time air monitoring information for O_3, SO_2, NO_2, CO, and $PM_{2.5}$, along with information on the new Enviroflash program are also available on the AQD's website under "Featured Online Services."

HAPs – Mercury

Another important issue addressed in 2005 was regarding mercury emissions. Mercury has been identified as a significant environmental pollutant for decades and is a persistent, bioaccumulative neurotoxin. Air emissions of mercury contribute to the global cycling of mercury as well as local deposition. A portion of deposited mercury can be converted to methylmercury in aquatic systems. Studies have indicated an increased risk to a developing fetus upon exposure to methylmercury via maternal fish consumption.

For Michigan, the largest industrial source of mercury air emissions is coal-fired power plants. To address this issue, the MDEQ and Michigan Public Service Commission staff, representative from utilities, and representatives from environmental, scientific, and public policy groups convened a workgroup to look at ways to reduce and phase-out mercury emissions from coal-fired power plants, along with the reduction of nitrogen oxides (NO_X - a precursor to both $PM_{2.5}$ and O_3), SO_2 (a precursor to the formation of $PM_{2.5}$ and NO_X), and carbon dioxide (CO_2). The Workgroup's report with recommendations was finalized in 2005.[4] This and other mercury issues are available on the AQD's website under "SPOTLIGHT" then "Mercury. Information is also provided in **Chapter 3** of this report.

Federal Rules and Requirements

The EPA finalized a suite of inter-related rules to address O_3 and $PM_{2.5}$, non-road diesel emissions, and power plant emissions of SO_2, NO_X, and mercury. Three rules specifically address the transport of pollution across state borders (the Clean Air Interstate Rule [CAIR], Clean Air Mercury Rule [CAMR], and Clean Air Non-road Diesel Rule). Both CAIR and CAMR are also aimed at reducing air pollutant emissions from power plants. Reducing non-road emissions is a critical part of the effort by federal, state, local, and tribal governments to reduce the adverse health impacts of air pollution.

Following EPA's release of the final CAIR and CAMR, numerous challenges from states, environmental groups, and power companies were filed requesting EPA to reconsider certain parts of these final rules. EPA opened up comment periods to address only four specific issues on CAIR[5] and 10 aspects of CAMR.[6] These actions did not delay implementation of the rules.

On December 20, 2005, EPA first published proposed amendments to its national air quality monitoring requirements and PM NAAQS. Michigan has provided comments on these proposals which are available from the AQD's website.[7]

Summary

For the criteria pollutants CO, Pb, NO_2 and SO_2, all of Michigan has continued to stay in attainment with levels well below their NAAQS. For O_3 and $PM_{2.5}$, Michigan does have some nonattainment areas but for both pollutants, levels have continued to decline.

The main contributing factors to Michigan's O_3 and $PM_{2.5}$ levels are on-road and non-road emission sources (O_3: 33% and 30%, respectively; $PM_{2.5}$: 18% and 32%, respectively). In addition, area sources also contribute 37% of $PM_{2.5}$ emissions. Therefore, with the new federal Clean Air Rules, along with Michigan's continued reduction efforts, both of these criteria pollutants levels should continue to decline.

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[4] Michigan's Mercury Electric Utility Workgroup report is available on the AQD's website at http://www.deq.state.mi.us/documents/deq-aqd-air-aqe-mercury-report.pdf.

[5] Information related to CAIR's regulatory actions can be found on EPA's website at http://www.epa.gov/cair/rule.html.

[6] For Information on all EPA's CAMR regulatory actions visit http://www.epa.gov/air/mercuryrule/rule.htm.

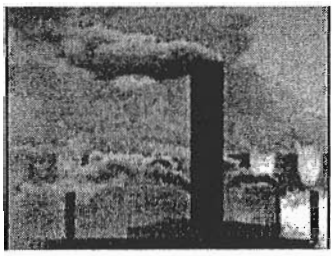
[7] EPA's proposed amendments to the National Air Quality Monitoring Regulations and proposed PM NAAQS are available at www.epa.gov/air/particlepollution/actions.html. Michigan's comments can be found at http://www.deq.state.mi.us/documents/deq-aqd-air-aqe-monitoring-comments-4-17-06.pdf and http://www.deq.state.mi.us/documents/deq-aqd-air-aqe-pm-naaqs-comments-4-17-06.pdf, respectively.

CHAPTER 2.5: PARTICULATE MATTER (PM_{10}, $PM_{2.5}$, $PM_{2.5}$ CHEMICAL SPECIATION, AND TSP) TRENDS

INTRODUCTION:

Particulate matter or PM is a general term used for a mixture of solid particles and liquid droplets found in the air. Some particles are large enough to be seen as dust or dirt (coarse PM) where others are so small they can only be detected with an electron microscope (fine PM) (**1, 12**).

PM can be emitted directly (primary) or may form in the atmosphere (secondary). PM in the atmosphere is further categorized according to size. Generally, coarse PM or PM_{10} (particles less than 10 microns [μm] in diameter which is equal to about 1/7th the diameter of a human hair) is composed largely of primary particles. Primary particles can originate from power plants, various manufacturing processes, wood stoves and fireplaces, agriculture and forestry practices, fugitive dust sources (road dust and wind blown soil), and forest fires. Fine PM or $PM_{2.5}$ (particles less than 2.5 μm in diameter) can come directly from primary particle emissions or through secondary reactions (**1**). Examples of secondary particulate reactions include sulfates formed from SO_2 (sulfur dioxide) emissions from power plants, motor vehicles (especially diesel trucks and buses), and industrial facilities, and nitrates formed from NO_X emissions from power plants, automobiles, and other types of combustion sources (**1**).



Particles with diameters of less than 50 μm are classified as total suspended particulates or TSP. Particles that are greater than 50 μm in diameter do not remain in the atmosphere for appreciable lengths of time and present a smaller health risk because they are too large to be inhaled. Most man-made particulate emissions fall into the size range classified as TSP.

PM EFFECTS:

Exposure to PM affects breathing and the cellular defenses of the lungs, aggravates existing respiratory and cardiovascular ailments, and has been linked with heart and lung disease. Various health problems have been associated with long-term (e.g., multi-year) exposures as well as daily and shorter term (e.g., 1-hour) exposures to PM. Particles of concern can include both fine and coarse-fraction particles with particle size being the major factor that determines which particles will enter the lungs and how deeply the particles will penetrate. $PM_{2.5}$ has been more clearly linked to the most serious health effects (**1**). People with heart or lung disease, the elderly, and children are at highest risk from exposure to particles.

In addition to health problems, PM is the major cause of reduced visibility in many parts of the U.S. with $PM_{2.5}$ considered to be one of the primary visibility-reducing components of urban and regional haze. Airborne particles can also impact vegetation ecosystems and can cause damage to paints, building materials and/or surfaces (**1**). Deposition of acid aerosols and salts may increase corrosion of metals and impact plant tissue by corroding leaf surfaces and interfering with plant metabolism (**1**).[21]

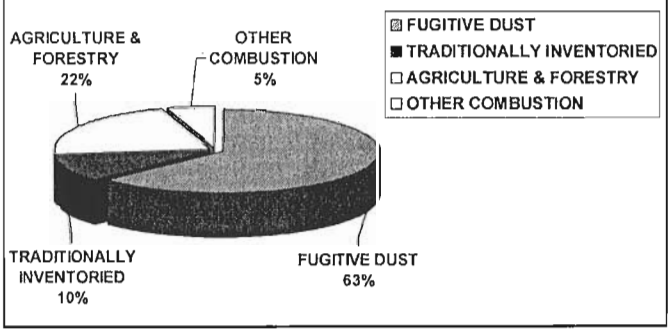
[21] More information about PM and its effects are at: http://www.epa.gov/ttn/oarpg/naaqsfin/pmhealth.html; http://www.epa.gov/oar/particlepollution; and http://www.epa.gov/airtrends/pm.html.

PM_{10} NATIONAL SOURCE TRENDS:

Figure 2.5-1 is from the EPA's 2003 National Air Quality and Emissions Trends Report and shows national direct PM_{10} emissions by source category for 2002.[22]

Nationally, 85% of direct PM_{10} emissions are from area and non-industrial sources (i.e., natural sources) such as agriculture and forestry, wildfires and managed burning, and fugitive dust from paved and unpaved roads (**1**). Traditionally inventoried PM_{10} emissions include fuel combustion, industrial processes, and transportation.

Figure 2.5-1: EPA's 2002 National PM_{10} Emissions by Source Category



MICHIGAN PM_{10} SOURCE TRENDS:

Utilizing EPA's 2002 emissions inventory data, **Figure 2.5-2** shows Michigan's percentage of emissions by source category. It's important to note that these percentages have changed since the 1999 emissions inventory data. For instance, in the 1999 data, point sources contributed 43% of PM_{10} emissions. The 2002 data shows that point sources now only contribute 34% of PM_{10} emissions in Michigan, a decrease of 9%. There was also a 11% decrease in Michigan's on-road and off-road PM_{10} emissions combined between the 1999 and 2002 emissions inventory data (45% and 34%, respectively). However, Michigan's area source contributions had a substantial increase in percentages from the 2002 emissions inventory (32%) to the 1999 emissions inventory (12%). **Table 2.5-1** lists the different types of point and area sources that contribute PM_{10} in Michigan.

Figure 2.5-2: Percentage of PM_{10} Emissions in Michigan By Source Type (EPA 2002 Emissions Inventory Data)

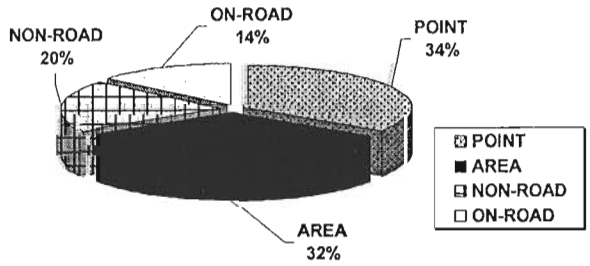


TABLE 2.5-1: PM_{10} POINT AND AREA SOURCE TYPES IN MICHIGAN

POINT SOURCES	AREA SOURCES
fossil fuel combustion (i.e., coal burning)	fossil fuel combustion; other combustion (i.e., residential fireplaces/wood stoves); incineration; and open burning
chemical and allied product manufacturing	oil and gas production
metals processing	agriculture, food, and mineral products
petroleum, petroleum products, and related industries	wood, pulp and paper, and publishing products; misc. industrial processes
other industrial processes	agriculture and forestry

[22] For more National Air Quality Trends, visit EPA's website at: http://www.epa.gov/airtrends.

Additional decreases in Michigan's point sources (metal processing) are expected due to EPA's Final Rule To Reduce Toxic Air Emissions From Taconite Iron Ore Processing Facilities. Michigan has two Taconite Ore Processing facilities that separate and concentrate iron ore from taconite and produce taconite pellets, which are approximately 60% iron. On August 25, 2003, through the participation from representatives of Michigan and Minnesota's ore processing facilities and other affected industry, the EPA issued this final rule establishing PM emission limits from four processes: ore crushing and handling, ore drying, pellet handling, and indurating (hardening) furnaces. Emissions from the indurating furnaces account for over 90% of all toxic air pollutants emitted from a taconite iron ore processing facility. The PM emission limits are a surrogate for the air toxic emissions targeted by this rule as PM emissions are more easily measured.

The EPA also issued a number of other air toxic pollution measures, known as maximum achievable control technology (MACT) standards that should help reduce PM emissions from some of Michigan's area sources and other point sources.[23]

$PM_{2.5}$ NATIONAL SOURCE TRENDS:

According to the EPA's National Air Quality and Emissions Trends Report, 2003 Special Studies Edition, $PM_{2.5}$ emitted directly from man-made sources decreased 17% between 1993 and 2002.[24] As stated in EPA's Particle Pollution Report: Current Understanding of Air Quality and Emissions through 2003, regional pollution in the eastern U.S. contributes more than half of total $PM_{2.5}$ concentrations. These regional concentrations come from emission sources such as power plants, natural sources, and urban pollution which can be transported hundreds of miles. The major chemical components that make up urban $PM_{2.5}$ are sulfates (largely due to SO_2 emissions from coal-fired power plants [**1**]), carbon (producing the largest local emission contributions), and nitrates.

It is important to note that many national programs have been put in place to reduce levels of PM. These programs control directly emitted PM and/or the emissions that contribute to PM formation, such as SO_2, NO_X, and VOCs. For example, EPA's Clean Air Interstate Rule (CAIR), finalized in 2005, focuses on those states whose SO_2 and NO_X emissions significantly contribute to the $PM_{2.5}$ and O_3 pollution problems in other downwind states.[25] The following **Table 2.5-2**, from EPA's Particle Pollution Report, lists the major emission control programs since 1995 that have or will reduce PM.

[23] More information on these MACTs is available at http://www.epa.gov/ttn/atw/mactfnl.html.
[24] It should be noted that EPA did not account for secondary particles formed when emissions of NO_X, SO_2, ammonia, and other gases reacted in the atmosphere (**1**).
[25] The final CAIR information is available at http://www.epa.gov/air/interstateairquality/.

Table 2.5-2: Selection of Emission Control Programs Contributing to PM Emission Reductions from 1995-2015

Program	Sector	Direct PM[a] Reductions	PM Precursors SO_2 Reductions	PM Precursors NO_x Reductions	PM Precursors VOC Reductions	Implementation Date
Clean Air Nonroad Diesel Rule	Mobile sources	X	X	X		2004-2015
Clean Air Interstate Rule (proposed December 2003)	Electric Utilities	X	X	X		2010-2015
Acid Rain Program	Electric Utilities		X	X		1995-2010
NO_x SIP Call	Electric Utilities		X	X		2004
Regional Haze Rule/ Best Available Retrofit Technology	Electric Utilities[b]	X	X	X		2013-2015
$PM_{2.5}$ Implementation[c]	Stationary/Area/ Mobile sources	X	X	X	X	2008-2015
PM_{10} SIPs (e.g., San Joaquin Valley)	Stationary/Area/ Mobile sources	X	X	X	X	Ongoing
Maximum Achievable Control Technology (MACT) Standards[d]	Stationary/Area	X			X	1996-2003
Various Mobile Source Programs[e]		X	X	X	X	Ongoing

[a] Includes elemental and organic carbon, metals, and other direct emissions of PM.

[b] Also applies to industrial boiler and the other source categories also covered under Prevention of Significant Deterioration (PSD).

[c] Includes Reasonably Available Control Technology (RACT) and Reasonably Available Control Measures (RACM).

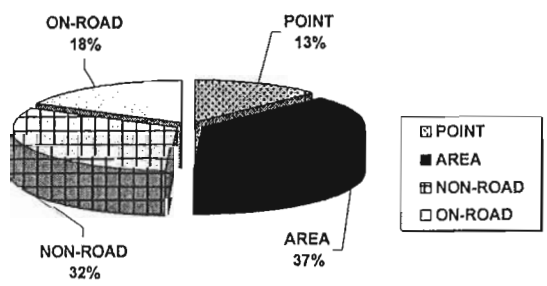
[d] Includes a variety of source categories such as Boilers and Process heaters, Pulp and Paper, Petroleum Refineries, various minerals and ores, and others. While these standards are for hazardous air pollutants (HAPs) such as metals, measures to reduce HAPs in many cases also reduce PM emissions.

[e] Includes such programs as onroad diesel and gasoline engines, nonroad gasoline engines, Low Sulfur Diesel and Gasoline Fuel Limits for onroad and offroad engines, Motorcycles, Land-based recreational vehicles, and Marine diesel engines.

MICHIGAN $PM_{2.5}$ SOURCE TRENDS:

EPA's 2002 emissions inventory data (**Figure 2.5-3**) shows that area sources (37%) produce the majority of $PM_{2.5}$ emissions in Michigan. However, non-road and on-road (18%) sources combined produce 50% of Michigan's $PM_{2.5}$ emissions. This has changed dramatically from EPA's 1999 emissions inventory data when non-road sources (59%) and on-road sources (39%) accounted for 98% of Michigan's overall $PM_{2.5}$ emissions.

Figure 2.5-3: Percentage Of $PM_{2.5}$ Emissions in Michigan By Source Type (EPA 2002 Emissions Inventory Data)



With road sources producing the majority of Michigan's $PM_{2.5}$ emissions, it is important to note that the EPA estimates that the Clean Air Non-road Diesel Rule, signed July 7, 2005, decreases exhaust emissions from these types of engines by more than 90%.[26]

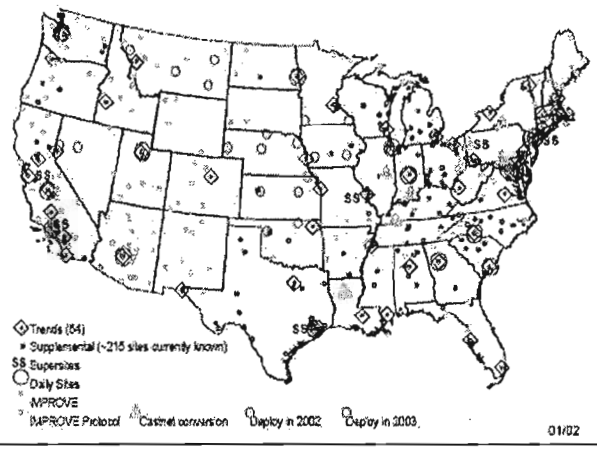
[26] Diesel Fuel Program information is at http://www.epa.gov/otaq/regs/fuels/diesel/diesel.htm#dfr-concurrent.

$PM_{2.5}$ CHEMICAL SPECIATION:

To gather data on the chemical makeup of $PM_{2.5}$, EPA established a Speciation Trends Network (STN) (**Figure 2.5-4**) consisting of approximately 54 sites in 43 states (**13**). The STN is intended to complement the other components of the $PM_{2.5}$ network by providing:[27]

- Annual and seasonal spatial characterization of aerosols;
- Air quality trends analysis and tracking the progress of control programs;
- Integration of the chemical speciation data set with the data collected from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network; and
- Development of emission control strategies.

FIGURE 2.5-4: CURRENT/PLANNED $PM_{2.5}$ SPECIATION NETWORKS



These chemical speciation sites are used to determine trends in concentration levels of selected ions, metals, carbon species, and organic compounds in $PM_{2.5}$. The STN samplers are placed at various NAMS and SLAMS across the nation. Approximately 20 of the monitoring sites have been placed at existing PAMS.[28] The placement of the remaining trends sites were coordinated by EPA and the state and local agencies with locations primarily in or near larger MSAs (**14**). Activities include annual and seasonal characterization of aerosols, air quality trends analysis in relation to the development of control programs, and the evaluation of the monitoring data in the development of emission control strategies (**14**). EPA does not rule out the possibility that objectives, requirements, and methods for speciation sampling may need to be adjusted in the futur e.[29]

NAAQS FOR PARTICULATE MATTER:

In 1971, a NAAQS was established for TSP. Michigan still uses TSP monitoring to determine the concentration of airborne metal particulates. The PM standard was revised from TSP to PM_{10} on July 1, 1987. Research demonstrated smaller size particles present a greater health risk.

PRIMARY PM_{10} NAAQS: Annual arithmetic mean not to exceed 50 $\mu g/m^3$

24-hour concentration limit of 150 $\mu g/m^3$. Average number of expected exceedances per year not to exceed one over the most recent three-year period.

SECONDARY PM_{10} NAAQS: Same as primary standard.

[27] STN data will not be used for attainment or nonattainment decisions.
[28] PAMS collect and report detailed data for VOCs, NO_X, O_3 and meteorological parameters. Information on PAMS is available at http://www.epa.gov/oar/oaqps/pams/.
[29] More $PM_{2.5}$ speciation information is available at http://www.epa.gov/ttn/amtic/pmspec.html.

On July 18, 1997, the PM_{10} standard was revised and a new standard was added for $PM_{2.5}$ (**15**). The final form of the $PM_{2.5}$ standard consists of an annual as well as a 24-hour average. Compliance with both the 24-hour and annual standards is based on data averaged over a three-year period.

PRIMARY $PM_{2.5}$ NAAQS:	Annual arithmetic mean not to exceed 15 $\mu g/m^3$ (based on a three-year average) 98th percentile of 24-hour concentration not to exceed 65 $\mu g/m^3$ (based on a three-year average).
SECONDARY $PM_{2.5}$ NAAQS:	Same as primary standard.

On December 20, 2005, EPA proposed revisions to the PM NAAQS. EPA states that these proposed revisions, published in the January 17, 2006 Federal Register (FR), would strengthen a $PM_{2.5}$ standard important for both health and visibility, and would improve and refocus the coarse particle standards on those particles that are associated with public health concerns.[30] The proposed revisions address two categories of particle pollution:

- *fine particles* ($PM_{2.5}$), which are 2.5 micrometers in diameter and smaller; and
- *inhalable coarse particles* ($PM_{10-2.5}$), which are smaller than 10 micrometers in diameter but larger than $PM_{2.5}$.

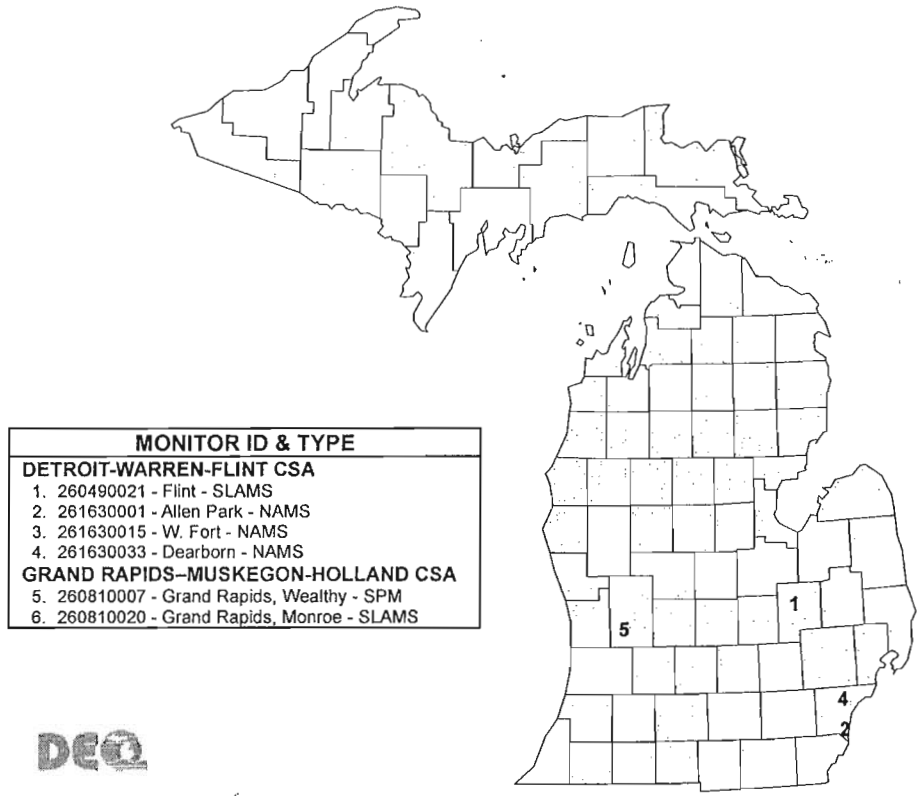
Simultaneously, EPA proposed amendments to its national air quality monitoring requirements, including those for monitoring particle pollution. The proposed changes include the design of a network to monitor $PM_{10-2.5}$.[31]

MONITORING FOR PM_{10} IN MICHIGAN:

Due to the recent focus upon $PM_{2.5}$ and because of the relatively low level of PM_{10} measured over recent years, Michigan's PM_{10} network is maintained at a minimum level. The map in **Figure 2.5-5** identifies the locations of the six PM_{10} monitoring stations that were operating in Michigan during 2005. These monitors are located in Michigan's largest populated urban areas with three in the Detroit area, one in Flint, and two in Grand Rapids. To better characterize the nature of PM in Michigan, many of the existing PM_{10} monitors are co-located with $PM_{2.5}$ monitors in population-oriented areas.

[30] Information on the revised particulate standards are available at http://www.epa.gov/airlinks/airlinks4.html.
[31] Current information on both proposals can be found at http://www.epa.gov/air/particles/actions.html.

FIGURE 2.5-5: PM_{10} MONITORS ACTIVE IN 2005



ATTAINMENT/NONATTAINMENT STATUS OF PM_{10} IN MICHIGAN:

All areas of Michigan are in attainment with the PM_{10} NAAQS since October 4, 1996.

PM_{10} TRENDS BY LOCATION:

Figures 2.5-6 through **2.5-8** are broken down by locations and identify the trends in the 24-hour PM_{10} values in Michigan over the past decade.

Figure 2.5-6 shows the annual arithmetic means for the Detroit-Warren-Flint CSA from 1996-2005. For 2005, all monitoring sites in the Detroit area had readings below the PM_{10} standard with the Dearborn continuing to have the highest maximum annual mean (39.7 $\mu g/m^3$) in the state.

Figure 2.5-6: PM_{10} Levels in MI's Detroit-Warren-Flint CSA from 1996-2005 (Annual Arithmetic Means)

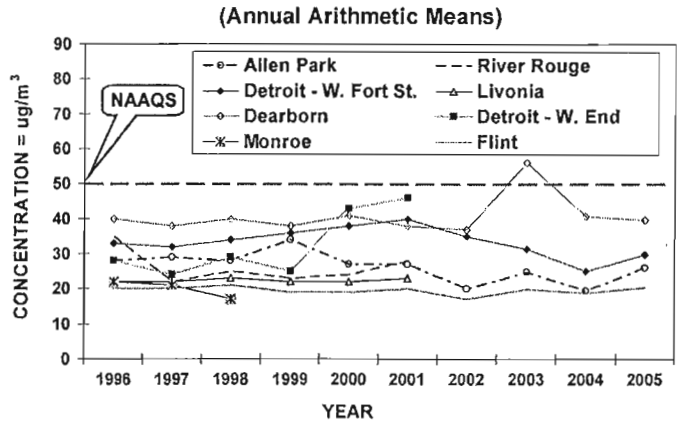
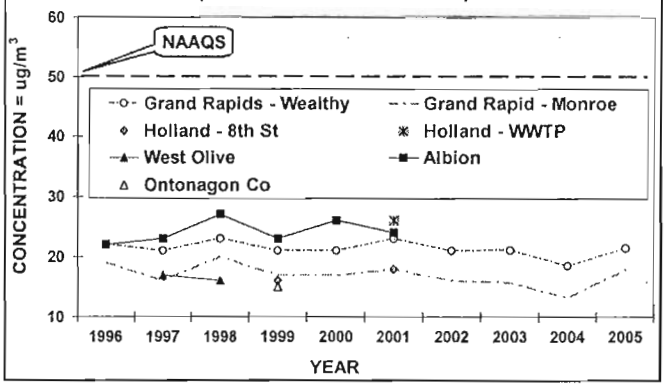


Figure 2.5-7 shows the annual arithmetic means for the Grand Rapids-Muskegon-Holland CSA and includes the Ontonagon County monitoring site. For 2005, there are only two sites monitoring for PM_{10}. Both of these sites were in the Grand Rapids area and they continue to show annual mean PM_{10} levels below the PM_{10} NAAQS. For the decade, all the monitoring sites in western Michigan have maintained a level well below the PM_{10} NAAQS.

Figure 2.5-7: PM_{10} Levels in the Grand Rapids-Muskegon-Holland CSA & North MI from 1996-2005 (Annual Arithmetic Means)



Exceedances of the PM_{10} Standard

Table 2.5-3 shows that from 1996 to 2005, there were a total of five exceedances of the 24-hour PM_{10} standard. Each occurred at the Dearborn monitoring station. NOTE: The two events in 2003 were inadvertently omitted from the 2003 and 2004 Annual Air Quality Reports and are included here (see **Appendix F: Errata Sheet**). Both the two exceedance events in 2003 and the one in 2004 happened during construction activities near the Dearborn monitor. However, only the 2004 exceedance was considered an "exceptional event" under federal criteria and this concentration was not used for attainment/nonattainment purposes. The following is a description of the 2004 exceptional event:

- On June 8, 2004, there was one exceedance of the 24-hour PM_{10} standard at 242 $\mu g/m^3$ due to construction at the nearby soccer field and running track. During this construction, a large dirt storage pile was placed within 100 feet of the Dearborn monitoring station. These particulate emissions were uncontrolled. Wind gusts reached greater than 28 mph and no precipitation was observed during the period of June 3rd through the 8th. On June 9, 2004, a thunderstorm came through the area providing moisture to the pile and created a hard crust, thereby mitigating further particulate emissions.

TABLE 2.5-3: VALUES EXCEEDING THE PM_{10} 24-HOUR NAAQS (150 $\mu G/M^3$) FROM 1996 TO 2005

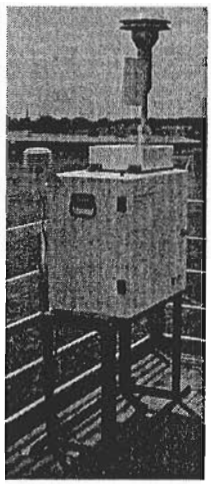
Year	Total Number of Exceedances Per Year	Site (s)	Date	24-Hour Value $\mu g/m^3$
1996	1	26-163-0033	9/5/96	158
1997	0	None		
1998	0	None		
1999	1	26-163-0033	10/25/99	156
2000	0	None		
2001	0	None		
2002	0	None		
2003	2	26-163-0033	4/15/03	191
			7/26/03	157
2004	1	26-163-0033	6/8/04	242
2005	0	None		

COMPREHENSIVE MONITORING FOR $PM_{2.5}$ IN MICHIGAN:

The statewide particulate network consists of many components which together provide a picture of the nature of PM within the state. The concentrations of $PM_{2.5}$ measured over a 24-hour time period are determined using the federal reference method (FRM). Only data generated by FRM monitors are used for comparisons to the NAAQS. The locations for the Michigan monitoring sites were selected using the EPA siting criteria for community-oriented, regional transport, and regional background sites (**16, 17**). These sites are located in urban, commercial, and residential areas where people are exposed to $PM_{2.5}$.

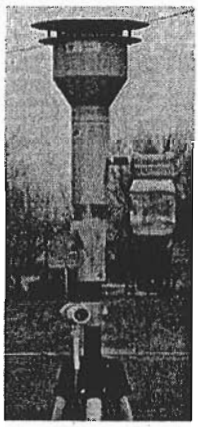
In addition to the FRM monitors, continuous and speciated monitors are also used at some locations. Continuous monitoring is beneficial as it provides real time hourly data that supplements the $PM_{2.5}$ data collected by FRM monitors. Speciated monitoring provides a better understanding of the chemical composition of $PM_{2.5}$ material and better characterizes background levels. The following are brief descriptions of the types of monitors that make up Michigan's $PM_{2.5}$ monitoring network.

$PM_{2.5}$ FRM Monitoring Network: The R&P sequential $PM_{2.5}$ FRM monitors are deployed at all of Michigan's $PM_{2.5}$ monitoring sites to characterize background or regional $PM_{2.5}$ transport collectively from upwind sources.


$PM_{2.5}$ FRM MONITOR

In 2005, four sites were added to Michigan's $PM_{2.5}$ FRM monitoring network bringing the total to 31 (see **Figure 2.5-8**). Two monitoring sites, Detroit's W. Lafayette and Newberry, were established as part of a new monitoring project to investigate PM levels in an area of Detroit heavily impacted by mobile source emissions. In October 2005, FRM monitors were added to the Channing and Crystal Falls area in Michigan's Upper Peninsula for a short-term study to determine the impact of outdoor wood boilers on air quality. Monitoring at these two sites will continue until April 2006.

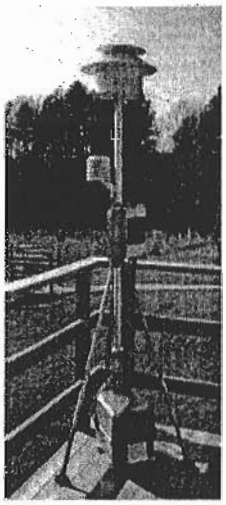
In addition, five $PM_{2.5}$ FRM monitoring sites are co-located with PM_{10} monitors to allow for $PM_{2.5}$ and PM_{10} comparisons (**16, 18, 19**). Co-located PM_{10} and $PM_{2.5}$ sites include Flint, Grand Rapids (Monroe), Dearborn, and Detroit's Allen Park and W. Fort St.. Siting criteria along with population distribution, emissions from stationary sources, the locations of existing O_3 and PM_{10} sites, and Michigan geography determine the final design of the Michigan $PM_{2.5}$ monitoring network.


TEOM MONITOR

Continuous $PM_{2.5}$ Monitoring: Short-term measurements of $PM_{2.5}$ or PM_{10} are updated on an hourly basis using R&P Tapered Element Oscillating Microbalance (TEOM) instruments. At least one continuous TEOM is required at a core monitoring $PM_{2.5}$ site in a metropolitan area with a population greater than one million (Detroit's Allen Park and Grand Rapids - Monroe) (**18**).

In 2005, TEOM monitors were added to Detroit's W. Lafayette and Newberry monitoring sites bringing Michigan's total to 14 continuous $PM_{2.5}$ monitors. The remaining TEOM monitors are located at Bay City, Dearborn, Flint, Holland, Houghton Lake, Kalamazoo, Lansing, Port Huron, Saginaw, and Ypsilanti.

Chemical Speciation Monitoring: Single event Met-One spiral ambient speciation samplers (SASS) are used throughout Michigan's speciation network and are placed in population-oriented stations in both urban and rural locations. $PM_{2.5}$ chemical speciation samples are collected on filters over a 24-hour period on either a once every three or once every six day schedule. Samples are collected on three types of filters: teflon, nylon, and quartz. Each filter is analyzed by a different method to determine various components of $PM_{2.5}$ **(20)**.



MET-ONE SASS MONITOR

For 2005, there were a total of nine chemical speciation monitoring sites. The primary objectives of these sites were to provide data that will be used to determine air quality and to support the development of attainment strategies. In the Detroit-Warren-Flint CSA the Allen Park, Dearborn, Luna Pier, and Ypsilanti monitors will be used in the creation of attainment strategies for Southeast Michigan. The Luna Pier speciation monitor is being used to characterize $PM_{2.5}$ arising from transport. The Ypsilanti speciation monitor supplies urban upwind data and also provides additional air quality data for Washtenaw County Health Department and other researchers in their investigation of the elevated asthma levels in the area.

For West Michigan, even though the counties were designated as attainment, there are two monitoring sites gathering speciation data. The monitor in Grand Rapids, a large population center, will be valuable in comparing the differences in chemical composition across large metropolitan areas and the Holland site addresses transport from Chicago and more rural concentrations of speciated $PM_{2.5}$.

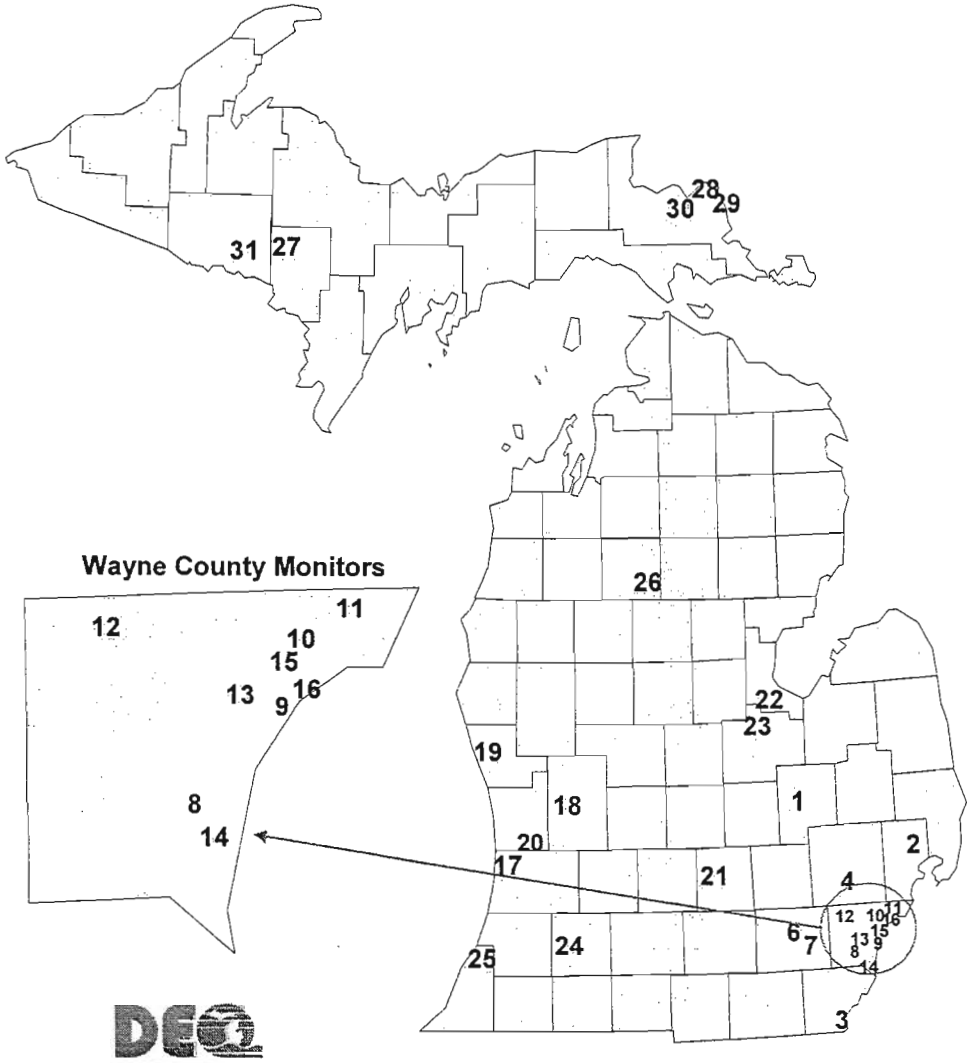
With Kalamazoo having the highest PM levels outside of the Detroit area, the speciation monitoring data will be helpful in maintaining attainment for this location.

Speciated monitors are used to gather background information for regional visibility modeling at Houghton Lake. Speciated $PM_{2.5}$ measurements are also being carried out by the Inter-Tribal Council at the Sault Ste. Marie – Easterday site for Michigan's Upper Peninsula.

In addition, Michigan has expanded its $PM_{2.5}$ monitoring by placing both TEOM and SASS monitors at the following seven locations: Allen Park, Dearborn, Grand Rapids, Holland, Houghton Lake, Kalamazoo, and Ypsilanti.

The following **Figure 2.5-8** shows all of Michigan's 31 $PM_{2.5}$ monitoring stations operating in 2005 and denotes which sites also have TEOM and/or SASS monitors in operation.

FIGURE 2.5-8: $PM_{2.5}$ MONITORS ACTIVE IN 2005



MONITOR ID & TYPE

DETROIT-WARREN-FLINT CSA
1. 260490021 – Flint – SLAMS* (TEOM)
2. 260990009 – New Haven – SLAMS
3. 261150005 – Luna Pier – SLAMS (SASS)
4. 261250001 – Oak Park – SLAMS*
5. 261470005 – Port Huron – SLAMS (TEOM)
6. 261610005 – Ann Arbor – SLAMS*
7. 261610008 – Ypsilanti - SLAMS* (TEOM/SASS)
8. 261630001 – Allen Park – SLAMS* (TEOM/SASS)
9. 261630015 – W. Fort - SLAMS
10. 261630016 – Linwood – SLAMS*
11. 261630019 – E. Seven Mile – SLAMS
12. 261630025 – Livonia – SLAMS*
13. 261630033 – Dearborn – SLAMS (TEOM/SASS)
14. 261630036 – Wyandotte – SLAMS*
15. 261630038 – Newberry – SPM (TEOM)
16. 261630039 – W. Lafayette – SPM (TEOM)

GRAND RAPIDS-MUSKEGON-HOLLAND CSA
17. 260050003 – Holland – SLAMS (TEOM/SASS)
18. 260810020 – Grand Rapids – SLAMS* (TEOM/SASS)
19. 261210040 – Muskegon - SLAMS
20. 261390005 – Jenison - SLAMS

LANSING-E. LANSING-OWOSSO CSA
21. 260650012 – Lansing – SLAMS* (TEOM)

SAGINAW-BAYCITY-SAGINAW TWP. NORTH CSA
22. 260170014 – Bay City – SLAMS (TEOM)
23. 261450018 – Saginaw – SLAMS (TEOM)

KALAMAZOO-PORTAGE MSA
24. 260770008 – Kalamazoo - SLAMS (TEOM/SASS)

NILES-BENTON HARBOR MSA
25. 260210014 – Coloma - SLAMS

CADILLAC MiSA
26. 261130001 – Houghton Lake – SPM (TEOM/SASS)

IRON MOUNTAIN (MI-WI) MiSA
27. 260430002 – Channing - SPM

SAULT STE. MARIE MiSA
28. 260330901 – Sault Ste Marie, Easterday – TRIBAL (SASS)
29. 260330902 – Sault Ste Marie, Marquette – TRIBAL
30. 260330903 – Bay Mills - TRIBAL

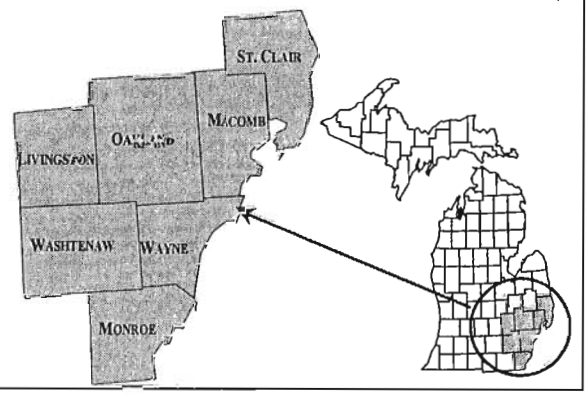
IRON COUNTY
31. 260710001 – Crystal Falls - SPM

*Pending approval for NAMS designation

ATTAINMENT/NONATTAINMENT STATUS OF $PM_{2.5}$ IN MICHIGAN:

EPA promulgated the $PM_{2.5}$ NAAQS on July 18, 1997. In the January 5, 2005 FR, EPA announced their $PM_{2.5}$ designations, effective April 5, 2005, utilizing the 2001-2003 three-year annual average data.[32] **Figure 2.5-9** shows the seven Southeast Michigan counties designated as nonattainment for $PM_{2.5}$: Monroe, Wayne, St. Clair, Oakland, Macomb, Livingston, and Washtenaw. As stated in the FR notice, States were allowed to submit 2004 $PM_{2.5}$ quality-assured monitoring data, calculate the 2002-2004 three-year annual average, and request changes in attainment status if this data and supporting rationale showed an area should instead be designated attainment.

FIGURE 2.5-9: EPA'S $PM_{2.5}$ NONATTAINMENT AREA DESIGNATIONS FOR MICHIGAN
(BASED ON THE 2001-2003 THREE-YR ANNUAL AVERAGES DATA)



On February 22, 2005, MDEQ submitted documentation demonstrating that monitors in the counties surrounding Wayne County (Livingston, Oakland, Macomb, Monroe, St. Clair, and Washtenaw Counties) are not violating the standard and that Wayne County is the only county showing nonattainment. The MDEQ submittal also included information supporting the conclusion that air pollution emissions in the surrounding six counties do not cause the nonattainment levels in Wayne County. However, EPA denied Michigan's request for reconsideration as they believe the surrounding counties contribute to the overall air quality violations at the Wayne County monitors.[33]

States with counties designated as nonattainment for $PM_{2.5}$ are required to develop control strategies to bring the areas into attainment by 2010. The state attainment plans and regulations must be submitted to EPA by January 2008. In the November 1, 2005 FR, EPA announced its proposed $PM_{2.5}$ Implementation Rule that describes the planning requirements for state, local, and tribal governments when developing their plans to meet the $PM_{2.5}$ NAAQS. The proposed rule addresses:

- Attainment Demonstrations and Modeling: Data period for attainment determinations, criteria for attainment date extensions, use of a classification/nonclassification system, modeling criteria.
- Reasonably Available Control Technology (RACT): Criteria, thresholds, and implementation deadlines; substituting CAIR requirements for EGU RACT.
- Reasonably Available Control Measures and Reasonable Further Progress: Criteria for meeting these requirements.
- New Source Review in Attainment and Nonattainment Areas: Identifies pollutants to be controlled ($PM_{2.5}$ direct emissions, SO_2, NO_X, and VOCs), threshold levels, and offset ratios.
- Transportation Conformity, Emission Test Methods, and Emission Inventories: Proposed requirements.

Michigan has several concerns and provided comments to this proposed rule on January 31, 2006. It's important to note that the MDEQ is working with a coalition of stakeholders, including the Southeast Michigan Ozone and $PM_{2.5}$ Task Force, and the Lake Michigan Air Director's Consortium, to effectively address $PM_{2.5}$. Studies are underway to determine source contribution of PM.

The following **Table 2.5-4** provides the 1999-2005 annual mean $PM_{2.5}$ concentrations by individual monitoring stations.

[32] Information on all of EPA's $PM_{2.5}$ designations is available at http://www.epa.gov/pmdesignations/.
[33] Michigan's submittal is at http://www.deq.state.mi.us/documents/deq-aqd-air-aqe-mi-pm2-5-ltr-2-22-05.pdf.

Stations labeled #2 provide a precision estimate of the overall measurement and operate on a one in six sampling schedule. All other samplers (except Holland, Grand Rapids #1, Allen Park #1, and Linwood), sample on a one in three day schedule. The differences in the average concentrations and maximum levels are the result from these differences in sampling frequency.

TABLE 2.5-4: ANNUAL MEAN $PM_{2.5}$ CONCENTRATIONS BY INDIVIDUAL MONITORING STATION FROM 1999-2005 (ANNUAL MEAN, ROUNDED)[34]

AIRS ID – Station Name	1999	2000	2001	2002	2003	2004	2005	2003-2005 Mean
260050003 - Holland	12.1	11.7	12.8	12.4	12.38	11.21	12.39	12.0
260070005 - Alpena		7.6	9.8	9.1				**
260170014 - Bay City		10.1	11.5	11.3	10.89	9.85	12.44	11.1
260210014 - Coloma	12.3	12.1	13.2	12.5	12.46	10.23	13.05	11.9
260330901 - Sault Ste. Marie #1			8.2	7.6	8.64	7.16	8.16	8.0
260330901 - Sault Ste. Marie #2			7.9	8.2	9.45*	6.28	9.29*	8.3
260330902 - Sault Ste. Marie			7.9	7.8	8.09	6.74	7.94	7.6
260330903 – Bay Mills							4.31*	**
260430002 - Channing							6.11*	**
260490021 - Flint	12.0	13.0	13.1	12.5	12.01	10.49	12.89	11.8
260550003 - Traverse City		8.6	9.3	8.0				**
260650012 - Lansing #1	12.6	13.1	14.0	13.50	13.01	11.06	13.54	12.5
260650012 - Lansing #2	12.9	13.6	13.3	12.4	14.08*	6.20*		**
260710001 – Crystal Falls							3.97*	**
260770008 - Kalamazoo #1	14.9	**15.1**	**15.6**	14.8	13.92	11.33	13.83	13.0
260770008 - Kalamazoo #2	14.7	14.7	14.6	15.0	14.27*	11.09	14.64*	13.3
260810020 - Grand Rapids #1	13.8	13.8	14.4	13.3	13.51	12.00	13.72	13.1
260810020 - Grand Rapids #2	13.9	13.8	14.2	13.2	14.00	11.26	**15.37**	13.5
260990009 - New Haven	12.7	13.4	13.6	13.4	12.8	11.96	14.37	13.1
261130001 - Houghton Lake					7.96	7.29	9.38	8.2
261150005 - Luna Pier		**15.2**	**15.3**	**16.3**	13.73	12.98	**15.70**	14.2
261210040 - Muskegon #1	12.2	11.9	12.6	12.4	11.87	10.16	13.07	11.7
261210040 - Muskegon #2	14.5	11.0						**
261250001 - Oak Park	14.2	**15.4**	14.7	15.0	14.58	12.76	**15.46**	14.3
261250010 - Southfield			17.1	17.6				**
261390005 - Jenison	12.9	13.2	13.8	13.6	12.69	11.33	13.99	12.7
261450018 - Saginaw #1	9.8	10.5	11.5	10.8	10.62	9.51	11.72*	10.6
261450018 - Saginaw #2	10.4	9.8	10.3					**
261470005 - Port Huron #1	13.2	14.4	14.0	13.8	14.16	12.10	**15.09**	13.8
261470005 - Port Huron #2			13.2	13.0	**15.67***			**
261530001 - Seney Nat'l Wildlife			7.5	6.0	3.73*			**
261610005 - Ann Arbor	12.8	13.2	13.5	13.6	13.06*	10.67	13.20	12.3
261610008 - Ypsilanti #1	14.2	14.3	14.5	14.9	14.64	12.87	**15.61**	14.4
261610008 - Ypsilanti #2			13.8	13.0	**15.12**	11.09	**16.70**	14.3
261630001 - Allen Park #1	**16.7**	**15.6**	**17.3**	**15.9**	**15.2**	14.24	**15.94**	**15.1**
261630001 - Allen Park #2	**19.6**	**16.0**	**16.2**	13.9	**17.51***	12.32	**17.66**	**15.8**
261630015 - Detroit - W. Fort t.	**17.7**	**18.1**	**18.3**	**17.4**	**16.63**	**15.39**	**17.21**	**16.4**
261630016 - Detroit - Linwood	**17.1**	**15.5**	**15.8**	**15.6**	**15.82**	13.69	**16.01**	**15.2**
261630019 - Detroit - E Seven Mile		14.5	14.5	**15.6**	14.63	13.23	**16.48**	14.8
261630025 - Livonia	13.1	14.6	14.6	14.4	14.14	12.57	14.94	13.9
261630033 - Dearborn	**17.0**	**20.1**	**19.6**	**19.8**	**19.11**	**16.83**	**18.55**	**18.2**
261630036 - Wyandotte	**16.3**	**17.6**	**18.2**	**16.3**	**16.26**	13.66	**16.41**	**15.5**
261630038 - Detroit - Newberry							**16.41***	**
261630039 - Detroit - W. Lafayette							**16.22***	**

*The mean does not satisfy summary criteria.
**The $PM_{2.5}$ NAAQS cannot be calculated as there is not three years worth of data or monitoring ended prior to 2005.
NOTE: The 2003 value for Houghton Lake has been corrected. See **Appendix F: Errata Sheet.**

[34] The annual $PM_{2.5}$ NAAQS is met when the three-year average is less than or equal to 15.0 $\mu g/m^3$. For comparing calculated values to the standard, the average annual means is rounded to the nearest 0.1 $\mu g/m^3$.

Table 2.5-5 is a detailed assessment of the 24-hour 98TH percentile $PM_{2.5}$ concentrations for 1999-2005 showing Michigan's levels are consistently below the 65 $\mu g/m^3$ standard (three-year average).

TABLE 2.5-5: 24-HOUR 98TH PERCENTILE $PM_{2.5}$ CONCENTRATIONS BY INDIVIDUAL MONITORING STATION FROM 1999-2005 (98TH PERCENTILE, ROUNDED)[35]

AIRS ID – Station Name	1999	2000	2001	2002	2003	2004	2005	2003-2005 Mean
260050003 - Holland	36.5	35.7	42.1	36.7	35.6	30.3	36.1	34.0
260070005 - Alpena		25.4	35.1	27.3				*
260170014 - Bay City		27.7	34.2	32.0	26.7	28.0	40.5	31.7
260210014 - Coloma	35.4	29.7	32.3	30.6	34.1	29.0	33.8	32.3
260330901 - Sault Ste. Marie #1			27.9	22.1	26.3	22.3	25.1	24.6
260330901 - Sault Ste. Marie #2			25.4	21.4	38.3	15.4	28.3	27.3
260330902 - Sault Ste. Marie			28.0	27.0	25.4	23.2	25.1	24.6
260330903 - Bay Mills							11.1	*
260430002 - Channing							18.4	*
260490021 - Flint	32.8	32.2	38.0	30.8	32.2	27.9	35.9	32.0
260550003 - Traverse City		27.2	32.7	23.3				*
260650012 - Lansing #1	34.6	37.2	37.2	32.8	29.0	29.4	38.1	32.2
260650012 - Lansing #2	36.8	35.3	40.4	30.1	28.9	6.2		*
260710001 - Crystal Falls							13.9	*
260770008 - Kalamazoo #1	38.0	35.5	40.0	32.3	36.9	27.3	33.3	32.5
260770008 - Kalamazoo #2	38.7	36.5	36.0	32.0	35.7	28.9	31.5	32.0
260810020 - Grand Rapids #1	38.8	40.5	43.5	35.1	35.0	31.8	44.7	37.2
260810020 - Grand Rapids #2	39.3	28.1	39.4	32.4	29.6	30.5	45.6	35.2
260990009 - New Haven	31.9	33.2	42.0	35.6	31.8	31.9	41.5	35.1
261130001 - Houghton Lake					23.6	21.0	30.8	25.1
261150005 - Luna Pier		37.2	39.2	42.7	34.7	35.0	49.3	39.7
261210040 - Muskegon #1	38.1	35.0	34.9	29.8	36.3	32.7	41.0	36.7
261210040 - Muskegon #2	39.1	23.5						*
261250001 - Oak Park	42.8	40.7	39.4	38.4	36.6	32.5	52.2	40.4
261250010 - Southfield			44.2	31.4				*
261390005 - Jenison	38.7	33.7	35.0	36.8	31.0	30.9	42.3	34.7
261450018 - Saginaw #1	31.0	27.5	34.6	26.0	26.8	27.4	37.8	30.7
261450018 - Saginaw #2	34.3	28.4	10.3					*
261470005 - Port Huron #1	44.5	33.1	40.5	35.3	37.2	32.2	47.6	39.0
261470005 - Port Huron #2			35.9	37.7	38.0			*
261530001 - Seney Nat'l Wildlife			26.0	18.0	15.8			*
261610005 - Ann Arbor	38.2	33.1	38.5	31.3	33.3	28.4	39.1	33.6
261610008 - Ypsilanti #1	40.6	30.3	39.7	30.9	38.8	31.5	52.1	40.8
261610008 - Ypsilanti #2			39.0	32.6	32.5	31.2	54.6	39.4
261630001 - Allen Park #1	49.0	41.8	48.3	39.6	40.5	36.9	43.0	40.1
261630001 - Allen Park #2	44.1	34.6	40.1	30.9	39.2	33.8	58.0	43.7
261630015 - Detroit - W. Fort St.	50.2	44.5	42.9	38.2	33.6	36.0	49.7	39.8
261630016 - Detroit - Linwood	51.7	44.0	46.0	42.7	46.2	38.3	51.8	45.4
261630019 - Detroit - E Seven Mile		42.0	42.0	34.4	37.1	35.0	52.3	41.5
261630025 - Livonia	38.4	35.9	44.7	32.7	38.1	32.2	40.2	36.8
261630033 - Dearborn	45.1	45.1	43.2	45.7	42.8	39.4	50.2	44.1
261630036 - Wyandotte	45.0	42.7	46.6	34.1	34.8	32.3	46.7	37.9
261630038 - Detroit - Newberry							57.5	*
261630039 - Detroit - W. Lafayette							43.9	*

*The 2003-2005 mean cannot be calculated as there is not three years worth of data or monitoring ended prior to 2005.

The following **Figures 2.5-10** through **2.5-14** shows the annual mean $PM_{2.5}$ trend for each monitoring site in Michigan for the years monitoring was conducted.

[35] The 98TH percentile value was obtained from the EPA AQS. For the purpose of comparing calculated values, the three-year 24-hour average is rounded to the nearest 0.1 $\mu g/m^3$.

For clarity purposes, the Detroit-Warren-Flint CSA has been broken down into two graphs. **Figure-2.5-10** shows Wayne County's nine monitoring sites (part of the Detroit-Warren-Flint CSA) annual mean trends from 1999-2005. In 2005, eight of the nine monitoring sites had yearly readings above the $PM_{2.5}$ standard with Livonia the only site below at 14.9 µg/m^3. After the three-year annual means are calculated, the following five sites did not meet the $PM_{2.5}$ NAAQS: Allen Park (15.1 µg/m^3), W. Fort (16.4 µg/m^3), Dearborn (18.2 µg/m^3), Linwood (15.2 µg/m^3), and Wyandotte (15.5 µg/m^3). Historically (since 1999), the Dearborn and W. Fort monitoring sites have continually been above the $PM_{2.5}$ NAAQS with Dearborn having the highest readings in the state.

Figure 2.5-10: Detroit-Warren-Flint CSA - (Wayne County Only) Annual Arithmetic Means for $PM_{2.5}$ from 1999-2005

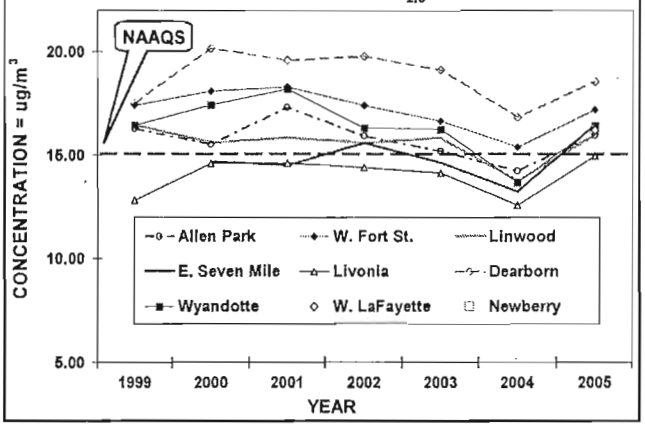


Figure 2.5-11 contains the remainder of those sites in the Detroit-Warren-Flint CSA's (without Wayne County). For 2005, Ypsilanti (15.6 µg/m^3) and Luna Pier (15.7 µg/m^3) were the only sites that had yearly readings above the $PM_{2.5}$ standard. However, after the three year annual mean is averaged these sites remained below the $PM_{2.5}$ NAAQS.

In summary, for the entire Detroit-Warren-Flint CSA, only Wayne County had three-year annual mean values above the $PM_{2.5}$ NAAQS. This trend was the same in 2004 reiterating Michigan's position that only Wayne County should be designated as nonattainment.

Figure 2.5-11: Detroit-Warren-Flint CSA (without Wayne County) Annual Arithmetic Means for $PM_{2.5}$ from 1999-2005

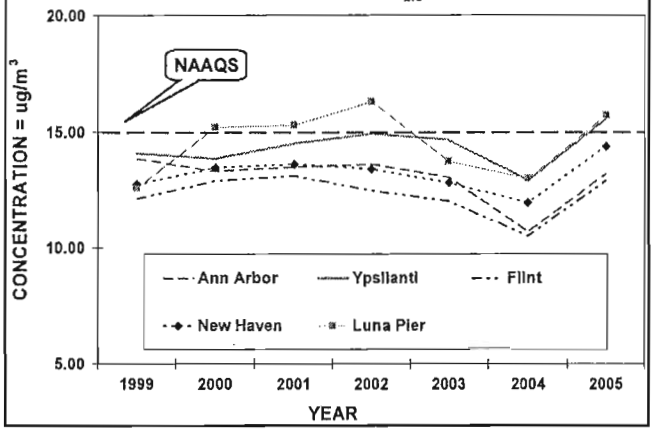


Figure 2.5-12 combines the $PM_{2.5}$ monitoring sites in the Grand Rapids-Muskegon-Holland CSA, Kalamazoo, and Coloma for a view of West Michigan.

All sites in Western Michigan have been below the $PM_{2.5}$ NAAQS since 2002. In 2000 and 2001, the Kalamazoo monitor was the only West Michigan monitor to have readings above the standard at 15.1 µg/m^3 and 15.6 µg/m^3, respectively.

Figure 2.5-12: West MI - Grand Rapids-Muskegon-Holland CSA, Kalamazoo & Benton Harbor MSAs Annual Arithmetic Means for $PM_{2.5}$ from 1999-2005

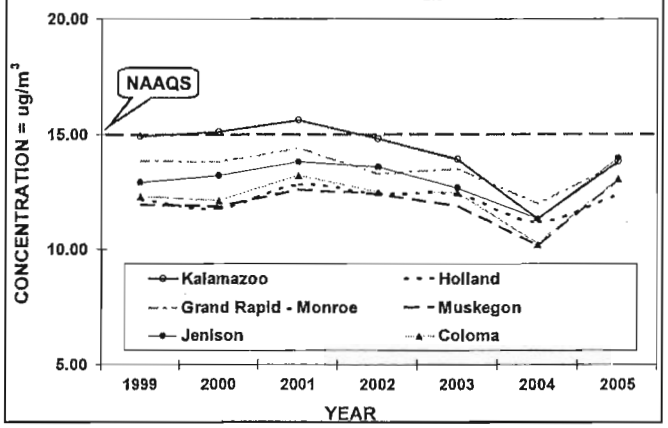


Figure 2.5-13 shows the remaining monitoring sites operational in Michigan's Lower Peninsula (Lansing-E. Lansing-Owosso CSA, Saginaw-Bay City-Saginaw Twp. North CSA, Traverse City MiSA, and Houghton Lake located in the Cadillac MiSA). All these sites have remained below the $PM_{2.5}$ NAAQS.

Figure 2.5-14 (below) contains those sites in Michigan's Upper Peninsula. All sites had levels below the $PM_{2.5}$ NAAQS. However, three-year annual averages are not available for these sites as they have not been in operation long enough.

Figure 2.5-13: Lansing-E. Lansing CSA, Saginaw-Bay City CSA, Traverse City MiSA, & Cadillac MiSA Annual Arithmetic Means for $PM_{2.5}$ from 1999-2005

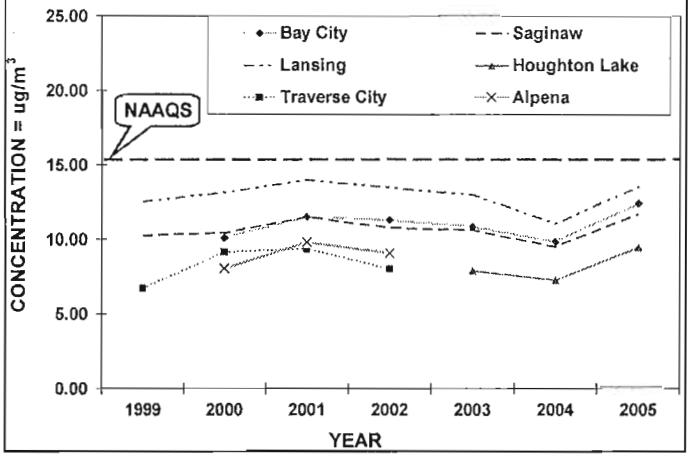
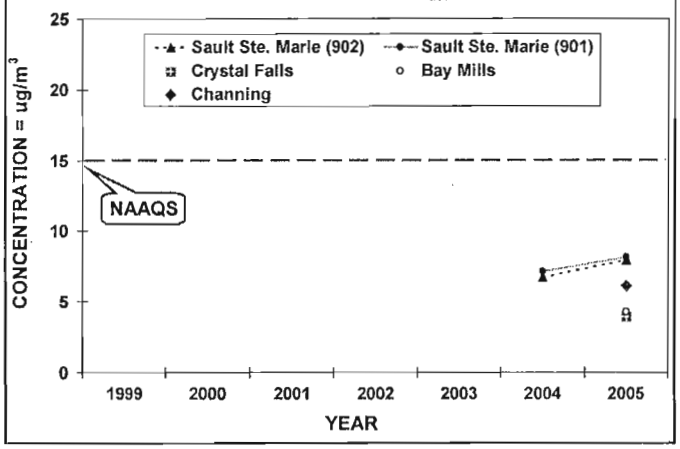


Figure 2.5-14: Sault Ste. Marie MiSA, Iron Mountain (MI-WI) MiSA, and Iron County Sites Annual Arithmetic Means for $PM_{2.5}$ from 1999-2005



NOTE: With on-road and non-road sources producing 50% of Michigan's $PM_{2.5}$ emissions, it is important to acknowledge that there are several federal measures that will reduce vehicle emissions nationwide.

Beginning in 2004, requirements to reduce emissions from on-road sources were phased-in. This measure, part of the Tier 2 Vehicle and Gasoline Sulfur Program, reduces the level of sulfur in gasoline and sets the standards for tailpipe emissions for all on-road passenger vehicles, regardless of whether they run on gasoline, diesel fuel, or alternative fuels.[36]

To address non-road sources, the new Clean Air Non-Road Diesel Rule reduces future diesel engines by integrating engine and fuel controls as a total system.[37] In order to meet these emission standards, engine manufacturers will produce new engines with advanced emission-control technologies. In addition, because the emission-control devices can be damaged by sulfur, this rule also decreases the allowable level of sulfur in non-road diesel fuel.

There are also several federal measures that will help reduce point source emissions of NO_X, a secondary source of $PM_{2.5}$. The first is the recently implemented NO_X SIP Call that requires NO_X reductions from power plants in 19 eastern states including Michigan. Other federal measures are included in the EPA's Clean Air Rules of 2004, such as CAIR, finalized in 2005, that requires NO_X reductions from power plants across the region that will also result in lower $PM_{2.5}$ levels.

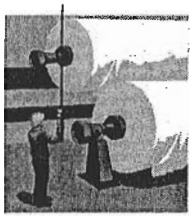
[36] The Tier 2 Vehicle and Gasoline Sulfur Program is available at http://www.epa.gov/tier2/.
[37] Information on the Clean Air Non-Road Diesel Rule is available at http://www.epa.gov/nonroad-diesel/2004fr.htm.

CHAPTER 2.6: SULFUR DIOXIDE TRENDS

INTRODUCTION:

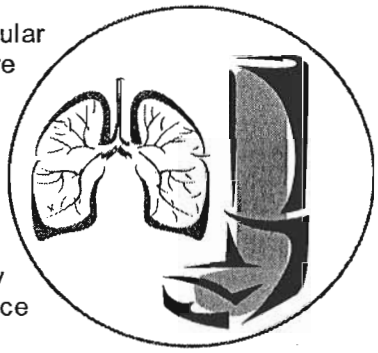
Sulfur dioxide (SO_2) is a colorless gas formed by the burning of sulfur-containing material and is odorless at typical ambient concentrations. It can react with other atmospheric chemicals to form sulfuric acid. When a sulfur-bearing fuel is combusted, the sulfur is oxidized to form SO_2 and then it reacts with other pollutants to form aerosols. In liquid form, it is found in clouds, fog, rain, aerosol particles, and in surface films on these particles. SO_2 reacts with ammonia in the atmosphere to form ammonium sulfate, a common fine particulate material ($PM_{2.5}$) found in the Midwest. Other sulfate-containing chemical species prevalent in fine particles include ammonium bisulfate.

Nationwide, the largest source of SO_2 comes from coal-burning power plants. State regulations require that most of the coal burned in Michigan contain low amounts of sulfur. SO_2 also is emitted from smelters, petroleum refineries, pulp and paper mills, transportation sources, and steel mills. Other sources include residential, commercial, and industrial space heating.



SO_2 EFFECTS:

Exposure to elevated levels of SO_2 aggravates existing cardiovascular and pulmonary disease. Asthmatics, children, and the elderly are especially sensitive to its effects. Asthmatic individuals receiving short-term exposures during moderate exertion may experience reduced lung function and symptoms such as wheezing, chest tightness, or shortness of breath (**1**). Depending upon the concentration, SO_2 may also cause symptoms in people who do not have asthma. Where SO_2 is emitted, PM is also often emitted. SO_2 and PM may exert a synergistic toxic effect. Together, they may cause respiratory illness, alteration in the body's defense and clearance mechanisms, and aggravation of existing cardiovascular disease (**1**).

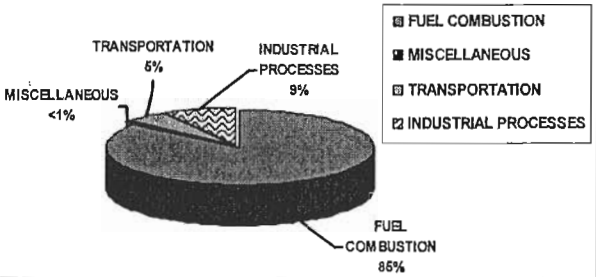


SO_2 and NO_X together are the major precursors to acid rain, which is associated with the acidification of soils, lakes, and streams and accelerated corrosion of buildings and monuments. SO_2 is also a major precursor to $PM_{2.5}$, which is a significant health concern, and a main contributor to poor visibility.

NATIONAL SOURCE TRENDS:

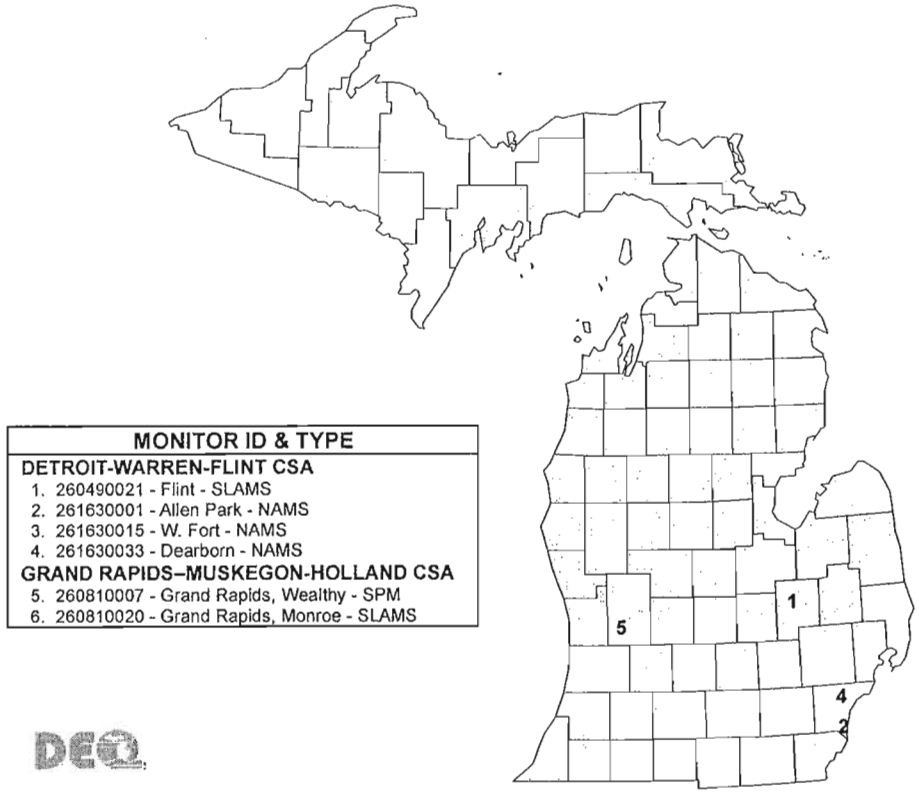
According to the EPA, coal-burning power plants have consistently been the largest contributor of SO_2 emissions, producing about 63% of all SO_2 emissions (**1**). The highest SO_2 emission density is located in the eastern U.S., in large metropolitan areas, and in those areas with coal-burning plants. Emissions from these power plants account for most of the fuel combustion category in EPA's **Figure 2.6-1**.[38]

Figure 2.6-1: EPA's 2002 National SO_2 Emissions by Source Category



[38] Figure 2.6-1 is from EPA Air Trends information located at http://www.epa.gov/airtrends/sulfur2.html.

FIGURE 2.5-5: PM_{10} MONITORS ACTIVE IN 2005



ATTAINMENT/NONATTAINMENT STATUS OF PM_{10} IN MICHIGAN:

All areas of Michigan are in attainment with the PM_{10} NAAQS since October 4, 1996.

PM_{10} TRENDS BY LOCATION:

Figures 2.5-6 through **2.5-8** are broken down by locations and identify the trends in the 24-hour PM_{10} values in Michigan over the past decade.

Figure 2.5-6 shows the annual arithmetic means for the Detroit-Warren-Flint CSA from 1996-2005. For 2005, all monitoring sites in the Detroit area had readings below the PM_{10} standard with the Dearborn continuing to have the highest maximum annual mean (39.7 $\mu g/m^3$) in the state.

Figure 2.5-6: PM_{10} Levels in MI's Detroit-Warren-Flint CSA from 1996-2005 (Annual Arithmetic Means)

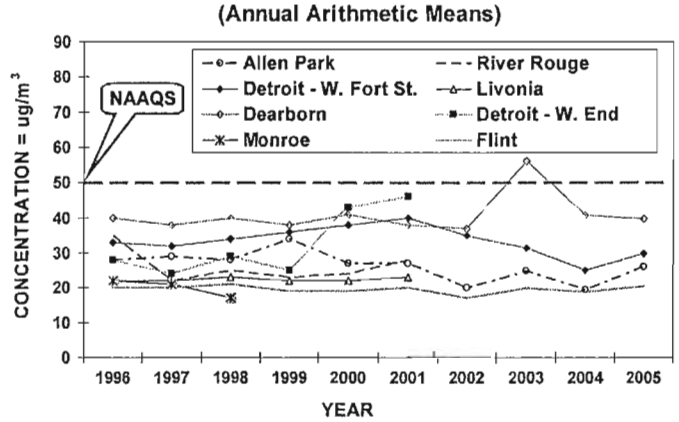
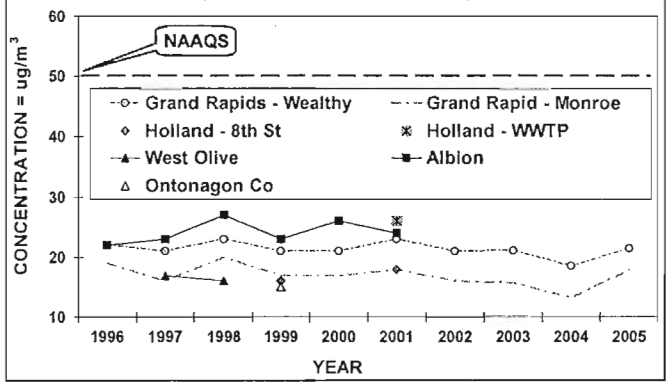


Figure 2.5-7 shows the annual arithmetic means for the Grand Rapids-Muskegon-Holland CSA and includes the Ontonagon County monitoring site. For 2005, there are only two sites monitoring for PM_{10}. Both of these sites were in the Grand Rapids area and they continue to show annual mean PM_{10} levels below the PM_{10} NAAQS. For the decade, all the monitoring sites in western Michigan have maintained a level well below the PM_{10} NAAQS.

Figure 2.5-7: PM_{10} Levels in the Grand Rapids-Muskegon-Holland CSA & North MI from 1996-2005 (Annual Arithmetic Means)



Exceedances of the PM_{10} Standard

Table 2.5-3 shows that from 1996 to 2005, there were a total of five exceedances of the 24-hour PM_{10} standard. Each occurred at the Dearborn monitoring station. NOTE: The two events in 2003 were inadvertently omitted from the 2003 and 2004 Annual Air Quality Reports and are included here (see **Appendix F: Errata Sheet**). Both the two exceedance events in 2003 and the one in 2004 happened during construction activities near the Dearborn monitor. However, only the 2004 exceedance was considered an "exceptional event" under federal criteria and this concentration was not used for attainment/nonattainment purposes. The following is a description of the 2004 exceptional event:

- On June 8, 2004, there was one exceedance of the 24-hour PM_{10} standard at 242 $\mu g/m^3$ due to construction at the nearby soccer field and running track. During this construction, a large dirt storage pile was placed within 100 feet of the Dearborn monitoring station. These particulate emissions were uncontrolled. Wind gusts reached greater than 28 mph and no precipitation was observed during the period of June 3rd through the 8th. On June 9, 2004, a thunderstorm came through the area providing moisture to the pile and created a hard crust, thereby mitigating further particulate emissions.

TABLE 2.5-3: VALUES EXCEEDING THE PM_{10} 24-HOUR NAAQS (150 $\mu G/M^3$) FROM 1996 TO 2005

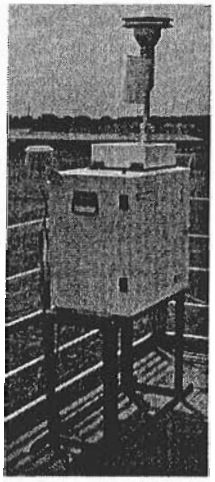
Year	Total Number of Exceedances Per Year	Site (s)	Date	24-Hour Value $\mu g/m^3$
1996	1	26-163-0033	9/5/96	158
1997	0	None		
1998	0	None		
1999	1	26-163-0033	10/25/99	156
2000	0	None		
2001	0	None		
2002	0	None		
2003	2	26-163-0033	4/15/03	191
			7/26/03	157
2004	1	26-163-0033	6/8/04	242
2005	0	None		

COMPREHENSIVE MONITORING FOR $PM_{2.5}$ IN MICHIGAN:

The statewide particulate network consists of many components which together provide a picture of the nature of PM within the state. The concentrations of $PM_{2.5}$ measured over a 24-hour time period are determined using the federal reference method (FRM). Only data generated by FRM monitors are used for comparisons to the NAAQS. The locations for the Michigan monitoring sites were selected using the EPA siting criteria for community-oriented, regional transport, and regional background sites (**16, 17**). These sites are located in urban, commercial, and residential areas where people are exposed to $PM_{2.5}$.

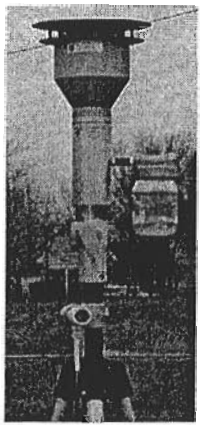
In addition to the FRM monitors, continuous and speciated monitors are also used at some locations. Continuous monitoring is beneficial as it provides real time hourly data that supplements the $PM_{2.5}$ data collected by FRM monitors. Speciated monitoring provides a better understanding of the chemical composition of $PM_{2.5}$ material and better characterizes background levels. The following are brief descriptions of the types of monitors that make up Michigan's $PM_{2.5}$ monitoring network.

$PM_{2.5}$ FRM Monitoring Network: The R&P sequential $PM_{2.5}$ FRM monitors are deployed at all of Michigan's $PM_{2.5}$ monitoring sites to characterize background or regional $PM_{2.5}$ transport collectively from upwind sources.


$PM_{2.5}$ FRM MONITOR

In 2005, four sites were added to Michigan's $PM_{2.5}$ FRM monitoring network bringing the total to 31 (see **Figure 2.5-8**). Two monitoring sites, Detroit's W. Lafayette and Newberry, were established as part of a new monitoring project to investigate PM levels in an area of Detroit heavily impacted by mobile source emissions. In October 2005, FRM monitors were added to the Channing and Crystal Falls area in Michigan's Upper Peninsula for a short-term study to determine the impact of outdoor wood boilers on air quality. Monitoring at these two sites will continue until April 2006.

In addition, five $PM_{2.5}$ FRM monitoring sites are co-located with PM_{10} monitors to allow for $PM_{2.5}$ and PM_{10} comparisons (**16, 18, 19**). Co-located PM_{10} and $PM_{2.5}$ sites include Flint, Grand Rapids (Monroe), Dearborn, and Detroit's Allen Park and W. Fort St.. Siting criteria along with population distribution, emissions from stationary sources, the locations of existing O_3 and PM_{10} sites, and Michigan geography determine the final design of the Michigan $PM_{2.5}$ monitoring network.


TEOM MONITOR

Continuous $PM_{2.5}$ Monitoring: Short-term measurements of $PM_{2.5}$ or PM_{10} are updated on an hourly basis using R&P Tapered Element Oscillating Microbalance (TEOM) instruments. At least one continuous TEOM is required at a core monitoring $PM_{2.5}$ site in a metropolitan area with a population greater than one million (Detroit's Allen Park and Grand Rapids - Monroe) (**18**).

In 2005, TEOM monitors were added to Detroit's W. Lafayette and Newberry monitoring sites bringing Michigan's total to 14 continuous $PM_{2.5}$ monitors. The remaining TEOM monitors are located at Bay City, Dearborn, Flint, Holland, Houghton Lake, Kalamazoo, Lansing, Port Huron, Saginaw, and Ypsilanti.

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PRINT THIS

DETROIT -- In the Hubbard Farms neighborhood of southwest Detroit -- one of the city's few thriving areas -- opposition is growing to a proposed second span of the Ambassador Bridge.

Residents of this tight-knit enclave say another bridge would bring added pollution and traffic and a greater security risk from terrorists looking to destroy two international crossings at once. The privately owned Ambassador, which connects Detroit and Windsor, is North America's busiest crossing for semi-trucks.

"Another span of the bridge would sound the death knell for our pleasant part of the city," said Lorraine Perlman, 72, who lives on Vinewood in the shadow of the Ambassador and its would-be companion.

A mile and a half downriver, in the ramshackle Delray neighborhood, a different mindset -- toward a different bridge plan -- has taken hold. Many poor and elderly residents here support a competing proposal for a publicly owned crossing to Canada -- if for no other reason than they'd get a government check to relocate.

"If I had the opportunity to move, yes I would move," said Joanne Tompos, a 65-year-old widow who lives on South Livernois in Delray. "I would go just to get away from the drugs and to get better service, in terms of police and fire. This is the forgotten zone down here -- it always has been."

The contentious race to build another bridge has pitted corporate bridge leaders against public officials, with each arguing they could run a better bridge in southwest Detroit.

Both spans would cost at least $1 billion, with tolls ultimately paying the bill. Neither side has acquired the needed permits to build; a new bridge wouldn't open before 2010.

The public proposal -- called the Detroit River International Crossing Project, or DRIC -- is run by the Michigan Department of Transportation, the Federal Highway Administration and their government counterparts in Canada.

The 78-year-old Ambassador is owned by Manuel "Matty" Moroun, a Grosse Pointe billionaire. His lieutenants say there would be no threat of relocation for residents in Hubbard Farms -- a historic neighborhood at West Grand and Vernor -- because Ambassador officials have bought all the land they need to build another bridge. They claim the new span would not harm the environment.

Not in Hubbard Farms' yard

But Hubbard Farms residents say additional truck traffic would create more emissions and noise, lower property values and impede progress. Southwest Detroit is the city's only area that has seen population growth in the past decade, according to the U.S. Census, with hundreds of new homes being built or rehabbed in Hubbard Farms, Mexicantown and the surrounding area.

"Much of this investment would be jeopardized by the construction and operation of a second span of the Ambassador Bridge," said Victor Abla, one of several dozen Hubbard Farms residents fighting the proposal.

Many of the residents wrote anti-bridge letters to the Coast Guard, the main U.S. decision-maker on the proposal. A ruling is expected in late summer or fall.

EXHIBIT 20

not everyone opposes the plan. In a supportive letter to the Coast Guard, Chris Compean, a corporate officer at Donovan's Pub on West Vernor, said the Ambassador is a "fantastic neighbor" whose long-planned second span is cc sted by community groups that are "jealous" of Moroun's success.

"If only the gloves would come off, then just maybe the 20 years already consumed by infighting could be replaced by advancement beneficial to the citizens of southwest Detroit," Compean wrote.

Delray seeks opportunity

In Delray, although support for the public bridge proposal isn't unanimous, many see it as an opportunity.

Randy Brown, a Presbyterian pastor who lives and works in the neighborhood, isn't one of them. He said the span would bring the same pollution and traffic problems as another Ambassador.

"I see a nightmare just in terms of getting around the neighborhood," Brown said.

The public bridge could displace occupants of some 300 homes and 50 businesses in Delray, a blighted community of about 3,100 people where nearly two out of three residents are jobless, according to the Census.

State laws mandate that residents receive moving costs and the fair-market value for their homes -- an attractive proposition for many who initially opposed the proposal. Public officials have not made any offers and say they wouldn't start buying homes for at least a year.

"I think people have come around to realize that they can have a better quality of life by being relocated," said lifelong resident John Nagy, 53. "Who wants to get up every day and look out their front doors and see junkyards or weeds that are almost as high as the housetops? It's a breeding ground for crime."

For Sylvia Hill, who has lived in Delray for most of her 39 years, the thought of leaving is bittersweet.

The mother of seven said she wouldn't mind moving her family to a safer community somewhere Downriver.

"Don't get me wrong: I'll always remember where my roots are," said Hill, whose newly remodeled home on Crawford Street could be demolished. "But I always want better for myself and I have kids I need to raise."

You can reach Andy Henion at (313) 222-2610 or ahenion@detnews.com.

Find this article at:
http://www.detnews.com/apps/pbcs.dll/article?AID=/20070822/METRO/708220398/1003

☐ Check the box to include the list of links referenced in the article.

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Chairperson
Susan Glaser
Vice-Chairperson

City of Detroit

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Dr. David Cason, Jr., AIC
Thomas Christensen
Robert L. Glenn

Roy Levy Williams

June 27, 2007

HONORABLE CITY COUNCIL

RE: The Detroit International Bridge Company's Ambassador Bridge Enhancement Project and related request for access to Public Activity Improvement Bonds (DEPARTMENTAL REPORT)

On June 4, 2007, Your Honorable Body received a presentation from the Detroit International Bridge Company (DIBC) on the status of the Enhancement Project at the Ambassador Bridge. Various questions were raised, and a request for responses from City agencies went forward with respect to both the proposal in general, the Draft Environmental Assessment and the requested access to Public Activity Improvement Bonds.

One of the questions asked, which had also been raised during previous discussions, was what City approvals will be required in order to facilitate the Enhancement Project. Additionally, the Michigan Strategic Fund board meets today, June 27, 2007 in Lansing and is expected to take up the DIBC's request for support and facilitating an application to the federal government for the Public Activity Improvement Bonds. This report is submitted in response to both of these items.

CITY APPROVALS

The staff of the City Planning Commission working in conjunction with the Research and Analysis Division and in consultation with the Law Department has attempted to identify the approvals that will likely be required of the City of Detroit in order to facilitate the DIBC's Ambassador Bridge Enhancement Project. The DIBC will be expected to submit to all applicable laws and ordinances of the City, including but not limited to the Zoning Ordinance and other provisions of the City Code. Initially, it appears that a rezoning may be required in order to allow the proposed span and any related uses in the immediate area. In order to construct the proposed facilities, the Buildings and Safety Engineering Department will, of course, have to issue permits for the work, which will entail the review of other agencies involved in the permitting process. Prior to construction some action(s) will also be needed to allow the new span and support structure to traverse, project over or occupy City rights-of-way and City-owned land.

Land Use and Zoning

Depending upon the size and scope of DIBC's cumulative plan for the impacted area and the approaches taken to address it, additional items may need to be addressed. As stated

EXHIBIT 21

above, a rezoning may be required for the project. The property beneath the proposed new span bears an M4 (Intensive Industrial District) zoning classification, which does not allow for Bridge Plaza and related Bridge uses. There may, however, be a distinction between those uses and the support structure for the proposed bridge span. However, if other bridge related activities are anticipated for the land beneath the proposed span, zoning will still have to be addressed.

Portions of Riverside Park were developed with Land & Water Conservancy Funds (LWCF). The impacted area of the Park may have benefited from these funds. If so, no part of the park acquired or improved with LWCF grant funds can be diverted to a non-park use until consent of the Michigan Department of Natural Resources and the National Park Service is obtained. Unless those entities conclude that the diversion does not adversely affect the recreational utility of the park, the consent would require, at minimum, new replacement parkland of comparable cost and recreational utility.

A number of other approvals may also be required or otherwise deemed necessary as the project advances. For additional insight, we took an historical approach and looked at the approval of the existing span of the ambassador Bridge.

Approval of the Existing Span

On May 24, 1927, the City Council passed an ordinance allowing for the construction and maintenance of the approaches to and span of an international bridge over and across certain streets and alleys. The ordinance defined a seventy-five (75) foot wide corridor, running from the north line of Howard Street to the Detroit River, wherein the span and supports may exist. It also preserved the City's ability to expand the width of Fort Street to a maximum of one hundred and twenty (120) feet.

In addition to the physical constraints described above, the ordinance also provided for other supervision and regulation of the bridge:

- The bridge was to be constructed, maintained and operated in accordance with all applicable federal, state and local laws, including but not limited to regulations involving drainage and traffic. Work in this regard, under the City's jurisdiction, would also be subject to inspection and supervision of City officials.
- Calls for compliance with the City's Master Plan.
- Provides for indemnification of the City with respect to the bridge.
- Calls for the setting of reasonable tolls.
- Preserves the City's right to impose taxes (personal or property).
- Gives preference to the City for the operation of transit services over and across the bridge.
- Requires the developer's acquisition of certain property in order to secure the approach to the bridge within five years of the effective date of the ordinance.

Consistent with the provisions of the ordinance, it did not become effective until such time as it had been approved by a vote of the people of the City. An election was established and held on June 28, 1927 whereupon the ordinance did prevail.

For Your review please find attached a copy of this ordinance as well the 1921 Act of Congress authorizing the undertaking of the Ambassador Bridge.

PRELIMINARY FINDINGS

As it concerns the new span, it would appear that the 1927 ordinance might have to be amended or another similar ordinance passed to make provision for the new span. It is not entirely clear from this analysis what an amended or new ordinance should address in this current context or if another election would be required. A legal opinion should be sought from the City's Law Department in this regard.

However, again, it is expected that this proposal will have to comply with all of the applicable laws and regulations of the City. It is clear that the proposed new span would have to traverse or project over several public rights-of-way as well as two of the three parcels that comprise Riverside Park. Air rights will have to be conveyed in some manner above the impacted streets and alleys. Air rights and possibly easements could also be required of the parkland, or that some portion of that park be conveyed directly to the DIBC or some related entity as proposed in the North Riverside land sale which was presented in March of this year and withdrawn in April. Lastly, zoning may have to be addressed, and building permits would be required to construct the new span, supports and related or accessory structures.

MICHIGAN STRATEGIC FUND MEETING

The Michigan Strategic Fund Board (MSF) is to meet today, Wednesday June 27th. It is anticipated that the Board will consider and likely act on DIBC's desire to apply for the Public Activity Improvement Bonds to finance this project. As mentioned during the June 4th discussion any award of the bonds may be conditioned upon DIBC obtaining all relevant approvals. While your Honorable Body has already approved and forwarded to the MSF a resolution expressing sentiments in this regard, You may desire staff representation at this meeting to observe and present the findings above.

Respectfully submitted,

Marcell R Todd, Jr (MRB)

Marcell R. Todd, Jr., Director

Attachment

002/003

THE STATUTES AT LARGE

OF THE

UNITED STATES OF AMERICA

FROM

MAY, 1919, TO MARCH, 1921

CONCURRENT RESOLUTIONS OF THE TWO HOUSES OF CONGRESS
AND
RECENT TREATIES, CONVENTIONS, AND EXECUTIVE PROCLAMATIONS
AMENDMENT TO THE CONSTITUTION

EDITED, PRINTED, AND PUBLISHED BY AUTHORITY OF CONGRESS
UNDER THE DIRECTION OF THE SECRETARY OF STATE

VOL. XLI

IN TWO PARTS

PART 1—Public Acts and Resolutions
PART 2—Private Acts and Resolutions, Concurrent Resolutions, Treaties, Proclamations, and Amendment to the Constitution

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PART 1

WASHINGTON
GOVERNMENT PRINTING OFFICE
1921

BODMAN LLP 003/003

were brought into the service of the United States from the National Guard of any State may be returned to that State upon request therefor from the governor thereof; and all others may be sent, upon request of the governor thereof, to whatever State the Secretary of War may determine to have furnished the majority of men to any such organization at the time of its formation: *Provided, however*, That where it is impossible to determine what State furnished a majority of the men of an organization at the time of its formation, or where any organization was so cosmopolitan in its original make-up that it is impossible to identify it with any particular State, the colors of such organization will be turned in to the Quartermaster General for such national use as the Secretary of War may direct: *Provided further*, That the title to all such colors, standards, and guidons shall remain in the United States: *And provided further*, That the Secretary of War shall require assurance that proper provision has been or will be made for their care and preservation before returning or sending the same as herein authorized.

To State furnishing majority of men.

Proviso. Use if not identified with any State.

Title unchanged.

Provision for preservation, etc., required.

Sec. 3. That in all cases in which the Secretary of War has heretofore furnished to the National Museum any property of the kinds described in section 1 hereof, or has disposed of any colors, standards, or guidons of demobilized organizations of the United States Army in the manner provided by section 2 hereof, his acts and doings in the premises are hereby ratified and confirmed.

Previous disposition of equipment, colors, etc., ratified.

Approved, March 4, 1921.

CHAP. 167.—An Act To authorize the construction and maintenance of a bridge across Detroit River within or near the city limits of Detroit, Michigan.

March 4, 1921. [S. 4960.] [Public, No. 362.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to American Transit Company, its successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across Detroit River at a point suitable to the interests of navigation, within or near the city limits of Detroit, Wayne County, Michigan, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March 23, 1906: *Provided*, That before the construction of the said bridge shall be begun all proper and requisite authority therefor shall be obtained from the Government of the Dominion of Canada.

Detroit River. American Transit Company may bridge, Detroit, Mich.

Construction. Vol. 34, p. 84.

Proviso. Consent of Canada required.

Sec. 2. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within three years and completed within seven years from the date of approval hereof.

Commencement and completion.

Sec. 3. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 4, 1921.

CHAP. 168.—An Act To retrocede to the State of Virginia exclusive jurisdiction heretofore acquired by the United States of America over the property and persons of the town site or territory known as United States Housing Corporation Project 150A, located in Norfolk County, State of Virginia, and called Cradock.

March 4, 1921. [H. 4924.] [Public, No. 364.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the exclusive jurisdiction heretofore acquired over the said town site or territory known as United States Housing Corporation Project 150A and called Cradock, and located in the county of Norfolk, State of Virginia, be, and the same is hereby, retroceded to the State of Virginia.

Cradock, Va. Jurisdiction over site, retroceded to Virginia.

Approved, March 4, 1921.

ection of steam and hot water
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or any other pressure vessel
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life and property; and examine
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installed. All boilers shall be
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, except low pressure steam
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in single and two famil-
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l boilers coming within the
sification of the American So-
of Mechanical Engineers low
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than 300 sq. ft. and less than
sq. ft. of heating surface,
be inspected once every two
years and shall be subject to
nual license fee, payable to
Department of Buildings and
Engineering.

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and an annual license fee
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13. Steam and hot water
in the City of Detroit shall
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, including Section 1—Pow-
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cations; Section 3—Loco-
boilers; Section 4—Low
re Heating Boilers; Section
ature boilers; Section 6—
for Inspection and the Ap-

d. February 21, 1927.
JOHN W. SMITH,
Mayor.

D W. READING,
City Clerk.

ve ordinance will take
the 24th day of March,

HARD W. READING,
City Clerk.

COMMON COUNCIL

(OFFICIAL)

Detroit, Tuesday, May 24, 1927.

The Council met and was called to order by the President Pro Tem, Hon. William P. Bradley.

Present—Councilmen Callahan, Castator, Dingeman, Ewald, Littlefield, Stevenson and the President Pro Tem —7.

There being a quorum present, the Council was declared to be in session.

The Journal of the preceding session was approved.

Taken From the Table

Councilman Castator moved to take from the table an Ordinance to amend an ordinance entitled "An ordinance to regulate the keeping of public places for playing games of billiards, etc.," laid on the table May 17, 1927 (J. C. C. p. 1380); which motion prevailed.

Councilman Castator then moved to amend the ordinance by striking out the word "living" in lines 5 and 25 of Section 3-A, which motion prevailed.

The ordinance was then placed on the order of third reading.

Third Reading of Ordinance

The title to the ordinance was read a third time.

The ordinance was then read.

The question being "Shall this ordinance now pass?" the ordinance was passed, as amended, a majority of the Councilmen present voting therefor as follows:

Yeas—Councilmen Callahan, Castator, Dingeman, Ewald, Littlefield, Stevenson and the President Pro Tem—7.

Nays—None.

The title to ordinance was confirmed.

Taken From the Table

Councilman Castator moved to take from the table an Ordinance to permit the American Transit Company to construct over certain streets in Detroit, the approaches to an international bridge between Detroit and Canada, etc., laid on the table May 19, 1927 (J. C. C. p. 1408), which motion prevailed.

Councilman Castator then moved that the following be substituted for the ordinance, which motion prevailed.

Substitute Ordinance

By Councilman Castator: .....

AN ORDINANCE to permit the American Transit Company to construct and maintain over and across certain streets and alleys in the City of Detroit the approaches to an international bridge for travel between Detroit and Canada; and to provide for supervision and regulation as in this ordinance prescribed.

IT IS HEREBY ORDAINED BY THE PEOPLE OF THE CITY OF DETROIT:

Section 1. The American Transit
2 Company, its successors and as-
3 signs, in constructing and main-
4 taining its international bridge
5 for travel between the City of De-
6 troit and Canada, under author-
7 ity of the Act of Congress ap-
8 proved March 4, 1921, and amend-
9 ments thereto, and the action of
10 the Secretary of War and other of-
11 ficials of the United States of
12 America pursuant thereto, is here-
13 by permitted and authorized to
14 construct and maintain the said
15 bridge and its approaches over
16 and across all streets and alleys
17 between Twenty-first and Twenty-
18 second Streets, between the North
19 line of Howard Street and the De-
20 troit River, in the City of Detroit,
21 of a maximum width over any
22 street or alley of not to exceed
23 Seventy-five (75) feet and with a
24 clearance between the lowermost
25 portion of the structure over each
26 street and the established grade
27 of such streets as follows:
28 At least twenty-two (22) feet
29 over the North sidewalk of West
30 Jefferson Avenue, fifty-two (52)
31 feet over Fort Street West, forty-
32 two (42) feet over Savoy Street,
33 twenty-eight (28) feet over Lafay-
34 ette Boulevard, and fifteen (15)
35 feet over Howard Street.
36 No piers or supports shall be
37 erected in any street or alley, and
38 at Fort Street the piers or sup-
39 ports shall be erected so as to be
40 without the side lines of said
41 street if hereafter widened to One
42 hundred twenty (120) feet.

Sec. 2. In the construction,
2 maintenance and operation of said
3 bridge and approaches, including
4 the drainage thereof, insofar as the
5 same is within the City of De-
6 troit, all valid applicable regula-
7 tions by the laws of the United
8 States of America or the State
9 of Michigan, or Charter or ordi-
10 nance of the City of Detroit, or
11 police regulations of the City of

Detroit including all reasonable traffic regulations, shall be complied with by the American Transit Company, its successors and assigns, and the work thereof shall be subject to inspection and supervision by the officials of the City of Detroit having jurisdiction in the enforcement of such regulations, and any connection with any storm or sanitary sewer shall be made only under the direction of the Department of Public Works of Detroit.

Sec. 3. The said bridge and approaches shall be so constructed and maintained as not to interfere in any way with the carrying out of the so-called Master Plan of the City of Detroit or the developing by the City of Detroit of the water front along said Detroit River abutting upon the said bridge property, insofar as either of the same shall not materially interfere with the maintenance and operation of said bridge, and the American Transit Company for itself, its successors and assigns, shall waive any claim which it, or any of them, might have because of any such development and carrying out of said plan.

Sec. 4. The American Transit Company, its successors and assigns, shall hereafter protect and save the City of Detroit harmless from any and all claims or demands of private parties for injuries to person or property or damages of any nature arising out of the construction, maintenance or operation of the said bridge, structures and approaches over and across any street, alley or other public place.

Sec. 5. Tolls shall be reasonable and just in accordance with the provisions of an Act of Congress approved March 23, 1906, entitled "An Act to regulate the construction of bridges over navigable waters," and amendments thereto, and in accordance with such authority as is reserved in this regard to the Dominion of Canada under the applicable laws and regulations there in force at the time.

Sec. 6. Nothing contained herein shall at any time be construed as amounting to a waiver of the right of the City of Detroit to impose taxes, either personal taxes or taxes upon real estate, on the property of the American Transit Company, its successors and assigns, within the limits of the City of Detroit.

Sec. 7. In the event the American Transit Company, its successors and assigns, shall negotiate for or shall request bids for the operation of street railway or motorbus transportation over and across the said international bridge and approaches, the right is granted to the City of Detroit to bid or contract for such right upon the general terms and conditions offered to private individuals, partnerships or corporations, and in the event the City of Detroit shall express its willingness or desire to comply with and to be bound by equal or better terms and conditions than those offered or submitted by private individuals, partnerships or corporations, the City of Detroit shall be given the preference to operate such street railway or motorbus transportation over and across such bridge and approaches, provided that in the operation of any street railway or motorbus transportation all applicable charter provisions and ordinances of the City of Detroit shall be fully observed and complied with.

Sec. 8. The American Transit Company, its successors and assigns, shall, within five (5) years from this date, acquire by purchase the land bounded by Porter Street, Twenty-first Street, Twenty-second Street and the alley first South of Porter Street, to be used in conjunction with the approach to said bridge; or, if said property cannot be purchased for a reasonable price, the American Transit Company shall, within five (5) years from this date, institute condemnation proceedings directed to the acquisition of said land and shall press said proceedings to a conclusion with all practicable dispatch.

Sec. 9. This Ordinance shall not become operative or of any force or effect whatsoever unless and until approved, as an express condition precedent thereto, by the electors of the City of Detroit at an election at which the same shall be submitted by the Common Council of the City of Detroit for that purpose.

The ordinance was then placed on the order of third reading.

Third Reading of Ordinance

The title to the ordinance was read a third time.

The ordinance was then read.

The question being "Shall this ordinance now pass" The ordinance was passed, a majority of the councilmen present voting therefor as follows:

Yeas—Councilmen Callahan, Castator, Dingeman, Ewald, Littlefield, Stevenson and the President Pro Tem—7.

Nays—None.

The title to ordinance was confirmed.

Unanimous consent

The following resol
fered out of order:

By Councilman Ding

Resolved, That a spe
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the City of Detroit to
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Election, the polls to
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ed by law, on Tuesda
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uals, partnerships or corpora-
s, and in the event the City
Detroit shall express its will-
ess or desire to comply with
to be bound by equal or bet-
terms and conditions than
e offered or submitted by pri-
individuals, partnerships or
orations, the City of Detroit
be given the preference to op-
such street railway or motor-
transportation over and across
bridge and approaches, pro-
that in the operation of any
t railway or motorbus trans-
tion all applicable charter
sions and ordinances of the
of Detroit shall be fully ob-
d and complied with.

8. The American Transit
pany, its successors and as-
shall, within five (5) years
this date, acquire by pur-
the land bounded by Porter
, Twenty-first Street, Twen-
ond Street and the alley first
of Porter Street, to be used
junction with the approach
bridge; or, if said property
t be purchased for a reason-
price, the American Transit
any shall, within five (5)
from this date, institute con-
ation proceedings directed to
quisition of said land and
press said proceedings to a
sion with all practicable dis-

9. This Ordinance shall not
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Reading of Ordinance

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ncilmen Callahan, Casta-
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to ordinance was con-

Unanimous consent being granted.

The following resolution was offered out of order:

By Councilman Dingeman:

Resolved, That a special election be and the same is hereby ordered in the City of Detroit to be held in the voting booths to be located in the same position as at the last Spring Election, the polls to be opened and closed at the regular hours designated by law, on Tuesday, the 28th day of June, 1927, and that all officers of the City who are charged with any duties and responsibilities in connection with a regular election, be and they are hereby charged with the same duties and responsibilities with respect to this election; that the approval or disapproval of an ordinance passed by the Council of the City of Detroit on the 24th day of May, 1927, to permit the American Transit Company, its successors and assigns, to construct and maintain over and across certain streets and alleys in the City of Detroit, the approaches to an International Bridge for travel between Detroit, Michigan, and Sandwich, Ontario, Canada, and to provide for supervision and regulation thereof, be submitted at said special election; that the American Transit Company be required to pay into the City Treasury for the purpose of meeting the expense of conducting this election the sum of Forty-five Thousand ($45,000.00) Dollars; any part of said sum not so used by the City to be returned to said company; that the City Election Commission prepare ballots for the use of the electors of the City as is provided by law, and that the form in which the question shall be submitted to the people be as follows:

INTERNATIONAL BRIDGE ORDINANCE

Do you favor adopting ordinance enacted by the Common Council May 24th, 1927, the substance of which ordinance grants permission to American Transit Company, a corporation, its successors and assigns, to construct and maintain, over and across certain streets and alleys in the City of Detroit, the approaches to an international bridge to be constructed across the Detroit River from a point in the vicinity of Twenty-first Street, Detroit, Michigan, for travel between United States and Canada; and provides for supervision and regulation thereof, the title of which ordinance is as follows:

AN ORDINANCE TO PERMIT THE AMERICAN TRANSIT COMPANY TO CONSTRUCT AND MAINTAIN OVER AND ACROSS CERTAIN STREETS AND ALLEYS IN THE CITY OF DETROIT THE APPROACHES TO AN INTERNATIONAL BRIDGE FOR TRAVEL BETWEEN DETROIT AND CANADA; AND TO PROVIDE FOR SUPERVISION AND REGULATION AS IN THIS ORDINANCE PRESCRIBED.

FOR THE ORDINANCE.....[ ]
AGAINST THE ORDINANCE .....[ ]

Approved as to form.

CHAS. P. O'NEIL,
Corporation Counsel.

Adopted as follows:

Yeas—Councilmen Callahan, Castator, Dingeman, Ewald, Littlefield, Stevenson and the President Pro Tem—7.

Nays—None.

Taken From the Table

Councilman Dingeman moved to take from the table an ordinance changing the names of LaBelle and American Avenues to Ewald Circle, laid on the table May 17, 1927, (J. C. C. p. 1379), which motion prevailed.

The ordinance was then placed on the order of third reading.

Third Reading of Ordinance

The title to the ordinance was read a third time.

The ordinance was then read.

The question being, "Shall this ordinance now pass?" The ordinance was passed, a majority of the Councilmen present voting therefor as follows:

Yeas—Councilmen Callahan, Castator, Dingeman, Littlefield, Stevenson and the President Pro Tem—6.

Nays—None.

Councilman Ewald was excused from voting.

The title to ordinance was confirmed.

From the Controller

May 24, 1927.

To the Honorable, the Common Council:

Gentlemen—The following claims have been examined, audited and found to be correct by this Department. I, therefore, recommend that they be approved and payment made.

ART COMMISSION FUND

610	American Federation of Arts	10.00
611-12	Bryant & Detwiler Co.	78,625.00
613	Detroit Edison Co.	3.56
614	Detroit News Co.	6.86
615	Postal Tel. Cable Co.	46.19
616	B. O. Willcock, Custodian Impr. Cash	8.28

BUILDING AND SAFETY ENGINEERING FUND

804-5	Guy L. Ingalls, City Treas.	20.00
806	Blome Bros. Co.	18.00

.J. Andrews

From: Gregg M. Ward [ward.gregg@gmail.com]
Sent: Tuesday, August 28, 2007 5:28 AM
To: Gregg M. Ward
Subject: Ambassador Bridge

----- Original Message -----
From: James Pugsley
To: detroit.river@mto.gov.on.ca
Sent: Friday, August 24, 2007 9:57 AM
Subject: Environmental Assessment RE: Ambassador Bridge

I understand that the Windsor Port Authority is involved in the issue of the approvals for leases to the new water lots that will be required for the construction of the "new ambassador bridge".

I am concerned that a very important issue is "falling through the cracks" with respect to the these matters. That is what assurances are being provided with respect to the future of the existing Ambassador Bridge. It has been publicly stated that, after the construction of the new bridge, the existing Ambassador Bridge is to be used only infrequently. Certainly infrequent use will not generate the revenue required for its proper maintenance.

I am concerned about what will happen in the future if the existing bridge is not properly maintained. I expect that the owners of the Ambassador Bridge will argue that it is private property and, particularly if decommissioned, is not subject to Transport Canada regulation.

. a. oncerned that the owners of the Ambassador Bridge will not formally commit to contractual performance bond ensured commitments to demolish the old bridge, the costs of which would seem to be enormous.

I would think that if the existing Ambassador Bridge falls into disrepair it will become a hazard to navigation on the Seaway.

I would think that the issue of when and under what circumstances the existing bridge will be demolished is a matter of great public interest and must be addressed.

I would think that the new leases for the new water lots should not be granted until proper enforceable assurances are in place with respect to the existing Bridge and its related water lots.

I am concerned that the Windsor Port Authority will not properly address these issues.

James Pugsley
==========

----- Original Message -----
From: James Pugsley
To: alghurabim@michigan.gov
Sent: Friday, August 24, 2007 10:11 AM
Subject: Existing Ambassador Bridge

I have left a voicemail on your system.

' ery concerned that proper consideration is not being given to what is to happen in the future to the existing ambassador dge.

EXHIBIT 22

Officials of the Ambassador Bridge have stated publicly that after construction of the new bridge the existing bridge will only see infrequent use. Therefore certainly it is not likely to generate the revenue required for its maintenance. I am concerned that the Ambassador Bridge company will not divert the resources required for its future maintenance and that it will become a hazard to navigation in the Seaway. I am concerned that new leases on water lots required for the new bridge will be granted without first ensuring that there will be in place enforceable, performance bond back commitments as to the huge future cost associated with the eventual demolition of the existing ambassador bridge.

I am concerned that this issue is not being given the consideration it deserves.

James Pugsley
519 257 5862

U.S. Department
of Transportation

**Federal Highway
Administration**

Michigan Division

315 W. Allegan St., Room 207
Lansing, Michigan 48933

January 15, 2004

Susan P. Mortel, Director
Bureau of Transportation Planning (B340)
Michigan Department of Transportation
Lansing, Michigan

Dear Ms. Mortel:

Re-evaluation of the Environmental Assessment (EA)
For the I-75 Ambassador Bridge/Gateway Project
City of Detroit, Wayne County, Michigan
C.S. 82194, J.N. 37795

We have completed our review of the second re-evaluation for the proposed Ambassador Bridge Gateway Project transmitted with your letter of December 23, 2003. Our review of the re-evaluation for the Gateway 2003 Revised Plan supports the finding that no additional, significant environmental, economic, or social impacts will occur from the proposed project. Therefore, the FHWA's FONSI remains valid.

The Finding of No Significant Impact (FONSI) for this project along with the access modifications of the I-75/I-96 interchange near the Ambassador Bridge was approved by FHWA on October 23, 1997. Subsequently, MDOT submitted a re-evaluation and new Interchange Justification Study reflecting the 1999 Revised Plan. On September 9, 1999, FHWA reviewed the modifications to the I-75/I-96 interchange and concluded that the FONSI remained valid and approved the access modifications.

The current proposal, 2003 Revised Plan, will still provide for all the basic movements at the interchange as presented in the 1999 Revised Plan. In addition, the overall footprint of the 2003 Revised Plan has been reduced and geometry of the mainline and ramps improved over the 1999 Revised Plan. FHWA did not require a new Interchange Justification Study since the access configuration remained similar to the 1999 Revised Plan; therefore, our approval of the access modifications of the I-75/I-96 interchange near the Ambassador Bridge remains valid from September 9, 1999.

MDOT may proceed with further project development, with exception of Contract 4/Phase IV. Contract 4/Phase IV still requires and executed Implementation Agreement with the Detroit International Bridge Company before MDOT can proceed beyond base plans.

Sincerely,

Dave Calabrese
Field Operations Group Leader

For: James J. Steele
Division Administrator

cc: Lori Noblet, MDOT, Transp. Planning (B340)
Andy Zeigler, MDOT, Metro Region
Paul Wisney, MDOT, Metro Region

EXHIBIT 23

I-75 Ambassador Bridge/Gateway Project Reevaluation

Project History

Because of changes in the project scope, the Michigan Department of Transportation (MDOT) has conducted a reevaluation of the proposed I-75 Ambassador Bridge/Gateway project in the City of Detroit, Wayne County, Michigan. In accordance with FHWA regulations, a re-evaluation of the factors, conditions, and rationale is required there has been a change in the project limits or scope. This is a request for your concurrence in our conclusion that the environmental clearance and location/design approval for the proposed changes in the state trunkline system associated with the proposed project remain valid.

The Environmental Assessment for the I-75 Ambassador Bridge/Gateway Project was signed by FHWA on January 8, 1997. A Finding of No Significant Impact (FONSI) was issued by FHWA on October 23, 1997. In 1998, the Transportation Equity Act for the 21st Century (TEA-21) was passed, which allowed the proposed project to become eligible for federal funds. This type of funding allowed for improvements to access roads and construction of access roads, approaches, and related facilities (such as signs, lights, and signals) necessary to connect the Ambassador Bridge to the I-75 Interstate systems.

From October 1997 to August 1999, refinements to the proposed project were made as part of the early preliminary engineering process. These refinements which enlarged the original footprint, were made to improve direct access between the Ambassador Bridge and Michigan's trunkline system including Fort Street (M-85), I-75 and I-96. In the original EA, the footprint was constrained because of the railroad bridge located over I-75/I-96 just south of Michigan Avenue, the Hubbard-Richard West Historic District located on the west side of I-75, and the historic structures located on Lafayette Street (See Exhibit 1). MDOT in coordination with the Detroit International Bridge Company (DIBC), a Michigan corporation and owner of the Ambassador Bridge, and other members of the Project Steering Committee which included the City of Detroit, Southeast Michigan Council of Governments (SEMCOG), FHWA, U.S. General Services Administration (USGSA), and U.S. Customs decided to expand the proposed work north beyond the existing railroad bridge, and to provide connectivity to the southbound I-75 Service Drive. MDOT worked closely with the State Historic Preservation Office (SHPO) who concurred in the no adverse effect determination for the 24th Street and Porter cul-de-sac located west of I-75 (See Exhibit 2).

Because of these refinements, MDOT conducted a reevaluation of the project in 1999. The reevaluation, along with the proposed plan was sent to FHWA for their review and concurrence. In September of 1999, FHWA reviewed the modifications to the I-75/I-96 interchange concepts and concluded that the FONSI remained valid.

In April of 2000, design work began on the Gateway Project. However, during the design phase, and after numerous meetings with the Project Steering Committee and Mexicantown Community Development Corporation, a revised concept was brought forward which actually reduces the project footprint.

Proposed Project

The 2003 Revised Plan (concept) maintains a similar access with a somewhat smaller footprint than the 1999 Revised Plan; however, some ramps have shifted which provide added flexibility to reconfigure the proposed plaza by reducing the number and length of bridge structures (See Exhibit 3).

The 2003 Revised Plan has a number of changes from the 1999 Revised Plan in respect to configuration (See Exhibit 4). The design intent was to stay within the footprint of the 1999 Revised Plan, and coordinate requirements of the USGSA/U.S. Customs and the Detroit International Bridge Company (DIBC) along with geometric refinements to allow the project to proceed to final design. The major changes between the 1999 and 2003 Revised Plans include:

- The exit ramps from the freeways (I-75 and I-96) to the proposed toll area were relocated to meet final identified toll area configuration, reduce ramp lengths and right-of-way needs.

- I-75 and I-96 were shifted horizontally from the 1999 Revised Plan to provide for acceptable ramp taper lengths and shoulder widths.

- The ramps from the toll area to the Ambassador Bridge were reconfigured to meet final identified toll area configuration, reduce ramp lengths and move vehicles further away from residential areas.

- The ramp from the auto and truck Customs inspection area to SB I-75 was reconfigured to reduce auto/truck weaving and achieve MDOT Traffic & Safety approvals of gore spacing.

- The above ramp reconfigurations provided the opportunity in the 2003 Revised Plan to provide a replacement of the continuous I-75 West Service Drive between Vernor and West Grand Boulevard for local traffic. This Service Drive was not included in the 1999 Revised Plan.

- The ramp from SB I-75 to Vernor was reconfigured to reduce grades and achieve geometric requirements of MDOT Traffic & Safety.

- Bagley Avenue is being vacated between the East Service Drive and 21st Street due to grade differences between Bagley and the new SB I-75/NB I-75 exit ramp, eliminating the need for a signal at the ramp/Bagley that was an identified issue in the 1999 Revised Plan. This was coordinated with local community input.

- The 2003 Revised Plan eliminates construction of elements on property owned by the USGSA.

The proposed project is being done in phases. Each of the phases (contracts) will have independent utility from the plaza area. Each phase (contract) including the proposed plaza is shown on Exhibit 5. The design concept for a new border crossing plaza is still being studied by the agency stakeholders and the DIBC to address border crossing security issues.

A public-private implementation agreement between MDOT and DIBC is needed before MDOT will proceed with design and construction of the direct connection between I-75 mainline and the proposed plaza (Phase IV (Contract 4)). Construction on the direct access ramps will proceed once the implementation agreement between MDOT and DIBC is signed.

The Construction Phases (Contracts) are as follows:

- Phase I (Contract 1) - The reconstruction or rehabilitation of Fort Street (M-85) from east of Rosa Parks Boulevard westerly to east of Clark Street including other related work, was been completed in 2003.

- Phase II (Contract 2) - The reconstruction of West Grand Boulevard from Fort Street northerly to I-75 including the removal and replacement of the West Grand Boulevard structures; the relocation of certain publicly-owned utilities as necessary to accommodate the construction of the project with other necessary related work. Construction for this phase was started in 2003, and is expected to be completed in 2004.

- Phase III (Contract 3) - The construction of a new eastbound I-96 service drive from Michigan Avenue (US-12) southerly to Vernor Highway underneath the existing railroad structure; the closure of Ruskin Street via the construction of a cul-de-sac at the existing eastbound I-96 service drive; the construction of a new off ramp to Vernor Highway from eastbound I-96; the removal of the existing on-ramp from Michigan Avenue (US-12) to eastbound I-96; and other related work is to be completed in 2004.

- Phase IV (Contract 4) - The reconstruction of the I-75 mainline freeway from south of West Grand Boulevard to north of Michigan Avenue. Construction of this phase is described as follows: (1) the reconstruction and realignment of Highway I-75/I-96 from southwesterly of West Grand Boulevard northerly to and including portions of the I-96/I-75 interchange, including the reconstruction of existing ramps to and from Clark Street; (2) the realignment and reconstruction of the I-75 southbound service drive from Vernor Highway southwesterly to West Grand Boulevard, including an access ramp to southbound I-75; (3) the demolition of the existing Porter and Lafayette Street bridges; (4) the removal and replacement of the Vernor Highway Bridge; (5) the reconstruction and

realignment of the northbound Lafayette Street exit ramp; (6) the construction of a new access ramp and structure carrying vehicular traffic from Highway I-75/I-96 to the bridge; (7) the construction of a new ramp, grade separation structure, and northbound service drive necessary to provide local access to Vernor Highway from northbound I-75; (8) the construction of a pedestrian bridge across I-75/I-96 near Bagley Avenue; (9) the construction of a new grade separation and ramp carrying vehicular traffic from the Ambassador Bridge and secondary inspection to southbound I-75; (10) the construction of a new grade separation structure and ramp carrying vehicular traffic from southbound I-75 to the new northbound service drive/Vernor Highway; (11) the reconstruction and realignment of the vehicular ramps and structures from the Ambassador Bridge to northbound I-75, westbound I-96 and 21st Street; (12) the construction of a new noise wall along I-75 southbound from the West Grand Boulevard northern abutment thence southerly approximately 750 feet; all together with any necessary remaining work, including all signing, signals, drainage, and utility relocations within the public right-of-way as necessary. Construction of this phase is planned for 2005 – 2007.

Pedestrian Bridge

A pedestrian bridge that would reestablish a link between the east and west sides of the Mexicantown Community is proposed as part of mitigation for this project in the original 1997 FONSI as well as the 1999 Reevaluation. The Mexicantown Community has been split since the I-75 and I-96 were built in the mid-1960's. The proposed pedestrian bridge, which is referred to as the Bagley Avenue Pedestrian Bridge will be constructed during Phase 4 of this project.

In August 1998, MDOT, FHWA, and DIBC joined together to sponsor a Pedestrian Bridge Design Competition. The Ambassador Gateway Project Steering Committee, along with others solicited, reviewed and selected a winner of the concept for the Bagley Street Pedestrian Bridge. The winner of this design competition was made apart of the consultant contract design team to develop a "signature" pedestrian bridge for the project. The recommended concept for the "signature" pedestrian bridge by the design team is a cable stayed design that will be a gateway for travelers coming to Mexicantown and Detroit from Canada and other places within the United States. In addition to providing direct pedestrian access between east and west Mexicantown and related business districts, the proposed Bagley Street Pedestrian Bridge will also serve as a visual landmark in conjunction with a proposed Welcome Center and Mercado as part of a separate development project. The proposed Welcome Center and Mercado are being constructed by MCDC.

Technical Reports

As part of the reevaluation process, several technical reports were prepared to determine if there had been a change in traffic, air quality or noise levels. The reports have been sent to FHWA to supplement review of this project. The conclusions for each of the reports are as follows:

1. A traffic report was completed in the spring of 2003 using 2015 forecasts. Based on the analysis, the level of service on the mainline, weave lanes, and ramps remain similar to or improved from the level of service that appeared in the 1999 Final Traffic Report Supplement.

   In comparing the 2015 and 2025 model forecasts for I-75 and I-96 from South of Clark Street to North of Porter Street and East of the I-75/I-96 Junction, the 1997 EA and the 1999 Revised Plan presented 24 hour freeway mainline volumes that were based upon the 2015 Southeast Michigan Council of Governments (SEMCOG) model. These volumes, presented for five freeway segments, were compared to the 2025 SEMCOG model forecasts. On three of the five segments, the 2025 model volumes were lower than the original 2015 forecasts. These three segments include: I-75 north of Clark Street, I-75 north of Porter Street, and I-75 east of I-96.

   At two locations, forecasted 2025 volumes were higher than forecasted 2015 volumes. These two locations were at the boundaries of the project: On I-75 south of Clark Street, and on I-96 north of the I-75/I-96 split. In both cases, the difference was under 10% which will minimally affect the level of service at the project boundaries.

2. An Air Quality Analysis was completed in June of 2003. Based on the microscale air quality analysis, all carbon monoxide (CO) concentrations are below the National Ambient Air Quality Standards (NAAQS) for both one-hour and eight-hour levels.

   A conformity analysis was preformed on this project. The calculated emissions from the 2025 Regional Transportation Plan were below levels established by the State Implementation Plan (SIP), thus conforming to the air quality requirements set by the SIP. The proposed project is in the 2002-2004 Transportation Improvement Plan (TIP) and the Regional Transportation Plan (RTP) for construction.

3. A technical Noise Report was completed in June of 2003 for the areas that changed since the 1999 Revised Plan. The noise report analyzed existing noise levels along the proposed project area, and projected noise levels for the no build and build alternatives. Twenty-four receptors were selected to illustrate the noise impacts at residences, apartments, commercial buildings, a community center and a church within the project area. The 24 receptors and the Noise Abatement Criteria (NAC) are identified in the Noise Report. Criteria (NAC). The existing noise levels along the study area range from 58 to 73 dBA Leg. Ten first floor apartment units, nine residents, and the Business United with Officers and Youth (BUOY) Community Center are currently exposed to noise levels that approach or exceed the FHWA Noise Abatement Criteria (NAC). The future 2015 noise levels for the proposed alternative would expose ten first floor apartment units, twenty residences, two commercial buildings, and the BUOY Community Center to design hour noise levels that would exceed the NAC. The future 2015 noise levels range from 61 to 79 dBA Leq.

Various methods were reviewed to mitigate the noise impact of the proposed project. These mitigation methods are discussed in the Noise Report. After considering all of the various mitigation options, MDOT concluded that only the construction of a noise wall warranted further analysis. MDOT looked at potential areas which included three residential areas and the BUOY Community Center. The results of the barrier analysis including barrier location indicated that that these sites were feasible but not reasonable to construct additional noise walls. However, MDOT will still be constructing one noise wall which was analyzed in the 1999 Reevaluation Environmental Document as being both feasible and reasonable to construct. MDOT has made a commitment to the community to construct this noise wall. The proposed noise wall is located west of I-75, between West Grand Boulevard and Hubbard Street. The ramp configuration in this area is the same as in the 1999 Revised Plan. See Exhibit 3 for the location of the proposed noise wall.

The previous 1999 revised reevaluation document identified another location for a noise wall along the right-of-way of I-75 linking to the West Grand Boulevard and extending to West Lafayette Boulevard. The ramp configuration in this area has changed from the 1999 Revised Plan. This location was analyzed in its revised configuration in the June 2003 Noise report as noted above. According to the 2003 Noise Report, a noise wall at this location was determined to be feasible but not reasonable because the cost would exceed $34,220, which is MDOT's criterion of reasonability per residence benefited. See Exhibit 4 for a comparison of the noise wall locations from 1999 to the proposed 2003 Revised Plan.

Right of Way

The acquisition of right of way is in the final stages for this project. DIBC has over time acquired most of the property in the project area, and within the plaza area. MDOT is also in the last stages of acquiring right of way that is needed to construct MDOT's portion of the I-75 Ambassador Bridge/Gateway Project. However, recently it was determined that two additional structures (garages) located in Hubbard-Richard West Historic District would be impacted in order to widen the service drive located to the north and east of 24th Street. The right of way impacts to these structures was not discussed in the 1999 Reevaluation Plan.

MDOT has coordinated with the State Historic Preservation Office (SHPO) concerning the historic integrity of these structures. The structures which are located directly behind the houses at 1250 and 1256 24th Street are in poor condition. The SHPO has concurred with MDOT that the structures do not contribute to the historic district due to their advanced state of deterioration. (See Appendix B for SHPO letter). Therefore, any impacts to the garages would not have an adverse effect upon the historic district.

After further analysis, MDOT has determined that the two garages will not need to be demolished in order to widen the service drive. Access to these two structures will be maintained by providing curb cuts along the service drive.

Agency (Stakeholders) Coordination

Coordination with various agencies and stakeholders has been on going for several years. MDOT has met with the key stakeholders such as the City of Detroit, MCDC, DIBC, USGSA/U.S. Customs, and Border Protection regarding this project, and other related issues. MDOT will continue to coordinate with the stakeholders throughout the final design and construction of this project.

Maintaining Traffic During Construction

MDOT is currently developing a plan to maintain traffic during the construction of Phase IV (Contract 4). MDOT has been coordinating with the city of Detroit, MCDC, and DIBC in developing a maintaining traffic plan that will maintain local access to businesses in the area, as well as provide direct access to and from the Ambassador Bridge. MDOT is proposing to close the I-75 Freeway to through traffic while still maintaining local access and direct access on I-75 and I-96. The through traffic on I-75 (from Clark Street to Rosa Parks Boulevard) and I-96 (from I-94 to I-75) will be detoured on to I-94. It is expected that the proposed maintaining traffic plan will not have long term impacts on motorists or property owners who live in the project area. However, there will be short term impacts such as longer travel times for motorists who use the I-94 detour route, or motorists may see a slight increase in traffic volumes on other adjacent state trunkline or local roads.

A component of the Maintaining Traffic Plan will be the development and implementation of a Motorist Information Plan (MIP). The MIP will include electronic message signs along the freeway system to inform motorists that I-75 and I-96 through traffic is being detoured on to I-94. The message signs will also inform motorists that local access to business within the project area, as well as direct access to and from the Ambassador Bridge is being maintained during construction. MDOT will also publish fliers and/or brochures to hand out to motorists at the Ambassador Bridge and Welcome Center informing motorists of the proposed maintaining traffic plan. For a complete description of the proposed construction staging plan, refer to Exhibit 6.

Public Information Meeting

The Michigan Department of Transportation held a public information meeting on August 29, 2003. Approximately 82 people attended the meeting. The purpose of the meeting was to allow the public an opportunity to review and comment on the proposed 2003 concept and plans for the construction of the I-75 Ambassador Bridge/Gateway Project. The group of attendees also had an opportunity to review and comment on conceptual designs for the proposed pedestrian bridge. The proposed pedestrian bridge will provide a connection for the residents who live on east and west sides of the I-75 interstate. MDOT representatives from Metro Region, Detroit Transportation Service Center and Lansing were available to address any issues or concerns that the public had regarding the proposed project and other related projects in the area. The majority of the people were satisfied with the proposed plans for the roadway and bridge.

Summary

Based on the information furnished in this reevaluation, MDOT contends the information and evaluation presented in the 1997 EA, 1997 FONSI and the 1999 Reevaluation document is still valid and there are no significant impacts in the project, its surroundings, or issues that would warrant a new EA or a Supplemental EA.

Rep. John D. Dingell, U.S. House of Representatives

Fax

Phone: 202-225-4071
Fax: 202-226-0371

To: Commandant Allen Date: 09/04/07

Fax: Phone:

CC: Pages (Including Cover Sheet): 3

From:

- [ ] Michael Robbins
- [ ] Beth Siniawsky
- [ ] Katie Murtha
- [ ] Adam Benson
- [ ] Josh Tzuker
- [ ] Jack Maniko
- [x] Kimberlee Trzeciak
- [ ] Dawn Parrish
- [ ] Lisa Pineles
- [ ] Erica Fein
- [ ] Luke Entelis

Comments:

JOHN D. DINGELL
16TH DISTRICT, MICHIGAN

CHAIRMAN
COMMITTEE ON
ENERGY AND COMMERCE

CO-CHAIR
HOUSE GREAT LAKES
TASK FORCE

MEMBER
MIGRATORY BIRD
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September 4, 2007

Admiral Thad W. Allen
Commandant, U.S. Coast Guard
Coast Guard Headquarters
2100 Second Street, SW
Washington, DC 20593

Dear Commandant Allen:

The United States (US) and Canada share a critical border crossing along the Detroit River. As you know, this crossing is the busiest international border crossing in North America, and trade between the US and Canada supports 7.1 million jobs in the US. Studies suggest that in the next 30 years US-Canada trade by truck will increase by 128% and vehicle traffic will grow by 57%. If the US intends to accommodate such traffic growth it is imperative that a second crossing be constructed.

Given the United States Coast Guard's (USCG) role in activities conducted along Michigan's waterways, the USCG is the one of the agencies charged with the administration of the permit process for any additional crossings over the Detroit River. To better understand the process currently underway for the proposed twining of the Ambassador Bridge, please answer the following questions:

1. Please provide the process for obtaining any permits for a proposed twining of the Ambassador Bridge. What would the timeline be for permitting such a project?

2. What is the character of the permit that will be required from the USCG? What other permits will be required for this project?

3. Who is the lead agency in the permitting process? What is the USCG function within the permitting process? What is the function of the Department of Transportation, Environmental Protection Agency, Army Corp of Engineers and any other federal agencies involved in this process?

4. When and where will the public be allowed to participate with regard to the permitting process?

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5. What has to be done to ensure compliance with the National Environmental Policy Act (NEPA)? What environmental studies are required under NEPA to guarantee that any impending environmental effects of a twinned bridge are quantified? Is there a timeline for that process? If so, please explain in detail.

As the author of NEPA, I have particular concern about the effect an additional span may have on the air and water quality in the region. Since the decision from the USCG is imminent, I would ask that a response be faxed to my office no later than September 17, 2007. I would ask that you fax your response to my Washington Office at (202) 226-0371.

I look forward to your anticipated cooperation. Should you have any questions, please contact Kimberlee Trzeciak of my staff at (202) 225-4071.

With every good wish,

Sincerely,

John D. Dingell
Member of Congress

Striffler, Scot

From: Kamke.Sherry@epamail.epa.gov
Sent: Tuesday, October 02, 2007 4:37 PM
To: Bloom, Robert
Cc: Carlson, Kurt; Bloom, Robert; Striffler, Scot
Subject: Re: EPA letter

Bob,

I'm sorry that I didn't copy you on the email that I sent to David Coburn. I'm attaching my message to David and the one that he sent to EPA below.

Sherry A. Kamke
Environmental Scientist
NEPA Implementation (Mailcode: E-19J)
Office of Enforcement and Compliance Assurance U.S. EPA Region 5
77 W. Jackson Blvd.
Chicago, Illinois 60604-3590
Phone: 312-353-5794
Fax: 312-353-5374

David,

I had a conversation with Michael Leslie about the conformity issues.
I'm going to summarize what he told me since he'll be out of the office for awhile. He said that he and his contacts at Headquarters (OTAQ) agree that the project should be considered "regionally significant." Therefore, it is appropriate for SEMCOG to include the project in its regional analyses and for conformity determinations to be made. Since the lead federal agency involved in the project is the Coast Guard, General Conformity applied. Michael said that he is trying to confirm this with Tom Coda from Research Triangle Park. I think Michael may have some technical questions regarding the general conformity work that was done but that can be dealt with we he gets back in town.

Regarding hot spots, it does not appear that there is any specific requirement in the conformity rules for a hot spot analysis to be done under these circumstances. Nonetheless, the Coast Guard may want to consider requesting a hot spot analysis be done as a matter of disclosure of potential impacts. As you know, this could well be an important issue to the public and it would be good to address as part of due diligence under NEPA. There is no requirement to do it under NEPA but EPA recommends it. We can discuss different approaches with you including qualitative assessments that would be primarily narrative all the way to quantitative analyses.

Please let me know if you have any questions and I'll do the best that I can to answer them. Thank you.

Sherry A. Kamke
Environmental Scientist
NEPA Implementation (Mailcode: E-19J)
Office of Enforcement and Compliance Assurance U.S. EPA Region 5
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Phone: 312-353-5794
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"Coburn, David"
<DCoburn@steptoe
.com>

09/26/2007 10:17
AM

To
Michael Leslie/R5/USEPA/US@EPA

cc
Sherry Kamke/R5/USEPA/US@EPA,
"Taub, Cynthia"
<CTaub@steptoe.com>

Subject
Ambassador Bridge

Michael -- I was following up on the message that Cynthia Taub and I left for you yesterday. We look forward to speaking with you on the conformity issue concerning the planned new span to the Ambassador Bridge. Specifically, our understanding is that hot spot analyses are required for transportation conformity analyses, not general conformity.
The regulations regarding hot spot analyses are included in 40 CFR Part 93, Subpart A, entitled "Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 U.S.C. or the Federal Transit Laws". As we discussed at the meeting, the Ambassador Bridge project is not developed, funded or approved under Title 23 or the Federal Transit Laws. Moreover, the specific provision regarding hot spot analyses, section 93.116, refers to "FHWA/FTA project(s)", which this project is not.

Thus, our understanding is that the USCG is not required to perform a hot spot analysis for this project.
We look forward to discussing this matter with you.
Regards. David

David H. Coburn

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"Bloom, Robert"
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To
Sherry Kamke/R5/USEPA/US@EPA

cc
"Carlson, Kurt"
<Kurt.A.Carlson@uscg.mil>,
"Striffler, Scot"
<Scot.M.Striffler@uscg.mil>

10/02/2007 01:38
PM

Subject
EPA letter

Hi Sherry,

Scot had contact with David Coburn, attorney for Ambassador Bridge application, and he indicated he had gotten letter from EPA as a follow-up to the air quality discussion we all had at SEMCOG on 20 September. He provided piecemeal reference to it, but nothing in its entirety. Being we are the lead agency for this proposal, would you please email me a copy of the letter in its entirety? Thank you .
Bob

ROBERT W. BLOOM, JR.
Bridge Program Manager
Ninth Coast Guard District
1240 East Ninth Street
Cleveland, Ohio 44199-2060
tele: 216-902-6085
FAX: 216-902-6088
email: Robert.W.Bloom@USCG.mil

Peterfreund, Anna L.

From: Coburn, David [DCoburn@steptoe.com]
Sent: Tuesday, October 02, 2007 8:29 AM
To: Kevin.Bate@WestonSolutions.com
Cc: Korpi, Scott M.; Peterfreund, Anna L.; Taub, Cynthia
Subject: EPA Determination

Kevin -- See the message below received from EPA late on Friday. They have suggested that we do a hot spot analysis, but acknowledge that it is not required (although they appear to leave the door open to changing their mind).

We have not yet had a chance to consult with the client on this, but I would appreciate it if you could send to me at your earliest convenience a cost estimate for the work that would be involved in performing this type of anaysis and an estimate of how long it would take. We may wish to begin this work very soon should we decide to go forward.

As to any technical questions that they might have on the general conformity analysis, I will let you know once I hear more.

Regards. David

David,

I had a conversation with Michael Leslie about the conformity issues. I'm going to summarize what he told me since he'll be out of the office for awhile. He said that he and his contacts at Headquarters (OTAQ) agree that the project should be considered "regionally significant."

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Please let me know if you have any questions and I'll do the best that I can to

answer them. Thank you.

Sherry A. Kamke
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JOHN D. DINGELL
16TH DISTRICT, MICHIGAN

CHAIRMAN
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October 12, 2007

Admiral Thad W. Allen
Commandant, U.S. Coast Guard
Coast Guard Headquarters
2100 Second Street, SW
Washington, DC 20593

Dear Commandant Allen:

Thank you for your letter dated September 26. I appreciate your responsiveness. As is often the case, your letter has prompted further questions regarding the permitting process for additional crossings over the Detroit River.

While the information you provided regarding the process has been helpful, your letter did not answer three very pertinent questions. Therefore, I respectfully request that you please answer the following questions:

1. Included in Appendix E of the Draft EA are copies of necessary permits that have been obtained by the Detroit International Bridge Company (DIBC). Permits obtained to date include Soil Erosion and Sedimentation Control Permit from MDEQ and Wayne County Department of Environment Land Resource Management Division, as well as authorization to discharge Storm Water from Construction Activities under the National Pollutant Discharge Elimination System, among others. However, your letter does not address what other permits will be required for this project. Please address in detail what other permits are required and the character of further permits needed by DIBC.

2. Under NEPA the U.S. Coast Guard is the lead federal agency and is obligated to consult with and obtain comments from any federal agency with legal jurisdiction or special expertise concerning any environmental or navigational impact involved. What federal agencies have legal jurisdiction concerning environmental or navigational impact? What federal agencies have special expertise concerning environmental or navigational impact? Has such consultation begun? If so, what agencies have you consulted? If not, what agencies will you consult?

3. In my letter dated September 4, 2007, I inquired about the function of the Department of Transportation, Environmental Protection Agency, and Army Corps of Engineers in the permitting process. Please address in detail the function of these federal agencies and any other agencies that are included in the permitting process.

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It is clear that there is a undeniable need for a second border crossing along the Detroit River, however, I strongly believe that a second crossing should not come at the expense of air and water quality or other environmental values in the region. Therefore it is imperative that we fully examine all of the affects a second crossing may have on the surrounding environment, before construction on a second crossing commences.

Thank you for your anticipated cooperation. Because of the sensitive nature of this situation, I would ask that a response be sent to me no later than October 26, 2007. I would ask that you fax these documents to my Washington office at (202) 226-0371. Should you have any questions, please contact Kimberlee Trzeciak of my staff at (202) 225-4071.

With every good wish,

Sincerely,

John D. Dingell
Member of Congress

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

470 L'Enfant Plaza East, SW
Room 7110
Washington, DC 20024-2135
Staff Symbol: CG-0921
Phone: (202) 245-0520
Fax: (202) 245-0529

5730
C732063

The Honorable John D. Dingell
U.S. House of Representatives
Washington, DC 20515

Dear Representative Dingell:

This is in response to your inquiry of October 12, 2007, regarding your additional questions pertaining to the permitting process for an additional crossing over the Detroit River.

Your letter asks what other permits will be required for the proposed Ambassador Bridge Enhancement Project (ABEP). Issuance of a Coast Guard bridge permit requires that the water quality certification provisions of the Clean Water Act (33 U.S.C. 1251), Section 401, and its implementing regulations in 40 CFR 121 are complied with. The applicant must apply for and obtain a Water Quality Certification (WQC), or obtain a WQC waiver before the Coast Guard can take a final agency action upon a proposed project.

All bridge actions must also comply with Section 307 of the Coastal Zone Management (CZM) Act of 1972 (16 U.S.C. 1451), as amended, and 15 CFR 930, which implements the CZM Act, and Coast Guard Coastal Zone Management Federal Consistency Procedures.

The Michigan Department of Environmental Quality (MDEQ) has issued two permits to the applicant in connection with the ABEP and operations of the Ambassador Bridge. The first permit was dated January 17, 2007, and provided overall permitting for the proposal, including Water Quality Certification and Coastal Zone Management consistency. The second permit was dated March 1, 2007, and provided approval for storm water outfall and discharge at the bridge. These permits conclude coordination with the Michigan Department of Environmental Quality (MDEQ).

The Coast Guard also must ensure that bridge projects receive the appropriate permits from the U.S. Army Corps of Engineers (USACE). The most common is a Section 404 of the Clean Water Act permit, which regulates the discharge of dredged or fill material into waters of the United States, including wetlands. Nationwide permits, those that streamline the evaluation and approval process throughout the nation for certain types of activities that have only minimal impacts to the aquatic environment, must also be obtained before the Coast Guard issues a bridge permit. Since there shall be no piers in the water associated with the construction of the new proposed new bridge, no USACE permit is required for this project.

We do not require that any additional permits be issued before we take a final agency action. United States Coast Guard Bridge Permits contain a "disclaimer" condition stating "issuance of a Coast Guard permit does not relieve the permittee of the obligation or responsibility for compliance with the provisions of any other law or regulation as may be under the jurisdiction of any federal, state or local authority having cognizance of any aspect of the location, construction or maintenance of said bridge".

Your second question pertains specifically to consultation with other federal agencies. We have begun consultation with all federal agencies that have a specific interest in this project. The Coast Guard issued two public notices for the ABEP. The first was issued on July 28, 2006. It advertised the project as a tentative categorical exclusion. The second was issued on May 10, 2007 announcing the availability of the Draft Environmental Assessment (EA) for comment. Both public notices were sent to a standard distribution list for Coast Guard actions. Included on this list were the USACE; the Federal Highway Administration (FHWA); the U.S. Environmental Protection Agency (EPA); the U.S. Department of the Interior, Fish and Wildlife Service (FWS); the U.S. Department of Commerce, National Marine Fisheries Service (NMFS); the U.S. Department of Homeland Security (DHS); the U.S. Department of State (DOS); the Department of Interior, Bureau of Indian Affairs (BIA), the MDEQ; the Michigan Department of Transportation (MDOT); the Michigan Department of History, Arts and Libraries, State Historic Preservation Office (SHPO); the Advisory Council on Historic Preservation (ACHP); and the Southeast Michigan Council of Governments (SEMCOG).

With regards to USACE, FHWA, FWS, NMFS, DHS, DOS, BIA, and MDEQ, we believe that all matters have been addressed to their satisfaction and shall be fully documented in the Final EA. We are heavily engaged with the EPA and SEMCOG with regards to air quality and with SHPO and ACHP for application of Section 106 of the National Historic Preservation Act. Consultation shall continue until all parties are in agreement with regards to their specific responsibilities.

You question the specific functions of the Department of Transportation (FHWA), the Environmental Protection Agency, and the Army Corps of Engineers. The responsibilities of EPA and USACE have already been identified. FHWA has no regulatory responsibilities for this proposed project since it will be funded solely with private funds. These agencies did reply to the Coast Guard public notice and those comments shall be replied to and incorporated into the Final EA. We do not anticipate further consultation with any additional agencies at this time.

We hope this information provided gives more clarification regarding the ABEP. My House Liaison Office at (202) 225-4775 would be pleased to respond to any further questions you or your staff may have.

Sincerely,

THAD W. ALLEN
Admiral, U.S. Coast Guard
Commandant

Rep. John D. Dingell, U.S. House of Representatives

Fax

Phone: 202-225-4071
Fax: 202-226-0371

To: Commandant Allen Date: 10/12/07

Fax: Phone:

CC: Pages (Including Cover Sheet): 3

From:

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- [ ] Jenny Harp
- [x] Kimberlee Trzeciak
- [ ] Dawn Parrish
- [ ] Allen McFarland
- [ ] Erica Fein
- [ ] Luke Entelis
- [ ] Other

Comments:

U.S. Department of Homeland Security

United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2025
Cleveland, OH 44199-2060

Phone: (216) 902-6085
FAX: (216) 902-6088

16590
B-117/sms
October 29, 2007

Mr. Kenneth Westlake
Supervisor, NEPA Implementation
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency – Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Subj: Ambassador Bridge Enhancement Project (ABEP), Detroit River, Detroit, Michigan

Dear Mr. Westlake:

I am writing to thank you for your comments and response to the Draft EA provided in your July 17, 2007 letter, and for the participation of your staff at the September 20, 2007 meeting in Detroit, Michigan at the offices of the Southeast Michigan Council of Governments (SEMCOG). Our response to your comments follows.

Relationship of ABEP to other DIBC Proposals

Your July 17 letter raised a concern regarding how the ABEP project relates to other proposals that DIBC has submitted or may submit in the future and whether any of them are dependent on each other. We are not aware of any other proposals that DIBC has submitted in addition to ABEP. In the U.S., the Ambassador Bridge Gateway Project, sponsored by the Federal Highway Administration and Michigan Department of Transportation, was expressly designed to accommodate a second bridge. The Gateway Project environmental documents included a connection to a future second bridge and is discussed in the ABEP Draft EA. Any other work at the plazas is not dependent upon or triggered by the new bridge. There has been no request to change the U.S. plaza as part of this project. This would require that DIBC submit a proposal to the General Services Administration and Customs and Border Protection for approval. To our knowledge, no such proposal is currently pending. In addition, no new connections to any road owned or operated by MDOT are proposed for the ABEP. Likewise, any Fort Street Relocation is unrelated to the ABEP and neither is dependent on the other. We appreciate the importance of ensuring that any related projects are considered in the EA, and will carefully consider whether the discussion of related projects needs to be expanded in the Final EA.

Uncertainty Regarding Status of Existing Bridge and Ultimate Bridge Capacity

The proposed project is designed to replace the existing 4-lane Ambassador Bridge with a new 6-lane cable-stay bridge. The existing bridge will be used only for pedestrian or other non-

vehicular traffic as may be allowed by inspection officials in both the U.S. and Canada, for DIBC vehicles, and to serve as a backup for the new structure in the event of an impediment to traffic on the new span and for emergencies. Demolishing the existing bridge is undesirable given the historic nature of the bridge. Furthermore, the costs to demolish such a structure over a busy active commercial waterway are high. All alternatives considered for this project included four lanes for general traffic and two lanes for commercial vehicles meeting the requirements of both governments for the FAST program with booths already present in the plazas. Thus, all alternatives have no more than six lanes between the U.S. Plaza and Fort Street.

Please note that substantial modifications to the U.S. and Canadian plazas, separate government approvals, and a separate NEPA review would be required to accommodate more than six lanes of traffic.

Your letter states that the EA should assume 10 lanes of traffic. During the September 20, 2007 meeting at the SEMCOG office we discussed 6 lanes and it was demonstrated that, as the U.S. plaza is currently configured, only 6 lanes can be effectively used for traffic heading for either Canada or the U.S. in the Gateway plaza, and that the plaza is not designed to accommodate traffic using both the old and new spans simultaneously. The plaza would have to be modified to accommodate both spans, and thus more than 6 lanes of traffic going on or coming off the bridge. Any such modification to the plaza would have to be evaluated under a separate proposal and would require a separate environmental study.

Nonetheless, we agree that further discussion of the operating scenarios for the two bridges, including the maximum number of lanes to be utilized at any one time, should be included in the Final EA.

Coordination with CEAA on Canadian Concerns

Environmental analysis is being undertaken in Canada in accordance with the Canadian Environmental Assessment Act. The results of the studies being undertaken in Canada will be submitted to Transport Canada and other Canadian officials as required by Canadian law. Results of the analyses of the assessments in Canada will be considered as appropriate by USCG. Further, USCG will take into account comments it has received from Canadian entities, including the City of Windsor.

Your letter states that the issues concerning the Ambassador Bridge that were raised in the DRIC study were not addressed in the Draft EA and should be addressed. The DRIC study is focused on addressing region-wide transportation needs relative to a new crossing and addressing future capacity issues. That study therefore applied different criteria to judging the merits of the various proposals under review, including the addition of a second bridge to the existing Ambassador Bridge. The DIBC proposal is more narrowly focused on moving traffic off the existing span onto a new span, while retaining the existing inspection plazas and road networks. In response to your comments regarding Canadian impacts, the Canadian study of the DIBC proposal will address these issues. The USCG will also address these issues as appropriate.

Air Quality

The Coast Guard is responsible for ensuring that the proposed project satisfies the Clean Air Act, as it is the lead agency under NEPA for the project. The Coast Guard believes the ABEP is subject to General Conformity Rule requirements, per 40 CFR Part 93, and the analysis performed by the applicant has demonstrated that the project will not exceed de minimus levels. This determination has been initially supported by USEPA since our September 20, 2007 meeting.

The applicant provided additional information during the September 20, 2007 meeting regarding alternatives, traffic counts, breakdown of car and truck traffic, idling times, and circulation of traffic from the bridge to the plaza and onto the connecting highway system. The applicant also submitted a study of potential air quality impacts during construction. The study is dated August 23, 2007, and provides the necessary data to demonstrate the temporary impacts during construction.

Even though Transportation Conformity Rule does not apply for this project because the proposal will not utilize federal funds from Federal Highway Administration or the Federal Transit Administration, the EPA has suggested that an additional hot-spot analysis be performed. We have advised the applicant to perform this analysis.

The latest approved version of MOBILE6 [MOBILE6.2.03 (24-Sep-2003)] and the most recent PM emission factor file (PMDCML.csv, Dated 17-Mar-2006) were used to assess air quality impacts from the project. The method used to calculate vehicle emissions was based upon the distribution of actual project vehicle miles traveled (VMT) counts for the bridge. The g/mile emission factor calculated by MOBILE6 was used for each vehicle type and the appropriate vehicle class emission factor was multiplied by the projected bridge traffic volume and VMT traveled over the bridge.

Stormwater

The stormwater from the new bridge will be collected and treated using the facilities constructed as part of the Ambassador Bridge Gateway Project. Just as the ramps in the interchange and plaza were designed to accommodate a new bridge, the stormwater treatment facilities were also sized to receive the additional stormwater from a new structure should one be constructed. A permit dated March 1, 2007 has already been obtained from the Michigan Department of Environmental Quality for such purposes.

Historic Resources

We are currently in consultation with the SHPO and ACHP to address all historic and cultural impacts in the project area as part of the Section 106 process. The Section 106 process will be fully documented in the Final EA.

Subj: Ambassador Bridge Enhancement Project (ABEP), Detroit River, Detroit, Michigan

Transboundary and Cumulative Effects

Section 4.3 of the Draft EA (page 90) provides a general discussion of Secondary and Cumulative Impacts of the project. Environmental analysis is being undertaken in Canada in accordance with the Canadian Environmental Assessment Act. Transboundary and cumulative impacts will be further considered in the Final EA.

Thank you again for your coordination and participation in this project. If you have any questions or concerns regarding this matter, please contact Scot Striffler, Bridge Management Specialist, Ninth Coast Guard District, at (216) 902-6087.

Sincerely,

Robert W. Bloom Jr.

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

Copy: Mr. David Coburn, Counsel for Detroit International Bridge Company
Mr. Paul Tait, Southeast Michigan Council of Governments (SEMCOG)
Mr. David Reese, Department of Homeland Security, Washington, D.C.

U.S. Department of Homeland Security
United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2025
Cleveland, OH 44199-2060

Phone: (216) 902-6085
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16590
B-116/sms
October 29, 2007

Mr. Paul E. Tait, C.A.E.
Executive Director
Southeast Michigan Council of Governments
535 Griswold – Suite 300
Detroit, Michigan 48226-3602

Subj: Ambassador Bridge Enhancement Project, Detroit River, Detroit, Michigan

Dear Mr. Tait,

I am writing to thank you for providing comments regarding the proposed Ambassador Bridge Enhancement Project (ABEP) in Detroit, Michigan, in your July 10, 2007 letter. I would also like to thank you and your staff for hosting the meeting in your offices on September 20, 2007 between the Coast Guard, Detroit International Bridge Company (DIBC), the applicant in the proposal, Weston Solutions of Michigan, consultants for DIBC, United States Environmental Protection Agency (USEPA), and representatives from your staff. Your July 10, 2007 letter is part of the case record for the project and will be included in the Final EA for this proposal. The coordination conducted during the September 20, 2007 meeting was especially constructive in providing additional information for satisfying federal and local requirements. In response to your July 10, 2007 letter we offer the following response.

Other Agency Coordination

Regarding coordination with Customs and Border Protection (CBP), Federal Highway Administration, and MDOT, each of these agencies was provided a copy of the Draft EA and asked to comment. We have received comments from FHWA and MDOT, and will address their comments in the Final EA. We did not receive any comments from Customs and Border Protection, or any other DHS agency.

Your letter requests confirmation from MDOT and Ontario's Transport Ministry that no changes to the plazas are required to accommodate the new Ambassador Bridge. In the U.S., the Gateway Project was expressly designed to accommodate a second bridge, and the environmental documents prepared for that Project so state. Further, DIBC is not requesting approval for changes to the US plaza as part this project. If such changes were necessary, DIBC would need to submit a proposal to the General Services Administration and CBP for approval. To our knowledge, no such proposal is currently pending. In addition, no new connections to any road owned or operated by MDOT is proposed for the ABEP. As you know, the Gateway Project has been separately evaluated and is addressed in the Draft EA. Similarly, the recently

completed expansion of the proponent's plaza in Windsor was designed and constructed to receive the new span by connecting directly into the now existing elevated concrete bridge deck on the west side of Huron Church Road. With this construction complete, no modifications will be necessary to the plaza to allow the ABEP to integrate seamlessly into the facility.

Traffic

In the September 20, 2007 meeting the applicant and their consultants illustrated how traffic volumes were derived from the September 2005 "Detroit River International Crossing Study Travel Demand Forecasts" as published under the Detroit River International Crossing (DRIC) Study sponsored by FHWA, MDOT, Transport Canada, and Ontario Ministry of Transportation, and compared them to the Gateway/EA FONSI traffic projections for 2015. The overall traffic numbers for 2030 were shown to be less than the overall 2015 projections. It was also shown in the 2030 traffic projections that car traffic is expected to decline while truck traffic would significantly increase. This specific data was not included in the Draft EA but has been provided to you and will be included in the Final EA.

No-Build Alternative

Given that the existing bridge is nearly 80 years old and experiences heavy truck traffic on a daily basis, and that its remaining life span is limited, the No Build alternative is not a viable alternative. The ABEP proposes to build a new bridge that will be able to accommodate commercial and other traffic well into the future.

The existing bridge has substandard 11' wide travel lanes rather than current standard 12' lanes. The existing bridge has minimal safety shoulders and does not meet current standards resulting in backups and congestion whenever work is required on the bridge or a vehicle breaks down. The existing bridge does not provide for effective operation of the FAST booths present in the existing plazas since low risk trucks must wait in the queue with other trucks to reach these booths. The new bridge will resolve this problem by providing for a third lane in each direction that will be dedicated to FAST and other low risk traffic, allowing for faster clearance of that traffic. The proposed project is expected to improve efficiency in moving traffic and reduce idle times. The existing bridge cannot feasibly be widened since it is constrained by the existing towers and catenary cables. The new structure will have standard 12' lanes, standard safety shoulders, and will provide for the operation of the FAST booths already in place in the existing plazas.

Alternatives

Your letter requests clarification on the alternatives considered and the criteria applied to the consideration of alternatives. Twelve alternatives in addition to the no build alternative were studied and described in Section 2.0 of the Draft Environmental Assessment. These included the following:

1) A new three lane "twin" suspension bridge west of the existing bridge spanning a portion of the river with three NB lanes on the existing bridge.
2) A new three lane suspension bridge east of the existing bridge spanning the entire river with three SB lanes on existing bridge.
3) A new three lane suspension bridge west of the existing bridge spanning the entire river with three NB lanes on existing bridge.
4) A new six lane suspension bridge west of the existing bridge spanning the entire river with the existing bridge in reserve.
5) A new six lane suspension bridge east of the existing bridge spanning the entire river with the existing bridge in reserve.
6) A new three lane cable stayed bridge east of the existing bridge spanning the entire river with three SB lanes on existing bridge.
7) A new three lane cable stayed bridge west of the existing bridge spanning the entire river with three NB lanes on existing bridge.
8) A new six lane cable stayed bridge west of the existing bridge spanning the entire river with the existing bridge in reserve.
9) A new six lane cable stayed bridge east of the existing bridge spanning the entire river with the existing bridge in reserve.
10) A new three lane tunnel east of the existing bridge with three SB lanes on existing bridge.
11) A new three lane tunnel west of the existing bridge with three NB lanes on existing bridge.
12) A new three lane tunnel east and a new three lane tunnel west of the existing bridge with the existing bridge removed after construction.

The ranking of each of the alternatives was based on impacts to the environment, impacts to navigation, number of relocations required, economic impacts, functionality, construction impacts, security, and life cycle costs. The analysis is presented in Section 2.0 of the Draft Environmental Assessment and will be expanded and clarified further in the Final Environmental Assessment.

An environmental review is being conducted in Canada under that nation's Environmental Assessment Act concurrently with the Environmental Assessment being prepared by the Coast Guard in accordance with the CEQ memorandum regarding Transboundary impacts dated July 1, 1997. Draft Environmental Assessment Guidelines prepared by the responsible authorities in Canada (Transport Canada and the Windsor Port Authority) with coordination through the Canadian Environmental Assessment Agency were included in Appendix M to the US Draft EA. Final Guidelines have now been published. We understand that an environmental report for the Canadian process is currently being prepared consistent with these Guidelines.

Preliminary Design

Your letter questions why design of the new bridge began before the EA is finalized. The final EA will clarify that only preliminary design work has been completed to assess the environmental impacts of the proposed project and to provide adequate information to the public regarding the concept for the structure. The public's input into key design elements for the new span was sought at a public meeting held in Detroit on May 24, 2007 and additional public meetings are anticipated to solicit input on the final design.

Operating Scenario and Number of Lanes

Your letter states that the EA should assume 10 lanes of traffic. During the September 20, 2007, meeting at your office, we discussed 6 lanes and it was demonstrated that only a total of 6 lanes can be effectively used for traffic heading to Canada or the U.S. in the Gateway plaza. The DIBC has shown that only 6 lanes of traffic may be processed at any time, whether one structure or two were used for traffic. The plaza would have to be modified to accommodate more than 6 lanes of traffic going on or coming off the bridge, which would be evaluated under a separate proposal and would require a separate study. The Final EA will illustrate this point in detail.

Visual Quality and Aesthetics

The State Historic Preservation Office and the Advisory Council on Historic Preservation have been consulted on several occasions and a Section 106 process is underway.

Water Quality and Stormwater

The stormwater from the new bridge will be collected and treated using the facilities constructed as part of the Ambassador Bridge Gateway Project. Just as the ramps in the interchange and plaza were designed to accommodate a new span, the stormwater treatment facilities were also sized to receive the additional stormwater from a new structure should one be constructed. A permit dated January 17, 2007 has already been obtained from the Michigan Department of Environmental Quality for such purposes.

Air Quality

The Coast Guard is responsible for ensuring that the proposed project satisfies the Clean Air Act, as the Coast Guard is a permitting agency for the project. The proposal will not utilize federal funds from Federal Highway Administration or the Federal Transit Administration. You have declared that the ABEP is considered a regionally significant project, requiring additional analysis. The Coast Guard believes the ABEP is subject to General Conformity Rule requirements, per 40 CFR Part 93, and the analysis performed by the applicant has demonstrated that the project will not exceed de minimus levels. This determination has been initially supported by USEPA since our September 20, 2007 meeting. Since additional analysis may be

required for SEMCOG's regulatory requirements, which would include localized data referred to in your letter of July 10, 2007, I request you provide the necessary local data needed to perform this thorough analysis so it may be included in the documentation for the project.

The applicant provided additional information during the September 20, 2007 meeting regarding alternatives, traffic counts, breakdown of car and truck traffic, idling times, and circulation of traffic from the bridge to the plaza and onto the connecting highway system. The applicant also submitted a study of potential air quality impacts during construction. The study is dated August 23, 2007, and provides the necessary data to demonstrate the temporary impacts during construction.

Even though Transportation Conformity Rule does not apply for this project, EPA requested that a hot-spot analysis be performed for inclusion in the case record, and we are advising the applicant to perform this analysis. The results of the analysis will be reported in the Final EA.

The latest approved version of MOBILE6 [MOBILE6.2.03 (24-Sep-2003)] and the most recent PM emission factor file (PMDCML.csv, Dated 17-Mar-2006) was used to assess air quality impacts from the project. The method used to calculate vehicle emissions was based upon the distribution of actual project vehicle miles traveled (VMT) counts for the bridge. The g/mile emission factor calculated by MOBILE6 was used for each vehicle type and the appropriate vehicle class emission factor was multiplied by the projected bridge traffic volume and VMT traveled over the bridge.

You indicated at the September 20, 2007 meeting that you had already undertaken an analysis of the project and that the project satisfied SEMCOG's criteria. We would appreciate confirmation of this for inclusion in the Final EA.

Thank you again for your coordination and participation in this project. If you have any questions or concerns regarding this matter, please contact Scot Striffler, Bridge Management Specialist, at (216) 902-6087.

Sincerely,

Robert W. Bloom Jr.

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

Copy: U.S. Environmental Protection Agency, Chicago, Illinois
David Coburn, Counsel for Detroit International Bridge Company

U.S. Department of Homeland Security

United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2025
Cleveland, OH 44199-2060

Phone: (216) 902-6085
FAX: (216) 902-6088

16590
B-117/sms
October 29, 2007

Mr. Kenneth Westlake
Supervisor, NEPA Implementation
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency – Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Subj: Ambassador Bridge Enhancement Project (ABEP), Detroit River, Detroit, Michigan

Dear Mr. Westlake:

I am writing to thank you for your comments and response to the Draft EA provided in your July 17, 2007 letter, and for the participation of your staff at the September 20, 2007 meeting in Detroit, Michigan at the offices of the Southeast Michigan Council of Governments (SEMCOG). Our response to your comments follows.

Relationship of ABEP to other DIBC Proposals

Your July 17 letter raised a concern regarding how the ABEP project relates to other proposals that DIBC has submitted or may submit in the future and whether any of them are dependent on each other. We are not aware of any other proposals that DIBC has submitted in addition to ABEP. In the U.S., the Ambassador Bridge Gateway Project, sponsored by the Federal Highway Administration and Michigan Department of Transportation, was expressly designed to accommodate a second bridge. The Gateway Project environmental documents included a connection to a future second bridge and is discussed in the ABEP Draft EA. Any other work at the plazas is not dependent upon or triggered by the new bridge. There has been no request to change the U.S. plaza as part of this project. This would require that DIBC submit a proposal to the General Services Administration and Customs and Border Protection for approval. To our knowledge, no such proposal is currently pending. In addition, no new connections to any road owned or operated by MDOT are proposed for the ABEP. Likewise, any Fort Street Relocation is unrelated to the ABEP and neither is dependent on the other. We appreciate the importance of ensuring that any related projects are considered in the EA, and will carefully consider whether the discussion of related projects needs to be expanded in the Final EA.

Uncertainty Regarding Status of Existing Bridge and Ultimate Bridge Capacity

The proposed project is designed to replace the existing 4-lane Ambassador Bridge with a new 6-lane cable-stay bridge. The existing bridge will be used only for pedestrian or other non-

vehicular traffic as may be allowed by inspection officials in both the U.S. and Canada, for DIBC vehicles, and to serve as a backup for the new structure in the event of an impediment to traffic on the new span and for emergencies. Demolishing the existing bridge is undesirable given the historic nature of the bridge. Furthermore, the costs to demolish such a structure over a busy active commercial waterway are high. All alternatives considered for this project included four lanes for general traffic and two lanes for commercial vehicles meeting the requirements of both governments for the FAST program with booths already present in the plazas. Thus, all alternatives have no more than six lanes between the U.S. Plaza and Fort Street.

Please note that substantial modifications to the U.S. and Canadian plazas, separate government approvals, and a separate NEPA review would be required to accommodate more than six lanes of traffic.

Your letter states that the EA should assume 10 lanes of traffic. During the September 20, 2007 meeting at the SEMCOG office we discussed 6 lanes and it was demonstrated that, as the U.S. plaza is currently configured, only 6 lanes can be effectively used for traffic heading for either Canada or the U.S. in the Gateway plaza, and that the plaza is not designed to accommodate traffic using both the old and new spans simultaneously. The plaza would have to be modified to accommodate both spans, and thus more than 6 lanes of traffic going on or coming off the bridge. Any such modification to the plaza would have to be evaluated under a separate proposal and would require a separate environmental study.

Nonetheless, we agree that further discussion of the operating scenarios for the two bridges, including the maximum number of lanes to be utilized at any one time, should be included in the Final EA.

Coordination with CEAA on Canadian Concerns

Environmental analysis is being undertaken in Canada in accordance with the Canadian Environmental Assessment Act. The results of the studies being undertaken in Canada will be submitted to Transport Canada and other Canadian officials as required by Canadian law. Results of the analyses of the assessments in Canada will be considered as appropriate by USCG. Further, USCG will take into account comments it has received from Canadian entities, including the City of Windsor.

Your letter states that the issues concerning the Ambassador Bridge that were raised in the DRIC study were not addressed in the Draft EA and should be addressed. The DRIC study is focused on addressing region-wide transportation needs relative to a new crossing and addressing future capacity issues. That study therefore applied different criteria to judging the merits of the various proposals under review, including the addition of a second bridge to the existing Ambassador Bridge. The DIBC proposal is more narrowly focused on moving traffic off the existing span onto a new span, while retaining the existing inspection plazas and road networks. In response to your comments regarding Canadian impacts, the Canadian study of the DIBC proposal will address these issues. The USCG will also address these issues as appropriate.

Air Quality

The Coast Guard is responsible for ensuring that the proposed project satisfies the Clean Air Act, as it is the lead agency under NEPA for the project. The Coast Guard believes the ABEP is subject to General Conformity Rule requirements, per 40 CFR Part 93, and the analysis performed by the applicant has demonstrated that the project will not exceed de minimus levels. This determination has been initially supported by USEPA since our September 20, 2007 meeting.

The applicant provided additional information during the September 20, 2007 meeting regarding alternatives, traffic counts, breakdown of car and truck traffic, idling times, and circulation of traffic from the bridge to the plaza and onto the connecting highway system. The applicant also submitted a study of potential air quality impacts during construction. The study is dated August 23, 2007, and provides the necessary data to demonstrate the temporary impacts during construction.

Even though Transportation Conformity Rule does not apply for this project because the proposal will not utilize federal funds from Federal Highway Administration or the Federal Transit Administration, the EPA has suggested that an additional hot-spot analysis be performed. We have advised the applicant to perform this analysis.

The latest approved version of MOBILE6 [MOBILE6.2.03 (24-Sep-2003)] and the most recent PM emission factor file (PMDCML.csv, Dated 17-Mar-2006) were used to assess air quality impacts from the project. The method used to calculate vehicle emissions was based upon the distribution of actual project vehicle miles traveled (VMT) counts for the bridge. The g/mile emission factor calculated by MOBILE6 was used for each vehicle type and the appropriate vehicle class emission factor was multiplied by the projected bridge traffic volume and VMT traveled over the bridge.

Stormwater

The stormwater from the new bridge will be collected and treated using the facilities constructed as part of the Ambassador Bridge Gateway Project. Just as the ramps in the interchange and plaza were designed to accommodate a new bridge, the stormwater treatment facilities were also sized to receive the additional stormwater from a new structure should one be constructed. A permit dated March 1, 2007 has already been obtained from the Michigan Department of Environmental Quality for such purposes.

Historic Resources

We are currently in consultation with the SHPO and ACHP to address all historic and cultural impacts in the project area as part of the Section 106 process. The Section 106 process will be fully documented in the Final EA.

Subj: Ambassador Bridge Enhancement Project (ABEP), Detroit River, Detroit, Michigan

Transboundary and Cumulative Effects

Section 4.3 of the Draft EA (page 90) provides a general discussion of Secondary and Cumulative Impacts of the project. Environmental analysis is being undertaken in Canada in accordance with the Canadian Environmental Assessment Act. Transboundary and cumulative impacts will be further considered in the Final EA.

Thank you again for your coordination and participation in this project. If you have any questions or concerns regarding this matter, please contact Scot Striffler, Bridge Management Specialist, Ninth Coast Guard District, at (216) 902-6087.

Sincerely,

Robert W. Bloom Jr.

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

Copy: Mr. David Coburn, Counsel for Detroit International Bridge Company
Mr. Paul Tait, Southeast Michigan Council of Governments (SEMCOG)
Mr. David Reese, Department of Homeland Security, Washington, D.C.

Peterfreund, Anna L.

From: Kamke.Sherry@epamail.epa.gov
Sent: Tuesday, November 20, 2007 5:47 PM
To: Korpi, Scott M.
Subject: RE: Ambassador Bridge Enhancement Project Meeting
Attachments: Image.image001.jpg@01C81A2D.7507B8F0.jpg

It doesn" t appear that this was sent to anyone else.

Her comments are minimal. She just wanted to confirm that we are modeling the entire bridge and she is confused on the modeling years. We are just using meteorological data from Detroit City Airport for the years 2001-2005, those are not the years that we are using for traffic data and emission factors. Her only other comment was recommending that we submit the protocol to the EPA.

Barry

-----Original Message-----
From: Joan Weidner [mailto:weidner@semcog.org]
Sent: Thursday, November 08, 2007 6:02 PM
To: Peterson, Barry T.
Cc: Carmine Palombo
Subject: Re: ABEP modeling protocol

Barry,

Attached is a copy of a letter that went in the mail to you today regarding comments on the Air Quality Modeling Protocol for the ABEP. Also attached are copies of SEMCOG's Mobile6 input files, which are referenced in the letter. They contain the localized data we have developed for use in Mobile6 runs for our region. I've included files for both a summer and a winter scenario as well as two time scenarios: 2005 and 2030.

The parameters in the 2030 file can be used for any future year run. You would just need to change the analysis year. All other parameters (fuel parameters, temperature, fleet age distribution...) would stay the same.

If you decide to use 2007 for your base year, instead of 2005, let me know. The parameters for 2007 are slightly different than 2005 because a new low-RVP fuel was introduced in the region this past summer. The LADCOReg.d file contains the fleet age distribution data called for in the M6 input files.

All of the files are in text format and can be opened with Notepad. Let me know if you have any questions.

Joan Weidner
Senior Transportation Planner
SEMCOG

535 Griswold, Suite 300
Detroit, MI 48226
weidner@semcog.org
Phone: (313) 324-3343
Fax: (313) 961-4869

>>> "Peterson, Barry T." <Barry.Peterson@WestonSolutions.com>
10/29/2007 1:15 PM >>>
Good Afternoon,

Per the discussion at the 20 September 2007 meeting between the Coast Guard, SEMCOG, EPA and DIBC representatives, the attached air dispersion
modeling protocol for the proposed new Ambassador Bridge is being supplied for your review. Please provide any comments that you may have
so that they can be incorporated into the modeling.

Thanks,

Barry

Barry Peterson

Weston Solutions, Inc.

4917 Waters Edge Drive, Suite 235

Raleigh, NC 27606

Tel.: 919-424-2237

Fax.:919-424-2201

barry.peterson@westonsolutions.com

[attachment "Air Dispersion Modeling Protocol ABEP.pdf" removed by Sherry Kamke/R5/USEPA/US]
[attachment "ABEP AQ Protocol Comments.pdf" removed by Sherry Kamke/R5/USEPA/US]
[attachment "CNF4_05S.IN" removed by Sherry Kamke/R5/USEPA/US]
[attachment "CNF5_30S.IN" removed by Sherry Kamke/R5/USEPA/US]
[attachment "CNF4_05W.in" removed by Sherry Kamke/R5/USEPA/US]
[attachment "CNF4_30W.in" removed by Sherry Kamke/R5/USEPA/US]
[attachment "LADCOReg.D" removed by Sherry Kamke/R5/USEPA/US]

U.S. Department of Homeland Security
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16590
B-122/sms
November 20, 2007

Mr. James J. Steele
Division Administrator
Federal Highway Administration – Michigan Division
315 W. Allegan – Room 201
Lansing, Michigan 48933

Subj: Ambassador Bridge Enhancement Project, Detroit River, Detroit, Michigan

Dear Mr. Steele,

I am responding to your May 24, 2007 letter in which you provided comments to the Draft Environmental Assessment (Draft EA) issued for the Ambassador Bridge Enhancement Project (ABEP). The ABEP is being proposed by the bridge owner, Detroit International Bridge Company (DIBC).

The Coast Guard is the lead federal agency for satisfying the National Environmental Policy Act (NEPA) since a Coast Guard Bridge Permit will be required to construct the proposed second bridge adjacent to the current Ambassador Bridge and the project will be privately funded. Although the Federal Highway Administration (FHWA) does not have permitting authority for this project, your comments are important as a transportation agency involved in other projects in the Detroit area that utilize federal funding, including the Ambassador Gateway Plaza Expansion Project.

In response to your comment concerning purpose and need and the disposition of the existing bridge, the purpose and need for the project remains unchanged - to ensure the safe, unimpeded and continued operation of the traffic crossing at this location. The only fundamental changes to the original plans that have been submitted by the proponent have been as a result of requests made by other governmental authorities. These changes included the addition of FAST (Free And Secure Trade) lanes as requested by the U.S. and Canadian governments to service approved low risk commercial travelers. These lanes will be restricted to such uses by connecting directly into the customs booths already within the plazas. The bridge owner already holds permit for an approved structure in the Ambassador Bridge corridor. The ABEP has been proposed to upgrade the infrastructure in this previously approved international corridor.

As to the status of the existing bridge, the most viable option is to maintain it and use it for special purposes such as for maintenance and operational personnel, customs and immigration needs, and as a backup redundant resource if traffic is impeded for any reason on the new bridge. Current maintenance costs of the existing bridge will be reduced since the existing bridge will not carry significant numbers of cars, and no truck traffic other than when the new span is unavailable. DIBC has assured the USCG that it intends to bear all maintenance costs necessary

to ensure that the bridge does not become a hazard. The continued maintenance of the existing bridge has been discussed as a possible mitigating measure in our coordination with Michigan SHPO. The Coast Guard will enforce the applicable federal statutes pertaining to the preservation of marine navigation, and will expect the bridge owners to prevent possible hazards to navigation associated with the existing bridge. The Coast Guard is prepared to recommend civil penalties if the existing bridge is ever determined to be a hazard to marine navigation.

Your letter questioned the use of Private Activity Bonds (PAB) to fund construction of the new span. The applicant is responsible for funding the entire construction of the project and meeting the costs associated with the project. The proposal will not utilize congressionally authorized funding that is disbursed through any federal agency. The Coast Guard has no reason to anticipate that the proponent can not provide adequate funding to perform the work as proposed or fulfill the conditions of a federal bridge permit, which is the extent of the Coast Guard's statutory authority for applications of this nature.

Regarding your comment concerning potential deleterious impacts to migratory birds, the Coast Guard has coordinated with Michigan Department of Environmental Quality, Michigan Department of Natural Resources, and U.S. Fish and Wildlife Service (USFWS). USFWS has recommended discussion in the Environmental Assessment specifically addressing the type of lighting that would be installed on the bridge as a means to minimize potential bird collisions. I will explore the use of white strobe lighting as suggested by USFWS, and expand discussion of migratory bird impacts in the Final EA.

You noted that the ABEP draws from data used in the Detroit River International Crossing (DRIC) study, particularly traffic data for the crossing, and that particular refinements should be included in the analysis that uses this data. Projected traffic volumes used were based on two different sources, including the volumes developed and approved by FHWA during the preparation of the Environmental Assessment for the Gateway Project which was initially approved by FHWA in 1997 and later re-evaluated and approved by FHWA on three separate occasions (1999, 2004 and 2007). The forecasted traffic volumes were then compared to the volumes available from the DRIC study of which FHWA is a lead sponsor. Impacts were analyzed and evaluated using the more conservative DRIC study volumes. Further analysis has been developed, in cooperation with Southeast Michigan Council of Governments (SEMCOG), the regional planning agency, and U.S. Environmental Protection Agency (EPA) to include the consideration of other existing crossings in the Detroit area.

In regards to your comment that the ABEP is a regionally significant transportation project that should be included in regional transportation plans; that is a determination that must be made by SEMCOG, the regional planning agency. The Coast Guard and the project applicant have coordinated with SEMCOG and EPA on this proposal, and it is my understanding that SEMCOG now has all the material necessary for them to make their determination of regional significance and to consider inclusion of the ABEP in regional plans. The Coast Guard determined that a general conformity analysis was required for this project, and it was found that the project's forecasted emissions were below de minimis thresholds. This analysis will be incorporated into the Final EA. EPA requested that a hot-spot analysis be performed for inclusion in the case record, and we have directed that the applicant perform this analysis. The results of the analysis will be reported in the Final EA.

Since the issuance of the Draft EA there has been extensive additional coordination performed with Michigan State Historic Preservation Officer (SHPO), EPA, SEMCOG, and other agencies. Much of this coordination has been conducted to address some of the issues conveyed in your May 24, 2007 letter, including impacts to historic properties and cultural resources, traffic volume projections, air quality analysis and conformity, and purpose and need. Also, in addition to the public outreach already performed, another public meeting has been scheduled for December 6, 2007, at Earhart Elementary School near the Ambassador Bridge. Consultation will be ongoing until all applicable Coast Guard requirements are satisfied and a Final Environmental Assessment (Final EA) is prepared.

Regarding the proposed use of a cable stayed bridge design, the applicant is charged with ensuring that the structure meets all current engineering standards necessary for the type of structure proposed. It is my understanding that other cable stayed bridges are under construction that will advance the longest cable stayed span to over 3500', roughly 60% greater than the length required for this proposed span. An engineering consultant with requisite experience in such bridge design was consulted in connection with the preliminary design presented in the document, and we are advised that the engineering team that will complete the final design will also be experienced in the design of such bridges.

In response to the comment concerning possible interference of the bridge tower with operations at Windsor Airport in Windsor, Ontario, Canada, the applicant is coordinating with Transport Canada and Windsor Airport. This issue will be addressed in the Environmental Assessment process on-going in Canada, which will also assess potential impacts in Windsor consistent with Canadian requirements.

Concerning transboundary effects and potential environmental impacts in Canada, the Final EA will include an expanded section on potential transboundary impacts. A copy of the Canadian environmental screening document will be appended to the Final EA. The project is not expected to significantly increase vehicular traffic or alter traffic patterns. With the planned and approved improvements to the plazas on both the U.S. and Canadian sides, and the addition of dedicated FAST lanes in both directions through the ABEP, less congestion and idling of vehicles is expected. There will be some short-term air quality impacts from construction, but these are not expected to be significant. These projected impacts have been submitted to SEMCOG for review, and includes mitigation through dust suppression and other measures that are typical for construction projects.

In the "Specific Comments" section of your May 24, 2007 letter you express belief that the stated repairs necessary to maintain the current of level of service do not reflect the latest inspection reports and that repairs to structural elements would improve the load rating for the bridge. The applicant has proposed the ABEP to provide a long-term plan to maintain traffic through the corridor with minimal interruption. The existing bridge is nearly 80 years old, with maintenance costs only expected to increase as the structure ages further. As a private owner, DIBC has made a decision to invest private money to improve their property. The Coast Guard's

role is to ensure that the project meets the required needs of marine navigation and that potential impacts to the natural and man-made environment are analyzed and mitigated. It is important to note that it is not the Coast Guard's role to make business decisions for private entities.

You included a question in your letter concerning the possible expansion of the truck cargo inspection facility in the Gateway Plaza that could affect Fort Street. The proposed Ambassador Bridge Enhancement Project is unrelated to the expansion of the inspection facility being investigated by GSA and DIBC. The purpose of the ABEP is to ensure that current operation of the facility can continue to operate. The benefits of building a modern updated structure across the river to ensure the steady flow of commerce and transportation, as detailed in the proposal, is the purpose of the project, not any modification to the existing plaza. The potential expansion of the inspection facility is still in the investigative stage and it is unclear whether the project will go forward. Thus, the inspection facility expansion is not a reasonably foreseeable future action that must be considered in this NEPA process. Moreover, if the inspection facility is expanded, this could reasonably be expected to further reduce traffic congestion and engine idling, and therefore would be expected to have positive environmental impacts. Any proposed alteration to Fort Street will require separate analysis and approvals from responsible transportation agencies. I am aware that there have been discussions regarding the possible relocation of Fort Street, however I am not aware of any pending formal proposal. The ABEP, as proposed, does not have any direct permanent impacts to Fort Street.

You discussed concerns about storm water runoff, collection systems, and overflows. The runoff will be treated by the applicant using its own storm water treatment plant. The applicant has received a permit from the Michigan Department of Environmental Quality for this purpose. The Final EA will include revisions to this section.

To respond to your other comments regarding noise mitigation, air quality, and historic structures, I am enclosing our recent letters to SHPO, SEMCOG and EPA for your information. I believe that these letters further clarify the issues and provide answers to your comments.

The Coast Guard believes that the ABEP will not introduce significant impacts on the natural or man-made environment within the project area. The proposed second bridge will enter directly into the Gateway Plaza where all international traffic using the corridor will be contained and processed before connecting with the interstate highway on the U.S. side. The Gateway EA/FONSI adequately assessed possible environmental impacts to the surrounding communities. The analysis prepared for the ABEP utilizes some of the Gateway NEPA documentation, as well as additional independent analysis.

Please be assured that your comments, and all comments received for the case record, will be specifically addressed in the Final EA.

Subj: Ambassador Bridge Enhancement Project, Detroit River, Detroit, Michigan

Thank you for your comments and participation in this project. Please feel free to contact me at (216) 902-6085 if you have any questions or concerns regarding this matter.

Sincerely,

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

Enclosures: U.S. Coast Guard letter to Southeast Michigan Council of Governments, Detroit, Michigan, dated October 30, 2007
U.S. Coast Guard letter to Environmental Protection Agency, Chicago, Illinois, dated October 30, 2007
U.S. Coast Guard letter to Michigan State Historical Preservation Officer dated September 4, 2007 (without attachments)

U.S. Department of Homeland Security

United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2025
Cleveland, OH 44199-2060

Phone: (216) 902-6085
FAX: (216) 902-6088

16590
B-121/sms
November 20, 2007

Mr. Kirk T. Steudle, P.E. - Director
Michigan Department of Transportation
Murray D. Van Wagoner Building
P.O. Box 30050
Lansing, Michigan 48909

Subj: Ambassador Bridge Enhancement Project, Detroit River, Detroit, Michigan

Dear Mr. Steudle,

I am writing in response to two letters sent by Michigan Department of Transportation (MDOT) regarding the Ambassador Bridge Enhancement Project (ABEP) proposed by the bridge owner, Detroit International Bridge Company (DIBC).

The first letter dated September 14, 2006, was signed by you and was sent to the Coast Guard in response to Coast Guard Public Notice 09-03-06, dated July 28, 2006. The letter stated no objection to the application before the Coast Guard. The second letter was dated July 17, 2007, and was sent to the Coast Guard in response to the Draft Environmental Assessment (Draft EA) issued for the project. The second letter was signed by Mr. David Wrensinski, Administrator, Project Planning Division, and provided comments to the Draft EA.

I appreciate the comments provided and wish to provide some responses to the questions in the July 17, 2007 letter.

The letter provides a statement concerning the association between the ABEP and the already approved Gateway Project adjacent to the bridge. The Gateway Project was clearly designed to improve traffic movement in the plaza and connections with the interstate system on the U.S. side, and included consideration of the addition of a second bridge alongside the existing Ambassador Bridge. The Gateway EA/FONSI provided for the removal of Ambassador Bridge traffic from local roadways and examined the environmental impacts to surrounding neighborhoods, including studies of traffic that use the bridge crossing and, subsequently, the Gateway Plaza. The ABEP connects only to the Gateway plaza and is not expected to create additional significant environmental impacts or affect any MDOT roadways that have not already been evaluated.

Regarding secondary and cumulative impacts, and specifically any impacts to proposals at the Detroit Intermodal Freight Terminal or reconstruction of Fort Street, the ABEP is not connected, nor should it affect either proposal. The studies conducted for the Gateway and the ABEP are

related to the international traffic that is contained to the bridge, Gateway, and the connecting highway system. Vehicle traffic will remain within the Gateway and will connect directly with the interstate system, removing all traffic from local roadways. The ABEP will require use of property only where bridge piers are expected to be placed. This area is adjacent to the City of Detroit Riverside Park, but the park area has undergone changes since the events of September 11, 2001 to improve security for the bridge and limit access to the area. No other parks are within one-half mile of the bridge and are not expected to be affected. DIBC can not unilaterally affect changes to Fort Street or any other publicly owned roadway. Any proposal for the reconstruction of Fort Street would require study and approval from MDOT and other transportation agencies. The ABEP connects directly into the approved Gateway plaza and will not require modifications to any publicly-owned roadways. Additionally, any changes within the Gateway plaza will require additional studies and approvals from various agencies and are not included in this proposal.

Regarding various environmental issues mentioned in the July 17, 2007 letter, including storm water runoff, utility relocations, noise analysis, and archaeological and cultural impacts, the Coast Guard is still in consultation with the Michigan State Historic Preservation Officer to address any effects from the project on historic properties and cultural resources. There has also been consultation with the local Metropolitan Planning Agency, Southeast Michigan Council of Governments (SEMCOG) and U.S. Environmental Protection Agency (USEPA) to address air quality issues and conformity with federal regulations. This coordination included the qualification of traffic data and modeling used for determining air quality impacts.

Michigan Department of Environmental Quality (MDEQ) has issued two permits to DIBC in connection with the ABEP and operations of the Ambassador Bridge. The first permit was dated January 17, 2007, and provided overall permitting for the proposal, including Water Quality Certification. The second permit was dated March 1, 2007, and provided approval for storm water outfall and discharge at the bridge. These permits conclude coordination with MDEQ.

I believe that your September 14, 2006 letter stating no objection to the proposed project recognizes the stated need at the international crossing to improve efficiency of moving traffic through the corridor, maintaining the movement of cross-border commerce between the U.S. and Canada, and providing for future traffic needs. The specific comments provided in the July 17, 2007 letter in response to the Draft EA will be addressed in the Final EA.

Thank you again for your comments. Please contact me at (216) 902-6085 if you have any questions or concerns regarding this matter.

Sincerely,

Robert W. Bloom Jr.

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

Striffler, Scot

From: SKorpi@ACE-FLA.com on behalf of Korpi, Scott M. [SKorpi@ACE-FLA.com]
Sent: Monday, November 26, 2007 10:34 PM
To: Striffler, Scot; Sugarman, Shelly; ELgaaly, Hala; Bloom, Robert; Garneau, Allen
Cc: Bate, Kevin; Peterson, Barry T.; Eldridge, Kevin M.; Peterfreund, Anna L.; Taub, Cynthia; DCoburn@steptoe.com
Subject: FW: Ambassador Bridge Enhancement Project Meeting

See note from Sherry Kamke of EPA below. Looks like they concur with our protocols for the dispersion modeling.

Scott Korpi, PE, SE
Principal
American Consulting Engineers of Florida, LLC
4111 Land O' Lakes Blvd. Suite 210
Land O' Lakes, FL 34639
Email: skorpi@ace-fla.com
Phone: 813-996-2800 x 5567
Cell: 813-340-6857
Fax: 813-996-1908

-----Original Message-----
From: Kamke.Sherry@epamail.epa.gov [mailto:Kamke.Sherry@epamail.epa.gov]

Sent: Monday, November 26, 2007 4:13 PM
To: Korpi, Scott M.
Cc: King.Suzanne@epamail.epa.gov; Leslie.Michael@epamail.epa.gov
Subject: RE: Ambassador Bridge Enhancement Project Meeting

Scott,

I did attempt to send you something but it wasn't what is shown below.
I'm not sure what happened.

What I typed up (but apparently didn't successfully send) before the Thanksgiving holiday was something along the lines of the following:

EPA has reviewed the Air Quality Dispersion Modeling Protocol. First, we are pleased that the dispersion analysis will be done for the ABEP project. Second, we agree with the selection of modeled pollutants and the general protocol since it relies in large part on existing and approved methods. Although, we believe that it may not be necessary to model MTBE since it is not used in gasoline here. If on the other hand, the Canadians use it, maybe it should be modeled. In addition to that, we support SEMCOG's comments, especially those related to future years.

If you have any questions, please let me know. Thanks.

Sherry A. Kamke
Environmental Scientist
NEPA Implementation (Mailcode: E-19J)

Office of Enforcement and Compliance Assurance U.S. EPA Region 5
77 W. Jackson Blvd.
Chicago, Illinois 60604-3590
Phone: 312-353-5794
Fax: 312-353-5374

"Korpi, Scott M." <SKorpi@ACE-FLA.com>
11/20/2007 07:08 PM

To
Sherry Kamke/R5/USEPA/US@EPA

cc

Subject
RE: Ambassador Bridge Enhancement Project Meeting

Sherry,

Did you intend to email me something?

Scott Korpi, PE, SE
Principal
American Consulting Engineers of Florida, LLC
4111 Land O' Lakes Blvd. Suite 210
Land O' Lakes, FL 34639
Email: skorpi@ace-fla.com
Phone: 813-996-2800 x 5567
Cell: 813-340-6857
Fax: 813-996-1908

From: Kamke.Sherry@epamail.epa.gov [mailto:Kamke.Sherry@epamail.epa.gov]

Sent: Tuesday, November 20, 2007 5:47 PM
To: Korpi, Scott M.
Subject: RE: Ambassador Bridge Enhancement Project Meeting

It doesn" t appear that this was sent to anyone else.

Her comments are minimal. She just wanted to confirm that we are modeling the entire bridge and she is confused on the modeling years.
We are just using meteorological data from Detroit City Airport for the years 2001-2005, those are not the years that we are using for traffic data and emission factors. Her only other comment was recommending that

we submit the protocol to the EPA.

Barry

-----Original Message-----
From: Joan Weidner [mailto:weidner@semcog.org]
Sent: Thursday, November 08, 2007 6:02 PM
To: Peterson, Barry T.
Cc: Carmine Palombo
Subject: Re: ABEP modeling protocol

Barry,

Attached is a copy of a letter that went in the mail to you today regarding comments on the Air Quality Modeling Protocol for the ABEP.
Also attached are copies of SEMCOG's Mobile6 input files, which are referenced in the letter. They contain the localized data we have developed for use in Mobile6 runs for our region. I've included files for both a summer and a winter scenario as well as two time scenarios:
2005 and 2030.

The parameters in the 2030 file can be used for any future year run.
You would just need to change the analysis year. All other parameters (fuel parameters, temperature, fleet age distribution...) would stay the

same.

If you decide to use 2007 for your base year, instead of 2005, let me know. The parameters for 2007 are slightly different than 2005 because a

new low-RVP fuel was introduced in the region this past summer. The LADCOReg.d file contains the fleet age distribution data called for in the M6 input files.

All of the files are in text format and can be opened with Notepad. Let me know if you have any questions.

Joan Weidner
Senior Transportation Planner

SEMCOG
535 Griswold, Suite 300
Detroit, MI 48226
weidner@semcog.org
Phone: (313) 324-3343
Fax: (313) 961-4869

>>> "Peterson, Barry T." <Barry.Peterson@WestonSolutions.com>
10/29/2007 1:15 PM >>>
Good Afternoon,

Per the discussion at the 20 September 2007 meeting between the Coast Guard, SEMCOG, EPA and DIBC representatives, the attached air dispersion modeling protocol for the proposed new Ambassador Bridge is being supplied for your review. Please provide any comments that you may have so that they can be incorporated into the modeling.

Thanks,

Barry

Barry Peterson

Weston Solutions, Inc.

4917 Waters Edge Drive, Suite 235

Raleigh, NC 27606

Tel.: 919-424-2237

Fax.:919-424-2201

barry.peterson@westonsolutions.com

[attachment "Air Dispersion Modeling Protocol ABEP.pdf" removed by Sherry Kamke/R5/USEPA/US] [attachment "ABEP AQ Protocol Comments.pdf" removed by Sherry Kamke/R5/USEPA/US] [attachment "CNF4_05S.IN" removed by Sherry Kamke/R5/USEPA/US] [attachment "CNF5_30S.IN" removed by Sherry Kamke/R5/USEPA/US] [attachment "CNF4_05W.in" removed by Sherry Kamke/R5/USEPA/US] [attachment "CNF4_30W.in" removed by Sherry Kamke/R5/USEPA/US] [attachment "LADCOReg.D" removed by Sherry Kamke/R5/USEPA/US]

JOHN D. DINGELL
15TH DISTRICT, MICHIGAN

CHAIRMAN
COMMITTEE ON
ENERGY AND COMMERCE

CO-CHAIR
HOUSE GREAT LAKES
TASK FORCE

MEMBER
MIGRATORY BIRD
CONSERVATION COMMISSION

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Washington, DC 20515–2215

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301 WEST MICHIGAN AVENUE
SUITE 305
YPSILANTI, MI 48197
(734) 481–1100

December 5, 2007

Admiral Thad W. Allen
Commandant, U.S. Coast Guard
Coast Guard Headquarters
2100 Second Street, SW
Washington, DC 20593

Dear Commandant Allen:

Thank you for your November 7 letter. I appreciate your responsiveness. As you well know, the construction of a second crossing over the Detroit River is not a matter to be taken lightly. This crossing is vital to the economic strength of Michigan and critical to maintaining a safe and secure border. More importantly, both the United States and Canadian economies rely heavily on trade amongst each other and a second crossing will ensure that this trade can continue.

To that I end, I would like to ensure that the concerns of other federal agencies, such as the Environmental Protection Agency (EPA) are taken into consideration. Therefore, I would request that you please answer the following questions:

1) Has the United States Coast Guard (USCG) responded to the comments the EPA provided on Public Notice 09-03-06 Approval of Location and Plans? Has the USCG responded to the comments the EPA provided on Environmental Assessment? If so, please provide me with a copy of your response. If not, why?

2) Have the EPA's comments been entered into the public record? If not, why?

3) How has the USCG implemented the comments from the EPA into their decision-making process?

4) Has a more detailed analysis been completed as recommended by the EPA in their July 17, 2007, letter? If so, please provide me with a copy of this analysis. If not, please explain why.

5) One of the recommendations made by the EPA was coordination with the Canadian Environmental Assessment Agency. What steps have been taken to ensure that the National Environmental Policy Act (NEPA) process is taking into consideration the Canadian evaluation and recommendations?

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6) It is my understanding from your letter that because no piers or other structures will be placed into the Detroit River there will be "minimal impacts to the aquatic environment". The EPA has suggested in their comments that increased traffic volume would have measurable impacts on the environment, in particular additional stormwater runoff and mobile source emissions. Has the USCG taken into consideration increased traffic volume while conducting its Environmental Assessment? If so, please explain how. If not, please explain why.

As the USCG moves forward in the NEPA review process, I urge you to continue to take into consideration the concerns of both federal agencies and the communities surrounding the current Ambassador Bridge. A second crossing over the Detroit River is a project of significant importance to Southeastern Michigan and their input is critical to any decision regarding its future. I intend to carefully monitor this situation, in particular compliance with the requirements of NEPA, which is the applicable law governing such projects.

Thank you for your anticipated cooperation. Because of the sensitive nature of this situation, I would ask that a response be sent to me no later than December 19, 2007. I would further ask that you fax these documents to my Washington office at (202) 226-0371. Should you have any questions, please contact Kimberlee Trzeciak of my staff at (202) 225-4071.

With every good wish,

Sincerely,

John D. Dingell
Member of Congress

JOHN D. DINGELL
15TH DISTRICT, MICHIGAN

CHAIRMAN
COMMITTEE ON
ENERGY AND COMMERCE

CO-CHAIR
HOUSE GREAT LAKES
TASK FORCE

MEMBER
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Congress of the United States
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SUITE 305
YPSILANTI, MI 48197
(734) 481–1100

December 7, 2007

Admiral Thad W. Allen
Commandant, U.S. Coast Guard
Coast Guard Headquarters
2100 Second Street, SW
Washington, DC 20593

Dear Commandant Allen:

I write to you today regarding an inquiry into my office about the timeline for the United States Coast Guard Bridge permit for the Ambassador Bridge Enhancement Project (ABEP). There is some concern that the USCG plans to issue this permit within the next week. Given this concern, I would respectfully request that you answer the following questions:

1) What is the current status of the USCG Bridge permit process?

2) What is the proposed timeline for the issuance of the USCG Bridge permit? Specifically, what is the proposed date for such issuance?

I appreciate your assistance in determining whether there is any truth to these rumors. The construction of a second crossing is important to the men and women in the 15th Congressional District, and it is imperative that there is a clear understanding regarding the issuance of any permit. I expect that the USCG will fully comply NEPA, as well as ensure that each of the respective agencies involved in the permit process meet all regulations and requirements of NEPA.

Thank you for your anticipated cooperation. Because of the sensitive nature of this situation, I would ask that a response be sent to me no later than December 20, 2007. I would further ask that you fax these documents to my Washington office at (202) 226-0371. Should you have any questions, please contact Kimberlee Trzeciak of my staff at (202) 225-4071.

With every good wish,

Sincerely,

John D. Dingell
Member of Congress

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Rep. John D. Dingell, U.S. House of Representatives

Fax

Phone: 202-225-4071
Fax: 202-226-0371

To: Commandant Allen Date: 12/13/07

Fax: Phone:

CC: Pages (Including Cover Sheet): 3

From:

- [ ] Michael Robbins
- [ ] Beth Siniawsky
- [ ] Katie Murtha
- [ ] Adam Benson
- [ ] Jonathan Smith
- [ ] Jenny Harp
- [x] Kimberlee Tizeciak
- [ ] Dawn Parrish
- [ ] Allen McFarland
- [ ] Erica Fein
- [ ] Luke Entelis
- [ ] Other

Comments:

JOHN D. DINGELL
16TH DISTRICT, MICHIGAN

CHAIRMAN
COMMITTEE ON
ENERGY AND COMMERCE

CO-CHAIR
HOUSE GREAT LAKES
TASK FORCE

MEMBER
MIGRATORY BIRD
CONSERVATION COMMISSION

Congress of the United States
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December 13, 2007

Admiral Thad W. Allen
Commandant, U.S. Coast Guard
Coast Guard Headquarters
2100 Second Street, SW
Washington, DC 20593

Dear Commandant Allen:

Last week on December 6, the United States Coast Guard (USCG) and the Detroit International Bridge Company (DIBC) held a public workshop to solicit public input on alternative project designs. At this meeting, the DIBC handed out a design charrette requesting input from attendees regarding tower configuration, tower texture and color, railings and roadway lighting and bridge lighting. According to your notice, any comments that are received will provide input as part of the Section 106 consultation process.

While I commend the USCG for offering the opportunity for public comment, I am curious as to why the design process is moving forward when a final permit has not been issued. Given that, I would respectfully request the answers to the following questions:

1) Is the DIBC entitled to move forward with design work without a permit from the USCG? If so, please answer why.

2) Was the DIBC authorized to hand out design charrettes at this public hearing? If so, please answer why.

3) How will the public comments on the design charter be used?

4) Will the public comments be entered into the record? If not, please explain why.

I thank you in advance for your anticipated cooperation. The NEPA permit process was designed in such a way as to ensure that federal agencies carefully examine any environmental consequences before undertaking any building activities. Similarly, Sec. 106 of the National Historic Preservation Act also requires federal agencies to take into account the effect of any undertaking on a historic site. As such, it is critical that the USCG give every consideration to all comments and concerns regarding the proposed twinning of the Ambassador Bridge prior to issuance of a final permit.

THIS MAILING WAS PREPARED, PUBLISHED, AND MAILED AT TAXPAYER EXPENSE
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Given the sensitive nature of this project, I would ask that a response be faxed to my office no later than January 4, 2007. I would further ask that you fax these documents to my Washington office at (202) 226-0371. Should you have any questions, please contact Kimberlee Trzeciak of my staff at (202) 225-4071

With every good wish,

Sincerely,

John D. Dingell
Member of Congress

Rcvd CDPB 12/26/07

JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

KIRK T. STEUDLE
DIRECTOR

December 18, 2007

Mr. Robert W. Bloom
Chief, Bridge Branch
United States Coast Guard
1240 East Ninth Street, Room 2025
Cleveland, Ohio 44199-2060

Dear Mr. Bloom:

Subject: Ambassador Bridge Enhancement Project

Thank you for your recent letter of November 20, 2007, responding to the Michigan Department of Transportation's (MDOT's) comments on the Detroit International Bridge Company's (DIBC's) Ambassador Bridge Enhancement Project Environmental Assessment.

It would appear from your letter that there is some concern the Coast Guard may have received mixed messages from this department due to the two letters from MDOT relative to the project in question. I do not believe MDOT was being inconsistent. My correspondence dated September 14, 2006, was merely recognition of DIBC's right as a private entity to pursue a project which they believe has merit.

Additionally, Dave Wresinski's correspondence dated July 17, 2007, should not be interpreted as an objection to the project itself. The sole purpose of that letter was to identify what appeared to be deficiencies in DIBC's Environmental Assessment from MDOT's perspective. Of particular interest to MDOT was what we perceived to be a segmentation issue with other announced projects by DIBC, which appear to be directly related to this project, but were not included in the analysis. Our concern with the segmentation issue arises from the fact that one of these apparently associated projects includes a proposal for a substantial relocation of part of a state trunkline.

Thank you for allowing me to clarify MDOT's position on this project. If you have any additional questions, please contact either me or Ms. Susan Mortel, Director, Bureau of Transportation Planning, at 517-373-0343.

Sincerely,

Kirk T. Steudle
Director

U.S. Department of Homeland Security

United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2025
Cleveland, OH 44199-2060

Phone: (216) 902-6085
FAX: (216) 902-6088

16590
B-121/sms
November 20, 2007

Mr. Kirk T. Steudle, P.E. - Director
Michigan Department of Transportation
Murray D. Van Wagoner Building
P.O. Box 30050
Lansing, Michigan 48909

Subj: Ambassador Bridge Enhancement Project, Detroit River, Detroit, Michigan

Dear Mr. Steudle,

I am writing in response to two letters sent by Michigan Department of Transportation (MDOT) regarding the Ambassador Bridge Enhancement Project (ABEP) proposed by the bridge owner, Detroit International Bridge Company (DIBC).

The first letter dated September 14, 2006, was signed by you and was sent to the Coast Guard in response to Coast Guard Public Notice 09-03-06, dated July 28, 2006. The letter stated no objection to the application before the Coast Guard. The second letter was dated July 17, 2007, and was sent to the Coast Guard in response to the Draft Environmental Assessment (Draft EA) issued for the project. The second letter was signed by Mr. David Wrensinski, Administrator, Project Planning Division, and provided comments to the Draft EA.

I appreciate the comments provided and wish to provide some responses to the questions in the July 17, 2007 letter.

The letter provides a statement concerning the association between the ABEP and the already approved Gateway Project adjacent to the bridge. The Gateway Project was clearly designed to improve traffic movement in the plaza and connections with the interstate system on the U.S. side, and included consideration of the addition of a second bridge alongside the existing Ambassador Bridge. The Gateway EA/FONSI provided for the removal of Ambassador Bridge traffic from local roadways and examined the environmental impacts to surrounding neighborhoods, including studies of traffic that use the bridge crossing and, subsequently, the Gateway Plaza. The ABEP connects only to the Gateway plaza and is not expected to create additional significant environmental impacts or affect any MDOT roadways that have not already been evaluated.

Regarding secondary and cumulative impacts, and specifically any impacts to proposals at the Detroit Intermodal Freight Terminal or reconstruction of Fort Street, the ABEP is not connected, nor should it affect either proposal. The studies conducted for the Gateway and the ABEP are

related to the international traffic that is contained to the bridge, Gateway, and the connecting highway system. Vehicle traffic will remain within the Gateway and will connect directly with the interstate system, removing all traffic from local roadways. The ABEP will require use of property only where bridge piers are expected to be placed. This area is adjacent to the City of Detroit Riverside Park, but the park area has undergone changes since the events of September 11, 2001 to improve security for the bridge and limit access to the area. No other parks are within one-half mile of the bridge and are not expected to be affected. DIBC can not unilaterally affect changes to Fort Street or any other publicly owned roadway. Any proposal for the reconstruction of Fort Street would require study and approval from MDOT and other transportation agencies. The ABEP connects directly into the approved Gateway plaza and will not require modifications to any publicly-owned roadways. Additionally, any changes within the Gateway plaza will require additional studies and approvals from various agencies and are not included in this proposal.

Regarding various environmental issues mentioned in the July 17, 2007 letter, including storm water runoff, utility relocations, noise analysis, and archaeological and cultural impacts, the Coast Guard is still in consultation with the Michigan State Historic Preservation Officer to address any effects from the project on historic properties and cultural resources. There has also been consultation with the local Metropolitan Planning Agency, Southeast Michigan Council of Governments (SEMCOG) and U.S. Environmental Protection Agency (USEPA) to address air quality issues and conformity with federal regulations. This coordination included the qualification of traffic data and modeling used for determining air quality impacts.

Michigan Department of Environmental Quality (MDEQ) has issued two permits to DIBC in connection with the ABEP and operations of the Ambassador Bridge. The first permit was dated January 17, 2007, and provided overall permitting for the proposal, including Water Quality Certification. The second permit was dated March 1, 2007, and provided approval for storm water outfall and discharge at the bridge. These permits conclude coordination with MDEQ.

I believe that your September 14, 2006 letter stating no objection to the proposed project recognizes the stated need at the international crossing to improve efficiency of moving traffic through the corridor, maintaining the movement of cross-border commerce between the U.S. and Canada, and providing for future traffic needs. The specific comments provided in the July 17, 2007 letter in response to the Draft EA will be addressed in the Final EA.

Thank you again for your comments. Please contact me at (216) 902-6085 if you have any questions or concerns regarding this matter.

Sincerely,

Robert W. Bloom Jr.

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

KIRK T. STEUDLE
DIRECTOR

September 14, 2006

Mr. Robert Bloom
Bridge Section
United States Coast Guard
1240 East Ninth Street
Cleveland, OH 44199-2060

RE: Ambassador Bridge Enhancement Project
Notice 09-03-06, Dated 7/28/06 (Type 2 Categorical Exclusion)

Dear Mr. Bloom:

The Michigan Department of Transportation (MDOT) has reviewed the submission and notice for the Ambassador Bridge Enhancement Project which pursues a new crossing of the Detroit River as a private sector initiative. MDOT has no objection to the application before you. Thank you for the opportunity to comment.

Sincerely,

Kirk T. Steudle, P.E.
Director

cc: Dan Stamper, President, Ambassador Bridge

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www.michigan.gov • (517) 373-2090

JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

KIRK T. STEUDLE
DIRECTOR

July 17, 2007

Mr. Robert Bloom, Commander "OBR"
U.S. Coast Guard
Ninth Coast Guard District
1240 E. Ninth Street
Cleveland, Ohio 44199-2060

Dear Commander Bloom:

Subject: Ambassador Bridge Enhancement Project Environmental Assessment

Thank you for the opportunity to review the Ambassador Bridge Enhancement Project Environmental Assessment (EA). The Michigan Department of Transportation (MDOT) has an interest in the transportation future of the Ambassador Bridge given that the bridge spans a roadway under our jurisdiction (Fort Street) and will soon connect directly to I-75. We have the following comments on the Ambassador Bridge Enhancement Project EA:

- The EA makes the argument that many environmental topics were discussed in the Gateway Project environmental documentation. However, the Gateway Project primarily focused on the impacts of connecting I-75 directly to the Ambassador Bridge plaza. As part of the Gateway study, MDOT assumed that a second span would be built in the future so the proposed design for the freeway connection would not interfere with the installation of a second span. MDOT accommodated the second span; however, we did not analyze the environmental impacts of building a second span because this was proposed as an independent action by the Detroit International Bridge Company (DIBC).

- The EA should more fully address the environmental areas of storm water runoff, contaminated site information, impacts to parks, noise analysis, utility relocations, right-of-way impacts, identification of environmental justice populations and impacts, information on rehabilitating the existing structure, and archaeological impacts. The impact of the second span on the existing historic bridge, including mitigation measures to avoid, minimize, or mitigate adverse effects should be addressed.

- The secondary and cumulative impact analysis should identify and analyze other projects in the immediate area that also affect the riverfront and southwest Detroit neighborhoods, such as the proposed Detroit Intermodal Freight Terminal and the reconstruction of Fort Street.

- The EA should discuss connected or similar actions and their associated impacts. For example, there are proposed changes to the plaza in the draft General Services Administration Master Plan for the Ambassador Bridge, as well as plans by the DIBC to make long-term changes. The DIBC has proposed a relocation of Fort Street to accommodate the expansion of the plaza. Additionally, the DIBC has plans to build a pump station, and the West Riverfront initiative proposes to establish right-of-way for a multi-use trail below the Ambassador Bridge. How do all of these actions relate to each other?

- From a transportation perspective, the study has no quantitative traffic information. Even though the EA contends there will be no increase in traffic, we would like to see a discussion of the modeling used to arrive at this conclusion. We would also like to see the traffic technical report supporting this conclusion. Traffic modeling is essential to the purpose and need for the proposed project and is the underpinning for the air quality and noise analyses.

- Finally, on another transportation-related topic, will the new span accommodate the transport of hazardous materials?

Again, thank you for the opportunity to comment on the Ambassador Bridge Enhancement Project EA. Should you need further clarification of our comments, please contact me at 517-373-2316.

Sincerely,

David E. Wresinski, Administrator
Project Planning Division

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

2100 Second St. S.W.
Washington, DC 20593
Staff Symbol: CG-00
Phone: (202) 372-4400
Fax: (202) 372-4960

5730
C742525
DEC 20 2007

The Honorable John D. Dingell
U.S. House of Representatives
Washington, DC 20515

Dear Representative Dingell:

This is in response to your two letters, dated December 5 and December 7, 2007, which raised questions and concerns on the status of the Ambassador Bridge Enhancement Project (ABEP).

You ask if the Coast Guard has responded to the comments the Environmental Protection Agency (EPA) provided to Public Notice 09-03-06. The Coast Guard did not respond directly to the EPA on their comments for this notice. The public notice announced the project as a Categorical Exclusion under the National Environmental Policy Act (NEPA) and was considered an initial scoping document. Based upon the responses received to the notice, the Coast Guard elevated the project to an Environmental Assessment (EA).

You further question whether the Coast Guard responded to the comments provided by the EPA to the Draft EA. Coast Guard Public Notice 09-03-07 was distributed on May 10, 2007 announcing the availability of a Draft EA for the proposed project. The EPA responded with comments to this notice by letter dated July 17, 2007. The Coast Guard provided direct response to these comments by letter dated October 29, 2007. All comments received by the Coast Guard for both public notices issued shall be appropriately documented and addressed in the Final EA.

You ask if the EPA's comments have been entered into the public record. All agency comments received to public notice 09-03-07 by the Coast Guard have been published on the Coast Guard's FOIA Electronic Reading Room. The website is http://www.uscg.mil/foia/reading_room.asp. Under **Frequently Requested Documents** select **Ambassador Bridge Enhancement Project – Redacted Comments 2** to review the comments.

You question if the Coast Guard implemented the comments from the EPA into our decision-making process. The Coast Guard is working closely with the EPA Region V to ensure that all concerns expressed by the EPA are fully addressed and considered before a final agency action is taken.

You also ask whether a more detailed air analysis has been completed as recommended by the EPA in their July 17, 2007 letter. Even though additional analysis was not required, based upon the comments received from the EPA the Coast Guard directed the applicant to conduct this additional air quality analysis, known as "Hot Spot" dispersion analysis. The EPA reviewed and approved the Air Quality Dispersion Modeling Protocol used for this analysis. The study was only recently completed and a final report has not yet been delivered. The applicant has told the Coast Guard that all air receptors analyzed during the study measured below the thresholds for the National Ambient Air Quality Standards at the proposed site.

You have inquired if the Coast Guard has taken steps to ensure that the NEPA process take into consideration the Canadian evaluation and recommendations. Environmental analysis is being undertaken in Canada in accordance with the Canadian Environmental Assessment Act. The results of the studies being undertaken in Canada have been submitted to Transport Canada and other Canadian officials as required by Canadian law. The Coast Guard will consider results of the analyses of the assessments in Canada as appropriate. Further, the Coast Guard will take into account comments it has received from Canadian entities, including the City of Windsor. Transboundary and cumulative impacts will be further considered in the Final EA.

You have asked if the Coast Guard has taken into consideration increased traffic volume while conducting the Environmental Assessment. Based upon comments received during to the Draft EA, bridge lane capacity and overall traffic volumes for the corridor have been specifically addressed. The comments indicated that many assumed ten lanes of traffic, six lanes for the new bridge and four lanes for the existing bridge. Since those comments, it has been demonstrated that only six lanes can be effectively used for traffic heading for either Canada or the U.S. in the Gateway Plaza. The applicant has shown that only six lanes of traffic may be processed at any time, whether one structure or two were used for traffic. The Plaza would have to be modified to accommodate more than six lanes going on or coming off the bridge, which would be evaluated under a separate proposal and would require a separate study.

Additionally, a meeting was held on September 20, 2007, between the applicant, Coast Guard, EPA, and Southeastern Michigan Council of Governments (SEMCOG). At that meeting the applicant and their consultants illustrated how traffic volumes were derived from the September 2005 "Detroit River International Crossing Study Travel Demand Forecasts" as published under the Detroit River International Crossing (DRIC) Study sponsored by Federal Highway Administration, Michigan Department of Transportation, Transport Canada, and Ontario Ministry of Transportation, and compared them to the Gateway/EA FONSI traffic projections for 2015. The overall traffic numbers for 2030 were shown to be less than the overall 2015 projections. It was also shown in the 2030 traffic projections that car traffic is expected to decline while truck traffic would significantly increase. This specific data was not included in the Draft EA but will be included in the Final EA.

You question the current status of the Coast Guard bridge permit process. The Coast Guard issued the Draft EA for comment on May 10, 2007. By request, the comment period was extended on two separate occasions, allowing comments to be received up to August 31, 2007. Since that time, the Coast Guard has been reviewing and addressing the comments that were received. We have met with the EPA Region V; the Michigan State Historic Preservation Officer (SHPO); and SEMCOG to address specific concerns that these agencies have identified. The Coast Guard will continue to address these issues until we are fully satisfied.

We are currently preparing a Final EA, but there is no specific timeline for its completion. Once the Final EA is complete, and based upon its findings, the Coast Guard will determine whether to prepare a Finding of No Significant Impact, or if significant impacts are identified, use the EA as the basis for preparing an Environmental Impact Statement.

You ask what is the proposed timeline for issuance of a permit, specifically what is the proposed date for such issuance. The Coast Guard is following no specific timeline for this application, and there is no proposed date for issuance of a permit. Contrary to what you may have heard, the Coast Guard will not be issuing a permit for the ABEP in the immediate future. A permit will only be issued once the Coast Guard is fully satisfied that the NEPA process is complete and all navigational and environmental issues have been appropriately addressed.

As the Coast Guard moves forward in the NEPA process, we will continue to involve the public and all interested parties consistent with both NEPA and the National Historic Preservation Act (NHPA) processes. A public workshop was recently held on Thursday, December 6th, in Detroit, Michigan, regarding the proposed project. It was an open design charrette intended to solicit public input on alternative project designs as well as address general project questions and concerns. Comments were received from the public and will be addressed in the final environmental document. The meeting was considered part of the Section 106 consultation process currently taking place in coordination with the SHPO. The SHPO was also in attendance.

Please know that the Coast Guard will fully comply with NEPA and will ensure that all of the respective agencies involved in the permit process meet the necessary requirements of NEPA. I hope this provides the additional clarification regarding the ABEP that you desire.

My House Liaison Office at (202) 225-4775 would be pleased to respond to any further questions you or your staff may have.

Sincerely,

THAD W. ALLEN
Admiral, U.S. Coast Guard
Commandant

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January 8, 2008

Rcvd (dpb) 1/15/08

Robert W. Bloom, Jr.
Chief, Bridge Branch
United States Coast Guard
1240 E. Ninth St., Room 2025
Cleveland, OH 44199-2060

RE: Ambassador Bridge Enhancement Project (ABEP), Detroit River, Detroit Michigan

Dear Mr. Bloom:

I received your October 29, 2007 letter responding to SEMCOG's comments on the Draft Environmental Assessment (EA) for the Ambassador Bridge Enhancement Project. There appears to be a difference in our understanding of what was agreed to at our meeting on September 20, 2007 with regard to the need for a Regional Transportation Conformity analysis of the project.

At that meeting, both SEMCOG and EPA emphasized that federal conformity regulations require non-federally funded transportation projects be analyzed for Regional Transportation Conformity if they are determined to be "regionally significant". It was SEMCOG's understanding that, following the meeting, EPA would review the conformity regulations and make the final determination as to whether the Ambassador Bridge Enhancement Project was "regionally significant".

In a September 28, 2007 e-mail correspondence, EPA subsequently notified the Detroit International Bridge Company (DIBC) that it had determined the project was "regionally significant" and that SEMCOG should include it in its regional conformity analysis. Your letter seems to indicate that EPA did not determine the project was "regionally significant" and instead found that only General Conformity applied to the project. We have requested that EPA follow up with you to clarify their position.

I also wanted to clarify that SEMCOG has not yet analyzed this project for Regional Transportation Conformity. I apologize if we gave you that impression. Regional Conformity will be analyzed when the Canadian environmental review process has been completed and when the project is ready for amendment to SEMCOG's long-range regional transportation plan.

Sincerely,

Paul E. Tait

Paul E. Tait, CAE
Executive Director

PT:jw

cc: Kenneth Westlake, USEPA

William T. Roberts Chairperson *Mayor, City of Walled Lake*
Mary Blackmon First Vice Chair *Trustee, Wayne County Regional Education Service Agency*
Robert J. Cannon Vice Chairperson *Supervisor, Clinton Township*
Philip M. Cavanagh Vice Chairperson *Commissioner, Wayne County Board of Commmissioners*
Robert Hison Vice Chairperson *Mayor, City of St. Clair Shores*
Michael Sedlak Vice Chairperson *Clerk, Green Oak Township*
John F. Jones Immediate Past Chair *Supervisor, Ira Township*
Paul E. Tait Executive Director

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February 18, 2008

RECEIVED BY
FEB 22 2008
AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC

Mr. Scott Korpi, PE, SE
American Consulting
Engineers of Florida, LLC
4111 Land O'Lakes Blvd., Suite 210
Land O'Lakes, Florida 34649

Dear Mr. Korpi:

Thank you for sending us Westin Solutions' updated analysis of air quality impacts related to the Ambassador Bridge Enhancement Project (ABEP). We appreciate the opportunity to review and comment on this analysis.

We're a bit confused because the most recent file appears to contain two separate documents: *Air Quality Conformity Determination Report* and *Air Quality Modeling Analysis for Ambassador Bridge Enhancement Project Detroit, Michigan.* The two documents contain some conflicting information, with the latter document addressing a number of the comments we submitted to the U.S. Coast Guard on July 10, 2007, while the former document does not. We are assuming that the latter document, dated December 17, 2007, supersedes the Conformity Determination document, dated November 9, 2007.

Assuming this is the case, we are pleased that Westin Solutions has incorporated our suggestions regarding 1) conducting a hotspot analysis for certain pollutants, 2) analyzing emissions from traffic on the entire bridge, not just U.S. side, 3) inclusion of idling emissions in their analysis, and 4) use of SEMCOG's localized inputs to Mobile6 model.

However, we have several of comments regarding how the analysis was performed. The first two relate to the approach taken in the hotspot analysis. The third pertains to the assumed bridge capacity.

First, in the November 8, 2007 letter to Westin Solutions, commenting on their Air Quality Dispersion Modeling Protocol for the ABEP, we pointed out that hotspot analyses usually analyze both a Do-Nothing (existing bridge) and a Build (new bridge) scenario for two future years: the year the project is expected to open to traffic and the last year included in the region's long-range transportation plan (2030). In addition, an analysis of the current configuration (existing bridge) for a recent past year (e.g. 2005) is usually included as a base line.

The Ambassador Bridge study does not include a base line analysis and appears to analyze only the existing bridge in 2010 and only the new bridge in 2030. This does not allow for a comparison of the two scenarios in the same year or a comparison of how future emissions will differ from those experienced at present.

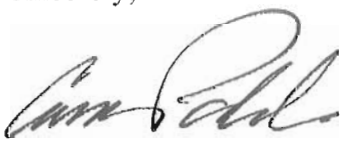
William T. Roberts Chairperson *Mayor, City of Walled Lake* | **Mary Blackmon** First Vice Chair *Trustee, Wayne County Regional Education Service Agency* | **Robert J. Cannon** Vice Chairperson *Supervisor, Clinton Township* | **Philip M. Cavanagh** Vice Chairperson *Commissioner, Wayne County Board of Commissioners* | **Robert Hison** Vice Chairperson *Mayor, City of St. Clair Shores* | **Michael Sedlak** Vice Chairperson *Clerk, Green Oak Township* | **John F. Jones** Immediate Past Chair *Supervisor, Ira Township* | **Paul E. Tait** Executive Director

Second, the report indicates that emission factors from the summer and winter seasons were averaged before running CAL3QCHR. All hotspot analyses we have reviewed in the past calculate emissions for the season in which a given pollutant is of greatest concern. In the case of CO, this is winter. In the case of ozone causing pollutants (VOC and NOx) this is summer. Averaging these factors before running the dispersion model will not provide accurate results in terms of the maximum 1-hour and 8-hour concentrations that these emissions could produce.

Finally, the analysis assumes that only the new bridge is open to traffic. Thus, the total capacity is six lanes. Based on information the Detroit International Bridge Company (DIBC) presented at the September 20, 2007 meeting at SEMCOG, it is our understanding that the current bridge configuration over Fort Street does not allow for more than six lanes of traffic. Thus, despite the existence of 10 lanes of capacity between the old and new bridge spans, it would be impossible for the DIBC to have more than six lanes open at any one time. It is also our understanding that, if modification of the bridge is necessary in the future to accommodate more lanes of traffic, a new environmental analysis would be required to determine the impacts of this change in capacity.

Thank you again for the opportunity to review this document. If you have any questions regarding the comments contained in this letter, please contact me.

Sincerely,



Carmine Palombo, P.E.
Director, Transportation Programs

Cc: Dan Stamper, President, DIBC

CP: jw

Striffler, Scot

From: Sugarman, Shelly
Sent: Tuesday, March 18, 2008 1:29 PM
To: SKorpi@ace-fla.com
Cc: ELgaaly, Hala; Garneau, Allen; Striffler, Scot
Subject: EPA's Comments on the ABEP Air Analysis

Scott, based upon the information that has been provided to the Coast Guard throughout this process regarding air quality, we are deferring to the subject matter experts and therefore agree with EPA and SEMCOG's determination that the ABEP is indeed regionally significant. Please make the necessary adjustments to your environmental documentation to reflect this determination.

EPA has responded to our request to review the "Air Quality Conformity Determination Report" and they agree that under General Conformity it shows that emission levels for the project are below de minimus thresholds. EPA had no comment on the procedures used to complete the Air Quality Dispersion Analysis. As addressed in Scot Striffler's email dated 2/27/08, you should move forward with your submission to SEMCOG to include the proposed project on their Regional Transportation Plan.

The Coast Guard is still waiting for EPA to make a determination as to whether the project must be on the RTP before NEPA can be finalized (i.e. a Finding of No Significant Impact or Record of Decision).

Shelly Sugarman
Permits Branch Chief, CG-54112
Bridge Administration Division
USCG Headquarters
202.372.1521

Peterfreund, Anna L.

From: Kamke.Sherry@epamail.epa.gov
Sent: Wednesday, March 26, 2008 12:09 PM
To: Sugarman, Shelly; Striffler, Scot
Cc: Leslie.Michael@epamail.epa.gov; Korpi, Scott M.; anna.peterfreund@mintra01.rtp.epa.gov
Subject: Fw: Ambassador Bridge Enhancement Project Air Quality Studies

Shelly,

Sorry for the delay in providing you more information. I have now confirmed with Michael Leslie (who discussed this case with Tom Coda) that you can finalize your NEPA document (e.g. sign the FONSI) once you have provided calculations that support that you are below the deminimus threshold. You have done this already in your air quality studies that we have already reviewed. Unless something has changed to make those calculations invalid, you have conducted the proper analysis needed to support general conformity. This is all that is required for demonstrating your compliance with general conformity and it should be reflected in your NEPA documentation. Other than that, you still will need to coordinate with SEMCOG in their regional process but that is an on-going effort that you work on with SEMCOG.

I hope this provides you some clarification. Let me know if you have any questions.

Sherry A. Kamke
Acting Associate
Materials Management Branch
U.S. EPA Region 5
77 W. Jackson Blvd.
Chicago, Illinois 60604-3590
Phone: 312-353-5794
Fax: 312-353-5374
----- Forwarded by Sherry Kamke/R5/USEPA/US on 03/26/2008 10:59 AM -----

Sherry Kamke/R5/USEPA/US
03/18/2008 09:18 AM

To "Sugarman, Shelly" <Shelly.H.Sugarman@uscg.mil>
cc Michael Leslie/R5/USEPA/US@EPA
Subject RE: Ambassador Bridge Enhancement Project Air Quality Studies (Document link: Sherry Kamke)

Shelly,

Yes, the regional analysis that I referred to is the RTP.

By the way, since I sent the last email, I received information that contradicts what I told you. We are still researching this topic.

Michael Leslie is corresponding with Tom Coda on this. When they finally get to talk about this directly, I think we will have the matter resolved. As soon as I hear anything I'll get back to you.

Sherry A. Kamke
Environmental Scientist
NEPA Implementation (Mailcode: E-19J)
Office of Enforcement and Compliance Assurance
U.S. EPA Region 5
77 W. Jackson Blvd.
Chicago, Illinois 60604-3590
Phone: 312-353-5794
Fax: 312-353-5374

"Sugarman, Shelly" <Shelly.H.Sugarman@uscg.mil>
Sent by: Shelly.H.Sugarman@uscg.mil
03/18/2008 06:30 AM

To: Sherry Kamke/R5/USEPA/US@EPA
cc: Kenneth Westlake/R5/USEPA/US@EPA, Michael Leslie/R5/USEPA/US@EPA, Tom Coda/RTP/USEPA/US@EPA, "Striffler, Scot" <Scot.M.Striffler@uscg.mil>
Subject: RE: Ambassador Bridge Enhancement Project Air Quality Studies

Sherry, thanks for the email. For clarification, when you state " that the
regional analysis must be completed before NEPA can be finalized", the regional analysis is the RTP, correct?

-----Original Message-----
From: Kamke.Sherry@epamail.epa.gov [mailto:Kamke.Sherry@epamail.epa.gov]

Sent: Friday, March 14, 2008 6:03 PM
To: Sugarman, Shelly
Cc: Westlake.Kenneth@epamail.epa.gov; Leslie.Michael@epamail.epa.gov; Coda.Tom@epamail.epa.gov; Striffler, Scot
Subject: RE: Ambassador Bridge Enhancement Project Air Quality Studies

Shelly,

I'm writing to give you yet another update to the air quality studies questions that you raised. You asked for two citations to explain why and how the ABEP project activities are included in regional transportation planning process in the Detroit area. Your requests for citations and our answers are below.

1) The cite where the USCG can find regionally significant criteria used to make the SEMCOG/EPA "regionally significant" determination for the ABEP is as follows:

Subpart A--Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 U.S.C. or the Federal Transit Laws

§93.101 Definitions.

Regionally significant project means a transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and
from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals as well as most terminals themselves) and would normally be included in the modeling of a metropolitan area's transportation network, including at a minimum all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel.

2) The cite outlining the requirement for a project to be on the RTP before a FONSI can be signed.

Michael Leslie discussed this with staff at the Office of Transportation and Air Quality in Ann Arbor. OTAQ confirmed what we thought- that the regional analysis must be completed before NEPA can be finalized (i.e. a Record of Decision or Finding of No Significant Impact). This has been confirmed with OTAQ lawyers. Michael did not give me a citation for this. I'm following up with him to get a citation while he follows up with Tom Coda, a general conformity contact in our OAQPS office.

Other than the regional significance comments discussed above we are not likely to have any other comments on the "Air Quality Conformity Determination Report". It shows that emission levels for the project are below de minimus thresholds. We also acknowledge the disclosure of information made in the "Air Quality Dispersion Analysis" document. We don't have any comments on the way the analysis was done, however, we believe that you should consult with the Michigan Department of Environmental Quality (MDEQ). I have contacted Bob Rusch and Bob Sills at MDEQ and they have indicated that they haven't received these reports. It would be good to have their input on the analysis and the use of MDEQ health based screening levels.

I'll follow up with you to get you a citation for the RTP question.

Sherry A. Kamke
Environmental Scientist
NEPA Implementation (Mailcode: E-19J)
Office of Enforcement and Compliance Assurance
U.S. EPA Region 5
77 W. Jackson Blvd.
Chicago, Illinois 60604-3590
Phone: 312-353-5794
Fax: 312-353-5374

"Sugarman, Shelly" <Shelly.H.Sugarman@uscg.mil>
Sent by: Shelly.H.Sugarman@uscg.mil

To: Sherry Kamke/R5/USEPA/US@EPA

cc:

03/05/2008 03:16
PM

Subject
RE: Ambassador Bridge Enhancement
Project Air Quality Studies

Sherry, thanks for the update.

-----Original Message-----
From: Kamke.Sherry@epamail.epa.gov [mailto:Kamke.Sherry@epamail.epa.gov]

Sent: Wednesday, March 05, 2008 3:03 PM
To: Sugarman, Shelly
Cc: Garneau, Allen; ELgaaly, Hala; Leslie.Michael@epamail.epa.gov;
Striffler, Scot; skorpi@ace-fla.com; anna.peterfreund@ace-fla.com
Subject: RE: Ambassador Bridge Enhancement Project Air Quality Studies

Shelly,

This is just an update on the status of the questions that we discussed in our conference call on 2/26/08. I am copying Scott Korpi and Anna Peterfreund on this message to provide them an update on CG/EPA conversations and to respond to their phone call.

Michael Leslie provided you an email response on 2/26/08 regarding the first question. We are still working on responding to the second question. A call is scheduled for 3/11/08 where this question will be discussed. We anticipate getting an answer that day. If so, we will provide a written set of comments on both air quality studies by 3/14/08. Please let me know if you have any other questions. Thanks.

Sherry A. Kamke
Environmental Scientist
NEPA Implementation (Mailcode: E-19J)
Office of Enforcement and Compliance Assurance
U.S. EPA Region 5
77 W. Jackson Blvd.
Chicago, Illinois 60604-3590
Phone: 312-353-5794
Fax: 312-353-5374

"Sugarman,
Shelly"
<Shelly.H.Sugarm
an@uscg.mil>
Sent by:
Shelly.H.Sugarma
n@uscg.mil

02/26/2008 03:01

To
Michael Leslie/R5/USEPA/US@EPA,
Sherry Kamke/R5/USEPA/US@EPA

cc
"ELgaaly, Hala"
<Hala.ELgaaly@uscg.mil>,
"Garneau, Allen"

PM <Allen.M.Garneau@uscg.mil>,
"Striffler, Scot"
<Scot.M.Striffler@uscg.mil>

Subject
RE: Ambassador Bridge Enhancement
Project Air Quality Studies

Mike and Sherry,

Just as a recap, EPA will be providing the following to the USCG in a few days via email: (1) the cite where the USCG can find regionally significant criteria used to make the SEMCOG/EPA "regionally significant" determination for the ABEP and (2) the cite outlining the requirement for a project to be on the RTP before a FONSI can be signed.

EPA will also be providing comments in writing on the Dispersion Analysis and the Conformity Determination Report in two weeks.

Thanks for your help with this process,

Shelly

-----Original Message-----
From: Leslie.Michael@epamail.epa.gov
[mailto:Leslie.Michael@epamail.epa.gov]
Sent: Tuesday, February 26, 2008 8:22 AM
To: Sugarman, Shelly
Cc: Kamke.Sherry@epamail.epa.gov
Subject: RE: Ambassador Bridge Enhancement Project Air Quality Studies

Shelly, I was wondering if you had some time this week to talk to Sherry Kamke and me about this project and the AQ studies? I think quick phone call will clear up lingering questions.

Michael Leslie, P.E.
USEPA - Region 5 (AR-18J)
77 W. Jackson Blvd.
Chicago, IL 60604
Phone: (312) 353-6680
Fax: (312) 886-0617

Striffler, Scot

From: Striffler, Scot
Sent: Wednesday, April 02, 2008 10:55 AM
To: 'Kamke.Sherry@epamail.epa.gov'; Sugarman, Shelly
Subject: RE: latest message

Sherry,

Thank you very much for the email and statement regarding the Ambassador Bridge project and the application of conformity rules for the project.

As a result of the continued consultation between EPA and USCG, the USCG will proceed with our NEPA process and declare the non-federally funded project in compliance with the General Conformity Rule, as the project has shown to be under de minimus levels and will not exceed NAAQS standards under 40 CFR Section 93. A Transportation Conformity Determination was not required per FHWA's website; http://www.fhwa.dot.gov/environment/conformity/ref_guid/sectionf.htm, which states "Project level conformity determinations are not required for regionally significant non-federal projects, but the conformity rule requires that these projects be included in a conforming plan/TIP or plan/TIP regional analysis before they are approved by a recipient of federal funds."

As the project has been determined to be regionally significant by EPA under the Transportation Conformity Rule, per 40 CFR 93.101, the applicant has been directed to perform an air dispersion analysis, which has been reviewed by EPA. The applicant has further been directed to provide the air dispersion analysis and application to SEMCOG for consideration of the project in regional plans. A copy of the air dispersion (hot-spot) analysis performed by the applicant will be included in the Final EA.

Our documentation for a completed EA (and potential FONSI) will emphasize General Conformity Rule compliance for federal review and direction for the applicant to coordinate with SEMCOG to include the project in the regional transportation plan.

We intend to respond to SEMCOG's January 8, 2008 letter and clarify our understanding regarding the regional significance determination and to describe the additional coordination between EPA and USCG since the writing of that letter.

A final statement of concurrence from EPA, or additional guidance, if applicable, would be appreciated to complete our consultation. If you could provide a response by April 9 it would be greatly appreciated. Once again, thank you very much for your work on this project.

Scot

Scot M. Striffler
Bridge Management Specialist
Ninth District Bridge Program
Office: (216) 902-6087
Fax: (216) 902-6088
Scot.M.Striffler@uscg.mil

-----Original Message-----
From: Kamke.Sherry@epamail.epa.gov [mailto:Kamke.Sherry@epamail.epa.gov]

Sent: Wednesday, March 26, 2008 1:56 PM
To: Sugarman, Shelly; Striffler, Scot
Subject: latest message

Sorry for the delay in providing you more information. I have now confirmed with Michael Leslie (who discussed this case with Tom Coda) that you can finalize your NEPA document (e.g. sign the FONSI) once you have provided calculations that support that you are below the deminimus threshold. You have done this already in your air quality studies that we have already reviewed. Unless something has changed to make those calculations invalid, you have conducted the proper analysis needed to support general conformity. This is all that is required for demonstrating your compliance with general conformity and it should be reflected in your NEPA documentation. Other than that, you still will need to coordinate with SEMCOG in their regional process but that is an on-going effort that you work on with SEMCOG.

I hope this provides you some clarification. Let me know if you have any questions.

Sherry A. Kamke
Acting Associate
Materials Management Branch
U.S. EPA Region 5
77 W. Jackson Blvd.
Chicago, Illinois 60604-3590
Phone: 312-353-5794
Fax: 312-353-5374

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April 17, 2008

Mr. Scott Korpi, P.E. SE, Principal/Project Manager
American Consulting
Engineers of Florida, LLC
4111 Land O'Lakes Boulevard, Suite 210
Land O'Lakes, Florida 34639

RECEIVED BY
APR 21 2008
AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC

Dear ~~Mr. Korpi~~: Scott

This letter is to inform you that SEMCOG is proceeding with amendment of the proposed Ambassador Bridge Enhancement Project to the *2030 Regional Transportation Plan for Southeast Michigan* (RTP) in June 2008. The project was originally proposed for amendment in October 2007; but, based on SEMCOG's finding that not all amendment criteria had been met, it was deferred.

In particular, SEMCOG expressed concerns that the analysis of impacts had not been adequately completed — either in the U.S. or Canada. Since then, additional analysis has been completed. We understand impacts on the Canadian side have been analyzed as well, although not necessarily approved by Canadian officials at this time. Our current understanding is that the new span would have four general-purpose traffic lanes and two lanes dedicated to the efficient processing of trucks enrolled in the Free and Secure Trade (FAST) program, and that the existing span would be maintained, but not for routine use as traffic lanes.

The schedule of SEMCOG meetings where we will consider these proposed projects is as follows:

- Transportation Advisory Council, Wednesday, April 23, 2008, 9:30 a.m., SEMCOG offices;
- Executive Committee, Thursday, May 8, 2008, 1 p.m., SEMCOG offices; and
- General Assembly, Thursday, June 26, 2008, 4:30 p.m., Lovett Hall, The Henry Ford, 20900 Oakwood Boulevard, Dearborn.

The above referenced meetings are all open and you are welcome to attend.

Please contact me if you have any questions.

Sincerely,

Carmine Palombo, P.E.
Director of Transportation Programs
SEMCOG

cc: Skip McMahon
Dan Stamper

CP: je

William T. Roberts, Chairperson, *Mayor, City of Walled Lake*
Mary Blackmon, First Vice Chair, *Trustee, Wayne County Regional Education Service Agency*
Robert J. Cannon, Vice Chairperson, *Supervisor, Clinton Township*
Philip M. Cavanagh, Vice Chairperson, *Commissioner, Wayne County Board of Commissioners*
Robert Hison, Vice Chairperson, *Mayor, City of St. Clair Shores*
Michael Sedlak, Vice Chairperson, *Clerk, Green Oak Township*
John F. Jones, Immediate Past Chair, *Supervisor, Ira Township*
Paul E. Tait, Executive Director

Canadian Environmental Assessment Agency

55 St-Clair Avenue East
9th Floor, Room 907
Toronto, Ontario
M4T 1M2

Agence canadienne d'évaluation environnementale

55 Avenue St-Clair Est
9ième étage, pièce 907
Toronto, Ontario
M4T 1M2

April 23, 2008

Hala Elgaaly, P.E.
Administrator, Bridge Administration Program
US Coast Guard
2100 Second Street, S.W
Washington, DC 20593

Dear Miss Hala,

Further to our conference call on April 7, 2008, this is a brief update on the status of the federal environmental assessment for the Ambassador Bridge Enhancement project on the Canadian side.

This project is being proposed by the Detroit International Bridge Company (DIBC) and the Canadian Transit Company (CTC), the owners and operators of the existing Ambassador Bridge. The project includes the construction and operation of a new international bridge across the Detroit River almost parallel to the existing Ambassador Bridge, which will connect into the existing plazas and infrastructure.

In Canada, a federal EA of the proposed project is required under the provisions of the *Canadian Environmental Assessment Act* (CEAA).

Transport Canada (TC) has confirmed that it is a responsible authority (RA) under CEAA for this environmental assessment (EA) because the project shall require an approval under the *Navigable Waters Protection Act*, which is identified in the *Law List Regulations*. The Windsor Port Authority (WPA) has also identified a need for an environmental assessment of the project, as it would involve crossing over federal water lots in Windsor, Ontario. Since the WPA is a Prescribed Authority, the *Canada Port Authority Environmental Assessment Regulations* will apply. TC and the WPA will coordinate their activities, to ensure that a single environmental assessment is conducted. Canadian Environmental Assessment Agency (the Agency) is acting as a Federal Environmental Assessment Coordinator (FEAC) for this project.

Section 18(1) of the CEAA requires TC and the WPA to ensure that a screening level assessment of the project is carried out before taking any action that would allow the project to proceed, in whole or in part.

.../2

The proponent submitted an Environmental Impact Statement in early December 2007. I believe it is available on the proponent's web site. Transport Canada, on behalf of ourselves and the Windsor Port Authority (and in consultation with other federal departments), wrote to the proponent in January 2008 to communicate the results of our preliminary review. We noted that the EIS did not analyze one of the project components that were identified in the Federal Environmental Assessment Guidelines as being part of the scope of the project. We advised that we require this information in order conduct an effective review of their EIS. We are still working with the proponent to resolve this issue.

In the meantime, Transport Canada, Windsor Port Authority and the Canadian Environmental Assessment Agency are working with other members of the federal EA review team to update our Federal Public Participation Plan. This plan will outline in more detail how we plan to involve stakeholders, government agencies, aboriginal and First Nation groups and the public in the review process. I would be happy to keep you updated on our progress.

As per our discussion, I would also like to have further discussions to look for opportunities to share information on transboundary issues related to this project.

If you have any questions or need any clarifications, please feel free to contact me at 416-952-1585.

Yours truly,

Mohammad Shahzad Murtaza

Mohammad Murtaza
Senior Program Officer

c.c.: Kaarina Stiff, Transport Canada
David Cree, Windsor Port Authority
Cindy Warwick, Department of Foreign Affairs and International Trade
Shelly Sugarman, US Coast Guard
Allen Garneau, US Coast Guard
Scot Striffler, US Coast Guard

U.S. Department of Homeland Security

United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2025
Cleveland, OH 44199-2060

Phone: (216) 902-6085
FAX: (216) 902-6088

16590
B-043/sms
May 7, 2008

Mr. Paul E. Tait, CAE
Executive Director
Southeast Michigan Council of Governments
535 Griswold – Suite 300
Detroit, Michigan 48226-3602

Subj: Ambassador Bridge Enhancement Project, Detroit River, Detroit, Michigan

Dear Mr. Tait,

I am responding to your January 8, 2008 letter regarding the proposed Ambassador Bridge Enhancement Project (ABEP) in Detroit, Michigan.

I apologize for the length of time to respond to your letter, and for any perceived misunderstanding from my October 29, 2007 letter. The Coast Guard understood that a determination of "regional significance" would be made by EPA following our September 20, 2007 meeting, and as you noted, EPA notified the Coast Guard and Detroit International Bridge Company (DIBC) by e-mail correspondence on September 28, 2007 of their determination that the project was considered to be regionally significant. Since that time, the Coast Guard and EPA have consulted on the application of the Clean Air Act requirements for the Coast Guard's federal NEPA process and for DIBC's overall approval processes for the project.

Regarding the application of General Conformity or Regional Transportation Conformity for the project, my October 29, 2007 letter indicated that the Coast Guard accepted the General Conformity analysis performed (for a non-federally funded project) to be under de minimus levels for the NAAQS, as per 40 CFR Part 93. The "regional significance" determination made by EPA under 40 CFR Part 93.101 requires the project to be included in the regional transportation plan, and therefore requires air dispersion modeling. EPA has reviewed the air dispersion modeling performed by DIBC and approved the analysis. DIBC has subsequently submitted the air dispersion analysis to your agency for technical review and consideration of the project for the 2030 Regional Transportation Plan for Southeast Michigan. Your letter of April 17, 2008 to Mr. Scott Korpi of American Consulting Engineers of Florida, DIBC's consultant, indicated that the project will be considered for amendment to the regional plan in June 2008.

In your January 8, 2008 letter you concluded with a statement of clarification that SEMCOG had not yet analyzed the project for Regional Transportation Conformity. Once again, the Coast Guard had no misunderstanding of the status of the project regarding its inclusion in the regional plan at the time of my October 29, 2007 letter.

Thank you again for your coordination and participation in this project. If you have any questions or concerns regarding this matter, please contact Scot Striffler, Bridge Management Specialist, at (216) 902-6087.

Sincerely,

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

Copy: U.S. Environmental Protection Agency, Chicago, Illinois

U.S. Department of Homeland Security
United States Coast Guard

Commander (dpb)
Ninth Coast Guard District
1240 E. Ninth Street, Room 2025
Cleveland, OH 44199-2060

Phone: (216) 902-6085
FAX: (216) 902-6088

16590
B-044/sms
May 7, 2008

Mr. Kirk T. Steudle, P.E. - Director
Michigan Department of Transportation
Murray D. Van Wagoner Building
P.O. Box 30050
Lansing, Michigan 48909

Subj: Ambassador Bridge Enhancement Project, Detroit River, Detroit, Michigan

Dear Mr. Steudle,

I am writing to thank you for your December 18, 2007 letter and the clarification you provided in that letter regarding MDOT's position on the proposed Ambassador Bridge Enhancement Project, along with your comments regarding the Draft Environmental Assessment. I apologize for the time in responding to your letter.

I wanted to address your stated concerns regarding segmentation and other projects that have been discussed that include proposals to relocate part of a state trunkline. Though you did not specifically identify the state trunkline that may be the focus of your concerns, I take this opportunity to update you on our evaluation of comments pertaining to possible Fort Street relocation. Though I addressed this issue in my November 20, 2007 letter, we have continued to evaluate and monitor the issue. Since my last letter, we have obtained a copy of the feasibility study commissioned by General Services Administration (GSA) in 2007 that explores possible Cargo Inspection Facility expansion and relocation of Fort Street. As noted in my previous letter, any proposals that include changes to a publicly-owned roadway or the plaza facilities would require additional studies and approval from MDOT and other transportation agencies, including additional environmental processes that would be performed if the studies ever become funded and approved. At this time, any changes to the plaza or public roadways are speculative and not reasonably foreseeable. Our current permit process to consider a companion span to the existing DIBC bridge is an independent project and not contingent upon the above mentioned speculative project.

I thank you for your comments and additional clarification. Please contact me at (216) 902-6085 if you have any questions regarding this matter.

Sincerely,

Robert W. Bloom, Jr.

ROBERT W. BLOOM, JR.
Chief, Bridge Branch
By direction of Commander,
Ninth Coast Guard District

Capitol Building, H-153 • P.O. Box 30014, Lansing MI 48909
Phone: (517) 373-0823 • Fax: (517) 373-5993

Michigan House of Representatives
Majority Floor Leader
Steve Tobocman
12th District

Fax

To: Jamie Frederick **From:** Karen Kavanaugh

Fax: 202-426-6081 **Pages:** 3

Phone: **Date:** 5-14-08

Re: **CC:**

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P.O. BOX 30014
LANSING, MI 48909-7514

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stevetobocman@house.mi.gov

STEVE TOBOCMAN
MICHIGAN HOUSE OF REPRESENTATIVES
MAJORITY FLOOR LEADER

May 13, 2008

Jamie Frederick
U.S. Coast Guard
Congressional Liaison Officer
Rayburn House Office Building
Room B320
Washington, D.C. 20515

Dear Mr. Frederick,

Thank you for taking the time to meet with me regarding the Ambassador Bridge Enhancement Project permit application proposed by the Detroit International Bridge Company and the U.S. Coast Guard Bridge Administration Program. The discussion was helpful to my understanding of the USCG's actions on this issue. While I recognize that your process entails compliance with administrative regulations, the fact that the USCG is processing a permit application for a new bridge simultaneous to the binational Detroit River International Bridge Study represents a profound challenge to determining the optimal public policy decisions regarding expanded international border crossing capacity at the Detroit Windsor border.

Congresswoman Cheeks-Kilpatrick and Congressman Knollenberg recently sent correspondence to Secretary Mary Peters requesting an extension of the comment period on the DRIC Draft Environmental Impact Statement (DEIS). In that correspondence, they state that there is a need for better coordination and timing with the Canadian environmental process that has not yet completed their customs plaza and roadway connection analysis. In addition, they suggest that there is a need for identification of the cumulative and transboundary impacts of the project when considered with other transportation projects. I agree that there is a need for coordinated analysis and decision making on the DRIC Study project as well as any other proposal for new international border crossing capacity, including the proposed Ambassador Bridge Enhancement Project. To this end, I would appreciate responses to the following questions:

- Is the USCG coordinating its analysis and final dispensation on the Ambassador Bridge Enhancement Project with the Canadian process and, if so, would issue a permit before their process is complete?

- Will the USCG commit to not issuing any permits to build a bridge until the Canadians demonstrate a clear intent to issue a similar permit, thus ensuring that the USCG does not permit "a bridge to nowhere."

- The DRIC Study is complying with the NEPA Environmental Impact Statement process. Given that the Ambassador Bridge Enhancement Project represents a similar project as that being evaluated by the DRIC Study, is it possible that the USCG will conclude that a full EIS will be required rather than the less rigorous Environmental Assessment?

In conclusion, I also respectfully request that the USCG convene and hold all public meetings and hearings on the Ambassador Bridge Enhancement Project instead of allowing the applicant to do so. This would assist the public in understanding that the process is one that is essentially a public function and responsibility. If indeed the USCG is in charge of making an independent analysis and decision regarding this project, then it should control the process by which it will base its decision.

Once again, thank you for meeting with me. I look forward to your response. I am always available for further discussion.

Sincerely,

Steve Tobocman
House Majority Floor Leader
12th District - Southwest Detroit

cc: Congressman John Dingell
Senator Carl Levin
Senator Debbie Stabenow
Congressman Bart Stupak

Minister of Transport,
Infrastructure and Communities

Ministre des Transports,
de l'Infrastructure et des Collectivités

Ottawa, Canada K1A 0N5

MAY 16 2008

Representative Lee Gonzales
Chair
Appropriations Transportation Subcommittee
Michigan House of Representatives
PO Box 30014
Lansing MI 48909 7514
USA

Dear Representative Gonzales:

Thank you for your correspondence of May 1, 2008, in which you requested clarification on the status of the Canadian federal environmental assessment associated with the proposed new span for the Ambassador Bridge.

As you noted in your letter, the Canadian Transit Company (CTC) submitted its Environmental Impact Statement (EIS) documentation to Canadian authorities on December 5, 2007. At that time, Transport Canada and the Windsor Port Authority, who are jointly responsible for the federal environmental assessment process, conducted a preliminary review of the documentation.

On January 18, 2008, the CTC was informed by Transport Canada that the absence of information in the EIS concerning the potential environmental effects associated with the modification or expansion of the customs facilities prevents the federal review team from conducting an appropriate review of the information provided. I should note that the CTC was given a draft set of Federal Environmental Assessment Guidelines in November 2006, that were developed in consultation with other federal authorities, including the Canada Border Services Agency. The Guidelines clearly identified the requirement to include consideration of the customs facilities in the EIS. This was confirmed in a second draft of the Guidelines that was made available for public consultation in March 2007, and was subsequently contained in the latest version of the Guidelines, which were provided to the CTC in August 2007.

At this time, the review of the EIS is not progressing, given that the CTC has not yet revised the documentation to meet the requirements of the Guidelines. This was confirmed with the CTC in further correspondence from Transport Canada of February 8, 2008, and at a meeting with CTC officials that was held on February 18, 2008. While it is my understanding that the CTC remains unsatisfied with this response, Transport Canada and the Windsor Port Authority continue to actively communicate with the CTC regarding this issue. That being said, our position remains firm.

In light of the foregoing, it is difficult to estimate when a final environmental assessment decision will be achieved. However, allow me to assure you that, once the CTC submits an EIS that complies with the requirements established in the Guidelines, the appropriate government authorities will review the documentation in as timely a manner as possible.

In response to your specific question regarding the permits, licences, and/or permissions that the CTC will need in order to proceed with the proposed replacement span project, I should note that, although the CTC may be required to obtain certain provincial and/or municipal approvals, I am only in a position to comment on the current federal requirements. In order for the project to proceed, the CTC will be required to obtain Transport Canada's approval under the *Navigable Waters Protection Act* and the *International Bridges and Tunnels Act*. Certain rights will also be required from the Windsor Port Authority, given that the project will pass over land administered by the Authority. In addition, if the assessment determines that the project will affect the natural level or flow of boundary waters in the Detroit River on the other side of the international boundary, then a licence under the *International Boundary Waters Treaty Act* will be required.

I trust that the foregoing provides sufficient clarification on the status of the Government of Canada's involvement in this project. Again, thank you for writing.

Yours truly,

The Honourable Lawrence Cannon, P.C., M.P.

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

470 L'Enfant Plaza East, SW
Room 7110
Washington, DC 20024-2135
Staff Symbol: CG-0921
Phone: (202) 245-0520
Fax: (202) 245-0529

5730
C772852

MAY 27 2008

The Honorable Steve Tobocman
Michigan House of Representatives
PO Box 30014
H-153 Capitol
Lansing, MI 48909-7514

Dear Representative Tobocman:

This is in response to your letter dated May 13, 2008 regarding the Ambassador Bridge Enhancement Project (ABEP).

The Coast Guard is coordinating its analysis and final dispensation of the ABEP with Canadian process and, if applicable, would issue a permit before their process is complete. Additionally the Coast Guard has consulted with Transport Canada (TC), the Canadian bridge permitting authority, and the Canadian Environmental Assessment Agency (CEAA) regarding the proposed project. The Coast Guard has not yet determined if a bridge permit would be issued before the Canadian process is complete.

The Coast Guard has not yet determined if such an action is warranted on whether the Coast Guard will commit to not issue any permits to build a bridge until the Canadians demonstrate a clear intent to issue a similar permit.

Regarding the possibility of an Environmental Impact Statement (EIS) for the proposed project, the Coast Guard does not currently anticipate elevating the document to an EIS. Once the Final EA is approved, the Coast Guard will determine whether a particular project will a) not have a significant impact on the environment and prepare a Finding of No Significant Impact (FONSI), or b) have a significant impact on the environment and prepare an EIS.

My House Liaison Office at (202) 225-4775 would be pleased to respond to any further questions you or your staff may have.

Sincerely,

MARK S. MESERVEY
COMMANDER, U.S. COAST GUARD
CONGRESSIONAL AND GOVERNMENTAL
AFFAIRS STAFF
BY DIRECTION

American

American Consulting Engineers of Florida, LLC
4111 Land O' Lakes Boulevard, Suite 210
Land O' Lakes, Florida 34639
Tel 813.996.2800 • Fax 813.996.1908
american@ace-fla.com • www.ace-fla.com

June 17, 2008

Ms. Patricia A. Kurkul
Regional Administrator
National Marine Fisheries Service
Northeast Regional Office
One Blackburn Drive
Gloucester, MA 01930-2298

Re: Ambassador Bridge Enhancement Project
Request for Essential Fish Habitat assessment
Wayne County, Detroit

Dear Ms. Kurkul:

I represent American Consulting Professionals, LLC, the lead engineering and design consultant to the Detroit International Bridge Company for the Ambassador Bridge Enhancement Project. The project identified as the "Ambassador Bridge Enhancement Project" consists of the construction of an adjacent span to the Ambassador Bridge, just west of the existing span between Detroit, Michigan and Windsor, Ontario, Canada. The bridge will span the entire waterway with no substructure elements to be constructed in the waterway. The second span will provide four full service traffic lanes plus two lanes dedicated to low risk commercial travelers. The second span will be a new state-of-the-art cable stayed bridge that will connect directly to the Canadian and U.S. plazas owned by DIBC/CTC. The Ambassador Bridge Enhancement Project will be constructed entirely within the limits of the current operations of the DIBC/CTC.

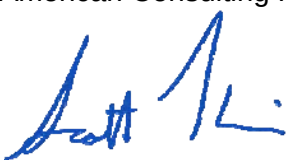
I have enclosed location maps and preliminary drawings showing the proposed crossing and request a review by your office concerning Essential Fish Habitat and Federally listed Threatened and Endangered Species. The U.S. Fish and Wildlife Service was contacted previously by the USCG and advise that the project would not result in impacts to threatened and endangered species since the bridge is designed to span the entire breadth of the river.

The project will require a bridge permit under Section 9 of the Rivers and Harbors Act of 1899 from the U.S. Coast Guard. In order to comply with the National Environmental Policy Act of 1969, we are currently preparing a Draft Environmental Assessment for final review and approval by the appropriate authorities and would appreciate any information that you can provide for inclusion in our assessment.

The proposed bridge will be constructed adjacent to and parallel with the existing Ambassador Bridge that now crosses the Detroit River between Detroit, Michigan and Windsor, Ontario. This is a privately funded project and is designed to provide long-term solutions to existing border traffic problems. Again, no support footings or piers for the proposed bridge will be constructed within the Detroit River. None of the project features involve the placement of dredged or fill material into United States waters or wetlands.

If you have any questions or would like additional information about this project, please contact me at your earliest convenience. I can be reached by writing in care of the above address or by calling 813-996-2800.

Sincerely,
American Consulting Professionals of New York, PLLC



Scott Korpi, PE, SE
Principal/Project Manager

cc: Dan Stamper, DIBC
Robert Bloom, USCG

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

JUL - 1 2008

Scott Korpi
American Consulting Engineers of Florida, LLC
4111 Land O'Lakes Boulevard. Suite 210
Land O'Lakes, Florida 34639

Re: Ambassador Bridge Enhancement Project

Dear Mr. Korpi,

This responds to your letter dated June 17, 2008 requesting information on the presence of listed species in the vicinity of the Ambassador Bridge Enhancement Project. The project is located on the Detroit River between Detroit, Michigan and Windsor, Ontario, Canada.

While several species listed by NOAA's National Marine Fisheries Service (NMFS) occur in New York waters, no listed species are known to occur in the Detroit River. As such, NMFS Protected Resources Division does not intend to offer additional comments on this proposal. Should project plans change or new information become available that changes the basis for this determination, further coordination should be pursued. If you have any questions regarding these comments, please contact Julie Crocker at (978)281-9300 x6530. Your request for information regarding Essential Fish Habitat will be addressed by NMFS' Habitat Conservation Division under separate cover.

Sincerely,

Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

RECEIVED BY
JUL 09 2008
AMERICAN CONSULTING ENGINEERS
OF FLORIDA, LLC

File Code: Sec 7 No Species Present 2008

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313- 961-4266 • *Fax (313) 961-4869* • www.semcog.org

July 10, 2008

Dan Stamper, President
Detroit International Bridge Company
PO Box 32666
Detroit, MI 48232-0666

Dear Mr. Stamper:

On June 26, 2008, SEMCOG's General Assembly amended the Ambassador Bridge Enhancement Project (ABEP) and Detroit River International Crossing (DRIC) to the *2030 Regional Transportation Plan for Southeast Michigan*, conditioned upon identification of the preferred alternative on the Canadian side by the appropriate Canadian officials.

The proposed ABEP includes the construction of a new bridge located immediately west of the existing Ambassador Bridge, with four general-purpose lanes and two lanes dedicated to the efficient processing of trucks enrolled in the Free and Secure Trade (FAST) program. The existing span would be maintained, but not for routine use as traffic lanes. The proposed DRIC includes a new six-lane bridge landing in the Delray area of Southwest Detroit. If constructed as proposed, these two projects combined would meet future border-crossing capacity and security needs.

If and when SEMCOG receives notification that an official decision has been made on the preferred alternative for either project, SEMCOG's General Assembly will be notified their condition has been met and the project(s) will be deemed eligible to move forward in the regional transportation planning process.

If you have any questions or concerns, I can be reached at Palombo@semcog.org or 313-324-3314.

Sincerely,

Carmine Palombo, P.E.
Director
SEMCOG Transportation Programs

PT: je

Mary Blackmon Chairperson *Treasurer, Wayne County Regional Education Service Agency*
Robert Hison First Vice Chair *Mayor, City of St. Clair Shores*
Robert J. Cannon Vice Chairperson *Supervisor, Clinton Township*
Philip M. Cavanagh Vice Chairperson *Commissioner, Wayne County Board of Commissioners*
Gretchen Driskell Vice Chairperson *Mayor, City of Saline*
Michael Sedlak Vice Chairperson *Clerk, Green Oak Township*
William T. Roberts Immediate Past Chair *Mayor, City of Walled Lake*
Paul E. Tait Executive Director

JOHN D. DINGELL
15TH DISTRICT, MICHIGAN

CHAIRMAN
COMMITTEE ON
ENERGY AND COMMERCE

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HOUSE GREAT LAKES
TASK FORCE

MEMBER
MIGRATORY BIRD
CONSERVATION COMMISSION

Congress of the United States
House of Representatives
Washington, DC 20515–2215

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July 21, 2008

Admiral Thad W. Allen
Commandant, U.S. Coast Guard
Coast Guard Headquarters
2100 Second Street, SW
Washington, DC 20593

Dear Commandant Allen:

In April your office kindly responded to follow-up questions that I had regarding the permitting process for the Detroit International Bridge Company (DIBC) and their Ambassador Bridge Enhancement Project. As is often the case, your response has prompted further questions regarding the project and the permitting process.

While the information you provided has been helpful, I remain concerned that the comments from the U.S. Environmental Protection Agency Region 5 (Region 5) regarding the draft environmental assessment (EA) are not adequately being taken into consideration. Furthermore, I have strong reservations about the fact that this process is being referred to as an "enhancement" and the current span will be maintained in addition to the new span. Therefore, I would respectfully request that you please answer the following questions:

1. On July 17, 2007 Region 5 sent a letter to Mr. Robert W. Bloom Jr. at the USCG Office of Commander outlining a number of different environmental concerns with the draft EA. The letter states: ". . . operational impacts – those impacts associated with six to ten lanes of traffic across the Detroit River – have not been completely assessed." With regard to air quality Region 5 suggested a PM2.5 and PM10 analyses should be done and has been provided guidance on how to do so. Region 5 also suggested that a mobile source air toxics and diesel particulate matter analysis. Has the USCG completed these analyses? If so, what were the results? If not, please explain why.

2. In its letter Region 5 also expresses concern that the project does not propose or discuss air quality mitigation in the EA. Region 5 recommends considering a construction emissions reduction plan including Best Available Retrofit Control Technology (BACT). Since receiving these comments, what has the USCG or DIBC done to address air quality mitigation? Has a construction emissions reduction plan been drafted? If so, please provide the appropriate documentation. If not, please explain why.

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3. Region 5 has also expressed a desire for more information regarding how the new bridge structure will impact stormwater runoff. Has the USCG or DIBC analyzed the additional load six lanes of traffic would add to the existing stormwater collection and treatment as suggested? If so, please provide the results of this analysis. If not, please explain why.

4. The Draft EA prepared by the American Consulting Engineers of Florida on behalf of the DIBC states, "Once the new structure is completed, the existing Ambassador Bridge will be taken out of service to effect repairs that are deemed necessary. Once any necessary repairs are completed, the existing structure will be used to provide for bridge internal operational needs and also to provide pedestrian and bicyclist amenities." In Chapter 5 of the U.S. Coast Guard Bridge Administration Manual, conditions to a bridge permit amendment are discussed regarding whether or not a bridge owner wishes to retain part or all of an existing structure. Has the DIBC discussed retention conditions with the USCG? If so, what do the retention conditions entail? If not, please explain why.

5. As stated in the manual, "Many of the conditions to a bridge permit amendment are the same as the conditions discussed in Parts C and D." Part D, Section b "Retention of Bridge" states, "As long as a transportation use is intended, such as one-way traffic, local access or pedestrian traffic, the entire structure may be retained under its existing permit, subject to future removal such as the conditions illustrated by Examples 5.52 and 5.53." Example 5.52 is as follows:

   > "The existing Red Bluff Road Bridge across Taylor Bayou, mile 2.6, to be retained for use as a pedestrian bridge shall be maintained by and at the expense of the owner of the bridge to the satisfaction of the District Commander. Should the District Commander determine the bridge to be a hazard to navigation or to the safety of the general public, the bridge shall be removed down to or below the natural bottom of the waterway and the waterway cleared to the satisfaction of the District Commander. Such removal and clearance shall be completed by and at the expense of the owner of the bridge upon due notice from the District Commander."

   Given that the Ambassador Bridge was opened in 1929, would the USCG include a similar retention condition in the bridge permit amendment for the DIBC?

6. As stated above, DIBC intends to maintain the existing structure and make any necessary repairs. Given the age of the Ambassador Bridge, has the District Commander inspected the current condition of the bridge to determine the safety of the current structure and any structural deficiencies? If so, please provide any relevant documentation. If not, please explain why.

As I have expressed to you, I have significant concerns about the proposed "enhancement" of the Ambassador Bridge. More importantly, I happen to agree with Region 5's belief that while the draft EA has provided relevant information regarding the impacts of the additional span, there are still a large number of outstanding concerns that have not been adequately addressed.

Given the sensitive nature of this project, I would ask that a response be faxed to my office no later than August 1, 2008. I would ask that you fax your response to my Washington Office at (202) 226-0371. Should you have any questions, please contact Kimberlee Trzeciak of my staff at (202) 225-4071.

With every good wish,

Sincerely,

John D. Dingell
Member of Congress

U.S. Department of
Homeland Security

United States
Coast Guard

Commandant
United States Coast Guard

2100 Second St., S. W.
Washington, DC 20593
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AUG 01 2008

The Honorable John D. Dingell
U.S. House of Representatives
Washington, DC 20515

Dear Representative Dingell:

This is in response to your letter dated July 21, 2008 regarding the proposed Ambassador Bridge Enhancement Project (ABEP).

Your letter first asks if the Coast Guard has conducted the additional air analysis as suggested by the Environmental Protection Agency (EPA) Region V via letter dated July 17, 2007, and for the results of the analysis. The proponent has performed the additional air dispersion analysis. The analysis included the length of the bridge into Windsor, Ontario, Canada, but did not attempt to analyze air quality impacts within the City of Windsor. The analysis indicated that the ABEP would not significantly adversely impact air quality across the length of the bridge, and would therefore not impose a significant transboundary impact. All criteria pollutants were analyzed in the air quality study, which was conducted using the latest EPA approved Mobile 6 model. The analysis was also based on the March 17, 2006 upgrade in the particulate matter (PM) emission factor file. We determined that the analysis performed by the applicant demonstrated that the project would not exceed de minimus levels for the National Ambient Air Quality Standards (NAAQS).

EPA reviewed the General Conformity and air dispersion modeling performed by DIBC and confirmed the applicability of General Conformity Rule requirements for the project. The air dispersion modeling was determined to be adequate for submission to Southeast Michigan Council of Governments (SEMCOG) for their consideration of the project in the regional transportation plan and for Transportation Conformity Rule requirements. SEMCOG advised the proponent by letter dated April 17, 2008 that the project would be considered for inclusion in the 2030 Regional Transportation Plan for Southeast Michigan in June 2008. By letter dated July 10, 2008, SEMCOG informed DIBC that on June 26, 2008, SEMCOG's General Assembly amended the Ambassador Bridge Enhancement Project to the 2030 Regional Transportation Plan for Southeast Michigan, conditioned upon identification of the preferred alternative on the Canadian side by the appropriate Canadian officials.

Your letter also questions what has been done to address air quality mitigation during construction activities. The study conducted by Weston, dated August 23, 2007,

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provided the necessary data to demonstrate the temporary impacts during construction. It determined that there would be minimal short-term air quality impacts from construction that shall be mitigated through dust suppression and other measures. These are standard accepted practices for short-term construction projects. Neither EPA nor SEMCOG offered further comment on these mitigation measures.

The Coast Guard worked closely with the EPA Region V to ensure that all concerns expressed in their response to the draft EA were fully addressed to their satisfaction. To date, both EPA and SEMCOG have expressed approval with the level of air quality analysis that has been conducted and with the results of said analysis. All of the air quality analysis discussed above shall be included in the Final EA.

You question the impacts of stormwater runoff from a new bridge. The Coast Guard addressed EPA's comments surrounding stormwater runoff by letter dated October 29, 2007. That letter identified that the stormwater from the new bridge would be collected and treated using facilities constructed as part of the Ambassador Bridge Gateway Project. The stormwater treatment facilities designed for that project were also sized to receive the additional stormwater from a new structure, should one be constructed. Additionally, a permit dated March 1, 2007 has been obtained by DIBC from the Michigan Department of Environmental Quality for such purposes. EPA has offered no further comment on this issue.

You also inquire as to whether DIBC has discussed retention conditions with the Coast Guard for the existing Ambassador Bridge. Throughout the permit process, DIBC has expressed their desire to retain the existing structure. At this stage in the process, the Coast Guard has not determined the language for the permit conditions.

Your final question asks if the Coast Guard has inspected the current condition of the existing Ambassador Bridge. The Coast Guard has no authority to conduct such inspections for structural integrity; therefore no such inspection has, or will, occur. Our authorities lie with navigational safety of the waterway through clearances approved by the Coast Guard. The Michigan Department of Transportation has an Agreement with DIBC regarding the design, construction, maintenance and operation of the bridge.

My House Liaison Office at (202) 225-4775 would be pleased to respond to any further questions you or your staff may have.

Sincerely,

THAD W. ALLEN
Admiral, U.S. Coast Guard
Commandant

United States Department of State
Washington, D.C. 20520

September 18, 2008

Ms. Hala Elgaaley
United States Coast Guard
2100 Second Street SW
Washington, D.C. 20593

Dear Ms. Elgaaley:

Thank you for bringing to our attention the letter you received from the Detroit International Bridge Company (DIBC) concerning its effort to obtain the required Coast Guard permits to twin the current span of the Ambassador Bridge. This letter is to clarify the Department of State position concerning the twinning of Ambassador Bridge.

As the letter correctly notes, the Department of State has determined that the Ambassador Bridge does not require a Presidential permit to expand or twin its span at its current location. This determination was based on the original Congressional statutes authorizing the bridge and the 1972 Bridge Act; there is no Presidential permit issued by this Department for the Ambassador Bridge.

The Department's determination that the twinning of the Ambassador Bridge at that location does not require a Presidential permit should not be considered as in any way affecting the standards or outcomes for reviews of this project undertaken by other U.S. federal agencies such as the Coast Guard. The Department of State determination also has no bearing on Canadian reviews of this project. Canadian authorities have clearly communicated to the Department of State and to DIBC that the Ambassador Bridge twinning project does require Canadian federal government approval for its construction under Canada's International Bridges and Tunnels Act. So far, Canadian federal authorities have not given such approval. The Department of State takes no position concerning Canada's regulation but respects Canada's right as a sovereign nation to require prior Canadian federal approval of any international bridge construction project between the U.S. and Canada. As would be the case in the United States, the bridge may also require approval by Canadian provincial and local authorities.

As a Presidential permit is not required, the Department of State has made no determination as to whether or not the twinning of the Ambassador Bridge is in the U.S. national interest. In general, and subject to the points raised above, the Department of State does support the creation of additional infrastructure to facilitate trade and travel between the United States and Canada.

We are also happy to consult with the Coast Guard on the ramifications, if any, of any Coast Guard permitting decision for our relations with Canada.

I hope this information is helpful to you.

Sincerely,

Edwin R. Nolan
Director
Office of Canadian Affairs

Attachment: 2005 letter to DIBC concerning Ambassador Bridge twinning

Drafted: WHA/CAN: EMFox, 7-2151

Cleared: WHA/CAN: GSheaffer – ok
L/EEB: JSchnitker – ok
OES/EGC: EOrlando
L/WHA: RLahne
L/OES: JKim

David H. Coburn, Esq.
Steptoe & Johnson, LLP
1330 Connecticut Ave., N.W.
Washington, D.C. 20036

Re: Detroit International Bridge Company

Dear Mr. Coburn:

This is in response to your question on behalf of the Detroit International Bridge Company (DIBC) as to whether the DIBC is required to obtain a Presidential Permit to construct a second span for the Ambassador Bridge, which crosses the Detroit River between Detroit, Michigan and Windsor, Ontario. In connection with your question, you have also provided the Office of the Legal Adviser with several pieces of correspondence concerning this matter. Based on the information available to us (including the information you have provided), we have determined that the DIBC does not require a Presidential permit to expand (or twin) the existing bridge at that location.

The Ambassador Bridge was constructed pursuant to a 1921 congressional statute that authorized the "American Transit Company, its successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Detroit River at a point suitable to the interests of navigation, within or near the city limits of Detroit, Wayne County, Michigan, in accordance with the provisions" of the 1906 Bridge Act, provided that the necessary authority for construction was obtained from the Canadian Government and that construction was commenced within three years and completed within seven years. Although the time periods within which the bridge could be constructed and completed were extended by Congress several times, it is our understanding that the bridge was built after Canadian approval was eventually obtained. You have further furnished us with information indicating that DIBC is the assignee of the American Transit Company, having acquired the bridge and the authority to operate it in 1927, pursuant to the 1921 congressional authorization.

In 1972, Congress enacted the International Bridge Act, which effectively ratified the Presidential permit process (delegated to the Department of State in 1968 under Executive Order 11423) that had been in operation for some time. In passing the 1972 statute, Congress made clear that activities conducted pursuant to prior congressional statutory authorizations would not be affected by the new law. Specifically, the House Report provides that the International Bridge Act "should not be construed to adversely affect the rights of those operating bridges previously authorized by Congress to repair, replace or enlarge existing bridges." H.R. Rep. No. 92-1303, 92d Cong., 2d Sess. 3-4 (1972). Further, as your letters note, in a number of prior instances, the Department has advised that the replacement or expansion of existing bridges authorized by Congress prior to passage of the 1972 International Bridge Act did not require a Presidential Permit. However, if expansion of the Ambassador Bridge Detroit were to require an agreement between the State of Michigan (or a subdivision or instrumentality of the State) and the Canadian government, a Canadian province or a subdivision or instrumentality of either, approval of such an agreement by the Secretary of State would be required under section 3 of the 1972 Act.

Therefore, based on our understanding that the DIBC is the assignee of the American Transit Company authorized by Congress to maintain and operate the Ambassador Bridge Detroit and that the DIBC is only seeking to expand (or twin) the operation of that bridge at that location, the DIBC does not require a Presidential permit under E.O. 11423, as amended. The fact that a Presidential permit is not required in this instance does not, however, exempt the DIBC from any other requirements under U.S. law, such as the requirement of advance approval of any plans for modification of the existing bridge by the Secretary of Homeland Security or his delegate under the 1906 Bridge Act.

I hope that you find this information helpful.

Sincerely yours,

Len Kusnitz
Acting Director
Office of Canadian Affairs

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
SOUTHEAST MICHIGAN DISTRICT OFFICE

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

RECEIVED BY
NOV 03 2008
AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC

October 29, 2008

Mr. Dan Stamper
Detroit International Bridge Co.
12225 Stephens Road
Warren, MI 48089

Dear Mr. Stamper:

SUBJECT: DEQ File Number 06-82-0121-P
City of Detroit, Wayne County
Ambassador Bridge Enhancement Project

We have received your letter dated October 20, 2008, requesting an extension of time for completion of work authorized by your Department of Environmental Quality (DEQ) permit.

This letter serves to extend your permit until January 17, 2012.

You are reminded that all conditions, as set forth in the original permit, remain in full force. This letter must be attached to your permit, kept at the work site, and be available for inspection at all times during the duration of the project or until the date of expiration. This extension does not obviate the need for other Federal, State and/or local permits, as may be required by law.

If you have additional questions, please contact this office.

Sincerely,

Jeremy Richardson
Land and Water Management Division
District Representative

cc: Mr. John Jones, Wayne County CEA
City of Detroit Clerk
Mr. Scott Korpi, American Consulting Engineers of Florida, LLC