DRAFT

The Detroit River International Crossing Study
Evaluation of Illustrative Alternatives on U. S. Side of Border

Volume 1
Summary

November 2005

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SUMMARY

Detroit River International Crossing Study
Evaluation of Illustrative Alternatives
on U.S. Side of the Border

S1. BACKGROUND

This is a Summary of the Detroit River International Crossing Study Evaluation of Illustrative Alternatives on the U.S. side of the border. It is the first of a three-volume set of reports. Volume 2 presents the details of the technical evaluation process. Volume 3 graphically displays the data reported upon in Volumes 1 and 2. The purpose of this summary is to concisely report on the evaluation process and results contained in Volumes 2 and 3.

S2. INTRODUCTION

The Detroit River International Crossing Study (DRIC) involves application of a structured process to evaluate Illustrative Alternatives that is consistent with laws and regulations guiding such analyses and past experiences on comparable projects. This process is used to determine which of the Illustrative Alternatives will be subject to more in-depth analysis to be documented in the Draft Environmental Impact Statement (DEIS). The DEIS is to be published by the end of 2006 (Figure S-1).

The evaluation process began when the Border Partnership Steering Committee, with input from the Working Group and its consultants,[1] identified options that would meet the project's purpose and need.

Project Purpose

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.***

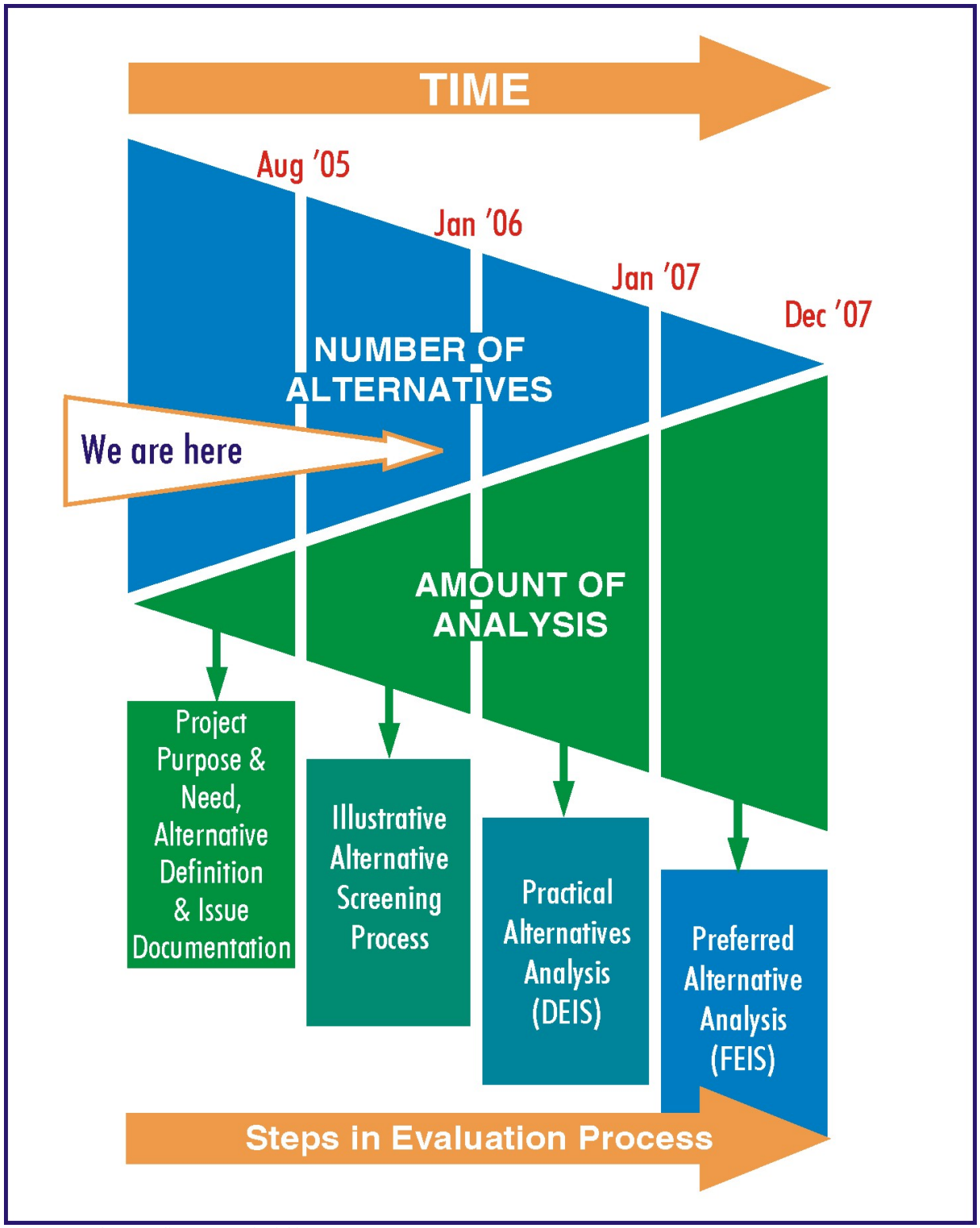
Project Need

To address future mobility requirements 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.***

[1] The Partnership Steering Committee is comprised of representatives of the Federal Highway Administration, Transport Canada, the Ministry of Transportation Ontario and the Michigan Department of Transportation. The staff members of these organizations comprise the Working Group. The Consultant teams are led by URS Canada (Canadian Team) and The Corradino Group of Michigan (U.S. Team).

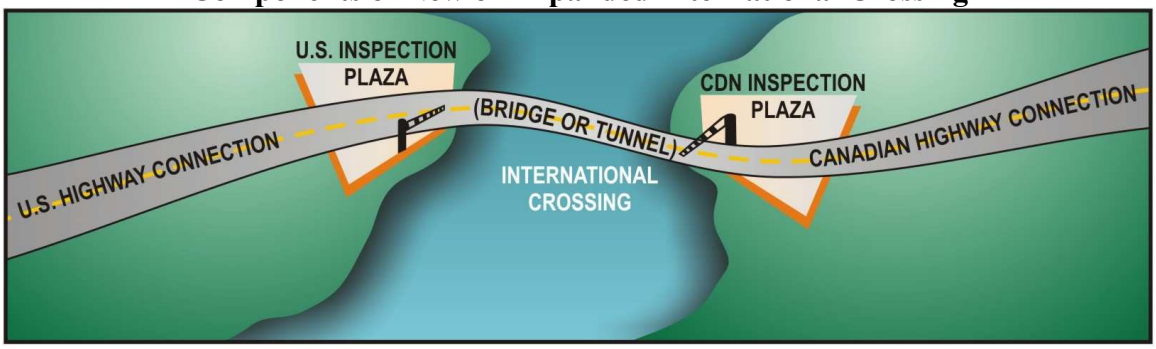
Figure S-1
Evaluation Process



Source: The Corradino Group of Michigan, Inc.

These are Illustrative Alternatives, as they were considered feasible when developed in June 2005, in connecting Highway 401 in Canada to I-75, I-94 and/or I-275 in Wayne County, Michigan. Each end-to-end Illustrative Alternative has several components (Figure S-2): highway route + plaza + border crossing + plaza + highway route. The complete depiction of the DRIC end-to-end alternative crossing systems is shown on Figure S-3.

Figure S-2
Components of New or Expanded International Crossing



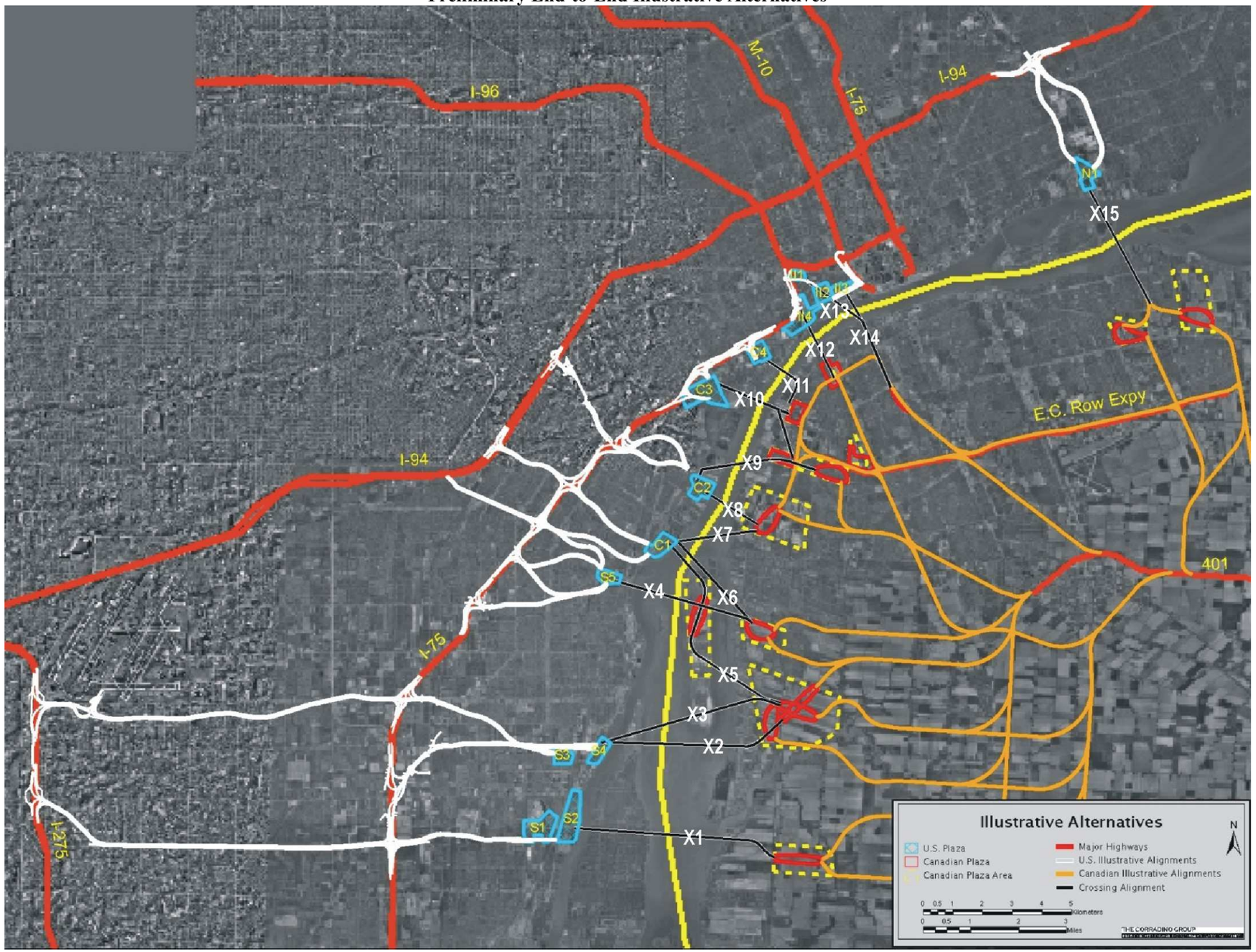
Source: The Corradino Group of Michigan, Inc.

This report summarizes the analysis of the river crossing system components and their effects on the U.S. side of the border. The results have been combined with evaluations on the Canadian side of the border of plazas, crossings and routes/interchanges. The resulting recommendations, which are based on this joint evaluation, will be presented for public comment beginning in late November 2005. Following public review and comment, the Border Partnership Steering Committee will decide by March 2006 the final list of Practical Alternatives.

S3. EVALUATION FACTOR WEIGHTING

The seven evaluation factors listed on Table S-1 form the foundation of the analysis. To conduct the analysis, data were assembled from secondary sources, plus a significant amount of field inventory was conducted. For example, the Geographic Information System (GIS) database was updated for the study area by teams of field personnel to determine items like: number of residential units (occupied and vacant); number of businesses; locations of schools, senior service facilities, places of worship, floodplain locations, parklands, cemeteries, and the like. A travel demand model, based on the SEMCOG modeling framework, was developed based on the most up-to-date data. The model report, *Travel Demand Model Update (UPDATED September 16, 2005)*, can be found on the project Web site (www.partnershipborderstudy.com).

Figure S-3
Preliminary End-to-End Illustrative Alternatives



Source: The Corradino Group of Michigan, Inc.

Table S-1
Detroit River International Crossing Study
Evaluation Factors and Performance Measures
Illustrative Alternatives Phase

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Evaluation Factor	Performance Measure Category		Performance Measures	
			Description/Units	Data Source
Protect Community/ Neighborhood Characteristics	Traffic Impacts	Volume Change – Key Links	Vehicles	DRIC Travel Demand Model
		Streets Closed (permanently)	Number	GIS/Field Review
		Streets Closed (temporarily)	Number	GIS/Field Review
		Streets Crossed	Number	GIS/Field Review
		Streets Rerouted	Number	GIS/Field Review
		Streets with Interchange	Number	GIS/Field Review
		Mainline Raillines Rerouted	Number	GIS/Field Review
	Noise	Frontline Exposure	Number of dwelling units exposed	Transportation Noise Model (TNM) Version 2.5
		Significant Receptors Exposures	Number/Specify	Field Review, TNM
	Community Cohesion/Character	Change from No Action	Positive/Negative/Neutral	Professional Judgment
	Potential Acquisition	Residential Units	Occupied	GIS/Field Review
			Vacant	GIS/Field Review
		Residential Population	Number	GIS/Field Review
		Business Units	Active	GIS/Field Review
			Vacant	GIS/Field Review
		Estimated Employees in Affected Census Blocks	Number	Tetrad Computer Applications, Inc.
		Other Land Uses Affected	Schools	GIS/Field Review
			Senior Service Facilities	GIS/Field Review
			Government Facilities	GIS/Field Review
			Places of Worship	GIS/Field Review
			Medical Facilities	GIS/Field Review
			State/Federal Government Facilities	GIS/Field Review
			Community Services	GIS/Field Review
			Vacant Buildings	GIS/Field Review
	Environmental Justice/Title VI	EJ Populations in Affected Census Block Groups	EJ Population (non poverty)	U.S. Census Data
			Population Groups Affected	U.S. Census Data
			% Households in Poverty/Above or Below 9.9% Regional Threshold	U.S. Census Data
			Households in Poverty	U.S. Census Data
		Title VI Groups in Census Tracts	Presence of Regionally Prominent Ancestral Groups	U.S. Census Data
	Public Safety/Security (Plaza Only)	Proximity to Industry	Number of heavy industry businesses within 1/2 mile	GIS/Field Review
			Number of medium industry businesses within 1/2 mile	GIS/Field Review
			Number of light industry/office businesses within 1,000 ft/300m	GIS/Field Review
		Proximity to Residential/Retail	Number of residences within 500 ft/150m	GIS/Field Review
			Number of retail businesses within 500 ft/150m	GIS/Field Review
		Proximity to Hazardous Materials	Number of EPA Licensed Hazmat TSD Facilities within one-half mile	
			Number of MDEQ Licensed TSD Facilities within one-half mile	
		Emergency Response	Distance to nearest fire station (mi)	GIS/Field Review
			Distance to nearest police station (mi)	GIS/Field Review
			Number of streets closed (perm.)	GIS/Field Review
			Number of streets closed (temp.)	GIS/Field Review
			Mainline Raillines Rerouted	GIS/Field Review
Maintain Consistency with Local Planning	Official Plans	Consistency	YES/NO	Professional Judgment
	Other Plans	Consistency	YES/NO	Professional Judgment
	Environmental Sites Affecting Plan Implementation (single sites may have multiple designations)	Leaking Underground Storage Tanks	Number	Web-based MDEQ files
		EPA/DEQ Licensed Hazmat TSD Facility	Number	Web-based EPA files
		National DEQ Priority List (Superfund)	Number	Web-based MDEQ/EPA files
		RTK/Cerclis (Superfund)	Number	Web-based MDEQ/EPA files
		Michigan Contaminated Site	Number	Web-based MDEQ files

Table S-1 (cont'd)
Detroit River International Crossing Study
Evaluation Factors and Performance Measures
Illustrative Alternatives Phase

Evaluation Factor	Performance Measure Category		Performance Measures		
			Description/Units		Data Source
Protect Cultural Resources	Above Ground Historic Resources	Historic Districts	Number		Web-based SHPO files
		Listed NRHP Sites/Structures	Number		Web-based SHPO files
		Listed SHRS Sites/Structures	Number		Web-based SHPO files
		Locally Listed Sites/Structures	Number		Local Historic Groups
		Potentially Eligible Sites/ Structures	Number		Field Review
	Archaeology	Previously Recorded Sites	Number		SHPO files
	Below Ground Resources	Potential to Find/Record	High/Medium/Low		Field Review
	Parkland	All Public Parks	Number/Acres		Municipal Web sites/Field Review
		6(f) Parks	Number/Specify		Web site – National Park Service
		Coastal Zone Management Projects	Number of Project/Specify		MDEQ and Grant Applications
Protect the Natural Environment	Surface Water	Floodplain	Number/Acres		GIS/Field Review
		Surface Run Off	Acres		Calculation
		Primary Steams	Number/Specify		GIS/Field Review
		Secondary Streams	Number/Specify		GIS/Field Review
		Other Water-crossings	Number/Specify		GIS/Field Review
	Groundwater	Municipal Wells	Number		Contact with Municipalities
		Water In-takes	Number/Specify		Contact with Municipalities
	Significant Habitat	Wetlands	Acres		Field Review
		Fens/Bogs	Number/Acres		Field Review
		Endangered Species	Potential Species		U.S. Fish & Wildlife/MDEQ
		Designated Wildlife Refuges	Number/Acres		U.S. Fish & Wildlife/MDEQ
	Prime/Unique Farmland	Farmland	Acres		GIS/U.S. Department of Agriculture
	Mineral Resources	Salt/Limestone	Type/Specify		Field Review/Industry sources
Improve Regional Mobility	Highway Network Effectiveness	VMT (int'l traffic only, PM Peak Hour for 2035)	No Action		SEMCOG Travel Demand Model
			With New Crossing		SEMCOG Travel Demand Model
			Difference from 2035 – No Action		SEMCOG Travel Demand Model
			Percent Difference		SEMCOG Travel Demand Model
		VHT (int'l traffic only, PM Peak Hour for 2035)	No Action		SEMCOG Travel Demand Model
			With New Crossing		SEMCOG Travel Demand Model
			Difference from 2035 – No Action		SEMCOG Travel Demand Model
			Percent Difference		SEMCOG Travel Demand Model
		V/C (total traffic)	Table 5-10, Figure 5-11		SEMCOG Travel Demand Model
		Diversion due to disruption at crossing	Difference of Int'l VMT with Ambassador Bridge Closed and New Crossing Open		SEMCOG Travel Demand Model
			Difference of Int'l VHT with Ambassador Bridge Closed and New Crossing Open		SEMCOG Travel Demand Model
		Detour of Local Arterials	Number of SEMCOG Network Links Rerouted		SEMCOG Travel Demand Model
Maintain Air Quality	Regional Burden	Change from No Action	VOC	lbs. in PM peak hour	EPA MOBILE6.2 & model runs
			CO	lbs. in PM peak hour	EPA MOBILE6.2 & model runs
			NOX	lbs. in PM peak hour	EPA MOBILE6.2 & model runs
			PM2.5	lbs. in PM peak hour	EPA MOBILE6.2 & model runs
			PM10	lbs. in PM peak hour	EPA MOBILE6.2 & model runs
			Benzene	lbs. in PM peak hour	EPA MOBILE6.2 & model runs
			1,3 Butadiene	lbs. in PM peak hour	EPA MOBILE6.2 & model runs
			Formaldehyde	lbs. in PM peak hour	EPA MOBILE6.2 & model runs
			Acetaldehyde	lbs. in PM peak hour	EPA MOBILE6.2 & model runs
			Acroline	lbs. in PM peak hour	EPA MOBILE6.2 & model runs
	Hotspot	Carbon Monoxide (CO)	Parts Per Million		Approved Federal Model (CALQ3HC)

Table S-1 (cont'd)
Detroit River International Crossing Study
Evaluation Factors and Performance Measures
Illustrative Alternatives Phase

Evaluation Factor	Performance Measure Category		Performance Measures	
			Description/Units	Data Source
Assess How Project Can Be Built	Traffic Maintenance	Streets closed during construction	Number	GIS/Field Review
		Adjacent businesses affected by construction	Number within 500 ft/150m	GIS/Field Review
		Adjacent schools or public use facilities affected by construction	Number within 500 ft/150m	GIS/Field Review
	Site constraints limiting access to the plaza for the river crossing or the roadway connections.	Plaza proximity to crossing landing	Distance (ft/m)	GIS/Field Review
		Raillines adjacent to or through plaza site	Number	GIS/Field Review
		Utilities adjacent to or through plaza site	Number	GIS/Field Review
		Presence of heavy industry adjacent to or on plaza site	Yes/No	GIS/Field Review
		Contaminated sites/hazardous materials within 500 ft/150m (single sites may have multiple designations)	EPA Licensed Hazmat TSD Facilities	Web-based EPA files
			National Priority List (Superfund)	Web-based MDEQ files
			RTK Cerclis (Superfund)	Web-based MDEQ files
			Michigan Contaminated Sites	Web-based MDEQ files
			DEQ Licensed TSD Facilities	Web-based MDEQ files
	Geotechnical constraints – identify any unusual geotechnical features/issues that may be problematic for construction	Proximity to solution mining areas	Number within 1,000 ft/300m	GIS
		Presence of poor soil conditions (e.g., compressible/expansive and organic)	Yes/No	GIS/Literature Review
		Presence of noxious gases (e.g., Hydrogen Sulfide and Methane)	Yes/No	Literature Review
		Presence of artesian groundwater	Yes/No	Literature Review
	Relative risk of known site conditions (environmental, geotechnical, other physical/ construction methodologies)	Engineering Consideration	High/Medium/Low	Professional Judgment

Source: The Corradino Group of Michigan, Inc.

EPA's model known as MOBILE6.2 was used to define air pollutants (including air toxics) at the regional level. Noise impacts were calculated using the Federal Highway Administration's Transportation Noise Model (TNM) Version 2.5. And, a preliminary wetlands inventory was completed. Details on the methodologies used and data collected are included in Volumes 2 and 3 of this series of reports.

The seven evaluation factors were then assigned a value of importance (weight) by both the citizens who engaged in the process and the MDOT Technical Team using the scoring form shown on Table S-2. A total of 875 completed citizen forms (out of 941 forms submitted) were included in the analysis. Nineteen members of the MDOT Technical Team were involved in the weighting process. These two sets of weights (Citizens and MDOT Technical Team) were compiled independently by each group with the MDOT Technical Team completing its scoring before the Citizens' weights were calculated.

The results are shown on Table S-3 and Figure S-4.[2] They indicate that the public sees all the factors, but Regional Mobility and Constructability, of about equal importance (15 to 19%). It sees Regional Mobility and Constructability much less important with weights at about six percent.

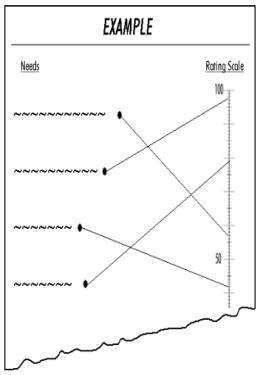
The MDOT Technical Team views the factors related to Air Quality, Consistency with Local Planning, Protecting the Natural Environment and Protecting Neighborhoods at a high level. But, it views Regional Mobility as the most important factor, and at a much higher weight than the public.

S3.1 Performance Measurement Process

Each set of weights has been applied in the scoring of the components of Illustrative Alternative crossing systems. In doing so, the "performance" of each Illustrative Alternative was first measured by the consultants by studying the data in the categories listed on Table S-1. For example, when examining the data for the evaluation factor of Protect Cultural Resources, the number of historic/archaeologic and park sites potentially impacted, along with their listing on a national or state register, contributed to the score of 0 to 100 assigned by each member of the evaluation team – a score lower than 50 is considered a poor performance. The total score of each alternative was developed by multiplying the performance score for a specific evaluation factor by the weight of that factor established by: 1) the public, and 2) the MDOT Technical Team. An example is provided in Section 5 of this report. When the weighted scores are added,

[2] All weights were tabulated on a normalized basis so all individual totals equal 100.00 percent.

Table S-2
Detroit River International Crossing Study
Scoring Form – Evaluation Factors



How Important Are These Items?

We want to know how you value the seven evaluation factors listed below. To provide us your opinion, please rate them on the scale of "1" through "100", with the highest rating indicating the item you believe is most important. Draw a line from the dot (•) following each factor on the left, to the scale on the right, to indicate your opinion. It you choose, you can have all factors at the same point on the scale at the right. When finished, return your form to a project representative, or by email, or by fax at the addresses listed at the bottom of this form.

Your opinions will be used to evaluate the impacts of the Illustrative Alternatives of the Detroit River International Crossing Project. In that process the Detroit River International Crossing Partnership must also consider the project's Purpose and Need Statement (attached). Therefore, a proposed river crossing alternative's international and national importance from economic and travel/transportation (including freight) perspectives may be overriding considerations throughout the evaluation. Thank you.

Factor	Rating Scale
Maintain Air Quality	100
Protect Community/Neighborhood Characteristics	
Maintain Consistency with Local Planning	
Protect Cultural Resources	50
Protect the Natural Environment	
Improve Regional Mobility	
Assess How Project Can Be Built	0

Name of Person Completing Form: _____

Please return the completed form by July 31, 2005.

www.partnershipborderstudy.com
Hotline: 800.900.2649
Fax: 248.799.0146

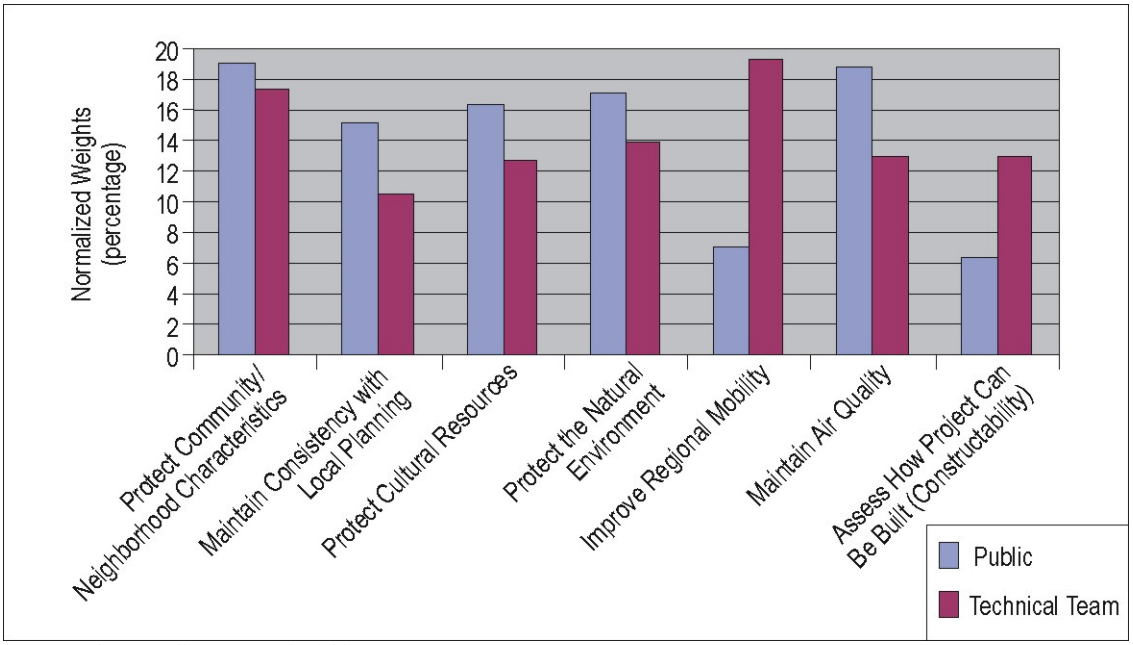
Source: The Corradino Group of Michigan, Inc.

Table S-3
Detroit River International Crossing Study
Evaluation Factor Weightings
(Normalized to 100%)
Citizens and MDOT Technical Team

Factor	Protect Community/ Neighborhood Characteristics	Maintain Consistency with Local Planning	Protect Cultural Resources	Protect the Natural Environment	Improve Regional Mobility	Maintain Air Quality	Assess How Project Can Be Built	Total
Citizens								
Weight	19.00%	15.18%	16.53%	17.09%	7.06%	18.88%	6.26%	100.00%
Ranking	1	5	4	3	6	2	7	
MDOT Technical Team								
Weight	17.44%	10.44%	12.77%	13.87%	19.46%	12.97%	13.05%	100.00%
Ranking	2	7	6	3	1	5	4	

Source: The Corradino Group of Michigan, Inc.

Figure S-4
Detroit River International Crossing Study
Evaluation Factor Weightings
(Normalized to 100%)
Citizens and MDOT Technical Team



Source: The Corradino Group of Michigan, Inc.

two totals are available per Illustrative Alternative. Those totals inform the decision of which alternatives are to be dropped from further consideration.

It is noteworthy that cost is applied after the evaluation scoring to determine "cost effectiveness," defined as "score (points) per dollar," for the border crossing system on the U.S. side, i.e., crossing, plaza and connecting route. This measure is also helpful in deciding the list of alternatives to be dropped from further consideration.

S4. UNIQUE CIRCUMSTANCES

As the data collection and evaluation processes unfolded, information was analyzed to determine if there were any unique alternatives or crossing system components that did not serve the project's purpose and need or were not practical to implement with minimal impacts and in a timely way. There are four such cases that affect a number of Illustrative Alternatives: 1) the constructability of a three-lane per direction tunnel north of Zug Island; 2) the proposed Detroit River Tunnel Partnership plan to convert the existing rail tunnels to truck use and construct a

third tunnel for rail use; 3) the U.S. Steel property as affected by Plazas C-1 and C-2; and, 4) the unique circumstance surrounding use of Fighting Island, which, while located on the Canadian side of the border, has an effect on the U.S. proposals.

S4.1 Tunnel/Constructability

The tunnel options considered are:

- Rock bored (Slurry Shield)
- Soft ground bored (Earth Pressure Balance)
- Submerged
- Mined (drill and blast)

The techniques to build such tunnels are described here.

1. Slurry Shield Tunnel Boring Machines (TBM) through rock – while preferred to blasting in urban areas, this method is considered impracticable because of the poor rock conditions in the Detroit River Area (Table S-4). Further, slurry shield boring is a new technology and, from a practical standpoint, is yet to be proven.

2. Earth Pressure Balance Tunnel Boring Machine (TBM) – suitable for tunneling in the soft clay overburden by controlling the pressure at the working-face. This method of construction, which was considered possible in the Central and Belle Isle Areas, requires state-of-the-art machinery and techniques and is further discussed below (Table S-4).

3. Submerged tunnel – is suitable anywhere the riverbed can be reasonably dredged to place the finished tunnel fully below the existing riverbed level. It has the advantage of a flexibly-shaped cross-section (not restricted to circular), which could minimize depth of dredging (through increasing width). But, the environmental impact of dredging in this section of the Detroit River would create such disturbance to sediment, including contaminated and toxic riverbed sediments, that the effect on river biology is considered unacceptable (Table S-4).

4. Drilling and blasting though bedrock – this method has a very poor history with construction difficulties, abandonment and fatalities. A recent attempt in the Rouge River near Zug Island was abandoned in 2003. The rock is of poor quality and fissured with infiltration of water and dangerous noxious gases. There is artesian pressure (2 to 3 meters of head above the river) due to the presence of aquifers. There is also the difficulty of blasting in urban areas. This method of construction is considered impracticable.

A complete report on these factors, entitled "Preliminary Tunnel Evaluation, Proposed Detroit River International Crossing," is available on the project's Web site (www.partnershipborderstudy.com). The information provided in that document led to the conclusion that, while a bridge crossing is feasible and prudent along the Detroit River from the Belle Isle to Downriver areas, only a soft ground bored tunnel appeared to be feasibly practical and, then, only in the Central and Belle Isle Areas (Table S-4). But, it was noted that even in these latter areas, a soft ground tunnel may not be practical if two tunnels, each three lanes wide, have to be bored.

Table S-4
Detroit River International Crossing
Tunnel Practical Feasibility

Category	Downriver	Central	Belle Isle
Soft Ground Bored Tunnel	Not Practically Feasible ▪ Insufficient soil depth	Possibly Practically Feasible ▪ Soil depth varies from marginal to insufficient	Practically Feasible ▪ Marginal soil depth
Rock Tunnel	Not Practically Feasible ▪ Poor rock ▪ Deep tunnel/long approaches ▪ Poor history	Not Practically Feasible ▪ Poor Rock ▪ Even deeper tunnel/long approaches ▪ Poor history	Not Practically Feasible ▪ Poor rock ▪ Very deep tunnel/long approaches
Submerged Tunnel	Not Practically Feasible ▪ Rock excavation required ▪ Environmental issues	Technically Practical – Engineering Not Practically Feasible – Environmental Issues	Technically Practical – Engineering Not Practically Feasible – Environmental Issues

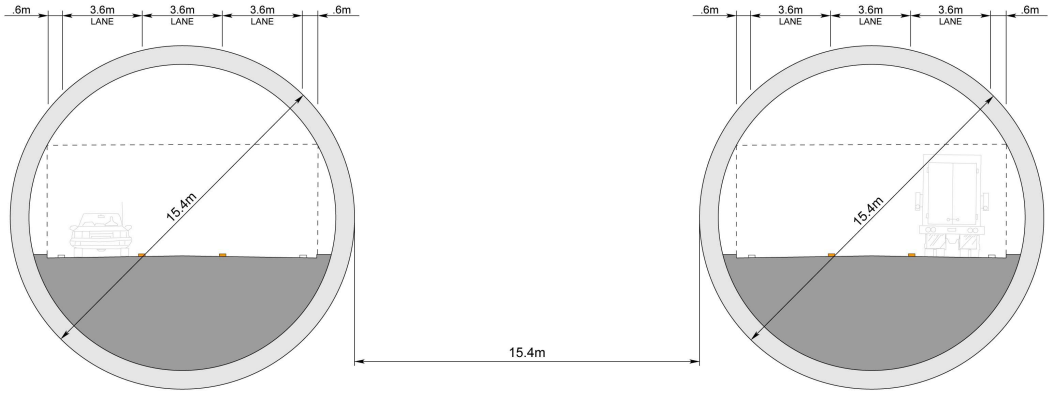
Source: Parsons Transportation Group

Soft ground bored tunnels are only practical under the Detroit River where the silty-clay overburden is deep enough to support tunnel-boring with adequate safe clearance above the bedrock and below the riverbed. This restricts soft-bore tunneling to proposed Crossings X-10, X-11 in the Central Area, X-14 in the I-75/I-96 Area and Crossing X-15 at the eastern tip of Belle Isle. The desired minimum depth from the top of the tunnel to the riverbed above was assumed initially to be approximately one tunnel diameter to prevent "floating" of the tunnel.

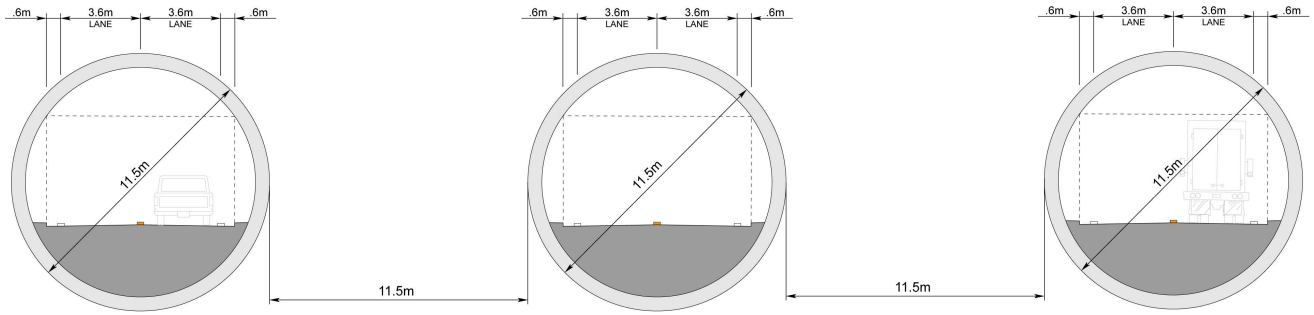
To determine the practical feasibility of the soft ground bored tunnels, two configurations were considered (Figure S-5):

- Twin-bore tunnel, three lanes per bore, approximate outer diameter of each bore at 15.4 meters (about 45 feet).

Figure S-5
Detroit River International Crossing Study
Tunnels Cross Sections



DOUBLE-BORE
15.4M (50 feet) Bore with 3 Traffic Lanes per Tunnel



TRIPLE-BORE
11.5M (38 feet) Bore with 2 Traffic Lanes per Tunnel

Source: Parsons Transportation Group

- Three-bore tunnel, two lanes per bore, approximate outer diameter of each bore at 11.5 meters (about 38 feet).

Geological profiles were developed for each option along the longitudinal crossing alignments. The tunnel profile for each of the four crossings was plotted, based on the "one-diameter" minimum clearance below riverbed. The results are shown in Table S-5A. From that analysis it was concluded that tunnels at Crossings X-10 and X-11 impact too deeply through the hardpan and into the underlying bedrock to be considered practically achievable.

Table S-5A
Detroit River International Crossing Study
Analysis of Twin and Triple Bore Tunnels

		Tunnel Cross-section		
Crossing	**Approximate River Width**	**Twin-bore 3 lanes/bore 15.2 m. diameter (approximately 50 feet)**	**Triple-bore 2 lanes/bore 11.5 m. diameter (approximately 38 feet)**	**Remarks**
X-10	600 meters (approximately 2,000 feet)	Totally within bedrock	Almost totally within bedrock	Inadequate clearance
X-11	600 meters (approximately 2,000 feet)	Totally within bedrock	Almost totally within bedrock	Inadequate clearance
X-14	720 meters (approximately 2,400 feet)	Partially within bedrock	Marginal	11.5 m (38 feet) diameter may be possible
X-15	1,900 meters (approximately 6,200 feet)	Partially within bedrock	Marginal	11.5 m (38 feet) diameter may be possible

Crossings X-14 and X-15 were then studied in more detail for only the 11.5 meter (38 feet) diameter bores by:

- Assuming a three-meter clearance above the hardpan stratum
- Checking this result for vertical clearance below the riverbed and using the profile to establish a preliminary tunnel length.

The results are presented in Table S-5B.

Table S-5B
Detroit River International Crossing Study
Analysis of 11.5 meter (38 ft.) Turn-Bore Tunnel

Crossing No.	Approximate Tunnel Length	Minimum Clearance to Riverbed
X-14	980 m (approximately 3,200 feet)	3 m (approximately 10 feet)
X-15	2,460 m (approximately 8,100 feet)	6 m (approximately 20 feet)

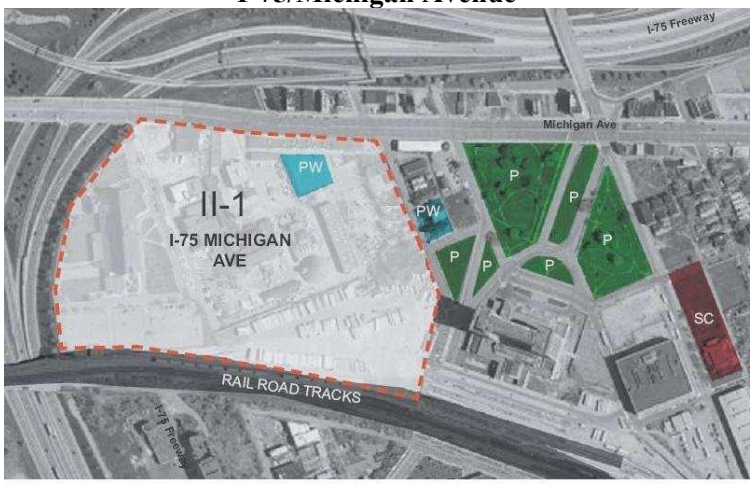
They indicate an 11.5 meter (38 feet) diameter tunnel constructed in the clay overburden at either Crossing X-14 or X-15 does not appear practically feasible as the tunnel clearance to the riverbed is less than the desired 11.5 meters (38 feet). In this situation, floating of the tunnel (i.e., buoyancy) is a major concern, due to the shallow ground cover (3 to 6 meters or about 10 to 20 feet). This was overcome in a similar case (under the Elbe River, Germany, with 14.2 meter diameter tunnel and 7 to 13 meter cover) by laying a dense overlay of material in the riverbed to prevent the tunnel from floating, blow-outs and settlements. This cannot be done in the Detroit River as it is a navigable channel and because of the environmental conditions associated with placing such material on the riverbed. Because six-lane tunnels in any configuration are not considered practically feasible from an engineering perspective, the alternatives examined at all crossings are suspension or cable stay type bridges.

S4.2 The Detroit River Tunnel Partnership (DRTP) Proposal

A key issue that guides the definition and analysis of an Illustrative Alternative is whether it meets the project's purpose and need. The best indicator of this is Regional Mobility, although other evaluation factors were also considered (included in Volume 2 of this report).

The DRTP proposal is defined in the Detroit River International Crossing Study as Crossing X-13 (refer to Figure S-3) – a one lane in each direction truck tunnel that uses the DRTP-controlled railroad right-of-way on each side of the Detroit River. In the U.S., the plaza is labeled II-1 and is depicted in Figure S-6. An evaluation of the potential impacts of this crossing system indicates the crossing

Figure S-6
Plaza II-1
I-75/Michigan Avenue



Source: The Corradino Group of Michigan, Inc.

itself, labeled X-13, performs poorly in the categories of "Protecting Neighborhoods" and "Protecting Cultural Resources" as it comes up to ground level from the tunnel section. The impact on the Michigan Central Railroad Station historic property (plus the MC Depot railroad yard ramp and tunnel, and the Lutheran Brothers Warehouse [1627/1629 Howard Street], all considered eligible for the *National Register of Historic Places*) contribute to its poor performance in the area of "Protecting Cultural Resources." The impact on three archaeological sites (the Howley site, the Gold site and the May's Creek Burial site) also affects the DRTP crossing's performance in the cultural resources evaluation area.

The connection of the plaza to the roadway system is judged to perform poorly in the category of "Consistency with Local Planning." Official plans by the City of Detroit for the area which the connecting route will penetrate are directed to residential/commercial revitalization, not a transportation corridor. The connection from the plaza to the roadway system performs poorly in the Regional Mobility area as part of an overall crossing system. It performs well in all other categories.

The plaza's characteristics are considered negative in the area of "Protecting Community/ Neighborhoods." This is attributable to its: 1) potential direct and indirect effects on minority and low-income people; 2) relocating the Southwestern Hospital and a nearby church; and, 3) relocating local businesses which employ more than 100 people. The DRTP plaza is judged to have a positive performance in all other plaza evaluation categories but Regional Mobility, which will be discussed in the last part of this section.

These factors, when combined with the DRTP's performance in the area of Regional Mobility (Table S-6), eliminate it from further consideration in the DRIC Study. The performance measures used in the Regional Mobility evaluation area (listed on Table S-1) are defined as follows. (All are calculated for the afternoon peak hour in 2035.)

- Vehicle miles of travel (VMT) for international trips – This is the sum over all roadway links in the network of link distance multiplied by the number of international cars and trucks on the link. It is reported as the difference from the No Action alternative.
- Vehicle hours of travel (VHT) for international trips – This is the sum over all roadway links in the network of link travel time multiplied by the number of international cars and trucks on the link. It is reported as the difference from the No Action alternative.
- Ratio of Volume to Capacity (V/C) – The V/C ratio is defined as the directional one-hour volume divided by the directional one-hour capacity for every link in the network.

Table S-6
Detroit River International Crossing Study
Evaluation of DRTP Proposal
Regional Mobility Characteristics
2035 PM Peak Hour Traffic

Evaluation Factor	Performance Measure Category		Description/Units	DRTP
Improve Regional Mobility	Highway Network Effectiveness	VMT (int'l traffic only, PM Peak Hour for 2035)	No Action	1,089,636
			With **New Crossing**	1,088,426
			Difference from 2035 – No Action	-1,210
			Percent Difference	**-0.11%**
		VHT (int'l traffic only, PM Peak Hour for 2035)	No Action	22,113
			With **New Crossing**	21,864
			Difference from 2035 – No Action	-249
			Percent Difference	**-1.13%**
		Diversion due to disruption at Ambassador Bridge	Difference of Int'l VMT without Amb Br.	-1,504
			Difference of Int'l VHT without Amb Br.	**9,073**

Source: The Corradino Group of Michigan, Inc.

- Crossing and Route Volumes – This is the total volume loaded on each crossing for the modeling period. Volumes are also reported for the connecting routes from a plaza to the interstate highway system.
- Diversion Due to Disruption – This is the systemwide difference of international VMT and VHT compared to the basic roadway system but with the Ambassador Bridge link removed and the Detroit-Windsor Tunnel still operating.

Based on analysis of international travel in the 2035 afternoon peak hour, the DRTP proposal (labeled "New Crossing" in Table S-6), when added to the Ambassador Bridge and the Detroit-Windsor tunnel, only reduces SEMCOG/Windsor/Essex County regional vehicle miles of travel by about one tenth of a percent (i.e., red cell). It reduces vehicle hours of travel by only one percent (yellow cell). No other crossing proposal performs at these low levels in addressing 2035 traffic movements. And, the DRTP proposal will do little in 2035 to reduce congestion on the Ambassador Bridge or the Detroit-Windsor Tunnel as defined by the Max V/C (volume-to-capacity ratio) columns on Table S-7.

Table S-7
Detroit River International Crossing Study
International Traffic Volume and Maximum Volume-over-Capacity Ratios (V/C)
for Key Regional Roadway Links
2035 PM Peak Hour Traffic

2035 PM Peak Hour	No Action		DRTP	
	Int'l Volume	Max V/C	Int'l Volume	Max V/C
New Crossing (DRTP)	N/A	N/A	601	0.78
Ambassador Bridge	3,694	1.12	3,311	1.10
Detroit River Tunnel	1,914	1.12	1,825	1.02

Source: The Corradino Group of Michigan, Inc.

To measure the redundancy of the DRTP proposal, the travel model was applied with the Ambassador Bridge removed from the roadway network. If the Ambassador Bridge were closed for an extended period of time, the DRTP proposal would fail to effectively serve the diverted traffic. Specifically, closure of the Ambassador Bridge with the DRTP proposal in place would create more than 9,000 vehicle hours of additional travel in the 2035 peak hour as the regional network with the truck tunnel does not efficiently accommodate the diverted traffic (blue cell on Table S-6).

Another test of the Regional Mobility characteristics of the DRTP proposal is a combination of it with other "new" crossings either Downriver or farther upstream. Referring to Figure S-1, the tests were applied by combining the DRTP proposal with a new crossing at X-2 (Table S-8A) or X-4 (Table S-8B) or X-11 (Table S-8C). In all analyses, the No Action crossings of the Ambassador Bridge, the Detroit-Windsor Tunnel and the Blue Water Bridge are included.

Table S-8A
Detroit River International Crossing Study
Analysis of DRTP with Downriver Crossing X-2 + Ambassador Bridge + Detroit-Windsor Tunnel + Blue Water Bridge
2035 PM Peak Hour Traffic[a]

New Crossing at X2/S3 and DRTP Alignment A37[b]		New Crossings		Existing Crossings			Total
		X2 Plaza S3	DRTP	AMB	DW Tunnel	BW Bridge	
U.S.-Canada	Cars	453	0	1,670	1,266	447	3,836
	Trucks	660	179	120	30	354	1,343
Canada-U.S.	Cars	199	0	493	309	400	1,401
	Trucks	277	55	152	2	331	817
Both Directions	Cars	652	0	2,163	1,575	847	5,237
	Trucks	937	234	272	32	685	2,160
Total		1,589	234	2,435	1,607	1,532	7,397

[a]Individual computer model assignments will vary slightly from one to another.
[b]Alignment for X2/S3 via Eureka to I-275.

Source: The Corradino Group of Michigan, Inc.

Table S-8B
Detroit River International Crossing Study
Analysis of DRTP with Downriver Crossing X-4 + Ambassador Bridge + Detroit-Windsor Tunnel + Blue Water Bridge
2035 PM Peak Hour Traffic[a]

New Crossing at X4/S5 and DRTP Alignment A36[b]		New Crossings		Existing Crossings			Total
		X4 Plaza S5	DRTP	AMB	DW Tunnel	BW Bridge	
U.S.-Canada	Cars	550	0	1,600	1,237	449	3,836
	Trucks	636	190	139	32	366	1,363
Canada-U.S.	Cars	201	0	484	311	403	1,399
	Trucks	253	56	151	2	337	799
Both Directions	Cars	751	0	2,084	1,548	852	5,235
	Trucks	889	246	290	34	703	2,162
Total		1,640	246	2,374	1,582	1,555	7,397

[a]Individual computer model assignments will vary slightly from one to another.

[b]Alignment for X4/S4 via Dix North to I-75.

Source: The Corradino Group of Michigan, Inc.

Table S-8C
Detroit River International Crossing Study
Analysis of DRTP with Central Crossing X-11 + Ambassador Bridge + Detroit-Windsor Tunnel + Blue Water Bridge
2035 PM Peak Hour Traffic[a]

New Crossing at X11/C4 and DRTP Alignment A35		New Crossings		Existing Crossings			Total All Crossing Traffic
		X11 Plaza C4	DRTP	AMB	DW Tunnel	BW Bridge	
U.S.-Canada	Cars	2,058	0	364	966	449	3,837
	Trucks	862	65	37	30	381	1,375
Canada-U.S.	Cars	559	0	177	258	406	1,400
	Trucks	400	0	38	1	347	786
Both Directions	Cars	2,617	0	541	1,224	855	5,237
	Trucks	1,262	65	75	31	728	2,161
Total		3,879	65	616	1,255	1,583	7,398

[a]Individual computer model assignments will vary slightly from one to another.

Source: The Corradino Group of Michigan, Inc.

Under these three scenarios, the DRTP proposal would carry less than 3.5 percent of all international traffic during the 2035 afternoon peak hour. This is another indication that the Regional Mobility needs of the DRIC will not be met by the Detroit River Tunnel Partnership proposal, alone or in combination with other proposals. Therefore, it is eliminated from further DRIC Study analysis. But, this decision does not prevent DRTP from continuing with its own environmental studies in accordance with the processes in the U.S. and Canada.

S4.3 U.S. Steel Property and Plazas C-1 and C-2

Plaza C-1 covers the area of the slag operation at U.S. Steel. Hot waste material travels in specially-designed vehicles from the main plant along the river's edge to the slag area where it is

dumped to cool. After cooling, much of the material is trucked away from the site using local streets. Hundreds of truck trips per day are involved in this operation.

After several discussions of the C-1 plaza concept with U.S. Steel, it is clear the slag operation is one of the most critical functions, if not **the** most critical function in maintaining its operations. If a plaza were located there, it would not be practical to relocate the slag operation to another part of the U.S. Steel property site because of its potential effects on U.S. Steel's operations and those of its contactors/vendors and their people. Relocating the slag operation offsite would have to be to an area no farther away from the plant it serves than it is today. This points to one example that straddles the boundary of the cities of Ecorse and River Rouge that is large enough (67 acres) to provide a major buffer of the area where the actual slag handling would occur (Figure S-7). The cost to acquire and prepare this area for the slag operation is estimated to be close to $100 million.

But, the problem of addressing the slag operation goes beyond cost. Relocating it to the nearby neighborhood is a virtual impossibility because of its potential effects and the liability of those effects on the surrounding community, the employees of U.S. Steel and its suppliers/contractors/vendors. Therefore, this plaza site was removed from further consideration.

Plaza C-2 (Figure S-8) is also a U.S. Steel property. Connection to the river crossing would cause the relocation and building of a new, replacement rolling mill. It must be in full operation before the existing mill is closed. This could add three (or more) years to the DRIC implementation schedule. The cost of a new rolling mill is estimated at $500 million. And, if the land could not be found on the U.S. Steel property, the mill's relocation to an area, like that shown on Figure S-7, would be necessary. This could add millions to the project's cost. Nonetheless, Plaza C-2 is carried through the evaluation process, with the $500 million cost for a replacement rolling mill included in the analysis. No property costs for a new site for the rolling mill have been included.

Figure S-8
Plaza C2
U.S. Steel North

Source: The Corradino Group of Michigan, Inc.

Figure S-7
Detroit River International Crossing Study
Example of Relocation Site for U.S. Steel Operations

S4.4 Fighting Island

Discussions with BASF, owners of Fighting Island, indicate if the island "is touched, it is bought in its entirety" (Figure S-9). Those discussions also indicate BASF has a royalty interest in the mining of salt under Fighting Island by another company. The northern part of the island is a corporate retreat. Other parts of the island are used for hunting and as a laboratory for educational purposes. BASF believes the 1,600-acre island has value and must be transferred in total. BASF indicates the liability, associated with years of dumping waste products on the island, must also be transferred in its entirety.

BASF has been advised by the MDOT Technical Team that Fighting Island could have a fair market value of "zero" because of the contamination. The company disagrees. Experience indicates resolution of such matters is left to the courts. In order to be conservative, no cost for acquiring Fighting Island has been included in this analysis. Nonetheless, this issue will loom large if use of this island is pursued.

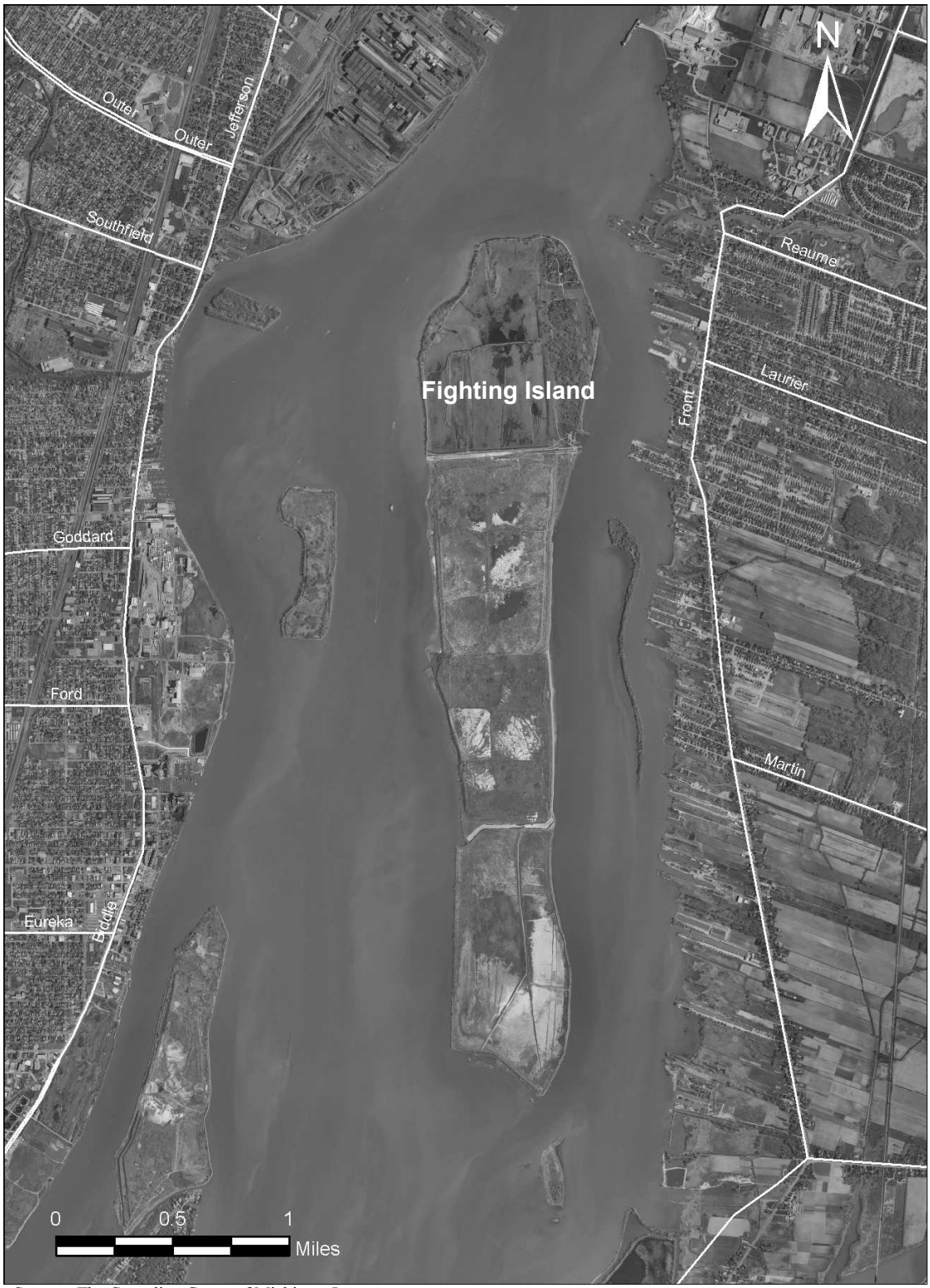
S5. RESULTS WITHOUT WEIGHTS AND WITH WEIGHTS

After starting with 51 crossing systems, then removing 14 that are affected by unique circumstances, the analysis of the Detroit River International Crossing Study led to the evaluation of the effectiveness of each of 37 river crossing systems in the U.S. – crossing, plaza and route (21 in Downriver Area; 11 in Central Area; 3 in I-75/I-96 Area; and, 2 in Belle Isle Area). The results of that analysis are summarized below by: 1) the scores applied by the U.S. consultant; 2) those results weighted by Citizen and Technical Team input; and, 3) cost-effectiveness.

S5.1 Effectiveness Results Without Weights

There are several steps that were taken to define the Practical Alternatives, i.e., a short list of end-to-end crossing systems. The first step was developing performance scores of the alternatives based on the analysis by the U.S. consultants of the data shown in Table S-1 for each plaza, river crossing and connecting route. Those scores are presented in Attachment A. A summary of that performance is provided here by area in reaching the following conclusions (Table S-9).

Figure S-9
Detroit River International Crossing Study
Fighting Island



Source: The Corradino Group of Michigan, Inc.

Downriver Area/21 Crossing Systems

Table S-9A
Detroit River International Crossing Study
Ranking of 21 Crossing Systems
in Downriver Area
Without Weights

Downriver Area	Total Crossing Systems in Area	Number Ranking in Top or Bottom													
		Comm/Neigh.		Local Planning		Cult. Res.		Nat. Env.		Reg. Mob.		Air Quality		Constructability	
		Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19
	21	10	11	7	14	16	5	5	16	4	17	17	4	7	14

Source: The Corradino Group of Michigan, Inc.

- 11 of 21 Downriver crossing systems are among the 19 alternatives in the bottom half of alternatives in Protecting the Community/Neighborhoods. Four Downriver alternatives are in the top five of the 37 crossing systems:

  - ✓ X-4/S-5 (Michigan Steel Works)/Moran/I-75
  - ✓ X-4/S-5 (Michigan Steel Works)/Dix-South/I-75
  - ✓ X-4/S-5 (Michigan Steel Works)/Dix-North/I-75
  - ✓ X-4/S-5 (Michigan Steel Works)/Southfield/I-75.

- 14 of 21 proposals are among the 19 alternatives in the bottom half in being Consistent with Local Planning. Two are in the top five of the 37 crossing systems:

  - ✓ X-2/S-3 (Atofina West)/Pennsylvania/I-75
  - ✓ X-3/S-3 (Atofina West)/Pennsylvania/I-75

- 16 of 21 proposals are among the 18 alternatives in the top half in Protecting Cultural Resources. Four are in the top five of the 37 crossing systems:

  - ✓ X-1/S-2 (McLouth Steel)/King/I-75
  - ✓ X-2/S-3 (Atofina West)/Pennsylvania/I-75
  - ✓ X-2/S-3 (Atofina West)/Eureka/I-75
  - ✓ X-3/S-3 (Atofina West)/Eureka/I-75

- 16 of 21 proposals are among the 19 alternatives in the bottom half in Protecting Natural Resources. No Downriver crossing system is in the top five of the 37 crossing systems.

- 17 of 21 proposals are among the 19 alternatives in the bottom half in Improving Regional Mobility. No Downriver crossing system is in the top five of the 37 crossing systems.

- 17 of 21 proposals are among the 18 alternatives in the top half in Maintaining Air Quality. The top five alternatives come from the Downriver Area:

  - ✓ X-2/S-3 (Atofina West)/Pennsylvania/I-75
  - ✓ X-3/S-3 (Atofina West)/Pennsylvania/I-75
  - ✓ X-2/S-4 (Atofina East)/Pennsylvania/I-75
  - ✓ X-2/S-4 (Atofina East)/Eureka/I-275
  - ✓ X-3/S-4 (Atofina East)/Pennsylvania/I-75

- 14 of 21 proposals are among the 19 alternatives in the bottom half of all alternatives in Constructability. One alternative is in the top five of the 37 crossing systems:

  - ✓ X-4/S-5 (Michigan Steel Works)/Moran/I-75

Central Area/11 Crossing Systems

Table S-9B
Detroit River International Crossing Study
Ranking of 11 Crossing Systems
in Central Area
Without Weights

Central Area	Total Crossing Systems in Area	Number Ranking in Top or Bottom													
		Comm/Neigh.		Local Planning		Cult. Res.		Nat. Env.		Reg. Mob.		Air Quality		Constructability	
		Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19
	11	6	5	9	2	0	11	8	3	11	0	0	11	6	5

Source: The Corradino Group of Michigan, Inc.

- 6 of 11 Central Area crossing systems are among the 18 alternatives in the top half of all alternatives in Protecting the Community/Neighborhoods. No Central Area crossing system is in the top five.

- 9 of 11 proposals are among the 18 alternatives in the top half in being Consistent with Local Planning. Two alternatives are in the top five.

  - ✓ X-8/C-2 (U.S. Steel North)/Schaefer-South/I-94

- All 11 proposals are among the 19 alternatives in the bottom half in Protecting Cultural Resources. No alternative is in the top five.

- 8 of 11 proposals are among the 18 alternatives in the top half in Protecting the Natural Environment. Three alternatives are in the top five.

    - ✓ X-10/C-3 (Delray West)/Dearborn/I-75
    - ✓ X-10/C-3 (Delray West)/Springwells/I-75
    - ✓ X-11/C-4 (Delray East)/Dragoon/I-75

- All 11 of the Central Area crossing systems are among the 18 alternatives in the top half in Improving Regional Mobility. All five top performers are from the Central Area:

    - ✓ X-8/C-2 (U.S. Steel North)/Schaefer-North/I-94
    - ✓ X-9/C-2 (U.S. Steel North)/Schaefer-North/I-94
    - ✓ X-10/C-3 (Delray West)/Dearborn/I-75
    - ✓ X-10/C-3 (Delray West)/Springwells/I-75
    - ✓ X-11/C-4 (Delray East)/Dragoon/I75

- All 11 of the Central Area crossing systems are among the 19 alternatives in the bottom half in Maintaining Air Quality. No alternative for the Central Area is in the top five.

- 6 of 11 proposals are among the 18 alternatives in the top half of all alternatives in Constructability. One alternative is in the top five:

    - ✓ X-11/C-4 (Delray East)/Dragoon/I-75

I-75/I-96 Area/3 Crossing Systems

Table S-9C
Detroit River International Crossing Study
Ranking of 3 Crossing Systems
in I-75/I-96 Area
Without Weights

I-75/I-96 Area	Total Crossing Systems in Area	Number Ranking in Top or Bottom													
		Comm/Neigh.		Local Planning		Cult. Res.		Nat. Env.		Reg. Mob.		Air Quality		Constructability	
		Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19
	3	2	1	2	1	0	3	3	0	3	0	0	3	3	0

Source: The Corradino Group of Michigan, Inc.

- 2 of 3 I-75/I-96 Area crossing systems are among the 18 alternatives in the top half of all alternatives in Protecting the Community/Neighborhoods. One alternative is in the top five.

  ✓ X-12/II-4 (Expanded Ambassador Bridge Plaza)/I-75

- 2 of 3 proposals are among the 18 alternatives in the top half in being Consistent with Local Planning. One alternative is in the top five.

  ✓ X-12/II-4 (Expanded Ambassador Bridge Plaza)/I-75

- All 3 of the I-75/I-96 Area alternatives are among the 19 in the bottom half in Protecting Cultural Resources.

- All 3 of the proposals are among the 18 alternatives in the top half in Protecting the Natural Environment. One alternative is in the top five.

  ✓ X-12/II-4 (Expanded Ambassador Bridge Plaza)/I-75

- All 3 of the I-75/I-96 Area alternatives are among the 18 in the top half in Improving Regional Mobility. No I-75/I-96 Area crossing system is in the top five.

- All 3 proposals are among the 19 alternatives in the bottom half in Maintaining Air Quality.

- All 3 proposals in the I-75/I-96 Area are among the 18 alternatives in the top half of all alternatives in Constructability. All are in the top five:

- ✓ X-14/II-2 (Rosa Parks/Bagley)/M-10
- ✓ X-14/II-3 (Rosa Parks/Porter)/M-10
- ✓ X-12/II-4 (Expanded Ambassador Bridge Plaza)/I-75

Belle Isle Area/2 Crossing Systems

Table S-9D
Detroit River International Crossing Study
Ranking of 2 Crossing Systems
in Belle Isle Area
Without Weights

Belle Isle Area	Total Crossing Systems in Area	Number Ranking in Top or Bottom													
		Comm/Neigh.		Local Planning		Cult. Res.		Nat. Env.		Reg. Mob.		Air Quality		Constructability	
		Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19	Top 18	Bottom 19
	2	0	2	0	2	0	2	2	0	0	2	0	2	2	0

Source: The Corradino Group of Michigan, Inc.

- Both Belle Isle Area proposals are among the 19 alternatives in the bottom half of all alternatives in Protecting the Community/Neighborhoods. No alternative in the Belle Isle Area is in the top five.

S5.2 Weighted Effectiveness

By combining the weights of the Citizens and Technical Teams with the consultant's performance scores, shown in Attachment A, the weighted performance of each of the 37 crossing systems was established (Table S-10). An example of a typical calculation to create the weighted effectiveness value of a crossing system is as follows:

Performance Score for Protect Cultural Resources of Plaza S-1	=	53.7
Protect Cultural Resources Citizens' Weight	X	16.53%
Citizen-Weighted Cultural Resources Score	=	8.88

The Citizen-weighted scores were then totaled for every evaluation factor for each component of the crossing system. The results are shown in Table S-10. Similarly, the MDOT Technical Team's weights were applied to the unweighted performance scores shown in Attachment A to arrive at final scores by evaluation factor for each plaza, crossing and connecting route. The MDOT Technical Team's results are also shown on Table S-10.

Table S-10
Weighted Performance Evaluation
37 Crossing Systems (Route + Plaza + Crossing)
U.S. Side of Border

Weighted Scores													
Plaza	S1	S1	S2	S2	S3	S3	S3	S3	S3	S3	S4	S4	S4
Crossing	X1S1	X1S1	X1S2	X1S2	X2S3	X2S3	X2S3	X3S3	X3S3	X3S3	X2S4	X2S4	X2S4
Alignment	S1King/I-75	S1King/I-275	S2King/I-75	S2King/I-275	S3Penn/I-75	S3Eureka/I-75	S3Eureka/I-275	S3Penn/I-75	S3Eureka/I-75	S3Eureka/I-275	S4Penn/I-75	S4Eureka/I-75	S4Eureka/I-275
Citizen Weighted Score	170.21	162.53	177.06	165.69	187.44	188.96	178.09	187.23	188.75	177.88	180.19	180.22	171.21
Rank	33	35	30	34	17	13	28	18	14	29	25	24	31
Technical Team Weight Score	169.80	163.29	175.04	165.66	182.34	183.09	173.46	182.50	183.24	173.62	176.15	175.85	167.70
Rank	31	35	28	34	22	20	30	21	19	29	25	27	33

Weighted Scores												
Plaza	S4	S4	S4	S5	S5	S5	S5	S5	C2	C2	C2	C2
Crossing	X3S4	X3S4	X3S4	X4	X4	X4	X4	X4	X8	X8	X8	X8
Alignment	S4Penn/I-75	S4Eureka/I-75	S4Eureka/I-275	S5Moran/I-75	S5Dix South/I-75	S5Dix North/I-75	S5Southfield/I-75	S5Southfield/I-94	C2Schaefer South/I-75	C2Schaefer South/I-94	C2Schaefer North/I-75	C2Schaefer North/I-94
Citizen Weighted Score	180.13	180.16	171.15	185.33	191.55	185.39	184.97	181.89	195.09	192.46	194.94	193.52
Rank	27	26	32	20	10	19	21	22	3	8	4	5
Technical Team Weight Score	176.30	176.01	167.85	185.34	190.14	185.32	184.87	181.50	201.46	199.03	201.21	199.94
Rank	24	26	32	16	15	17	18	23	3	8	4	5

Weighted Scores												
Plaza	C2	C2	C2	C2	C3	C3	C4	II2	II3	II4	N1	N1
Crossing	X9	X9	X9	X9	X10	X10	X11	X14 II2	X14 II3	X12	X15	X15
Alignment	C2Schaefer South/I-75	C2Schaefer South/I-94	C2Schaefer North/I-75	C2Schaefer North/I-94	C3Dearborn/I-75	C3Springwells/ I-75	C4Dragoon/I-75	II2Lafayette/M-10	II3Lafayette/ M-10	II4Gateway/I-75	N1St.Jean/I-94	N1Conner/I-94
Citizen Weighted Score	193.41	190.78	193.26	191.84	188.69	189.41	196.98	187.97	180.34	197.89	153.89	152.61
Rank	6	11	7	9	15	12	2	16	23	1	36	37
Technical Team Weight Score	199.89	197.47	199.65	198.38	197.65	198.03	208.18	197.45	191.70	206.92	161.08	159.76
Rank	6	12	7	9	11	10	1	13	14	2	36	37

Source: The Corradino Group of Michigan, Inc.

The objective in using these data is to take the first step to define the list of alternatives to be eliminated from the U.S. perspective.

Using the MDOT Technical Team weights, no Downriver alternative is in the top five in the overall performance evaluation (Table S-10) of the 37 crossing alternatives because of their impacts on neighborhoods, the natural environmental and their low performance in regional mobility. It is noteworthy that the Citizen and Technical Team rankings of alternatives do not differ by more than three places for 17 of the 21 alternatives.

In the Central Area, the Citizens' and Technical Team's weights place four alternatives among the top five performers because they penetrate areas that are largely industrial with relatively few natural environmental consequences. They also perform very well in regional mobility.

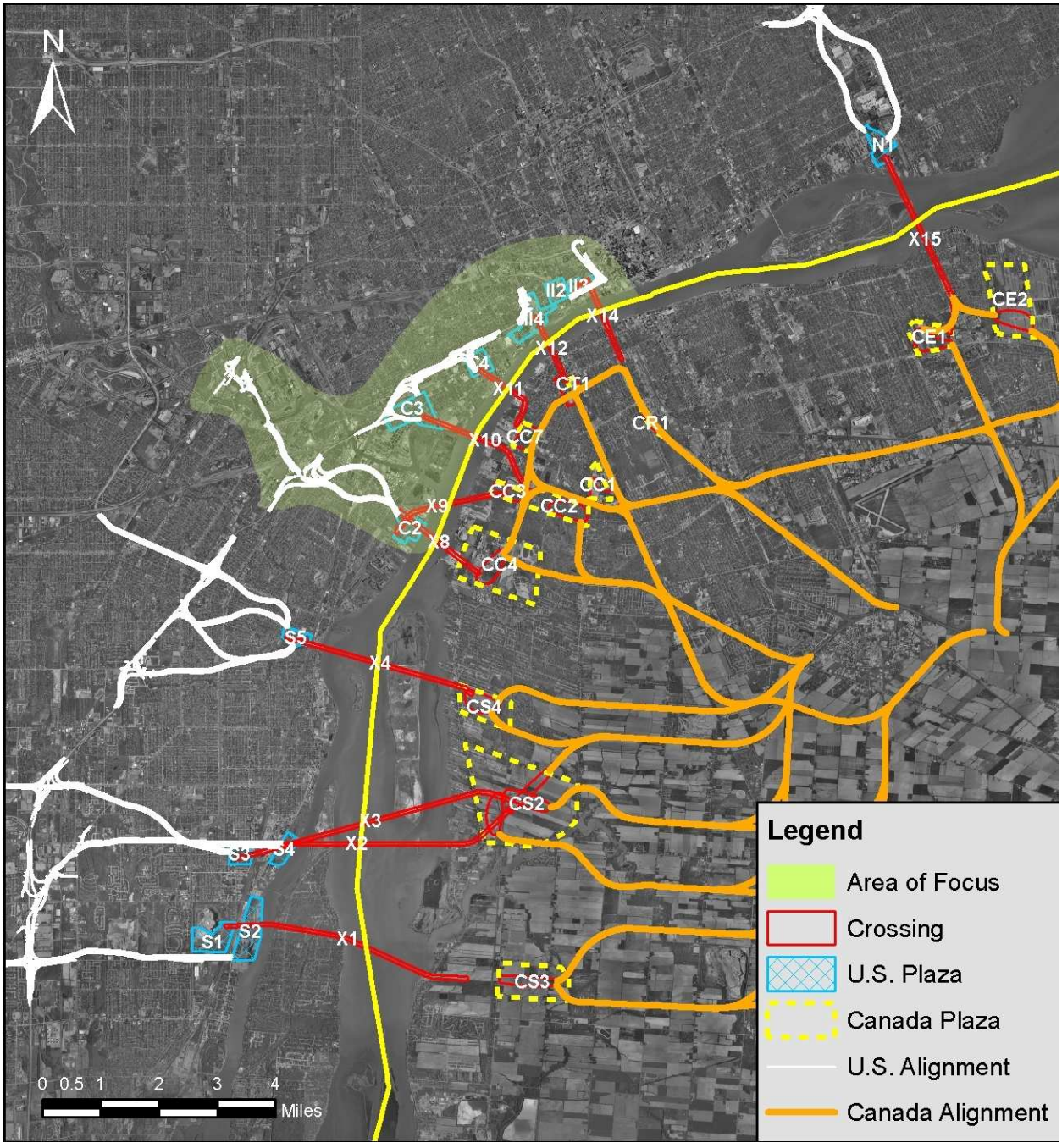
- X-8/C-2 (U.S. Steel North)/Schaefer-South/I-75
- X-8/C-2 (U.S. Steel North)/Schaefer-North/I-75
- X-8/C-2 (U.S. Steel North)/Schaefer-North/I-94
- X-11/C-4 (Delray East)/Dragoon/I-75

In the I-75/I-96 Area, both Citizens' and Technical Team's weightings place crossing system X-12/II-4 (Expanded Ambassador Bridge Plaza)/I-75 in either first or second place due to relatively few impacts on neighborhoods and the natural environment. This is also a very high performing alternative in regional mobility. The two other alternatives in the I-75/I-96 Area rank in the teens or worse.

The Belle Isle alternatives occupy the last two positions overall (36^{th} and 37^{th}) according to both the Citizens' and Technical Team's weightings because of their impacts on neighborhoods, cultural resources and air quality. They also do not perform well in the regional mobility area.

In summary, the weighted effectiveness scores shown on Table S-10 point to the area in green on Figure S-10 as a focus for a new border crossing system.

Figure S-10
Area of Focus Based on Weighted Performance Analysis



Source: The Corradino Group of Michigan, Inc.

S5.3 Alternatives in Focused Analysis Area

S5.3.1 Crossings X-8 and X-9/Plaza C-2 (U.S. Steel North)/Schaefer Road South

Plaza C2 **U.S. Steel North**

Location: East side of Marlon Avenue; City of Wyandotte

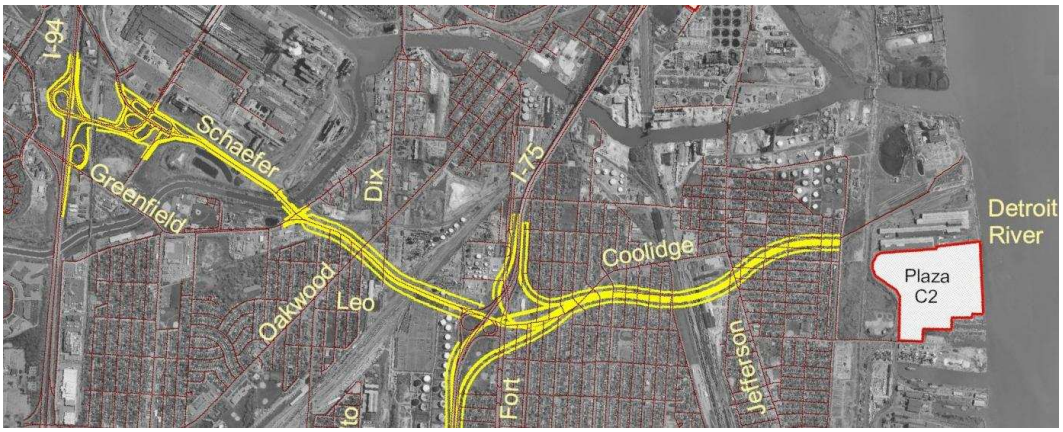
Plaza Size: Approximately 110 acres

This plaza site is part of the existing and operating U.S. Steel complex and is immediately north of the main plant. Its east property line fronts on the Detroit River. The west side of the site is bordered by rail and undeveloped land. To the north of the site is the U.S. Steel rolling mill. The river crossings (X-8 and X-9) tying into this plaza site will require the rolling mill to be relocated and replaced new by the project.

Route 1 – Schaefer Road South

This proposed route is about four miles long and provides a new alignment from the plaza near the Belanger Park entrance to the existing I-75/Schaefer Road interchange on the south side of Coolidge and Schaefer. The alignment could extend west from I-75 to I-94 connecting on the west side of the Rouge plant.

For the purposes of assessing travel demand, this route is being considered as two options: 1) from the plaza to I-75; and, 2) from the plaza to I-94.



This crossing system performs in the top ten of all crossings in Regional Mobility. At the other end of the spectrum is a low performance in regional Air Quality. Lower performance is also evident in the area of impacts on the Natural Environment, largely because of Plaza C-2's potential use of wetlands (21.3 acres) – this is the largest wetland impact of all plazas. The route connecting Plaza C-2 to the nearby freeway system also incurs major impacts in the areas of Protecting Neighborhoods, Consistency with Local Planning, Protecting Cultural Resources, and Protecting Natural Resources. Examples of the route impacts include: 1) the potential acquisition of 450 to 600 dwelling units and 35 to 50 businesses; 2) impacts to a known archaeological site and more than 15 acres of a public park; and, 3) impacts to a primary stream (Ecorse River), wetlands and the potential habitat of an endangered species. The crossings (X-8 and X-9) would have main structures that are among the longest (5,200 to 5,900 feet) of all the bridges over the Detroit River, which will affect their costs.

S5.3.2 Crossings X-8 and X-9/Plaza C-2 (U.S. Steel North)/Schaefer Road North

Plaza C2 **U.S. Steel North**

Location: East side of Marlon Avenue; City of Wyandotte

Plaza Size: Approximately 110 acres

This plaza site is part of the existing and operating U.S. Steel complex and is immediately north of the main plant. Its east property line fronts on the Detroit River. The west side of the site is bordered by rail and vacant land. To the north of the site is the U.S. Steel rolling mill. The river crossings (X-8 and X-9) connecting to this plaza site will require the rolling mill to be relocated and replaced new by the project.

Route 2 – Schaefer Road North

This proposal is about 4.5 miles long and moves in a semi-circular path north of Coolidge and Schaefer to minimize the residential property acquisitions. After the Schaefer Road interchange with I-75, it then follows Schaefer Road to its interchange with I-94.

For the purposes of assessing travel demand, this route is being considered as two options: 1) from the plaza to I-75; and, 2) from the plaza to I-94.

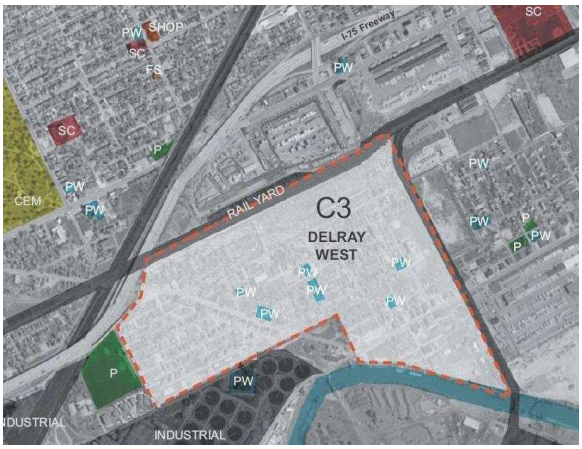
This crossing system also performs in the top ten of all alternatives in Regional Mobility. It performs in the bottom half of all alternatives in Air Quality because the regional travel characteristics (vehicle miles and vehicle hours of travel) do not produce the same reduction in air pollutants as other alternatives, particularly those in the Downriver Area. Plaza C-2 has the greatest wetland impacts among all plazas. The crossing route will likely cause: 1) acquisition of almost 600 houses and up to three dozen businesses; 2) impacts to a known archaeologic site and about 15 acres of a public park; and, 3) impacts to a primary stream (Ecorse River), wetlands and the potential habitat of an endangered species. The crossings (X-8 and X-9) would have main structures that are among the longest (5,200 to 5,700 feet) of all bridges over the Detroit River, which would increase its cost.

S5.3.3 Crossing X-10/Plaza C-3 (Delray West)/I-75 at Dearborn Avenue

Plaza C3 **Delray West**

Location: South of Rail Way Road, west of West End Street, east of Dearborn Street; City of Detroit

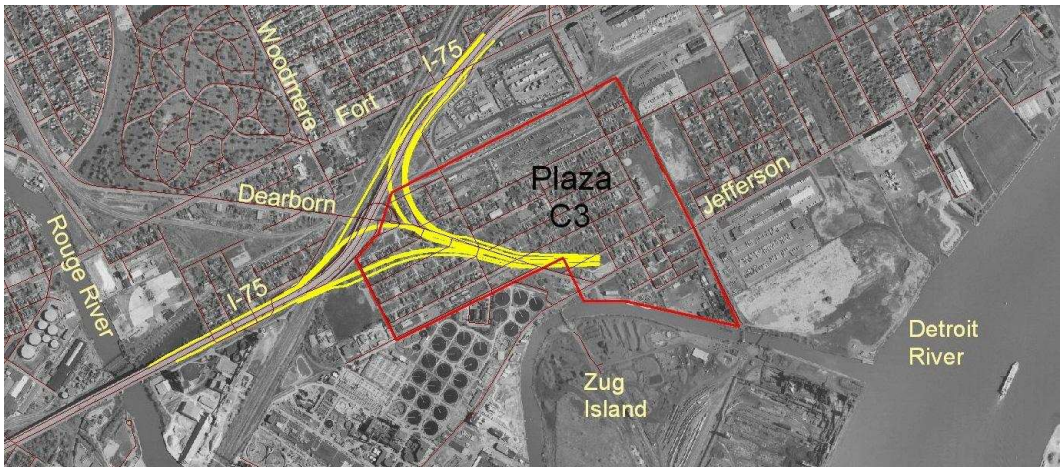
Plaza Size: Approximately 206 acres



This area contains primarily single-family homes on small residential lots. There are also a number of vacant lots. The area includes mixed uses consisting of small neighborhood commercial business. There is an active rail line that forms the northern edge of the potential plaza site. The river crossing to which the plaza would be connected is X-10.

Route – Plaza C-3 to I-75 at Dearborn

The plaza would be connected to I-75 at the existing Dearborn Road interchange, providing a full interchange with I-75.



This crossing system performs second of the 37 alternatives in Regional Mobility. It performs fifth in Protecting the Natural Environment. But, it performs almost last in Consistency with Local Planning as the area is proposed to be redeveloped for residential uses. It also scores almost last in regional Air Quality and Protecting Cultural Resources. The latter impact is associated with Plaza C-3's potential impact on one known *National Register* historic site; four sites that are considered potentially eligible for the *National Register*; and, two known archaeologic sites. Plaza C-3 has the lowest performance of all plazas in Impacts on Neighborhoods/Communities.

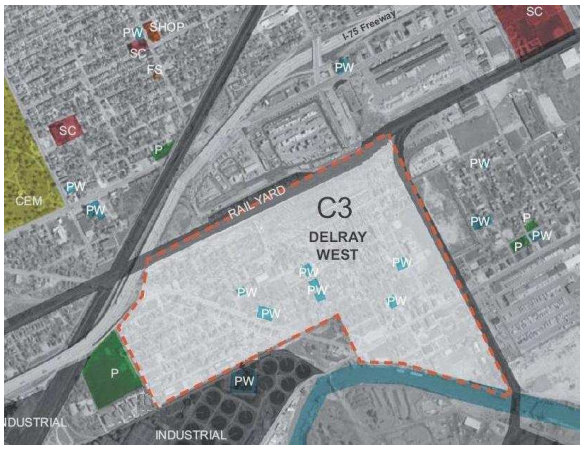
Crossing X-10 connected to Plaza C-3 would have a main structure of about 5,650 feet. This is one of the longest proposed bridges over the Detroit River, which would increase its cost. But, it would have a virtual direct connection to I-75 from the plaza, which would lower this alternative's cost.

S5.3.4 Crossing X-10/Plaza C-3 (Delray West)/I-75 at Springwells Avenue

Plaza C3 **Delray West**

Location: South of Rail Way Road, west of West End Street, east of Dearborn Street; City of Detroit

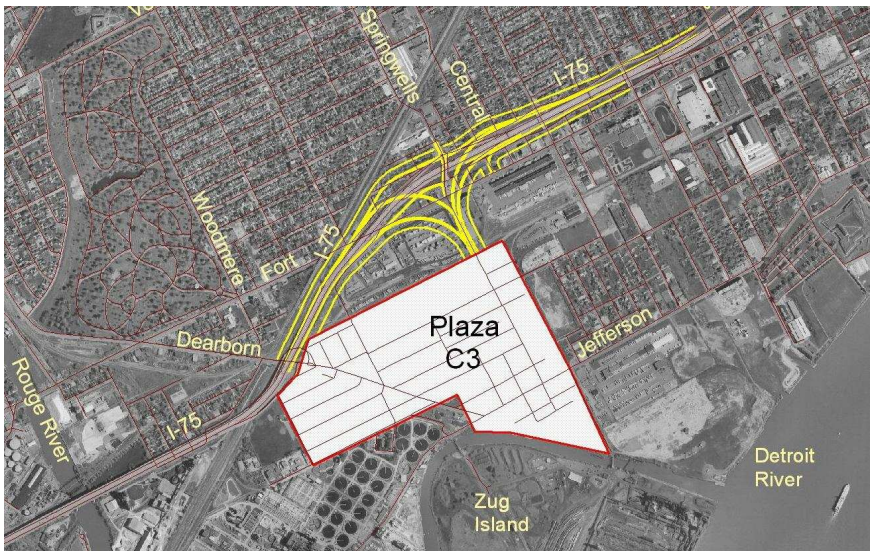
Plaza Size: Approximately 206 acres



This area contains primarily single-family homes on small residential lots. There are a number of vacant lots. The area includes mixed uses consisting of small neighborhood commercial business. There is an active rail line that forms the northern edge of the potential plaza site. The river crossing to which the plaza would be connected is X-10.

Route – Plaza C-3 to I-75 at Springwells

The plaza would be connected to I-75 at Springwells Avenue.



This crossing system performs third of the 37 alternatives in Regional Mobility. It performs fourth in Protecting the Natural Environment. But, it scores very low (26th out of 37 alternatives) in Consistency with Local Planning as the area is mostly residential and planned to continue that way. Its impacts on Cultural Resources are considered significant. They are mostly related to Plaza C-3's potential impact on one known *National Register* historic site; four

sites that are considered potentially eligible for the *National Register*; and, two known archaeologic sites. And, Plaza C-3 has the lowest performance of all plazas in Impacts on Neighborhoods/Communities.

Crossing X-10 connected to Plaza C-3 would have a main structure of about 5,650 feet. This is one of the longest proposed bridges over the Detroit River, which would increase its cost. But, it would have a virtual direct connection to I-75 from the plaza, which lowers this alternative's cost.

S5.3.5 Crossing X-11/Plaza C-4 (Delray East)/I-75 at Dragoon

Plaza C4 **Delray East**

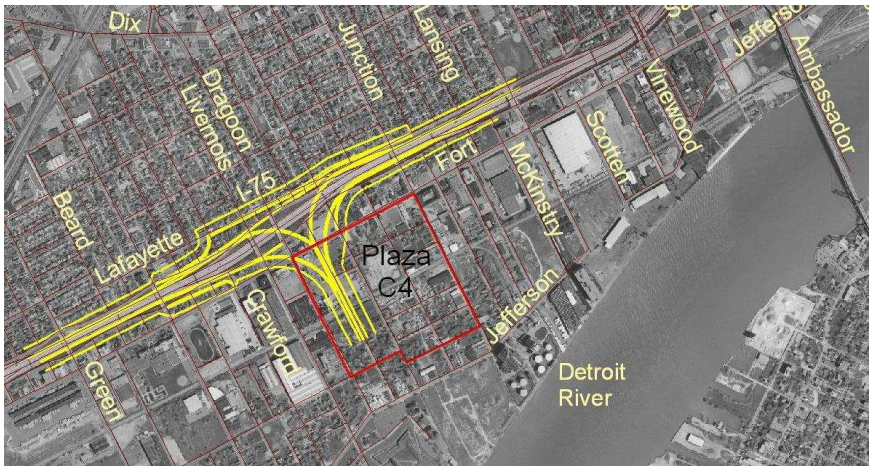
Location: South of Fort Street, west of Junction Street, east of Livernois Avenue, north of West Jefferson Avenue; City of Detroit

Plaza Size: Approximately 84 acres

This area contains a limited number of single-family homes on small residential lots. There are vacant lots scattered throughout the area. An active rail line forms the northern boundary of the potential site. A number of businesses are in the area. Crossing X-11 would connect to the plaza.

Route – Plaza C-4 to I-75 at Dragoon

The plaza would be connected with "flyovers" to I-75 east of Dragoon.



This crossing system is connected to a bridge over the Detroit River (Crossing X-11) with the shortest main structure (about 3,100 feet) of all alternatives. This would lower its cost. It also would have a virtual direct connection to I-75, which would also contribute to a lower cost. This crossing system also ranks first in Regional Mobility and Constructability. It performs second in its Consistency with Local Planning, as the area is industrial and planned to continue as such. This crossing system is also ranked second in Protecting the Natural Environment. It performs very low in the areas of Air Quality and Community/Neighborhood Impacts. The latter impact is mostly associated with the connection of the plaza to I-75 which would cause the likely acquisition both north and south of I-75 of more than 300 houses and more than two dozen businesses.

S5.3.6 Crossing X-14/Plaza II-2 (Rosa Parks/Bagley)/M-10 at Lafayette

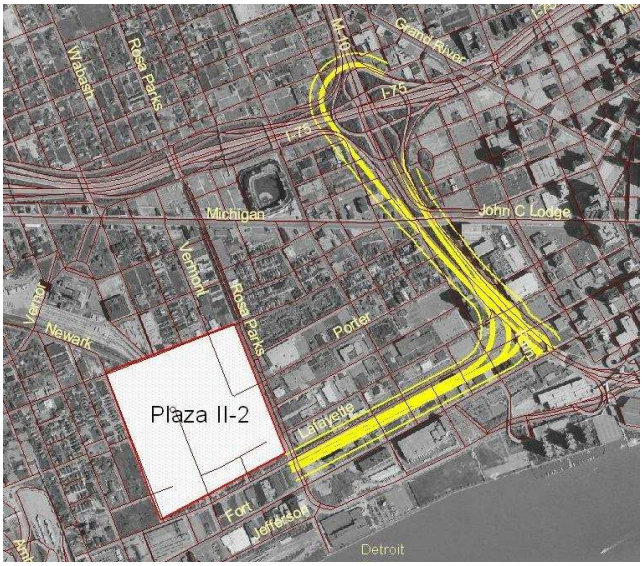
Plaza II-2 **Rosa Parks Boulevard/Bagley Street**

Location: South of Rosa Parks Boulevard, east of Bagley Street, west of Lafayette Boulevard, north of 16th Street; City of Detroit

Plaza Size: Approximately 73 acres

This site consists of several vacant industrial structures and some active industrial buildings. The site is in the Corktown neighborhood with numerous renovated properties. West of Bagley Street is a United States Postal Facility and east of Lafayette Street is a building housing community mental health services. The plaza is connected to Crossing X-14.

Route – Plaza II-2 to M-10 at Lafayette



This alternative is connected by way of Crossing X-14, which is considered a bridge linking the DRTP-owned right-of-way on each side of the Detroit River. The crossing would have a main span of about 5,600 feet, one of the longest, which would affect its cost. Access is then provided from Plaza II-2 to M-10 by way of an alignment parallel to Lafayette Boulevard.

This crossing system has its highest performance (3rd out of 37 alternatives) in the area of Constructability as there are few, if any, impediments to its construction. It also performs well (6th) in Protecting the Natural Environment. Its lowest performances are in regional Air Quality and Protecting Cultural Resources. In the latter area, the connection from Plaza II-2 to M-10 is expected to impact seven known archaeologic sites and one historic district. Seven properties that would likely be impacted are also considered eligible for the *National Register of Historic Places*.

S5.3.7 Crossing X-14/Plaza II-3 (Rosa Parks/Porter)/M-10 at Lafayette

Plaza II-3 **Rosa Parks Boulevard/Porter Street**

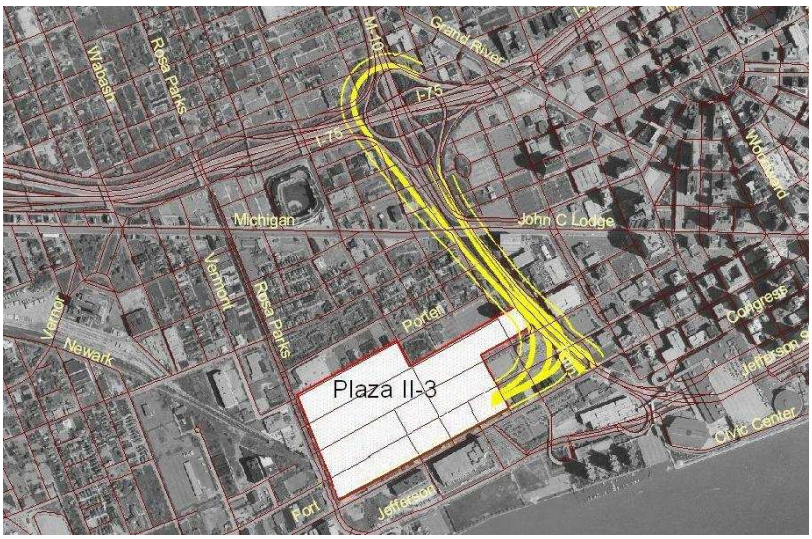
Location: East of Rosa Parks Boulevard, north of Fort Street, south of Porter Street, west of U.S. 10; City of Detroit

Plaza Size: Approximately 63 acres

This site consists of several occupied government office and commercial buildings along with a number of vacant buildings. South of Fort Street is a United States Postal Facility and parking lots serving existing businesses. North of the site are additional occupied office and commercial buildings.

Route – Plaza II-3 to M-10 at Lafayette

This alternative is connected by way of Crossing X-14, which is considered a bridge linking the DRTP-owned right-of-way on each side of the Detroit River. Access is then provided to M-10 by way of an alignment parallel to Lafayette Boulevard.



This crossing system ranks third in Protecting the Natural Environment and fourth in Constructability. It is 12th in Regional Mobility. But, it performs very low in the regional Air

Quality and Protecting Cultural Resources evaluation categories. In the latter area, Plaza II-4 is likely to impact six known archaeologic sites and five properties considered eligible for the *National Register of Historic Places*. The main structure of X-14 is likely to be about 5,600 feet, among the longest, which will affect its cost.

S5.3.8 Crossing X-12/Plaza II-4 (Expanded Ambassador Bridge Plaza)/I-75

Plaza: II-4 - Expanded Ambassador Bridge Plaza

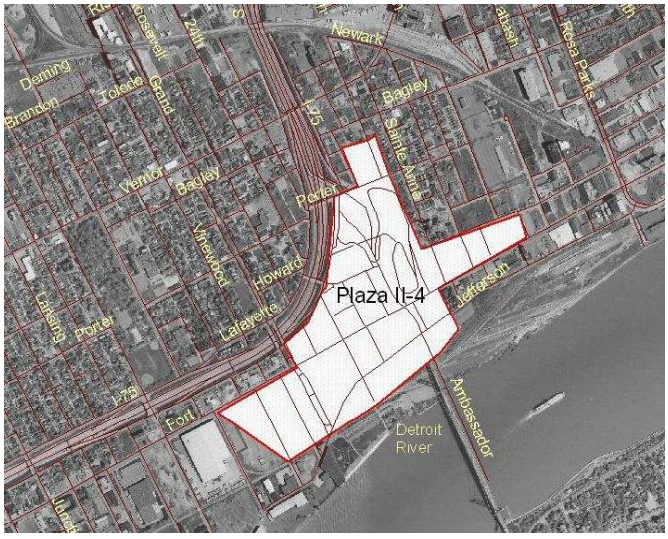
Location: East of I-75, south of Bagley Street, west of St. Anne Street to Fort Street, juts out to 16th Street at Fort Street and Jefferson Avenue, north of Jefferson Avenue, and east of Scottien Street.

Plaza Size: Approximately 160 acres

This site consists of the existing U.S. Custom plaza for the Ambassador Bridge (about 30± acres), parkland, vacant industrial structures with some active industrial buildings. Adjacent to the south side of the site is an active rail line. The potential plaza abuts industrial to the north, residential and industrial to the east, railway and parkland to the south and I-75 freeway to the west. It is served by the proposed second span of the Ambassador Bridge.

Route – Plaza II-4 to I-75

This route is a direct connection of Plaza II-4 to I-75.



This crossing system ranks first in the following categories: Community/ Neighborhood Impacts, Consistency with Local Planning, and Protecting the Natural Environment. It is the second highest performer in Constructability. But, it ranks 14th in Regional Mobility and almost last in the Air Quality and Protecting Cultural Resources areas. In the latter area, Plaza II-4 is likely to impact 18 known archaeologic sites and eight properties considered eligible for the *National Register of Historic Places*. The crossing connection to Plaza II-4 is expected to have a main span of 4,300 feet, the second shortest in the focused area of analysis.

S5.4 Cost-effectiveness Evaluation Process

Establishing the cost effectiveness of the border crossing systems requires the definition of property-related and construction-related costs. These were established as follows:

Property-related Costs – Wayne County's tax records for parcels that may be acquired was the basis for the property value analysis. The tax value of residential properties that may be acquired was multiplied by eight to account for adjustments between tax and fair market value as well as the items related to: relocation, structure demolition, remediation (e.g., asbestos), plus contingency. The tax value of commercial properties per Wayne County records was multiplied by 12 to define the cost of acquiring the business property, relocating the business, demolishing the structures, remediation of the property, plus contingency. Special, non-residential properties, like churches, were considered to be replaced "new" in the cost analysis.

There are a number of instances where an inactive plant would have to be acquired, structures removed and contamination remediated before construction begins. These include the Michigan Steel Works and the McLouth Steel Plant. To remove and remediate the property, a cost between $115,000 and $250,000 per acre was used. Where the combined sewer overflow plant exists on Plaza S-5, it was assumed that a $150 million cost would be incurred to rebuild the plant before the plaza could be built. This estimate was based on the fact that the Twelve Towns CSO facility cost $144 million and the Conner Creek CSO facility cost upwards of $180 million.

It was noted earlier there are special costs associated with the crossings connected to Plaza C-2 where a replacement U.S. Steel rolling mill would be built at a cost of $500 million, excluding land outside the current boundary of the U.S. Steel property that may be needed for the new rolling mill. The cost to acquire Fighting Island and address the liability of its contamination is more difficult to assess. It could equate to hundreds of millions of dollars in "liability exposure," in addition to the cost of the property, including compensation for royalties due BASF for mining of salt under the island. But, no cost has been included here because of uncertainties, which would be addressed if Fighting Island were a Practical Alternative.

Construction-related Cost – The approach to costing each of the three components of the crossing system are described here.

> ***Roadway*** – Roadway costs were developed given the known engineering and design information. Linear unit estimates were developed based on common roadway engineering practices and current MDOT prices. The overall estimate was intended to provide a relative comparison between the routes being evaluated.

The following items are key assumptions and unit costs used in the estimate.

1. All ramps were priced as two-lane ramps at a unit price of $203/lineal ft. ($617/lineal m).
2. The new connector routes were priced as a six-lane urban freeway system at-grade with median barrier at a unit price of $1,063/lineal ft. ($3,240/lineal m).
3. If a railroad was crossed, a bridge was assumed. The typical railroad bridge was estimated at $232/ft.^{2} ($2,153m^2).
4. Retaining walls were estimated at all the interchanges. The retaining walls were estimated at $354/lineal ft. ($1,077/lineal m).
5. A two-lane ramp bridge was estimated at $290/ft.^{2} ($2,691/m^2). A ramp bridge that was three levels was estimated at $348/ft.^{2} ($3,229.1/m^2).

Items not specifically calculated but covered by a contingency are:

1. Earthwork.
2. Costs for grade crossing of major arterials or local streets were not included, unless the proposed route layout was an existing roadway being realigned.
3. Utility relocation, demolition, site clean-up, etc. were not factored into the base construction cost.

An additional item for each roadway alternative connecting to I-75 or the Lodge Freeway is the cost associated with modifying the section of freeway one interchange in each direction from where the new crossing enters the freeway. For all areas but those connected to Plazas C-3, C-4 and the I-75/I-96 connections, $80 million is the added cost. For the C-3 connection to I-75, $250 million is added to account for the special need related to rebuilding the Rouge River Bridge. The cost of modifying I-75 at Plaza C-4 is placed at $100 million. The cost to modify I-75 or the Lodge Freeway where Plazas II-2, II-3 or II-4 connection is placed at $80 million.

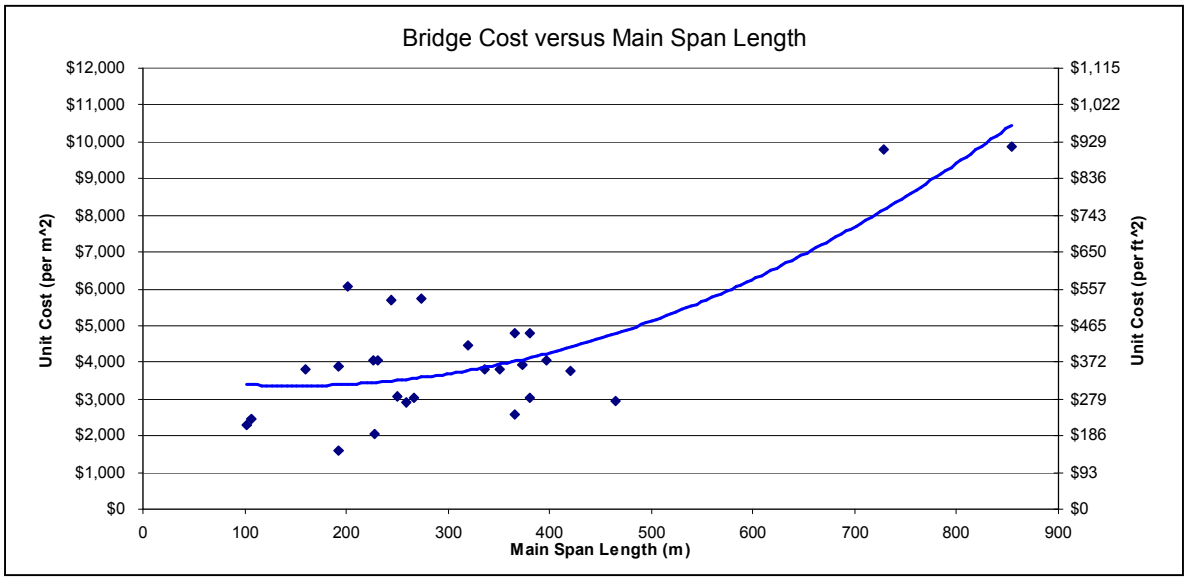
Plaza – At this stage of the project, general plazas space requirements of 80 to 100 acres have been developed in consultation with the border inspection agencies. The actual layout and functional requirements of the inspection plazas will be established later in the project.

An historical review of recent and planned plaza expansion projects in Ontario, New York, and Michigan were examined to estimate the plaza construction cost. These costs vary widely because some plazas include land costs and others include significant connecting roadway systems. Where possible, such costs were removed. The remaining costs were then adjusted for the year of construction or the year the plaza was planned and for geographic location in order to derive the estimated cost of $150 million for an 80-acre plaza, before contingencies are added. Assuming that the facility construction from plaza to plaza would be similar in scope and cost, the only differences in cost would be related to site work, influenced by site constraints and risks. Therefore, the base cost was adjusted using the constructability score in the illustrative alternative evaluation process.

Bridge Crossing – The cost of each bridge was estimated based on the average cost per square foot (or square meter) for bridges of similar length. The bridges were divided into approach spans over land, approach spans over water, and the main bridge, which commonly consists of a main span and two anchor or tail spans.

In order to develop the average cost per square foot, a database was developed in cooperation with the Canadian consultant for long-span, suspended bridges (cable stay and suspension) built since 1981. Major bridges with main spans from 330 feet (100 m) to 2,800 feet (850 m) were considered. The construction costs were then adjusted for inflation and location using RS Means and Engineering News Record factors. Based on the adjusted costs, a regression analysis was performed to develop an equation of the cost of structures by main span length (Figure S-11). That analysis indicates that very few structures in excess of 1,640 feet (500 m) have been constructed in the past 25 years. The proposed spans over the Detroit River range from 1,080 feet (330 m) to 2,560 feet (780 m), which puts the DRIC project at the end of the cost curve. For the approaches to the main structure, a common cost for spans in the river and for spans over land was also developed.

Figure S-11
Detroit River International Crossing Study
Bridge Cost versus Main Span Length



Source: Parsons Transportation Group.

As Figure S-11 illustrates, a small increase in the main span length can have a significant impact on cost. For example, a 660-foot (200 m) increase in the main span length, say from 1,640 feet (500 m) to 2,300 feet (700 m), increases the total cost by 221 percent. For this reason, the total cost of much longer crossings in the southern corridor, with main spans in the range of 300 meters, are similar in cost to the central corridor bridges, where main spans of 700 meters to 800 meters would be needed.

It is noteworthy that a 30 percent contingency has been added to all construction costs.

The results of the cost analysis are displayed on Table S-11. They indicate that property-related costs often represent one-quarter to one-half of the total cost – it is noted only one-half of the crossing construction cost is included in Table S-11 as it is assumed the total construction cost will be equally allocated with the Canada partners. The most costly crossing systems are associated with the Eureka Road connection to I-75 or I-275 – each exceeds $2 billion and those connected to I-275 exceed $3 billion. The least costly is X-11/C-4/Dragoon/I-75 because at this very narrow part of the river, the bridge is expected to cost $430 million, including contingencies (data in Table S-11 reflects half of that construction cost). That is not the case with the nearby X-12 and X-14 bridges which are estimated to cost $590 million and $1.1 billion, including contingencies, respectively (data in Table S-11) reflects half of that construction cost. The larger costs are directly related to a larger main span with no piers in the Detroit River. Again, one-half of the crossing cost is to be borne by the U.S.

Table S-11
Total Estimated Cost of River Crossing Systems
U.S. Side of River
(millions of 2005 dollars)

	Crossing System												
Plaza	S1	S1	S2	S2	S3	S3	S3	S3	S3	S3	S4	S4	S4
Crossing	X1S1	X1S1	X1S2	X1S2	X2S3	X2S3	X2S3	X3S3	X3S3	X3S3	X2S4	X2S4	X2S4
Alignment	S1King/ I-75	S1King/ I-275	S2King/ I-75	S2King/ I-275	S3Penn/ I-75	S3Eureka/ I-75	S3Eureka/ I-275	S3Penn/ I-75	S3Eureka/ I-75	S3Eureka/ I-275	S4Penn/ I-75	S4Eureka/ I-75	S4Eureka/ I-275
Property Related	537.35	879.70	518.94	861.29	940.59	1077.66	2118.72	922.42	1059.50	2100.56	941.98	1062.46	2102.52
Construction Related	1004.29	1051.28	1033.93	1080.92	999.60	979.46	1166.01	954.10	933.96	1120.51	1041.98	1022.53	1209.08
Total	1541.64	1930.98	1552.87	1942.21	1940.18	2057.12	3284.73	1876.52	1993.46	3221.07	1983.95	2084.98	3311.59

	Crossing System											
Plaza	S4	S4	S4	S5	S5	S5	S5	S5	C2	C2	C2	C2
Crossing	X3S4	X3S4	X3S4	X4	X4	X4	X4	X4	X8	X8	X8	X8
Alignment	S4Penn/I-75	S4Eureka/ I-75	S4Eureka/ I-275	S5Moran/ I-75	S5Dix South/I-75	S5Dix North/I-75	S5Southfield/ I-75	S5Southfield/ I-94	C2Schaefer South/I-75	C2Schaefer South/I-94	C2Schaefer North/I-75	C2Schaefer North/I-94
Property Related	936.29	1056.77	2096.83	580.03	504.32	372.07	457.51	718.50	330.04	380.63	364.98	387.25
Construction Related	996.48	977.03	1163.58	1038.15	1022.93	1020.44	1020.44	1103.52	1271.34	1279.20	1287.30	1295.16
Total	1932.77	2033.80	3260.41	1618.18	1527.25	1392.50	1477.94	1822.02	1601.38	1659.83	1652.28	1682.42

	Crossing System											
Plaza	C2	C2	C2	C2	C3	C3	C4	II2	II3	II4	N1	N1
Crossing	X9	X9	X9	X9	X10	X10	X11	X14 II2	X14 II3	X12	X15	X15
Alignment	C2Schaefer South/I-75	C2Schaefer South/I-94	C2Schaefer North/I-75	C2Schaefer North/I-94	C3Dearborn/ I-75	C3Springwells/ I-75	C4Dragoon/ I-75	II2Lafayette/ M-10	II3Lafayette/ M-10	II4Gateway/ I-75	N1St.Jean/ I-94	N1Conner/ I-94
Property Related	330.04	380.63	364.98	387.25	217.07	250.11	180.57	615.24	572.31	469.61	397.29	392.42
Construction Related	1219.34	1227.20	1235.30	1243.16	1204.44	1205.56	668.60	949.00	919.50	624.00	914.36	912.43
Total	1549.38	1607.83	1600.28	1630.42	1421.51	1455.67	849.17	1564.24	1491.82	1093.61	1311.65	1304.85

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Source: The Corradino Group of Michigan, Inc.

S5.4.1 Cost-effectiveness Results

With the costs established for each component of the crossing system as well as the effectiveness/performance scores available, the cost effectiveness of each system can be determined to help shape the short list of Practical Alternatives. This is not an attempt to minimize cost. Instead, the objective is to ensure that the focus for further analysis is on those alternatives of value – i.e., performance is returned for investment. To develop the cost-effectiveness index, the crossing system's total performance score (Table S-10) is divided by its cost in millions of dollars (Table S-11) and the result multiplied by 100 to create an index greater than one. The results of the cost-effectiveness analysis are shown on Table S-12. It is again noteworthy that this calculation considers all the impacts on the U.S. side of the border and, as such, considers all related costs. That means for the crossing itself, the cost is one-half of the construction cost as the impacts on the Canadian side are not included in the analysis.

S6. FINAL NARROWING OF THE ILLUSTRATIVE ALTERNATIVES

Based on the examination of weighted effectiveness and cost effectiveness, it is possible to narrow the Illustrative Alternatives to those which should be analyzed further in the DRIC Study. The discussion below first covers those alternatives with the best overall performance from the U.S. perspective. Then, the conditions of those alternatives are summarized from the Canadian perspective. Finally, comments are presented on other alternatives in each of the Central, Downriver, Belle Isle and I-75/I-96 Areas.

S6.1 Best Overall Performing Illustrative Alternatives

U.S. Perspective

The most cost-effective Illustrative Alternatives are X-11/C-4 (Delray East)/Dragoon/I-75 and X-12/II-4 (Expanded Ambassador Bridge Plaza)/I-75 which rank first and second, respectively, in terms of cost-effectiveness by both the Citizens' and Technical Team's weights. These alternatives are also the top two performers in effectiveness (Table S-10) according to both the Citizens' and Technical Team's weights. These indices are very much apart from all other alternatives. And, these two crossing systems are among the best performers in Regional Mobility.

The third to fifth most cost-effective alternatives are X-10/C-3 (Delray West)/Dearborn/I-75 and X-11/C-3 (Delray East)/Springwells/I-75. They are ranked in effectiveness 12^{th} and 15^{th}, respectively, by the Citizens' weights and 10^{th} and 11^{th}, respectively, by the Technical Team weights. Based on a combination of these evaluations, Crossings X-10/C-3 (Delray East)/Dearborn/I-75 and X-10/C-3 (Delray East)/Springwells/I-75 are considered candidates for further analysis. They are among the best performers in Regional Mobility.

Table S-12
Detroit River International Crossing Study
Cost Effectiveness Results
Crossing Systems (Route + Plaza + Crossing)

	Crossing System												
Plaza	S1	S1	S2	S2	S3	S3	S3	S3	S3	S3	S4	S4	S4
Crossing	X1S1	X1S1	X1S2	X1S2	X2S3	X2S3	X2S3	X3S3	X3S3	X3S3	X2S4	X2S4	X2S4
Alignment	S1King/ I-75	S1King/ I-275	S2King/ I-75	S2King/ I-275	S3Penn/ I-75	S3Eureka/ I-75	S3Eureka/ I-275	S3Penn/ I-75	S3Eureka/ I-75	S3Eureka/ I-275	S4Penn/ I-75	S4Eureka/ I-75	S4Eureka/ I-275
Citizen Cost Effectiveness Score	11.04	8.42	11.40	8.53	9.66	9.19	5.42	9.98	9.47	5.52	9.08	8.64	5.17
Rank	22	33	21	32	25	28	35	24	26	34	29	31	37
Technical Team Cost Effectiveness Score	11.01	8.46	11.27	8.53	9.40	8.90	5.28	9.73	9.19	5.39	8.88	8.43	5.06
Rank	22	32	21	31	25	28	35	24	26	34	29	33	37

	Crossing System											
Plaza	S4	S4	S4	S5	S5	S5	S5	S5	C2	C2	C2	C2
Crossing	X3S4	X3S4	X3S4	X4	X4	X4	X4	X4	X8	X8	X8	X8
Alignment	S4Penn/ I-75	S4Eureka/ I-75	S4Eureka/ I-275	S5Moran/ I-75	S5Dix South/ I-75	S5Dix North/ I-75	S5Southfield/ I-75	S5Southfield/ I-94	C2Schaefer South/I-75	C2Schaefer South/I-94	C2Schaefer North/I-75	C2Schaefer North/I-94
Citizen Cost Effectiveness Score	9.32	8.86	5.25	11.45	12.54	13.31	12.52	9.98	12.18	11.60	11.80	11.50
Rank	27	30	36	20	6	3	7	23	9	18	14	19
Technical Team Cost Effectiveness Score	9.12	8.65	5.15	11.45	12.45	13.31	12.51	9.96	12.58	11.99	12.18	11.88
Rank	27	30	36	20	12	5	10	23	9	18	16	19

	Crossing System											
Plaza	C2	C2	C2	C2	**C3**	**C3**	**C4**	II2	II3	**II4**	N1	N1
Crossing	X9	X9	X9	X9	**X10**	**X10**	**X11**	X14 II2	X14 II3	**X12**	X15	X15
Alignment	C2Schaefer South/I-75	C2Schaefer South/I-94	C2Schaefer North/I-75	C2Schaefer North/I-94	**C3Dearborn/ I-75**	**C3Springwells/ I-75**	**C4Dragoon/ I-75**	II2Lafayette/ M-10	II3Lafayette/ M-10	**II4Gateway/ I-75**	N1St.Jean/ I-94	N1Conner/ I-94
Citizen Cost Effectiveness Score	12.48	11.87	12.08	11.77	**13.27**	**13.01**	**23.20**	12.02	12.09	**18.10**	11.73	11.70
Rank	8	13	11	15	**4**	**5**	**1**	12	10	**2**	16	17
Technical Team Cost Effectiveness Score	12.90	12.28	12.48	12.17	**13.90**	**13.60**	**24.52**	12.62	12.85	**18.92**	12.28	12.24
Rank	6	13	11	17	**3**	**4**	**1**	8	7	**2**	14	15

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Source: The Corradino Group of Michigan, Inc.

Canadian Perspective

On the Canadian side of the border, the proximity of Crossings X-10 and X-11 to the urban areas of Windsor and LaSalle allows them to better serve the "local" and "long-distance" international traffic than the Belle Isle and Downriver alternatives. And, of the possible plaza connections on the Canadian side of the border to Crossings X-10 and X-11, all have impacts but Plaza CC-3 (refer to Figure S-10) is associated with the fewest impacts of the plaza sites (CC-1, CC-2, CC-3 and CC-7). It is west of the Ojibway Parkway, in an area designated by the City of Windsor for an industrial park. It is also identified in the *Schwartz Report* as a possible plaza site.

Therefore, after consideration of the Canadian evaluation within the focused area, Crossings X-10 and X-11 are considered, from the Canadian and U.S. perspectives, as candidates for continued analysis.

The X-12 crossing, plaza and roadway options in Canada have more impacts than those in the U.S. Specifically, the existing plaza in Canada at the Ambassador Bridge is approximately 20 acres. A suitable plaza size to meet the requirements of border agencies, accommodate all international truck and auto traffic and connections to a second span of the Ambassador Bridge is 120 acres. The existing plaza is bounded on the south by the Essex Terminal Rail right-of-way, and on the east by the University of Windsor campus. To avoid impacts to these areas, several alternative proposals were developed. Each would have similar negative impacts on a nearby high school, the University of Windsor Stadium and other areas. So, the possibilities of a remote plaza with a secure roadway connecting to the foot of the bridge were examined. These alternatives would follow the existing Essex Terminal Rail right-of-way, where there is highly-valued open space serving as a community recreation area/parkland. Placing a high-volume roadway in this area would have a high negative impact on the community cohesion and character.

While the plazas to serve a second span to the Ambassador Bridge would have major impacts in Canada, a freeway connection leading to a second span would have high benefits to regional mobility. By providing a free-flow connection through the elimination of the existing signalized intersections, the connecting roadway leading to the Ambassador Bridge would operate with good levels of service during daily peak travel periods. The benefits to the local road network of building a second span to the Ambassador Bridge are comparable to those provided by a new crossing in the Central Area (Crossings X-10, X-11). However, the Canadian evaluation notes a second span of the Ambassador Bridge would be an expansion of the existing crossing, not a new crossing of the river with new connections to the freeway systems in Ontario and Michigan.

So, on the Canadian side of the border, a second span of the Ambassador Bridge is not considered a candidate for further study as maintaining the existing crossing and connections in the border transportation network does not address redundancy needs and, regardless of the plaza site selected, it would cause high impacts to neighborhoods. Nonetheless, the U.S. plaza, and its freeway connection, are considered candidates for further analysis.

S6.2 Central Area Plaza C-2 and Crossings X-8 and X-9

U.S. Perspective

The crossing systems including Plaza C-2 (U.S. Steel North) and Crossings X-8 and X-9 scored high in effectiveness (3rd to 12th), but lower in cost effectiveness (8th to 19th). And, with the needed time required to build the new rolling mill for U.S. Steel, its cost (which the DRIC analysis eventually indicated would not likely qualify for federal funding), plus the potential addition of millions of dollars in property cost to relocate the mill, Crossing Systems X-8/C-2 (U.S. Steel North) and X-9/C-2 (U.S. Steel North) are not considered practical alternatives from the U.S. perspective.

Canadian Perspective

On the Canadian side of the border, the systems connected to Crossings X-8 and X-9 perform at a high level. The preferred alternative leading to the plazas that could be connected to Crossings X-8 and X-9 is by way of the E.C. Row Expressway to Huron Church Road/Talbot Road. Upgrading this connection to a freeway was determined to have the least impacts on community cohesion and character because the current facility serves as the primary access route to the Ambassador Bridge. It can be connected to several plazas (CC1, CC2, CC3 and CC4) and then to Crossings X-8 and/or X-9.

While the proposed Canadian Plaza CC3 has impacts, it has the lowest impacts of the plaza sites considered in this area of the river. West of the Ojibway Parkway, it is an area designated by the City of Windsor for an industrial park. The site is adjacent to existing manufacturing plants and two major power generation plants. This plaza site was identified in the City of Windsor *Schwartz Report* as suitable for conversion to an inspection plaza for a new crossing in this area of the Detroit River. However, connecting this site to a crossing is dependent upon geotechnical conditions, as this area has historically been used for solution mining of salt. The size and location of the underground caverns (or brine wells) produced by these mining operations are not fully documented. These caverns create a constraint to siting bridge pier footings, as structural integrity of the rock above these caverns is not fully known. (In 1954, a large sinkhole resulting

from the collapse of a cavern roof and gradual subsidence of the covering material destroyed a building. The sinkhole site is currently occupied by Essex Aggregates.)

Based on these characteristics, particularly those on the U.S. side of the border, plus the presence of solution mining areas on both sides of the river, Crossing Systems X-8/Plaza C-2 (U.S. Steel North) and X-9/Plaza C-2 (U.S. Steel North) are not proposed as candidates for further analysis.

S6.3 Downriver Alternatives

U.S. Perspective

All Downriver crossings are not considered for further analysis in the DRIC Study from a U.S. perspective as they are neither effective nor cost-effective. It is noteworthy that Crossing System S-5/X-4 (Atofina East/Dix-North/I-75) ranked in the top five in terms of cost-effectiveness by both the Citizens' and Technical Team's weightings but placed 17th to 19th in overall effectiveness. The analysis of this alternative did not include the cost associated with acquisition, remediation and use of Fighting Island by a plaza and/or a bridge. That could be tens of millions to hundreds of millions of dollars of risk/investment. Therefore, Crossing System S-5/X-4 (Atofina East/Dix-North/I-75) is also not considered a practical alternative from the U.S. perspective.

Canadian Perspective

The Canadian evaluation indicates Canadian Plaza CS1 would be sited in the middle section of Fighting Island to serve Crossing X-4. This area of Fighting Island was used for disposal of alkaline waste in layers between about two feet (0.5 meters) and 35 feet (11 meters) thick. Constructing a plaza on Fighting Island would require removal/remediation of the waste material. Preliminary analysis indicates it is unlikely that any major waste removal would be permitted by the Ontario Ministry of the Environment for redevelopment or reuse of the Island. Construction of a plaza on Fighting Island, therefore, would require removal of the waste material to other parts of Fighting Island and importing materials suitable for construction. The constructability of a plaza, bridge pier(s) and/or connecting roadway in this manner has significant risks, because it is quite likely that the waste material was pumped directly onto the marshland peat layer. Therefore, use of BASF's Fighting Island is not considered practical from a Canadian perspective.

The Canadian analysis indicates that, while all other Downriver alternatives generally impact fewer features than alternatives upriver, the Downriver alternatives offer fewer benefits to the transportation network in the Windsor-Essex County region. Nonetheless, it is noted that the

southernmost plazas in Canada, CS-2 and CS-3 are proposed in rural areas of the Towns of LaSalle and Amherstburg, respectively. The proposed plaza sites are primarily agricultural properties inland from the shoreline of the Detroit River. Plazas at these locations would result in displacement and/or disruption of agricultural operations, although no special operations (e.g. orchards) were identified. Providing adequate services (power, water, water treatment) to these plaza sites was identified as being a cost/timing issue for the construction at these sites.

The Canadian Downriver Plaza CS-4 would be situated within the designated future urban boundary of LaSalle on a site that is presently open field. Adjacent land uses are primarily residential, with some natural features (woodlots) and the Essex Golf and Country Club. A plaza site in this area is incompatible with the adjacent land uses, and the site offers little flexibility for future expansion. Shoreline impacts between the plaza and the Detroit River associated with connecting Canadian Plaza CS4 to Crossing X-4 include approximately 20 residences, two marinas, an arena and six small businesses.

The Canadian Downriver connecting routes from Highway 401 to these plaza sites generally traverse the lightly-populated rural areas of LaSalle and Amherstburg. The route connecting to Canadian Plaza CS-4 would intrude into the urban area of LaSalle near Victory Street, thereby displacing approximately 76 residential units (including rental apartments). The routes connecting to Crossings X-1, X-2 and X-3 would displace very few residences. Nonetheless, a subdivision common to all Canadian Downriver routes would be disrupted (approximately 52 homes within about 800 feet [250 meters] of the right-of-way). It is adjacent to the existing Highway 401 right-of-way.

In Canada, Downriver Crossing X-2 has the greatest potential for impacts to marshes, affecting the shoreline area north of the Canard River and Turkey Island in the Detroit River. Crossings X-3 and X-4 would have some impact on the marshes, but not to the same extent as that of Crossing X-2. Crossing X-1 would not impact any shoreline marshes.

In summary, and based largely on the poor overall performance in Regional Mobility of the crossing systems on both sides of the river, plus the poor performance of the crossing system components on the U.S. side of the river, the Downriver alternatives are not considered candidates for continued analysis.

S6.4 Belle Isle Alternatives

U.S. and Canadian Perspectives

Based on the analyses presented earlier in this report, the Belle Isle alternatives are neither effective (Table S-10) nor cost-effective from a U.S. perspective (Table S-12). This is supported by the Canadian analysis, which indicates transportation effects of the system connected to Crossing X-15 (Lauzon Parkway or Bonwell Road) would provide only limited benefits to the Windsor transportation network. And, the connecting roadways to the Ambassador Bridge and the Detroit-Windsor Tunnel, particularly Huron Church Road, would operate poorly with many sections at or over capacity.

The Canadian plaza site for Crossing X-15 would be located north of Tecumseh Road in an area currently occupied by "big box" commercial uses, including Wal-Mart, Home Depot, Rona and other ancillary retail. The plaza would displace eight businesses and another seven businesses would be disrupted. The crossing itself, which would extend about 2,600 feet (800 meters) inland through a densely populated residential area, would cause the displacement of approximately 700 households.

On the Canadian side of the border, the connecting roadway to Crossing X-15 would impact 100 residential units, six businesses and disrupt more than 1,500 residences and 70 businesses. Kiwanis Park at E.C. Row/Lauzon Parkway would also be disrupted by the new facility.

Therefore, both U.S. and Canadian evaluations of the system associated with Crossing X-15 at Belle Isle find that the crossing systems there are not candidates for the short list of Practical Alternatives from a U.S. perspective.

S6.5 I-75/I-96 Area Alternatives

U.S. Perspective

In the I-75/I-96 Area, crossing systems X-14/II-2 (Rosa Parks/Bagley)/M-10 and X-14/II-3 (Rosa Parks/Porter)/M-10 place 7th to 12th in cost-effectiveness in the U.S. evaluation. They ranked poorer in effectiveness (13th to 23rd). As noted earlier in this report, the greatest concerns are impacts on neighborhoods, cultural resources and consistency with local planning.

Canadian Perspective

This situation is amplified by the Canadian evaluation. That assessment is based on a six-lane freeway design, the right-of-way of which would be 260 feet (80 meters), which is wider than the

existing rail corridor south of E.C. Row (130 feet/40 meters). North of E.C. Row, the rail corridor is sufficiently wide to accommodate the freeway connection.

To elaborate on Canadian conditions, it is noted that two areas of the DRTP rail corridor that would incur substantial property impacts outside the rail property are: between E.C. Row and Highway 401, and north of College Street to the Detroit River. In these areas, Provincial Road parallels the rail corridor. On the lands between the rail corridor and Provincial Road, approximately 40 commercial, major industrial and retail uses would likely be displaced, including retail shopping centers, supermarkets, car dealerships, etc. and mid-size industrial operations. Also, adjacent to Provincial Road and the rail corridor are residential neighborhoods, which are continuing to develop. Approximately 550 residences are within about 650 feet (200 meters) of the right-of-way along this section of the new facility, and are assumed to be disrupted.

If the continued use of the rail corridor is recommended by a Rail Rationalization Study being undertaken by the City of Windsor, the alignment of the new freeway would have to be shifted onto Provincial Road and a new service road would be required to provide access to lands east of Provincial Road. Under this condition, impacts on residential, commercial and industrial uses in this area would increase beyond the numbers identified above.

The Canadian evaluation indicates that constructing an interchange at E.C. Row would be complex due to the proximity of two existing, closely-spaced interchanges at this location: Dougall Avenue and Howard Avenue. The reconfiguration of these interchanges would result in additional displacements of properties around the interchange (primarily commercial and industrial uses) and impact the primary access to this important commercial center of Windsor.

Immediately north of E.C. Row Expressway is a large scrap yard, which would be disrupted by the proposed new freeway. This scrap yard is a contaminated area, and remediation of this site would have cost and schedule implications for this option.

North of the plaza, the rail corridor passes through a mix of mature residential housing stock and industrial uses. The new bridge crossing would touch down in this area, displacing approximately 200 households.

The Canadian analysis of travel demand in 2035 indicates that a new crossing constructed in the rail corridor as a multi-lane freeway would attract a high proportion of the international truck and

auto traffic. With international traffic moving to higher-order roads, the minor street system in the city would carry fewer international trips, providing some benefit to local access.

But, the above-described change in traffic patterns and the change in use of the rail corridor from low-volume rail to a high-volume roadway facility has a negative impact as well on community character and cohesion. A new highway corridor is perceived in the Canadian evaluation to be a barrier between the residential neighborhoods and the retail areas in this corridor. Although the existing rail line acts somewhat as a barrier in the community already, at two to three trains per day, in effect, the rail line is more a part of the community landscape than a disruptive barrier.

This barrier effect would be felt to a greater degree in the area of the new crossing. Here, the rail line is not visible, as the existing crossing is a tunnel; the lands on the surface of the tunnel are used as a green space/recreation area connecting to the continuous waterfront park. In this area of the city, the neighborhoods are highly populated, mature and stable. A new freeway and major bridge structure through this area would markedly change the character and the central Windsor/University neighborhoods. A new structure would span the river, which is approximately 2,850 feet (850 meters) wide at this location, with piers on the shore of the river. The backspan of the bridge would extend approximately 1,300 feet (400 meters) inland.

Based on these analyses, particularly the impacts in Canada, the two X-14 crossing systems are not considered candidates for additional analysis.

S7. SUMMARY AND RECOMMENDATIONS

The Detroit River International Crossing Study (DRIC) involved application of a structured process to evaluate Illustrative Alternatives. The evaluation was applied to more than a dozen plazas and river crossings and more than three dozen roadway connections (refer to Figure S-3). It involved the community in weighting the evaluation factors along with those weights established by the MDOT Technical Team. The evaluation factors are: Protect Community/Neighborhood Characteristics; Maintain Consistency with Local Planning; Protect Cultural Resources; Protect the Natural Environment; Improve Regional Mobility; Maintain Air Quality; and, Constructability.

The first part of the analysis concluded that the Illustrative Alternatives in the Downriver Area (Crossings X-1, X-2, X-3 and X-4 on Figure S-10) and the Belle Isle Area (Crossing X-15) were not candidates for further study because of significant problems in handling traffic and/or causing impacts to communities, the natural environment, etc. The analysis of the cost-effectiveness of these alternatives reinforces that conclusion. Also, eliminated was the proposal

by the Detroit River Tunnel Partnership to convert two rail tunnels to truck use after building a new, single-track modern tunnel for rail vehicles. This proposal does not address the long-range capacity needs of the region. But, this position does not prevent DRTP from continuing its own environmental studies in accordance with the processes in the U.S. and Canada.

The analysis then focused on the practical feasibility, including cost-effectiveness, of the end-to-end alternatives of the systems between and including Crossings X-8 and X-14 (refer to Figure S-10). Both the U.S. and Canadian analyses led to the elimination of Crossings X-8 and X-9 because of the impacts on the continued operation of the U.S. Steel plant and the inability to construct the new Detroit River crossing in a timely manner (i.e., completion by 2013). This crossing area is also affected by the presence of known brine wells and the fact that many brine wells remain unknown because complete records of solution mining were not kept for years.

That work also led to the elimination from further consideration of Crossing X-14, which uses the Canadian Pacific rail right-of-way on both sides of the Detroit River. The impacts to neighborhoods, and plans for their future, cultural resources and air quality led to this conclusion.

Finally, the study indicates the proposed U.S. plaza next to/downriver from the Ambassador Bridge, and its possible connections to I-75, should remain in the continuing analysis, but not as part of a second span of the Ambassador Bridge. That crossing alternative is eliminated because, in Canada, the plaza and freeway connection leading to a second span would have unacceptable community impacts and the constructability of a six-lane freeway along Huron Church Road is doubtful in light of intensity of the surrounding development.

Therefore, the analyses of Illustrative Alternatives define an area upstream of Zug Island to the foot of the Ambassador Bridge in the U.S., and, in Canada, from Broadway Boulevard to the vicinity of Brock Street (Figure S-12) as the places where further analyses will be conducted to specify where the Practical Alternatives for bridges, plazas and highway route connectors should be placed. The components of the crossing systems previously analyzed will now be replaced by new ones developed through involvement of the local community, its elected representatives, the project's Local Advisory Council, the City of Detroit, and a host of stakeholders. The analyses to support defining the Practical Alternatives will include detailed examination of possible impacts to the community's people and the large and small businesses that exist there, and its resources, such as the historically-significant Fort Wayne. Engineering examinations will be conducted of items such as the possible relocation of utilities or major rail lines, and how connections can best be made to I-75. The additional work will also include study of river-

related issues ranging from navigation, to the presence of brine wells to possible impacts on sensitive biologic communities/habitats.

Therefore, the recommendation at the conclusion of the study of Illustrative Alternatives is to focus on the area on both sides of the Detroit River shown in Figure S-12, over the period December 2005 to March 2006 to define the final components of the Practical Alternatives. The schedule is consistent with the DRIC Study Work Plan.

Figure S-12
Detroit River International Crossing Study
Area of Continued Analyses

Source: The Corradino Group of Michigan, Inc.

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Attachment A

Detroit River International Crossing Study
Unweighted Performance Evaluation
Crossing Systems (Route + Plaza + Crossing)

Table A-1
Detroit River International Crossing Study
Unweighted Performance Evaluation
21 Downriver Crossing Systems (Route + Plaza + Crossing)
U.S. Side of Border

All Alternatives Aggregate Unweighted Scores

Plaza	S1	S1	S2	S2	S3	S3	S3	S3	S3	S3
Crossing	X1S1	X1S1	X1S2	X1S2	X2S3	X2S3	X2S3	X3S3	X3S3	X3S3
Alignment	S1King/I-75	S1King/I-275	S2King/I-75	S2King/I-275	S3Penn/I-75	S3Eureka/I-75	S3Eureka/I-275	S3Penn/I-75	S3Eureka/I-75	S3Eureka/I-275
Community Neighborhood Impacts	147.30	133.60	154.00	139.80	145.90	138.10	122.80	146.90	139.10	123.80
Consistency w/Local Planning	111.80	113.10	107.00	107.30	185.20	178.60	178.60	184.20	177.60	177.60
Cultural Resources	213.20	206.80	233.80	206.90	217.80	239.60	221.70	217.90	239.70	221.80
Natural Environment	136.60	112.90	154.60	130.40	142.20	147.50	121.30	139.90	145.20	119.00
Regional Mobility	159.10	161.00	160.00	162.00	168.10	167.00	168.90	170.80	169.70	171.60
Air Quality	228.50	228.10	229.40	229.20	252.50	251.10	251.20	252.50	251.10	251.20
Constructability	196.70	193.10	190.20	186.30	188.20	185.70	174.80	187.20	184.70	173.80

All Alternatives Aggregate Rank by Factor

Plaza	S1	S1	S2	S2	S3	S3	S3	S3	S3	S3
Crossing	X1S1	X1S1	X1S2	X1S2	X2S3	X2S3	X2S3	X3S3	X3S3	X3S3
Alignment	S1King/I-75	S1King/I-275	S2King/I-75	S2King/I-275	S3Penn/I-75	S3Eureka/I-75	S3Eureka/I-275	S3Penn/I-75	S3Eureka/I-75	S3Eureka/I-275
Community Neighborhood Impacts	13	33	6	28	16	31	35	15	29	34
Consistency w/Local Planning	35	34	37	36	3	13	13	4	15	15
Cultural Resources	15	17	3	16	14	2	12	13	1	11
Natural Environment	29	36	22	32	25	23	33	26	24	34
Regional Mobility	37	35	36	34	32	33	31	28	30	26
Air Quality	28	29	26	27	4	14	11	4	14	11
Constructability	9	14	18	25	21	27	30	23	28	31

All Alternatives Aggregate Unweighted Scores

Plaza	S4	S4	S4	S4	S4	S4	S5	S5	S5	S5	S5
Crossing	X2S4	X2S4	X2S4	X3S4	X3S4	X3S4	X4	X4	X4	X4	X4
Alignment	S4Penn/I-75	S4Eureka/I-75	S4Eureka/I-275	S4Penn/I-75	S4Eureka/I-75	S4Eureka/I-275	S5Moran/I-75	S5Dix South/I-75	S5Dix North/I-75	S5Southfield/I-75	S5Southfield/I-94
Community Neighborhood Impacts	145.10	140.60	122.30	145.40	140.90	122.60	155.10	158.80	159.50	158.10	152.90
Consistency w/Local Planning	142.10	139.60	139.60	143.80	141.30	141.30	128.00	127.10	118.70	129.00	129.60
Cultural Resources	228.30	231.80	227.10	228.30	231.80	227.10	194.30	223.50	194.20	183.60	174.90
Natural Environment	133.00	139.50	113.90	130.70	137.20	111.60	183.00	188.30	188.00	189.20	188.50
Regional Mobility	171.60	170.60	172.20	173.80	172.80	174.40	183.10	183.00	182.80	184.30	185.90
Air Quality	253.60	252.30	252.70	253.20	251.90	252.30	251.10	251.30	251.30	250.60	250.90
Constructability	169.50	167.70	158.70	168.50	166.70	157.70	203.30	201.60	199.80	197.50	184.70

All Alternatives Aggregate Rank by Factor

Plaza	S4	S4	S4	S4	S4	S4	S5	S5	S5	S5	S5
Crossing	X2S4	X2S4	X2S4	X3S4	X3S4	X3S4	X4	X4	X4	X4	X4
Alignment	S4Penn/I-75	S4Eureka/I-75	S4Eureka/I-275	S4Penn/I-75	S4Eureka/I-75	S4Eureka/I-275	S5Moran/I-75	S5Dix South/I-75	S5Dix North/I-75	S5Southfield/I-75	S5Southfield/I-94
Community Neighborhood Impacts	20	26	37	18	25	36	5	3	2	4	7
Consistency w/Local Planning	19	22	22	18	20	20	30	31	33	29	28
Cultural Resources	6	4	8	6	4	8	18	10	19	30	32
Natural Environment	30	27	35	31	28	37	17	12	13	9	11
Regional Mobility	27	29	25	23	24	22	17	18	19	16	15
Air Quality	1	7	3	2	8	6	13	9	9	17	16
Constructability	32	34	36	33	35	37	5	6	7	8	28

Source: The Corradino Group of Michigan, Inc.

Table A-2
Detroit River International Crossing Study
Unweighted Performance Evaluation
11 Central Area Crossing Systems (Route + Plaza + Crossing)
U.S. Side of Border

All Alternatives Aggregate Unweighted Scores

Plaza	C2	C2	C2	C2	C2	C2	C2	C2	C3	C3	C4
Crossing	X8	X8	X8	X8	X9	X9	X9	X9	X10	X10	X11
Alignment	C2Schaefer South/I-75	C2Schaefer South/I-94	C2Schaefer North/I-75	C2Schaefer North/I-94	C2Schaefer South/I-75	C2Schaefer South/I-94	C2Schaefer North/I-75	C2Schaefer North/I-94	C3Dearborn/I-75	C3Springwells/I-75	C4Dragoon/I-75
Community Neighborhood Impacts	151.70	148.40	150.60	151.10	145.80	142.50	144.70	145.20	150.50	144.30	134.30
Consistency w/Local Planning	180.60	182.60	181.30	182.00	179.60	181.60	180.30	181.00	124.00	134.10	188.90
Cultural Resources	188.90	184.40	186.90	187.40	188.70	184.20	186.70	187.20	181.10	183.90	187.20
Natural Environment	185.10	179.50	189.20	182.90	183.30	177.70	187.40	181.10	236.10	236.60	248.00
Regional Mobility	253.10	254.10	254.00	255.30	253.30	254.30	254.20	255.50	256.90	256.70	264.40
Air Quality	243.00	241.00	241.50	239.10	243.10	241.10	241.60	239.20	218.40	216.90	191.90
Constructability	196.00	191.10	192.80	188.50	194.40	189.50	191.20	186.90	185.90	187.60	232.90

All Alternatives Aggregate Rank by Factor

Plaza	C2	C2	C2	C2	C2	C2	C2	C2	C3	C3	C4
Crossing	X8	X8	X8	X8	X9	X9	X9	X9	X10	X10	X11
Alignment	C2Schaefer South/I-75	C2Schaefer South/I-94	C2Schaefer North/I-75	C2Schaefer North/I-94	C2Schaefer South/I-75	C2Schaefer South/I-94	C2Schaefer North/I-75	C2Schaefer North/I-94	C3Dearborn/I-75	C3Springwells/I-75	C4Dragoon/I-75
Community Neighborhood Impacts	8	12	10	9	17	23	21	19	11	22	32
Consistency w/Local Planning	10	5	8	6	12	7	11	9	32	26	2
Cultural Resources	20	27	25	22	21	28	26	23	31	29	24
Natural Environment	15	20	9	18	16	21	14	19	5	4	2
Regional Mobility	11	8	9	5	10	6	7	4	2	3	1
Air Quality	19	23	21	25	18	22	20	24	30	31	34
Constructability	10	17	15	20	12	19	16	24	26	22	1

Source: The Corradino Group of Michigan, Inc.

Table A-3
Detroit River International Crossing Study
Unweighted Performance Evaluation
5 Crossing Systems (Route + Plaza + Crossing) in I-75/I-96 and Belle Isle Areas
U.S. Side of Border

All Alternatives Aggregate Unweighted Scores

Plaza	II2	II3	II4	N1	N1
Crossing	X14BII2	X14BII3	X12	X15B	X15B
Alignment	II2Lafayette/ M-10	II3Lafayette/ M-10	II4Gateway/ I-75	N1St.Jean/I-94	N1Conner/I-94
Community Neighborhood Impacts	146.90	141.30	174.20	140.20	138.20
Consistency w/Local Planning	170.90	138.50	252.10	134.90	132.70
Cultural Resources	157.40	151.30	174.30	146.30	148.10
Natural Environment	228.60	240.60	253.50	206.00	202.00
Regional Mobility	247.30	248.40	243.70	175.20	174.70
Air Quality	202.70	194.50	121.90	120.60	120.70
Constructability	212.80	208.70	226.60	195.80	193.30

All Alternatives Aggregate Rank by Factor

Plaza	II2	II3	II4	N1	N1
Crossing	X14BII2	X14BII3	X12	X15B	X15B
Alignment	II2Lafayette/ M-10	II3Lafayette/ M-10	II4Gateway/ I-75	N1St.Jean/I-94	N1Conner/I-94
Community Neighborhood Impacts	14	24	1	27	30
Consistency w/Local Planning	17	24	1	25	27
Cultural Resources	34	35	33	37	36
Natural Environment	6	3	1	7	8
Regional Mobility	13	12	14	20	21
Air Quality	32	33	35	37	36
Constructability	3	4	2	11	13

Source: The Corradino Group of Michigan, Inc.