

<b>Title:</b>	<b>Proposal for Project Funding under the National Trade Corridors Fund</b>
<b>Project Name:</b>	<b>“Sarnia-Lambton Oversized Load Corridor”</b>
<b>Location:</b>	<b>City of Sarnia</b> [Port of Sarnia] <b>extending to St. Clair Township</b> [Corunna and Village of Brigden]
<b>Applying Organization:</b>	<b>The Corporation of the City of Sarnia</b> on behalf of: <ul style="list-style-type: none"> <li>• The Corporation of the City of Sarnia;</li> <li>• The Corporation of the Township of St. Clair; and</li> <li>• The Corporation of the County of Lambton</li> </ul>
<b>Submitted:</b>	<b>November 6, 2017</b>



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# Executive Summary

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## Short Project Description:

### **Location**

The Sarnia-Lambton Oversized Load Corridor is planned as a designated and protected 36 km (22.3 mi) route using existing public rights-of-way linking the Port of Sarnia to clusters of industrial fabricators and manufacturers located within the County of Lambton. Lambton County is located in southwestern Ontario and includes the City of Sarnia and the Township of St. Clair.

Sarnia, Ontario is located at a major international border with the United States with the Bluewater Bridge operating as Canada's second busiest international commercial crossing. Highway 402 of the 400 series highways in Ontario starts at the Bluewater Bridge and connects Sarnia-Lambton with all parts of Ontario to the east. The Port of Sarnia is located at the confluence of the St. Clair River and Lake Huron, on the busy water highway of the international St. Lawrence Seaway. See the following link for examples of super, oversized loads in the Sarnia-Lambton area: (<http://sarnia.ca/doing-business/economic-development/sarnia-harbour>). St. Clair Township is further south of Sarnia along the St. Clair River, connected to Port of Sarnia by County, Township and City roads as well as Provincial Highway 40.

### **Scope**

The scope of the project is to create and maintain an oversized load corridor (OLC) linking the City-owned Port of Sarnia with local industrial fabricators and manufacturers to facilitate the transportation of super, oversized loads destined for export and import.

The newly created OLC will have the capacity to accommodate larger loads up to 9.14 m high by 9.14 m wide by 45.72 m long (30 ft by 30 ft by 150 ft). Within this document, "*super, oversized*" loads are referring to these measures. The current standards of the Ontario Ministry of Transportation for conventional loads are a maximum of 4.15 m high by 2.6 m wide by 23 m long (13.5 ft by 8.5 ft by 75 ft). Loads that lie between the conventional load and the super, oversized load will be referred to simply as "*oversized loads*".

Manufacturers in the region are currently designing, fabricating and shipping numerous items that fall within the provincial size guidelines for transportation of these goods. There are also oversized loads being manufactured here that do not fit within these guidelines. These oversized items require considerable cost, time, effort, public inconvenience and the duplication of many services to import and export these items to local and global markets. The development and protection of the OLC will ensure public safety, environmental impacts, competitiveness in a global market and the creation and retention of the Advanced Manufacturing sector in Lambton County.

Examples of super, oversized loads in the Sarnia area are depicted below:



Super, oversized loads cannot be accommodated today on any transport corridor in Sarnia-Lambton linking the Port of Sarnia to industrial fabricators or manufacturers. This represents a limit on the export of manufactured goods from local fabricators and the import of specialized equipment for local manufacturers.

The project will significantly reduce recurring extraordinary costs which have been in the million(s) of dollars to temporarily relocate existing obstructions that enable super, oversized loads to travel from place of fabrication to the Port of Sarnia. Significant savings for transportation of these goods will improve the competitiveness of local industry and create 123 FTE direct employment positions annually. Immediate growth for the national economy translates to \$1.2 million dollars of annual tax revenue for government.

**Major Project Activities**

Creation of an OLC includes:

- Removal and/or relocation of all existing overhead obstructions and underground improvements required along the entire length of the 36 km route
- Modification and reconstruction of intersections along the route to enable the turning of oversized loads
- Improving existing underground crossings along the route to ensure the weight of oversized loads can be supported
- Constructing specialized dock facilities at the terminus of the OLC (Port of Sarnia) to enable and facilitate the transfer of oversized and super, oversized loads from specialized trailers, Roll on/Roll off (RoRo) to ships, and barges
- Expanding a laydown area at the Port of Sarnia to facilitate the increased handling of inbound and outbound shipping containers.

**Timelines**

OLC project construction is planned over a four (4) year period.

*Years 1 – 2 – 3*

- Starting at the harbor, remove and/or relocate all existing obstructions along the OLC
- Modification and reconstruction of intersections along the route to enable the turning of oversized loads and improving or replacing existing underground crossings

*Years 3 -4*

- Construction of the specialized dock facilities (RoRo) at the terminus of the OLC to enable and facilitate the transfer of super, oversized loads from specialized trailers to ships, and barges

**Project Total Cost:**

The total estimated cost to construct the Sarnia-Lambton OLC is \$12,009,095.00. For the purposes of this NTCF funding application, this figure has been rounded to \$12,000,000.

**Total Eligible Expenditures**

Total Eligible Expenditures to construct the Sarnia-Lambton Oversized Load corridor are as follows:

Expenditure Item	Cost
Port of Sarnia Improvements	\$5,146,782.00*

<b>Expenditure Item</b>	<b>Cost</b>
Road Improvements	\$3,214,616.00*
Overhead Obstructions	\$3,069,033.00*
<i>Total</i>	<i>\$11,430,431.00**</i>
Escalation for 2016 & 2017 (@ 2.5%)	\$578,664.00
<b>TOTAL</b>	<b>\$12,009,095.00</b>

(\*) Includes a 20% Contingency Allowance and a 10% Escalation Allowance

(\*\*) Total based on 2016 Estimates

### **Total Ineligible Expenditures**

1. 2012 Shipping Study (M.I.G. Engineering) \$35,000.00 +HST = \$39,550.00
  - This study evaluated multiple locations and identified the optimal location for the trans-shipment of locally fabricated and manufactured oversized loads.
  - This Study was funded with contributions from:
    - Sarnia-Lambton Economic Partnership (SLEP) - \$14,550.00,
    - NRC-IRAP - of \$25,000.00
  
2. 2016 Engineering Study (M.I.G. Engineering) \$82,742.00 + HST = \$93,498.00 and 2016 Business Case Analysis (CPCS-Canadian Pacific Consulting Services) \$119,201.00 + HST = \$134,291.40.
  - This engineering study provided a detailed Level C estimate for the construction of the OLC, incorporating allowances for contingencies and inflation.
  - This business case analysis provided justification together with estimates of potential job creation and economic benefits.
  - Taken together, these two studies had a combined cost of \$227,789.40.
  - These studies were funded with contributions from:
    - Sarnia Lambton Industrial Alliance (SLIA) and private industry, \$58,750.00
    - City of Sarnia, \$52,500.00
    - SLEP and the County of Lambton, combined contribution of \$68,859.00
    - Province of Ontario (MRA-RED), \$47,680.40.

### **Total Federal Funding Requested**

A total of \$6,000,000.00 in Federal National Trade Corridor Funding is requested to support the development of the Sarnia-Lambton Oversized Load Corridor.

### **All Sources of Funding**

The Sarnia-Lambton Oversized Load corridor estimated funding amount of \$12,000,000.00 will be funded as follows:

<b>Funding Source</b>	<b>Funding Amount</b>
Transport Canada NTCF	\$ 6,000,000.00
City of Sarnia:	\$ 4,715,000.00
County of Lambton	\$ 1,200,000.00
St. Clair Township	\$ 75,000.00
S.L.I.A.	\$ 10,000.00
<b>Total Required Funding</b>	<b>\$12,000,000.00</b>

### **Project Objectives and Alignment with NTCF Program Objectives**

The Sarnia-Lambton OLC aligns with the objectives of the National Trade Corridor Fund by virtue of supporting and increasing local economic activity and facilitating more efficient and cost effective physical movement of super, oversized manufactured and fabricated goods to



access and serve local, national and world markets. The Sarnia-Lambton OLC will facilitate the transportation of super, oversized loads that cannot be accommodated today, thereby creating opportunities currently unavailable for local fabricators or manufacturers.

Existing transportation assets will be strengthened with improved interconnectivity of Provincial, City, County and Township road networks and the Port of Sarnia, which connects exporters to the St. Lawrence Seaway international shipping route.

This corridor at the beginning of the 400 series highways will support a significant flow of trade nationally and internationally in the form of super, oversized manufactured goods, that are critical to strategic sectors of the national economy, including the mining sector and the emerging bio-based and traditional petroleum based refining and processing sectors.

The OLC will improve reliability and efficiency of transporting super, oversized loads without creating excess or underutilized capacity. It will alleviate cost and time pressures and liabilities on exporting industry and help achieve greater utilization of intermodal containers for commodity exports.

### **Performance Indicators –NTCF Program Objectives**

The OLC will improve and advantage the existing supply chain performance for the emerging bio-based industry, mining as well as traditional carbon-based sectors. The International Bluewater Bridge is Canada's second busiest commercial crossing located at the start of Canada's 400 series highways in Sarnia-Lambton. The integration of the OLC will significantly improve the fluidity of the transportation of super, oversized loads and traditional shipping containers and their products across North America.

This innovative approach for the creation of the RoRo docking facility will address the program's objective in new technologies at the Port of Sarnia. It will be the first of its kind in Canada, providing innovation, speed, safety, and reliability for the movement of super, oversized loads between transport trucking and marine shipping supplying global clients.

Further, the establishment of a one-call permitting system will eliminate red tape and time-consuming delays that exist within the current arrangement that necessarily requires permits from multiple approving authorities. By eliminating obstructions, the OLC eliminates the need to seek approval from multiple local authorities.

The future construction of projects within the territorial North will require that part of Canada to import oversized modular designed components, plants, buildings and other facilities. Sarnia-Lambton's extensive manufacturing industry is well suited to assist the territorial North and the upgrade to the Port of Sarnia will address the unique and urgent need in Canada's territorial North by reducing transportation costs and increasing the frequency of supply shipments to destinations only accessible by water, improving the social and economic development of these communities inaccessible by conventional freight methods.

Development of the OLC and improvements to the Port of Sarnia will reduce costs and logistically expedite shipments by water to the Ring of Fire by traditional transportation of super, oversized loads. This critical development will also enhance the ability to provide services to many First Nation communities.

The OLC project has the unique advantage of confirmed partnerships from local industry, the Sarnia Lambton Industrial Alliance (SLIA), Sarnia-Lambton Economic Partnership (SLEP), County of Lambton, Township of St. Clair, the City of Sarnia and others as proven by the letters of support, investment and continued commitment to the project.

## **Performance Indicators: Achieving Project Objectives**

A strategy to measure project performance will demonstrate that both project and program objectives have been achieved and will include (i) a record of new employment created by companies that comprise the fabricating sector, (ii) a record of the frequency of oversized loads shipped via the improved facilities at the Port of Sarnia, (iii) a record of reduced time required to plan and acquire permitting for the movement of an oversized load via the corridor, (iv) a record of the value of manufactured product shipped via the corridor, and (v) a record of reduced costs for the transport of oversized goods from point of origin to the Port of Sarnia for trans-shipment to national and world markets.

By starting the project at the Port of Sarnia and working east and south in small calculated manageable areas to be upgraded we will be able to easily control and monitor the project progress.

## **Applicant Information**

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### **Applicant Organization:**

#### **Legal Name and Status of the Applicant Organization**

The Corporation of the City of Sarnia

The City of Sarnia is a municipal corporation located in the Province of Ontario.

#### **Primary Contact**

Margaret Misk-Evans, Chief Administrative Officer

255 North Christina Street, P.O. Box 3018, Sarnia, ON N7T 7N2

Ph. 519-332-0330

[marg.evans@sarnia.ca](mailto:marg.evans@sarnia.ca)

#### **Secondary Contact**

Peter B. Hungerford, MCIP, RPP Consultant/Former City of Sarnia Director of Economic Development and Corporate Planning

255 North Christina Street, P.O. Box 3018, Sarnia ON N7T 7N2

Ph. 519-331-2098

[peter.hungerford@sarnia.ca](mailto:peter.hungerford@sarnia.ca)

#### **Mandate/Role**

The mandate and role of The Corporation of the City of Sarnia is to manage and deliver a full range of local services in a sustainable manner for the benefit of the residents and ratepayers residing and carrying on business within the corporate limits of the municipality. This broad mandate includes the management of growth and development and undertaking economic development initiatives and activities that contribute to the overall economic, social and environmental health and well-being of the municipality.

The City of Sarnia is best suited to undertake the development of the proposed OLC as it is the owner and operator of the Port of Sarnia (recently divested by Transport Canada in 2014) being the terminus of the OLC, and is the authorized road authority within the County of Lambton having jurisdiction over the road rights of ways located within the municipality's corporate limits that comprise a large portion of the route of the OLC. The City of Sarnia is also acting on behalf of The Corporation of the Township of St. Clair and The Corporation of the County of Lambton who collectively have jurisdiction over the road rights of way located outside of Sarnia's corporate limits that comprise the remainder of the OLC. The City of

Sarnia was assigned as the corporate project lead for the OLC project based on having the majority share of infrastructure along the designated corridor route.

## **Authorizations**

### *The Corporation of the City of Sarnia*

The following City of Sarnia Council resolution was considered and approved on November 6, 2017:

1. *That Sarnia City Council authorize and approve the City of Sarnia submission dated November 6, 2017 for National Trade Corridor Funding (NTCF) to construct the proposed Oversized Load Corridor, and*
2. *Approve funding for the Oversized Load Corridor in the amount of \$4,715,000 over the duration of the project conditional upon approval of NTCF funding in the amount of \$6,000,000 and partner funding by the County of Lambton and St. Clair Township in the combined amount of \$1,275,000 and the Sarnia Lambton Industrial Alliance in the amount of \$10,000 for a total project cost of \$12,000,000.*

### *The Corporation of the County of Lambton*

The following County of Lambton Council resolution was considered and approved on November 1, 2017:

- a) *That Lambton County Council commit to funding \$1.2 million over the next four years toward the design and construction of the Oversized Load Corridor project, subject to obtaining 50 percent funding support through the National Trade Corridors Fund.*
- b) *That the \$1.2 million in funding for the Oversized Load Corridor project be provided from the Opportunities and Contingency Reserve.*

### *The Corporation of the Township of St. Clair*

The following St. Clair Township Council resolution was considered and approved on November 6, 2017:

*Motion #3 That Township of St. Clair Council authorizes and approves the City of Sarnia submission dated November 6, 2017 for National Trade Corridor funding (NTCF) to construct the proposed Oversize Load Corridor; and*

*That Township of St. Clair Council approves funding for the Oversize Load Corridor up to the amount of \$75,000 over the duration of the project conditional upon approval of NTCF funding in the amount of \$6,000,000 and partner funding by the County of Lambton, the City of Sarnia and the Sarnia Lambton Industrial Alliance for a total project cost of \$12,000,000.*

## **Project Team**

### **Project Manager, Team and Contact information**

#### *Project Manager:*

Peter B. Hungerford, MCIP, RPP  
Project Consultant / Former Sarnia Director of Economic Development  
and Corporate Planning, Corporation of the City of Sarnia  
255 North Christina Street, P.O. Box 3018, Sarnia ON N7T 7N2  
Ph. 519-331-2098  
[peter.hungerford@sarnia.ca](mailto:peter.hungerford@sarnia.ca)

Peter Hungerford will act as overall project coordinator. Components of the OLC project will be managed by personnel holding Engineering credentials as required.

### **Project Team and Contact Information**

#### *Margaret Misek-Evans*

Chief Administrative Officer, Corporation of the City of Sarnia  
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#### *Jason Cole, P.Eng*

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#### *Rick Perdeaux*

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### **Evidence of Qualifications**

The project team is comprised of senior management members of the respective major stakeholders and infrastructure ownership impacted by the Oversized Load Corridor Project.

Collectively, the project team members have several decades of experience in delivering local, regional and utility services at the municipal level as part of capital and economic development programs. They are each supported by a full contingent of technical, professional, and support staff to resource the project through the demonstrated support of their respective political and corporate leadership.

Peter Hungerford is a Registered Professional Planner with over 40 years' experience managing both planning and economic development projects for the City of Sarnia. Projects of a scale and complexity similar to the proposed oversized load corridor have included (i) the acquisition, servicing and development of three business and industrial parks (including a full range of municipal services in each) located in the municipality, (ii) the divestiture of Port of Sarnia (2014) and establishing and managing harbour business operations, (iii) property acquisition and construction of a complex urban storm drainage system and storm water management facility together with associated parklands and trails, and (iv) the conduct of numerous real estate transactions on behalf of the City of Sarnia.

Margaret Misek-Evans is the Chief Administrative Officer for the City of Sarnia and in that capacity oversees the operations of the City administration and supports and implements the direction of Council. She has functioned in this capacity for the past four years. Prior to that, Margaret was a Registered Professional Planner with over 25 years' experience in land use planning and development as well as resource development, housing administration, by-law enforcement, building permitting and project management. Margaret holds Bachelor of Arts and Master of Arts degrees and is a member of the Canadian Institute of Planners, the Ontario Professional Planners Institute and the Ontario Municipal Administrators Association. She has professional experience in municipal jurisdictions in Ontario and British Columbia.

Mike Berkvens is the Director of Engineering for the City of Sarnia, reporting directly to the Chief Administrative Officer. He has over 33 years of municipal experience with various municipalities. His experience with municipalities includes the duties of the Roads Superintendent and Manager of Development/Transportation before assuming his current role at the City. Mike is a graduate of Civil Engineering Technology at St. Clair College and is a member of OACETT. He also has extensive experience working with local developers, neighbouring municipalities, utility companies, contractors, railway authorities, and provincial ministries that will be required to deliver this infrastructure project.

Lisa Armstrong is the Director of Finance and Treasurer for the City of Sarnia. She is a Certified Professional Accountant, holds a Masters of Business Administration and a Bachelor of Mathematics. She is responsible for various corporate services of the City including Accounting, Budgeting, Customer Service, Information Technology, Taxation and Purchasing. Prior to her role at the City, she has worked in the energy, automotive and banking sectors.

Jason Cole is the General Manager, Infrastructure & Development Services Division for the County of Lambton, reporting directly to the Chief Administrative Officer. He is registered as a professional engineer in the Province of Ontario and has over 15 years of experience delivering capital projects in a public sector environment. He is currently responsible for the 650 km of urban and rural roadways and nearly 190 structural bridges and culverts that make up the county road network. He also has extensive experience working collaboratively with the local municipalities, utilities, railway authorities, and provincial ministries that will be required to deliver this infrastructure project.

Alex Palimaka: is the Senior Vice President and General Counsel for the Bluewater Power Group of Companies, which include Bluewater Power Distribution Corporation, Bluewater Power Services Corporation, Bluewater Power Renewable Energy Inc., Electek Power Services Inc., Unconquered Sun Solar Technologies Inc., and Bluewater Regional Networks Inc. Alex has a Bachelor's degree from the University of Toronto and is a graduate of the Joint Law and Masters in Environmental Studies Program offered by Osgoode Hall Law School and York University.

In addition to his responsibilities as legal counsel, Alex leads those departments responsible for Regulatory, Customer Service, Conservation and Demand Side Management and Materials Management. Prior to moving back to Sarnia, Alex practiced municipal law in Toronto and then joined the City of Sarnia where he served as the City Solicitor for five years.

Domenic Pinelli is the Manager of Design Services for the Bluewater Power Group of Companies, which include Bluewater Power Distribution Corporation, Bluewater Power Services Corporation, Bluewater Power Renewable Energy Inc., Electek Power Services Inc., Unconquered Sun Solar Technologies Inc., and Bluewater Regional Networks Inc. Domenic has worked at Bluewater Power (formerly Sarnia Hydro) since 1992. Domenic is a graduate of Lambton College with a Diploma in Electronics Engineering Technology. His responsibilities with Bluewater Power principally include management of the Design Services department where the design team consists of Design Technologists, Drafting and GIS professionals. Domenic oversees the day to day functions of the department which includes, engineering and design of the electrical distribution system, overall system planning, residential/commercial electrical servicing, asset management of distribution assets and GIS functions.

Rick Perdeaux graduated from George Brown College in Toronto. He is the owner /operator of Toolrite Engineering(EST.1964) KGS Machine and Jacques Babbiting. These are all custom CNC and conventional machine shops located in Sarnia Lambton proudly serving clients including Siemens, Polinter, RIL, Cabot , Praxair, Nova Chemicals, Shell, Lyondell, Suncor in Canada, and clients in the USA, India, Nigeria, Venezuela and Korea. As the chairman of the SLIA group, he has helped it grow into a respected sustainable portal for its 35 plus members to gain direct access to and from numerous manufactures / produces within the Engineering, Fabricating, Machining, Water and Waste Water, Environmental domains within Sarnia Lambton. His role here will be to ensure the line of communication between industry and the project and its organizers is clearly understood and respected.

### **Project's Governance Structure**

The City of Sarnia will provide overall guidance, management services and cost control for the constructed improvements of the components of the OLC. Established municipal purchasing policies, tender protocols and industry standard construction contracts will be employed to ensure transparency as costs are incurred and the project proceeds through 4 years of phased construction.

The Project Manager and Project Team will meet regularly to oversee design, tendering and construction activities and ensure the project remains within established timeline and budget parameters. Protocols will be established to ensure each partner organization is advised of anticipated timeline or cost changes (additions or savings) associated with their respective portions of the project.

## **Partner Organizations' Legal Names**

### *The Corporation of the County of Lambton*

789 Broadway Street, P.O. Box 3000, Wyoming, ON N0N 1T0  
Contact: Jason Cole – General Manager – Ph. (519) 845-5413

### *The Corporation of the Township of St. Clair*

1155 Emily Street, Mooretown, ON, N0N 1M0  
Contact: John Rodey – Chief Administrative Officer – Ph. (519) 867-2021

### *Sarnia Lambton Industrial Alliance Association,*

1086 Modeland Road, Building 1050, Suite 100, Sarnia, ON N7S 6L2  
Contact: Rick Perdeaux – Chairman – Ph. (519) 337-6993

### *Bluewater Power Distribution Corporation*

855 Confederation Street, P.O. Box 2140, Sarnia, ON N7T 7L6  
Contact: Alex Palimaka, Senior Vice President – Ph.: (519) 337- 8201

## **Project Description**

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### **Project Background**

#### **Existing Conditions; Constraints or Weaknesses**

Sarnia-Lambton is the birth place of commercial oil discovery and production in North America. Industrial areas located in the City of Sarnia and the Township of St. Clair have historically provided locations where large fabricating and manufacturing firms have established clusters of businesses to serve the petrochemical and refining sectors with a supply of large fabricated vessels, reactors, cracking towers and pipe rack systems that are the fundamental building block of these industries. This local industry is internationally recognized for its skilled labour and expertise in producing high quality products, and is adapting to manufactured products for other industrial sectors like bio-industry and mining. In addition, the cost of fabricating these large units is very competitive allowing this area to compete for contracts both nationally and internationally.

The absence of a designated oversized load route connecting the Port of Sarnia with the many advanced manufacturers of competitive products, as well as the large existing local industry that itself is reliant on special imports, severely restricts the competitiveness of the Sarnia-Lambton industry to reach its full potential. In the absence of the OLC, we will have closed the door to super, oversized loads and allow to continue the duplication of effort to remove and replace the same obstacles regularly to transport oversized loads at a severe cost burden to the manufacturers which makes them less competitive for reasons beyond their control.

The strategic importance of this cluster of specialized industry is reflected in the degree to which the economic health and growth of the Bio- Hybrid, Bio-Chemical and traditional Carbon-based industries depend upon the existing proven supply chain that is already in place. As the size of the local and national petrochemical and refining sector has diminished over time, there is now a substantial under-utilized labour force and excess production capacity. The OLC represents the opportunity to leverage growth in this sector through the elimination of constraints to local and export markets. An OLC would eliminate such

constraints by significantly reducing transportation costs, removing logistical hurdles and improving local competitiveness.

As the nature of these industries evolve, the local cluster of fabricating and manufacturing companies are currently targeting local and export markets for this specialized super, oversized equipment to supply the emerging bio-based fuel and bio-based chemical industries. The OLC will be of strategic importance to supporting the expansion of firms such as BioAmber, Comet Biorefining and other bio-based industries that have begun to form a cluster of excellence in the Sarnia area.

Just as this region exported its expertise in the late 19<sup>th</sup> century on the extraction of oil, Sarnia-Lambton is now exporting its expertise in manufacturing through traditional exports to carbon based producers located in Northern, Western, and Eastern Canada, throughout the entire USA, the Middle East, and other emerging world markets.

In order to improve the competitiveness of this cluster of companies, the OLC project is needed to remove the bottlenecks created by corridor obstructions thereby allowing the time and costs of shipments to be significantly reduced. The elimination of these obstructions will also reduce the extent to which traffic is disrupted and delayed whilst super, oversized objects move through the urban area. An obstruction free route will require fewer utility, emergency and other support vehicles to accompany a super, oversized load reducing emissions from these and other idling vehicles, and as a result overall public safety will be improved.

### **Condition Assessment of Existing Infrastructure**

Existing city, county and township roads and rights-of-way that comprise the proposed OLC are presently adequate to serve the normal types of traffic using these roads, but these roads are inadequate to accommodate the transportation of super, oversized loads for movement along the corridor.

Existing overhead obstructions including power lines, street lights, signal lights and other utility lines require relocation by being permanently raised or buried. There are 11 intersections along the length of the corridor where a 90-degree turn is required and at these locations modifications are needed to relocate or remove obstructions such as signage, lighting, curbing, overhead utilities and power lines.

The Port of Sarnia is a City-owned deep water port that was divested by Transport Canada to the City of Sarnia in March of 2014. The Port of Sarnia is located at the center of the Great Lakes system and the St. Lawrence Seaway system where access to both inland Canadian and U.S. ports is maintained for at least nine (9) months of the year whilst the locks on the Great Lakes system are operational. Additionally vessels from Sarnia can access both Canadian and U.S. ports on lakes Erie, Huron and Michigan located above the Welland Canal during winter months depending upon ice conditions. At the Port of Chicago this would include access to navigation on the Mississippi river system.

Following the divestiture of the harbour in 2014, the City of Sarnia has updated and replaced the entire shore side electrical supply system at a cost of \$1,750,000 to ensure a reliable power supply to the many Great Lakes vessels, international vessels, and Canadian Coast Guard vessels that regularly make use of harbour facilities. Most recently (2017), the City of Sarnia completed a harbour dredging project at a cost of over \$3,000,000 that removed sediment from the harbour achieving a navigable depth of over 8.2 meters below datum. This is sufficient depth to accommodate any domestic or international vessel



traversing the Great Lakes and St. Lawrence Seaway system. These projects to improve shore side electrical and navigational depths will support the Port of Sarnia in its role as the terminus for the OLC.

The wharves and docks of the Port of Sarnia are well suited for ship berthing and ship repair activities that regularly use these facilities. However, they are deficient to effectively accommodate the super, oversized loads that are currently transported from their point of origin to the harbour. The construction of the OLC would rectify this deficiency by adding specialized dock, Roll on Roll off (RoRo) wharf improvements and an expanded load staging area to facilitate the intermodal transfer of these loads from transport truck onto vessel or barge.

### **Work Already Completed**

#### *2012 Shipping Study (M.I.G. Engineering)*

\$35,000.00 +HST = \$39,550.00

This study evaluated multiple locations and identified the optimal location for the trans-shipment of locally fabricated and manufactured oversized loads. The study identified Port of Sarnia as the optimal location for the terminus of the OLC.

This Study was funded with contributions from:

- Sarnia-Lambton Economic Partnership (SLEP) - \$14,550.00,
- NRC-IRAP - of \$25,000.00

#### *2016 Engineering Study (M.I.G. Engineering)*

\$82,742.00 + HST = \$93,498.00

This engineering study provided a detailed Level C estimate for the construction of the Oversized Load Corridor, incorporating allowances for contingencies and inflation.

#### *2016 Business Case Analysis (CPCS-Canadian Pacific Consulting Services)*

\$119,201.00 + HST = \$134,291.40

The business case analysis provided a business case justification together with estimates of potential job and wealth creation. It was determined that all levels of government will receive a net return on investment over a reasonable period.

The Engineering and Business Case studies were funded with contributions from:

- Sarnia Lambton Industrial Alliance (SLIA) and private industry, \$58,750.00
- City of Sarnia, \$52,500.00
- SLEP and the County of Lambton, combined contribution of \$68,859.00
- Province of Ontario (MRA-RED), \$47,680.40
- Supported in part by in-kind contributions by Bluewater Power Distribution Corporation

Taken together, these two studies had a combined cost of \$227,789.40.

### **Other Relevant Background Information**

In 2011 the Sarnia-Lambton Economic Partnership (SLEP) undertook a study with the Sarnia Lambton Industrial Alliance (SLIA) to examine the manufacturing sector and identify a strategy whereby the area's skilled trade work base could be retained and expanded. The initiative to create an oversized load corridor was a direct result of this earlier initiative. In addition to fund raising, volunteers have lobbied all levels of government to seek and gain their support for this project which has been recognized as beneficial to build the local, provincial and national economy.

## **Project Rationale**

### **Implications Arising from Non-Implementation**

- To date, the 2017 unemployment rate for Sarnia-Lambton has ranged between 7.3% and 8.1%. Should the project not be implemented, area advanced manufacturers employing thousands of skilled trades people will be primarily relying on servicing more localized petrochemical and biochemical industry. With ongoing rationalization of the petrochemical industry this may put thousands of skilled jobs at risk relative to the prospect of serving broader national and international markets. Restricted access to the global market will eliminate opportunities to diversify and export limiting growth and job creation.
- Periodic export of large loads will occur as is currently the case. These loads must be of a value and unique technology to justify the very high cost of making temporary corridor arrangements for transport. This includes disconnecting or temporarily raising utility lines, use of specialized transporting equipment and significant municipal and utility staff resources to navigate the existing route, adding time and cost to shipping.
- Without the OLC, there will be lost opportunities for local manufacturers to be competitive globally on lower-valued oversized loads or any type of super, oversized loads which simply cannot currently be accommodated on local transportation routes even on a temporary basis.
- Expansion and upgrading of large existing industry and new biochemical industry start-ups will be jeopardized due to the cost of importing large, specialized equipment. As this community works to retain its existing petrochemical industry and to build a globally recognized bio-chemical industry, it is critical those industries be given every opportunity to access competitively priced specialized oversized loads they require from national and global suppliers.
- The projected total FTE of 2600, GDP of \$263 million and tax revenue of \$21 million will not be realized.
- Attraction of new industry in the bio-chemical and bio-fuel sectors who rely on oversized modular construction which increases the time from concept to start up will be negatively impacted due to the cost of importing large equipment or transporting it from local fabricators.
- Accidents such as the one of November 23, 2015 which closed Hwy 402 and resulted in a \$3 million-dollar bridge replacement by the Province of Ontario and months of traffic diversion on a 400 series highway will continue to be a risk. (<http://london.ctvnews.ca/indian-road-overpass-hit-by-transport-truck-1.2670847>)
- Disruption to general public and businesses along the route will continue to be a costly concern with negative implications for public safety.

### **Project Aligned with Need and NTCF Program Objectives**

- By minimizing the cost of local shipping for incoming and outgoing large equipment, advanced manufacturing jobs that had been developed in Sarnia-Lambton over the past several decades will be retained. Opening up new opportunities for super, oversized loads may stimulate local manufacturers and provide for an expanded workforce that would get skilled workers back to work and reduce the local unemployment rate.
- The project will support the fluidity of Canadian trade by alleviating the constraint of high priced shipping for super, oversized loads. The project greatly improves the interconnectivity of modes of transport, particularly truck to ship and ship to truck, to and from the deep water Port of Sarnia. Due to the physical size of the equipment,

shipment by rail is extremely limited and air is not a shipping option. To access world markets, a clear pathway to the Port of Sarnia is imperative for both fabricators as exporters and manufacturing industry as importers.

- Innovations in the area of bio-chemicals, fuels and materials are helping this sector replace traditional carbon based raw materials at a rapid pace. The large specialized equipment required to turn bio materials into the various components of consumer products are similar in nature and complexity compared to the traditional carbon based equipment. By making the proposed changes to the local transportation system, area Small & Medium Enterprises (SMEs) will be able to fulfill the requirements of this growth industry in Canada and internationally.
- Traditional chemical and fuel plants are rapidly introducing new technologies to achieve reductions in their GHG and decrease their environmental footprint. The fabrication of the new advanced equipment to achieve these goals, which local advanced manufacturers produce, can be more readily and cost effectively shipped to their ultimate destinations locally, nationally and internationally.
- In addition to large equipment to supply bio and traditional carbon based fuel and chemical businesses, there is also the need to fabricate large equipment for the mining operations in Northern communities. Area advanced manufacturers regularly build large equipment for the mining industry. By decreasing the cost of shipping, their ability to supply companies within the Northern territories of Canada with the equipment they need at competitive prices will be greatly increased. This will be a win for both Northern communities as well as Sarnia-Lambton companies.
- Multiple partners have been leveraged to bring forward this project. The County of Lambton and St. Clair Township each have assets within the proposed shipping route that require improvement. They have agreed to have the City of Sarnia take the lead in applying for funding under the NTCF and have each agreed to contribute their share for improvements to their assets. Ontario Ministry of Rural Affairs contributed to the necessary studies to verify the value of the project and identify the cost of completing the improvements. The Sarnia Lambton Industrial Alliance and their 35+ member companies have led the grass roots effort to make the vision a reality by contributing both cash and thousands of hours of volunteer time to champion and promote the concept.
- The project is an exact match to the objectives of the NTCF to improve the efficiency of the local trade corridor and better connect Canadian industry to world and domestic markets.
- The methodical approach of starting at the Port of Sarnia and working east and south on the OLC will make access to the port easier with each leg of the project being completed. This will enable the organizers / contractors to mobilize equipment and manpower within defined sections of the geography to complete the tasks in an orderly manner, maximizing productivity.
- Refer to Civil Key Plan.

### **Project Overlap and Relationship to Other Initiatives**

The project to create an oversized load corridor to serve the interests of Sarnia-Lambton industry and create local, Provincial and National benefits does not overlap with any other projects planned for the Sarnia-Lambton area, but rather supports and enhances the overriding economic development initiatives expressed in the operational plans for SLEP, the City of Sarnia and the County of Lambton. Proposed enhancements to the transportation corridor and related infrastructure will benefit local industry and represent improvements that are solely directed to support local economic development. It is unlikely that these

planned improvements set out in this application would have been undertaken by the respective municipalities except for the need to create an oversized load corridor.

The project is integral to the economic future of our community and is directly related to several local economic development initiatives. Firstly, the Sarnia-Lambton Economic Partnership (SLEP) Strategic Plan speaks to exporting the efforts of our skilled trades and the Sarnia Lambton Industrial Alliance (SLIA) has taken on that initiative. Secondly, SLEP and all of the communities in Lambton County have recognized our position as an agricultural community that is home to a world class petrochemical industry, thereby creating a unique opportunity to become a global bio-chemistry cluster. Both initiatives are well on their way to achieving success, but that success will be restricted in part by the lack of an efficient and adequate trade corridor linking our community with Canadian and global markets.

### **Summary of Forecasted Improvements for the Short and Long Term**

In the short term and long term, it is anticipated that time required to pre-plan the movement of oversized loads along the corridor will be greatly reduced. Presently each object that is moved along the corridor is subjected to a detailed analysis to identify every obstruction and identify an appropriate mitigation. Each utility, agency and police force must plan for the assignment of sufficient resources in the form of labour and equipment to effect required mitigation. The permitting required for each load movement is complex and requires an exceptional degree of coordination. The time required to plan and the cost required for each load movement would be reduced significantly with the implementation of the oversized load corridor.

The Business Case Analysis conducted by CPCS has calculated using Statistics Canada Interprovincial Input-Output Model simulation, and on the basis of an assumed 3 year construction period, that:

- Ontario/Canada GDP would increase by \$4,736K.
- Including Indirect Impact and Induced Impact, Total Economic Impact was calculated to be \$10,388K for Ontario and \$11,725K for Canada.
- Using the same model and assumption, a total of 112 FTE jobs would be created for Ontario and 123 FTE jobs for Canada.
- Increased tax revenue (not including income taxes) would accrue at a rate of approximately \$1M to Ontario and \$1.2M to Canada as a whole.

Over the long term and based on the same model, after construction, CPCS analysis concluded that:

- Annual Ontario GDP would increase by \$7.339M and annual Canada GDP would increase by \$8.383M.
- Annual total of 73 FTE Jobs would be created for Ontario and 83 FTE jobs for Canada.
- Increased tax revenue (not including income taxes) would accrue at an annual rate of approximately \$0.6M to Ontario and \$0.7M to Canada as a whole.

### **Alignment with NTFC program objectives**

- The existing advanced manufacturing cluster in the area has both the skills and technology to supply world class large industrial modular equipment and vessels to the mining, bio-chemical, bio-fuels, petro-chemical, and carbon-based sectors in Canada and around the world.

- SMEs have the capacity to significantly expand the amount of fabrication done locally for export. The bottleneck of restrictive roads to/from the Port of Sarnia will be relieved allowing them compete effectively in domestic and world markets by facilitating faster, cheaper, less complicated intermodal connections.
- Eliminating constraints will allow to the intermodal transportation system will allow talented, local fabrication firms to build the equipment demanded by industry using and implementing new technologies to maximize efficiencies and minimize environmental impact.
- By reducing the costs of shipping large industrial mining equipment to Northern communities including the “Ring of Fire”, Sarnia-Lambton could become a key partner with the North, thereby accelerating the process of their economic development.
- The City of Sarnia, County of Lambton, and St. Clair Township have all agreed to partner in this economic development project with the City of Sarnia taking the lead. The project has also been supported by the Province of Ontario through the Ministry of Rural Affairs. The Sarnia Lambton Industrial Alliance and their 35+ member companies (primarily SME’s) have invested both considerable volunteer time and financial contributions to show the need and potential for this project.

**Table 2: NTCF Program Objectives Assessment Criteria**

Selection Criteria	Assessment and Evaluation
<b>NTCF Objective:</b> Support the fluidity of Canadian trade by alleviating capacity constraints and bottlenecks, and strengthen modal interconnectivity and operability	
Improve the national transportation system’s efficiency and reliability for Canadian and North American exports	<ul style="list-style-type: none"> <li>• The project improves connections with high growth markets across Canada, specifically Northern Ontario and Northern/Eastern/Western Canada, USA, Middle East, Mexico, Central and South America.</li> <li>• The project is directly aimed at improving the intermodal connectivity between road and marine shipments</li> <li>• The advanced manufacturing industrial fabrication cluster has the capacity to build and ship more high value equipment</li> <li>• The Port of Sarnia has the capacity to handle more outgoing and incoming industrial equipment, traditional shipping containers and bulk agricultural products.</li> </ul>
Increase Canada’s share of North American bound container and/or bulk imports	<ul style="list-style-type: none"> <li>• The planned Harbour improvements, and increased lay down area, and Roll On Roll Off capabilities will easily facilitate the import and export of oversized loads internationally, also increasing the amount of standard shipping containers in/outbound will benefit.</li> <li>• The dock improvements will allow better utilization of the existing agricultural bulk loading terminals at the Port of Sarnia.</li> <li>• The Oversized Load Corridor will benefit large loads both incoming and outgoing. This ensures that new and existing large industry can be supplied with the equipment they desire to build, expand, and modernize their operations at the most economical cost. This in turn assures job retention and job creation.</li> </ul>

Selection Criteria	Assessment and Evaluation
<p>Support fluid and reliable trade flows between Canada and the U.S.</p>	<ul style="list-style-type: none"> <li>• The improved oversized load corridor to/from the Port of Sarnia will provide improved access to markets between the two countries as well as international markets around the world.</li> <li>• The International Bluewater Bridge is Canada’s second busiest commercial crossing located at the start of Canada’s 400 series highways in Ontario and Sarnia-Lambton. The integration of the OLC will significantly improve the fluidity of the transportation of super, oversized loads and traditional shipping containers and their products across North America, e.g. Sault Ste. Marie, Thunder Bay, Duluth, Chicago, Detroit, Cleveland, Toledo, etc. There are over 60 commercial ports on Great Lakes and over 173 M tons of cargo are carried by the Great Lakes fleets annually.</li> </ul>
<p><b>NTCF Objective:</b> Increase the resilience of the Canadian transportation system to a changing climate and its adaptability to new technologies and future innovation</p>	
<p>Enhance the safety of transportation systems/assets where the risks of disruption are highest (eg. Due to flooding, landslides or deteriorating technology and assets) and/or represent significant potential for lost national income</p>	<ul style="list-style-type: none"> <li>• Oversized loads require much preparation, permitting and planning to ensure public safety and prevent damage to public infrastructure</li> <li>• On Nov. 23, 2015 an oversized truck load taking equipment from Imperial Oil’s refinery accessed Hwy #402. The load was too high and struck an overpass at Indian Rd. Damage was estimated at \$3 million and the repair took months with periodic traffic impediments to eastbound lanes of a major provincial 400 series highway.</li> <li>• The collision and repairs, which took months to complete, necessitated the re-routing of trucks crossing into Canada at the Bluewater Bridge International border crossing. This is the second busiest commercial freight crossing between Canada and the USA.</li> <li>• The danger of these type of accidents represent significant public safety concerns and lost national income due to impeded domestic and international trade.</li> <li>• Having a designated Oversized Load Corridor will mitigate this risk</li> <li>• Single call permitting for super, oversized loads will eliminate red tape and costly delays.</li> </ul>
<p>Promote sustainable transportation by reducing environmental impacts including greenhouse gas (GHG) and air contaminant emissions and mitigating any adverse impacts on the environment</p>	<ul style="list-style-type: none"> <li>• Presently each oversized load requires a minimum of 10 escort vehicles to handle the temporary removal of each overhead obstacle and replacement of same.</li> <li>• Once completed, the need for escort vehicles will be reduced to 2-3 per load.</li> <li>• The duration of the travel time where vehicles are either moving or idling waiting for pathway clearance will be reduced by 80%. Therefore the GHG and air contaminant emissions will be reduced by 94% overall.</li> </ul>

Selection Criteria	Assessment and Evaluation
Strengthen the resiliency of Canada’s transportation networks to impacts related to climate change	<ul style="list-style-type: none"> <li>• By burying overhead obstructions (utility lines) the residences and businesses serviced by these lines will have their service better protected in the event of wind storms, tornados, falling tree branches etc.</li> <li>• Roll On Roll Off improvements to the port will also allow shipments to better adapt to changing water levels with increased safety, while protecting natural wildlife habitat and environmentally sensitive areas.</li> </ul>
Promote innovation and productivity improvements within the transportation system as a whole, or within or between specific transportation modes	<ul style="list-style-type: none"> <li>• The main intention of the Oversized Load Corridor is to provide productivity improvements to the shipping of large equipment through our community to/from the Port of Sarnia.</li> <li>• The planned harbour improvements and an expanded laydown area using the innovative Roll On Roll Off capabilities will enhance the transfer of super, oversized loads shipped by truck to ship/barge.</li> <li>• The dock improvements will facilitate increased productivity and safety in the transfer from agricultural equipment to bulk loading terminals at the Port of Sarnia.</li> <li>• Innovation and productivity improvements throughout the Sarnia-Lambton transportation system as a whole will be achieved with a dedicated Oversized Load Corridor by removing bottle necks, traffic delays and obstructions along the route. A significant increase in productivity will be found in connecting the Oversized Load Corridor to improved infrastructure at the Sarnia deep-water port, which is an immediate gateway to the Great Lakes and St. Lawrence Seaway Systems.</li> </ul>
Promote and enhance stakeholder understanding of how transportation related technologies can build system capacity and inform evidence based decision making	<ul style="list-style-type: none"> <li>• SLEP, SLIA, County of Lambton, City of Sarnia, St. Clair Township, have participated in the process of identifying, understanding, promoting and funding the oversized load corridor concept by hosting public forums, social and traditional media.</li> <li>• This includes industrial fabrication companies, transportation companies, numerous suppliers to the fabrication companies, large industry, 15,000 unionized and 6,500 non-unionized skilled trades people and laborers, Chamber of Commerce, Aamjiwnaang First Nation, all Municipal Councils involved, and the general public.</li> <li>• This process has led to a much greater understanding of how the various transportation systems and the improvement of same can build system capacity, and create and retain industry and skilled jobs.</li> </ul>
Increase mobility options available for the movement of goods and passengers at strategic gateways, along trade corridors, including urban areas or through border crossings	<ul style="list-style-type: none"> <li>• Sarnia is a gateway City to the USA. The Bluewater Bridge and rail tunnel under the St. Clair River provide direct access for commercial goods into and out of Canada. The Port of Sarnia provides a valuable connection to the movement of goods around the world as part of the St. Lawrence Seaway.</li> <li>• The improved port facility will allow for rail-to-ship/barge, transport-to-ship/barge and vice versa.</li> <li>• The OLC will increase public safety, minimize traffic disruptions and increase mobility of transporting super, oversized loads along the trade corridor in the urban and rural industrial areas of Sarnia and St. Clair Township.</li> </ul>

Selection Criteria	Assessment and Evaluation
<b>NTCF Objective:</b> Address the transportation needs of Northern communities, including safety and economic development	
Enhance northern transportation corridors that support enhancements to safety, security, economic and/or social development in Canada's three territories	<ul style="list-style-type: none"> <li>• The primary means of shipping oversized equipment to the three territories to serve the mining and oil industries being developed there is by ship.</li> <li>• Improving access to the Port of Sarnia will decrease the cost of supplying equipment to the territories via the St. Lawrence Seaway.</li> <li>• Proven methods of Roll On Roll Off loading /unloading will be able to adapt to Northern Ports. This will increase safety and lower the threat of negative environmental impacts in these areas.</li> <li>• Typically all of the super, oversized loads are 100% non-hazardous.</li> </ul>
Address the unique and urgent transportation needs in Canada's territorial North related to transportation safety and to support access to new economic opportunities	<ul style="list-style-type: none"> <li>• Equipment will be less costly to ship to the Territorial North due to the significant decrease in local shipping costs. This in turn will accelerate the economics of opportunities being pursued in the region.</li> <li>• The territorial North's future construction will consist of the importation of oversized modular designed components, plants, buildings and other facilities. The upgrade to the Port of Sarnia will address the unique and urgent need in Canada's territorial North by reducing transportation costs and increasing the frequency of supply shipments to destinations only accessible by water, and improving the social and economic development of these communities inaccessible by conventional freight methods.</li> <li>• Development of the OLC and improvements to the Port of Sarnia will reduce costs and logistically expedite shipments to Thunder Bay/James Bay by water and North or South to the "Ring of Fire" by traditional transportation of super, oversized loads. This critical development will enhance the ability to provide services to the many First Nation communities.</li> </ul>
<b>NTCF Objective:</b> Leverage investments from multiple partners	
Support critical trade enhancing projects that align with NTCF priorities and receive the financial backing of other public or private entities	<ul style="list-style-type: none"> <li>• The project to create an oversized load shipping corridor is an exact match to stated NTCF priorities and will operate as a trade enhancing project by connecting regional industry to national and international markets and supporting intermodal transportation.</li> <li>• Public and private partnerships and financing are in place for the balance of the OLC costs as well as for project delivery. Project partners include the County of Lambton, Township of St. Clair, City of Sarnia, Sarnia Lambton Industrial Alliance and Bluewater Power Distribution Corporation.</li> </ul>
Multiply investments in down-stream economic benefits	<ul style="list-style-type: none"> <li>• The economic benefits of the project have been independently verified in the supporting CPCS Consulting report, including short-term (3 year) benefits of: <ul style="list-style-type: none"> <li>- Ontario/Canada GDP would increase by \$4,736K.</li> <li>- Including Indirect Impact and Induced Impact, Total Economic Impact was calculated to be \$10,388K for Ontario and \$11,725K for Canada.</li> <li>- Using the same model and assumption and a total of 112 FTE Jobs would be created for Ontario and 123 FTE jobs for Canada.</li> </ul> </li> </ul>



Selection Criteria	Assessment and Evaluation
	<ul style="list-style-type: none"> <li>- Increased tax revenue (not including income taxes) would accrue at a rate of approximately \$1M to Ontario and \$1.2M to Canada as a whole.</li> </ul> <p>Over the long term and based on the same model, after construction, CPCS analysis concluded that:</p> <ul style="list-style-type: none"> <li>- Annual Ontario GDP would increase by \$7.339M and annual Canada GDP would increase by \$8.383M.</li> <li>- Annual total of 73 FTE Jobs would be created for Ontario and 83 FTE jobs for Canada.</li> <li>- Increased tax revenue (not including income taxes) would accrue at an annual rate of approximately \$0.6M to Ontario and \$0.7M to Canada as a whole.</li> </ul> <p>(Full report is attached)</p>
Foster local support for important transportation corridors/ infrastructure projects	<ul style="list-style-type: none"> <li>• Local support from 3 partnering municipalities, Economic Development agency (SLEP), industrial fabrication firms, Industrial association (SLIA), Chamber of Commerce and Labour and senior level government officials have all been confirmed</li> </ul>

## Project Scope

### Overall Work Plan

The project will be managed by the City of Sarnia which has many years of experience dealing with municipal infrastructure projects. The County of Lambton and St. Clair Township have agreed to support the City of Sarnia in taking the lead for management of the project. They will directly participate and co-operate to ensure all plans meet their respective standards, and to ensure the portions of the project within their jurisdictions will be performed in a timely and efficient manner. The project will be subject to a sequential public tendering process already in practice in the City of Sarnia to ensure best value and lowest possible project cost.

Bluewater Power will be responsible overall for utility line improvements and will as part of the Project Team assist in determining which components of the work can be completed by internal staff and which portions are required to be outsourced in accordance with its Purchasing Policy.

The design of required roadway improvements will be undertaken by professional civil engineers, and the design of improvements to overhead obstructions will be undertaken by electrical and other specialized professional engineers. Construction supervision of all components of construction will be provided by professional engineers and certified engineering technologists.

Port of Sarnia improvements will be designed by a professional marine engineer, tendered and planned to be completed in phases so as to minimize the impact on existing usage of the facilities.

The newly created OLC will have the capacity to accommodate larger loads up to 9.14 m high by 9.14 m wide by 45.72 m long (30 ft by 30 ft by 150 ft). Within this document, super, oversized loads are referring to these measures. The current standards of the Ontario Ministry of Transportation for conventional loads are a maximum of 4.15 m high by 2.6 m wide by 23 m long (13.5 ft by 8.5 ft by 75 ft).



### **Project Components and Phases**

There are three principle components for construction of the Oversized Load Corridor.

These are:

- i. Improvements to Roadways
- ii. Improvements to Overhead Obstructions
- iii. Improvements to Port Facilities.

The Oversized Load Corridor will be constructed over a period of four (4) years. Required improvements to roadways and overhead obstructions will be undertaken over a three (3) year period in years 1, 2 and 3. This will facilitate the coordination of necessary approvals and construction, and allow sufficient period for construction to avoid conflict between required construction activities. Improvements to harbour facilities will be phased over two (2) years in years 3 and 4 and allow sufficient time for design and permitting.

### **Partner Roles and Responsibilities**

The City of Sarnia will have overall responsibility for project management and delivery.

The County of Lambton will provide management assistance in the design, tendering and construction of improvements to County Roads.

St. Clair Township will provide management assistance in the design, tendering and construction of improvements to Township Roads.

The Bluewater Power Distribution Corporation will provide management assistance and oversee the improvements to electrical infrastructure, as well as telecommunications attached to its poles.

### **Project Maps; Plans; Diagrams**

[Reference: Detailed M.I.G. Engineering Study (2016)]

The 2016 Engineering Study completed by consulting professional engineers identified construction components of the Oversized Load Corridor and provided a detailed estimate for the construction of the corridor, and incorporated allowances for contingencies and inflation. Detailed surveys and assessments of existing infrastructure along the length of the corridor were prepared and these surveys were used to develop cost estimates to complete contemplated infrastructure improvements. These improvements and modifications to corridor infrastructure included an assessment of underground services and utilities, overhead obstructions (electrical and utility lines), street lights and intersection signalizations, road rights of way and road intersections, bridges and culverts, and harbour facilities. Cost estimates for changes to roadways and overhead obstructions were developed by the consulting engineers in partnership with the road authorities (City of Sarnia and County of Lambton Engineering departments) and Bluewater Power Distribution Corporation, being the local electric authority.

### **Work Schedule**

#### *Project Start Date; Completion; Timelines; Milestones*

The Project will commence immediately upon confirmation of NTCF approval and funding. The target date for the receipt of this approval is April 1, 2018. The project is conceived to undergo construction over a four year period to accommodate partner cash flows. Survey and design work will be undertaken in advance of each phase of the project, followed by tendering, award of contract, and construction. The project is forecast to reach completion on or before March 31, 2022.

Milestones established for the project will constitute the successful completion of each successive phase. Road work and the removal / relocation of overhead obstructions are planned to be undertaken in years 1, 2 and 3 of the project. This construction requires internal approval by the City of Sarnia and partners and will not constitute any impediment to the project. Improvements to harbour facilities at the Port of Sarnia are planned to be undertaken in years 3 and 4 of the project subsequent to the acquisition of required approvals and permits.

#### *Project Dependencies; Interdependencies; Hurdles*

Project dependencies and interdependencies relate to the appropriate coordination of construction activities along the length of the Oversized Load Corridor. The coordination of construction activities along the route of the oversized load corridor represents the most significant dependency that will require close management to minimize duplication of effort by each of the three road authorities and the relevant utilities involved in the project. These improvements require no formal approval by external agencies or authorities.

The construction of harbour improvements at the Port of Sarnia will proceed concurrently and independently of the improvements planned along the roadways that comprise the route of the corridor. This strategy will separate that portion of the project for which

multiple approvals may be needed and ensure that phases of the project can proceed to construction without delay. Based on recent experience in managing the dredging of the harbour, time will be reserved to complete possible fish habitat studies and ultimately obtain the approval of the Department of Fisheries and Oceans with whom the City of Sarnia established credibility and forged a cooperative relationship.

### *Timelines for Permitting and Approvals*

Approvals for the design of roadway improvements and the relocation of overhead obstructions are anticipated to require a period of 2 to 3 months by each respective road authority and utility. Based on recent experience a period of up to 12 to 18 months may be needed to secure approvals for planned harbour improvements.

**Table 3: Project Schedule**

Project Activity / Milestone	Timelines	
	Start Date	Completion Date
<b>Project Design and Surveying:</b> Design and Surveying will take place over 4 years to coincide with each consecutive construction phase.	April 1, 2018 January 1, 2019 January 1, 2020 January 1, 2021	June 30, 2018 March 31, 2019 March 31, 2020 March 31, 2021
<b>Environmental Assessment:</b>	N/A	N/A
<b>Aboriginal Consultations:</b> Consultations will be undertaken with 5 First Nation groups, which is a replication of prior consultations undertaken for harbour divestiture and harbour dredging.	November 1, 2017	April 1, 2018
<b>Construction and other Permits:</b> Permits required for Harbour Work – Transport Canada, Provincial Ministry of Natural Resources and Forestry, St. Clair Region Conservation Authority and Department of Fisheries and Oceans.	April 1, 2018	December 31, 2019
<b>Tender Calls:</b> Sequential Tender Calls planned for Road Works, Electrical and Utility work, and Harbour Work.	June 30, 2018 April 1, 2019 April 1, 2020 April 1, 2021	September 1, 2018 June 30, 2019 June 30, 2020 June 30, 2021
<b>Starts of Construction:</b>	September 1, 2018 July 1, 2019 July 1, 2020 July 1, 2021	December 31, 2018 December 31, 2019 December 31, 2020 December 31, 2021
<b>Substantial Completion</b>		September 30, 2021
<b>Project Completion</b>		March 31, 2022

### *Project Delivery Method*

At the present time the project has been subject to a preliminary Level 'C' design conducted by M.I.G. Engineering (consulting professional engineers) in consultation and with active input from the City of Sarnia, the County of Lambton, the Township of St. Clair and Bluewater Power Distribution Corporation. Detailed design remains to be completed for tendering and phased construction to proceed.

The City of Sarnia will provide the overall management function to deliver the project over a four year period in collaboration with project partners. The project will be subject to a sequential public tendering process carried out over a period of four (4) years to phase construction works and to ensure all approvals are in place when required. The public tendering of sequential contracts will adhere to the City of Sarnia established purchasing

policies that will ensure work is carried out by qualified contractors whilst obtaining best value and lowest possible project cost.

The City of Sarnia has many years of experience managing the delivery of complex infrastructure projects including roads, underground services, bridges and public buildings. The County of Lambton and St. Clair Township will support the City of Sarnia in taking the lead for the overall management of the project by participating and co-operating to ensure all plans meet jurisdictional standards .

Bluewater Power will have overall responsibility for electrical and utility line improvements, and will as well be part of the Project Team. The utility will assist in determining which components of the work can be completed by internal staff and which portions need to be outsourced in accordance with its own purchasing policy. The design of improvements to overhead obstructions will be undertaken by electrical and other specialized professional engineers.

The design of required roadway improvements will be undertaken by professional civil engineers and technicians, and overseen by each respective road authority. Construction supervision of all components of construction will be provided by professional engineers and certified engineering technologists either employed by the City and partners or on a consulting basis.

Improvements to the harbour at the Port of Sarnia will be designed, tendered and supervised by a professional marine engineer, and planned to be completed in phases so as to minimize the impact on existing usage of the harbour and port facilities.

### *Performance Measurement Strategy*

A strategy to measure project performance will demonstrate that both project and program objectives have been achieved and will include (i) a record of new employment created by companies that comprise the fabricating sector, (ii) a record of the frequency of oversized loads shipped via the improved facilities at the Port of Sarnia, (iii) a record of reduced time required to plan and acquire permitting for the movement of an oversized load via the corridor, (iv) a record of the value of manufactured product shipped via the corridor, and (v) a record of reduced costs for the transport of oversized goods from point of origin to the Port of Sarnia for trans-shipment to national and world markets.

This data will be compared to corresponding data from previous years prior to the construction of the oversized load corridor and will provide an actual measurement of value and benefit that is a direct result of the oversized load corridor.

**Table 4: Performance Indicators Measurements**

Outcomes/ Outputs	Performance Indicator	Current Performance	Performance Target	Source of Data	Date Collection Frequency
<b>New Employment Created</b>	Jobs Created	Existing Jobs in Sector	50 – 70 jobs	Industry Aggregated	Annual
<b>Frequency of Load Shipments</b>	Number of Loads to/from Port	2*	5 – 10 loads	Industry Aggregated + Civic Records	Annual
<b>Record of</b>	Hours in Transit	Varies – Calculate current industry	Reduction by 10% - 25%	Industry Aggregated	Annual

Outcomes/ Outputs	Performance Indicator	Current Performance	Performance Target	Source of Data	Date Collection Frequency
<b>Time Saved</b>		average		+ Civic Records	
<b>Increased Value of Product</b>	Current Value	Varies – Calculate Current Industry Average	Increase by \$8 – 10 M	Industry Aggregated	Annual
<b>Record of Reduced Shipping Costs</b>	Dollars Saved	Varies – Calculate Current Industry Average	Reduction by 25% - 75%	Industry Aggregated	Annual

\* Current loads although oversized are not to same dimensions proposed for new OLC

## Funding Rationale

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### **Benefits of the Project**

The project to establish the Sarnia-Lambton Oversized Load Corridor is well aligned with the stated objectives of the National Trade Corridor Fund, in that the corridor will support and increase local economic activity and provide for the more efficient and cost effective movement of super, oversized fabricated product to access and support Canadian, North American and world markets. The corridor will enhance existing electrical and transportation infrastructure assets including City, County and Township arterial roads and the harbour dockage at the Port of Sarnia. The corridor will also enhance a nationally significant flow of trade in the form of super, oversized manufactured goods that are critical to strategic sectors of the national economy, including the mining sector and the emerging bio-based and traditional petroleum based refining and processing sectors.

### **Alignment with Local/Regional/National Transportation Priorities**

Table 2 - NTCF Program Objectives Assessment Criteria included in Section D.3 of this application provides a detailed description of the manner in which the Sarnia-Lambton Oversized Load Corridor aligns with the program objectives and priorities of the National Trade Corridor.

Recognizing that the existing advanced manufacturing cluster of petro-chemical, refining and emerging bio-based industries in the Sarnia-Lambton area have both the skills and technology to supply world class, large industrial modular equipment and vessels to the mining, oil, petro-chemical, bio-chemical and bio-fuels sectors in Canada and around the world, the transportation bottleneck between that cluster and the Port of Sarnia is preventing them from competing effectively in domestic and world markets. Making this necessary inter-modal connection and through the creation of this corridor, these constraints will be eliminated, and the corridor will maximize efficiencies.

### **Necessity for Federal and Other Funding**

The proposed Oversized Load Corridor is an economic development initiative that is not supported by any other government program offered by senior levels of government at this time. Without the significant support that is now available through the NTCF, the project would be beyond the financial capability of the local municipalities and industrial association who have partnered in making this application for funding.

### **Data / Sources to Support Investment Decision**

Support for the establishment of the proposed oversized load corridor has been determined on both technical feasibility and business grounds. Firstly, an engineering study was

completed by a local professional engineering consultant that concluded the corridor could be constructed at a cost of approximately \$12,000,000. Secondly, a Business Case Analysis was completed by (CPCS - Canadian Pacific Consulting Services) that provided a business case justification together with estimates of potential job creation and economic benefits.

## **Project Budget**

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### **Activity Expenditure Breakdown**

#### **Total Project Cost**

The Sarnia-Lambton Oversized Load Corridor has a projected cost in current dollars, allowing for escalation over the term of planned construction, of approximately \$12,000,000.00.

#### **Project/Activity Budget – Phased Cash Flow Forecast**

See Table 5 following.

#### **Statement As To Accuracy of Cost Estimates**

The cost estimate upon which this application is based incorporates a contingency allowance of 20% recommended by the engineering company that prepared the estimate, which is consistent with the Level 'C' estimate provided. Also included is an escalation allowance of 10% to account for annual construction cost increases that may occur over the planned period of construction.

#### **Statement of Responsibility for Cost Overruns**

The City of Sarnia and partners shall be responsible for cost overruns associated with this project.

**Table 5: Project Activity Expenditure Breakdown**

Project Activity	Project costs by fiscal year					
	Total up to 2017	2018-19	2019-20	2020 -21	2021 – 22	All future years
<b>A - Ineligible Expenditures by Project Activity and Fiscal Year</b>						
Ineligible Expenditure A1 M.I.G. Engineering Study No.1 (2012)	N/A	N\A	N\A	N\A	N/A	
Ineligible Expenditure A2 M.I.G. Engineering Study No. 2 (2016)	N/A	N\A	N\A	N\A	N/A	
Ineligible Expenditure A3 CPCS Business Case Analysis (2016)	N/A	N/A	N/A	N/A	N/A	
Total Ineligible Costs	N/A	N/A	N/A	N/A	N/A	
<b>B – Eligible Expenditures by Project Activity and Fiscal Year</b>						
B.1 - Utility; Traffic Light; Street Light Improvements		1,074,800	1,074,800	1,074,800		3,224,400
B.2 - Road Resurfacing and Culvert Upgrades; Widening Road Intersections		1,125,785	1,125,785	1,125,785		3,377,355
B.3 - Port Improvements				2,703,668	2,703,668	5,407,336
<b>B.1+B.2+B.3= Total Eligible Costs</b>		<b>2,200,585</b>	<b>2,200,585</b>	<b>4,904,253</b>	<b>2,703,668</b>	<b>12,009,091</b>
<b>Total Project Costs (ineligible + eligible)</b>		<b>2,200,585</b>	<b>2,200,585</b>	<b>4,904,253</b>	<b>2,702,668</b>	<b>12,009,091</b>



## Financial Plan

### **Disclosure of Funding Sources**

- Transport Canada funding will be sourced from the National Trade Corridors Fund.
- City of Sarnia Funding will be sourced from municipal reserves.
- County of Lambton funding will be sourced from reserves.
- St. Clair Township funding will be sourced from reserves.

Estimated cash flow is depicted in the following Table 6: Project Costs by funding Source (Municipal Reserves) and Fiscal Year.

### **Contributions: NTCF; Applicant; Partners; Other:**

The Requested NTCF contribution is:	\$6,000,000
The City of Sarnia contribution is:	\$4,715,000
The County of Lambton contribution is:	\$1,200,000
The St. Clair Township contribution is:	\$ 75,000
Sarnia Lambton Industrial Alliance	\$ 10,000

### **Evidence of Ability to Fund Expenditures and Operating Costs**

The ability of the applicant and partners to fund upfront expenditures is assured based on the ability of the applicant and each partner to access reserve accounts and operating lines of credit established by municipalities to carry on day to day business.

### **Assurance to Capacity to Maintain Corridor Infrastructure**

The oversized load corridor, once established, will be maintained by the municipal authorities having jurisdiction over each of the roadways and associated infrastructure along the length of the corridor. Future improvements to roadways, intersections, street lighting, signalizations and any other modifications or additions will be required to adhere to an established set of standards that essentially preserve the clearances established by corridor construction.

Presently, permits from each operating authority are required for each oversized move. Permitting will provide a source of revenue to offset costs associated with operating and maintaining the oversized load corridor.

### **Summary of Ability of Project to Generate Revenue; Fee Collection; Annual Revenue**

The use of the oversized load corridor will continue to be regulated by a requirement to obtain permits prior to any oversized movement of product. The creation of a one-call permitting system will simplify the permitting system required in respect of each oversized move and reduce the time required for pre-planning each such move. Permits will provide a source of revenue and ensure that the product to be transported along the length of the corridor conforms to established clearances. Additionally, fees in the form of wharfage will be collected when product is loaded or unloaded at the harbour. Typically the fees that are collected reflect established federal tariffs and are dependent upon the nature of the product, the volume of the product or total product weight, whichever is greater.

**Table 6: Project Costs by Funding Source and Fiscal Year**

Funding partners		Funding sources by fiscal year (April 1 <sup>st</sup> -March 31 <sup>st</sup> )				
Funding Source for the Ineligible Costs	Secured Funding	2018-19	2019-20	2020-21	2021-22	Total
Applicant:	N\A	N\A	N\A	N\A	N\A	N\A
Total Ineligible costs:	N\A	N\A	N\A	N\A	N\A	N\A
Funding Source for the Eligible Costs		2018-19	2019-20	2020-21	2021-22	Total
NTCF contribution	Yes	1,100,293	1,100,293	2,452,127	1,351,834	6,000,000
Applicant	Yes	906,543	906,543	2,003,377	903,084	4,724,092
County of Lambton	Yes	166,250	166,250	421,250	446,250	1,200,000
St. Clair Township	Yes	25,000	25,000	25,000	0	75,000
S.L.I.A.	Yes	2,500	2,500	2,500	2,500	10,000
<b>Total Eligible costs</b>		<b>2,200,585</b>	<b>2,200,585</b>	<b>4,904,253</b>	<b>2,703,668</b>	<b>12,009,091</b>
<b>Total Project Cost</b>		<b>2,200,585</b>	<b>2,200,585</b>	<b>4,904,253</b>	<b>2,703,668</b>	<b>12,009,091</b>

## Evidence of Support

### **Letters of Intent** (See Appendix "B").

Letters of Intent are provided from each partner organization indicating the type of financial or in-kind support being provided. Each Letter of Intent includes:

- Relevant Contact information.
- A Statement of Intent / Statement of Support for the proposed project.
- A description of the nature, extent, sources and valuations of any in-kind contributions.

Additional letters of support are also provided from:

- Marilyn Gladu, M.P. Sarnia-Lambton
- Bob Baily, M.P.P. Sarnia-Lambton
- Bioindustrial Innovation Canada
- Sarnia-Lambton Economic Partnership
- Sarnia Lambton Industrial Alliance
- Bluewater Power Group of Companies
- Sarnia-Lambton Chamber of Commerce
- Sarnia & District Labour Council
- Labourer's International Union of North America (LIUNA!)

## **Project Consistent with Planning and Growth Management Documents**

### *City of Sarnia Corporate Strategic Plan*

The City of Sarnia Corporate Strategic Plan (2017-2020) identifies Economic Innovation as a Strategic Priority, including infrastructure investments and improvements needed to

undergird economic development growth and collaboration with stakeholder networks to attract and retain new business and industry. A key Plan priority includes support for existing businesses and new business attraction and promotion and marketing.

### *County of Lambton Strategic Plan*

A key component of the vision expressed in The County of Lambton Strategic Plan is the need for the community to “achieve positive economic growth as a basis to achieve a successful future and to support the value of a caring community, and diversifying the economic base of Lambton, creating employment opportunities that attract new residents and support younger generations and achieving a balance between economic development in the areas of environmental quality...”. The Plan supports collaborative efforts with municipal and community partners and the use of local assets, skills and abilities to achieve positive economic growth capable of providing employment and economic activity necessary to sustain the community. The Plan strives to build a more balance and sustainable economic future for the County through long term economic sustainability strategies involving employment growth.

### *Sarnia-Lambton Economic Partnership Strategic Plan (2015-18)*

The SLEP Strategic Plan expresses a vision to grow Sarnia-Lambton “as Canada’s biohybrid chemistry and energy cluster by attracting an increasing number of international investors to develop opportunities in the region. The Plan recognizes that the cluster will build on the proven long term experience and expertise on local company’s strengths in engineering, fabrication and machining.

The OLC is the outcome of one of the Plan’s strategic initiatives to undertake comprehensive research, analysis and planning for the fabricating sector. The OLC will support municipal economic development initiatives that build community capacity, improve economic receptivity and readiness and attract new investment in jobs. The development of the corridor will leverage local expertise and resources, reduce duplication and enhance collaboration.

### *City of Sarnia Official Plan*

The City of Sarnia Official Plan is the document that guides the management of growth and development for the municipality.

Policies in the Sarnia Official Plan that support initiatives to support employment area (Ref. 4.7.1.8 Supportive Initiatives for Employment Areas) provide for Employment Areas to be enhanced to ensure they are attractive and function well through actions such as:

- a) permitting a broad array of economic activity, supporting a diversity of activity within existing buildings and facilitating firms with functional linkages to locate in proximity to one another;
- b) investing in key infrastructure, or facilitating investment through special tools, programs, or partnerships, in order to:
  - i. revitalize employment areas that may be experiencing decline because of vacancies and closures, absence of key infrastructure, poor accessibility, or poor environmental conditions;
  - ii. promote the distinctive character or specialized function of an employment area to attract firms within a particular targeted cluster of economic activity;
  - iii. facilitate the redevelopment of vacant lands;
  - iv. create comfortable streets, parks and open space for workers and landscaped streetscapes to attract new business ventures.

- c) supporting business associations that promote and provide a business voice for employment areas.

Policies in the Sarnia Official Plan (Ref.4.7.1.5 Transportation in Employment Areas) also support planned improvements to roadways necessary for the operation of the oversized load corridor. Specifically, the Official Plan provides for measures to be introduced and standards applied on roads within employment areas that give priority to the movement of trucks and transit vehicles.

Official Plan policies intended to ensure Infrastructure is supportive of Employment Areas (Ref. 4.7.1.6 Infrastructure in Employment Areas) provides for the City to ensure that the necessary infrastructure is provided to support the current and projected needs of *employment areas*.

The Official Plan also includes policies specifically directed to the Port, (Ref. 4.5.2.6 The Port of Sarnia) are recognize that the Port is designated for Heavy Industrial use and further provides that supporting road and rail systems will be protected, maintained and improved in support of marine activities over the long term.

#### *City of Sarnia Transportation Master Plan*

The City of Sarnia Transportation Master Plan provides a policy framework to guide improvements planned for the overall transportation system in the municipality. The improvements to the road network required for the oversized load corridor including Intersection and road upgrades required for the oversized load corridor would support a number of capital projects identified in the City's Transportation Master Plan to improve the operational efficiency of the transportation system.

#### *County of Lambton Official Plan*

The County of Lambton Official Plan also includes policy that is supportive of the oversized load corridor. At Section 7.1 'Road Network' of the Plan it is noted that a goal of the plan is to ensure the continued provision of a safe, efficient, and high-quality network of roads that primarily meet the needs of traffic with origins and destinations within the County.

## **Project Risks**

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### **Project Risks and Mitigation Measures:**

Risks that may impact the project to construct the oversized load corridor include the following:

- (i) Potential construction cost increases arising from more detailed engineering estimates or unforeseen conditions;
- (ii) Potential construction cost index increases arising over the planned construction period;
- (iii) Delays in obtaining required approvals for modifications to harbour facilities; and
- (iv) Weather related construction delays.

These risks have been mitigated as follows:

The potential for construction cost increases that may arise subsequent to the completion of more detailed engineering estimates is offset by the inclusion of a 20% allowance for construction contingences. Notwithstanding the characterization of existing cost estimates as being at a Level 'C' for accuracy, they were prepared with the benefit of detailed field

survey, collaboration with the electrical utility, and input from local municipal engineering departments.

The potential construction cost index increases that may arise over the planned four (4) year construction period is offset by firstly adjusting the estimated cost base from 2016 to 2018 by a factor of 2.5% compounded, and by the inclusion of a 10% escalation factor to allow for a construction index of 2.5% for each of the 4 years needed for the project.

Potential delays that may be encountered in obtaining required permits and approvals for modifications to harbour facilities is offset by scheduling these improvements for construction in years 3 and 4 of the construction period.

Delays that may be encountered as a consequence of weather related events will be mitigated by virtue of the plan to complete construction of the corridor over a four (4) year period.

## **Cost-Benefit Analysis**

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### **Methodology:**

The OLC was evaluated through a standard cost-benefit analysis framework considering the direct, societal, and economic impacts of the project. Gains and losses to the Users (oversized equipment manufacturers), community, and region were determined by utilizing market values based on two technical reports prepared as part of the project design; the Oversize Load Corridor Shipping Route Study (2016) prepared by MIG Consulting Engineers and the Business Case Analysis for Oversized Freight To/From Sarnia-Lambton (2016) prepared by CPCS. Assigning dollar values to social benefits and costs was considered using revealed preference and stated preference models, however, standard valuation applications were found to be insufficient for assessment and impacts were identified qualitatively and quantified through relation to the technical report findings.

The cost-benefit analysis for the OLC was compared to the current condition using net present value calculated over a 30 evaluation period with a 10% discount rate.

Note: See Annex E for CBA detail.

### **Major Project Benefits:**

The identified benefits from the OLC project can be related to:

- i. Direct User Benefits resulting from cost savings that will be recognized by removing physical and logistical obstacles which costs are attributed back to manufactures when transporting oversized equipment along the designated corridor route. These include reduced costs by eliminating or decreasing the need for the following activities required under the current system:
  - Oversized load route planning to verify impacts from existing utilities, bridges, culverts, roadways, and other roadside infrastructure.
  - Time and resources for logistical scheduling, route selection, and coordination.
  - Temporary utility relocation or disconnection by multiple crews consisting of specialized equipment and personnel to allow passage of oversized equipment.
  - Reinforcement of bridges and culvers, relocation of roadside appurtenances, or compensation for damaged municipal infrastructure.

User Benefits	\$95,000	Cost savings for oversized loads manufacturers and shippers using the designated route. Applied at 1% of estimated annual additional production and sales of oversized equipment (\$9,500,000) following completion of OLC construction.
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### Net Present Value; Internal Rate of Return; Net Cost-Benefit Ratio:

The Cost-Benefit Analysis for the OLC project indicates the following outcomes as compared to the current condition:

Net Present Value	\$44,152,398
Internal Rate of Return	43%
Cost-Benefit Ratio	5.97

The positive Net Present Value, Internal Rate of Return and Cost-Benefit Ratio all identify that the project is a desirable investment.

## Legal, Regulatory and Other Requirements

### Preliminary Environmental Review

**Table 7: Preliminary Environmental Review Table**

Identification of Environmental Assessment Requirements
1. Does the project (either in full or in part) include one or more physical activities that are designated by <i>Regulations Designating Physical Activities</i> ? <b>NO</b>
2. Does the project (either in full or in part) require a provincial environmental assessment? <b>NO</b>
3. Does the project (either in full or on part) require an environmental assessment under a northern regime? <b>NO</b>
4. Will the project (either in full or in part) be carried out on Federal Lands? <b>NO</b>

### Climate Change Adaptation and Resilience Assessment

The project has given consideration to the issue of climate change adaptation and resilience and to the issue of greenhouse gas emissions and related reductions that relate to the project to create and maintain an Oversized Load Corridor. These considerations are summarized in the following Tables 8 and 9.

**Table 8: Climate Change Adaptation and Resilience Assessment**

<p><b>Questions 1 and 2:</b> Have vulnerabilities associated with climate change and extreme weather events been considered in respect of the project to construct and operate an Oversized load corridor, <i>and</i> what sources of information were consulted?</p>
<p><b>Answer:</b> Vulnerabilities associated with climate change and extreme weather are considered to have the potential for minimal impact on the construction and operation of the Sarnia-Lambton Oversized Load Corridor. Construction of the project is planned to occur over a four year period and delays due to extreme weather events can easily be accommodated over this time frame. Construction is anticipated to take place during the typical annual Canadian construction season of April 1 – December 31 – a period during which project construction</p>

will easily avoid winter weather.

Operation of the Oversized Load Corridor is anticipated to be primarily confined to the period during which the St. Lawrence Seaway is open and operating – typically the period between April 1 and December 31 every year. It is standard practice to undertake detailed planning in advance of initiating the transport of any oversized load. Specialized transport equipment is usually required and must be arranged well in advance of any scheduled move. Planning the timing of any future moves through the corridor would take into consideration predicted weather for the duration of the movement of the load and opportunity will exist to plan the avoidance of any predicted severe weather event.

In assessing potential vulnerabilities regard was had to historic weather data for the regions of Sarnia-Lambton region and Southwestern Ontario. Historically the corridor has not been impacted by the results of severe weather events such as localized flooding or wind damage. The Climate Risks & Adaptation Practices for the Canadian Transportation Sector 2016 and sample assessments utilizing the Public Infrastructure Engineering Vulnerability Committee's Engineering Protocol were also consulted. These documents highlight the types of vulnerabilities that need to be considered for the work required to implement the Oversized Load Corridor.

The City of Sarnia considers vulnerabilities related to climate change as part of the detailed design of all projects. A high level review of potential impacts was completed as part of the Proposal. A more detailed investigation of the specific vulnerabilities utilizing the Public Infrastructure Engineering Vulnerability Committee's Engineering Protocol will be completed as part of the detailed design.

**Question 3 and 4:**

The extreme weather events that have impacted the general area have been limited to localized flooding due to the restricted capacity of the storm sewer system, and damage to trees and other infrastructure resulting from high winds. The vulnerabilities associated with these types of events are considered to be low. The corridor route has not experienced any flooding, however the potential for increased frequency of heavy precipitation pose a nominal potential threat to the storm water and drainage infrastructure related to the road upgrades required for the project.

The City has recently modified its IDF curves to account for the impact of climate change. These will be utilized as part of the detailed design of all storm water infrastructure related to the Oversized Load Corridor. The size of the culverts being replaced as part of the project will be reviewed using the modified IDF curves and some may require upsizing to meet the new requirements.

The detailed design of the harbour upgrades will analyze climate change impacts to water levels in greater detail and ensure accessibility is maintained with varying water levels and that erosion mitigation measures are incorporated. Fluctuations in lake water levels over the long term may impact the harbour, both during high water levels and low levels that can impact the ability of ships to dock. Impacts to the harbour are considered to be nominal having regard to the extra draft below datum that is maintained by regular periodic dredging.

## **Greenhouse Gas Emissions Analysis**

An analysis of predicted reductions in Greenhouse Gas emissions was completed by the City of Sarnia engineering department, having regard to the current state when oversized loads are moved through the municipality, and the projected changes in the emission of greenhouse gases after the corridor is completed and available for regular use. These are reflected in the following Table 9.

## **Table 9: Greenhouse Gas Emissions Analysis**

<b>Question 1: Does the project support a longer term reduction in GHG emissions from transportation sources compared to a scenario where the project is not carried out?</b>
<b>Answer: Yes</b>  The Oversized Load Corridor will improve the efficiency of existing oversized load transports along the proposed corridor. Fewer utility support vehicles will be required to proceed and then follow the progress of an oversized load to relocate and then restore obstructions. The corridor will also improve the speed of the transported load, and by improving the speed of the transports will significantly reduce the delay to general traffic. In addition, loads of a certain size must currently be split into smaller components to be shipped.  Implementing the operation and management of the Oversized Load Corridor will allow for transport of these larger components by ship. For example, shipping an oversized load from Sarnia to St. John's, Newfoundland would reduce greenhouse gas emissions from 60 metric tons of CO <sup>2</sup> to 10 metric tons. The corridor would also allow for manufacturers in Sarnia to compete against manufacturers from other countries, and the shorter route from Sarnia to other Canadian Locations would reduce emissions as well.
<b>Question 2: Does the project take action to reduce direct or indirect GHG emissions during construction and maintenance of the project?</b>
<b>Answer: Yes</b>  The City of Sarnia has established a Procurement of Goods and Services Policy that requires all projects to identify and purchase the most environmentally and socially responsible available products and services. For all construction activities, the traffic management plans will be strategically designed and contracts will include tight schedules with provision for liquidated damages, to ensure the projects are completed as quickly as possible in order to minimize traffic disruption. Wherever possible, excavated material will be reused on site to reduce the GHG emissions that would result from trucking such material away from the construction site, and trucking new material to the site. Once in operation, future shipments of loads along the corridor are planned to require scheduling during off peak hours traffic hours so as to minimize the impacts and delays to background traffic.
<b>Question 3: Does the project support the reduction of other environmental impacts, such as emissions of local air pollutants?</b>
<b>Answer: Yes</b>  The Oversized Load Corridor project supports the reduction of local air pollutants by reducing the support vehicles required when transporting oversized loads. Currently, at least three utility trucks are required per trip to raise overhead cables and shift traffic signals. Implementation of the oversized load corridor will reduce the requirement for support vehicles and accelerate the overall time required which reduces the disruption to existing traffic

## **Aboriginal Consultations**

The City of Sarnia will initiate a program of aboriginal consultation similar to the consultations that were undertaken at the time the Port of Sarnia was divested by Transport Canada to the City of Sarnia, and at the time when the City of Sarnia undertook a dredging program at Port of Sarnia. In both instances five aboriginal communities were contacted and information was provided in respect of the intended divestiture and dredging.



The five communities that have been contacted as part of this project are:

**Aamjiwnaang First Nation**

Chief Joanne Rogers  
June Simon, Band Manager  
978 Tashmoo Ave.  
Sarnia, ON N7T 7H5

**Chippewas of Kettle and Stony Point First Nation**

Chief Tom Bressette  
Lorraine George, First Nation Manager/CEO  
6247 Indian Lane, ON N0N 1J1

**Walpole Island First Nation**

Chief Dan Miskokomon  
Michael Dashner, Director of Operations  
117 Tahgahoning, R.R. 3  
Walpole Island, ON N8A 4K9

**Chippewas of the Thames First Nation**

Chief Myeengun Henry  
Clint Couchie, Policy Analyst  
324 Chippewa Rd  
Muncey, ON N0L 1Y0

**Caldwell First Nation**

Allen Deleary, Director of Operations  
14 Orange Street  
Leamington, ON. N8H 1P5

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## Declarations

### Conflict of Interest

The Applicant, the Corporation of the City of Sarnia, hereby declares as follows:

- a) No former public servant shall derive benefits from the Contribution Agreement.
- b) No former public office holder shall derive a direct benefit from the Contribution Agreement.
- c) No member of the House of Commons of Canada shall be admitted to any share or part of the Contribution Agreement or to any benefit to arise therefrom.

### Applicant Declaration

I / We, the undersigned, hereby certify that:

- a) All information provided to Transport Canada in support of this request for National Trade Corridor Funding (NTCF) is true and complete.
- b) If the funding requested in this application is approved, the funds will be spent solely for the project and activities described in this application.

- c) I \ We provide consent to Transport Canada to make necessary credit and other enquires in support of this application.

*Margaret Misiek-Evans*

**Margaret Misiek-Evans  
Chief Administrative Officer  
Corporation of the City of Sarnia  
November 6, 2017**

## Annex A

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### TC's EOI Acceptance Letter

#### EOI Submission

**\*Note: Includes Business Case Analysis for Oversized Freight To/From Sarnia-Lambton prepared by Canadian Pacific Consulting Services; and Oversized Load Corridor Shipping Route Study prepared by MIG Engineering (2011) Ltd.**

**From:** [National Trade Corridor Fund / Fonds national des corridors commerciaux \(TC\)](#)  
**To:** [National Trade Corridor Fund / Fonds national des corridors commerciaux \(TC\)](#)  
**Subject:** National Trade Corridors Fund - Results of the Expression of Interest Screening Process  
**Date:** Friday, October 06, 2017 4:29:17 PM

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*\*\*please reply to confirm receipt of this email\*\**

Good afternoon,

Transport Canada is pleased to inform you that your Expression of Interest (EOI) submitted for funding under the National Trade Corridors Fund has been accepted by Transport Canada.

As part of the second phase of the application process, you are now invited to submit a Comprehensive Project Proposal to Transport Canada.

**The Comprehensive Project Proposal must be received by Transport Canada no later than 11:59 p.m. eastern standard time (EST) on Monday, November 6, 2017.**

The *NTCF Comprehensive Project Proposal Applicant Guide* (the Guide) may be found at <https://www.tc.gc.ca/eng/programs/ntcf-applicant-guide-comprehensive-project-proposal.html>. The Guide provides a detailed description of the information required and the criteria that will be used to evaluate the application.

Your project is one of more than 200 that have met the screening criteria and been invited to submit a Comprehensive Project Proposal.

It is important to note that this invitation to submit a Comprehensive Project Proposal does not guarantee federal funding for the project. All applications will be assessed on the degree to which they meet the following principles of the National Trade Corridors Fund:

- Support the flow of goods and passengers by reducing bottlenecks, and address capacity issues
- Help the transportation system withstand the effects of climate change and make sure it is able to support new technologies and innovation
- Address the unique transportation needs in Canada's territorial North to improve safety and foster economic and social development
- Build on investments made by a variety of public and private sector partners

In addition, the evaluation will consider all the criteria outlined in the Guide (pages 8 to 12). Final project selection will be made following a merit-based analysis of each proposal invited to submit through the EOI phase. In addition, the funding (\$409 million) allotted to the first three years of the 11-year National Trade Corridors Fund program will further inform the project selection.

Proposals must also demonstrate and include evidence that the project is fully funded. Failure to demonstrate this will result in a proposal's elimination from funding consideration.

Lastly, it is important to remember that any costs incurred related to developing a business case or proposal for funding are ineligible for federal reimbursement regardless of any final funding decisions.

Should you have any further questions, please consult our webpage at <http://www.tc.gc.ca/eng/programs/national-trade-corridors-fund.html> or send an email to [tc.ntcf-fncc.tc@tc.gc.ca](mailto:tc.ntcf-fncc.tc@tc.gc.ca).

Thank you!

August 15, 2017

Transport Canada  
NTCF – EOI Submission  
Business Centre  
330 Sparks Street  
Place de Ville, Tower C  
Ottawa, Ontario K1A 0N5

**Re: National Trade Corridors Fund (NTCF) Expression of Interest (EOI) Submission – City of Sarnia – Oversized Load Corridor**

To whom it may concern:

Please find enclosed our Expression of Interest Submission for the National Trade Corridors Fund. The City of Sarnia has partnered with the County of Lambton and St. Clair Township, who are all impacted by this infrastructure improvement project. The establishment of an “oversized load corridor” is determined as a way to fulfill the mandate to ensure that infrastructure, including roads and ports, are suitable for existing and future industry to grow and prosper.

Our submission includes the following additional attachments:

- NTCF EOI Submission;
- Council resolutions from the City of Sarnia, County of Lambton and St. Clair Township supporting the project;
- Support letters from the Sarnia-Lambton Economic Partnership, Sarnia-Lambton Chamber of Commerce, Sarnia-Lambton Industrial Alliance, Sarnia District Labour Council and Bluewater Power;
- Project Briefing Document – Sarnia-Lambton Oversized Load Corridor

- Business Case Analysis for Oversized Freight To/From Sarnia-Lambton prepared by Canadian Pacific Consulting Services
- Oversized Load Corridor Shipping Route Study prepared by MIG Engineering (2011) Ltd.

We thank you for your consideration of our submission and look forward to hearing from you.

Sincerely,



Margaret Misek-Evans  
Chief Administrative Officer

Attachments: Council resolutions, Letters of Support, Project Briefing Document, Business Case Analysis, Shipping Route Study

Copy: County of Lambton  
St. Clair Township  
Sarnia Lambton Economic Partnership  
Sarnia Lambton Chamber of Commerce  
Sarnia Lambton Industrial Alliance  
Sarnia District Labour Council  
Bluewater Power  
Marilyn Gladu, MP  
Bob Bailey, MPP  
Members of Sarnia City Council

## NATIONAL TRADE CORRIDORS FUND (NTCF) EXPRESSION OF INTEREST (EOI) SUBMISSION

**Transport Canada must receive complete applications at its Ottawa office no later than:  
15:00 (3:00 p.m.), Eastern Time, on  
Tuesday, September 5, 2017**

Before completing this NTCF EOI Submission, the Applicant should refer to the NTCF Applicant's Guide – Expression of Interest, available at:  
<https://www.tc.gc.ca/eng/programs/ntcf-applicant-guide-expression-interest.html>

SECTION A – APPLICANT INFORMATION		
Full legal name of Applicant <b>The Corporation of the City of Sarnia</b>		
Address <b>255 North Christina St., P.O. Box 3018</b>		
City <b>Sarnia</b>	Province/Territory <b>ON</b>	Postal code (A1A 1A1) <b>N7T 7N2</b>
Applicant Type <b>Municipalities, including local and regional governments and municipally-owned entities</b>		
If a suitable Applicant Type is not provided, please specify below.		
SECTION B – APPLICANT MANDATE		
Describe the Applicant's mandate, its role in the project and why it is best suited to lead the project. (maximum number of characters including spaces, 3000) <b>As a municipality, the applicant's mandate is multi-faceted. One of the primary mandates is to ensure that infrastructure, including roads and ports, are suitable for existing and future industry to grow and prosper. This will facilitate economic growth and increase exports. As this occurs, high skilled/highly paying jobs will be retained, and added, generating tax revenues for the municipal, provincial and federal governments so that all can prosper. The establishment of an "oversized load corridor", utilizing existing roads, has been determined as a way to fulfill this mandate.</b>		
<b>The Corporation of the City of Sarnia (City of Sarnia) has agreed to partner with the County of Lambton and St. Clair Township, who are all to be impacted by this infrastructure improvement project. Portions of the "corridor" are located within each of the partners jurisdictions. It has been agreed that City of Sarnia will take the lead on the application as the majority of improvements are located within the municipality.</b>		
<b>City of Sarnia also has the engineering and project management staff in place that are experienced at handling projects of this size and scope.</b>		
<b>Please find attached the following:</b>		
<ul style="list-style-type: none"> <li>- resolution from each of the City of Sarnia, County of Lambton and St. Clair Township supporting the project and acknowledging that City of Sarnia will be the lead applicant</li> <li>- support letters from Sarnia-Lambton Economic Partnership, Sarnia Lambton Chamber of Commerce, Sarnia Lambton Industrial Alliance, Sarnia District Labour Council and Bluewater Power.</li> </ul>		



**SECTION C – PROJECT OVERVIEW**

Identify the population centre (city, village, town, etc.) nearest to the project

City of Sarnia to Village of Brigden

Project location or start point (GPS coordinates)

Latitude

42.9859N

Longitude

82.4160W

Project end point (GPS coordinates)

Latitude

42.8097N

Longitude

82.2830W

Provide an overview of the proposed project, including a description of the major components. (maximum number of characters including spaces, 2300)

Based on industry members recommendations, our own analysis, and supported by an independent consulting firm's detailed business case study, we wish to establish an "Oversized Load Corridor". The corridor will link the deep water Port of Sarnia to the highly skilled industrial fabrication firms in the area. Recently, the harbour was divested by the Federal Government to the City of Sarnia who continues to actively operate it as an active shipping port. Sarnia-Lambton based advanced manufacturing firms produce technical and specialized oversized equipment which is used locally and shipped worldwide for use in the petroleum, petro-chemical, bio-fuel, bio-chemical and various other heavy industries.

Major Components of the Project:

- Final detailed engineering
- Permanently raising or burying utility lines along the corridor, moving street lights and installation of swing away traffic lights
- Re-engineering road infrastructure as necessary to accommodate heavy and long/wide loads
- Capital improvements to the Port of Sarnia to accommodate, stage, handle and load large equipment items

Note: we attach a Project Briefing Document that recaps the background and highlights of the project.

Provide a brief rationale for the project. (maximum number of characters including spaces, 2300)

A complete supply chain of advanced manufacturing firms and their various suppliers has been well established in the Sarnia Lambton area for many generations. They service the large petroleum refineries and petro-chemical companies located here, and, more recently are adapting to other uses including the bio-fuel and bio-chemical firms establishing here. Each of these industries, and many others, utilize very large metal equipment modules, pressure vessels and boilers to process raw materials into their various outputs.

The advanced manufacturers are pursuing opportunities to export their world class equipment to other parts of Canada, USA and various other international locations. One of the hurdles to competing for exports, is the high transportation costs of temporary changes to the route from their manufacturing sites to the Port of Sarnia. Under current conditions, the very slow movement process is disruptive to local traffic, can create safety issues with regard to emergency service vehicles accessing the area and impacts local businesses on the route who may have utilities disconnected or customer access restricted. The establishment of a designated over-size load corridor route will alleviate these issues and facilitate access to the export market. The City, County, not-for-profit industry association Sarnia-Lambton Industrial Alliance, many of their individual members and Province of Ontario RED program all contributed \$225,000. to have independent studies done in 2016. The "Business Case" study confirmed the positive economic impact of the project, including:

- generation of 2,613 FTE jobs,
- add \$263 million to Canada's GDP, and
- add \$21.4 million to government tax revenues. An engineering report provides a detailed estimate of the costs involved. These reports (attached) confirm the project as shovel ready and able to provide an economic return on investment over a reasonable period. The project will increase fluidity of Canadian Trade to improve supply chain performance and multi-modal connectivity of the transportation system to support trade.

**SECTION D – PROJECT SCHEDULE**

Indicate estimated dates for the following project milestones.

Design start date (yyyy-mm-dd) 2018-01-02	Design end date (yyyy-mm-dd) 2018-02-28
Construction start date (yyyy-mm-dd) 2018-05-01	Construction end date (yyyy-mm-dd) 2020-12-31

Other comments relevant to project schedule:  
**The municipalities involved have already agreed in principle to fund up to 1/3rd of the cost of this project over a 3 - 4 year period contingent on federal and provincial support covering the balance of the costs. Due to the preliminary engineering work already completed, it should be possible to begin portions of the project in the next few years. Each obstacle removed and improvement made will assist the industry members in reducing the costs of outbound and inbound shipments. Acceleration of the whole project depends on securing funding from senior governments.**

**SECTION E – PROJECT COSTS**

Provide estimates for the following, in consideration of Section 2.6 (Eligible Expenditures) of the NTCF Applicant's Guide - Expression of Interest.

Total project costs \$12,000,000.00	Total eligible costs \$12,000,000.00
--	---

If possible, estimate total eligible costs by fiscal year.

Funding Source	2018/19	2019/20	2020/21	Future Years
NTCF	\$2,000,000.00	\$2,000,000.00	\$2,000,000.00	
Others	\$2,000,000.00	\$2,000,000.00	\$2,000,000.00	

**SECTION F – PROJECT FUNDING**

Describe and identify all sources of project funding.

Project costs covered by the Applicant (\$) \$3,000,000.00	Total NTCF funding requested (\$) \$6,000,000.00
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Project funding provided by other federal organization(s) (\$)  
\$0.00

Name the federal funding organization(s) and indicate whether funding is secured.

Secured

Identify all other project funding partners below.

Organization	Contribution Amount	Secured
Ontario Ministry of Infrastructure	\$3,000,000.00	<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>

What steps are required to secure funding?  
**Preliminary meetings have been held with Ontario Minister of Infrastructure, Robert Chiarelli, who has confirmed that funding for this project will fall under his ministry. At the time of the meeting he indicated that they did not currently have a program that matched the project. He indicated his support and asked his staff to follow to see if a match could be found. He also encouraged our delegation to seek a confirmation of support from the Federal Government as this could help justify Provincial participation.**  
**In a telephone conference call of Apr 6, 2017 with Minister of Infrastructure Sohi, we received encouragement and direction to the upcoming Ministry of Transportation funding program.**

Do you anticipate collecting tolls or user charges as a source of revenue for this project?  Yes  No

I understand that the Applicant will be responsible for all cost overruns.



Not Applicable     Applicable

1. How would the project support the efficient movement of Canadian goods and people? (maximum number of characters including spaces, 2300)

- will support the efficient movement of Canadian goods by allowing the specialized highly skilled fabricators to significantly reduce the cost of shipping costs from the shop to the deep water Port of Sarnia.
- allows the overall delivered cost of their tenders to be cost competitive on a world wide basis.
- currently they are unable to bid or lose bids due to the high cost of temporary accommodations that must be made to local infrastructure. When bids are successful, the infrastructure must be replaced each time to the original configuration and the process (and related costs) repeated with each subsequent oversized load.
- efficiency and speed of the movement of the loads will also increase so that disruption to local traffic, and emergency services, is minimized. This will be a positive impact on the movement of people of the region who are currently inconvenienced with each slow move.
- the project has support from the local industrial base of petroleum refineries, petro-chemical plants and a growing number of bio-chemical plants. They would benefit from reduced costs for large equipment deliveries to their locations both from local and world-wide suppliers.
- Meets each of the following NTCF objectives: 1st, 2nd, and 4th bullets on page 3 of the applicant guide.

Not Applicable     Applicable

2. How would the project increase the resiliency of the Canadian transportation system to a changing climate and its adaptability to new technologies and future innovations? (maximum number of characters including spaces, 2300)

- increases the resiliency of the local portion of the Canadian transportation system by making it better suited for shipment of large oversized loads of specialized high tech equipment.
- the equipment being produced by the fabricators is used to supply industrial facilities in Canada and export abroad with the latest technology to upgrade older obsolete equipment or supply brand new facilities using the latest technology minimizing the impact on the environment. For example: the equipment includes water processing units to allow water to be reused in SAGD oil extraction processes. It also includes equipment that reduces the energy usage and decreases emissions in chemical plants.
- by minimizing the time it takes and the number of support vehicles required to move equipment to/from the Port of Sarnia, the environmental impact from these vehicles will also be minimized.
- supports multi-modal transportation, connecting road-based transport to seaway transport which relieves road degradation and congestion and facilitates efficient water-based transport.
- increased supply chain improvements to support the bio-fuel and bio-chemical industry cluster developing in Sarnia-Lambton area and elsewhere.
- project will broaden the existing Great Lakes trade corridor to increase trade both inter-provincially and internationally with 9 month per year access to the St. Lawrence Seaway which also benefits the revenue base of the Seaway.

Not Applicable     Applicable

3. How would the project address the transportation needs of Canada's territorial North, including safety, and social and economic development? (maximum number of characters including spaces, 2300)

- advanced manufacturing firms of the area have been building large equipment for the mining industry. By building this vital link from fabrication facility to the Port of Sarnia, it directly connects to the supply of equipment to the mining and related industries of the Canada's territorial north.

Not Applicable     Applicable

4. How would the project leverage investments from multiple partners? (maximum number of characters including spaces, 2300)

The project leverages the work of many partners over a period of six years (since 2011). At that time the opportunity to take advantage of the world class capabilities of area fabrication firms and the supply chain in place to export to other areas of Canada and the world was identified and promoted. This was initiated by a group of 30+ local companies that came together and formed the Sarnia Lambton Industrial Alliance (SLIA) as a not-for-profit industry group with the support of the Sarnia-Lambton Economic Partnership (SLEP). Since that time SLIA volunteers have put thousands of hours of their personal time into investigating and promoting the corridor concept and also have invested some \$60k in cash towards project conceptualization, planning and technical and economic feasibility.

In 2012, SLIA and SLEP were successful in getting the support of National Research Council - Industrial Research Assistance Program and the County of Lambton to fund a preliminary study of the various route and Port options in the regions. This report has formed the basis of numerous meetings and presentations since that time.

In 2016 approx \$225k was raised from City of Sarnia, County of Lambton, SLIA and their members, SLEP and Ontario Ministry of Rural Affairs (RED) to fund engineering and business case studies. With this information on hand, the three municipalities have all agreed to share in a portion of the project costs and are seeking the participation of senior levels of government.

It is important to note that in addition to widespread municipal government support, large industry in the area, Sarnia Lambton Chamber of Commerce, Sarnia and District Labour Council, and provincial and federal politicians of all major parties have confirmed their support for the project.

**SECTION H – PRIMARY CONTACT INFORMATION**

Annex A – Page 10

Full Name	
Margaret Misek-Evans	
Title	
Chief Administrative Officer	
Telephone number (999-999-9999)	Email
519-332-0330 Ext 3230	cao@sarnia.ca
<input checked="" type="checkbox"/> I hereby declare that the information contained herein is true and accurate.	

**SECTION I – SUBMITTING THE EXPRESSION OF INTEREST**

**Please note that National Trade Corridor Fund Expression of Interest submissions may be shared with Infrastructure Canada and the Canada Infrastructure Bank (CIB). The CIB's application process would be separate from this NTCF process.**

Applicants can submit their completed NTCF Expression of Interest Submissions electronically at [tc.ntcf-fncc.tc@tc.gc.ca](mailto:tc.ntcf-fncc.tc@tc.gc.ca)

**Submit by Email**

If unable to submit electronically, submissions may be sent by mail or courier service to:

Transport Canada  
NTCF – EOI Submission  
Business Centre  
330 Sparks Street  
Place de Ville, Tower C  
Ottawa, ON K1A 0N5



**THE CORPORATION OF THE CITY OF SARNIA  
City Clerk's Department**

255 Christina Street N. PO Box 3018  
Sarnia ON Canada N7T 7N2  
519-332-0330 (phone) 519-332-3995 (fax)  
519-332-2664 (TTY)  
[www.sarnia.ca](http://www.sarnia.ca) [clerks@sarnia.ca](mailto:clerks@sarnia.ca)

August 3, 2017

To Whom it May Concern,

I, Dianne Gould-Brown, City Clerk for the Corporation of the City of Sarnia, hereby certify that the following is a true copy of a resolution adopted by Sarnia City Council at its meeting held on January 16, 2017:

***That Sarnia City Council endorse the conclusions contained in the report titled 'Business Case Analysis for Oversized Freight To/From Sarnia Lambton' dated October 31, 2016, prepared by Canadian Pacific Consulting Services (CPCS) in association with Anderson Haulage.***

A handwritten signature in cursive script that reads "Dianne Gould-Brown". The signature is written in black ink and is positioned above a horizontal line.

Dianne Gould-Brown  
City Clerk

**THE CORPORATION OF THE CITY OF SARNIA  
City Clerk's Department**



255 Christina Street N. PO Box 3018  
Sarnia ON Canada N7T 7N2  
519-332-0330 (phone) 519-332-3995 (fax)  
519-332-2664 (TTY)  
[www.sarnia.ca](http://www.sarnia.ca) [clerks@sarnia.ca](mailto:clerks@sarnia.ca)

August 3, 2017

To Whom it May Concern,

I, Dianne Gould-Brown, City Clerk for the Corporation of the City of Sarnia, hereby certify that the following is a true copy of a resolution adopted by Sarnia City Council at its meeting held on October 3, 2016:

***That Sarnia City Council refer a capital allocation of \$200,000 from the Sarnia Harbour Reserve to the 2017 budget process to cover the cost of detailed engineering for the Sarnia oversized load corridor subject to Council's consideration and approval of the business plan, successful senior government funding to a minimum of 2/3 project costs and Council approval of 1/3 funding of project costs from capital; and***

***That Sarnia City Council receive and file the Oversized Load Corridor Shipping Route Study prepared by MIG Engineering (2011) Ltd. dated August 4, 2016.***

A handwritten signature in cursive script that reads "Dianne Gould-Brown".

Dianne Gould-Brown  
City Clerk

## County of Lambton Council Resolution

### INFRASTRUCTURE & DEVELOPMENT SERVICES DIVISION

Report dated April 5, 2017 Regarding Oversize Load Corridor - Update

#5: Bradley/McGugan:

- a) That Lambton County Council endorse and confirm the County's continuing support for the Oversize Load Corridor project, as proposed.
- b) That Lambton County Council support the City of Sarnia as the lead funding applicant to senior government programs on behalf of the entire Oversize Load Corridor project partners.
- c) That Lambton County Council establish a budget of up to \$100,000 from the Opportunities and Contingency Reserve for public consultation and detailed design for the Oversize Load Corridor project, subject to the following conditions:
  - a. Obtaining at least 2/3 funding support from senior level government sources; and
  - b. Arriving at a satisfactory cost share and responsibility agreement between the municipal partners.
- d) That a report be prepared for Council regarding the status of funds in the Opportunities and Contingencies Reserve Fund.
- e) That there be proper public consultation by all parties regarding the proposed project.

A recorded vote starting with Councillor Marriott was requested by Councillor Bradley on motion #5 of this day's minutes:

S. Arnold ..... Yes (3)  
D. Boushy..... Yes (3)  
M. Bradley ..... Yes (3)  
A. Broad ..... Yes (1)  
A. Bruziewicz..... Yes (3)  
T. Case..... Yes (2)  
D. Cook ..... Yes (2)  
P. Gilliland..... Yes (2)  
A.M. Gillis..... Yes (3)  
B. Hand ..... Absent  
B. MacDougall..... Yes (3)  
K. Marriott..... Yes (1)  
J. McCharles ..... Yes (2)



D. McGugan ..... Yes (1)  
L. Napper ..... Yes (3)  
I. Veen..... Absent  
B. Weber ..... Yes (3)  
Yeas - 35; Nays - 0.

Motion Carried.

**TOWNSHIP OF ST. CLAIR  
PUBLIC WORKS & OPERATIONS COMMITTEE  
AGENDA**

St. Clair Civic Centre  
Committee Room #1  
February 21, 2017  
4:00 p.m.

4:00 p.m. – SLIA Presentation – David Moody

**1. DECLARATION OF PECUNIARY INTEREST:**

**2. COORDINATOR OF OPERATIONS' (ROADS) REPORTS:**

- Monthly Report
- Temporary Buckingham Road Closure
- Alleyway – 4370 St. Clair Parkway (Port Lambton)
- Reduced Speed Limit – Riverview School
- Municipal Dock Use Agreement

**3. COORDINATOR OF OPERATIONS' (WATER) REPORTS:**

- Monthly Report
- Corunna Pump Station Odour Control
- Odour Control Update
- CH2M (OMI) Contract Amendment No.5

**4. COORDINATOR OF ENGINEERING'S REPORTS:**

- Monthly Report
- Urban Asphalt Resurfacing – 2017
- Brigden Tower Lease Agreement – County Fire Radio Communication
- Duthill Bridge – North Sydenham River at Holt Line – Preferred Alternative

**5. DRAINAGE SUPERINTENDENT'S REPORT:**

- Monthly Report
- Froomfield Drain Assessment - Aamjiwnaang

**6. WATER/WASTE WATER SPECIALIST'S REPORTS:**

- 2016 Annual Report/2016 Annual Summary Report

**7. NEW BUSINESS:**

**8. ADJOURNMENT:**

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**DECLARATION OF PECUNIARY INTEREST:**

None declared.

At the appointed time of 4:25 p.m., Chairperson Gilliland welcomed David Moody, Paul Healy and Rick Perdeaux of the Sarnia Lambton Industrial Alliance (SLIA) to make their presentation related to a Heavy Haul Corridor.

SLIA is comprised of 35 local industrial companies collectively employing over 2600 people and is non-profit organization.

Members of SLIA ship oversized modules, constructed by local skilled tradesmen, to Alberta, the East Coast, the Middle East and the Gulf Coast. In order to continue to produce modules and

Committee of the Whole  
February 21, 2017

stay competitive globally, they require a permanent Heavy Haul Access Route to a marina. SLIA undertook studies to determine the best possible location and costs involved in creating a permanent, obstruction free, heavy haul corridor from a number of local businesses to the marina in Sarnia.

Public safety is the number one concern and the proposed route considered overhead wires, width of roads, quality of road construction and potential disturbance to the public when selecting the route. The Township of St. Clair would require improvements to Polymoore Drive connecting to Highway 40 via Hill Street (County road), and Brigden Road connecting to Highway 80 (both county roads).

The overall cost to construct the permanent Heavy Haul Corridor would be \$12 million according to the study. Ideally the funding for this project would come from the provincial and federal governments, with the balance being picked up by local municipalities, local industry and SLIA itself. If all funding were secured, the Township would be asked to contribute approximately \$50,000 towards the entire project (as the improvements to Polymoore would be minimal and the other improvements within the Township would be the responsibility of the County of Lambton).

Moved by S. Arnold

Seconded by J. Agar

**Motion #1** That the Heavy Haul Corridor project be approved in principle in a collective partnership with SLIA, the City of Sarnia, and the County of Lambton.

**CARRIED**

**COORDINATOR OF OPERATIONS' (ROADS) REPORTS:**

Moved by S. Miller

Seconded by J. Agar

**Motion #2** That it be recommended to Council that the monthly report submitted by the Coordinator of Operations (Roads) dated February 14, 2017 be received as information.

**CARRIED**

Moved by S. Miller

Seconded by J. De Gurse

**Motion #3** That it be recommended to Council that the report submitted by the Coordinator of Operations dated February 15, 2017 with regard to Temporary Buckingham Road Closure be received as information and that the request from the Wallaceburg District Secondary School to allow a temporary closure of Buckingham Road from Whitehead Line to Lambton Line to accommodate the 'Tinman Triathlon' from 8:00 a.m. until 1:00 p.m. on Tuesday, May 30, 2017 be approved.

**CARRIED**

Moved by S. Miller

Seconded by D. Randell

**Motion #4** That it be recommended to Council that the report submitted by the Coordinator of Operations dated February 15, 2017 with regard to Alley at 4370 St. Clair Parkway be received as information and that the request submitted by James Guzi to clear the alleyway located between John and Broadway Streets be denied.

**CARRIED**

Moved by S. Arnold

Seconded by J. Agar

**Motion #5** That it be recommended to Council that the report submitted by the Coordinator of Operations dated February 15, 2017 with regard to Reduced Speed Limit – Riverview School be received as information and that Council approve the reduction of the speed limit on a portion of St. Clair Parkway between French Line and No. 3886 (Baptist Church) by using a flashing light / sign system, during designated times and during school days, at an estimated cost of \$12,000 to be paid from the Education and Environment Reserve.

**CARRIED**

Moved by D. Randell

Seconded by S. Miller

**Motion #6** That it be recommended to Council that the report submitted by the Coordinator of Operations dated February 15, 2017 be received and that Council approve the minimum rental rate of \$24,000/year to remain unchanged from previous years, and that the lease agreement be finalized and signed by the Mayor and Clerk.

**CARRIED**

August 2, 2017

Margaret Misek-Evans  
Chief Administrative Officer  
The Corporation of the City of Sarnia  
255 North Christina St., P.O. Box 3018  
Sarnia ON N7T 7N2

Dear Margaret,

The Sarnia-Lambton Economic Partnership is pleased to support the Corporation of the City of Sarnia's expression of interest submission for the *National Trade Corridors Fund (NTCF)* in connection to the *Sarnia-Lambton Oversized Load Corridor*.

We recognize that the establishment of an "Oversized Load Corridor" linking the deep-water Port of Sarnia to the highly-skilled industrial fabrication and advanced manufacturing firms in the area will allow for these companies to more competitively pursue opportunities to export world class equipment – including large metal equipment modules, pressure vessels, and boilers – to other parts of Canada, USA, and other international locations.

The project will support high-value trade originating in the Sarnia-Lambton region, while strengthening the efficiency and resilience of transportation assets that are critical for the continued success of Sarnia-Lambton's industrial fabrication and advanced manufacturing sectors in international commerce. This will be accomplished through the capacity added to the regional transportation system to accommodate the movement of heavy-haul loads, via investment in one of the critical assets in the community that supports economic activity and the physical movement of goods, both nationally and internationally. The result will be an increase in the competitiveness and productivity within these sectors resulting in higher values of freight originating from the Sarnia-Lambton area, moving at significantly lower costs to the manufacturer.

Funding through the National Trade Corridors Fund would provide the City of Sarnia, its collaborators and subsequently, other parties throughout Sarnia-Lambton – including the County of Lambton, Township of St. Clair, and Sarnia-Lambton Industrial Alliance – with the resources necessary to complete final detailed engineering, the movement of utility lines, re-engineering of road infrastructure, and capital improvements to the Port of Sarnia.

Past milestones, including an Oversized Load Shipping Route Study and a Business Case Analysis for Oversize Freight To/From Sarnia-Lambton report, have confirmed the project would have an economic impact resulting in the generation of 2,613 FTE jobs and the addition of \$263 million to Canada's GDP and \$21.4 million to government tax revenues.

Given the Sarnia-Lambton Economic Partnership's position in providing strategic leadership and support to community-based economic development in Sarnia-Lambton, we see the potential for the successes of this project to help achieve the ultimate NTCF outcome to make the multimodal transportation network more efficient, safe, and secure for the movement of international trade within and beyond Canada's borders.

Yours sincerely,

Matthew Slotwinski  
Acting CEO / Business Development Consultant  
Sarnia-Lambton Economic Partnership



556 Christina Street N.  
Sarnia, ON N7T 5W6  
Tel (519) 336-2400  
Fax (519) 336-2085  
info@sarnialambtonchamber.com  
www.sarnialambtonchamber.com



August 1, 2017

Transport Canada  
NTCF- EOI Submission  
Business Centre  
330 Sparks Street  
Place de Ville, Tower C  
Ottawa, ON K1A ON5

**Re: National Trade Corridors Fund EOI by the City of Sarnia**

The Sarnia Lambton Chamber of Commerce is pleased to express its support of the City of Sarnia's application to the National Trade Corridors Fund for the purpose of establishing an "Oversized Load Corridor" (OLC). As a municipality, the City of Sarnia has the necessary capacity and resources to manage such a project.

Sarnia Lambton is home to a world-scale cluster of advanced technology chemical manufacturing industries supporting, directly and indirectly, approximately 28,000 fulltime equivalent jobs. The cluster has expanded and evolved from being the birthplace of North America's first commercial oil in 1858 to the bio-hybrid chemistry cluster that exists today. The cluster includes advanced manufacturers that produce large modular equipment for both local and global markets. Moving this equipment to and from Sarnia-Lambton is costly and less accessible, preventing this cluster from developing to its full potential.

The Chamber fully supports the efforts of City and its partners, the Sarnia Lambton Economic Partnership and the Sarnia Lambton Industrial Alliance to establish an OLC that links our world class industrial fabricators to the deep water Port of Sarnia. Trade-accessible transportation infrastructure is a critical component of our local industry's ability to access global markets. The Chamber believes the OLC would help grow Canada's manufacturing sector and Sarnia-Lambton's bio-hybrid chemistry cluster while adding \$263 million to Canada's GDP and creating over 2,600 FTE skilled jobs.

The Sarnia Lambton Chamber of Commerce is pleased to provide their support for the subject funding application. Please feel free to contact Shirley de Silva at 519-336-2400 or [sdesilva@slchamber.ca](mailto:sdesilva@slchamber.ca) if additional information is needed.

Yours truly,

A handwritten signature in blue ink, appearing to read "S de Silva".

Shirley de Silva  
President and CEO

A handwritten signature in blue ink, appearing to read "Michael John Kooy".

Michael John Kooy  
Chair

**The Business Voice of Choice**



Aug. 9, 2017

Ms. Margaret Misek-Evans  
Chief Administrative Officer  
The Corporation of the City of Sarnia  
255 North Christina St., P.O. Box 3018  
Sarnia ON N7T 7N2

Dear Ms. Misek-Evans,

Sarnia Lambton Industrial Alliance (SLIA) is pleased to support the City of Sarnia's submission of an "Expression of Interest" for the National Trade Corridors Fund (NTCF) in relation to the establishment of an Oversized Load Corridor in Sarnia Lambton.

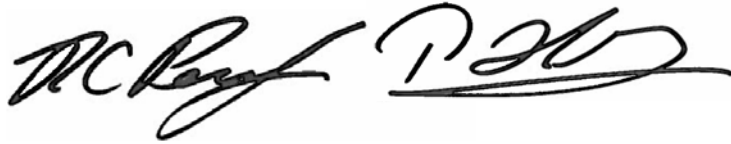
As you know, SLIA, is an incorporated not-for-profit industry association with over 30-member companies, primarily Small to Medium sized Enterprises (SME's), employing collectively some 2,600 skilled trade and professional employees. SLIA, and our members, identified the need for the establishment of a designated Oversized Load Corridor back in 2011. We have been working since that time, with various partners and supporters, to make the project a reality.

Our executive members have contributed thousands of hours of volunteer personal time to investigate and promote the corridor concept. We continue to make ourselves available to explain both the need and the benefit of the project from the grass roots industry level and to work hand in hand with you through the process.

Recently, we canvassed our membership and other industry members to raise nearly \$60,000. as a financial contribution towards the necessary independent "Engineering" and "Business Case" studies. We are pleased that the Business Case study strongly supports our contention that many high skilled, highly paid jobs will be created and maintained. The report also confirms that the project will provide a net return of tax revenues to all levels of government much higher than the cost to complete the project.

The NTCF mandate and criteria appear to be an exact match to the Sarnia Lambton Oversized Load Corridor project. We are, therefore, extremely pleased to support the City's Expression of Interest, and, hopefully ultimate approval of funding for this project.

Yours truly,



Rick Perdeaux  
Chairman



Paul Healy  
Director



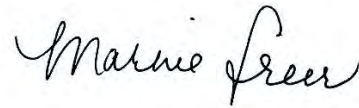
Marty Raaymakers  
Director



Tara Duff-Cloes  
Director



per Katherine Walker  
Director



Marnie Freer  
Director





900 Devine Street  
Sarnia, ON N7T 1X5  
sdlc@bellnet.ca

Phone: 519.542.2375  
Fax: 519.542.0178

To whom it may concern,

As the president of the Sarnia and District Labour Council, it is indeed my pleasure to indicate our support for the creation of an oversized load corridor in Lambton County. The work which has been spear headed by the Sarnia Lambton Industrial Alliance, (SLIA), carried on by the Sarnia Lambton Economic Partnership (SLEP) and City of Sarnia has certainly recognized the need for this important access to be created in Lambton County.

It is widely accepted that the work created as well as retained by this corridor would play a significant role in reducing unemployment for Sarnia Lambton's thousands of skilled trades workers. This unemployment rate has increased in recent years causing many of these workers, vital to Sarnia Lambton's overall economy, to be forced to relocate to find employment. Sarnia's skilled trades work force certainly welcome this project.

The study confirming the enormous employment and economic benefit to the area has been completed and as expected indicates the positive impact this project will have on our community. Therefore, on behalf of the over 10000 members of Sarnia Lambton's unionized labour community we hope you will consider our support when reviewing this application for funding for the project.

Should you have any questions, please don't hesitate to contact the author.

Sincerely,

A handwritten signature in cursive script that reads "Jason McMichael".

Jason McMichael

President

Sarnia and District Labour Council



P.O. Box 2140  
855 Confederation Street  
Sarnia, Ontario N7T 7L6  
Tel: (519) 337-8201  
Fax: (519) 344-6094

July 31, 2017

Transport Canada  
NTCF – EOI Submission  
Business Centre  
330 Sparks Street  
Place de Ville, Tower C  
Ottawa, ON K1A 0N5

To whom it may concern,

**Re: National Trade Corridors Fund (NTCF) Expression of Interest (EOI) Submission  
The Corporation of the City of Sarnia, County of Lambton, St. Clair Township**

Bluewater Power is pleased to provide a letter in support of the City of Sarnia's National Trade Corridors Fund Expression of Interest submission.

The Bluewater Power family of companies includes Bluewater Power Distribution Corporation, Bluewater Power Renewable Energy Inc., Bluewater Power Services Corporation, Electek Power Services Inc., Unconquered Sun Solar Technologies Inc. and Bluewater Regional Networks. Bluewater Power Distribution is the largest electric utility in Lambton County and provides electrical distribution and related services to over 36,000 customers in Southwestern Ontario. Bluewater Power Renewable Energy Inc. was established in 2007 with the mandate to promote, develop and maintain clean and renewable generation projects. Bluewater Power Services provides high voltage line construction and maintenance to industries. Electek Power Services provides a complete package of highly specialized power distribution system services including electrical maintenance and commissioning testing, switch gear modifications and retrofits, high/low voltage installations and substation installation. Unconquered Sun Solar Technologies Inc., a Tecumseh-based firm, is an installer of rooftop solar projects. Bluewater Regional Networks was established to provide a carrier-grade, true "end-to-end" fibre network to Sarnia's enterprise businesses. Services provided include High Speed Commercial Fibre Internet, Wireless Internet and Cloud Services. The Bluewater Power Group of Companies mission is to maintain strong local roots while adding value as a leading energy solutions provider through innovation and partnerships.

Bluewater Power actively participated in the successful completion of the Oversized Load Corridor Shipping Route Study completed in May 2016 which provided a detailed scope of upgrades required to implement an oversized load corridor in Sarnia-Lambton. The establishment of an oversized load corridor linking local industrial fabrication companies to the Port of Sarnia will facilitate economic growth, increase exports and significantly decrease shipping costs. Components of the project include permanently raising or burying utility lines along the corridor which will increase safety significantly by eliminating the risks associated with disconnecting and reconnecting power lines and other utilities which currently occur with each oversized load move. Street lights will be moved and swing away traffic lights installed. Benefits also include reduction/elimination of the impact of temporary power outages for business and residents as well as reduced on-going duplicate costs.

In summary, Bluewater Power enthusiastically supports the goal of the establishment of an Oversized Load Corridor in Sarnia-Lambton and we look forward to continuing our partnership with the City of Sarnia to make this goal a reality.

Sincerely,

A handwritten signature in black ink that reads "Janice McMichael-Dennis". The signature is written in a cursive style with a large initial "J" and "M".

---

Janice McMichael-Dennis  
President and Chief Executive Officer  
Bluewater Power Group of Companies

A handwritten signature in blue ink that reads "Tim Vanderheide". The signature is written in a cursive style with a large initial "T" and "V".

---

Tim Vanderheide  
Chief Operating Officer, Bluewater Power Renewable Energy Inc. and Electek Power Services Inc.  
Vice President Strategic Planning, Bluewater Power Distribution Corporation

JMD\*mg

# SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR

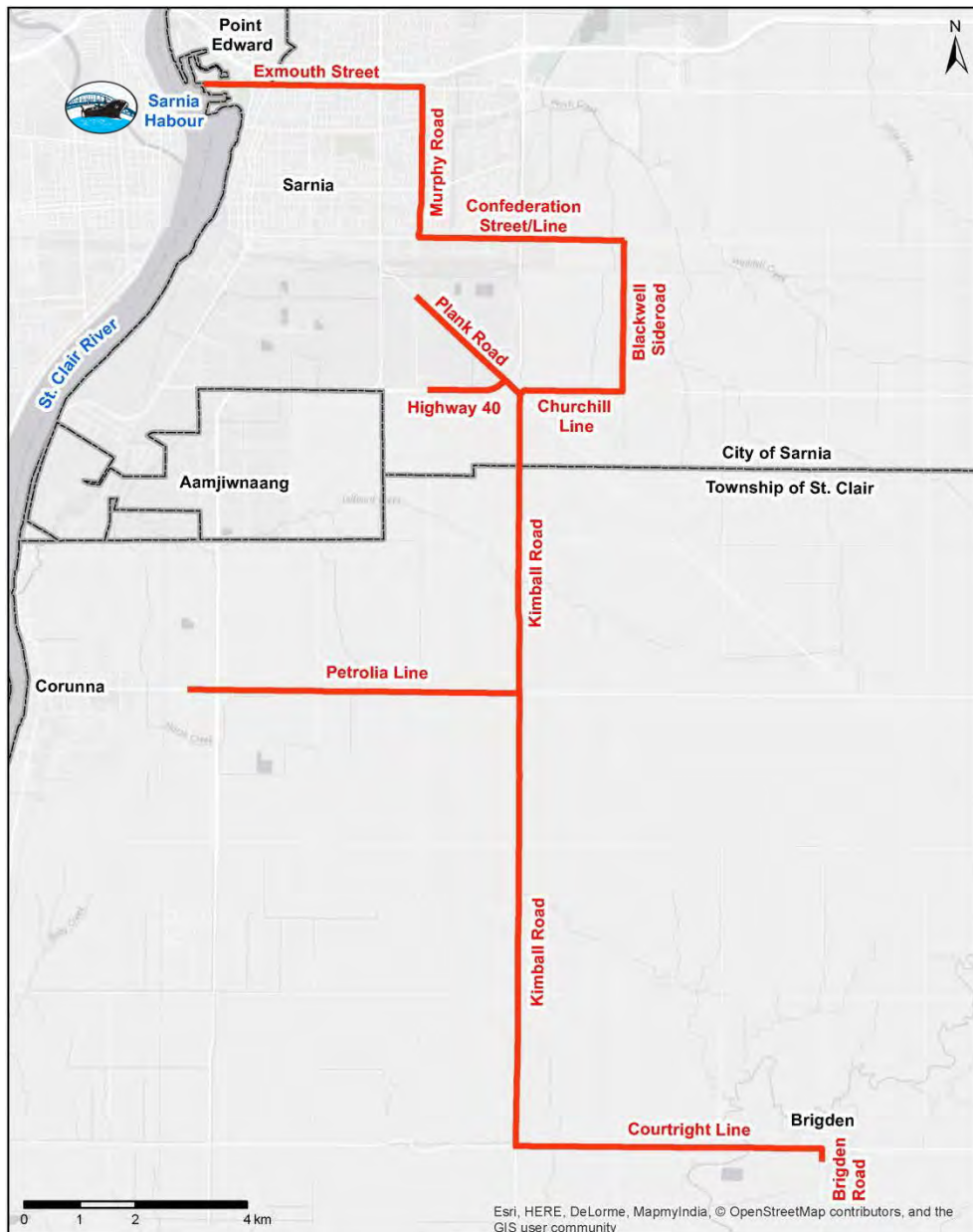




## Oversized Load Corridor

The proposed Oversized Load Corridor (OLC) is a designated protected route on existing roadways connecting fabricators to Sarnia Harbour for the unimpeded export and trans-shipment of oversized product to and from fabricators and Sarnia-Lambton's industrial base.

Clear passage preserved along this route will improve the competitiveness of local fabricators and large industry by reducing shipping costs, creating new jobs, and increasing the potential for the export of valuable locally manufactured vessels, reactors and modules.



## **Local Support**

---

The Oversized Load Corridor Project has broad local support from:

- The City of Sarnia, St. Clair Township, and the County of Lambton
- Sarnia-Lambton Economic Partnership (SLEP)
- Sarnia Lambton Chamber of Commerce
- Sarnia & District Labour Council
- The Honorable Amaritt Soji
- MP Marilyn Gladu
- MPP Bob Bailey
- MPP Andrea Horwath
- MPP Patrick Brown
- Large Petrochemical and Refining Industries throughout Sarnia-Lambton
- Sarnia Lambton Industrial Alliance (SLIA)

## **What is the Sarnia Lambton Industrial Alliance?**

---

The Sarnia Lambton Industrial Alliance (SLIA) is an incorporated not-for-profit industry association of primarily locally owned small to medium sized enterprises, managed by a volunteer executive. The Alliance is currently composed of over 35 fee paying member companies who employ over 2,600 people and is dedicated to helping members identify and capture new business opportunities and address issues that may impede such business opportunity. Members include industrial fabricators, machine shops, engineering firms, environmental service firms, and water & wastewater treatment companies.

## **The Project is a Match to Grow Sarnia-Lambton Manufacturing**

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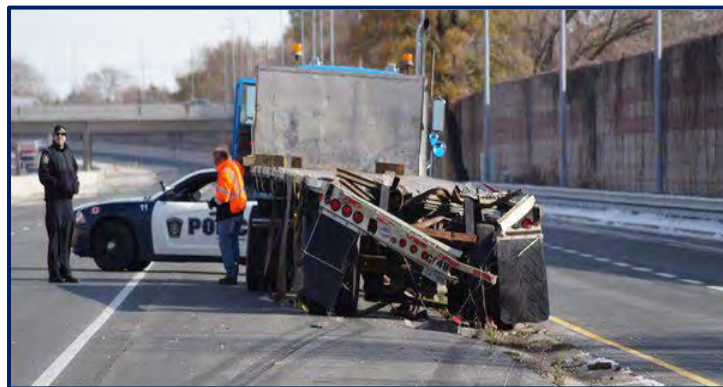
Sarnia-Lambton fabrication shops are an exact match to the demands of Alberta, the East Coast, the US Gulf Coast, and International markets. Billions of dollars in fabrication contracts will be outsourced annually over the next 25+ yrs. Custom built modules are the “building blocks” of modern energy complexes worldwide. Each module has a value of \$250,000 to \$1,500,000 to build, and 50% of this cost is direct high skilled labour. Sarnia-Lambton has a well-established complete supply chain in place to support the manufacturing of such modules and other large products.





## Local Shipping Opportunity

Fabrication companies are all located within a few kilometers of the St. Clair River and the deep water of the Sarnia Harbour. The Sarnia Harbour is owned and managed by The Corporation of the City of Sarnia. The Harbour is actively maintained to conform to current St. Lawrence Seaway shipping standards, and has the capacity to handle the loads. Due to low utility lines and tight corners, etc., moving oversized loads to and from the Port of Sarnia can be extremely expensive and slow. As a consequence, exports are not as competitive as they could be with an established OLC. Lack of a designated route can also prove to be dangerous and costly to fabricators and taxpayers.



## Questions and Answers

---

**Q Will jobs be created/maintained?**

**A** 2613 FTE jobs are forecast to be created by this project.

**Q How much will it cost?**

**A** The OLC has an estimated cost between \$11.4M and \$12M including escalation and improvements to the Sarnia Harbour. Delays in construction will increase costs.

**Q What are the benefits?**

**A** The implementation of the OLC will create an additional \$263M in Gross Domestic Product, and \$21.4M government tax revenues.

**Q What has been the local financial support to date?**

**A** SLEP, SLIA and the City of Sarnia have raised funds from SLIA/SLEP members, the City of Sarnia, the County of Lambton, industry members and the Province of Ontario to pay for necessary studies at a cost of \$225,000.

**Q What studies have been completed in support of the OLC?**

**A** An engineering study completed by MIG Engineering Limited and a Business Case Analysis completed by Canadian Pacific Consulting Services (CPCS) have provided estimates of project cost and project benefits.



## **The OLC will have a Positive Impact on the Community**

- Increased public safety.
- Reduced public inconvenience.
- Exporters will be more competitive with increased competitive advantage.
- Increased skilled trades employment will result in economic benefit with the potential of the multiplier effect.
- Shipping will be less costly for existing industry to import large equipment to maintain and expand large industry in the area.
- Local industry will be more competitive, efficient and better able to attract additional corporate investment.

## **Potential Impact of Shipping Route on the Community**

- Large modules are not hazardous.
- Elimination of slow movement of product through the City of Sarnia, St. Clair Township, and Lambton County can cause traffic disruptions.
- Policies and operational procedures will be established to minimize disruption on businesses and traffic movement.

## **Local Business and Community Benefit**

---

- Significant reduction in cost to ship oversized equipment – more contracts – more direct jobs – more spin off jobs.
- Reduces the cost of equipment coming in for large plants such as NOVA and CF Industries.
- Loads will move more quickly through the community – reduce disruption to residents.
- Designated route will increase safety.



## **What is Needed?**

---

- Federal Infrastructure Funding \$\$\$\$ with an emphasis on Trade Corridor enhancement.
- Provincial recognition of the project as one of their priorities to ensure Federal participation.
- Provincial agreement to partner with Local Municipalities and the Federal Government to fund the Corridor Project.



# Business Case Analysis for Oversized Freight To/From Sarnia-Lambton

(Client Ref: 2015-004)

## Final Report

Prepared for:

Sarnia-Lambton Economic Partnership

Sarnia-Lambton Industrial Alliance

Prepared by:

CPCS

In association with:

Anderson Haulage

### **Acknowledgments**

CPCS acknowledges and is thankful for input provided by local and regional fabricators, transportation companies, public officials, and other stakeholders consulted in the development of this report.

Cover image source: SLEP / KelGor

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# Acronyms / Abbreviations

ABSA	Alberta Boilers Safety Association
AOPS	Arctic Offshore Patrol Ships
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
Bpd	Barrels per day
CAPP	Canadian Association of Petroleum Producers
CSC	Canadian Surface Combatant
CSM	Canadian Structural & Mechanical
EPC	Engineering Procurement Construction
FEED	Front End Engineering and Design
FPSOs	Floating Production, Storage and Off-loading vessels
FTE	Full-Time Equivalent
GDP	Gross Domestic Product
JV	Joint Venture
km	Kilometre
LNG	Liquefied Natural Gas
m	Metre
M	Million
mbspd	Million Barrels per Day
mmBTU	Million per British Thermal Units
MTO	Ministry of Transportation Ontario
NAFTA	North American Free Trade Agreement
NARL	North Atlantic Refining Limited
NSS	National Shipbuilding Strategy
OPG	Ontario Power Generation
PA	Pennsylvania
SC	South Carolina
SLEP	Sarnia Lambton Economic Partnership
SLIA	Sarnia Lambton Industrial Alliance
SPMT	Self-Propelled Modular Transporter
TSSA	Technical Standards & Safety Authority
UAE	United Arab Emirates
US	United States of America

# Executive Summary

Sarnia-Lambton is host to a well-established cluster of fabricators who have served the needs of the local petroleum and petrochemicals sector for decades. These companies have experience with pipe fabrication, heat exchangers and pressure vessels, reactors, boilers, towers, and other specialty equipment. Much of this equipment can be large, heavy, and challenging to transport, particularly over longer distances.

Further to a slow-down in local client demand, some of the fabricators are looking at development of additional and alternative market opportunities beyond the region. Historically, sales of oversize products beyond the region has been limited, in part due to a strong local market which has kept fabricators busy, but also because of the high transportation costs of moving large pieces of equipment beyond Sarnia-Lambton.

A recent engineering study identified the preferred route for such a corridor could be established for an estimated cost of \$11.4 million. The assumption is that adjustments to the existing road infrastructure and Sarnia Harbour to create a permanent oversize corridor will lower transportation costs, thereby improving the competitiveness of Sarnia-Lambton fabricators to serve other regions and reach new markets.

Based on research and consultation, this report assesses the potential impact of the proposed corridor both in terms of benefits for locally based companies who seek to import oversize loads, as well as additional sales from exports by fabricators outside of the region.

With respect to imports of oversize equipment, our research suggests that the lack of a corridor to date has not inhibited existing industries from building large-scale operations (e.g. existing refineries and petrochemicals companies). Many of the Sarnia-Lambton refineries were built decades ago, are located on the waterfront, and were able to bring in large equipment when required. Nor did consultations with local industry reveal that the oversize corridor would have a major impact in terms of leading to expansion of existing operations. However, the oversize corridor may have a positive impact in drawing industry to Sarnia-Lambton in the future, and would certainly be part of a larger sales pitch for the Sarnia-Lambton for industrial investment attraction. When making an investment decision, existence of the oversize corridor could be one consideration for companies requiring large equipment in terms of their selected location. However, it is not possible to confirm that it would be the defining factor for such an investment decision.

Our market analysis suggests that the markets with the highest level of potential will remain closely linked to the petroleum and petrochemicals sector. This includes opportunities in Atlantic Canada, and to a lesser extent the US East Coast, Mexico, and the Middle East. A number of other sectors have moderate potential, though additional market research, marketing efforts, and potential technical adaptation would be required to serve these markets. The figure below summarizes our analysis of market potential (Chapter 5), reflecting the focus of the study on opportunities that will become available as a result of the oversize corridor.

Figure ES-1: Analysis of Potential Market Opportunities

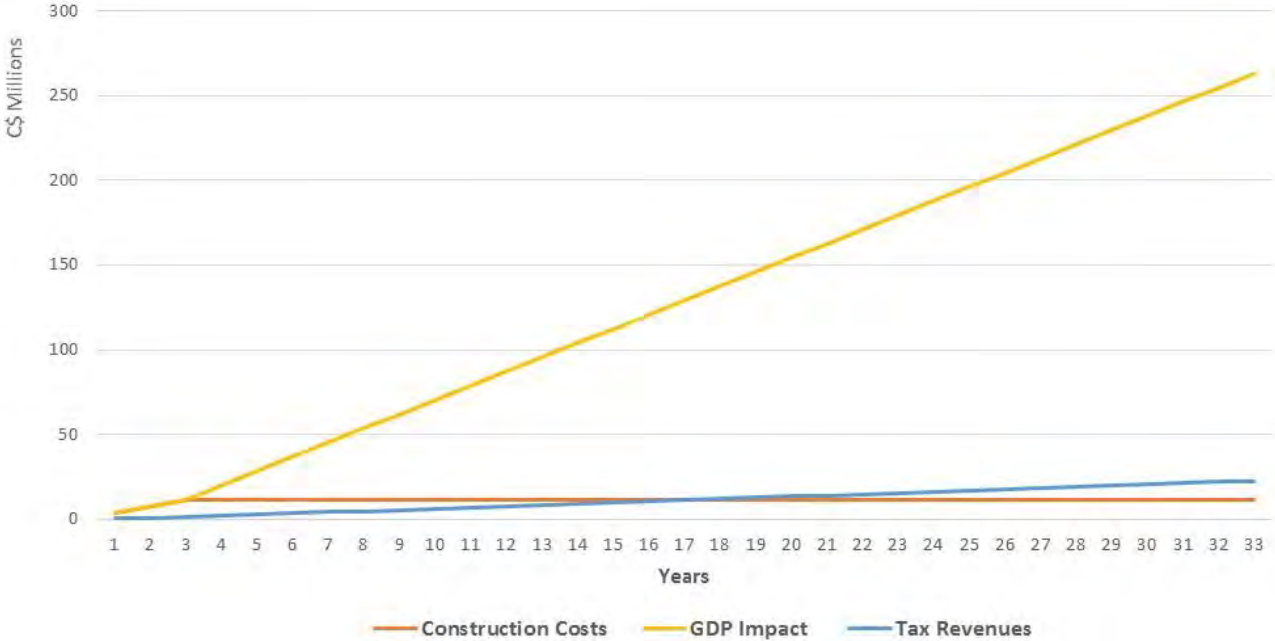
Potential Market	Strength of Opportunity
Western Canada (Alberta)	Medium
Atlantic Canada	High
US Petroleum (pipelines)	Low
US Petroleum (LNG export facilities)	Medium
Mexico (Pemex)	Medium
Cuba	Low-Medium
Middle East	Medium
West Coast LNG	Low
Biochemicals	Medium (in the long term)
Shipbuilding	Low-Medium
Water and Wastewater	Low
Power Generation	Low-Medium
Mining	Low-Medium
Food and beverage processing	Low
Pulp and Paper	Low

In terms of exports, the corridor will lower transportation costs and will enable Sarnia-Lambton fabricators to serve new markets more competitively. Based on consultations and our market analysis, we estimate the construction of the oversize corridor could result in additional potential annual sales of \$9.5 million for Sarnia-Lambton fabricators. Achieving this level of additional sales would require complementary efforts by fabricators, including significant marketing to existing and new clients beyond the region.

Based on construction costs of \$11.4 million, and additional annual sales of \$9.5 million of products by regional fabricators, the corridor project could add \$263 million to Canada's GDP (2010 dollars). This would generate an estimated 2,613 additional full time equivalent jobs (person years of employment). The project would also add approximately \$21.4 million to government tax revenues (2010 dollars). These estimates reflect an aggregated impact from the construction phase and operations phase of the corridor (assuming a time period of 30 years).

The figure below illustrates the cumulative costs and benefits of the project over a 30 year period. Even using a relatively conservative estimate in terms of additional sales (\$9.5 million), it is clear that investment in the corridor would more than pay for itself in the short term (GDP impact) and medium term (tax revenues).

Figure ES-2: Illustration of Cumulative Costs and Economic Impacts



Source: CPCS analysis of costs and economic impacts. Assumes three year construction timeframe with costs and benefits spread equally across three years, and no maintenance costs. Assumes corridor operating benefits start accruing in Year 4 for 30 years.

# 1 Introduction

## Key Chapter Takeaway

Sarnia area fabricators cannot competitively serve clients beyond the region due in part to high transportation costs resulting from a lack of a dedicated oversize freight corridor to reach the waterfront. This Study assesses the anticipated economic impact (future GDP growth, tax revenues, job creation) of constructing an oversize freight corridor to improve the competitiveness of regional fabricators looking to sell products beyond the region.

## 1.1 Study Background

Sarnia-Lambton has a long history with the petroleum and petrochemicals industry, reaching back as far as the late 19<sup>th</sup> century, when the first oil refinery was established in Sarnia. Today, the region is host to major refineries owned by Imperial Oil, Shell, and Suncor, in addition to a number of important petro-chemical and bio-hybrid processing facilities, including NOVA Chemicals and Bio-Amber.

The presence of these major industrial players has resulted in a well-established cluster of mid-stream companies serving the engineering, construction, machining, fabrication, and maintenance requirements of these players. Of particular relevance for this study are the Sarnia-Lambton-based manufacturers and mechanical fabricators who produce, install, and service large pieces of machinery and piping required for ongoing operations and expansion. These fabricating and machining companies have extensive experience with pipe fabrication, heat exchangers and pressure vessels, reactors, boilers, towers, and other specialty equipment – much of which can be large, heavy, and challenging to transport.

The fabricators are part of a well-established supply chain, which has to date been focused almost entirely on the needs of local petroleum-based industries. Further to a slow-down in the growth of the petroleum-based industry in Sarnia-Lambton (and elsewhere globally), and with the objective of sustaining economic growth in Sarnia-Lambton, consideration has been given to development of additional and alternative market opportunities for local area fabricators. While local fabricators have some experience in exporting their products outside of the region, they are currently limited in their ability to move larger size fabricated equipment and modules that are often required in major petroleum-based industry beyond the local area, due in part to the prohibitive costs of transportation.

A number of barriers to transporting large pieces beyond the local market have been identified. A 2010 study assessing the Sarnia-Lambton manufacturing and engineering sector identified a

need to improve transportation infrastructure to allow transportation of oversize products<sup>1</sup>. The study identified that not all local roads are adequate to handle the size and weight requirements of large fabricated modules for transportation to the Sarnia Harbour, or to other docks located along the St. Clair River. In addition, the Sarnia Harbour facility requires upgrading to store, handle, and load larger units.

Without a corridor and shipping route that can accommodate oversize loads, local area manufacturers and fabricators are limited in their ability to bid on contracts to supply oversize products to markets in other parts of Canada and internationally. In addition, local multinational petroleum, petro-chemical, and other industrial companies may benefit from an established corridor to import large freight components for their operations.

In 2012, a preliminary engineering study was commissioned to consider a range of corridor routing options for shipping large manufactured and fabricated products to markets outside of Sarnia-Lambton, using water-based transportation<sup>2</sup>. The study considered a number of road routing options to reach a range of dock sites. In 2016, a further engineering study was completed identifying the requirements and costs for a single recommended route to the Sarnia Harbour (see map at Appendix A)<sup>3</sup>. The estimated cost for creating the oversized corridor, including road-related and port improvements, was \$11.4 million.

CPCS Transcom Limited (CPCS) has been engaged to carry out this complementary study, focused on assessing the business case and economic impact of the proposed oversize corridor, in order to support any future investment decision.

## 1.2 Objectives and Key Questions

The primary objective of this study is to assess the business case for investing in development of a new oversize corridor, taking into consideration the anticipated benefits from the corridor for the region and province.

The study addresses the following key questions:

- What are the capabilities of Sarnia-Lambton fabricators with respect to oversize fabricated products?
- Where is the market potential greatest for Sarnia-Lambton manufacturers for oversize products?
- What would be the economic impact of an improved oversize freight transportation corridor?

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<sup>1</sup> Hickling Arthurs Low “Manufacturing, Machine Shop and Engineering Inventory and Capability Study: Final Report”, prepared for the Sarnia-Lambton Economic Partnership, May 6, 2010.

<sup>2</sup> MIG Consulting Engineers “Shipping Route Assessment for Oversize Freight from Sarnia-Lambton”, prepared for the Sarnia-Lambton Economic Partnership and the Sarnia Lambton Industrial Alliance, 2012.

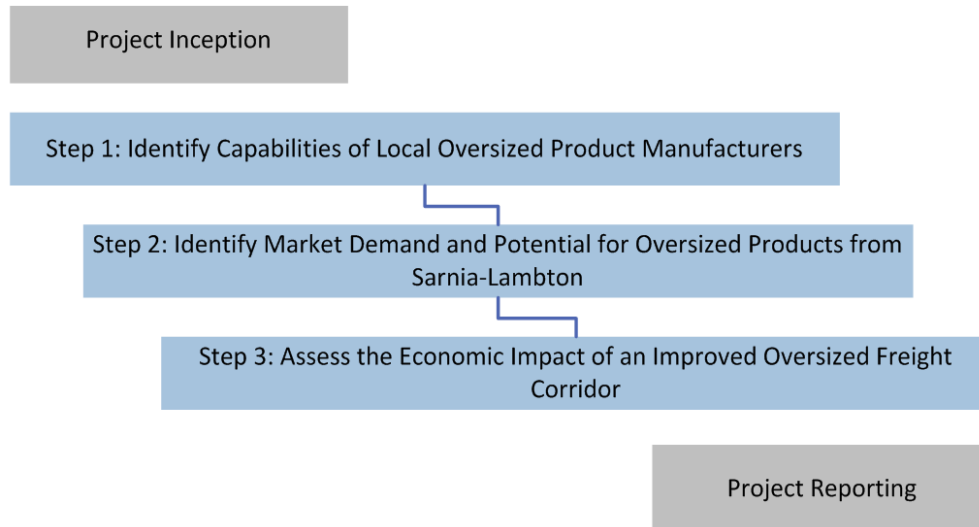
<sup>3</sup> MIG Consulting Engineers “Oversize Load Corridor: Shipping Route Study”, prepared for the Sarnia-Lambton Economic Partnership and the Sarnia Lambton Industrial Alliance, 2016.

The report will be used by the City of Sarnia, the County of Lambton and the Township of St. Clair to support applications for senior level government funding, and by the Sarnia Lambton Economic Partnership (SLEP) and Sarnia Lambton Industrial Alliance (SLIA) in further consideration of their support to the development of the corridor.

### 1.3 Methodology

The project was carried out in three broad phases as set out in Figure 1-1.

Figure 1-1: Project Structure



The study was developed using the following sources of information:

- Literature review of documents related to the movement of oversize freight (in Sarnia-Lambton and beyond) as well as reports on the Sarnia-Lambton manufacturing cluster. A list of documents reviewed is included in Appendix B.
- Desk-based research on potential markets identified by stakeholders as having the most potential for growth in exports of large fabricated units (largely online research, company websites, etc.).
- Consultations with local fabricators, industrial companies, and public sector authorities, as well as potential clients and industry experts who could shed light on opportunities outside of Sarnia-Lambton. (Consulted stakeholders are listed in Appendix C)

### 1.4 Limitations

The information received from local stakeholders, particularly local area fabricators, was invaluable in preparing the report. To protect the confidentiality of the information provided, we have aggregated most of the findings from consultations, with limited direct reference to individual stakeholders.

# 2 Oversize Product Shipping to/from Sarnia-Lambton

## Key Chapter Takeaway

Moving oversize loads within and beyond Sarnia-Lambton involves extensive planning and permitting, with the level of effort and cost varying according to the size of the load. The proposed corridor connecting with the Sarnia Harbour would provide fabricators with improved and less costly access to clients via marine transportation, though there would still be restrictions to reaching some markets for very large loads where significant road transportation is still required to connect to marine port facilities.

## 2.1 Overview of Oversize Product Movement in Sarnia

In this chapter, we describe current approaches and limitations to moving oversize freight, within and beyond the region. This provides context for further discussions regarding imports and exports of oversize freight to/from the region.

### 2.1.1 Definition of an Oversize Load in Ontario

The vast majority of “oversize” products currently moved within and beyond Sarnia-Lambton are done by road transport. A truck load is typically considered oversize once it reaches size limitations beyond which permitting is required to move on Ontario roads. This would apply to a load (including truck and trailer) that meets *any* of the following criteria:

- Over 8’6” (2.6 m) wide
- Over 13’ (4 m) high (most 400 series highways in Ontario have 14’6” (4.4 m) clearance)
- More than 75’ (23 m) long, or
- More than 63,600 kg (140,000 lbs) gross vehicle weight

The permitting process for movement of loads meeting this criteria varies significantly depending on the size of the freight. It is relatively simple to arrange permitting for loads which are moderately beyond any of these criteria. For example, moving a small oversize backhoe (12’ wide x 14’ high x 82’ long; 3.7 m x 4.3 m x 25 m) could be moved on a regular basis with an “annual permit”. It is also possible to move loads in Ontario up to 16’ (4.9 m) wide with a private escort only (as opposed to police escorts, which adds significant cost) under an “annual permit”.



However, the permitting process becomes much more onerous and costly for any freight move which hits the “superload” limit, defined as any load (including transport equipment) with the following criteria:

- Over 16’4” (5 m) wide
- Over 16’ (4.9 m) high<sup>4</sup>
- More than 150’ (45.7 m) long
- More than 120,000 kg (264,000 lbs) gross weight

Figure 2-1: Repairs to Hwy 402 Bridge from Oversize Vehicle



Source: SLEP, 2015

The total load size being planned for as a maximum for the Sarnia-Lambton oversize corridor, as established in the engineering study, is 30’ wide x 30’ high x 150’ long (9 m x 9 m x 45.7 m). This would equate to a module or equipment size of 30’ wide x 26’ high x 100’ long (9 m x 8 m x 3.1 m).<sup>5</sup>

### 2.1.2 Oversize Shipping within Sarnia-Lambton

The majority of fabricators within Sarnia-Lambton are located within a 10 km radius from their clients in the region, with some as close as a couple of kilometres away. There are relatively few truly oversize moves in any given year, and there is no historical or typical oversize corridor within Sarnia-Lambton. Rather, for each individual load the company arranging the transportation will consider:

- The size of the module or item being moved
- The necessary equipment to move it (for example, flatbed truck, Self-Propelled Modular Transporter (SPMT), number of axles required, etc.)
- A route which avoids bridges, where possible (over 120,000kg or 264,000 lbs)
- A route which can accommodate the swing path / turning radius of the vehicle

Once a proposed route is established, a range of public authorities are then contacted for their consent, permitting, and approvals. These include:

- Ministry of Transportation Ontario (MTO) for road permits
- Municipalities across Sarnia-Lambton
- Bell Canada
- Cable TV companies (Cogeco)

<sup>4</sup> Over 16’ high is not a superload but does begin to incur HydroOne costs.

<sup>5</sup> MIG Engineering Ltd, “Oversize Load Corridor: Shipping Route Study”, August 2016.

- Hydro One
- Bluewater Power
- Street traffic light management entity
- Police escorts

Once consultation with the entities above has begun, there may then be additional requirements or changes to the proposed route, for example, if construction is taking place on the proposed route at the anticipated time of the move.

Making arrangements for these permits can take anywhere from a minimum of two weeks to six months or more. The figures below illustrate the scale and complexity of oversize moves.

Figure 2-2: Oversize Product Moves in Sarnia-Lambton



Source: Kel-Gor / SLEP (images 1,3,4) and blackburnnews.com – photo by Briana Carnegie – July 17, 2015, Image 2 (Alliance)

The most significant defining factor affecting the planning (and costs) of oversize loads in Sarnia-Lambton is the height of the loads. This is because wire lifting is required. Loads with a total vehicle height under 15' to 16' (4.6 m – 4.9 m) high do not typically need wire lifting in Sarnia-Lambton, but above that height, all of the utilities listed above would likely be involved (depending on the origin and destination).

In addition, the higher the load, the more cost and risk is involved. This is because as a load gets higher it will reach increasingly more and higher voltage power utility cables, with greater implications for the community. For example, for loads of over 22' to 24' (6.7 to 7.3 m) high,

customers in the region affected by the power lines may have to have their power cut off temporarily, which requires significant planning.

The maximum size load that can currently be moved out of Sarnia-Lambton is determined by a number of factors. For example, a load 25' (7.6 m) wide is possible if it is 60-80' (18- 24 m) long. However, if the same load is 140' (43 m) long it becomes much more difficult as the turning radius and clearances at the corners increase significantly. The specific route which is feasible will always depend on the size of the load and transporter required. For example, Mammoet, a hoisting and transport company, previously quoted a move between Sarnia Harbour and one of the major oil company facilities with loaded dimensions that were 25' wide x 28' high x 235' long (7.6m W x 8.5m H x 72 m L) (including transporter) and 950,000 lbs (430 tonnes) gross weight. In this case, they would have needed to deviate from a more obvious route to negotiate the corner of Exmouth and Murphy Street. As noted above, one of the main obstacles to any move is overall height and usually the maximum height is determined by either hard overhead obstacles (building or underpass) or power transmission lines.

### 2.1.3 Oversize Shipping Beyond Sarnia-Lambton

Oversize products have been shipped by truck beyond the Sarnia-Lambton region, but this is limited to smaller oversize loads, due to the complexities and size limits described above.

There have also been a number of oversize moves through the Sarnia Harbour, but these are only in the order of one load in and one load out per year, over the past ten years or so. The water-based moves starting on the St. Clair River are primarily destined to locations in the Great Lakes / St. Lawrence region in Canada and the US (not overseas to any significant extent). The costs of transporting goods to the port and making arrangements for a water-based move are too high in most cases to make such a move competitive. In rare cases, the refineries have used docks at their own sites to move products in, notably when they have constructed the refineries (decades ago).

Once on the water, there are theoretically no limits to where a vessel or barge can be moved on the Great Lakes, St. Lawrence, and beyond. However, there are still some limitations with respect to water-based transportation opportunities for oversize products to certain markets.

- **Thunder Bay to Alberta:** With an oversize corridor, very large equipment could be moved to the water from Sarnia Harbour to Thunder Bay. There is ample space and technical equipment to load and unload oversize products at the port of Thunder Bay. However, moving west by road from Thunder Bay also involves road restrictions. Until you reach the designated "High Load Corridor" in Alberta<sup>6</sup>, which accommodates loads up to 29.5' (9 m) high, movements are generally limited to about 18'6" (5.6 m) high and 18' (5.5 m) wide. Saskatchewan has greatly improved their road allowances on a selection of main roads, and

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<sup>6</sup> The High Load Corridor in Alberta consists of designated highways which have had overhead utility lines raised to accommodate loads up to 29.5' (9 metres) high. <https://www.transportation.alberta.ca/3192.htm>

in some instances they can accommodate slightly larger loads than even Alberta<sup>7</sup>. Manitoba has not improved any of its corridors recently to handle larger loads. Manitoba also employs a slightly different bridge modelling arrangement than most of the other provinces, so determining optimum axle configurations can be challenging for superloads. Clients in the petroleum sector in Alberta more often spec their requirements for larger modules, given their access to the High Load Corridor. As a result, while Sarnia-Lambton fabricators have and continue to serve clients in the oil sands, they are somewhat limited from bidding on contracts which request much larger modules or units. The fabricators still have to contend with building only as large as the most restrictive road corridor segment.

- **Duluth to Alberta:** Shipping through the Port of Duluth, MN, is also an option to reach Western Canada. However, there are also similar load size limitations with this route as with Thunder Bay. The Port of Duluth-Superior is located inside the city, limiting the loaded dimensions to 24' (7.3m) wide and 20' (6m) high and involving utilities, which significantly increases the cost of moving the load. There are also more political risks and potential for environmental blockades when shipping through the US.
- **South along Mississippi:** Transporting oversize products down the Mississippi River into the US is restricted by height. In particular, there is an old railway bridge in Lemont, Illinois (just south-west of Chicago), which has a height restriction of 19' (5.8 m) from the water level. To address this challenge, it is possible to ballast a barge down to its lowest allowable freeboard, or to transship from a deck barge to an open hopper barge (where the load sits on the bottom of the barge as opposed to on the top).

None of the restrictions above would be alleviated by development of the proposed oversize corridor in Sarnia-Lambton.

#### 2.1.4 Costs of Oversize Shipping in Sarnia-Lambton

Oversize loads currently moving from fabricator sites to the Sarnia Harbour incur transportation costs in the range of \$15,000 to \$150,000 per move depending on the size of the piece of equipment. Weight and transporter configuration will be a major contributor to the range of costs. A move with loaded dimensions 20' H x 20' W x 40' L (6m H x 6m W x 12m L) and 60 tonnes could be moved for \$15,000. However, if the same size load was 160 tonnes it would climb into the \$30,000 range. If it was 260 tonnes it would likely climb to the \$100,000 range. Increasing the height to 28' (8.5m) for the last example could push the price into the \$150,000 range (in large part because of the cost for utility cables to be moved).

Some of the factors behind the high costs include the following:

- **Lack of a fixed corridor.** There is no fixed oversize corridor in the region. As such, every time a move is required, planning processes must be repeated (MTO approval, structural engineering reports for bridges, permitting, etc.) and infrastructure adjustments carried out

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<sup>7</sup> This has been done by the Saskatchewan government to enhance their own oil-related business opportunities and for future mining opportunities in the province.

(moving hydro lines, street lights, etc.). This results in significant bureaucracy, duplication of efforts for each move, and higher costs.

- **Uncertainty of costs.** As each move is slightly different (e.g. different vehicle height) utilities therefore provide a different quote for each move. Our consultations suggested that utilities do not provide a firm, fixed quote until the move has been completed (e.g. final price could go up or down significantly). This means that fabricators must choose whether to be conservative in their bids to clients and include the higher cost estimate (and risk losing the job), or provide a bid based on the lower end of the estimate and take a risk that they will have to pay more than planned for transportation if they win the job.

### 2.1.5 Proposed Oversize Corridor

The proposed oversize corridor for Sarnia-Lambton is designed to provide fabricators with more efficient and less costly access to the Sarnia Harbour, to enable them to ship their products to markets beyond the region. The corridor may also be used, and have benefits for, local companies importing oversize products (as discussed in Chapter 4).

The corridor route selected is described in a report by MIG Engineering<sup>8</sup>. The route was determined based on the following factors:

- Ability to provide heavy shipping access to all major local facility owners and fabrication stakeholders
- Route that would minimize required upgrades and repair costs
- Route that would minimize traffic disturbances and road closures

A map of the proposed corridor can be viewed in Appendix A.

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<sup>8</sup> MIG Engineering, "Oversize Load Corridor: Shipping Route Study", August 2016.

# 3 Sarnia-Lambton Fabricators and Capacities

## Key Chapter Takeaway

A highly capable group of mechanical fabricators has been serving the local petroleum-based industry in Sarnia-Lambton for decades. Fabrication of oversize modules is a relatively small part of their business, which also encompasses design, installation (on-site), and ongoing maintenance.

## 3.1 Overview of Existing Fabrication Industry

### 3.1.1 Consultation with Fabricators

In August 2016, members of our team visited Sarnia-Lambton to carry out consultations with large fabricators. The objective was to gather information to start our assessment of the likely economic impact (sales revenues) from establishment of the oversize corridor. To do this, fabricators were asked to provide:

- A qualitative overview of operations, capabilities, and any limitations
- A quantitative summary of existing operations (sales) related to the production of oversize modules and equipment
- An overview of current client base and approach to serving the same, and
- A perspective on the potential benefits or downsides of establishing an oversize corridor in Sarnia-Lambton.

The stakeholder questionnaire provided to fabricators ahead of the meetings is at Appendix D.

### 3.1.2 Overview of Fabrication Companies

#### Types of Oversize Products Being Manufactured

There are half a dozen or so mechanical fabricators in Sarnia-Lambton that have the capacity to produce oversize products, the largest ones being Alliance Fabricating, Anderson-Webb, Canadian Structural & Mechanical (CSM), Chemfab, Great Lakes Fabricating, Kel-Gor, and LamSar.<sup>9</sup>

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<sup>9</sup> Many other small and medium size fabricators and machinists provide support and inputs for these larger producers, but they are not producing oversize pieces.

There are other major fabricators in Sarnia-Lambton that produce structural components and assemblies, some for mechanical / electrical modules both within the region and into the US. These fabricators also produce miscellaneous metals, such as stairs, handrails, platforms, mezzanines, and miscellaneous components for industries other than Oil and Gas. They include ANJ Industrial Fabricating, Lambton Metal Service, and ProMart Industrial Products.

There is some overlap in skills and production capacity. For example, some mechanical fabricators (e.g. CSM, KelGor) have the ability for mechanical and structural work, while some companies strictly carry out structural and miscellaneous metals work (e.g. ANJ, ProMart).

The primary products produced are described below for context.

- **Mechanical modules** is the generic description given to the majority of modules required by the oil and gas and power sectors. A mechanical module is, simply put, a “unit” containing equipment (pumps, valves, compressors, vessels, etc.) and piping, instrumentation, lifting / transporting pads, and padeyes, of a prescribed size. These units are generally encompassed within a rectangular frame of structural steel members that serve for positioning / transport framing, and protection of the internal “mechanical” components. The size of modules is almost always dictated by the client and based on the available site “footprint” size.
- **Modular assemblies** are component pieces of a unit (for example, control buildings for power substations). These are often constructed in large “sub-assemblies” with all of the necessary framing to accept the designated switch panels, cable tray, etc. These “sub-assemblies” are transported to the field site where they are assembled into the final “Control Building”. This process aides in transport as these units are often in remote areas. Modular assembly production is more efficient than “stick-building” on site (where many small components are assembled), however not as efficient as completed modules.
- **Pressure vessels** are containers often cylindrical in shape, designed to hold gases or liquids, at a pressure substantially different than ambient pressure. Typically they are constructed from superior materials that are substantially heavier (than those required to construct a storage vessel of the same size). Pressure vessel fabrication and testing is regulated by engineering authorities (e.g. American Society of Mechanical Engineers - ASME) and backed up by legislation (Technical Standards & Safety Authority (TSSA), Alberta Boilers Safety Association (ABSA), and others).
- **Boilers** consist of a closed vessel, in which water or other fluid is heated. These units often look like pressure vessels, cylindrical. Boilers however, have internal piping called “tubes”. This makes boilers considerably heavier, and more complex to construct than a conventional pressure vessel of the same size. Boilers are also regulated by provincial authority (TSSA in Ontario), and ASME Boiler and Pressure Vessel Code (BPVC).
- **Piping modules** are units, often rectangular in shape, that primarily contain piping. For example, manifold piping modules often contain one very large pipe running the long axis of the module. Smaller diameter pipes are attached to the large pipe (perpendicular) and routed to various coordinates within the module to match site hook-up coordinates. These

smaller pipes may be used to channel the final product to different units or to inject an additive into the primary product.

- **Heat exchanger** is simply a device that transfers heat from one or more fluids. Heat exchangers in general are cylindrical in shape, made from materials such as carbon steel, or special alloys, depending on the service conditions. Heat exchangers have an outer “shell” similar to a pressure vessel, and internal “tube bundle/s”.

### **Level of Specialization Across Fabricators**

As noted above, there is overlap in production expertise and strong competition among the fabrication companies, with most of the large fabricators producing (or very able to produce) many of the products described above. That being said, the fabricators are to some extent limited by what they are certified to produce. For example, modules destined for the oil and gas sector fall under very strict regulatory scrutiny (TSSA in Ontario, ABSA in Alberta), ASME for pressure vessels, etc. Only a limited number of fabricators produce heat exchangers and pressure vessels, although the majority have the ability and technology to do so.

The level of industry knowledge, technology and equipment present in each facility varies. Generally speaking, however, the knowledge, technology and equipment in Sarnia-Lambton results in outputs that are comparable or better than the majority of industry facilities that fabricators could be competing against in the oil and gas sector. This is not to say that the upgrading or replacement of some equipment might not be required at a later date should order size and/or order type dictate. But presently, there are no obvious equipment or technological shortfalls that will impede Sarnia-Lambton fabricators when competing with other Canadian or international fabrication companies. In particular, the current level of automation and technology is not expected to affect the types of opportunities that become available as a result of any oversize corridor.

### **Size of Oversize Modules**

There is no ‘standard’ size for an oversize module. The fabricators produce as large or as small a unit as their clients demand, restricted only by their ability to transport the product from their shop to the client (either fully fabricated and ready for installation, or in very large parts, to be installed on site). The only significant restrictions regarding size are related to transportation of the piece to the client site (as discussed in the previous Chapter).

Fabricators have the technical capacity and physical space to produce much larger and heavier units but they do not currently do so. As noted below, this is partly as a result of the fact that their primary market is located very nearby, where it is often more economical to ship a few moderately sized parts to the client site nearby and assemble them on-site, than to try and move a much larger final product by truck. It is also because of the limits to transporting products economically out of the region, given the costs of arranging such moves within existing road and port infrastructure restrictions.



### 3.1.3 Typical Business Model for Fabricators in Sarnia-Lambton

#### Diverse Revenue Sources

Most fabricators earn their revenues from a range of services comprising fabrication, specialised construction, installation, and ongoing support to clients (on-site). The latter is particularly relevant when there is a major “turnaround” at one or more of the refineries, where operations are temporarily shut-down for regular / scheduled maintenance and a large number of skilled workers are required on site round the clock to maintain or upgrade some of the facilities.

Overall, the fabrication of oversize modules is actually a relatively small part of the business of most fabricators in the region, with much of their product “stick built” (where a unit is built – one piece at a time – on client site).

#### Client Markets

The majority of production (overall) for the fabricators is destined to the local oil / petrochemicals industry. For a couple of the larger or more specialised firms, approximately 50% or more leave Sarnia-Lambton by road, though this is typically only slightly oversize, given existing road permitting requirements. For the majority of the firms, more than 80% (in some cases over 95%) of their outputs are destined to locations within Sarnia-Lambton.

Most of the fabricators interviewed are companies that have been active in the area for decades, and in some cases generations. Until recent years, they have had no need or desire to explore markets or opportunities outside Sarnia-Lambton (and some do not have the mindset to do so either). By way of exception, the majority of local fabricators have historically performed work at the Imperial Oil, Nanticoke, Ontario facility (approximately 250 km east of Sarnia), including during turnarounds. This is the result of their relationship with Imperial Oil Limited, Sarnia.

With the downturn in the oil and gas sector nationally and internationally, as well as the steady state (limited anticipated growth) among existing refineries in Sarnia-Lambton, some fabricators have begun exploring, and exploiting “offshore” markets. This effort has achieved some positive results, though limited with respect to oversize products.

#### Physical Capacity

Fabricators are not limited in their physical or technological capacity to make larger pieces. However, they have limited production of these units because:

- They cannot physically (and economically) move the larger units out anywhere over long distance (truck and/or water); and
- They have the option of stick-building for their local clients and shipping, say, four smaller loads on a flatbed truck to assemble them 2 km down the road, rather than building one large unit and requiring significant transportation costs and permitting time to make this an oversize move.

That being said, the utilization of “offsite assembled” modules (large modules assembled entirely at the fabricator site) has significant benefits over on-site “stick building”. It allows components to be assembled, in a controlled environment, with a trained shop fabrication crew. Perhaps the biggest benefit is the potential schedule savings realized from parallel construction activities made possible by offsite fabrication. The majority of these modules may have testing performed prior to arrival on site. Once in position in the facility, they then only require “hook-up” to the adjacent components and power source (as needed).

For this reason, having an oversize corridor in Sarnia-Lambton would likely lead to benefits even for very local moves, by enabling economical transportation of more “offsite assembled” modules, relative to stick-building.

### 3.1.4 Summary of Fabricator Position

In summary, our consultations with fabricators in the area indicated the following:

- Fabricators are not limited in their physical space for production expansion, should the need arise. Many have recently upgraded their facilities or have the physical space to upgrade should market demand increase to the level that additional investments are required.
- Fabricators have “world class” quality outputs based on good/excellent technology combined with excellent skilled labour. The level of industry knowledge, technology, and equipment present in each facility varies, however, it is comparable with the majority of industry facilities they could be competing against. Moreover, the current level of automation and technology is not expected to affect opportunities that become available as a result of any oversize corridor.
- There is currently ample labour available to increase production of fabricated oversize products, should the market demand it. That being said, it was also recognized that there will always be peaks and troughs in work demands for Sarnia-Lambton fabricators, where labour supply is tight (e.g. when there are turnarounds at oil refineries in the region).

As assessment of potential new markets for Sarnia-Lambton fabricators to compete in, as well as an assessment of their capability to serve these markets, is included in Chapter 5.

# 4 Local Users of Oversize Freight

## Key Chapter Takeaway

Consultation with existing Sarnia-based industries that purchase oversize freight have indicated that the development of a corridor will not trigger any expansions that are not already being planned. The consultations also indicate that the sourcing of oversize freight by these industries is unlikely to shift from local fabricators to regional or international firms due to the development of the oversize corridor. Users of oversize freight already look outside the Sarnia-Lambton for oversize specialized equipment and still select local fabricators.

Establishment of an oversize corridor may provide an incentive to new industries that require oversize products as inputs to locate in Sarnia, though it is not possible to say whether the existence of an oversize corridor would be a *defining* factor in any investment decision.

## 4.1 Local Users of Oversize Freight

The project team identified local industries that purchase oversize freight to define how they might use the proposed oversize corridor to import products from beyond the region, and the impacts the corridor might have on their business.

### 4.1.1 Approach to Consultations

Consultations with local users of oversize freight focused on the following topics:

- **Current impediments to getting oversize freight** – Define whether the lack of an oversize corridor has limited the company’s ability to obtain required oversize freight. This question covered both infrastructure impediments, namely the inability for an oversize load to get to the facility, and transportation costs.
- **Impact of the oversize corridor and port enhancements** – Define whether the oversize corridor and port improvements would lead to an expansion of the company’s operations in Sarnia-Lambton.
- **Oversize freight sourcing decisions** – Define whether the oversize corridor and accompanying port improvements are expected to change oversize freight sourcing. Questions on this topic helped define whether the corridor and port enhancements could lead to greater competition between local fabricators and fabricators outside Sarnia-Lambton.

### 4.1.2 Consultation Findings

The project team consulted with BioAmber, Imperial Oil, NOVA Chemicals, Suncor, TransAlta, Ubiquity Solar, and CF Industries to discuss impacts of the proposed oversize corridor and port expansion. The following sections provide company background and synthesize the comments received during consultations.

#### **BioAmber**

BioAmber opened its succinic acid production facility in 2015. BioAmber has not needed oversize equipment since the opening of the facility, so their ability to comment on their future use of the proposed corridor is limited.

The existing facility is a proto-type 30,000 tonne production facility. BioAmber is considering developing a larger 200,000 tonne facility, which may be located in Sarnia, Louisiana or Iowa. It was indicated by BioAmber that is too early in the process to determine if they might use the port or corridor.

#### **Imperial Oil**

Imperial Oil produces petroleum products and petrochemical products in Sarnia. Imperial Oil has no immediate plans to use the proposed oversize corridor, but is generally in support of the project. Imperial Oil has historically been able to obtain the oversize equipment as needed and does not expect the corridor and port enhancements to change the sourcing of oversize equipment in the future.

Imperial Oil has used local fabricators for their most recent projects. The company explored sourcing from outside Sarnia-Lambton, but ultimately sourced oversize equipment locally. Sourcing is driven by schedule, quality, and cost. In the last five years, the availability of local fabricators to produce the required equipment and the relatively weak Canadian dollar have also aided in competitiveness. Imperial Oil does not expect to expand operations as a result of the oversize corridor, but they would use the Sarnia Harbour if they needed to bring in oversize equipment via waterway.

#### **Suncor**

Suncor operates a refinery and ethanol plant in the Sarnia-Lambton. Suncor has their own dock that they have used to bring in oversize equipment, though not in recent years. Suncor used their dock for bringing in products for their 2005/2006 Genesis project. Since the Genesis project, Suncor has not needed to offload oversize equipment. The Suncor dock is not ideal for bringing in oversize products, but is sufficient for one-off projects. Suncor does not have any planned expansions scheduled.

Overall, the oversize corridor and port expansion only provides value to Suncor as an option for the future. Suncor voiced their support of the project as it will enable local fabricators to export their goods (and maintain a strong industry presence).

### **TransAlta**

TransAlta operates a 500 megawatt cogeneration plant. The company does not typically import oversize products, but did so in 2000 and 2002. TransAlta is in favour of the corridor because it will enable local fabricators and encourage general economic development. TransAlta has access to an existing dock, but it is currently not set up for handling oversize equipment. Historically TransAlta has been able to get the equipment needed without an oversize corridor. They do not expect to use the oversize corridor and dock, but see it as a potential promotional option that may be valuable to future tenants of the Bluewater Energy Park.

### **Ubiquity Solar**

Ubiquity Solar is currently in the fundraising stage to develop a solar cell manufacturing plant located at the TransAlta Bluewater Energy Park. The initial build would be a demonstration site, with final plans including a larger plant. Ubiquity Solar plans on sourcing locally, regionally and internationally driven by cost. The project is in its early stages, so there is uncertainty regarding the impediments to getting oversize equipment. Ubiquity Solar would like to use the dock on the TransAlta site as the first option for bringing in oversize equipment from outside the region, but they see the benefit of having a second option from the Sarnia Harbour. Ultimately, Ubiquity Solar sees the proposed corridor and port enhancements as a net benefit to local fabricators.

### **CF Industries**

CF Industries does not have immediate needs for the oversize corridor and port enhancements. They do not see the corridor and port enhancements changing the sourcing of oversize equipment in the future. CF Industries generally supports the project and sees it benefitting local fabricators.

### **NOVA Chemicals**

NOVA Chemicals produces petrochemical products. According to our consultation with NOVA Chemicals, existing infrastructure has not hindered NOVA from expanding operations in the past. The transportation costs of moving oversize equipment have not been high enough to stop expansion. The development of an oversize corridor and port enhancement could change the source of oversize goods, but NOVA believes the project will be a net benefit to local fabricators. NOVA cited non-price factors, such as knowledge of NOVA's equipment, how they do business, and the strong local labour force available to provide maintenance support, as reasons that local fabricators are competitive.

NOVA has a potential \$2.5 billion project for a new polyethylene plant in Sarnia, and expansion of the existing cracker facility scheduled to start in the middle of 2017 and end by 2021. The local fabricators would very likely be engaged to work on the project, though it is unlikely that they will have enough capacity to absorb all aspects of the expansion. As such, imports from beyond the region will be required. The lead time needed for construction of the corridor may result in minimum immediate benefit to the NOVA scheduled expansion (e.g. major imports of oversize product will likely be required before the corridor is complete).

NOVA views the corridor as a net benefit to fabricators. It sees the potential increase in exports from local fabricators as a benefit to their future business. NOVA supports local exports because

it will lead to a steadier stream of business for fabricators, which in turn will aid in retention of the fabricator labour pool in Sarnia-Lambton and potentially increase local capacity. Local capacity is currently limited when a large project occurs (new build or turnarounds), requiring a company to source products and labour from outside the region. It is possible that local fabricators might be able to undertake a larger proportion of expansion projects following the growth and expansion from fulfilling export demand.

#### 4.1.3 Summary Impact on Local Industry Users of Oversize Freight

As summary of the takeaways from consultations with industry are as follows:

- The lack of a corridor has not limited Sarnia-Lambton users of oversize equipment ability to expand operations. Additionally, those consulted suggested that the development of a corridor will not trigger expansions that are not already being planned. Users expect some transportation cost savings after the corridor is constructed and are in support of the project.
- The establishment of the corridor may have a positive impact attracting companies that require oversize inputs that are considering investment in Sarnia-Lambton. For example, TransAlta views the corridor as a potential selling point to companies looking to locate their activities at the Bluewater Energy Park. Bluewater Energy Park also offers cheaper “behind the fence” electricity pricing (without delivery charges) which would represent a significant savings to industries that locate there. Indeed, research suggests that a critical factor in assessing investment decisions in the sector also include the costs of power, which are typically much higher in Ontario (relative to competing jurisdictions)<sup>10</sup>.
- Overall, it is not clear that the existence of an oversize corridor would be the single a defining factor in any investment decision; many other factors are at play (e.g. electricity costs). Transportation costs can in some cases be a relatively small component of a major investment project (e.g. the proposed \$2.5 billion NOVA expansion project).
- The sourcing of oversize freight by local industries is unlikely to shift from local fabricators to regional or international firms due to the development of the oversize corridor and port enhancements. Multiple consultations suggested that users of oversize freight already look outside Sarnia-Lambton for oversize specialized equipment and still select local fabricators, in part due to their local knowledge and ability to provide ongoing maintenance support.
- If construction of the oversize corridor proceeds, decision makers should identify ongoing and upcoming expansion projects to ensure construction is not hindering these projects and identify opportunities for the project to eliminate impediments affecting ongoing or upcoming projects. The NOVA chemical polyethylene expansion is an example of a project that could be ongoing during the construction phase of the oversize corridor. There may be an opportunity to prioritize the removal of costly impediments affecting the NOVA project in order to maximize the benefit the corridor confers to the region.

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<sup>10</sup> Canadian Energy Research Institute “Competitive Analysis of the Canadian Petrochemicals Sector”, Study No. 160, October 2016.

# 5 Potential Markets for Sarnia-Lambton Fabricators

## Key Chapter Takeaway

The markets with the greatest increased potential – as a result of the oversize corridor – are likely to remain the petroleum and petrochemicals sector. The opportunities will be highest for clients located near a marine port or terminal facility, where the benefits of building large modules for the oversize corridor could be maximized. Geographically, the potential appears strongest in Atlantic Canada, with moderate opportunity in the US (LNG export facilities), Western Canada, Mexico, and the Middle East. There are also opportunities in Western Canada (Alberta), though inland transportation restrictions would still prevent maximization of module or equipment size.

## 5.1 Approach

### 5.1.1 Approach to Identifying Markets

This Chapter reviews and comments on the potential markets that could be served as a result of the oversize corridor. The identification of potential opportunities for Sarnia-Lambton fabricators was based on a “market” defined by three dimensions:

- Types of oversize products fabricated in Sarnia-Lambton
- Industries currently or potentially requiring these types of oversize products
- Markets which are geographically located in areas where Sarnia-Lambton fabricators are currently able to compete or likely to be able to compete in future (once a corridor is established).

With respect to the last point above, geographical limits cover opportunities that are physically located within a reasonable distance such that Sarnia-Lambton fabricators could potentially have an advantage based on schedule, and where they are not in close proximity to much cheaper competitors (e.g. producers in India, Malaysia, China, etc.). Most of the opportunities described later in this chapter are in North America for these reasons. In addition, the clients in North America demand equipment that meets standards which Sarnia-Lambton fabricators can

currently build to (e.g. ASME, API, TSSA, ABSA, etc.), which further bolsters the opportunities in this region.

The analysis also focuses on clients / projects that are either located on or very near the water, or if located inland, have access to an oversize corridor. This is because this study is focused on assessing the benefits of moving *oversize* loads through a corridor, not simply looking at any industry demanding fabricated products. To clarify, Sarnia-Lambton fabricators can already compete in markets for normal size loads; whether or not they choose to is not the focus of this study.

Potential markets analysed in the remainder of this chapter include:

Oil & Gas Sector	Other Sectors
<ul style="list-style-type: none"> <li>• Western Canada: Inland Oil and Gas</li> <li>• Atlantic Canada: Oil and Gas</li> <li>• United States: Oil and Gas</li> <li>• Mexico: Oil and Gas</li> <li>• Cuba</li> <li>• Middle East</li> <li>• Canada West Coast: oil and LNG export</li> </ul>	<ul style="list-style-type: none"> <li>• Biochemicals</li> <li>• Government of Canada Shipbuilding</li> <li>• Water and Wastewater</li> <li>• Power Generation</li> <li>• Mining</li> <li>• Pulp and Paper</li> <li>• Food and Beverage Processing</li> </ul>



## 5.2 Western Canada: Inland Oil and Gas

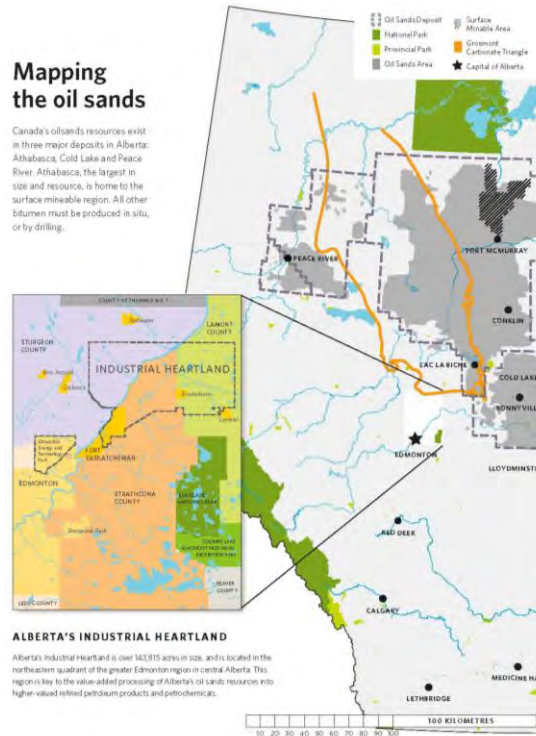
Canada, with 173 billion barrels of oil reserves, is the third largest oil producer in the world, following Saudi Arabia and Venezuela. About 98 percent (170 billion barrels) of Canada's oil reserves are located in Alberta, making Western Canada a critical market for fabricators in Sarnia-Lambton.<sup>11</sup>

### 5.2.1 Current / Anticipated Sourcing Pattern for Oversize Freight

The majority of the oil reserves located in Alberta are recovered from bitumen deposits, which have higher recovery costs than traditional oil wells. These high costs, and the recent low price of oil, have slowed the expansion of the oil and gas industry in Alberta, increasing the uncertainty in estimating the size of the potential market for supplying oversize goods in the near-term. It is likely that projects currently under construction will be completed, but new projects will be deferred or cancelled (a list of oil and gas sector projects under consideration in Alberta is provided at Appendix E). An example of this slowdown in capital expenditure can be seen in the Canadian Association of Petroleum Producers' forecasting of a 62% drop in capital expenditure in 2016 (\$31 billion) compared to 2014 (\$81 billion).<sup>12</sup> Capital expenditure is not expected to recover before 2020.<sup>13</sup>

While there is short-term uncertainty regarding the level of future investment in the Alberta oil sands, the region still remains a good potential market for Sarnia-Lambton fabricators and should be tracked. As shown in Figure 5-2, a 2012 study of the economic impact of oil sands investment (capital expenditure on new project, maintenance, repairs, and replacement) by the Conference Board of Canada determined 27% of employment associated with providing goods and services in support of expenditures in the Alberta oil sands between 2012 and 2035 went to the producers of imported goods. Additionally, 91% of the value of these imports were

Figure 5-1: Location of Alberta Oil Sands



Source: Alberta Oil Sands Industry Quarterly Update, Spring 2016

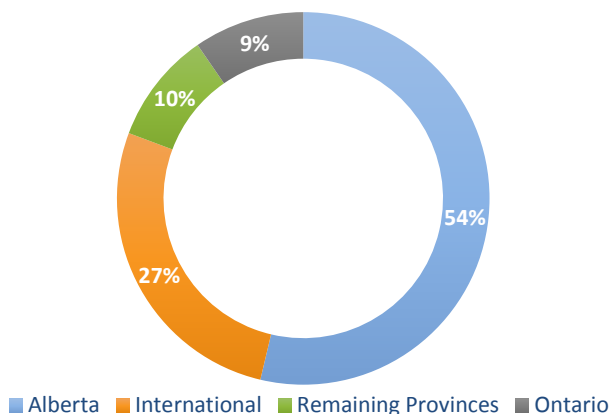
<sup>11</sup> [http://www.albertacanada.com/files/albertacanada/AOSID\\_QuarterlyUpdate\\_Spring2016.pdf](http://www.albertacanada.com/files/albertacanada/AOSID_QuarterlyUpdate_Spring2016.pdf)

<sup>12</sup> <http://www.capp.ca/media/news-releases/capital-investment-in-canada-oil-and-gas-industry-down-62-percent-in-2-years>

<sup>13</sup> [http://www.careersinoilandgas.com/media/243763/oil\\_sands\\_outlook\\_online.pdf](http://www.careersinoilandgas.com/media/243763/oil_sands_outlook_online.pdf)

manufactured goods, including machinery, primary metals, transportation equipment, and fabricated metal products.<sup>14</sup>

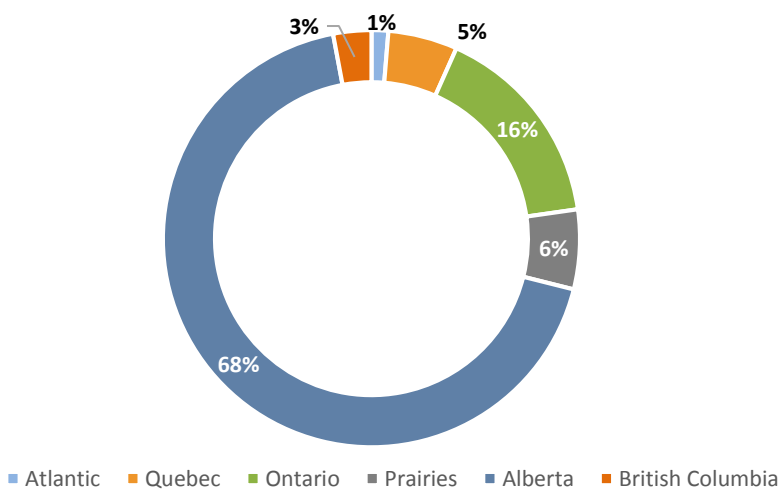
Figure 5-2: Distribution of Employment from the Supply Chain Effects of the Oil Sands



Source: CPCS Analysis of *Fuel for Thought: The Economic Benefits of Oil Sands Investment for Canada's Regions*

As shown in Figure 5-3, Ontario is the second largest Canadian recipient of employment in the fabricated metal manufacturing industry, relating specifically to projects in the Alberta oil sands.<sup>15</sup> Though Ontario has supplied the oil sands in the past, it does not guarantee future work. Furthermore, not all of the fabricated metal manufacturing will be oversize or of the technical nature that Sarnia-Lambton fabricators specialize in.

Figure 5-3: Proportion of Canadian Employment from the Supply Chain Effects of Fabricated Metal Products Manufacturing



Source: CPCS Analysis of *Fuel for Thought: The Economic Benefits of Oil Sands Investment for Canada's Regions*

<sup>14</sup> [https://www.albertacanada.com/files/albertacanada/AIS\\_FuelforThought.pdf](https://www.albertacanada.com/files/albertacanada/AIS_FuelforThought.pdf)

<sup>15</sup> The fabricated metal manufacturing industry includes machine shops; metal tanks; coating, engraving, heat treating and allied activities; ornamental and architectural metal products; all other plate work; and fabricated structural products.

In addition to the potential illustrated above from oil sands projects, there is associated potential for growth in the petrochemicals sector in Alberta, thanks in part to Government support to this subsector. In particular, the Government of Alberta recently announced (February 2016) a Petrochemicals Diversification Program which will provide \$500 million in royalty credits awarded to up to three new petrochemical facilities. The credits can be traded to an oil or natural gas producer, facilitating an agreement for reduced feedstock costs for the petrochemical producer in return for reduced royalty payments from the oil or natural gas producer. The focus of the program is investments in methane and propane upgrading.<sup>16</sup>

### Sources of Oversize Freight

The government of Alberta, energy, and engineering companies estimate that 50% to 70% of equipment used in maintenance, repair, and overhaul projects is imported. A 2015 study conducted for the Canadian Transportation Act Review defined the following ports as sources of oversize modules destined for Western Canada<sup>17</sup>:

- Vancouver, British Columbia
- Prince Rupert, British Columbia
- Thunder Bay, Ontario
- Seattle, Tacoma, Washington
- Vancouver, Washington
- Houston, Texas

The Port of Houston in Texas serves as a major hub of international oversize freight destined for Western Canada. While there is not a High Load Corridor in the United States, the Great Plains states along the corridor from Texas to Alberta are less densely populated, which reduces impediments to large oversize freight. Figure 5-4 displays the location of ports of entry and the routes used to reach the Alberta Oil sands.

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<sup>16</sup> Canadian Energy Research Institute “Competitive Analysis of the Canadian Petrochemicals Sector”, Study No. 160, October 2016.

<sup>17</sup> Source: Van Horne Institute, PROLOG Canada, JRBS Logistics Consulting, “Over-dimensional Load – A Canadian Solution”, July 2015.

Figure 5-4: Oil Sands Routes



Source: Van Horne Institute, PROLOG Canada, JRSB Logistics Consulting, "Over-dimensional Load – A Canadian Solution", July 2015.

Large oversize freight is permitted on a state-by-state and province-by-province basis. Additionally, oversize loads are limited by the corridors on which they travel. For example, Alberta has developed a High Load Corridor that can accommodate a load which is 23'8" (7m) wide and 29.5' (9m) high.<sup>18</sup> That said, the roads that lead to the High Load Corridor from the Great Lakes region have many more limitations (as described in Section 2.1.3).

### 5.2.2 Implications for Sarnia-area Fabricators

The Alberta oil sands offer considerable opportunities for companies in Sarnia-Lambton.

Fabricators in the region are more than technically capable of supplying the equipment required for operations in Alberta. Building the oversize corridor now (construction will take a few years) will ensure that Sarnia-Lambton fabricators can be ready to benefit from the rebound in the oil sector when it happens. President-elect Donald Trump also appears to strongly support approval of the Keystone XL pipeline, which could boost the oil and gas sector in Alberta.

That being said, there are still some limits to the benefits of the corridor overall. As shown in the corridor from Thunder Bay to Alberta, even if the oversize corridor is built in Sarnia-Lambton, there are restrictions on the movement of oversize loads from Thunder Bay to Western Canada. Therefore, while the proposed corridor would allow for a loaded size of 30' high and wide, such a load size could not be transported between Thunder Bay and Alberta. The difficulty with this restriction is that clients dictate the size of unit they require, which is dependent on the facility/purpose. In some cases, clients require modules larger than the above

<sup>18</sup> Over-dimensional Load – A Canadian Solution, 2015. The Van Horne Institute.

noted size criteria, leaving Sarnia-Lambton fabricators facing barriers even if the corridor is built. There may be scope to work with provincial governments to try and address this situation between Thunder Bay and Alberta. In particular, the Government of Ontario in its Budget 2016 committed to creating “Superload” corridors.<sup>19</sup> The federal government has also shown an interest in better understanding the issues associated with oversize transport in Canada; a research report on oversize loads in Canada was commissioned by the Canada Transportation Act Review committee in 2016<sup>20</sup>.

Other challenges highlighted in previous studies in terms of accessing markets in Western Canada are a lack of local presence and engaging with oil sands firms.<sup>21</sup>

### Relationship between Large and Small Fabrication Shops

Many of the major engineering, procurement, and construction (EPC) contractors have large fabrication shops located across Canada. For example, AECOM has fabrication shops in seven cities across the country. One might ask how can the smaller shops in Sarnia-Lambton possibly compete against them?

In some cases, these large EPC contractors and the relatively smaller fabrication companies in Sarnia-Lambton will compete directly on a single job. This would typically be for a smaller order. Sometimes the Sarnia-Lambton fabricators will be able to beat the larger fabrication shops on price, given they are leaner and have lower overheads. In other cases, particularly for larger orders, the big EPC companies will ask the Sarnia-Lambton fabricators to provide them with quotes for individual components or modules, which will then be included in the larger bid (e.g. sub-contracting).

The large companies often have huge fabrication shops to assist their “internal” projects, or execute very large projects like building “super modules”. They will compete if capacity and commitments allow, but it is not their primary purpose.

It is also worth noting that the Sarnia-Lambton fabricators are not only well qualified, but they are very efficient. The companies in the region have been competing against each other for years and this has contributed to their efficiency.

The level of competition and collaboration between the large and small fabrication shops is also affected by the state of the oil and gas market at any given time. When things are slow (as is currently the case), many fabrication shops will be relatively quiet and companies will be hungrier for work and do more in-house. However when the industry returns to some form of “normal”, it is expected that Sarnia-Lambton’s lean and efficient approach will again enable them to “punch above their weight” in terms of the contracts they could secure.

<sup>19</sup> Ontario Budget 2016: Jobs for Today and Tomorrow, page 19. [http://www.fin.gov.on.ca/en/budget/ontariobudgets/2016/papers\\_all.pdf](http://www.fin.gov.on.ca/en/budget/ontariobudgets/2016/papers_all.pdf)

<sup>20</sup> Van Horne Institute, PROLOG Canada and JRSB Consulting Ltd, “Over-dimensional Loads – a Canadian Solution”, July 2015.

<sup>21</sup> [https://www.albertacanada.com/files/albertacanada/AIS\\_FuelforThought.pdf](https://www.albertacanada.com/files/albertacanada/AIS_FuelforThought.pdf)

Overall, the potential size of future investment, the impacts that the corridor could have on reducing transportation costs (for the smaller oversize loads which can fit through the western corridor), and the advantageous Canadian exchange rate could position Sarnia-Lambton fabricators to be greater recipients of future projects from the Alberta oil sands. Fabricators with existing relationships are best positioned to take advantage of increased competitiveness due to the corridor.

## 5.3 Atlantic Canada: Oil and Gas

### 5.3.1 Upstream Oil and Gas

Atlantic Canada is currently home to the offshore oil and gas industry in Canada. Cumulative expenditures by the Atlantic Canadian offshore industry since 1996 total more than \$39 billion. In 2014, the oil and natural gas industry paid more than \$2 billion in royalties to the governments of Newfoundland and Labrador (NL) and Nova Scotia. The industry supports more than 800 supply and service companies.<sup>22</sup>

#### Newfoundland and Labrador (Upstream)

The first offshore oil wells in NL were drilled in the early 1960s, however nothing significant was found until 1979 when the Hibernia field was discovered. Many obstacles had to be overcome before first oil could be produced in 1997 when the Hibernia platform was positioned and started production. Since then, three projects have come online and each has brought opportunities for the province and Canada as a whole. The offshore projects in NL are:

- Hibernia platform gravity base offshore installation
- Two Floating Production, Storage and Off-loading vessels (FPSOs): Sea Rose and Terra Nova
- Hebron gravity base structure (under development - which is approximately 80% complete)

To date, more than 3 billion barrels of oil have been discovered offshore NL and the province estimates more than 6 billion barrels of oil are still undiscovered. In terms of natural gas, 11 trillion cubic feet of natural gas have been discovered to date, with another 60 trillion cubic feet of natural gas estimated to be undiscovered.<sup>23</sup>

#### Nova Scotia (Upstream)

Canada's first offshore project, Cohasset-Panuke, commenced oil production in 1992 and ceased production in December 1999. It produced more than 44 million barrels of crude, was a significant contributor to the Nova Scotia and Atlantic Canadian economies, and helped to build offshore oil infrastructure on Canada's East Coast.

<sup>22</sup> [www.capp.ca](http://www.capp.ca) and [www.Atlanticcanadaoffshore.ca](http://www.Atlanticcanadaoffshore.ca)

<sup>23</sup> [www.capp.ca](http://www.capp.ca)

There are currently two producing offshore natural gas fields in Nova Scotia: the Sable Offshore Energy Project (3 platforms, North Triumph, Tibeau, and Venture) and Deep Panuke.

The province of Nova Scotia estimates there is 120 trillion cubic feet of natural gas offshore resource potential and 8 billion barrels of oil in resource potential.<sup>24</sup>

### 5.3.2 Implications for Sarnia-Lambton Fabricators in Upstream Oil and Gas

All of the above noted installations in Atlantic Canada require constant maintenance, and periodic shutdowns, for major maintenance and upgrading. Opportunities may exist prior to and during these outages for Sarnia-Lambton fabricators to construct modules, vessels, or other components for installation or use during these shutdowns.

Two major projects which may present further opportunities include:

- **West White Rose Extension – Husky Energy (NL).** This project involves a “smaller” gravity base than the Hibernia platform, and will be the first offshore project to be constructed outside the Bull Arm fabrication facility. The facility construction is on hold until the price of oil and conditions within the industry rebound.
- **Goldboro LNG Terminal and Storage facility – Sable Energy (NS)** (see text box overleaf). We believe there are particularly good opportunities for Sarnia-Lambton fabricators to supply the Goldboro project. The facility is being developed water-side, meaning few restrictions (on the import side) in terms of the size of the products that can be shipped. This means that Sarnia-Lambton fabricators could build up to the maximum corridor size.

Generally speaking, offshore oil and gas development in and off Atlantic Canada is very young. Although these future projects are lucrative and create a huge boost to the local economy, they are few and far between (with an average time between mega-projects being 5 to 10 years.) That being said, for the foreseeable future, offshore oil and gas installations will continue to be constructed on the east coast to meet Canada’s energy needs. Although there is no continuity in the construction of these platforms, they still create hundreds of excellent opportunities for qualified fabricators (mechanical and otherwise) such as those in Sarnia-Lambton.

These opportunities will become much more accessible when the oversize overweight corridor is complete and transport becomes more of a “port to port” exercise.

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<sup>24</sup> [www.capp.ca](http://www.capp.ca)

### Goldboro LNG Project

The Goldsboro liquefied natural gas (LNG) project is in development. It consists of an LNG processing facility, storage tanks and marine works, located in at the Goldsboro Industrial Park in Guysborough County, NS. The facility is adjacent to the Maritimes & Northeast Pipeline, a 1,400-kilometre transmission pipeline system built to transport natural gas between developments in Nova Scotia, Atlantic Canada and the northeastern United States. It is anticipated to produce approximately ten million metric tonnes of LNG per year and have on-site storage capacity of 690,000 cubic metres of LNG (three new Cryogenic tanks with a capacity of 230,000 Cubic Meters each). Once completed, it will be Eastern Canada's LNG export facility.

The project is being developed by Pieridae Energy (Canada) Limited, a Canadian infrastructure development company focused on LNG opportunities, at an approximate value of C\$5 - \$10 billion. Pieridae continues to meet major milestones for the project. Construction is expected to begin in 2017, with a workforce estimated in the 1,500 persons range during construction. Commercial operations are expected to start in 2019. There will be significant subcontractor and fabricator support requirements, including for construction of the three storage tanks, piping, and pipe racks.

CB&I UK is performing the front end engineering and design (FEED) engineering out of their office in London, England (design from the well head / platform to the beach). On completion of the terminal, storage tanks, pipe-racks, and other component pieces, the owners expect 7-13 vessel shipments per month to sail from Goldsboro.

We understand that some of the Sarnia-Lambton contractors are already aware of this opportunity.

Source: [www.goldborolng.com](http://www.goldborolng.com) and industry consultation

### 5.3.3 Downstream Oil and Gas

There are two downstream refinery complexes in Atlantic Canada:

- Irving Refining Limited, in Saint John, NB, is one of the largest refiners in Canada producing 300,000-320,000 barrels of product per day.
- North Atlantic Refining Limited (NARL), in Come by Chance, NL is a midsize refinery, producing in the range of 115,000 barrels of oil per day<sup>25</sup>.

Both of these facilities require ongoing maintenance, equipment replacement and repair, scheduled and unscheduled turnarounds, and capital expansion and upgrades. Sarnia-Lambton fabricators are already competing in this market (e.g. they could theoretically already bid on jobs), but are not doing so to any great extent. Given their technology, workforce, and quality of product we believe that additional opportunities to serve this market competitively will arise thanks to transportation cost savings from the proposed oversize corridor. The reduction of the

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<sup>25</sup> <http://northatlantic.ca/our-company>



freight cost (travelling through the city without complex load-out arrangements) as a result of the corridor will go a long way in helping them be competitive.

### Refineries in Québec

There are two refineries in the province of Quebec: the Ultramar refinery in Levis and the Suncor refinery in Montreal. In theory, opening the corridor would also make Sarnia-Lambton fabricators more competitive to provide equipment to these refineries. In practice, penetrating the Quebec market is more complex than other parts of Canada. The requirements are slightly different, the Union system is more complex (with essentially one agreement covering more than a dozen building trades and others) and language barriers are a significant issue. In particular, it could be necessary to hire a bilingual supervisor for execution of installation for a fabricated piece, which would add additional cost to the project. In short, we do not believe the Quebec market would present the same opportunities as in Atlantic Canada.

## 5.4 United States: Oil and Gas

The recent exploitation of the Utica and Marcellus shale gas areas are a major driver of growth in the petroleum and petrochemicals sector in the US. This has implications for Sarnia-Lambton fabricators on a number of levels, both in terms of opportunities on the US North-East coast, as well as in the traditional petroleum hub of the Gulf Coast.

### 5.4.1 Utica and Marcellus Shale Areas

The Utica and Marcellus Shale areas are located in overlapping regions of the north-eastern US, covering large areas of Ohio, Pennsylvania, West Virginia, and New York<sup>26</sup>. Until the early 2000s, the areas had been known to contain natural gas but had not been extensively developed due to the great depth of the resources and the low permeability of the rock. This changed with the advent of horizontal drilling and hydraulic fracking technologies, which established the region as one of the world's largest natural gas fields under development. Production from the Marcellus and Utica shales of Pennsylvania, West Virginia, and Ohio has increased 17-fold in less than a decade, and was up to 22 billion cubic-feet/day in February 2016. Indeed, shale production out of the US in the past decade has been a major reason for the drop in natural gas prices worldwide, as a new source of production hit the markets.<sup>27</sup>

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<sup>26</sup> The Utica Shale is located a few thousand feet below the Marcellus Shale.

<sup>27</sup> Gregory Meyer, Financial Times "US Gas: Global Market, Local Problems", September 26, 2016.

Figure 5-5: Marcellus Shale Play



JOHN SOPINSKI/THE GLOBE AND MAIL » SOURCE: U.S. ENERGY INFORMATION ADMINISTRATION

Low gas prices have slowed the natural gas fracking boom (22 rigs are drilling in Pennsylvania currently, down from 109 five year ago), though gas producers in the region are still producing huge volumes of natural gas.<sup>28</sup>

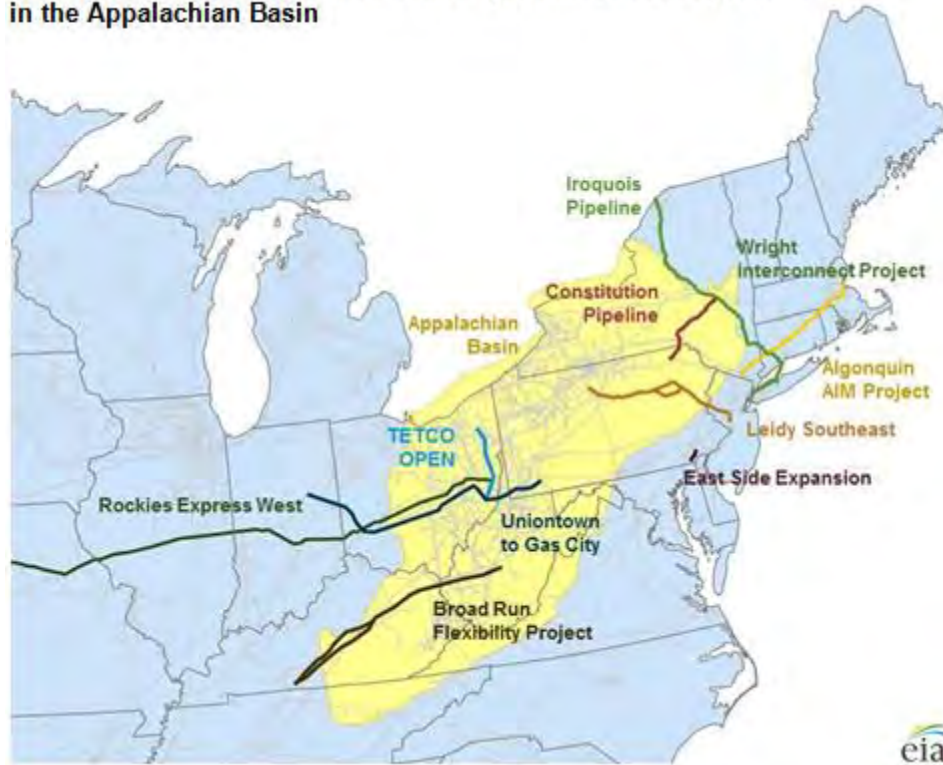
The growth in natural gas production has resulted in a major demand for two types of infrastructure: pipelines and LNG liquefaction.

Pipelines have historically run north to south in the US, though new natural gas pipeline projects have been proposed in recent years both down to the Gulf Coast and the US East Coast (see Figure 5-6).

<sup>28</sup> Gregory Meyer, Financial Times “US Gas: Global Market, Local Problems”, September 26, 2016

Figure 5-6: Proposed Natural Gas Pipeline Projects

### Selected existing and planned natural gas infrastructure projects in the Appalachian Basin



Source: <http://www.oilandgas360.com/lng-update-u-s-export-terminals-and-infrastructure-in-the-works/> from EIA

New LNG (liquefaction) production and export facilities are expected to be largely concentrated on the Gulf Coast. Major LNG export terminals in development include:

- Sabine Pass LNG, Louisiana (first LNG shipment made in February 2016)
- Dominion Energy's Cove Point LNG terminal (Maryland)
- Corpus Christi LNG (Texas)
- Cameron LNG (Louisiana)
- Freeport LNG (Texas)

Some of these involve conversion of existing import terminals into export terminals.

### Procurement Approach

The price of gas will have to recover for some of the proposed investment projects to move ahead, but it is expected that the natural gas boom in the US will continue for many years to come. It is difficult to say with any certainty which, and when, various pipeline and LNG export facilities will be approved and come online. In particular, there is strong resistance in the US north east to development of gas pipelines which has delayed development of additional pipelines.<sup>29</sup>

<sup>29</sup> Gregory Meyer, Financial Times "US Gas: Global Market, Local Problems", September 26, 2016

For projects that do proceed, the procurement approach for new construction is expected to follow a similar approach to existing petroleum facilities. That is, major oil and gas companies will procure EPC contractors who would then sub-contract components as required to specialised firms, including for fabrication.

#### 5.4.2 US Gulf Coast

The Gulf of Mexico area, both onshore and offshore, is one of the most important regions for energy resources and infrastructure in the US. Gulf of Mexico federal offshore oil production accounts for 17% of total US crude oil production and federal offshore natural gas production in the Gulf accounts for 5% of total US dry production. Even more relevant for Sarnia-Lambton fabricators, over 45% of total US petroleum refining capacity is located along the Gulf coast (Texas, Louisiana, Mississippi, Alabama), as well as 51% of total US natural gas processing plant capacity.<sup>30</sup> All major multinational oil companies are active along the Gulf Coast, with Houston being a major petroleum and petrochemicals hub.

#### 5.4.3 Implications for Sarnia-Lambton Fabricators

The pipeline and LNG liquefaction projects will demand the kind of equipment that Sarnia-Lambton fabricators could provide, with varying degrees of opportunity.

##### LNG Export Facilities North East US

For new/re-configured LNG export facilities on the US North-East coast, Sarnia-Lambton fabricators may be more competitive, given the relative proximity to Sarnia-Lambton and higher labour cost in the US North-East states (e.g. with labour rates more comparable to Canada).

##### US Gulf Coast

Although present circumstance within the oil and gas industry are not “booming”, the oil and gas industry in the Gulf of Mexico is always busy and relatively short on fabricator capacity. For new LNG and other facilities on the Gulf Coast, it may be difficult for Sarnia-Lambton fabricators to compete, given the abundance of a local, highly skilled labour force located nearby, which commands lower wages. While the Canadian dollar is weak, Sarnia-Lambton fabricators may see some benefits. But this is a market that would likely only be competitive on the basis of schedule (if fabrication shops in the Gulf Coast region are busier than in Sarnia-Lambton, and if fabricators can produce on a timeline that local area fabricators cannot meet).

##### Pipeline and Inland Work

For future pipeline projects (and other LNG-related facilities inland), Sarnia-Lambton fabricators could compete, notably through production of compression stations and pumps for pipelines. However, the size of the corridor is not likely to be a huge defining factor for this market. As the pipeline projects would mostly be located inland, the market would still be limited to sized that can fit on existing roadways (e.g. under 16’ high, or face quickly incurring additional costs). This

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<sup>30</sup> US Energy Information Administration, “Gulf of Mexico Fact Sheet”. [http://www.eia.gov/special/gulf\\_of\\_mexico/](http://www.eia.gov/special/gulf_of_mexico/)

is a market that Sarnia-Lambton fabricators can already theoretically compete in, though they would become slightly more cost competitive with the opening up of the corridor.

#### Shell Petrochemicals Complex - Pennsylvania

In June 2016, Shell Chemical Appalachia announced the final investment decision to build a major petrochemicals complex, comprising an ethylene cracker with a polyethylene derivatives unit, near Pittsburgh, PA on the Ohio River. The complex will use ethane from shale gas producers in the Marcellus and Utica basins to produce up to 1.6 million tonnes of polyethylene per year.

The proposed facility is about 500 km away by road from Sarnia. The project is a good opportunity for Sarnia-area fabricators as they are very likely to have the capacity to produce inputs for the facility. That being said, the type and size of modules required will have an impact on competitiveness and decisions regarding routing (road vs. water).

Any modules moving by road from Sarnia-Lambton to the new Shell facility would have to fall into the small size category (12' W x 12' H x 50' L; 3.6m W x 3.6 m H x 15m L) due to road restrictions along the route. Such moves would be unlikely to benefit from the oversize corridor. If larger modules were required, these could be shipped by barge from Sarnia, transit via the Illinois River to the Mississippi River, and back up the Ohio River (significantly more time involved). There is a low bridge on the Illinois River which limits loaded barge height to 19' above water, so modules would be limited to around 16' high, but they could be significantly heavier, wider, and longer than units shipped by road. The modules could alternatively be transferred to hopper style barges near Chicago to go down the river which would allow taller units. However this increases costs significantly. Generally speaking, river transport can be a challenge as there are a whole new set of conditions to meet versus simply barging on the Great Lakes.

In brief, it is hard to tell what impact the corridor would have on the competitiveness of Sarnia-Lambton fabricators for the new Shell facility. If small modules (normal size loads) are required, the competitive landscape is unchanged from the present context. If larger modules are required, the oversize corridor would have an impact on lowering transportation costs with the water option.

Source: [www.shell.com](http://www.shell.com); industry consultation; and Canadian Energy Research Institute "Competitive Analysis of the Canadian Petrochemicals Sector", Study No. 160, October 2016.

Figure 5-7: Module Moved by Barge on River System from Goose Creek, SC to Monaca, PA



Source: Mammoet Transport.

## 5.5 Mexico: Oil and Gas

Mexico is currently the 11<sup>th</sup> largest crude oil producer in the world. In 2015, it produced 2.6 million barrels per day (mbpd). In comparison, Canada produced 4.4 mbpd. Since 1938, when the Mexican government nationalised (expropriated) all oil resources and facilities from formerly private hands, the sector has been run entirely by the state-owned company Petróleos Mexicanos (Pemex). Pemex controls all oil production, refining, and sale of gasoline across the country. Infrastructure in the sector comprises 6 refineries, 9 gas processing facilities, 3 petrochemicals complexes, and a pipeline network.

Figure 5-8: Key Oil and Gas Facilities



Source: [www.pemex.com](http://www.pemex.com) (Green = Refinery, Blue = Petrochemicals, Red = Gas processing centre)

The petroleum sector is critical to the Mexican economy. Pemex has historically been very heavily taxed (close to 100% tax), with their tax revenues accounting for about one third of the federal government's total tax revenues. The company has regularly operated at a loss as a result of this arrangement, and has subsequently failed to invest adequately in maintaining and upgrading existing petroleum and petro-chemical sector infrastructure facilities, let alone carrying out additional exploration (refinery utilization rates are below the 80% level, and the country imports large volumes of gasoline from the US).<sup>31</sup> This suggests that there is likely decades of re-building required which includes new vessels, exchangers, towers, modules, pipe-racks, tanks, etc.

Oil production has declined steadily for the past decade or so, from a high of 3.8 mbpd in 2004 to 2.6 mbpd in 2015. Proven oil reserves have also declined over time (in contrast to the US and

<sup>31</sup> OPEC World Oil Outlook 2015, p. 315.

Canada, for example), though recent discoveries of offshore oil and gas have renewed hope in the sector.

The energy sector in Mexico is undergoing major reforms, and Pemex is being re-structured. In 2014, the government signed into law energy reforms which ended Pemex's 75-year monopoly on oil and gas activities. The legislation enables some private sector participation in the oil and gas sector, including opening up the market for competitive tender by foreign firms for offshore exploration contracts (with production-sharing contracts).<sup>32</sup> The reforms were done in an effort to increase investment in oil and gas exploration, and addresses the need for major overhaul of how the sector is managed in order to encourage the upgrading of existing refinery and other processing facilities across the country.

As part of the energy sector reform, Pemex is in the process of implementing a major “fuel quality” project, which involves US\$2.8 billion investment in increasing production of lower sulfur diesel at five of Mexico's refineries. Contracts awarded in recent years associated with this fuel quality project include:<sup>33</sup>

- Técnicas Reunidas EPC contract (US\$500 million) for commissioning of three new refining units at the Lazaro Cardenas refinery
- ICA Fluor Daniel (US\$737 million) for the Francisco Madero refinery
- Samsung Engineering Co. Ltd. (US\$359 million) for the Antonio Amor refinery
- Foster Wheeler USA Corp. (US\$584 million) for the Antonio Dovalí Jaime refinery
- ICA-Fluor Joint Venture for modernization and expansion of Miguel Hidalgo refinery in Tula.

All of these projects are multi-year undertakings, and a number are still in the early stages. There are additional refinery upgrade projects in various stages of planning, some of which are on hold for the time being, pending an increase in the price of oil.

Overall, the energy sector reforms have improved the outlook for the Mexican oil and gas sector, and should significantly increase the number of opportunities for foreign companies to become involved in the oil and gas sector across the country.

Based on consultation, following decades of under-investment, there is a major lack of any local capacity for fabrication of modules and other technical equipment required for the sector, and the market is ripe for entrants from outside of Mexico.

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<sup>32</sup> HART ENERGY E & P “Mexico: Land of Bidding Opportunity”, May 1, 2015. <http://www.epmag.com/mexico-land-bidding-opportunity-792711#p=full>

<sup>33</sup> Oil & Gas Journal, “Pemex advances diesel program at Mexican refineries”, September 15, 2014. <http://www.ogj.com/articles/2014/09/pemex-advances-diesel-program-at-mexican-refineries.html>, and Oil & Gas Journal, “Pemex lets contract for Tula refinery upgrade”, November 13, 2015. <http://www.ogj.com/articles/2015/11/pemex-lets-contract-for-tula-refinery-upgrade.html>

### 5.5.1 Current / Anticipated Sourcing Pattern for Oversize Freight

Experience to date suggests that the procurement model used for Greenfield and upgrading investments in the petroleum sector will be similar to approaches used globally. Large EPC companies (Empresas ICA,<sup>34</sup> Fluor,<sup>35</sup> Foster Wheeler, Samsung Engineering, etc.) are being engaged by Pemex to carry out work in the sector. These companies then subcontract various components to specialised sub-contractors, including for fabrication.

Consultation suggests that an absolutely critical factor to securing any contracts or sub-contracts in Mexico (relative to Canada and the US) is establishment of local relationships. This does not necessarily mean that a Sarnia-Lambton fabricator needs to establish a shop in Mexico, but rather that use of a local, well-connected agent is essential to become known to the right companies and players.

### 5.5.2 Implications for Sarnia-Lambton Fabricators

There appears to be a significant demand for the types of products manufactured by Sarnia-Lambton companies in Mexico, though it is not possible to determine what proportion of future project needs will relate to oversize products specifically. Importantly, we understand there is very limited local fabrication capacity for supplying high-end products, most of which will therefore need to be sourced externally. This suggests that there is a large opportunity for Sarnia-Lambton fabricators, particularly taking into consideration some existing trade advantages between Canada and Mexico:

- Canada is part of NAFTA and would benefit from some of its advantages, including the right to bring Canadian-made equipment, materials, and services into the country tariff-free, as well as access to dispute resolution mechanisms.<sup>36</sup> Of course, these benefits extend to US competitors as well. It is also worth noting that the future of NAFTA under President Trump is unclear, though one could assume that trade relations between Canada and Mexico would remain strong.
- The relatively low Canadian dollar exchange rate makes nearby US fabricator products relatively more expensive.

There are risks to doing business in Mexico. Public sector corruption is a challenge. The country ranks 95<sup>th</sup> out of 168 countries globally in the Transparency International “Corruption

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<sup>34</sup> Empresas ICA, S.A.B. de C.V. is Mexico's largest infrastructure company. ICA carries out large-scale civil and industrial construction projects and operates a portfolio of long-term assets, including airports, toll roads, water systems, and real estate. Founded in 1947, ICA is listed on the Mexican and New York Stock exchanges. [www.ica.com.mx](http://www.ica.com.mx)

<sup>35</sup> Fluor Corporation (NYSE:FLR) is a global engineering and construction firm that designs and builds complex infrastructure projects, including engineering, procurement, fabrication, construction, maintenance, and project management. For more than a century, Fluor has served clients in the energy, chemicals, government, industrial, infrastructure, mining, and power market sectors. [www.fluor.com](http://www.fluor.com)

<sup>36</sup> C. Sands and J. Barnett, “The Mexican Energy Opportunity for the Reluctant Amigo”, Energy Magazine, Issue 2, 2016. [www.energymag.ca](http://www.energymag.ca)



Perceptions Index”, which ranks countries on perception of public sector corruption.<sup>37</sup> Security can also be a concern. There are options to address these risks, including Export Development Canada (EDC) Insurance that can also be used to mitigate financial risk when doing business with companies in countries such as Mexico.

Overall, we believe there is an opportunity worth exploring to supply fabricated pieces to major EPC contractors active in the country, without a major need for investment or physical presence in the country. What is critical, as noted above, is investment in developing the necessary relationships with locally-based agents and companies active in the sector to market the capacities of local area fabricators.<sup>38</sup> Developing such relationships will take time, and if Sarnia-Lambton fabricators wish to serve this market (for oversize products or otherwise), development of these relationships should start now (e.g. even before physical development of any oversize corridor).

## 5.6 Cuba: Oil and Gas

Over the course of our consultations, the potential for demand for fabricated products in the Cuban oil and gas sector was also mentioned. Cuba’s current crude oil and associated natural gas production from onshore and shallow water coastal reservoirs is approximately 50,000 bpd of liquids and 20,000 bpd oil equivalent of natural gas.<sup>39</sup> The country is increasingly interested in offshore exploration, mostly across the Cuban shelf, located along the Northern region of the country.<sup>40</sup>

Cuba Petróleo Union (CUPET) is the state-owned oil company responsible for the country’s oil and gas sector, including refining and distribution of petroleum products. A number of international companies are active in the country, including Canada’s Sherritt International which produced about 20,000 barrels of oil per day in 2014 (the country’s largest independent energy producer<sup>41</sup>).<sup>42</sup> CUPET is working on increasing their refining capacity and reworking currently suspended wells.

In November 2014, Cuba’s Ministry of Foreign Trade and Investment announced 246 development projects for which it was seeking US\$8 billion in foreign investment. Among the portfolio of projects, 86 are in the petroleum sector. The Government has specifically stated

<sup>37</sup> Transportation International, 2015. [www.transparency.org](http://www.transparency.org)

<sup>38</sup> Pemex has an on-line supplier registration process, known as Pemex PASS, which may be one angle to starting to do business in the country ([www.pemex.com/en/procurement/supplier\\_relationships/Paginas/pemex-pass.aspx](http://www.pemex.com/en/procurement/supplier_relationships/Paginas/pemex-pass.aspx)). However, it would be insufficient and development of additional relationships would be required.

<sup>39</sup> US Geological Survey, “Recent Trends in Cuba’s Mining and Petroleum Industries”, April 2015.

<sup>40</sup> <http://www.cubabusinessreport.com/interview-with-felix-chevalier-on-the-recent-houston-trade-mission-to-havana/> and <http://www.usnews.com/news/articles/2016-03-21/obama-castro-call-for-trade-embargo-on-cuba-to-be-lifted>

<sup>41</sup> US Geological Survey, “Recent Trends in Cuba’s Mining and Petroleum Industries”, April 2015.

<sup>42</sup> Cuba Business Report “The Oil and Gas Industry in Cuba”, March 13, 2016. <http://www.cubabusinessreport.com/the-oil-and-gas-industry-in-cuba/>

that Cuba will remain a state-driven economy dominated by large public-sector owned companies and that most foreign ventures will retain a majority Cuban ownership. In the energy sector specifically, the country is offering joint ventures in petroleum extraction from onshore and offshore blocks, but has also reported that it hopes to increase the share of electricity produced by renewable sources (hydro, wind, solar) from 4% in 2014 to 24% by 2030.<sup>43</sup>

As of 2015, deep-water drilling by such foreign companies as Repsol S.A. of Spain and JSC Zarubezhneft of Russia has resulted in no discovery of commercial quantities of oil or gas.

### 5.6.1 Potential for Sarnia-Lambton Area Fabricators

In principle, there is an abundance of opportunity for further development of the oil and gas sector in Cuba, though it is difficult to determine the extent of the opportunity for Sarnia-Lambton fabricators at this stage. There are still risks to doing business in Cuba as it is a very different environment to most open market economies worldwide, with public-sector ownership (or majority ownership) still prevalent and a tightly controlled labour market. It is not clear what this relationship would mean for Sarnia-Lambton in terms of influence on procurement decisions, bearing in mind that Sarnia-Lambton fabricators would likely be subcontractors to larger engineering firms for any upgrading or new investment work. In principle, Canadian fabrication firms – relative to their US competitors in the Gulf Coast – would likely have a major advantage serving this market, at least until the US trade embargo is removed.<sup>44</sup>

Again, marketing efforts targeted at developing relationships on the ground would be critical to this success.

## 5.7 Middle East: Oil and Gas

Countries in the Middle East lead global production of petroleum products. Saudi Arabia is currently the world's largest single oil producer, with other low-cost producers in the region including Kuwait, the United Arab Emirates (UAE), Iraq, and Iran. While the Middle East has long dominated the world market for crude oil exports, the region has not until recently started to build up a significant refinery system. Some of the crude that is produced in the Middle East is shipped to refineries in Asia, Europe, and the US before being sold back to the Middle East in the form of gasoline, jet fuel, and petrochemicals products.<sup>45</sup>

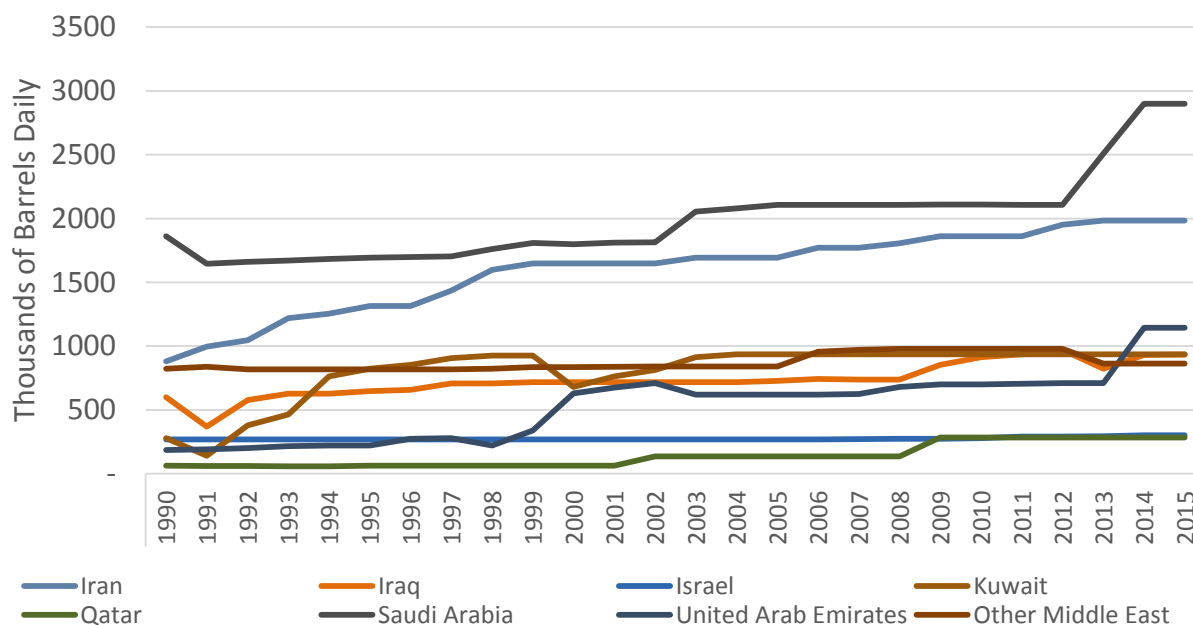
<sup>43</sup> US Geological Survey, "Recent Trends in Cuba's Mining and Petroleum Industries", April 2015.

<sup>44</sup> On January 15, 2015, the U.S. Departments of Commerce and the Treasury published regulatory amendments to the Cuba sanctions (U.S. Department of the Treasury, 2015) in accordance with President Obama's December 2014 policy announcement (The White House, 2014). These measures made changes in the implementation of the embargo but did not lift the embargo. Most transactions involving Cuba, including private and public investment in mineral production, continue to be prohibited. Source: US Geological Survey, "Recent Trends in Cuba's Mining and Petroleum Industries", April 2015.

<sup>45</sup> Wall Street Journal, "Middle East Refinery Expansion Plans Hit Snags", August 3, 2015. <http://www.wsj.com/articles/middle-east-refinery-expansion-plans-hit-snags-1438591860>

In recent years, countries in the region – led by Saudi Arabia and the UAE – are making concerted efforts to change this reality by investing in development of refinery systems, thereby offering greater opportunities for value adding at home and reducing the need for imports. Middle Eastern refining capacity increased from 6.5 million barrels/day in 2000 to 9.4 million barrels/day in 2015 (Figure 5-9). To put this in perspective, in 2015, countries in the Middle East accounted for 32% of oil production globally, but still only accounted for only 9.6% of refining capacity worldwide<sup>46</sup>.

Figure 5-9: Middle East Oil Refining Capacities



Source: CPCS analysis of BP Statistical Review of World Energy 2016. "Oil Refinery Capacities".

While there are always fluctuations in the petroleum and petrochemicals sector (alongside the price of crude oil), the World Oil Outlook 2015 forecasts that more refining capacity will be added in the Middle East than any other region of the world between 2015 and 2020. A few of the projects in development are listed below.<sup>47</sup>

- Saudi Arabia is developing a new 400,000 bpd refinery complex "Jazan Industrial City" (start-up anticipated in in 2018) as well as expanding the Petro Rabigh refinery/petrochemicals complex.
- UAE is developing a 200,000 bpd refinery in Fujairah on Gulf of Oman, and is upgrading their Jebel Ali condensate refinery.

<sup>46</sup> BP Statistical Review of World Energy 2016

<sup>47</sup> OPEC World Oil Outlook 2015, October 2015.  
[http://www.opec.org/opec\\_web/static\\_files\\_project/media/downloads/publications/WOO%202015.pdf](http://www.opec.org/opec_web/static_files_project/media/downloads/publications/WOO%202015.pdf)

- Kuwait plans to build the Middle East’s largest refinery (Al-Zour) at 615,000 bpd (commissioning unlikely before 2019), and is adding refining capacity at two of its existing facilities (Mina Abdullah and Mina Al-Ahmadi).

The projects above are examples of the types of mega projects that may provide opportunities for fabricators in the Sarnia-Lambton region.

### 5.7.1 Current / Anticipated Sourcing Pattern for Oversize Freight

Many of the petroleum refineries in the Middle East are owned by state-owned companies. Based on a review of previous refinery upgrade and greenfield projects, contracts for engineering and construction of large projects have been awarded to multi-national EPC companies including: SK Engineering & Construction, Samsung Engineering, Daewoo Engineering & Construction, CB&I, Saipem (Snamprogetti), Technip, and Foster-Wheeler, to name a few.<sup>48</sup>

Sarnia-Lambton fabricators could be sub-contractors to these types of companies.

### 5.7.2 Implications for Sarnia Area Fabricators

There is a large and ongoing demand for the types of metal and mechanical fabricated products made in Sarnia-Lambton in the Middle East. The question, however, is whether Sarnia-Lambton based fabricators are competitive enough to tap into this market. Three factors are notable in this respect.

#### Transportation Logistics

Our consultations suggested that clients in the Middle East retain responsibility for arranging the logistics and transportation from the fabricator site to the job site. This is in contrast to local and regional moves in North America, which typically remain the responsibility of the supplier. To date, we are aware of only one fabricator from Sarnia-Lambton who has successfully supplied products to the Middle East, and these were not oversize products, meaning that arranging transportation was not complex or costly (relative to oversize products). It is not possible to confirm, but one could assume that arranging transportation for an oversize load in Sarnia-Lambton would be more complex for an outside agent, than for a local fabricator, given their limited knowledge of the local context, transporters, etc. This could be viewed as an added obstacle and cost, relative to competitors with fabrication shops that provide easier (cheaper) access to water. This would of course be alleviated somewhat with the introduction of a permanent oversize corridor, which could be used as a “marketing tool” to entice potential clients to consider Sarnia-Lambton.

Sarnia-Lambton fabricators could also potentially make arrangement of transportation part of their offer to Middle East clients, should such clients be open to this approach.

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<sup>48</sup> Arabianoilandgas.com, “The 25 Biggest Refineries in the Middle East”.

### Relative Proximity to Asian Fabricators

The Middle East is physically closer to extremely large fabrication shops in Asia (China, Korea, Malaysia, India) that have economies of scale beyond the realm of anything possible in Sarnia-Lambton (see Figure 5-10). This places Sarnia-Lambton fabricators at a disadvantage in terms of physical distance and time required to reach client site from the fabrication shop. Considering the cheaper cost of production in Asia due to lower labour rates and economies of scale, Sarnia-Lambton fabricators may face some disadvantages, though they could still potentially compete on the basis of quality and schedule (e.g. if the Asian shops are very busy, while Sarnia-Lambton fabricators are not).

Figure 5-10: Daewoo Fabrication Yard, Korea



Source: dsmeoffshore.com

### Importance of Local Presence

In North America, much of the procurement for metal fabricated pieces for petroleum sector projects is carried out through a competitive tender based on a list of approved global suppliers. This approach is much less common in the Middle East, where having a local presence (or at least visibility through a local agent) is critical to developing personal relationships for securing contracts. Without this type of presence, it can be challenging to secure business to any significant extent. Though existing relationships with global EPC contractors may help, significant efforts would still be required to develop any substantial awareness of Sarnia-Lambton fabricators in the region (e.g. for more than one-off, occasional sales).

The factors above suggest that the Middle East is a very large market opportunity (made even larger by the lifting of sanctions against Iran in 2016). Securing even a small portion of anticipated work in future could keep Sarnia-Lambton fabricators very busy. That being said,

Sarnia-Lambton fabricators will need to devote significant efforts to developing this market (relative to other opportunities). It will take time to build relationships with some of the key players in the region, and to illustrate the quality of product which is available from Sarnia-Lambton companies.

## 5.8 Canada West Coast: Oil and Gas Export

A large number of export-related oil and LNG projects are under consideration on the West Coast of Canada, all of which would require inputs that Sarnia-Lambton fabricators could theoretically manufacture. The largest of these include:

- **Pacific North West LNG Project:** an LNG export terminal in Prince Rupert connected by pipeline to BC's northeast, owned by Malaysian-state owned firm Petronas.
- **Northern Gateway Pipeline Project:** two parallel 1,176 km pipelines connecting Bruderheim, AB and Kitimat, BC, one flowing west with crude oil, and one flowing east with condensate. The projects would require ten pump stations powered by electric pumps, in addition to infrastructure at a Kitimat Marine terminal with two tanker berths and a tank farm.<sup>49</sup>
- **Pacific Trail Pipeline:** A 470km natural gas pipeline from Summit Lake, BC to Kitimat, with an investment decision linked to the associated **Kitimat LNG Project**, natural gas liquefaction plant and marine export terminal. The Kitimat LNG Project EPC contract was awarded in 2014 to a JV of Fluor Canada and JGC Corp of Japan.
- **TransCanada Pipeline:** A 700 km pipeline, from Montney region near Dawson Creek, BC to Kitimat, which is linked with the **LNG Canada** project, a natural gas liquefaction plant and marine export terminal in Kitimat. Per an agreement from 2014, this plant would be built by CFSW LNG Constructors (a partnership of Chiyoda, Foster Wheeler, SAIPEM, and WorleyParsons).
- **Kitimat Clean Refinery:** Kitimat Clean Ltd has proposed to build a heavy oil refinery near Kitimat. It would be one of the ten largest refineries in the world, capable of processing 400,000 bpd of bitumen from the oil sands into gasoline, jet fuel, and diesel fuel, primarily for export.
- **Pacific Future Energy:** This project involves construction of a refinery to process a form of bitumen transported by rail from Alberta to an industrial area called Dubose Flats (halfway between Terrace and Kitimat). The refinery would have an input capacity of 200,000 bpd of "NEATBIT" a processed form of bitumen the consistency of peanut butter which requires rail transportation.<sup>50</sup>

<sup>49</sup> <http://www.kitimat.ca/EN/main/business/invest-in-kitimat/major-projects.html>

<sup>50</sup> Because NEATBIT has very small amounts of diluent, unlike other forms of oil transported by rail or pipeline, it has very low flammability, and as a result is exempt from the Transport Canada *Transportation of Dangerous Goods Regulations* ((Part 1, 1.33).

All of these are multi-year, multi-billion dollar projects. All of the projects have been in development for years, and it is too early to say which of the projects will proceed, if any, particularly given the slump in oil and natural gas prices over the past five years or so. The price of LNG has fallen from \$18.17 million per British thermal units (mmBTU) in 2012 to \$5.75 per mmBtu currently. Most recently (September 2016), the federal government announced its conditional approval of the Pacific NorthWest LNG project, though with 190 legally binding conditions.<sup>51</sup>

### 5.8.1 Current / Anticipated Sourcing Pattern for Oversize Freight

The procurement approach for these major petroleum-sector projects is expected to be similar to other projects in the sector. The sponsors of the project (oil majors) engage large EPC contractors to manage the work. In turn, Sarnia-Lambton fabricators could potentially supply components to these EPC contractors under sub-contract.

### 5.8.2 Implications for Sarnia Area Fabricators

A number of the projects taking place in northern BC consist of marine export terminals, which have virtually no load-size restrictions relative to other petroleum sector facilities in-land.

This is a positive for Sarnia-Lambton, insofar as once a large module or piece of equipment is loaded at the Sarnia Harbour, it could be shipped entirely by water through the St. Lawrence Seaway, Panama Canal, and up the West Coast to northern BC.<sup>52</sup> However, it is also a positive for very large fabricators located in Asia, who would be competitive in terms of production costs. Shipping times from Asia to the North Coast of BC are also about half the time as a move from Sarnia-Lambton. For example, shipping from China and South Korea to the port of Prince Rupert takes approximately 8 – 12 days of sailing time assuming a direct service.<sup>53</sup> In contrast, shipping from Sarnia to Prince Rupert would likely take more like 16 – 20 days via the Panama Canal.

Some companies have already indicated that sourcing will be directed immediately to Asian fabricators. For example, the Pacific Future Energy refinery Project Description Summary states outright that “the Project is planning for the purchase of [100 to 150] pre-built Refinery modules from Asia [...] each with dimensions ranging from 40 – 50 m in length, 35 – 47 m in width, and 17 – 27 m in height [...] and] estimated to weigh between 2,5000 and 5,000 metric tonnes.”<sup>54</sup> This approach suggests that Sarnia-Lambton fabricators will not be in a strong position to supply the West Coast.

Overall, the opportunity to supply major projects under consideration in BC are not obvious. The projects are still likely years away from commencing construction, though the EPC

<sup>51</sup> CBC News “Federal government approves liquefied natural gas project on BC coast with 190 conditions”, September 27, 2016. <http://www.cbc.ca/news/politics/pacific-northwest-lng-project-1.3780758>

<sup>52</sup> Shipping by rail would be an alternative (to Prince Rupert, with CN), but this would not be feasible for oversize loads.

<sup>53</sup> [http://www.maerskline.com/~media/maersk-line/Countries/int/Routenet/pdfs/2m-east-west-network-2015/2016/6\\_ASIA%20TO%20NORTH%20AMERICA\\_V19.pdf](http://www.maerskline.com/~media/maersk-line/Countries/int/Routenet/pdfs/2m-east-west-network-2015/2016/6_ASIA%20TO%20NORTH%20AMERICA_V19.pdf)

<sup>54</sup> Pacific Future Energy Refinery, Project Description Summary, June 2016. <http://pacificfutureenergy.com/wp-content/uploads/2016/06/SuperfinalSUMMARY.pdf>

contractors have already been identified in the anticipation of project progression. In short, while there is little risk to Sarnia-Lambton fabricators from marketing themselves to the future EPC contractors that have already been announced, the opportunities where Sarnia-Lambton fabricators can compete may be limited to higher value products where Sarnia's quality and potential schedule advantage (if they are less busy than shops in the US and Asia) could come into play.<sup>55</sup>

Overall, in the current market, it is unlikely that Sarnia-Lambton fabricators could compete on the West Coast, as fabrication activity worldwide is slower than normal and there would be significant competition.

## 5.9 BioChemicals

Biochemical facilities and bio-commodities may present a good opportunity for Sarnia-Lambton fabricators. This sector includes plants manufacturing cellulose fibres, butanediols, ethanol from grain and other plants, and other bio-fuels. Biobased feedstocks for both energy use and basic chemicals are increasingly being developed (alongside greater use of natural gas) as replacements for traditional crude-based feedstocks and this trend is expected to continue over time.

The new BioAmber facility in Sarnia – producing succinic acid from sugar feedstocks from corn – is an example of this type of industry. Suncor also operates an ethanol plant in Sarnia-Lambton currently.

The biochemical sector (and bio-economy generally speaking) are growing sectors in Canada. Of note, provincial and federal government agencies are turning to the sector as it holds potential for new manufacturing opportunities. In particular, in Ontario, the provincial government is looking to the bio-economy as a means to shift reliance away from the historically important automotive manufacturing sector to the bio-chemicals sector. The sector would also benefit from access to agricultural inputs from the important growing regions of Southern Ontario.<sup>56</sup>

The biochemical sector is very new. Other than ethanol production, there are relatively few biochemical facilities in North America, with BioAmber being one such facility.<sup>57</sup> We are not aware of any new biochemical facilities being developed in Ontario, though BioAmber intends to develop a larger facility in future (its existing facility is a 30,000 tonne production prototype; the larger facility will be 200,000 tonne production). The company has not decided whether this will be in Sarnia-Lambton or another area.

There is some overlap in the types of equipment in demand for the sector and the capacity of Sarnia-Lambton fabricators. In particular, the majority of biochemical facilities require the use of fermenters (fermentation tanks), which could be produced by the fabricators. We

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<sup>55</sup> For the avoidance of doubt, in the case of smaller size (normal loads), shipping by rail to the West Coast, and then truck or barge to the client site, would be quicker than marine shipping through the panama canal.

<sup>56</sup> Invest in Ontario, "Chemical and Biochemical" background: <http://www.investinontario.com/chemical-and-biochemical#extensive-infrastructure>

<sup>57</sup> Other examples include DuPont Tate & Lyle Biochemicals (Loudon, Tennessee) and Natureworks (Blair, Nebraska).



understand that some of the biochemicals produced in North America are used in food products. When this is the case, the equipment must be developed to food grade standards. We do not believe this would be a significant investment requirement for Sarnia-Lambton fabricators (in terms of meeting equipment standard requirements), though it would require market research to understand how these standards could be achieved.

Overall, the extent of the opportunities which would become available as a result of the oversize corridor is not known, given the early stage of development of the sector. On one hand, Sarnia-Lambton fabricators have the technical capacity to supply equipment to this sector (pending confirmation that food grade standards could be achieved in some cases). On the other hand, given the very early stage of market development it is not possible to confirm the level of demand for oversize pieces specifically or whether future production facilities will be located near water to benefit from an oversize corridor. Certainly, in the case of BioAmber potentially expanding in Sarnia-Lambton, the local area fabricators would have a good opportunity to supply this market.

Sarnia-Lambton fabricators should monitor this market to gain a better understanding of the types of equipment that will be required (food grade or otherwise), and whether these are for oversize products.

## 5.10 Government of Canada Shipbuilding

The National Shipbuilding Strategy (NSS) was introduced in 2010 and seeks to support the Canadian marine industry by providing long-term certainty to Canadian shipbuilders. With this certainty, shipbuilders can develop, modernize and invest in the facilities, skills and expertise needed for building modern vessels.

After the development of the NSS, the Canadian government selected two shipyards to rebuild the Royal Canadian Navy and the Canadian Coast Guard fleet. The selected shipyards are Seaspan's Vancouver Shipyards for non-combat vessels and Irving Shipbuilding in Halifax for combat vessels. Contracts will span a 20 to 30 year period. Seaspan and Irving have invested \$500 million in their shipyards to develop the capacity, facilities, and processes to undertake shipbuilding projects.

The NSS has three components: 1) Construction of large vessels, 2) Construction of small vessels, and 3) Vessel repair, refit and maintenance (RRM).

### Large Vessel Construction

The large vessel program is further split into the following combat and non-combat vessels:<sup>58</sup>

- Combat Vessels – Arctic Offshore Patrol Ships (AOPS) and Canadian Surface Combatant (CSC).

<sup>58</sup> <http://www.tpsgc-pwgsc.gc.ca/app-acq/amd-dp/mer-sea/sncn-nss/rapport-report-20151231-3-eng.html#a1>

- AOPS – Six vessels built in Halifax for approximately \$3.5 billion. The AOPS are under construction, with the first vessel set for delivery in 2018.
- CSC – Up to 15 vessels built in Halifax. The budget was originally over \$26 billion, but is now under review. Contracts to build CSC are expected to be awarded in 2021.
- Non-combat vessels – Offshore Fisheries Science Vessels, Offshore Oceanographic Science Vessel, Joint Support Ships and Polar Icebreaker.
  - Offshore Fisheries Science Vessels – Three vessels built in Vancouver for approximately \$687 million. Construction underway with first vessel to be delivered in 2017.
  - Offshore Oceanographic Science Vessel – One vessel built in Vancouver. The budget is under review. The build contract is expected to be awarded in 2017 and delivery is expected in 2018-2019.
  - Joint Support Ships – Two vessels built in Vancouver, originally budgeted \$2.3 billion, but the budget is under review. The build contract is expected to be awarded in 2017 and delivery of the first vessel is expected in 2020.
  - Polar Icebreaker – One vessel built in Vancouver, originally \$800 million, but the budget is under review. The build contract is expected to be awarded in 2018 and delivery is expected in 2021.

### Small Vessel Construction

Small vessel construction and repair is competed on a project-by-project basis. The Seaspan and Irving shipyards engaged in large vessel construction are not eligible for small vessel contracts. The amount budgeted in 2010 for Small Vessel Construction was \$2 billion spent over 30 years. From February 2012 through the end of 2015, \$162 million has been contracted under small vessel construction, of which Ontario received \$63 million.

### Vessel Repair, Refit and Maintenance

RRM is competed through publically announced requests for proposals. The budget identified in 2010 for RRM was \$500-600 million annually. From February 2012 through the end of 2015, the RRM program has contracted \$400 million, of which Ontario received \$66 million.

#### 5.10.1 Current / Anticipated Sourcing Pattern for Oversize Freight

Based on initial estimates, approximately \$30 billion will be spent in the construction of CSC and AOPS vessels at the Irving shipbuilding facility in Halifax. The approach to building the AOPS and likely the CSC is to modularize construction as much as possible, which would provide opportunities for Sarnia-Lambton fabricators.

The AOPS vessels are already under construction and existing supplier relationships have been established, making it difficult for Sarnia-Lambton fabricators to provide fabricated goods on these contracts. However, the CSC vessels are in the initial stages of identifying the design of the CSC and are likely years away from engaging suppliers. Another benefit is that the multi-year shipbuilding program could provide modular requirements for a number of years to come.

Irving Shipbuilding has internal fabricators and there are established suppliers in this space. Therefore Sarnia-Lambton fabricators would have to become known and demonstrate value to secure work in this area. The recommendation from Irving Shipbuilding is to register with Irving's supplier registry, which will be used to issue requests for proposals for AOPS vessels and will possibly be used for CSC vessels. Irving Shipbuilding noted that the AOPS suppliers would be notified if a separate database were developed for CSC vessels. Irving Shipbuilding notes the following considerations when selecting a potential supplier:<sup>59</sup>

- Capability to provide the required materials
- An established position in the market
- Provide Canadian manufactured content for Canada
- Provide a great value for Canada
- Robust quality assurance, ISO or equivalent controls
- Security clearances including Controlled Goods and Canadian Industrial Securities Directorate
- Workers compensation board registrations
- Appropriate insurances

### 5.10.2 Implications for Sarnia Area Fabricators

Overall, there is potential for Sarnia-Lambton fabricators to provide modules for the future CSC vessels, particularly given the preference for Canadian context. However, there is uncertainty about the timing and the exact needs for these ships. Additionally, the requirement for some projects to require a security clearance, competition from internal Irving fabricators, and existence of firms already producing oversize equipment in the shipbuilding industry limit the potential opportunity for Sarnia-Lambton fabricators.

## 5.11 Water and Wastewater

This sector comprises water and wastewater retrieval/distribution systems (pipes/sewers) as well as the facilities where water and wastewater are treated.

Generally speaking, the technology required by the sector is much less sophisticated than what the Sarnia-Lambton fabricators are able to produce and excel at producing. Most water distribution systems in Canada are based on plastic, as opposed to metal, piping. The technology at water treatment facilities uses significant amounts of concrete/concrete basins as part of the filtration process, in addition to metal storage tanks, pipes and pumps. However, the level and standard of technology required is generally lower (for most equipment) than in the oil and gas sector, in part due to the different risks involved in handling petroleum and petrochemicals versus water/sewage. For example, while a lot of atmospheric tanks (not

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<sup>59</sup> <http://irvingshipbuilding.com/irving-shipbuilding-suppliers-supplier-faqs.aspx>

pressurised) are used in a water treatment plant, there are no pressure vessels to speak of. The types of metal pieces used in water and waste water treatment do not require ASME or other similar standards.

### 5.11.1 Procurement Approach

Water and wastewater treatment is controlled at the municipal level across Canada. Unlike the private petroleum sector, when minor or major works are required municipalities are required to carry out a public procurement exercise with an open tender process, notably through the national public tenders system MERX<sup>60</sup> (procurement notices will also often be included on regional and municipal government websites).

For a specific small technical job, it would be possible for smaller firms to directly compete and supply a piece of equipment to a water or wastewater treatment facility through a public procurement exercise. For larger jobs such as construction of new wastewater treatment plant, the municipality would typically look to contract with a larger engineering firm (e.g. Veolia) who may then be subcontracting to external firms for specific components of work.

### 5.11.2 Implications for Sarnia

The water and wastewater treatment sector does not appear to offer significant potential for future business for Sarnia-Lambton mechanical fabricators, given that most work involves technology which is less sophisticated than what Sarnia-Lambton fabricators produce. It would not make commercial sense to pursue these markets if other more lucrative opportunities are available where Sarnia-Lambton fabricators have a competitive advantage given their specialised skills and equipment.

That being said, the technology in the water treatment sector is undergoing change to increase the level of sophistication. This includes a gradual move away from simple filtration processes in huge basins of water to the use of high-rate technologies which involve mixers, railing, and module components with a smaller footprint than typical water treatment plants. This may be an area for further exploration.

Beyond mechanical fabrication, there may be opportunities for structural steel components at the water filtration plant, such as towers and tanks. The extent of this market would be based on individual water and wastewater treatment facilities in development.

## 5.12 Power Generation

Power plants make use of both mechanical fabrication and structural fabrication. Thermal power plants (e.g. coal, gas) make use of boilers, tubes, turbines, and cooling towers. Nuclear power stations also use heat exchangers. Hydroelectric projects require less mechanical fabrication, but do require extensive structural fabrication.

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<sup>60</sup> [www.merx.com](http://www.merx.com)

## Province of Ontario

The province of Ontario (through Ontario Power Generation) currently produces power through the following systems:

- Two thermal biomass plants at Atikokan and Thunder Bay. Both the Atikokan Generation and Thunder Bay Generating Stations were converted from coal to biomass and recommissioned in September 2014 and February 2015, respectively<sup>61</sup>. Sarnia-Lambton fabricators did supply equipment to the Thunder Bay conversion.
- One dual-fuel oil and natural gas plant in Lennox.
- Two nuclear power plants owned and operate by OPGs: Pickering and Darlington. OPG also owns two nuclear generating stations on Lake Huron that are leased to and operated by Bruce Power (a private company).
- 65 hydroelectric stations and 240 dams.

We are aware of only two major projects underway in Ontario that may require significant inputs from fabricators in Sarnia-Lambton.

The Darlington power plant is undergoing a major refurbishment, which will commence in October 2016. The EPC contract was awarded to a JV of AECOM and SNC Lavalin in 2011. Planning, design, and training working is now complete. Refurbishment is expected to start in October 2016, with four units to be refurbished and project completion in 2023. Cost of the refurbishment project is \$12.8 billion.<sup>62</sup>

Bruce Power announced in early 2016 a long-term refurbishment program (\$13 billion) on six of its units that will commence in 2020.

## Other Provinces

Conversion of power plants from coal to natural gas or biomass would likely present some opportunities for Sarnia-Lambton fabricators. As noted above, Ontario has now converted all of its coal-fired power plants. Saskatchewan, Nova Scotia, and New Brunswick all have coal-fired power plants, with no intention to convert the plants based on our research.<sup>63</sup> Alberta has 18 coal power stations and the province has announced plans to phase them out by 2030. Two-

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<sup>61</sup> There are no longer any coal-fired power stations in Ontario.

<sup>62</sup> [www.opg.com](http://www.opg.com).

<sup>63</sup> Saskatchewan does not have plans to phase out coal (and may be going down the carbon capture route instead). Nova Scotia has eight coal-powered plants and an agreement with the Federal government to keep them open (e.g. no plans for change). New Brunswick has one coal-powered plant, with no plans for closure. Sources: <https://www.thestar.com/opinion/commentary/2016/09/08/alberta-the-new-coal-burning-canary-steward.html> and <http://www.cbc.ca/news/business/canadian-coal-by-the-numbers-1.3408568>.

thirds of the power from these is planned to be replaced with renewable sources, with one-third replaced by natural gas.<sup>64</sup>

### 5.12.1 Procurement Approach

The Darlington nuclear unit refurbishment is scheduled to commence shortly, and we understand that major contractors have already been selected.<sup>65</sup> Given the length of the refurbishment program (up to 2023), there may still be opportunities for fabrication and other sub-contracts.

The Bruce Power refurbishment program is at an earlier stage of development, and there would likely be more opportunities for exploring sub-contracting opportunities at this stage, relative to the Darlington refurbishment.

### 5.12.2 Implications for Sarnia Area Companies

We understand that nuclear power plant work is broken into two sections, with different implications for Sarnia-Lambton fabricators.

The first type is process piping inside the Nuclear Cell, which must be fabricated under extremely stringent Quality Assurance standards with contractors that do speciality work under what is called an “N” stamp, which is different from the ASME qualification which is called a “U” stamp. Companies with this “N” certification include Aecon, ES Fox, etc. We do not believe any of the fabricators in Sarnia-Lambton currently have this certification.

The work outside of the Nuclear Cell falls under the “U” stamp work, or at a minimum under the TSSA. All of the mechanical contractors in Sarnia-Lambton carry the TSSA certification, though only three have the “U” stamp as far as we know (Alliance Fabricating, Canadian Structural & Mechanical, and Kel-Gor). There is a reasonable amount of work in the ASME position, however, this work is typically done by the contractors that also have the “N” stamp.

Consultations suggest that while attaining the “N” stamp for some of the larger fabricators would be attainable, the investment does not appear to have been warranted to date. The initial costs of obtaining this certification are in the order of \$100,000, and would require new market entry efforts for Sarnia-Lambton fabricators to prove themselves in the nuclear power business.

Beyond the nuclear power plants, there are always general structural manufacturing requirements at power plants. However, the competition in this market is quite high.

Finally, as noted above, Alberta appears to be the province with the most opportunity for power plant conversion to natural gas. As noted previously, opportunities for Sarnia-Lambton fabricators would therefore still be limited to equipment that can move within the road / rail

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<sup>64</sup> <http://www.alberta.ca/climate-coal-electricity.aspx>

<sup>65</sup> See partners here: <http://www.opg.com/generating-power/nuclear/stations/darlington-nuclear/darlington-refurbishment/Pages/our-people.aspx>

transportation load size limits. The oversize corridor would lower transportation costs for slightly oversize loads, but would not make a difference for very large loads.

### 5.13 Mining

Mining is a huge industry in Canada with over 375,000 persons working in mining and mineral processing across the country.<sup>66</sup> During industry consultations and research, few “significant” opportunities were uncovered for Sarnia-Lambton fabricators.

There are two somewhat distinct markets in the mining sector which have different opportunities for Sarnia-Lambton fabricators: these can be loosely broken into mine site/heavy handling and processing.

At the mine site, most of what would be considered “typical” equipment for extraction of raw materials (e.g. conveyors, hoppers, etc.) can be built by fabricators that carry significantly less certification than the Sarnia-Lambton mechanical fabricators, if any certification at all. This type of work includes “Carbon Steel work”, the type of structural/mechanical work that almost any fabricator could produce. Some of this work is a little more complex, and will require some structural and mechanical engineering to accomplish (for example: ore conveyors and ship loaders). Some of the large ship loaders can carry 200 metric tonnes of ore plus their own weight and they articulate. The conveyors can carry a good deal more than that and are often quite high. While engineering is required, the fabrication though not simple, requires a lower level of certification and standard (if any) relative to the mechanical fabrication that Sarnia-Lambton fabricators can supply. There is a large number of such fabricators that can supply this market, and they have a lower cost overhead. This would therefore impact the Sarnia-Lambton fabricators ability to compete on that sort of equipment, as they have to produce their fabricated products to a more demanding standard (with associated cost overheads).

There may, however, be opportunities for the fabricators that can produce structural steel components to supply equipment to mine sites on a case by case basis in this steel work area. There is, however, significant competition for this market. For the corridor to make a difference in competitiveness, the mine or location of demand for equipment (e.g. ship loaders) would need to be located by the water, or on an oversize corridor, which is not likely in the case of the mine (mine location is based on resource location, not convenience of transportation).

In contrast, Sarnia-Lambton mechanical fabricators could potentially supply equipment required as part of the processing (smelting/refining) activities for mining projects, many of which are located on the water to receive the heavy inputs required for processing. For example, in order to process ore from their Voisey’s Bay mine in Newfoundland, Vale constructed: a Hydromet plant in Argentia (a process that uses water based chemicals to recover metals from minerals); a concentrator in Voisey’s Bay, Labrador; a refinery in Long Harbor; and a port facility at Long Harbor. This project is currently in operation, with some construction activities continuing alongside production.

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<sup>66</sup> Mining Association of Canada

In the smelting/refining (e.g. precious metals) area of a mining operation you will find the chemical refining systems, the storage of chemicals, mixers, piping, separation vessels, etc. This process often requires that the "containers" (tanks, vessels) have to be of a suitable alloy and a quality that can withstand the harsh chemicals used in the process. They will likely also require that they be fabricated to an accepted standard (i.e. ASME, API, etc.) and are more suited to the Sarnia-Lambton fabricators technology and capabilities than other more basic mine equipment. This is the area where the Sarnia-Lambton fabricators could do well, in particular because the competition is limited.

These fabricated components would likely be large enough to require the use of an oversize overweight corridor to transport them from the fabricators facility to the Sarnia Harbour.

Going forward, the mining industry could be tracked, in particular for new smelters or refining facilities being constructed, bearing in mind that such projects are few and far between. Smelters are very costly to build and are built sporadically to cater to multiple sources of inputs from a range of different mine locations across the world (e.g. a new smelter is not required for each new mine).

We are not aware of any new smelter or ore refining capacity projects in development in North America currently. This does not appear to be a "low hanging" fruit market for Sarnia-Lambton mechanical fabricators to exploit in the short-term.

## 5.14 Other Sectors

There are other industrial sectors that require the use of boilers, tanks, piping, and modules.

### **Pulp and Paper Sector**

Our consultations did not indicate that this sector presents strong opportunities for Sarnia-Lambton fabricators. The technical standards required in this industry are less stringent than in the oil and gas sector, due to the relatively lower level of risk involved. This means that the market is open to more fabrication shops that do not have to maintain the same accreditations and work to the higher standard codes that the Sarnia-Lambton fabricators must keep for the oil and gas sector work (e.g. fabricating to ASME standards, traceability requirements, etc.).

Sarnia-Lambton fabricators face costs associated with working to these standards, including paperwork and the use of unionised labour, which contribute to increasing their overheads and making them relatively costly compared to basic fabrication shops.

While the shops in Sarnia-Lambton could theoretically "dumb down" to serve the pulp and paper market, and other sectors that require structural steel or modular equipment where standards are lower, this would not make commercial sense. The oil and gas sector will continue to be the major driver for the Sarnia-Lambton fabricators and they will always need to maintain high standards to keep this clientele. Furthermore, there are many more basic fabrication shops in the market that can manufacture products for the non-oil and gas sector, meaning Sarnia-Lambton fabricators would face even stiffer competition for relatively lower-margin work.



### Food and Beverage Processing

Based on consultations, we do not believe that opening of an oversize corridor would create significant additional opportunities in the food processing industry.

On one hand, Sarnia-Lambton fabricators have the technical skills and engineering expertise to supply this sector with some of the higher-end equipment that is required in food processing plants.<sup>67</sup> Of note, some of the companies already work with speciality stainless steels that are used across much of the food processing industry. Consultations also suggest that there is a shortage of locally-made, higher-end processing equipment, with some companies looking to Europe for the best technology. On the other hand, there are different regulatory standards for food and beverage processing equipment and we are not aware that any of the Sarnia-Lambton fabricators have such certifications in place. Research would need to be carried out to better understand what level of effort would be required to achieve these standards.

Even more importantly, however, the requirements for food processing equipment (generally speaking) are not for oversize equipment. This suggests that the oversize corridor in and of itself would not open up significant new opportunities for support to the food processing sector that do not already exist. Rather, consideration would need to be given to the certifications required to supply this sector generally (for normal size loads) and whether this would present a strong market for the fabricators to consider.

### 5.15 Summary of Opportunities

Overall, our assessment of the market can be summarised as follows:

- **Stay focused on petroleum and petrochemicals.** Sarnia-Lambton fabricators have significant experience catering to the oil and gas sector. This is a large and lucrative market (when times are good), which requires the technical skills and certifications that Sarnia-Lambton fabricators possess. Opportunities to expand sales to upstream and downstream petroleum sector companies within Canada, the US, and globally appears to offer the greatest potential for the region, should a corridor be developed.

**Look to the water.** Generally, the 30' x 30' corridor in Sarnia-Lambton is really opening up markets where the load is traveling from Sarnia-Lambton to a port destination or close to a port. With the possible exceptions where you can access the Alberta High Load Corridor or something similar, all loads will contend the same restrictions as currently. The corridor is therefore expected to make a primary difference in competitiveness for loads that are oversize and currently not able to move at a reasonable cost within the physical limitations of road or rail corridors. The relevant markets where new opportunities will be available are therefore likely to be those where client has direct access to the water (e.g. a smelter), as opposed to inland (e.g. a mine). Figure 5-11 presents a summary of the potential for Sarnia-Lambton fabricators to supply these markets.

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<sup>67</sup> Food processing also requires some more basic equipment, which could be supplied by non-specialized fabricators and which would not be an attractive market for Sarnia are fabricators.

Figure 5-11: Analysis of Potential Market Opportunities

Potential Market	Strength of Opportunity	Comments
<i>Petroleum / Petrochemicals</i>		
Western Canada (Alberta)	Medium	<ul style="list-style-type: none"> <li>Market is large (notably once sector conditions improve)</li> <li>Companies consistently require large equipment</li> <li>Opportunities will become available due to lower transport costs, but there are still size restrictions west of Thunder Bay / Duluth so full benefits of oversize loads will be limited</li> </ul>
Atlantic Canada	High	<ul style="list-style-type: none"> <li>Water-side opportunities where load size can be maximized</li> <li>Goldboro LNG (immediate opportunity)</li> <li>West White Rose Expansion (when price of oil improves)</li> </ul>
US Petroleum (pipelines)	Low	<ul style="list-style-type: none"> <li>Most pipelines will be inland (far from water), thus limiting much of the comparative advantage fabricators could have as a result of the corridor.</li> </ul>
US Petroleum (LNG export facilities)	Medium	<ul style="list-style-type: none"> <li>Water-side transportation</li> <li>US Gulf Coast fabricators typically cheaper (lower labour cost), but could be beat on schedule if shops are busy.</li> <li>Competitiveness also depends on value of C\$</li> </ul>
Mexico (Pemex)	Medium	<ul style="list-style-type: none"> <li>Very large market with immediate needs</li> <li>Currently underserved (limited local capacity)</li> <li>C\$ favourable (relative to US Gulf Coast fabricators)</li> <li>Risks in terms of security</li> <li>Establishing personal relationships / presence critical</li> </ul>
Cuba	Low-Medium	<ul style="list-style-type: none"> <li>Similar opportunities to Mexico (sector in need of investment)</li> <li>Strong Canadian-Cuban relationship (relative to US-Cuba)</li> <li>Risks associated with government ownership / tightly controlled labour market</li> <li>Establishing personal relationships / presence critical</li> </ul>
Middle East	Medium	<ul style="list-style-type: none"> <li>Water-side opportunities</li> <li>Plenty of opportunity (very large market)</li> <li>Some cost challenge in terms of competing with international (Asian) suppliers</li> <li>Establishing personal relationships / presence critical</li> </ul>
West Coast LNG	Low	<ul style="list-style-type: none"> <li>Market size unknown as many approvals still required</li> <li>Difficult for Sarnia fabricators shops to compete on price with closer, Asian suppliers</li> </ul>

Potential Market	Strength of Opportunity	Comments
<i>Other Sectors</i>		
Biochemicals	Medium (in the long term)	<ul style="list-style-type: none"> <li>• Some overlap in technology with petrochemicals (e.g. tanks)</li> <li>• Growing bio-based sector in North America, though still very new with limited immediate and clear opportunities</li> <li>• May require different certification for food-grade biochemicals</li> <li>• Demand for oversize equipment cannot be confirmed</li> </ul>
Shipbuilding	Low-Medium	<ul style="list-style-type: none"> <li>• Unknown market / unknown to client</li> <li>• Preference for Canadian content (positive)</li> <li>• Barriers to entry (security clearance)</li> </ul>
Water and Wastewater	Low	<ul style="list-style-type: none"> <li>• Limited, diverse, one-off opportunities</li> <li>• Public tendering with lots of competition</li> <li>• Sector generally requires lower-tech standards that those Sarnia fabricators can attain (and must maintain at a cost)</li> </ul>
Power Generation	Low-Medium	<ul style="list-style-type: none"> <li>• Nuclear may present opportunities for Sarnia-Lambton fabricators but added certifications are required in some cases (“U” stamp) and Sarnia-Lambton fabricators not well known in the sector</li> <li>• Alberta planning major conversion from coal power plants to alternative fuels, though size limitations would still exist for equipment transportation</li> <li>• All power plants present opportunities for structural, though competition is high</li> </ul>
Mining	Low-Medium	<ul style="list-style-type: none"> <li>• Mechanical fabrication needed in the processing / refining sector, but such opportunities (new smelters) are few and far between</li> <li>• Structural fabrication opportunities on a case by case basis (mine sites not on water cannot harness benefits of corridor)</li> </ul>
Food and beverage processing	Low	<ul style="list-style-type: none"> <li>• For higher-end equipment, there is demand for Canadian suppliers, but regulatory standards require different certification</li> <li>• For lower-tech equipment, there is an abundance of fabricators available to provide this equipment at a cheaper cost than Sarnia-Lambton</li> <li>• Industry does not typically require oversize equipment, and processing facilities not usually close to water access</li> </ul>
Pulp and Paper	Low	<ul style="list-style-type: none"> <li>• Sector generally requires lower-tech standards that those Sarnia-Lambton fabricators can produce (and must maintain at a cost)</li> <li>• Multiple suppliers already available to meet market need</li> </ul>

# 6 Actions to Harness Benefits from Oversize Corridor

## Key Chapter Takeaways

Having a permanent, oversize corridor will open up opportunities for Sarnia-Lambton fabricators and enable them to be more price competitive. However, harnessing the benefits of the corridor will rest as much on marketing efforts by the regional fabricators as it will on being able to be price competitive.

Consultations did not indicate that investment in additional technological / automation at the fabrication shops would influence the overall benefits of the corridor. Further investment may be beneficial as market potential becomes clearer.

The extent of benefits which may arise from the corridor will also be influenced by external factors beyond the control of fabricators, most notably, the price of oil and value of the Canadian dollar.

The previous chapter outlined a number of potential market opportunities for Sarnia-Lambton fabricators to consider, should an oversize corridor be established. In this chapter we outline the factors that will impact the ability of Sarnia-Lambton manufacturers to be competitive in these markets, as well as the actions required to increase the anticipated economic benefits of the corridor.

## 6.1 Competitiveness Considerations

Clients consider three overarching factors when making a purchasing decision: quality, schedule, and price. In the subsections below, we describe the current status of Sarnia-Lambton fabricators with respect to each component.

The majority of existing clients for Sarnia-Lambton fabricators are still in the petroleum and petrochemicals sector. We anticipate this is likely to remain the case for the majority (though not all) potential future markets. The analysis which follows is thus primarily focused on the oil and gas sector, unless noted otherwise.

### 6.1.1 Quality

Given the long life of oil refineries and other petrochemicals facilities, and the high opportunity cost involved in turnarounds, clients look for very high quality in the goods they are purchasing. This encompasses both the physical product being provided, as well as access to skilled labourers to install the product and provide ongoing maintenance. The same could be said for

other sectors where major capital investments are being made (biochemical, mining smelter, etc.).

Sarnia-Lambton fabricators produce quality products to high standards. They have the technical capacity to produce world-class quality modules and other units, with support from a pool of highly skilled tradespeople. We do not believe quality is a reason for lack of ability to serve existing and new petroleum and petrochemicals markets that would be more accessible with an oversize corridor.

For entry into new sectors (e.g. biochemicals, power generation), fabricators would need to ensure they meet the certification standards associated with the sector, which would require additional market research and potentially investment.

### 6.1.2 Schedule

Schedule refers to the ability of fabricators to produce outputs within a timeframe that meets the window of installation at a client site. The overall schedule is a factor of both **fabrication time** (based on availability of raw materials, equipment and labour) and **transportation time** (to move product from the shop floor to the client site).

While oil companies typically schedule their major projects and refinery turnarounds with at least a year of notice, schedules can sometimes change and a new piece may be required within a shorter timeframe. Of note, oil companies always want to limit the duration of any “turnaround” to as few days as possible, given a shut-down of any of their oil producing facilities can literally cost them millions of dollars a day. Sarnia-Lambton will continue to have a major schedule advantage in terms of serving the local oil and gas companies in Sarnia-Lambton, relative to other fabrication shops outside of the region.

For clients located beyond Sarnia-Lambton, establishing a permanent oversize corridor could be expected to lower the time required to plan and undertake transportation to the port. This, however, would be time savings in the order of days or weeks, not months. The corridor is therefore not expected to materially affect the overall schedule (and competitiveness) for a move by water beyond the region.

A much more critical factor regarding overall schedule is how busy competing fabrication shops are relative to local area fabricators. During busy times, skilled labourers are often at maximum capacity and this can affect the ability to produce new units within the required timeframes (most clients provide at least a few months to a couple of year of notice of their requirements).

Sarnia-Lambton fabricators compete with fabricators located near major petroleum-based industry hubs in Alberta and Gulf Coast / Southern US (among others internationally). Even in quiet times (for Sarnia-Lambton), fabricators in these other markets often operate at capacity and are busy relative to Sarnia-Lambton fabricators. They are sometimes not able to meet tight timelines (even with a year or more of notice). As a result, Sarnia-Lambton fabricators may be able to – when they themselves are not busy with work – compete on schedule for markets outside of the region, even where there are equally capable fabricators located within closer proximity to the client. Based on our consultations, the limits of the “schedule benefit” appear

to be primarily limited to clients located within Canada (Alberta), the US Great Lakes area and Atlantic Canada.

Overall, however, we do not anticipate the corridor would have a major impact on schedule considerations or significantly increase the competitiveness of Sarnia-Lambton fabricators (relative to quality and price).

### 6.1.3 Price

The final price is typically the most heavily weighted factor in any purchasing decision. The price to the client for a fabricated unit can be loosely broken down into four cost categories: raw materials, labour costs, transportation costs, and profit margin.

#### i) Raw Materials

Fabricators require a range of materials and component pieces for their manufacturing, including steel, alloy steels, tubes, pipe, valves, pumps, structural members, etc. Consultations suggested these materials and component pieces accounted for (very roughly) 10% of total project cost. Based on our knowledge of the sector, Sarnia-Lambton fabricators do not have any particular advantage or disadvantage with respect to the cost of these inputs, which are often determined on a global scale based on commodity prices. As such, the cost of raw materials / parts does not appear to play a significant role in whether or not Sarnia-Lambton fabricators are competitive relative to their peers outside of the region. We do not anticipate that the corridor would change this situation.

#### ii) Labour Costs

Labour costs make up the largest part of any fabrication business in Sarnia-Lambton, as skilled, unionised labour is required. Consultations in Sarnia-Lambton indicated that labour costs make up between 50% - 60% of the total landed price of their products to clients, with a typical skilled worker costing approximately \$65/hour. In busy times (turnarounds), this can increase to \$100/hour or more, where overtime is required.

While these labour costs are comparable (or slightly lower), than labour costs in Alberta for similar work, they are among the highest in the world in terms of the companies competing for international business. Consultations suggested labour rates in some Asian markets (China, India, Malaysia) are in the \$5 - \$15/hour range for similar work, though quality is not always as high. In the US market, rates are also typically lower. Of note, while some states in the US use unionised labour, a number of southern states are “Right to Work” states, where employees have the right to work without being required or compelled to join a union. This can keep labour costs very low (in the US\$20 - \$25/range).

Of course, hourly labour costs cannot be directly compared across countries without also considering labour productivity. While labour costs in Sarnia-Lambton are higher, efficiency of labour is also high; with good technology more can be done per hour of labour. Climate and shop conditions also make a difference. For instance, welding inches per hour (a productivity metric) in a climate controlled shop in Sarnia-Lambton would be higher than outside in February

in Northern Alberta or July in Louisiana. Finally, the amount of work being carried out in each market affect labour efficiency. A consistently high demand for workers in Alberta, for example, has typically meant employees can command a higher wage in that province. Labour shortages have meant that less experienced and less productive staff are sometimes hired, driving down efficiency.<sup>68</sup>

In terms of sales within Sarnia-Lambton, the relatively high labour costs of local area fabricators does not appear to have disadvantaged the fabricators (relative to their competitors outside the region), given their advantages with respect to schedule, the high quality of their products, and the benefits that clients gain from working with nearby fabricators that can manufacture, install, and service their facilities on an ongoing basis.

In terms of sales beyond the region, this high cost of labour could result in a significantly higher production cost, particularly with respect to Asian suppliers. This invariably affects competitiveness, *all else being equal*, but we do not believe it would prohibit Sarnia-Lambton fabricators from competing outside of the region given their productivity and quality.

Overall, the corridor will not alter labour costs. Fabricators have very little control on these labour costs, though when warranted (e.g. once a potential market is proven) there is always opportunity to invest in automation should the economics of such a decision make sense.

### iii) Transportation Costs

The oversize corridor would have a significant impact on lowering the transportation costs associated with moving oversize products from fabricator facilities to clients (both locally and beyond the region via the port).

As noted in Chapter 2, these costs range from anywhere between \$15,000 to \$150,000 or more, depending on the size of the equipment being moved. With the establishment of an oversize corridor, costs would be lowered considerably. The cost of arranging for infrastructure adjustments would virtually disappear, as the movement of utility lines accounts for the largest portion of the transportation costs (though traffic lights would still need to be moved, and a police escort required in some cases). The process of streamlining applications for oversize loads could presumably also take place if authorities know that the corridor is already engineered to carry these loads.

The extent to which this permanent change would affect the competitiveness of fabricators would vary for each move and would depend on the proportion of total landed price which is made up by local transportation costs (which in turn will depend on the value of the module). Very roughly speaking, mechanical fabricated pieces and other pieces range in price anywhere from \$100,000 - \$1 million, meaning that transportation costs could have a very significant, or minimal, impact on total landed price.

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<sup>68</sup> Canadian Energy Research Institute “Competitive Analysis of the Canadian Petrochemicals Sector”, Study No. 160, October 2016.

#### iv) Profit Margin

The final component of any price to a client is the profit margin for the fabricator. This will always vary based on the given market context, depending on supply and demand. The Sarnia-Lambton fabricators, and the owner clients, have enjoyed a long history together, through many oil industry cycles. They have remained viable and competitive with each other and in some cases outside the region. This would lead one to believe that the local fabricators profit margins are set at a “tolerable” level.

Outside the region, Sarnia-Lambton fabricators may need to consider accepting lower profit margins in order to break into and provide themselves in new markets to new clients. This would require a long term perspective of diversification. This would naturally be considered on a case by case basis for each fabricator.

In summary, the corridor’s primary impact on competitiveness would be to lower transportation costs. As explained previously, the ultimate impact will vary depending on the size of the load and value of the product.

## 6.2 Investment and Improvement Needs

### 6.2.1 Physical and Technology Investments

Based on our consultations and knowledge of the competencies of Sarnia-Lambton fabricators, there are no major physical investments needed for these fabricators to be able to compete with their peers. Most of the companies have good technology, excellent skilled labour, and plenty of space either already developed or that could be very easily developed for increased business activity (e.g. they have the land already in their ownership).

This is not to say that investments in upgraded technology and automation would not be beneficial generally, including to lower labour requirements and associated costs. However, the investment in such technology would likely only be warranted with an expanded order book. Put differently, lack of technology or other physical investments are not expected to be a binding constraint to the competitiveness of Sarnia-Lambton fabricators should the corridor be built.

### 6.2.2 Marketing Efforts

Having a permanent, oversize corridor will open up opportunities for Sarnia-Lambton fabricators and enable them to be more price competitive. However, harnessing the benefits of the corridor will rest as much on marketing efforts by the regional fabricators as it will on being able to be more price competitive.

The corridor will not generate sales by itself; significant marketing to develop new relationships will generate sales. Some of the markets described in this report could already be attractive to Sarnia-Lambton fabricators (for normal size loads), but they are not being considered by all fabricators. Moreover, existence of the corridor could become a sales point both for oversize and normal loads, insofar as it might create a more efficient process/system for movement by truck for all load sizes.



The Sarnia-Lambton fabricators already have some advantages that will help them win business outside of Sarnia-Lambton. The companies are already known and contracted by Exxon Mobil, Shell, Suncor, Nova, CF Industries and other global players. In some cases, the fabricators already have sight of upcoming Request for Quotation (RFQs) and Requests for Proposals (RFPs) from these types of companies. The companies have also performed work for major EPC contractors such as Horton CB&I, Kellogg Brown and Root (KBR) Aecon, and Jacob's. These are among the largest oil and gas contractors in the world. Many have global procurement systems that allow contractors to view potential projects required around the world. Fabricators interested in bidding on more opportunities (e.g. getting more sight of RFQs) could also reach out to procurement managers to promote themselves further if the corridor is approved.

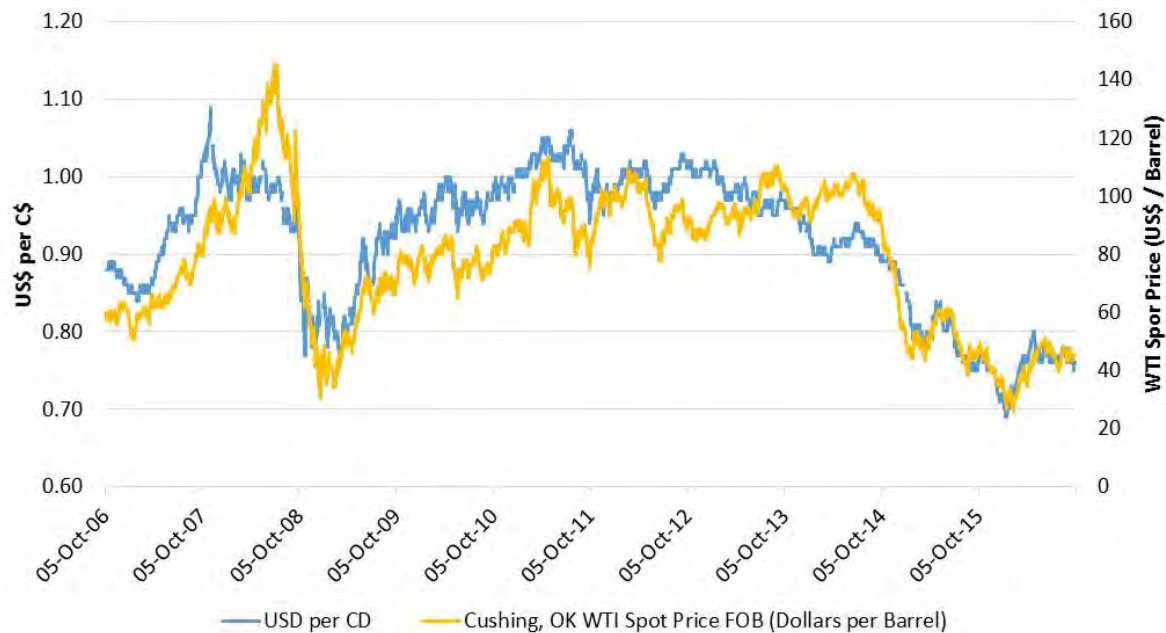
Market research, and marketing efforts where warranted, will also be required in new industries that are currently not being served to any great extent (nuclear power generation, bio-chemicals, etc.).

### 6.2.3 Other Factors

A number of other factors will influence the impact of the oversize corridor in terms of increased sales beyond the region.

- **Exchange rate fluctuations.** For the time being, the Canadian dollar is very weak (see Figure 6-1). This provides Sarnia-Lambton fabricators with a slight advantage in terms of price relative to their US counterparts. The time to start looking for new markets is now – while the low Canadian dollar provides a competitive advantage.
- **Pick up in the oil and gas sector.** The oil and gas sector is in a major slump, as reflected in the low price of oil (see Figure 6-1). When the sector picks up, not only will this mean more opportunity for projects beyond Sarnia-Lambton (e.g. shelved projects), but it will also likely mean more activity within Sarnia-Lambton. The benefits of the corridor will be highest if Sarnia-Lambton fabricators continue to look outside the region when the sector improves, even if they are busy with local business. This would require taking a longer-term view of market development. As can be seen from the figure, however, the price of oil and the value of the Canadian dollar typically follow the same pattern, so when business picks up, the Canadian dollar also increases in value.

Figure 6-1: Exchange Rate and Crude Oil Prices, 2006 – 2016



- Support from public authorities.** The benefits of the corridor will be enhanced in terms of time and associated cost savings if public sector authorities involved in approving oversize load moves through the city and Sarnia Harbour are willing to use a ‘fast track’ approach to permitting such moves. For example, removing requirements for additional engineering studies for oversize loads for each move, as long as the load follows the oversize corridor route.

**Speed of corridor development.** NOVA Chemicals is considering building a new petrochemicals facility in Sarnia-Lambton. We understand that they could start moving in large modules in the next couple years, which is before any proposed corridor could be built (e.g. pending approval of funding and distribution, as well as construction activities). To the extent that the corridor could be built sooner rather than later, this may provide added benefits for NOVA Chemicals (and they could even be approached to support the cost of such a corridor).

# 7 Economic Impact Analysis

## Key Chapter Takeaway

Assuming construction costs of \$11.4 million, and additional annual fabricated product sales of \$9.5 million, the Sarnia-Lambton oversize freight corridor project would add approximately \$263 million to Canada's GDP (2010 dollars) over a period that includes a three year construction phase and 30 years of operation. The project would result in an estimated 2,613 additional full time equivalent jobs (person years of employment), and would add approximately \$21.4 million to government tax revenues (2010 dollars).

## 7.1 Introduction and Approach

This chapter estimates the economic impact of the proposed oversize Sarnia-Lambton freight corridor in terms of:

- Gross Domestic Product (GDP)<sup>69</sup>
- Employment
- Government tax revenues

Simulation using an input-output model (a model that replicates the inter-industry relationships in the economy) is the method used to estimate the economic impact. The simulation is carried out by deliberately altering or “shocking” the level of a particular variable (or variables) in order to change them from their status quo, and then observing the effects on the remaining variables in the model, in particular GDP, employment, and tax revenues.

The key drivers resulting in the economic impacts are: (i) the construction activity involved in building the improved corridor as measured by its capital costs; and (ii) the anticipated increase in revenues for local area fabrication companies who would increase their production and sales of oversize equipment as a result of having access to an improved corridor.<sup>70</sup> We were not able to quantify any impacts for future increases in inbound shipments, as we could not identify any immediate such shipments.

### 7.1.1 Construction Costs of Improved Corridor

Construction costs of the improved corridor are provided in the engineering analysis commissioned for the project and shown in MIG Consulting Engineers, “Oversize Load Corridor

<sup>69</sup> GDP is a measure of the value of all the goods and services produced by an economy.

<sup>70</sup> In some infrastructure projects, economic impact analysis would also include an assessment of the impact of “operating costs” for a new asset. In the case of the oversize corridor in Sarnia, we expect such ongoing operating (maintenance) costs to be minimal and have not included them.

Shipping Route Study” (Revision Date: August 4, 2016). Figure 7-1 presents a summary of the estimated construction costs. The total costs are estimated as \$11.4 million. Based on conversation with the City of Sarnia, the time to complete the corridor may be estimated as three years (assuming no fast-tracking).

As may be seen, the largest element of the construction cost (\$4.0 million) is due to the necessary improvements at the Sarnia Harbour. Other major elements are the civil and structural work involving improvements to bridges, culverts, and road upgrades (\$2.5 million) and the electrical work to relocate wires, cables, poles, transformers, traffic signals, and lights (\$2.4 million) to ensure uninterrupted passage of oversize loads and their transport vehicles.

The engineering study also includes in the total for the project an amount of \$2.6 million to account for Contingency (20 percent) and Escalation (10 percent). In Figure 7-1 we have spread this proportionately among the three main construction cost elements.

Figure 7-1: Sarnia-Lambton Oversize Freight Road Corridor Construction Cost Summary

Item	Description	Construction Cost (\$)	Contingency and Escalation (\$)
1	Port of Sarnia Harbour and Dock	3,959,063	1,187,719
2	Road Infrastructure (Civil, Structural and Misc.)	2,472,782	741,835
3	Road Infrastructure (Electrical)	2,360,794	708,238
	Sub-Total	8,792,639	2,637,792
	<b>Total for Construction, Incl. Contingency and Escalation</b>	<b>\$11,430,431</b>	

Source: Cost summary in MIG Consulting Engineers, Oversize Load Corridor Shipping Route Study Revision B (August 4, 2016)

### 7.1.2 Anticipated Increase in Sales from Oversize Corridor

Based on our industry consultations with fabricators, combined our assessment of potential market opportunities, we estimate that the oversize corridor could result in additional sales of \$9.5 million per year in fabricated equipment (mechanical and structural fabrication). This estimate reflects the competitive environment faced by fabricators regionally and globally.

## 7.2 Economic Impact Methodology

To estimate the economic impact of the Sarnia-Lambton oversize freight road corridor we used the Statistics Canada Interprovincial Input-Output (I-O) model.<sup>71</sup> The model, through its representation of the inter-industry relationships in the economy, allows for the estimation of the direct, indirect and induced impacts of a project. In carrying out the exercise we worked closely with Statistics Canada’s Industry Accounts Division which maintains the model, makes available the service of running the model, and advises on its use. Use of the model is made available by Statistics Canada on a cost recovery basis and is common practice by project proponents in Canada.

<sup>71</sup> Statistics Canada. Input-Output Model Simulations (Interprovincial Model). Product main page at <http://www5.statcan.gc.ca/olc-cel/olc.action?lang=en&ObjId=15F0009X&ObjType=2>

### 7.2.1 The Input-Output Model

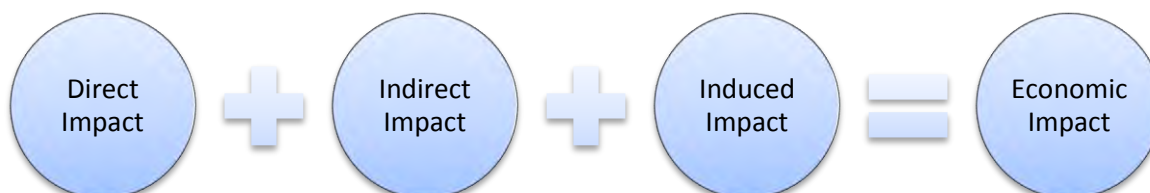
Industry inputs and outputs in the I-O model cover every industry in the economy and must, of course, be expressed in a common measurement unit. They are therefore expressed in value (dollars), and not volume, terms. The current model is based on 2010 values for industry inputs and outputs. This means that the impacts estimated using the model will reflect the 2010 inter-industry structure and relative prices in the economy.

Modeling inter-industry relationships requires a system for classifying industries and commodities. As described by Statistics Canada,<sup>72</sup> the industry classification in the model is designed to accommodate business establishment-based data, the building blocks of the I-O system. The commodity classification used is designed specifically for the I-O system and is intended to provide concordance between a variety of commodity classification systems employed throughout the Canadian statistical system. Consistent classification of commodities is crucial in the construction and balancing of I-O tables. For example, a commodity must be coded consistently whether it be as part of manufacturing output, as an item being transported, as an export or import, or as a purchase by a final consumer.

### 7.2.2 Standard Economic Impact Assessment

The analysis takes the standard approach of estimating three categories of impacts: direct, indirect, and induced. Also in keeping with standard practice, the sum of these is referred to as the economic impact of the project, as illustrated in Figure 7-2.

Figure 7-2: Components of Economic Impact



As defined by Statistics Canada, **direct impact** in general measures the initial requirements for an extra dollar's worth of output of a given industry. **Indirect impact** measures the changes due to inter-industry purchases in response to the new demands of the directly affected industries. This includes all the chain reaction of outputs up the production stream since each of the products purchased will require, in turn, the production of various inputs. **Induced impact** measures the changes in the production of goods and services in response to consumer expenditures induced by households' incomes generated by the production of the direct and indirect requirements.

<sup>72</sup> Statistics Canada. A User Guide to the Canadian System of National Accounts, Chapter 3, Input-Output. <http://www.statcan.gc.ca/nea-cen/pub/guide/chap3-eng.htm>.

In the results presented below, impacts are presented for Ontario, the province where the project is occurring, and for all of Canada. Impacts are reported in terms of additional GDP, full-time equivalent (FTE) jobs – the same as person-years of employment – and tax revenues. Regarding tax impacts, these are taxes on products and production; the model does not include income taxes.

### 7.2.3 Interpreting the Results

Every project has a life cycle including both a construction phase and an operations phase. For the present analysis, I-O model simulations have been carried out to estimate the economic impacts of both phases, i.e. construction and operations. However, it is important to recognize that the results of the two phases cannot simply be added together to arrive at the total impact over the project life cycle.

When the model is shocked by an amount accounting for the cost of construction or expansion of a facility, the model estimates the economic impact. In reality, however, such activity occurs over a number of years and what the model estimates is, in effect, the cumulative impact of the construction phase. In contrast, when the model is shocked by an amount representative of annual activity in the operations phase, the result given by the model corresponds to the economic impact for a single year. To arrive at the cumulative impact of the operations phase, the results given by the model would have to be multiplied by the number of years the facility would be in operation.<sup>73</sup> In section 7.3.2 below, we summarize the operations phase impacts on both an annual and cumulative basis.

## 7.3 Economic Impact of Oversize Freight Road Corridor

This section summarizes the estimated economic impact of the Sarnia-Lambton oversize freight corridor project. Results are indicated first for the construction and operations phases of the project, respectively. Following this, we provide an indication of the impact on a cumulative basis, combining the results for the construction and operations phases.

### 7.3.1 Construction Phase Impact

In order to estimate the economic impact of the construction phase it has been necessary to assign the engineering construction cost estimates shown above to the appropriate I-O model industry categories. Figure 7-3 shows this assignment.

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<sup>73</sup> Calculating the cumulative impact in this manner does not, of course, take into account the “time value of money,” as would be the case in a financial or economic cost-benefit evaluation where future cash flows are discounted to their present values.

Figure 7-3: Road Corridor Construction Cost Classified for Economic Impact Analysis

Engineering Description	\$ Thousands			I-O Model Industry	
	Construction Cost	Contingency and Escalation	Total	Code	Title
Port of Sarnia Harbour and Dock	3,959	1,188	5,147	BS23C100	Transportation engineering construction
Road Infrastructure (Civil, Structural and Misc.)	2,473	742	3,215	BS23C100	Transportation engineering construction
Road Infrastructure (Electrical)	2,361	708	3,069	BS23C300	Electric power engineering construction
<b>Total</b>	<b>8,793</b>	<b>2,638</b>	<b>11,430</b>		

As may be inferred from Figure 7-3, carrying out the model simulation to estimate the economic impact of the construction phase has involved shocking two industries, the transportation engineering construction industry where the shock value amounts to \$8.4 million, and the electric power engineering construction industry where the shock value amounts to \$3.1 million, with these adding up to the total engineering cost estimate of \$11.4 million.

Using the above costs to “shock” the I-O model, Figure 7-4 summarizes the economic impact results for the construction phase of the Sarnia-Lambton oversize freight road corridor project. Not surprisingly, almost all of the impact occurs in Ontario.

Figure 7-4: Sarnia-Lambton Oversize Freight Corridor Construction Phase Economic Impact

Effect	GDP at Basic Prices (\$ thousands)		FTE Jobs Created (number)	
	Ontario	Canada	Ontario	Canada
Direct Impact	4,736	4,736	58	58
Indirect Impact	3,450	4,267	34	40
Induced Impact	2,202	2,722	20	25
<b>Total Economic Impact</b>	<b>10,388</b>	<b>11,725</b>	<b>112</b>	<b>123</b>

Source: Statistics Canada Interprovincial Input-Output Model simulation

In total (adding the direct, indirect, and induced impacts together), the construction of the road corridor is estimated to lead to an increase in GDP of approximately \$11.7 million in Canada as a whole, of which \$10.4 million occurs in Ontario and \$1.3 million occurs in the rest of Canada. We note that the GDP impact in Figure 7-4 is measured at “basic prices” (i.e. it excludes taxes on products) and is the incremental value added associated with the estimated job creation. The FTE jobs created during the construction phase are estimated as 123 in Canada, of which 112 would occur in Ontario.

Not shown in Figure 7-4 are the tax implications. In total, the construction of the Sarnia-Lambton oversize freight road corridor is estimated by the I-O model to lead to an increase in governments’ tax revenue (not including income taxes) of approximately \$1.2 million in Canada as a whole, of which approximately \$1.0 million would accrue in Ontario.

### 7.3.2 Operations Phase Impact (Additional Sales)

It is our understanding that, once it is constructed, any work activity associated with maintaining the new corridor will be relatively insignificant and we have not included such activity in the economic impact analysis.

The economic impact in the operations phase therefore derives from the additional production and sales of oversize fabricated equipment that access to the corridor would make possible. Based on our consultations with members of the industry, this is estimated to be \$9.5 million per year. Also, this represents the delivered value of the equipment, i.e. it includes the costs of production as well as the costs of transportation and handling to deliver the products to their final markets. We estimate that of the \$9.5 million per year, 80 percent would be exported to markets outside of Ontario and 20 percent would be destined for customers within Ontario.

To estimate the economic impact of the additional production and sales of oversize fabricated equipment we must, as with the construction phase economic impact analysis, identify the appropriate I-O model variables to be shocked. Based again on our consultations and knowledge of the fabricator sector in Sarnia-Lambton, it is estimated that of the \$9.5 million in annual production and sales, 80 percent would fall under “Boiler, tank, and shipping container manufacturing” (industry BS332400). This includes boilers, heat exchangers, pressure vessels and the like, equipment manufactured by the majority of the fabricators consulted. The remaining 20 percent would fall under “Architectural and structural metals manufacturing” (Industry BS332300). This would include structural steel framing, stands, platforms, stairs, handrails, etc.

Figure 7-5 shows the estimated economic impacts resulting from the additional production and sales of fabricated equipment made possible by the oversize freight corridor. In total, there would be an annual impact on GDP of \$8.4 million for Canada as a whole, of which \$7.3 million would occur in Ontario. The annual FTE jobs created are estimated as 83 in Canada, of which 73 would accrue in Ontario.

Figure 7-5 also shows the cumulative impact of the additional production and sales assuming operation of the road corridor over a period of 30 years. The cumulative impact would amount to additional GDP of \$251 million for Canada, of which \$220 million would occur in Ontario. The corresponding additional FTE jobs would amount to 2.5 million for Canada, of which 2.2 million would occur in Ontario.

Figure 7-5: Sarnia-Lambton Oversize Freight Corridor Operations Phase Economic Impact (Annual and 30-Year Cumulative)

Effect	GDP (\$ thousands)		FTE Jobs Created (number)	
	Ontario	Canada	Ontario	Canada
Direct Impact	3,861	3,861	39	39
Indirect Impact	1,822	2,463	19	24
Induced Impact	1,656	2,058	15	20
<b>Total Economic Impact</b>	<b>7,339</b>	<b>8,382</b>	<b>73</b>	<b>83</b>
<b>Total Over 30 years</b>	<b>220,170</b>	<b>251,460</b>	<b>2,190</b>	<b>2,490</b>

Source: Statistics Canada Interprovincial Input-Output Model simulation



Although not shown in Figure 7-5, the additional production and sales of fabricated equipment enabled by the oversize freight corridor would also result in increased tax revenues for governments. For Canada as a whole, the annual tax revenues generated from this activity are estimated by the I-O model to total \$0.7 million (not including income taxes), of which approximately \$0.6 million would accrue in Ontario.

### 7.3.3 Summary of Economic Impact

Figure 7-6 presents a summary of the project's economic impact on the Canadian economy. Focusing on the cumulative impacts, the results indicate that the project would add approximately \$263 million to Canada's GDP (2010 dollars) over a period that includes a three year construction phase and 30 years of operation. The resulting additional full time equivalent jobs, or person years of employment, would be approximately 2,613. The project would also add approximately \$21.4 million<sup>74</sup> to governments' tax revenues (2010 dollars).

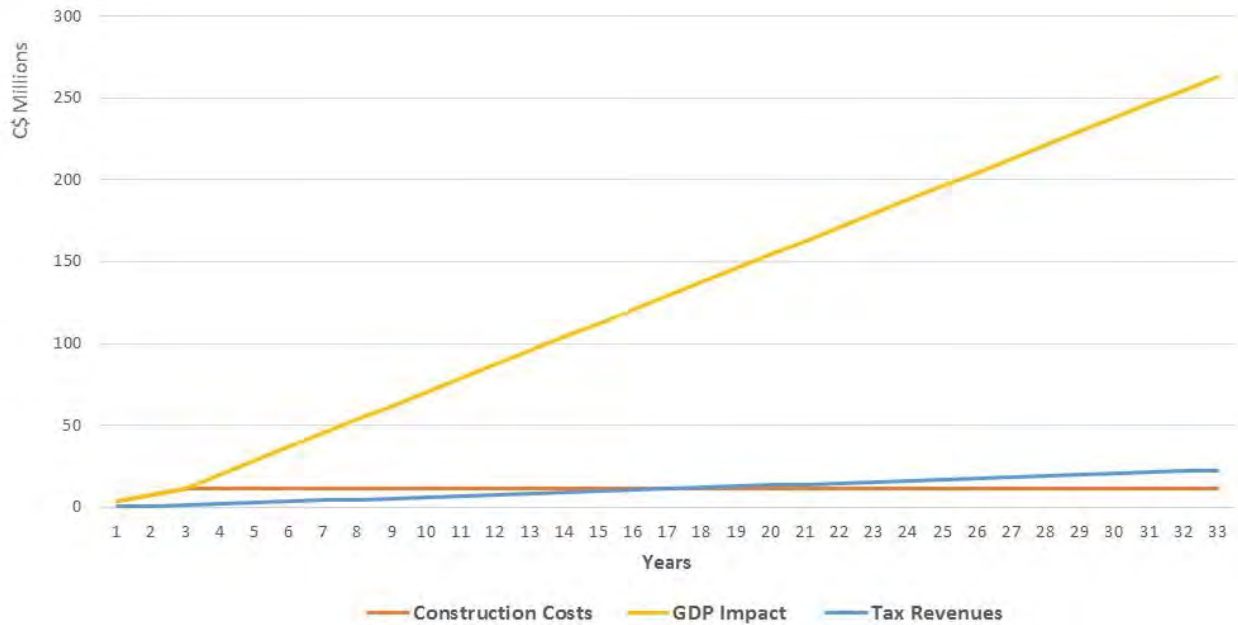
Figure 7-6: Summary of Sarnia-Lambton Oversize Freight Road Corridor Economic Impact <sup>(1)</sup>

Construction Phase Impact (2)	
Total construction cost (including contingency and escalation)	\$11.4 million
GDP impact	\$11.7 million
Jobs impact	123
Tax impact	\$ 1.2 million
Annual Operations Phase Impacts (3)	
Annual production/sales of oversize equipment enabled by corridor	\$9.5 million
Annual GDP impact	\$8.4 million
Annual jobs impact	83
Annual tax impact	\$ 0.7 million
Cumulative Impacts (4)	
GDP impact	\$ 263 million
Jobs impact	2,613
Tax impact	\$ 21.4 million
<p><sup>(1)</sup> Impacts shown are for Canada, and are the total of direct, indirect and induced effects. Jobs impacts are full-time equivalent full year jobs and thus equal to person-years of employment. Tax impacts include taxes on production and on products but not on incomes. Dollar figures are 2010 values reflecting the current version of Statistics Canada's Interprovincial Input-Output (I-O) Model. All figures are nominal values.</p> <p><sup>(2)</sup> Construction costs and impacts are totals relating to the entire construction period (3 years).</p> <p><sup>(3)</sup> Production/sales of equipment and impacts relate to a single year in the operating life of the corridor.</p> <p><sup>(4)</sup> Cumulative impacts are the sum of the impacts for the construction phase and for 30 years of operation of the corridor. All figures are nominal values.</p>	

<sup>74</sup>\$21.4 million results from using figures as actually generated by the model and not the rounded figures reported above.

Figure 7-7 below illustrates the cumulative costs and benefits of the project over a 30 year period. Even using a relatively conservative estimate in terms of additional sales (\$9.5 million), it is clear that investment in the corridor would more than pay for itself in the short term (GDP impact) and medium term (tax revenues).

Figure 7-7: Illustration of Cumulative Costs and Economic Impacts



Source: CPCS analysis of costs and economic impacts. Assumes three year construction timeframe with costs and benefits spread equally across three years, and no maintenance costs. Assumes corridor operating benefits start accruing in Year 4 for 30 years.

## 7.4 Additional Economic Benefits (Qualitative Benefits)

### 7.4.1 Further Benefits of the Corridor

The economic impacts quantified above are limited to impacts from construction activities and sales of additional fabricated products destined beyond the region. There would be a number of additional benefits to the corridor, as listed below. These have not been quantified, either because the benefits are very small and/or are not quantifiable.

- **Benefits for local moves:** While not the focus of the study, the construction of an oversize corridor could also be expected to improve the economics (lower transportation costs) of moving oversize pieces of equipment from local fabrications to existing clients within the region. This could result in cost savings to clients and/or increased profitability for the local area fabricators.
- **Future cost savings:** If the corridor is not built, costs will continue to be incurred for each and every oversize product move destined both within and beyond the region. As such, construction of the corridor will result in future cost savings as a result of no longer having to alter infrastructure repeatedly for oversize moves. This would benefit both local moves

(from fabricators to client sites) as well as moves from fabricator facilities to the port for movement beyond the region.

- **Lowering health and safety risks:** Related to the point above, establishing a permanent corridor will remove significant health and safety risks associated with moving hydro and other utility lines. Every time a hydro one employee must lift a hydro line, there are health risks involved which must be taken into consideration. These risks would be reduced or eliminated if the corridor is established.
- **Marketing tool for future investors in Sarnia-Lambton:** We were not able to quantify the potential benefits that may arise for future importers of oversize freight who could locate themselves in Sarnia-Lambton, given this future market is unknown. However, one could assume that in the coming decades, the corridor will serve as a benefit to at least one or more companies who require the use of an oversize freight corridor and who would not otherwise have considered Sarnia-Lambton.

# 8 Conclusions

## 8.1 Summary of Findings

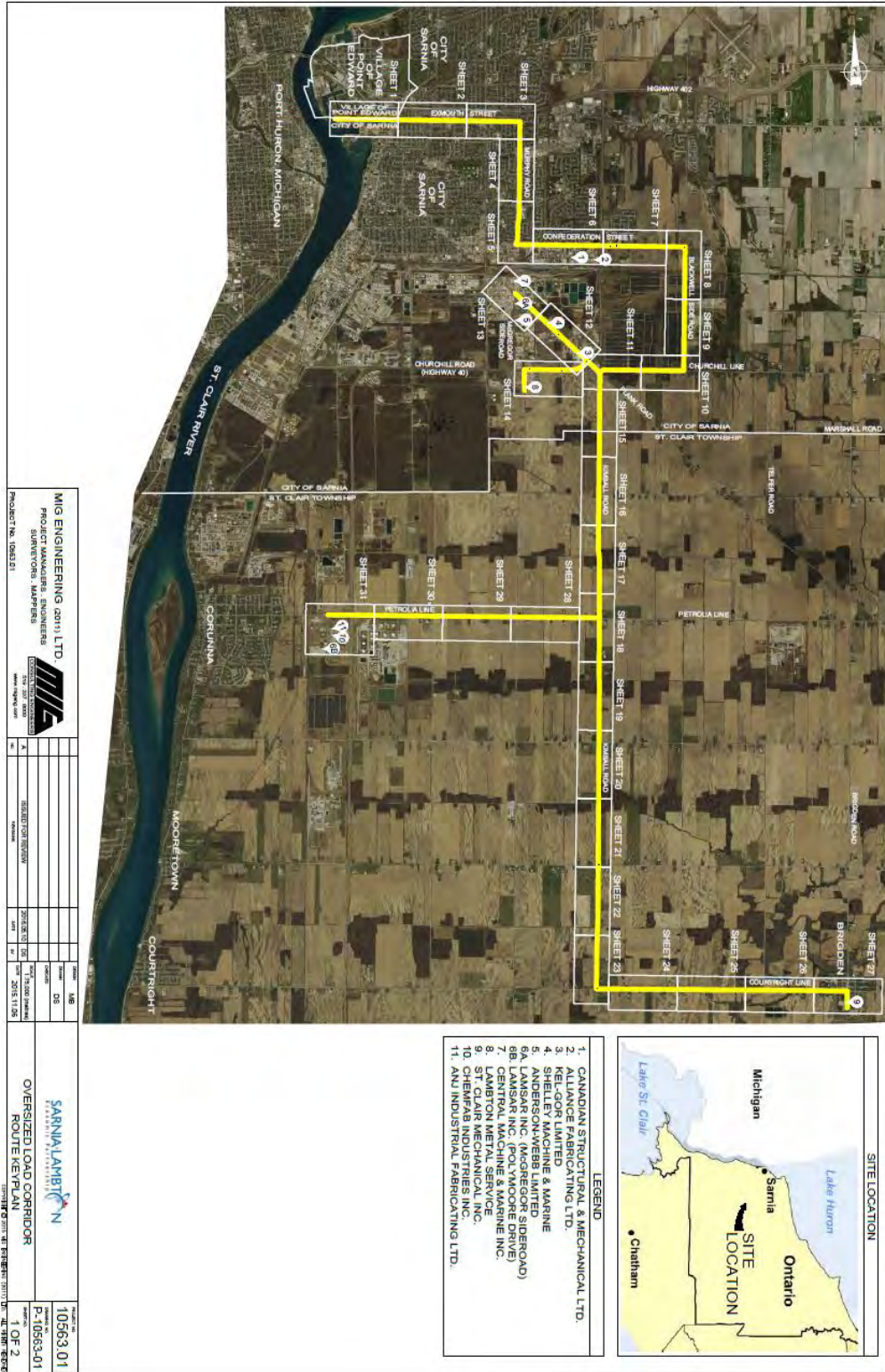
Establishing an oversize corridor to enable less costly transportation of oversize products to existing and new clients in markets outside of Sarnia-Lambton would improve the ability of local fabricators to develop and compete in these markets. The impact in terms of additional sales will be highest for large, lower value pieces of equipment, where the difference in transportation cost has the greatest impact on total landed price.

The markets with the highest potential appear to be in the petroleum and petrochemicals sector, as well as opportunities where clients are located directly on the water front and equipment could be built to the maximum load size permitted through the corridor. Petroleum sector opportunities in Atlantic Canada appear to hold the highest potential, followed by the US East Coast, Mexico and the Middle East.

Based on consultations and assessment of potential markets, we estimate that an additional \$9.5 million in annual sales could be generated as a result of the corridor. To realise the full benefits of the oversize corridor, however, Sarnia-Lambton fabricators will have to carry out marketing to existing and more geographically diverse clients in the petroleum and petrochemicals sector. They will also need to undertake market research to better assess opportunities in other sectors that may require the types of equipment that Sarnia-Lambton fabricators do, or could, produce.

Assuming construction costs of \$11.4 million, and additional sales of \$9.5 million per year (for 30 years), the corridor is expected to generate cumulative economic impacts which could add approximately \$263 million to Canada's GDP (2010 dollars). The project could generate 2,613 full time equivalent jobs (or person years of employment), and could generate approximately \$21.4 million in government tax revenues. Investment in the corridor would more than pay for itself in the short term (GDP impact) and medium term (tax revenues).

# Appendix A: Corridor Map



# Appendix B: Literature Reviewed

- Canadian Energy Research Institute “Competitive Analysis of the Canadian Petrochemicals Sector”, Study No. 160, October 2016.
- Canadian Manufacturers & Exporters, “Manufacturing Supply Chains in Alberta’s Oil Sands”, October 2014
- Canadian Manufacturers & Exporters, “Oil Sands Manufacturing”, November 2013
- CAPP- Canada’s Oil & Natural Gas Producers, “Crude Oil Forecast, Markets and Transportation”, June 2016
- Cuba Business Report “The Oil and Gas Industry in Cuba”, March 13, 2016
- Financial Times, “US gas: Global market, local problems”, September 26, 2016
- Forest Products Biotechnology- The University of British Columbia, “The Biorefinery Concept in Alberta: Opportunities and Challenges”, Alberta Science and Research Authority, August 11, 2003
- HAL Innovation Policy Economics, “Manufacturing, Machine Shop and Engineering Inventory and Capability Study”, Sarnia-Lambton Economic Partnership, May 6, 2010
- HART ENERGY E&P, “Mexico: Land of Bidding Opportunity”, May 1, 2015MaRS Market Intelligence, “Digging in to Bio-based Innovation”, November 2013
- MIG Consulting Engineers “Oversize Load Corridor: Shipping Route Study”, prepared for the Sarnia-Lambton Economic Partnership and the Sarnia Lambton Industrial Alliance, 2016.
- MIG Engineering, “Shipping Route Assessment for Oversize Freight from Sarnia-Lambton”, for Sarnia-Lambton Economic Partnership, 2012
- Oil & Gas Journal, “Pemex advances diesel program at Mexican refineries”, September 15, 2014
- Oil & Gas Journal, “Pemex lets contract for Tula refinery upgrade”, November 13, 2015
- Organization of the Petroleum Exporting Countries, “2015 World Oil Outlook”, October 2015
- Pacific Future Energy Refinery, Project Description Summary, June 2016
- The Conference Board of Canada, “Fuel for Thought: The Economic Benefits of Oil Sands Investment for Canada’s Regions”, 2012
- The Economist, “Canada’s internal trade, The great provincial obstacle course”, July 23 2016
- The Van Horne Institute, PROLOG Canada Inc., JRSB Logistics Consulting Ltd, “Over-dimensional Loads- a Canadian Solution”, July 2015
- U.S. Geological Survey, “Recent Trends in Cuba’s Mining and Petroleum Industries”, April 2015
- U.S. Department of Commerce, International Trade Administration, Industry & Analysis, “2016 Top Markets Report Upstream Oil and Gas Equipment”, May 2016
- Wall Street Journal, “Middle East Refinery Expansion Plans Hit Snags”, August 3, 2015

# Appendix C: Stakeholders Consulted

- Alliance Fabricating Limited
- Anderson-Webb
- ANJ Industrial Fabricators
- BioAmber
- Bioindustrial Innovation Canada
- Bluewater Power
- Canadian Structural & Mechanical
- CF Industries
- CH2M Engineering (water and wastewater specialist)
- Chemfab
- City of Sarnia
- Food and Beverage Ontario
- Former naval maritime surface and sub-surface officer (with expertise on ship construction and procurement)
- Great Lakes Fabricating
- Imperial Oil
- Irving Shipbuilding
- Kel-Gor
- LamSar
- Macrotek
- Mammoet Transportation
- Marilyn Gladu (MP for Sarnia)
- NOVA Chemicals
- Ontario Ministry of Economic Development and Growth (Project Lead – Energy Connections)
- Port of Sarnia
- Promart
- Suncor
- Toolrite Engineering
- TransAlta
- Ubiquity Solar

# Appendix D: Fabricator Survey

## Study Background

The Region of Sarnia-Lambton is considering the development of an enhanced oversize/overweight (OSOW) freight road-port corridor in the City of Sarnia. The anticipated corridor would facilitate increased movement of large industrial fabricated steel modules and equipment to and from local industries, lower transportation costs for exporters and importers of such freight, and enhance trade in OSOW products.

CPCS Transcom (CPCS) has been engaged by the Sarnia Lambton Economic Partnership (SLEP) and the Sarnia-Lambton Industrial Alliance (SLIA) to assess the benefits, including economic impacts, of the proposed OSOW project, notably from increased ability for regional fabricators to compete in new markets.

**Company-level information provided in interviews will be held strictly in confidence. Analysis of information in our report to SLEP/SLIA will reflect an aggregated perspective for the entire Sarnia-Lambton region.**

**Qualitative production overview:** Please describe your operations, as related to oversize products.

1. Do you ship OSOW assemblies? What specific type(s) (e.g. mechanical modules, modular assemblies, pressure vessels, piping modules, storage tanks, boilers, heat exchanges, etc.)?
2. Is there a standard assembly size or range of sizes for your assemblies? (e.g. 15 x 15, 20 x 20, etc.)
3. Are there other modular assemblies that you have the capacity to fabricate which you ARE NOT currently fabricating (e.g. upstream oil & gas, power sector modules, mining modules)?

**Quantitative production overview:** Please describe the approximate scale of your operations.<sup>75</sup>

4. What is the approximate revenue from each type of module (price per ton per type of assembly – mechanical, vessels, piping, structural, etc.)?
5. Approximately how many tons of each type of module do you produce each year? And how does this break down between local sales within the Sarnia-Lambton region, versus sales outside the region?
6. What are your current employment levels (skilled, unskilled) related to fabrication of oversize overweight assemblies?

---

<sup>75</sup> Information on sales and employment will be aggregated across all companies and used to assess the quantitative benefits of an expanded corridor in the region (e.g. current sales and employment relative to potential future sales and employment).



**Current market overview:** Please describe your current client base and approach to supplying them.

7. Which downstream industries are you currently supplying with your OSOW products?
8. Where are these downstream clients located and how do you transport OSOW loads to these clients?
9. Who are your key competitors (other fabricators) outside the Sarnia-Lambton region?

**Transportation and other costs.** Please provide an overview of costs/barriers for OSOW product movement.

10. What are the approximate costs to transport oversize loads to your current clients (cost per ton of module for a range of load types, distance to client, etc.)? What is the approximate transport cost as a percent of total landed cost (price to your client) for the modules you supply?
11. Do you experience administrative or regulatory difficulties or delays in obtaining permits required for your transportation of OSOW loads?

**Potential Markets with Enhanced Corridor.** Please describe the qualitative and quantitative benefits you anticipate from the proposed oversize freight corridor.

12. Which specific downstream industries and markets do you see as having the greatest potential for your sales of OSOW products *as a result of the enhanced corridor* (in Canada, US, overseas)?
13. To what extent have transportation costs been a significant issue prohibiting you from servicing these industries? What other factors (other than costs and efficiency of transportation) might affect your ability to compete in these markets (e.g. labour costs, technology usage, etc.)?
14. For the different OSOW products that you fabricate, what do you estimate is the potential additional sales (in \$ value terms) that would result from having access to an enhanced OSOW freight corridor? How would this likely break down as between increased shipments to existing markets and new shipments to currently unserved markets)?
15. Considering any additional production of OSOW products that would result from access to an enhanced freight corridor, what, if any, investments or improvements in fabrication do you feel would be necessary to better serve existing and/or new markets?
16. Considering the additional production of OSOW products that would result from access to an enhanced freight corridor, what impact would this have on your employment levels (skilled and unskilled)? Would you anticipate difficulties in securing the required additional labour from the existing local labour force?

# Appendix E: Alberta Oil and Gas Projects

## Alberta Major Projects

The timing and size of expansions in Alberta's oil and gas sector is uncertain due to the relatively low price of oil.

Industry groups such as the Canadian Association of Petroleum Producers (CAPP) suggest that projects under construction will continue, but projects that have been approved but have not yet begun construction are expected to be delayed. Given the time needed to secure funding and to construct the oversize corridor, a short term delay in Alberta projects could allow Sarnia fabricators to access these markets in the future using the oversize corridor. As noted, fabricators should leverage existing relationships and will need to market their services to expand their presence in the Alberta oil and gas sector.

As a resource to guide future marketing, in conjunction with economic development and industry organizations, the tables in this section are included to provide a sense of upcoming opportunities. The information provided in these tables was sourced from the [Alberta Government's Major Projects Database](#), which lists private and public sector projects by sector over \$5 million. Sectors include:

- Industrial
- Infrastructure
- Institutional
- Mixed-Use
- Oil and Gas
- Pipelines
- Power
- Residential
- Retail
- Tourism/Recreational

## Oil Sands Project

The table below presents oil sands projects, noting the name of the project, municipality, type of oil sands project, cost, project stage, and schedule when available. For further information on these projects, the project name hyperlinks to an overview of the project. Additionally, the Alberta government produces a quarterly report titled [Alberta Oil Sands Industry Quarterly Update](#), which provides regularly updated details on the status of oil sands projects (announced, in application, approved, under construction, on-hold, suspended, or cancelled). Additionally, the *Alberta Oil Sands Industry Quarterly Update* is organized by region and company, providing information needed to strategically target companies based on location, project status, or existing relationship.

## Oil Sands Projects

Project Name	Municipality	Project Type	Cost	Project Stage	Schedule
<a href="#">BlackGold Oil Sands Project Phase 2</a>	Wood Buffalo	In Situ	\$540.0M	Proposed	-
<a href="#">Great Divide SAGD Expansion Phase 1</a>	Wood Buffalo	In Situ	\$600.0M	Proposed	-
<a href="#">Lewis SAGD Oil Sands Project</a>	Wood Buffalo	In Situ	\$65.0M	Proposed	-
<a href="#">May River Bitumen Project Phase 1</a>	Wood Buffalo	In Situ	\$250.0M	Proposed	-
<a href="#">Silvertip Oil Sands Facility Phases 1 and 2</a>	Wood Buffalo	In Situ	\$100.0M	Proposed	-
<a href="#">Tamarack Bitumen Project Phase 1</a>	Wood Buffalo	In Situ	\$1.4B	Proposed	-
<a href="#">Thickwood SAGD Oil Sands Project</a>	Wood Buffalo	In Situ	\$420.0M	Proposed	-
<a href="#">Equinox Oil Sands Mine</a>	Wood Buffalo	Mining	\$5.8B	Proposed	-
<a href="#">West Ells' Oil Sands Project Phases 1 and 2</a>	Wood Buffalo	In Situ	\$525.0M	Proposed	2012 - 2015
<a href="#">Germain Commercial Demonstration Project Phase 2</a>	Athabasca County	In Situ	\$1.1B	Proposed	2013 - 2015
<a href="#">Blackrod SAGD Oil Sands Project Phase 1</a>	Lac la Biche County	In Situ	\$802.0M	Proposed	2014 - 2016
<a href="#">Hoole Grand Rapids SAGD Project Phase 1</a>	Opportunity No. 17	In Situ	\$452.0M	Proposed	2014 - 2016
<a href="#">Muskwa SAGD Oil Sands Project</a>	Opportunity No. 17	In Situ	\$800.0M	Proposed	2014 - 2017
<a href="#">Pelican Lake Grand Rapids SAGD Oil Sands Project</a>	Opportunity No. 17	In Situ	\$2.0B	Proposed	2014 - 2017
<a href="#">Audet Lands Oil Sands Facility</a>	Wood Buffalo	In Situ	\$550.0M	Proposed	2015 - 2016
<a href="#">Dunkirk Project</a>	Opportunity No. 17	In Situ	\$123.0M	Proposed	2015 - 2016
<a href="#">Rigel Oil Sands Project</a>	Wood Buffalo	In Situ	\$390.0M	Proposed	2015 - 2017
<a href="#">Saleski Oil Sands Pilot Project Expansion</a>	Opportunity No. 17	In Situ	\$520.0M	Proposed	2015 - 2017
<a href="#">Saleski Thermal Oil Sands Project</a>	Opportunity No. 17	In Situ	\$300.0M	Proposed	2015 - 2017
<a href="#">Christina Lake SAGD Project Phase 3</a>	Wood Buffalo	In Situ	\$500.0M	Proposed	2016 - 2018
<a href="#">Pike Oil Sands Project</a>	Lac la Biche County	In Situ	\$3.8B	Proposed	2016 - 2018
<a href="#">Sepiko Kesik (Saleski East) Oil Sands Project</a>	Opportunity No. 17	In Situ	\$70.0M	Proposed	2016 - 2018
<a href="#">Aspen Oil Sands Project</a>	Wood Buffalo	In Situ	\$7.0B	Proposed	2016 - 2020
<a href="#">Birchwood SAGD Oil Sands Project</a>	Wood Buffalo	In Situ	\$510.0M	Proposed	2017 - 2018
<a href="#">Taiga Oil Sands Project</a>	Bonnyville No. 87	In Situ	\$1.6B	Proposed	2017 - 2018
<a href="#">Cold Lake Oil Sands Project (Midzaghe Project)</a>	Cold Lake	In Situ	\$2.0B	Proposed	2019 - 2022
<a href="#">Frontier Oil Sands Mine</a>	Wood Buffalo	Mining	\$20.0B	Proposed	2019 - 2026

<a href="#">Walleye SAGD Oil Sands Project</a>	Bonnyville No. 87	In Situ	\$450.0M	Proposed	Commencing 2017
<a href="#">Algar Lake Oil Sands Project Phase 2</a>	Wood Buffalo	In Situ	\$185.0M	Proposed	Commencing 2018
<a href="#">Grouse In Situ Oil Sands Project</a>	Lac la Biche County	In Situ	\$1.5B	Proposed	Commencing 2018
<a href="#">Voyageur South Mine</a>	Wood Buffalo	Mining	\$4.4B	Proposed	Commencing 2018
<a href="#">Ells North Oil Sands Facility Phases 1 and 2</a>	Wood Buffalo	In Situ	\$100.0M	Proposed	Commencing 2019
<a href="#">Christina Lake Thermal Expansion Project</a>	Lac la Biche County	In Situ	\$2.7B	Under Construction	2012 - 2017
<a href="#">Foster Creek Oil Sands Project</a>	Bonnyville	In Situ	\$2.0B	Under Construction	2012 - 2017
<a href="#">Horizon Oil Sands Project Phase 2 and 3</a>	Wood Buffalo	Mining	\$2.1B	Under Construction	2012 - 2017
<a href="#">Hangingstone SAGD Commercial Production Project</a>	Wood Buffalo	In Situ	\$774.0M	Under Construction	2013 - 2016
<a href="#">Narrows Lake In Situ Oil Sands Project</a>	Wood Buffalo	In Situ	\$1.6B	Under Construction	2013 - 2017
<a href="#">Fort Hills Oil Sands Mine</a>	Wood Buffalo	Mining	\$13.5B	Under Construction	2013 - 2017
<a href="#">Dover Commercial Project Phase 1</a>	Wood Buffalo	In Situ	\$2.5B	Under Construction	2014 - 2017
<a href="#">Telephone Lake SAGD Project Phase 1</a>	Wood Buffalo	In Situ	\$1.0B	Under Construction	2014 - 2018
<a href="#">Kirby North Phase 1 Oil Sands Project</a>	Lac la Biche County	In Situ	\$1.4B	Under Construction	2015 - 2016

Source: Alberta Government Major Projects Database

### Gas Projects

The following gas sector projects include processing, storage and expansion projects, among others. The project name hyperlinks to an overview of the project.

#### Gas Projects

Project Name	Municipality	Cost	Project Stage	Schedule
<a href="#">Greenview Sour Gas Plant</a>	Greenview No. 16	\$50.0M	Proposed	-
<a href="#">LNG Production Plant and other facilities</a>	Sturgeon County	\$4.0B	Proposed	-
<a href="#">Turner Valley Gas Plant Renovations</a>	Turner Valley	\$23.5M	Proposed	-
<a href="#">LNG Liquefaction Plant</a>	Edmonton	\$45.0M	Proposed	2014 - 2016
<a href="#">Redwater RFS 3 Fractionator</a>	Redwater	\$460.0M	Proposed	Commencing 2017
<a href="#">Sasol Natural Gas to Liquid Refinery</a>	Strathcona County	\$12.5B	Proposed	Commencing 2017
<a href="#">Simonette Gas Plant Modifications</a>	Yellowhead County	\$90.0M	Under Construction	2014 - 2015
<a href="#">Keyera NGL Expansion</a>	Fort Saskatchewan	\$220.0M	Under Construction	2015 - 2016

Source: Alberta Government Major Projects Database

## Distribution and Storage Projects

The figure below displays oil and gas sector storage and distribution facilities. The project name hyperlinks to an overview of the project.

Distribution and Storage Projects

Project Name	Municipality	Cost	Project Stage	Schedule
<a href="#">Condensate tanks at Edmonton Terminal</a>	Edmonton	\$90.0M	Proposed	-
<a href="#">Hydrocarbon Storage Cavern</a>	Redwater	\$65.0M	Proposed	-
<a href="#">Sturgeon Refinery Terminal</a>	Fort Saskatchewan	\$180.0M	Proposed	-
<a href="#">Sunday Creek Terminal Expansion</a>	Wood Buffalo	\$200.0M	Proposed	-
<a href="#">Terminal Expansion</a>	Edmonton	\$100.0M	Proposed	2014 - 2015
<a href="#">Edmonton Terminal Expansion Project Phase 2</a>	Strathcona County	\$112.0M	Proposed	2015 - 2017
<a href="#">Strathcona Salt Cavern Storage Project</a>	Strathcona County	\$200.0M	Proposed	2015 - 2017
<a href="#">Cheecham Terminal Expansion</a>	Wood Buffalo	\$300.0M	Under Construction	-
<a href="#">Edmonton Terminal South Expansion</a>	Strathcona County	\$260.0M	Under Construction	2013 - 2015
<a href="#">Baseline Terminal</a>	Strathcona County	\$672.0M	Under Construction	2015 - 2017
<a href="#">Northern Courier Tank Terminal</a>	Wood Buffalo	\$50.0M	Under Construction	2015 - 2017
<a href="#">Canadian Diluent Hub Phase 1</a>	Strathcona County	\$250.0M	Under Construction	2016 - 2017

Source: Alberta Government Major Projects Database

## Upgrader and Other Projects

The figure below displays other proposed oil and gas projects, not classified above. The project name hyperlinks to an overview of the project.

Other Oil and Gas Project

Project Name	Municipality	Cost	Project Stage	Schedule
<a href="#">Chemical Looping Steam Generator Pilot Plant</a>	Wood Buffalo	\$62.0M	Proposed	
<a href="#">Hi-Q Pilot Plant</a>	Strathcona County	\$50.0M	Proposed	
<a href="#">Centrifuge Plant for Mature Fine Tailings</a>	Wood Buffalo	\$1.9B	Under Construction	2012 - 2015
<a href="#">North West Bitumen Refinery Phase 1</a>	Redwater	\$8.5B	Under Construction	2013 - 2017
<a href="#">Frac Sand Transfer Facility near Peers</a>	Yellowhead County	\$20.0M	Under Construction	2015 - 2016

Source: Alberta Government Major Projects Database



## Oversized Load Corridor

## Shipping Route Study



MIG Engineering (2011) Ltd.

453 Christina St. N.

Sarnia, Ontario, Canada

N7T 5W3

Project No. 10563.01

Revision: B

Revision Date: Aug. 04, 2016

## Executive Summary

### Introduction and Background

World class industrial fabrication companies located in the Sarnia Lambton area have been fabricating oversized industrial process equipment and equipment modules for many years. Equipment has been built to meet the demanding standards of large industry located in the area. The supply of equipment in large modular form has become an international standard. Highly skilled engineering support for the industry is also located in the local cluster as well as many specialized support trades. They all participate and benefit from this work.

In recent years, fabricators have been pursuing contracts to build and export similar equipment, to markets in other regions of Canada and internationally. They have a competitive advantage gained from the many years of local experience as well as the complete supply chain already in place. Due to the inefficiency and associated costs of local transportation logistics for oversized loads within Sarnia Lambton the fabricators lose their competitive advantage when bidding on many of these export contracts. Existing infrastructure, including overhead utility lines along local roads makes movement of large loads difficult and costly to temporarily change. Existing dock sites were not designed or constructed to accommodate the loading and unloading of large equipment. This requires temporary accommodations and limits the type and number of pieces that can be handled in each load.

In addition to the opportunity to export oversized equipment, local large industries (and potential new ones), often require the supply of specialized large equipment from outside of the Sarnia Lambton area. This equipment is used to expand or improve their facilities and operations. It ensures their long term viability. This, in turn, leads to job retention and job creation both directly and indirectly through the local supply chain that installs and maintains the equipment. These companies face the same hurdles and expenses with transportation logistics as the local fabricators do for export. In some cases, the cost of delivery from the water to the industry site will impact whether or not the project occurs.

The Sarnia-Lambton Economic Partnership has been successfully promoting growth of the industrial sector in Sarnia Lambton. They, along with their industry partners, have identified an opportunity for increased exporting and importing of oversized equipment through creation of a designated Oversized Load Corridor to/from the Port of Sarnia.

### Study Purpose and Objective

The overall purpose of the study is to provide a dedicated corridor for oversized loads in Sarnia-Lambton to accommodate shipments to local industries and the export of equipment to similar industries outside of Sarnia-Lambton. In general, the shipments will be fabricated structures, modules and large equipment and will not contain hazardous materials. The purpose of the dedicated oversized load corridor is to identify conditions that restrict transportation of an oversize load. The study also recommends the infrastructure upgrades and related improvements to eliminate or mitigate restrictions related to temporary removal costs, individual route evaluations, traffic control, property damage, power disruptions and safe and efficient transportation of an oversized load.

The objective of the study is to provide a report that can be implemented into detailed engineering design and provide a detailed cost analysis in order to proceed with project funding. In addition, the report can be used as a basis for public notifications and a future platform to evaluate public response to the proposed route.

In addition to the Oversize Load Corridor, a business case study will be completed separate from this study. The business case will provide an economic analysis and evaluate the socio-economic impacts of the proposed route and project.

### Proposed Route

The preferred Oversized Load Corridor route was identified through a preliminary study of various dock sites and routes completed in Dec. 2012. The chosen route provides improved access to the Port of Sarnia to all major fabricators and industrial facilities. Our report also identifies and recommends improvements to the Port site itself to better accommodate these shipments. Once improvements are completed, it will reduce, or eliminate completely, temporary improvement costs which are currently repeated with each large load moved. It will also minimize traffic disruptions and road closures and decreases the chance of costly accidental damage to existing infrastructure.

### Route Design Basis

The engineering assessment of the Oversized Load Corridor is based on an overall transporter size of 30 feet wide x 30 feet high x 150 feet long (9m W x 9m H x 45.7m L), including the transport vehicle. The height overall is from grade. This equates to a module or equipment size of 30 feet wide x 26 feet high x 100 feet long (9m W x 8m H x 30m L). The transporter vehicle recommended for the proposed shipping size and arrangement would consist of a tractor unit pulling two, six axle (self-steering) transporters. The quantity of axles is to ensure the load is distributed to keep tire loads below the maximum allowable as defined by the Highway Traffic Act.



### Cost Summary

The study provides a detailed cost estimate to complete the improvements based on the engineering assessment of the required changes and upgrades. The cost estimate also includes a cost for the reconstruction and resurfacing of Blackwell Side Road.

The cost is a total installed cost that includes the applicable allowances and contingencies and is summarized below:

<b>Description</b>	<b>Sub-Total Cost</b>
Port of Sarnia Harbour	\$3,959,063
Road Infrastructure (Civil, Structural and Misc.)	\$2,472,782
Road Infrastructure (Electrical)	\$2,360,794
<b>Sub-Total</b>	<b>\$8,792,639</b>
Contingency (20%)	\$1,758,528
Escalation (10%)	\$879,264
<b>Total Cost</b>	<b>\$11,430,431</b>

### Conclusion and Recommendations

This report provides the Sarnia-Lambton Economic Partnership, and their partners, a detailed list of recommended improvements for the proposed route and Port of Sarnia Harbour to achieve their goals.

The report provides a summary of the project risks and outstanding items that will require further investigation during detailed design and they are summarized below:

- Proceed with a public open house or announcement to evaluate input from private, commercial and industrial sectors.
- Further investigation is required to evaluate underground infrastructure at proposed bore locations, including sewer systems and utilities.
- The permit applications for Lambton County require oversize loads to be transported during daylight hours only. Further investigation is recommended to revise the existing permit application to allow non-daylight hour transportation to limit traffic disruptions.
- Further investigation is required to determine the impact of the oversize load corridor at the Highway 402 off ramp exiting onto Exmouth Street at Indian Road. The traffic disruptions could cause traffic to back into the eastbound lanes of Highway 402.
- An engineering assessment is required for the existing structures for each individual oversized load as defined by CSA S6-06 and the Ministry of Transportation Ontario.
- Further investigation is required at the Port of Sarnia Harbour based on the loading and unloading strategy for each individual oversized load.
- Approval of the Operational Procedure, Policies and Permits, including recommendations, will be required prior to implementation of the Oversize Load Corridor.

It also provides a detailed cost estimate to complete these improvements based on an engineering assessment of the required changes and upgrades. The cost estimate also includes a cost for the reconstruction and resurfacing of Blackwell Side Road.

The total project cost to complete the recommended improvements to an accuracy of +/- 20% is projected as \$11,430,431, excluding HST.

The study includes an assessment for a large percentage of the types and size of loads to be shipped, but additional study work will be required for sizes outside of this boundary and this could lead to further impact of existing infrastructure. A preliminary investigation of each oversize load is recommended to ensure it meets the criteria of the Oversized Load Corridor.

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Appendix A: Oversized Load Corridor Route Key Plan and Route Layout

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- Route Layout: P-10563-02, Sht. 1 to 31

Appendix B: Associated Engineering (Ont.) Ltd.: Transporter Vehicle Template, 20155932-SK4

Appendix C: Associated Engineering (Ont.) Ltd.: Oversized Load Corridor Study Report

Appendix D: Culvert Report and Reference Culvert Photos

Appendix E: Bluewater Power Key Plan and Route Crossings

- Bluewater Power Key Plan: P-10563-01, Sht. 2 of 2
- Bluewater Power Route Crossings: B-447, Sht. 1 to 16

Appendix F: Electrical Report: Bluewater Power and Hydro One

Appendix G: Port of Sarnia Harbour and Dock Study Report

Appendix H: LAWSS Distribution System Drawings

Appendix I: Total Installed Cost Estimate Summary

Appendix J: Total Installed Cost Estimate Details

Appendix K: Operational Procedures, Policies and Permits

REVISION REGISTER					
Rev. No.	Rev. Section No.	Description	Rev. Date	Prepared By	Approved By
A	All	Issued for Review	May 10 , 2016	D. Johnson	M. Boshier
B	All	Incorporate Stakeholder Comments. Issued for Approval.	Aug. 04, 2016	D. Johnson	M. Boshier

## 1. Acknowledgements and Involvement

The following is a summary of the parties involved in the Oversized Load Corridor and the support they provided in the Shipping Route Study.

### Major Stakeholders

- Sarnia-Lambton Economic Partnership (SLEP)
- Sarnia-Lambton Industrial Alliance (SLIA)
- The Corporation of the City of Sarnia

### Stakeholders

- The Corporation of the County of Lambton
- The Corporation of the Township of St. Clair

### Engineering Support

- MIG Engineering (2011) Ltd.: Engineering Lead
- Associated Engineering (Ont.) Ltd.: Sub-Consultant (Swept-Path Analysis)
- Riggs Engineering Ltd.: Sub-Consultant (Port of Sarnia Harbour)

### Utility Support

- Bell Canada
- Bluewater Power Distribution Corporation
- Cogeco Cable Canada
- Hydro One Inc.
- Lambton Area Water Supply System (LAWSS)

### Financial Support

- Sarnia- Lambton Industrial Alliance (SLIA)
- Toolrite Engineering
- LamSar Inc.
- Alliance Fabricating Ltd.

- Anderson-Webb Ltd.
- ANJ Industrial Fabricating Ltd.
- Canadian Structural and Mechanical Ltd.
- Central Machine and Marine Inc.
- John Duff Ltd.
- Kel-Gor Ltd.
- Lambton Metal Service
- Sandarin Services Inc.
- Sarnia Wolverine Manufacturing Ltd.
- St. Clair Mechanical Inc.

#### Interested Parties

- Chemfab Industries Inc.
- Great Lakes Fabricating Ltd.
- Promart Industrial Products Ltd.
- Shelly Machine & Marine
- Specialty Machine & Fabrication

#### Regulatory

- Ministry of Natural Resources and Forestry (MNRF)
- Ministry of the Environment and Climate Change (MOECC)
- Ministry of Transportation Ontario (MTO)
- St. Clair Region Conservation Authority (SCRCA)
- Transport Canada (TC)

#### Miscellaneous Support

- Mammoet Canada Eastern Ltd.
- Canadian National Railway Company (CN)

## 2. Project Objective and Background

The objective of this project is for MIG Engineering (2011) Ltd. (MIG) to provide a detailed scope of upgrades that will be required to implement an Oversized Load Corridor in Sarnia-Lambton. In addition to the report, a detailed total installed cost (TIC) estimate has been provided for the recommended upgrades.

For many generations, manufacturing companies located in the Sarnia-Lambton area have been fabricating oversized steel modules and equipment for the many international petroleum and petro-chemical industries. These companies are very well equipped and experienced to service this sector. A complete supply chain is in place to support this activity including machine shops, engineering firms and environmental service firms. This sector includes over 5,000 highly skilled unionized workers registered with the Sarnia Construction Association and many non-unionized skilled trades and specialized professionals that service the industry.

Sarnia-Lambton Economic Partnership (SLEP) has been successfully promoting growth of the area in both the traditional oil and petro-chemical sectors as well as building a new bio-hybrid chemical cluster that has the potential for significant growth. The supply chain that is in place is a major reason for the growth of the area.

The area manufacturers and fabricators have also been actively looking for new opportunities to export their specialized products and services to other Canadian and International markets. The Alberta Oil Sands and oil fields of Saskatchewan have been identified as a domestic area of rapid growth and demand that far outstrip the supply capability of local companies. A recent dramatic decrease in the price of oil has caused many exploration and new oil production projects in Canada, and around the world, to be deferred. These are expected to resume in the future. There remains an ongoing worldwide demand for equipment to maintain existing operations. There is also an increased demand for more efficient equipment and processes to be implemented due to the downturn. Increasing environmental vigilance and regulations require the latest specialized equipment to be utilized to adapt and improve processes. The current low oil price climate has also forced oil companies to reassess their supply chain procedures to seek out more efficient and cost effective high quality suppliers. This situation is applicable in Canada, the USA and around the world.

It is acknowledged that the shipping route from Thunder Bay to approximately Winnipeg is too restrictive to allow full Alberta sized equipment modules to be shipped by road or rail. This limits local area manufacturers and fabricators in their ability to fully supply this market.

It has also been determined that large modular steel fabrication has become an international standard in building for many industries. It is understood that the demands of such projects as the Hibernia and Hebron Oil developments will have similar large needs. Many other industries such as natural gas, petro-chemical plants, water and waste-water treatment and food processing with locations in Canada, the USA and Internationally also have the potential to be served by the local Sarnia-Lambton fabricators.

Due to the close proximity of local manufacturers and fabricators to end users in the Sarnia-Lambton area, there was rarely the need to ship oversized, heavy product over long distances. In many cases, much of the fabrication work occurred on-site. In the case of units fabricated for export from the local area, barriers to easy shipment have been identified. Local roads are not all adequate to handle the size and weight requirements to transport finished products to the City of Sarnia owned port facility, or other docks located along the St. Clair River. The Port facility itself, although usable in its current form, was not built with the necessary infrastructure to store, handle and load these very large units.

Large International industries in the Sarnia-Lambton area periodically need to import oversized equipment to expand, improve or retrofit their operations. New industry considering the area as a potential building site will also have the need to import certain large specialized equipment pieces. Although much of this equipment can be supplied locally, some items need to be sourced from international suppliers where patents are in place, or if pricing dictates a foreign supplier. These companies face the same hurdles and expenses shipping in large items as do local fabricators for outbound shipments. In some cases, the cost of the inbound shipment of necessary equipment may prohibit an expansion taking place at an existing site, or deter prospective industries.

A preliminary assessment of road routes from the area fabrication shops to various potential dock sites was completed in December 2012. This report included a rough estimate of costs required to make improvements to establish a dedicated "Oversize Load Corridor". After analysis of the report and review by the various parties involved, it was determined that the most feasible dock site is the existing Port of Sarnia.

### **3. Oversized Load Corridor (Route Selection)**

The selected oversized load corridor is based on the original Phase 1 study prepared by MIG in 2012. The Phase 1 study evaluated various routes, including docking options and evaluation of module sizes. The selected route is represented on the key plan in Appendix A, drawing P-10563-01, Sht. 1 of 2. Additional routing options were not evaluated as part of this study. The selected route was determined based on the following factors:

- Providing heavy shipping access to all major facility owners and fabrication stakeholders.
- Minimizing required upgrades and repair costs.
- Minimizing traffic disturbances and road closures.

### **4. Load (Module) Size Evaluation**

The shipment size criteria was defined in the SLEP Request for Proposal (RFP), 2015-003. The criteria for the overall dimensions are defined in the RFP as 30 feet wide x 30 feet high x 150 feet long (9m W x 9m H x 45.7m L), including the transport vehicle. The 30 foot height is the overall height from grade.



In order to evaluate the shipment size and the restrictions associated with oversized loads, MIG contacted Mammoet Canada Eastern Ltd. (Mammoet). Mammoet was very supportive and a valuable resource to the study team. Mammoet provided various transport arrangements from actual shipments to determine the module size restrictions and the overall transporter dimensions for the turn analysis.

The overall transporter dimensions provided by Mammoet meet the requirements of the SLEP RFP 2015-003 for height, width and length, which equates to a module or equipment size of approximately 30 feet wide x 26 feet high x 100 feet long (9m W x 8m H x 30m L). The Mammoet template was the basis for the turn analysis and has been prepared in Appendix B for Associated Engineering (Ont.) Ltd. (AE)'s Transporter Vehicle Template, drawing No. 20155932-SK4. Also refer to the transporter vehicle dimensions provided in the AE report in Appendix C.

The transport vehicle recommended for the proposed shipping arrangement consists of a tractor unit pulling two, six axle (self-steering) transporters. The quantity of axles is to ensure the load is distributed and to maintain ground loadings that meet the maximum allowable gross vehicle weights as defined by the Highway Traffic Act, Ontario Regulation 413/05. In addition, the axles can be individually adjusted vertically to accommodate grade changes across intersections, rail crossings, curbs, bridges, etc.

## **5. Associated Engineering (Ont.) Ltd.: Swept-Path Analysis**

AE was involved in the study to evaluate the swept-path of the load and the wheel base configuration of the transport vehicle at the associated intersections only. AE's analysis includes a summary of the recommended changes, based on a geometric assessment, and includes conceptual sketches of the proposed improvement. The swept-path analysis was completed for inbound and outbound shipments. Refer to Appendix C for the Study Report completed by AE.

It should be noted that the swept-path analysis is based on the assumption that the vehicle will travel at 5km/h and the transport vehicle operator will undertake each movement at a low speed in accordance with the MTO Long Combination Vehicle (LCV) Program.

The recommended changes were incorporated into the detailed cost estimate prepared by MIG and included in Appendix I. The changes include road widening at intersections, curb and gutter modifications and miscellaneous items such as street signs that are impacted at the intersections.

## **6. Structural and Civil Scope of Work**

The structural and civil scope of work consists of an evaluation of the existing bridges and various types of culverts. Each structural item was reviewed based on the transportation vehicle provided in Appendix B. The following is a summary of the evaluations and the necessary or recommended improvements.

## 6.1 Bridges

### Bear Creek Bridge

The proposed route along Courtright Line will cross the Bear Creek Bridge (B1): (Refer to Appendix A, drawing P-10563-02, Sht. 26 of 31).

MIG obtained drawings of the bridge, which were used to determine the capacity of key bridge components. The Bear Creek Bridge was analyzed based on the transportation vehicle provided in Appendix B, and a number of other wheel configurations. Based on this analysis, the existing deck and girders would not be sufficient to support the loads imposed by the selected shipping arrangement. However, the bridge was sufficient under a variety of other shipping configurations.

It is important to note that each shipping arrangement is custom designed to accommodate a module over the traveled route. Whereas loading impacts on small structures can be generalized for a range of different shipping arrangements, this is not the case for large structures like the Bear Creek Bridge.

Because of its span, many variables impact the stresses experienced by the bridge, such as module size and weight distribution, the width and length of the truck bed, the number and the configuration of axles, the number of tires per axle, etc. Due to the variables involved, an overall weight limit, for instance, cannot be generalized from analyzing the selected transport arrangement.

As such, our analysis of the bridge was performed as a guideline only, and each oversized load crossing of the bridge must be reviewed and approved by a Professional Engineer in accordance with MTO's operational policies and procedures.

In order to help streamline the review process and allow movers to select an acceptable transport arrangement at the outset, we suggest the following weight guidelines (based on bending moment envelopes for a variety of moving load configurations). In order to represent a wide range of different shipping arrangements, these guidelines are necessarily conservative, and should not be considered strict limits. For axle groups spaced relatively far apart, we suggest that the maximum load per 65' span be limited to 125,000lbs for single wide trailers and 300,000lbs for double wide trailers. For closely spaced axles evenly distributed across the span, we suggest a uniform load per 65' span of 3,500lbs/ft for single wide trailers, and 8000lbs/ft for double wide trailers.

The cost estimate is based on the assumption that bridge upgrades will not be necessary for the Bear Creek Bridge. Increasing the capacity of the bridge would require costly structural modifications to the main girders, the deck and possibly the piers. At a minimum, this would involve installing hanging scaffolding from the bridge to weld flange plates along the length of the beam, and reinforcing the deck slab. Retrofits of this extent are not a cost-effective means of shipping modules. Rather, a proper transporter arrangement should be selected to suit the bridge in its current form.

We believe this is the best approach, but want to address a potential impact: certain modules may require a double wide trailer in order to space heavy loads across two lanes and utilize the capacity of all

five bridge girders. As the scope of this study has not included turn analysis for a double wide trailer, this could result in interferences at various intersections that have not yet been accounted for.

However, based on correspondance with heavy moving companies, there are other unrelated reasons a double wide trailer may be required (e.g. lighter, taller, unblanced modules with high centers of gravity). In these cases, even extensive bridge upgrades would not eliminate this need. As such, we feel that the costs of upgrading the bridge outweigh the potential benefits of reducing the unkown impacts associated with a small percentage of potential moves.

MIG has considered a hypothetical “worst case” in which a module must be shipped in one piece across Bear Creek Bridge using a certain transport arrangent that cannot be maneuvered within the boundaries of each intersection. In this case, a two stage shipping process would be required: after shipping across the bridge, a module would be craned onto a new transport arrangement to maneuver the intersections and be transported the rest of the way to the dock.

Operational considerations to note:

- The transporter will need to drive along the middle of the bridge, taking up both lanes. All traffic will need to be restricted for the duration of the move.
- Due to the width of potential loads, there will be limited clearance on either side of the bridge—in some cases as little as 1’ to the inside face of the existing barriers. Movers should be made aware of this constraint and any operational difficulties that this may entail.

## 6.2 Culverts

As part of the project scope, MIG performed a field survey to identify the culverts along the proposed route. The field survey included location, diameter, length and depth. In addition, a visual inspection identified the type and existing condition of each culvert. The survey data of the culverts is provided in the Culvert Report in Appendix D. The culvert locations are specified on drawings P-10563-02, Sht. 1 to 31 based on the item description from the Culvert Report. If one end of a culvert was not accessible (e.g. buried or located in a catch basin) this was noted in the report. The report also references the municipal drains that are associated with each culvert, if applicable.

The visual inspection included an evaluation of each culvert based on the following definitions, and in certain cases a combination was specified (i.e. Good to Fair, Fair to Poor). For reference, photos of the culverts are included in Appendix D (Photos are not available for S7 and S68).

- Poor: Extensive corrosion, spalling or deterioration; deformation or mechanical damage.
- Fair: Some corrosion or spalling; localized deformation or mechanical damage.
- Good: No major defects; minimal corrosion or spalling; no deformation.

The culverts that were defined as 'Poor', 'Fair to Poor' or 'Fair' are included in the total installed cost estimate for replacement in-kind. The associated removal and road repair costs are included for each replacement. The existing designs and materials were assumed to be adequate for drainage purposes, and no new culvert designs or materials were evaluated for any of the culverts to be replaced.

The evaluation also included a review of the existing depth of cover. This was evaluated based on the requirements for culvert design defined by the Ministry of Transportation Ontario (MTO).

It was determined that there was adequate existing cover above all the culverts to be replaced. Due to the adequate level of cover, replacement in kind was determined to be sufficient and no other remedial measures were deemed necessary (e.g. increased cover, protective slabs or upgrading to thicker wall culverts). The depth of cover for culverts that could not be verified were assumed to be acceptable.

In general, since only the exposed portions of the culverts could be assessed, the condition of the entire culvert can only be approximated. The cost estimate is conservative insofar as it accounts for the replacement of all damaged or corroded culverts. In practice, even damaged culverts can withstand traffic loads, provided that they have adequate cover, and that the surrounding road-bed is in good condition.

When route development planning is underway, we recommend working with the associated municipality to determine a culvert replacement schedule using a priority based system (i.e. those to be replaced immediately, those to be replaced in the next 5 years, etc.) and to coordinate replacements with road upgrades or other improvements in order to minimize costs and traffic disturbances.

#### Culverts Spanning Over 3m

CSA S6-06, Canadian Highway Bridge Design code defines a bridge as being a structure with a span greater than 3m and the MTO requires any bridge structure to be inspected and evaluated structurally before any heavy shipment crosses. The following culverts were identified with a span over 3m:

- S7- Porter Creek Culvert: 4.2m Span. (Refer to Appendix A, drawing P-10563-02, Sht. 8 of 31)
- S38- Wray Drain Culvert: 6.1m Span. (Refer to Appendix A, drawing P-10563-02, Sht. 17 of 31)
- S48- Burton Creek Culvert: 3.7m Span. (Refer to Appendix A, drawing P-10563-02, Sht. 20 of 31)
- S77-Wellington Drain: 3.7m Span. (Refer to Appendix A, drawing P-10563-02, Sht. 29 of 31)

MIG inspected the above structures, took measurements and pictures, and identified key features. They were assumed to be in good condition, and do not require repairs or replacement at this time.

Drawings were obtained for Wray Drain and Burton Creek Culverts, verified with field measurements, and used to evaluate the capacities of the structures.

Drawings were unavailable for Porter Creek and Wellington Drain Culverts. However, these structures are typical to standard MTO rigid frame, open footed culverts. MIG reviewed the MTO Concrete Culvert

Design and Detailing Manual, and was able to select structures with the appropriate forms and dimensions to match our field measurements. Rebar details were determined from the appropriate tables in the manual, and used to evaluate the capacity of the structure.

The four structures were modelled as rigid frames under the loading pattern generated by the transport vehicle shown in Appendix B, as well as other wheel configurations. It was determined that the Porter Creek (S7), Burton Creek (S48), and Wellington Drain (S77) culverts were acceptable under the given load conditions. Wray Drain (S38) had insufficient capacity, and was found to be unacceptable under the given loading conditions.

Different modules and transport arrangements will produce different loading patterns. Therefore, as part of the permitting process, the above structures must be analyzed before each heavy move takes place.

Based on our analysis we have determined that some or all of the above structures will be undersized for a portion of the heavy moves. However, we have not included costs to replace any of these structures in our estimate. Instead we have assumed that temporary “jumper bridges” can be used to cross the structures when necessary. This option is common practice for other heavy shipments of this nature. A pre-shipping structural study will determine the required type of jumper bridge to be used in each case.

If the number of heavy shipments across these structure greatly increases, or if the existing structures deteriorate to a point that justifies replacement, the option of upgrading the existing designs to withstand heavier loads should be considered.

Operational considerations to note:

- A set of hazard markers on the guiderail system of the Porter Creek Culvert will need to be removed during transportation. The transport load would be above the guiderail system, but would come in contact with the hazard marks.
- Temporary Jumper bridges are usually made available by the transport company involved with the move. The setting up and operation of any temporary bridges must be coordinated before the move takes place.

### Assumptions

The following assumptions were used to determine replacement costs:

- Culvert S-22: 450mm diameter culvert with 1200mm cover assumed.
- Assume the culvert can be replaced in a single lift (this may require the roadway to be blocked and/or detour).

### Replacement Scope of Work

The following is the recommended scope of work for the culvert replacement and the basis for the cost estimate. The cost estimate also includes cost associated with traffic control and detour plans for construction.

- Excavation
  - The existing asphalt shall be cut neatly and fully stripped away above the area to be excavated.
  - Stripped asphalt shall not remain on the road, but be stockpiled on grade.
  - The roadbed shall be excavated at a 1:2 slope or shallower to expose the culvert.
  - No more than 50'(15m) of length shall be excavated at a time.
  - Excavated fill shall be piled for removal or re-use as applicable.
- Culvert Removal
  - Culverts shall be removed according to OPSS 510.
  - Culverts shall be removed so that no damaged portions remain in place.
  - Removed culverts shall be set aside for salvage, as required.
- Culvert Installation
  - New corrugated steel pipe shall be to OPSS 1801.
  - Steel culverts may be assembled beside the excavation or in the trench.
  - Where applicable, steel culvert sections shall be lapped and joined by means of steel couplers.
  - The pipe shall normally be joined with external screw-on couplers or split couplers.
- Road Bed Repair
  - Bedding and cover shall be placed and compacted in layers not exceeding 200mm thickness.
  - Backfilling and bedding shall be placed according to OPSS 401.
  - Compacting of bedding and cover shall be according to OPSS 501.
- Roadway Restoration

- The sub-base course shall be 12" (300mm) of Granular B.
- The base course shall be 6" (150mm) of Granular A.
- The roadway shall be 6" (150mm) of asphalt.
- Granular sub-base and base courses shall be placed according to OPSS 314.
- Hot Mix Asphalt shall be according to OPSS 1151.

In addition to the culverts, a construction cost was also included for upgrades to the Murphy Road catch basin leaders and storm sewer connection.

### **6.3 Road Upgrades**

As part of the study, it was recommended that full depth reconstruction of Blackwell Side Road is required. The cost estimate and the detailed cost breakdown is included in Appendix J and includes 2,100m of roadway, 6.5m asphalt with 1m shoulders.

The road reconstruction scope of work will generally follow that specified under section 5.2 culverts (P.8) with a finished asphalt width of 6.5m and 1.0m wide gravel shoulders.

The road upgrades also include any impacts determined from the swept-path analysis. This includes any changes or upgrades to curbs, gutters, shoulders, asphalt and truck aprons as provided in the AE report in Appendix C.

## **7. Electrical Scope of Work**

The electrical scope of work focused on the electrical and utility interferences along the proposed route. The electrical scope includes existing infrastructure owned by Bluewater Power Distribution Corporation (Bluewater Power), Hydro One Corporation (Hydro One) and low voltage cables for internet and cable (Cogeco and Bell). The general concept of the electrical scope is to ensure any wires, cables, poles, transformers, traffic signals and lights are relocated to allow uninterrupted passage of the oversized load and transport vehicle.

A field survey was completed by MIG to evaluate each of the electrical crossings along the proposed route. The field survey also included Bluewater Power and Hydro One to support the proposed solutions and provide input related to cost estimating.

The location of the Bluewater Power crossings are provided in Appendix E, B-447, Sht. 1 to 16. The reference drawings were provided by Bluewater Power and are labeled to coincide with the item numbers provided on the Electrical Report in Appendix F. Any items indicated with 'N/C' require no changes or upgrades to the crossing.

The location of the Hydro One crossings are provided in Appendix A, on drawings P-01563-02, Sht. 16-31 as separate Hydro One drawings were not available. Similar to Bluewater Power, the Hydro One labels also coincide with the item numbers provided on the Electrical Report in Appendix F.

The required transport vehicle clearance above the top of the travelling load is defined as 3 feet for low voltage, insulated lines (data or power) and 6 feet minimum to the neutral of a high voltage line over 600V. This criteria was determined based on the minimum vertical clearance above finished grade of 5.1m (17ft) as defined by MTO Provincial Standards. The proposed solutions for the interferences and the associated costs, are provided in the Electrical Report, in Appendix F.

The costs provided include temporary supports, equipment, material and labour. The cost was determined with input from Bluewater Power, but Hydro One was not included in the review, and costs for Hydro One will be estimated as the same as Bluewater Power.

The following is a detailed description of the proposed changes as outlined in the Electrical Report in Appendix F.

## **7.1 Road Bores**

For the proposed road bores, a boring company will excavate to the required depth and bore a duct under the roadway. The duct should extend between the pole (or service) on each side of the road. The road bore will use a 4" duct for each high voltage line (H), a 2" duct for each commercial (C) or residential (R) line, and 1" duct for each low voltage line (T). In addition, every bore will include a 2" spare duct. The spare will be turned up at the pole base on both sides or terminate in a PVC surface junction box with a removable pedestrian cover. All ducts, including the spare, will be identified clearly with a unique matching label on both sides of the road. It is assumed that the existing poles will remain installed and the removal cost is not included in the estimate.

Verification of existing underground infrastructure will be required prior to road bore designs and cost has been included for locating and daylighting any utilities at the proposed locations. This is in addition to the Ontario One Call requirements.

## **7.2 New or Replacement Power Poles**

Line on new poles will be raised, including all lines crossing the road(s), to provide a minimum clear height of 33 feet (10m) from the highest point in the road surface to the lowest point of sag, at 28 degrees centigrade.

Each new pole is to be a regulation 55-foot (16.8m) wood pole or higher, installed in a seven-foot-deep hole filled with compacted sand in layers. The holes will be excavated using Hydro-vacuuming methods to ensure that no underground infrastructure is damaged. The cost for Hydro-vacuuming the poles is



included in the electrical cost as part of the \$8000 pole replacement. All poles must be provided with the necessary wood arms and insulators.

Each pole that replaces an existing pole will use the same number as the existing pole. Additional poles will be numbered by the utility using the pole.

In areas where an overhead system is required to be installed, the existing pole will remain installed. A cost for pole removal is not required.

### **7.3 Guy Wires (G)**

Guy wires will normally be elevated so there is at least 33 feet (10m) clearance from highest point in the road surface to the lowest point of sag, at 28 degrees centigrade. Where the guy wire cannot be raised on an existing pole, a new pole will be provided. In some cases, it may be possible to rework the crossing in order to eliminate the need of the guy wire. Rigid pole bracing was reviewed, but is not an acceptable practice by the utility companies.

### **7.4 Residential (R) and Commercial (C) Feeder Lines**

All residential and commercial feeders shall meet the requirements of the installing utility and the requirements provided in this study. All underground feeders are to be individual insulated copper wires with a bare ground wire. Colour coding shall be white for a neutral, black & red for single-phase services and black, red and blue for three phase services.

### **7.5 Low Voltage Lines (T): Telephone, Internet, Fibre Optic**

Low voltage supplies will be relocated and/or replaced by the company that owns the cabling. Notify Cogeco, Bell Canada or other supplier before starting any work that has a low voltage line as outlined in the Electrical Report. Clearly direct the low voltage supplier as to how the new feeder system will be replaced.

Bell Canada was contacted and they advised us that there are no aerial services along the proposed route.

### **7.6 High Voltage Lines (H1 and H3)**

The high voltage lines that are recommended to be relocated on existing or new poles shall meet the installation requirements of the utility in all regards. High voltage wires installed underground shall be single shielded insulated copper wires rated for the utility voltage. Neutrals may be bare copper and must be grounded at each point that the wire emerges from the ground. Where the new duct runs up

the height of the pole, the neutral is to be connected to the ground wire at the first point that it is exposed to air. No exceptions are permitted.

## **7.7 Traffic Signals**

Traffic signals that interfere with the proposed route are to be fitted with a hinged or sliding device at the supporting pole which, by the removal of a pin locking device, can be rotated or slid and temporarily be held out of the path of the transport vehicle. The traffic signal may move in any direction to suit the particular location (up, down or horizontal). The internal wires will have to be fitted with a flexible metal conduit to protect the wires from damage and the weather.

## **7.8 Street Lighting**

Similar to traffic signals, street lights that interfere with the proposed route are to be fitted with a hinged or sliding device at the supporting pole and by the removal of a pin locking device, can be rotated or slid and temporarily held out of the path of the transport vehicle. The street light may move in any direction to suit the particular location (up, down or horizontal). The internal wires will have to be fitted with a flexible metal conduit to protect the wires from damage and the weather.

## **8. Miscellaneous Scope of Work**

The street signs that are impacted by the proposed route are provided in the AE Study Report and are included in the cost estimate.

There are no fire hydrants that are impacted by the proposed route.

There are no bus stops or other structures that are impacted by the proposed route.

## **9. Port of Sarnia Harbour and Dock Scope of Work**

Riggs Engineering Ltd. (Riggs) provided the study for the changes associated with the Sarnia Harbour for loading and unloading shipping loads and modules. The analysis, including associated cost estimates is provided in Appendix G.

The evaluation of the harbor area is based on three potential loading/unloading methods which will be specific to the oversized load being transported. The study is based on direct access to Exmouth Street and a swept-path analysis was not completed at the harbor. Further investigation will be required to evaluate the loading or unloading with one (or two) shore cranes.

## **10. Communication: Approvals and Notifications**

The study included communication with various corporations, agencies, stakeholders and municipalities to review the proposed route and gather feedback related to their experience and the current requirements and restrictions for oversized load shipments. The following is a summary of the communication and the information provided that is not referenced previously in the report. Refer to Appendix K for details of the permit requirements and the operational procedures and policies.

### **10.1 Lambton Area Water Supply System (LAWSS)**

MIG discussed the route with Susan MacFarlane, Ph.D., P.Eng., General Manager of LAWSS, and she provided us with locations of their existing chambers along the route. For reference, the chamber locations along the route have been identified and highlighted on the drawings provided in Appendix H. She mentioned that the existing chambers would require an internal inspection by a structural engineer to verify the integrity. The inspection will need to be part of LAWSS preventative maintenance program, as the proposed loads that would be applied to the existing chambers would not exceed the current load restrictions.

### **10.2 Ministry of Transportation Ontario (MTO)**

The MTO was contacted as the route requires access to two portions of Ontario Highway 40, which is a Provincial Highway maintained by the MTO. One portion of the Highway is known as Churchill Line and the other is Confederation. The MTO will need to be contacted for each oversized shipment along the route and the MTO will require permits on an individual shipment basis.

### **10.3 Ministry of the Environment and Climate Change (MOECC)**

The MOECC will review any proposed dock construction plans with particular interest in any impact of the work on adjacent land. MOECC will evaluate impacts related to erosion, silt control and bank stability in the dock area.

### **10.4 Ministry of Natural Resources and Forestry (MNRF)**

The MNRF will review any proposed dock construction plans, including water lot legal plans. The MNRF will issue a work permit for the construction. The MNRF will also assess the potential for impact to existing species as identified under the Ontario Endangered Species Act.

## **10.5 Transport Canada**

The proposed dock enhancements and construction will require approval from Transport Canada to ensure the proposed work meets the requirements of the Navigation Protection Act.

## **10.6 St. Clair Region Conservation Authority (SCRCA)**

In addition to the requirements of the MOECC, the proposed dock construction plans will need to be submitted to the SCRCA, who represent the work on behalf of the Department of Fisheries and Oceans (DFO). Prior to submission of a work permit, they will evaluate river and shoreline habitat protection and approve mitigation procedures. The work permit will provide construction restrictions for in-water work and may require water quality monitoring.

## **10.7 Canadian National Railway Company (CN)**

MIG contacted CN as the proposed route crosses an existing CN railway along Blackwell Side Road. Refer to Appendix A, drawing P-10563-02, Sht. 8 of 31 for location. MIG requested a review from CN (Eastern Canada Division of Engineering) for the transport vehicle over the railway and any restrictions or permits that may be required for the railway crossing. All shipping information outlined on the permit application shall be provided to CN 2-3 weeks prior to crossing. CN will provide a letter of approval and Track Supervisor contact information to ensure flagging is set up during crossing. The CN Track Supervisor who is responsible for this crossing is Derek Basso (Ph. 905-669-3184, [derek.basso@cn.ca](mailto:derek.basso@cn.ca)). CN may also provide an option to set up a yearly permit to include multiple crossings. Refer to Appendix K for permit details.

## **11. Total Installed Cost Estimate**

The summary of the total installed cost estimate is provided in Appendix I based on the subtotal costs. It should be noted that the costs are not separated per municipal jurisdiction. Appendix I includes three sections of the estimate: 1. Overall Summary, 2. Discipline Cost Summary and 3. Road and Intersection Cost Summary. The overall summary includes all applicable costs, including indirect costs. The discipline cost summary provides sub-total costs for each discipline and the road and intersection cost summary provides sub-total costs for each road based on discipline. The cost breakdown of the roads follows the flow of the route from the harbor as represented on the key plan in Appendix A.

The estimate details that can be used for further cost breakdown are provided in Appendix J for infrastructure upgrades and road reconstruction. The detailed electrical costs are included in the Electrical Report in Appendix F.

The following is a summary of the estimate basis for the costs that have been provided.

## 11.1 Estimate Allowances and Indirect Costs

The following is a summary of the allowances and contingencies that are included in the total installed cost estimate:

- Engineering: 15% of discipline sub-total. The engineering fee is included for each discipline sub-total to account for detailed engineering of the proposed changes, including design drawings, material selection and tender documents.
- Project and Construction Management: 10% of discipline sub-total. The Project Management is related to the management of the detailed engineering noted above. This may be represented through SLEP or the engineering consultant, but the responsibility is to manage deliverables, schedule of work areas, prioritizing projects, etc. The Construction Management has similar responsibilities, but this is directly related to construction including management of construction contractors (including Bluewater Power and Hydro One) and scheduling to ensure progress of the work related to project budgets.
- Contingency: 20% of total cost. The contingency was included to account for the overall accuracy of the estimate based on the estimate basis, assumptions and project risks.
- Escalation: 10% of total cost. Escalation was included to account for price increases related to inflation of material and construction costs based on the assumption that the work will occur over the next five years.

## 11.2 Estimate Assumptions and Exclusions

The following is a summary of the assumptions and exclusions applicable to the total installed cost estimate:

- Existing infrastructure is assumed to be designed to meet the requirements of the Ontario Highway Traffic Act for load distribution.
- The estimate does not include any Owner or stakeholder related costs.
- The estimate does not include costs associated with a public open houses or public advertisements.
- The cost for Bluewater Power to move hinged lights during a move is not included in the estimate.
- Costs have not been included for temporary bridge support or jumper bridge designs.
- It is assumed that there are no impacts related to the Municipal Drainage Act.
- Existing sewer systems were not evaluated as part of this study.

- It is assumed that there are no underground interferences with the proposed road bores. The estimate includes locate services and daylighting for underground infrastructure prior to bores.
- The assessment does not include an evaluation of obstructions at the fabricator facilities. The study is based on the fabricators accessing the proposed route.

## **12. Operational Procedures, Policies and Permits**

A separate report was completed for the operational procedures, policies and permits and is included in Appendix K. The report provides a summary of the permit requirements for the Oversized Load Corridor and a recommended system for the coordination of the local permits. The report also includes potential responsibilities and a summary of the recommended changes that would be required to support the implementation of the proposed procedure.

In addition, the report also provides a summary of the current 'High Load Corridor' that is implemented in Alberta for reference.

## **13. Risks and Outstanding Items**

The following are the risks associated with the Study and any outstanding items that require further study and investigation during detailed engineering:

- Detailed structural studies will be required based on individual shipping arrangements prior to each move.
- Evaluate the hinged traffic light design to ensure they are acceptable for installation on an existing wood pole. Also review interferences with the swing path of the hinged traffic light if moved in the vertical or horizontal positions.
- Proceed with public notifications and/or public open house of proposed route. May lead to potential project risk based on feedback from affected property owners.
- Evaluate underground infrastructure for proposed road bores.
- Kimball Road south of Petrolia Line is currently signed as having spring load restrictions and/or truck restrictions (with the exception of local deliveries). Include with Operating Procedure and permits.
- It is recommended that the Highway 402 Off-Ramp (W-E/W Ramp) exiting onto Exmouth Street at Indian Road be reviewed to verify that the queuing generated while access to Exmouth Street is blocked, does not spill back into the eastbound lanes of Highway 402 during the period on time envisioned.

- Recommend providing parts of this report as part of a 'Notification of Potential Use', including proposed routing, to notify adjacent landowners and affected private, commercial and industrial sectors (may become part of the public notification also).
- It should be noted that the existing fire hydrant at the intersection of Confederation Line and Blackwell Side Road. The fire hydrant is outside of the swept path of the transport vehicle but is in close proximity.
- Review alternative design options and materials for culvert replacements during detailed engineering.
- Further investigation is required to evaluate the loading and unloading of oversize loads at the harbour using one or two shore cranes and determine the impacts or interferences.

## **Annex B**

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### **Letters of Intent from Partner Organizations**

**The Corporation of the City of Sarnia**

**The Corporation of the County of Lambton**

**The Corporation of the Township of St. Clair**

**The Sarnia-Lambton Industrial Association**





**THE CORPORATION OF THE CITY OF SARNIA**  
**Office of the Chief Administrative Officer**  
255 Christina Street N. PO Box 3018  
Sarnia ON Canada N7T 7N2  
519-332-0330 (phone) 519-332-3995 (fax)  
[www.sarnia.ca](http://www.sarnia.ca) [cao@sarnia.ca](mailto:cao@sarnia.ca)

November 6, 2017

Transport Canada  
NTCF – CPP Submission  
Business Centre  
330 Sparks Street  
Place de Ville, Tower C  
Ottawa, ON K1A 0N5

To whom it may concern:

**RE: Letter of Intent**

I am writing to confirm the City of Sarnia's support for the Sarnia-Lambton Oversized Load Corridor application to the National Trade Corridor Fund. The Oversized Load Corridor (OLC) is a strategic economic development opportunity for Sarnia, St. Clair Township and Lambton County. It will serve to dramatically improve the competitiveness of established area fabricating and manufacturing firms and benefit the economic health of the community. Moreover, the OLC Project will expand opportunities for the export of super, oversized equipment from area fabricators to local, national and international markets by creating a dedicated and protected transportation route between the industrial areas and the deep water harbour at the Port of Sarnia. It fits perfectly with the NTCF objectives for catalyzing export trade and serving Northern communities with access to fabricated goods.

We are very fortunate to have been selected to move forward in the NTCF competitive application process and our submission is attached. We are pleased to provide the following resolution of Council in support of this very important project:

*That Sarnia City Council authorizes and approves the City of Sarnia submission dated November 6, 2017 for National Trade Corridor funding (NTCF) to construct the proposed Oversize Load Corridor; and*

*That Sarnia City Council approves funding for the Oversize Load Corridor in the amount of \$4,715,000 over the duration of the project conditional upon approval of NTCF funding in the amount of \$6,000,000 and partner funding by the County of Lambton and St.*

*Clair Township in the combined amount of \$1,275,000 and the Sarnia Lambton Industrial Alliance in the amount of \$10,000 for a total project cost of \$12,000,000.*

In addition to the financial commitment of Council, the City of Sarnia will provide in-kind support to the project through the Project Team, three of whom are City staff. As Chief Administrative Officer, I will be the primary contact for the City on the project. We look forward to your favourable consideration of our proposal and if there are questions or clarifications required regarding our submission, please feel free to contact me at your convenience.

Sincerely,

A handwritten signature in cursive script that reads "Margaret Misek-Evans".

Margaret Misek-Evans  
Chief Administrative Officer

Copy:           Members of Sarnia City Council



**Office of the County Warden**  
789 Broadway Street, Box 3000  
Wyoming, ON N0N 1T0

Telephone: 519-845-0801  
Toll-free: 1-866-324-6912  
Fax: 519-845-3160

November 6, 2017

Transport Canada  
NTCF – CPP Submission  
Business Centre  
330 Sparks Street  
Place de Ville, Tower C  
Ottawa, ON K1A 0N5

**Re: Letter of Intent - County of Lambton Oversize Load Corridor Funding Commitment**

I am very pleased to provide this letter demonstrating the County of Lambton's support for the Sarnia-Lambton Oversized Load Corridor application to the National Trade Corridor Fund.

The Oversized Load Corridor (OLC) is a strategic economic development opportunity for Sarnia, St. Clair Township and Lambton County. It will serve to dramatically improve the competitiveness of established area fabricating and manufacturing firms and benefit the economic health of the community.

In addition, the OLC Project will expand opportunities for the export of super, oversized equipment from area fabricators to local, national and international markets by creating a dedicated and protected transportation route between the industrial areas and the deep water harbour at the Port of Sarnia. This project aligns with the NTCF objectives for catalyzing export trade and serving Northern communities with access to fabricated goods.

To confirm the County of Lambton's financial commitment to the Oversize Load Corridor project, the following motion was passed at the November 1, 2017 meeting of County Council to adopt the following recommendations:

**#7: Case/McGugan:**

- a) *That Lambton County Council commit to funding \$1.2 million over the next four years toward the design and construction of the Oversize Load Corridor project, subject to obtaining 50 percent funding support through the National Trade Corridors Fund.*
- b) *That the \$1.2 million in funding for the Oversize Load Corridor project be provided from the Opportunities and Contingency Reserve.*

*Carried.*

Please do not hesitate to contact me should you have any questions or concerns.

Yours truly,

Bill Weber  
Warden



Township of St. Clair

Chief Administrative Officer	519-867-2021
Administration / Clerks Dept.	519-867-2021
Finance & Treasury Dept.	519-867-2024
Water Dept.	519-867-2128
Engineering Dept.	519-867-2125
Public Works Dept.	519-867-2993
Fire Dept. Administration	519-481-0111

November 6, 2017

Transport Canada  
NTCF – CPP Submission  
Business Centre  
330 Sparks Street  
Place de Ville, Tower C  
Ottawa, ON K1A 0N5

To whom it may concern:

**RE: Letter of Intent**

I am writing to confirm the Township of St. Clair's support for the Sarnia-Lambton Oversized Load Corridor application to the National Trade Corridor Fund. The Oversized Load Corridor (OLC) is a strategic economic development opportunity for Sarnia, St. Clair Township and Lambton County. It will serve to dramatically improve the competitiveness of established area fabricating and manufacturing firms and benefit the economic health of the community. Moreover, the OLC Project will expand opportunities for the export of super, oversized equipment from area fabricators to local, national and international markets by creating a dedicated and protected transportation route between the industrial areas and the deep water harbour at the Port of Sarnia. It fits perfectly with the NTCF objectives for catalyzing export trade and serving Northern communities with access to fabricated goods.

We are very fortunate to have been selected to move forward in the NTCF competitive application process and our submission is attached. We are pleased to provide the following resolution of Council in support of this very important project:

*That Township of St. Clair Council authorizes and approves the City of Sarnia submission dated November 6, 2017 for National Trade Corridor funding (NTCF) to construct the proposed Oversize Load Corridor; and*

*That Township of St. Clair Council approves funding for the Oversize Load Corridor up to the amount of \$75,000 over the duration of the project conditional upon approval of NTCF funding in the amount of \$6,000,000 and partner funding by the County of Lambton and the City of Sarnia, the Sarnia Lambton Industrial Alliance for a total project cost of \$12,000,000.*

As Chief Administrative Officer, I will be the primary contact for the Township on the project. We look forward to your favourable consideration of our proposal and if there are questions or clarifications required regarding our submission, please feel free to contact me at your convenience.

Sincerely,



John Rodey  
Chief Administrative Officer

Copy: Members of Township of St. Clair Council



Oct. 18, 2017

Ms. Margaret Misek-Evans  
City of Sarnia  
255 N. Christina St.,  
Sarnia, ON N7T 7N2

**Re: Oversized Load Corridor Funding Application to Federal Government's National Trade Corridors Fund**

Dear Ms. Misek-Evans,

Please accept this letter as an expression of overwhelming support for your subject application. We also confirm our financial commitment of \$2,500.yr for 4 years from 2018 – 2021 (total \$10,000.), conditional on the success of your funding application.

This represents approx. 10% of our group's annual revenues.

Sarnia Lambton Industrial Alliance (SLIA) is an incorporated not-for-profit industrial association with over 30-member companies, a volunteer board of directors and no paid employees. The members are committed to individually and collectively seeking out new business opportunities to grow their businesses and the local economy.

The lack of a suitable oversized load corridor in our area was identified by group members in 2010. We have been working since that time to see the opportunity become a reality. Our members and executive have contributed nearly \$60,000. in cash and thousands of hours of volunteer time to promote and justify the project to date.

We are, therefore, your strongest supporter as you apply for this very important funding.

Yours truly,

A handwritten signature in black ink, appearing to read "Rick Perdeaux".

Rick Perdeaux  
Chairman

## **Annex C**

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### **Council Resolutions from Partner Municipalities**

**The Corporation of the City of Sarnia**

**The Corporation of the County of Lambton**

**The Corporation of the Township of St. Clair**



**THE CORPORATION OF THE CITY OF SARNIA  
City Clerk's Department**

255 Christina Street N. PO Box 3018  
Sarnia ON Canada N7T 7N2  
519-332-0330 (phone) 519-332-3995 (fax)  
519-332-2664 (TTY)  
[www.sarnia.ca](http://www.sarnia.ca) [clerks@sarnia.ca](mailto:clerks@sarnia.ca)

November 6, 2017

To Whom It May Concern:

I, Dianne Gould-Brown, City Clerk for the Corporation of the City of Sarnia, hereby certify that the following is a true copy of a resolution adopted by Sarnia City Council at its meeting held on November 6, 2017.

***That Sarnia City Council authorizes and approves the City of Sarnia submission dated November 6, 2017 for National Trade Corridor funding (NTCF) to construct the proposed Oversize Load Corridor; and***

***That Sarnia City Council approves funding for the Oversize Load Corridor in the amount of \$4,715,000 over the duration of the project conditional upon approval of NTCF funding in the amount of \$6,000,000 and partner funding by the County of Lambton and St. Clair Township in the combined amount of \$1,275,000 and the Sarnia Lambton Industrial Alliance in the amount of \$10,000 for a total project cost of \$12,000,000.***

A handwritten signature in cursive script that reads "Dianne Gould-Brown".

Dianne Gould-Brown  
City Clerk





November 2, 2017

Margaret Misek-Evans  
Chief Administration Officer  
City of Sarnia  
255 Christina Street North  
Sarnia, ON N7T 7N2

Dear Ms. Misek-Evans

**Re: County of Lambton Oversize Load Corridor Funding Commitment**

This serves to confirm that at its meeting on November 1, 2017, the elected Council of The Corporation of the County of Lambton ("County") adopted the following motion regarding the County's financial commitment to the Oversize Load Corridor project:

- a) That Lambton County Council commit to funding \$1.2 million over the next four years toward the design and construction of the Oversize Load Corridor project, subject to obtaining 50 percent funding support through the National Trade Corridors Fund.
- b) That the \$1.2 million in funding for the Oversize Load Corridor project be provided from the Opportunities and Contingency Reserve.

A formal record of the minutes will be provided when available, when ready.

Sincerely,

Stephane Thiffeault  
General Manager, Corporate Service  
County Solicitor & County Clerk

cc: Jason Cole, General Manager, Infrastructure & Development



Township of St. Clair

Chief Administrative Officer	519-867-2021
Administration / Clerks Dept.	519-867-2021
Finance & Treasury Dept.	519-867-2024
Water Dept.	519-867-2128
Engineering Dept.	519-867-2125
Public Works Dept.	519-867-2993
Fire Dept. Administration	519-481-0111

November 6, 2017

Transport Canada  
NTCF – CPP Submission  
Business Centre  
330 Sparks Street  
Place de Ville, Tower C  
Ottawa, ON K1A 0N5

To whom it may concern:

The purpose of this letter is to advise that during their regular meeting held on November 6, 2017, Council of the Township of St. Clair passed the following motion in support of the Sarnia-Lambton Oversized Load Corridor application to the National Trade Corridor Fund:

***Motion #3*** That Township of St. Clair Council authorizes and approves the City of Sarnia submission dated November 6, 2017 for National Trade Corridor funding (NTCF) to construct the proposed Oversize Load Corridor; and  
That Township of St. Clair Council approves funding for the Oversize Load Corridor up to the amount of \$75,000 over the duration of the project conditional upon approval of NTCF funding in the amount of \$6,000,000 and partner funding by the County of Lambton, the City of Sarnia and the Sarnia Lambton Industrial Alliance for a total project cost of \$12,000,000.

Please accept this as evidence of an approved motion.

Kind regards,

Jeff Baranek, RPP  
Clerk/Deputy CAO  
Township of St. Clair

I, Jeff Baranek, Clerk of the Corporation of the Township of St. Clair  
Hereby certify this to be a true copy of  
Motion #3 passed by  
the Council of the Township of St. Clair,  
under date of November 6 2017

## Annex D

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### Letters of Support

**Marilyn Gladu, M.P. Sarnia-Lambton**

**Bob Baily, M.P.P. Sarnia-Lambton**

**Bioindustrial Innovation Canada (BIC)**

**Sarnia-Lambton Economic Partnership (SLEP)**

**Sarnia Lambton Industrial Alliance (SLIA)**

**Bluewater Power Group of Companies**

**Sarnia-Lambton Chamber of Commerce**

**Sarnia & District Labour Council**

**Labourer's International Union of North America (LiUNA!)**



HOUSE OF COMMONS  
CHAMBRE DES COMMUNES  
CANADA

*Marilyn Gladu*  
Member of Parliament  
Sarnia—Lambton



November 2, 2017

**Re: Sarnia Oversized Load Corridor project**

The construction of this project will create thousands of well-paying jobs in Sarnia-Lambton, and will give our manufacturing industry a competitive edge to fabricate modules for many industries in Canada, the US, and globally.

The entire community as well as myself heartily support this project, and I encourage the federal government to approve the requested funding as quickly as possible.

Thank you for your consideration.

Best regards,

A handwritten signature in blue ink, appearing to read "Marilyn Gladu".

Marilyn Gladu  
Member of Parliament  
Sarnia-Lambton

Room 554, Wellington Building, Ottawa, Ontario K1A 0A6  
Tel.: 613-957-2649 Fax.: 613-957-2655

*Ottawa*

*Constituency Office*

1000 Finch Drive, Unit 2, Sarnia, Ontario N7S 6G5  
Tel.: 519-383-6600 Fax.: 519-383-0609

Marilyn.Gladu@parl.gc.ca  
<http://marilyngladu.com>



LEGISLATIVE ASSEMBLY

---

**BOB BAILEY, M.P.P.**  
Sarnia-Lambton

November 3, 2017

Ms. Margaret Misek-Evans  
City of Sarnia  
255 Christina St.,  
Sarnia, ON  
N7T 7N2

□ <b>Queen's Park Office:</b>	□ <b>Constituency Office:</b>
Rm 203, North Wing	102 - 805 Christina St. N
Legislative Building	Point Edward, Ontario
Queen's Park	N7V 1X6
Toronto, ON M7A 1A8	Tel: 519-337-0051
Tel: 416-325-1715	Fax: 519-337-3246
Fax: 416-325-1852	

RE: National Trade Corridor Fund - Sarnia-Lambton Oversized Load Corridor

Dear Ms. Misek-Evans,

I am writing to confirm my support for the Sarnia-Lambton Oversized Load Corridor application to the National Trade Corridor Fund.

A permanent oversized load corridor in the community would help to link our world class industrial fabrication shops in the area to global markets by eliminating the bottlenecks and capacity issues that currently exist between Sarnia-Lambton's industrial sector and the St. Lawrence Seaway System.

The recently completed business case analysis of this project by Canadian Pacific Consulting Services projected that an oversized load corridor in Sarnia-Lambton is estimated to contribute \$263 million to Canada's GDP, create 2,613 full time equivalent jobs, and generate \$21.4 million in government tax revenues. The business case analysis concludes, "Investment in the corridor would more than pay for itself in the short term (GDP impact) and medium term (tax revenues)."

I believe this project provides incredible value-for-money and the National Trade Corridor Fund should allocate the full \$6 million in support that you are seeking.

Should you require any additional information regarding my support for this project, please contact me directly.

Sincerely,

A handwritten signature in black ink, appearing to read "Bob Bailey".

Bob Bailey, MPP  
Sarnia-Lambton



Oct. 18, 2017

Ms. Margaret Misek-Evans  
City of Sarnia,  
255 N. Christina St.,  
Sarnia, ON N7T 7N2

Re: Oversized Load Corridor Funding Application to Federal Government's National Trade Corridors Fund

Dear Ms. Misek-Evans,

We are pleased to confirm our support for your subject application.

BioIndustrial Innovation Canada provides support to start-up companies using clean, green and sustainable technologies including bio-based products across Canada, including those that choose to locate in the Sarnia Lambton area. The rapidly growing, environmentally friendly, biochemical, biofuel and biomaterial industries all require specialized large equipment to process bio-based feedstocks into their end products. These products are being used with traditional carbon based products.

The Sarnia Lambton area has a well developed world class cluster of industrial fabrication firms and a complete supply chain that supports them. The large equipment required by the bio industry, similar to the processing equipment required for the traditional carbon based industries, is very difficult and costly to move due to obstructions on traditional roadways. These obstructions must be temporarily moved and replaced each occasion.

Development of an oversized load corridor, connecting the Port of Sarnia to the industrial fabrication firms in Sarnia, Corunna and Brigden by making improvement to existing roads, is well warranted. This will allow for large bioprocessing equipment to be shipped out of Sarnia Lambton area at significantly less cost than is currently the case. This capability allows the industrial fabrication firms in Sarnia to take advantage of their developed capabilities in biotechnology fabrication by shipping equipment out of the region.

The corridor will also improve the access, and reduce the costs, for equipment supplied to locally locating bio-industries, whether it is produced locally or shipped in through the Port of Sarnia and the improved corridor route. Cost savings such as this, particularly for start-up companies, can accelerate the time frame to start up and achieving profitability.

If additional information or confirmation of our support is required, please contact the writer.

Yours truly,

A handwritten signature in black ink, appearing to read 'A.J. Marshall', is written over a horizontal line.

A.J. (Sandy) Marshall  
Executive Director  
Bioindustrial Innovation Canada



Nov. 1, 2017

Margaret Misek-Evans  
Chief Administrative Officer  
The Corporation of the City of Sarnia  
255 North Christina St., P.O. Box 3018  
Sarnia ON N7T 7N2

Dear Margaret,

The Sarnia-Lambton Economic Partnership is pleased to support the Corporation of the City of Sarnia's application to the *National Trade Corridors Fund (NTCF)* in connection to the *Sarnia-Lambton Oversized Load Corridor*.

We recognize that the establishment of an "Oversized Load Corridor" linking the deep-water Port of Sarnia to the highly-skilled industrial fabrication and advanced manufacturing firms in the area will allow for these companies to more competitively pursue opportunities to export world class equipment – including large metal equipment modules, pressure vessels, and boilers – to other parts of Canada, USA, and other international locations.

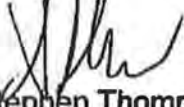
The project will support high-value trade originating in the Sarnia-Lambton region, while strengthening the efficiency and resilience of transportation assets that are critical for the continued success of Sarnia-Lambton's industrial fabrication and advanced manufacturing sectors in international commerce. This will be accomplished through the capacity added to the regional transportation system to accommodate the movement of heavy-haul loads, via investment in one of the critical assets in the community that supports economic activity and the physical movement of goods, both nationally and internationally. The result will be an increase in the competitiveness and productivity within these sectors resulting in higher values of freight originating from the Sarnia-Lambton area, moving at significantly lower costs to the manufacturer.

Funding through the National Trade Corridors Fund would provide the City of Sarnia, its collaborators and subsequently, other parties throughout Sarnia-Lambton – including the County of Lambton, Township of St. Clair, and Sarnia-Lambton Industrial Alliance – with the resources necessary to complete final detailed engineering, the movement of utility lines, re-engineering of road infrastructure, and capital improvements to the Port of Sarnia.

Past milestones, including an Oversized Load Shipping Route Study and a Business Case Analysis for Oversize Freight To/From Sarnia-Lambton report, have confirmed the project would have an economic impact resulting in the generation of 2,613 FTE jobs and the addition of \$263 million to Canada's GDP and \$21.4 million to government tax revenues.

Given the Sarnia-Lambton Economic Partnership's position in providing strategic leadership and support to community-based economic development in Sarnia-Lambton, we see the potential for the successes of this project to help achieve the ultimate NTCF outcome to make the multimodal transportation network more efficient, safe, and secure for the movement of International trade within and beyond Canada's borders.

Yours sincerely,



Stephen Thompson  
Chief Executive Officer  
Sarnia-Lambton Economic Partnership





Oct. 18, 2017

Ms. Margaret Misek-Evans  
City of Sarnia  
255 N. Christina St.,  
Sarnia, ON N7T 7N2

**Re: Oversized Load Corridor Funding Application to Federal Government's National Trade Corridors Fund**

Dear Ms. Misek-Evans,

Please accept this letter as an expression of overwhelming support for your subject application. We also confirm our financial commitment of \$2,500/yr for 4 years from 2018 – 2021 (total \$10,000.), conditional on the success of your funding application.

This represents approx. 10% of our group's annual revenues.

Sarnia Lambton Industrial Alliance (SLIA) is an incorporated not-for-profit industrial association with over 30-member companies, a volunteer board of directors and no paid employees. The members are committed to individually and collectively seeking out new business opportunities to grow their businesses and the local economy.

The lack of a suitable oversized load corridor in our area was identified by group members in 2010. We have been working since that time to see the opportunity become a reality. Our members and executive have contributed nearly \$60,000. in cash and thousands of hours of volunteer time to promote and justify the project to date.

We are, therefore, your strongest supporter as you apply for this very important funding.

Yours truly,

A handwritten signature in black ink, appearing to read "Rick Perdeaux".

Rick Perdeaux  
Chairman



P.O. Box 2140  
855 Confederation Street  
Sarnia, Ontario N7T 7L6  
Tel: (519) 337-8201  
Fax: (519) 344-6094

November 1, 2017

Transport Canada  
NTCF – EOI Submission  
Business Centre  
330 Sparks Street  
Place de Ville, Tower C  
Ottawa, ON K1A 0N5

To whom it may concern,

**Re: National Trade Corridors Fund (NTCF) Expression of Interest (EOI) Submission  
The Corporation of the City of Sarnia, County of Lambton, St. Clair Township**

Bluewater Power is pleased to provide this letter in support of the City of Sarnia's National Trade Corridors Fund Application. We believe the Oversized Load Corridor proposed by the City of Sarnia and its partners is critical to the success of our local manufacturers by providing a gateway to the world for the local expertise that we have amassed in our community. We also believe that the Oversized Load Corridor will provide a vital link for our existing Petrochemical and Bio-Industry that will secure the future of this industry that has been the "heart beat" of our community.

The Bluewater Power family of companies includes Bluewater Power Distribution Corporation, Bluewater Power Renewable Energy Inc., Bluewater Power Services Corporation, Electek Power Services Inc., Unconquered Sun Solar Technologies Inc. and Bluewater Regional Networks Inc. Bluewater Power Distribution is the largest electric utility in Lambton County and provides electrical distribution and related services to over 36,000 customers in Southwestern Ontario.

Bluewater Power actively participated in the successful completion of the Oversized Load Corridor Shipping Route Study completed in May of 2016, which provided a detailed scope of upgrades required to implement an Oversized Load Corridor in Sarnia-Lambton. The establishment of an Oversized Load Corridor linking local industrial fabrication companies to the Port of Sarnia will facilitate economic growth, increase exports and significantly decrease shipping costs. Components of the project include permanently raising or burying utility lines along the corridor which will increase safety significantly by eliminating the risks associated with disconnecting and reconnecting power lines and other utilities which currently occur with each oversized load move. Streetlights will be moved and "swing-away" traffic lights installed. Benefits also include reduction/elimination of the impact of temporary power outages for business and residents along the proposed route.

Assuming the application by the City of Sarnia and its partners is successful, Bluewater Power will be integral to implementing the trade corridor as our infrastructure today creates one of the major barriers to the transport of oversized loads. We will dedicate all necessary resources to make the Oversized Load Corridor a success within the timelines outlined in the application.

In summary, Bluewater Power enthusiastically supports the goal of the establishment of an Oversized Load Corridor in Sarnia-Lambton and we look forward to continuing our partnership with the City of Sarnia to make this goal a reality.

Sincerely,

A handwritten signature in black ink that reads "JMcMichael-Dennis". The signature is written in a cursive, flowing style.

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Janice McMichael-Dennis  
President and Chief Executive Officer  
Bluewater Power Group of Companies



556 Christina Street N.  
Sarnia, ON N7T 5W6  
Tel (519) 336-2400  
Fax (519) 336-2085  
info@sarnialambtonchamber.com  
www.sarnialambtonchamber.com



November 1, 2017

Ms. Margaret Misek-Evans  
City of Sarnia  
255 N. Christina St.  
Sarnia, ON N7T 7N2

**Re: National Trade Corridors Funding Application for the Oversized Load Corridor**

The Sarnia Lambton Chamber of Commerce is pleased to express its support of the City of Sarnia's application to the National Trade Corridors Fund for the purpose of establishing an "Oversized Load Corridor" (OLC). As a municipality, the City of Sarnia has the necessary capacity and resources to manage such a significant project.

Sarnia Lambton is home to a world-scale cluster of advanced technology manufacturing industries supporting, directly and indirectly, approximately 28,000 fulltime equivalent jobs. The cluster has expanded and evolved from being the birthplace of North America's first commercial oil producer in 1858 to the bio-hybrid chemistry cluster that exists today. The cluster includes innovative manufacturers that produce large modular equipment for both local and global markets. However, moving this equipment to and from Sarnia-Lambton is costly and less accessible, preventing this cluster from developing to its full potential.

The Chamber fully supports the efforts of City and its partners to establish an OLC that would reduce local bottlenecks and ease access to the deep water Port of Sarnia. Trade-accessible transportation infrastructure is a critical component of our local industry's ability to access global markets. The Chamber believes the OLC would help grow Canada's manufacturing sector and Sarnia-Lambton's bio-hybrid chemistry cluster while adding \$263 million to Canada's GDP and creating over 2,600 FTE skilled jobs.

The Sarnia Lambton Chamber of Commerce is pleased to provide its support for the subject funding application. Please feel free to contact Shirley de Silva at 519-336-2400 or sdesilva@slchamber.ca if additional information is needed.

Yours truly,

A handwritten signature in cursive script that reads "Sde Silva".

Shirley de Silva  
President and CEO



# Sarnia & District Labour Council

900 Devine Street  
Sarnia, ON N7T 1X5  
sdlc@bellnet.ca

Phone: 519.542.2375  
Fax: 519.542.0178

November 1, 2017

To whom it may concern,

As the president of the Sarnia and District Labour Council, it is indeed my pleasure to indicate our support for the creation of an oversized load corridor in Lambton County. The work which has been spear headed by the Sarnia Lambton Industrial Alliance, (SLIA), carried on by the Sarnia Lambton Economic Partnership (SLEP) and City of Sarnia has certainly recognized the need for this important access to be created in Lambton County.

It is widely accepted that the work created as well as retained by this corridor would play a significant role in reducing unemployment for Sarnia Lambton's thousands of skilled trades workers. This unemployment rate has increased in recent years causing many of these workers, vital to Sarnia Lambton's overall economy, to be forced to relocate to find employment. Sarnia's skilled trades work force certainly welcome this project.

The study confirming the enormous employment and economic benefit to the area has been completed and as expected indicates the positive impact this project will have on our community. Therefore, on behalf of the over 15000 members of Sarnia Lambton's unionized labour community we hope you will consider our support when reviewing this application for funding for the project.

Should you have any questions, please don't hesitate to contact the author.

Sincerely,

A handwritten signature in cursive script that reads "Jason McMichael".

Jason McMichael

President

Sarnia and District Labour Council

MIKE MAITLAND

Business Manager/Secretary-Treasurer

# LiUNA!

LABOURER'S INTERNATIONAL UNION OF NORTH AMERICA

1255 Confederation Street • Sarnia, Ontario N7S 4M7

Phone: 519-332-1089 • Fax: 519-332-6378



DANI MAOLA  
*President*

GERRY VARRICCHIO  
*Vice-President*

CHAD HOGAN  
*Recording Secretary*

CLARANCE FIELDS  
*Executive  
Board Member*

JASON WILLIAMS  
*Executive  
Board Member*

VICTOR TEIXEIRA  
*Executive  
Board Member*

To Whom it May Concern

As the Business Manager for LiUNA (The Labourers International Union of North America) Local 1089 here in Sarnia Lambton, it is my pleasure to write to indicate our support for the Over Sized Load Corridor proposed for Lambton County.

This project would not only create work during the production of the corridor but would place our community contractors on a level playing field with other communities when bidding on the type of projects that would move down this corridor. This increase in work for our skilled trades would benefit every level of the economy in Sarnia Lambton.

The Labourers International Union of North America, Local 1089 unreservedly supports this project.

Should you have any questions please do not hesitate to contact myself.

Best Regards,

Mike Maitland

LiUNA 1089

Business Manager/Secretary Treasurer

**Local 1089**

[www.liuna1089.ca](http://www.liuna1089.ca)



**Annex E**

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**Cost-Benefit Analysis**

**COST-BENEFIT ANALYSIS**  
**SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR**

Prepared for: Department of Transport  
National Trade Corridors Fund

November 6, 2017



**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR****1.0 INTRODUCTION****1.1 Purpose**

This Cost-Benefit-Analysis was undertaken to evaluate the net tangible and intangible impacts of constructing an Oversized Load Corridor (OLC) to support the transportation needs in the municipalities of the City of Sarnia and Township of St. Clair within the County of Lambton.

The proposed OLC project consists of numerous isolated improvements to overhead utility crossings and municipal roadway infrastructure along a 34 kilometre route to facilitate the movement of super, oversize equipment between regional petro-chemical and bio-hybrid manufacturing clusters/industry and the Port of Sarnia. In addition, the project proposes improvements at the deep water Port of Sarnia to enable the transfer and provide laydown areas for super, oversize loads, creating opportunities for local industry to access national and global markets.

**1.2 Background**

The Sarnia area is host to an extensive petro-chemical and bio-hybrid network that includes several specialized manufacturing and fabricating clusters to support the needs of the major industrial players. The equipment produced out of these clusters frequently exceeds the height, width, and/or weight of standard highway transportation options. Classified as super, oversize loads, these shipments require special considerations to facilitate delivery. The necessity of pre-trip inspections, temporary utility relocations, and municipal infrastructure modifications to allow passage of super, oversize loads creates additional and reoccurring costs for the manufacturers, transporters, and industry.

The opportunity exists to designate a standard oversized load corridor along existing roadways and construct infrastructure improvements or modifications to remove current barriers for transporting super, oversize loads. In addition, by connecting the corridor to the Port of Sarnia, and installing improvements at the deep water port, the existing local industry can gain access to national and global markets that are currently restricted due to excess and limited access transportation costs.

The *Oversize Load Corridor Shipping Route Study (2016)* prepared by MIG Consulting Engineers reviewed and analysed potential routing alternatives based on the number and costs of improvements required to eliminate existing barriers to super, oversize loads. The identified preferred OLC route connects local clusters of manufacturers and fabricators to a high-level, regional roadway network and the Port of Sarnia. The preferred designated OLC route is identified in Appendix 1.

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR****1.3 Methodology**

The OLC was evaluated through a standard cost-benefit analysis framework considering the direct, societal, and economic impacts of the project. Gains and losses to the User (oversized equipment manufacturers), community, and region were determined by utilizing market value based on two technical reports prepared as part of the project conceptual design; the *Oversize Load Corridor Shipping Route Study (2016)* prepared by MIG Consulting Engineers and the *Business Case Analysis for Oversized Freight To/From Sarnia-Lambton (2016)* prepared by CPCS. Assigning dollar values to social benefits and costs were considered using revealed preference and stated preference models, however, standard valuation applications were found to be insufficient for assessment and impacts were identified qualitatively and quantified through relation to the technical report findings.

The cost-benefit analysis for the OLC was compared to the current condition using net present value calculated over a 30 year evaluation period with a 10% discount rate.

**2.0 ASSUMPTIONS AND CONDITIONS****2.1 Assumptions**

Assumptions utilized as part of this Cost-Benefit Analysis are outlined as follows:

- The work and research included in the *Oversize Load Corridor Shipping Route Study (2016)* and *Business Case Analysis for Oversized Freight To/From Sarnia-Lambton (2016)* are considered to be accurate and complete.
- Construction cost estimates developed as part of the *Oversize Load Corridor Shipping Route Study (2016)* were adjusted by 2.5% annually to reflect increases resulting from inflation since the analysis were originally prepared.
- The life expectancy for any capital improvements constructed as part of the OLC project will equal or exceed the life of the existing associated infrastructure. The improvements will not be recognized as new tangible capital assets, but be incorporated into the normal life cycle of the existing infrastructure.

**2.2 Conditions**

External conditions identified as part of this Cost-Benefit Analysis include:

- Current local, national, and international market conditions for petroleum and bio-hybrid alternatives are maintained.
- Industry and regulatory standards for fabrication and transportation of the specialized large-size will not significantly deviate from existing conditions.
- Infrastructure construction costs will not exceed normal inflationary factors due to unforeseen supply or labour demand.

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR****3.0 DESCRIPTION OF ALTERNATIVES****3.1 Current System**

The Current System maintains the existing infrastructure and barriers to transport super, oversize loads between manufacturers, industry, and the Port of Sarnia. There would be no changes to the current procedures that require significant logistical and planning resources on the part of manufacturers/transporters to determine various routing alternatives on a case-by-case basis with mandatory infrastructure and utility crossing inspections. Repetitive temporary and costly measures to accommodate super, oversize shipments along chosen routes would remain unchanged. In addition, loading and unloading super, oversize equipment to deep water vessels would be restricted by the existing conditions at the Port of Sarnia, limiting the size and type of equipment that could be shipped out of that location to national and international markets.

**3.2 Proposed System**

Proceeding with the OLC project will enable streamlining of super, oversize load transportation in the Sarnia-Lambton area. Localized improvements along the designated OLC route will reduce or eliminate requirements for temporary utility or infrastructure modifications. Future encroachment along the route will be negated by maintaining standards that meet the super, oversize load parameters and will allow for reliable planning for shipments along the OLC. Modifications to the Port of Sarnia will ensure that manufacturers and transporters can easily access the vessels required to ship within the Great Lakes, St. Lawrence Seaway, and national and international ports.

**4.0 COST ANALYSIS****4.1 Key Costs**

The following table provides a summary of the key benefits identified in the analysis for the OLC project.

<b>Cost</b>	<b>Value</b>	<b>Detail</b>
Conceptual Design Costs	\$ 227,789	Planning and design costs expended to dated related to the OLC project.
Construction Costs	\$12,009,091	Capital costs for infrastructure improvements to facilitate super, oversize loads

**4.2 Conceptual Design Costs**

These are the costs that have been incurred by the OLC project design to date. They include consulting fees for the preparation of the *Oversize Load Corridor Shipping Route Study (2016)* prepared by MIG Consulting Engineers and the *Business Case*

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR**

*Analysis for Oversized Freight To/From Sarnia-Lambton (2016)* prepared by CPCS. Although already incurred, the Conceptual Design Costs have been included in Year 1 to capture them in the financial model.

Cost	Value	Detail
Conceptual Design Costs	\$ 227,789	Planning and design costs expended by partners to date related to the OLC project. Assigned to Year 1 of analysis.
Total	\$ 227,789	

### 4.3 Construction Costs

The primary costs for OLC alternative are associated with the capital investment required to construct improvements along the OLC route and at the Sarnia Harbour<sup>1</sup>. This analysis uses the estimates identified in the *Oversize Load Corridor Shipping Route Study (2016)* for the anticipated construction needs at each of the improvement locations along the designated route.

The costed improvements address all design and construction aspects to carry out the infrastructure improvements along the corridor route. These include the following modifications or upgrades:

#### Sarnia Harbour Improvements

- Adjustments to loading and unloading facilities
- Access and internal routing modifications

#### Road Improvements

- Bridge and culvert improvements or reinforcements
- Intersection modifications to provide wider turning radii, retractable signal arms, and clearing the roadside allowance
- Pavement reconstruction and platform widening

#### Overhead Obstructions

- Permanently lifting or burying electrical, telephone, cable, and other utilities crossing roadways for transmission, distribution, and residential and commercial connections
- Moving or replacing associated utility infrastructure, such as poles and guy wires

<sup>1</sup> MIG Consulting Engineers (2016). *Oversize Load Corridor Shipping Route Study*. Sarnia, ON

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR**

The capital costs for the project are distributed over a four-year period to correspond with the anticipated construction schedule. They are identified in Years 1 to 4 in the financial model.

<b>Cost</b>	<b>Value</b>	<b>Detail</b>
Sarnia Harbour Improvements	\$ 5,407,337	Capital costs for harbour improvements to facilitate super, oversize loads. Assigned to Years 1 to 4 in analysis.
Road Improvements	\$ 3,377,356	Capital costs for bridge, culvert, pavement, and intersection improvements to facilitate super, oversize loads. Assigned to Years 1 to 4 in analysis.
Overhead Obstructions	\$ 3,224,402	Capital Costs for utility move or relocation to facilitate super, oversize loads. Assigned to Years 1 to 4 in analysis.
<b>Total</b>	<b>\$12,009,095</b>	

**4.4 Other Costs**

Other considered costs were considered but dismissed as part of this analysis due to the similarity in nature of the current infrastructure to the improved or modified states. These include:

- Increases to maintenance costs for elements such as buried utilities, taller poles, or widened intersections are nominal or net to zero.
- Lifecycle costs for the infrastructure improvements are also considered to be equitable to the current state option since they generally consist of many minor improvements across the entire corridor and do not significantly contribute to the value of the tangible capital asset.

**5.0 BENEFIT ANALYSIS****5.1 Key Benefits**

The following table provides a summary of the key benefits identified in the analysis for the OLC project.

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR**

<b>Benefit</b>	<b>Value</b>	<b>Detail</b>
User Benefits	\$ 95,000	Cost savings for super, oversize load manufacturers and shippers using the designated route. Applied at 1% of estimated annual additional production and sales of oversized equipment (\$9,500,000) following completion of OLC construction, applied to Years 5 to 30 of analysis.
Indirect Benefits	\$ 8,382,449	Annual anticipated GDP increase from industry growth following completion of OLC construction, applied to Years 5 to 30 of analysis.

**5.2 User Benefits**

The identified user benefits in this analysis result from the elimination of various charges and expenses currently required for oversized load shipping that could be accommodated by the designated corridor route improvements. These costs are associated with activities to plan, coordinate, or carryout the physical transportation of the manufactured equipment to the destination. Although the responsibility for these requirements may be undertaken by a number of contractors, consultants, or infrastructure owners as part of the move operation, the financial obligation is typically translated back to the manufacturer to be incorporated as part of the shipping cost. In some cases, the manufacturer is able to account for all costs as part of the manufacturing contract, and in others, some element of risk is assumed by the manufacturer through the bidding process.

Currently, transportation costs occur at two phases: the Planning Phase, where the route is reviewed and any necessary improvements are identified; and the Moving Phase, where the actual physical transportation of the equipment takes place. Following the construction of the OLC improvements, user benefits will occur by eliminating costs in the following areas:

Utility Route Inspections (Planning Phase)

Vehicle heights are regulated by the *Highway Traffic Act, 1990*. To transport vehicles and loads that exceed these standards, utility owners (electrical, telephone, cable, etc.) must verify that the load can either pass beneath any overhead utility crossings along the route, or identify those crossings that will require temporary measures to allow passage. Each utility company carries out an independent review along the specified route which may vary in scope, from an in-office exercise to field examination and measurement.

The cost for each review can be in excess of \$1,500 to compensate the utility company for employee time. In addition, this expense is repeated for each new

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR**

move request that exceed the standards to account for any changes or temporary conditions with respect to utilities along the route.

### Structural Reviews (Planning Phase)

For loads that exceed the weight restrictions identified in the *Highway Traffic Act, 1990*, a review of the bridges, culvers, and pavement along the transport route may be requested by the road authority. These reviews typically require the retention of a consulting engineer to independently assess the ability of the roadway components to withstand the loading.

The cost of such reviews are dependent on the number of structures along the intended route, but typically result in a \$2,500 to \$5,000 expense per move project. Structural verification is required for all new loads in order to assess current structure condition and as a record for unforeseen damage during the move.

### Logistics (Planning Phase)

Transportation contractors are required to verify the needs of the infrastructure owners and coordinate the necessary studies and assessments in advance of receiving approval to proceed with super, oversize load moves from the respective road authorities. These logistical activities may collectively add up to one or two weeks of staffing time to arrange, receive and report on the above required activities. Additional time prior to delivery is also required to accommodate the utility companies or consultants conducting the assessments. This can add one to two months to a delivery schedule.

### Utility Lifts & Disconnects (Moving Phase)

Where overly high loads are expected to physically encroach on utility crossings, the utility company, or a designated contractor, will be required to adjust the lines to allow passage of the vehicle. In some cases, service of the utility can be maintained by physically lifting the cable to allow the vehicle and load to pass underneath. However, it may be necessary to disconnect the utility altogether and reconnect the service after the load has passed. This work can also extend to the necessary removal and restoration of overhead traffic lights, luminaires, signage, and warning signals by the municipalities.

Specialized equipment and personnel are required to carry out this work. In addition, since these utility operations are time consuming; multiple crews are typically deployed to maintain continuous movement of the load along the route. Three to four concurrent utility crews can be required for the entire duration to facilitate demanding moves.

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR**Structural Reinforcement (Moving Phase)

The reinforcement of bridges and culvers may be needed to allow passage of loads that are heavier than designated highway standards. For short crossings, this can be accommodated by specialized load transfer equipment that is placed over the identified structure that will distribute the vehicle weight beyond the area of concern. For larger bridges, a specific engineering support design and construction may be required.

Where the pavement structure is identified to be at risk of damage from heavy loads, the most common alternative is to employ specialized movement equipment with additional axils and tires to better distribute the weight across the entire road. In these cases, specialized transportation contractors are required that may need to import widened trailers or individual mobile units to complete the move. Shipping costs will increase when this equipment is required, where it may otherwise be avoided. In addition, manufacturers and transportation companies will be responsible for any identified damage to the roadway that occurs as a result of the delivery operation.

All of the above user costs under the Current System are heavily dependent on the type, size, and weight of the loads being transferred. Where required, the combined total of these costs have been reported to range from nominal review costs to in excess of \$150,000 per oversized load delivery.<sup>2</sup>

The construction of the OLC will create a higher level of standard for highway transport with respect to height and weight allowances along the designated route. Utility owners, municipal jurisdictions, manufacturers, and transportation contractors will then be able to rely on these new standards, thus eliminating the need for the above noted assurances to deliver oversized equipment.

It is important to note that the benefits of the improvements along the OLC do not only translate into benefits for those loads routed to the Sarnia Harbour. The manufacturing clusters primary service the existing petrochemical industrial sector in Sarnia and St. Clair Township. Where manufacturers and transporters currently identify individual routes for large size transports, many of the shipments will be able to utilize the improved corridor for regional transportation needs once the OLC improvements are complete.

Determining the value for the User Benefits was not calculated on a trip-by-trip cost savings basis due to the variability and dependency to the specific nature of each super, oversize load and limited detail of historic data regarding the number and types of loads transferred annually. Instead, relation of the User Benefit was estimated as a percentage of the future increased opportunity generated by the OLC. For this analysis, 1% of the estimated additional sales and production resulting from the OLC construction, as demonstrated in the *Business Case Analysis for Oversize Freight*

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<sup>2</sup> CPCS (2016) Business Case Analysis for Oversize Freight To/From Sarnia-Lambton, Sarnia, ON, p. 14.



**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR**

*To/From Sarnia-Lambton (2016)*.<sup>3</sup> These benefits are dependent on the construction of the OLC and are recognized annually after Year 4 in the analysis.

<b>Benefit</b>	<b>Value</b>	<b>Detail</b>
User Benefits	\$ 95,000	Cost savings for super, oversize loads manufacturers and shippers using the designated route. Applied at 1% of estimated annual additional production and sales of oversized equipment (\$9,500,000) following completion of OLC construction, applied to Years 5 to 30 of analysis.
<b>Total</b>	<b>\$ 95,000</b>	

### 5.3 Indirect Benefits

The indirect benefits of the OLC project are identified in the *Business Case Analysis for Oversize Freight To/From Sarnia-Lambton (2016)*.<sup>3</sup> These benefits are derived from the anticipated increased GDP impacts growing out of area industries following the construction of the OLC project.

<b>Benefit</b>	<b>Value</b>	<b>Detail</b>
Indirect Benefits	\$ 8,382,449	Annual anticipated GDP increase from industry growth following completion of OLC construction, applied to Years 5 to 30 of analysis.
<b>Total</b>	<b>\$ 8,382,449</b>	

### 5.4 Other Benefits

Other benefits were considered as part of the analysis for the OLC project. These include: producer benefits toward the municipalities, such as additional permitting fees; environmental benefits from carbon reduction due to increased transportation speeds and reduced reliance on utility equipment; and transportation benefits from improved travel time, reduced requirements for traffic detours and associated public delay and safety risks. These benefits were considered to be nominal compared to the overall User and Indirect benefits applied in the analysis and were not calculated.

In addition, any benefits gained from renewal of infrastructure as part of capital construction the improvements are offset by those costs identified through lifecycle costing. These are not considered tangible capital asset improvements due to the nature of the numerous isolated works identified in the project scope.

<sup>3</sup> CPCS (2016) Business Case Analysis for Oversize Freight To/From Sarnia-Lambton, Sarnia, ON, p. 75.

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR****6.0 COST AND BENEFIT COMPARISON**

## Cost and Benefit Analysis

Details	Total Discounted	Total
<b>A. COSTS (\$)</b>		
A1. Capital Cost	8,891,416	11,381,335
Concept design cost	207,081	227,789
Construction	8,684,335	11,153,546
<b>A. Total COSTS: (A = A1 )</b>	<b>8,891,416</b>	<b>11,381,335</b>
<b>B. BENEFITS (\$)</b>		
B1. Users benefits		
Costs savings for users of corridor	594,420	2,470,000
B2. Producer benefits		
Revenue from corridor	-	-
B3. Indirect benefit		
GDP impact	52,449,394	217,943,674
<b>B. Total BENEFITS: (B= B1 + B2 +B3)</b>	<b>53,043,814</b>	<b>220,413,674</b>
<b>C. TOTAL NET VALUE (C = B - A): (\$)</b>	<b>44,152,398</b>	<b>209,032,339</b>
<b>D. Internal Rate of Return (IRR)</b>	<b>43%</b>	
<b>E. Cost-Benefit Ratio</b>	<b>5.97</b>	

Net Present Value: Discounted benefits minus the discounted cost results in a positive NPV at 10% prescribed interest rate.

Internal Rate of Return (IRR): Rate of return is the discount rate that makes the net present value (NPV) of all cash flows equal to zero.

Cost-Benefit Ratio: Ratio of project economic benefits versus the project economic costs over 30 years. In economic terms, the benefits exceed the costs.

The positive Net Present Value, Internal Rate of Return (IRR) and Cost-Benefit Ratio all identify that the project is a desirable investment.

Supporting detail by year are included in Appendix 2.

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR****7.0 SENSITIVITY ANALYSIS**

Sensitivity analysis is used to determine how “sensitive” a model is to changes in the value of the parameters of the model and to changes in the structure of the model. Sensitivity analysis helps to build confidence in the model by studying the uncertainties associated with parameters in model.

The key assumptions made in the above cost-benefit analysis have been tested at various levels to identify if this changes the desirability of the project.

<b>DISCOUNT RATES</b>	<b>Results (discounted \$ millions or %)</b>		
	<b>COSTS/BENEFITS</b>	<b>2.0%</b>	<b>5%</b>
Net present value	146.78	90.24	44.15
Internal rate of return (%)	43%	43%	43%
Cost-benefit ratio	14.59	10.01	5.97

<b>CONSTRUCTION COSTS</b>	<b>Results (discounted \$ millions or %)</b>		
	<b>COSTS/BENEFITS</b>	<b>20% Lower</b>	<b>Base case (\$12.3M)</b>
Net present value	45.89	44.15	42.42
Internal rate of return (%)	49%	43%	38%
Cost-benefit ratio	7.41	5.97	4.99

<b>USERS BENEFITS</b>	<b>Results (discounted \$ millions or %)</b>		
	<b>COSTS/BENEFITS</b>	<b>0.5%</b>	<b>Base Case (1%)</b>
Net present value	43.86	44.15	44.75
Internal rate of return (%)	43%	43%	43%
Cost-benefit ratio	5.93	5.97	6.03

<b>INDIRECT BENEFITS (GDP)</b>	<b>Results (discounted \$ millions or %)</b>
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**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR**

<b>COSTS/BENEFITS</b>	<b>20% Lower</b>	<b>Base Case</b>	<b>20% Higher</b>
Net present value	33.66	44.15	54.64
Internal rate of return (%)	37%	43%	48%
Cost-benefit ratio	4.79	5.97	7.15

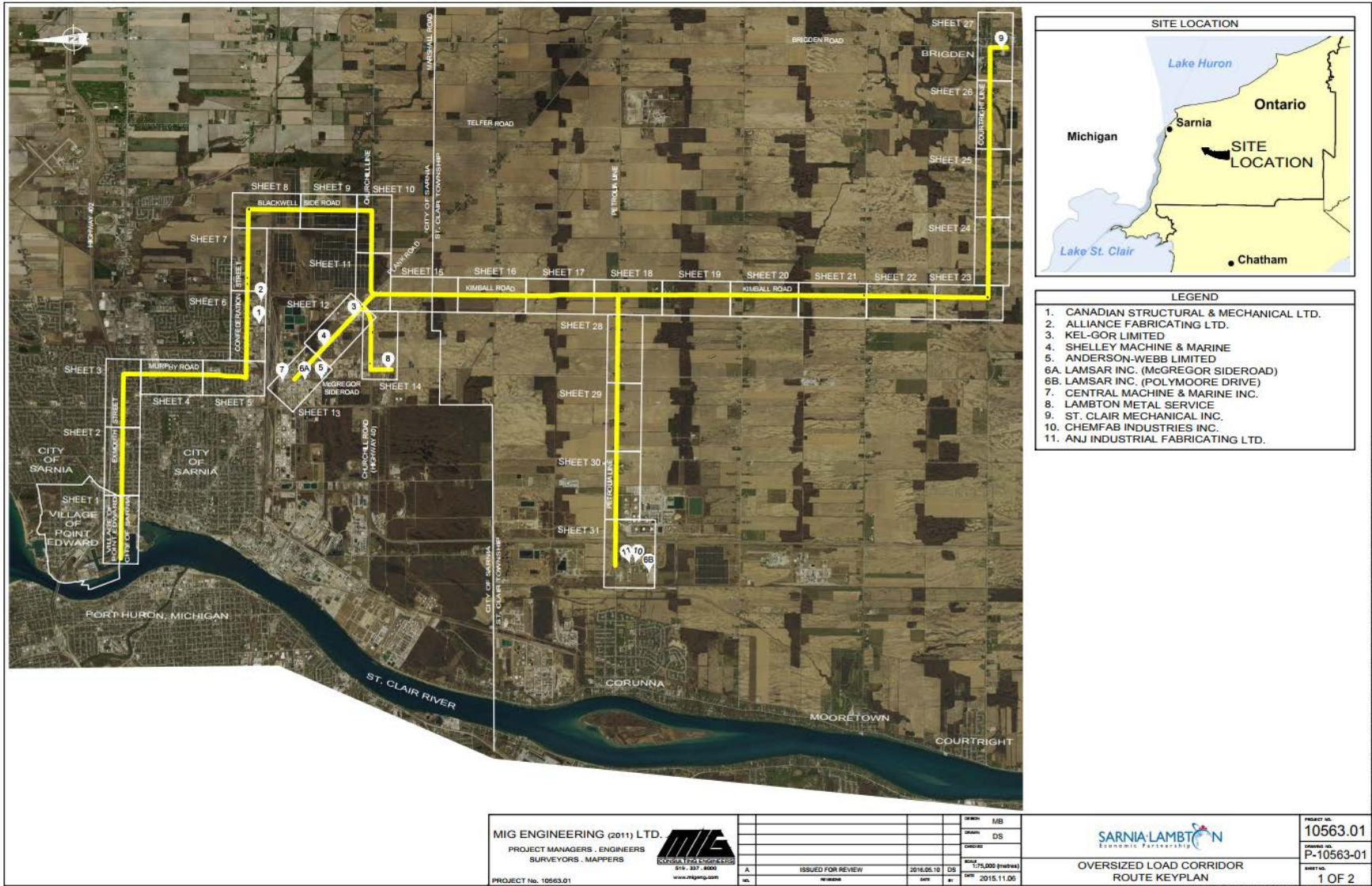
In all cases, the positive Net Present Value, Internal Rate of Return (IRR) and Cost-Benefit Ratio all identify that the project remains a desirable investment within the parameter range tested.

## **8.0 RESULTS OF THE ANALYSIS**

Based on the analysis completed, the project is a valuable investment in the base case, as well as within the sensitivity ranges tested.

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR**

**APPENDIX 1: OVERSIZED LOAD CORRIDOR ROUTE<sup>4</sup>**



<sup>4</sup> MIG Consulting Engineers (2016). *Oversize Load Corridor Shipping Route Study*. Sarnia, ON

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR****APPENDIX 2: SUPPORTING DATA****CONVERSION COSTS TO CONVERT INVESTMENT COSTS TO ECONOMIC INVESTMENT COSTS**

Raw materials and equipment	0.978	Estimated based on average tariffs for Canada <sup>5</sup>
Labour unskilled	0.8	Estimated economic wage for a semi-competitive labour market <sup>5</sup>
Labour skilled	1	Estimated economic wage for a competitive labour market
Labour specialist	1	Estimated economic wage for a competitive labour market
Works	0.929	30% unskilled labour; 15% skilled labour; 5% specialist labour; 50% Raw Materials

<sup>5</sup> World Trade Organization. (2017, November 4). Tariff Profile [Canada], Retrieved November 4, 2017, from World Trade Organization Statistics Database: <http://stat.wto.org/TariffProfile/WSDBTariffPFView.aspx?Country=CA&Language=F>

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR****INVESTMENT COSTS**

<b>FINANCIAL INVESTMENT COSTS</b>					
	<b>TOTAL</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
<b>A1. Capital Cost</b>	<b>12,236,880</b>	<b>2,428,374</b>	<b>2,200,585</b>	<b>4,904,253</b>	<b>2,703,668</b>
Concept design cost	227,789	227,789	-	-	
Construction	12,009,091	2,200,585	2,200,585	4,904,253	2,703,668
<b>ECONOMIC INVESTMENT COSTS</b>					
	<b>TOTAL</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
<b>A1. Capital Cost</b>	<b>11,381,335</b>	<b>2,271,602</b>	<b>2,043,812</b>	<b>4,554,867</b>	<b>2,511,055</b>
Concept design cost	-	227,789	-	-	
Construction	11,153,546	2,043,812	2,043,812	4,554,867	2,511,055

**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR****COST BENEFIT ANALYSIS BY YEAR**

Details	TOTAL DISCOUNTED	TOTAL	Year 1	Year 2	Year 3	Year 4	Year 5 to Year 30
<b>A. COSTS (\$)</b>							
<b>A1. Capital Cost</b>	<b>8,891,416</b>	<b>11,381,335</b>	<b>2,271,602</b>	<b>2,043,812</b>	<b>4,554,867</b>	<b>2,511,055</b>	<b>-</b>
Concept design cost	207,081	227,789	227,789	-	-	-	-
Construction	8,684,335	11,153,546	2,043,812	2,043,812	4,554,867	2,511,055	-
<b>A. Total COSTS: (A = A1 )</b>	<b>8,891,416</b>	<b>11,381,335</b>	<b>2,271,602</b>	<b>2,043,812</b>	<b>4,554,867</b>	<b>2,511,055</b>	<b>-</b>
<b>B. BENEFITS (\$)</b>							
<b>B1. Users benefits</b>							
Costs savings for users of corridor	594,420	2,470,000	-	-	-	-	95,000
<b>B2. Producer benefits</b>							
Revenue from corridor	-	-	-	-	-	-	-
<b>B3. Indirect benefit</b>							
GDP impact	52,449,394	217,943,674	-	-	-	-	8,382,449
<b>B. Total BENEFITS: (B= B1 + B2 +B3)</b>	<b>53,043,814</b>	<b>220,413,674</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>8,477,449</b>
<b>C. TOTAL NET VALUE (C = B - A): (\$)</b>	<b>44,152,398</b>	<b>209,032,339</b>	<b>- 2,271,602</b>	<b>2,043,812</b>	<b>4,554,867</b>	<b>- 2,511,055</b>	<b>8,477,449</b>
<b>D. Internal Rate of Return (IRR)</b>	<b>43%</b>						
<b>E. Cost-Benefit Ratio</b>	<b>5.97</b>						



**COST-BENEFIT ANALYSIS: SARNIA-LAMBTON OVERSIZED LOAD CORRIDOR**

A1 CAPITAL COST – FROM INVESTMENT TABLE, ADJUSTED TO ECONOMIC INVESTMENT COST – YEARS 1 TO 4

B1 USER BENEFITS – ASSUMED AT 1% OF ADDITIONAL PRODUCTION/SALES ENABLED BY THIS PROJECT AS ESTIMATED IN BUSINESS CASE, YEAR 5 THROUGH 30

B2 PRODUCER BENEFITS – ASSUMED TO BE NEGLIGIBLE

B3 INDIRECT BENEFITS – GDP PER CPCS BUSINESS CASE, TABLE 7-4 PAGE 74. YEAR 5 THROUGH 30

DISCOUNT RATE =10%

# Annex F

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## Glossary of Terms

## **GLOSSARY OF ACRONYMS**

CPCS – Canadian Pacific Consulting Services

FTE – Full Time Equivalent

GDP – Gross Domestic Product

GHG – Greenhouse Gas

MRA RED – Ministry of Agriculture, Food and Rural Affairs Rural Economic Development Program

NRC-IRAP – National Research Council-Industrial Research Assistance Program

NTCF – National Trade Corridors Fund

OLC – Oversized Load Corridor

RoRo – Roll on/Roll off

SLEP -Sarnia Lambton Economic Partnership

SLIA – Sarnia Lambton Industrial Alliance

SMEs - Small & Medium Enterprises