Detroit River
INTERNATIONAL CROSSING
PROJECT

A BORDER TRANSPORTATION PARTNERSHIP

U.S. Department of Transportation Federal Highway Administration

Canada

MDOT Michigan Department of Transportation

Ontario

DETROIT RIVER INTERNATIONAL CROSSING

Conceptual Engineering Report

VOLUME 1: SECTIONS 1 THROUGH 6

February 2008

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Under agreement with: CORRADINO THE CORRADINO GROUP

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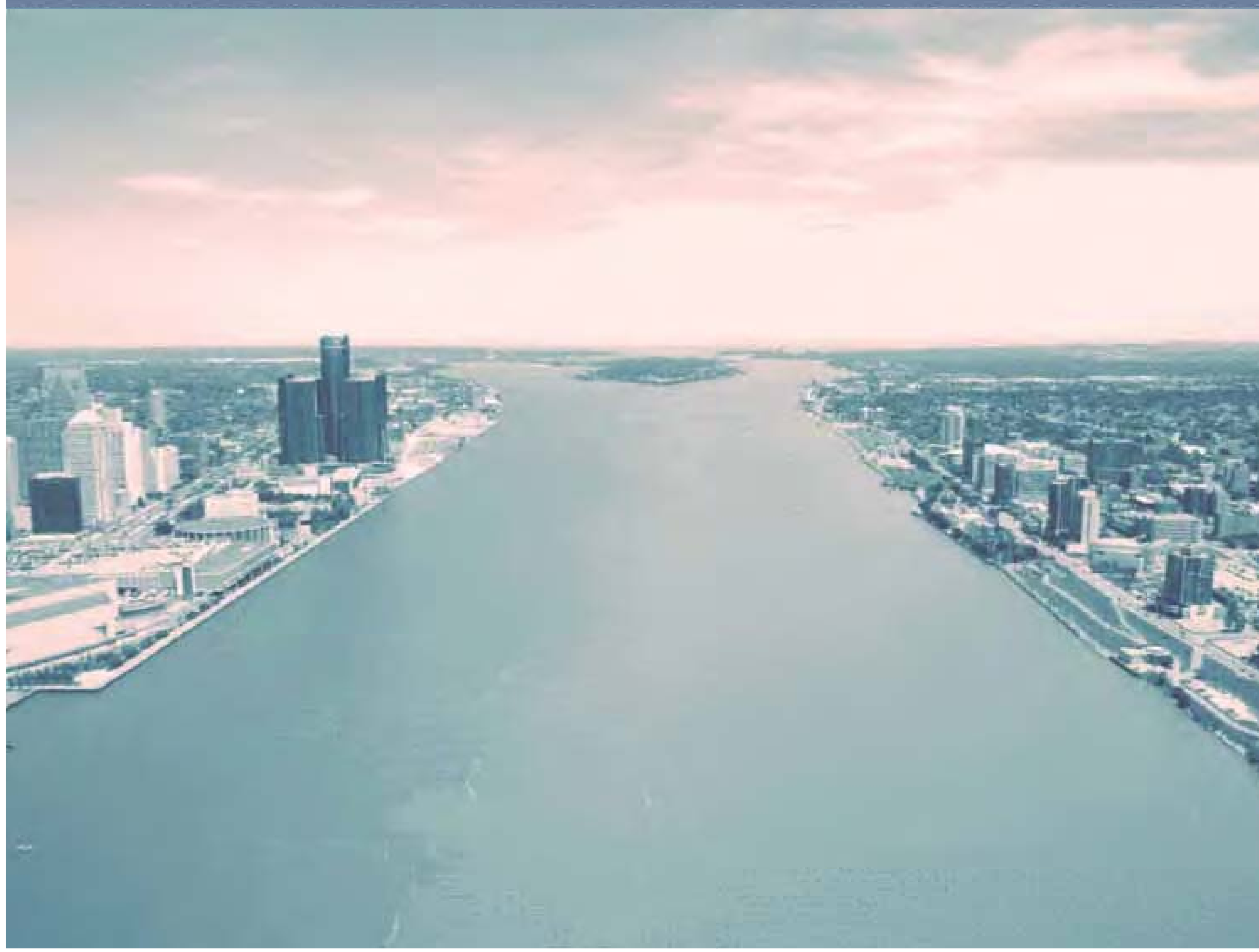


1. EXECUTIVE SUMMARY

1.0 EXECUTIVE SUMMARY

1.1 Project Introduction

The Detroit River International Crossing (DRIC) Study is a bi-national effort to complete the environmental study processes for the United States, Michigan, Canada, and Ontario governments. The purpose of the study is to identify solutions that support the region, state, provincial, and national economies while addressing civil and national defense and homeland security needs of this trade corridor between the United States and Canada. Transportation alternatives have been considered that will improve the border crossing facilities, operations, and connections to meet existing and future mobility needs, security needs, and border crossing redundancy.

The Border Transportation Partnership (the Partnership) was formed to comprehensively assess mobility needs in the Detroit River area. This collaborative effort includes members from the following agencies:

- Federal Highway Administration (FHWA)
- Michigan Department of Transportation (MDOT)
- Ontario Ministry of Transportation (MTO)
- Transport Canada (TC)

The Partnership completed the Planning/Needs and Feasibility Study in February 2004. Its findings serve as the foundation for the environmental study. The Partnership is also studying governance options to determine the structure for ownership, operations, and maintenance of a new facility.

1.1.1 Project Purpose and Need

The purpose of the Detroit River International Crossing Project is to (for the foreseeable future, i.e., at least 30 years):

- Provide safe, efficient, and secure movement of people and goods across the Canadian-U.S. border in the Detroit River area to support the economies of Michigan, Ontario, Canada, and the U.S.
- Support the mobility needs of national and civil defense to protect the homeland.

1.1.2 Project Goals

The goals of the Border Transportation Partnership for the DRIC Study are:

- Approve a location for a river crossing.
- Approve connections to freeways in the U.S. and Canada
- Approve locations for plazas in the U.S. and Canada
- Complete comprehensive engineering to support approvals, property acquisition, design and construction.
- Submit all of the above for approval by December 2008.

To address future mobility requirements (i.e., at least 30 years) across the Canada-U.S. border, there is a need to:

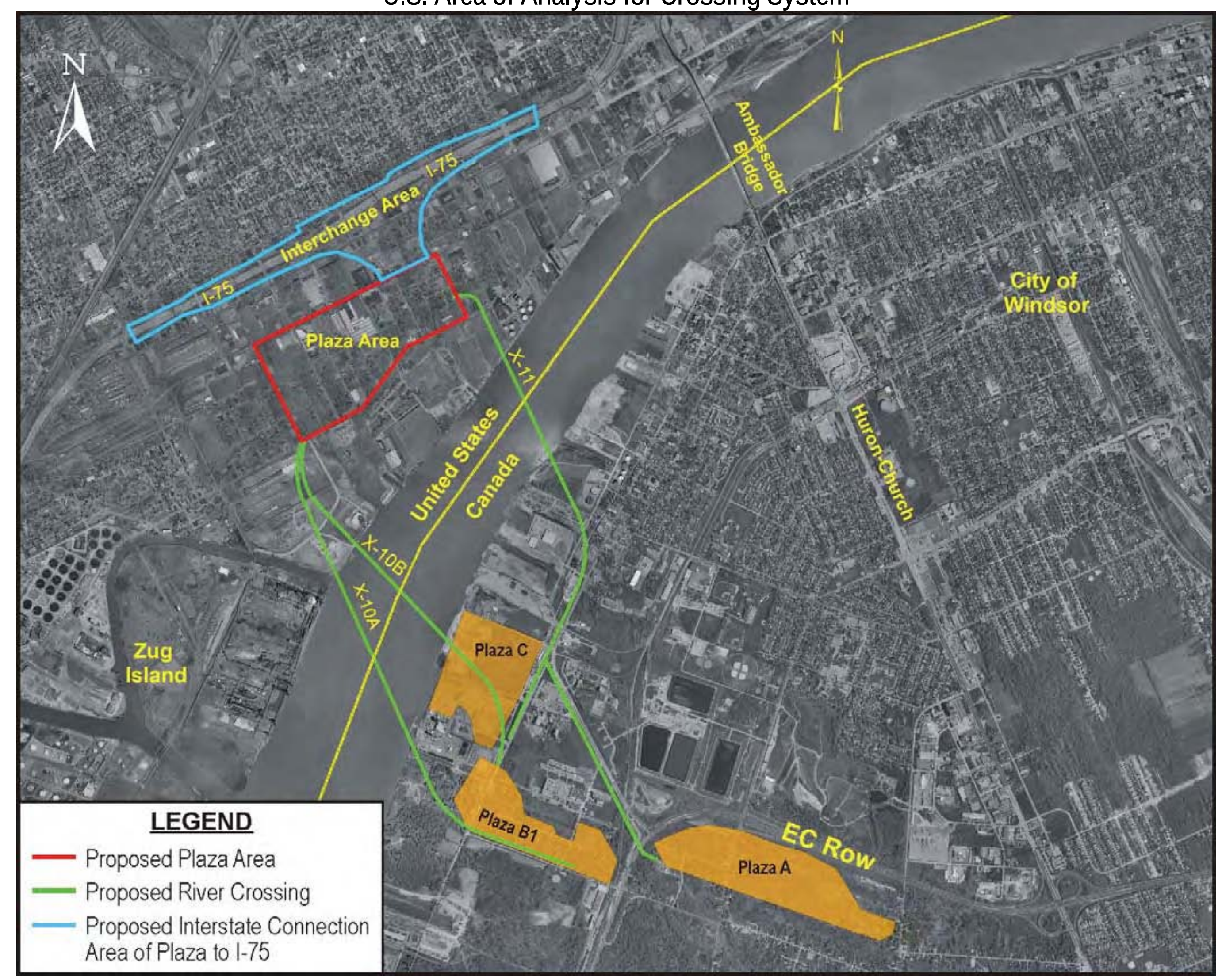
- Provide new border crossing capacity to meet increased long-term demand;
- Improve system connectivity to enhance the seamless flow of people and goods;
- Improve operations and processing capability; and
- Provide reasonable and secure crossing options in the event of incidents, maintenance, congestion, or other disruptions.

The border crossing facilities, roads, interchanges, and processes operate as a system. Solving capacity problems involves a comprehensive approach. This means that roadway deficiencies on the cross border structures cannot be effectively addressed apart from issues dealing with interchange and processing capabilities, and, conversely, processing and interchange capacity issues cannot be effectively addressed without dealing with impending capacity problems on the cross border structures.

1.1.3 Report Scope and Approach

The purpose of this report is to document the engineering details of the alternatives development and evaluation process conducted for this project. The report focuses primarily on the U.S. side of the border. Figure 1.1-1 shows the area of analysis for the project from the U.S. side to the Canadian side. The connections from the Canadian Plazas to Highway 401 are not shown.

Figure 1.1-1
Detroit River International Crossing Study
U.S. Area of Analysis for Crossing System



Source: The Corradino Group of Michigan, Inc.

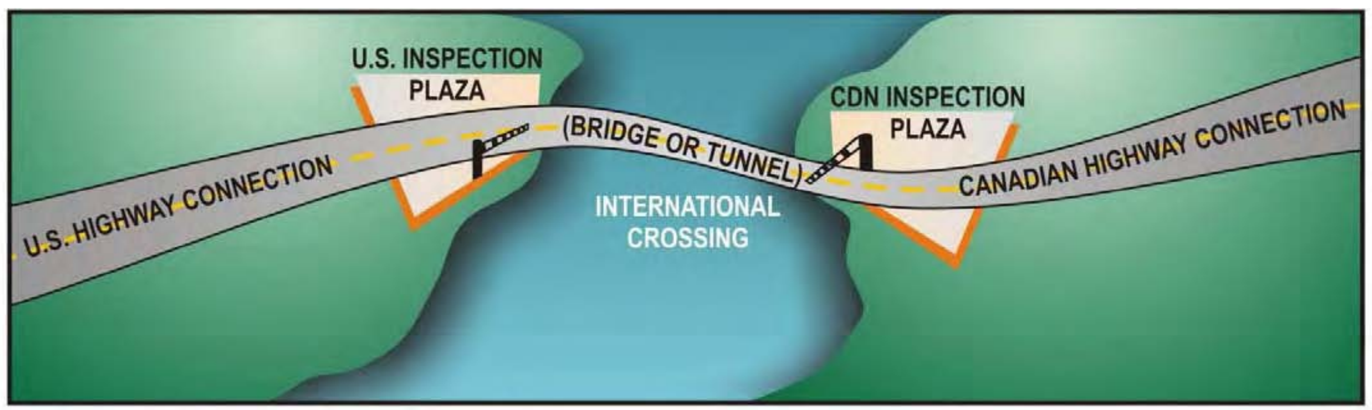
1.2 Practical Alternatives

The Practical Alternatives are summarized in this section. All alternatives that were developed and evaluated are described in **Section 3**. The Practical Alternatives are those that have the best opportunity to be implemented, i.e., the most practical.

1.2.1 General Alternative Description

Each end-to-end alternative has several components (**Figure 1.2-1**): highway route + plaza + border crossing + plaza + highway route going from the U.S. interstate highway system to Highway 401 in Canada.

Figure 1.2-1
Components of New or Expanded International Crossing



Source: The Corradino Group of Michigan, Inc.

1.2.2 Practical Alternatives

After the screening of alternatives, nine Practical Alternatives were retained for study in the DEIS. The nine Practical Alternatives were made up of a combination of six interchange options for connection to I-75 and the local roadway system, two toll and inspection Plazas, and two bridge crossing corridors. **Figures 1.2-2** to **1.2-10** show the conceptual engineering drawings of the nine Practical Alternatives. These figures are not intended to show detail but to summarize the alternatives. More detailed figures can be found in **Section 3** and design drawings can be found in **Appendix B**.

For the main Detroit River Bridge three alignments are under consideration (See **Figure 1.1-1**) X-10(A), X-10(B) and X-11 (C). For each of the crossing alignments a series of bridge types were developed and evaluated as documented in the Bridge Type Study Report. **Table 1.2-1** shows the bridge concepts that were selected for further development and evaluation after the Type Study. In the Type Study Crossing X-10(A) was determined to not be preferred from a bridge engineering perspective therefore advancing conceptual engineering of bridge options at X10(A) was postponed until preliminary results are obtained from the geotechnical investigation program and any other relevant project EIS studies. A final recommendation from the geotechnical investigation program is not expected until after this report is published.

Table 1.2-1
Bridge Options

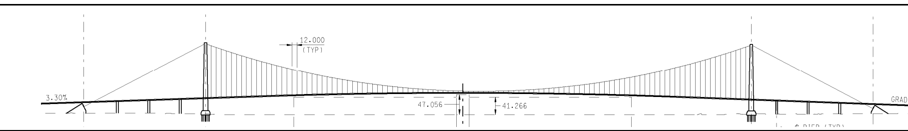
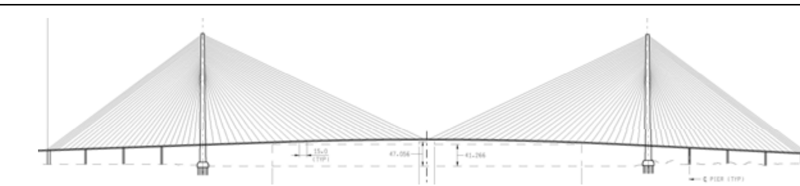
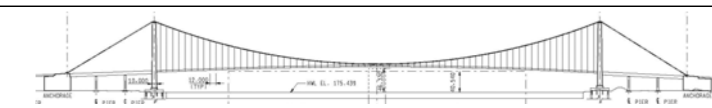
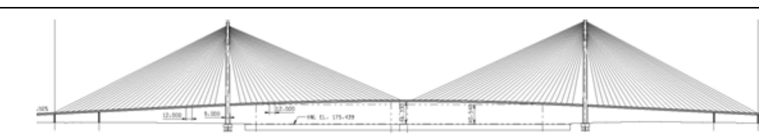
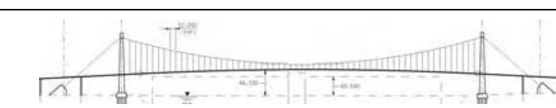
Conceptual Engineering Option Elevation	CD Option
X10(A)	
	Option 1
X10(B)	
	Option 4
	Option 7
X11(C)	
	Option 9
	Option 10

Figure 1.2-2 Practical Alternative #1

Figure 1.2-3 Practical Alternative #2

Figure 1.2-4 Practical Alternative #3

Figure 1.2-5 Practical Alternative #5

Figure 1.2-6 Practical Alternative #7

Figure 1.2-7 Practical Alternative #9

Figure 1.2-8 Practical Alternative #11

Figure 1.2-9 Practical Alternative #14

Figure 1.2-10 Practical Alternative #16

1.3 Cost Estimates

Table 1.3-1, on the following page, presents the cost estimate for the U.S. portion of each Practical Alternative. These estimates are in year-of-expenditure U.S. dollars. Additional cost detail is presented in Appendix D.

1.4 Schedule

The project schedule is as follows:

- December 2008 – Complete Environmental Process (Record of Decision)
- January 2009 – Begin property acquisition
- January 2009 – Begin final design of Preferred Alternative
- 2010 – Begin construction
- December 2013 – Complete construction and open to traffic.

1.5 Practical Alternative Evaluation

The purpose of this report is to identify any problems or major issues with the Practical Alternatives and finally identify any differentiating features that are relevant to the selection of a Preferred Alternative. In summary all of the Practical Alternatives are fully functional in that they meet the project design criteria, meet the project purpose and need, and project goals. Each alternative has similar features and magnitude of impacts.

All of the Practical Alternatives under consideration have good traffic Levels of Service on both the I-75 mainline and local intersections. The mainline operates at Level of Service (LOS) ranging from A to D, for the AM and PM Peak Hours. For the intersections all operate at LOS C and above.

From an engineering perspective there are very few differentiators among the Practical Alternatives. For the Detroit River Bridge there are no significant differentiators other than cost. A full discussion of the alternatives evaluation can be found in Section 6. A summary of the critical differentiators for the Interchanges and Plazas are as follows:

<u>Interchanges</u>

- Interchange I (Practical Alternative #16) provides the best local connectivity to and from I-75.
- Interchange G (Practical Alternative #14) provides the least amount of local connectivity to and from I-75 and closes the most cross roads.
- Interchange G (Practical Alternative #14) has a lower design speed than the other alternatives.
- Interchange C (Practical Alternatives #3 & #11) would cause acquisition of the least number of properties in the neighborhood abutting I-75 to the north.

<u>Toll and Inspection Plazas</u>

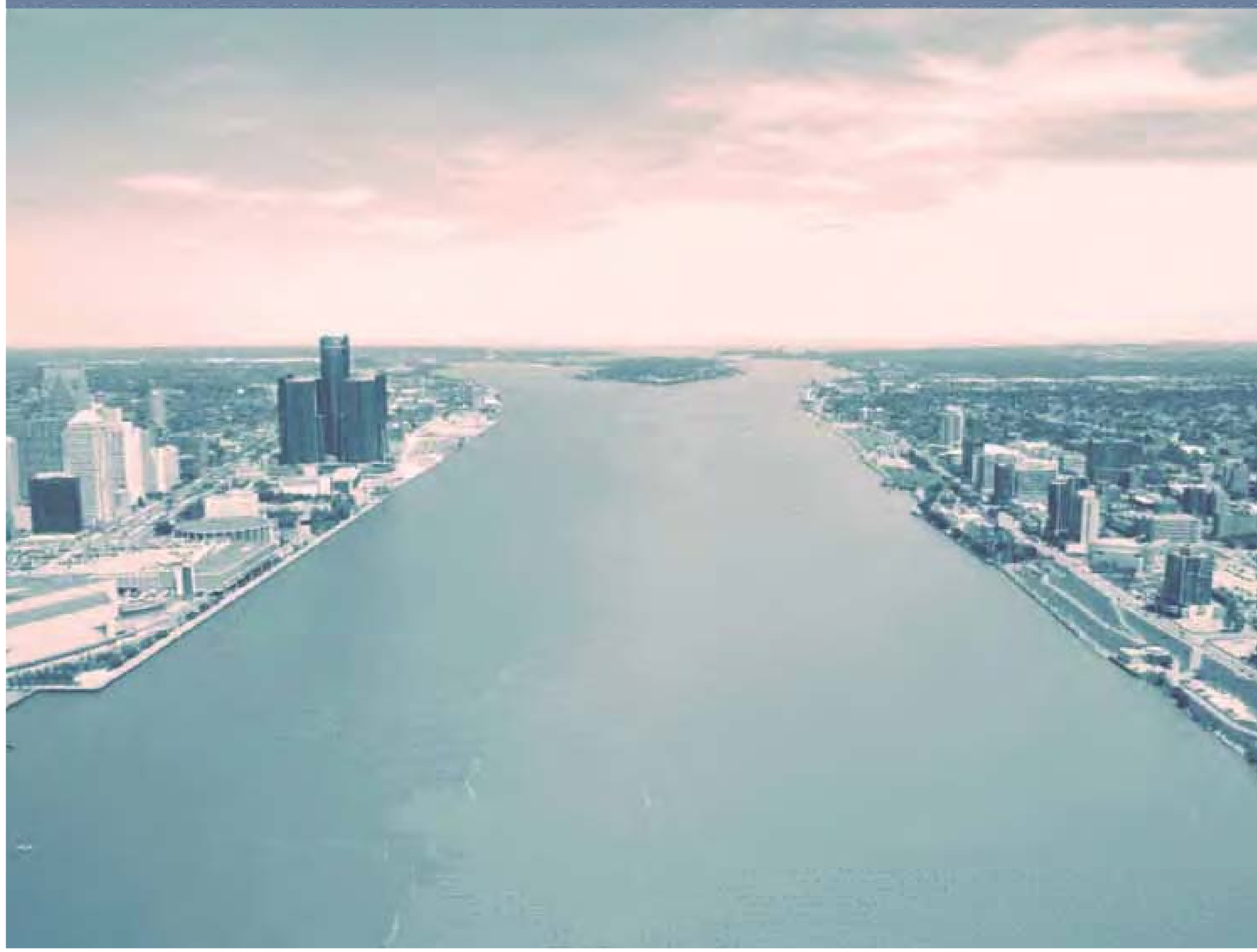
- Plaza P-a (Practical Alternatives #1, #2, #3, #5, #14, #16) provides the best circulation patterns and smallest footprint.

Table 1.3-1 Cost Estimates

Practical Alternative:	#1		#2		#3		#5		#7		#9		#11		#14		#16	
Bridge Option:	4	7	4	7	4	7	4	7	9	10	9	10	9	10	4	7	4	7
Cost Detail	(million)		(million)		(million)		(million)		(million)		(million)		(million)		(million)		(million)	
Construction Costs [1]																		
Detroit River Bridge (to come)	$ 282	$ 344	$ 282	$ 344	$ 282	$ 344	$ 282	$ 344	$ 243	$ 309	$ 243	$ 309	$ 243	$ 309	$ 282	$ 344	$ 282	$ 344
Toll and Inspection Plaza	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150	$ 190	$ 190	$ 190	$ 190	$ 190	$ 190	$ 150	$ 150	$ 150	$ 150
Connecting Roadways	$ 185	$ 185	$ 199	$ 199	$ 179	$ 179	$ 177	$ 177	$ 187	$ 187	$ 202	$ 202	$ 180	$ 180	$ 167	$ 167	$ 204	$ 204
Subtotal - Construction	*$ 616*	*$ 679*	*$ 631*	*$ 693*	*$ 611*	*$ 673*	*$ 609*	*$ 671*	*$ 621*	*$ 686*	*$ 635*	*$ 701*	*$ 613*	*$ 679*	*$ 599*	*$ 661*	*$ 636*	*$ 698*
Property Acquisition/Remediation	$ 179	$ 179	$ 174	$ 174	$ 183	$ 183	$ 194	$ 194	$ 172	$ 172	$ 167	$ 167	$ 176	$ 176	$ 171	$ 171	$ 183	$ 183
Utilities [2]	$ 174	$ 174	$ 173	$ 173	$ 153	$ 153	$ 169	$ 169	$ 166	$ 166	$ 166	$ 166	$ 168	$ 168	$ 145	$ 145	$ 183	$ 183
Management Contingency (5%)	$ 40	$ 43	$ 40	$ 43	$ 38	$ 41	$ 39	$ 42	$ 39	$ 43	$ 40	$ 43	$ 39	$ 42	$ 37	$ 40	$ 41	$ 44
Grand Total - Construction & Acquisition Costs	**$ 1,009**	**$ 1,074**	**$ 1,018**	**$ 1,083**	**$ 985**	**$ 1,050**	**$ 1,011**	**$ 1,076**	**$ 998**	**$ 1,067**	**$ 1,008**	**$ 1,077**	**$ 996**	**$ 1,066**	**$ 952**	**$ 1,018**	**$ 1,043**	**$ 1,108**
Soft Costs [3]																		
Final Design & Permits (7.5%)	$ 59	$ 64	$ 60	$ 65	$ 57	$ 62	$ 58	$ 63	$ 59	$ 64	$ 60	$ 65	$ 59	$ 64	$ 56	$ 60	$ 61	$ 66
Construction Engineering (7.5%)	$ 59	$ 64	$ 60	$ 65	$ 57	$ 62	$ 58	$ 63	$ 59	$ 64	$ 60	$ 65	$ 59	$ 64	$ 56	$ 60	$ 61	$ 66
Grand Total - Soft Costs	**$ 119**	**$ 128**	**$ 121**	**$ 130**	**$ 115**	**$ 124**	**$ 117**	**$ 126**	**$ 118**	**$ 128**	**$ 120**	**$ 130**	**$ 117**	**$ 127**	**$ 112**	**$ 121**	**$ 123**	**$ 132**
Grand Total Alternative Cost (rounded)	**$ 1,128**	**$ 1,202**	**$ 1,139**	**$ 1,213**	**$ 1,100**	**$ 1,174**	**$ 1,127**	**$ 1,202**	**$ 1,116**	**$ 1,195**	**$ 1,128**	**$ 1,207**	**$ 1,113**	**$ 1,193**	**$ 1,064**	**$ 1,138**	**$ 1,166**	**$ 1,241**
Inflation (rounded) - 20% [4]	**$ 226**	**$ 240**	**$ 228**	**$ 243**	**$ 220**	**$ 235**	**$ 225**	**$ 240**	**$ 223**	**$ 239**	**$ 226**	**$ 241**	**$ 223**	**$ 239**	**$ 213**	**$ 228**	**$ 233**	**$ 248**
Grand Total Cost (rounded)	**$ 1,353**	**$ 1,443**	**$ 1,366**	**$ 1,456**	**$ 1,320**	**$ 1,409**	**$ 1,353**	**$ 1,442**	**$ 1,339**	**$ 1,434**	**$ 1,353**	**$ 1,448**	**$ 1,336**	**$ 1,431**	**$ 1,277**	**$ 1,366**	**$ 1,399**	**$ 1,489**

General Notes:
Grand Total Cost in year of expenditure dollars.
Bridge Options: 4 & 9 - Cable-Stay, 7 & 10 - Suspension

Notes:
1 Construction Costs include design & construction contingencies, Maintenance of Traffic (MOT) and mobilization in 2006$.
2 Utility costs include both public and private relocation costs.
3 Final Design & Construction Engineering soft costs are 7.5% of Construction Subtotal and utilities each.
4 Inflation costs weighted using cash flow year of expenditure for a typical alternative.



2. INTRODUCTION AND PROJECT OVERVIEW

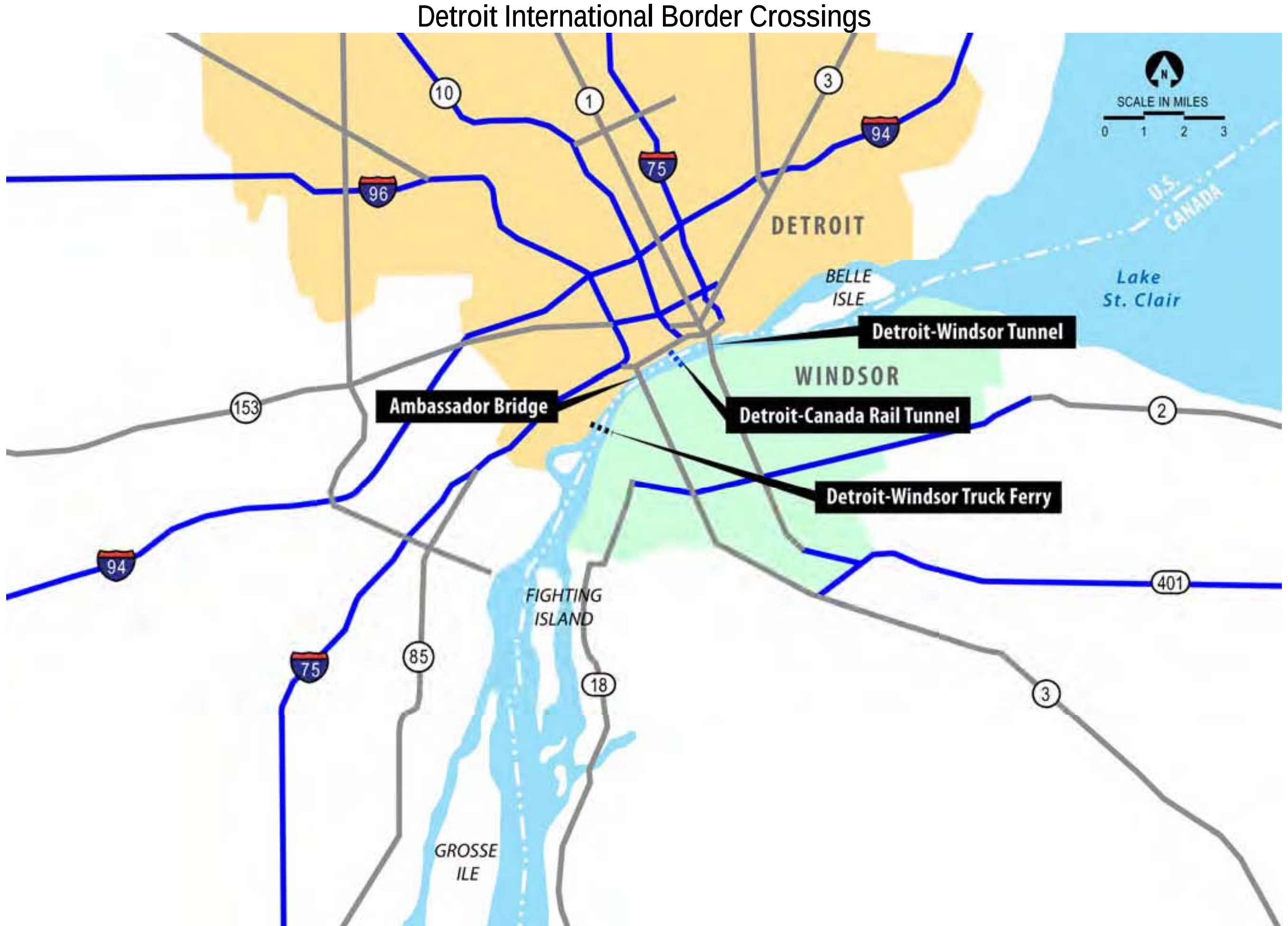
2.0 INTRODUCTION AND PROJECT OVERVIEW

2.1 Project Background

The Detroit River area represents the busiest corridor for trade between Canada and the United States. The benefits of such trade to the local, regional and national economies are represented in the prosperity, opportunities and high standards of living the citizens of each country enjoy. The prospect of continued and increased trade passing through this corridor must be supported as well as protected.

International border crossings in the Detroit River area occur via the Ambassador Bridge, the Detroit-Windsor Tunnel, the Detroit-Canada Rail Tunnel, and the Detroit-Windsor Truck Ferry that principally carries trucks hauling hazardous materials not allowed on the bridge or in the tunnel. (See Figure 2.1-1.) Almost one-fourth of all surface trade between the countries crosses the border at Detroit-Windsor, demonstrating the importance of this corridor to the economic well being (regional, national, and international) of the United States, Canada and their communities. Backups occur frequently at the existing bridge and tunnel crossings. These conditions will worsen over time as forecasts indicate cross-border passenger traffic will increase by approximately 40 percent by 2030, and truck traffic will grow by 120 percent.

Figure 2.1-1
Detroit International Border Crossings



The Detroit River International Crossing (DRIC) Study is a bi-national effort to complete the environmental study processes for the United States, Michigan, Canada, and Ontario governments. The purpose of the study is to identify solutions that support the region, state, provincial, and national economies while addressing civil and national defense and homeland security needs of this trade corridor between the United States and Canada. Transportation alternatives have been considered that will improve the border crossing facilities, operations, and connections to meet existing and future mobility needs, security needs, and border crossing redundancy.

The Border Transportation Partnership (the Partnership) was formed to comprehensively assess mobility needs in the Detroit River area. This collaborative effort includes members from the following agencies:

- Federal Highway Administration (FHWA)
- Michigan Department of Transportation (MDOT)
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The Partnership completed the Planning/Needs and Feasibility Study in February 2004. Its findings serve as the foundation for the environmental study. The Partnership is also studying governance options to determine the structure for ownership, operations, and maintenance of a new facility.

2.2 Project Purpose and Need

The purpose of the Detroit River International Crossing Project is to (for the foreseeable future, i.e., at least 30 years):

- Provide safe, efficient, and secure movement of people and goods across the Canadian-U.S. border in the Detroit River area to support the economies of Michigan, Ontario, Canada, and the U.S.
- Support the mobility needs of national and civil defense to protect the homeland.

The Detroit River area has characteristics that could cause trade to grow at a higher rate than the economies of Canada and the United States, because the area is a major center of manufacturing in North America, is the automotive capital of the world, and because the economies of the two nations are increasingly integrated. Canada and the United States, as the largest bilateral trade partners in the world, have the responsibility to maintain access to the bilateral trade opportunities, and to protect their respective homelands and their shared strategic vital resources. To that end, the goals of the Border Transportation Partnership for the DRIC Study are:

- Approve a location for a river crossing.
- Approve connections to freeways in the U.S. and Canada.
- Approve locations for plazas in the U.S. and Canada.
- Complete comprehensive engineering to support approvals, property acquisition, design and construction.
- Submit all of the above for approval by December 2008.

To address future mobility requirements (i.e., at least 30 years) across the Canada-U.S. border, there is a need to:

- Provide new border crossing capacity to meet increased long-term demand;
- Improve system connectivity to enhance the seamless flow of people and goods;
- Improve operations and processing capability; and
- Provide reasonable and secure crossing options in the event of incidents, maintenance, congestion, or other disruptions.

The border crossing facilities, roads, interchanges, and processes operate as a system. Solving capacity problems involves a comprehensive approach. This means that roadway deficiencies on the cross border structures cannot be effectively addressed apart from issues dealing with interchange and processing capabilities, and, conversely, processing and interchange capacity issues cannot be effectively addressed without dealing with impending capacity problems on the cross border structures.

2.3 Report Scope and Approach

The DRIC Study consists of all work related to the Route Planning and Environmental Impact Statement through the Record of Decision (ROD) for a new Detroit River International Crossing, including the following:

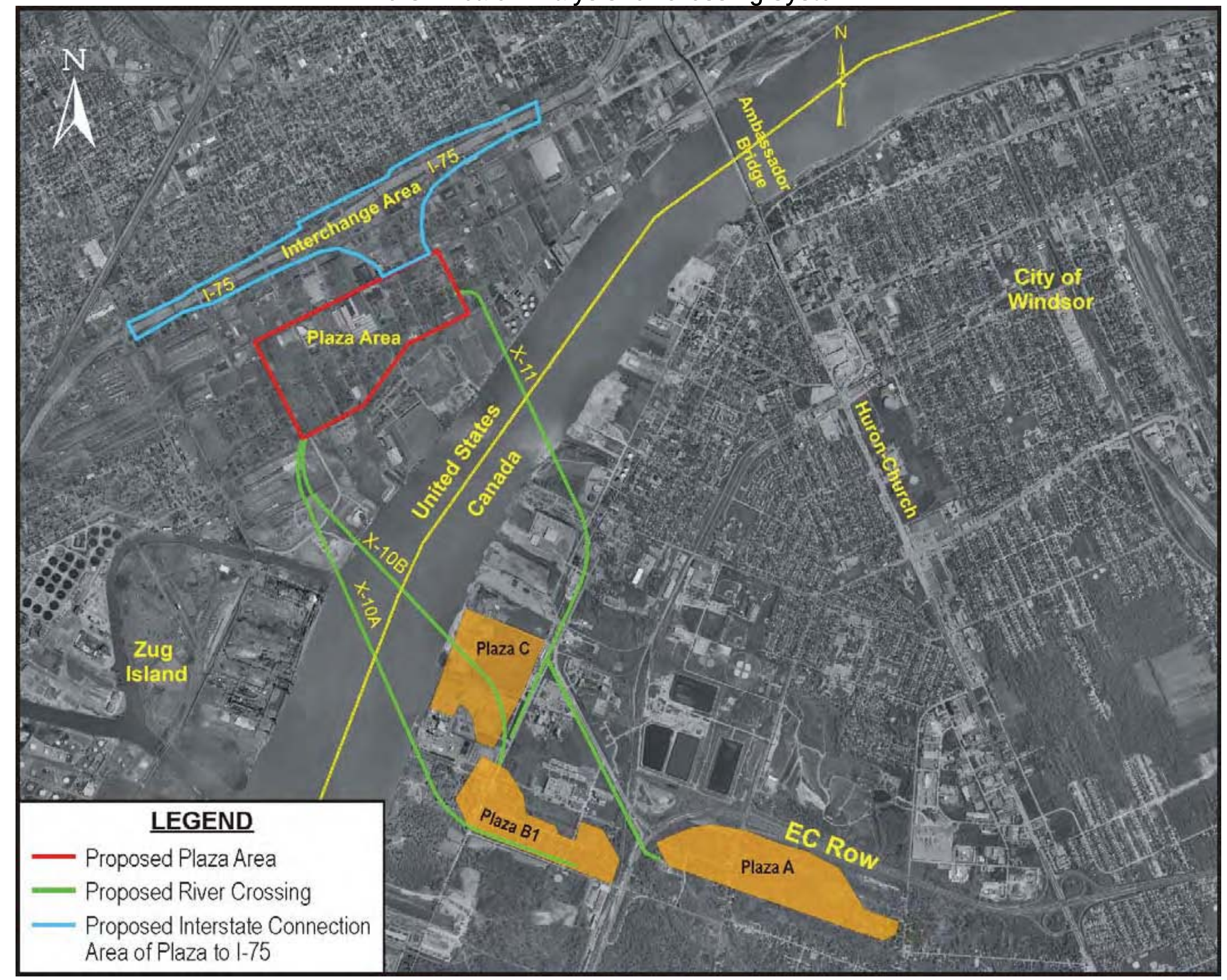
- Preparing needed documentation to receive approvals under the United States National Environmental Policy Act (NEPA) for a new crossing of the Detroit River along with roadway approaches and connections to the existing transportation system.
- Coordinating NEPA activities with the Canadian Environmental Assessment Act (CEAA) and the Ontario Environmental Assessment Act (OEAA).
- Working in conformance with current MDOT, FHWA, and AASHTO practices, guidelines, policies, and standards. For a bridge or tunnel, Canadian practices, guidelines, policies, and standards were reviewed. The more rigorous or restricting standard will generally prevail when standards differ between nations.

The purpose of this report is to document the engineering details of the alternatives development and evaluation process conducted for this project. The report focuses primarily on the U.S. side of the border.

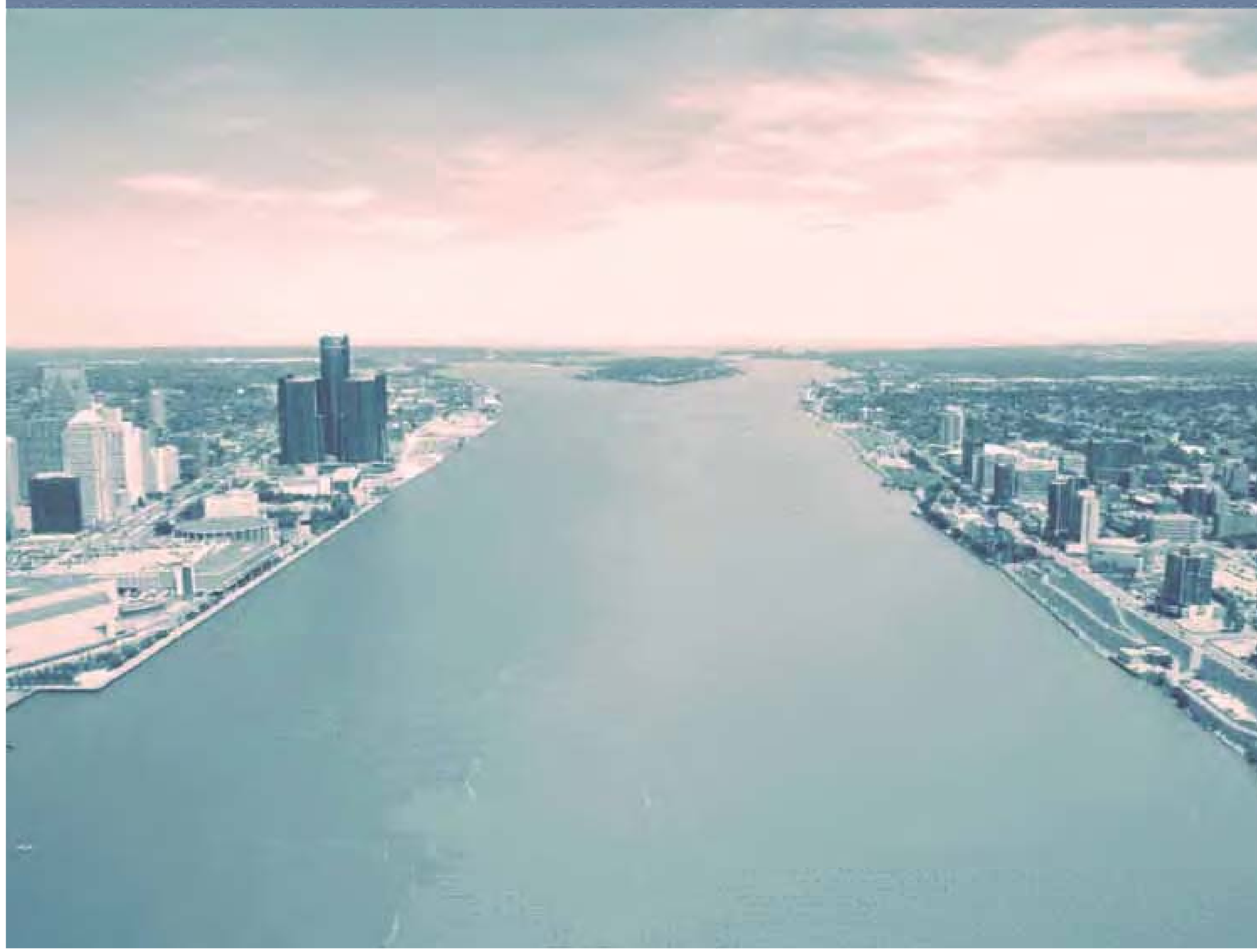
The study started within the geographic area of Wayne County, and the cities of Detroit, Ecorse, River Rouge, and Wyandotte, Michigan. The preliminary study limits extended from Belle Isle on the east, to the I-94 corridor on the north, to Grosse Isle on the west, and to the Canadian border in the Detroit River on the south. Within these geographical limits the Illustrative Alternatives were developed. After a comprehensive evaluation, the Illustrative Alternatives were screened down to an Area of Continued Analysis that is located between the Ambassador Bridge and Zug Island in the U.S. Within the Area of Continued Analysis Practical Alternatives were developed through a comprehensive engineering, environmental, and public consultation process. See Section 3.0 for a discussion of the alternative development and evaluation process.

The Practical Alternatives are comprised of three components on the US side: the crossing, plaza (where tolls are collected and Customs inspections take place), and interchange connecting the plaza to I-75 as shown in Figure 2.3-1. The same project components are also on the Canadian side, which is the subject of a report prepared by the DRIC Canadian Team.

Figure 2.3-1
Detroit River International Crossing Study
U.S. Area of Analysis for Crossing System



Source: The Corradino Group of Michigan, Inc.



3. ALTERNATIVES DEVELOPED AND EVALUATED

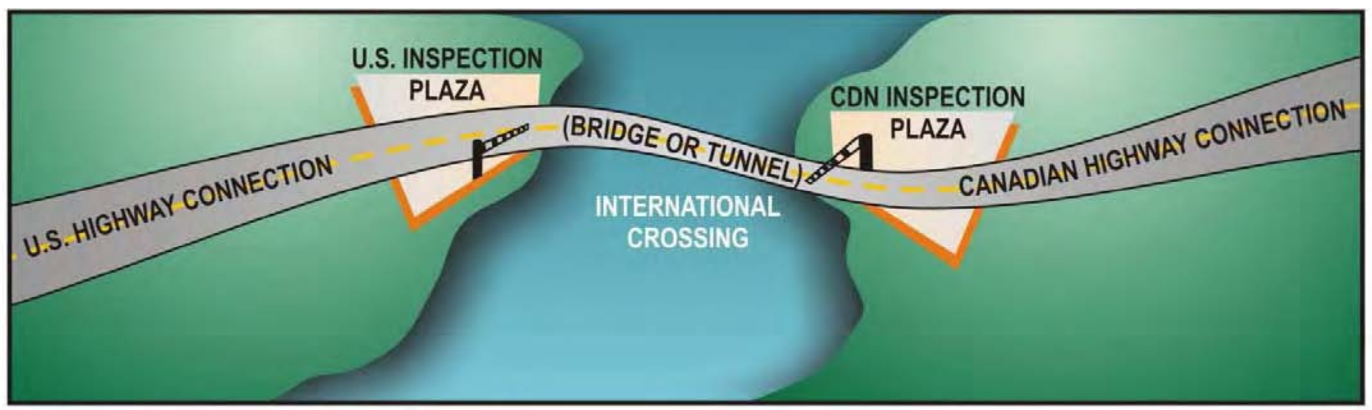
3.0 ALTERNATIVES DEVELOPED AND EVALUATED

A comprehensive alternative development and evaluation process was conducted for the DRIC project. This section describes what constitutes a project alternative, then the alternative development process from project inception to refinement of the Practical Alternatives, and, finally, the Build Alternatives that are evaluated in the Draft Environmental Impact Statement.

3.1 General Alternative Description

Each end-to-end alternative has several components (Figure 3.1-1): highway route + plaza + border crossing + plaza + highway route going from the U.S. interstate highway system to Highway 401 in Canada.

Figure 3.1-1
Components of New or Expanded International Crossing



Source: The Corradino Group of Michigan, Inc.

This report will address the three primary elements in the U.S.:

- Highway Connections to a Plaza
- Toll and Inspection Plaza
- Main River Bridge

3.1.1 Roadway Connections to the Plaza

Each alternative will have a connection to the local roadway network. The primary connection will be to the U.S. Interstate Highway system with full directional connectivity to the Plaza. Secondarily, each plaza will be connected to the local roadway system to allow for the movement of international traffic to the immediate vicinity of the Plaza when its destination is there.

3.1.2 U.S. Toll and Inspection Plaza

Each alternative will have a Toll and Inspection Plaza which consists of a Federal Inspection Station (FIS) where people and goods are inspected either entering or exiting the U.S. In addition, tolling facilities will be provided on the Canada-bound side of the Plaza. The FIS facilities house a variety of Federal inspection agencies. The primary inspection agency is US Customs and Border Protection (CBP), within the Department of Homeland Security. The facilities are the responsibility of the General Services Administration (GSA).

3.1.3 International Crossing

The last part of the U.S. portion of the end-to-end alternative is the international crossing of the Detroit River. At the outset of the DRIC Study, bridge or tunnel river crossings were under consideration. Any crossing would be a significant structure.

3.2 Alternatives Development Process

The Alternatives Development Process for this project was advanced through the following stages:

- Illustrative Alternatives
- Initial Practical Alternatives
- Refined Practical Alternatives

3.2.1 Illustrative Alternatives

In the Illustrative Alternative evaluation process, schematic alternatives were developed which included a connecting roadway to the interstate highway system, plaza, and international crossing. These alternatives were sized using the travel demand model traffic volumes, agency plaza requirements, and project area constraints.

Each Illustrative Alternative was evaluated against seven screening criteria which were weighted by both the general public and the consultant team. The seven criteria were:

- Maintain Air Quality
- Protect Community/Neighborhood Characteristics
- Maintain Consistency with Local Planning
- Protect Cultural Resources
- Protect the Natural Environment
- Improve Regional Mobility
- Assess How Project Can Be Built

Costs were used to weight effectiveness. Each alternative was given a thorough technical analysis, and the performance of each alternative was scored by each screening criterion by the consultant team. The weightings assigned to each criterion by the public and the consultant team were then applied and the alternatives ranked. The DRIC Canadian team followed a similar process. A consensus ranking of the end-to-end alternatives was then developed considering impacts on both sides of the border.

Through this comprehensive evaluation process, the alternatives were narrowed to the Area of Continued Analysis (see Figure 3.2-1 on the following page) between the Ambassador Bridge and Zug Island. [Corradino, Evaluation of Illustrative Alternatives on U.S. Side of Border, Vol. 1-3].

3.2.2 Initial Practical Alternatives

Once the Area of Continued Analysis was defined, the Illustrative Alternatives in that area were redefined through a comprehensive series of public workshops where the public first identified their vision for the area with and without a new crossing, then identified and refined opportunity areas for the Plaza. This process resulted in the definition of a Plaza Opportunity Area.

Within this area, 14 Build Alternatives were developed which consisted of an Interchange with I-75, a Plaza, and one of two crossings on either side of Fort Wayne. Following the initial definition and engineering of these alternatives, which included full horizontal and vertical geometry, a Value Planning session was held to evaluate the alternatives and determine if any additional alternative merited consideration. The Value Planning process is summarized in Section 5.

Figure 3.2-1
Area of Continued Analysis

3.2.3 Refined Practical Alternatives

The Value Planning team suggested adding two alternatives for further study. At the same time discussions were ongoing with Customs and Border Protection (CBP) regarding the Plaza concepts. The Plaza concepts were refined and provided to CBP for evaluation. The environmental impacts of the alternatives were evaluated. Based on the analysis of environmental impacts, agency evaluation, public input, and engineering considerations, several alternatives were eliminated from consideration.

During subsequent consultation with the public it became apparent that local connectivity to and from I-75 as well as across I-75 needed further refinement. After examining in more detail the connectivity issues, Interchange 1-Modified (now known as Alternative #16), a hybrid of several which had been examined by the VP team and discarded, was brought back into consideration.

The remaining nine alternatives are presented and evaluated in the Draft Environmental Impact Statement. From these alternatives a Preferred Alternative will be selected and refined.

The remainder of this section describes the alternatives developed and evaluated in each stage of the process.

3.3 Context Sensitive Solutions

According to FHWA, the Context Sensitive Solutions process is “A collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility.” Governor Jennifer M. Granholm directed MDOT to, “Incorporate context sensitive design (solutions) into transportation projects . . . .” In short, CSS is a blending of community values and sound engineering.

The DRIC CSS process is an ongoing effort which began with a community visioning effort, developed land use concepts, and then, with those elements as a basis, transitioned into the engineering and landscape elements of the project. The following community workshops (Table 3.3-1) were held as part of the CSS process:

Table 3.3-1
Context Sensitive Solutions Community Worskshops

Meeting #	Date	Workshop Subject
1	December 14, 2005	Vision Statement
2	December 21, 2005	First Step to Plaza Location
3	January 4, 2006	Final Vision Statement and Presentation of Preliminary Plaza Locations
4	January 18, 2006	Proposed Plaza Locations and Work Station “Q and A”
5	February 8, 2006	Proposed Plazas w/ Preliminary Tie to Bridge and I-75
6	February 27, 2006	Land Use Goals
7	March 8, 2006	Community Analysis
8	March 22, 2006	Community Planning
9	April 19, 2006	Context Sensitive Solution Terminology/Process
10	May 9 & 10, 2006	Social and Cultural Issues
11	May 23, 2006	Illustrative Land Use Plans
12	June 22, 2006	Bus Tour to View Toledo and Port Huron Bridges
13	August 24, 2006	Context Sensitive Solutions – Initial Ramp/Plaza/Bridge Concepts
14	November 2 & 15, 2006	Context Sensitive Solutions – Refined Ramp/Plaza/Bridge Concepts
15	April 26, 2007	Context Sensitive Solutions – Refined Local Access and Interchanges
16	August 8, 2007	Context Sensitive Solutions – Refined Bridge Concepts
17	December 12, 2007	Context Sensitive Solutions – Project Summary

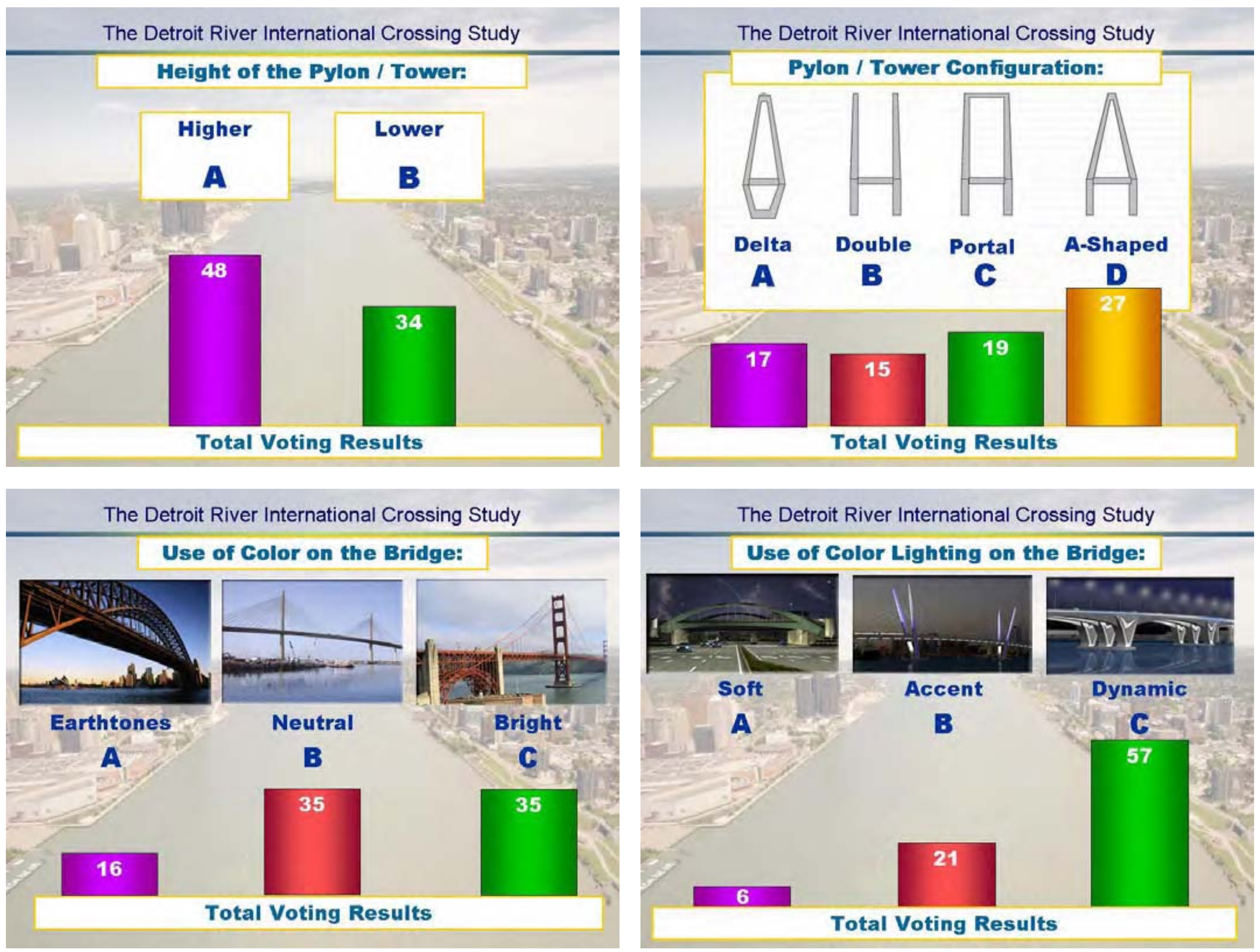
This report addresses the engineering and landscape elements of the project (Workshops 9, and 12 through 16). At each workshop, visual options were presented to the public and rated through a real-time interactive electronic feedback system. The participants pressed a button on a keypad and their choice registered on the presentation slides. This section of the report will generally discuss the options presented and then show those that were preferred by the community.

3.3.1 CSS Workshops

Workshop #9 – April 19, 2006
This workshop generally introduced the CSS process to the public. The project team made a presentation of the general application of the CSS process and its application to the DRIC project, examples from other projects, the elements of the project to which CSS would be applied, and potential themes or visions. The project team also made a presentation of bridge terminology in order to inform the community and presented where aesthetic opportunities existed for the DRIC crossing system.

At the end of the presentation, the public's preferences for use of color, lighting, tower height, and configuration were polled (Figure 3.3-1). The results are as follows:

Figure 3.3-1
Community Aesthetic Preferences



Source: Parsons Transportation Group of Michigan, Incorporated

Workshop #12 – June 22, 2006
This workshop consisted of a bus tour of interested community members to the Maumee River Bridge construction site in Toledo, Ohio and the Blue Water Bridge International Crossing in Port Huron, Michigan (Figure 3.3-2). The Maumee River Bridge project team made a presentation regarding the project and accompanied the participants to the project site and through the adjacent neighborhoods.

Figure 3.3-2
Community Workshop Bus Tour

At the Blue Water Bridge, the participants were able to experience how an existing international crossing could be integrated into a community and see what the surrounding community could look like.

Workshop #13 - August 24, 2006
The goal of this workshop was to work toward consensus on the vision for the aesthetic treatment of the crossing system, including the bridge, plaza, interchange, and local access (Figures 3.3-3 and 3.3-4). A presentation was made

by the project team that explained the work done to date, the CSS process, and then presented a series of potential vision expressions for the main river bridge. The community expressed their preferences using the interactive system, which were the following:

Bridge

- Friendship and History visions for the bridge component were most preferred for each crossing. Gateway was third for Crossing X-11.

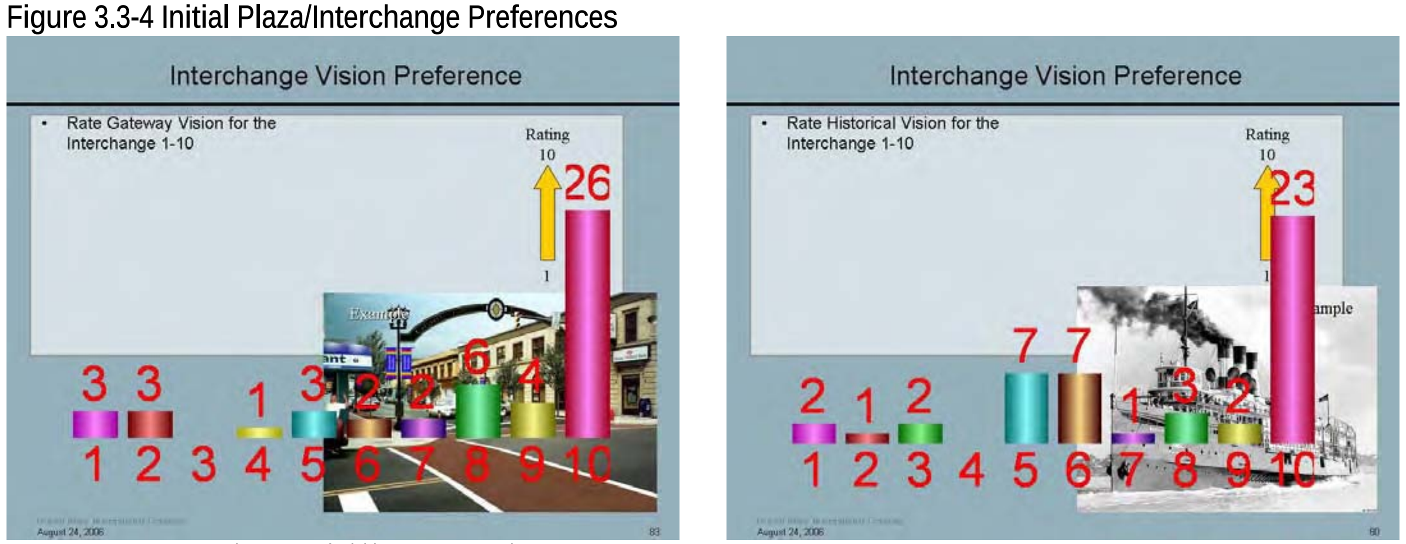
Figure 3.3-3 Initial Bridge Preferences

Source: Parsons Transportation Group of Michigan, Incorporated

Plaza and Interchange

- The top two preferences were the Gateway and History visions with Culture third.

Figure 3.3-4 Initial Plaza/Interchange Preferences



Source: Parsons Transportation Group of Michigan, Incorporated

U.S. Local Access/Community Buffer

- The top two preferences were Historical and Cultural.

Workshop # 14 – November 2 & 15, 2006

The November 2nd and 15th workshops were held in the U.S. and Canada, respectively. This workshop focused on refining the vision preferences for the bridge, plaza and interchange, and U.S. Local Access and Community Buffer selected in the previous workshop (Figures 3.3-5 through 3.3-8). This was accomplished through a real-time interactive computer simulation model where participants could walk through the project element, like the bridge, and select individual preferences for each element such as lighting, railings, light fixtures, sidewalk patterns, etc.

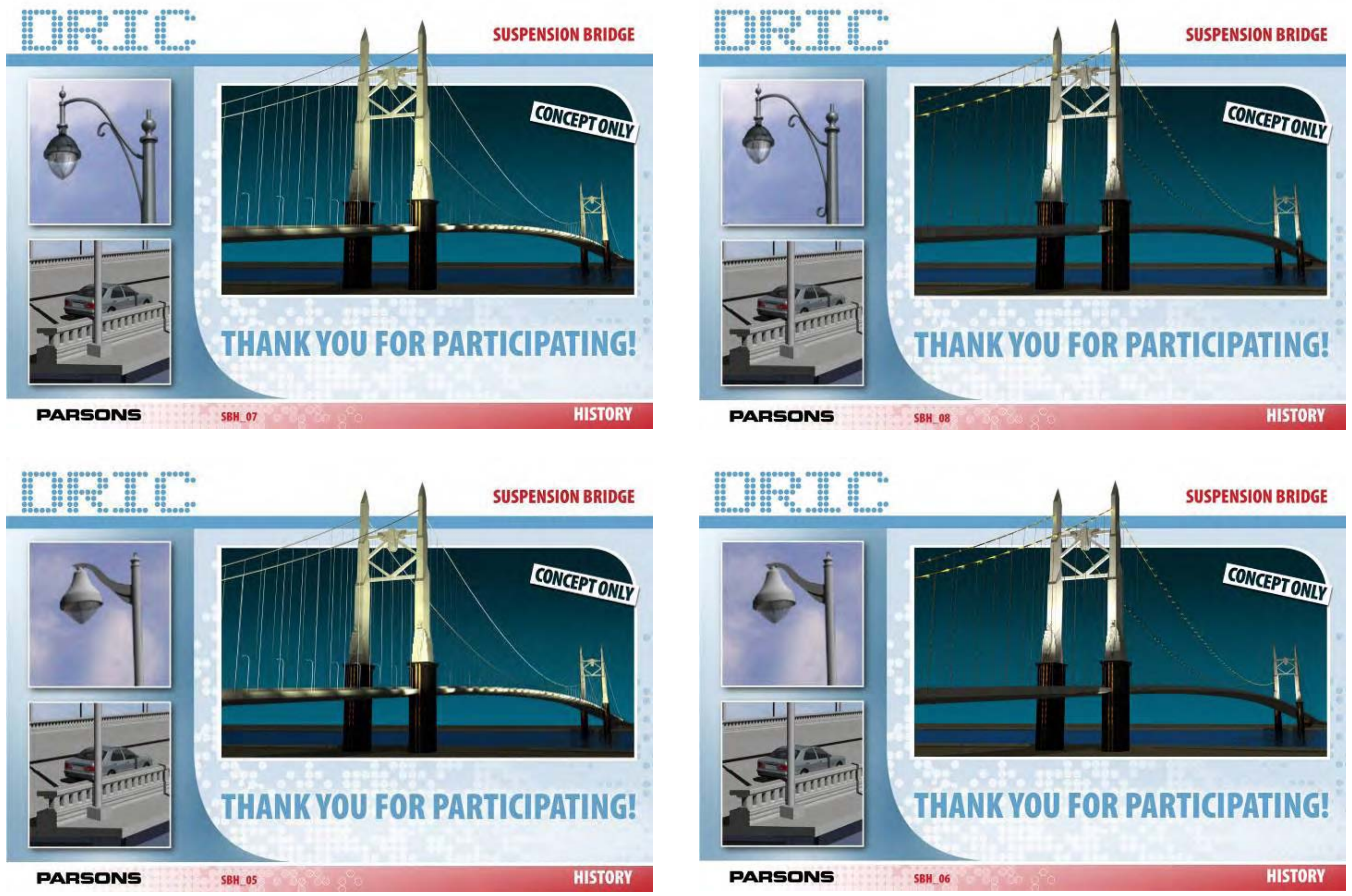
Figure 3.3-5
Refined Local Access/Community Buffer Vision Preferences - Historical

Source: Parsons Transportation Group of Michigan, Incorporated

Figure 3.3-6
Refined Interchange Vision Preferences – Historical

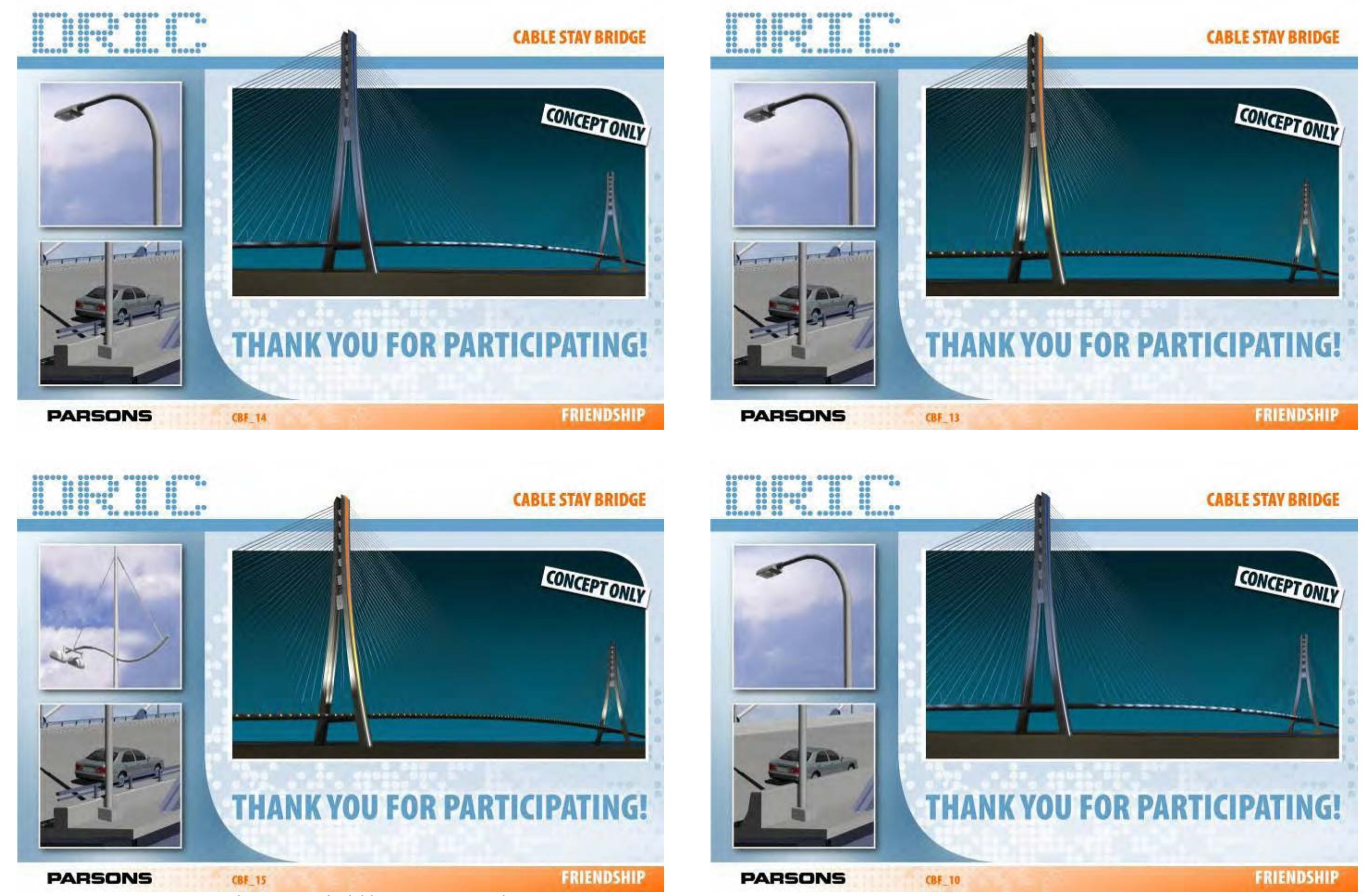
Source: Parsons Transportation Group of Michigan, Incorporated

Figure 3.3-7
Refined Suspension Bridge Vision Preferences – Historical



Source: Parsons Transportation Group of Michigan, Incorporated

Figure 3.3-8
Refined Cable-Stay Bridge Vision Preferences - Friendship

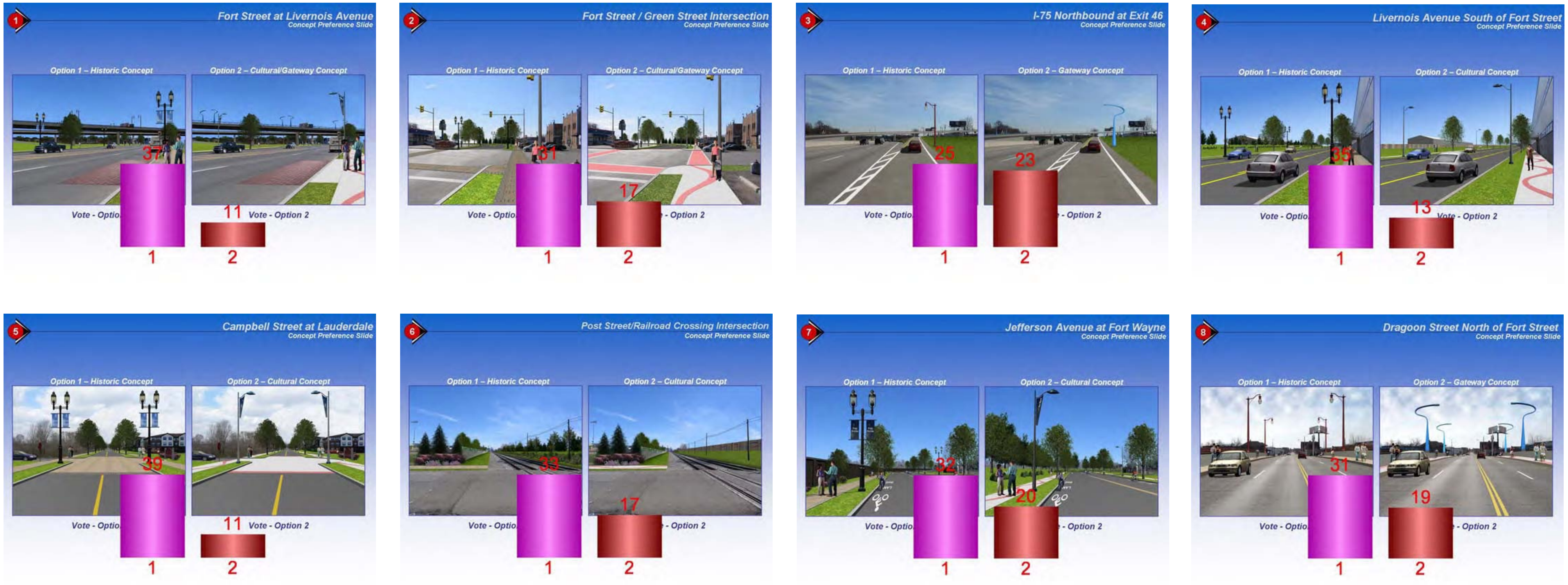


Source: Parsons Transportation Group of Michigan, Incorporated

Workshop # 15 - April 26, 2007

This workshop continued the refinement process from Workshop #14. At this workshop location specific treatment options were presented for eight local street system locations in the project area. Workshop participants were asked to indicate a preference between the vision expressions using the interactive system. The preferences are shown in **Figures** 3.3-9. This workshop confirmed that, for all treatments, the Historic Concept expression was preferred.

Figure 3.3-9 Refined Local Access at Interchange Preferences



Source: Parsons Transportation Group of Michigan, Incorporated

Workshop #16 – August 8, 2007

The goal of this workshop was to move toward consensus on the aesthetic vision of the Detroit River Bridge to reflect the community and context. The bridge workshop consisted of an open house session with physical renderings of bridge elements followed by a formal presentation. At the end of the presentation the audience was invited to participate in expressing their preferences using the interactive devices. The workshop focused on the Suspension and Cable-Stayed Bridge types. Each bridge type was simulated to scale at each crossing location. The visual simulation of individual elements did not differentiate between bridge corridors. The results of this workshop are shown in Figures 3.3-10 through 3.3-16.

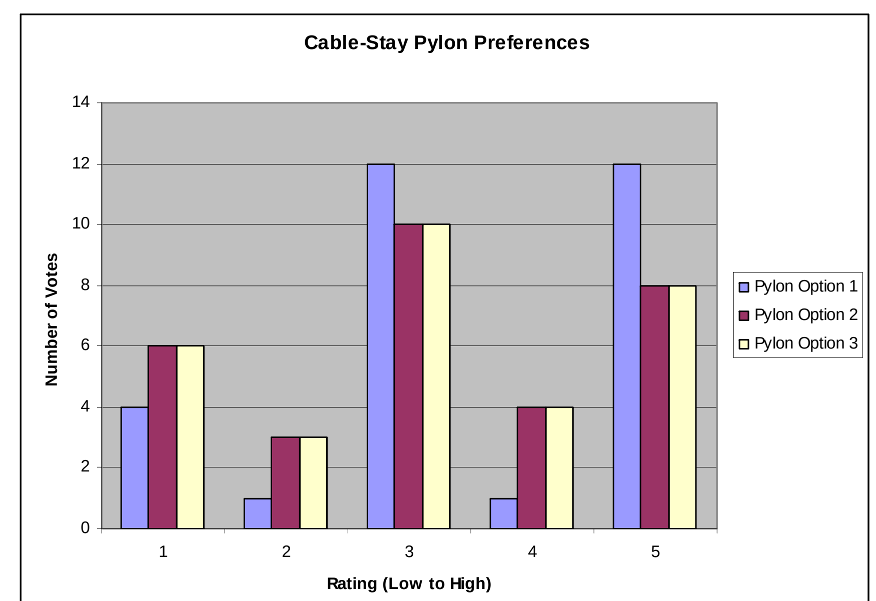
Cable-Stay Bridge

For the Cable-Stay Bridge three different pylon options were presented (Figure 3.3-10): slightly curved inverted Y; inverted Y; and A. Participants showed a moderate preference for Option 1 with identical preferences for Option 2 and 3 (Figure 3.3-11).

Figure 3.3-10 Cable-Stay Bridge Options

Option 1 Option 2 Option 3

Figure 3.3-11 Cable-Stay Community Preferences

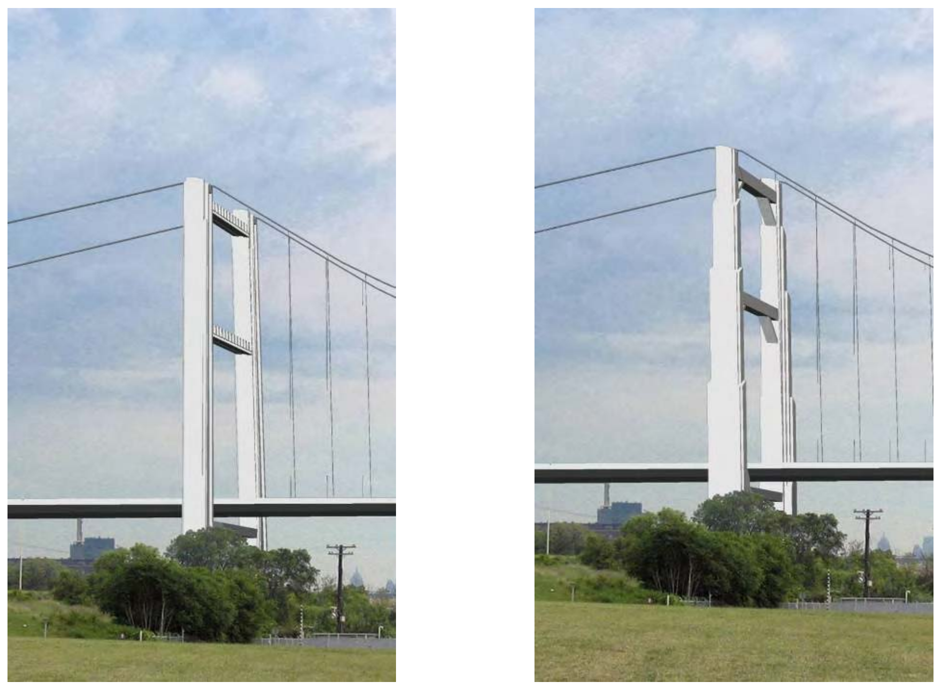


Source: Parsons Transportation Group of Michigan, Incorporated

Suspension Bridge

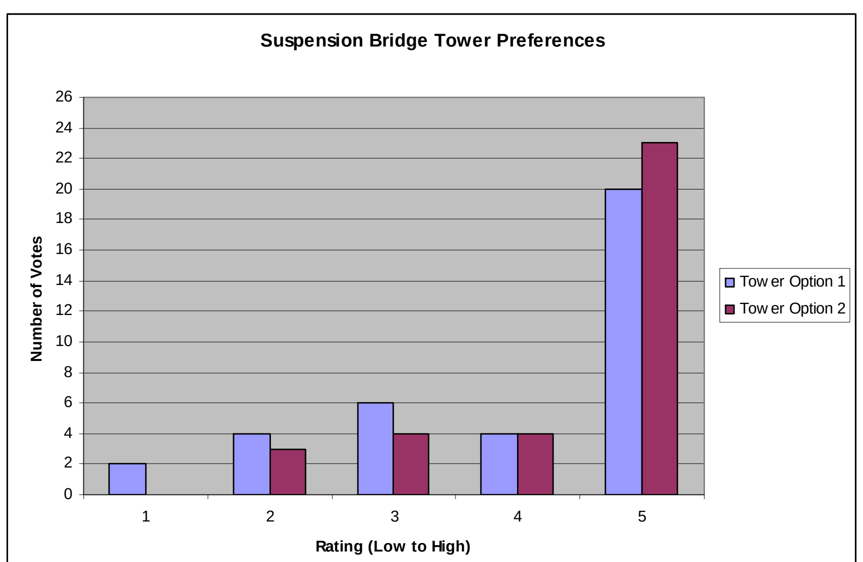
For the Suspension Bridge two different tower options and two different anchorage options were presented (**Figure 3.3-12**). For the tower options a less ornate type and an Empire Style. Participants showed a slight preference for Option 1 with no strong dislike shown for either (**Figure 3.3-13**).

Figure 3.3-12 Suspension Bridge Options



Option 1 Option 2

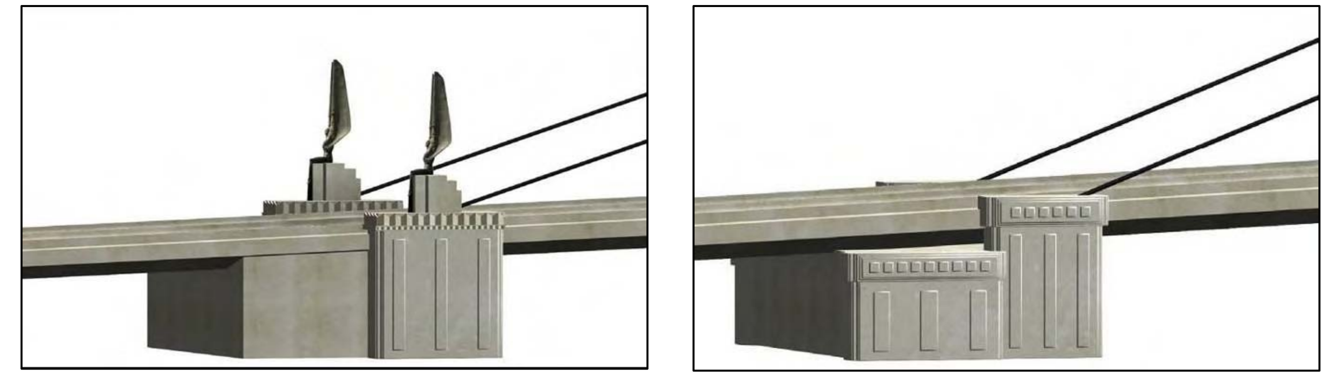
Figure 3.3-13 Suspension Bridge Community Preferences



Source: Parsons Transportation Group of Michigan, Incorporated

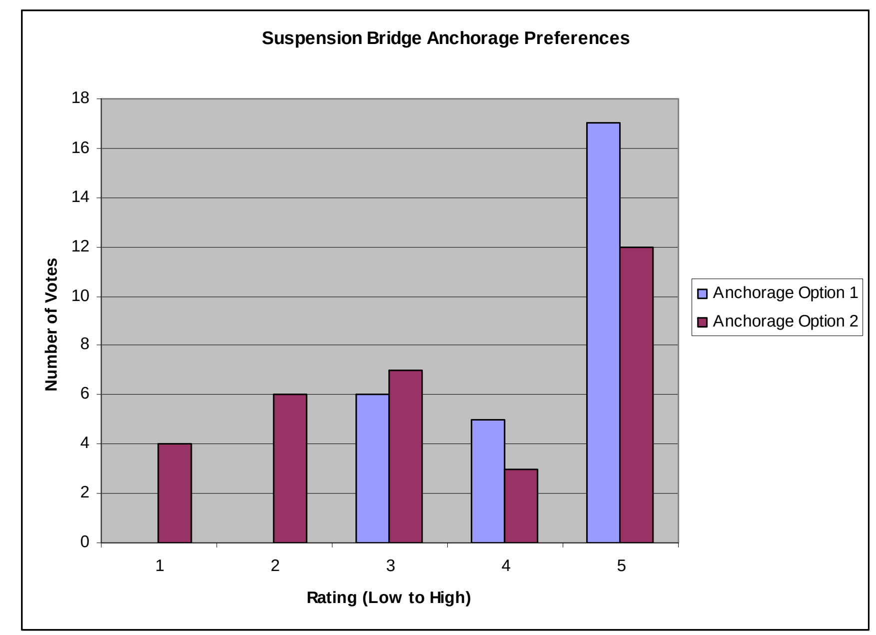
For the anchorages, two options were also reviewed – an Empire Style and a more ornate style with an opportunity for sculptural elements (**Figure 3.3-14**). A stronger preference was shown for Option 1, the sculptural style (**Figure 3.3-15**).

Figure 3.3-14 Suspension Bridge Anchorage Options



Option 1 Option 2

Figure 3.3-15 Suspension Bridge Anchorage Preferences

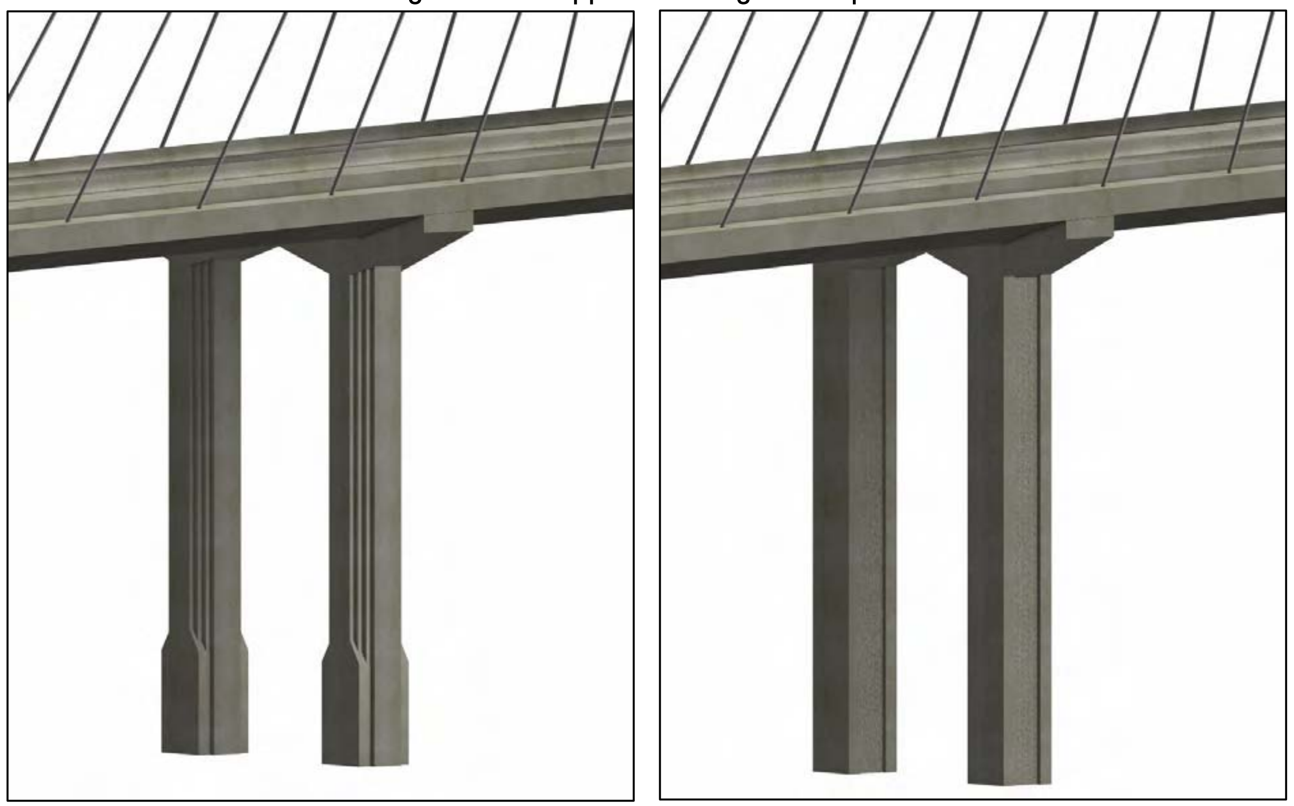


Source: Parsons Transportation Group of Michigan, Incorporated

Approach Bridge Piers

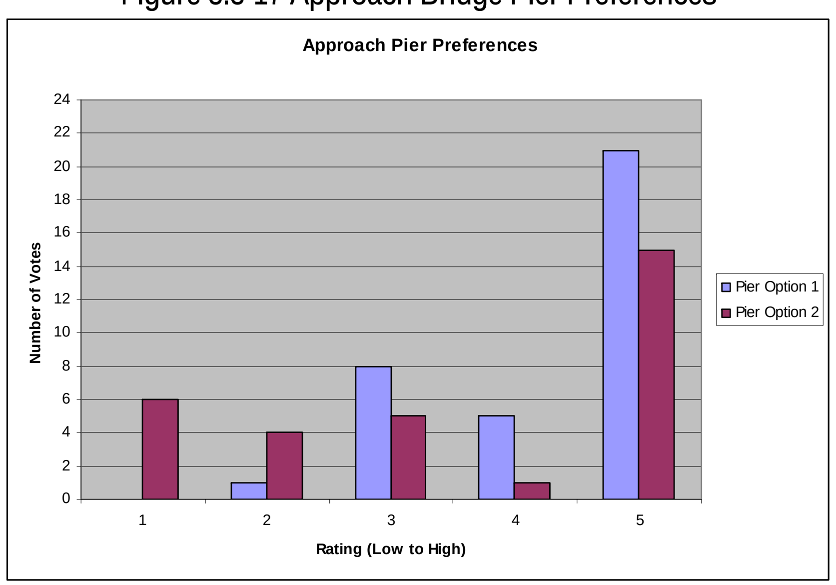
Approach Bridge piers were first shown in earlier workshops often connected with the discussion of interchange ramps. In this workshop, two approach bridge pier options were presented (Figure 3.3-16). Again, a more-sculpted option was shown as well as a more subdued option. A stronger preference was shown for Option 1, the sculpted option (Figure 3.3-17).

Figure 3.3-16 Approach Bridge Pier Options



Option 1 Option 2

Figure 3.3-17 Approach Bridge Pier Preferences



Source: Parsons Transportation Group of Michigan, Incorporated

3.3.2 Summary

For the local access, interchanges, and area surrounding the Plaza, the community clearly preferred visual expressions that represented the history of the surrounding area. This is consistent with the culture of the community. For the bridges, the historical vision expression also applied to classical bridge form - the Suspension Bridge. For the more modern Cable-Stay Bridge, the more contemporary vision expressions of Friendship and Gateway were preferred. For the main river bridge, Appendix A – Design Criteria contains aesthetic guidelines which can be used during the final design process.

3.4 Project Design Criteria

During the Detroit River International Crossing Study, all of the alternatives were developed and evaluated to conform to current MDOT, FHWA, and AASHTO guidelines, policies, and standards. The recommended highway design criteria reflect the urban areas within which alternatives were developed and the heavy truck traffic that is expected to use the facilities.

<u>River Bridge</u>

The recommended bridge geometric design criteria reflect the assumption that the bridge will function as a connection between the U.S. and Canadian Plazas, both of which are secure facilities, with traffic entrances and exits to functional areas very close to the ends of the bridge. Traffic entering and exiting the plazas needs to be traveling at low speeds to protect the safety of bridge traffic operators and government inspectors working on the plazas. Other traffic crossings in Michigan have posted speed limits of 50 km/h (30 MPH). The recommended design speed of 60 km/h enables use of somewhat increased profile grades, and shorter vertical curves than the approach highways, which will substantially reduce the length of bridge approaches needed to cross the shipping channels on the Detroit River.

<u>Interchange</u>

Plaza Ramps
The geometric design guides listed below were used to prepare geometrics for traffic analysis.

Urban 2 Lane Entrance Ramps: MDOT geometric design guide G-210 (Case I freeway lanes increase by one after the gore). Where the number of lanes after the gore equals the number of lanes before the gore (4 lane freeway), the conceptual alignments were drawn with an additional 185m tangent (+90 m taper) for a double lane drop.

Urban 2 Lane Exit Ramps: MDOT geometric design guide G-240 (Case II with the same number of freeway lanes before and after the gore). This item was tabulated per linear meter of ramp (excluding bridges) and applies to the ramps connecting the plaza to the I-75 freeway. This includes construction of new ramps as indicated on the plans.

Local Access Ramps
The ramps are the urban one lane style with a 1.2- meter left shoulder, a single 4.8-meter lane, and a 2.4-meter right shoulder. The geometric design guides listed below were used to prepare geometrics for subsequent traffic analysis.

Urban 1 Lane Entrance Ramps: MDOT geometric design guide G-201 Case I. This item applies to the ramps connecting the service drives to the I-75 freeway.

Urban 1 Lane Exit Ramps: MDOT geometric design guide G-205. This item applies to the ramps connecting the service drives to the I-75 freeway.

Service Drives
The existing service drives will need to be reconfigured to allow for the new ramps. Where possible, the existing service drive was matched to avoid additional ROW acquisition. The service drives are generally ten meters wide to allow for two traffic lanes and on street parking.

Local Roads
To provide continued traffic flow, some local roads will need to be altered. Some roads will be terminated and a cul-de-sac will be placed at the end. Newly constructed local roads will have 3.6-meter lanes.

Bridges
I-75 in this area is on MDOT's list of Special Routes, therefore, bridges are based upon an under clearance of 4.5 meters (14'-9") which is roughly the existing under clearance over I-75. It should be noted that providing a greater under clearance would significantly raise the vertical alignment of bridges and consequently the service drives as well. This would likely lead to moving the service drives further away from I-75 than the existing location which would require large amounts of property acquisition to provide the necessary road right-of-way.

<u>Plaza Design Criteria</u>

Plaza space programming and facilities are provided in accordance with the U.S. Land Port of Entry Design Guide Supplement dated 15 March 2006 (Design Guide), U.S. Land Port of Entry Design Guide Security and Information Technology Supplemental Guide dated 31 August 2007, and the Program of Requirements dated June 2007 from the General Services Administration (GSA).

A complete listing of the design criteria used for this project is provided in Appendix A – Design Criteria.

3.5 Initial Practical Alternatives Development

Through a series of workshops held from December 2005 to March 2006, the "zone" within which the plazas would be located was determined in concert with the public. Once the plaza zone was defined, plaza concepts were developed to fit within it. Then interchange concepts were established to connect each plaza to I-75. This initially resulted in fourteen alternatives (Table 3.5-1, plus Figures 3.5-1 through 3.5-14). These figures are not intended to show detail but are the exact figures submitted to the Value Planning team. Impacts were then measured and the resultant data displayed for public review in March 2006. Subsequently, the plazas and interchanges were refined and, along with their impacts, presented to the public in December 2006.

Following the December 2006 public meetings, the interchanges were subject to a detailed "peer group" review called Value Planning, conducted from January 29 to February 2, 2007. A summary of the Value Planning results is provided in Section 5. Additionally, GSA and CBP reviewed the plaza concepts. By combining the impact assessment information, the results of the Value Planning and the input from GSA/CBP, the basis to screen the plazas and interchanges of the initial Practical Alternatives was formed. The evaluation was intended to retain only those with the best opportunity to be implemented, i.e., the <u>most practical</u>, with the others eliminated from further detailed analysis.

Table 3.5-1
Labeling Nomenclature

Practical Alternative #	Interchange	Plaza	Crossing
1	1	4	X-10
2	2	4	
3	3	4	
4	4	4	
5	6	4	
6	1	5	X-11
7	1	6	
8	2	5	
9	2	6	
10	3	5	
11	3	6	
12	4	5	
13	5	2	
14	1/2	4	X-10

Note: Alternative 14 was later renumbered to Alternative #16

Figure 3.5-1 Alternative #1

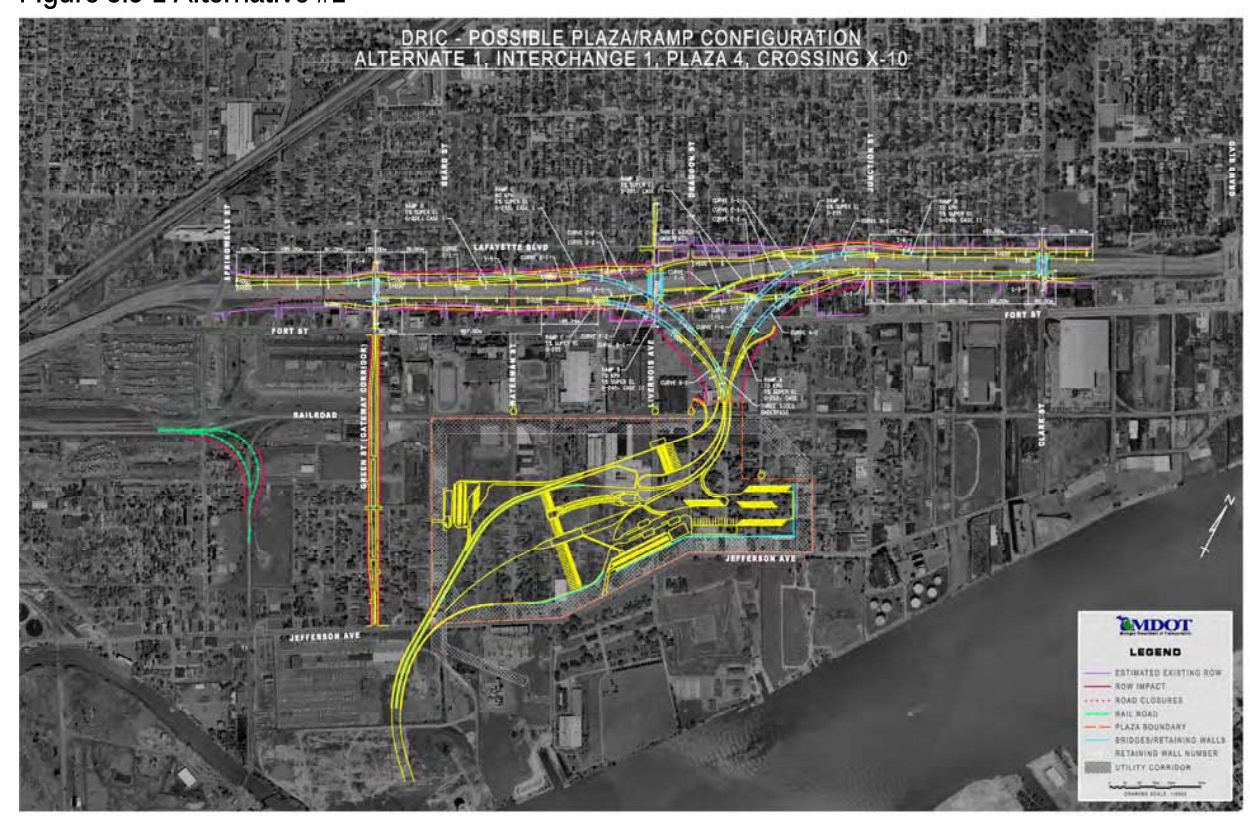


Figure 3.5-2 Alternative #2

Figure 3.5-3 Alternative #3

Figure 3.5-4 Alternative #4

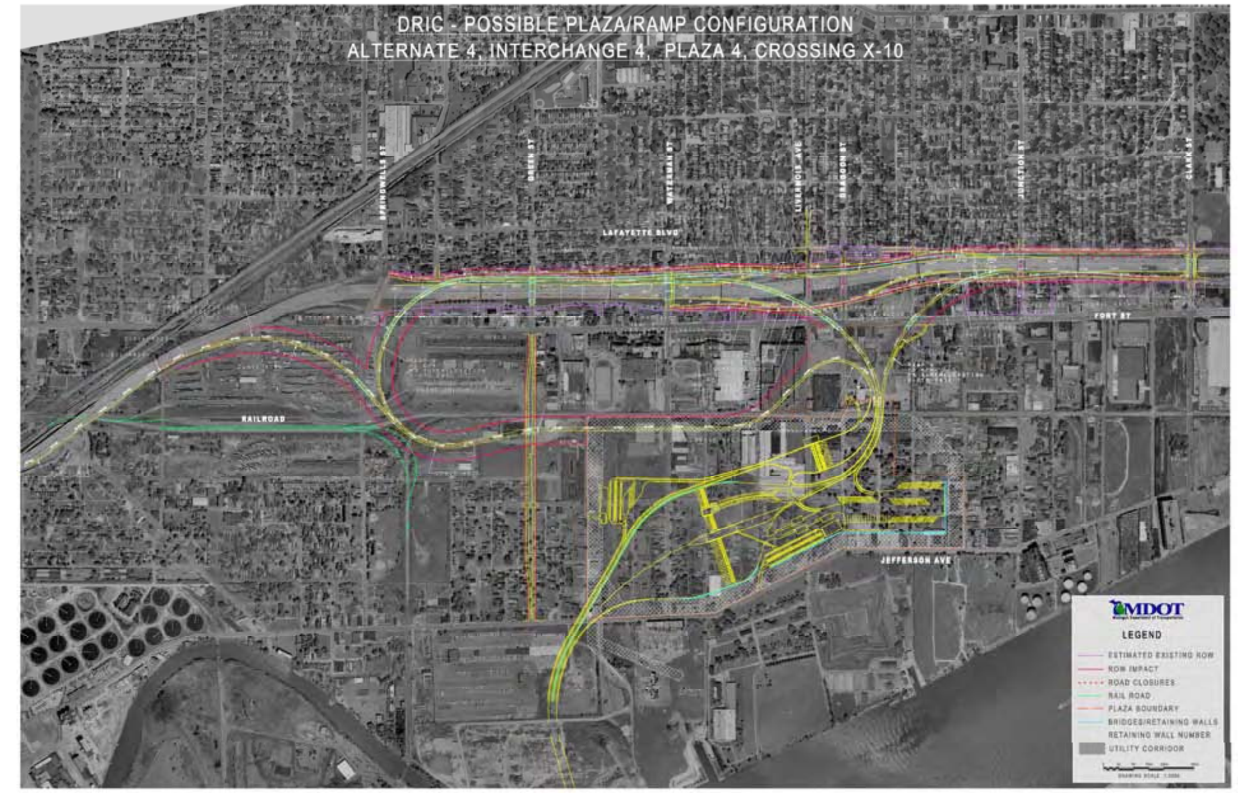


Figure 3.5-5 Alternative #5

Figure 3.5-6 Alternative #6

Figure 3.5-7 Alternative #7

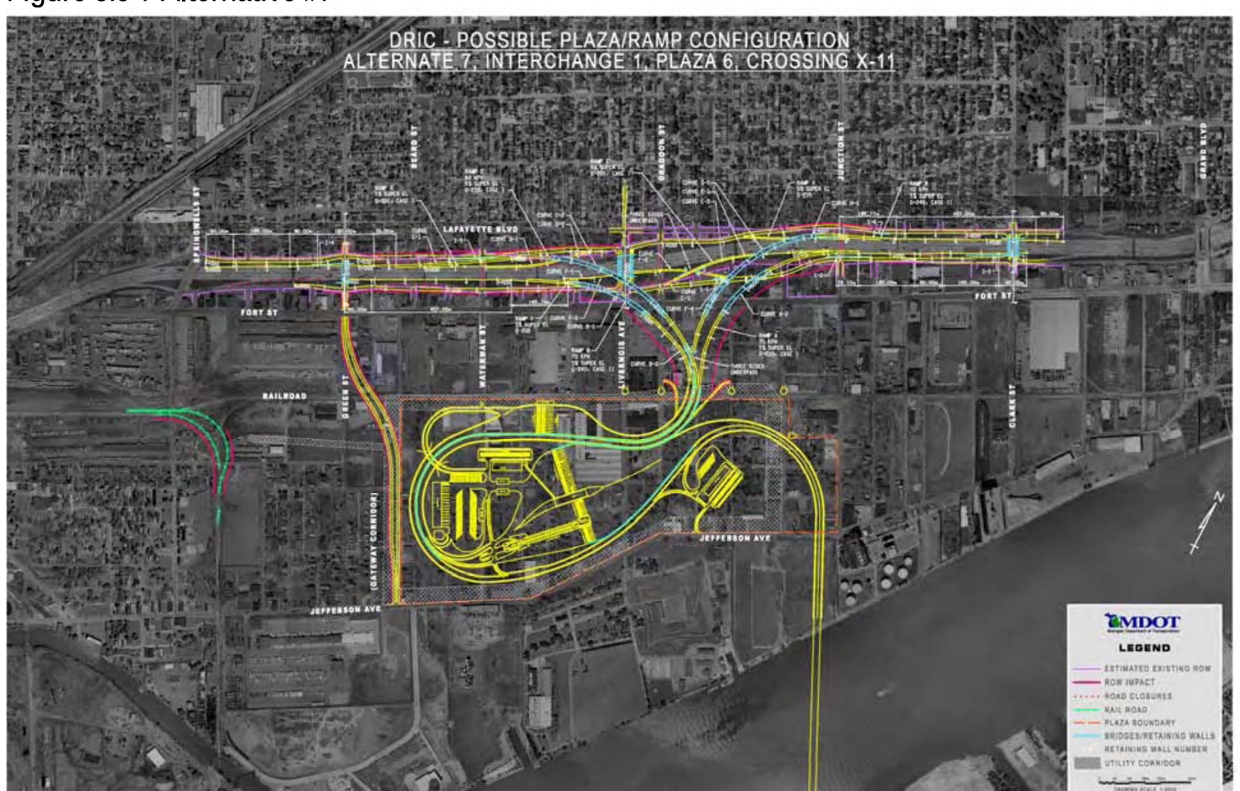


Figure 3.5-8 Alternative #8

Figure 3.5-9 Alternative #9

Figure 3.5-10 Alternative #10

Figure 3.5-11 Alternative #11

Figure 3.5-12 Alternative #12

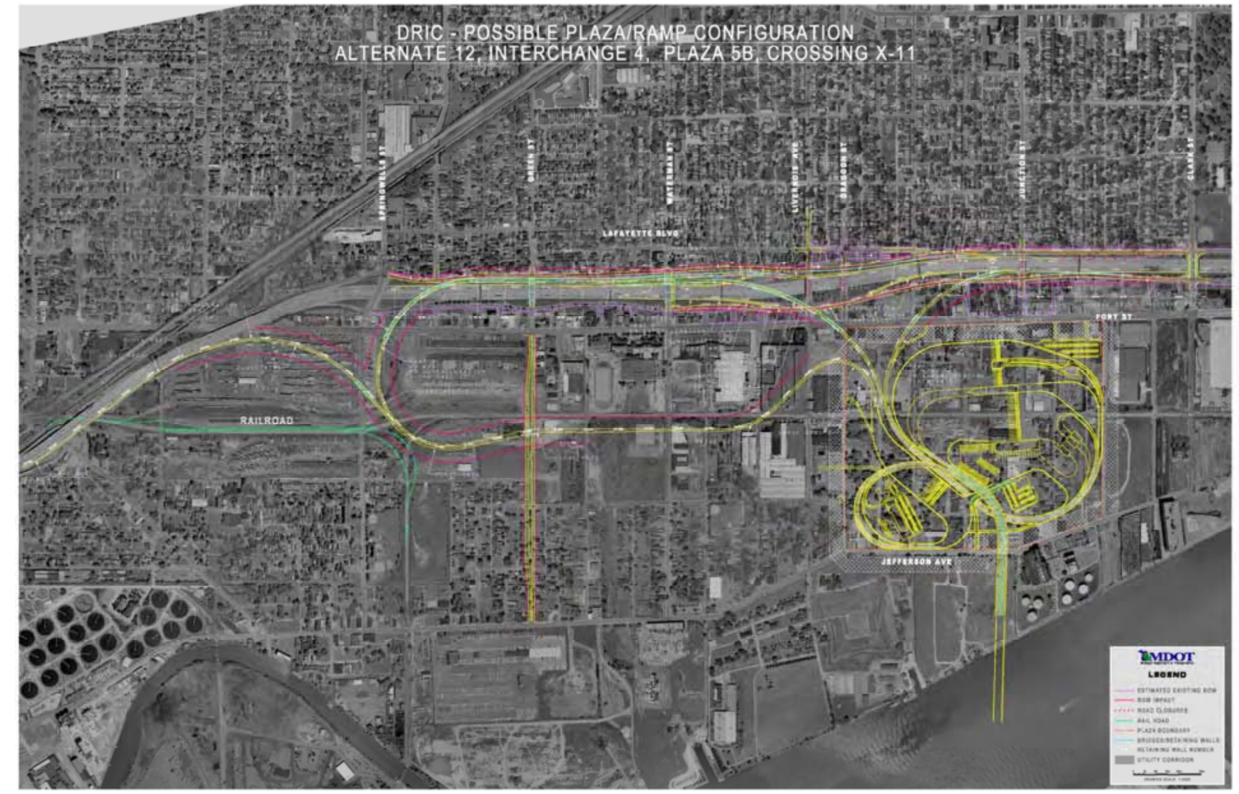


Figure 3.5-13 Alternative #13

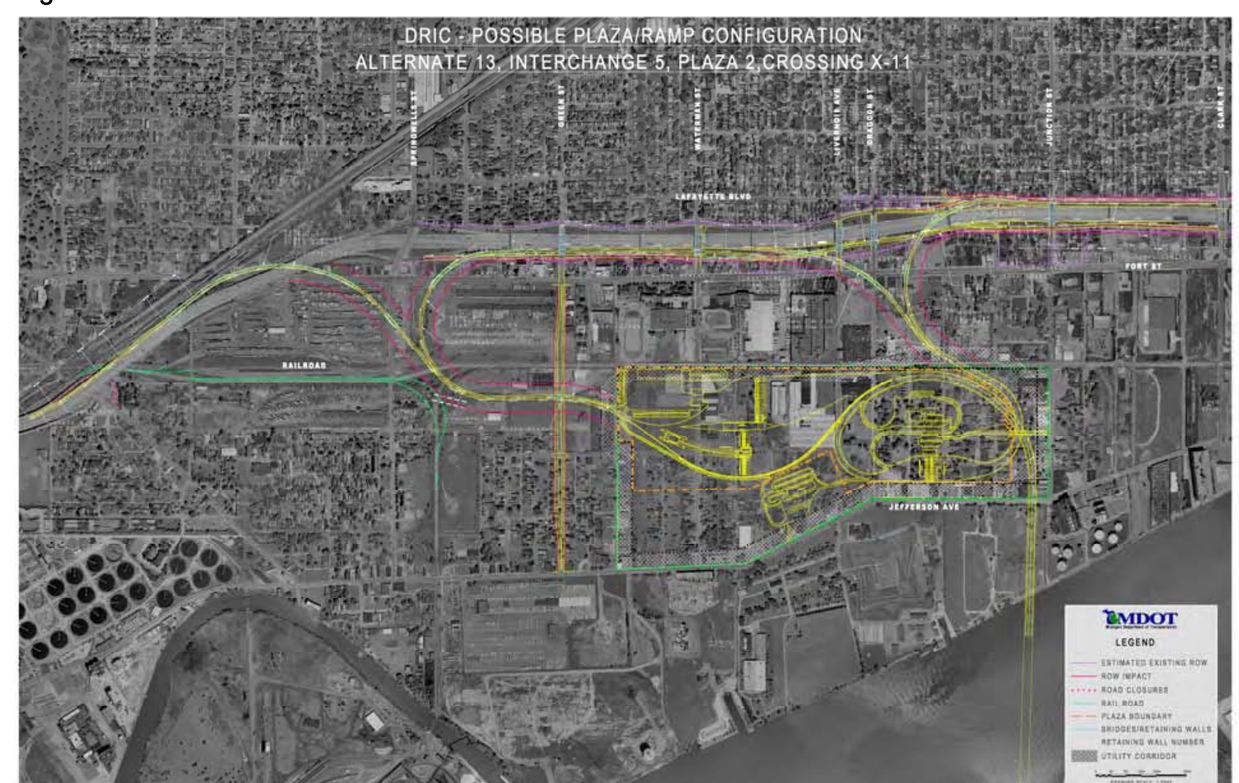


Figure 3.5-14 Alternative #14

Impact Assessment Information

Among the Initial Practical Alternatives there was little difference in terms of potential significant impacts. The one exception was that utilities to accommodate Plaza P-b had the potential to affect Fort Wayne. As there is an alternative to avoiding this impact, the P-b plaza was not considered a desirable alternative. Additionally, the most directly affected community spoke out at the March 2006 Local Advisory Council meeting and subsequent public meetings, stressing the interchanges of Alternatives #4, #12 and #13 (i.e., interchanges D and F) are unacceptable because they would "isolate" the most viable residential enclave remaining in Delray. Those alternatives would also affect the block-long Produce Terminal, which is potentially eligible for listing on the *National Register of Historic Places*.

Value Planning (VP) Study Results

A Value Planning (VP) study was held from January 29, 2007 through February 2, 2007 to review the new Detroit River International Crossing (DRIC) project between the U.S. and Canada. The scope of the VP study was focused on the interchange connecting the plaza on the U.S. side to I-75. The study did not include the plaza or the bridge crossing the Detroit River into Canada.

The six interchange options are listed below:

- Interchange A (formerly Interchange 1)
- Interchange B (formerly Interchange 2)
- Interchange C (formerly Interchange 3)
- Interchange D (formerly Interchange 4)
- Interchange E (formerly Interchange 6)
- Interchange F (formerly Interchange 5)

The VP Team organized the workshop into two distinct parts: the first to review, analyze and evaluate the alternatives (Value Analysis) that the DRIC Early Preliminary Engineering (EPE) Study Team had developed; and the second, to speculate on improvements to these alternatives or propose new alternatives (Value Planning).

Results of the Value Planning study led to the elimination of Interchanges D and F. Additionally, two new interchange alternatives (Interchange G/Alternative #14 and Interchange H/Alternative #15, See **Figures 3.5-15** and **3.5-16**.) were developed to mitigate some of the anticipated impacts associated with Interchange E. Interchange G will be evaluated in detail in the Draft Environmental Impact Statement, while Interchange H was ultimately eliminated from further analysis because engineering review indicated it was not practical to construct. A more detailed summary of the Value Planning Study is provided in **Section 5** of this report.

Figure 3.5-15 Interchange G/Alternative #14

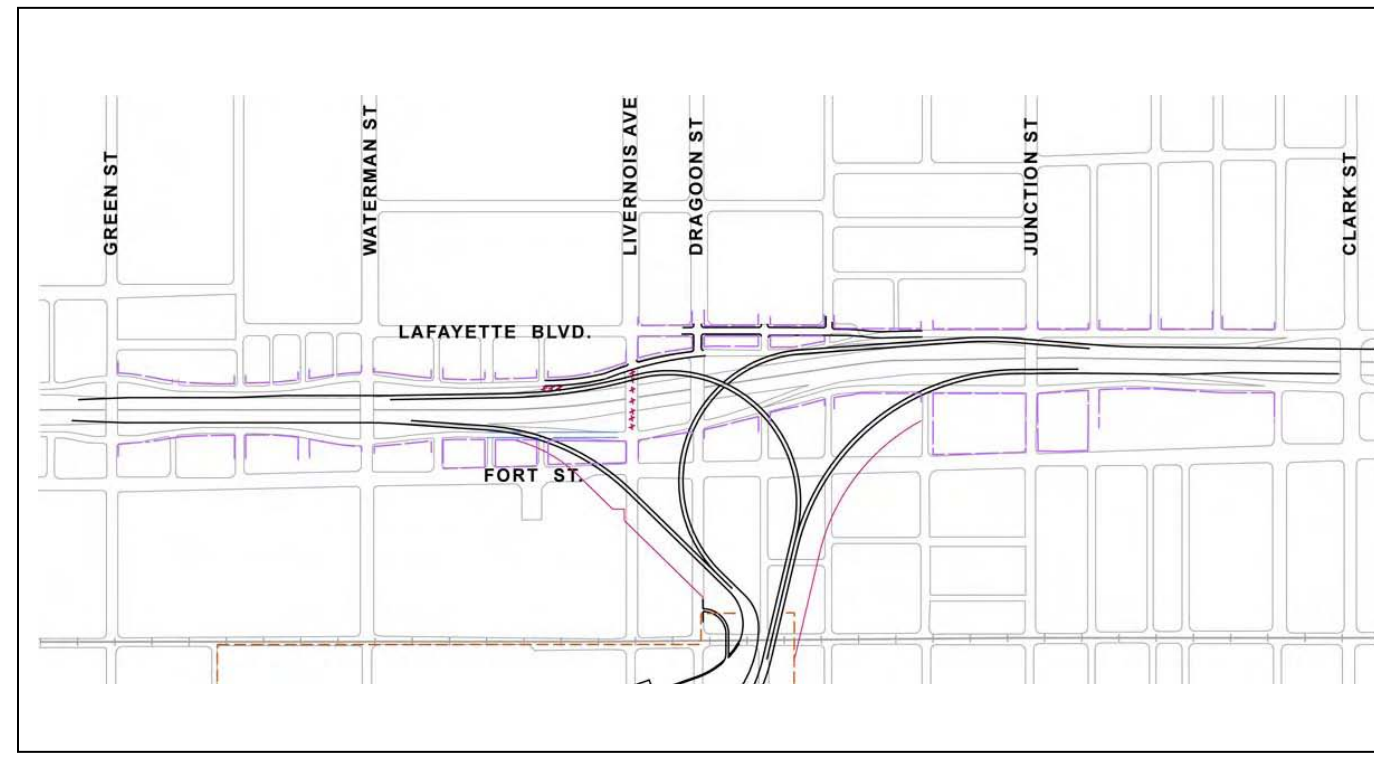
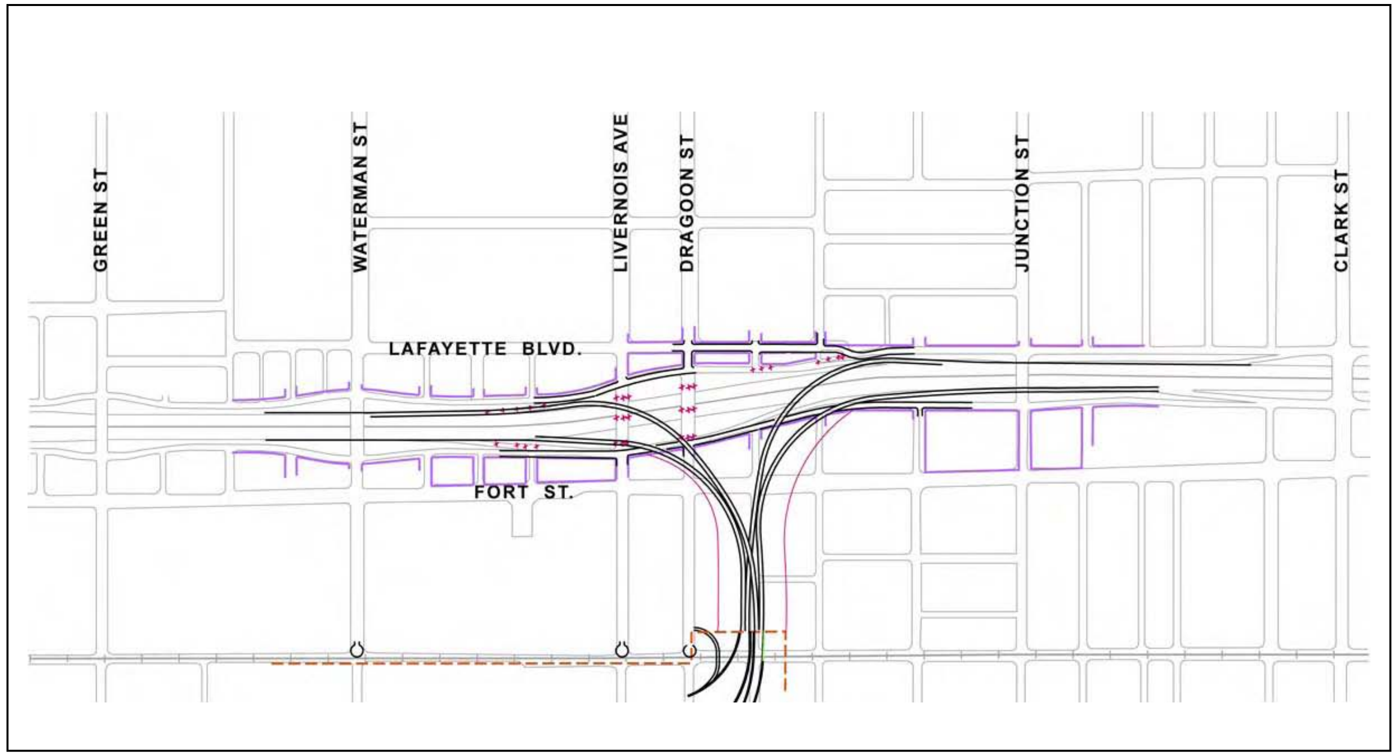


Figure 3.5-16 Interchange H/Alternative #15



Plaza Analysis

In February and March 2007, the General Services Administration (GSA), in combination with the U.S. Customs and Border Protection Agency (CBP), provided detailed input to each of the four DRIC plaza concepts (Figures 3.5-17 through 3.5-20). These figures are not intended to show detail but are intended to show the exact figures submitted for review.

The following summarizes the comments received from GSA and CBP:

Plaza P-a (previously Plaza 4)
- Reduces security issue along RR track;
- Provides good service and employee access;
- Has fewest compromises;
- Provides smooth traffic flow;
- Stays away from Mistersky Power Plant; and
- The DTE Substation could be an issue.

Plaza P-b (previously Plaza 5)
- Has limited flexibility/expandability;
- Has difficulty relocating Duty Free for future outbound inspection;
- Has circuitous return to Canada;
- Provides poor employee access;
- Does not allow for smooth traffic flow; and
- Places bridge adjacent to Mistersky Power Plant.

Plaza P-c (previously Plaza 6)
- Reduces security issue along RR track;
- Raises questions regarding service and employee access;
- Moves broker building closer to commercial building;
- Provides smooth traffic flow;
- Has limited flexibility/expandability;
- Places bridge adjacent to Mistersky Power Plant; and
- Mixes outbound traffic/employees.

Plaza P-d (previously Plaza 2)
- Places secondary commercial in close proximity to Southwestern High School;
- Separates outbound from inbound traffic;
- Does not provide smooth traffic flow;
- Requires flag control of "refused entry" vehicles;
- Places bridge adjacent to Mistersky Power Plant; and
- Places perimeter security along RR track.

Based on the comments provided by GSA and CBP, Plaza P-b and Plaza P-d were eliminated from further analysis. The biggest flaw with Plaza P-b was that it would require abandoning the Norfolk Southern rail line, which is not a practical option. It would also have circuitous traffic flow patterns and limited flexibility and expandability. Because Plaza P-b was included with Alternatives #6, #8, #10 and #12, these alternatives were not advanced for detailed evaluation in the Draft Environmental Impact Statement (DEIS). Plaza P-d was eliminated because of: 1) the large separation that would be required between inbound and outbound inspection functions; 2) its secondary commercial area's proximity to Southwestern High School and the possible effects that would create; and, 3) its limited flexibility and expandability. This plaza was included with Alternative #13, and therefore, this alternative was not advanced for detailed evaluation in the DEIS.

Summary

During subsequent consultation with the public, it became apparent that local connectivity to and from I-75, as well as across I-75, was a critical issue. After examining in more detail the connectivity issues, Alternative 1-Modified (previously known as Value Planning Alternative #14), a hybrid of several alternatives which had been examined by the VP team and discarded, was brought back into consideration. This was designated as Alternative #16. Based on the evaluation conducted, Alternatives #4, #6, #8, #10, #12, #13, and #15 were eliminated from further analysis. Alternatives #1, #2, #3, #5, #7, #9, #11, #14, and #16 were proposed for further analysis as "Practical Alternatives" (Table 3.5-2).

Figure 3.5-17 Plaza P-a

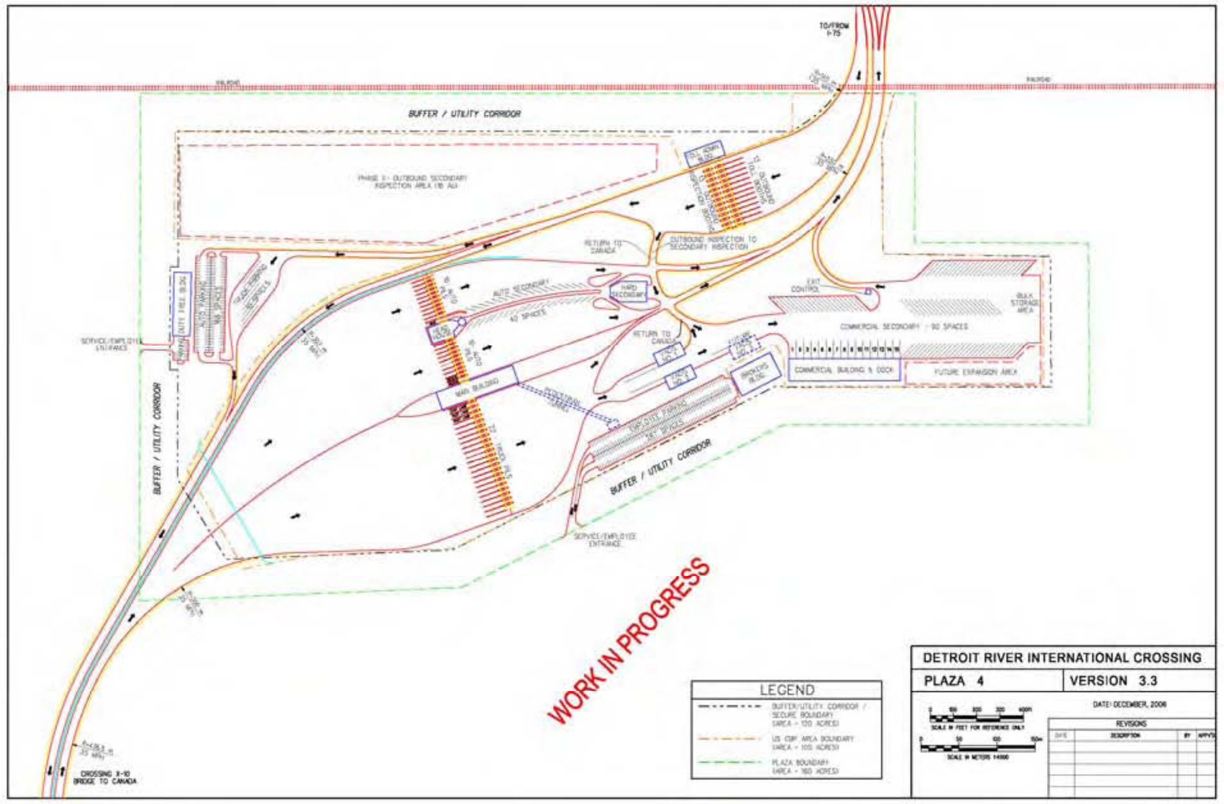


Figure 3.5-18 Plaza P-b

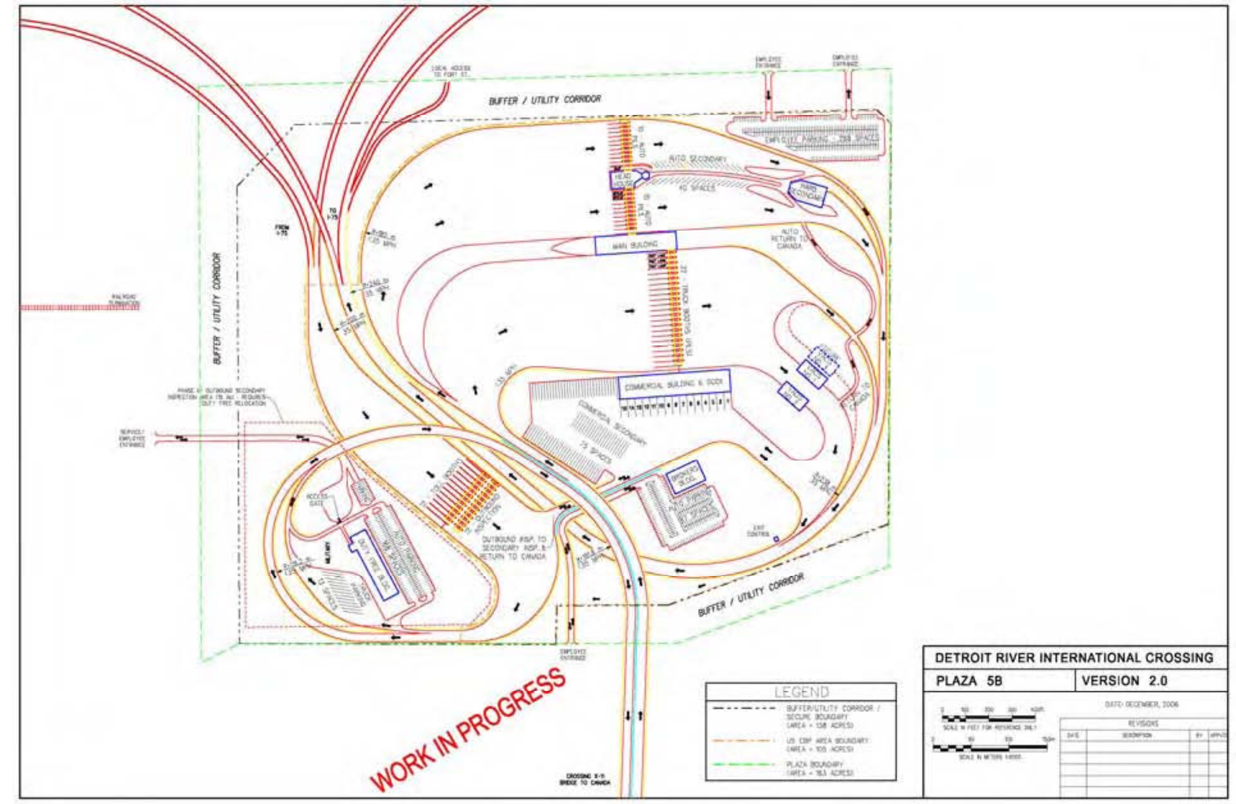


Figure 3.5-19 Plaza P-c

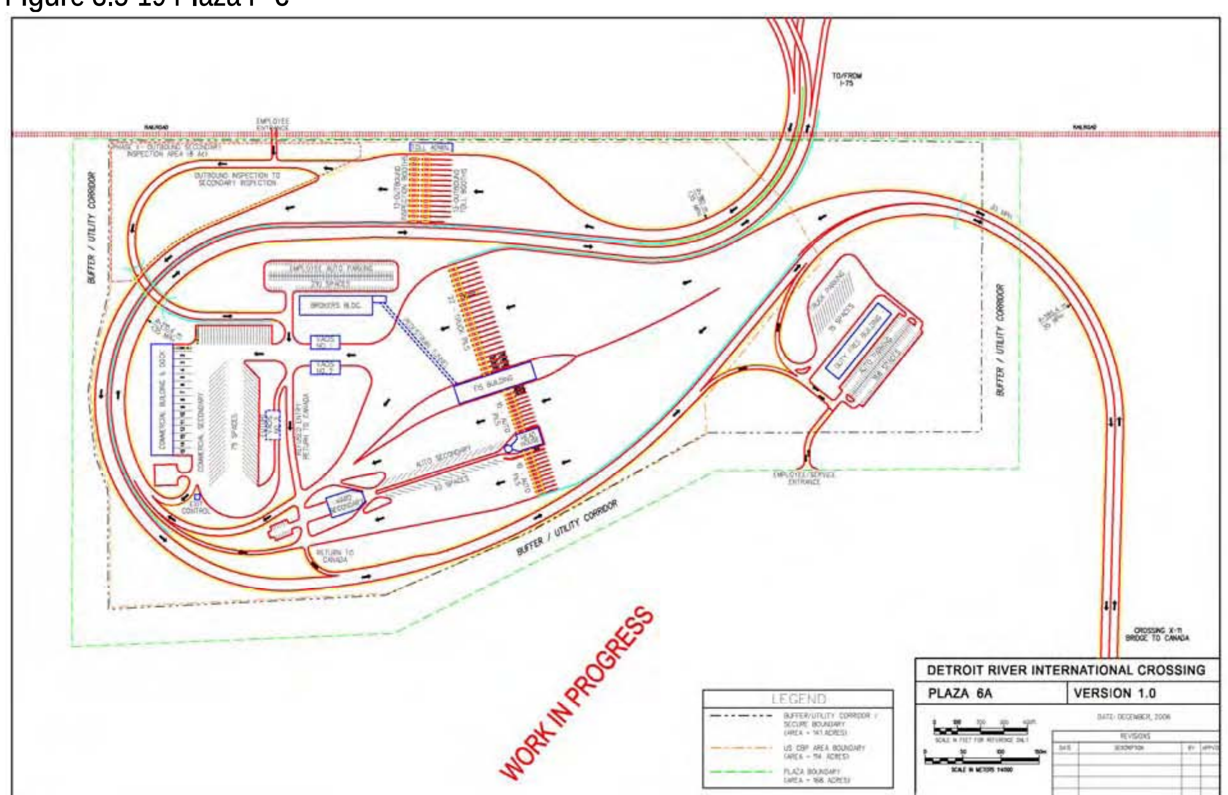


Figure 3.5-20 Plaza P-d

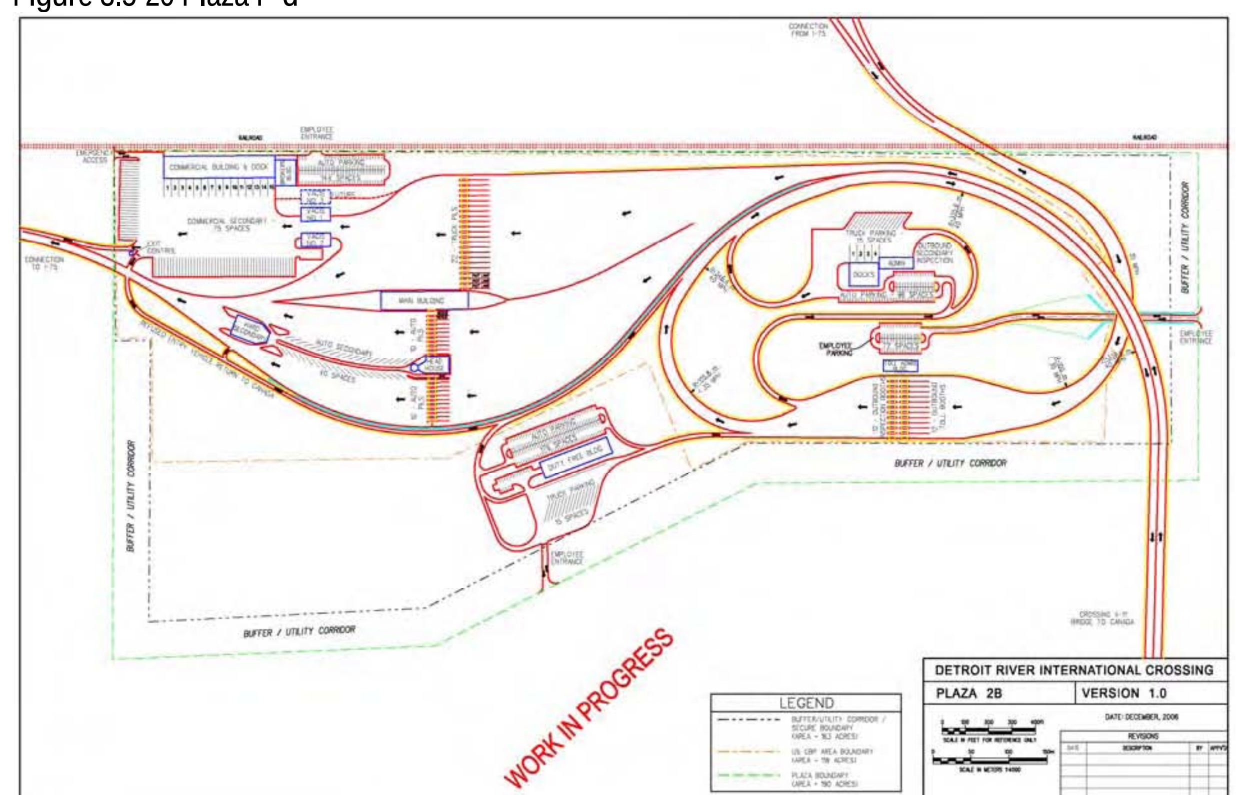


Table 3.5-2
Status of Interchanges and Plazas following Value Planning, GSA/CBP and Public Input

Alternative	Interchange	Plaza	Crossing	Proposed Status
1	A	P-a		Retain for future analysis
2	B	P-a		Retain for future analysis
3	C	P-a	X-10	Retain for future analysis
~~4~~	~~D~~ [1,2]	P-a		Eliminate from further analysis[1,2]
5	E	P-a		Retain for future analysis
~~6~~	A	~~P-b~~ [3,4]		Eliminate from further analysis[3,4]
7	A	P-c		Retain for future analysis
~~8~~	B	~~P-b~~ [3,4]		Eliminate from further analysis[3,4]
9	B	P-c		Retain for future analysis
~~10~~	C	~~P-b~~ [3,4]	X-11	Eliminate from further analysis[3,4]
11	C	P-c		Retain for future analysis
~~12~~	~~D~~ [1,2]	~~P-b~~ [3,4]		Eliminate from further analysis[1,2,3,4]
~~13~~	~~F~~ [1]	~~P-d~~ [4]		Eliminate from further analysis[1,4]
14	G	P-a	X-10	Retain for future analysis
~~15~~	~~H~~ [2]	**P-a**	X-10	Eliminate from further analysis[2]
16	**I**	**P-a**	X-10	Retain for future analysis

[1]Unacceptable community impacts.
[2]Unacceptable engineering impacts.
[3]Unacceptable impacts on Fort Wayne due to proposed utility placement.
[4]Unacceptable impacts as judged by U.S. General Services Administration/Customs and Border Protection Agency input.

The nine alternatives retained for future analysis as Practical Alternatives are evaluated in detail in the Draft Environmental Impact Statement. The remaining discussion in this section of the report provides additional information about the practical alternatives.

3.6 Refined Practical Alternatives

Figures 3.6-1 through 3.6-9 show the nine Practical Alternatives retained for further evaluation in the Draft Environmental Impact Statement.

3.6.1 Connecting Roadways and Interchanges

Six interchanges were advanced for further evaluation as part of the Draft Environmental Impact Statement. Each of the interchanges consist of four plaza ramps connecting I-75 and the plaza: Ramps A through D. The configuration of the plaza ramps for each interchange impacts the existing local access to and from I-75 at Springwells Street, Livernois Avenue/Dragoon Street, and Clark Street. Also, each interchange has varying impacts on the ability to maintain the current local street crossings of I-75. After the initial Practical Alternatives were completed, it was determined that the Norfolk Southern (NS) Rail line must be maintained through the project site, and the plaza ramps were re-designed to clear the tracks. The four plaza ramps are shown on structure, from the crossing of Fort Street, south to the plaza. After the Preferred Alternative is determined, a cost benefit analysis will be completed to determine whether a portion of the ramps should be on fill between the structures over Fort Street and the NS Rail line. The key features of each of these interchanges are summarized below.

Interchange A

Interchange A would require the reconfiguration of the existing ramps along I-75. The existing ramps at Livernois Avenue and Dragoon Street would be relocated. The northbound exit to Clark Street and the southbound entrance from Clark Street would be closed along with the northbound entrance from Springwells Street and the southbound exit to Springwells Street. Access to and from I-75 would be restored with the northbound exit and entrance ramps relocated between Dragoon Street and Junction Street, and the southbound exit and entrance ramps would be shifted to the east and west, respectively between Junction Street and Waterman Street. The northbound exit ramp (Ramp F) between Dragoon Street and Junction Street would cross beneath the northbound entrance ramp (Ramp E), utilizing a three-sided underpass. The southbound exit ramp (Ramp H) would merge with the Service Drive between Junction Street and Dragoon Street. The southbound entrance ramp (Ramp G) would exit the Service Drive just after Livernois Avenue.

Closure of the Waterman Street, Dragoon Street, and Junction Street bridges would be required due to the geometry of the plaza ramps and the location of the service drive ramps. Reconstruction of the Green Street, Livernois Avenue, and Clark Street bridges would be required to accommodate the new ramps. Livernois Avenue would become a two-way street between Fort Street and Lafayette Boulevard in order to maintain the northbound access across I-75 that utilized Dragoon Street.

Interchange B

Interchange B would require the reconfiguration of the existing ramps along I-75. All of the existing ramps at Livernois Avenue and Dragoon Street would be closed. The northbound exit to Clark Street and the southbound entrance from Clark Street would be closed along with the northbound entrance from Springwells Street and the southbound exit to Springwells Street. The braided ramps, as provided in Interchange A, would be eliminated in favor of auxiliary lanes along I-75. The northbound entrance ramp (Ramp F) would exit the northbound service drive between Waterman Street and Livernois Avenue and merge with I-75 creating an auxiliary lane. The auxiliary lane would become the northbound exit only lane for Ramp E. Ramp E would merge with the northbound service drive before Junction Street. The southbound entrance ramp (Ramp H) would exit the southbound service drive after Junction Street and merge with I-75 creating an auxiliary lane. Similar to northbound, the auxiliary lane would become the southbound exit only lane for Ramp G. Ramp G would merge with the southbound Service Drive between Livernois Avenue and Waterman Street.

Closure of the Waterman Street and Junction Street bridges would be required due to grade issues of the plaza ramps. Reconstruction of the Green Street, Livernois Avenue, Dragoon Street and Clark Street bridges would be required to accommodate the proposed ramps.

Interchange C

Interchange C would incorporate a shift of I-75 to the south from 225m (740-feet) west of Livernois Avenue to Clark Street. The shift was included to minimize impacts on the residential area north of I-75. The existing ramps along I-75 at Livernois Avenue would be reconfigured. The northbound exit to Clark Street and the southbound entrance from Clark Street would be closed along with the northbound entrance from Springwells Street and the southbound exit to Springwells Street. The new northbound exit ramp (Ramp F) would exit the freeway at Livernois Avenue and merge with the northbound service drive between Dragoon Street and Junction Street. This ramp would utilize a three-sided underpass where it is crossed by the northbound entrance ramp (Ramp E), similar to Interchange A. Ramp E would exit the service drive at Dragoon Street and merge with the freeway. The southbound exit ramp (Ramp H) would exit the freeway near Junction Street and merge with the service drive near Dragoon Street. The southbound entrance ramp (Ramp G) would exit the Service Drive a few blocks before Dragoon Street and merge with the freeway at Livernois Avenue. Ramp G would also utilize a three-sided underpass section where it crosses Ramp H.

Closure of the Livernois Avenue, Dragoon Street, and Junction Street bridges would be required due to the geometry of the plaza ramps and the location of the service drive ramps. The Waterman Street and Clark Street crossings of I-75 could remain if the bridges were reconstructed to accommodate the proposed ramps.

Interchange E

Interchange E is similar to Interchange B, except that the plaza ramps would be shifted east to maximize the distance from Southwestern High School and the residential properties along Post Street. This is the only interchange option that would impact the possible Ambassador Gateway Project addition to I-75. The ramps at Livernois Avenue and Dragoon Street, as well as all of the ramps at Clark Street, would be closed. The northbound entrance from Springwells Street and the southbound exit to Springwells Street would be closed similar to Interchanges A, B and C. Access to and from I-75 would be reconfigured utilizing entrance and exit ramps with a length of auxiliary lanes on northbound and southbound I-75, similar to Interchange B. The northbound entrance ramp (Ramp F) would exit the service drive near Livernois Avenue and the northbound exit ramp (Ramp E) would merge with the service drive before Clark Street. The southbound entrance ramp (Ramp H) would exit the Service Drive east of Junction Street, and the southbound exit ramp (Ramp G) would merge with the service drive west of Livernois Avenue.

Closure of the Livernois Avenue, Dragoon Street, and Junction Street bridges would be required due to the grade issues of the proposed ramps. The Waterman Street, and Clark Street bridges would require reconstruction to accommodate the proposed ramps.

Interchange G

Interchange G would incorporate a lower design speed for the plaza ramps: 60 km/h instead of the 70 km/h of the other interchanges. This interchange was developed to evaluate minimization of the interchange footprint and the associated impacts. This interchange would close three of the four ramps at Livernois Avenue and Dragoon Street, maintaining the northbound entrance ramp. These movements would not be restored although the northbound entrance from Springwells Street and the southbound exit to Springwells Street would remain open for this interchange. The northbound exit to Clark Street and the southbound entrance from Clark Street would be closed similar to the other interchanges.

Closure of the Livernois Avenue, Dragoon Street, and Junction Street bridges would be required due to the grade issues of the proposed ramps. The Green Street, Waterman Street, and Clark Street bridges would require reconstruction to accommodate the proposed plaza ramps.

Interchange I

Interchange I is a hybrid of interchanges A and B that would allow the southbound exit to Springwells Street and the northbound entrance from Springwells Street to remain in operation. The ramps would be re-built close to the existing locations. The intent of developing Interchange I, for Alternative #16, is to improve local access to and from I-75, in particular the Clark Street and Springwells Street interchanges. Springwells Street, which becomes West End Street south of Fort Street, would be the most critical north-south connector if the Livernois/Dragoon corridor were eliminated by the Plaza. To the north, Springwells Street is included in, and connects to, the Vernor Business Improvement District. To the south, via West End Street, it connects to the City of Detroit industrial park at the mouth of the Rouge River.

Due to the proximity of the proposed Plaza ramps, Interchange I would require the replacement of the entrance and exit ramps at Springwells Street to meet current design criteria. The new ramps could be tied into the existing Springwells Street bridge, which cross I-75 at a skew. However, this is undesirable from a geometric standpoint. To improve the Springwells interchange, the bridge would be realigned to eliminate the skew. While it would be possible to correct the existing deficiencies in the Springwells interchange as part of any of the other interchanges, it is not included with the other options since they would not directly impact the interchange in the same manner.

The ramps at Livernois Avenue and Dragoon Street would be closed. The northbound exit ramp at Clark Street and southbound entrance ramp would also be closed. A new northbound exit ramp (Ramp F) would exit the freeway east of Dragoon Street and merge with the service drive before Junction Street. A new southbound entrance ramp (Ramp G) would exit the service drive west of Junction Street and merge with the freeway before Dragoon Street.

Closure of the Junction Street and Waterman Street bridges would be required due to grade issues. The Springwells Street, Green Street, Livernois Avenue, and Clark Street bridges would be reconstructed to accommodate the proposed ramps.

Figure 3.6-1 Practical Alternative #1

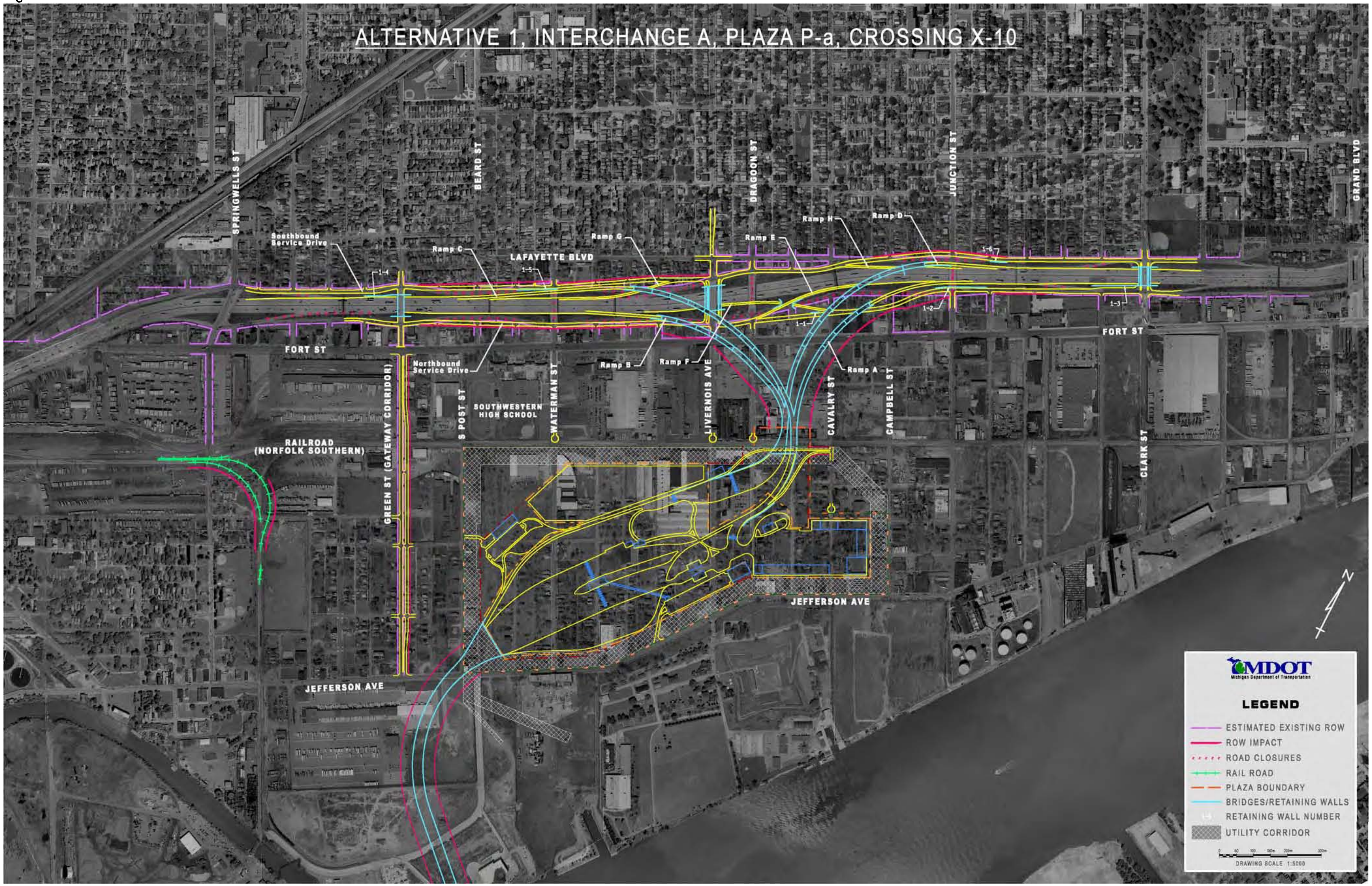


Figure 3.6-2 Practical Alternative #2

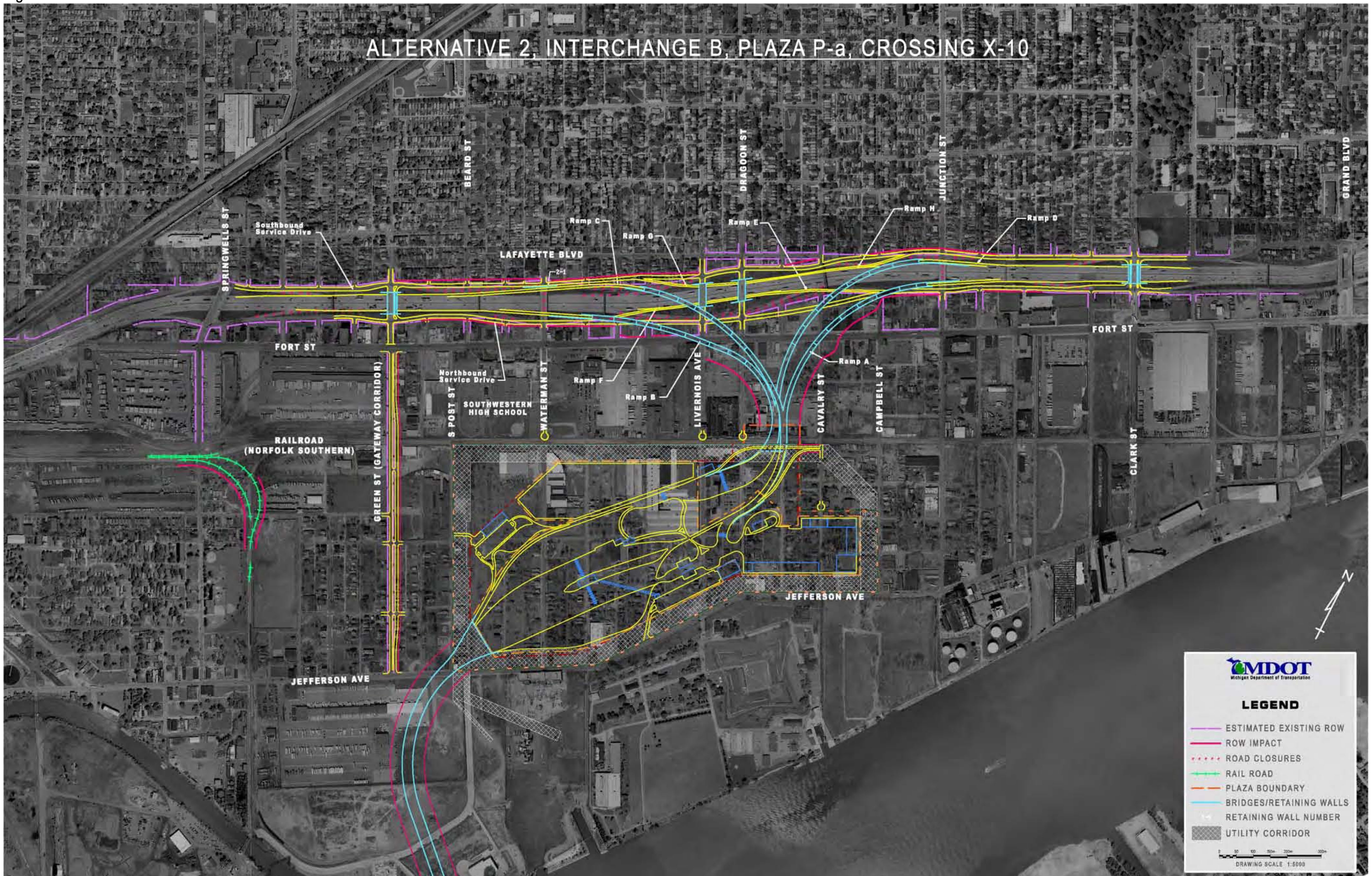


Figure 3.6-3 Practical Alternative #3

Figure 3.6.-4 Practical Alternative #5

Figure 3.6-5 Practical Alternative #7

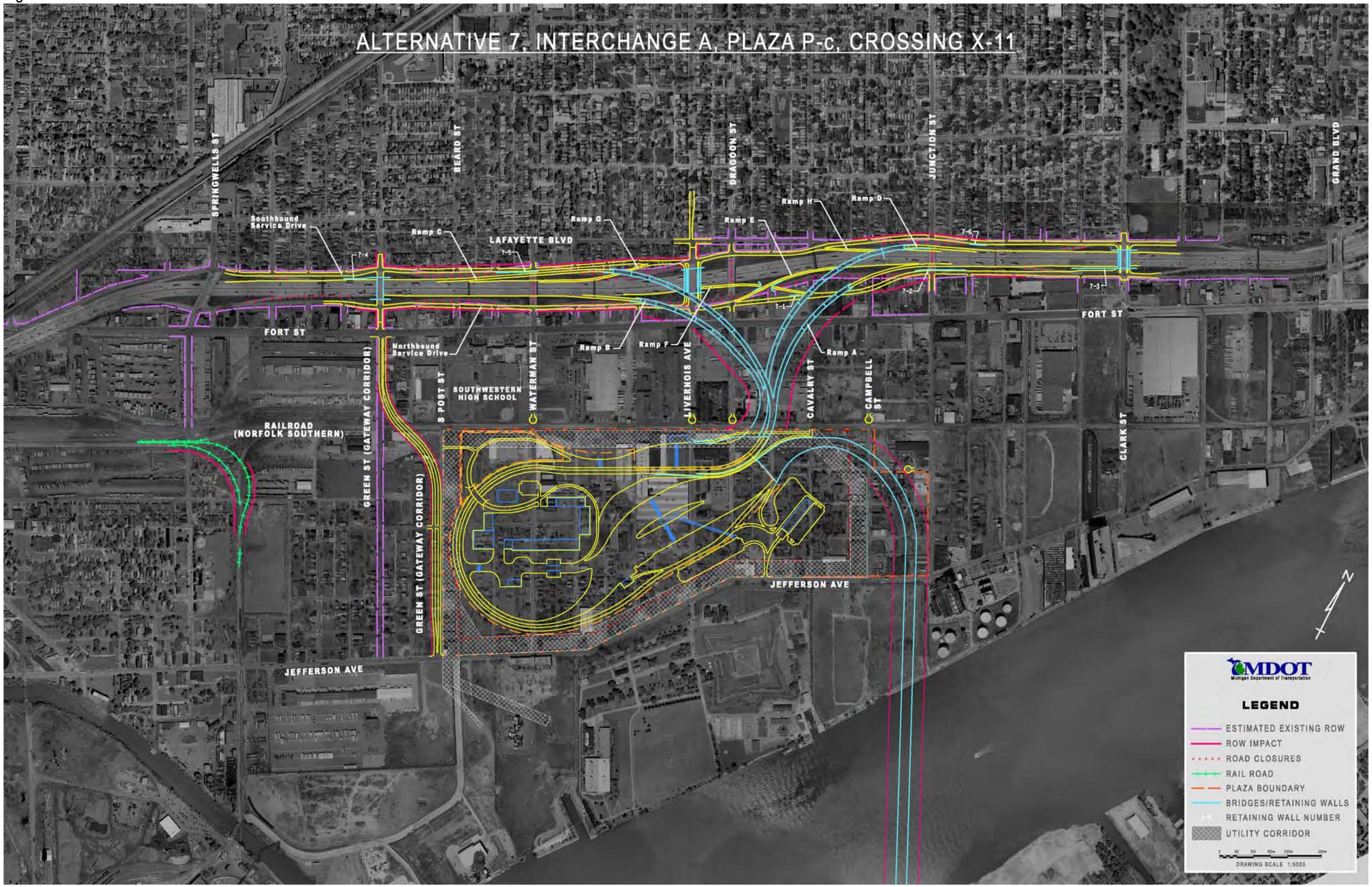


Figure 3.6-6 Practical Alternative #9

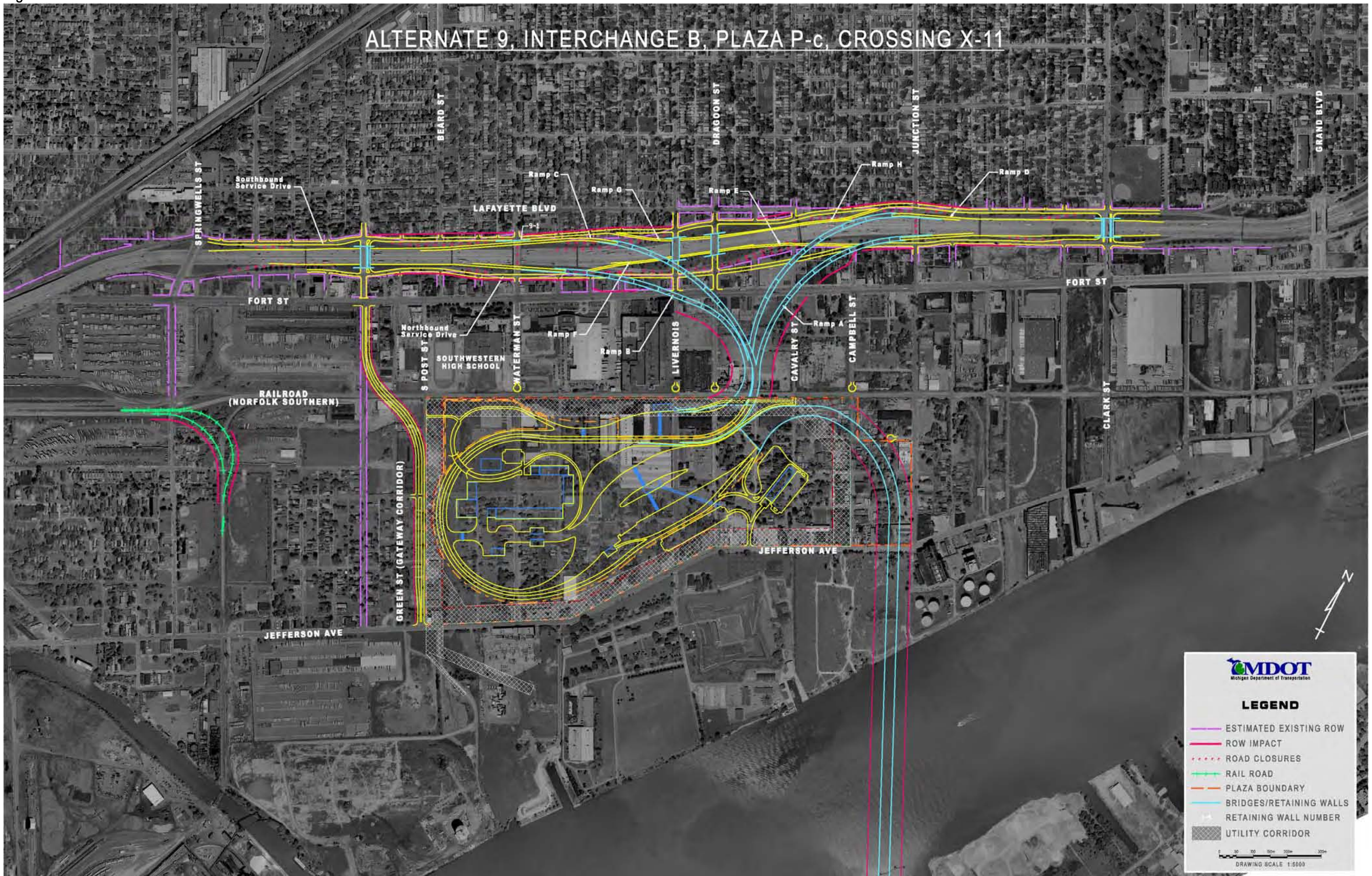


Figure 3.6-7 Practical Alternative #11

Figure 3.6-8 Practical Alternative #14

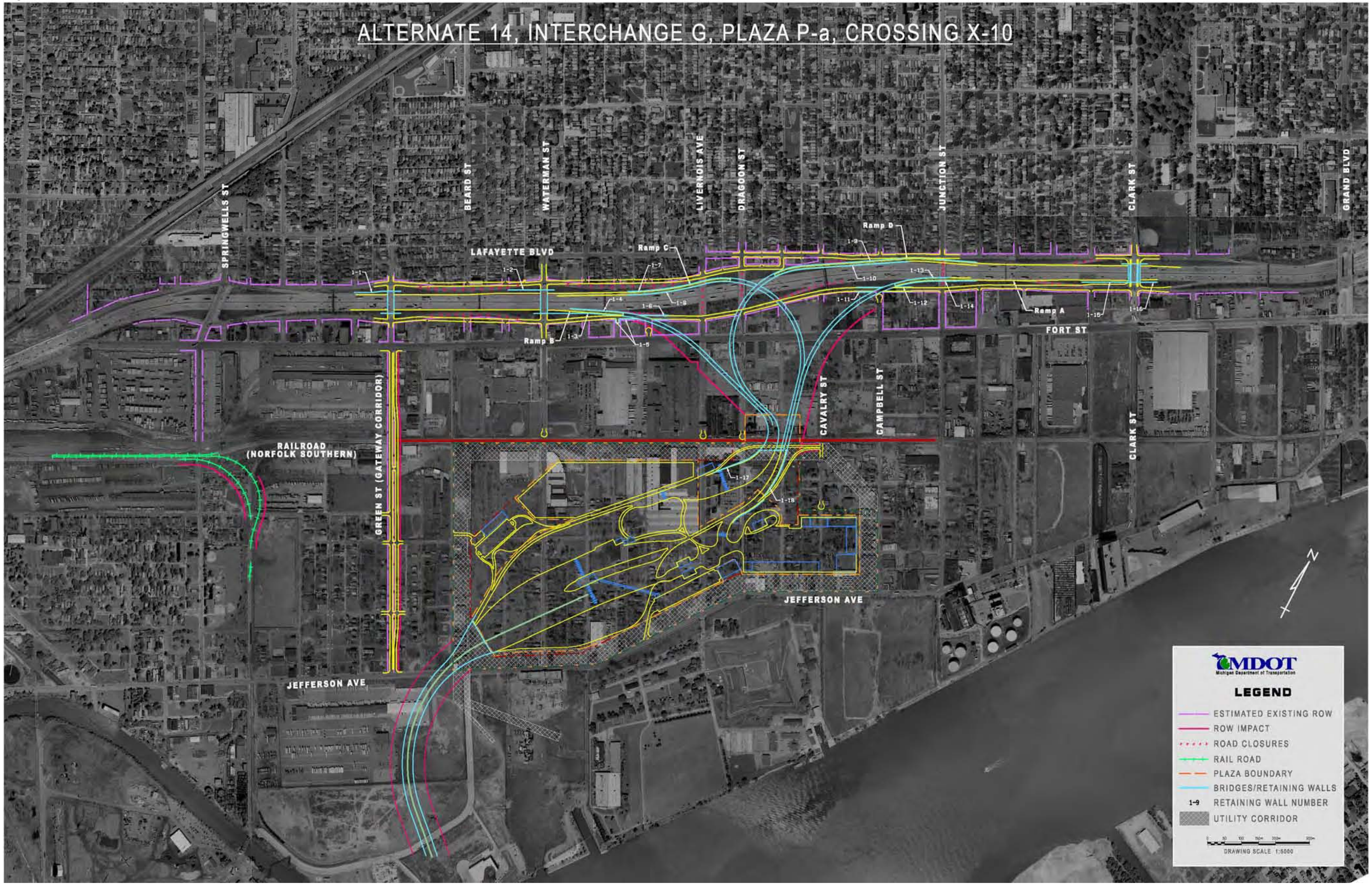


Figure 3.6-9 Practical Alternative #16

3.6.2 Local Connections

Due to the existing close spacing of the interchanges along this stretch of I-75, as well as introducing a new interchange serving the international crossing, maintaining the existing access patterns is not possible between Clark and Springwells Streets. This will include closure of some existing ramps, closure of some cross-streets over I-75, and other modifications to the existing interchanges. To mitigate these impacts additional access is provided and new crossover u-turns are proposed at some cross-streets. Figure 3.6-10 illustrates the proposed local connectivity for each alternative.

3.6.3 U.S. Toll and Inspection Plaza

Plaza space programming and facilities are provided in accordance with the U.S. Land Port of Entry (LPOE) Design Guide Supplement dated 15 March 2006 (Design Guide), U.S. LPOE Design Guide Security and Information Technology Supplemental Guide dated 31 August 2007, and the Program of Requirements dated June 2007 from the General Services Administration (GSA). Each Plaza option consists of a Federal Inspection Station facility as well as a toll facility run by the bridge owner/operator. Each Plaza option has the same components which are described in the following sections. Figure 3.6-11 is a schematic flow diagram that shows the plaza functions described below.

Primary Inspection

Commercial and passenger occupied vehicles (POV) are initially processed in the primary inspection lanes (PIL). There are 10 truck primary inspection lanes. There are 10 primary passenger vehicle inspection lanes including 1 bus lane. Primary inspection lanes include provisions for expedited trade and traveler programs with dedicated NEXUS and FAST lanes at the center of the inspection band. Any commercial primary inspection lane can be dedicated as a FAST truck inspection lane. Primary inspection lanes provide for passive Radiation Portal Monitors (RPM), License Plate Readers (LPR), and other technologies.

Space is provided on each side of the PIL band for future expansion to 20 truck booths and 20 auto booths. The layout of the buildings and secondary inspection allows for an easily phased addition of these PIL's without modifying the main buildings.

Commercial Secondary Inspection

For the flow of traffic, commercial secondary inspection is provided after the primary inspection. The secondary inspection facility includes a combined warehouse, truck dock and commercial processing building, a brokers building, two Non-Intrusive Inspection (NII) buildings, a brokers building, and a U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS) livestock inspection facility. Space is also reserved for a hazardous materials inspection area, bulk bins, impound lot, mobile NII enclosure, and empty-truck inspection. The facility also contains commercial secondary parking spaces for trucks that are not required to park at the truck docks. The warehouse/truck dock/commercial processing building houses CBP commercial inspectors, open and enclosed dock facilities, agency offices, and truck driver processing facilities. Exit control is maintained by four exit control booths.

Passenger Secondary Inspection

The Federal Inspection Station (FIS) Main Building is a two-story building massed in the center of the plaza dividing primary auto and commercial inspection bands. This building houses traveler inspection and processing facilities as well as CBP administrative offices. A head house and hard secondary are provided at the end of the auto secondary inspection canopy to the left of the POV PIL's. Sixteen auto spaces are provided in the secondary facility. This location of the FIS building along the center of the plaza allows for passenger traffic to flow primarily to the left side of the plaza as it enters the U.S. thereby reducing vehicle conflicts. A bus inspection lane is provided on the left side of the main building. This is preferred because bus entry doors are located on the right and this allows disembarking right into the Main Building.

Canada Bound Traffic

Twelve toll booths are provided on the Canada-bound side of the Plaza. An administration building, which would consist of administrative offices, locker rooms, and other toll support services, is provided to the right of tolls. This facility is outside the FIS boundary but past the point-of-no-return.

Four outbound inspections booths are provided on the westbound lanes. A dedicated secure ramp is provided which would allow outbound inspectors to divert autos and trucks directly to the secondary inspection area, as the need arises. Export inspection and US-VISIT program requirements can be accommodated in the Duty Free facility. Space is provided for a future full independent outbound secondary inspection area.

Other Facilities

Duty Free is a building located within the secure perimeter of the Plaza past the tolls and outbound inspection lanes. A service entrance and employee parking accessed from the local surface streets is provided. Duty Free parking for cars and trucks is provided adjacent to the Duty Free Building. Maintenance facility requirements on the U.S. plaza have not yet been determined, but may include a material storage building which could be located in the commercial secondary area. Offsite maintenance facilities are also a possibility.

Master Plan space is provided for a future, large-sized kennel facility. This space is provided in a way that can be accessed from outside the Plaza in order to serve other border inspection needs.

Employee Parking

Two hundred and sixty eight secure employee parking spaces with local access are provided for each alternative.

Plaza Access

Direct connections to I-75, north and southbound, will be provided via direct connect ramps. Local access will also be provided to and from the local street system.

Figure 3.6-10 Local Connectivity Alternatives A through C

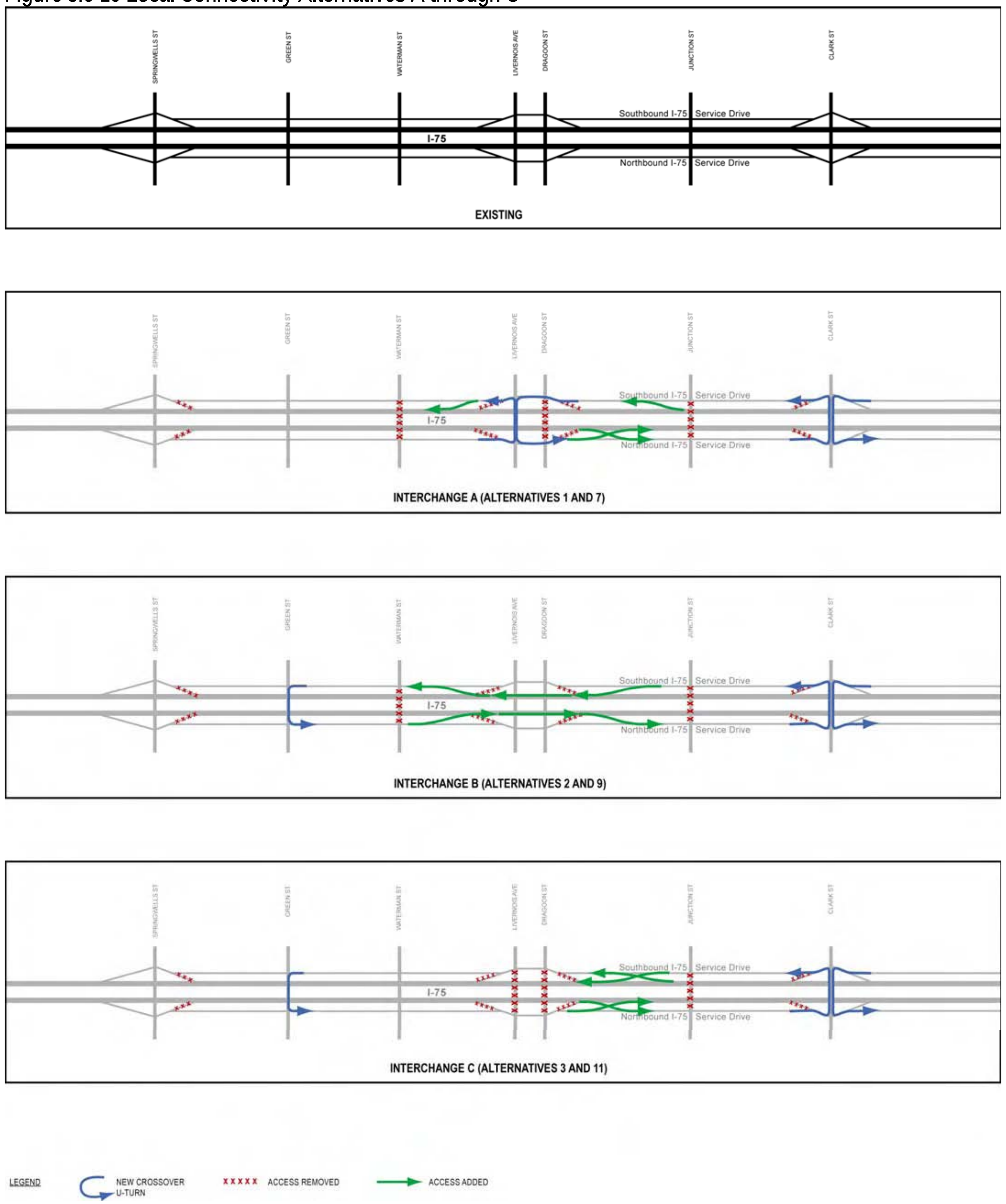


Figure 3.6-10 Local Connectivity Alternatives E, G, and I

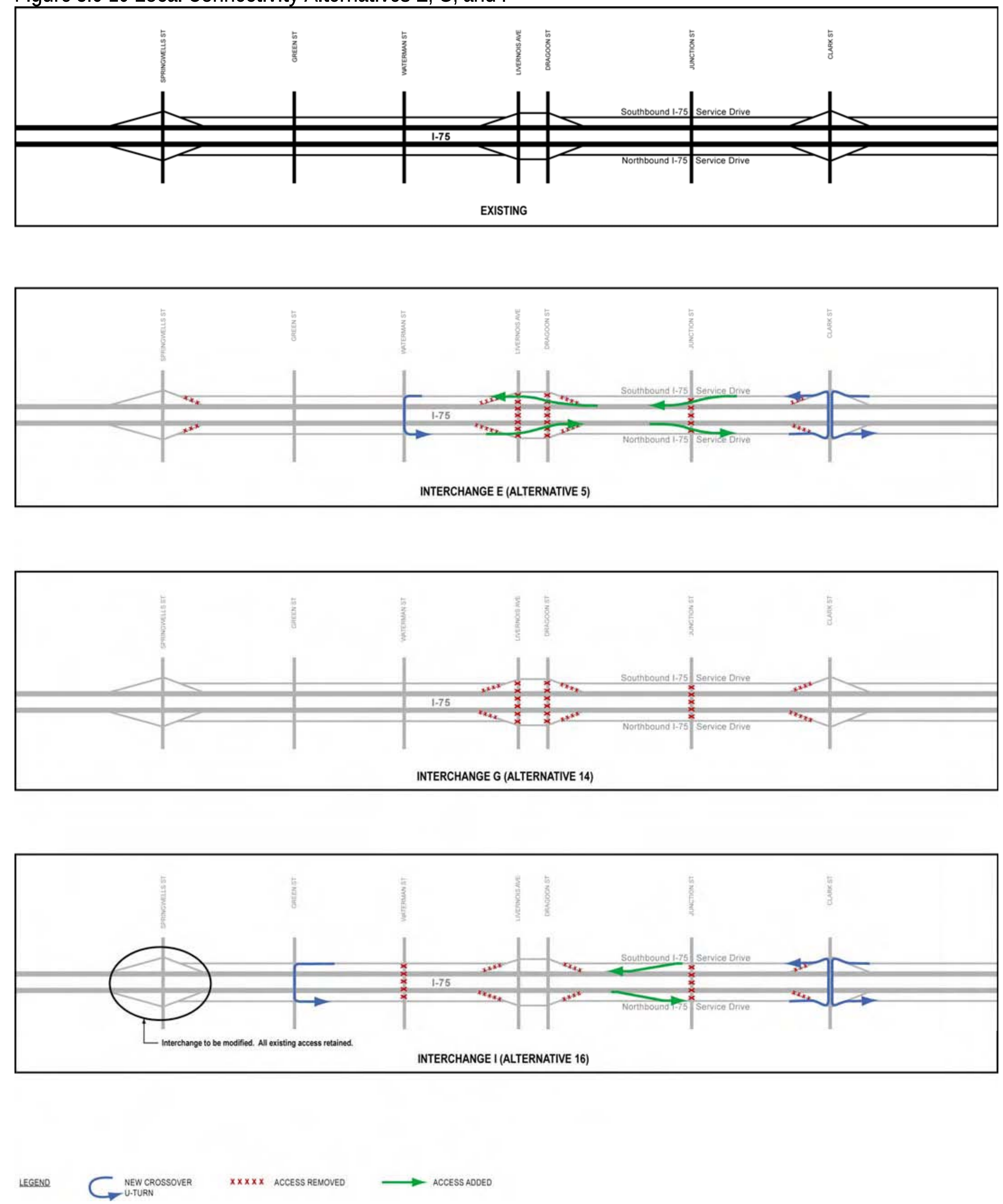
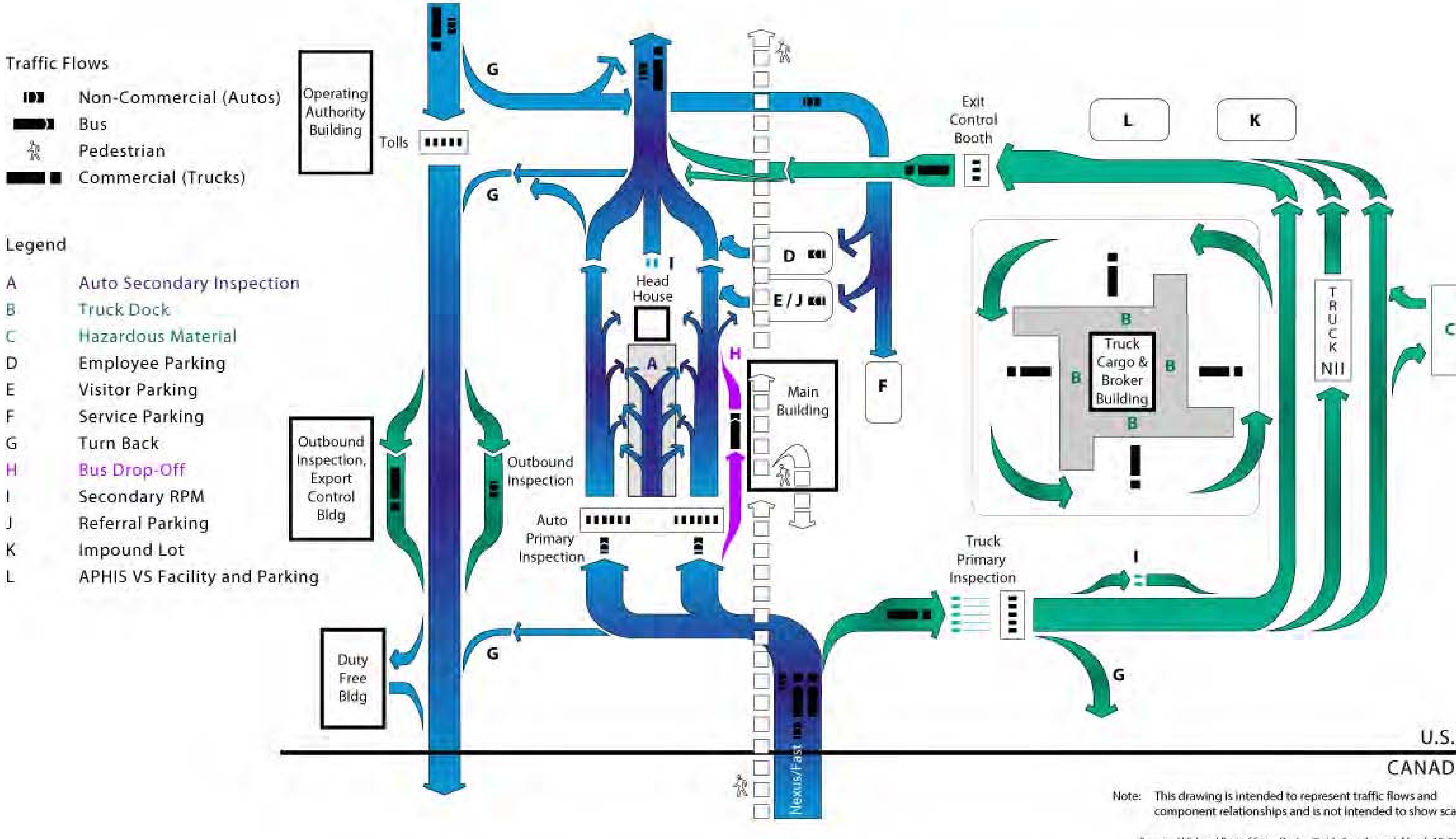


Figure 3.6-11 Plaza Traffic Flow



Plaza Options

In this phase of the design the two remaining FIS Plaza options were refined in consultation with CBP, GSA, and USDA-APHIS as well as being coordinated with the design refinements of the DRIC bridge and interchanges. Each plaza now includes a grade crossing of the railroad. Due to this new vertical geometry, the inbound and outbound facilities were adjusted to provide adequate space to either reach grade or, in the case of outbound tolls and inspection, to place these facilities on fill with a relatively flat grade preceding them. In addition, the need to grade cross the railroad required a redesign of the local connections which now split from the traffic stream prior to the railroad and then follow the railroad right-of-way to reach Calvary Street.

These three FIS Plazas have been designated Plaza P-a (formerly Plaza 4), P-c (formerly Plaza 6), and P-a Modified as shown in Figures 3.6-12, 3.6-13, and 3.6-14.

FIS Plaza P-a

This FIS Plaza incorporates the elements described above. Plaza P-a will connect the X-10 crossing corridor with Interchanges A, B, C, E, G and I. The Plaza exit/entrance ramp configuration is altered slightly for Interchange E. This Plaza has a linear flow from the foot of the bridge to its exit. The total Plaza area is 160 acres, 114 acres within the secure boundary, of which 92 acres is within the U.S. FIS boundary. There is a utility corridor/buffer around the exterior of the plaza. Additional buffer is also provided in the northwest corner which is adjacent to Southwestern High School. The Plaza is bounded on the north by the railroad corridor. Local traffic access to and from the Plaza will be via Calvary Street.

FIS Plaza P-c

This FIS Plaza incorporates the elements described above. Plaza P-c connects the X-11 crossing corridor with Interchanges A, B, and C. This Plaza has a more circuitous traffic pattern in order to route traffic from the foot of the bridge through the required Plaza functions and exit to I-75 near the same point. The total Plaza area is 168 acres, 141 acres within the secure boundary, of which 94 acres is within the U.S. FIS boundary. There is a utility corridor/buffer on the south and west sides of the Plaza. The Plaza is bounded on the north by the railroad corridor. Local traffic access to and from the Plaza will be via Calvary Street.

FIS Plaza P-a Modified

Interchange E (Alternative #5) was developed in an effort to reduce the impact of the Plaza on the properties west of Post Street due to the proximity of the bridge as it entered the Plaza. Initially Plaza P-a was used for the Initial Practical Alternative. However, it became apparent that the Plaza interface with the Interchange also required modification and the internal elements could be shifted east. Therefore, a new option Plaza P-a Modified was developed. This Plaza is substantially similar to Plaza P-a with the same internal circulation patterns; however, the bridge and interchange alignments are modified, and the Plaza is shifted east. Local traffic access to and from the Plaza will be via Campbell Street.

Figure 3.6-12 Plaza P-a

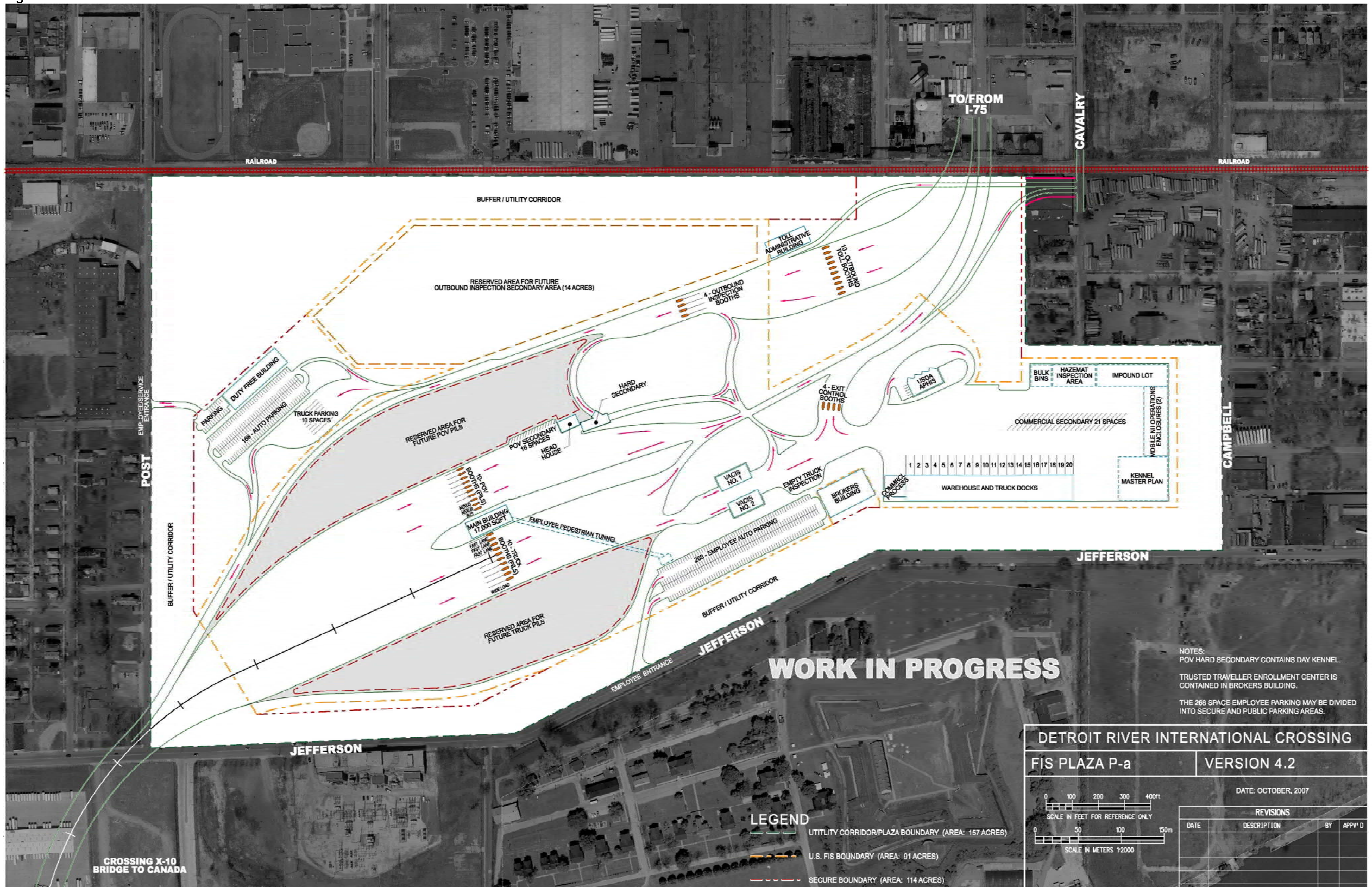


Figure 3.6-13 Plaza P-c

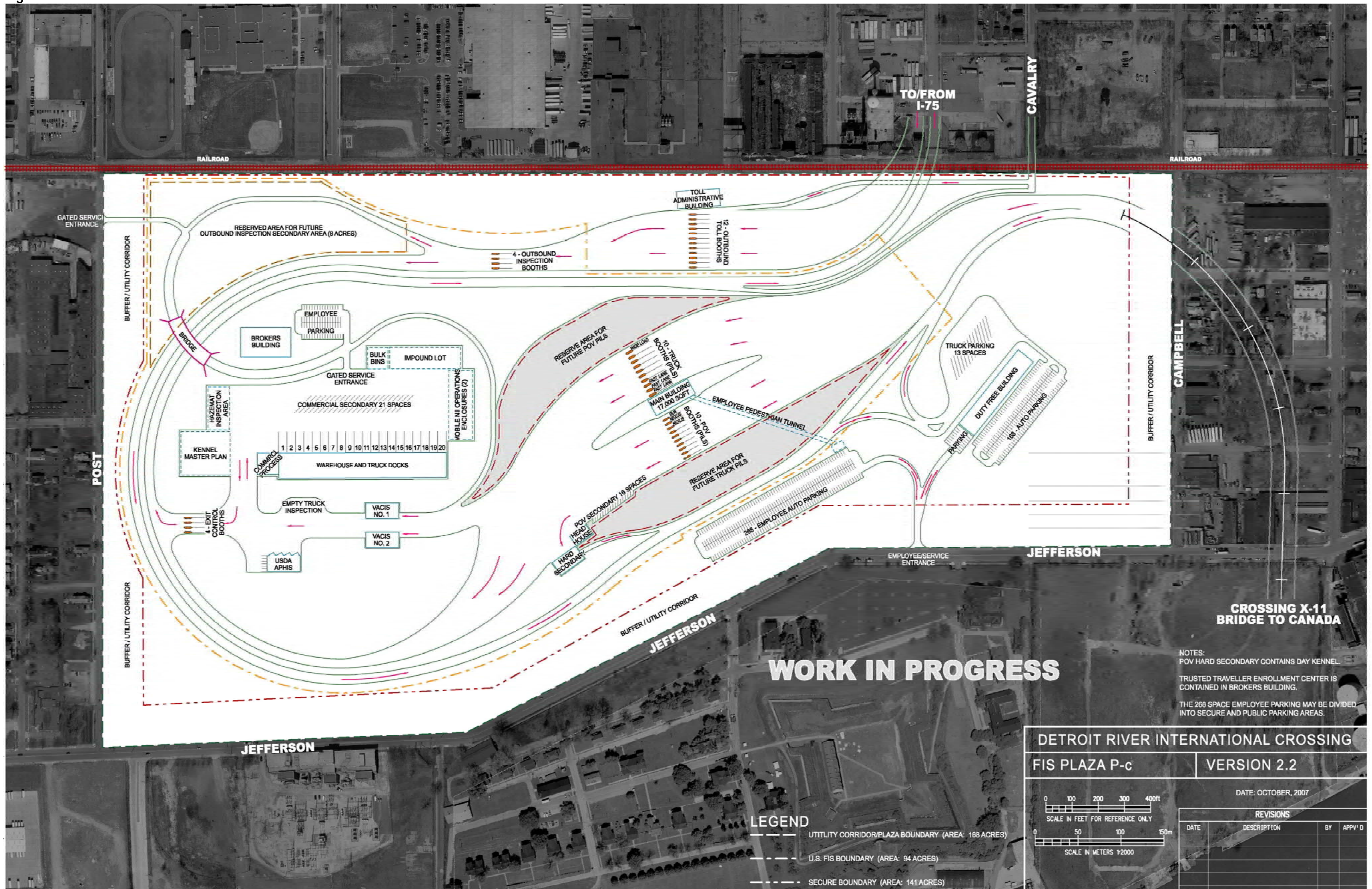
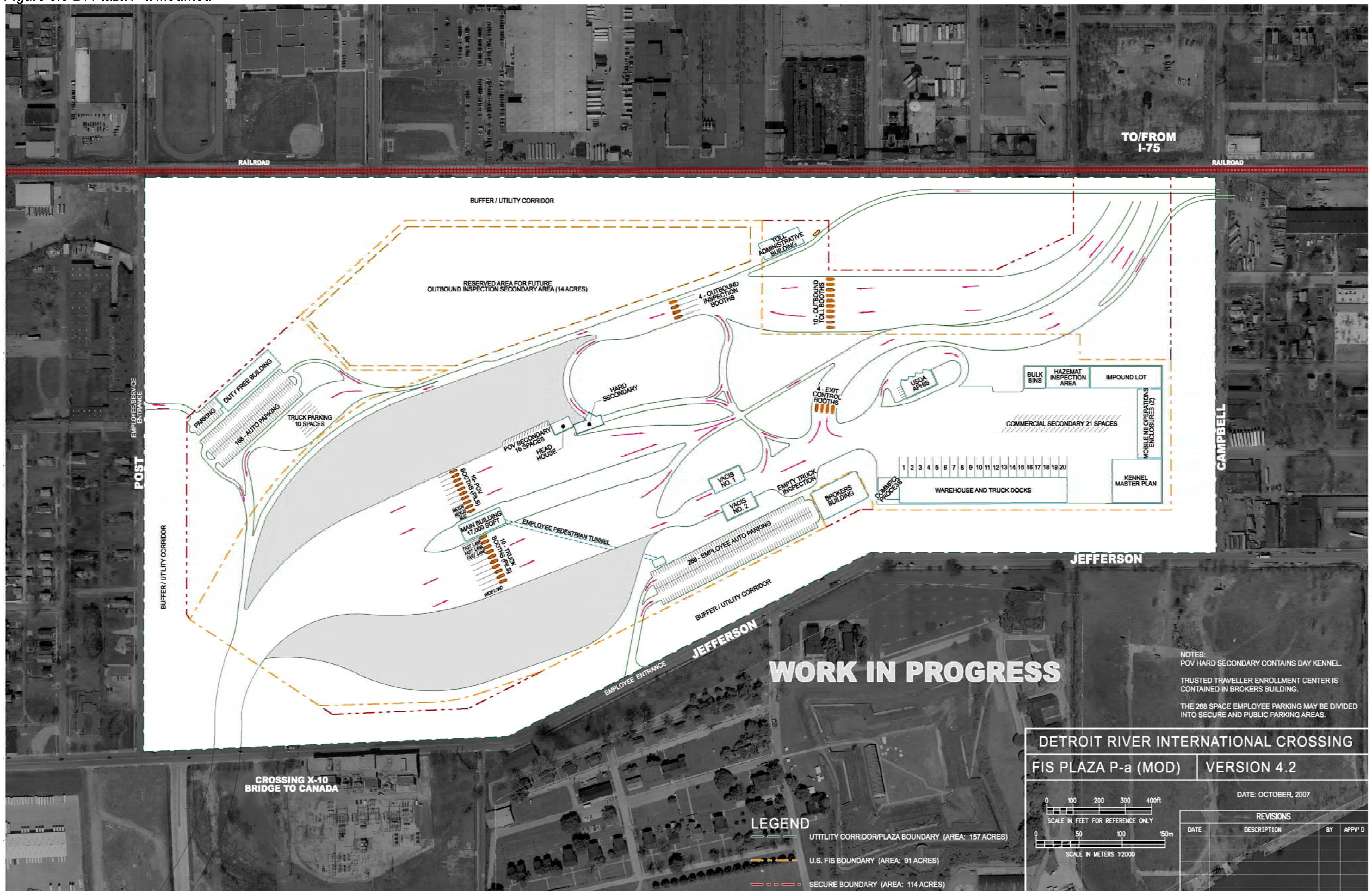


Figure 3.6-14 Plaza P-a Modified

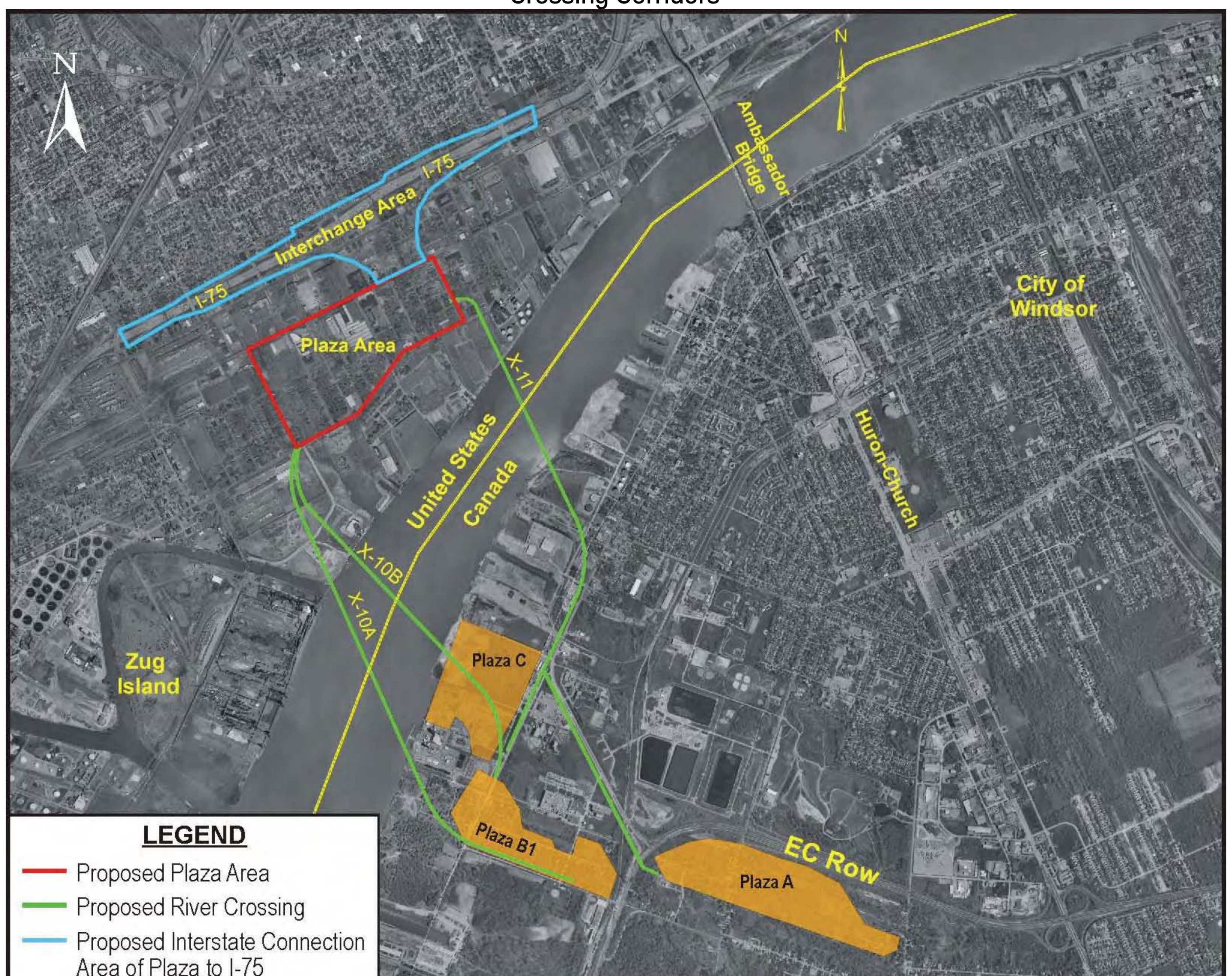


3.6.4 Main River Bridge Engineering

The Area of Continued Analysis incorporated the two river crossing corridors, X-10 and X-11. Based on the locations of the toll and inspection plaza options, geotechnical considerations, as well as the avoidance of major industries and cultural properties, three horizontal alignments were developed, X-10(A), X-10(B) and X-11(C), as shown in **Figure 3.6-15**. The bridge Options were developed through a two-step process; Phase 1 is the Bridge Type Study (TS Phase); and, Phase 2 is the Conceptual Engineering (CE Phase).

The X-10(A) alignment was developed to avoid the area near a known sinkhole from historical brine mining in Canada. The alignment starts near the location of X-10(B) in the U.S. and lands in Canada southwest of Brighton Beach Power Station. Crossing X-10(A) is not the optimum from a bridge engineering perspective, as detailed in the Type Study Report. Therefore, advancing conceptual engineering of bridge options at X-10(A) was postponed until preliminary results are obtained from the geotechnical investigation program and any other relevant project EIS studies. A final recommendation from the geotechnical investigation program is not expected until after this report is published.

Figure 3.6-15
Crossing Corridors



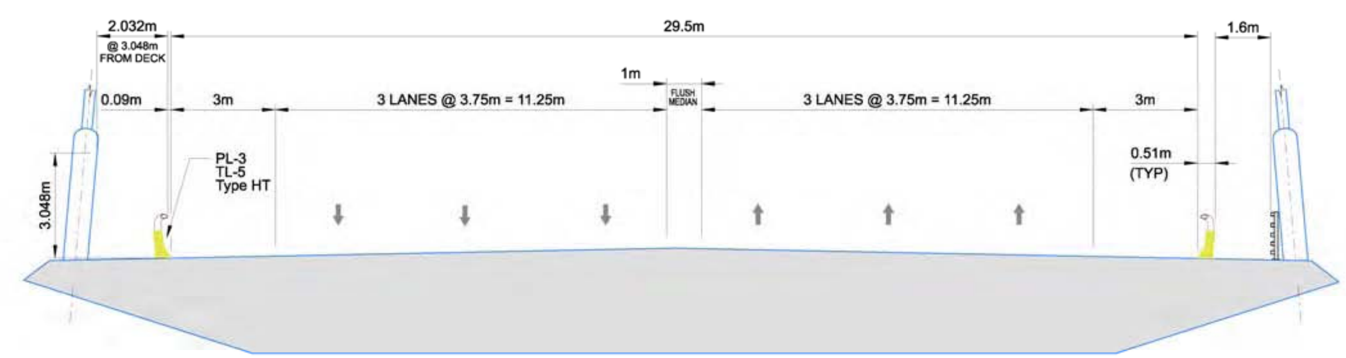
Source: The Corradino Group of Michigan, Inc.

<u>Type Study</u>

The detailed **Bridge Type Study Report**, Revision 2, dated July 2007 can be found in a technical report, bound separately. The first task was to establish a proposed roadway cross section and evaluate the project constraints. Fifteen bridge-type concepts were developed encompassing two structure types in several different configurations. These bridge types included Cable-Stay and Suspension. Configurations included suspended and unsuspended back spans, piers in the water, and piers on land.

The most significant constraint was the navigation clearance of the Detroit River. Initially a channel similar in height and width to the Ambassador Bridge was proposed. This would allow consideration of one or both main piers in the river which would substantially shorten the main span bridge lengths and have a commensurate reduction in cost. However, through consultation with the U.S. Coast Guard, Transport Canada, and project stakeholders, it was determined that piers in the water posed a significant navigation impediment and those options were eliminated because they are not practical. The bridge cross section was established as a six-lane structure with shoulders and a 1m (3-foot) flush median, see **Figure 3.6-16.**

Figure 3.6-16
Proposed Cross Section



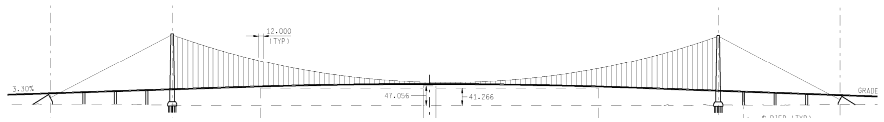
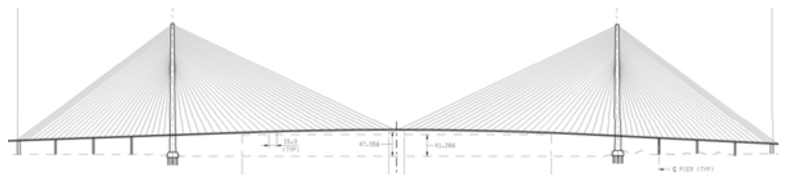
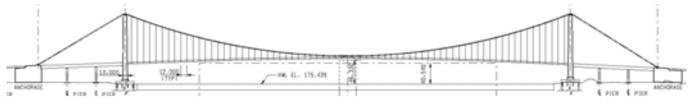
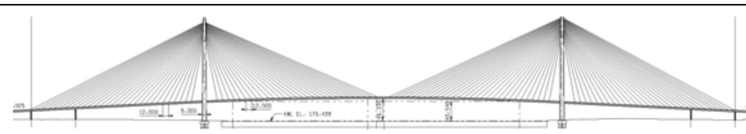
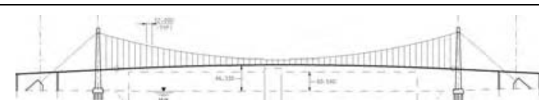
Each of the bridge-type concepts was evaluated against the same evaluation criteria used in the Illustrative Alternatives analysis. These criteria were broken into sub-criteria and a team of bridge experts evaluated each bridge type against those criteria. Based on that evaluation, the bridge concepts shown in **Table 3.6-1** were advanced to the Conceptual Engineering phase.

<u>Type Study Key Findings</u>

The key findings of the Bridge Type Study were:

- Cost, cost risk, schedule duration, schedule risk, and vulnerability to ship impact were the major differentiators between the bridge types.
- Piers placed in the Detroit River while producing a lower cost bridge would create an unacceptable navigation hazard.
- Both suspension and cable-stay bridge types were cost competitive.
- For suspension bridges the most economical structural arrangement was an unsuspended side span.
- Crossing X-10(A) is not practical unless crossings X-10(B) and X-11(C) are eliminated due to brine well presence.

Table 3.6-1
Bridge Elevation Options

Conceptual Engineering Option Elevation	CD Option
X10(A)	
	Option 1
X10(B)	
	Option 4
	Option 7
X11(C)	
	Option 9
	Option 10

<u>Conceptual Engineering</u>

The detailed **Bridge Conceptual Engineering Report** dated December 2007 can be found in a technical report, bound separately. This report documents the development of the four (4) Practical Alternatives advanced through the Conceptual Engineering Phase.

The scope of the Conceptual Engineering Report documents the development process for the main bridge crossing the Detroit River, discuss the options developed and considered, evaluate the technical merits of those options, and provide input into the evaluation of project alternatives. For the Preferred Alternative, two bridge types, suspension and cable-stay, will be advanced for further development in the Design Phase.

The crossing locations for the Detroit River that are being considered are described in this section of the report. They include two horizontal alignments that were developed in consideration of project constraints. The alignments cross the river at skew angles of 25 degrees and 29 degrees for alignments X-10(B) and X-11(C), respectively (skew angle measured from a line perpendicular to the centerline of channel to centerline of bridge). The combination of skews and the requirement to clear span the river result in the main span lengths shown in **Table 3.6-2** that are being considered during conceptual engineering for the DRIC crossing.

Table 3.6-2. Summary of Main Span Lengths and Bridge Types

Alignment	Conceptual Engineering Option/ Sub-Option		Main Span (m) / (ft)	Bridge Type Cable-Stayed (C) Suspension (S)
X10(B)	4	Option 1a	840 / 2756	C
	7	Option 5a	855 / 2805	S
X11(C)	9	Option 1a	760 / 2493	C
	10	Option 2a	760 / 2493	S

Figures 3.6-17 through 3.6-20 show the general plan and elevation for the four structures. Full plans of the bridge options are shown in **Appendix C – Main River Bridge Plans.**

<u>Conceptual Engineering Key Findings</u>

The key findings of the Bridge Conceptual Engineering Report were:

- The major differentiator for the crossing bridges was cost. However, market forces and differences in steel and cement commodity prices at the time of construction will significantly influence the cost differentials between structure types, as well as other matters affecting cost, such as a Buy America clause.
- For Crossing X-10(B) and X-11(C) the Cable-Stayed Bridges, Options 4 & 9, were more economical than the Suspension Bridges, Options 7 & 10. The predominant reason is the costs of the anchorage foundations, which is in part due to unknowns regarding the soil conditions.
- While the structures were estimated based on North American steel sources, the sourcing of structural steel (Buy America vs. international) can have a substantial influence on cost.
- Construction durations for these structures are similar.
- No significant differentiators in technical feasibility or performance were found between the crossings.
- No environmental impact differentiators were found, with the exception of the bridge vertical profiles.

Several issues require additional investigation once a Preferred Alternative Alignment is selected. The issues include:

- Suspension bridge anchorage foundation investigation, including soil borings to support the effort.
- Sensitivity analysis of bridge cost to unit price changes for steel and concrete.
- For Cable-Stay Bridge further examination of the transition from the concrete box section to the steel box section through the pylon and over the river (including navigation, environmental impacts, cost of falsework, marine construction, one-off atypical considerations, permitting, communication/coordination with the marine community, etc.).

Figure 3.6-17 Crossing Option #4

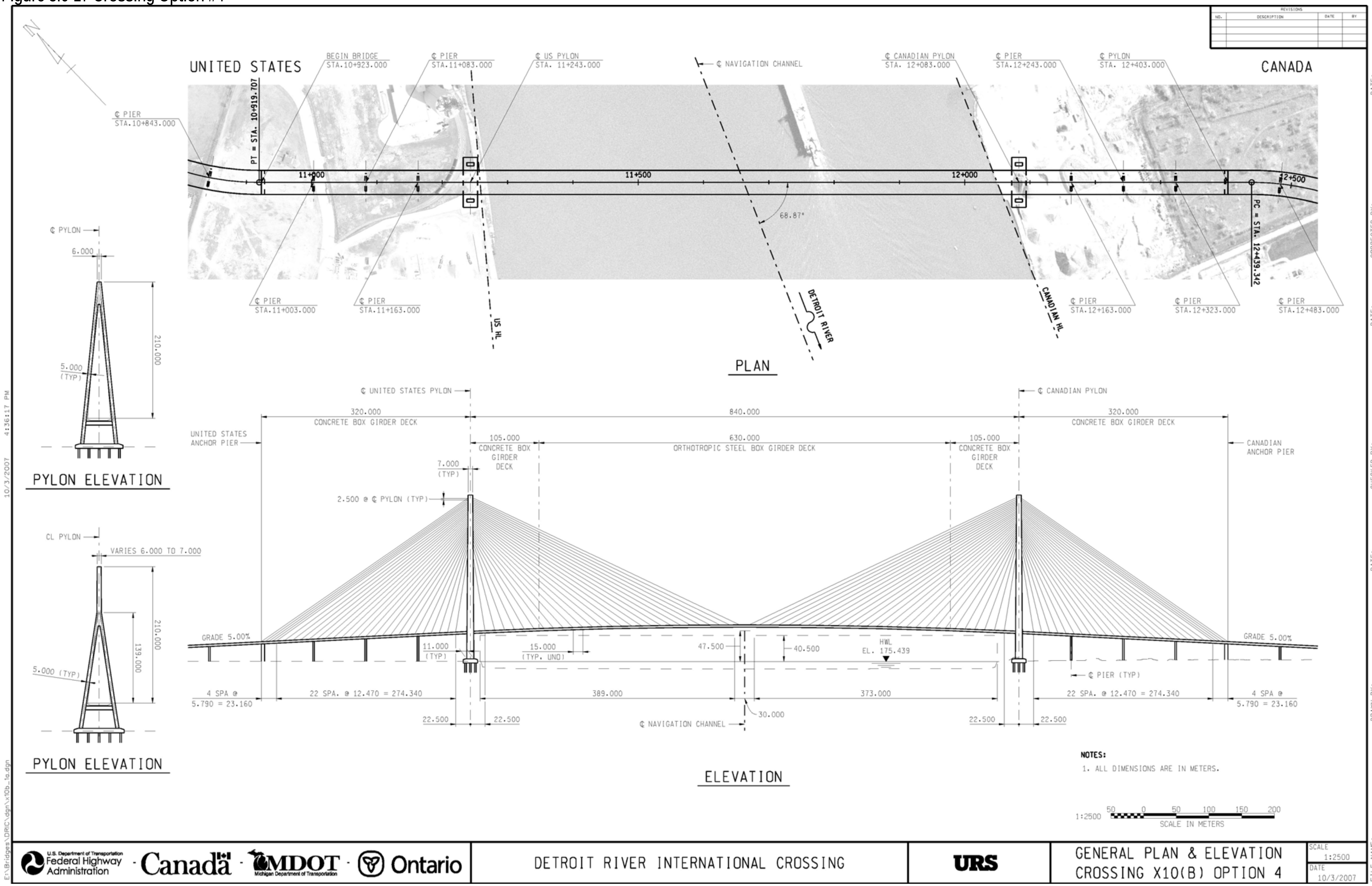


Figure 3.6-18 Crossing Option #7

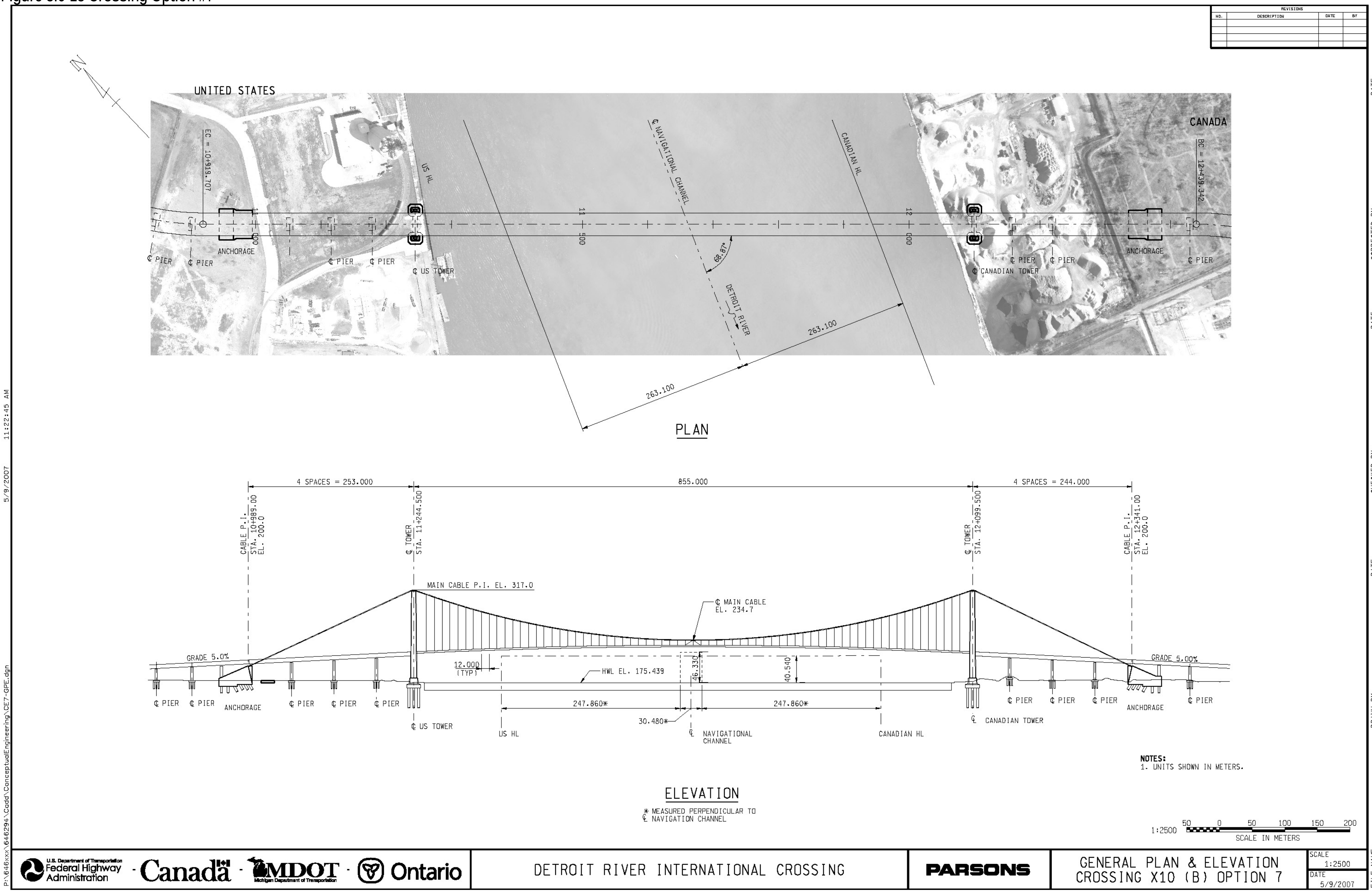


Figure 3.6-19 Crossing Option #9

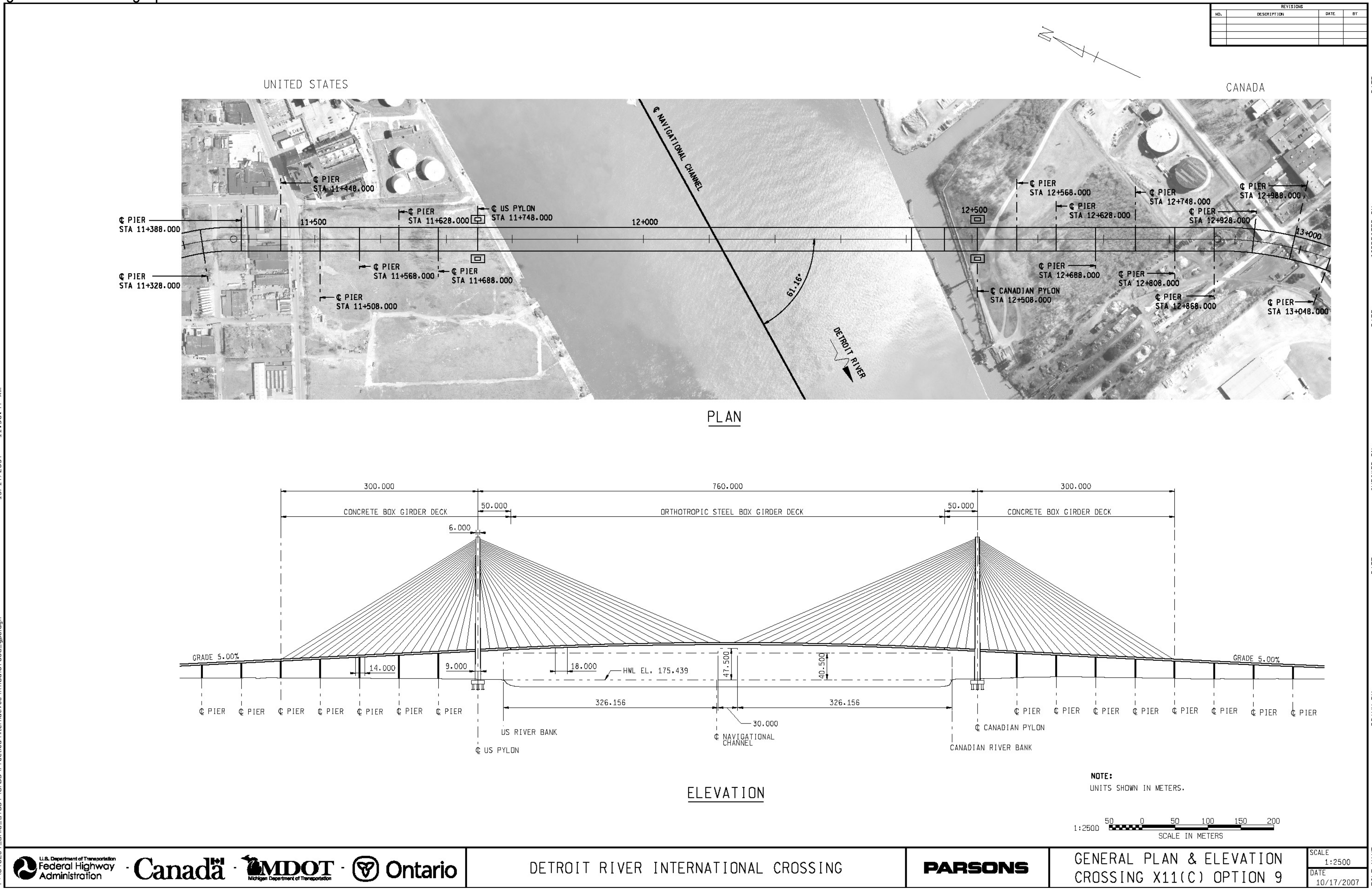
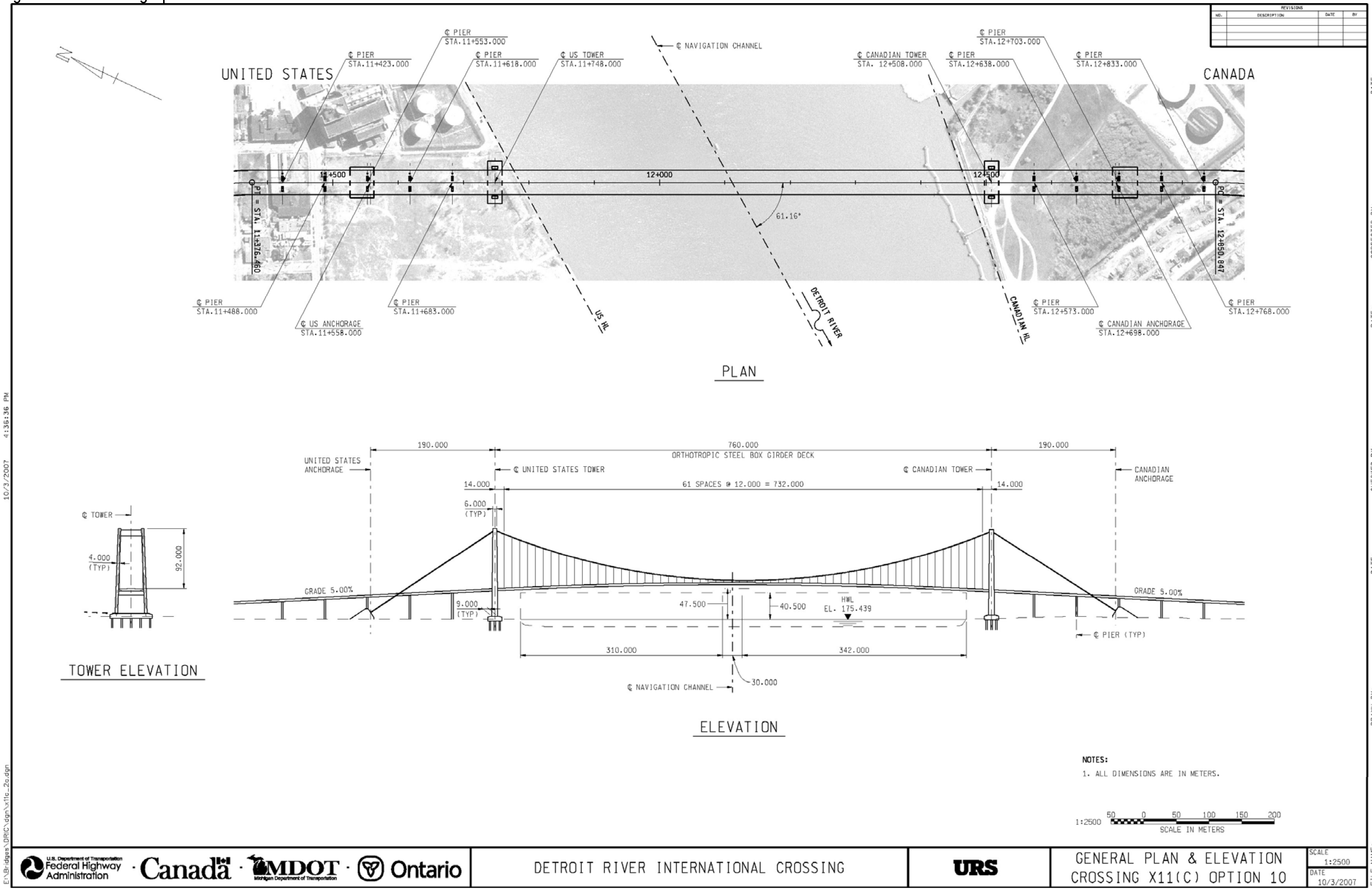


Figure 3.6-20 Crossing Option #10



3.7 Utilities

Utilities will need to be relocated for all of the options. A plaza would have more impacts to utilities than either an interchange or river crossing. Utility corridors have been provided around each plaza option to provide space for relocated utilities. Potential utility impacts and proposed utility corridor cross sections are shown in Appendix G.

3.8 Geotechnical Issues

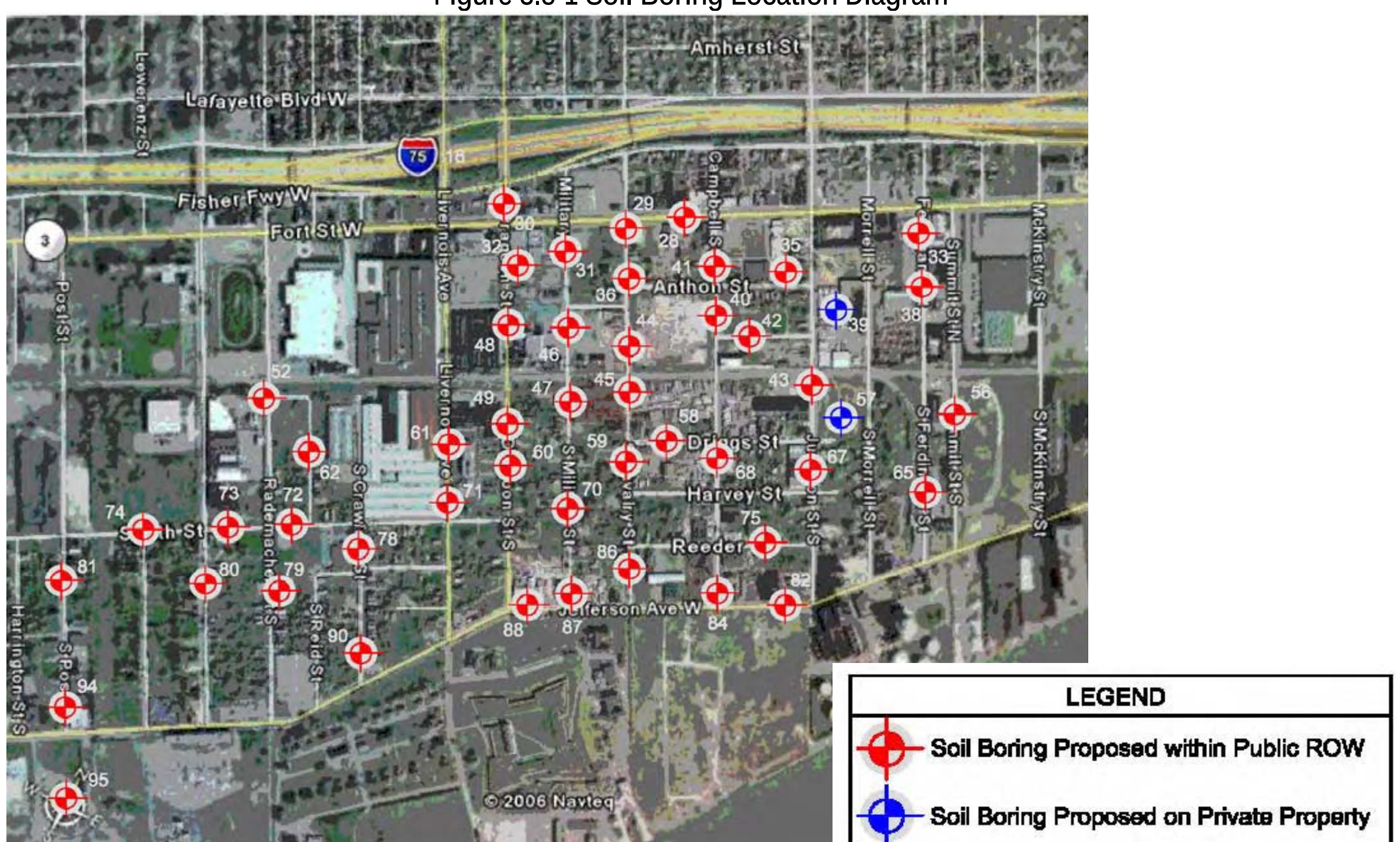
A limited geotechnical investigation of the two proposed plaza areas for the Detroit River International Crossing project was completed in August 2006. Its purpose was to obtain a general description of the subsurface conditions across the site. The description and results of the field investigation are provided below.

Description of Field Investigation

Proposed boring locations were generally spaced in a grid pattern, at 500-foot intervals, across the two proposed plaza areas. During this phase of the fieldwork, all soil borings were performed within City of Detroit streets. At the time of the investigation, authorization to drill on property parcels owned by individuals, or railroad right-of-way had not been given. Therefore, when practical, borings were moved to within the right-of-way of city streets.

A total of 45 borings were performed. (See Figure 3.8-1) All were to a depth of 3 meters (10 feet), with the exception of three borings (B-71, B-82, and B-88), which terminated on apparent obstructions at about 1.5 meters (5 feet) below grade.

Figure 3.8-1 Soil Boring Location Diagram



Generalized Description of Subsurface Conditions

A generalized description of the soils encountered in the borings drilled in the areas of the proposed plazas, beginning at the existing ground surface and proceeding downward, is provided below:

Stratum 1: Pavement. In 33 out of 45 borings, asphaltic cement concrete over Portland cement concrete pavement was encountered. The thicknesses of the asphalt pavement ranged from 5 to 23 centimeters (2 to 9 inches). The thicknesses of the concrete pavement ranged from 5 to 28 centimeters (2 to 11 inches). The pavement section typically consisted of 8 to 15 centimeters (3 to 6 inches) of asphaltic cement concrete over 15 to 25 centimeters (6 to 10 inches) of Portland cement concrete. (In boring B-52, alternating layers of asphaltic cement concrete and Portland cement concrete were encountered to a depth of 0.5 meters (1.5 feet) below the pavement surface).

Table 3.8-1 summarizes the pavement conditions encountered in the remaining 12 borings.

Table 3.8-1 Pavement Conditions

Pavement Description	No. of Borings	Boring Designations
6 inches of Portland cement concrete	2	B-42, B-58
5 to 8 inches of asphaltic cement concrete	3	B-35, B-36, B-45
2 to 4 inches of asphaltic cement concrete over a 4 inch brick layer	2	B-40, B-41
4 to 9 inches of asphaltic cement concrete over 4 to 8 inches of crushed concrete fill	5	B-33, B-49, B-56, B-73, B-80

Stratum 2: Fill. Fill or possible fill soils were encountered beneath the pavement in all borings. These soils consisted primarily of mixtures of clay, silt, sand, and gravel. Brick layers, however, were encountered in borings B-70, B-82, and B-87. The fill materials extended to depths ranging from about 0.3 meters (1 foot) beneath the pavement surface to the boring termination depths of 1.5 to 3 meters (5 or 10 feet).

Stratum 3A: Silt. Layers of clayey silt or sandy silt were encountered beneath the fill soils in borings B-28, B-44, B-45, B-48, B-52 and B-90. The silt soils extended to depths ranging from about 1.5 to at least 3 meters (8 to at least 10 feet), and had apparent densities ranging from loose to medium dense.

Stratum 3B: Clay. Natural brown or gray silty clay soils were encountered in all borings, except those that terminated in fill materials, or in borings B-45, B-52, and B-90, which terminated in silt soils. The consistencies of these clay soils ranged from soft to hard. When encountered, the natural clay soils extended to the termination depths of the borings, or 3 meters (10 feet).

Groundwater was encountered during drilling in borings B-46, B-78, and B-84, at depths ranging from 5 to 8± feet below grades. Upon completion of drilling, groundwater was measured in only one boring, B-46, at a depth of approximately 2 meters (7 feet).

The majority of the soil profile across the site, beneath the fill soils, consists predominantly of clay soils. Therefore, a longer time may be required for the water level in the borings to reach an equilibrium position. The depth at which the soil color changes from brown to gray is frequently indicative of the long-term groundwater level.

Based on the available groundwater and soil information, it is estimated that the long-term groundwater level in the area of the proposed plazas is situated at about 1.7 to 2.7 meters (5.5 to 9 feet) below existing grades.

Geotechnically Related Construction Considerations

It is anticipated that the future plaza area will consist of building and pavement structures, as well as landscaped areas.

Pavement overlying fill soils was encountered in each of the 45 borings. Prior to the placement of engineered fill or construction of new pavement or slabs-on-grade, the existing pavement will need to be completely removed. The existing fill soils encountered in the borings are generally considered suitable for support of pavement and slabs-on-grade, provided they are properly prepared. Typical subgrade preparation includes proofrolling and compaction. It is possible that removal and replacement of existing fill soils will be required if organic or deleterious materials are encountered during construction activities.

Foundations constructed on fill soils are not recommended. Any foundations constructed within the plaza area must extend through the existing fill soils to the underlying natural silt or clay. As an alternative, the existing fill soils could be removed and replaced with granular engineered fill. It should be noted that in several of the borings the fill soils extended to depths of at least 3 meters (10 feet) (the boring termination depth). It is probable that deeper fill soils and building rubble will be encountered on property parcels outside of the right-of-way of the city streets.

As stated previously, obstructions were encountered at an approximate depth of 1.5 meters (5 feet) below grade in borings B-71, B-82 and B-88. Generally, obstructions are expected within this area of Detroit due to previously existing roads and houses. (It is common for entire basements to be backfilled with building debris). Significant obstructions may result in construction delays and budget issues.

Voids were encountered beneath a brick layer in borings B-70 and B-87. It is assumed the voids may be old, abandoned brick sewer tunnels. (The obstructions encountered in borings B-71, B-82 and B-88 also indicate the presence of abandoned brick tunnels). Depending on the proposed design of the plaza, these old tunnels may need to be backfilled.

Additional Geotechnical Investigations

In May 2007, soil borings on six city parcels were performed. A generalized description of the soils encountered in the six additional borings, beginning at the existing ground surface and proceeding downward, is provided below:

Stratum 1A: Topsoil. A 65-centimeter (26-inch) topsoil layer in boring B-101 and an 18-centimeter (7-inch) topsoil layer in boring B-106 were reported.

Stratum 1B: Pavement. Asphaltic cement concrete and associated base material was encountered from the surface of boring B-102 and B-103. In boring B-102, 6.4 centimeters (2.5 inches) of asphalt underlain by about 8.9 centimeters (3.5 inches) of broken concrete was reported. In boring B-103, 5 centimeters (2 inches) of asphalt and 30 centimeters (12 inches) of pavement base material, consisting of coarse sand and gravel were encountered.

Stratum 2: Fill/Possible Fill. Fill or possible fill soils were encountered from the surface of borings B-104 and B-105, and beneath the topsoil or pavement in the other borings. These soils consisted primarily of medium-dense to very loose and sand soils, occasionally mixed with topsoil or silty clay. However, in boring B-104, a layer of broken concrete was encountered beneath the sandy fill soil. The fill/possible fill materials extend to depths ranging from 1 meter to 3 meters (3 feet to 10 feet) below grade.

Stratum 3: Sand. Natural medium-dense to dense sand and gravel was encountered in all borings except B-102 and B-103. The natural sand soils were encountered beneath the fill/possible fill soils, and typically extend to the boring termination depth of 3 meters (10 feet). In boring B-101, the natural fine-to-coarse sand and gravel extend to only 2.6 meters (8.5 feet).

Stratum 4: Clayey Silt/Silty Clay. Layers of natural loose clayey silt or stiff-to-very-stiff silty clay were encountered beneath the fill/possible fill soils in borings B-102 and B-103, and beneath the natural sand in boring B-101, and extend to a depth of 3 meters (10 feet).

Groundwater was encountered during drilling in borings B-101, B-102, B-103, and B-105 at depths ranging from 0.8 meters to 2± meters (2.5 to 6± feet) below grades. Upon completion of drilling, groundwater was measured in borings B-101 through B-103 at depths ranging from 1 to 2 meters (3.5 to 7 feet).

Based on available groundwater and soil information, it is estimated that the long-term groundwater level in the area of the proposed plazas is situated at about 1.7 to 2.7 meters (5.5 to 9 feet) below existing grades.

Soil conditions at specific boring locations are provided with the Logs of Test Borings (Appendix F). It is noted that the stratification lines shown on the Logs of Test Borings are approximate indications of change from one soil type to another at the locations of the boreholes. The actual transition from one stratum to the next may be gradual, and may vary within the area represented by the test boring.

Brine Wells

The Michigan Basin is one of the largest areas of halite (salt-NaCl) deposition in the world. Halite has historically been mined either directly in solid form as rock salt or as natural or artificial brine pumped through solution mining wells. The area beneath Detroit and Windsor within the Michigan Basin is currently mined primarily using conventional room-and-pillar excavation methods. Beginning in the late 1880's, solution mining was used to extract salt. Solution mining in the proposed crossing areas was generally discontinued in the 1960's as a result of increasing concerns of surface subsidence.

Generally, known solution mining areas are located on Zug Island up river to the western end of the project study area, but the occurrence of brine wells throughout the crossing corridors cannot be precluded as undocumented wells may exist. Further, solution mining companies are known to have owned parcels of land along the river in addition to those where brine wells were documented. Generally, the brine wells extended to depths of 335 m (1,100 ft) to 460 m (1,500 ft) in the area of continued analysis.

Solution mining consists of introducing water from the surface down a well casing between an outer casing and a central tube. The brine produced from the salt dissolving in the water is recovered through the central tube. With continued production using this method, solution cavities often coalesce with adjacent cavities to form composite cavities called galleries. When this occurred historically, one or more of the wells were then converted to water inlet wells and the brine was pumped out through other wells in the interconnected system, creating a gallery.

As production continued in the gallery, large spans of unsupported roofs were sometimes created, which in turn could result in sagging, downward flexure, and local separation of rock units resulting in local roof collapse and eventual surface subsidence in some instances. Uncontrolled solution mining near the top of a salt layer commonly left overlying weak or weakened rocks exposed at the top of the cavity, which increased potential for roof collapses. The subsidence and/or collapse would progress upwards as a chimney effect on an angle from the outside edges of the cavity.

The solution mining areas are of concern for the proposed crossing locations, as they present the potential for future ground subsidence and related adverse effects on elements of the proposed crossing structure. Due to the concerns regarding solution mining an extensive field investigation program has been completed. Preliminary analysis of the field data has been completed.

Conclusions

Based on the data gathered and analyzed to date in the US, no large cavities have been observed in either crossing corridor, greater than 38.1m wide by 6.1m high (125 ft by 20 ft) and 45.7m wide by 9.1m high (150 ft by 30 ft) for X-10 and X-11 respectively, nor is there evidence of potential instability of the rock mass within the crossing corridors. In fact, the analysis shows that the observed anomalies have probably been filled by one of several mechanisms. In addition, even for the largest of the anomalies discovered, and assuming an unfilled cavern, the anomaly is stable, and will not progress upward any significant distance. Nonetheless, it is noted that, at this time, all data have not been interpreted, in the final sense, to provide complete conclusions regarding the presence or absence of all possible voids within the subject crossing corridors under study. As the analyses move forward, additional results will be documented, and included in subsequent drafts of this report.

3.9 DRAINAGE

This section summarizes the existing drainage system in the DRIC study area and identifies the potential major impact of the proposed improvements.

Combined Sewer System

The study area is generally flat with a general ground elevation of approximately 180 meters (590 feet). Storm water throughout the study area is routed to combined sewers that fall under the jurisdiction of the Detroit Water and Sewerage Department (DWSD). These combined sewers are between 55 and 100 years old as shown in the *DWSD Wastewater Master Plan Project – Review of collection System Regulators and Outfalls (CS-1314)* report which was found on the DWSD website.

Sewer Outfalls

There are nine main sewer outfalls within the study area. The sewer flow collected in the DWSD combined sewers outlet to eight outfalls along the Detroit River and one outfall along the Rouge River. These outfalls range in size from 1.4 meters to 4 meters (4.5 feet to 13 feet) in diameter. Most outfalls are a combination of two or more pipes. There are a total of 19 pipes or box culverts which make up the 9 outfalls. See Table 3.9-1 and Table 3.9-2 for outfall information and capacities. Existing sewer outfalls are identified in Figure 3.9-1.

Impacts to the Existing System

Existing storm sewers along I-75 and the service drives that conflict with the proposed ramps and expansion will need to be removed. The existing combined secondary sewer lines will allow lateral connections for the proposed ramps and expansion. A list of impacts for each interchange option is provided below. A diagram of the impact area is shown in Figure 3.9-1.

Table 3.9-1
Existing Outfalls

Outfall ID #	MDEQ Permit #	Outfall Location	Year Built	Sewer	Material / Shape	Size	Length (ft)	Downstream Invert (ft)	Upstream Invert (ft)
B35	037	McKinstry & Jefferson	1927	McKinstry	Brick / Cylinder	2 @ 4.5'	950	91.30	94.00
							950	91.30	93.61
B36	038	Summit & Jefferson	1922	Clark-Summit	Concrete / Box	3 @ 8'-8" x 7'-6"	600	88.00	88.30
B37	039	Ferdinand & Jefferson	1950	Ferdinand	Concrete / Cylinder	2 @ 4.5'	130	93.30	94.10
B38	040	Morrell & Jefferson	1912	Morrell	Brick / Cylinder	4 @ 5'-0"	880	91.00	91.00
B39	041	Junction & Jefferson	1928	Calvary	Concrete / Cylinder	13'-0"	890	81.30	81.80
B40	042	Campbell & Jefferson	1908	Campbell	Brick / Cylinder	1 @ 6.5', 6.3' & 6.2'	1078	93.21	94.40
B41	043	Dragoon & Jefferson	1952	Livernois Relief	Concrete / Cylinder	10'-6"	2353	85.20	85.70
B42	044	Schroeder & Jefferson	1938	Schoeder	Brick / Cylinder	1 @ 6'-0"	1200	93.60	95.60
						1 @ 6.8'	1200	93.60	94.20
B44	046	Cary & Jefferson	1946	Cary	Brick / Egg	3.3' x 5.3'	447	94.53	96.53

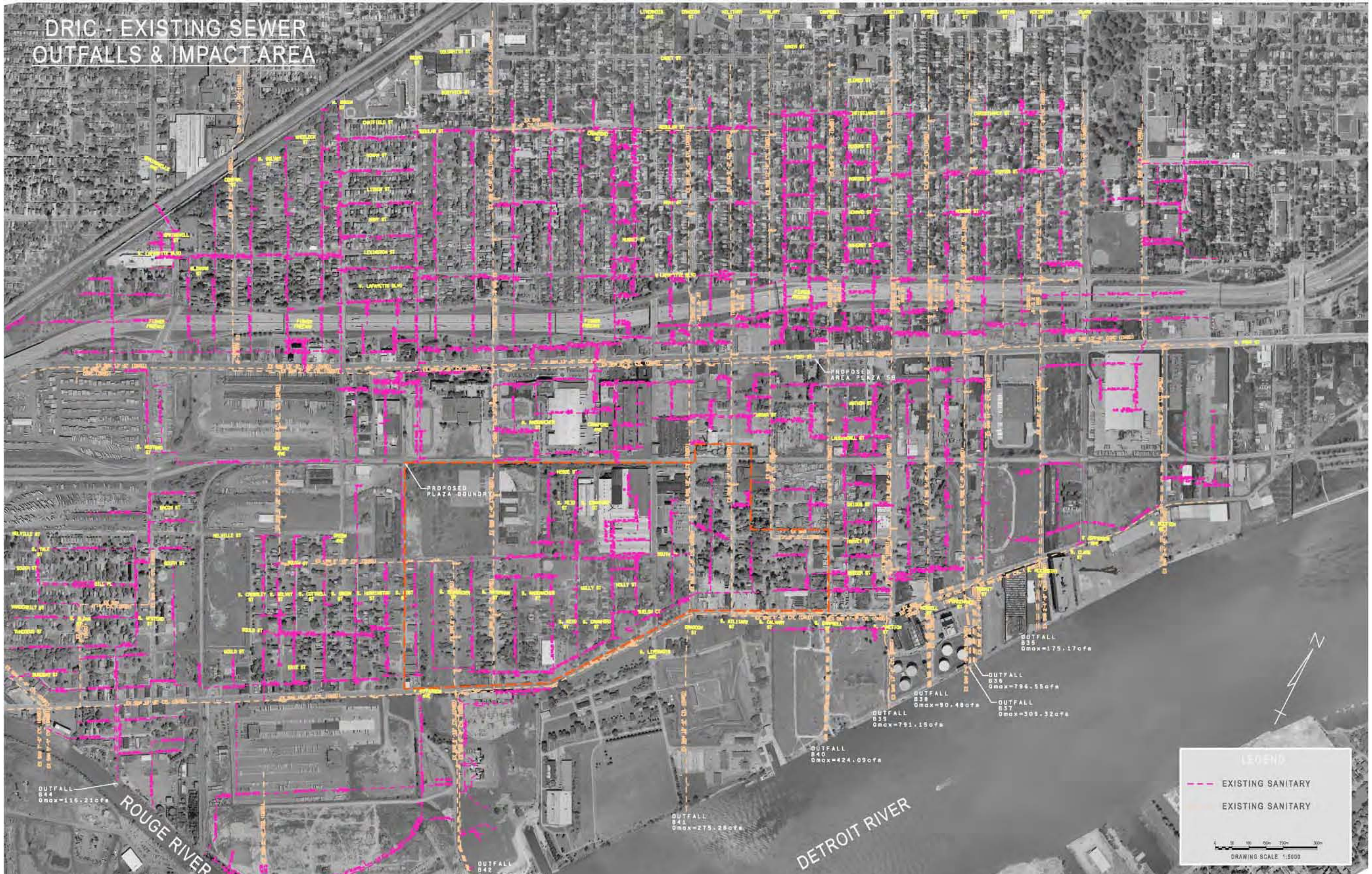
Notes:
1) Outfall information is from the DWSD Wastewater Master Plan Project # CS-1314 Review of Collection System Regulators and Outfalls
2) Refer to http://dwsd.org/about/wastewater/volume2/Review_of_Collection_System_Regulators_and_Outfalls.pdf
3) Refer to "C_EXUTIL_ExSewerExibit.pdf" for Outfall ID # locations

Table 3.9-2
Existing Maximum Capacity

Outfall ID #	Outfall Location	Material / Shape	Size	Length (ft)	Downstream Invert	Upstream Invert	Slope (ft/ft)	Manning's n	Area (ft^2)	Wetted Perimeter	Hydraulic Radius	Max Q (cfs)
B35	McKinstry & Jefferson	Brick / Cylinder	4.5'	950	91.30	94.00	0.0028	0.015	15.90	14.13	1.13	91.09
			4.5'	950	91.30	93.60	0.0024	0.015	15.90	14.13	1.13	84.07
											Total for Outfall =	**175.17**
B36	Summit & Jefferson	Concrete / Box	8'-8" x 7'-6"	600	88.00	88.30	0.0005	0.013	65.03	32.34	2.01	265.52
			8'-8" x 7'-6"	600	88.00	88.30	0.0005	0.013	65.03	32.34	2.01	265.52
			8'-8" x 7'-6"	600	88.00	88.30	0.0005	0.013	65.03	32.34	2.01	265.52
											Total for Outfall =	**796.55**
B37	Ferdinand & Jefferson	Concrete / Cylinder	4.5'	130	93.30	94.10	0.0062	0.013	15.90	14.13	1.13	154.66
			4.5'	130	93.30	94.10	0.0062	0.013	15.90	14.13	1.13	154.66
											Total for Outfall =	**309.32**
B38	Morrell & Jefferson	Brick / Cylinder	5.0'	880	91.00	91.00	0.0001	0.015	19.63	15.71	1.25	22.62
			5.0'	880	91.00	91.00	0.0001	0.015	19.63	15.71	1.25	22.62
			5.0'	880	91.00	91.00	0.0001	0.015	19.63	15.71	1.25	22.62
			5.0'	880	91.00	91.00	0.0001	0.015	19.63	15.71	1.25	22.62
											Total for Outfall =	**90.48**
B39	Junction & Jefferson	Concrete / Cylinder	13'-0"	890	81.30	81.80	0.0006	0.013	132.73	40.84	3.25	791.15
											Total for Outfall =	**791.15**
B40	Campbell & Jefferson	Brick / Cylinder	6.5'	1078	93.21	94.40	0.0011	0.015	33.18	20.42	1.62	151.35
			6.3'	1078	93.21	94.40	0.0011	0.015	31.17	19.79	1.58	139.26
			6.2'	1078	93.21	94.40	0.0011	0.015	30.19	19.47	1.55	133.48
											Total for Outfall =	**424.09**
B41	Dragoon & Jefferson	Concrete / Cylinder	10'-6"	2353	85.20	85.70	0.0002	0.013	86.59	32.99	2.62	275.28
											Total for Outfall =	**275.28**
B42	Schroeder & Jefferson	Brick / Cylinder	6.0'	1200	93.60	95.60	0.0017	0.015	28.27	18.85	1.50	150.21
			6.8'	1200	93.60	94.20	0.0005	0.015	36.32	21.36	1.70	114.93
											Total for Outfall =	**265.13**
B44	Cary & Jefferson	Brick / Egg	3.3' x 5.3'	447	94.53	96.53	0.0045	0.015	17.49	17.49	1.00	116.21
											Total for Outfall =	**116.21**

Notes:
1) Outfall information is from the DWSD Wastewater Master Plan Project # CS-1314 Review of Collection System Regulators and Outfalls
2) Refer to http://dwsd.org/about/wastewater/volume2/Review_of_Collection_System_Regulators_and_Outfalls.pdf
3) Refer to "C_EXUTIL_ExSewerExibit.pdf" for Outfall ID # locations
4) Capacities are based on Mannings equation assuming Pipes are flowing full

Figure 3.9-1 Existing Sewer Outfalls and Impact Area



The existing ground within the proposed plaza location has an elevation of about 180 meters (590 feet) and the proposed plaza could have an elevation up to 190 meters (620 feet). Assuming that the Plaza area is to be significantly higher than the surrounding ground, it is hydraulically possible to utilize the same outfalls. However, other factors may need to be considered before using the outfalls for this major development.

The most significant and costly impact to the existing drainage system is the relocation of DWSD combined sewers and secondary sewers that run underneath the proposed plaza area. These sewers are planned to be rerouted around the plaza area via the proposed utility corridor.

Additional analysis will need to be done on regional conveyance, downstream conveyance, detention, and water quality. These items are not part of this evaluation.

Interchange Options

Each of the interchange options has been studied to determine the major impacts to the existing drainage system. The following is a summary of those impacts. There are multiple DWSD sewers in the project area. Many of these will be able to be used as outfalls for the proposed drainage systems along the ramps and plaza. Based on preliminary study, it appears there are enough outfalls for the proposed drainage systems. Some of the ramps include undercuts; however most of the undercuts do not seem to be deep enough or at a location that would effect a major storm sewer line. The undercuts which may have impacts on the proposed geometry are listed for each interchange.

Because of existing drainage systems along the I-75 corridor, some existing pipes may have to be connected to the proposed storm sewers due to conflicts. Accepting existing flows into the proposed system will thereby require an increase in the size of proposed systems. The preliminary proposed drainage system will have to be designed to determine the validity of this situation. In general, special attention is required during the design to ensure that adequate cover is provided over the existing sewers.

The anticipated drainage issues associated with each proposed interchange option are summarized below.

<u>Interchange A and B (formerly Interchange 1 and 2)</u>

No major drainage issues specific to these interchanges can be seen at this time.

<u>Interchange C (formerly Interchange 3)</u>

- Major undercutting will occur along the new I-75 alignment. The proposed sewer system is dependent on the finalized alignment and profile of the re-designed I-75 alignment.

<u>Interchange D (formerly Interchange 4)</u>

- The majority of Ramp C is above the existing ground surface. There is a portion of undercut from approximately 31+100 to 31+500 of approximately 2 meters (6 feet). There are 3 DWSD sewers crossing in the area of the undercut. The depth of the sewers is not known at this time.
- The majority of the NB Service Drive is along the existing ground surface. There is a portion of undercut from approximately 60+650 to 61+200 of approximately 4 meters (12 feet) to pass under Ramp A. There is a DWSD sewer crossing in the area of the undercut. The depth of the sewers is not known at this time.

<u>Interchange E (formerly Interchange 6)</u>

- There is a portion of undercut along Ramp E from approximately 0+700 to 1+100 of approximately 9 meters (30 feet) to pass under Ramp A. There is a DWSD sewer crossing in the area of the undercut. The depth of the sewers is not known at this time.
- There is a portion of undercut along Ramp F from approximately 0+100 to 0+300 of approximately 5 meters (15 feet) to pass under Ramps B and C. There is a DWSD sewer crossing in the area of the undercut. The depth of the sewers is not known at this time.

<u>Interchange F (formerly Interchange 5)</u>

- There is a large amount of undercut in Ramp A. The portion of undercut is from approximately 11+200 to 12+800 and has a maximum depth of roughly 9 meters (30 feet). There are multiple secondary sewers crossing in the area of the undercut. The depth of the sewers is uncertain at this time. It is likely that existing sewers will need to be lowered or rerouted to avoid the undercut. It is uncertain at this time if there is an outlet low enough to drain the lowest portion of roadway.
- Also there are similar situations where special attention is required during the design to ensure that adequate cover is provided over the existing sewers.

<u>Interchange G</u>

- There is undercutting on the northbound service drive under Proposed Ramp A and Ramp B. The undercutting will probably be between two and three meters. This should not have a large impact on the project.

<u>Interchange I</u>

- There is reconstruction of the northbound service road, which may involve some undercutting. Existing sewer depths will have to be located to assure there are no conflicts. This should not have any large impact on the project.

3.10 Project Phasing

This section summarizes the potential construction contracts, construction durations, and project sequencing. At this time, the discussion is general in nature and applies to all nine Practical Alternatives. As the project progresses, this information will be refined to reflect the proposed project phasing of the Preferred Alternative.

All of the alternatives include the following common construction elements:

- Main River Span and approach spans
- Toll and Inspection Plaza
- Four I-75 interchange ramps connecting I-75 to the Plaza
- Reconstruction of the one-way Service Drives on each side of I-75
- Elimination of several crossroad bridges over I-75 and reconstruction of others, including U-Turn movements
- Elimination of select local ramps and reconstruction and/or relocation of others
- Improvements to a local roadway corridor to serve as a “Gateway Corridor” into the neighborhood surrounding Historic Fort Wayne
- Widening of I-75 for the addition of auxiliary lanes associated with ramp terminals only.
- Major utility modifications or relocations required for the construction of the plaza, crossroad bridges, and widening of I-75

- Remediation of hazardous soil contamination
- Potential traffic mitigation improvements to local roads

In addition, Practical Alternatives #3 and #11 include the reconstruction of I-75 on an offset alignment to the south, from west of Livernois Ave. to Clark Street

The following goals were identified prior to developing the proposed construction staging and preliminary Project Sequencing Schedule:

- Maintain local access across I-75 during construction

  Considering Livernois and Dragoon as a single crossing (they are now one-way southbound and northbound, respectively), there are six crossings within the corridor including Springwells Street and Clark Street. Prior to the completion of a detailed traffic analysis of detoured traffic, the desire would be to maintain four of the crossings during all phases of construction. All alternatives ultimately will provide four crossings except Alternatives #2, #9, and #16 which would provide five.

- Complete construction of the "Gateway Corridor" early in the project

  Because each of the Plaza Options disrupts the continuity of several north-south local streets, the construction of a new corridor between Fort Street and Jefferson Avenue is vital for the area's circulation. Also, completing a high-profile access link to Historic Fort Wayne and the surrounding area will have positive effects.

- Provide for continuity of east-west local travel along the I-75 corridor

  There are two factors that drive the need for this: 1) closures of existing ramps and crossroads which will limit access along the corridor; and, 2) traffic wanting to avoid the congestion on I-75 due to construction within the corridor will require a reasonably continuous alternate route.

  Fort Street, which is two-way and parallels the project corridor on the south side from Springwells Street to Clark Street, would be an excellent detour route during the construction of the northbound Service Drive and work along I-75. Proposed work along Fort Street is currently envisioned to only include intersection improvements and possible minor construction impacts due to the interchange ramps crossing Fort Street

  Lafayette Boulevard, on the north side of I-75, is not continuous from Clark Street to Springwells Street but, when combined with the existing southbound Service Drive from Clark Street to west of Junction Street, a continuous southbound corridor could be provided as far as Beard Street on the west. With a short jog to the north on Beard Street, access to Springwells Street can be continued on Lafayette Boulevard.

- Provide multiple local access points to and from I-75 along the corridor during construction.

  The closure of crossroads across I-75 will cause traffic to find alternate routes. Because of the full diamond interchanges at Springwells Street and Clark Street, these streets will undoubtedly realize an increase of traffic. Maintaining the existing Springwells Street and Clark Street ramp movements until Ramps E, F, G and H are completed will facilitate local access.

Construction Contracts

If a conventional design/bid/build project implementation approach is pursued, the following construction packages are suggested:

- Hazardous Soil Contamination Remediation.
- Utility Relocations in multiple packages to allow for variable utility design schedules, procurement of long lead time items, similar types of utility construction, and/or to meet the desired sequence of construction. (Relocation contracts will also have to be separated out by public and private utilities since they are processed differently.)
- "Gateway Corridor" improvements
- Service Drives and local ramps including related minor utility modifications or relocations. This work could be split into multiple contracts based on logical segments for traffic operations, or size of contract.
- Removal and replacement of crossroad bridges over I-75, including the roadway approaches and intersections with the Service Drives. This work could also be split into several separate contracts.
- Toll and Inspection Plaza. This work could be split between discreet facilities with the Federal Agency facilities being constructed separately from State and Private facilities, such as the Toll and Duty Free elements.
- Main span and approach spans up to plaza. Advance acquisition for long lead items such as cable wire could be undertaken concurrently with utility relocation.
- Interchange ramps from plaza to I-75, including widening work along I-75. Interface with Service Drive work will require coordination or splitting of work between contracts.

Other project implementation methods, such as Design/Build or Public Private Partnership, would modify the contract packaging, although the general sequencing would likely remain the same.

Construction Durations for Project Elements

The local street and interchange roadway/bridge improvements were divided into "Units" of construction for estimating construction durations. A 400-meter (1300-foot) segment corresponding to the distance between cross-roads was used for the road work. The MDOT Critical Path Construction Time Estimates were used for the individual operation rates. Use of these estimates provides a conservative estimate for the potential duration of construction activity. Accelerated schedules may ultimately be used when constructing certain portions of this project. A more detailed construction schedule will be developed as the project proceeds through final design. Appendix E includes a spreadsheet for each "Unit" which lists the work element, assumed work rates, and other assumptions used to develop the durations. The following general assumptions were used:

- A single crew for a specific work element, unless noted
- The durations have been developed without overtime, double shifts or weekend work, except for work requiring off-peak traffic restrictions on I-75
- An average of 19 Work Days/month
- Overlap of activities when feasible as noted
- The interchange ramp work between the plaza and the ramp structures can be accomplished within the duration of the ramp structure work.

The "Units" and the corresponding durations, rounded to the nearest month, with 3 months minimum, are summarized in Table 3.10-1. Combinations of these durations and other elements can be used to determine a conceptual Project Sequencing Schedule.

Table 3.10-1 Construction Duration Units

Unit No.	Description	Duration (months)
1	Removal of Crossroad bridge with no Replacement (each)	3
2	Removal of Crossroad bridge with construction of new bridge (each)	7
3	Construction of a 400m (1300 ft) segment of Service Drive (including 50m of retaining wall)	6
4	Construction of a 400m (1300 ft) segment of a single direction of the "Gateway Corridor"	3
5	Widening of a 400m (1300 ft) segment of I-75 (including 150m of retaining wall)	5
6	Reconstruction of a 1600m (5300 ft) length of I-75 on an offset alignment (Alternatives 3, and 11 only)	18
7a	Construction of 4-span interchange ramp bridge (each)	7
7b	Construction of 7-span interchange ramp bridge (each)	10

In addition to the unit durations listed above, the Table 3.10-2 summarizes the durations for other construction elements.

Table 3.10-2 Other Construction Durations

Project Element	Construction Durations
Hazardous Soil Contamination Remediation	6-9 months/area
Utility relocations for the construction of the Plaza	*
Utility relocations to the "Utility Corridor" required for the construction of the "Gateway Corridor"	*
Utility modifications/relocations for the construction of the Service Drives, Crossroad bridges, and widening of I-75	*
Utility relocations for the construction of the Main Span and approach spans	*
Inspection and Toll Plaza	36 months**
Main River Span; Corridors X-10B or X-11 and approach spans including advance acquisition and fabrication Corridor X-10A and approach spans including advance acquisition and fabrication	4 years** 5 years**

* MDOT is currently reviewing the scope of the utility relocations required for each Alternate, including the estimated durations and costs.
** These estimates are based on similar projects.

3.11 Maintenance of Traffic

The following general Maintenance of Traffic (MOT) approach (Table 3.11-1) is recommended for each of the main project elements:

Table 3.11-1 Maintenance of Traffic Approach

Project Element	MOT Approach
Utility relocations for the construction of the Plaza	Local road lane closures as required
Utility modifications/relocations for the construction of the cross-road bridges, and widening of I-75	I-75 lane closures as required. However, open cuts across I-75 not anticipated
Utility relocations for the construction of the Main River Span and approach spans	Local road lane closures as required
Toll and Inspection Plaza	Closure of intersecting streets; lane closures for local access ramps
Main River Span and approach spans	Minimal impact; possible lane closures on local roads.
One-way Service Drives on each side of I-75. (Unit No. 3)	Detour the NB Service Drive traffic to Fort Street. Detour the SB Service Drive traffic to Lafayette Blvd. for construction west of Dragoon. East of Dragoon, either maintain the existing SB Service Drive or detour to Fort Street. Convert Dragoon to two way between Fort Street and Lafayette
Demolition and/or reconstruction of existing cross-road bridges over I-75. (Unit Nos. 1 and 2)	Close cross-road across I-75 and detour traffic to adjacent cross-road. Clark and Springwells to be reconstructed half-width under traffic. I-75 lane closures for bridge removal and superstructure construction.
Reconstruction and/or relocation of local ramps.	Closure of ramp, sign detour. Maintain traffic on SB I-75 exit to Clark Street if possible.
"Gateway Corridor" improvements (Unit No. 4)	Lane closures and part-width phased construction to maintain access along corridor.
I-75 interchange ramps (Unit Nos. 7a and 7b)	Local road lane closures adjacent to structure work; median shoulder and inside lane closures for median pier work; off-peak closure of I-75 and local road lanes for superstructure erection.
Widening of I-75 for the addition of auxiliary lanes (Unit No. 5)	Outside lane closures of 8-lane facility, as required
Reconstruction of I-75 on offset alignment; Alternates 3 and 11 (Unit No. 6)	*Stage 1*: Maintain traffic in existing configuration. Construct NB and SB I-75 that doesn't impact existing traffic. *Stage 2*: Shift all traffic to the existing SB lanes utilizing median cross-overs, maintaining minimum of 2 lanes in each direction. Construct tie-ins of NB lanes. *Stage 3*: Shift SB and NB traffic to completed NB lanes utilizing median cross-overs and construct SB tie-ins.

Staging Plans

A conceptual staging plan for the construction of the local road improvements has been developed and a summary of the concept is provided below. The four stages meet the following goals:

- Construction of the "Gateway Corridor" prior to the closure of local streets and construction of the plaza.
- Four local crossings of I-75 are maintained.
- Construction of the SB service drive between Livernois Avenue and Springwells Street will be completed to minimize the duration of using Lafayette Avenue as a detour route.
- The "local" ramp access to I-75 will be completed in advance of the plaza interchange ramps which are not required until the completion of the bridge and plaza.
- The existing ramps at Springwells Street and Clark Street will be maintained as long as possible.

The staging plan was developed using Alternative 1 to illustrate the concept. The concept can be applied to all of the alternatives. (See Appendix E.)

Local Road Staging
(Alternative 1 used for Illustrative purposes)

<u>Stage 1A</u>

Construction:

- Construct NB lanes of the "Gateway Corridor" improvement.
- Construct portion of intersections with Jefferson Avenue and Fort Street, including necessary temporary signals to shift construction traffic for next stage.

Traffic:

- Restrict traffic on "Gateway Corridor" roadway to one lane in each direction on existing pavement.
- Lane closures at intersections with Jefferson Avenue and Fort Street as required.

<u>Stage 1B</u>

Construction:

- Construct SB lanes of the "Gateway Corridor" improvement.
- Construct portion of intersections with Jefferson Avenue and Fort Street, including permanent signals.

Traffic:

- Restrict traffic on "Gateway Corridor" roadway to one lane in each direction and shift to the completed NB lanes.
- Close lanes at intersections with Jefferson Avenue and Fort Street, as required, to complete the final intersections.

<u>Stage 2</u>

Construction:

- Construct Green Street and Livernois Avenue bridges over I-75.
- Construct the NB Service Drive from west of Green Street to west of Junction Street, and the SB Service Drive from west of Dragoon Street to east of Springwells Street.
- Begin construction of Ramp G (SB entrance) and Ramp F (NB exit).

Traffic:

- Maintain I-75 traffic with median shoulder and inside lane closures for median pier work and outside shoulder and lane closure for ramp work.
- Maintain traffic on Springwells Street, Waterman Street, Junction Street and Clark Street.
- Convert Dragoon Street to two-way traffic and close Livernois Avenue and Green Street.
- Maintain all ramps at Springwells Street and Clark Street, and the SB exit west of Junction Street. Close the SB entrance and NB exit ramps west of Livernois Avenue.
- Detour NB Service Drive traffic to Fort Street. Maintain traffic on the SB Service Drive from Clark Street to east of Dragoon Street and detour traffic to Lafayette Boulevard from Cavalry Street to Springwells Street.

<u>Stage 3</u>

Construction:

- Construct the Waterman Street, Dragoon Street, and Junction Street (NB Service Drive only) intersections with the Service Drives and demolish the bridges.
- Construct the east half of the Clark Street bridge over I-75 and the Service Drives east of Clark Street.
- Construct the SB Service Drive from Dragoon Street to Ramp H.
- Complete construction of Ramp G (SB entrance) and Ramp F (NB exit). Construct Ramp E (NB entrance) and Ramp H (SB exit).

Traffic:

- Maintain I-75 traffic with median shoulder and inside lane closures for median pier work and outside shoulder and lane closure for ramp work. Maintenance of traffic coordinated with plaza ramp construction.
- Maintain traffic on Springwells Street as in Stage 1 and on the west half of the Clark Street bridge. Open Green Street and Livernois Avenue to traffic with Livernois Avenue two-way.
- Close Waterman Street, Dragoon Street, and Junction Street.
- Maintain all ramps at Springwells Street and Clark Street. Maintain traffic on the ramps east of Clark Street during construction of the east half of the Clark Street bridge and the Service Drive connections. Close the SB exit west of Junction Street.
- Detour NB Service Drive traffic to Fort Street as in Stage 1. Maintain traffic on the SB Service Drive from Clark Street to east of Dragoon Street and detour traffic to Lafayette Boulevard from Cavalry Street to Springwells Street as in Stage 1.

<u>Stage 4</u>

Construction:

- Complete construction of the NB Service Drive between Junction Street and Clark Street. Complete the SB Service Drive from Clark Street to Ramp H and the connection at Springwells Street. Construct the west half of the Clark Street bridge over I-75.

Traffic:

- Maintain I-75 traffic with median shoulder and inside lane closures for median pier work. Maintenance of traffic coordinated with Plaza ramp construction.
- Maintain traffic on Springwells Street, Green Street, Livernois Avenue as in Stage 2, and shift Clark Street traffic to the completed east half of the bridge.
- Close the SB exit ramp at Springwells Street and the SB entrance and NB exit ramps at Clark Street. Traffic on the NB entrance ramp at Springwells Street can remain open until the Plaza ramps are opened. Maintain traffic on the ramps east of Clark Street. Open Ramps E, F, G, and H.

- Open the NB Service Drive to traffic from Springwells Street to Junction Street. Detour the SB Service Drive traffic between Clark Street and Livernois Avenue to Fort Street with the SB Service Drive open between Livernois Avenue and Springwells Street.
- The completed Livernois Avenue "Gateway Corridor" is opened to traffic.

Project Sequencing Schedule

The current project schedule requires that the end-to-end crossing be operational by the end of 2013 (Figure 3.11-1). If the Preferred Alternative is selected by April 2008, as currently planned, preliminary design could begin by June 2008 if scoping documents are prepared and negotiations begin in anticipation of the Preferred Alternate being selected. A conceptual Project Sequencing Schedule has been developed that meets these two constraints and is based on incorporating the following:

- Constructing the Detroit River Bridge, regardless of which corridor is selected, will take a minimum of four years for the Main Span and approaches.
- A critical element of the schedule is expediting the design, procurement, and relocation of the utilities that must be moved for the plaza construction.
- Preliminary design will be expedited to allow the preparation of ROW documents for separate contracts to allow the individual elements of work to proceed. Final Right-of-Way plans can be prepared and approved so as to allow the acquisition to occur, as required. The acquisition of the right-of-way necessary for specific elements of the improvements would be sequenced such that right-of-way acquisition would not delay the start of that specific construction element. Potential constraints for the sequence of right-of-way acquisition are not known at this time and could not be factored into developing the sequence of construction.
- The majority of the ROW would not be acquired prior to the Record of Decision, anticipated to be received in November 2008; although some advance acquisition may be necessary.
- Most of the major utility relocations required for the project will be part of the project scope.
- The improvements for the "Gateway Corridor" will be completed prior to closing the local streets impacted by the plaza.

A preliminary Project Sequencing Schedule that could apply to all of the Practical Alternatives is included in Appendix E. The schedule is very generic, (one schedule representing all 9 Alternatives) and is not intended to be a detailed construction schedule. The schedule uses the "Unit" durations derived and assumes that several units can be completed in a construction season without multiple crews or extended weekly work schedule, by overlapping the construction of each unit. An overlap of approximately 20 percent of the "Unit" duration (1 to 2 months) has been assumed to account for the individual work elements proceeding linearly from one section to another. Exceptions to non-expedited work are:

- Both Service Drives are shown to be under construction in Stage 2 at the same time which would require multiple crews.
- I-75 Reconstruction utilizes multiple crews for earthwork, drainage, and tie-ins.

A summary of the seven year schedule is as follows:

Year 1 (2007):
- Complete Engineering Report
- Complete DEIS

Year 2 (2008):
- Hold Public Hearing
- Select Preferred Alternative
- Complete FEIS
- Begin Preliminary Roadway and Bridge design, with an emphasis on identifying ROW requirements and utility impacts
- Begin Utility Relocation design
- Issue ROD
- Prepare Preliminary and Final ROW Plans for critical elements

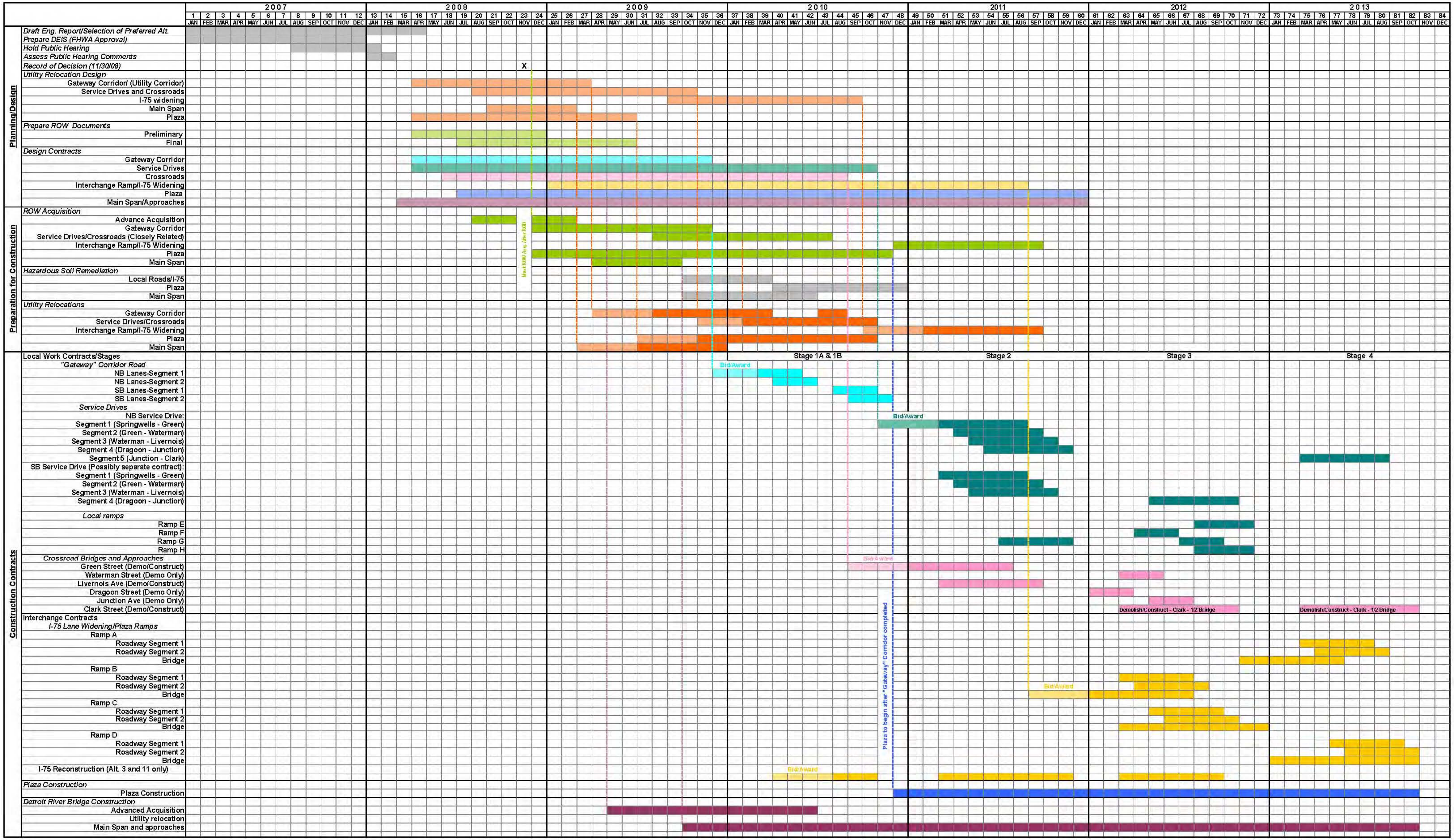
Year 3 (2009):
- Continue Preliminary and Final design
- Complete critical utility design for the project and begin construction of the critical utilities
- Acquire ROW, initially focusing on parcels required for utility relocations, Utility Corridor, Plaza, Main Span, and the "Gateway Corridor"
- Begin advanced acquisition of long lead items for the Main Span. Begin bridge and approaches if ROW is acquired
- Construct Off-System traffic mitigation improvements, if required, for signed detours (Fort Street) or potential alternate routes (Lafayette Boulevard)
- Start hazardous soil remediation as ROW acquisition allows

Year 4 (2010):
- Complete utility relocations required for the Plaza, Service Drives and Crossroads
- Continue hazardous soil remediation
- Construct NB and SB lanes of the "Gateway Corridor" improvements
- Begin construction of Main Span
- Begin off-alignment site clearing for the I-75 reconstruction (Alternatives #3 and #11 only)

Year 5 (2011):
- Begin Service Drive construction (an Advance contract in Year 4 to relocate utilities prior to the reconstruction of I-75 for Alternatives #3 and #11 may be necessary)
- Demolish and construct crossroad bridges and approaches
- Continue Main Span and approaches
- Begin construction of the Plaza
- Begin reconstruction of I-75 and ramps (Alternates #3 and #11 only)

Year 6 (2012):
- Complete additional segments of the Service Drives
- Remove existing Crossroad bridges and complete local ramps.
- Continue Main Span and approaches
- Continue Plaza
- Complete I-75 reconstruction
- Begin plaza interchange ramps

Figure 3.11-1 Project Sequencing Plan



Year 7 (2013):
- Complete remaining segments of the Service Drives
- Complete Crossroad bridges over I-75
- Complete Main span
- Complete Plaza
- Complete Interchange ramps

3.12 Practical Alternatives Cost Estimates

3.12.1 Interchanges

<u>Cost Items</u>

The potential facilities that would connect the plaza to I-75 mainly consist of road and bridge systems to provide a direct highway connection from the plaza to the freeway, freeway entrance and exit ramps, freeway service drives, service drive ramps, local streets crossing I-75 and a local street connector carrying traffic from I-75 and Fort Street to Jefferson Avenue. The attached spreadsheets and backup documentation, in Appendix D, summarize probable opinions of cost for these potential facilities.

Other costs in addition to the construction costs for the U.S. connecting roadways are included on the spreadsheet and are outlined below. The FHWA cost model has been used for the development of contingencies that are applicable at this stage of the project. Items shown as yet to be determined on the spreadsheet are needed however the costs are unknown at this time. Items shown with a quantity of zero are not applicable to the specific alternates and are shown for continuity with other alternates.

Nine cost summary sheets were prepared, one for each alternative. The following sections A, B, C and D provide background for the corresponding sections of the cost opinion summary sheets. Construction cost items in Section A below that are associated with unit costs on the U.S. Roadway/Bridge Cost Estimate summary sheets are identified with *italic* text. Refer to the probable cost summary sheets.

A. Construction Cost

i. Roadways & Ramps

- Freeway Lanes.
  In Alternatives #3 and #11, I-75 is shifted towards the Detroit River. In these cases, all new freeway lanes will have to be constructed. This would include an eight-lane freeway with concrete median barrier.

  Reconstructed 8-lane freeway with concrete median barrier.
  This item is tabulated per linear meter of freeway and applies only to the options where the existing I-75 freeway alignment would be shifted south toward the Detroit River. This includes removal and reconstruction of the freeway including removal of existing storm drainage, and excluding construction of new storm drainage for these options.

  In Value Planning it was recommended that I-75 be reconstructed from the Ambassador Gateway Project to Springwells in all alternatives due to its condition and in order to present an "apples to apples" comparison among alternatives. After further consideration of this issue, it is apparent that Alternatives #3 and #11 are not really "reconstruction" alternatives but are "relocation" alternatives as the freeway is being shifted to avoid impacts to the neighborhoods north of I-75. Therefore, in order to adequately weigh the benefits of avoidance versus cost, this cost item was only developed for Alternatives #3 and #11. The need to reconstruct this section of I-75 may be considered in the Preferred Alternative.

- Plaza Ramps.
  In all alternatives, new ramps will need to be constructed to connect the freeway with the plaza. They are urban, two-lane ramps with a 1.2-meter (4-foot) left shoulder, two 3.6-meter (12-foot) lanes, and a 2.4-meter (8-foot) right shoulder.

- Service Drive Ramps.
  All alternatives will also require new ramps from the service drives to the I-75 freeway. Some of the existing freeway access ramps will be closed. The ramps are the urban, one-lane style with a 1.2- meter (4-foot) left shoulder, a single 4.8-meter (16-foot) lane, and a 2.4-meter (8-foot) right shoulder. This item was tabulated per linear meter of ramp and applies to the ramps connecting the service drives to the I-75 freeway.

- Service Drives.
  The existing service drives will need to be reconfigured to allow for the new ramps.

  Constructing 10 m (33-foot) wide service drive and removing existing 10 m (33-foot) service drive.
  This item was tabulated per linear meter of service drive and applies to all alternates for complete removal and reconstruction of the existing I-75 service drives.

- Local Roads.
  To provide continued traffic flow, some local roads will be altered. Some roads will be terminated and a cul-de-sac will be placed at the end. *New construction per 3.6 m (12-foot) lane and remove existing local road per 3.6 m (12-foot) lane w/ curb and gutter.*

  This item was tabulated per linear meter of road per lane and applies to portions of local roads that cross I-75 and local street connectors between Fort Street and Jefferson Avenue.

ii. *Sound Abatement Walls.*
Wall cost is estimated at $820 per linear meter ($250 per linear foot) for foundations and drainage plus $270 per square meter ($25 per square foot) of wall construction. With a generic 4-meter high wall the cost would be $1900/m (with a generic 12' high wall the cost would be $550/ft). Sound wall costs are preliminary subject to feasibility/reasonability testing the Preferred Alternative.

iii. Bridges

- *Plaza Ramp Bridges.*
  This item was tabulated per square meter of structure and applies to the ramps connecting the plaza to the I-75 freeway. This includes construction of new bridges as indicated on the plans.

- *Crossing Bridges.*
  This item was tabulated per square meter of structure and applies to the local street bridges crossing I-75. This includes construction of new bridges as indicated on the plans. I-75 in this area is on MDOT's list of Special Routes. Therefore bridge costs are based upon an under clearance of 4.5 meters (14'-9") which is roughly the existing under clearance over I-75. It should be noted that providing a greater under clearance would significantly raise the vertical alignment of bridges and consequently the service drives as well. This would likely lead to moving the service drives further away from I-75 than the existing location which would require large amounts of property acquisition to provide the necessary road right-of-way.

- *Pedestrian Bridges (same locations as existing bridges).*
  This item was tabulated per each bridge. This includes construction of the same number of new bridges as existing pedestrian bridges. Further study of the Preferred Alternative would provide more analysis to determine the number of pedestrian bridges anticipated.

iv. Retaining Walls

- *Gravity Walls, MSE Walls and Soldier Pile Walls.*
  These items were tabulated per square meter of wall. These wall types were used to obtain representative costs. MSE walls were used where possible due to their relatively lower cost. Application of the different wall types is based upon the height of the wall and whether or not MSE wall would be constructible in a specific location. In general, application of the wall types is based on the following criteria:

  Gravity Walls (GM Barrier) – 1.2m (4ft) height or less
  MSE Walls - Greater than 1.2m (4ft) height when there is room for earthwork and engineered fill work
  Soldier Pile Walls - Greater than 1.2 (4ft) height and no room for MSE engineered fill work.

  Detailed wall engineering was not performed. Walls were located where the depressed freeway side slopes would be steeper than 3 horizontal to 1 vertical. Each wall was given a unique number for reference to the backup calculations.

v. Demolish Bridge

- *Entire bridge, grade separation.*
  This item was tabulated per square meter of structure and applies to removal of existing bridges over I-75. This is tabulated separately from construction of new bridges because some bridges that are removed are not being replaced.

vi. Roadway Storm Drainage

- *Freeway Drainage.*
  This item is tabulated per linear meter of freeway and applies only to the options where the existing I-75 freeway alignment would be shifted south toward the Detroit River. This includes construction of storm drainage and excludes removal of freeway storm drainage.

- *Ramp drainage, Local Road drainage and Service Drive drainage.*
  These items were tabulated per linear meter of road and apply to construction of storm sewers.

- *Remove exist storm drain system (per side).*
  This item is tabulated per linear meter of road and applies to the removal of storm drainage. This does not apply to the removal of existing storm drainage for options where existing I-75 freeway alignment would be shifted south toward the Detroit River.

- *Pump station*
  Pump station work is assumed to be required for each alternative. This could include rehabilitation of existing pump stations due to their age or condition or reconstruction of pump stations that may be impacted by the proposed improvements.

  All of the roadway storm drainage items only include potentially impacted localized storm drainage facilities. This includes 1.2-meter (48-inch) and 1.5-meter (60-inch) diameter drainage structures for collecting surface runoff and 0.5-meter (18-inch) to 0.6-meter (24-inch) diameter pipes. Downstream conveyance systems, regional conveyance systems, potential storm detention and storm water treatment are not included at this time.

vii. Design Contingencies (20%)

- The construction categories listed above are totaled to create a construction cost subtotal. The design contingency percentage is then applied to the subtotal and added to create a new construction cost subtotal.

- Design contingency reflects the level of design completed for this particular phase of the project due to uncertainty inherent in the remaining design to be completed. As the level of completion reaches 100% (final plans) this contingency reaches 0%. Design contingency typically ranges from 20% to 40%. A 20 % design contingency was used reflecting the additional level of detail of the calculations and geometrics at this stage of the study and also the potential for economy of scale for a project of this size.

- Design contingencies also include potential work items that are not itemized with quantities and unit prices. These include but are not limited to items such as: additional right or left turn service drive lanes, signing, sign structures, pavement marking, traffic signals, street lighting, guardrail, sidewalk, temporary and permanent erosion control, turf establishment, tree removal, fencing, aesthetic treatments and approach slabs.

viii. Maintenance of Traffic (excluding Plaza Ramps - 5%), Maintenance of Traffic (Plaza Ramps - 2%), and Mobilization (5%)

- The maintenance of traffic and mobilization percentages are applied to the sum of the construction categories, design contingencies and added to create "Subtotal A – Construction".

- Maintenance of traffic was calculated using two percentages. Five percent was applied to all general construction costs excluding the plaza ramps. Two percent was applied to the plaza ramps separately because the ramps connecting the plaza to the I-75 freeway would be new and do not currently carry any traffic. The plaza ramps are a significant cost item and it was deemed that five percent may overestimate maintaining traffic costs for the plaza ramps.

B. Construction Contingency

Construction contingency is a factor to cover risk and uncertainty in the construction of the project from factors such as material price volatility, unforeseen site conditions, project complexity and duration, environmental mitigation, etc. This item will be calculated as 10% of the final construction costs.

C. Management Contingency

The management contingency factor provides for third party and other unanticipated changes, such as changes to the project scope. It is 5% of the final construction costs. Management contingency could include items such as railroad abandonment or relocation costs, highway enhancements, resurfacing of existing roads, traffic mitigation for local roads.

D. Other Cost Items

i. Right-of-Way

- This item includes cost associated with right-of-way acquisition and remediation.

ii. Utilities

- This item would include costs associated with utility relocation including but not limited to sanitary sewers, water mains, electric, gas, telephone and cable television. Most of the utility costs in the U.S. would be associated with providing a clear site for the inspection and toll plaza south of I-75 between Jefferson Avenue and Fort Street.

- Utility cost estimates were developed using unit costs provided by individual utility companies. The total cost is presented which includes both public and private utility costs. Generally MDOT will be responsible for public utility costs, e.g. DWSD, and some private utility costs such as relocating the DTE substation. Private utility companies will be generally responsible for relocating utilities located in public rights of way although this will be negotiated between MDOT and each utility company. The utility relocation costs appear to be conservative and further refinement of both the impacts, required relocations, and unit costs will be done once the Preferred Alternative is identified.

The Construction Cost "A", Construction Contingency "B", Management Contingency "C", and Other Items "D" are summed, resulting in a total U.S. Connecting Roadways Interchange cost, "Total (A,B,C,D)". This cost does not include a U.S. toll and inspection plaza, bridge crossing the Detroit River, or any Canadian facilities.

Refer to the nine attached U.S. Roadway/Bridge Cost Estimates labeled with each interchange alternative they apply to.

<u>Unit Cost Development</u>

The unit cost items are a compilation of various MDOT pay item average unit prices. The MDOT "Weighted Average Item Price Cost Report" dated 6/19/2006 was utilized. That report covers averages prices from June, 2005 through June, 2006. Some bridge data (as indicated in the backup documentation) utilizes 2004 average cost data with an inflation factor of three percent per year for a period of two years applied to adjust the cost to a comparable year. The 2004 data was used to provide additional data on a wider variety of pay items.

Prices from English pay item contracts awarded statewide (listed in the backup documentation) were converted to metric units. A comparison was done between the statewide prices and those of the Metro Region. It was found that Metro Region prices were approximately 10% higher than statewide prices. Unit prices were adjusted to account for the additional 10%. A comparison of the Statewide and Metro Region prices is included in the backup documentation. Average unit prices were also rounded according to the following convention:

$1000 and greater was rounded to the nearest $100
$100 to $999.99 was rounded to the nearest $10
$10 to $99.99 was rounded to the nearest $1
$0 to $9.99 was rounded to the nearest $0.10

Refer to the attached documentation supporting the logic behind the unit cost calculations.

<u>Quantity Calculations</u>

Cost items to which unit costs were assigned were developed as a function of the current level of study detail, the desire for the items to be applicable to all of the Practical Alternatives, and the desire for the items to be portable to potential new study concepts for the refinement of alternatives. This portability would be key in developing a potential hybrid option that combines desirable aspects of various alternatives. Thus, many of the cost quantities were simplified to their rudimentary elements in units such as of meter of road and square meter of bridge.

The Quantity calculation process was twofold. First, the quantity of each detailed item that would be part of a cost item was calculated, and then the quantity of the cost item was calculated as it applies to each of the alternatives. Refer to Appendix D for documentation supporting the logic behind the quantity calculations.

3.12.2 Plazas

The Plazas were estimated by scaling the costs for recent plaza construction or cost estimates for planned plazas at Champlain & Buffalo, NY as well as the Blue Water Bridge in Port Huron. Since the elements of Plaza P-a, P-c, and P-a Modified are identical each plaza is estimated at the same cost. A more detailed estimate based on building square footage, pavements, etc. will be developed for the Preferred Alternative.

3.12.3 Main River Bridge

The main river bridge costs are based on a detailed quantity estimate for the main bridge and an examination of unit costs for similar large span bridges in North America. The estimate for the approach bridges are based on a per square meter cost. Additional detail may be found in the separately bound Bridge Conceptual Engineering Report. The summary of the total bridge costs, including Canadian portion are found in Table 3.12-2.

3.12.4 Construction Year Costs

The cost estimates developed are based on 2006 unit prices as discussed previously. New guidelines require construction estimates to be shown for the year of incurrence. For this stage of the project, this has been accomplished by developing a "weighted" inflation factor. Refer to the table in Appendix D. The table lists the major elements of the project and the estimated percent of the work which will occur in each of the construction years 2010 thru 2013. The estimated percents are based on the sequencing plan outlined in Figure 3.11-1. Since this conceptual plan can be applied to each of the alternatives, a single weighted inflation rate can be used. Several sources were researched to determine an annual rate of cost escalation to apply for this estimate. The labor and material cost data ranged from 2% to 5% annual growth, although one source indicated that the price volatility has leveled off. A 3% annual rate of price increases was assumed in the development of the weighted rate. A factor of 18.58% was computed, and has been added to the bottom of Table 3.12-1 to develop the total cost of each alternative for comparative purposes. After the Preferred Alternative is developed, a more detailed construction schedule will be developed and the costs for each year of construction will be estimated.

3.12.5 Practical Alternatives Estimates

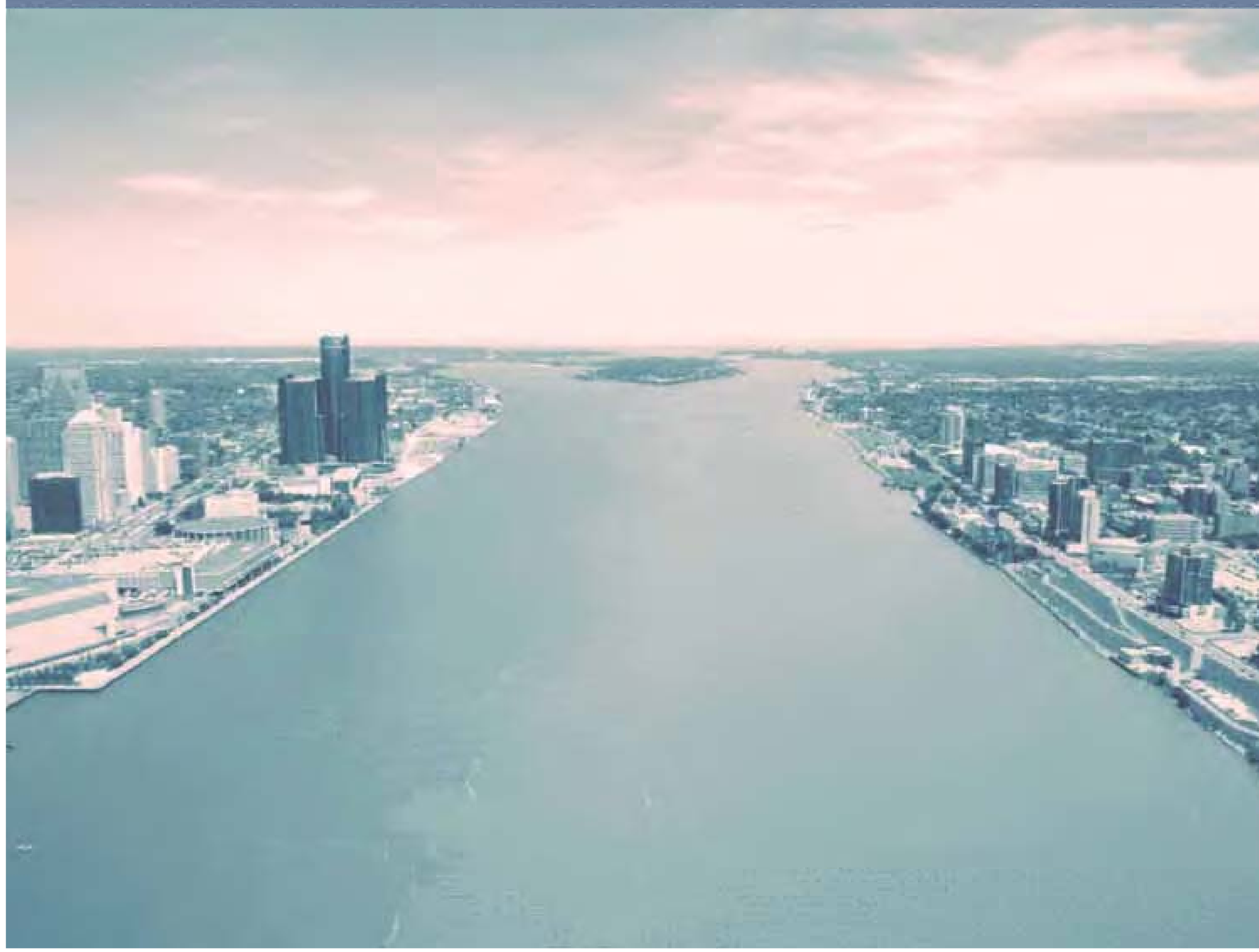
Table 3.12-1 summarizes the cost estimates for the US portion of each alternative. The costs are summarized by interchange, plaza, and bridge as discussed above, and include additional soft costs of design and construction engineering. The bridge costs presented are for the U.S. portion of the bridge options.

Table 3.12-1 Alternative Cost Estimates

Practical Alternative:	#1		#2		#3		#5		#7		#9		#11		#14		#16	
Bridge Option:	4	7	4	7	4	7	4	7	9	10	9	10	9	10	4	7	4	7
Cost Detail	(million)		(million)		(million)		(million)		(million)		(million)		(million)		(million)		(million)	
Construction Costs [1]																		
Detroit River Bridge (to come)	$ 282	$ 344	$ 282	$ 344	$ 282	$ 344	$ 282	$ 344	$ 243	$ 309	$ 243	$ 309	$ 243	$ 309	$ 282	$ 344	$ 282	$ 344
Toll and Inspection Plaza	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150	$ 190	$ 190	$ 190	$ 190	$ 190	$ 190	$ 150	$ 150	$ 150	$ 150
Connecting Roadways	$ 185	$ 185	$ 199	$ 199	$ 179	$ 179	$ 177	$ 177	$ 187	$ 187	$ 202	$ 202	$ 180	$ 180	$ 167	$ 167	$ 204	$ 204
Subtotal - Construction	*$ 616*	*$ 679*	*$ 631*	*$ 693*	*$ 611*	*$ 673*	*$ 609*	*$ 671*	*$ 621*	*$ 686*	*$ 635*	*$ 701*	*$ 613*	*$ 679*	*$ 599*	*$ 661*	*$ 636*	*$ 698*
Property Acquisition/Remediation	$ 179	$ 179	$ 174	$ 174	$ 183	$ 183	$ 194	$ 194	$ 172	$ 172	$ 167	$ 167	$ 176	$ 176	$ 171	$ 171	$ 183	$ 183
Utilities [2]	$ 174	$ 174	$ 173	$ 173	$ 153	$ 153	$ 169	$ 169	$ 166	$ 166	$ 166	$ 166	$ 168	$ 168	$ 145	$ 145	$ 183	$ 183
Management Contingency (5%)	$ 40	$ 43	$ 40	$ 43	$ 38	$ 41	$ 39	$ 42	$ 39	$ 43	$ 40	$ 43	$ 39	$ 42	$ 37	$ 40	$ 41	$ 44
Grand Total - Construction & Acquisition Costs	**$ 1,009**	**$ 1,074**	**$ 1,018**	**$ 1,083**	**$ 985**	**$ 1,050**	**$ 1,011**	**$ 1,076**	**$ 998**	**$ 1,067**	**$ 1,008**	**$ 1,077**	**$ 996**	**$ 1,066**	**$ 952**	**$ 1,018**	**$ 1,043**	**$ 1,108**
Soft Costs [3]																		
Final Design & Permits (7.5%)	$ 59	$ 64	$ 60	$ 65	$ 57	$ 62	$ 58	$ 63	$ 59	$ 64	$ 60	$ 65	$ 59	$ 64	$ 56	$ 60	$ 61	$ 66
Construction Engineering (7.5%)	$ 59	$ 64	$ 60	$ 65	$ 57	$ 62	$ 58	$ 63	$ 59	$ 64	$ 60	$ 65	$ 59	$ 64	$ 56	$ 60	$ 61	$ 66
Grand Total - Soft Costs	**$ 119**	**$ 128**	**$ 121**	**$ 130**	**$ 115**	**$ 124**	**$ 117**	**$ 126**	**$ 118**	**$ 128**	**$ 120**	**$ 130**	**$ 117**	**$ 127**	**$ 112**	**$ 121**	**$ 123**	**$ 132**
Grand Total Alternative Cost (rounded)	**$ 1,128**	**$ 1,202**	**$ 1,139**	**$ 1,213**	**$ 1,100**	**$ 1,174**	**$ 1,127**	**$ 1,202**	**$ 1,116**	**$ 1,195**	**$ 1,128**	**$ 1,207**	**$ 1,113**	**$ 1,193**	**$ 1,064**	**$ 1,138**	**$ 1,166**	**$ 1,241**
Inflation (rounded) - 20% [4]	**$ 226**	**$ 240**	**$ 228**	**$ 243**	**$ 220**	**$ 235**	**$ 225**	**$ 240**	**$ 223**	**$ 239**	**$ 226**	**$ 241**	**$ 223**	**$ 239**	**$ 213**	**$ 228**	**$ 233**	**$ 248**
Grand Total Cost (rounded)	**$ 1,353**	**$ 1,443**	**$ 1,366**	**$ 1,456**	**$ 1,320**	**$ 1,409**	**$ 1,353**	**$ 1,442**	**$ 1,339**	**$ 1,434**	**$ 1,353**	**$ 1,448**	**$ 1,336**	**$ 1,431**	**$ 1,277**	**$ 1,366**	**$ 1,399**	**$ 1,489**

General Notes:
Grand Total Cost in year of expenditure dollars.
Bridge Options: 4 & 9 - Cable-Stay, 7 & 10 - Suspension

Notes:
1 Construction Costs include design & construction contingencies, Maintenance of Traffic (MOT) and mobilization in 2006$.
2 Utility costs include both public and private relocation costs.
3 Final Design & Construction Engineering soft costs are 7.5% of Construction Subtotal and utilities each.
4 Inflation costs weighted using cash flow year of expenditure for a typical alternative.



4. TRAFFIC ANALYSIS

4.0 TRAFFIC ANALYSIS

The Level 2 Traffic Analysis Report, Part 2: Highway Capacity Analysis and Microsimulation Model Report documents the applications and results of the *Highway Capacity Software (HCS)* and *VISSIM* modeling software to evaluate the potential traffic impacts on the U.S. side of the border for the proposed new crossing system over the Detroit River between Detroit, Michigan, and Windsor, Ontario, Canada. This section of the Engineering Report summarizes those findings.

The traffic analyses were conducted for Base Year 2006 conditions with the Ambassador Bridge Gateway Project in place, the 2035 No Build traffic conditions and 2035 conditions of nine DRIC alternatives: Alternatives #1, #2, #3, #5, #7, #9, #11, #14 and #16. The DRIC alternatives are comprised of various interchange and ramp configurations connecting I-75 to the proposed toll plaza and changes to the connections to the adjacent local street system. Input to the analyses includes MDOT traffic counts, counts made for the purposes of this study and Travel Demand Model 2035 forecasts for the study area. Based on the traffic volumes determined for the Base Year 2006 and future 2035 forecasts, capacity analyses were conducted for three peak-hour periods (AM, Midday, and PM) for the 2006 Base Year, 2035 No Build and DRIC alternatives. Results include: traffic density, level of service, and, where appropriate, average delay for each freeway mainline segment, merge/diverge area, weaving segments, and local intersections.

In this report only the DRIC alternatives are presented. The analyses of the 2006 Base Year and No Build conditions may be found in the sections of the Level 2 Traffic Analysis Report, Part 2, referenced above.

4.1 Traffic Projections

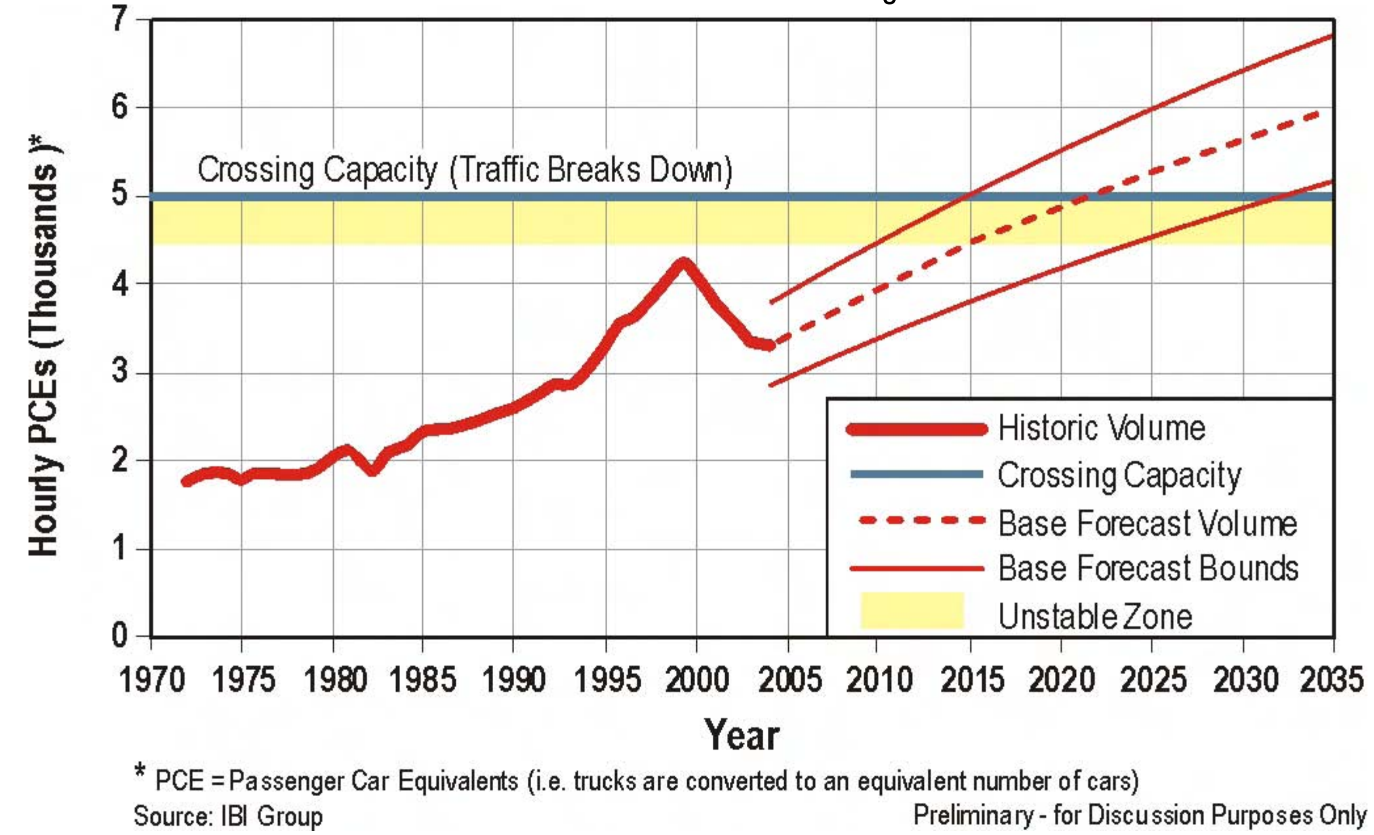
The Level 2 Traffic Analysis Report, Part 1: Traffic Demand Modeling documents the traffic projections for the project. Over the next 30 years, Detroit River area cross-border passenger car traffic is forecast to increase by approximately 57 percent and movement of trucks by 128 percent. Traffic demand could exceed the "breakdown" cross-border roadway capacity as early as 2015 under high growth scenarios. Even under "low" projections of cross-border traffic, the "breakdown" roadway capacity of the existing Detroit River border crossings (bridge and tunnel combined) will be exceeded by 2032 (Figure 4.1-1). Additionally, the capacity of the connections and plaza operations will be exceeded in advance of capacity constraints of the roadway. Without improvements, this will result in a deterioration of operations, increased congestion and unacceptable delays to the movement of people and goods in this strategic international corridor.

4.2 Future Traffic Analysis

4.2.1 Future (2035) Build Volumes

This report section documents the future traffic conditions within the Detroit River International Crossing (DRIC) study area. The study area roadway network includes ten miles of freeway, two miles of service drives, and 14 miles of arterial roads (Figure 4.2-1). More specifically, the study area includes I-75 from southwest of Dearborn Avenue to its interchange with I-96, and I-96 from I-75 to I-94. The study area also includes the arterial roadways within the Delray neighborhood extending to an area north of I-75. This area includes the service drives along I-75 as well as Fort Street. The major north-south streets of Springwells/Westend Street, Green Street, Waterman Street, Livernois Avenue, Dragoon Street, Junction Street, Clark Street, and West Grand Boulevard from north of I-75 into Delray are included as well.

Figure 4.1-1
Travel Demand vs. Capacity:
Combined Detroit River Crossings

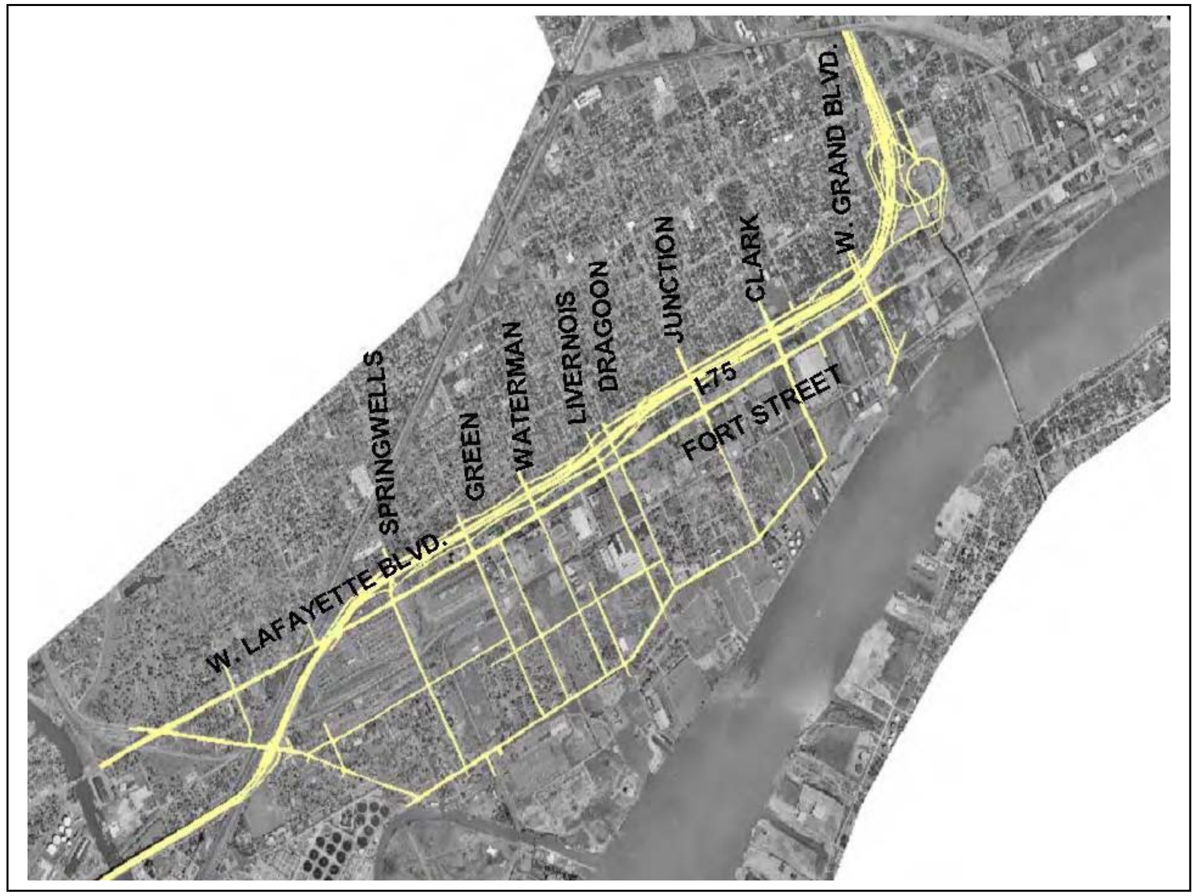


Source: The Corradino Group of Michigan, Inc.

Figure 4.2-1 also shows the new layout of the Gateway plaza and interchange project currently under construction at the Ambassador Bridge. The Gateway project will be completed in 2009. Therefore, the Base (2006) traffic conditions analyses include the Gateway project so that a comparison could be made against the future No Build and Build scenarios.

The travel demand model (TDM) was used as a basis for development of future 2035 detailed traffic volumes for the freeway and ramp system and the local street network. The Build (2035) volume diagrams for the AM and PM peak periods are provided in Appendix I. Additional diagrams for the midday volumes as well as outside the build alternative areas are in the Traffic Analysis Report.

Figure 4.2-1
Study Area Roadway Network



4.2.2 Highway Capacity Analysis

This section documents the findings of the Highway Capacity Analysis done for Part 2 of the Level 2 Traffic Analysis Report. The capacity analyses results included in the report for freeway mainline segments, merge/diverge areas and weaving segments, are those produced by the HCS analyses. The capacity analyses for the local intersections were derived from VISSIM modeling output.

On the following pages, Tables 4.2-1 through 4.2-6 present the AM and PM level of service results for the capacity analyses conducted for each condition and alternative. The traffic report also analyzes the midday traffic period but those results were not found to be significant, they were bounded by the AM and PM results, therefore they are not presented here.

The capacity analyses found no levels of service (LOS) on I-75 below LOS D as a result of any DRIC alternative and no level of service below LOS C for any local street study intersection (see Figures 4.2-2 and 4.2-3 for AM and PM). For example, with the maximum peak traffic, the PM peak with 2035 traffic volumes, and using Alternative #14 as an example (Figure 4.2-3) there were no levels of service below LOS D on the freeway and LOS C for the local road intersections. All other conditions and alternatives evaluated were found to operate at similar or better levels of service for all time periods depicted here for Alternative #14. Additional details of the analysis for all DRIC alternatives are provided in the Traffic Analysis Report.

4.3 Pedestrians and Bicycles

The size of the proposed DRIC plaza would limit the pedestrian flow through the Delray area. Land use planning associated with the DRIC calls for a “Gateway Boulevard” west of the plaza that would provide for an enhanced north-south pedestrian linkage. On the east, the access to Fort Wayne would be enhanced along Campbell and/or Junction Streets, depending on the final DRIC alternative selected. While the study area’s population is mostly north of I-75, Southwestern High School and the main bus lines serving Delray are on Fort Street south of I-75.

All bridges that remain over I-75 (or that are rebuilt) would have sidewalks. Replacement pedestrian/bicycle bridges would be constructed in those locations where warranted and where no conflict with the ramps of the proposed DRIC alternatives would occur.

Traffic operations accommodations to take into account the changes in pedestrian and bicycle patterns through the area as a result of the DRIC alternatives will be needed. The re-distribution of pedestrians and bicycles to the remaining pedestrian/bicycle bridges and to the enhanced north-south linkages, “Gateway Boulevard” to the west and Campbell and/or Junction Streets to the east, make this necessary.

Fortunately, the capacity analyses results for all DRIC alternatives during all peak periods showed that the majority of the local street intersections, including service drive intersections, operate at levels of service (LOS) A or B. Several locations for certain periods of the day are operating at LOS C but these are few in number. The excess capacity represented by these higher levels of service provides flexibility to adapt traffic operations to meet changing pedestrian and bicycle use patterns. Traffic signal timing can be designed and timing adjustments implemented to accommodate the changes in pedestrian and bicycle use patterns that will occur with the DRIC alternatives. This can be done in a manner that facilitates the changed patterns and any future growth in pedestrian and bicycle use while still effectively managing vehicular traffic in the study area.

In addition improvements to the local streets with the DRIC project will provide additional design opportunities to further enhance pedestrian and bicycle operations in the project area. The design will insure that the Delray area and Southwestern High School pedestrians and bicyclists are adequately served.

On the main river bridge a 3 m (10 ft) sidewalk is proposed. However, given the high cost of the bridge consideration may be given to alternate accommodations for pedestrians and bicycles. At other international crossings a complementary or low cost shuttle service is provided. If pedestrian access is maintained across the bridge those pedestrians will have to be securely moved from the bridge to the processing area of the plaza and then to the local surface streets. This accommodation will be made during design of the Practical Alternative after a decision has been made regarding the bridge sidewalk.

Table 4.2-1
Detroit River International Crossing Study
AM Peak Hour Levels of Service
Mainline Freeway

FREEWAYS	BASE YEAR (2006)	NO BUILD (2035)	BUILD ALTERNATIVES (2035) #1	#2	#3	#5	#7	#9	#11	#14	#16
Northbound I-75 Freeway Segments											
Dearborn off-ramp to Springwells off-ramp	C	C	D	D	D	D	D	D	D	D	D
Springwells off-ramp to Springwells on-ramp	C	C								D	C
Springwells off-ramp to DRIC Plaza off-ramp			C	C	C	C	C	C	C		
Springwells on-ramp to Livernois off-ramp	D	D									
Springwells on-ramp to DRIC Plaza off-ramp										C	C
DRIC Plaza off-ramp to Livernois off-ramp			C		C		C		C		
DRIC Plaza off-ramp to Livernois on-ramp				C				C			
DRIC Plaza off-ramp to Dragoon on-ramp						C					
DRIC Plaza off-ramp to Dragoon off-ramp											C
DRIC Plaza off-ramp to DRIC Plaza on-ramp										C	
Livernois off-ramp to Dragoon on-ramp	D	D	C		B		C		B		
Livernois on-ramp to Junction off-ramp				C				C			
Dragoon on-ramp to Junction off-ramp						C					
Dragoon on-ramp to Clark off-ramp	D	D									
Dragoon on-ramp to DRIC Plaza on-ramp			C		C		C		C		
Dragoon off-ramp to DRIC Plaza on-ramp											C
Junction off-ramp to DRIC Plaza on-ramp				C		C		C			
Clark off-ramp to Clark on-ramp	D	D									
DRIC Plaza on-ramp to Clark on-ramp			D	D	D	C	C	C	C	D	C
Clark on-ramp to Grand Blvd. off-ramp	D	D	D	D	D		D	D	D	C	D
Grand Blvd. off-ramp to WB I-96 off-ramp	D	D	D	D	D	D	D	D	D	D	D
Southbound I-75 Freeway Segments											
Ambassador Bridge on-ramp to Grand Blvd. on-ramp	B	C	B	B	B	B	B	B	B	B	B
Grand Blvd. on-ramp to Clark off-ramp		C	B	B	B		A	A	A	B	B
Clark off-ramp to Clark on-ramp	B	B				B					
Clark off-ramp to DRIC Plaza off-ramp			B	B	B		B	A	B	B	B
Clark on-ramp to Dragoon off-ramp	B	B									
DRIC Plaza off-ramp to Junction off-ramp			B				B				
DRIC Plaza off-ramp to Junction on-ramp				B		B		B			B
DRIC Plaza off-ramp to Dragoon off-ramp					B				B		
DRIC Plaza off-ramp to DRIC Plaza on-ramp										B	
Dragoon off-ramp to Livernois on-ramp	B	B			A				A		
Junction off-ramp to Livernois on-ramp			A				A				
Junction on-ramp to Livernois off-ramp				A				A			
Junction on-ramp to Dragoon off-ramp						B					
Junction on-ramp to DRIC Plaza on -ramp											A
Livernois on-ramp to Springwells off-ramp	B	B									
Livernois on-ramp to DRIC Plaza on-ramp			B		B		B	B	B		
Livernois off-ramp to DRIC Plaza on-ramp				B							
Dragoon off-ramp to DRIC Plaza on-ramp						B					
DRIC Plaza on-ramp to Springwells off-ramp										B	B
Springwells off-ramp to Springwells on-ramp	B	B								B	B
DRIC Plaza on-ramp to Springwells on-ramp			B	B	B	B	B	B	B		
Springwells on-ramp to Dearborn on-ramp	B	B	B	B	B	B	B	B	B	B	B

Legend
Not Congested (LOS A-B)
Near Congested (LOS C-D)
Congested (LOS E-F)
Source: Parsons Transportation Group

Table 4.2-2
Detroit River International Crossing Study
AM Peak Hour Levels of Service
I-75 Merge/Diverge Areas and Weaving Segments

FREEWAYS	BASE YEAR (2006)	NO BUILD (2035)	BUILD ALTERNATIVES (2035) #1	#2	#3	#5	#7	#9	#11	#14	#16
Northbound I-75 Ramp Merge and Diverge Areas											
Dearborn off-ramp	D	D	C	C	C	C	C	C	C	C	C
Springwells off-ramp	C	C	C	C	C	C	C	C	C	C	C
Springwells on-ramp	C	C								C	B
DRIC Plaza off-ramp			A	A	A	A	A	A	A	A	A
Livernois off-ramp	C	C	B		B		B		B		
Livernois on-ramp				C				C			
Dragoon off-ramp											C
Dragoon on-ramp	C	C	C		C	B	C		C		
Junction off-ramp				B		C		B			
Clark off-ramp	C	C									
Clark on-ramp	B	B	C	C	C		C	C	C	C	C
Grand Blvd. off-ramp	C	C	C	C	C	C	C	C	C	C	C
Southbound I-75 Ramp Merge and Diverge Areas											
Service Drive on-ramp (E. of Grand Blvd.)	B	B	B	B	B	B	B	B	B	B	B
Clark off-ramp	B	B	B	C	B		B	B	B	C	C
Clark on-ramp	B	B									
DRIC Plaza off-ramp			A	A	A	A	A	A	A	A	A
Junction off-ramp			B				B				
Junction on-ramp				B		B		B			A
Dragoon off-ramp	B	B			B	B			B		
Livernois off-ramp				B				B			
Livernois on-ramp	B	B	B		A		B		B		
Springwells off-ramp	B	B								B	B
Springwells on-ramp	B	B	B	B	B	B	B	B	B	B	B
Dearborn on-ramp	A	B	B	B	B	B	B	B	B	B	B
Northbound I-75 Weaving Segments											
Springwells on-ramp to DRIC Plaza off-ramp										C	C
Livernois on-ramp to Junction off-ramp				C				C			
Dragoon on-ramp to Junction off-ramp						C					
Clark on-ramp to Grand Blvd. off-ramp	C	C	C	C	C		C	C	C	C	C
Southbound I-75 Weaving Segments											
Ambassador Bridge on-ramp to Clark off-ramp	B	B	B	B	B		B	B	B	B	B
Junction on-ramp to Dragoon off-ramp						B					
Junction on-ramp to Livernois off-ramp				B				B			
DRIC Plaza on-ramp to Springwells off-ramp										B	B

Legend
Not Congested (LOS A-B)
Near Congested (LOS C-D)
Congested (LOS E-F)
Source: Parsons Transportation Group

Table 4.2-3
Detroit River International Crossing Study
AM Peak Hour Levels of Service
Local Intersections

LOCAL INTERSECTIONS	BASE YEAR (2006)	NO BUILD (2035)	BUILD ALTERNATIVES (2035)								
			#1	#2	#3	#5	#7	#9	#11	#14	#16
Fort at Westend	A	B	A	B	A	A	B	B	A	A	B
Fort at Green	A	A	A	A	A	A	A	A	A	A	A
Fort at Waterman	B	B	A	A	A	A	A	A	A	A	A
Fort at Livernois	B	B	B	B	A	A	B	B	A	B	B
Fort at Dragoon	A	A	A	A	A	B	A	A	B	A	A
Fort at Junction	A	A	A	A	B	B	A	A	B	A	A
Fort at Clark	B	B	B	B	B	B	B	B	B	B	B
Southbound Service Drive at Livernois	A	A	A	A	A	A	A	A	A	A	A
Southbound Service Drive at Dragoon	B	B	A	B	A	A	A	B	A	A	B
Southbound Service Drive at Waterman					B				B		
Northbound Service Drive at Livernois	B	B	A	B	A	A	A	B	A	A	B
Northbound Service Drive at Dragoon	A	A	A	B	A	A	A	B	A	A	B
Southbound Service Drive at Springwells	B	B	B	B	B	B	B	B	B	B	B
Northbound Service Drive at Westend	B	B	B	B	B	B	B	B	B	C	B
Northbound Service Drive at Clark	B	B	A	B	B	B	A	B	B	B	B
Southbound Service Drive at Clark	B	B	B	B	B	A	B	B	B	C	C
Fort at Grand Blvd.	A	A	A	A	A	A	A	A	A	A	A
Northbound Service Drive at Grand Blvd.	B	B	B	B	B	B	B	B	B	B	B
Southbound Service Drive at Grand Blvd.	A	A	A	A	A	A	A	A	A	A	A
Fort at Post	A	A	A	A	A	A	A	A	A	A	A

Legend
Not Congested (LOS A-B)
Near Congested (LOS C-D)
Congested (LOS E-F)
Source: Parsons Transportation Group

Table 4.2-4
Detroit River International Crossing Study
PM Peak Hour Levels of Service
Mainline Freeway

FREEWAYS	BASE YEAR (2006)	NO BUILD (2035)	BUILD ALTERNATIVES (2035)								
			#1	#2	#3	#5	#7	#9	#11	#14	#16
Northbound I-75 Freeway Segments											
Dearborn off-ramp to Springwells off-ramp	B	B	C	C	C	C	C	C	C	C	C
Springwells off-ramp to Springwells on-ramp	B	B								B	B
Springwells off-ramp to DRIC Plaza off-ramp			B	B	B	B	B	B	B		
Springwells on-ramp to Livernois off-ramp	B	B									
Springwells on-ramp to DRIC Plaza off-ramp										B	B
DRIC Plaza off-ramp to Livernois off-ramp			B		B		B		B		
DRIC Plaza off-ramp to Livernois on-ramp				B				B			
DRIC Plaza off-ramp to Dragoon on-ramp						B					
DRIC Plaza off-ramp to Dragoon off-ramp											B
DRIC Plaza off-ramp to DRIC Plaza on-ramp										B	
Livernois off-ramp to Dragoon on-ramp	B	B	A		A		B		A		
Livernois on-ramp to Junction off-ramp				A				A			
Dragoon on-ramp to Junction off-ramp						B					
Dragoon on-ramp to Clark off-ramp	B	C									
Dragoon on-ramp to DRIC Plaza on-ramp			A		B		A		B		
Dragoon off-ramp to DRIC Plaza on-ramp											B
Junction off-ramp to DRIC Plaza on-ramp				B		B		B			
Clark off-ramp to Clark on-ramp	B	C									
DRIC Plaza on-ramp to Clark on-ramp			B	B	B	B	B	B	B	B	A
Clark on-ramp to Grand Blvd. off-ramp	C	C	B	B	B		B	B	B	B	B
Grand Blvd. off-ramp to WB I-96 off-ramp	B	B	B	B	B	B	B	B	B	B	B
Southbound I-75 Freeway Segments											
Ambassador Bridge on-ramp to Grand Blvd. on-ramp	D	D	C	C	C	C	C	C	C	C	C
Grand Blvd. on-ramp to Clark off-ramp		D	C	C	C	D	C	C	C	D	D
Clark off-ramp to Clark on-ramp	D	D									
Clark off-ramp to DRIC Plaza off-ramp			C	C	C		C	C	C	C	C
Clark on-ramp to Dragoon off-ramp	D	D									
DRIC Plaza off-ramp to Junction off-ramp			D				D				
DRIC Plaza off-ramp to Junction on-ramp				D		D		D			D
DRIC Plaza off-ramp to Dragoon off-ramp					D				D		
DRIC Plaza off-ramp to DRIC Plaza on-ramp										D	
Dragoon off-ramp to Livernois on-ramp	D	D			C				C		
Junction off-ramp to Livernois on-ramp			C				C				
Junction on-ramp to Livernois off-ramp				C				C			
Junction on-ramp to Dragoon off-ramp						C					
Junction on-ramp to DRIC Plaza on -ramp											C
Livernois on-ramp to Springwells off-ramp	D	D									
Livernois on-ramp to DRIC Plaza on-ramp			D		D		D	D	D		
Livernois off-ramp to DRIC Plaza on-ramp				D							
Dragoon off-ramp to DRIC Plaza on-ramp						D					
DRIC Plaza on-ramp to Springwells off-ramp										D	C
Springwells off-ramp to Springwells on-ramp	D	D								D	D
DRIC Plaza on-ramp to Springwells on-ramp			D	D	D	D	D	D	D		
Springwells on-ramp to Dearborn on-ramp	D	D	D	D	D	D	D	D	D	D	D

Legend
Not Congested (LOS A-B)
Near Congested (LOS C-D)
Congested (LOS E-F)
Source: Parsons Transportation Group

Table 4.2-5
Detroit River International Crossing Study
PM Peak Hour Levels of Service
I-75 Merge/Diverge Areas and Weaving Segments

FREEWAYS	BASE YEAR (2006)	NO BUILD (2035)	BUILD ALTERNATIVES (2035)								
			#1	#2	#3	#5	#7	#9	#11	#14	#16
Northbound I-75 Ramp Merge and Diverge Areas											
Dearborn off-ramp	C	C	B	B	B	B	B	B	B	B	B
Springwells off-ramp	B	B	B	B	B	B	B	B	B	B	B
Springwells on-ramp	B	B								B	B
DRIC Plaza off-ramp			A	A	A	A	A	A	A	A	A
Livernois off-ramp	B	B	A		A		A		A		
Livernois on-ramp				B				B			
Dragoon off-ramp											B
Dragoon on-ramp	B	B	B		A	B	B		B		
Junction off-ramp				A		B		A			
Clark off-ramp	B	B									
Clark on-ramp	B	B	B	B	B		B	B	B	B	B
Grand Blvd. off-ramp	B	B	B	B	B	B	B	B	B	B	B
Southbound I-75 Ramp Merge and Diverge Areas											
Service Drive on-ramp (E. of Grand Blvd.)	B	B	C	C	C	C	C	C	C	C	B
Clark off-ramp	C	C	D	D	D		D	D	D	D	C
Clark on-ramp	B	B									
DRIC Plaza off-ramp			A	A	A	A	A	A	A	A	A
Junction off-ramp			C				C				
Junction on-ramp				C		C		C			C
Dragoon off-ramp	C	C			C	C			C		
Livernois off-ramp				C				C			
Livernois on-ramp	C	C	C		C		C		C		
Springwells off-ramp	C	C								C	C
Springwells on-ramp	B	B	C	C	C	C	C	C	C	C	D
Dearborn on-ramp	B	B	C	C	C	C	C	C	C	C	C
Northbound I-75 Weaving Segments											
Springwells on-ramp to DRIC Plaza off-ramp										B	B
Livernois on-ramp to Junction off-ramp				A				A			
Dragoon on-ramp to Junction off-ramp						B					
Clark on-ramp to Grand Blvd. off-ramp	B	B	B	B	B		B	B	B	B	B
Southbound I-75 Weaving Segments											
Ambassador Bridge on-ramp to Clark off-ramp	C	D	D	D	D		D	D	C	D	D
Junction on-ramp to Dragoon off-ramp						C					
Junction on-ramp to Livernois off-ramp				C				C			
DRIC Plaza on-ramp to Springwells off-ramp										C	C

Legend
Not Congested (LOS A-B)
Near Congested (LOS C-D)
Congested (LOS E-F)
Source: Parsons Transportation Group

Table 4.2-6
Detroit River International Crossing Study
PM Peak Hour Levels of Service
Local Intersections

LOCAL INTERSECTIONS	BASE YEAR (2006)	NO BUILD (2035)	BUILD ALTERNATIVES (2035)								
			#1	#2	#3	#5	#7	#9	#11	#14	#16
Fort at Westend	B	A	A	A	A	A	A	A	A	A	B
Fort at Green	B	B	A	B	B	B	B	B	B	B	B
Fort at Waterman	A	B	A	A	A	A	A	A	A	B	A
Fort at Livernois	B	B	B	B	B	B	C	B	B	A	B
Fort at Dragoon	A	A	B	A	B	B	B	B	B	A	B
Fort at Junction	A	A	A	B	B	A	A	B	B	A	B
Fort at Clark	B	B	B	B	B	B	B	B	B	B	B
Southbound Service Drive at Livernois	A	A	A	A	A	A	A	A	A	A	A
Southbound Service Drive at Dragoon	B	B	A	B	A	A	A	B	A	A	B
Southbound Service Drive at Waterman					B				B		
Northbound Service Drive at Livernois	B	B	A	B	A	A	A	B	A	A	B
Northbound Service Drive at Dragoon	B	B	A	B	A	A	A	B	A	A	B
Southbound Service Drive at Springwells	B	B	A	B	B	B	A	B	B	C	B
Northbound Service Drive at Westend	B	B	B	B	B	B	B	B	B	B	B
Northbound Service Drive at Clark	B	B	B	C	C	B	B	B	C	B	C
Southbound Service Drive at Clark	B	B	B	B	B	B	B	B	B	B	B
Fort at Grand Blvd.	A	A	A	A	A	A	A	A	A	A	A
Northbound Service Drive at Grand Blvd.	B	A	B	B	A	A	B	B	B	B	B
Southbound Service Drive at Grand Blvd.	A	A	A	A	A	A	A	A	A	A	A
Fort at Post	A	A	A	A	A	A	A	A	A	A	A

Legend
Not Congested (LOS A-B)
Near Congested (LOS C-D)
Congested (LOS E-F)
Source: Parsons Transportation Group

Figure 4.2-2
Detroit River International Crossing Study
AM Peak Hour Levels of Service

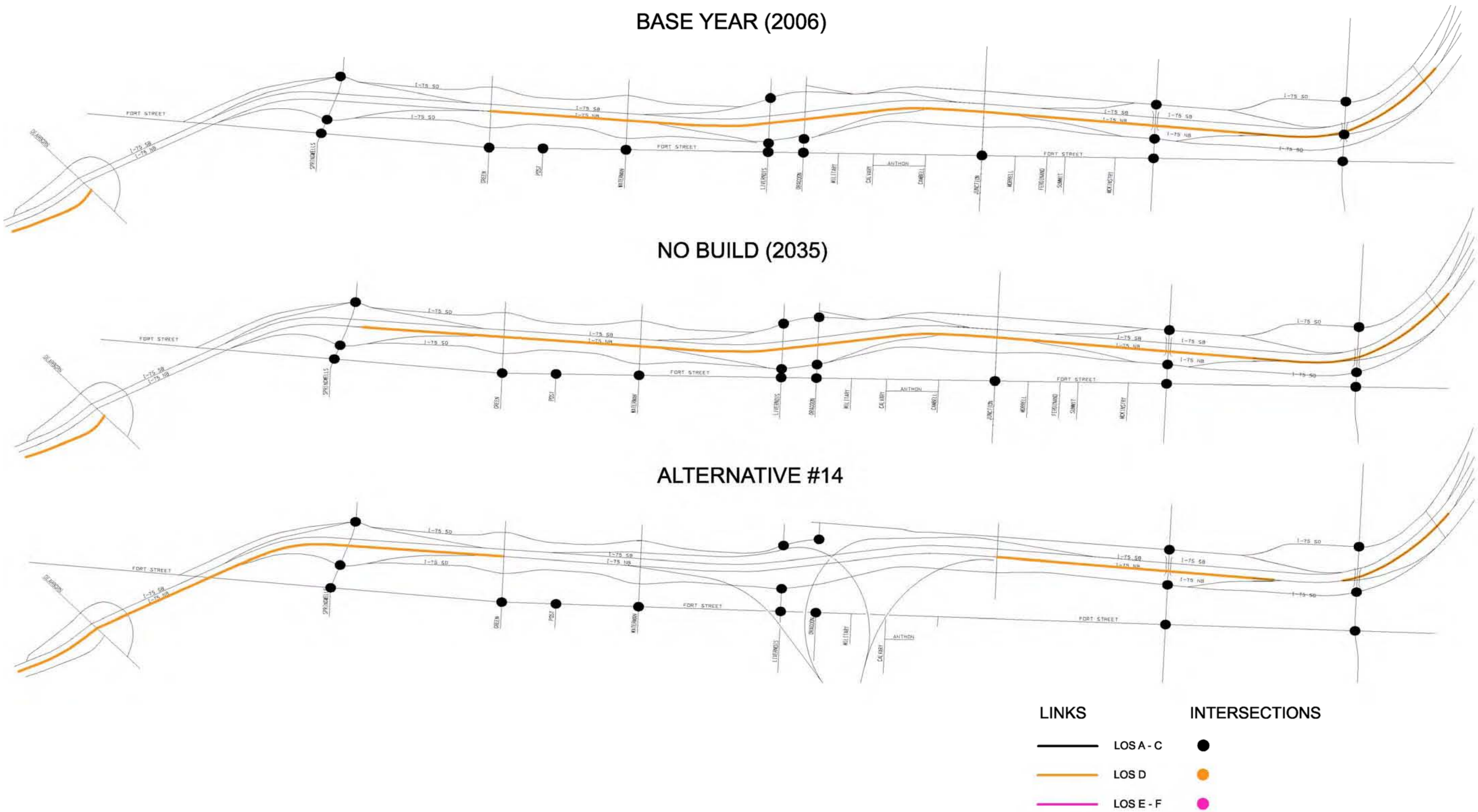
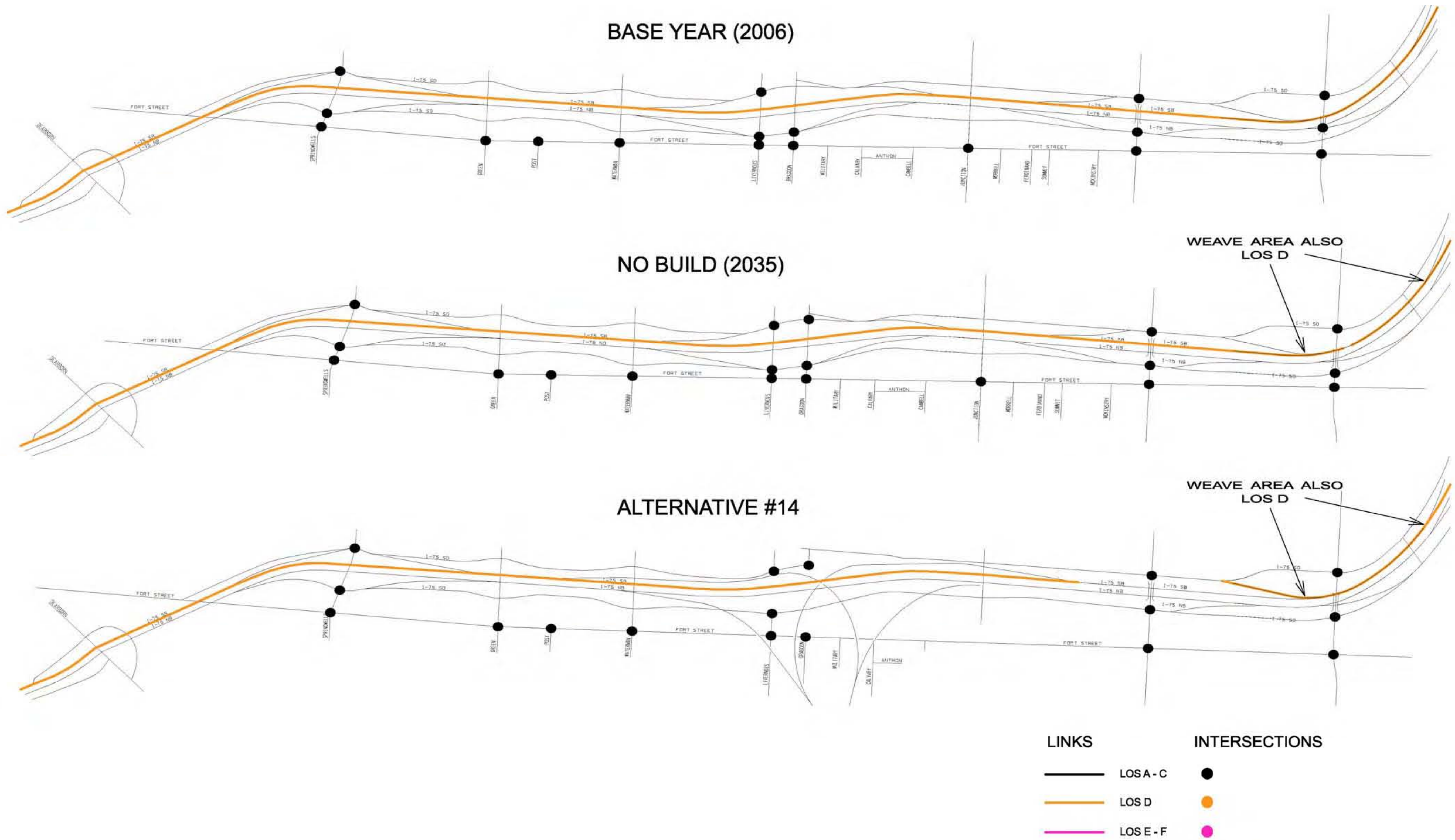
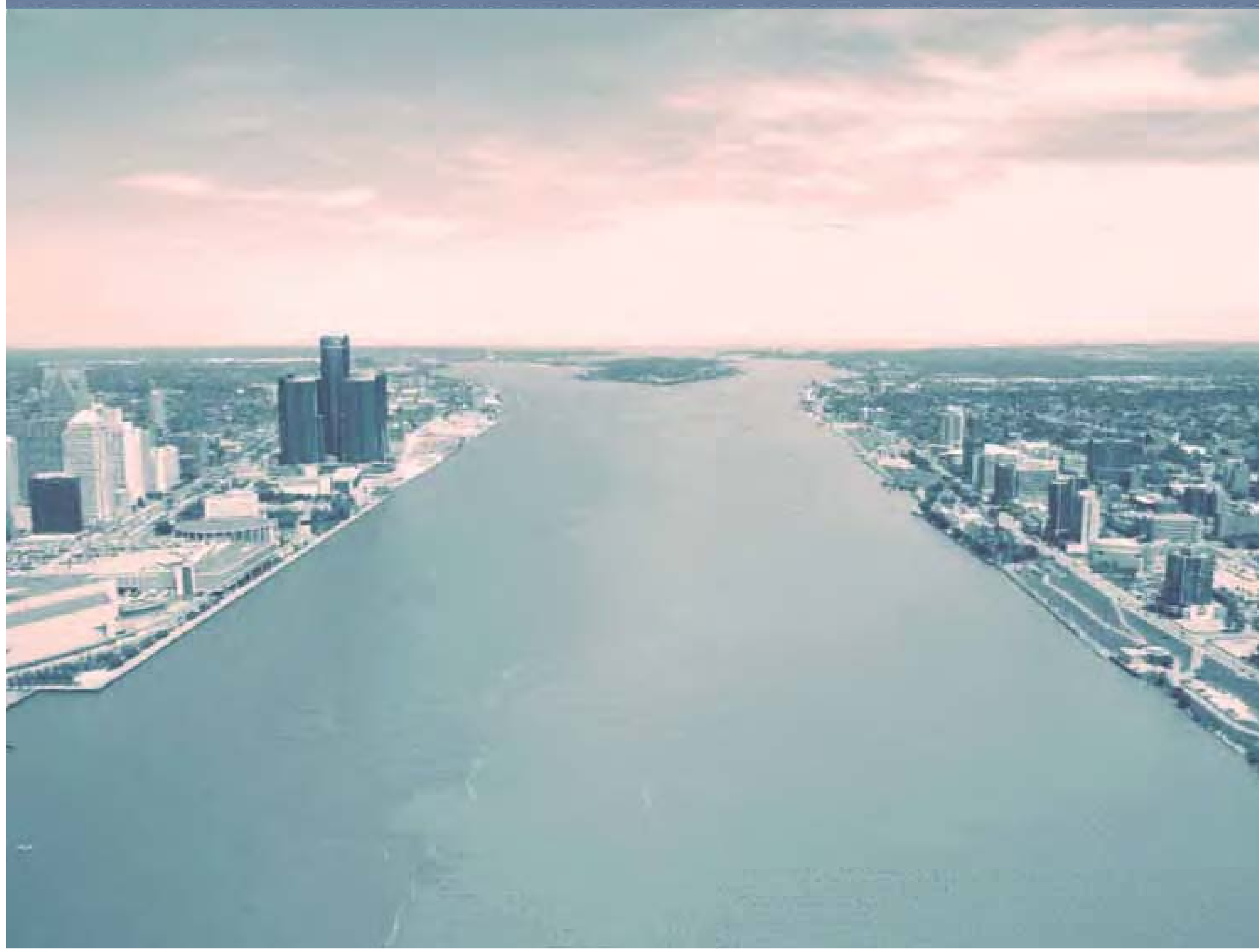


Figure 4.2-3
Detroit River International Crossing Study
PM Peak Hour Levels of Service





5. VALUE PLANNING STUDY

5.0 VALUE PLANNING STUDY

A Value Planning (VP) study was held January 29, 2007 through February 2, 2007 to review the new Detroit River International Crossing (DRIC) project between the U.S. and Canada. The scope of the VP study was focused on the interchange connecting the plaza on the U.S. side to I-75. The study did not include the plaza or the bridge crossing the Detroit River into Canada.

The VP Team organized the workshop into two distinct parts: the first to review, analyze and evaluate the alternatives (Value Analysis) that the DRIC Early Preliminary Study (EPE) Study Team had developed; and the second, to speculate on improvements to these alternatives or propose new alternatives (Value Planning).

Developed Interchange Alternatives

The VP Team considered seven alternative interchanges developed by the DRIC EPE Study Team that would connect the plaza to I-75 (Figures 5-1 through 5-7). Because of the proximity of I-75 and the Detroit River, the plaza is a relatively short distance from I-75, limiting the available space to develop connecting ramp geometries. Adding ramps to and from I-75 to the plaza will make it impossible to maintain all cross roads because of conflicting elevations.

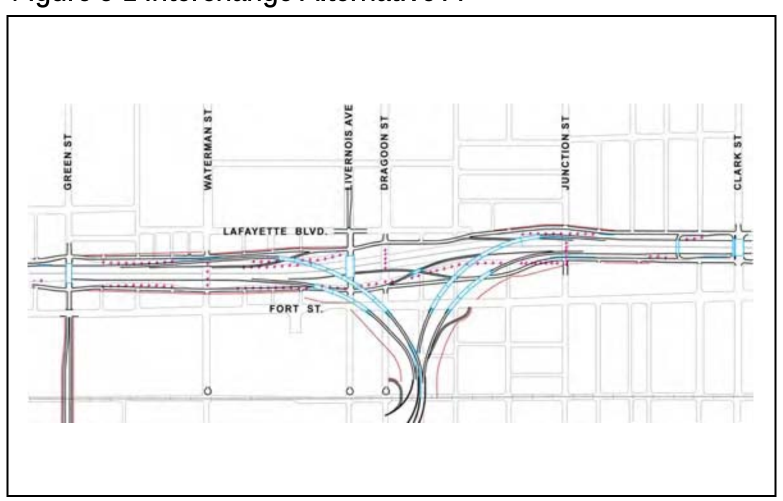
Summary of Alternatives

Interchange alternatives consist of three general configurations:

- Connecting I-75 exit and entrance ramps to a plaza in the same location.
- Splitting the I-75 connection to the plaza with exit ramps more easterly and the entrance ramps more westerly.
- Splitting the I-75 connection to the plaza with entrance ramps more easterly and the exit ramps more westerly.

Interchange Alternative A

Figure 5-1 Interchange Alternative A

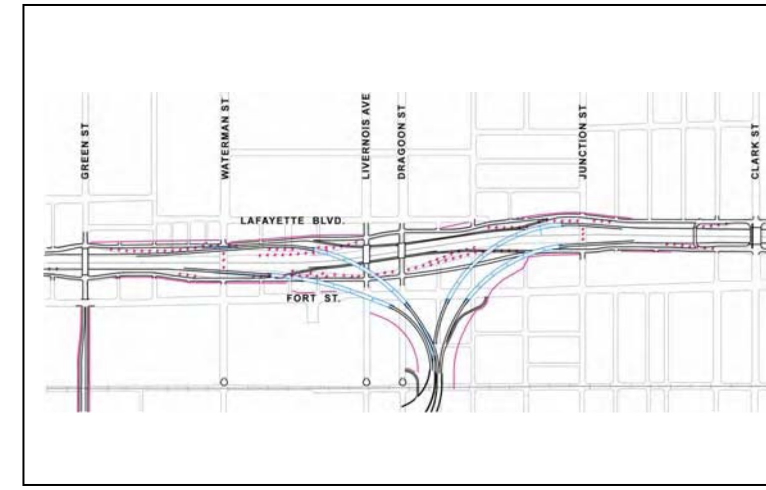


Interchange Alternative A is a directional three-legged interchange. Key elements of this interchange are listed below:

- Reconfigures location of existing ramps along I-75.
- Closure of Dragoon Street bridge over I-75 due to eastbound ramp from the service drive through the Dragoon intersection with the northbound I-75 service drive (existing one-way pair).
- Closure of Waterman and Junction Street bridges over I-75 due to grade issues.
- Because of the closure of the Dragoon Street bridge, Livernois Avenue is turned into a two-way road between Fort Street and Lafayette Boulevard in order to maintain access across I-75.
- Introduces braided ramps.

Interchange Alternative B

Figure 5-2 Interchange Alternative B

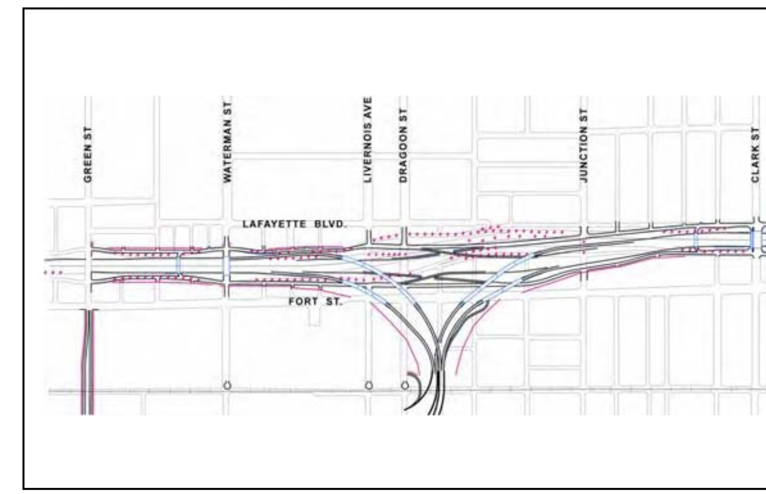


Interchange Alternative B is a directional three-legged interchange. Key elements of this interchange are listed below:

- Reconfigures location of existing ramps along I-75.
- Eliminates braided ramps, introduces auxiliary lanes along I-75.
- Closure of Waterman and Junction Street bridges over I-75 due to grade issues.
- Maintains Livernois Avenue and Dragoon Street bridges over I-75.

Interchange Alternative C

Figure 5-3 Interchange Alternative C

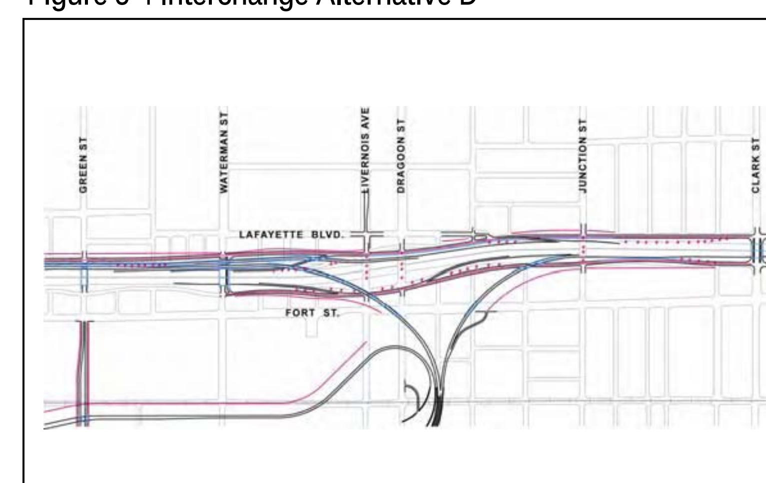


Interchange Alternative C is a directional three-legged interchange. Key elements of this interchange are listed below:

- Shifts I-75 southerly to minimize impacts to residences on north side.
- Reconfigures location of existing ramps along I-75.
- Closure of Livernois Avenue and Dragoon Street bridges over I-75 due to conflicts with the eastbound ramp from the service drive.
- Closure of Junction Avenue bridge over I-75 due to grade issues.
- Waterman Street over I-75 can be kept open with grade raise.

Interchange Alternative D

Figure 5-4 Interchange Alternative D



Interchange Alternative D is a split interchange. Ramp terminals for traffic from the U.S. to Canada are located west of Springwells Street. Ramp terminals for traffic from Canada to the U.S. are located at Livernois/Dragoon. Key elements of this interchange are listed below:

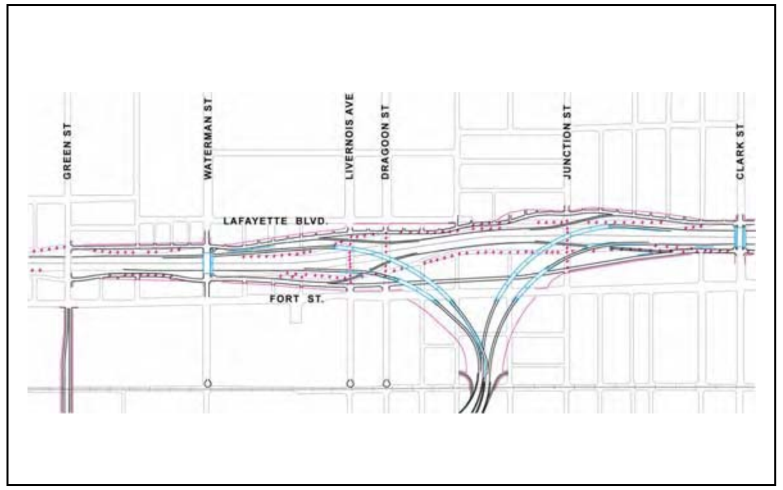
- Reconfigures location of existing ramps along I-75.
- Closure of Livernois Avenue and Dragoon bridges over I-75 due to impacts with Plaza Ramp D.
- Ramp D is on bridge structure from

Livernois Avenue through Green Street.

- Waterman Street over I-75 can be kept open.
- Closure of Junction Avenue bridge over I-75 due to grade issues.
- It may be possible to create a hybrid option by combining the plaza ramp with the service drive.

Interchange Alternative E

Figure 5-5 Interchange Alternative E

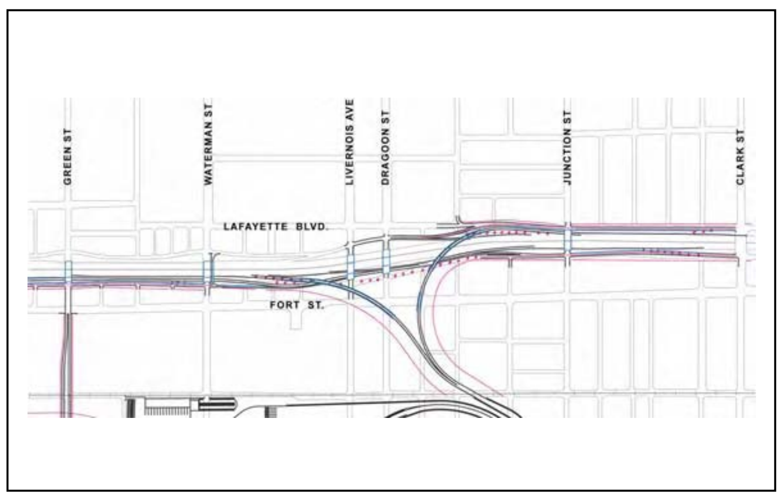


Interchange Alternative E is a three-legged directional interchange. Key elements of this interchange are listed below:

- Interchange shifted to the east to maximize the distance from Southwestern High School.
- Reconfigures location of existing ramps along I-75.
- Introduces auxiliary lanes along I-75.
- Closure of Livernois Avenue and Dragoon Street bridges over I-75 due to conflicts with the local ramps.
- Closure of Junction Avenue bridge over I-75 due to grade issues.
- Waterman Street over I-75 remains open.
- This option appears to be one of the better options for permanent signing.

Interchange Alternative F

Figure 5-6 Interchange Alternative F

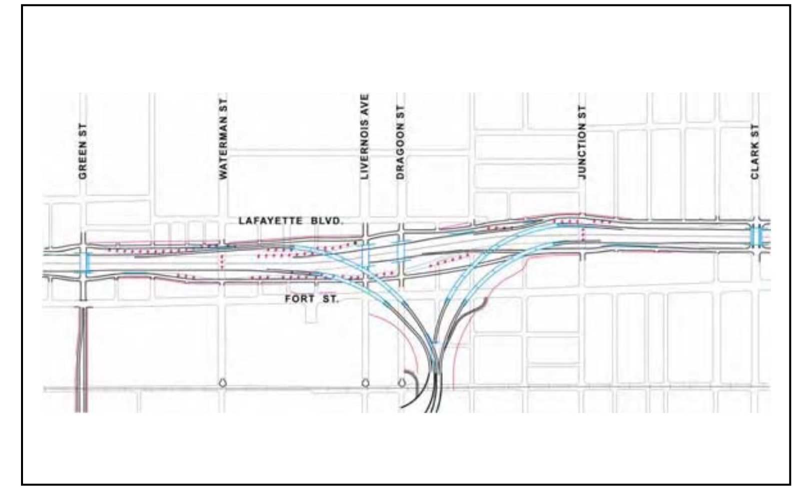


Interchange Alternative F is a split interchange. Ramp terminals for traffic from the U.S. to Canada are located west of Springwells Street. Ramp terminals for traffic from Canada to the U.S. are located at Livernois/Dragoon. Key elements of this interchange are listed below:

- Reconfigures location of existing ramps along I-75.
- Livernois Avenue and Dragoon Street over I-75 remain open.
- Waterman Street and Junction Avenue over I-75 remain open.
- The northbound service drive merges with Ramp A and is depressed under Livernois Avenue and Dragoon Street.
- The northbound service drive exit ramp weaves with Ramp A.
- The design speed for ramps is 70 km/hr (45 mph) in the gore area. The tighter curve in the plaza entrance ramp to northbound I-75 away from the freeway can have a 50 km/hr (30 mph) design speed.
- A separate service drive may not be needed. It may be possible to combine Ramp A with the service drive and merge them together sooner. It would need to be determined if it is acceptable to provide trucks access to local streets as they exit the plaza.

Interchange Alternative I

Figure 5-7 Interchange Alternative I



Interchange Alternative I Modified is a three-legged directional interchange. Key elements of this interchange are listed below:

- All of the other concepts include maintaining an interchange (Service Drive ramps) in between the Clark Street and Springwells Street interchanges. This concept includes removing the Livernois/Dragoon interchange and providing service drive access to Clark/Junction and Springwells Streets.
- The plaza ramps are similar to Interchange Alternative A.
- The service drives are similar to Interchange Alternative B.
- Six of the eight Service Drive entrance and exit ramps to I-75 at the Springwells Street and Clark Street interchanges are anticipated to be two lane ramps. The northbound I-75 exit ramp to Clark Street are anticipated to be one lane ramps.
- Livernois Avenue and Dragoon Street over I-75 remain open.
- Closure of Junction Avenue and Waterman Street bridges over I-75 due to grade issues.

Value Analysis

Performance and Acceptance criteria were developed from the Function Logic diagram which was then used to rank each of the seven alternatives developed by the DRIC EPE Study Team.

The criteria for Performance included: Access to/from Plaza, Traffic operations on I-75, Local access within corridor, Local traffic operations and Bridge geometry/retaining wall. The Acceptance criteria included: Protect community/neighborhood characteristics, impact to N/S neighborhood, constructability, Impact to Utilities, Driver Comfort and Impact to Delray.

The criteria for both the Performance and Acceptance were analyzed for importance by the VP Team. Using these criteria the evaluation teams scored each of the alternatives. The scoring for each criterion was based on a 0 to 5 rating, 5 being the highest and 0 being unacceptable. The seven alternatives ranked between (3.0) good to (4.0) very good for Performance. The high rankings were expected due to the level of previous review and refinement by the DRIC EPE Study Team. Using the same procedure each of the alternatives were evaluated and ranked using the Acceptance criteria. The seven alternatives ranked between 2.43 (Interchange D) and 3.72 (Interchange I). Interchanges D and F both impact the Delray Community to a higher degree then the others, substantially impacting the Acceptance of either of these two alternatives.

Conceptual level cost estimates were prepared by the Study Team. The costs included construction, right-of-way acquisition and remediation for significant environmental impacts. The cost estimates range from $178 million to $255 million. The VP Team assigned scores to each of these by utilizing a graphical method as defined in the report.

The VP Team found that all seven alternatives were feasible. Alternatives that ranked lower in either Acceptance or Cost may be improved through further refinement as they are developed in greater detail.

Value Planning

As part of the Value Planning process, the VP Team developed 124 ideas. From these ideas the VP Team proposed four new interchange concepts, two of which were recommended for further study. The four alternatives along with their identified advantages and disadvantages are listed below (Figures 5-8 through 5-11).

VP Interchange 1

Circular three-legged directional interchange.

Advantages:
- Maintains Clark and Springwells interchanges
- Localizes the impacts to service drives
- Requires less right-of-way
- Reduces impacts north of I-75
- Slows traffic entering the plaza

Disadvantages:
- Design speed of 50 km/h (30 mph) in circle
- Close Livernois Bridge
- Close Livernois/Dragoon interchange

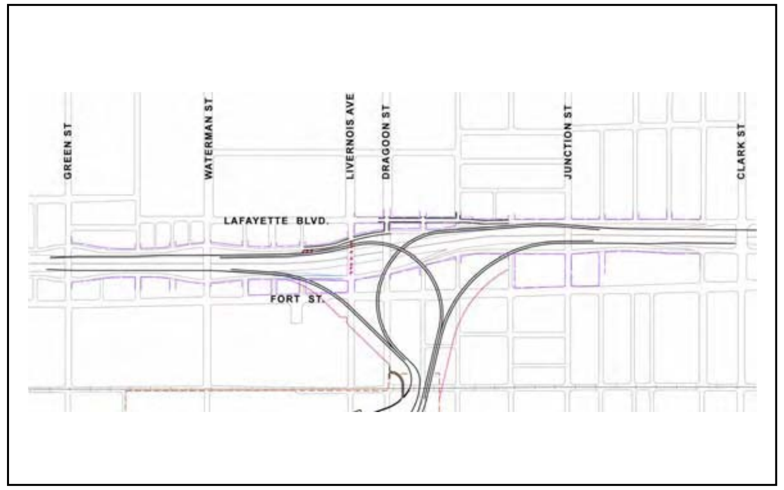


Figure 5-8 VP Interchange 1

VP Interchange 2A

Signalized three-legged interchange.

Advantages:
- Maintains Clark and Springwells interchanges
- Localizes the impacts to service drives
- Requires less right-of-way
- Reduces impacts north of I-75
- Localizes impact to Delray
- Less bridge area
- Reduces bridges over Fort Street

Disadvantages:
- Stop condition for southbound traffic to and from the Plaza (twice)
- Close Dragoon Bridge
- Mixes local and bridge traffic
- Discontinuity in service drives
- Air Quality and Noise impact on north side of I-75

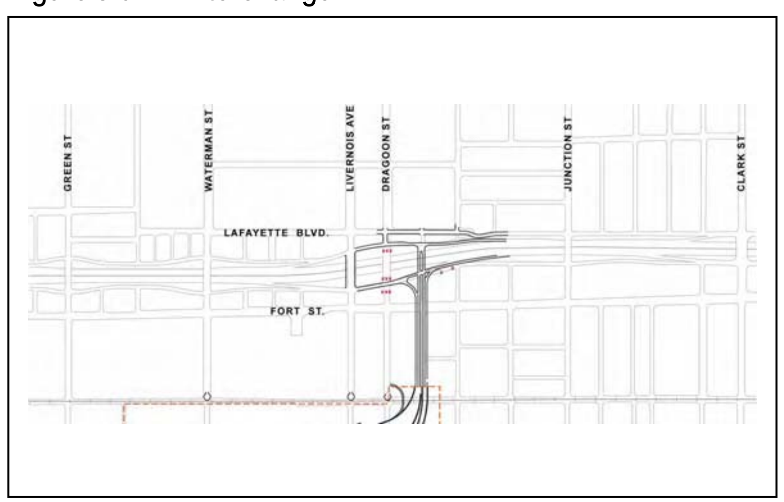


Figure 5-9 VP Interchange 2A

VP Interchange 2B

The proposed VP Interchange 2B is a variation of VP Interchange 2A except that the northbound service drive goes under the ramps to and from the plaza. As such VP Interchange 2B has the same advantages and disadvantages as VP Interchange 2A with the exception that only one signal will be required for 2B.

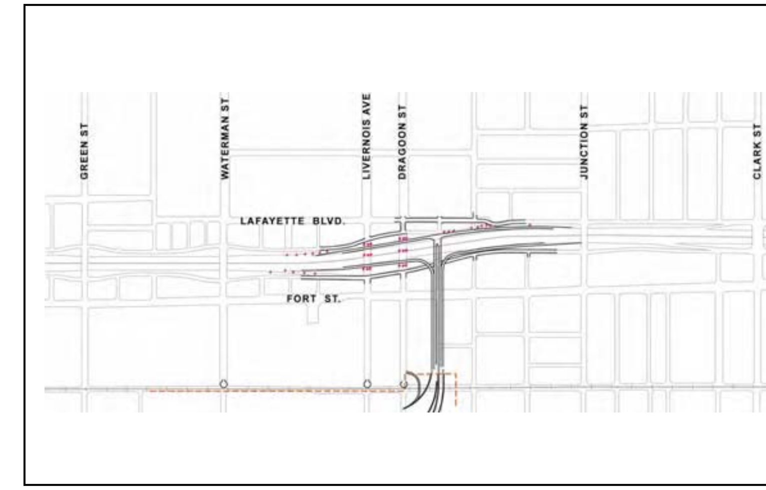


Figure 5-10 VP Interchange 2B

VP Interchange 3

Three-legged interchange.

Advantages:
- Maintain Clark and Springwells interchanges
- Localizes impacts to service drives
- Requires less right-of-way
- Reduces impacts north of I-75
- Localizes impact to Delray
- Less bridge area
- Reduces bridges over Fort Street
- Slows traffic entering the plaza

Disadvantages:
- Design speed 50 km/h (30 mph)
- Close Dragoon and Livernois bridges
- Close Livernois/Dragoon interchange
- Discontinuity in service drives

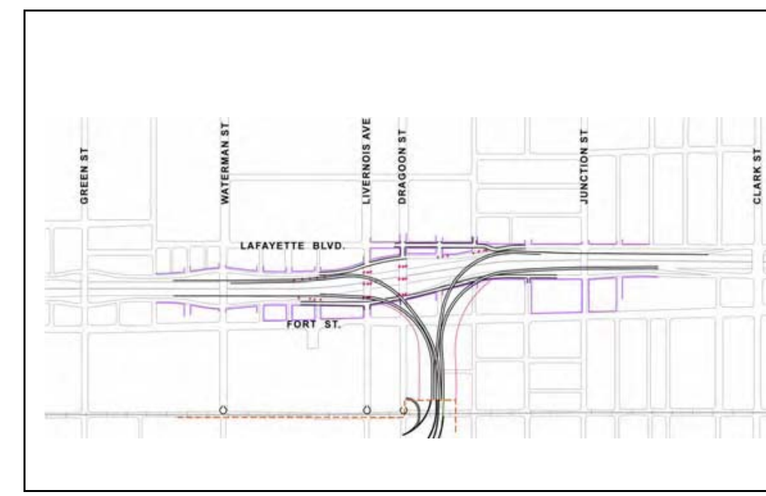


Figure 5-11 VP Interchange 3

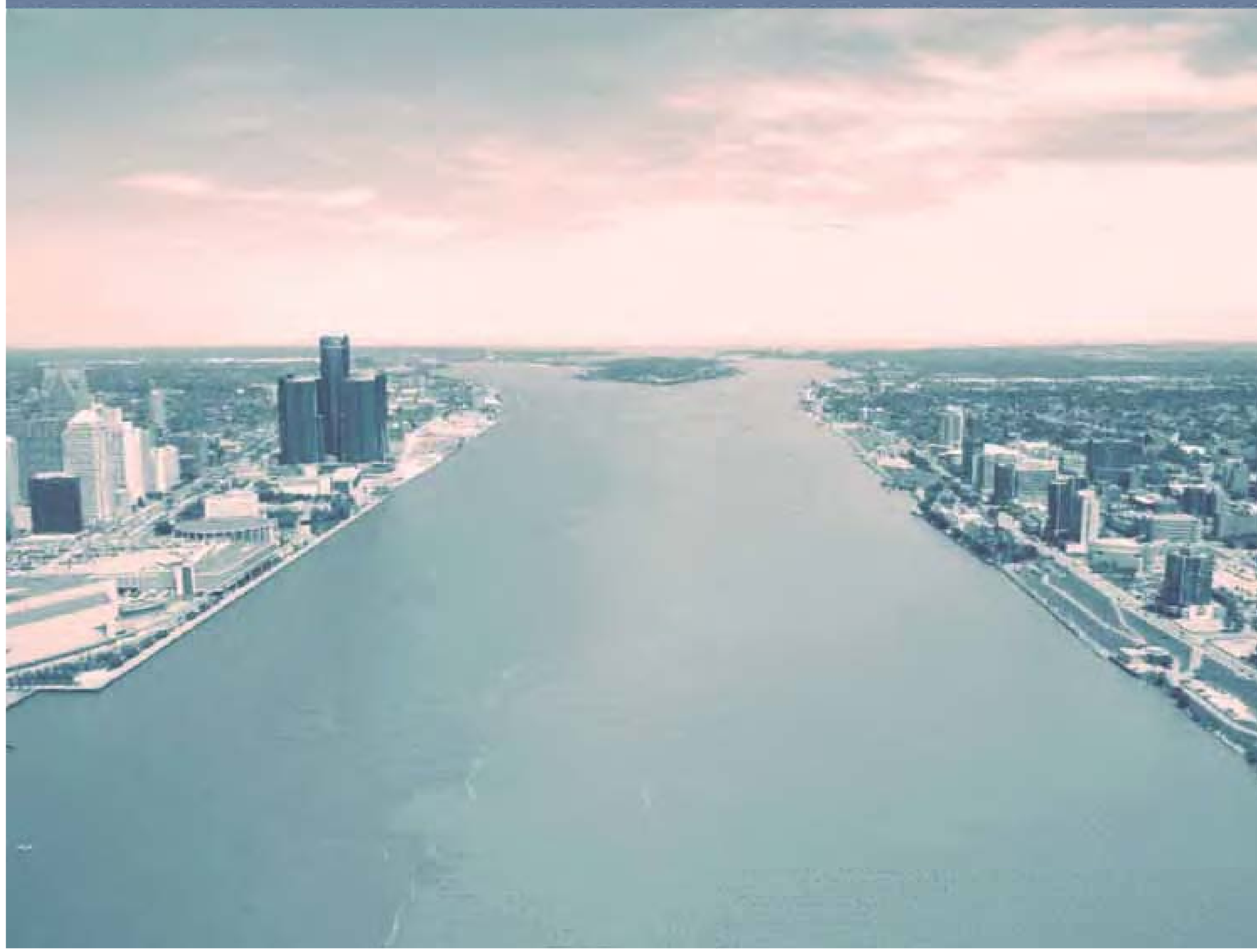
Cost Model

Prior to the VP Study, the DRIC EPE Study Team prepared a conceptual level cost estimate which was reviewed by the VP Team. The VP Team found the estimate to be reasonable for the level of detail available at this stage of the planning process. The VP Team suggested that the cost estimate be further developed in the ASTM format as the alternatives are revised to reflect the outcome of the VP suggestions. The VP Team also suggested that cost estimates be prepared for the two interchanges recommended for additional study as they are further developed.

Summary

MDOT's letter dated March 6, 2007 listed the following items presented by the VP Team and MDOT's decision for their implementation:

- New Interchange Concept VP1 at I-75: Circular Interchange
  - Decision: Accept for Further Study
  - Current Status: Concept VP1 is included in the report as Alternative #14.
- New Interchange Concept VP3 at I-75: Diamond Interchange
  - Decision: Accept for Further Study
  - Current Status: Concept VP3 was eliminated from further consideration after the Value Planning process due primarily to the geometric constraints of the railroad.
- Reduce Proposed Ramp Design Speed to 60 km/h (35 mph), from EPE-proposed 70 km/h (45 mph)
  - Decision: Accept for Further Study
  - Current Status: The reduced design speed of 60 km/h (35 mph) has been incorporated with Alternative #14.
- MDOT questioned the truck rollover safety factor of all ramps leading to the DRIC Plaza, for any Ramp Design Speed
  - Decision: Accept for Further Study
  - Current Status: The issues involved with this recommendation will be addressed during development of the Preferred Alternative.
- MDOT questioned the desirability to construct, operate, and maintain ramp bridges with tightly-curved alignments, for any Ramp Design Speed
  - Decision: Accept for Further Study
  - Current Status: The bridges shown for all alternatives are feasible for the design criteria and horizontal alignments.
- Consider Reconstructing I-75 Pavement with all Interchange Alternatives
  - Decision: Accept for Further Study
  - Current Status: Alternatives #3 and #11 require a shifting of I-75 to minimize impacts on the north side. Adding the reconstruction of I-75 to the other alternatives would affect the evaluation of a Preferred Alternative. Adding the reconstruction of I-75 to the project scope can be evaluated at a later time.
- Add Items to Improve Public Acceptance of Interchange Alternative D, and others
  - Decision: Accept for Further Study
  - Current Status: Although this interchange has been eliminated from further consideration, the suggestion to review the alternatives for potential improvements to minimize impacts will be addressed during development of the Preferred Alternative.
- Close I-75 during constructing whichever new DRIC interchange
  - Decision: Reject
  - Current Status: Not Applicable



6. PRACTICAL ALTERNATIVE COMPARISON / SUMMARY

6.0 PRACTICAL ALTERNATIVE COMPARISON/SUMMARY

A summary of the geometric, operational, and engineering aspects of the Practical Alternatives has been developed and is included in Table 6-1 for comparison. In addition, a qualitative assessment of several other items is included, including the magnitude of the utility impacts, and complexity of the drainage required for each of the Alternatives. A summary of the costs as presented in Section 3.13 and Appendix D is also shown.

The Summary includes comparison items that relate to the criteria used in the Value Planning Study as well as other items. While these criteria were used to validate and evaluate the Initial Practical Alternatives, they also serve to compare the current Alternatives and ultimately select the Preferred Alternative.

Interchange Evaluation

There are six interchange configurations used in the nine alternatives; A, B, C, E, G, and I. The configurations include the following elements:

- Location of Plaza Ramps A, B, C, and D.
- Elimination and/or re-location of Service Drive ramps.
- Introduction of weaving lengths along I-75.
- Re-location of the I-75 centerline to the south in two Alternatives.
- Creation of a north-south "Gateway" corridor.

The significant differences between the interchange configurations are as follows:

- Alternative #14 incorporates a 60 km/h (35 mph) design speed for the entrance ramps to the plaza. All other Alternatives use 70 km/h (45 mph).
- Plaza configuration P-c (Alternatives #7, #9, and #11) allows a re-alignment of the Green St. "Gateway Corridor" away from the residential neighborhood.
- Comparatively, Alternative #5 provides one less SB exit ramp and one less NB entrance ramp. Alternative #14 provides one additional NB entrance ramp, one less SB entrance ramp, and one less NB exit ramp.
- The I-75 freeway mainline segments have similar LOS, ranging from A to D, for the AM and PM Peak Hours for all of the Alternatives.
- The local intersections for Alternatives #1, #5, and #9 operate better than the others with all intersections at LOS B or better.
- Alternatives #2, #5, #9, #14, and #16 introduce weaving sections along I-75.
- The configurations for Alternatives #2, #9 and #16 only require the elimination of two of the existing cross-roads over I-75. The others require three to be eliminated.
- Alternatives #14 and #16 provide a full interchange at Springwells Street. All other alternatives eliminate the SB exit and NB entrance ramps at Springwells Street.
- Alternative #16 provides for the re-alignment of Springwells Street and the reconstruction of the SB entrance and NB exit ramps.
- Alternatives #1 and #7 require the least distance of re-routed traffic through the neighborhoods for access to and from I-75. Alternative #5 requires the most.
- Alternative #5 impacts the "Gateway" project east of Clark Street due to the Plaza ramp tapers extending farther east than the other Alternatives.
- All Alternatives provide local access to the Plaza from Cavalry Street except Alternative #5, which provides local access from Campbell Street.
- Alternatives #3 and #11 have a greater impact on the existing inverted siphons due to the shifting of the I-75 centerline to the south.
- All Alternatives can be constructed in a similar sequencing scheme except Alternatives #3 and #11, which require separate stages to relocate I-75. All Alternatives can be constructed by 2013.

Plaza Evaluation

Each plaza essentially contains the same functional elements. What differentiate the plazas are two factors: 1) operational circulation; and 2) flexibility. Operational circulation is important to limit travel distances within the plaza and simplify way finding and the return of refused entry vehicles to Canada. Another important aspect of operational circulation is traveler and employee safety. Flexibility is an important principle because the border inspection procedures, equipment, and policies are constantly changing. Flexibility also includes the ability to expand facilities to meet changing and unforeseen demands.

Plaza P-a provides better operational circulation than Plaza P-c. Plaza P-a provides linear circulation between the bridge and interchange while Plaza P-c provides a circuitous circulation pattern that requires Canada bound traffic to circulate around the entire perimeter of the Plaza to reach I-75 and the local streets. The circuitous circulation of Plaza P-c also creates poorer internal circulation between Plaza functions and increases the Plaza size by 8 acres. The same circuitous flow of Plaza P-c also limits its flexibility and expandability as the commercial secondary facilities are confined in the center of the Plaza between the access roadways.

Bridge Evaluation

The key findings of the Bridge Conceptual Engineering Report were:

- The major differentiator for the crossing bridges was cost. However, market forces and differences in steel and cement commodity prices at the time of construction will significantly influence the cost differentials between structure types, as well as other matters affecting cost, such as a Buy-America clause.
- For Crossing X-10(B) and X-11(C) the Cable-Stayed Bridges, Options 4 & 9, were more economical than the Suspension Bridges, Options 7 & 10. The predominant reason is the costs of the anchorage foundations due to the soil conditions.
- The sourcing of structural steel (buy America vs. international) will have a substantial influence on cost.
- Construction durations for these structures are similar.
- No significant differentiators in technical feasibility or performance were found between the crossings.
- No environmental impact differentiators were found, with the exception of the bridge vertical profiles.

Table 6-1
Practical Alternative Summary/Comparison

Comparison Item	Alternative #1	Alternative #2	Alternative #3	Alternative #5	Alternative #7	Alternative #9	Alternative #11	Alternative #14	Alternative #16
Major Elements of Alternatives									
Interchange	A	B	C	E	A	B	C	G	I
Plaza	P-a	P-a	P-a	P-a Mod.	P-c	P-c	P-c	P-a	P-a
River Crossing	X-10	X-10	X-10	X-10	X-11	X-11	X-11	X-10	X-10
Design Criteria/Geometry									
Plaza Ramp Design Speed	70 km/h (45 mph)	70 km/h (45 mph)	70 km/h (45 mph)	70 km/h (45 mph)	70 km/h (45 mph)	70 km/h (45 mph)	70 km/h (45 mph)	60 km/h (35 mph)	70 km/h (45 mph)
Design Exceptions	None	None	None	None	None	None	None	None	None
Relocation of I-75	No	No	Yes	No	No	No	Yes	No	No
"Gateway Corridor"	Green St.	Green St.	Green St.	Green St.	Re-Aligned Green St.	Re-Aligned Green St.	Re-Aligned Green St.	Green St.	Green St.
Traffic Operations on I-75									
SB Entrance Ramps	2	2	2	2	2	2	2	1	2
SB Exit Ramps	2	2	2	1	2	2	2	2	2
NB Entrance Ramps	2	2	2	1	2	2	2	3	2
NB Exit Ramps	2	2	2	2	2	2	2	1	2
Traffic Analysis									
Mainline Freeway- AM Peak	LOS D or better	LOS D or better	LOS D or better	LOS D or better	LOS D or better	LOS D or better	LOS D or better	LOS D or better	LOS D or better
Mainline Freeway- PM Peak	LOS D or better	LOS D or better	LOS D or better	LOS D or better	LOS D or better	LOS D or better	LOS D or better	LOS D or better	LOS D or better
I-75 Merge/Diverge & Weaving- AM Peak	LOS C or better	LOS C or better	LOS C or better	LOS C or better	LOS C or better	LOS C or better	LOS C or better	LOS C or better	LOS C or better
I-75 Merge/Diverge & Weaving- PM Peak	LOS D or better	LOS D or better	LOS D or better	LOS C or better	LOS D or better	LOS D or better	LOS D or better	LOS D or better	LOS D or better
Local Intersections- AM Peak	LOS B or better	LOS B or better	LOS B or better	LOS B or better	LOS B or better	LOS B or better	LOS B or better	LOS C or better	LOS C or better
Local Intersections- PM Peak	LOS B or better	LOS C or better	LOS C or better	LOS B or better	LOS C or better	LOS B or better	LOS C or better	LOS C or better	LOS C or better
Weave Areas	0	2 (1 SB, 1 NB); between Local Ramps	0	2 (1 SB, 1 NB); between Local Ramps	0	2 (1 SB, 1 NB); between Local Ramps	0	2 (1 SB, 1 NB); w/Plaza Ramps	2 (1 SB, 1 NB); w/Plaza Ramps
Local Traffic Operations									
Proposed Crossings of I-75	4 of 7 Remain	5 of 7 Remain	4 of 7 Remain	4 of 7 Remain	4 of 7 Remain	5 of 7 Remain	4 of 7 Remain	4 of 7 Remain	5 of 7 Remain
Full Interchange at Springwells St.	No	No	No	No	No	No	No	Yes	Yes
Re-alignment of Springwells St.	No	No	No	No	No	No	No	No	Yes
Full Interchange at Clark St.	No	No	No	No	No	No	No	No	No
SB Service Dr. direct connection to Lafayette	Eliminated	Modified	Eliminated	Modified	Eliminated	Modified	Eliminated	Modified	Modified
Plaza									
Operational Circulation	Linear	Linear	Linear	Linear	Circuitous	Circuitous	Circuitous	Linear	Linear
Flexibility	Good	Good	Good	Good	Limited	Limited	Limited	Good	Good
Local Plaza Access	From Cavalry St.	From Cavalry St.	From Cavalry St.	From Campbell St.	From Cavalry St.	From Cavalry St.	From Cavalry St.	From Cavalry St.	From Cavalry St.
Impacts									
Distance of re-routed traffic onto Service Drives; includes backtracking- (Blocks) (1 block is distance between major cross-streets)									
SB I-75 Exit to Service Dr.	4 (from Springwells to Dragoon)	5 (from Dragoon to Waterman & Springwells to Waterman)	3 (from Springwells to Dragoon)	6 (from Clark to Livernois & Springwells to Livernois)	4 (from Springwells to Dragoon)	5 (from Dragoon to Waterman & Springwells to Waterman)	3 (from Springwells to Dragoon)	3 (from Dragoon to Springwells)	3 (from Dragoon to Springwells)
SB Service Dr. Entrance to I-75	2 (from Clark to Livernois)	4 (from Clark to Junction & Livernois to Springwells)	5 (from Clark to Junction & Livernois to Springwells)	4 (from Clark to Junction & Livernois to Springwells)	2 (from Clark to Livernois)	4 (from Clark to Junction & Livernois to Springwelsl)	5 (from Clark to Junction & Livernois to Springwells)	6 (from Clark and Livernois to Springwells)	4 (from Clark to Junction & Livernois to Springwells)
NB I-75 Exit to Service Dr.	2 (from Clark to Cavalry)	2 (Livernois to Junction & Clark to Junction)	4 (from Livernois to Junction and Clark to Junction)	2 (from Livernois to Junction)	2 (from Clark to Cavalry)	2 (Livernois to Junction & Clark to Junction)	4 (from Livernois to Junction and Clark to Junction)	6 (from Livernois & Clark to Springwells)	3 (from Livernois to Junction & Clark to Junction)
NB Service Dr. Entrance to I-75	4 (from Clark to Dragoon)	5 (Springwells to Waterman & Dragoon to Clark)	3 (from Springwells to Dragoon)	6 (from Sprigwells to Livernois & Clark to Livernois)	4 (from Clark to Dragoon)	5 (Springwells to Waterman & Dragoon to Clark)	3 (from Springwells to Dragoon)		3 (from Dragoon to Clark)
Total (Blocks)	10	16	15	18	10	16	15	15	13
Impact to "Gateway Project"	None	None	None	Plaza Ramps extend east of Clark St.	None	None	None	None	None
Drainage									
Impact on I-75 inverted siphons	Minimal	Minimal	High	Minimal	Minimal	Minimal	High	Minimal	Minimal
Construction Phasing/MOT			Additional Stages for I-75 relocation				Additional Stages for I-75 relocation		
Total Cost (millions)									
Bridge Option 4	$1,353	$1,366	$1,320	$1,353	$1,339	$1,353	$1,336	$1,277	$1,399
Bridge Option 7	$1,443	$1,456	$1,409	$1,442	$1,434	$1,448	$1,431	$1,366	$1,489

Summary of Impacts

At this stage of the project Right-of-Way (ROW) surveys have not been performed. They will be performed as part of preliminary design for the Preferred Alternative. For the Practical Alternative phase of the project the existing ROW lines were estimated. Project ROW was established by defining a distance from the edge of pavement or back of curb on proposed local roadways and ramps. For local roadways a distance of 5 m (16 ft) was used and for plaza ramps 40 m (131 ft) was used. In cases of limited takes these limits could be refined as necessary to limit impacts in future design. ROW lines for the Plazas were defined at logical break points which would encompass contiguous city blocks. For the main river bridge crossing a 100 m (328 ft) corridor was defined. This would allow for security and maintenance access. Based on these assumptions for ROW and the conceptual plans presented in this report, potential relocations have been identified for each Practical Alternative. (See Table 6-2.)

Table 6-2
Potential Relocations

	Description/Units	#1	#2	#3	#5	#7	#9	#11	#14	#16
Residential Units	Occupied	335	331	341	384	368	364	374	260	339
	Vacant	6	5	5	6	19	18	18	4	6
Residential Population	Number	821	811	836	941	902	892	917	637	840
Business Units	Active	39	38	46	46	39	38	46	35	39
	Vacant	25	25	30	30	24	24	29	27	25
Estimated Employees	Number	805	800	826	810	905	900	920	688	805
Other Land Uses Affected	Schools	0	0	0	0	0	0	0	0	0
	Senior Service Facilities	0	0	0	0	0	0	0	0	0
	City/Government Facilities	3	3	3	4	3	3	3	2	3
	Places of Worship	6	7	7	5	6	7	7	6	6
	Medical Facilities	1	1	1	1	1	1	1	1	1
	State/Federal Government Facilities	2	2	2	2	2	2	2	1	2
	Community Services	0	0	0	0	0	0	0	0	0
	Vacant	0	0	0	0	0	0	0	0	0

Source: The Corradino Group of Michigan, Inc.