Prepared for the

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December, 2010

Strait of Canso Superport Master Development Plan

AECOM

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Executive Summary

The Strait of Canso Superport Corporation Limited (SCSCL), with funding partners Enterprise Cape Breton Corporation, Nova Scotia Department of Economic & Rural Development, Municipality of the District of Guysborough and the Municipality of the County of Richmond, have partnered to create a unified port master development plan for the Strait of Canso region. The primary goals of the master development plan consist of the following major themes:

- Determine the best form of future port governance
- Develop a realistic market analysis to identify potential terminal opportunities
- Identify potential development sites suitable for terminal development
- Provide a long range vision plan for future expansion of port assets

The master development plan will act as the guideline for future marine operations and expansion in the Strait of Canso region over the next 20 years. The heart of the study was to evaluate the necessary form of port governance required to create a focused marine leadership entity to market the port assets, expand terminal operations and advance the port as the Atlantic Gateway port of choice. The new leadership structure is envisioned as a symbiotic relationship between port management, private terminal operators and local and provincial government stakeholders. The master development plan will act as a guide to make decisions for the entire region.

Report Format

The master development plan includes an inventory of existing terminal assets, overview of existing infrastructure, detailed market analysis, identification of potential deep-water terminal development sites and a broad based implementation program. The report is organized into the following sections:

Executive Summary
1. Introduction
2. Existing Conditions
3. Port Governance
4. Market Analysis
5. Strategic Marketing Plan
6. Potential Terminal Development Sites
7. Preferred Terminal Development Sites
8. Preferred Site Development Considerations
9. Future Terminal Needs Based on Potential Market Opportunities
10. Planning Level Rough Order of Magnitude Cost Estimate
11. Master Plan Implementation Program

The report is organized to reflect the planning process used to create the master development plan. The study started first by reviewing the existing conditions, followed by understanding the market conditions, and once the potential market opportunities were developed, the study focused on evaluating potential terminal development sites for future port expansion. The report also includes a detailed discussion on future port governance options and an implementation program. The following discussion provides an overview of the contents included in the report sections.

The Introduction section provides a background on the purpose of the study, study approach and methodology, focus of the study area, description of the general port setting and jurisdictional boundaries. The Existing Conditions section of the report identifies the public and private terminals, and provides an overview of the regional access and utility infrastructure. The Port Governance section provides a background on the federal port divestiture program, history of the creation of SCSCL, provides an evaluation of options for future port governance, and recommends that SCSCL continues pursuing Canada Port Authority (CPA) status.

The Market Study section discusses the approach and methodology associated with the market analysis, identifies the key markets for Canada by region and import/export trade lanes, and discusses potential markets that could be served by the Strait of Canso. The Strategic Marketing Plan provides a program to target future studies and identifies key terminal operators and shipping lines for development of terminals to serve the potential market opportunities in the Strait of Canso.

The Potential Terminal Development Sites section evaluated potential sites that could be explored for future terminal construction. The Strait of Canso region is characterized by low rolling hills and steep hillside conditions with limited flat terrain adjacent to the waterfront. In addition, much of the readily available flatter terrain has been developed with marine related industrial uses. This section of the report details the efforts to evaluate the natural deep-water areas, identify areas located near sea level, and assess the steepness of the slope areas. The Preferred Terminal Development Sites identifies the four potential development sites available for future port expansion, along with the potential marine land uses appropriate for each site based on the terminal requirements and site characteristics. The Preferred Site Development Considerations discusses the natural resource constraints associated with each of the preferred sites, along with zoning and land ownership considerations that need to be addressed during development of the sites.

The Future Terminal Needs section identifies the physical improvements required to operate each terminal, including wharf configuration, number of berths, cargo conveyance method, cargo storage methods, terminal size and other terminal attributes used for development of the cost estimates. The Cost Estimating section provides a rough order of magnitude cost estimate for each type of terminal identified in the market analysis to meet the potential market opportunities.

The Master Plan Implementation Program provides an overview of the actions necessary to implement the recommendations of the study. Discussions are provided for the following areas: governance structure, port marketing strategy, immediate terminal opportunities, long-term terminal opportunities, and potential developer attraction efforts to promote investment.

Overview of the Recommendations of the Master Development Plan

The following discussion provides an overview summary of the recommendations and objectives outlined in the plan. The Executive Summary is not intended to document the entire technical study, and instead focuses on the relative findings and recommendations. Further detailed analysis, information, and other factors used to support the final recommendations are provided in the relative technical sections of the report.

The Executive Summary is provided to present the major findings and recommendations of the study. The Executive Summary overview provides the relevant findings and recommendations contained in the report from the relevant chapters. The overview of the study recommendations are organized into the following order:

- Port Governance
- Management of Publicly Owned Lands
- Potential Market Opportunities

- Strategic Marketing Program
- Preferred Terminal Development Sites

The individual discussions provide a cursory review of the detailed materials contained in the report. The discussions are followed by goals necessary to implement the concepts provided in the summary. The recommendations and goals of the master development plan are contingent upon SCSCL attaining a governance structure with a source of revenue. In addition, further discussions are necessary with the municipal and provincial governments to establish the preferred regional marine leadership roles. Likewise, future land management decisions will require continued involvement of all stakeholders, especially Nova Scotia Business, Inc. (NSBI).

Port Governance

The SCSCL is in the process of exploring new port governance options to facilitate regional marine leadership within the Strait of Canso. This leadership role is not anticipated to dictate future decisions in the port, but rather act as a consensus builder between the various stakeholders to provide future direction and a local voice to the future development and operation of the port. This master plan is a step in that direction by providing a guideline to identify potential market opportunities and land use suggestions for the future development of the port. The SCSCL Board and other master plan stakeholders have identified four primary governance issues to address in the port master plan. The primary governance issues are listed below:

- What is the best governance structure to access the Harbour dues for local reinvestment?
- What is the best governance structure to market the Strait of Canso?
- What is the best governance structure to implement and advance the recommendations of the port master plan?
- What is the best governance structure to facilitate development of the publicly owned land in the Strait of Canso?

SCSCL is the logical entity to lead the evolution of a new port governance structure for the Strait of Canso.

Since adoption of the Port Divestiture Program, there has not been a strong marine leadership presence in the Strait of Canso. Much of the port's continued success and cargo growth is attributed to organic growth due to the port's regional location in North America, sheltered harbour conditions, year-round ice-free operations, significant deep water and abundant industrial waterfront land areas. The SCSCL Board and other surrounding municipalities see a need for regional leadership to help the port grow, attract new developer interests, provide a focused vision for the future development, and act as the regional marketing arm for the Strait of Canso. Since inception, SCSCL has operated in this capacity to promote the Strait of Canso's public and private terminals for the benefit of the entire region. They have also worked with the Province and local municipalities to attract private marine development to the region.

Under the Canada Marine Act, Transport Canada and Canada Port Authorities (CPA's) are the only agencies authorized to collect Harbour dues. The Federal government originally mandated the Harbour dues for the operation and on-going maintenance of federally owned marine assets. The Harbour dues collected in the Strait of Canso by Transport Canada are significant. In the 2008/2009 fiscal year, approximately $1.2 million in Harbour dues were collected in the port. SCSCL and other regional governmental agencies feel that these fees should be re-invested in the region for an international marketing program to promote trade, maintain existing marine assets, stimulate the creation of new terminal facilities, and other efforts to expand domestic and international trade through the Strait of Canso region.

In 2007, SCSCL made application to Transport Canada to be considered as a CPA. Transport Canada has not approved or denied the application and there is continued dialogue between SCSCL and Transport Canada. A considerable amount of discussion and negotiation remains to be undertaken before CPA status can be granted to the Superport Corporation. However, as one of Canada's largest tonnage ports it is important that SCSCL continue the process to become a CPA. This would place the Strait of Canso Port on a level playing field with other CPA ports that have control of and revenue from their respective Harbour beds. The revenue from Harbour dues is essential to market and develop the Strait of Canso.

The combined marine terminal facilities in the Strait of Canso region have become major players in the national and international market place. Cargo tonnage through the Strait of Canso has rivaled other ports throughout the country for numerous years and has continued to grow. Since 2005, the amount of cargo handled at the Strait of Canso Port per year has been over 30 million tonnes. The cargo base is lead by liquid bulk petroleum products, non-metallic minerals, and aggregate products. In addition to the existing cargo base new major terminals, such as a LNG import terminal and international container terminal, would significantly increase cargo throughput and diversity in the region. The existing and future terminals place the Strait of Canso Port as an important player in Canada's Atlantic Gateway for international trade in North America.

The future success of the Strait of Canso Port is based on seeking designation of CPA status. CPA status will provide the funds necessary to market the port facilities internationally, maintain existing facilities, attract developer interests to the region, expand port facilities, enhance cargo throughput and implement the goals of the port master plan as a focused vision for the future. These additional funds could come from the collection of Harbour dues and the borrowing mechanisms available to CPA's.

For the reasons stated above, modification of the port status to CPA is the preferred organizational structure to continue to operate and expand the marine facilities in the Strait of Canso. The Strait of Canso Superport Corporation is open to suggestions from Transport Canada on a new model that would achieve these same goals. However, in the absence of another defined model discussions should begin around a CPA. The Port Master Plan will provide the framework for on-going discussions with Transport Canada and illustrate the port's commitment to growth. This process will require a considerable amount of time and further negotiations with Transport Canada.

Conversion to CPA status will allow the port to attract additional world-class international terminals and industrial manufacturing to the region to enhance trade. A set of governance goals has been developed by SCSCL to maintain the organizational vision desired for the future. Governance goals for the Strait of Canso include:

- Provide focused marine leadership for the region
- Implement a focused domestic/international marketing strategy
- Guide future development and expedite approval process
- Increased regional trade through development of new marine terminals
- Long-term viability and funding for facility maintenance and future expansion
- Identify possible funding sources for the expanded role
- Implement the recommendations of the port master plan

Attaining CPA status is critical to achieving these goals.

GOAL 1 SCSCL will continue negotiations with Transport Canada to attain status as a CPA.
GOAL 2 SCSCL will approach Enterprise Cape Breton Corporation for funds to negotiate and implement the new governance structure.

Management of Publicly Owned Land

The master development plan provides a framework for assessing potential future terminal development in the Strait of Canso region. Key parcels have been identified that are suitable for future terminal development based on site characteristics, adjacent deep-water and terminal development requirements. Selection of these sites and the development criteria are discussed in the relevant technical studies of this report.

Much of the available industrial land located along and adjacent to the Strait of Canso is publicly held by the local municipalities and various provincial governmental agencies. This creates multiple levels of bureaucracy that may be involved with possible land transactions and private developers. In addition to the multiple agencies involved in reviewing developer proposals, there is a lack of coordinated effort focused on marketing the marine assets in the Strait of Canso for future terminal development. Attraction of potential terminal developers in the Strait of Canso has suffered from this lack of focused local leadership.

In addition to attracting initial developer interest to the region, it is difficult for potential developers to work through the various governmental agencies involved with assessing the land use proposals, transferring land, obtaining permits and collecting information. A local centralized entity could improve the process by acting as the key point of contact for the remaining industrial waterfront parcels in the Strait of Canso.

Creation of a local entity responsible for marketing and managing the potential terminal sites would lead to an accelerated development program and enhance job creation and cargo throughput in the region. Creation of a leadership role for the disposition of waterfront property will also help facilitate implementation of the master development plan.

Another option includes transfer of the key marine parcels to a local entity for focused redevelopment. Similar efforts have been completed in other areas of Nova Scotia to provide more local control over disposition of Crown lands. A specific example of the province transferring Crown land to a local municipality includes redevelopment of a former military base at the Debert Industrial Park.

SCSCL is the agency best suited to lead the discussions on the management of the available industrial waterfront parcels in the Strait of Canso. The SCSCL Board represents a cross section of all stakeholders in the region including involvement of the shipping community, municipal governments, and provincial and federal government.

GOAL 3 SCSCL will lead negotiations for the transfer of management for key provincially owned water front land parcels identified for possible terminal development to a local entity for future developer attraction.

GOAL 4 SCSCL will initiate discussions with the Province of Nova Scotia to investigate the possible transfer of key waterfront Crown land that are identified as potential terminal development sites to a local entity.

Potential Market Opportunities

The market analysis determined the historic cargo trends for national and regional marine traffic. This approach identified all cargo flows through Canada and then focused on the percentage allocation to each region and port to evaluate existing cargo trends applicable to the Strait of Canso region. The market analysis assessed cargo through the private and public terminals. Containerized cargo was not a focus of the market analysis as a detailed analysis has been previously performed for the Maher Melford Terminal (container terminal) partners as a part of their permitting process.

Non-containerized import commodities through the Strait of Canso region are lead by crude oil followed by gasoline/jet fuel and coal. Furthermore, the majority of the imported non-containerized cargo is handled at the private terminals within the Strait of Canso. Non-containerized imports through the region are driven by trade with Africa; Northern European imports have been declining, while Mediterranean sourcing has increased.

Cargo exports through the Strait of Canso region shows strong growth. Crude oil exports are the dominant non-containerized export cargo via the Strait and have been growing strongly since 2002. This export trade is predominately with the US marketplace.

Overall, non-containerized imports through all the Canadian ports have grown at 3.6% annually, while the regional ports of interest, including the ports of Quebec, Strait of Canso, Saint John, Sydney, Montreal and Halifax, have experienced a 3.2% growth annually since 2000. With respect to the regional ports of interest, Quebec is the leading port for non-containerized imports, overtaking Saint John and Strait of Canso since 2005. Crude oil, coal and metallic ores are the key commodities of import via all Canadian ports, but crude oil dominates the non-containerized imports into the regional ports. Northern Europe has historically been the dominant source of imports of non-containerized cargo into the regional ports, with the Mediterranean and Africa growing in importance. Africa is the major source of non-containerized imports into the regional ports, primarily driven by crude oil imports.

Canadian exports of non-containerized cargo have grown at about 3.8% annually since 2000, while non-containerized exports from the regional ports of interest have grown at 5.4% annually over the same time period. The Strait of Canso dominates the non-containerized exports from the regional ports. Coal, ores and minerals are the dominant export cargoes for all Canadian ports, but crude oil and fuel oil are the major non-containerized exports from the regional ports. The United States is the key trading partner.

Continued growth of the existing cargo base is anticipated to be robust following a gradual stabilization of world markets. In addition to the existing commodities flowing through the region, there are opportunities for development of new commodity markets based on pending mining operations in the region as well as possible shifts in logistics trade lanes due to potential economic advantages offered by the Strait of Canso region. These new cargo opportunities consist of the following commodities:

- Export of metallurgical coal
- Dry bulk transshipment terminal serving the Great Lakes region
- Offshore oil field/wind farm support facility

The most immediate market opportunity consists of the potential export of metallurgical coal by Xstrata. The conversion of this opportunity depends upon the ability to barge the coal from the mine location to the Strait of Canso more cost effectively than by transporting the coal by rail to Sydney docks for export internationally. The new mining venture is evaluating this potential barge transfer operation in the Strait. The opportunity presents 2.5-5.0 million tonnes annually of export activity.

An economic assessment was developed for the feasibility to develop a bulk transshipment operation in the Strait of Canso. The concept of a transshipment operation is designed to maximize the water depth available in the region to provide a least cost routing option to consuming industries such as steel operations located at Great Lakes ports with limited water depth. Under the transshipment concept, dry bulk cargo destined for the United States and Canadian Great Lakes ports would be moved via Cape Size vessels into the Strait of Canso, and then moved by smaller Laker class vessels consistent with the limited Seaway depth of 27 feet into the Great Lakes ports for consumption by local industries. Similar options may also benefit the export of cargo from Great Lakes ports through a transshipment terminal with transfer to larger Cape Size vessels.

The logistics cost analysis suggests that transshipment through Quebec is slightly more cost effective than transshipment through the Strait of Canso. Use of a bulk transshipment port at the Strait of Canso is consistently the second most cost effective method to serve the steel and industrial facilities located at the key Great Lakes ports. However, land area for development of transshipment may be more limited at Quebec. Furthermore, on longer Asian routings, the differential between the Strait of Canso and Quebec routings narrows. Given land availability and aggressive pricing, the Strait of Canso may have the opportunity to compete for transshipment cargoes on specific trade routes.

The initial analysis of the transshipment markets through the Great Lakes and the Strait of Canso was assessed on a cursory level. The results of the study indicated that there is a potential opportunity for the Strait of Canso to compete with rail transportation costs associated with existing US East Coast ports. Further detailed market analysis is warranted to identify specific commodities and trade routes. Iron ore and coal commodities represent the higher opportunities for transshipment through the Strait of Canso as well as longer trade routes to regions such as Asia and India.

The third key opportunity is the development of an offshore energy support operation, as well as an offshore wind energy support and manufacturing operation. These opportunities require significant investment in infrastructure and should be pursued with the identified wind energy manufacturers.

Strategic Marketing Program

It is recommended that SCSCL pursue a three-phased marketing program to capture the potential market opportunities. The first Phase of the program should be directed to securing the commodity opportunities identified in the analysis, particularly focusing on the coal export opportunity. This will require continual discussions with Xstrata, focusing on the cost effectiveness of the development of a barge operation from the mine to the Strait of Canso. This will entail contacts with barge operators as well as coordination with a terminal operator at the port. In reality, this focus on a coal export transshipment operation is consistent with the second phase of the market recommendations, which is the development of the transshipment concept and the marketing of this concept to potential terminal operators and investors.

Phase 2 of the marketing strategy involves reaching out to the key shippers and terminal operators involved in these types of facilities to “test the concept”. The next step in the development of a marketing campaign targeted to potential dry bulk transshipment operators/investors is to develop a more detailed market research, including the identification and interviews with the key importers/exporters of dry bulk cargoes at the respective Great Lakes ports. These interviews must focus on an assessment of current logistics patterns now in place (rail vs. direct service), logistics costs, ability to use the Strait of Canso as an inventory control mechanism and transshipment center, seasonality needs, shipment lot size requirements, etc. A documentation of these factors will be required prior to developing a formal marketing campaign to terminal operators/investors.

In addition to developing the more detailed market intelligence on potential transshipment markets, it is recommended that a basic concept plan be developed for the transshipment facility to size the terminal and develop a rough order of magnitude cost estimate. A detailed market analysis and conceptual plan can be used to market the site to potential operators.

Phase 3 of the marketing strategy involves identification of potential users for a terminal facility to support the offshore oil field and wind farm markets. Although the prospects for developing gas fields have declined due to poor field results and reduced natural gas prices, there is a potential for this market to return as demand for product increases. Construction of a new terminal for oil field support may need to be reevaluated as the market recovers and exploration effort returns to the Canadian North Atlantic region. With respect to the offshore oil and natural gas support base operations, the SCSCL should begin discussions with the offshore oil field industry when the market returns over the long-term horizon.

The market analysis also identified an opportunity to import or export wind mill components as a part of the National Renewable Energy Program in Canada. Generally, the existing terminal facilities in the Strait of Canso do not have adequate lay down/storage area to accommodate the large superstructures involved in wind mill components. If this market materializes new terminal facilities would need to be developed to accommodate the large cargo.

Due to the nature of the design and layout of these facilities with a wharf and large open storage yard, these facilities may be combined with other terminal operations such as offshore energy support facilities. The types of activities could be coordinated to complement each other and expand the use of the terminal facilities.

With Daewoo developing a wind mill component manufacturing facility in Trenton, there is potential for attracting export cargo through this facility as well. Further analysis will need to occur to evaluate competition with other surrounding ports and potential logistic costs. It would be beneficial for the Strait of Canso Port to reach out to Daewoo during the early stages of their facility development.

It is recommended that the three phases of the strategic marketing plan be pursued concurrently, and sequentially. The marketing of the dry bulk transshipment terminal to potential operators and investors will require a more in-depth market assessment of the current logistics patterns of potential users, as well as the development of conceptual plans and order of magnitude costs to support a transshipment operation as well as an Omni bulk port to support local coal and mineral export opportunities.

GOAL 5 SCSCL will continue discussions with the Xstrata coal mining consortium to find a mutual opportunity to capture the coal transshipment operations in the Strait of Canso and eventual development of a regional coal transshipment terminal.

GOAL 6 SCSCL will reach out to key dry bulk transshipment operators to test the proposed terminal concept.

GOAL 7 Based on the results of Goal 6, SCSCL will commission a detailed market analysis and conceptual terminal plan for supporting attraction of a private investor to develop and operate a dedicated or third party dry bulk transshipment terminal.

GOAL 8 SCSCL will evaluate market trends over the short term to evaluate the potential for renewed offshore oil field activity. If the market returns, SCSCL will reach out to the key oil field operators to identify potential terminal requirements.

GOAL 9 SCSCL will evaluate market trends over the short term to evaluate the potential for development of offshore wind farm activity. If the market emerges, SCSCL will reach out to the key wind farm operators and regional wind mill equipment manufacturers such as Daewoo to identify potential terminal requirements.

Preferred Terminal Development Sites

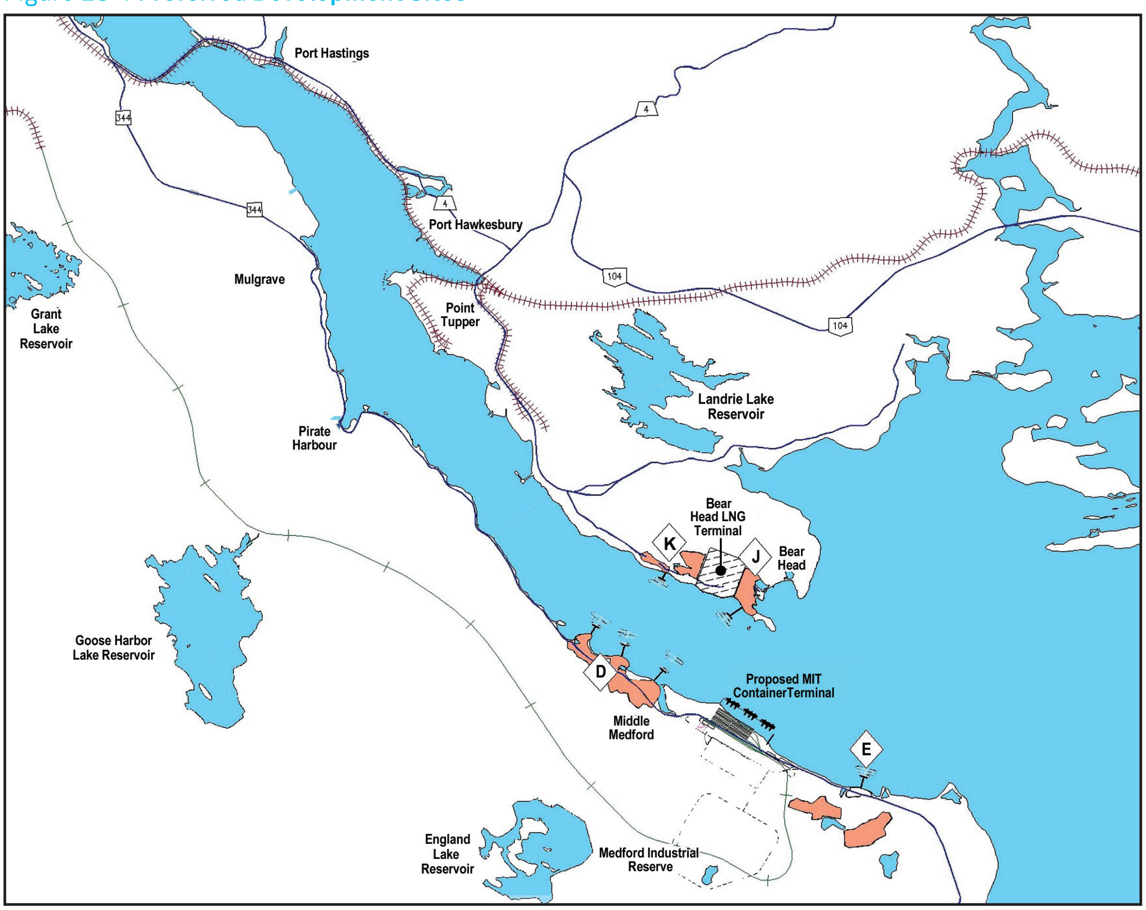
A detailed analysis of the potential terminal development sites was conducted to assess the deep-water locations and site characteristics of the available waterfront parcels within the Strait of Canso region. The analysis included an evaluation of vessel draft requirements, site elevation relative to sea level and a detailed slope analysis to identify flatter terrain and hillside conditions. The analysis also identified areas that were unavailable for development due to existing industrial uses.

The initial analysis reviewed 12 potential terminal development sites. The initial screening process resulted in the identification of four preferred terminal development sites. The details of the evaluation process and findings are detailed in Section 6 and 7 of this report. The following sites were identified as the preferred terminal development sites:

- Site D – Byers Cove
- Site E – Eddy Cove
- Site J – Bear Head
- Site K – Ship Point

Sites D and J are characterized by relatively flatter terrain adjacent to the waterfront. Sites E and K are noted as hillside terrain with flatter portions of land at higher elevations. The general locations of the four preferred development sites are illustrated in Figure ES-1.

Figure ES-1 **Preferred Development Sites**



Sites D and E are located in the vicinity of the Melford Industrial Land Reserve on the mainland, adjacent to the proposed Maher Melford Terminal development site. Sites J and K are located in the Bear Head Industrial Reserve on Cape Breton Island. Further details of each of the specific development sites are included in the technical components of the report.

Site D represents the greatest land asset in the Strait of Canso for future terminal development due to the large contiguous land mass and relatively flat terrain. The site offers approximately 69 hectares of land area and relatively deep water close to shore. Site D can be used for a single terminal activity, or multiple terminals depending on the specific use or area required. Due to the size and flat terrain the following terminal uses have been identified:

Site D	Coal Transshipment Terminal
	General Dry Bulk Transshipment Terminal
	Offshore Oil Field/Alternative Energy Terminal (Optional)

Site E is characterized with a small flat area located close to shore with steep hillsides climbing to flatter terrain at higher elevations above. The site consists of a total land area of approximately 58.0 hectares. The hillside terrain and high elevation storage area makes this site more appropriate for liquid bulk or gas terminal development. Access to tanker level deep water is approximately 325 meters.

Site J is located in the Bear Head Industrial Reserve, adjacent to the Bear Head LNG terminal site. The site offers approximately 22 hectares (54.0 acres) of land area with minimal grading activity. The Handymax class water depths can be accessed at approximately 293 meters off the coast. Site J has been identified as the potential location of an offshore oil field/wind farm support terminal.

Bear Island Road is unpaved as it crosses the LNG terminal site and accesses Site J. Due to potential security issues, this road may need to be relocated in the future to avoid the LNG terminal. There are possible options to relocate the road alignment east of the terminal and tie into roads constructed for the Point Tupper Wind Farm. This will require further coordination with the LNG terminal developers and NSBI to evaluate options and distribute roadway costs.

Site K is located in the Bear Head Industrial Reserve on Cape Breton Island between the NuStar Energy liquid bulk terminal and Bear Head LNG terminal site. The site generally consists of hillside terrain with flatter storage areas at 20.0 to 25.0 meters above sea level. There is a 7.0 hectare area located adjacent to the waterfront, with a 16.0 hectare potential storage area adjacent to the Bear Head LNG terminal site. There is additional flatter area for storage area expansion at 40 meters above sea level on the northern portions of the site. The hillside nature of the terrain with storage areas at higher elevations is best suited to liquid bulk or gas related terminal development. The tanker water depths are available at approximately 250 meters off of the coast.

All four preferred terminal development sites represent critical assets to the future development and expansion of the port. There are limited opportunities for deep-water terminal sites in the Strait of Canso and these areas should be recognized regionally and preserved for future development. As a first step in preserving these assets, SCSCL should coordinate with the province and local municipalities to identify the preferred deep-water terminal sites on the corresponding agency's zoning maps and general plans. This effort may require administrative actions and public hearings to modify the maps and plans.

Preferred terminal development sites D and E are located in the Melford Industrial Land Reserve. The sites include mixed industrial and residential zoning designations, as well as land ownership controlled by the province, municipalities and private ownership. Future terminal development will require re-zoning the parcels to allow for port industrial land uses and potential lot consolidation and acquisition.

Due to the value offered by the large contiguous flat terrain associated with Site D, the plan recommends a focused priority on rezoning this land area and acquiring properties as they become available on the open market. As developer interests are attracted to the site, consolidation and acquisition plans may need to be accelerated.

Site E offers less immediate opportunities for development of a liquid bulk terminal or oil refinery in the short-term horizon. However, the site should be re-zoned and designated for future deep-water port uses with the local agencies.

Sites J and K are located in the Bear Head Industrial Reserve and are entirely owned by NSBI. The parcels are also zoned for port industrial uses. In this case SCSCL will need to coordinate with NSBI to preserve the sites for future deep-water port uses.

GOAL 10 SCSCL should coordinate with the local municipalities and the provincial government to preserve the four preferred terminal development sites as deep-water port expansion areas and designate them on their respective general plan documents.

GOAL 11 SCSCL should initiate discussions with the Municipality of the District of Guysborough to request rezoning of the parcels on Site D for industrial land uses.

GOAL 12 SCSCL should work with government departments and other local municipalities to acquire privately owned parcels within Site D as they become available on the open market. This will require identification of possible funding sources for property acquisition.

GOAL 13 SCSCL should coordinate with NSBI to market the preferred development sites consistent with the terminal recommendations of the master development plan, including:

Site D	Coal Transshipment Terminal General Dry Bulk Transshipment Terminal Offshore Oil Field/Alternative Energy Terminal (Optional)
Site E	Liquid Bulk Petroleum Terminal
Site J	Offshore Oil Field/Alternative Energy Terminal (Preferred)
Site K	Liquid Bulk Petroleum Terminal

1.0 Introduction

1.1 Purpose

The Strait of Canso Superport Corporation Limited (SCSCL), along with funding partners Enterprise Cape Breton Corporation, the Nova Scotia Department of Economic & Rural Development, Municipality of the District of Guysborough, and the Municipality of the County of Richmond, have partnered to create a unified port master development plan for the Strait of Canso region. The primary goals of the master development plan consist of the following major themes:

- Determine the best form of future port governance,
- Develop a realistic market analysis to identify potential terminal opportunities,
- Identify potential development sites suitable for terminal development, and
- Provide a long range vision plan for future expansion of port assets.

A previous study effort was attempted in 2009 but never reached completion. Some sections of that previous study were found to have credibility such as the existing utility infrastructure and terminal inventory discussions. SCSCL decided to continue the master development plan process and retained AECOM to perform a focused study based on new analysis. The purpose of the new master development plan was to focus on the primary goals identified above to develop a Port Master Plan that will guide the planning process through 2030.

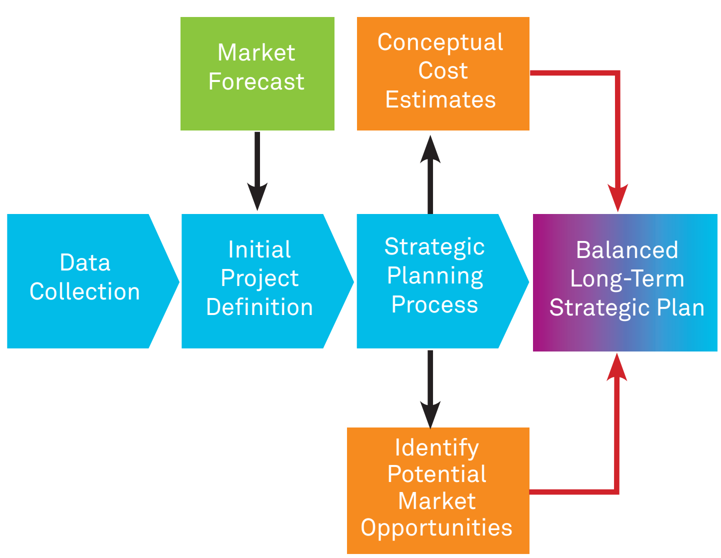
The current planning effort with AECOM involved an interactive process between SCSCL staff and the consultant team. Information and data was collected during the project and technical studies were reviewed with the Superport Corporation staff and Board members throughout the course of the project. Comments were received and incorporated into the studies to create a development plan that was validated throughout the planning process.

1.2 Approach and Methodology

This section provides a general overview of the project approach and methodology. Additional specific details of the approach and methodology are contained in each of the technical report sections.

The port master development plan was envisioned as a focused market-driven effort to address the future development of the existing public terminals and readily available provincial industrial waterfront land areas. The resulting plan creates a balanced long-term strategic plan based on realistic expectations and goals. The development plan will also attempt to identify potential funding sources and port governance structure necessary to implement the goals of the planning study.

Figure 1-1 **Port Master Development Process**



Generally, the study occurred over an eight month period that involved a cycle of data collection, analysis, and technical studies followed by review meetings to reach a mutual consensus on concepts and other critical decisions made throughout the planning study. Review meetings were conducted with Superport Corporation staff and Board members either in person or remotely using WebEx technology at regular intervals. A schematic image of the general port master development process is provided in Figure 1-1 on the previous page.

Discussion materials were presented in PowerPoint, technical reports, drawings/sketches, and technical white papers. The materials were presented at review meetings or interim review meetings, and summarized in meeting minutes. The content and results of these meetings are summarized in this report.

1.3 Focus of Update and Completion

From the initial meetings with the Superport Corporation staff and Board members, the focus of the update and completion of the development plan has been directed at the public terminals and available land areas controlled by the Province of Nova Scotia. The port operations within the Strait of Canso are a mixture of public and private terminal facilities. SCSCL does not have control over the private terminal areas and stressed the importance of their continued partnership with the private operators in the Strait of Canso. The study provides an overview of the private terminal operations for background information only. The focus on changing facilities and potential terminal expansions are directed at the public terminals and land areas under the control of the province.

Another focus of the development plan update and completion is to provide recommendations for a modified regional port governance structure. The Board has reiterated the importance of developing a new regional governance structure to promote and expand marine operations and private investment in the port. There is an overlap of jurisdictional boundaries and rights that has hindered development in the region in the past. Development of a regional port governance structure would also promote a unified vision for development throughout the Strait of Canso.

The market analysis was prepared with an emphasis on developing a true picture of the realistic cargo opportunities anticipated in this region. The analysis relies on the analysis of cargo trends, regional port competition, and interviews with regional business interests and other industry accepted practices. There has been extensive analysis completed by the private sector on the emerging potential container market in this region for the proposed Maher Melford Terminal. The market analysis, which forms part of this report, did not address this opportunity further due to the recent studies completed by Melford International Terminal. The market analysis focused on general non-container cargo trends.

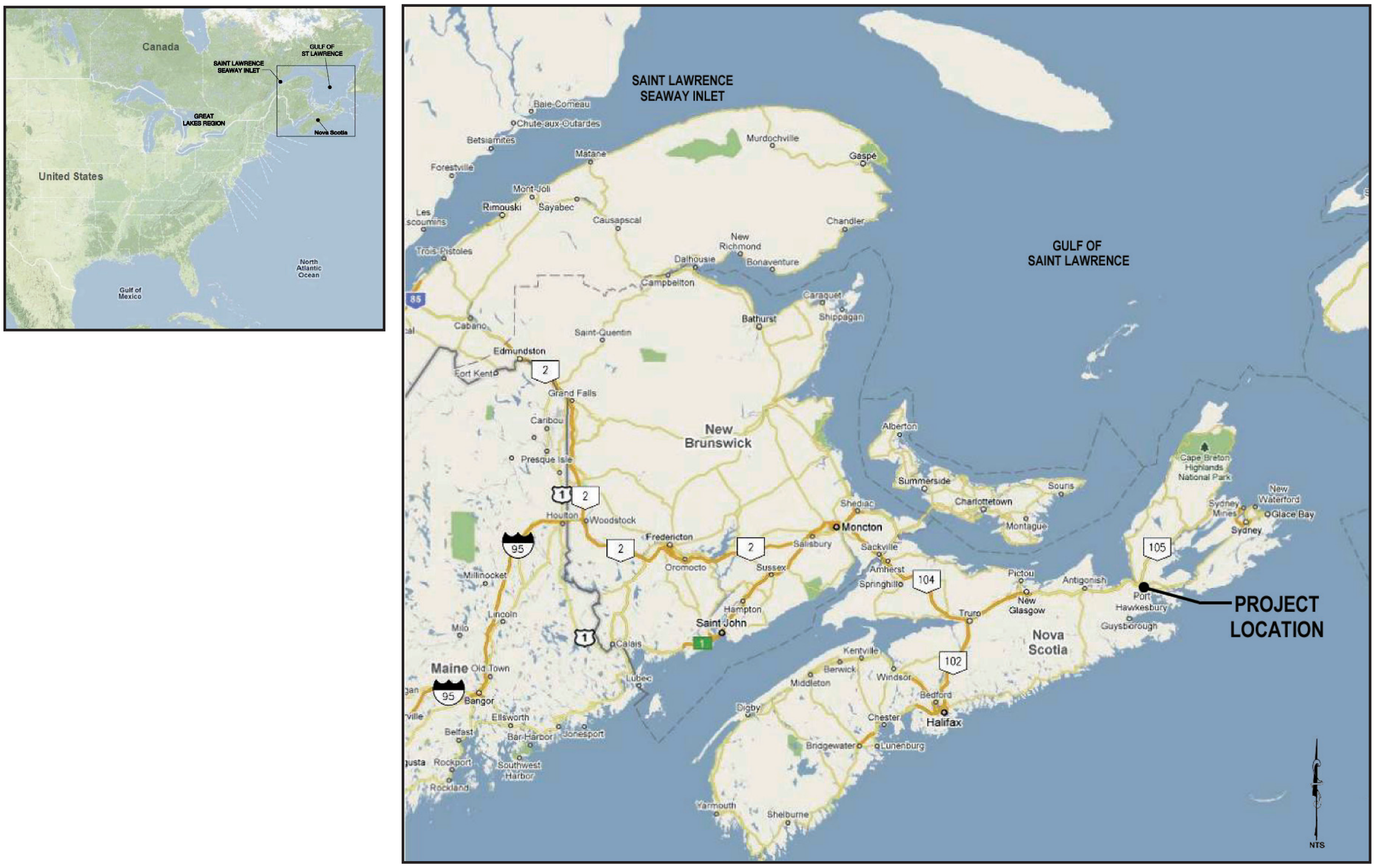
The details of the approach, methodology and findings of these focused areas of study are addressed in the subsequent sections of this report.

1.4 General Description of Port Setting and Jurisdictional Boundaries

The Strait of Canso is generally located on the east coast of Canada in a natural deep-water inlet located on the Atlantic Ocean in the northern portion of Nova Scotia with the mainland portion on the western side of the waterway, and Cape Breton Island on the east. The Strait passes between mainland Nova Scotia and Cape Breton Island. The Canso Causeway was constructed at the northern end of the Strait to connect mainland Nova Scotia with Cape Breton Island. The Causeway provides vehicular and rail access to the island, and provides a lock system to access St. Georges Bay and the Gulf of St. Lawrence. In addition to providing access to the island, the causeway construction has acted as a barrier to winter icing conditions prevalent in the Gulf of St. Lawrence and allows year-round ice-free marine operations within the Strait of Canso.

The surrounding major land masses in the region consist of the provinces of Newfoundland and Labrador to the north and east, Prince Edward Island, New Brunswick and Quebec to the west, and the US New England Seaboard to the

Figure 1-2 **Strait of Canso Regional and Location Maps**

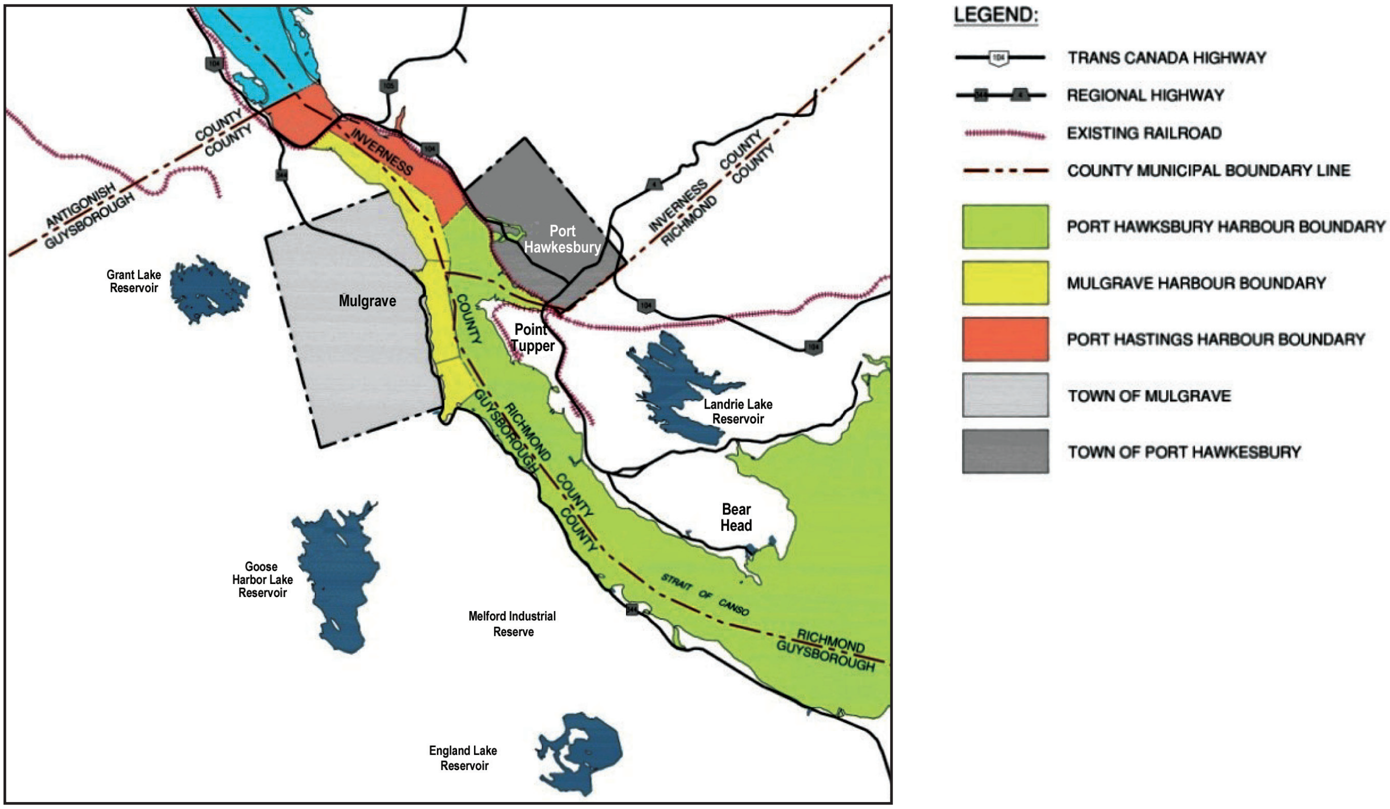


southwest. The surrounding waterways consist of the Atlantic Ocean and Chedabucto Bay to the south, St. Georges Bay and the Gulf of St. Lawrence to the northwest, with the St. Lawrence Seaway inlet located to the far northwest. A regional map is provided in Figure 1-2 to depict the general location of the port and surrounding area.

The Strait of Canso region is located within the province of Nova Scotia and adjacent to four Municipal units and two towns. These include the Municipality of the District of Guysborough on the western shores of the Strait; the Municipality of the County of Inverness on Cape Breton Island, generally north of the Town of Port Hawkesbury; the Municipality of the County of Richmond, generally south of the Town of Port Hawkesbury; and the Municipality of the County of Antigonish, which is north of the Municipality of the District of Guysborough boundary. The two towns in the region are the Town of Mulgrave on the west side of the Strait of Canso and the Town of Port Hawkesbury on the east side. In addition to the county and municipal boundaries, the federal government has established port boundaries within the Strait of Canso for the collection of Harbour dues.

The Canadian Government, through Transport Canada, controls the Strait of Canso Harbour bed and collects Harbour dues based on the gross vessel tonnage for each vessel transiting the Strait and transferring cargo within the port. The Harbour bed is defined by three federally designated ports within the Strait of Canso, including the Port of Port Hawkesbury, the Port of Mulgrave, and the Port of Port Hastings. The Port of Port Hawkesbury is the largest of the three ports stretching from Chedabucto Bay to the south to a point just north of Port Hawkesbury. The Port of Mulgrave is located on the west side of the Strait of Canso, from Pirate Harbour on the south, to the Canso Causeway on the north. The Port of Port Hastings is located on the east side of the

Figure 1-3 **Strait of Canso Jurisdictional Boundaries**



channel and generally extends from the northern limits of Port Hawkesbury to beyond the Canso Causeway to the location of the Antigonish and Guysborough County boundary line. The general boundaries for the various jurisdictions are included in Figure 1-3.

Two industrial land reserves are located within the Strait of Canso to promote private industrial development in the region, including the Melford Industrial Land Reserve and the Bear Head Industrial Land Reserve.

The Melford Industrial Land Reserve is the larger of the two areas consisting of over 14,000 acres of land and is located on the west side of the Strait, in the Municipality of the District of Guysborough just south of the Town of Mulgrave. The Melford Industrial Land Reserve is jointly owned and administered by Nova Scotia Business, Inc. (NSBI) and Nova Scotia Department of Natural Resources (DNR). Other government departments involved include Nova Scotia Department of Transportation and Infrastructure Renewal and Nova Scotia Department of Environment. All are engaged in decisions associated with land requests. The Bear Head Industrial Land Reserve is located on the east side of the Strait and is owned and administered by NSBI.

2.0 Existing Conditions

2.1 SCSCL Public Terminal Assets

SCSCL currently operates three terminal facilities in the Strait of Canso region; Mulgrave Marine Terminal, Port Hawkesbury Pier and the Nova Scotia Business Inc. dock in Point Tupper (i.e. former Federal Gypsum wharf). The Mulgrave Marine Terminal and Port Hawkesbury Pier are owned by SCSCL. The former Federal Gypsum wharf is managed under a berthing agreement with NSBI.

The Mulgrave Marine Terminal is the only SCSCL facility used for cargo handling purposes. The Port Hawkesbury Pier and former Federal Gypsum wharf are used for lay berthing purposes.

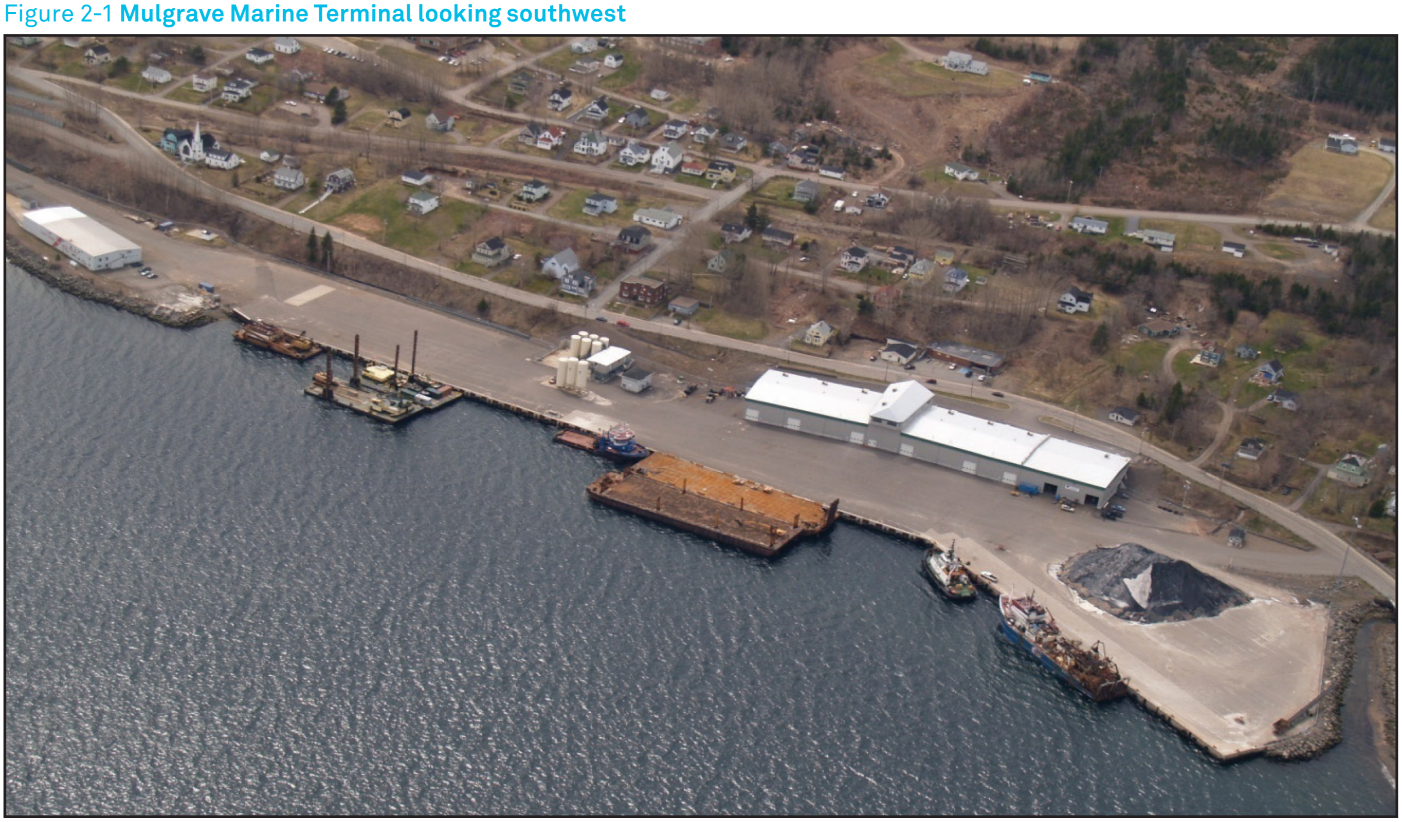
The following discussion provides an overview of the facility attributes and general usage.

2.1.1 Mulgrave Marine Terminal

The 2.8 hectare Mulgrave Marine Terminal is located on the west side of the Strait of Canso, in the Town of Mulgrave. An image of the terminal is provided in Figure 2-1. The general terminal layout consists of a wharf, open storage yard, general warehousing structures, storage silos and a second floor office space that houses SCSCL staff over the main warehouse structure.

The wharf has two berths, which total approximately 500 meters in length. The north berth has a water depth of 10 meters while the south berth has a water depth ranging between 6-10 meters. The wharf length provides operational berthing for two to three vessels depending on vessel length and lay berthing activity. Handymax bulk ships typically call at this facility.

Figure 2-1 **Mulgrave Marine Terminal looking southwest**



The main warehouse area consists of two 10,000 square foot bays, a 7,500 square foot bay, and a 6,500 square foot bay for a total of approximately 34,000 square foot of cargo warehousing. A 15,000 square foot ancillary warehouse is leased to Point Tupper Marine Services for oil spill response equipment storage. There are approximately 1.6 hectares of open storage area along the wharf.

All cargo arrives and departs the Mulgrave Marine Terminal by vessels and/or trucks; there is no rail service at the terminal. Salt is transshipped using barges and deep-sea vessels.

Typical cargoes handled at the terminal in 2009 included:

- Road Salt 349,158 MT
- Aggregate 130,000 MT
- Slag 22,423 MT
- Kraft Pulp 17,254 MT
- Fertilizer (bagged) 3,227 MT

A total of 522,062 metric tonnes (MT) of cargo, including ship and barge activity, were handled in 2009 at Mulgrave Marine Terminal. Road salt is transshipped through the terminal. Aggregates and kraft pulp bales are exported, and the slag and fertilizer products are recent import cargoes. Road salt and aggregates make up a majority of the cargo handled at this terminal.

The demand for road salt is based on winter weather conditions and cargo tonnage can fluctuate year to year based on the severity of the weather. Aggregate cargo comes by truck from the adjacent Rhodena Rock mining operation and is tied directly to construction demand. The port has recently experienced a decline in kraft pulp demand due to worldwide economic conditions, but is expected to return after markets have settled.

The kraft pulp bales are stored in the warehouse facilities to protect them from weather. Kraft paper can be stored at the waterfront warehouse for up to six months. All other cargoes are stored outdoors in open piles and tarped when necessary. Road salt is stored long term on the terminal, typically for five to six months per year. All other cargoes are discharged from the terminal quickly due to the limited terminal area available.

SCSCL provides limited cargo handling equipment at the terminal to assist truck and vessel loading operations. Most vessels discharging cargo use vessel gear for cargo handling. Typical equipment provided includes:

- On-dock mobile hopper/conveyor are used for salt and aggregates (Provided by contractor)
- Front end loader is used for all bulk cargoes (Provided by contractor)
- Forklifts are used for handling kraft pulp bales (Provided by SCSCL)

Road salt arrives by barge and deep sea vessels. Barges are unloaded using front end loaders and a mobile hopper/conveyor system, which operates at a rate of approximately 360 MT per hour. Deep-sea vessels self-unload at a rate of 2,000 MT per hour. Exported road salt is typically transferred into the deep-sea vessels using four front end loaders and a mobile hopper/conveyor system, which operates at a rate of 1,000 to 1,200 MT per hour.

Aggregate arrives at the terminal by truck and is exported on barges. Four front end loaders load material into the mobile hopper/conveyor system with a typical loading rate of 1,000 to 1,200 MT per hour.

Kraft pulp is stored in the main warehouse and has the following capacity measures:

- Bay 2 – 6,500 Square Feet 2,290 MT Capacity
- Bay 3 – 7,500 Square Feet 2,645 MT Capacity
- Bay 4 – 10,000 Square Feet 3,525 MT Capacity

Kraft paper is loaded on vessels using ship cranes at an average rate of 100 MT per hour.

Slag material was a one-time event in 2009. The cargo was discharged from a self-unloading vessel at a rate of 1,000 to 1,200 MT per hour. Front end loaders were then used to directly load the material into trucks for import.

Current Federal safety and security requirements indicate that only 10,000 tonnes of fertilizer can be offloaded at one port at any given time. Therefore, to meet these requirements, some ammonium nitrate fertilizer destined for Prince Edward Island was offloaded at the Mulgrave Marine Terminal; this activity has only occurred once in 2008 and once in 2009. Bagged fertilizer is discharged from self-unloading vessels at a rate of 60 to 70 MT per hour.

2.1.2 Port Hawkesbury Pier

Port Hawkesbury Pier is located on the east side of the Strait of Canso in the Town of Port Hawkesbury. An aerial photo of the pier is provided in Figure 2-2. After Transport Canada transferred the facility to SCSCL, the pier was completely reconstructed. The pier structure is used by local vessels for lay berthing activity. Typical non-winter lay berthing activity is short duration; one to two day stays. During winter months barges can lay at berth for up to six months out of the year.

Figure 2-2 **Port Hawkesbury Pier looking south**

There are a total of 82 meters of berthing length available on the north side of the pier. An additional 63 meters of berth length are available on the south side of the pier and 37 meters on the west side. Water depth along the pier is approximately five to six meters.

Typical vessels and the associated vessel lengths that lay berth at the Port Hawkesbury Pier are provided below:

- Barges — 38 m to 112 meters
- Tugs — 20 m to 40 meters
- Canadian Coast Guard — 14.7 m to 15.2 meters
- Fishing vessels — 7.3 m to 18.3 meters
- Pleasure craft (boats & yachts) — 6.1 m to 57.3 meters

2.1.3 Former Federal Gypsum Wharf (NSBI Lease)

The former Federal Gypsum drywall plant has been closed permanently and is currently owned by Nova Scotia Business, Inc. (NSBI). NSBI is a quasi-governmental agency operated by the province to oversee provincial assets and attract business opportunities to the region. NSBI is leasing the wharf to SCSCL for lay berthing activity. This facility is located on the east side of the Strait of Canso in the Point Tupper area. A photo of the wharf is provided in Figure 2-3.

Figure 2-3 **Former Federal Gypsum Wharf Looking East**

As can be seen in Figure 2-3, there is one berth position along the face of the facility parallel with the Strait of Canso. The berth length is approximately 70 meters, with a water depth of approximately six to seven meters. The shallow water depths limit vessel activity to barges and tug boats. Typical vessel lengths are provided below:

- Barges — 92 to 106 meters
- Tugs — 39 meters

Typical lay berthing activity ranges from a few days to several months, with longer durations during the winter months.

2.2 Private Marine Terminals

The following section provides an overview of the private terminal facilities located and proposed in the Strait of Canso region. This section is provided to give a cursory summary of the private terminals, cargo handled and potential expansion plans where noted.

The master plan study focused on the existing SCSCL facilities and potential expansion options in the region. Additional private terminal facility inventory and operational data is contained in the appendices.

2.2.1 NuStar Energy Liquid Bulk Terminal

NuStar Energy is a liquid bulk terminal located in the Point Tupper area on the east side of the Strait of Canso. This facility is a private terminal that handles import and export of crude oil, propane and finished fuel products. NuStar Energy handles nearly 80% of the cargo tonnage in the Strait of Canso region. Figure 2-4 provides an aerial view of the terminal.

The 27-meter limiting water draft in the Strait of Canso allows some of the world's largest super tankers to call at NuStar's deep-water berths. Super tankers (VLCC and ULCC class) are used to import crude oil to the on-site tank farm and feeder vessels transship the product to US refineries. NuStar has recently received permitting approval to expand their existing facility to provide two new berth positions. Additional tank construction will also be necessary to effectively utilize the planned new berths. The exact timing of this project has not yet been determined.

A majority of the product is transshipped by vessel. Limited amounts of product are transported by truck and rail to the local domestic market. Currently, there is not a regional petroleum pipeline system available for transporting product to local markets or refineries.

NuStar holds development permits to construct a refinery on-site. However, NuStar is primarily interested in moving liquid bulk products and has not expressed an interest in operating a refinery at the site. The permit allows for refinery development by third parties as well. In 2007, Headwaters Group investigated the potential for refinery development at Melford and at NuStar. There are limited options for delivery of finished products to market without significant investment in the installation of a regional pipeline system.

Figure 2-4 **NuStar Energy Liquid Bulk Terminal**

NuStar, through prior agreements obtained by Statia Terminals, has agreements in place to use the salt domes in the Port Malcolm area for natural gas storage. This option has not been exercised due to the cost of developing a distribution pipeline system between the terminal and storage areas. The Strait of Canso region is at the terminus of the natural gas distribution chain for North America and the consumption market in the US Northeast consumer markets.

NuStar is in the process of extending the existing wharf structure to the south to create two additional berthing positions. Environmental permitting for the project has been completed and engineering design for the new structure is underway. Completion of the project will allow simultaneous loading/offloading at multiple berth positions and increase the velocity of the terminal. Expansion of the tank farm operations is also under consideration to expand the storage capacity of the terminal. Combined, these projects will increase the capacity of the existing terminal operations.

2.2.2 ExxonMobil Fractionation Plant

The Exxon/Mobil Fractionation Plant is located on an interior parcel at the NuStar Energy Terminal on land area leased from NuStar. This facility manufactures propane and butane from liquids collected at the Sable Gas Fields. The liquids are transported from the Sable Field to the fractionation plant by pipelines.

Refined gas products are shipped to market by rail cars and trucks. The products are shipped to Canadian and US Northeast consumer markets.

2.2.3 Nova Scotia Power Plant and Coal Terminal

Nova Scotia Power is the regional supplier of electricity and maintains a power plant and coal receiving terminal in the Strait of Canso. The Point Tupper coal generating power station and coal receiving terminal are located in the Point Tupper area directly north of NuStar Energy. An aerial view of the power plant and terminal facility is provided in Figure 2-5.

Figure 2-5 **Nova Scotia Power Plant and Coal Terminal**

Nova Scotia Power constructed the coal import terminal in 2006 after the local coal mines in Sydney were closed. Coal is purchased on the spot market and delivered by ship. In addition to providing coal as an energy source to the local power plant, coal is also transported by rail to the coal-fired power generation plant in Trenton.

The regional population is becoming more socially and environmentally aware of the health implications associated with coal-fired power plants. There is a move underway throughout Canada to shift to alternative energy sources for energy generation. The immediate future looks to be headed towards wood pellets as a fuel source. Locally, biomass and wind farm development are being used as an alternative renewable energy source to supplement the regional demand for electrical power.

2.2.4 NewPage Corporation Port Hawkesbury Paper Mill

The NewPage Port Hawkesbury paper mill is located in Point Tupper between Nova Scotia Power and the former Federal Gypsum Plant. The facility is used for the manufacture of newsprint and high quality glossy supercalendar paper used by the printing industry. Paper production at the NewPage facility serves the Canadian and Northeast US markets. An aerial view of the paper plant and berthing facility is provided in Figure 2-6.

Limited products are transported by water from this facility. Primary waterborne cargo includes imported dry bulk Kaolin that is used in the supercalendar paper production. Most of the raw products used in production are imported to the site by truck. Finished paper products are shipped by truck and rail to the Canadian and Northeastern US markets. International exports are loaded into containers and shipped through the Port of Halifax.

The paper mill industry in Canada is in a state of decline nationally.

Figure 2-6 **NewPage Paper Manufacturing Plant and Wharf**

2.2.5 Former Federal Gypsum Plant

The former Federal Gypsum Plant is located in Point Tupper adjacent to the NewPage Paper Mill and Georgia Pacific gypsum terminal. The plant and warehouse facility was closed after Federal Gypsum filed for bankruptcy protection. NSBI has taken possession of the property and its assets. The land and buildings have recently been leased to Acadia Drywall Supplies Limited for operation of a drywall manufacturing facility. The lease with Acadia Drywall did not include the existing wharf structure. SCSCL is currently leasing the existing wharf from NSBI and providing lay berthing services to local tug boat and barge operators. Further discussion on the SCSCL use of the wharf and aerial photograph is provided in Section 2.1.3.

Louisiana Pacific originally built the gypsum plant and wharf in the late 1980's. US Gypsum acquired the property after Louisiana Pacific had a specialized building product development venture that failed. US Gypsum also ran into difficulty and was subsequently acquired by Federal Gypsum. Traditional gypsum facilities are generally located near regional mining sites and export raw product to regional wallboard manufacturing sites by ship. Federal Gypsum attempted to manufacture the wallboard and ship it finished to regional markets. The model failed in part due to excessive product damage encountered during shipping by truck and the downturn of the US construction market.

Both US Gypsum and Federal Gypsum relied on truck movements for importing waste paper and raw gypsum to the plant. Finished drywall was exported from the plant by truck. Neither operator used the wharf for importing raw materials or for exporting finished products.

2.2.6 Georgia-Pacific Gypsum Terminal

The Georgia-Pacific gypsum terminal is located at the northern end of Point Tupper, adjacent to the former Federal Gypsum Plant. The terminal is used to export raw gypsum materials by ship to regional Georgia-Pacific wallboard manufacturing plants throughout the US. An aerial view of the terminal is shown in Figure 2-7.

Figure 2-7 **Georgia-Pacific Gypsum Terminal**

Gypsum is mined in the surrounding region on Cape Breton Island and trucked to the marine terminal. The mine is approximately 25 miles away from the marine terminal.

There have been past concerns over the projected lifespan of the existing mine based on current consumption patterns. Recent discussions with Georgia-Pacific reveal that there are plans to extend the life of the existing mine and additional new mining operations in the surrounding region will be investigated to continue gypsum export operations in the Strait of Canso for the foreseeable future.

2.2.7 Martin Marietta Materials Aggregate Quarry and Marine Terminal

The Martin Marietta Materials aggregate quarry and marine terminal are located on the west side of the Strait of Canso adjacent to the Canso Causeway. The quarry was originally constructed to facilitate construction of the Causeway and canal locks in the mid-1950's. Figure 2-8 depicts the facility as it exists today.

The quarry operations consist of open pit mining on the top of the hillside and conveying the material down to the lower level adjacent to the wharf. Rock material is removed by blasting operations. Rock product is ground down to the required granular size on site. A series of mobile conveyor systems are used for transporting materials between storage areas and the wharf.

The quarry currently serves the US East Coast and Gulf Coast construction markets. The terminal currently handles approximately 4,000,000 to 5,000,000 tonnes of aggregate products per year. There are terminal upgrades underway to double terminal throughput. Limited opportunities exist for new quarries adjacent to deep water in the region and should help to secure the long-term viability of this operation well into the future.

Figure 2-8 **Martin Marietta Materials Aggregate Quarry and Marine Terminal**

2.2.8 Rhodena Rock Aggregate Quarry

Rhodena Rock operates an aggregate quarry adjacent to Martin Marietta Materials on the west side of the Strait of Canso. Rhodena Rock does not have sufficient direct access to the Strait of Canso to efficiently construct a wharf. To overcome this issue the mined aggregate is trucked to the Mulgrave Marine Terminal for mainly local distribution with PEI being a targeted market area. Annual throughput in 2009 was 100,000 tonnes.

2.2.9 Bear Head LNG Terminal (Partially Constructed)

The partially constructed Bear Head LNG Terminal is located on the eastern portion of the Bear Head Industrial Land Reserve on the east side of the Strait of Canso. The site location for the private terminal is on land acquired from the Province of Nova Scotia through NSBI. All necessary development permits were acquired and construction started in 2007, but was postponed in 2008 due to economic conditions. The project has since been mothballed; however, construction may restart in the future provided favorable conditions exist for the operation. In Figure 2-9, much of the mass grading for the project as well as the tank farm pile foundation has been completed.

The terminal was being constructed for the import of LNG/natural gas to serve the northeast US markets and local domestic markets in Nova Scotia. An existing eight-inch gas line operated by M&NP is located in the vicinity of the terminal for domestic gas distribution. Further investment in new pipeline infrastructure will be necessary to connect the terminal with northeast US consumer markets.

Under the existing land sale agreement with NSBI there are no provisions for reverting the Crown land back to NSBI. It may be appropriate for NSBI to approach the Bear Head LNG developers to discuss potential reversionary actions if terminal development is not anticipated to continue. If an acceptable reversion process can be negotiated, SCSCL and NSBI will need to evaluate possible alternative developments for this site.

Figure 2-9 **Bear Head LNG Terminal (Partially Constructed)**

2.2.10 Melford International Container Terminal (Proposed)

The Maher Melford Terminal (formerly referred to as Melford International Terminal), an international container terminal, is proposed for the eastern portion of the Melford Industrial Land Reserve on the west side of the Strait of Canso. Environmental permits are in place for development of the terminal. The ultimate configuration of the terminal will include a container terminal, intermodal rail yard, container freight station (CFS), and a logistics park.

2.3 Regional Highway System

The Strait of Canso is served by a series of local and regional highways that connect with the national TransCanada Highway system. Route 104 of the TransCanada Highway serves much of northern Nova Scotia and crosses the Canso Causeway to serve Cape Breton Island. An eastern connection to the National Highway system continues through New Brunswick on TransCanada Route 2. TransCanada Route 2 also provides connection to US Interstate Route I-95, which serves the US eastern seaboard areas. Regional Highway 344 runs parallel to the Strait of Canso on the west side of the channel and extends south beyond the Melford Industrial Land Reserve. Regional Highway 4 serves a portion of the Point Tupper area on the east side of the Strait of Canso. The regional highway system is shown in Figure 2-10.

The roadway system appears to maintain adequate capacity to handle the traffic generated from semi-rural residential and industrial land uses found in the region. There are highway improvement projects underway west of the Strait of Canso to widen TransCanada Route 104 and allow for two lanes in each direction along the entire route. Route 104 provides roadway connectivity throughout eastern Canada and the Northeast US. A map of the Canada-US Highway system is provided in Figure 2-11.

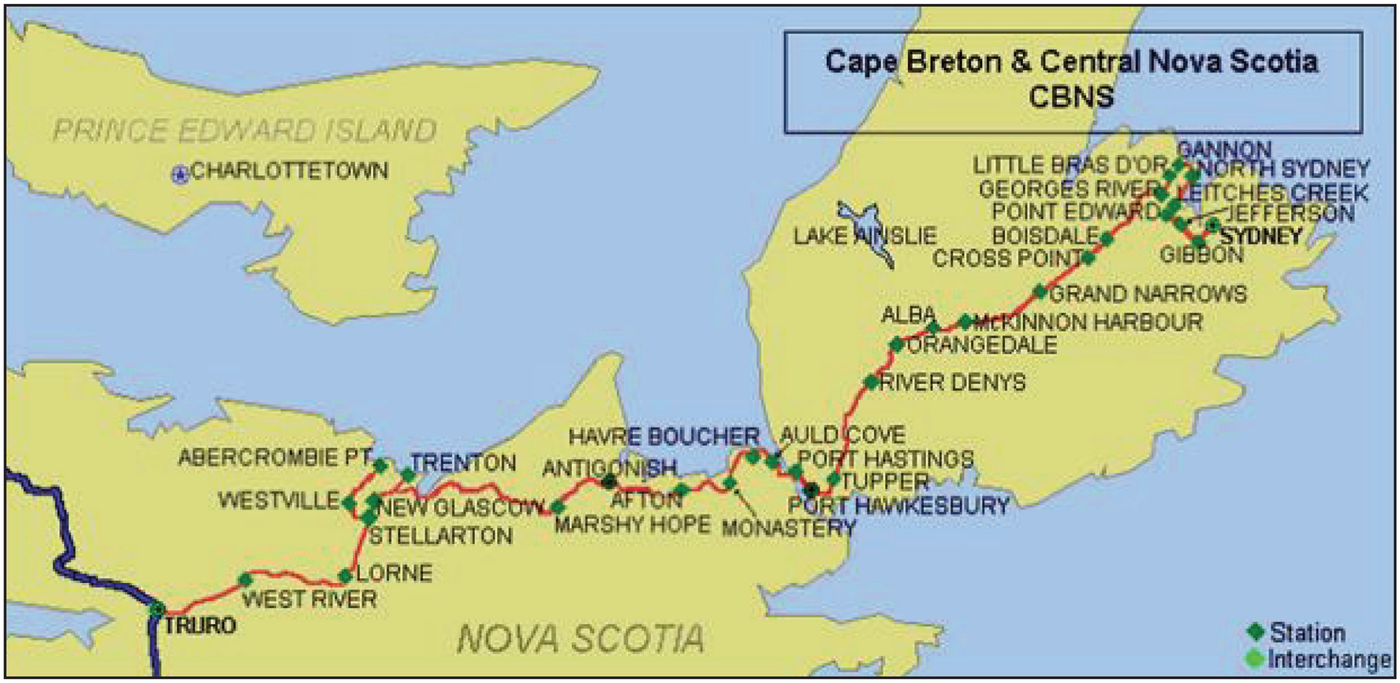
Figure 2-10 **Regional Highway System**

Figure 2-11 **Canada - US Highway System**

2.4 Regional Rail Road System

Rail service in the Strait of Canso and Cape Breton Island regions is provided by Cape Breton and Central Nova Scotia Rail Road (CBCNS) with direct connections with Canadian National Rail Road (CN) mainline track in Truro. The CBCNS rail line extends from Truro to Sydney. The system from the Strait of Canso to Sydney is subsidized by the Nova Scotia provincial government through 2010 with an extension to the agreement currently being negotiated. The CBCNS rail map is shown in Figure 2-12.

Figure 2-12 **CBCNS Rail Map**



The CBCNS tracks are rated at 263,000 pounds per car, which is lower than the 286,000 pounds per car rating on the national rail system found throughout Canada and the US. This limitation is more related to dry bulk cargoes than containerized cargoes. Double stack container trains typically operate at below 263,000 pounds per car. The Canadian federal government has developed a program to financially assist short line rail roads to upgrade their track rating to 286,000 pounds per car.

In addition to the track load capacity issue, there are limited opportunities for adequate siding track lengths to allow unit train switching at Truro. Track sidings in Truro are limited to 6,000 foot train lengths and much of the national trail system provides 10,000 foot track sidings for longer unit trains. CN rail road is working with CBCNS to adjust train operating schedules in the near term and to identify potential siding areas for the long term solution. This issue may impact more robust train operations at the existing or future terminal developments where long unit trains are used or high frequency train switching occurs. The Maher Melford Terminal is anticipated to have lower rail use during the initial container terminal start-up and this issue will need to be addressed as rail activity increases.

Maher Melford Terminal is planning to construct a new rail corridor from their proposed container terminal to the existing CBCNS tracks west of Mulgrave. The segment of track between this point and Truro has been reviewed for double stack container trains. The areas reviewed included steep grades, height obstructions, and other operational concerns. The existing track system appears to be adequate for future double stack train operations.

Limited opportunities for new rail access exist in the Bear Head area due to existing development and hillside conditions along the coastline. Future terminal operations that require on-terminal rail access may need to focus on the Melford Industrial Land Reserve.

The CN Railroad provides rail connectivity throughout Canada and central US markets. A regional map of the track routes in Canada and US regions is provided in Figure 2-13. Further connections into other regional rail roads are provided by connections into the northeast US markets. The track system is rated at 287,000 pounds per car. CN provides fast rail connections to the following cities:

- Montreal 4 Days
- Toronto 5 Days
- Mid-West US/ Chicago 6 Days

In addition to CN, there are a number of other shortline rail roads that can be used to access the US northeast markets. There are no direct service routes to the northeast US markets and some routes require switching between multiple rail road operators. The additional switching operations add service costs and schedule delays, as compared with direct shipping routes. A map of the regional Class-I and shortline rail roads are provided in Figure 2-14.

Figure 2-13 **Canada National Rail Road Map**

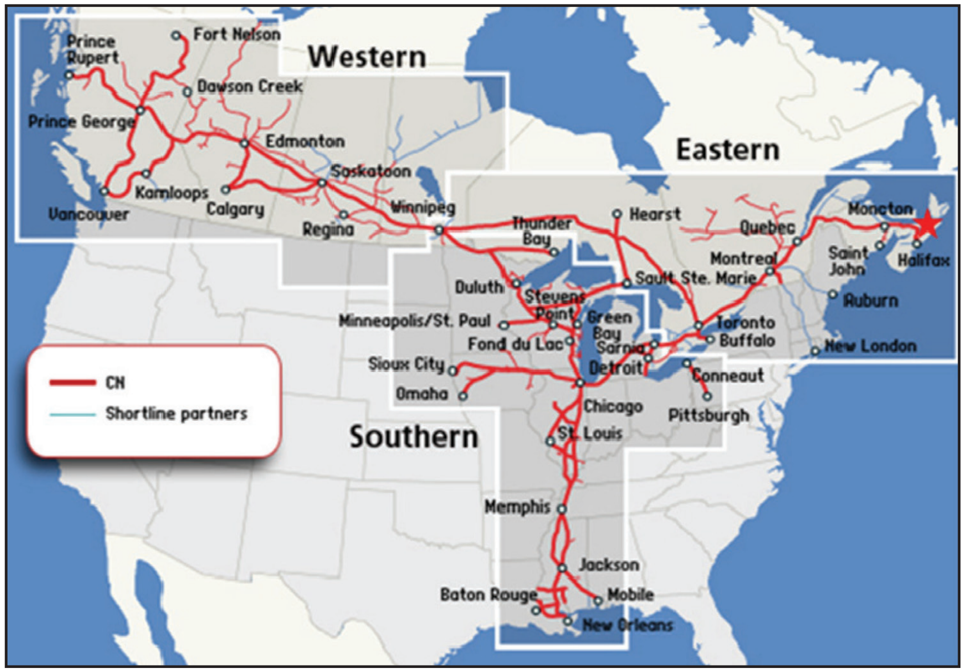
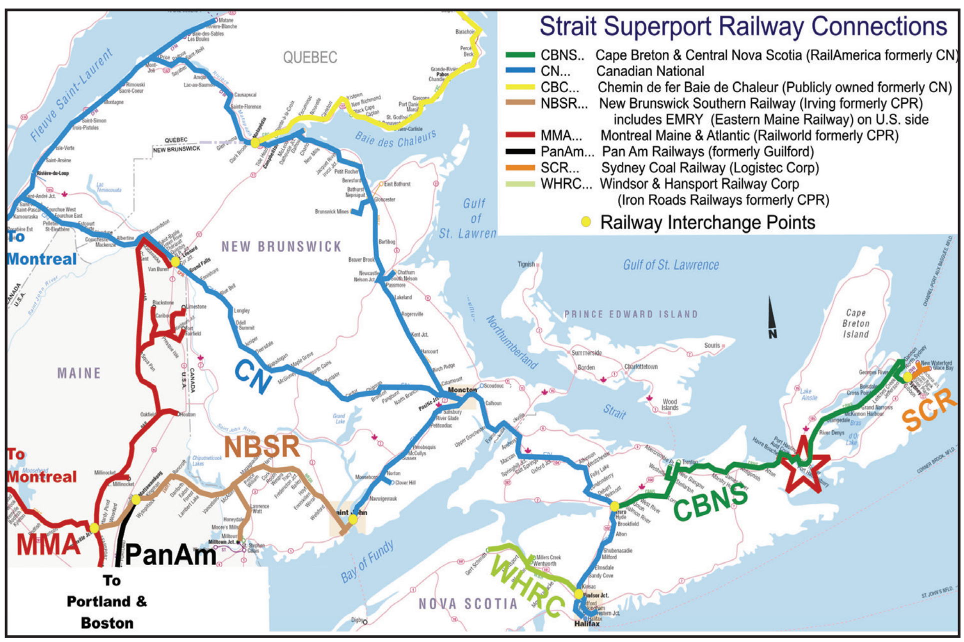


Figure 2-14 **Regional Rail Connections**



PanAm Railways and Montreal Maine and Atlantic Railroad (MMA) provide connections to Portland and Boston for service to the New England region. Travel to Boston requires approximately seven days. Some of the track segments have weight limitations. This system is also prone to slower train speeds and infrequent service schedules. Use of the MMA line requires switching operations with the New Brunswick Southern Railway (NBSR).

Figure 2-15 **Canadian Pacific Railway System Map**

The former Canadian Pacific Railroad route is currently operated by Canadian Pacific Railway Limited (CPR). This former Class-I rail road now operates as a feeder system to connect other Class-I rail roads and provides good connections to New York and Philadelphia via Montreal in about seven days. CPR does not operate east of Montreal and requires a switching operation with CN at Montreal. CPR also serves the Great Lakes region and central Canada. The CPR system map is provided in Figure 2-15.

In conclusion, CN should be used to service eastern Canada and surrounding markets, including the US Midwest areas. Connecting rail road service to US northeast markets will be determined by the market area served. Areas in the northern New England region will be best served by CN, NBSR and PanAm or CN and MMA for service into Portland or Boston areas. Areas further south are best served by CN and CPR via Montreal, or direct connection to Class-I rail roads providing north-south routes, such as NS and CSX via Montreal.

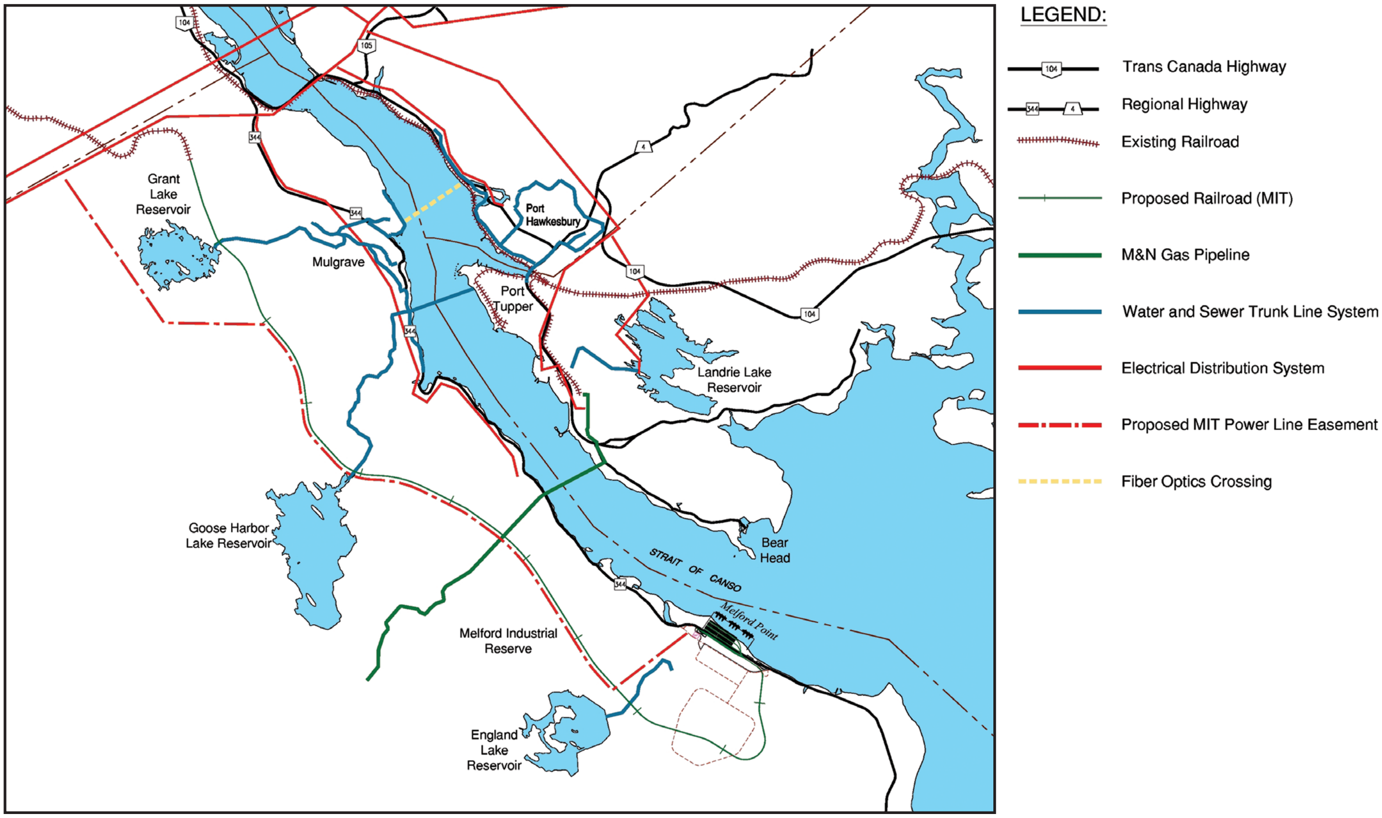
2.5 Regional Utilities

The region surrounding the Strait of Canso is primarily comprised of rural and semi-rural residential uses and industrial facilities, with limited commercial uses on Cape Breton. The residential uses are clustered around the Towns of Mulgrave and Port Hawkesbury. The industrial uses are primarily concentrated on the Point Tupper and Bear Head areas. The regional utility systems reflect these development patterns. Figure 2-16 illustrates the existing regional utility systems for water/sewer, electrical distribution, fiber optics, and major gas lines. A more detailed discussion of the utility infrastructure location and sizing is provided in the Appendix of this report.

It should be noted that the public utility systems are mainly provided for the residential and commercial land uses. Industrial land uses are required to develop their own independent private utility systems for their facility requirements. The exception to this rule is electrical distribution extensions and natural gas. Water and domestic sewer are provided on site by the facility developer.

There are three private utility crossings that are depicted on the map; a fiber optics line, a natural gas liquids line and a natural gas line across the Strait of Canso. The fiber optics line is provided for high-speed communication and is located between Mulgrave and Port Hawkesbury (see yellow line on Figure 2-16). The gas pipelines traverse the channel between the Melford Industrial Land Reserve and Point Tupper (see green line on Figure 2-16). The following sub-sections provide an overview of each of the water, sewer and electrical distribution utility systems and planned extensions.

Figure 2-16 **Existing Regional Utility System Map**



2.5.1 Water and Domestic Sewer

Water and sewer systems are combined in the regional utility maps and due to drawing scale it is difficult to separate the individual trunk lines in the region. The water and sewer systems are generally located in the areas of higher urbanization around Mulgrave and Port Hawkesbury. Industrial users in the Strait of Canso region typically develop their own independent water collection and treatment systems on-site as well as domestic sewer services. Large-scale waste water related to industrial operations requires on-site treatment.

For the purposes of evaluating future port related terminal developments in the Strait of Canso, industrial manufacturing uses were not considered. However, domestic water service and sewer discharge for limited employee base will need to be provided at each future terminal.

As stated previously, there is not a regional water treatment agency in the region for industrial users. Industrial water supply is provided from one of the four regional reservoirs, including: Landrie Lake, Grant Lake, Goose Harbor Lake, and England Lake Reservoirs. Landrie Lake is located behind Bear Head on Cape Breton Island. The other three reservoirs are located on the mainland side of the Strait. Adequate water supply exists in the surrounding lakes for minimal terminal usage. If significant water demand is anticipated for manufacturing, processing or other water dependent uses, additional review of water capacity needs may be required.

Landrie Lake provides potable water to Port Hawkesbury residential and commercial customers. A number of the industrial uses on Point Tupper and Bear Head use water from Landrie Lake. NewPage Corporation paper manufacturing operations in Point Tupper requires significant volumes of water. NewPage accesses water from Landrie Lake, Goose Harbor Lake and Grant Lake reservoirs. A pipeline crosses the Strait of Canso at Point Tupper to supply water to NewPage from Grant and Goose Harbor Lakes.

The industrial users typically construct a water collection system at the adjacent reservoir and pipe the water to their on-site treatment facility. A typical system includes a water intake structure at the selected reservoir, pump station, distribution pipeline, and an on-site water treatment system. The water is used for potable water, irrigation, fire protection and other terminal uses.

Similar to water supply, domestic sewer service is required to handle terminal employee demands. Typical on-site sewer systems consist of a septic system with an adequate disposal field. Waste water from rainfall is also collected, tested and treated prior to release at liquid bulk terminals. All other terminal facilities simply drain rain water runoff back into the channel. Leachate disposal or other liquid waste developed during manufacturing is required to be collected and disposed properly off-site.

2.5.2 Electrical Distribution System

Electrical power generation in the Strait of Canso region is provided by Nova Scotia Power from their power plant located in Point Tupper. This power plant has a generating capacity of 160 Mw. There is a 220 kilowatt hydroelectric power plant on the Black River within the Melford Industrial Land Reserve near the England Lake Reservoir. The recently completed Point Tupper Wind Farm in the Bear Head area generates approximately 21.8 Mw of power for use in the region. Trenton is the location of the next closest power plant in the region.

A new 60 Mw biomass cogeneration power plant has been approved for NewPage in partnership with Nova Scotia Power to supplement the power demand at the NewPage paper plant. Additional spare capacity not used by NewPage would be offered to Nova Scotia Power for use in the regional power grid. NewPage is responsible for the construction and operation of the cogeneration facility as well as the fuel supply.

During negotiations and preliminary design of the Bear Head LNG terminal it was determined that the radial high voltage line in the Point Tupper and Bear Head area did not have adequate power capacity. This required the installation of a new radial power line and substation upgrades to service the LNG terminal. The cost of installing the new 10-kilometer power radial extension and substation upgrades were quite significant at approximately CAN $15 million. Future terminal developers will need to investigate power distribution capacity in the region. Similar power distribution efforts will be necessary for future terminal developments on the west side of the Strait of Canso.

A utility corridor has been identified to provide general utility extensions to the proposed Maher Melford Terminal. Power distribution will be included in the corridor. There is a potential to discuss over sizing these utilities now to accommodate future terminal uses in the Melford area if opportunities for development are identified. Otherwise a separate system will need to be developed independently at a much higher cost. There may be an opportunity to cost share some of these improvements to benefit all parties in the future.

2.5.3 Natural Gas Service

Natural gas is provided in the region with pipeline services. Industrial land uses are provided with gas service from a pipeline operated by M&NP. The M&NP pipeline consists of two 8-inch pipelines; one for natural gas liquids and one for natural gas. The pipelines traverse the channel between the Melford Industrial Land Reserve and Point Tupper. NewPage and Georgia-Pacific currently use the 8-inch gas line for industrial purposes. Future industrial development in the region will need to extend gas service to their development site for natural gas service. Capacity and use of the system will need to be coordinated with M&NP.

3.0 PORT GOVERNANCE

3.0 Port Governance

The Strait of Canso Superport Corporation Limited (SCSCL) is the logical entity to lead the evolution of a new port governance structure for the Strait of Canso.

Since adoption of the Port Divestiture Program, there has not been a strong marine leadership presence in the Strait of Canso. Much of the port's continued success and cargo growth is attributed to organic growth due to the port's regional location in North America, sheltered harbour conditions, year-round ice-free operations, significant deep water and abundant industrial waterfront land areas. The SCSCL Board and other surrounding municipalities see a need for regional leadership to help the port grow, attract new developer interests, provide a focused vision for the future development, and act as the regional marketing arm for the Strait of Canso. Since inception, SCSCL has operated in this capacity to promote the Strait of Canso's public and private terminals for the benefit of the entire region. They have also worked with the Province and local municipalities to attract private marine development to the region.

SCSCL is in the process of exploring new port governance options to facilitate regional marine leadership within the Strait of Canso. This leadership role is not anticipated to dictate future decisions in the port, but rather act as a consensus builder between the various stakeholders to provide future direction and a local voice to the future development and operation of the port. This master plan is a step in that direction by providing a guideline to identify potential market opportunities and land use suggestions for the future development of the port. The SCSCL Board and other master plan stakeholders have identified four primary governance issues to address in the port master plan. The primary governance issues are listed below:

- What is the best governance structure to access the Harbour dues for local reinvestment?
- What is the best governance structure to market the Strait of Canso?
- What is the best governance structure to implement and advance the recommendations of the port master plan?
- What is the best governance structure to facilitate development of the publicly owned land in the Strait of Canso?

This section will provide background on the Canada Marine Act, early formation of the SCSCL, Harbour bed transfer options, and the purpose of modifying the governance status of SCSCL for the benefit of the Strait of Canso region. Changing the governance status for the Strait of Canso will require dedication, perseverance, and cooperation by all levels of government.

3.1 Transport Canada Divestiture Program (Canada Marine Act 1998)

The Canada Marine Act of 1998 was passed in an effort to create a system of Canadian ports that are competitive, efficient and commercially oriented. The Federal government mandated Transport Canada to oversee the divestiture program, manage the Harbour beds, and administer and monitor the new port facilities. During the initial Port Divestiture Program, the Federal government created three general approaches for transferring the Federal port assets:

- Canada Port Authority (CPA) designation
- Regional/Local Port designation
- Remote Ports

3.1.1 Canada Port Authorities

The Canada Marine Act initially identified 8 major ports in the country as mandatory members of a National Ports System due to their perceived strategic importance to Canada's marine sector. These ports were St. John's, Halifax, Saint John, Quebec City, Montreal, Vancouver, Fraser River and Prince Rupert. These ports were designated to become Canada Port Authorities.

Canada Port Authorities (CPA's) typically include critical port infrastructure including container terminals, cruise terminals and bulk cargo handling facilities. CPA's can also include private terminal facilities as part of their cargo tonnage base As a CPA, the port is allowed to borrow against future port revenue projections and utilize other financial instruments to raise capital. They are also allowed to collect Harbour dues and must share a portion of the collected fees with the Federal government. These revenue funds can be used by CPA designated ports to maintain existing port assets, acquire land for expansion, and develop new port facilities.

Since creation of the initial 8 CPA's, additional regional ports have been designated as CPA's. The Canada Port Authorities, which currently exist, are noted in Table 3.2. The Canada Marine Act has provisions to evaluate letters of patent applications from ports to re-designate them to CPA status. Transport Canada has developed criteria to evaluate the letters of patent for designation as a CPA including, but not limited to, the following:

- Financial self-sufficiency
- Strategic significance to Canada's trade
- Links to major modes of transportation
- Diversified traffic

It is through the analysis of these criteria that Transport Canada accepts or rejects applications for CPA status.

3.1.2 Regional/Local Ports

A second category of Regional/Local Ports was identified for transfer to local interest groups. The intent was to have these ports managed by local interests in a manner more responsive to local needs with lower costs and better service. Under the National Marine Policy, ports falling under this designation could apply for the conversion of their Regional/Local Port into a Canada Port Authority. Such an application would have to meet the criteria identified in section 3.1.1.

Regional/Local Ports were typically transferred to not-for-profit organizations for on-going public terminal operations serving their local markets. Many of the facilities were transferred with capital funds to cover upgrades for delayed maintenance improvements at the existing terminal facilities. Some funds were also provided by Transport Canada to subsidize the local ports operating budgets while the new entities established their markets during the initial transition. No financial provisions were made by Transport Canada for on-going facility maintenance or future port expansion at the regional/local designated ports.

3.1.3 Remote Ports

A third category of ports known as Remote Ports was identified. These Remote Ports were selected using criteria that reflected the community's isolation and its reliance on both marine transportation and an existing Transport Canada fixed wharf structure. Typically, these ports were transferred to the Department of Fisheries and Oceans for continued operation.

3.2 Creation of SCSCL and Transfer of Port Assets

3.2.1 Creation of SCSCL and Board

The Strait of Canso Superport Corporation Limited (SCSCL) was incorporated in 1997 to acquire the Mulgrave Marine Terminal and the Port Hawkesbury Pier in anticipation of the pending Canada Marine Act of 1998. The initial discussions between SCSCL and Transport Canada regarding divestiture and transference of the federal assets focused on the physical assets, the Harbour bed and regulatory control of shipping operations within the Strait of Canso.

From the early onset of the Superport Corporation, the group envisioned themselves as a larger part of the Strait of Canso regional community. That vision included a role that included management and operations for the entire port. In anticipation of that role, SCSCL adopted the following mission statement:

"To promote and accommodate Marine Operations in the Strait of Canso for the benefit of the area's economy."

This mission statement was focused on more than the physical assets, and created a larger vision that included using the entire port to act as an economic engine for the region managed by SCSCL. The thirteen member Board of Directors includes a cross section of community leaders from the shipping lines, local municipalities, and other governmental agencies to follow the same principles outlined in the mission statement. Including all factions of the marine and local community in the Board insured that all stakeholders would have a voice in the future of the port. This approach to Board representation is a reflection of the original intent of the negotiations that involved the physical assets, Harbour bed and regulatory control of shipping in the Strait. The Strait of Canso Superport Corporation is governed by a volunteer Board of Directors nominated by the following groups:

- Three individuals nominated by the Shippers
- Two individuals nominated by the Ship Service Providers
- Five individuals nominated by the municipalities bordering the Strait of Canso Port
- One individual nominated by the Province of Nova Scotia
- One individual nominated by the Federal government
- One individual nominated by the Strait Area Chamber of Commerce

In February 2000, Transport Canada transferred the physical assets to SCSCL, which included the Mulgrave Marine Terminal and the Port Hawkesbury Pier. Detailed discussions of the public marine terminal assets are included in Section 2 of this report. The divestiture agreement did not include transfer of the Harbour bed or regulatory control of the shipping operations. The Strait of Canso Port was defined as a Regional/Local Port at this time. SCSCL was one of the earlier ports to become involved in the Federal Divestiture Program. More recent divestitures under this program have included the Harbour bed along with the physical assets.

In addition to transferring the physical assets, Transport Canada provided funds to repair/upgrade both wharf structures as well as initial operating funds upon transfer. Transport Canada provided a total of CAN $6.6 million to conduct critical repairs at both facilities. CAN $2.4 million was provided to demolish and replace the Port Hawkesbury Pier structure. An additional CAN $4.2 million was used to reconstruct the south berth at the Mulgrave Marine Terminal. A ten-year operational budget of CAN $3.9 million was provided to supplement operational cost during initial port start-up over a ten-year period. Operational assistance was provided in recognition of the financial challenge of operating the facilities without the benefit of Harbour dues.

3.2.2 Collection of Harbour Dues

Under the National Marine Act, Transport Canada and CPA's are the only agencies authorized to collect Harbour dues. The Federal government originally mandated the Harbour dues for the operation and on-going maintenance of federally owned marine assets. The Harbour dues collected in the Strait of Canso by Transport Canada are significant as shown in Table 3-1.

Table 3-1 **Harbour Dues Collected in the Strait of Canso**

Fiscal Year	Harbour Dues Revenue
2002/2003	$673,500
2003/2004	$864,574
2004/2005	$980,084
2005/2006	$1,256,341
2007/2008	$1,272,627
2008/2009	$1,179,485

In the 2008/2009 fiscal year Transport Canada collected approximately CAN $1.2 million of Harbour dues revenue from vessels entering the Strait of Canso Port and berthing at the public and private terminals. These fees are transferred to the Federal government's General Revenue Fund. The fees are not generally reinvested in the region to enhance marine activities or maintain terminal facilities in the ports in which the fees are collected. Basically, the port assets were transferred to SCSCL without a source of revenue for port operations or facility maintenance, other than wharfage and berthage. At the Strait of Canso public terminals, the wharfage and berthage fees marginally cover operational costs, but do not allow enough revenue to establish funds to cover maintenance or depreciation costs.

SCSCL feels that these fees should be used in the region for an international marketing program to promote trade, maintain existing marine assets, stimulate the creation of new terminal facilities, and other efforts to expand domestic and international trade through the Strait of Canso region.

3.2.3 Regulatory Control in Canadian Ports

In the Canadian marine system there are two ways in which the Federal government can transfer regulatory control of shipping in a Port:

- Divestiture of the Harbour beds through the Port Divestiture Program
- Granting a port Canada Port Authority status

Port Divestiture Program
The Federal government is willing to divest of the Harbour bed through the Port Divestiture Program. The process would include transferring the Harbour bed to a new entity and the Federal government would then "de-proclaim the Port". This basically means that the port is no longer a port under Federal control and therefore, Harbour dues would no longer apply. This eliminates the major source of revenue for the organization that takes over the Harbour bed. It is illogical to accept responsibility for the Harbour bed without a guaranteed source of revenue. Theoretically, the recipient organization can institute its own set of fees for the port, however, the validity and legality of the new fees would likely be challenged by the shipping interests in the port, especially if little or no service is provided for the fee.

In 2006, the Province of Nova Scotia started negotiations with Transport Canada to acquire the rights to operate the Harbour beds and collect Harbour dues through the Port Divestiture Program. Under the initiative proposed by Nova Scotia, the Strait of Canso Harbour bed would be transferred to the Province and following such a transfer the Province would enter into a management agreement with SCSCL to manage the Harbour bed. Phase 1 and Phase 2 Environmental Assessments were performed as part of the analysis of the potential transfer. The environmental assessments discovered some areas of potential contamination related to past and current marine operations. Under the Port Divestiture Program, the Province would be required to accept the assets and liabilities of the Harbour bed and have some responsibility for potential future environmental cleanup projects. Due to the potential environmental liabilities there is some hesitancy on the part of the Province to continue this process.

Acquiring the Harbour bed through the Divestiture Program is not a practical solution since it will lead to the elimination of Harbour dues, which would limit the possibility of reintroducing a new fee to replace this source of revenue.

Canada Port Authority Status

Granting a port CPA status is the other way to transfer regulatory control of shipping within a port to another entity. This process has generated considerable interest because a Canada Port Authority (CPA) has the legislative authority to charge and collect Harbour dues. Under this scenario the Federal government retains ownership of the Harbour bed and the CPA basically manages these assets. In return the CPA pays the Federal government a predetermined percentage of the fees and Harbour dues it collects.

Under the Canada Marine Act there are no clear provisions for converting a Regional/Local Port to CPA status. As regional ports grow beyond their local markets and become players in the national and international marketplace there is no clear language on how Transport Canada can modify a port's status, regardless of how important that port has become to national and international trade. It is in provincial and national interests that ports grow and expand. As they grow it is essential that Regional/Local Ports be able to evolve into the strategic port designations afforded CPA's.

Throughout the world there are numerous ways in which ports raise money to operate. These range from direct government grants to taxation powers. In Canada the accepted options are limited. For the purpose of examining governance models for the Strait of Canso, only governance models currently accepted in Canada are discussed in this report. The prospect of Transport Canada accepting a new model for the Strait of Canso that affords flexibility not available in other ports is unlikely. Of the options currently available in Canada, CPA status offers the best opportunity for the Superport Corporation to collect revenue to support future activities.

3.3 SCSCL Request for CPA Status

In 2007, SCSCL submitted an application to Transport Canada to be considered as a CPA. Transport Canada has not approved or denied the application and there is continued dialogue between SCSCL and Transport Canada. A considerable amount of discussion and negotiation remains to be undertaken before CPA status can be granted to the Superport Corporation. However, as one of Canada's largest tonnage ports it is important that SCSCL continue the process to become a CPA. This would place the Strait of Canso Port on a level playing field with other CPA ports that have control of and revenue from their respective Harbour beds. The revenue from Harbour dues is essential to market and develop the Strait of Canso.

The combined marine terminal facilities in the Strait of Canso region have become major players in the national and international market place. Cargo tonnage through the Strait of Canso has rivaled other ports throughout the country for numerous years (see Table 3-2) and has continued to grow. The cargo base is lead by liquid bulk petroleum products, non-metallic minerals, and aggregate products. In addition to the existing cargo base, new major terminals, such as a LNG import terminal and international container terminal are under construction/ proposed, which will significantly increase cargo throughput and diversity in the region. The existing and future terminals place the Strait of Canso Port as an important player in Canada's Atlantic Gateway for international trade in North America. Table 3.2 illustrates the tonnage handled at Canada Port Authorities and highlights the strategic importance of the Strait of Canso in Canada's marine sector. It is essential that the Strait of Canso be recognized as strategic in Canada's National Ports System and be afforded Canada Port Authority status.

The future success of the Strait of Canso Port is based on seeking designation of CPA status. CPA status will provide the funds necessary to market the port facilities internationally, maintain existing facilities, attract developer interests to the region, expand port facilities, enhance cargo throughput and implement the goals of the port master plan as a focused vision for the future. These additional funds could come from collection of Harbour dues and the borrowing mechanisms available to CPA's. Negotiations with Transport Canada to become a CPA will take time.

Table 3-2 **Annual Cargo Tonnage through Canadian Ports**

Ports	TOTAL CARGO TONNAGE (In million metric tonnes)					
	2004	2005	2006	2007	2008	2009
Belledune	2.1	2.2	1.8	1.85	2.41	2.63
Fraser River[3]	36.6	38.8	35.9			
Halifax	13.8	13.7	13.7	12.2	10.3	9.65
Hamilton	12.0	12.4	12.6	11.8	11.1	8.36
Montreal	23.6	24.3	25.1	26.0	27.0	23.8
Nanaimo	1.99	1.98	1.87	1.76	1.43	1.53
North Fraser[3]	17.8	16.4	13.8			
Port Alberni	0.97	1.01	1.26	1.26	1.09	1.09
Port Metro Vancouver[2]				127.8	114.6	101.9
Prince Rupert	4.19	4.23	7.57	10.4	10.6	12.2
Quebec	21.8	22.9	23.5	26.8	27.2	22.1
Saguenay	0.391	0.311	0.324	0.288	0.334	0.292
Saint John	26.3	27.5	24.9	27.0	25.6	26.9
Sept-Iles	17.5	22.5	23.5	21.4	22.6	19.8
St. John's	1.62	1.42	1.47	1.48	1.40	1.41
Thunder Bay	8.55	8.20	8.47	8.49	8.07	7.29
Toronto	2.64	2.56	2.15	2.07	1.99	1.62
Trois-Rivieres	2.34	2.48	2.72	2.51	2.61	2.57
Vancouver[3]	73.6	76.5	79.6			
Windsor	5.27	5.47	5.78	5.13	5.22	4.89
Strait of Canso[1]	24.8	32.5	32.7	33.4	31.2	33.5

Notes:
1 - Not a CPA.
2 - Port Metro Vancouver includes the following former CPA's: Vancouver, North Fraser and Fraser River.
3 - CPA's that no longer exist; they combined to form one larger CPA.

Source: Cargo statistics were obtained from the CPA websites and through communication with CPA employees.

3.4 Purpose and Need for CPA Status

As presented in the previous chapters of this section, the Strait of Canso region desires to create a local marine organization that is focused on expanding port operations, marketing the regional marine assets, attracting new terminal development and increasing trade through the region. SCSCL has been acting in this regional capacity unofficially since the organization was created in 1997. SCSCL has filed a request for CPA status in 2007 in recognition of the need to alter their leadership role in the Strait of Canso.

The Strait of Canso Port has grown to become one of the largest ports by tonnage in the country, and the leading port on the east coast of Canada. In 2009 the Strait of Canso handled 33.5 million tonnes of cargo through the public and private terminals. The cargo base has grown despite the lack of local focused leadership in the region. This growth is directly related to the port's regional location in North America, sheltered harbour conditions, year-round ice-free operations, significant deep water and abundant industrial waterfront land areas. Promotion of SCSCL as a CPA will insure continued accelerated growth and maintain the Strait of Canso as Canada's premier Atlantic Trade Gateway.

Expanding this effort will require identification of funding sources to support this new focused role. SCSCL functions on a limited operating budget obtained from revenues provided through collection of wharfage and berthage fees for vessels using the public terminal assets and sub-letting berthage at the Nova Scotia Business, Inc. dock in Point Tupper (i.e. former Federal Gypsum dock). This limited revenue stream is not covering the full costs associated with the long-term operation and maintenance of the public terminal facilities. As a Regional/Local Port, SCSCL is not able to levy fees or taxes, participate in the Harbour dues, or issue revenue bonds necessary to allow them to market the port assets internationally, acquire land for port expansion, or improve the existing marine terminals. To take the port to the next level it will require a focused domestic and international marketing effort and there are no funds available at the municipal or provincial levels to assist in this regard.

SCSCL is an established port organization recognized by the regional community. In addition, the SCSCL Board of Directors is comprised of a balanced representation of the shipping community, municipalities, Provincial and Federal governments. SCSCL has gathered the political support to pursue a change in governance structure and use of the Harbour dues for the advancement of the Strait of Canso region.

For the reasons stated above, modification of the port status to CPA is the preferred organizational structure to continue to operate and expand the marine facilities in the Strait of Canso. The Strait of Canso Superport Corporation is open to suggestions from Transport Canada on a new model that would achieve these same goals. However, in the absence of another defined model discussions should begin around a CPA. The Port Master Plan will provide the framework for on-going discussions with Transport Canada and illustrate the port's commitment to growth. This process will require a considerable amount of time and further negotiations with Transport Canada.

Conversion to CPA status will allow the port to attract additional world-class international terminals and industrial manufacturing to the region to enhance trade. A set of governance goals has been developed by SCSCL to maintain the organizational vision desired for the future. Governance goals for the Strait of Canso include:

- Provide focused marine leadership for the region
- Implement a focused domestic/international marketing strategy
- Guide future development and expedite approval process

- Increase regional trade through development of new marine terminals
- Long-term viability and funding for facility maintenance and future expansion
- Identify possible funding sources for the expanded role
- Implement the recommendations of the port master plan

Attaining CPA status is critical to attaining these goals.

3.5 Management of Publicly Owned Land

There are more than 15,000 acres of publicly owned land adjacent to the Strait of Canso. Unfortunately, there is not a consistent, well-coordinated process of administering the land and dealing with entrepreneurs who are interested in acquiring property to develop industrial projects. Government organizations and departments with provincial mandates too often find themselves in a conflict when trying to adequately promote industrial land in competing jurisdictions within the Province.

There needs to be a locally mandated organization to manage industrial enquiries for land in the Strait of Canso. The Strait of Canso Superport Corporation can play a pivotal role in coordinating this activity. A more cohesive and user-friendly approach to responding to industrial enquiries is critical to the growth of the port.

A broad range of options including, but not limited to, local ownership and control of the property should be considered. Discussions should begin immediately with the Province of Nova Scotia to create an efficient locally based structure to manage industrial land adjacent to the Strait of Canso.

4.0 Market Analysis

This section assesses the market opportunities for the future development of port facilities at the Strait of Canso Superport. The first phase of the analysis consisted of the development of a historical cargo database for the Strait of Canso and cargo flows by Canadian port and commodity. The second phase of the analysis focused on the current importers and exporters that could potentially use the Strait of Canso Superport. This phase included interviews with the importers and exporters, the results of which were used to document current logistics patterns used, and the potential to move cargo through the Strait of Canso Superport. The third phase of the analysis focused on the use of the Superport as a transshipment center for bulk cargoes with an emphasis on US and Canadian Great Lakes ports. The results of these three research phases are provided in the following sections.

4.1 Historical Overview

In this section, the historical cargo flows through Canadian ports is presented, with an emphasis on the traffic flows through Canadian ports that are located in proximity to the Strait of Canso Superport. The focus of the market study is on break bulk and bulk cargoes.

4.1.1 Historical Overview of Non-Containerized Cargo moving through Canadian Ports

The historical cargo flow analysis is based on data provided to Martin Associates by Statistics Canada (or Transport Canada). The databases developed cover the period 2000 through the first six months of 2008. Unfortunately, due to the reporting structure of Statistics Canada, 2009 data is not available, and hence the historical analysis is limited in its usefulness in that the impact of the world recession will not be represented by the historical overview. Nonetheless, the data does provide a setting in which the Strait of Canso Superport operates, and highlights growth commodities, port areas and trading partners.

Figure 4-1 shows that non-containerized imports through all Canadian ports have been relatively stable throughout the 8-year period, hovering around the 100 million tonne level. Between 2000 and 2005, non-containerized cargo at Canadian ports grew at 3.6% annually from 2000-2005, but has been in decline in recent years, and this declining trend has most likely continued through 2009.

Figure 4-1 **Non-Containerized Imported Cargo at All Canadian Ports**

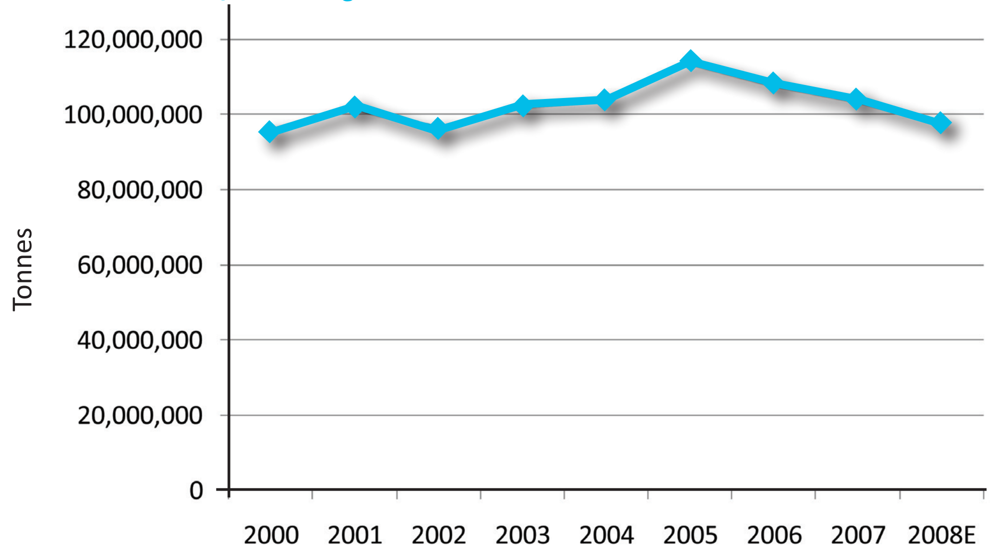


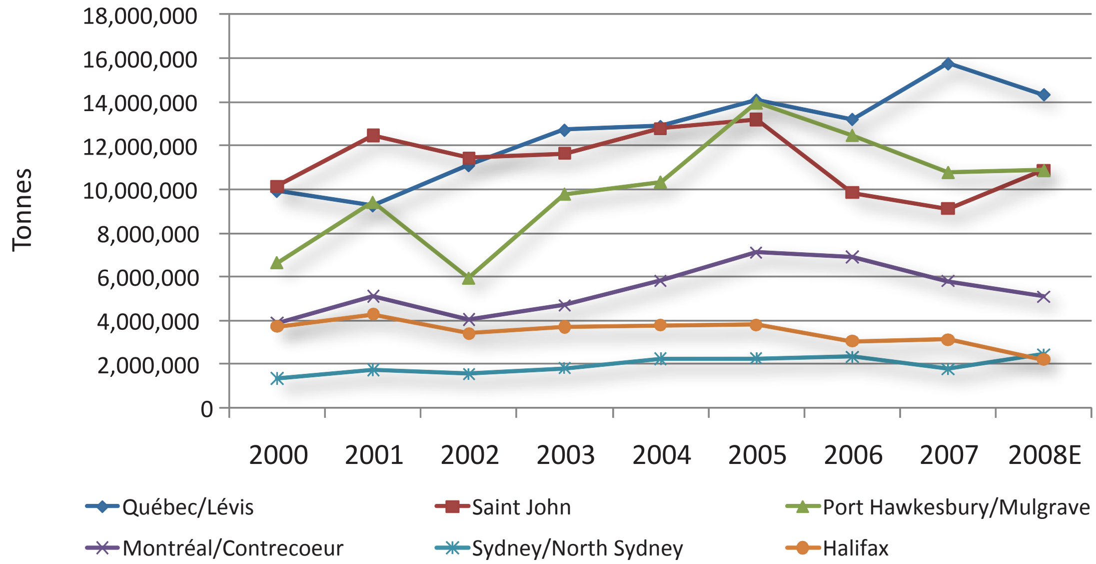
Table 4-2 shows the non-containerized imports by key port. Quebec, Strait of Canso and Saint John are the leaders in handling the non-containerized cargo imports, with Strait of Canso posting the highest compound annual growth rate over the period, 6.34% annually.

Table 4-2 **Historical Non-Containerized Cargo Imports by Port (Tonnes)**

Port	2000	2001	2002	2003	2004	2005	2006	2007	2008E	CAGR
Québec/Lévis	9,930,908	9,273,551	11,109,899	12,722,784	12,891,312	14,092,892	13,218,278	15,754,289	14,344,068	4.70%
Saint John	10,150,079	12,462,884	11,429,461	11,647,393	12,784,534	13,204,531	9,850,851	9,110,008	10,872,978	0.86%
Port Hawkesbury	6,643,555	9,408,073	5,930,321	9,788,070	10,342,622	13,964,214	12,483,707	10,781,577	10,866,646	6.34%
Nanticoke	12,419,126	13,914,929	12,661,028	12,206,406	10,114,303	11,934,309	11,960,090	11,103,976	9,395,182	-3.43%
Other	11,492,020	11,232,415	10,863,653	10,735,302	10,097,856	8,650,808	9,490,355	9,719,045	7,438,786	-5.29%
Metro Vancouver	4,270,712	4,237,952	4,377,336	4,116,506	5,046,281	5,179,160	5,908,142	5,827,022	6,256,578	4.89%
Come-By-Chance	4,474,928	4,905,583	5,014,639	6,103,291	5,947,637	5,365,273	5,382,919	5,315,454	5,845,606	3.40%
Montréal/Contrecoeur	3,889,535	5,109,043	4,035,562	4,695,941	5,818,309	7,118,407	6,910,197	5,797,954	5,085,706	3.41%
Port-Alfred	3,737,995	4,108,526	4,467,416	4,489,447	3,763,257	4,644,543	4,521,975	4,742,019	4,677,412	2.84%
Hamilton	4,965,528	3,923,259	5,145,142	4,819,113	5,644,758	5,791,661	5,539,765	5,132,316	4,237,230	-1.96%
Sault-Ste-Marie	4,653,298	3,475,339	3,524,017	3,187,077	3,293,188	4,426,672	4,366,200	3,514,480	3,436,524	-3.72%
Courtright	3,710,728	4,252,273	3,252,545	3,359,163	2,982,996	3,012,814	2,996,438	2,400,110	2,987,666	-2.67%
Sydney	1,348,122	1,743,845	1,552,754	1,822,614	2,243,734	2,257,465	2,338,901	1,776,469	2,446,556	7.73%
Halifax	3,723,291	4,280,951	3,401,939	3,714,198	3,787,896	3,790,175	3,057,578	3,121,098	2,213,718	-6.29%
Sept-Îles/Pointe-Noire	1,117,809	1,014,717	847,851	1,016,542	1,125,265	1,534,972	1,871,218	1,747,900	1,789,926	6.06%
Belledune	1,194,182	1,411,375	1,331,731	1,449,690	1,351,438	1,627,211	1,192,885	1,255,854	1,440,040	2.37%
Bécancour	1,637,976	1,503,829	1,698,104	1,651,220	968,397	1,449,849	1,441,413	1,362,962	1,224,672	-3.57%
Trois-Rivières	1,228,583	1,427,304	1,452,984	1,288,497	1,662,176	1,649,085	1,650,940	1,356,566	1,175,890	-0.55%
Baie-Comeau	1,626,291	1,381,288	1,628,603	1,572,111	1,571,985	1,564,824	1,553,684	1,649,034	1,108,934	-4.67%
Windsor Ontario	1,964,956	1,272,490	1,568,983	1,314,428	1,584,976	2,113,079	2,217,279	1,636,818	669,042	-12.60%
Port-Cartier	1,465,977	1,574,542	1,210,273	574,874	1,166,697	817,179	360,878	849,641	360,712	-16.08%
Total	**95,645,599**	**101,914,168**	**96,504,241**	**102,274,667**	**104,189,617**	**114,189,123**	**108,313,693**	**103,954,592**	**97,873,872**	**0.29%**

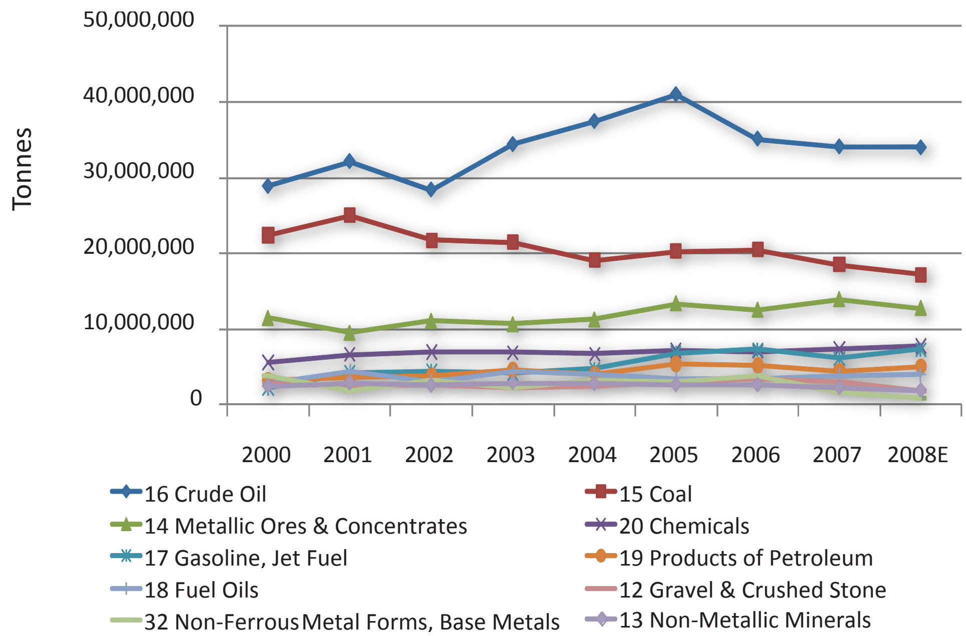
Despite the strong growth of Strait of Canso - Port Hawkesbury, in the latter part of the study period, import tonnage at the Strait of Canso has declined, and the Port of Quebec has become the dominant port in terms of non-containerized import cargo. Figure 4-3 illustrates the imported cargo growth at six regional ports of interest.

Figure 4-3 **Non-Containerized Imports by Regional Ports of Interest**



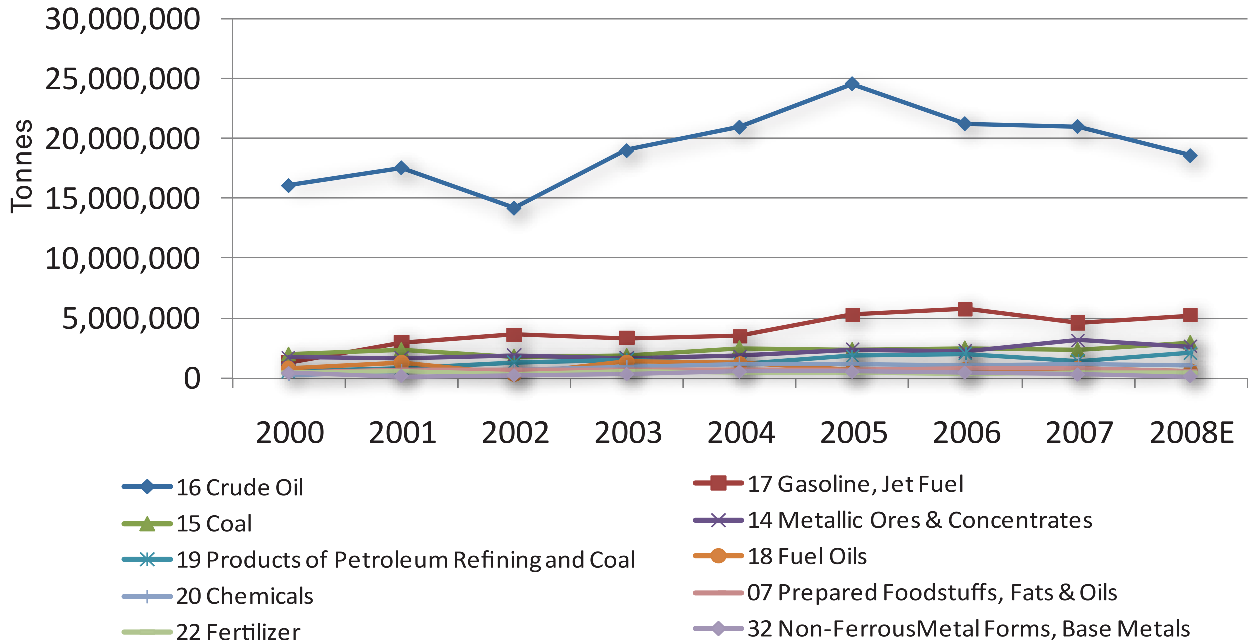
Non-containerized imports through all Canadian ports are driven by crude oil, coal and ores. Crude oil imports have been relatively stable over the period, while coal imports have shown a downward trend, and ore imports have shown a slight increasing trend over time. The historical trend in non-containerized imports by commodity is shown in Figure 4-4.

Figure 4-4 **Non-Containerized Imported Commodities**



With respect to the six regional ports of interest, crude oil imports dominate the non-containerized import markets.

Figure 4-5 **Non-Containerized Imported Commodities at Regional Ports**



Specifically with respect to the Strait of Canso, crude oil has been the major non-containerized import, as shown in Figure 4-6. Furthermore, the majority of the imported non-containerized cargo is handled at the private terminals within the Strait of Canso. These private facilities include NuStar Energy and Martin Marietta.

Figure 4-6 **Non-containerized Imported Commodities at the Strait of Canso**

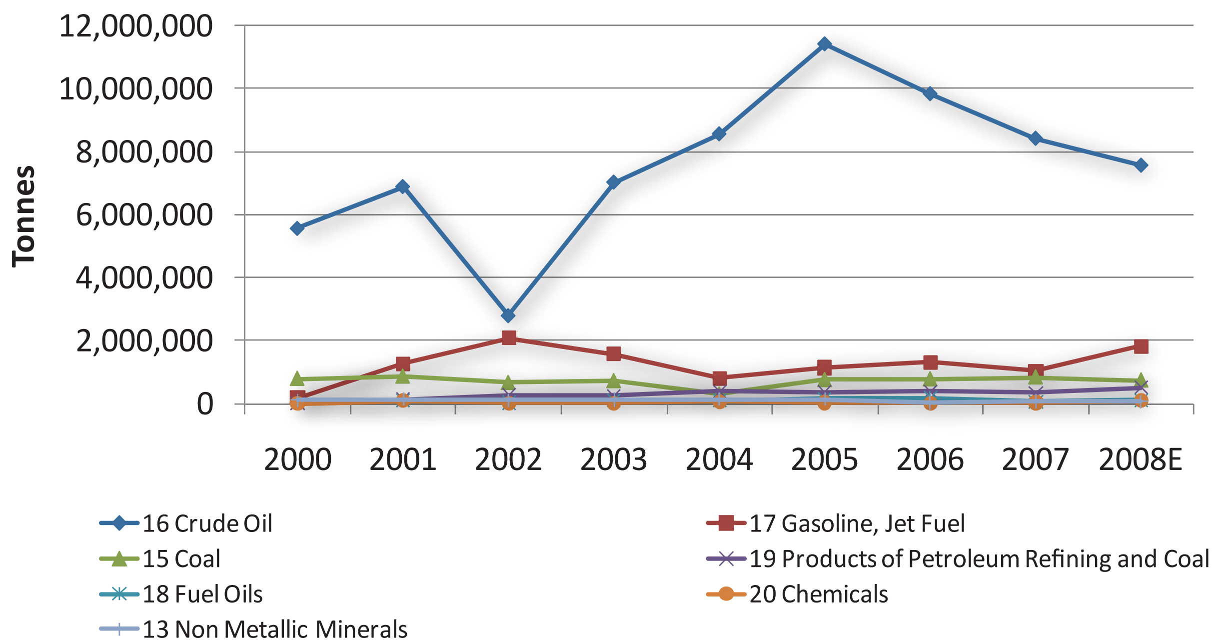
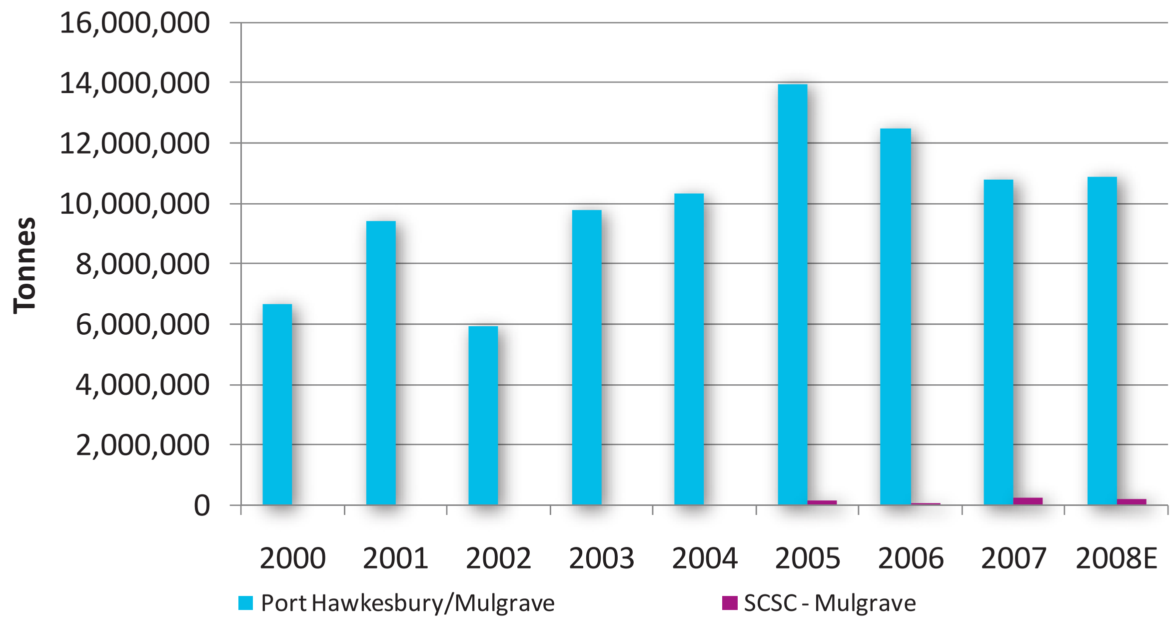
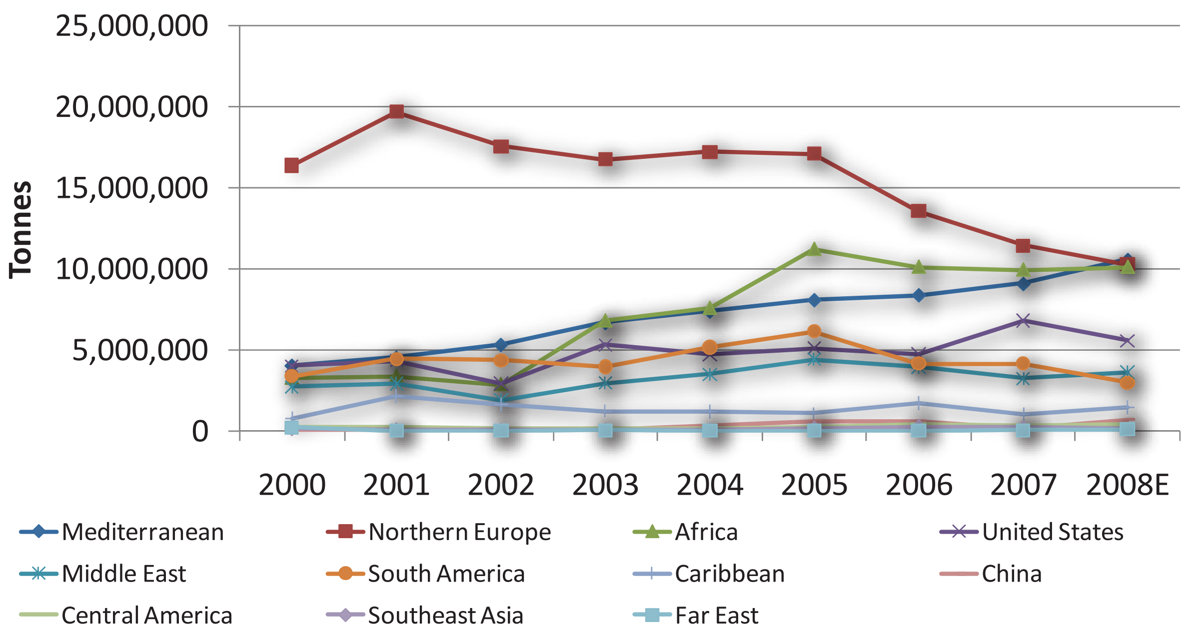


Figure 4-7 **Imported non-containerized cargo at the Private and Public Terminals in the Strait of Canso**



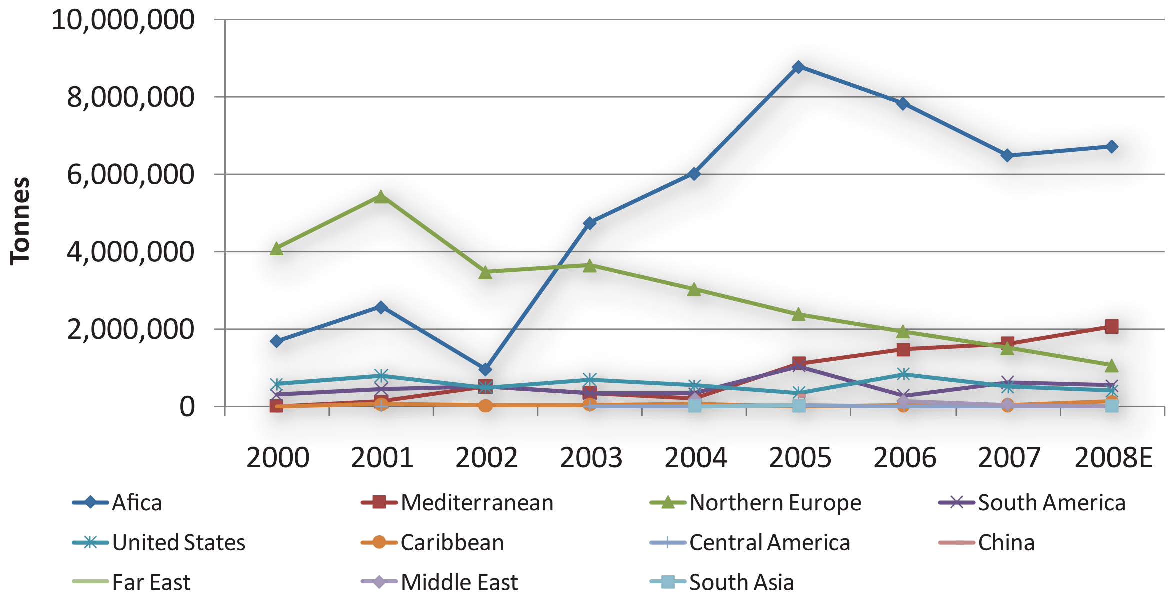
Northern Europe has historically been the dominant source of non-containerized imports through the six regional ports of interest. The Mediterranean and Africa have been gaining share as sources of imported non-containerized cargo into the six regional ports of interest, as shown in Figure 4-8.

Figure 4-8 **Non-Containerized Imported Cargo into the Strait of Canso**



Non-containerized imports through the Strait of Canso are driven by trade with Africa; Northern European imports have been declining, while Mediterranean sourcing has increased at the Strait of Canso, as shown in Figure 4-9.

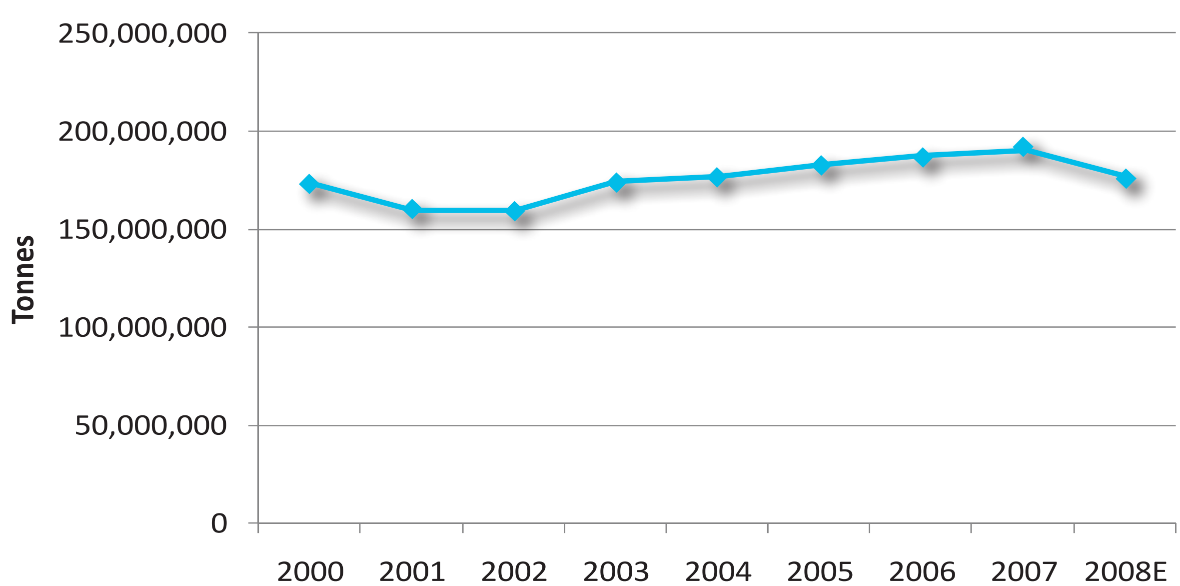
Figure 4-9 **Non-Containerized Imported Cargo into the Strait of Canso**



4.1.2 Non-Containerized Cargo Export Market

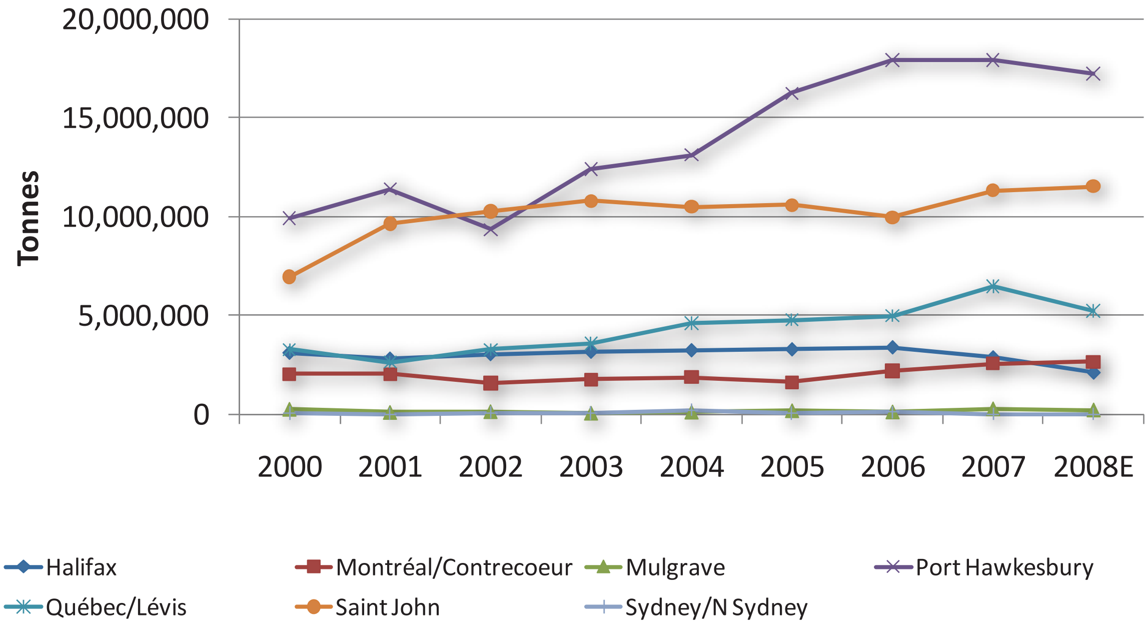
Figure 4-10 shows the non-containerized exports through the regional ports of interest. It is to be noted that due to changes in the definition of ports for export purposes by Statistics Canada, specific ports have been combined in 2008 (i.e. Metro Vancouver), and as a result historical comparisons for all Canadian ports at the port level are more difficult than for the import cargo. However, total non-containerized exports though Canadian ports have demonstrated steady growth through 2002-2007, but the impact of the world recession in early 2008 can be seen on the decline in export tonnage in 2008.

Figure 4-10 **Non-Containerized Exports at Canadian Ports**



With respect to regional ports of interest, Figure 4-11 demonstrates that the Strait of Canso and Port of Saint John have dominated the non-containerized export market in Eastern Canada/Marines.

Figure 4-11 **Non-Containerized Exports at Regional Ports of Interest**



As shown in Figure 4-12, the top 10 non-containerized exports through all Canadian ports have been led by ores and coal; crude oil shipments increased since 2001, but leveled off in 2008.

Figure 4-12 **Leading Non-containerized Exports through All Canadian Ports**

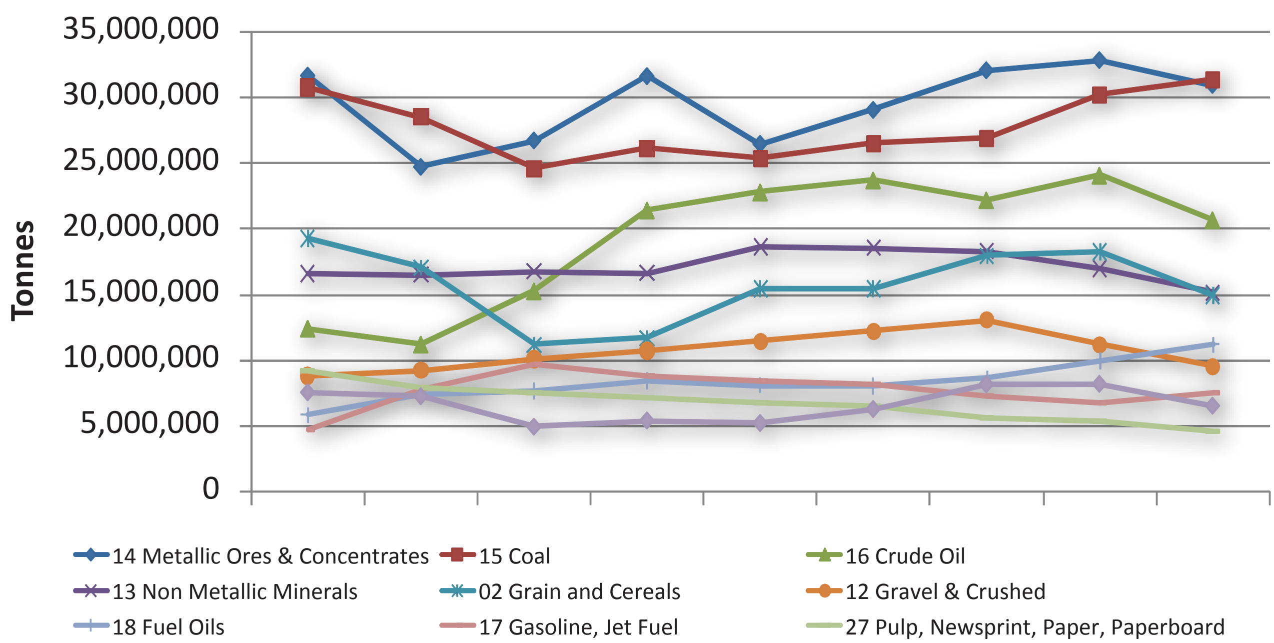
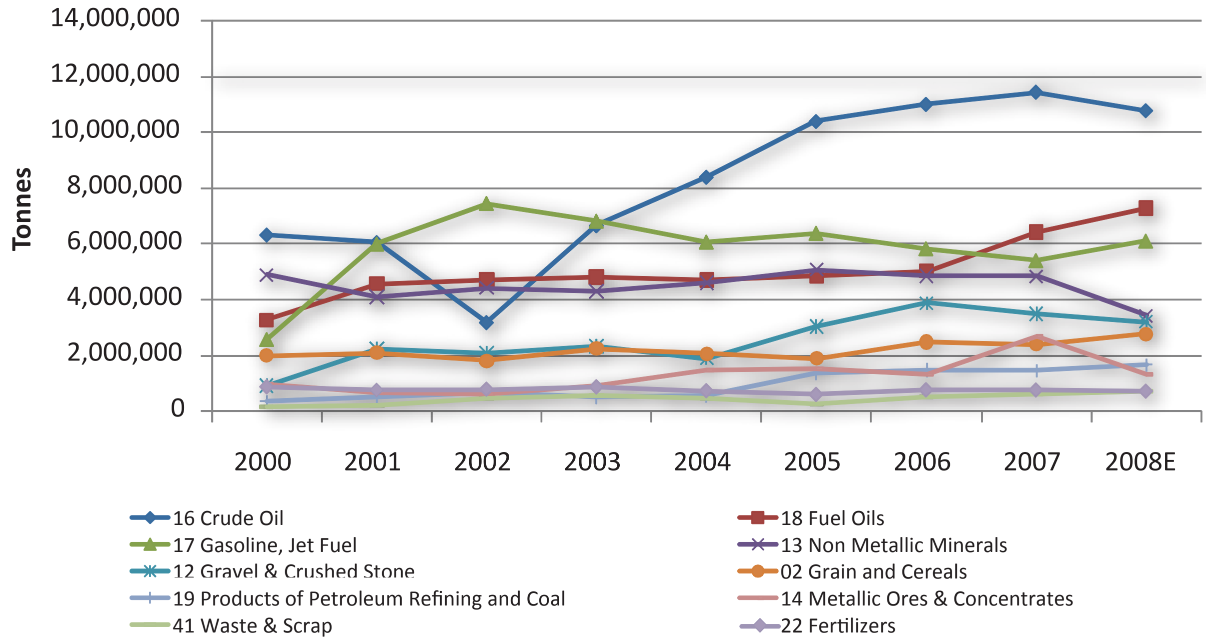


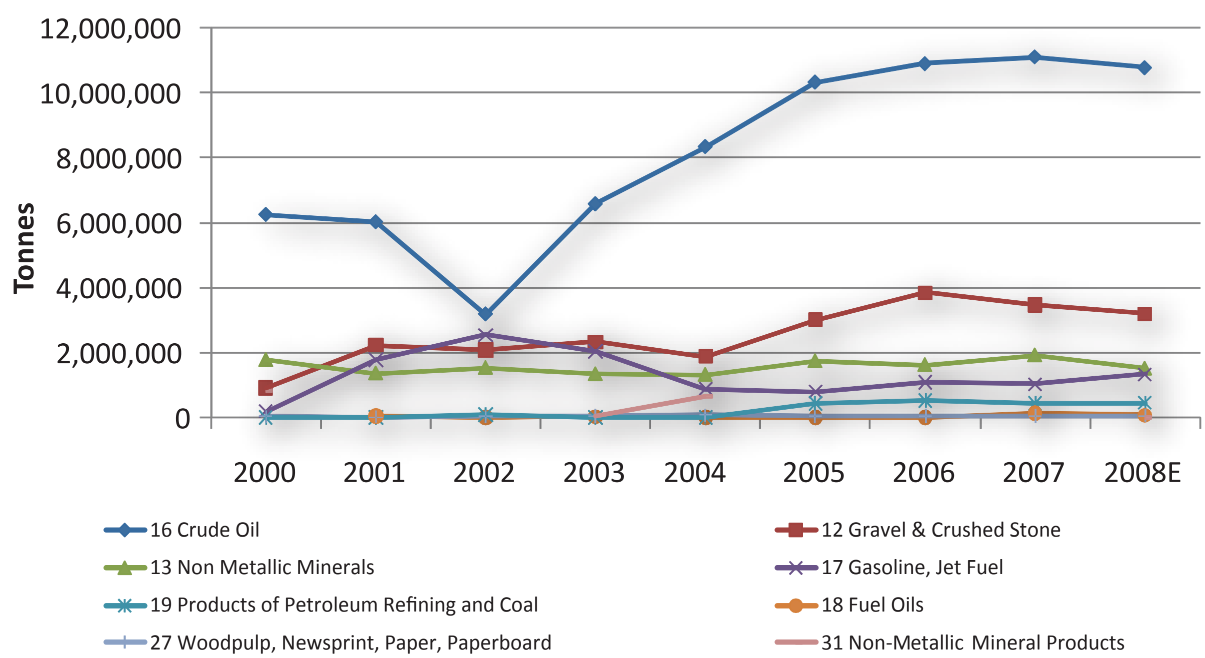
Figure 4-13 shows that with respect to the composition of exports through regional ports, crude oil exports through regional ports of interest have become the dominant commodity; fuel oils have also shown increases in the 2006-2008 period.

Figure 4-13 **Leading Non-Containerized Exports by Commodity through Regional Ports**



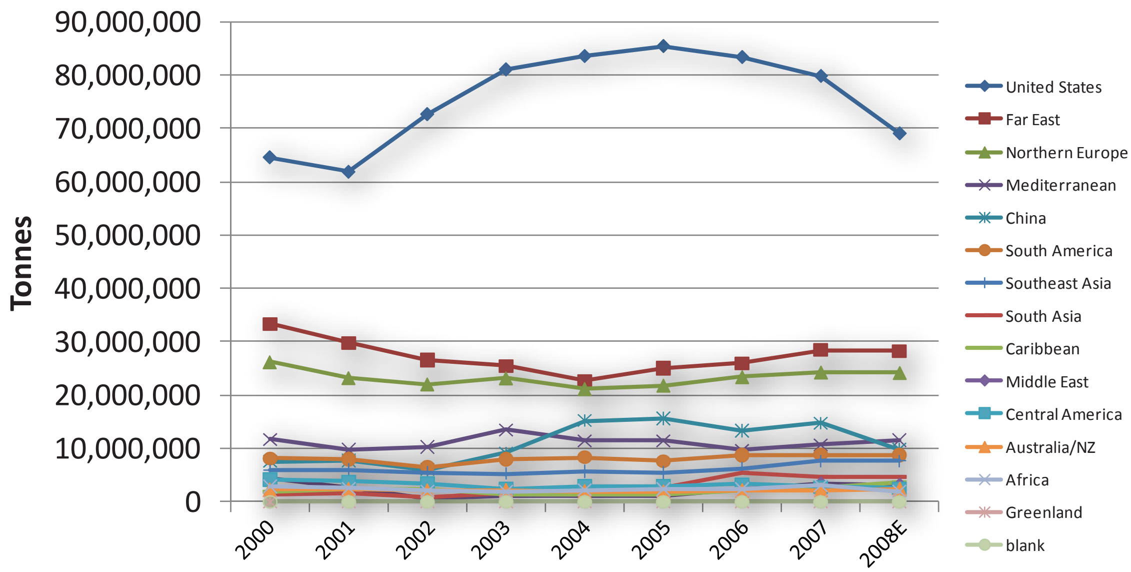
As shown in Figure 4-14, crude oil exports are the dominant non-containerized export cargo via the Strait of Canso, and the crude oil exports have been growing strongly since 2002.

Figure 4-14 **Non-Containerized Exports by Commodity through the Strait of Canso**



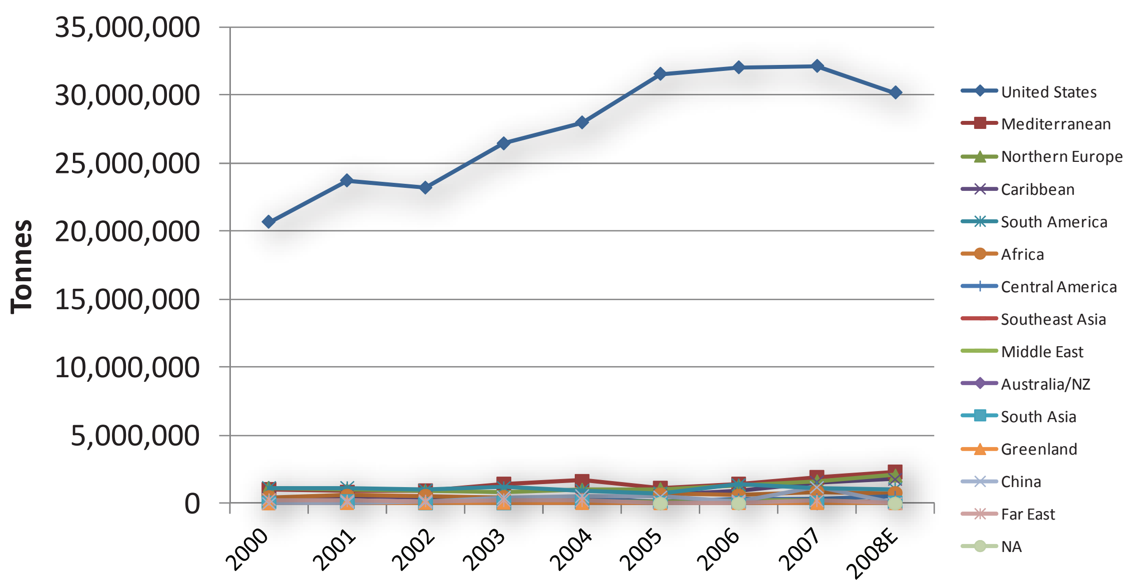
The United States is the largest trading partner for non-containerized exports from all Canadian ports, followed by the Far East and Northern Europe. Figure 4-15 shows the destinations of exports from all Canadian ports.

Figure 4-15 **Destination of Non-containerized Exports from All Canadian Ports**



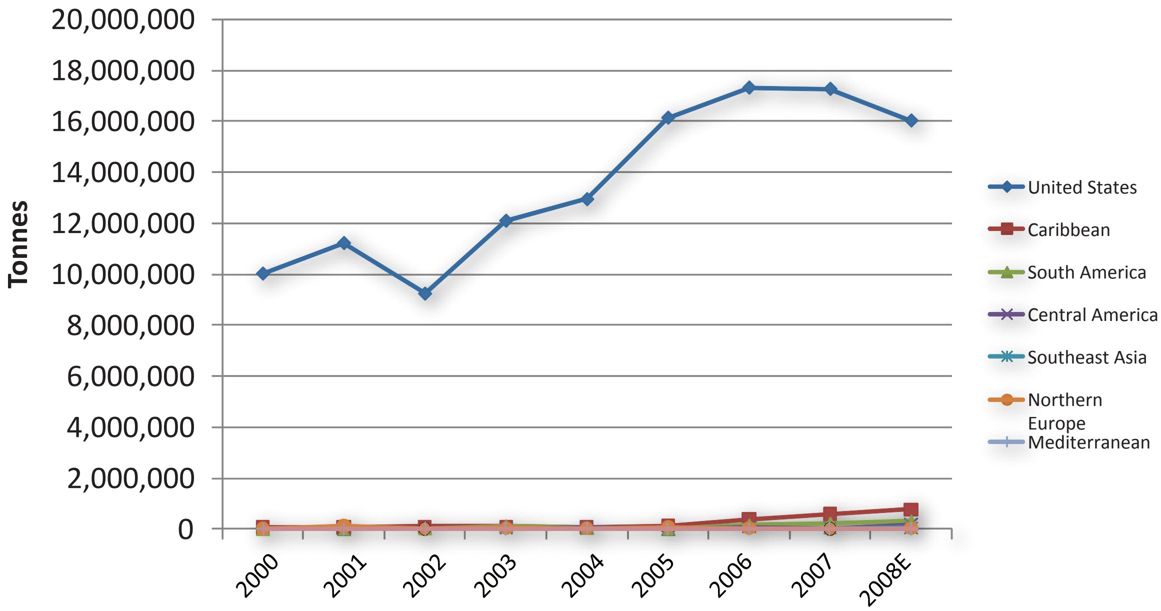
Similarly, the United States is the dominant export market for non-containerized exports from the regional ports of interest. The US export market has been flat since 2005 and the impact of the recession is evident in 2008/2009 as shown in Figure 4-16.

Figure 4-16 **Destination of Non-containerized Exports from Regional Ports of Interest**



The United States is the dominant export market for non-containerized exports from the Strait of Canso and the exhibited dramatic growth over the 2000-2006 period is shown in Figure 4-17.

Figure 4-17 **Destination of non-containerized exports from the Strait of Canso**



In summary, the statistical overview indicates the following: Non-containerized imports through all Canadian ports have grown at 3.6% annually, while the regional ports of interest have experienced a 3.2% growth annually since 2000. With respect to the regional ports of interest, Quebec is the leading port for non-containerized imports, overtaking Saint John and the Strait of Canso since 2005. Crude oil, coal and metallic ores are the key commodities of import via all Canadian ports, but crude oil dominates the non-containerized imports into the regional ports. Northern Europe has historically been the dominant source of imports of non-containerized cargo into the regional ports, with the Mediterranean and Africa grow in importance. Africa is the major source of non-containerized imports into the regional ports, primarily driven by crude oil imports.

Canadian exports of non-containerized cargo have grown at about 3.8% annually since 2000, while non-containerized exports from the regional ports have grown at 5.4% annually over the same time period. The Strait of Canso dominates the non-containerized exports from the regional ports. Coal, ores and minerals are the dominant export cargoes for all Canadian ports, but crude oil and fuel oil are the major non-containerized exports from the regional ports. The United States is the key trading partner.

The Strait of Canso region dominates the export and import tonnage, and this cargo moves via privately owned terminals. In order to develop the Strait of Canso Superport, it will be necessary to diversify the markets now handled by the private terminals, and focus on niche markets that capitalize on the deepwater strategic location of the Port to serve the United States and Eastern Canadian markets.

To identify potential market opportunities for the Strait of Canso, a series of interviews were conducted with the non-containerized cargo importers/exporters now using private terminals in the area as well as potential mineral exporters located in other surrounding areas of Nova Scotia. The results of these interviews are provided in the following section.

4.2 Overview of Current and Potential Importers/Exporters in the Strait of Canso Region

A series of interviews were conducted with regional mining and production companies to identify potential new markets/cargoes for the Strait of Canso Superport. A summary of the logistics patterns for the key shippers/ consignees follows.

4.2.1 Gypsum

There are five existing mines within Nova Scotia, including the Georgia Pacific mine in Melford, Inverness County. These deposits could support about 1-2 million tons per year of extraction. The raw product has typically been exported to the US East Coast for wallboard production. The current recession has had an impact on the gypsum export, as the contraction of the US construction activity has resulted in 50-60% reductions in production of gypsum. The Federal Gypsum plant is currently shut down; however, Acadia Drywall Supplies Limited has recently indicated they will be operating a drywall manufacturing plant at this facility.

Based on data developed by the US Maritime Administration, imports from Canada of gypsum and mined stone into the Atlantic Coast Ports of the United States have fallen by 53% between 2006 (when the US construction industry peaked for the decade) and 2009.

While the US economy still remains well below the 2006 and 2007 levels of activity, moody's economy.com projects that the US construction industry will grow by about 6.3% annually between 2010 and 2020. This robust forecast suggests that the gypsum exports to the US will begin to rebound throughout the 2010-2020 decade.

4.2.2 Limestone/Rock

Interviews were conducted with companies involved in crushed rock operations, including Martin Marietta. Martin Marietta is the operator at the aggregate quarry in Auld's Cove. This operation produces 5 million tons of stone aggregate annually, and at that rate, it is estimated that this mine has a 150-year supply available. The major export destination is the US East Coast for use in asphalt and other construction uses. The operations exports are down about 20% due to the recession, but with the strong rebound projected in US construction activity over the next decade, it is anticipated that the activity levels will return to pre-recession levels. Xstrata is pursuing the permitting process to mine and export crushed stone out of various deposits in Nova Scotia. However, due to low margins it is unlikely that export opportunities exist.

While there appears to be sufficient stone deposits, particularly with Martin Marietta and Rhodena Rock, the transportation costs from Rhodena Rock to Strait Superport combined with the low margins of crushed rock, make this opportunity a challenge. Martin Marietta has its own wharf and therefore transportation costs to the Superport Corporation are not an issue.

4.2.3 Cement

There exists an abundance of cement grade limestone and marble. Based on the interviews with the cement suppliers, it is estimated that there are nearly 1 billion tons of cement grade limestone reserves in the Glendale/ Glencoe area, which is about 30 km from the Strait of Canso. These reserves represent a good product for high calcium uses such as ground calcium carbonate, which is used in paper production and other industrial applications.

This grade of limestone could be moved to a terminal at the Strait Superport from Glendale/Glencoe region. However, the development of these limestone reserves is dependent upon other reserves/deposits closer to rail facilities in Truro and port facilities in Sydney. If such deposits are developed in proximity to Sydney, they may be able to move the product by rail to Truro. If deposits are developed closer to the rail facilities in Truro, which is closer to other port facilities than the Strait of Canso, it appears that the transportation routing would not favor the Strait Superport. At this time we are not aware of any efforts to develop deposits in the Truro or Sydney areas. The Glendale/Glencoe limestone deposit is the active quarry in the region and if there is a market for cement, the feasibility of using the Strait of Canso would be based on this deposit.

4.2.4 Coal

Coal exports via the Strait Superport represent a potential opportunity. Currently, Xstrata is in a partnership with Erdene Resource Development Corp. and are currently investigating the potential to open a mine at Donkin. While there have been some delays, this project is anticipated to move ahead and start production in 2013 or 2014. The Donkin mine, located near Sydney, N.S., was originally slated as a supplier of raw coal to Nova Scotia Power. Now, however, the coal produced will be used as coking coal for industrial uses. It is expected that 2.5-5.0 million tons of coal will be mined and exported to Europe, South America and Asia. The Sydney coal dock is closest for export. The coal could be moved from the mine to the Sydney dock at a rate of $6-7 per tonne (by rail) and loaded directly on Cape Size vessels for export. Water depths at Sydney are not adequate at this time. The Port of Sydney is considering a $38 million dredging project to allow Cape Size vessels to enter the port. The other option is to move the coal directly by barge to the Strait of Canso Superport for loading onto a Cape Size Vessel. The barge cost is estimated to range between $3-4 per tonne. It is assumed that the load charge from the rail to vessel at Sydney will be similar to the direct load charge from barge to vessel at the Superport, and in fact if a direct barge to ship loading operation is developed, the vessel loading charge at the Superport may in fact be less than the rail loading charge, in particular if the coal is first dumped at Sydney and then loaded via conveyor system.

4.2.5 Marble

MacLeod Resources Limited operates a marble quarry located at River Denys, about 40-50 km northeast of the Strait of Canso. Large blocks of marble are quarried and sent to China and Italy for processing and finishing. About 60% of the exports return to Canada, and then sold into the US market. A new venture will provide expansion capital for MacLeod Resources. With this expansion, production will ramp up to 600-1,000 tonnes per month, or 10-17 TEUs weekly. The River Denys location has reserves for 300 years at that rate of production. The containers are loaded at the quarry, and then trucked to Halifax for the export move. The truck cost is $875 per load, and the service times are reliable and satisfactory. MacLeod Resources is not aware of any other marble quarries in the region or even the province, although they are looking at a couple of other locations. MacLeod Resources indicated that developing a quarry, including permitting time, takes 2–3 years.

With the potential development of Maher Melford Terminal, this cargo could be diverted from Halifax to the Strait of Canso when the new container terminal is operational. This is primarily due to the proximity of the Strait of Canso to the quarry as opposed to Halifax.

4.2.6 Lumber and Fuel Pellets

The demand for wood pellets represents a growing export market opportunity, particularly in Europe. The long-term market potential for wood pellets in Europe has been projected to reach up to 130 million MT of consumption of which roughly 30% would be sourced and shipped from international origins, some 39 million metric tons. The primary drivers for the push behind wood pellets have been Carbon Credit considerations in the European Union and Investment Tax Credits. The major co-firing power customers for wood pellets in Europe at this time include:

- Drax Group in the UK;
- RWE Innogy is a German company with facilities in Western Europe;

- Scottish and Southern Energy in the UK;
- Vattenfall, a multinational company located in Western Europe; and
- Electrabel, a multinational company located in Western Europe.

The development of a wood pellet production facility at the Strait of Canso Superport could act as a catalyst to create jobs and provide for a cleaner environment. The wood pellets could be used for the export as well as the domestic market. Furthermore, biomass is also a renewable resource if it is managed properly and can last many generations. The development of such a pellet production facility would consist of a partnership between forestry companies, wood pellet manufacturers, and Economic Development Departments. In the Southeastern United States, ports, stevedores, ocean carriers, railroads, trucking companies, terminal operators and the European power companies purchasing the pellets have joined together to initiate and work the process to completion.

While the export wood pellet market appears to be an emerging growth market, there are major concerns in the provincial government regarding the export of biomass/fuel pellets from Nova Scotia. The Provincial Minister of Natural Resources is on the record as opposing exports of biomass from Crown Lands. Furthermore, NewPage Corporation, located in Port Hawkesbury, would be a competitor for biomass and already has the rights to regional Crown Lands.

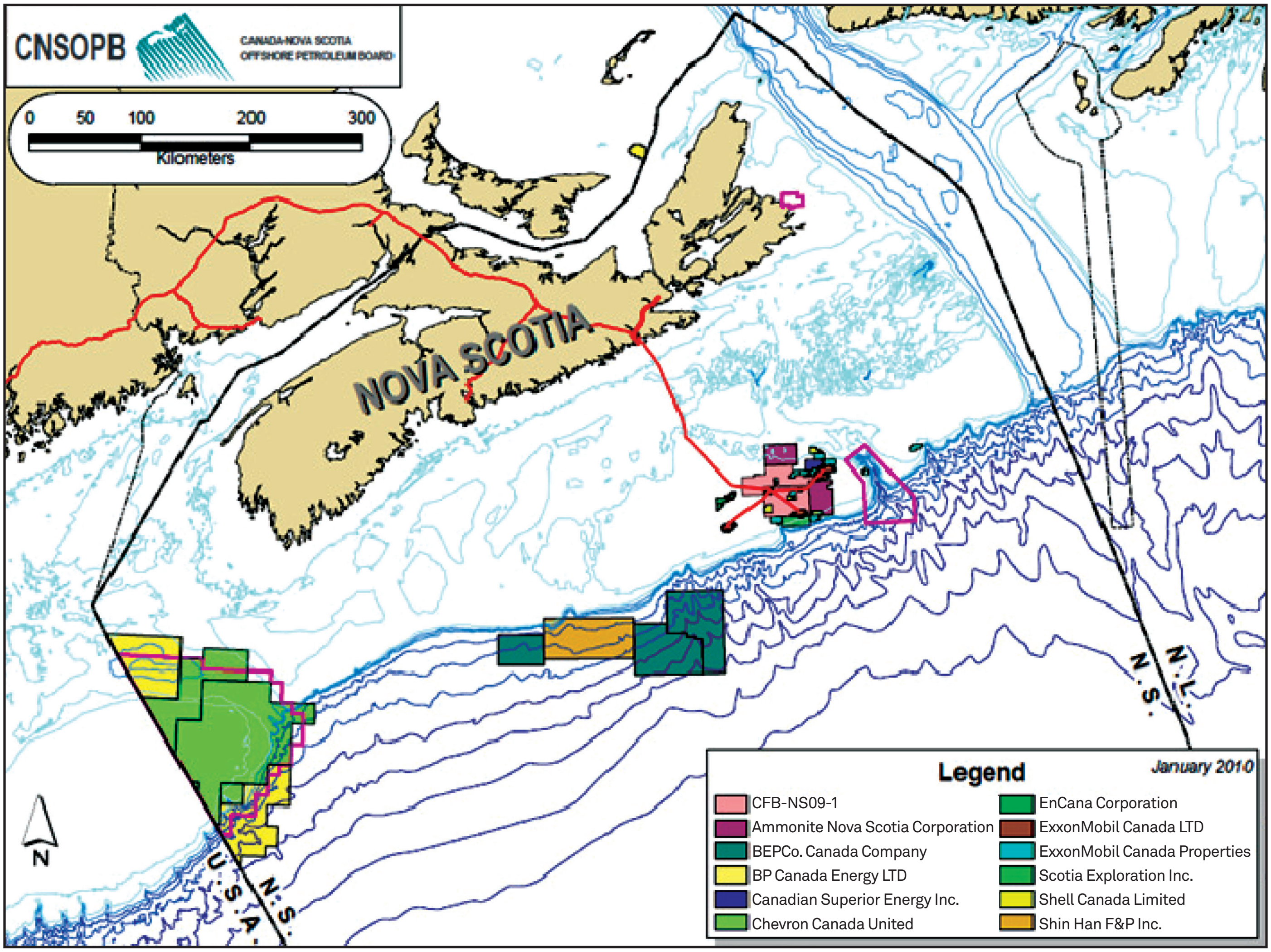
The Nova Scotia provincial government wants to target renewable resources, and has identified electricity production as its target. Therefore, governmental opposition appears to thwart the potential to develop a wood pellet export market. If the existing pulp and paper industry continues to decline in Canada, the potential use of biomass materials may need to be reassessed. As the demand for this natural resource declines, new alternative uses for these products my need to be identified, including wood pellet exports. Additional wood pulp resources may also need to be assessed from the Atlantic Provinces or Quebec and Ontario for wood pellet manufacturing and export.

4.2.7 Petroleum/Natural Gas

The Sable Island project and pipeline consists of an offshore gas production with a production level between 400-500 million cubic feet daily. However, this production site is expected to have a limited life as reserves are depleted. There are good deposits of gas in the Sable Island area, with potential for oil as well. The Deep Panuke project is currently under development for production to start in 2011. The exploration off of Nova Scotia has been slow due to a lack of good geological information, and the Province is now conducting a $15 million study. The current Sable Island licensing rights are shown in Figure 4-18. The proximity of the Strait of Canso Superport to these offshore sites suggests the possibility to develop an offshore support base.

Recent exploration efforts for natural gas in the Sable Island and Deep Panuke fields have not produced results to warrant further exploration until worldwide gas prices rise and/or demand increases. This is not expected to occur for a long time and future markets are to be considered a long term option. When there is an increased interest and offshore exploration expands, there is the potential to develop a support base or home base for the vessels that would service the drilling rigs. Mulgrave Marine Terminal is capable of providing shore base support in the short term. Halifax already provides some support and Sheet Harbour does as well, but a renewed exploration push would need to occur to warrant greater levels of support.

Figure 4-18 **Sable Island Exploration Licenses**



4.2.8 Offshore Wind Energy Operations

Offshore wind energy operations have been a growing market segment that may represent a potential development at the Strait of Canso Superport. Under this opportunity the Port would serve as a support base for offshore wind farm development, similar to an offshore support operation for petroleum and LNG operations. In addition, there are a number of wind energy manufacturing companies that are developing production centers in North America, and with the rail connections from the Strait of Canso, as well as the potential use of barge and vessel operations into the Great Lakes, such development could not only serve potential offshore wind farm development, but also supply landside as well as Great Lakes offshore developments in North America. The major players in the offshore wind farm developments are described in the balance of this section.

Cape Wind Associates has proposed constructing an offshore wind farm in Nantucket Sound off the coast of Massachusetts. This operation would consist of 130 wind turbines over 24 square miles. The scale of operation would power about 400,000 homes. Based upon receiving final US government approval, construction of the wind turbines could begin by 2010 with production starting in 2011 or 2012.

Bluewater Wind has proposed constructing an offshore wind farm about 11 miles east of Rehobeth Beach, Delaware. This would consist of 60 large wind turbines, and was signed into law in June 2008. The development consists of a 25-year power purchase agreement to allow Delmarva Power to buy up to 200 megawatts of electricity, and the operation could begin delivering energy to Delaware customers by 2012. The South Jersey Port Corporation is planning to develop an offshore support base for this project at a new facility located in Paulsboro, New Jersey.

Other offshore wind farms are proposed for off the coasts of New Jersey, New York, Maryland, Texas, Rhode Island and Massachusetts. The United States and the Great Lakes represent a unique opportunity for offshore wind farms. The Great Lakes region has a sustainable strong wind pattern and the lake beds are shallower and water is less turbulent than ocean waters. This allows for easier construction and lower costs. Trillium Power Wind Corp. is positioning itself to be the first to develop on the Great Lakes. It is planning for 64 offshore wind sites on Lake Ontario, consisting of 150 wind turbines. If built, it will be the largest wind project in North America and one of the largest offshore projects in the world.

With respect to manufacturing operations, Vestas Wind Systems, the world's largest wind-turbine maker, opened its first U.S. manufacturing plant in Windsor, Colorado in March 2008. The operation will produce 130 to 144-foot long wind blades for approximately 600 turbines a year. It has since expanded for a total value of $100 million. In March 2009, Vestas also broke ground for 2 new manufacturing plants in Brighton, Colorado, valued at $290 million; the plants are expected to be fully operational in 2010. Vestas is also building a $250 million plant in Pueblo to manufacture the towers, the largest in the world according to Vestas.

Recent developments in Trenton, Nova Scotia may lead to Daewoo manufacturing wind mills for use in Canada and worldwide. Trenton is approximately 120km from the Strait of Canso. This provides the potential opportunity for export of wind mill components from the Strait of Canso. The export of wind mills requires large lay down area and new terminals would have to be developed to accommodate this activity.

4.2.9 Potash

Potash Corporation of Saskatchewan (PotashCorp) currently produce 1-1.5 million tonnes annually from a mine in Sussex, New Brunswick. The potash moves by direct rail from the mine to the Port of Saint John, N.B. The majority of potash is exported to Latin America and Caribbean destinations, with about 5-10% shipped to the US. PotashCorp is investigating opening a new mine, which would add 1-2 million tonnes of product annually, but will be shipped via the current Port of Saint John terminal. Interviews with PotashCorp indicated that another port would only be considered should an overflow situation arise.

Potash exports are growing, with primary consumption taking place in Asia. Potash cargo is typically moved through the west coast ports of Vancouver, British Columbia, Longview, Washington, and Portland, Oregon due to their proximity to Asia. Potash cargo moving east typically moves through Thunder Bay, Ontario using Laker Class vessels, which travel directly to their foreign destinations. There are limited opportunities for cargo to move through Eastern Canadian ports at the present time.

4.2.10 Base Metals

Lead and zinc deposits have been historically mined in Richmond and Cape Breton Counties, although recent activity has been sporadic. Explorations have also occurred in Victoria County and have found expanded ore reserves. These mines however, are located about 50-75 km away from the Strait Superport, and transportation costs to the Superport would likely be cost prohibitive for an export move. Ultimately, based on interviews, the volumes from mine production would not be large enough for shipping by ocean carrier.

4.2.11 Clay

Black Bull Resources has investigated supplying kaolin clay for use by the NewPage Port Hawkesbury mill in the Strait of Canso. The clay would be barged from a terminal near the mine in the Shelburne, N.S. area to the private terminal mill in the Strait of Canso. However, the quality of the clay was determined to not be suitable for the paper use. The facility currently receives clay imports from Brazil. While Black Bull Resources is now under new management and may again refocus on supplying NewPage, it is unlikely that this product would move over an SCSCL public terminal.

4.2.12 Salt

The Canadian Salt Company moves 300,000 to 500,000 tonnes per year over the Mulgrave docks at the Strait of Canso. The majority of the salt is destined for the US market for roadway salt application. The Canadian Salt Company is currently a major client of the Strait of Canso Superport Corporation. The major competition is Cargill located in Cleveland, Ohio and salt reserves on Magdalen Islands.

4.2.13 Interview Conclusions/Implications

The most immediate opportunity consists of the potential export of coal by Xstrata. The conversion of this opportunity depends upon the ability to barge the coal from the mine near Sydney to the Strait Superport more cost effectively than by transporting the coal by rail to the Sydney docks for export. The opportunity presents 2.5-5 million tons annually of export activity.

An economic assessment was developed to review the feasibility to develop a bulk transshipment operation at the Strait of Canso. The concept of a transshipment operation is designed to maximize the water depth available at the Superport to provide a least cost routing to consuming industries, such as steel operations located at Great Lakes ports, with limited water depth. Under the transshipment concept, dry bulk cargo destined for the United States and Canadian Great Lakes ports would be moved via Cape Size vessels into the Superport, and then moved by smaller vessels consistent with the limited Seaway depth of 27 ft. into the Great Lakes ports for consumption by local industries.

The third key opportunity is the development of an offshore energy support operation, as well as an offshore wind energy support and manufacturing operation. These opportunities require significant investment in infrastructure and should be pursued with the identified wind energy manufacturers.

4.3 Feasibility of the Development of a Transshipment Operation at the Superport

The first steps in the transshipment analysis is to identify the major bulk commodities moving into the Great Lakes ports, and the origins of the cargo moving into the Great Lakes Ports. The second step in the analysis is to develop a competitive logistics cost analysis to serve selected Great Lakes ports and the industries located at these ports. The competitive logistics cost analysis consists of comparing the logistics costs of moving the cargo into a Great Lakes ports using a direct vessel service with a seaway draft vessel from the cargo origin to the Great Lakes port; the logistics cost of moving dry bulk cargo into the Great Lakes ports via a deepwater coastal port such as Baltimore, and then railing the cargo to the Great Lakes port; and the logistics cost of moving the cargo to the Great Lakes port via a transshipment operation at the Strait of Canso or at Quebec, and then transshipping the cargo to a Great Lakes port via a Laker or Seaway compatible sized ocean vessel.

4.3.1 Commodities moving to and from US and Canadian Great Lakes Ports

Dry bulk cargoes moving into the Great Lakes ports were identified. To identify the bulk cargoes moving on the Great Lakes, and in particular to the US Great Lakes, principal dry bulk commodities were collected from the US Maritime Administration international waterborne commerce database. The commodities are identified on a 4-digit commodity code level and represent 99% of the dry bulk cargo imported into the US Great Lakes ports. As identified in Table 4-19, iron ore is the major commodity moving into the US Great Lakes ports, followed by salt, dolomite and cement.

Table 4-19 **US Great Lakes Import Commodities**

Commodity	2003	2004	2005	2006	2007	2008	2009
Iron Ore	4,743,573	4,092,201	4,754,055	4,792,071	4,212,338	4,341,340	2,464,594
Salt	3,614,036	3,603,858	2,909,772	3,492,986	3,375,629	3,912,213	5,008,589
Dolomite	3,186,343	3,487,908	2,444,739	3,344,031	2,069,058	2,204,342	1,232,273
Cement	2,470,120	2,442,203	2,477,629	2,312,178	2,111,983	1,643,887	1,490,628
Gravel	1,460,865	1,424,414	1,471,184	1,073,388	946,573	728,509	733,513
Coal	486,484	668,616	561,557	504,863	573,746	598,592	334,394
Slag	546,250	335,141	707,543	622,262	626,507	328,826	485,652
Coke/Petcoke	284,424	405,239	709,009	706,768	366,063	813,503	256,699
Sand	400,589	443,283	333,647	387,958	316,544	315,859	257,114
Oats	102,667	156,265	176,482	177,149	181,417	191,704	197,758
Ash	156,078	197,353	237,131	236,374	269,808	39,495	
Wheat	64,671	67,718	146,175	50,626	28,197	57,756	249,281
Titanium Ore	62,624	74,990	50,593			271,590	37,031
Aluminum Ore	44,343		47,153	159,460	58,473	28,075	74,235
Scrap Iron	96,365	66,150	31,104	59,214	5,321	9,604	42,433
Magnesite	53,775	2,650	3,552	12,100	6,650	11,228	
Gypsum							33,853
Total	**17,773,208**	**17,467,989**	**17,061,326**	**17,931,428**	**15,148,308**	**15,496,524**	**12,898,047**

Table 4-20 shows that the key US Great Lakes ports handling the imported dry bulk cargoes into the United States are Toledo, Detroit, Chicago (including Burns harbor), and Cleveland.

Table 4-20 **Import Tonnage through US Great Lakes Ports**

Great Lakes Port	2003	2004	2005	2006	2007	2008	2009
Toledo-Sandusky, OH	3,986,293	3,734,960	4,418,416	4,821,434	3,497,293	3,775,224	2,741,099
Detroit, MI	2,668,949	2,416,256	2,812,605	2,775,330	2,323,486	2,498,466	2,501,510
Chicago, IL	2,138,793	3,426,282	2,426,486	2,852,057	2,413,621	2,521,654	2,182,656
Cleveland, OH	2,021,602	2,224,591	2,112,391	2,719,183	1,712,538	1,278,457	1,035,996
Ashtabula/Conneaut, OH	1,225,506	714,103	719,001	743,519	1,297,619	1,618,094	512,911
Milwaukee, WI	767,827	933,967	939,833	322,248	1,118,904	856,961	1,003,789
Saginaw-Bay City, MI	1,107,603	565,650	506,033	484,655	318,176	454,694	396,197
Port Huron, MI	642,284	703,518	541,854	451,950	284,509	360,159	249,604
Duluth, MN - Superior, WI	346,122	272,853	316,851	464,628	332,521	406,474	384,183
Oswego, NY	186,725	438,929	423,632	422,224	400,339	302,999	225,290
Green Bay, WI	196,595	123,737	116,187	700,659	267,025	185,138	376,908
Buffalo-Niagara Falls, NY	365,414	273,041	252,320	248,606	327,264	337,291	143,939
Sault Ste Marie, MI	228,831	334,396	228,002	137,503	237,725	322,538	395,168
Muskegon, MI	656,119	339,500	397,794	140,088	108,313	21,559	18,823
Ogdensburg, NY	137,099	167,492	157,972	160,378	85,986	81,661	84,442
Rochester, NY	114,557	145,710	141,323	156,862	88,601	95,059	101,110
Battle Creek, MI	98,995	285,544	33,540	11,783		158,200	144,853
Erie, PA	39,294	5,891	58,452	153,936	154,523	32,481	58,084
Escanaba, MI	28,300	136,164	37,538	22,995	16,910	51,171	153,188
Marinette, WI	51,807	15,507		39,828	35,775	110,693	160,690
Marquette, MI	173,543	45,565	131,949	28	25,253	17,140	
Grand Haven, MI	135,508	85,311	123,442	6,960	12,493		16,295
Alpena, MI		24,640	82,752	75,273	71,919	10,413	6,910
Ferrysburg, MI	110,445	14,398	82,952	19,302	17,515		
Syracuse, NY	240,874						
East Chicago, IN	104,123	39,985					
Gary, IN							4,403
Total	**17,773,208**	**17,467,989**	**17,061,326**	**17,931,428**	**15,148,308**	**15,496,524**	**12,898,047**

Table 4-21 shows that Canada is the major trading partner with respect to dry bulk cargo moving into the US Great Lakes ports, followed by South America (primarily Brazil for iron ore and steel slab). It is to be emphasized that due to the recession in 2008 and 2009, the 2003-2007 tonnage by trading partner is of more relevance than in the 2008-2009 recession years.

Table 4-21 **Trading Partners for Dry Bulk Cargoes Moving into US Great Lakes Ports**

World Area	2003	2004	2005	2006	2007	2008	2009
Canada	16,660,772	16,402,998	15,824,590	16,308,198	14,334,605	14,213,580	12,532,669
S America	761,820	727,961	710,871	813,303	530,299	593,537	150,843
SE/E Asia	34,945	86,146	146,530	484,574	17,519	373,083	21,988
Africa	129,521	142,305	173,988	140,108	170,017	126,977	87,912
Med Sea	49,822	32,324	50,725	163,060	84,861	79,139	74,235
N Europe	79,816	48,251	126,880	196		71,833	30,400
Aus/NZ	56,513	28,003	27,743	21,988	11,007	38,376	
Total	**17,773,208**	**17,467,989**	**17,061,326**	**17,931,428**	**15,148,308**	**15,496,524**	**12,898,047**

With respect to the Canadian Great Lakes ports focusing on dry bulk imports, Hamilton, Ontario is the major importer of iron ore and slab for use in nearby steel operations. Based on the dry bulk commodity flow analysis, the transshipment operations, feasibility analysis will focus on moving dry bulk cargoes to and from South America (Brazil), South East Asia (China and India) and Africa. The next section describes the competitive logistics cost analysis.

4.3.2 Competitive Logistics Cost Analysis

The competitive logistics cost analysis consists of an analysis of total costs to move dry bulk cargo from ports in Brazil, Africa, and Southeast Asia to the Great Lakes Ports of Cleveland, Burns Harbor and Hamilton. The logistics costs include:

- Vessel cost from each origin to Quebec, the Strait of Canso Superport and Baltimore using a Cape Sized vessel
- Direct vessel costs from the world origins to each Great Lakes port using a seaway sized vessel
- Vessel cost of feeder move from transshipment operation at Quebec or Strait of Canso to the Great Lakes ports
- Rail cost from Baltimore to the Great Lakes port
- Stevedoring and handling costs at the transshipment port

The routings are then compared for various world origins and Great Lakes ports to identify least cost routing for each origin/destination pairings.

The voyage costs of delivering the bulk cargoes to these ports were then computed using the transshipment/feeder service compared to a direct call at the Great Lakes ports (using the smaller vessels). The Voyage Costing Model is used for many purposes, including the analysis of the benefits of channel deepening studies for the US Army Corps of Engineers, to assess fleet deployment decisions for ocean carriers, and for competitive ports analysis. The cost elements of the model are specific to the type and size of vessel and are developed for a "typical vessel" by the US Army Corps of Engineers. The vessel operating costs for the prototype bulk ships were identified from the US Army Corps of Engineers Deep Draft Self Propelled Vessel Cost Data Base (2004 and adjusted to 2010 levels). This database provides typical operating costs for specific types of vessels (container, break bulk, liquid bulk/tanker and dry bulk) and size classes within each vessel type category, as well as by flag of registry (US vs. foreign). Cost data is provided for such items as crew costs, insurance, annualized capital costs, fuel consumption at sea and at port, ship stores, and maintenance and repair. Other vessel characteristics included in the database are operating draft and speed. The Martin Associates' models also include assumptions as to load and discharge rates (which impact time at port), routings involving the use of the Panama Canal, or Suez Canal, and probable delay days on specific routes. Fuel prices are based on current marine fuel costs from Bunker World.

Models were developed for four different sizes of a foreign flag dry bulk carrier:

- 15,000 DWT - 27.2 ft. Draft or 8.3 meters;
- 25,000 DWT - 31.9 ft. Draft or 9.7 meters;
- 35,000 DWT - 35.5 ft. Draft or 10.8 meters; and
- 40,000 DWT - 37 ft. Draft or 11.3 meters.

Vessel costs were estimated based on the development of a direct service into each Great Lakes port based on published drafts:

- Algiers, Algeria;
- Cape Town, South Africa;
- Colombo, Sri Lanka;
- Sao Francisco Do Sul, Brazil; and
- Shanghai, China.

The voyage days are based on average speed of vessel and distance (one way). The distances between import country of origin and destination port were calculated using Distances between Ports. Pub. 151. Eleventh Edition.

The port days are adjusted to reflect Suez or Panama Canal transits. The vessel costs were recalculated next using an 80,000 DWT bulk vessel for direct calls into Baltimore, Strait of Canso, and Quebec, and then transshipped into a 15,000 DWT Laker and Salty vessels to move to each of the Great Lakes Ports. A $2/ton handling charge is assumed every time cargo is handled at the transshipment port, and it is assumed that stevedoring charges at Baltimore, Strait of Canso, Quebec and the Great Lakes Ports are equal. Rail rates were developed from CN and CSX carload prices and from the Surface Transportation 1% Waybill Sample for specific origins and destinations, with a 15% discount applied to reflect contract rates. A 26.5 ft. maximum draft for Great Lakes transits was assumed. The Laurentian Pilotage Authority provided Martin Associates sample pilotage rates for transiting the St. Lawrence Seaway. Martin Associates Great Lakes Pilotage Study used to calculate Great Lake Pilot Rates for Salties. The Canal Charges and Tolls were calculated using the Great Lakes St. Lawrence Seaway System Tolls Schedule.

The following assumptions were made for vessel load and discharge operations:

- 15,000 DWT/25,000 DWT vessel assumes 3,000 tons per day loading/discharge; and
- 80,000 DWT vessel assumes 15,000 tons per day loading/discharge and a 50 foot channel.

Tables 4-22 through 4-41 indicate that for each world area of import origin and Great Lakes Port, the use of a transshipment operation with a salty feeder at Quebec is the least costly routing, in each case. The use of a transshipment operation at the Strait of Canso is also very competitive with the costs of using Quebec as a transshipment center, and provides a cost competitive routing over a direct service into the Great Lakes as well as a routing to a Great Lakes port via Baltimore and an inland rail operation.

Table 4-22 **Algiers (Mediterranean)/Burns Harbor Port Pairing**

Logistics Cost $/Ton				
	Tranship Using US Laker To Burns Harbor			Direct Via Salty
Route: Algiers	Baltimore	Strait of Canso	Quebec	
Direct	$ 5.67	$ 4.71	$ 5.49	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 20.31	$ 16.99	
Rail to Burns Harbor	$ 55.39			
Direct Salty				$ 26.46
Total Cost/ton	$ 65.06	$ 29.02	**$ 26.48**	**$ 26.46**
Differential Strait of Canso To Least Cost Routing			$ 2.56	

Logistics Cost $/Ton				
	Transship Using Salty To Burns Harbor			Direct Via Salty
Route: Algiers	Baltimore	Strait of Canso	Quebec	
Direct	$ 5.67	$ 4.71	$ 5.49	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 14.86	$ 12.58	
Rail to Burns Harbor	$ 55.39			
Direct Salty				$ 26.46
Total Cost/ton	$ 65.06	$ 23.57	**$ 22.07**	$ 26.46
Differential Strait of Canso To Least Cost Routing			$ 1.50	

Table 4-23 **Colombo (India Sub Continent)/Burns Harbor Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Burns Harbor			Direct Via Salty
Route: Colombo	Baltimore	Strait of Canso	Quebec	
Direct	$ 15.05	$ 14.09	$ 14.87	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 20.31	$ 16.99	
Rail to Burns Harbor	$ 55.39			
Direct Salty				$ 52.42
Total Cost/ton	$ 74.44	$ 38.40	**$ 35.86**	$ 52.42
Differential Strait of Canso To Least Cost Routing			$ 2.54	

Logistics Cost $/Ton				
	Transship Using Salty To Burns Harbor			Direct Via Salty
Route: Colombo	Baltimore	Strait of Canso	Quebec	
Direct	$ 15.05	$ 14.09	$ 14.87	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 14.86	$ 12.58	
Rail to Burns Harbor	$ 55.39			
Direct Salty				$ 52.42
Total Cost/ton	$ 74.44	$ 32.95	**$ 31.45**	$ 52.42
Differential Strait of Canso To Least Cost Routing			$ 1.50	

Table 4-24 **Cape Town/Burns Harbor Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Burns Harbor			Direct Via Salty
Route: Cape Town	Baltimore	Strait of Canso	Quebec	
Direct	$ 9.41	$ 9.04	$ 9.82	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 20.31	$ 16.99	
Rail to Burns Harbor	$ 55.39			
Direct Salty				$ 39.42
Total Cost/ton	$ 68.80	$ 33.35	**$ 30.81**	$ 39.42
Differential Strait of Canso To Least Cost Routing			$ 2.54	

Logistics Cost $/Ton				
	Transship Using Salty To Burns Harbor			Direct Via Salty
Route: Cape Town	Baltimore	Strait of Canso	Quebec	
Direct	$ 9.41	$ 9.04	$ 9.82	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 14.86	$ 12.58	
Rail to Burns Harbor	$ 55.39			
Direct Salty				$ 39.42
Total Cost/ton	$ 68.80	$ 27.90	**$ 26.40**	$ 39.42
Differential Strait of Canso To Least Cost Routing			$ 1.50	

Table 4-25 **Sao Francisco Do Sul, Brazil/Burns Harbor Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Burns Harbor			Direct Via Salty
Route: Sao Francisco Do Sul	Baltimore	Strait of Canso	Quebec	
Direct	$ 7.07	$ 7.32	$ 8.10	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 20.31	$ 16.99	
Rail to Burns Harbor	$ 55.39			
Direct Salty				$ 34.27
Total Cost/ton	$ 66.46	$ 31.63	**$ 29.09**	$ 34.27
Differential Strait of Canso To Least Cost Routing			$ 2.54	

Logistics Cost $/Ton				
	Transship Using Salty To Burns Harbor			Direct Via Salty
Route: Sao Francisco Do Sul	Baltimore	Strait of Canso	Quebec	
Direct	$ 7.07	$ 7.32	$ 8.10	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 14.86	$ 12.58	
Rail to Burns Harbor	$ 55.39			
Direct Salty				$ 34.27
Total Cost/ton	$ 66.46	$ 26.18	**$ 24.68**	$ 34.27
Differential Strait of Canso To Least Cost Routing			$ 1.50	

Table 4-26 **Shanghai (Asian)/Burns Harbor Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Burns Harbor			Direct Via Salty
Route: Shanghai	Baltimore	Strait of Canso	Quebec	
Direct	$ 17.68	$ 18.36	$ 19.13	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 20.31	$ 16.99	
Rail to Burns Harbor	$ 55.39			
Direct Salty				$ 59.57
Total Cost/ton	$ 77.07	$ 42.67	**$ 40.12**	$ 59.57
Differential Strait of Canso To Least Cost Routing			$ 2.55	

Logistics Cost $/Ton				
	Transship Using Salty To Burns Harbor			Direct Via Salty
Route: Shanghai	Baltimore	Strait of Canso	Quebec	
Direct	$ 17.68	$ 18.36	$ 19.13	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 14.86	$ 12.58	
Rail to Burns Harbor	$ 55.39			
Direct Salty				$ 59.57
Total Cost/ton	$ 77.07	$ 37.22	**$ 35.71**	$ 59.57
Differential Strait of Canso To Least Cost Routing			$ 1.51	

Table 4-27 **Algiers (Mediterranean)/Cleveland Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Cleveland			Direct Via Salty
Route: Algiers	Baltimore	Strait of Canso	Quebec	
Direct	$ 5.67	$ 4.71	$ 5.49	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 16.25	$ 12.93	
Rail to Cleveland	$ 33.56			
Direct Salty				$ 22.99
Total Cost/ton	$ 43.23	$ 24.96	**$ 22.42**	$ 22.99
Differential Strait of Canso To Least Cost Routing			**$ 2.54**	

Logistics Cost $/Ton				
	Transship Using Salty To Cleveland			Direct Via Salty
Route: Algiers	Baltimore	Strait of Canso	Quebec	
Direct	$ 5.67	$ 4.71	$ 5.49	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 11.40	$ 9.12	
Rail to Cleveland	$ 33.56			
Direct Salty				$ 22.99
Total Cost/ton	$ 43.23	$ 20.11	**$ 18.61**	$ 22.99
Differential Strait of Canso To Least Cost Routing			**$ 1.50**	

Table 4-28 **Cape Town (South Africa)/Cleveland Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Cleveland			Direct Via Salty
Route: Cape Town	Baltimore	Strait of Canso	Quebec	
Direct	$ 9.41	$ 9.04	$ 9.82	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 16.25	$ 12.93	
Rail to Cleveland	$ 33.56			
Direct Salty				$ 35.95
Total Cost/ton	$ 46.97	$ 29.29	**$ 26.75**	$ 35.95
Differential Strait of Canso To Least Cost Routing			$ 2.54	

Logistics Cost $/Ton				
	Transship Using Salty To Cleveland			Direct Via Salty
Route: Cape Town	Baltimore	Strait of Canso	Quebec	
Direct	$ 9.41	$ 9.04	$ 9.82	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 11.40	$ 9.12	
Rail to Cleveland	$ 33.56			
Direct Salty				$ 35.95
Total Cost/ton	$ 46.97	$ 24.44	**$ 22.94**	$ 35.95
Differential Strait of Canso To Least Cost Routing			$ 1.50	

Table 4-29 **Colombo (India Sub Continent)/Cleveland Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Cleveland			Direct Via Salty
Route: Colombo	Baltimore	Strait of Canso	Quebec	
Direct	$ 15.05	$ 14.09	$ 14.87	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 16.25	$ 12.93	
Rail to Cleveland	$ 33.56			
Direct Salty				$ 48.96
Total Cost/ton	$ 52.61	$ 34.34	**$ 31.80**	$ 48.96
Differential Strait of Canso To Least Cost Routing			$ 2.54	

Logistics Cost $/Ton				
	Transship Using Salty To Cleveland			Direct Via Salty
Route: Colombo	Baltimore	Strait of Canso	Quebec	
Direct	$ 15.05	$ 14.09	$ 14.87	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 11.40	$ 9.12	
Rail to Cleveland	$ 33.56			
Direct Salty				$ 48.96
Total Cost/ton	$ 52.61	$ 29.49	**$ 27.99**	$ 48.96
Differential Strait of Canso To Least Cost Routing			$ 1.50	

Table 4-30 **Sao Francisco Do Sul, Brazil/Cleveland Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Cleveland			Direct Via Salty
Route: Sao Francisco Do Sul	Baltimore	Strait of Canso	Quebec	
Direct	$ 7.07	$ 7.32	$ 8.10	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 16.25	$ 12.93	
Rail to Cleveland	$ 33.56			
Direct Salty				$ 30.81
Total Cost/ton	$ 44.63	$ 27.57	**$ 25.03**	$ 30.81
Differential Strait of Canso To Least Cost Routing			$ 2.54	

Logistics Cost $/Ton				
	Transship Using Salty To Cleveland			Direct Via Salty
Route: Sao Francisco Do Sul	Baltimore	Strait of Canso	Quebec	
Direct	$ 7.07	$ 7.32	$ 8.10	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 11.40	$ 9.12	
Rail to Cleveland	$ 33.56			
Direct Salty				$ 30.81
Total Cost/ton	$ 44.63	$ 22.72	**$ 21.22**	$ 30.81
Differential Strait of Canso To Least Cost Routing			$ 1.50	

Table 4-31 **Shanghai (Asian)/Cleveland Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Cleveland			Direct Via Salty
Route: Shanghai	Baltimore	Strait of Canso	Quebec	
Direct	$ 17.68	$ 18.36	$ 19.13	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 16.25	$ 12.93	
Rail to Cleveland	$ 33.56			
Direct Salty				$ 56.11
Total Cost/ton	$ 55.24	$ 38.61	**$ 36.06**	$ 56.11
Differential Strait of Canso To Least Cost Routing			$ 2.55	

Logistics Cost $/Ton				
	Transship Using Salty To Cleveland			Direct Via Salty
Route: Shanghai	Baltimore	Strait of Canso	Quebec	
Direct	$ 17.68	$ 18.36	$ 19.13	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 11.40	$ 9.12	
Rail to Cleveland	$ 33.56			
Direct Salty				$ 56.11
Total Cost/ton	$ 55.24	$ 33.76	**$ 32.25**	$ 56.11
Differential Strait of Canso To Least Cost Routing			$ 1.51	

Table 4-32 **Algiers (Mediterranean)/Hamilton Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Hamilton			Direct Via Salty
Route: Algiers	Baltimore	Strait of Canso	Quebec	
Direct	$ 5.67	$ 4.71	$ 5.49	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 15.34	$ 12.03	
Rail to Hamilton	$ 28.61			
Direct Salty				$ 22.07
Total Cost/ton	$ 38.28	$ 24.05	**$ 21.52**	$ 22.07
Differential Strait of Canso To Least Cost Routing			$ 2.53	

Logistics Cost $/Ton				
	Transship Using Salty To Hamilton			Direct Via Salty
Route: Algiers	Baltimore	Strait of Canso	Quebec	
Direct	$ 5.67	$ 4.71	$ 5.49	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 10.47	$ 8.20	
Rail to Hamilton	$ 28.61			
Direct Salty				$ 22.07
Total Cost/ton	$ 38.28	$ 19.18	**$ 17.69**	$ 22.07
Differential Strait of Canso To Least Cost Routing			$ 1.49	

Table 4-33 **Cape Town (South Africa)/Hamilton Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Hamilton			Direct Via Salty
Route: Cape Town	Baltimore	Strait of Canso	Quebec	
Direct	$ 9.41	$ 9.04	$ 9.82	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 15.34	$ 12.03	
Rail to Hamilton	$ 28.61			
Direct Salty				$ 35.03
Total Cost/ton	$ 42.02	$ 28.38	**$ 25.85**	$ 35.03
Differential Strait of Canso To Least Cost Routing			$ 2.53	

Logistics Cost $/Ton				
	Transship Using Salty To Hamilton			Direct Via Salty
Route: Cape Town	Baltimore	Strait of Canso	Quebec	
Direct	$ 9.41	$ 9.04	$ 9.82	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 10.47	$ 8.20	
Rail to Hamilton	$ 28.61			
Direct Salty				$ 35.03
Total Cost/ton	$ 42.02	$ 23.51	**$ 22.02**	$ 35.03
Differential Strait of Canso To Least Cost Routing			$ 1.49	

Table 4-34 **Colombo (India Sub Continent)/Hamilton Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Hamilton			Direct Via Salty
Route: Colombo	Baltimore	Strait of Canso	Quebec	
Direct	$ 15.05	$ 14.09	$ 14.87	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 15.34	$ 12.03	
Rail to Hamilton	$ 28.61			
Direct Salty				$ 48.04
Total Cost/ton	$ 47.66	$ 33.43	**$ 30.90**	$ 48.04
Differential Strait of Canso To Least Cost Routing			$ 2.53	

Logistics Cost $/Ton				
	Transship Using Salty To Hamilton			Direct Via Salty
Route: Colombo	Baltimore	Strait of Canso	Quebec	
Direct	$ 15.05	$ 14.09	$ 14.87	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 10.47	$ 8.20	
Rail to Hamilton	$ 28.61			
Direct Salty				$ 48.04
Total Cost/ton	$ 47.66	$ 28.56	**$ 27.07**	$ 48.04
Differential Strait of Canso To Least Cost Routing			$ 1.49	

Table 4-35 **Sao Francisco Do Sul, Brazil /Hamilton Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Hamilton			Direct Via Salty
Route: Sao Francisco Do Sul	Baltimore	Strait of Canso	Quebec	
Direct	$ 7.07	$ 7.32	$ 8.10	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 15.34	$ 12.03	
Rail to Hamilton	$ 28.61			
Direct Salty				$ 29.89
Total Cost/ton	$ 39.68	$ 26.66	**$ 24.13**	$ 29.89
Differential Strait of Canso To Least Cost Routing			$ 2.53	

Logistics Cost $/Ton				
	Transship Using Salty To Hamilton			Direct Via Salty
Route: Sao Francisco Do Sul	Baltimore	Strait of Canso	Quebec	
Direct	$ 7.07	$ 7.32	$ 8.10	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 10.47	$ 8.20	
Rail to Hamilton	$ 28.61			
Direct Salty				$ 29.89
Total Cost/ton	$ 39.68	$ 21.79	**$ 20.30**	$ 29.89
Differential Strait of Canso To Least Cost Routing			$ 1.49	

Table 4-36 **Shanghai (Asian)/Hamilton Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Hamilton			Direct Via Salty
Route: Shanghai	Baltimore	Strait of Canso	Quebec	
Direct	$ 17.68	$ 18.36	$ 19.13	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 15.34	$ 12.03	
Rail to Hamilton	$ 28.61			
Direct Salty				$ 55.19
Total Cost/ton	$ 50.29	$ 37.70	**$ 35.16**	$ 55.19
Differential Strait of Canso To Least Cost Routing			$ 2.54	

Logistics Cost $/Ton				
	Transship Using Salty To Hamilton			Direct Via Salty
Route: Shanghai	Baltimore	Strait of Canso	Quebec	
Direct	$ 17.68	$ 18.36	$ 19.13	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 10.47	$ 8.20	
Rail to Hamilton	$ 28.61			
Direct Salty				$ 55.19
Total Cost/ton	$ 50.29	$ 32.83	**$ 31.33**	$ 55.19
Differential Strait of Canso To Least Cost Routing			$ 1.50	

Table 4-37 **Algiers/Detroit Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Detroit			Direct Via Salty
Route: Algiers	Baltimore	Strait of Canso	Quebec	
Direct	$ 5.67	$ 4.71	$ 5.49	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 16.71	$ 13.40	
Rail to Detroit	$ 37.80			
Direct Salty				$ 23.57
Total Cost/ton	$ 47.47	$ 25.42	**$ 22.89**	$ 23.57
Differential Strait of Canso To Least Cost Routing			$ 2.53	

Logistics Cost $/Ton				
	Transship Using Salty To Detroit			Direct Via Salty
Route: Algiers	Baltimore	Strait of Canso	Quebec	
Direct	$ 5.67	$ 4.71	$ 5.49	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 11.98	$ 9.70	
Rail to Detroit	$ 37.80			
Direct Salty				$ 23.57
Total Cost/ton	$ 47.47	$ 20.69	**$ 19.19**	$ 23.57
Differential Strait of Canso To Least Cost Routing			$ 1.50	

Table 4-38 **Capetown/Detroit Port Pairing**

Logistics Cost $/Ton				
	Transship Using US Laker To Detroit			Direct Via Salty
Route: Cape Town	Baltimore	Strait of Canso	Quebec	
Direct	$ 9.41	$ 9.04	$ 9.82	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 16.71	$ 13.40	
Rail to Detroit	$ 37.80			
Direct Salty				$ 36.53
Total Cost/ton	$ 51.21	$ 29.75	**$ 27.22**	$ 36.53
Differential Strait of Canso To Least Cost Routing			$ 2.53	

Logistics Cost $/Ton				
	Transship Using Salty To Detroit			Direct Via Salty
Route: Cape Town	Baltimore	Strait of Canso	Quebec	
Direct	$ 9.41	$ 9.04	$ 9.82	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 11.98	$ 9.70	
Rail to Detroit	$ 37.80			
Direct Salty				$ 36.53
Total Cost/ton	$ 51.21	$ 25.02	**$ 23.52**	$ 36.53
Differential Strait of Canso To Least Cost Routing			$ 1.50	

Table 4-39 **Colombo/Detroit Port Pairing**

Logistics Cost $/Ton				
	Tranship Using US Laker To Detroit			Direct Via Salty
Route: Colombo	Baltimore	Strait of Canso	Quebec	
Direct	$ 15.05	$ 14.09	$ 14.87	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 16.71	$ 13.40	
Rail to Detroit	$ 37.80			
Direct Salty				$ 49.54
Total Cost/ton	$ 56.85	$ 34.80	**$ 32.27**	$ 49.54
Differential Strait of Canso To Least Cost Routing			$ 2.53	

Logistics Cost $/Ton				
	Tranship Using Salty To Detroit			Direct Via Salty
Route: Colombo	Baltimore	Strait of Canso	Quebec	
Direct	$ 15.05	$ 14.09	$ 14.87	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 11.98	$ 9.70	
Rail to Detroit	$ 37.80			
Direct Salty				$ 49.54
Total Cost/ton	$ 56.85	$ 30.07	**$ 28.57**	$ 49.54
Differential Strait of Canso To Least Cost Routing			$ 1.50	

Table 4-40 **Sao Francisco Do Sul Brazil/Detroit Port Pairing**

Logistics Cost $/Ton				
	Tranship Using US Laker To Detroit			Direct Via Salty
Route: Sao Francisco Do Sul	Baltimore	Strait of Canso	Quebec	
Direct	$ 7.07	$ 7.32	$ 8.10	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 16.71	$ 13.40	
Rail to Detroit	$ 37.80			
Direct Salty				$ 31.39
Total Cost/ton	$ 48.87	$ 28.03	**$ 25.50**	$ 31.39
Differential Strait of Canso To Least Cost Routing			$ 2.53	

Logistics Cost $/Ton				
	Tranship Using Salty To Detroit			Direct Via Salty
Route: Sao Francisco Do Sul	Baltimore	Strait of Canso	Quebec	
Direct	$ 7.07	$ 7.32	$ 8.10	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 11.98	$ 9.70	
Rail to Detroit	$ 37.80			
Direct Salty				$ 31.39
Total Cost/ton	$ 48.87	$ 23.30	**$ 21.80**	$ 31.39
Differential Strait of Canso To Least Cost Routing			$ 1.50	

Table 4-41 **Shanghai/Detroit Port Pairing**

Logistics Cost $/Ton				
	Tranship Using US Laker To Detroit			Direct Via Salty
Route: Shanghai	Baltimore	Strait of Canso	Quebec	
Direct	$ 17.68	$ 18.36	$ 19.13	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - US Laker		$ 16.71	$ 13.40	
Rail to Detroit	$ 37.80			
Direct Salty				$ 56.69
Total Cost/ton	$ 59.48	$ 39.07	**$ 36.53**	$ 56.69
Differential Strait of Canso To Least Cost Routing			$ 2.54	

Logistics Cost $/Ton				
	Tranship Using Salty To Detroit			Direct Via Salty
Route: Shanghai	Baltimore	Strait of Canso	Quebec	
Direct	$ 17.68	$ 18.36	$ 19.13	
Handling Costs	$ 4.00	$ 4.00	$ 4.00	
Feeder - Salty		$ 11.98	$ 9.70	
Rail to Detroit	$ 37.80			
Direct Salty				$ 56.69
Total Cost/ton	$ 59.48	$ 34.34	**$ 32.83**	$ 56.69
Differential Strait of Canso To Least Cost Routing			$ 1.51	

4.3.3 Logistics Cost Analysis Conclusions/Implications

In conclusion, the logistics cost analysis suggests that transshipment through Quebec is slightly more cost effective than transshipment through the Strait of Canso. Use of a bulk transshipment facility at the Strait of Canso Superport is consistently the second most cost effective method to serve the steel and industrial facilities located at the key Great Lakes ports. However, land area for development of transshipment may be more limited at Quebec. Furthermore, on longer Asian routings, the differential between the Strait of Canso and Quebec routings narrows. Given land availability and aggressive pricing, the Strait of Canso may have the opportunity to compete for transshipment cargoes in specific instances.

The initial analysis of the transshipment markets through the Great Lakes and the Strait of Canso was assessed on a cursory level. The results of the study indicated that there is a potential opportunity for the Strait of Canso to compete with rail transportation costs associated with existing US East Coast ports. Further detailed market analysis is warranted to identify specific commodities and trade routes. Iron ore and coal commodities represent the higher opportunities for transshipment through the Strait of Canso as well as longer trade routes to regions such as Asia and India.

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5.0 STRATEGIC MARKETING PLAN

5.0 Strategic Marketing Plan

It is recommended that the Strait of Canso Superport Corporation pursue a three-phased marketing program. The first Phase of the program should be directed to securing the commodity opportunities identified in the analysis, particularly focusing on the coal opportunity. This will require continual discussions with Xstrata, focusing on the cost effectiveness of the development of a barge operation from the mine to the Strait Superport. This will entail contacts with barge operators as well as coordination with a terminal operator at the Superport. In reality, this focus on a coal export transshipment operation is consistent with the second phase of the market recommendations, which is the development of the transshipment concept, and the marketing of this concept to potential terminal operators and investors. The key bulk terminal operators that will need to be targeted include:

- Babcock and Brown;
- Hutchison Port Holdings;
- Associated British Ports;
- European Bulk Handling Installation;
- International Bulk Terminals Group;
- DP Ports;
- PD Ports;
- Euroports;
- Stevedoring Services of America;
- Highstar Capital/Ports America; and
- Kinder Morgan Bulk Terminals.

Initial contact should be made with these operators to “test the concept”. The next step in the development of a marketing campaign targeted to potential operators/investors is to develop more detailed market research, including the identification and interviews with the key importers of dry bulk cargoes at the respective Great Lakes ports. These interviews must focus on an assessment of current logistics patterns now in place (rail vs. direct service), logistics costs, ability to use the Strait of Canso as an inventory control mechanism and transshipment center, seasonality needs, shipment lot size requirements, etc. A documentation of these factors will be required prior to developing a formal marketing campaign to terminal operators/investors.

In addition to developing the more detailed market intelligence on potential transshipment markets, it is recommended that a basic concept plan be developed for the transshipment facility to size the terminal and develop a rough order of magnitude cost estimate. A detailed market analysis and conceptual plan can be used to market the site to potential operators.

The market analysis also identified an opportunity to import or export wind mill components as a part of the National Renewable Energy Program in Canada. Currently the existing terminal facilities in the Strait of Canso are not of adequate size to accommodate the large superstructures involved in wind mill components. If this market materializes new terminal facilities would need to be developed to accommodate the large cargo. Due to the nature of the design and layout of these facilities with a wharf and large open storage yard, these

facilities may be combined with other terminal operations such as offshore energy support facilities. The types of activities could be coordinated to complement each other and expand the use of the terminal facilities.
With Daewoo developing a wind mill component manufacturing facility in Trenton, there is potential for attracting export cargo through this facility as well. Further analysis will need to occur to evaluate competition with other surrounding ports and potential logistic costs. It would be beneficial for the SCSCL to reach out to Daewoo during the early stages of their facility development.

The third phase of the marketing strategy should be targeted to the wind energy companies identified in this report, including not only the offshore operations but also the manufacturing companies. These companies include:

- Cape Wind Associates;
- Bluewater Wind;
- Vestas Wind Systems;
- Trillium Power Wind Corp.; and
- Daewoo Industries.

Although the prospects for developments beyond the Sable Island and Deep Panuke fields have declined due to poor field results and reduced natural gas prices, there is a potential for this market to return as demand for product increases. Construction of a new terminal for oil field support may need to be reevaluated as the market recovers and exploration effort returns to the Canadian North Atlantic region. With respect to the offshore oil and natural gas support base operations, the Strait of Canso Superport should begin discussions with Sable Island license holders, which include:

- Ammonite Nova Scotia Corporation;
- BEPCo. Canada Company;
- BP Energy Ltd.;
- Canadian Superior Energy;
- Chevron Canada Limited;
- EnCana Corporation;
- ExxonMobil Canada;
- Scotia Exploration Inc.;
- Shell Canada Limited; and
- Shin Han F&P Inc.

It is recommended that these phases be pursued concurrently, and sequentially except that the marketing of the terminal to potential operators and investors will require a more in-depth market assessment of the current logistics patterns of potential users, as well as the development of conceptual plans and order of magnitude costs to support a transshipment operation as well as an Omni bulk port to move local coal and mineral export opportunities.

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6.0 POTENTIAL TERMINAL DEVELOPMENT SITES

6.0 Potential Terminal Development Sites

6.1 Screening Process

The Strait of Canso geography consists of a water passage located between the mainland of Nova Scotia and Cape Breton Island. The center of the navigation channel is predominantly deep water, and the harbour has a limiting water depth of 27 meters. There are areas of natural deep water along portions of the Strait adjacent to the shoreline. The land terrain ranges from mountainous to steep hillside conditions with intermittent areas of flatter terrain. Characteristically, the steeper hillside areas are located adjacent to natural deep-water areas and the shallower water areas are typically adjacent to the flatter terrains. Much of the flatter terrain located adjacent to deep water has been developed for waterfront industrial purposes and under the control of private land owners. The remaining waterfront development areas are located in more isolated undeveloped areas or have significant hillside development constraints.

A screening process was developed to identify potential development sites along the Strait of Canso for future development opportunities. The initial screening process consisted of the following assessments, listed in order of operation:

- Site availability – eliminate existing industrial waterfront sites
- Deep water access (existing conditions)
- Ground elevation above sea level (natural terrain)
- Slope analysis and general landform terrain

The purpose of the screening process was to provide a focus for future land development decisions. SCSCL and NSBI are contacted on a regular basis by private terminal developers looking for potential terminal sites in the region. The screening process will help to identify where future development should occur. Initial review of the Strait of Canso hydrographic maps revealed that limited areas of natural deep water conditions existed along the shoreline. It became apparent that critical deep water resources should be identified and reserved for future development. These development sites will be used later to assess potential terminal locations for the market opportunities identified in the market analysis. The more credible sites will be identified as potential acquisition targets or land banked for future terminal opportunities.

The following sections provide an overview of the screening process approach and general findings for each criterion.

6.2 General Development Criteria Considered

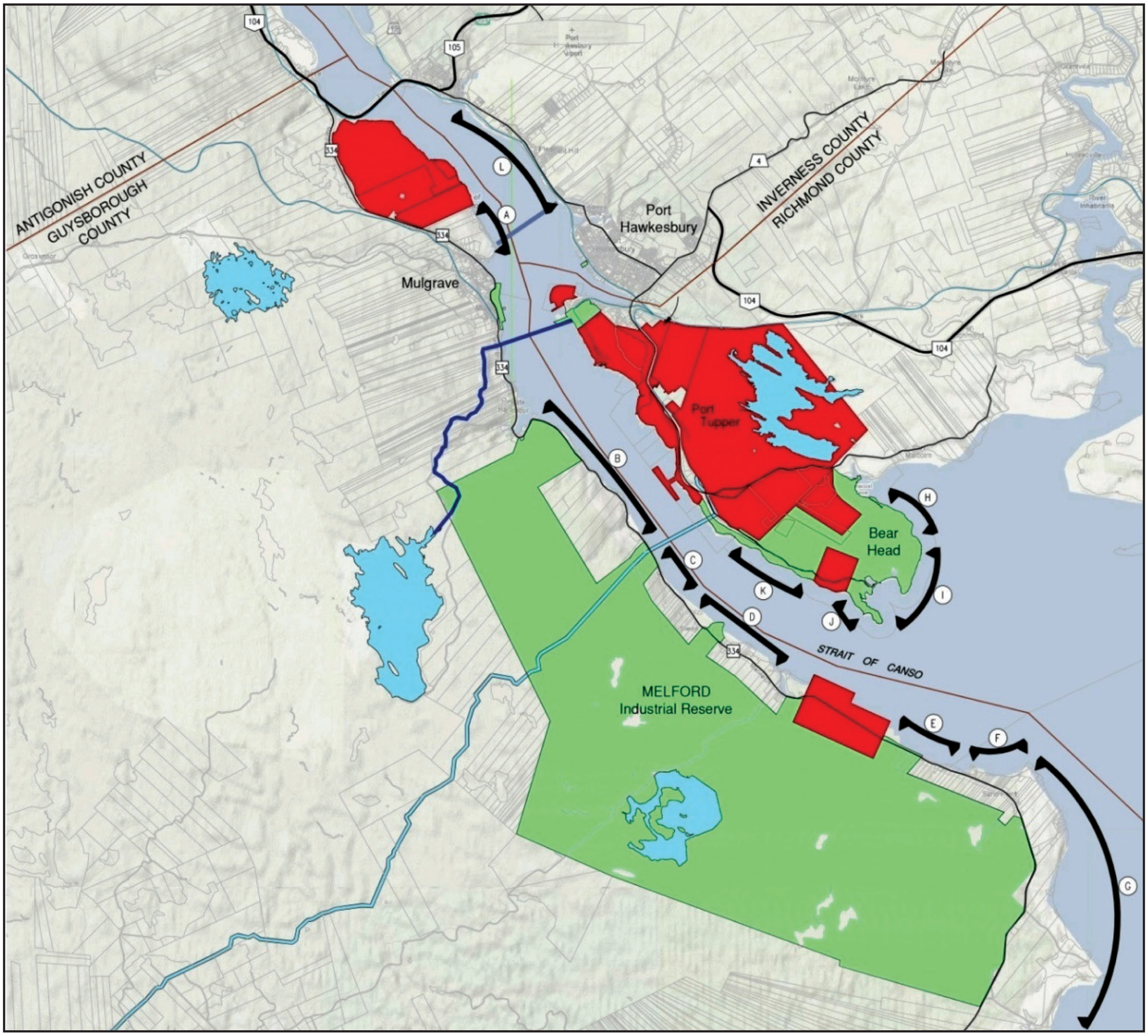
6.2.1 Site Availability

The first screening process consisted of reviewing the Opportunities and Constraints Map along with the Property Ownership Maps developed in subsequent tasks. Waterfront land areas that were currently developed with industrial uses or terminals were excluded. In addition, land areas that were/are under development, such as the Bear Head LNG terminal and Maher Melford Terminal (container terminal), were excluded as well.

The second screening of the site availability assessment included a cursory review of water access or terrain constraints to identify significant dredging or grading that would need to occur prior to development. The land areas were divided into flatter terrain, hillside and steep. The excessively shallow water areas were identified as well.

A total of 12 sites were assessed in the initial screening process. The initial 12 screening sites are depicted in the site development map in Figure 6-1. The sites are superimposed on the Opportunities and Constraints map, where red areas are constraints and green areas are possible opportunities.

Figure 6-1 **Potential Development Sites**



Of the 12 sites investigated, eight warrant further investigation. The results of the initial screening assessment and general site observations are included in Table 6-2.

Table 6-2 **Deep Water Access Study – Initial Screening Results**

Site	Further Study	General Observations
A	Yes	Steepy Hilly Terrain
B	Yes	Steepy Hilly Terrain
C	Yes	Hilly Terrain
D	Yes	Flat Terrain
E	Yes	Steepy Hilly Terrain
F	Yes	Steepy Hilly Terrain
G	No	Faces Open Ocean/ Steepy Hilly Terrain
H	No	Extensive Dredging/Shallow Water
I	No	Faces Open Ocean
J	Yes	Flatter Terrain/Shallow Water
K	Yes	Steepy Hilly Terrain
L	No	Highway/Rail Corridor/Coastal Urban Development

Note: Areas of Existing Terminal Development Not Considered in Study

6.2.2 Deep Water Access / General Vessel Criteria Assumptions

Following the initial screening process, a deep-water access study was conducted to review the locations of natural deep water adjacent to the shoreline. The study included a review of existing hydrographic mapping within the Strait of Canso and development of general vessel criteria to determine a range of water depth requirements.

General vessel criteria were developed to determine what type of vessels might call at the future terminal sites based on existing vessel fleet requirements and potential new vessels. The consultant team worked with the Strait Superport Corporation staff to identify the class of vessels that may call at the port in the future. It was determined that three classes of vessels would be considered in the general vessel assumptions; Handymax general cargo ship, Panamax bulk cargo ship or tanker vessel, and Very Large/Ultra Large Crude Carrier tanker vessels. Table 6-3 provides an overview of the vessel types and water depth requirements in feet and meters. This water depth dimension will be used to position the future pier positions adjacent to the shore, with the goal of identification of deep water adjacent to the shoreline.

Table 6-3 **General Vessel Criteria and Water Depth Requirements**

Vessel Type	Water Depth (includes under keel clearance)	
	Feet	Meters
Handy Max	40-50	12.2-15.5
Panamax	50-60	15.2-18.3
Tanker (VLCC/ULCC)	60-80	18.3-24.4

The resulting brackets were developed based on the vessel criteria for each type of vessel. Due to the distance from the shore to deep water it is assumed that all future terminals will require offshore pier structures to access the deeper water areas. Additional study will be necessary in the future to assess potential dredge/fill operations to access deep water. Therefore, it was assumed that berthing areas closest to shore were the most advantages to contain future pier development costs.

The hydrographic mapping is included in Figure 6-4 in section 6.2.3 to illustrate the locations of the deep water and their proximity to the existing shoreline.

6.2.3 Ground Elevation Relative to Sea Water Elevation

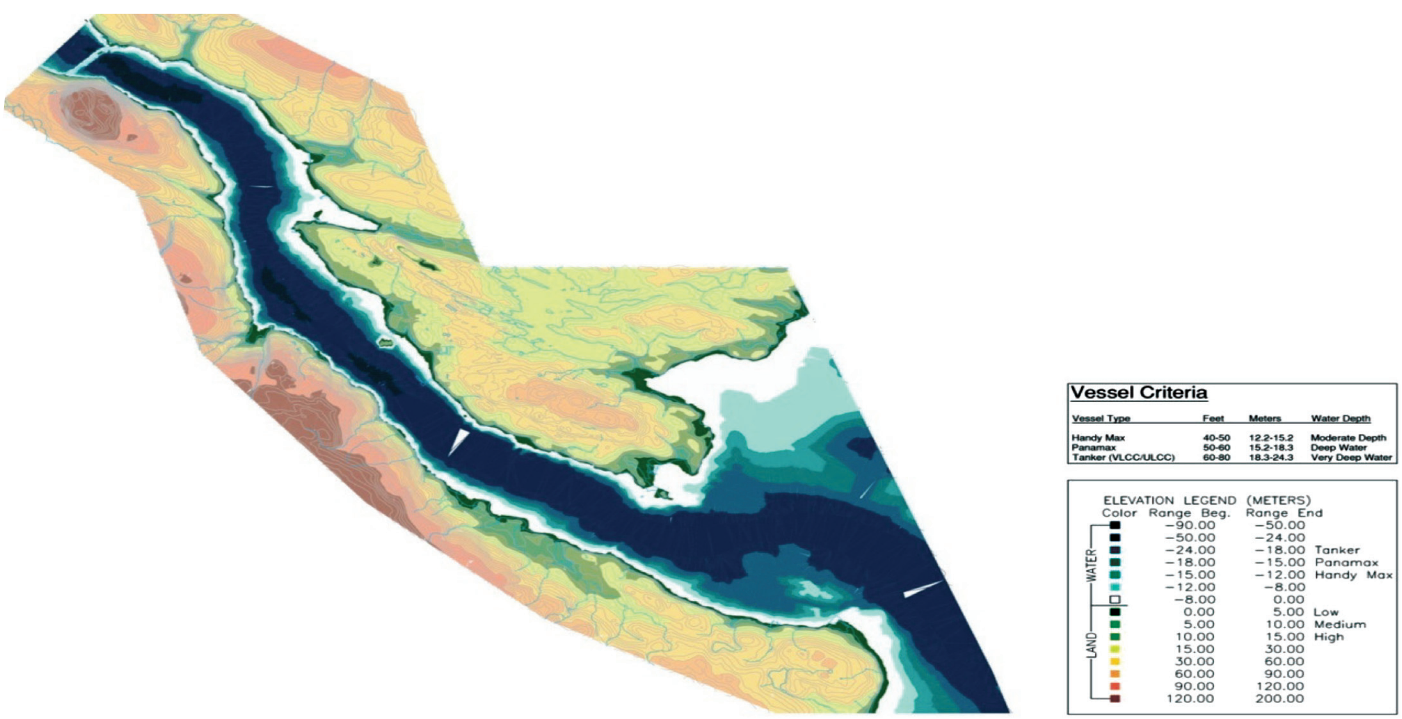
Wharf structures in the Strait of Canso are typically constructed at approximately +5.0 meters above mean low low water level (MLLW). To limit on-site grading operations the development sites that were within +0.0 to +10.0 meters were identified as the primary sites due to limited grading necessary to meet the proposed +5.0 meter wharf structure height. Site elevation criteria were developed to assess acceptable ground elevation limits relative to sea level at each of the potential development sites:

+0.0 to +5.0 meters	Low Elevation
+5.0 to +10.0 meters	Moderate Elevation
Beyond +10.0 meters	High Elevation

The areas that exceeded +10.0 meters above sea level were considered as hillside areas with limited marine terminal development opportunities other than liquid bulk or chemical terminals with remote tank farms and pipeline systems. The extensive costs associated with large scale grading projects will need to be assessed on a case-by-case basis to determine the overall project development cost and projected revenue streams. Typically, terminal development in this region comes from private investment in the facilities and this will be a part of their evaluation process. For the purpose of the site selection process, the assessment evaluates existing terrain conditions with minimal modifications.

A contour map was developed to combine the hydrographic mapping and ground elevations to identify deep-water areas and assess the ground elevation at the waterfront areas. This map is depicted in Figure 6-4. The darker blue areas within the channel identify the deeper water areas based on the vessel criteria discussed in the previous section. The land area has been mapped to identify the low, moderate and higher elevation areas with the dark green areas as the lower elevations going into lighter tan as the elevations increase.

Figure 6-4 **Hydrographic Map with Land Elevations**



As can be seen in Figure 6.4, the lower elevation areas are located near shallow water and the hillside terrain with higher elevations is located near the deeper water. However, two areas show promise along the Melford Industrial Land Reserve and Bear Head Industrial Reserve that provide fairly large lower elevation areas.

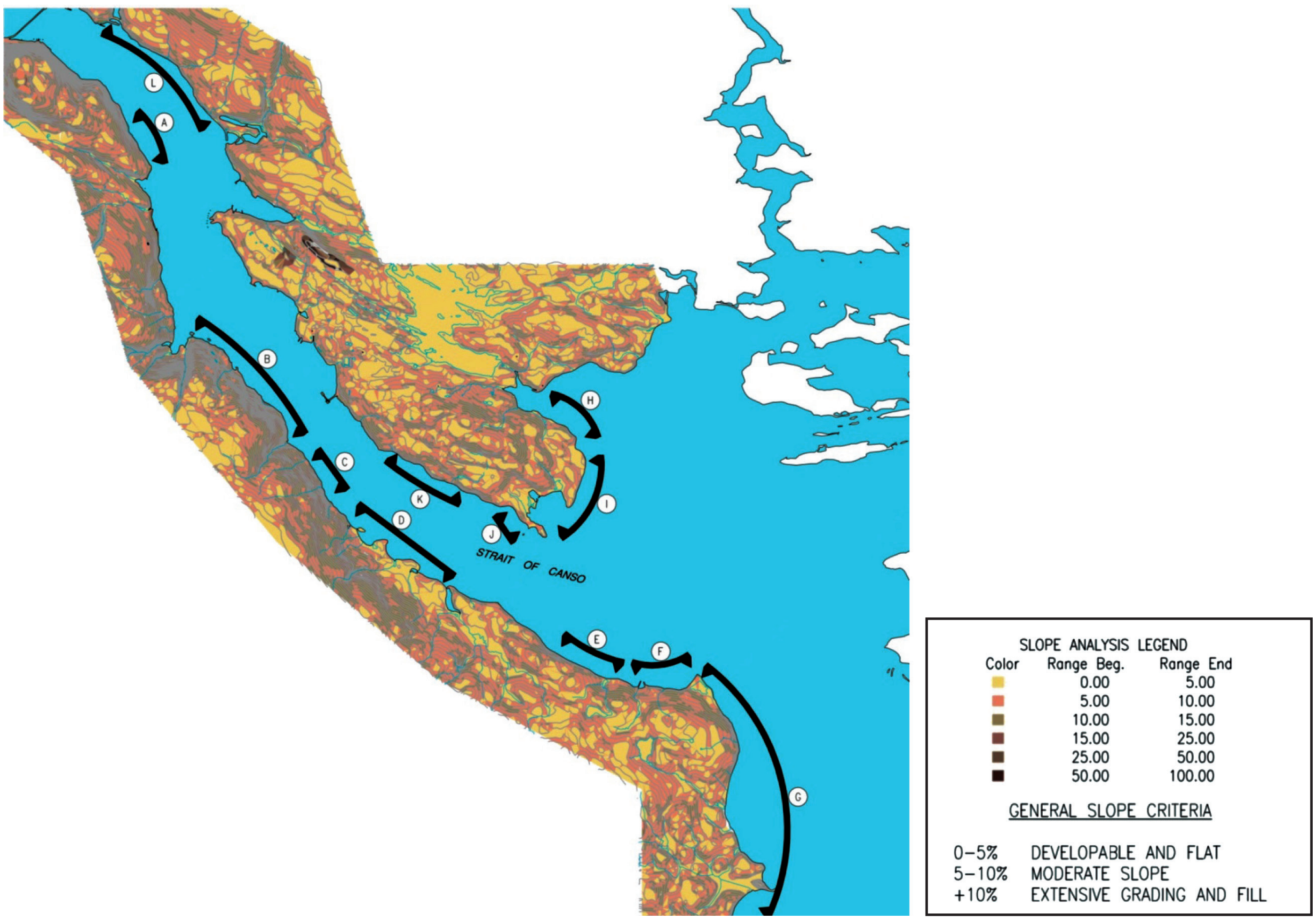
6.2.4 Slope Analysis

In addition to reviewing ground elevations relative to sea level, the assessment also included a review of the slope gradient along the Strait of Canso to determine how steep the slopes were along the coastline. This effort will be used to identify the flatter terrain along with the steeper hillside areas that will require more extensive grading operations or terracing the development site for future development. Slope is a calculation of the rise (change in elevation) over the run (distance). The higher the slope ratio indicates steeper terrain.

The land elevation map was modified to assess the slope analysis of the coastline and is shown in Figure 6-5. The lighter colored areas indicate the lower slope elevations. General slope criteria were developed to assess ease of development based on the steepness of the terrain and need for grading activity. The following slope criteria apply:

0% to 5% Slope	Flatter terrain
5% to 10% Slope	Moderate slope and grading
Above 10% Slope	Extensive grading and fill required

Figure 6-5 **Slope Analysis Map**



6.2.5 Site Selection Conclusions

There are some options for future waterfront terminal development along the Strait of Canso. Due to existing terminal developments having occupied many of the prime sites and rugged terrain restricting development on others, the options are not as numerous as first anticipated. Potential development sites should be targeted for acquisition and land banking pending developer interest. The market analysis identified potential terminal opportunities and the flatter terrain areas should be reserved for these emerging terminal options. The hillside development areas are more conducive to liquid or gas cargoes that can be transported to higher elevations with pipelines.

There are four distinct terminal development sites identified during the initial site assessments:

Site D	Flat Terrain – Moderate to Deep Water Depth
Site E	Hillside Terrain – Deep to Very Deep Water
Site J	Flat Terrain – Shallow to Moderate Water Depth
Site K	Hillside Terrain – Deep to Very Deep Water

Based on the results of the slope analysis there are a few areas remaining that offer flatter terrain adjacent to the waterfront, including Sites D, H, I and J. Sites H and I were eliminated due to the extensive shallow water shelf that exists along this portion of the coastline, which would require extensive dredging activity to create the necessary water depths. Sites D and J offer reasonable opportunities for flatter terrain adjacent to the waterfront.

There are also limited areas located adjacent to natural deep water for deep draft vessels. Two of the potential sites provide deeper water near the shoreline, which include Sites E and K. However, these sites are also constrained by extreme changes in elevation and higher slopes. Due to the hillside nature of the sites, they may be more appropriate as future liquid bulk terminals with remote tank farms on the hillsides with terracing.

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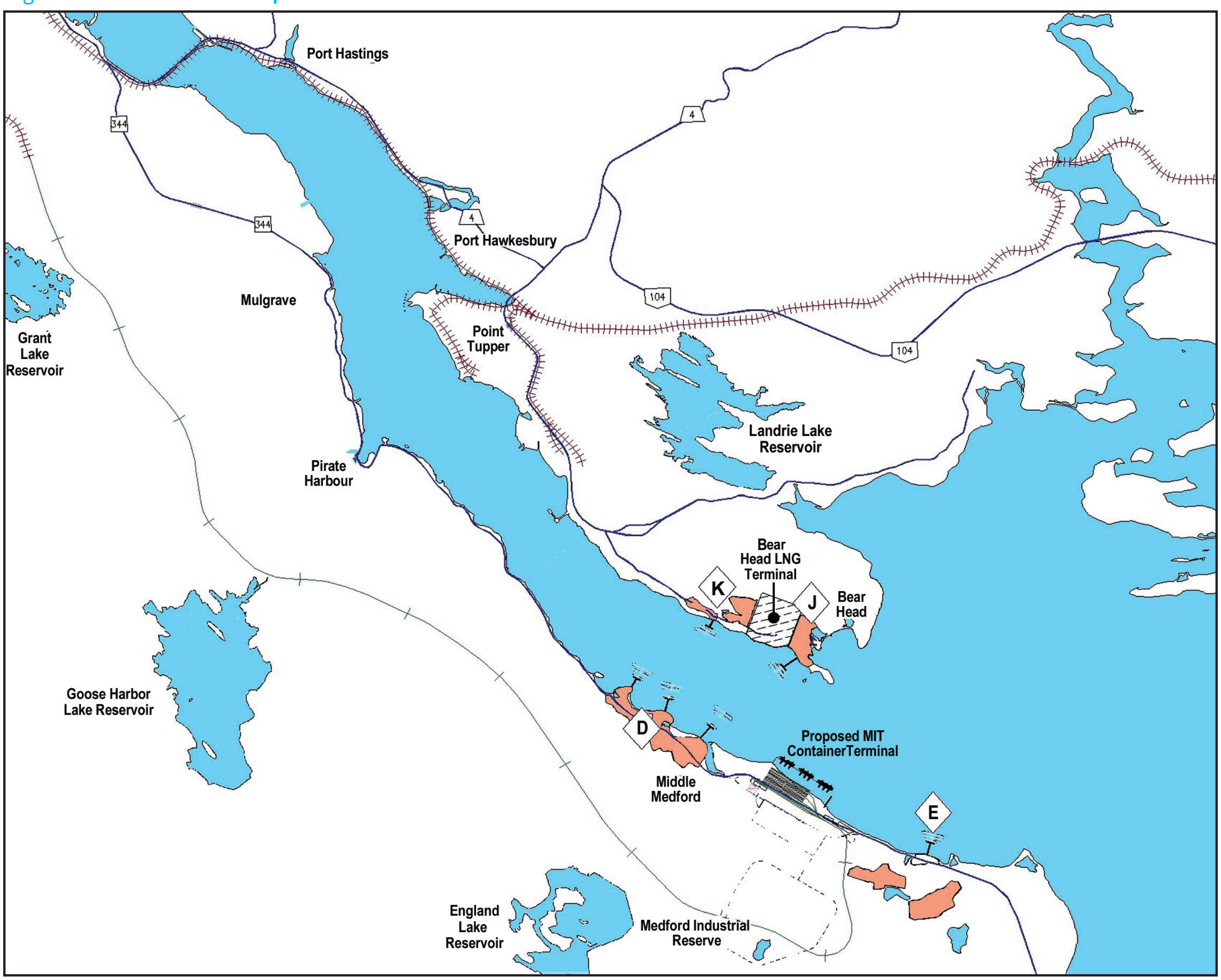
7.0 Preferred Terminal Development Sites

The initial screening process resulted in the identification of four preferred terminal development sites. The details of the evaluation process and findings are detailed in the previous chapter, Section 6.0. The following sites were identified as the preferred terminal development sites:

- Site D – Byers Cove
- Site E – Eddy Cove
- Site J – Bear Head
- Site K – Ship Point

Sites D and J are characterized by relatively flatter terrain adjacent to the waterfront. Sites E and K are noted as hillside terrain with flatter portions of land at higher elevations. The general locations of the four preferred development sites are illustrated in Figure 7-1.

Figure 7-1 **Preferred Development Sites**



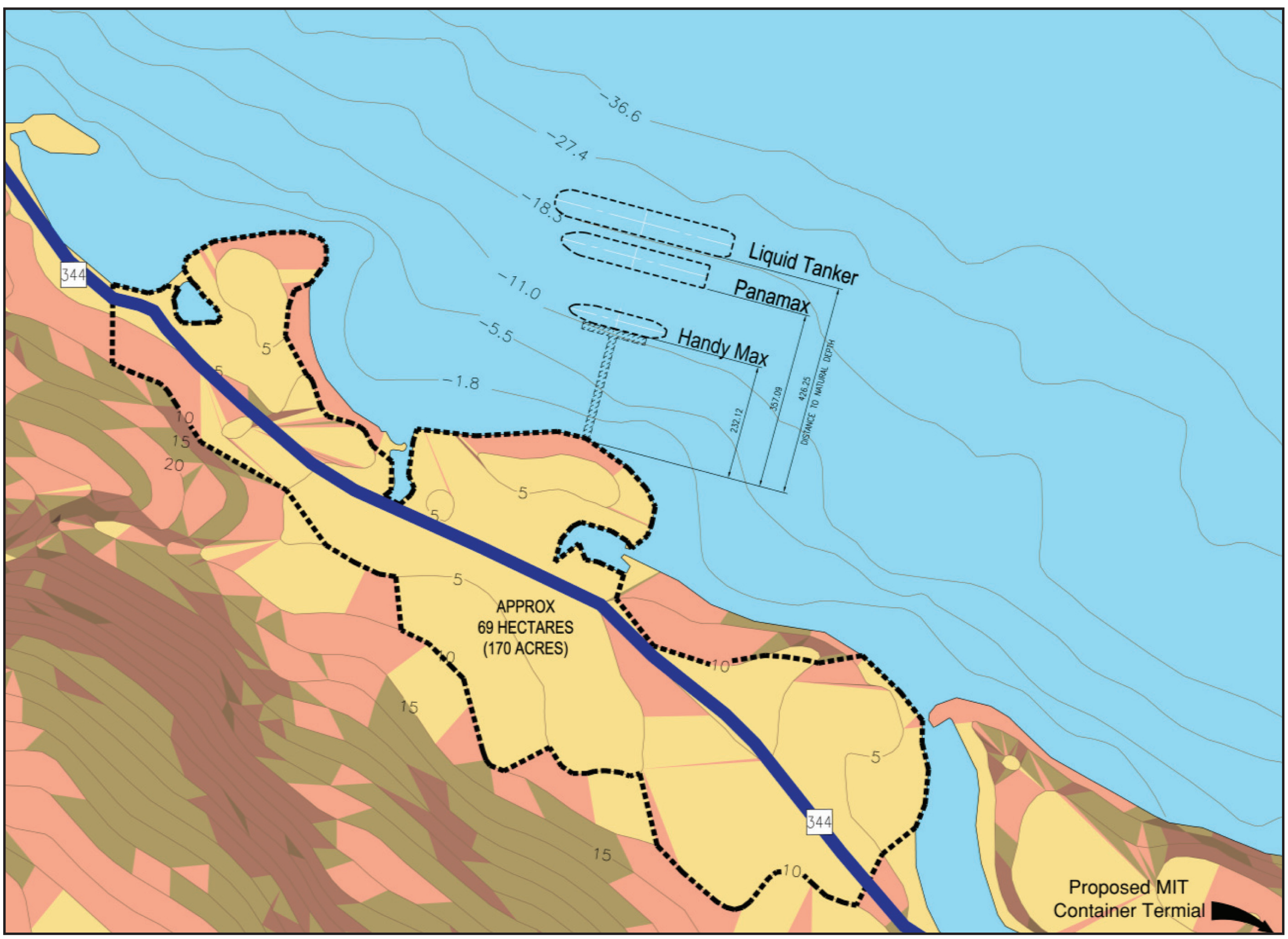
Sites D and E are located in the vicinity of the Melford Industrial Land Reserve on the mainland, adjacent to the proposed Maher Melford Terminal development site. Sites J and K are located in the Bear Head Industrial Reserve on Cape Breton Island. Further details of each of the specific development sites are included in the following subsections.

7.1 Site D – Byers Cove

Preferred terminal development Site D is located on the west side of the Strait of Canso adjacent to and within the Melford Industrial Land Reserve and just north of the proposed Maher Melford Terminal. Of the four preferred terminal development sites, Site D offers the highest terminal development potential due to the relatively flat terrain and large contiguous land area. The site is also approximately at 5.0 to 10.0 meters above sea level throughout most of the site. The site boundary consists of approximately 69.0 hectares (170 acres) of land area. Highway 344 currently bisects the development site and may need to be relocated to maximize use of the site. The terminal development and road relocation costs would need to be covered by the future private developer.

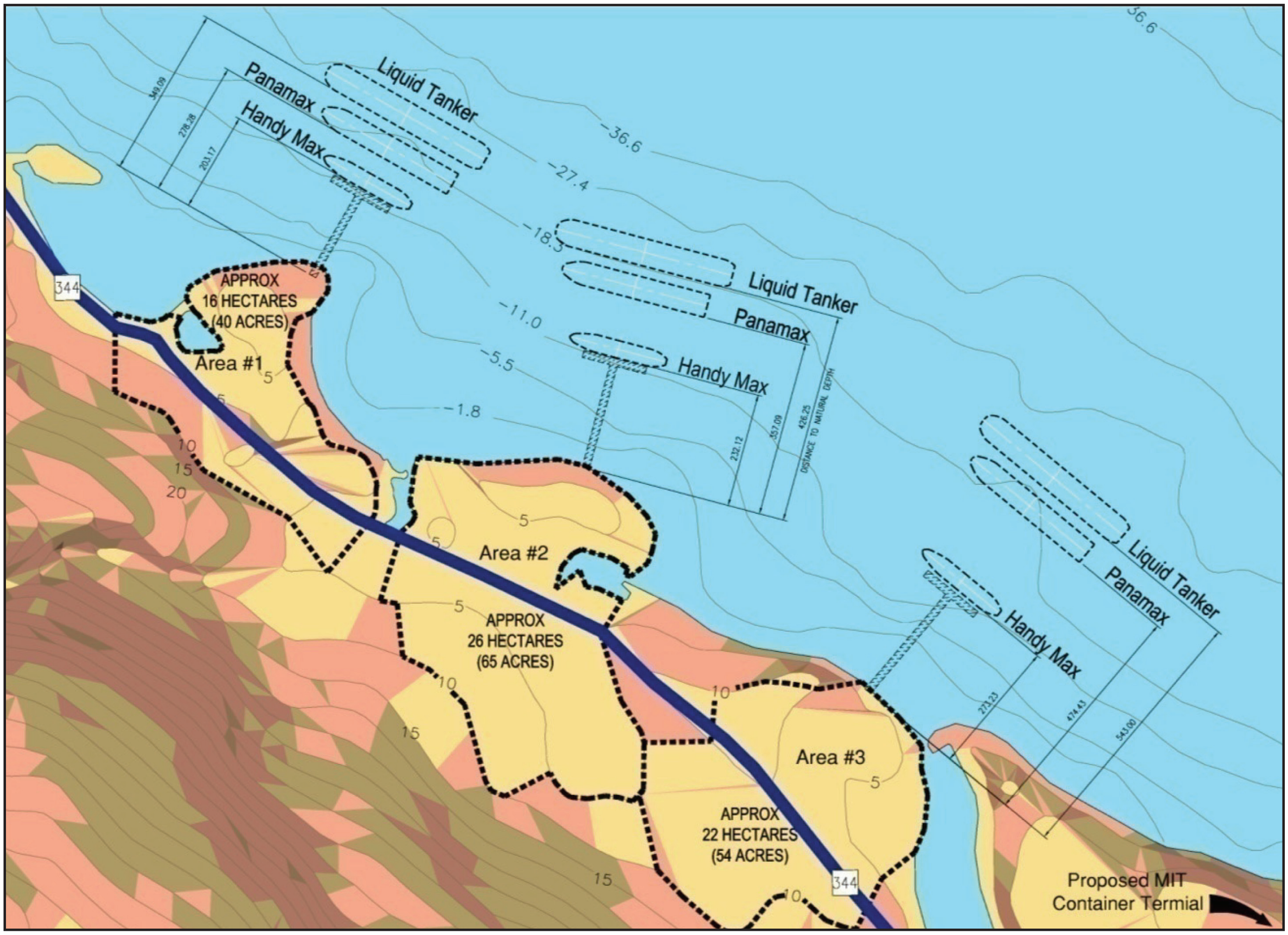
The general site and potential pier placement to access deep water is shown in Figure 7-2. The land area includes the slope analysis map as the background, where lighter colors represent the flatter terrain.

Figure 7-2 **Site D – Single Terminal Layout**



Due to the site configuration and land area at Site D, the site could be divided into two or three individual terminal sites with separate or combined pier configurations. A potential multi-terminal layout is depicted in Figure 7-3. This option provides three terminals ranging in size from 16.0 hectares (40.0 acres) to 26.0 hectares (65.0 acres).

Figure 7-3 **Site D – Multi-Terminal Layout**



Distance to deep-water access is depicted on both figures. The pier locations are conceptual in nature and further refinement will occur during the actual design process after evaluating the underlying geotechnical properties and potential cost benefits of dredging to bring the structure closer to shore. The current configuration places the pier in natural deep water without dredging requirements. Generally, the Handymax class vessel pier would be approximately 200 to 270 meters off the coast to access the required water draft. The Panamax and Tanker vessels would require further offsets to reach deep water. Area #1 provides the shortest distance to deep water for all vessel classes anticipated.

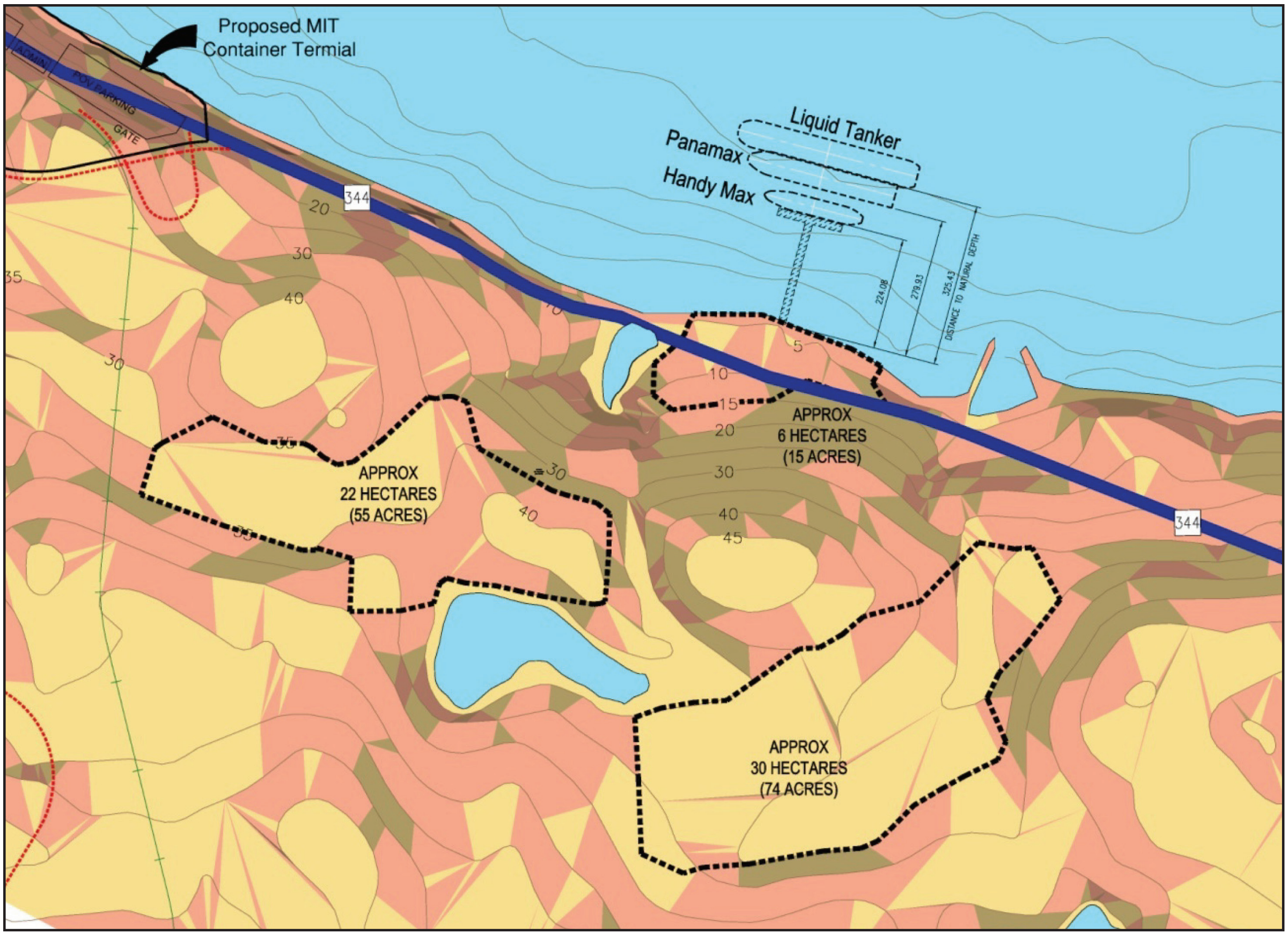
If more aggressive grading and dredging were considered, there is an option to fill the cove between Area #1 and #2 to provide a wharf with associated backland adjacent to the berth. This option would benefit the types of cargo activities associated with Handymax vessels. This berth option will require further evaluation to assess the project costs and relocation of an existing natural drainage outlet.

7.2 Site E – Eddy Cove

Preferred terminal development Site E is located on the west side of the Strait of Canso and south of the proposed Maher Melford Terminal. The site is also located in the vicinity of the private Eddy Point Commercial Fishing Marina. The site is characterized by a small flat area at the waterfront with potential storage areas at much higher elevations of 30 to 40 meters above sea level. The shoreline area consists of a 6.0 hectare site (15.0 acres) and two storage areas of 22.0 hectares (55.0 acres) and 30.0 hectares (74.0 acres). Total site area is approximately 58.0 hectares (154.0 acres). The general site configuration is provided in Figure 7-4.

The hillside terrain and high elevation storage area makes this site more appropriate for liquid bulk or gas terminal development. Access to tanker level deep water is approximately 325 meters.

Figure 7-4 **Site E – Hillside Development**

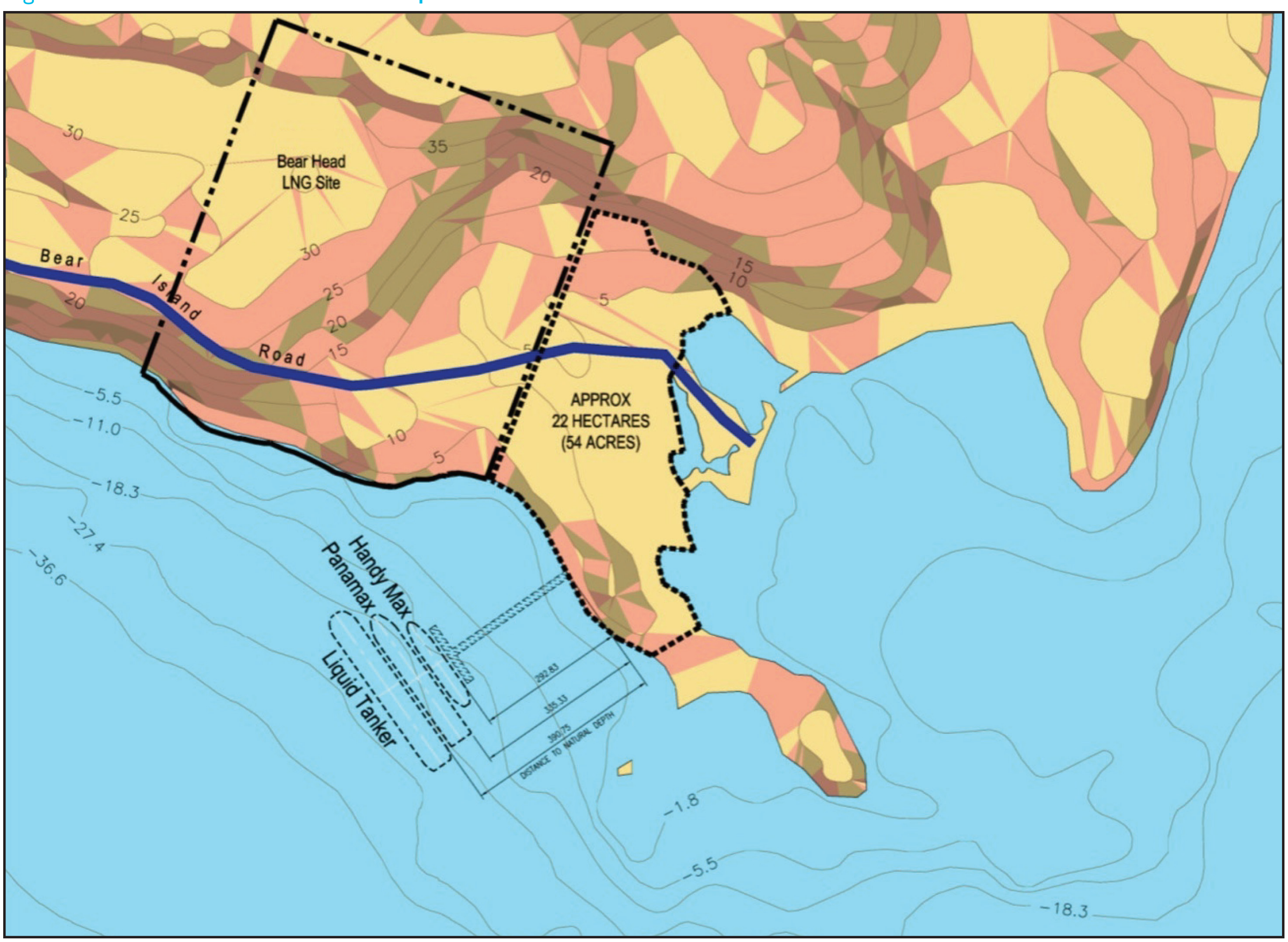


7.3 Site J – Bear Head

Preferred terminal development Site J is located near the southern portion of the Bear Head Industrial Reserve, on the east side of the Strait of Canso. The site is also located adjacent to the partially constructed Bear Head LNG terminal site. Site J is characterized by relatively flat terrain and longer reach to access deeper water. The site offers approximately 22 hectares (54.0 acres) of land area with minimal grading activity. The Handymax class water depths can be accessed at approximately 293 meters off the coast. Site J is shown in Figure 7-5. Future pier orientation and terminal layout will need to be coordinated with the Bear Head LNG terminal developers. The Bear Head LNG development permits include potential blast hazard and fire protection areas that need to be avoided. In some cases habitable buildings and personnel activities may be constricted on portions of Site J. Vessel berthing and navigation will need further study as well to assess adjacent ship activities and potential blast hazard footprints. This additional review and coordination will be required during initial due diligence investigations conducted by potential private terminal developers at this site.

Bear Island Road is unpaved as it crosses the Bear Head LNG terminal site and accesses Site J. Due to potential security issues, this road may need to be relocated in the future to avoid the LNG terminal. There are possible options to relocate the road alignment east of the terminal and tie into roads constructed for the Point Tupper Wind Farm. This will require further coordination with the Bear Head LNG terminal developers and NSBI to evaluate options and distribute roadway costs.

Figure 7-5 **Site J – Flatter Terrain Development**

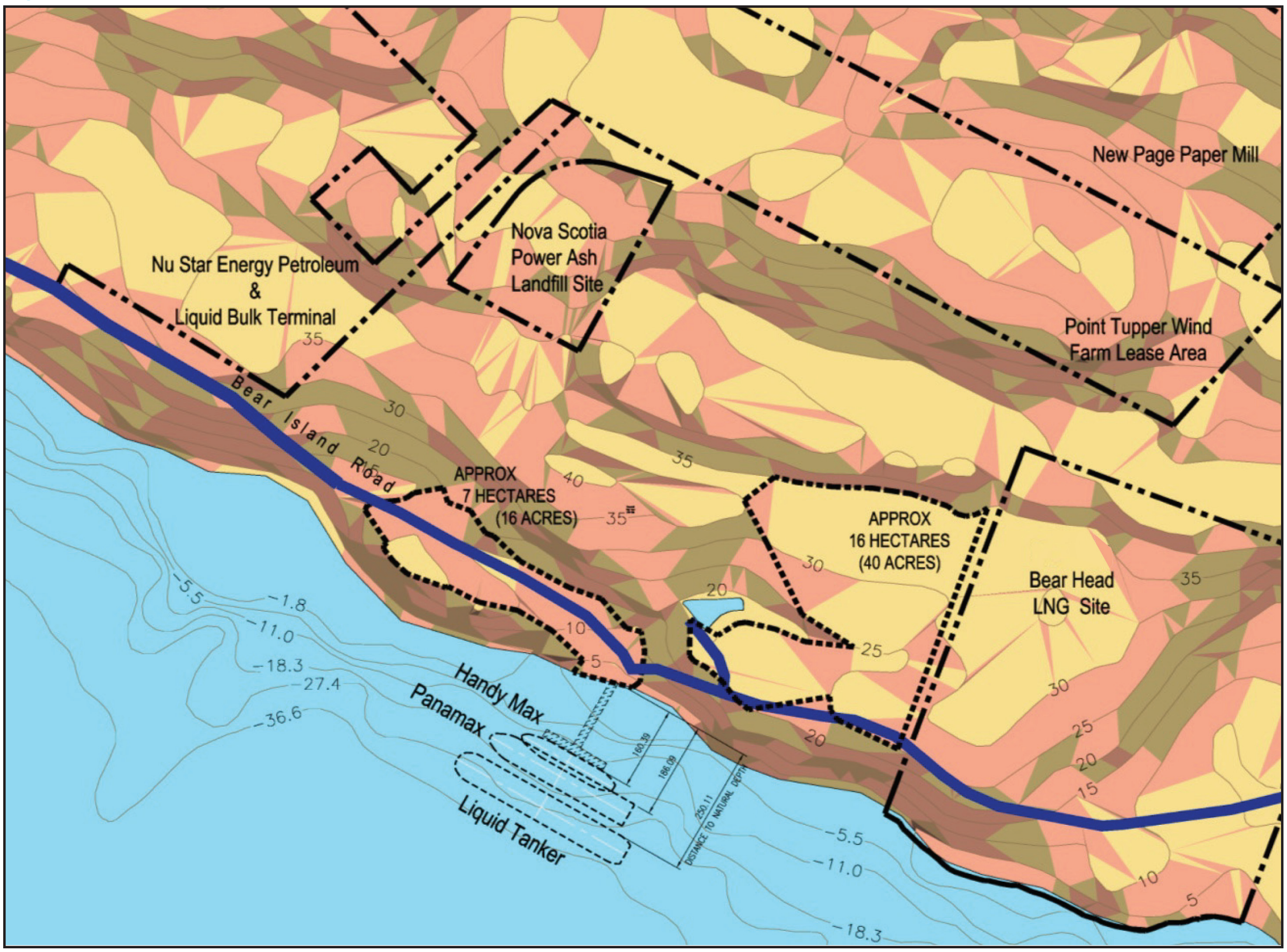


7.4 Site K – Ship Point

Preferred terminal development Site K is located on the eastern side of the Strait of Canso between the NuStar Energy liquid bulk terminal and the Bear Head LNG terminal site. The site generally consists of hillside terrain with flatter storage areas at 20.0 to 25.0 meters above sea level. There is a 7.0 hectare (16.0 acre) area located adjacent to the waterfront, with a 16.0 hectare (40.0 acre) potential storage area adjacent to the Bear Head LNG terminal site. There is additional flatter area for storage area expansion at 40 meters above sea level on the northern portions of the site. The hillside nature of the terrain with storage areas at higher elevations is best suited to liquid bulk or gas related terminal development. The Site K area is depicted in Figure 7-6.

The offshore channel bathymetry falls off quickly and deep water is accessed quickly. The tanker water depths are available at approximately 250 meters.

Figure 7-6 **Site K – Hillside Development**



7.5 Potential Terminal Uses for Flatter Terrain Conditions

Preferred terminal development Sites D and J consist of flatter terrain at lower elevations adjacent to the waterfront. These areas should be reserved for cargoes that require cargo storage adjacent to the pier structure for shorter conveyance routes. Typical examples of terminal uses on the flatter terrain conditions are listed below:

- Break bulk
- Dry bulk
- Waterfront industrial and manufacturing uses
- Offshore oil field support facilities

7.6 Potential Terminal Uses for Hillside Terrain Conditions

Preferred terminal development Sites E and K are hillside terminal sites with limited flat terrain at the waterfront. In addition, these sites are characterized by flatter terrain at higher elevations. Due to the steep terrain and changes in elevation, these sites are more suitable to liquid bulk or gas type cargoes that can be conveyed by pipeline. Typical examples of terminal uses on the hillside terrain conditions are listed below:

- Liquid bulk/petroleum
- Liquid bulk/chemical
- Natural gas/LNG
- Oil Refineries

8.0 PREFERRED SITE
DEVELOPMENT CONSIDERATIONS

8.0 Preferred Site Development Considerations

In Section 7.0, the potential development sites were generally selected based on the physical attributes of the site terrain and adjacency to naturally deep water areas. In this section, we will explore development considerations that may limit or alter use of the preferred development sites.

Upon review by the Strait of Canso Superport Corporation staff and Board, further site assessment was necessary to address the following site development considerations:

- Site Zoning
- Property Ownership
- Navigational Aids
- Aquacultural Resources

The following subsections provide further details on the potential development considerations encountered at each of the preferred development sites.

8.1 Zoning and Property Ownership Considerations

The preferred development sites are generally located on the east and west side of the Strait of Canso. Sites D and E are located on the west side of the Strait, adjacent to or within the Melford Industrial Land Reserve. Zoning in this region is administered by the Municipality of the District of Guysborough. Sites J and K are located on the east side of the Strait within the Bear Head Industrial Reserve, and zoning is administered by the Municipality of the County of Richmond.

This subsection will also address property ownership considerations. This is most relative to the preferred development sites located adjacent to the Melford Industrial Land Reserve where private property parcels exist. The preferred development sites in the Bear Head Industrial Reserve are owned by the Province of Nova Scotia.

Site D – Byers Cove Area

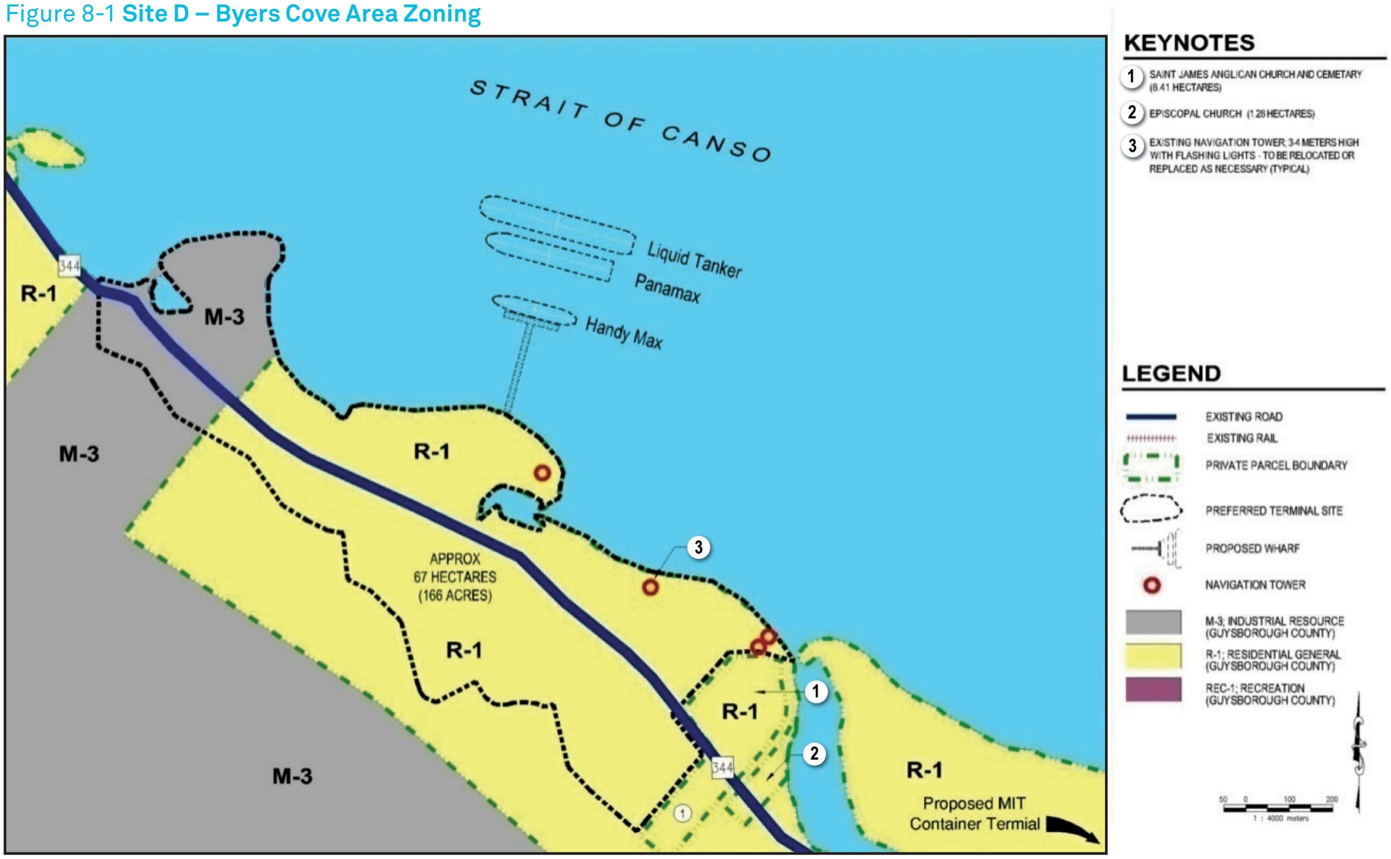
Site D is located on the west side of the Strait of Canso adjacent to and within the Melford Industrial Land Reserve, north of the proposed Maher Melford Terminal. Zoning in this region is administered by the Municipality of the District of Guysborough. The general site configuration and zoning in the vicinity of Site D is shown in Figure 8-1.

As indicated on the drawing, the majority of the preferred development site is zoned R-1: General Residential. A smaller portion of the site is zoned M-3: Industrial Resource.

Much of the Site D area includes privately owned parcels. In addition, the site is located next to parcels owned by the Anglican and Episcopal churches. The Anglican Church site is identified as Keynote #1 in Figure 8-1 and includes the church site and a cemetery. The Episcopal Church site is identified by Keynote #2 on the figure. The church sites are considered as culturally significant resources in the region and have been excluded from the preferred development site boundary.

The existing alignment of regional Highway 344 bisects the boundary of Site D. Future development of this terminal area may consider relocation of the roadway to the west to maximize the development area adjacent to the waterfront. This will be a decision of the future developer. Note that in Figure 8.1, not all properties in the green broken line boundaries are private, some are Crown and owned by the Province of NS. Others are owned by the Municipality of the District of Guysborough.

Figure 8-1 **Site D – Byers Cove Area Zoning**



The large relatively flat land area adjacent to deep water is a rare commodity in the Strait of Canso region. This asset is very favorable for future waterfront development and commercial port interests for generation of regional employment and stimulation of the regional economy. Of the four preferred development sites identified in the land use study, this site holds the best position for attracting future development prospects due to the size of the area and low rolling terrain. This area should be identified and preserved as future port expansion area.

Future development of the Site D area will require rezoning and assistance with property assembly efforts to promote waterfront development of this area.

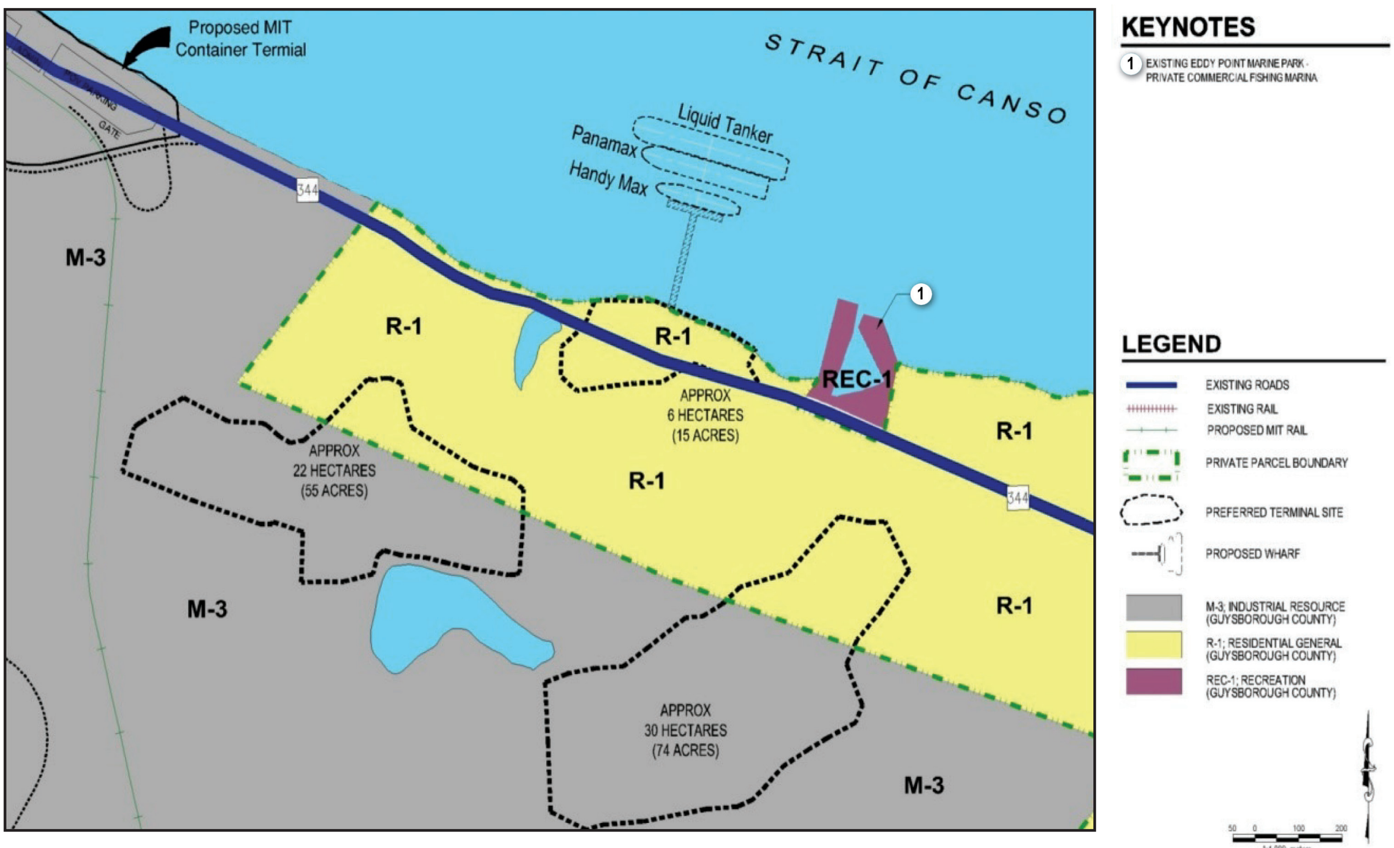
In addition to the zoning and property ownership considerations, Site D also includes four land based navigational aids that are used by vessels in the Strait of Canso. The existing navigation towers are approximately three to four meters in height and include flashing light systems. If possible, the location and visibility of the towers should be maintained. However, if the future development of the site requires impacting the tower locations of view corridors, the navigation towers will need to be relocated or removed to a more suitable location. The remaining development sites do not include land based navigational aids.

Site E – Eddy Cove Area

Site E is located south of the proposed Maher Melford Terminal in the Melford Industrial Land Reserve. Zoning is administered by the Municipality of the District of Guysborough. The general site configuration and zoning in the vicinity of Site E is shown in Figure 8-2.

As depicted in the image, the waterfront portion adjacent to the proposed pier location is zoned R-1: General Residential. The proposed tank farm areas are primarily zoned M-3: Industrial Resource with a smaller portion of each tank farm site zoned R-1: General Residential. The adjacent Eddy Point Marina is zoned REC-1: Recreational.

Figure 8-2 **Site E – Eddy Cove Area Zoning**



Development of this site will require rezoning and property assembly assistance at the waterfront area and tank farm to promote development. Additional rezoning and parcel assembly may be required for pipeline and utility corridors between the wharf and tank farm areas. The ultimate site configuration and parcel requirements will be refined as developer interests are identified.

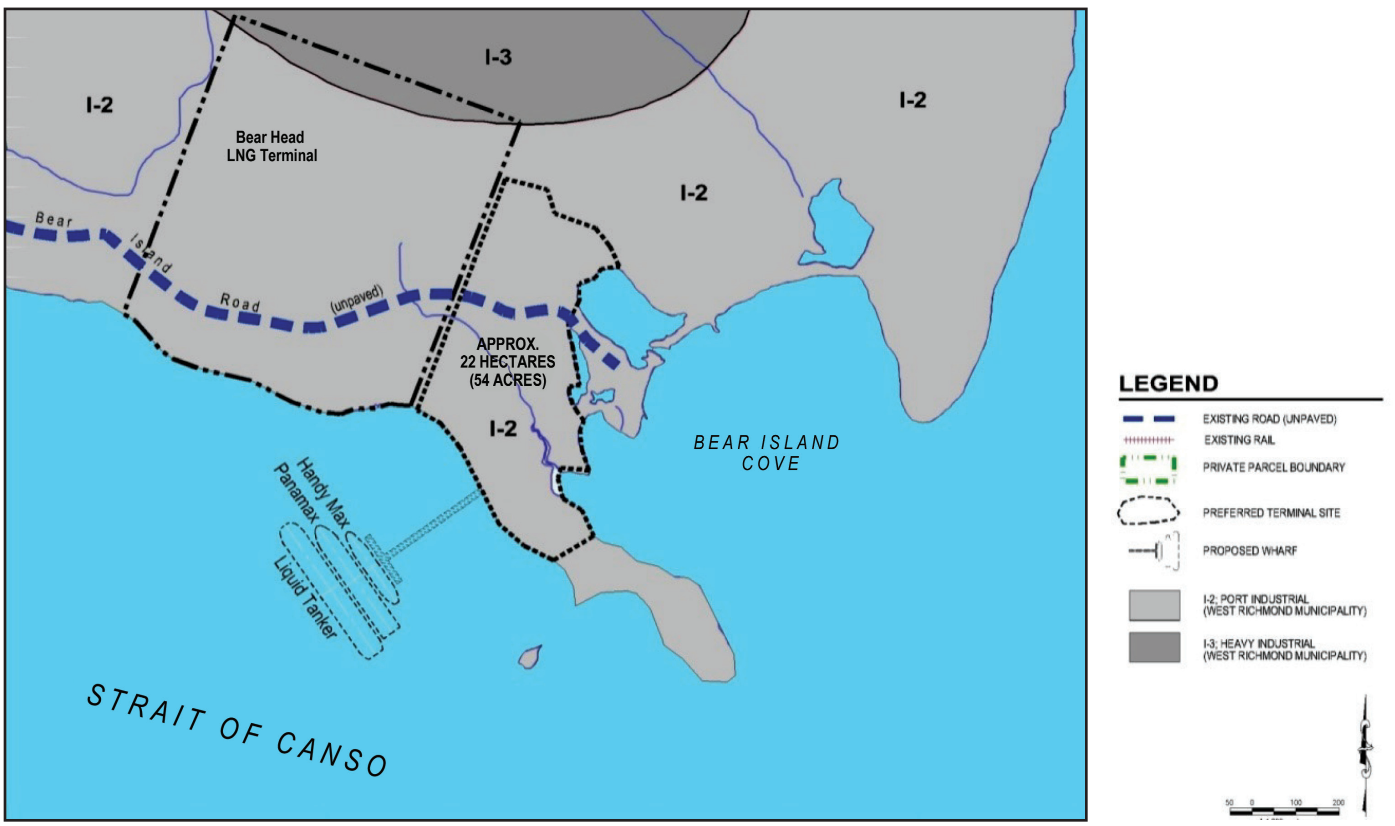
Site J – Bear Head Area

Site J is located in the Bear Head Industrial Reserve and zoning is administered by the Municipality of the County of Richmond. As depicted in Figure 8-3, Site J is currently zoned I-2: Port Industrial.

Site J is located adjacent to the Bear Head LNG terminal site and will need to consider potential blast hazard footprints associated with the tank farm and pipelines. The blast footprints may impact site development and building placement on this parcel. The future wharf structure placement will need to be coordinated with Bear Head LNG to verify safety and navigation considerations as well.

The existing Bear Island Road right of way is located along the coastline and traverses the LNG terminal site. The road alignment may need to be relocated to account for security requirements. Further discussion with NSBI will be necessary to understand the nature of the land sale agreement relative to site access and roadway relocation. A potential solution may include re-routing the roadway north of the LNG terminal and tie into the Point Tupper Wind Farm roadway system. This area is fairly hilly and will require further study to identify possible roadway alignment options.

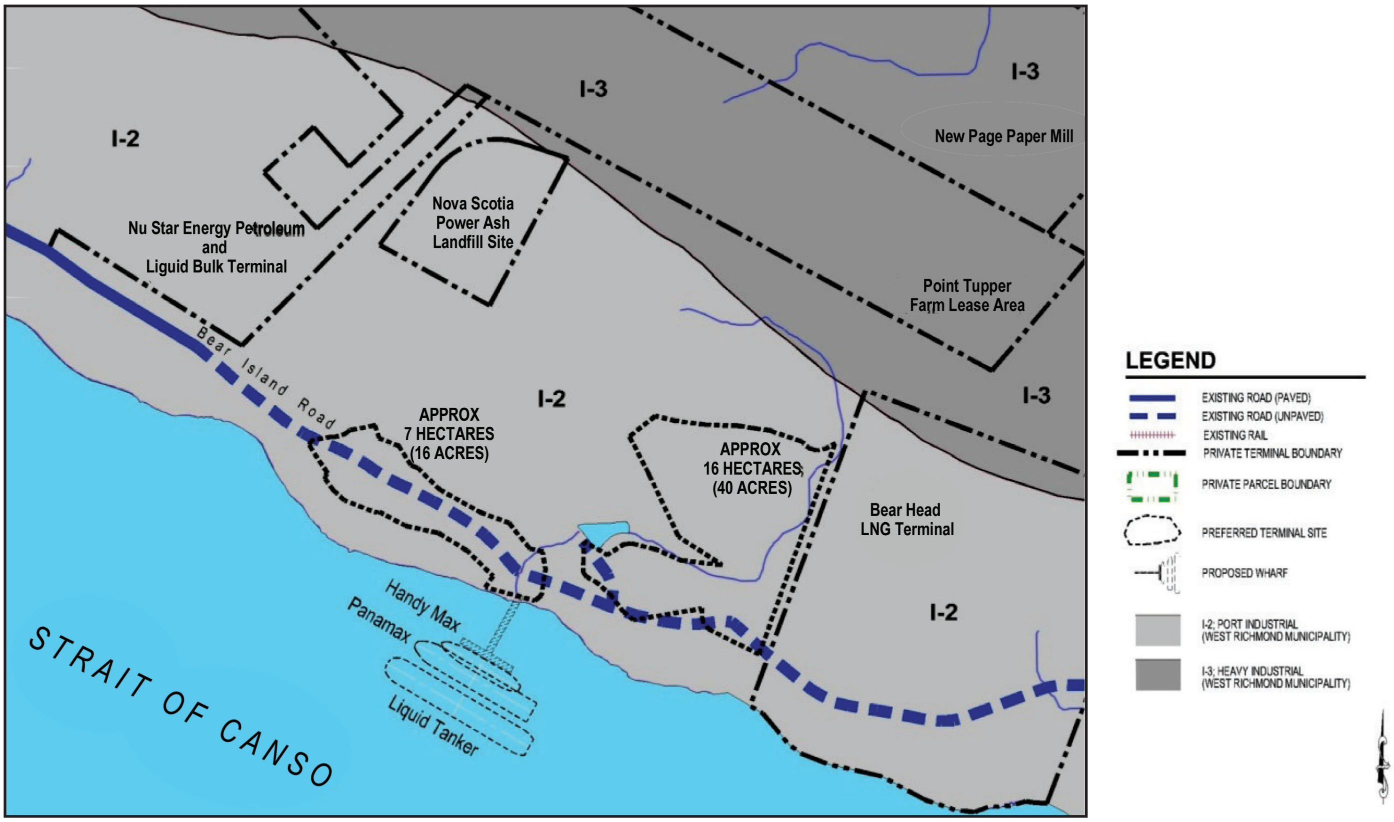
Figure 8-3 **Site J – Bear Head Area Zoning**



Site K – Ship Point Area

Site K is located in the Bear Head Industrial Reserve and zoning is administered by the Municipality of the County of Richmond. Site K is zoned I-2: Port Industrial and the general zoning boundaries in this area are included in Figure 8-4.

Figure 8-4 **Site K – Ship Point Area Zoning**



8.2 Aquaculture Resources Considerations

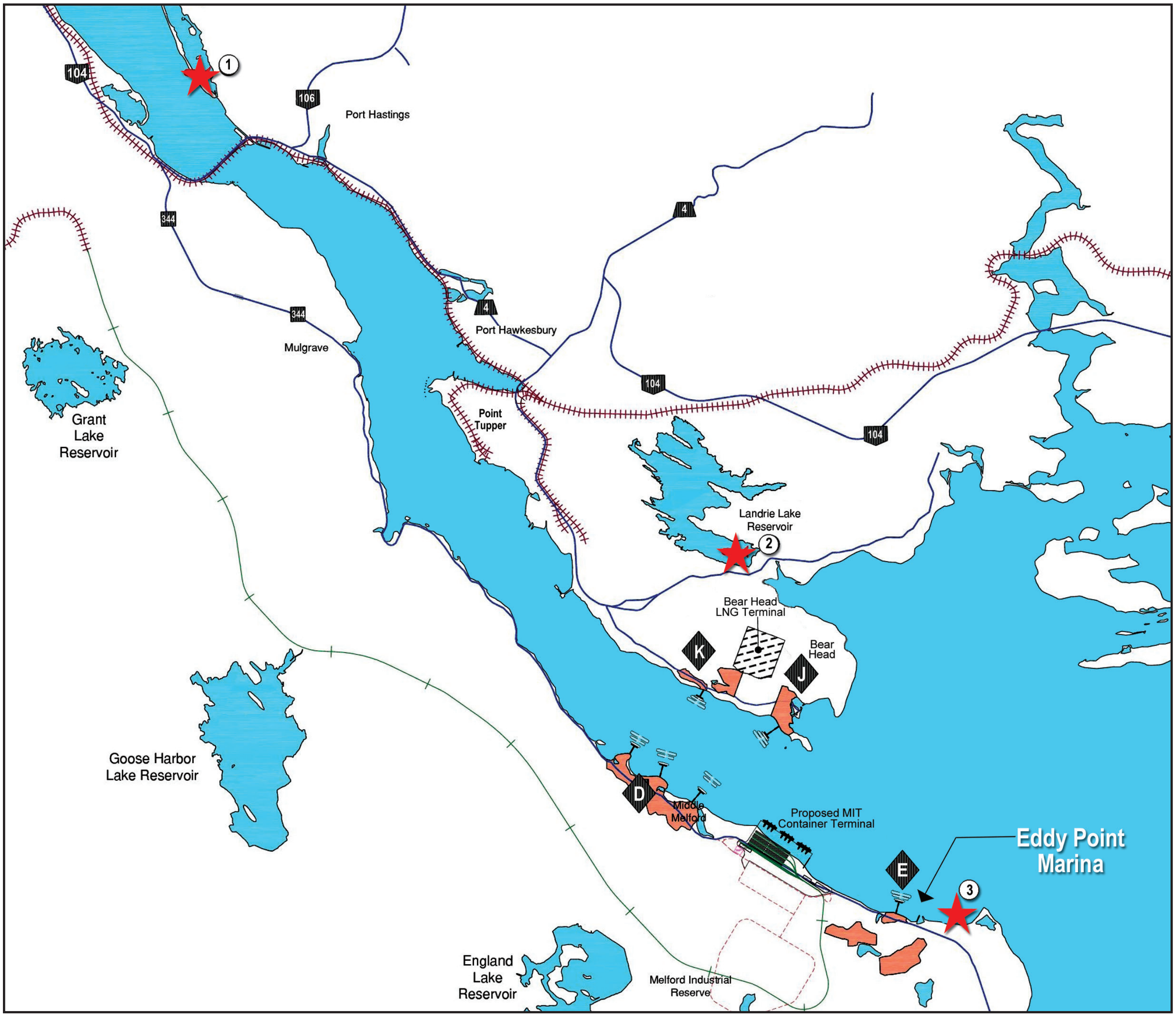
The Nova Scotia Department of Agriculture and Fisheries, Aquaculture Division monitors commercial farming of sea life. The Aquaculture Division issues licenses for farm sites and maintains an on-line database of the licenses based on regional maps. A review of the aquaculture database for the Strait of Canso region revealed three license holders in the region. It was not clear whether these sites were operational from the information available on the website database. A map of the registered aquaculture sites is depicted in Figure 8-5 and the sites are identified by star symbols.

The first site, License 0136, is located north of the Canso Causeway and was issued for American Oysters, Blue Mussels and Sea Scallops. License 1089 is an inland site located on Landrie Lake for raising Rainbow Trout. The third site is located near Sand Point adjacent to the Melford Industrial Land Reserve and was issued for farming Atlantic Salmon and Rainbow Trout.

The Eddy Point Marina is a private marina that caters to the commercial fishing fleet in the region. The Marina is located in the general area of Sand Point.

The aquaculture sites and Eddy Point Marina are located away from the preferred development sites and no project related impacts are anticipated from future development.

Figure 8-5 **Aquaculture Sites**



Strait of Canso Superport
Master Development Plan

December, 2010

9.0 FUTURE TERMINAL NEEDS BASED ON POTENTIAL MARKET OPPORTUNITIES

9.0 Future Terminal Needs Based on Potential Market Opportunities

As discussed in the previous sections focused on potential terminal development site selection, the sites with flatter terrain were selected for general cargo uses that required storage areas near the pier structure and hillside areas were designated for liquid bulk or gas type cargoes using pipeline conveyance systems with remote tank farms. There are four potential deep water terminal development sites identified within the Strait of Canso; two with flatter terrain and two with hillside terrain. The limited number of development sites will need to be addressed carefully as future developer interest is attracted to the region.

Other considerations for selecting sites include highway and rail access if necessary. Some of the sites lend themselves to potential rail access due to existing or planned rail corridors in close proximity to the site. Other sites may be limited for future rail service due to hillside terrain or distance to existing rail corridors. Both of these factors can impact the cost viability of extending rail service onto the site.

In this section we will review the potential terminal opportunities identified in the market analysis and identify potential terminal locations based on the preferred terminal sites. In some cases multiple terminal opportunities may be assigned to a given development site, and on others the terrain or rail access may limit opportunities.

This section is provided to help guide future development decisions in the Strait of Canso and preserve the limited deep water terminal sites for marine uses. Development decisions will need to be reviewed on a case-by-case basis to identify the highest and best use for each site as terminal developer interests arise in the region. SCSCL, NSBI and the surrounding municipalities will need to continue to work together to evaluate the future development proposals and evaluate the best location to promote for the proposed use.

9.1 Types of Greenfield Terminal Concepts Considered

The market analysis identified the types of cargo terminals anticipated in the future based on market trends and potential logistic chain cost savings. Some of the opportunities are based on actual operator interests, such as coal transshipment from local mining operations, while others are based on empirical research observations. Securing the potential opportunities will require significant outreach and marketing efforts to attract the potential terminal operations and associated private developer investment to the Strait of Canso region. The potential terminal types identified in the market analysis are listed below:

- Coal Transshipment Terminal
- General Dry Bulk Cargo Transshipment Terminal
- Liquid Bulk Petroleum Cargo Transshipment Terminal
- Offshore Oil/Alternative Energy Support Facility

The following subsections provide a narrative description of the potential terminal facility attributes such as pier structure type, water depth at berth, backland storage area, type of cargo conveyance and other operational requirements. These elements will be used to size the terminals and support future cost estimating efforts. The terminal attributes are provided as an example and future developer interests may design the project differently based on actual facility requirements and site conditions. The terminal attributes are simply provided for planning purposes and evaluating future developer proposals.

Each of the four identified potential terminal development sites are currently undeveloped parcels of land in relatively isolated areas that will require financial investments for the site development, pier development, roadway extensions, utilities and other associated project related improvements. The greenfield nature of the terminal development sites will also allow the specific sites to be developed to meet the operator's terminal requirements. In some cases, retrofitting or upgrading an existing marine terminal can be more expensive than developing a terminal from scratch for a specific specialized cargo that is different than what was handled previously.

9.1.1 Coal Transshipment Terminal

Coal transshipment opportunities are a potential expansion market that could be promoted in the Strait of Canso. This would involve the export of metallurgical coal to China and India. A local mining operation is being pursued by a group called Xstrata on Cape Breton Island. Coal movements through the Sydney coal terminal are considered too costly. In addition, rail access would need to be constructed and would require a large investment by the mining consortium. This would make the project's viability questionable from a transportation cost perspective.

As an alternative, Xstrata is investigating the option of barging coal to the Strait of Canso and transshipping the coal into larger deep-sea vessels. Coal transshipment by other parties has already begun with direct vessel to vessel coal transfers in the Strait. Under this scenario the ships must wait for one another to arrive in order to start discharging, which can be very time consuming and costly from a demurrage perspective. As an alternative, it may be more economical to create a land based transfer facility that would accept coal from the vessels, stockpile material on-site, and then transfer material directly to the deep sea ships with hoppers and conveyors. The additional cost of developing the terminal and pier structure would need to be evaluated against the lost opportunity cost associated with vessel delays and direct vessel transfers. Another option would involve the development of a third party terminal operator that would handle multiple mining accounts as a semi-public terminal. This type of operation would benefit from future rail access to keep transportation costs down between the mines and terminal locations.

A typical coal transshipment terminal would include the following elements: offshore pier structure with a two-way conveyor system between the berth and storage yard, outdoor storage yard with overhead conveyor, hopper in yard with return conveyor system, and a small office and repair shop. The terminal will require approximately 16 to 24 hectares (40 to 60 acres) of land area. Although rail access is not anticipated for the terminal proposed by Xstrata, future rail access and unloading capabilities may want to be considered to attract other coal mining operations to ship through the region.

Typical vessels anticipated to call at the proposed terminal may include barges, Laker vessels and Cape Size Bulk vessels. Barges and Laker vessels would bring the material to the terminal, and the Cape Size vessels would export the cargo. No truck or rail related cargo movements are anticipated at this time. The typical vessel dimensions are provided below:

Ocean-Going Barge	181.8 meter LOA x 18.2 meter Beam x 10.9 meter Draft
Seawaymax Laker	226 meter LOA x 24 meter Beam x 8.0 meter Draft
Panamax (75,000 DWT)	225 meter LOA x 32.26 meter Beam x 12.6 meter Draft
Cape Size (160,000 DWT)	280 meter LOA x 45.0 meter Beam x 17.0 meter Draft

The pier structure will need to be constructed with a minimum water draft of 19.0 meters and accommodate two Cape Size vessels simultaneously. The minimum berth length for a Cape Size Bulk vessel is approximately 325 meters to provide adequate mooring area (Vessel LOA + 1 Beam). The structure and associated trestle should be wide enough to support the hopper and conveyor system.

This type of facility could be combined with the general dry bulk transshipment terminal using a third party terminal operator. This approach could be expanded to handle other similar products to maximize return on the investment associated with constructing the terminal infrastructure by increasing facility utilization.

9.1.2 General Dry Bulk Cargo Transshipment Terminal

The market analysis identified a potential opportunity to compete with dry bulk cargo, primarily iron ore and coal, transported by rail between the Great Lakes region and the US east coast ports of Baltimore, Maryland and Norfolk, Virginia. The highest cost savings were realized on the farther travel distances by ship, such as Asia. The market analysis identified opportunities for handling both import and export of given commodities. Additional study will be necessary to identify specific cargo commodities and trade routes. This opportunity could be combined with the regional coal mining operations that are looking to transfer cargo between barges/ vessels and deep-sea vessels to realize greater scales of economy and recover terminal development costs quicker.

The typical dry bulk cargo transshipment terminal facility is similar to the coal transshipment terminal discussed previously. It may be necessary to create separate storage areas to segregate materials and avoid potential contamination between commodities. This may also require additional conveyor cleaning between cargo handling operations to avoid cross contamination as well. The storage yard should be sized to service two to four Cape Size vessels per month.

A typical dry bulk transshipment terminal would include the following elements: offshore pier structure with a two-way conveyor system between the berth and storage yard(s), outdoor storage yard(s) with overhead conveyor, hopper in yard with return conveyor system, and a small office and repair shop. The terminal will require approximately 40 hectares (+100 acres) of land area depending on the quantity of cargo handled per month and number of commodities handled at the terminal. The terminal may also need additional storage yard area to accommodate stock piling materials during the winter months when the St. Lawrence Seaway experiences freeze conditions. Although rail access is not anticipated for the terminal proposed by Xstrata, future rail access and unloading capabilities may want to be considered to attract other commodities and supplement cargo movement during winter months.

Typical vessels anticipated to call at the proposed terminal may include barges, Laker vessels and Cape Size Bulk vessels. No truck or rail related cargo movements are anticipated at this time. The typical vessel dimensions are provided below:

Ocean-Going Barge	181.8 meter LOA x 18.2 meter Beam x 10.9 meter Draft
Seawaymax Laker	226 meter LOA x 24 meter Beam x 8.0 meter Draft
Panamax (75,000 DWT)	225 meter LOA x 32.26 meter Beam x 12.6 meter Draft
Cape Size (160,000 DWT)	280 meter LOA x 45.0 meter Beam x 17.0 meter Draft

The pier structure will need to be constructed with a minimum water draft of 19.0 meters and accommodate two Cape Size vessels simultaneously. The minimum berth length for a Cape Size Bulk vessel is approximately 325 meters to provide adequate mooring area (Vessel LOA + 1 Beam). The structure and associated trestle should be wide enough to support the hopper and conveyor system.

9.1.3 Liquid Bulk Petroleum Transshipment Terminal

SCSCL, municipalities, local development agencies and NSBI have been approached by operators investigating the potential for developing petroleum transshipment terminals and refineries in the Strait of Canso. There have not been any firm commitments arising from these initial discussions. SCSCL feels that there may be interest in the future for developing and operating a liquid bulk petroleum terminal and/or refineries. The proposed facility would handle cargo for the surrounding region and US northeastern markets.

NuStar Energy is increasing their terminal capacity by extending their existing wharf and adding two additional berthing positions and expanding their tank farm capacity This additional terminal capacity planned at NuStar Energy will accommodate a portion of this projected cargo growth in the region. If additional market capacity is required in the region or new refinery opportunities materialize, additional new petroleum terminals may need to be developed.

A typical liquid bulk transshipment terminal would include the following elements: pier structure, causeway with a pipe rack, 4.0 million barrel tank farm capacity with multiple tanks, and a small office. Product would move between the storage tanks and berth using pipelines and booster pumps. The terminal would include approximately 20 to 25 hectares (50 to 60 acres) of land area. If a refinery is anticipated, additional land area may be necessary. There are no regional petroleum or fuel pipelines in the Strait of Canso region and product is typically transported domestically by truck and rail operations. The potential petroleum terminal would require rail car loading facilities and regional rail access. Product movements to the US northeast markets would occur by vessel.

Typical vessels anticipated at the liquid bulk terminal include AFRAmax and VLCC/ULCC tankers. Vessel draft requirements at berth are approximately 27.0 meters for the larger VLCC and ULCC tankers. Typical vessel dimensions are provided below:

AFRAmax Tanker	253 meter LOA x 44.2 meter Beam x 11.6 meter Draft
VLCC/ULCC Tanker	379 meter LOA x 68.0 meter Beam x 24.5 meter Draft

The pier structure should be designed to accommodate two VLCC/ULCC class tankers simultaneously. A typical berth length should be approximately 447 meters overall (Vessel LOA + Beam). The wharf structure and trestle should accommodate vehicular access and an overhead pipe rack structure.

9.1.4 Offshore Oil Field/Alternative Energy Support Facility

Development of offshore oil and natural gas is occurring at a slow pace off the coast of Nova Scotia on the Sable Island gas/oil field and Deep Panuke gas field. Recently, interest in these fields has cooled due to discouraging production rates and the cost of gas has dropped below rates necessary to support infrastructure investment. Due to the decline in interest for developing the offshore oil & gas fields offshore Nova Scotia, this potential terminal facility is a long term development potential. As the demand for natural gas and oil products increases, this terminal alternative may become viable in the future as exploration matures.

The field supports are currently serviced by Halifax and Sheet Harbour. Historically, Mulgrave was used as an offshore supply base when there was more vibrant exploration activity in the 1970's and early 1980's. Limited operations have occurred at the existing Mulgrave Marine Terminal and should exploration and development rebound in the future, the Terminal is expected to play a role. Initial start up operations will continue to occur at Mulgrave and may need an established terminal if future drilling activity increases.

The Offshore Oil Field Support Facility is envisioned to provide a base of operations to supply staffing/crews, drilling equipment, drilling mud, construction materials, construction equipment, pipe, general provisions and other items to support construction, operation and maintenance of the offshore platforms. Offshore oil and gas activity off of Nova Scotia's coast is not looking promising in the short term. The offshore oil and gas fields predominantly produce natural gas. Natural gas prices have stagnated at a level which is not high enough to make exploration and development feasible. This, combined with the attention now being paid to onshore shale gas development, limits the potential for offshore oil and gas exploration. For now, the Mulgrave Marine Terminal has the capability to meet the current and immediate future offshore oil and gas industry needs. SCSCL should continue to monitor the status of the offshore oil and gas industry to evaluate the potential need to develop an offshore oil field support facility. In addition to serving the oil and gas industry, a future terminal could also serve the potential emerging offshore wind farm opportunities. Combining these operations into one terminal could allow for a higher usage of the facility by supplementing cargo throughput.

In addition to offshore oil field support, the market analysis also identified a potential for coastal alternative energy projects emerging in the Nova Scotia region including offshore wind farms and tidal generators. The Mulgrave Marine Terminal is investigating the potential to handle wind farm components for land based wind farms in the surrounding region. However, due to the size of the existing marine terminal, there is limited lay down area adjacent to the wharf. There is also some discussion regarding tidal generators for the Bay of Fundy, although geographically this is quite a distance from the Strait of Canso by water. This type of terminal could serve both of these alternative energy programs as well as during construction, operation and maintenance of the alternative energy programs in the waters surrounding Nova Scotia.

A typical offshore oil field/alternative energy support facility would consist of a warehouse, office, labor check-in building, paved or unpaved open storage yard, and a pier structure to accommodate large construction equipment vehicles, construction materials, provisions and staff transport. The terminal backland area will require approximately 8 to 16 hectares (20 to 40 acres) of land area. The terminal may require on-site silos or storage tanks for storage of drilling mud and other liquid oil field waste materials. Offshore exploration will only occur if the price of gas is significant enough to support development of the field.

A recent call for bids for exploration on blocks of offshore acreage in the Sable Island region did not result in bids due to the limited exploration results. In addition, some holders of offshore acreage are relinquishing their holdings due to the results of explorations completed to date and the decline in the price of gas. Any future terminal opportunities should be viewed as long term possibilities.

Typical vessels include crew boats and ocean going barges. Vessel draft requirements are approximately 11 to 12 meters of water at berth. Typical vessel dimensions are provided below:

Crew Boat	30.0 meter LOA x 6.36 meter Beam x 8.0 meter Draft
Ocean-Going Barge	181.8 meter LOA x 18.2 meter Beam x 10.9 meter Draft

The pier structure should be designed to accommodate berthing on both sides of the pier. The pier will require a RORO ramp or other accommodations to allow loading large construction equipment and other large vehicles onto barges and smaller ships. A minimum berth length of 200 meters is anticipated to accommodate one barge length. The trestle connecting the pier to the shore should accommodate two-way traffic and handle oversize equipment loads.

9.2 Potential Terminal Assignments by Development Site

Of the four potential cargo opportunities addressed in the market analysis, three of the four alternatives require flatter terrain with close proximity to the pier structure. The liquid bulk petroleum terminal can be adapted for use on hillside terrain. Coal transshipment, dry bulk transshipment and the offshore oil field terminals should be focused on the flatter terrain areas.

In addition to considering geographical terrain conditions, the site selection process should also evaluate future rail access requirements for the potential terminals. Initially there is not a driving demand for rail connectivity at any of the proposed terminals with the exception of the liquid bulk terminal. Rail access to a future liquid bulk terminal is critical to the success of the new facility. The dry bulk and coal terminal may benefit in the long term from rail access at the terminal as new cargo sources are identified in the surrounding region. In the case of a Great Lakes dry bulk transshipment terminal, rail access may be necessary to handle cargo during the severe winter months when the Saint Lawrence Seaway passage freezes.

The dry bulk transshipment and offshore oil field/alternative energy support terminals should be located on the flatter terrain areas, such as terminal development Sites D and J. Due to potential complimentary uses of the wharf and loading equipment, it may be advantageous to combine the dedicated coal transshipment terminal and general dry bulk transshipment operations into one facility. The land area required for a facility of this magnitude would require use of a portion or the entire Site D development site. Site J does not provide adequate land area for this type of operation. Alternatively, Site D could be divided into two or three terminals to create independent dry bulk terminal operations.

In the long term it would be more advantageous to develop Site D as one large terminal handling multiple dry bulk cargoes from multiple sources, both import and export. There are multiple stevedores and shipping lines that act as third party operators. This would insure the long term viability of the facility. A stand alone, single purpose dedicated terminal facility may potentially close as the mining operation declines or business levels decline. This has been experienced in the single-user facility at the former Federal Gypsum plant in the Strait of Canso. A multi-cargo third party operation would help to alleviate some of those concerns.

The intermodal rail tracks for the proposed Maher Melford Terminal are located in close proximity to Site D. A short loop track or spur could be extended from Maher Melford Terminal's tracks to provide on-site rail capability. Rail service could allow for continuous winter service and potential cargo throughout expansion as regional rail is extended to remote mining resources. The future dry bulk transshipment terminal would benefit from on-site rail access. This option would have to be coordinated with Maher Melford Terminal.

The offshore oil field/alternative energy support terminal will require a smaller footprint of operation as compared with the coal and dry bulk transshipment terminal uses. The offshore oil field/alternative energy facility does not require on-site rail access. If rail shipments are necessary on an interim basis, cargo could be transported by truck to existing rail sidings in the region as they occur. Terminal development Site J provides sufficient area to develop a general cargo terminal to service the offshore oil field/alternative energy facility. As an alternative, Site D could also accommodate this type of terminal if the entire site is not used for dry bulk transshipment.

The liquid bulk petroleum terminal should be directed to the hillside terminal development Sites E and K. Site E offers the added advantage of future rail access through possible connection to the future Maher Melford Terminal rail improvements. A spur track could be extended from the proposed southern loop as it enters the container terminal. The proposed tank farm storage areas are located in close proximity to the Maher Melford Terminal tracks. Site K would require more extensive rail improvements to provide rail access. The priority would be to direct future liquid bulk terminal interests to Site E initially. Site E would also be a logical choice for a new refinery attached to the liquid bulk terminal because of the potential industrial expansion area surrounding the site within the Melford Industrial Land Reserve.

In conclusion, the site selection process and terminal requirements dictate the following terminal siting recommendations:

Site D	Coal Transshipment Terminal General Dry Bulk Transshipment Terminal Offshore Oil Field/Alternative Energy Terminal (Optional)
Site E	Liquid Bulk Petroleum Terminal
Site J	Offshore Oil Field/Alternative Energy Terminal (Preferred)
Site K	Liquid Bulk Petroleum Terminal

Site D has been identified as a valuable asset to the Strait of Canso's future marine operations due to the size of the land area, flat terrain, adjacency to deep water and potential for rail connectivity. Site D should be identified as a regional marine asset and protected for future use. Likewise, Site E should be preserved as a valuable asset for future liquid bulk terminal operations and associated refinery development in the region. The dry bulk transshipment terminal concept is ready to proceed now as terminal operators and investors are identified. The liquid bulk terminal will need to attract and commit investors to the Strait of Canso.

Development beyond the Deep Panuke gas field and Sable Island gas field has been slow due to poor exploration results and declining natural gas prices. The Nova Scotia offshore oil and gas resources primarily produce natural gas, which is sensitive to fluctuating gas price structures. The offshore oil & gas industry is expected to develop over time as demand for oil and gas increases. Site J should be preserved as a long term asset for future terminal development should the need for this type of facility return as this offshore market recovers. This potential terminal will need to be assessed for potential offshore alternative energy projects in the future as well.

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10.0 Planning Level Rough Order of Magnitude Cost Estimate

10.1 Purpose

A planning level rough order of magnitude cost estimate was prepared to evaluate future terminal development proposals submitted by private investors. At this point we have selected potential development sites and determined the type of terminal that is most appropriate for each development site. However, the sites have not been laid out nor have we specified the conceptual terminal design elements. There is limited site data available at this time to support design of the terminals. Additional information such as land surveys, geotechnical studies, detailed hydrographic mapping, hydrology studies and other associated technical studies are necessary to support technical design efforts. The perspective terminal developers will perform these details and technical studies.

This planning level cost estimate is based on the consultant teams experience with similar terminal developments in other parts of the world. The cost estimate was developed with this in mind and should not be used for budgeting purposes without further design concept refinement or development of technical studies necessary to support conceptual design efforts.

10.2 Approach and Methodology

The rough order of magnitude cost estimates were developed from the narrative terminal concepts developed in the previous section. Quantity take offs were established based on anticipated terminal area and terminal throughput estimates where available. We also looked at similar terminals in the Strait of Canso and other parts of the world. This approach helped us estimate the terminal elements to determine berth lengths, trestle lengths, paved areas, building area and other critical elements of the terminals.

Unit costs were developed for each element based on recent projects and cross referenced with Mean's Cost Estimating Handbooks. The unit cost assumptions were also reviewed by a group of local engineering consultants and contractors to fine tune the assumptions and make final adjustments. Unit cost assumptions are provided in Canadian dollars.

The quantity assumptions were applied to the unit cost estimates to create general line items within the cost estimate for the major elements of the terminal construction. The general line items were organized into the following headings:

- Site Preparation
- Site Development
- Wharf Development
- Buildings

Site preparation includes clearing and grubbing the site, rough grading, rock removal and cut/fill activities. Site development includes installation of the terminal infrastructure such as: paving, site utilities, drainage/storm water improvements, off-site roadwork, power supply/substations, site lighting, domestic water system including intake structure and treatment facilities, on-site septic disposal system and other infrastructure needs. Wharf development costs include the pier structure, causeway trestle, pipe racks or conveyor systems associated with the pier structure. Buildings include any necessary offices, warehouse or other specialized storage structures such as silos or tank farms.

After sub-totaling the major project headings to establish the raw development cost, a 30 percent contingency was applied to the development costs to cover project unknowns such as poor soil conditions, environmental mitigation or other considerations not identified due to lack of detailed design efforts. The contingency cost can be reduced as more information becomes available and the conceptual design is refined. A factor of 12 percent was applied after the application of the contingency to estimate the design fee and construction management efforts. This is customary for a project of this magnitude.

Similar order of magnitude cost estimating efforts were created for each terminal development site. Site D was separated into three individual terminals for coal or general dry bulk transshipment facilities. The Site E cost estimate was developed for a typical liquid bulk petroleum terminal. Site J was assumed to be developed for offshore oil field/alternative energy support terminal. The Site K cost estimate was developed for a typical liquid bulk petroleum terminal.

10.3 Rough Order of Magnitude Cost Estimate for Planning Purposes

The following tables provide a detailed breakdown of the major elements associated with the individual terminal developments. Site D is broken down into three individual terminals. Area #1 is for a 16 hectare Dry Bulk Transshipment terminal in the northwest portion of Development Site D and the rough order of magnitude (ROM) cost estimate is provided in Table 10-1.

Table 10-1 **Site D – Area #1 ROM Cost Estimate**

Line Item	Length (m)	Width (m)	Quantity	Units	Unit Rate ($ CAN)	Cost ($ CAN)
Site Prep						
Clearing & grubbing	-	-	16	hectare	26,335	$ 421,360
Cut and fill	-	-	80,000	cu m	26	$ 2,106,800
Grading	-	-	16	hectare	63,204	$ 1,011,264
					Site Prep Subtotal:	**$ 3,539,424**
Site Development						
Storm water collection			12	hectare	203,306	$ 2,439,674
Septic system/domestic sewer			1	each	126,408	$ 126,408
Paving/roadwork	-	-	50,000	sq m	8	$ 421,360
Site lighting & utility			9	hectare	21,068	$ 189,612
Water intake, pump and piping			1,500	m	400	$ 600,438
Water treatment			1	each	29,495	$ 29,495
Power supply		-	1.5	Km	342,355	$ 513,533
Power substation & transformer			1.0	each	1,580,100	$ 1,580,100
					Site Development Subtotal:	**$ 5,900,620**
Wharf Development						
Pier head structure	325.0	30.3	9,848	sq m	3,476	$ 34,232,076
Trestle structure	318.8	10.0	3,188	sq m	2,317	$ 7,388,126
Conveyor systems (2)	1,400	-	1,400	m	11,587	$ 16,222,360
					Wharf Development Subtotal:	**$ 57,842,562**
Buildings						
Office Building			750	sq m	2,267	$ 1,700,188
M&R Building			2,500	sq m	1,133	$ 2,833,646
					Buildings Subtotal:	**$ 4,533,834**
					Sub-Total (Site Development):	$ 71,816,440
Contingency (30%)						$ 21,544,932
					Sub-Total (Contingency):	$ 93,361,372
Engineering & Supervision						$ 11,203,365
					Total:	**$ 104,564,737**

Area #2 of Site D is for a 26 hectare Dry Bulk Transshipment terminal located in the middle of Site D and the cost estimate is provided in Table 10-2.

Table 10-2 **Site D – Area #2 ROM Cost Estimate**

Line Item	Length (m)	Width (m)	Quantity	Units	Unit Rate ($ CAN)	Cost ($ CAN)
Site Prep						
Clearing & grubbing	-	-	26	hectare	26,335	$ 684,710
Cut and fill	-	-	130,000	cu m	26	$ 3,423,550
Grading	-	-	26	hectare	63,204	$ 1,643,304
					Site Prep Subtotal:	**$ 5,751,564**
Site Development						
Storm water collection			20	hectare	203,306	$ 3,964,471
Septic system/domestic sewer			1	each	126,408	$ 126,408
Paving/roadwork	-	-	50,000	sq m	8	$ 421,360
Site lighting & utility			9	hectare	21,068	$ 189,612
Water intake, pump and piping			1,500	m	400	$ 600,438
Water treatment			1	each	29,495	$ 29,495
Power supply		-	1.5	Km	342,355	$ 513,533
Power substation & transformer			1.0	each	1,580,100	$ 1,580,100
					Site Development Subtotal:	**$ 7,425,417**
Wharf Development						
Pier head structure	325.0	30.3	9,848	sq m	3,476	$ 34,232,076
Trestle structure	396.0	10.0	3,960	sq m	2,317	$ 9,177,221
Conveyor systems (2)	1,600	-	1,600	m	11,587	$ 18,539,840
					Wharf Development Subtotal:	**$ 61,949,137**
Buildings						
Office Building			750	sq m	2,267	$ 1,700,188
M&R Building			2,500	sq m	1,133	$ 2,833,646
					Buildings Subtotal:	**$ 4,533,834**
					Sub-Total (Site Development):	$ 79,659,952
Contingency (30%)						$ 23,897,986
					Sub-Total (Contingency):	$ 103,557,938
Engineering & Supervision						$ 12,426,953
					Total:	**$ 115,984,890**

Area #3 of Site D is for a 22 hectare Dry Bulk Transshipment terminal located on the north end of Site D and the cost estimate is provided in Table 10-3.

Table 10-3 **Site D – Area #3 ROM Cost Estimate**

Line Item	Length (m)	Width (m)	Quantity	Units	Unit Rate ($ CAN)		Cost ($ CAN)
Site Prep							
Clearing & grubbing	-	-	22	hectare	26,335	$	579,370
Cut and fill	-	-	11,000	cu m	26	$	289,685
Grading	-	-	22	hectare	63,204	$	1,390,488
					Site Prep Subtotal:	**$**	**2,259,543**
Site Development							
Storm water collection			17	hectare	203,306	$	3,354,552
Septic system/domestic sewer			1	each	126,408	$	126,408
Paving/roadwork	-	-	50,000	sq m	8	$	421,000
Site lighting & utility			9	hectare	21,068	$	189,612
Water intake, pump and piping			1,500	m	400	$	600,438
Water treatment			1	each	29,495	$	29,495
Power supply		-	1.5	Km	342,355	$	513,533
Power substation & transformer			1.0	each	1,580,100	$	1,580,100
					Site Development Subtotal:	**$**	**6,815,138**
Wharf Development							
Pier head structure	325.0	30.3	9,848	sq m	3,476	$	34,232,076
Trestle structure	512.7	10.0	5,127	sq m	2,317	$	11,881,720
Conveyor systems (2)	1,800	-	1,800	m	11,587	$	20,857,320
					Wharf Development Subtotal:	**$**	**66,971,116**
Buildings							
Office Building			750	sq m	2,267	$	1,700,188
M&R Building			5,500	sq m	1,133	$	6,234,021
					Buildings Subtotal:	**$**	**7,934,209**
					Sub-Total (Site Development):	$	83,980,006
Contingency (30%)						$	25,194,002
					Sub-Total (Contingency):	$	109,174,008
Engineering & Supervision						$	13,100,881
					Total:	**$**	**122,274,889**

Site E includes a 35 hectare Liquid Bulk terminal with an associated tank farm and the cost estimate is provided in Table 10-4.

Table 10-4 **Site E – ROM Cost Estimate**

Line Item	Length (m)	Width (m)	Quantity	Units	Unit Rate ($ CAN)	Cost ($ CAN)
Site Prep						
Clearing & grubbing	-	-	35	hectare	29,495	$ 1,032,332
Cut and fill	-	-	175,000	cu m	26	$ 4,608,625
Grading	-	-	35	hectare	63,204	$ 2,212,140
					Site Prep Subtotal:	**$ 7,853,097**
Site Development						
Storm water collection			26	hectare	203,306	$ 5,336,788
Septic system/domestic sewer			1	each	126,408	$ 126,408
Paving/roadwork	-	-	50,000	sq m	8	$ 421,360
Storage tanks			4,000,000	bbl	16	$ 65,310,800
Site lighting & utility			5	hectare	21,068	$ 105,340
Water intake, pump and piping			3,300	m	400	$ 1,320,964
Water treatment			1	each	29,495	$ 29,495
Power supply		-	3.3	Km	342,355	$ 1,129,772
Power substation & transformer			1.0	each	1,580,100	$ 1,580,100
					Site Development Subtotal:	**$ 75,361,027**
Wharf Development						
Pier head structure	379	30.3	11,484	sq m	2,844	$ 32,661,710
Trestle structure	305	10.0	3,050	sq m	2,107	$ 6,425,740
Piping	7,500	-	7,500	m	395	$ 2,962,688
					Wharf Development Subtotal:	**$ 42,050,138**
Buildings						
Office Building			750	sq m	2,267	$ 1,700,188
M&R Building			2,500	sq m	1,133	$ 2,833,646
					Buildings Subtotal:	**$ 4,533,834**
					Sub-Total (Site Development):	$ 129,798,096
Contingency (30%)						$ 38,939,429
					Sub-Total (Contingency):	$ 168,737,525
Engineering & Supervision						$ 20,248,503
					Total:	**$ 188,986,028**

Site J includes the 22 hectare offshore oil field/alternative energy support terminal and the cost estimate is provided in Table 10-5. Development of this terminal option is tied to future oil explorations efforts in the Atlantic Ocean off of Nova Scotia. Current oil field exploration activities in the North Atlantic Ocean have stalled due to the limited exploration results and the decline in oil and gas prices internationally. Should this market stabilize and return the existing Mulgrave Marine Terminal can accommodate initial start up operations and development of a new dedicated off shore oil field/alternative energy support terminal could be considered in the long term future.

Table 10-5 **Site J - ROM Cost Estimate**

Line Item	Length (m)	Width (m)	Quantity	Units	Unit Rate ($ CAN)	Cost ($ CAN)	
Site Prep							
Clearing & grubbing	-	-	22	hectare	29,495	$	648,894
Cut and fill	-	-	110,000	cu m	26	$	2,896,850
Grading	-	-	22	hectare	63,204	$	1,390,488
					Site Prep Subtotal:	**$**	**4,936,232**
Site Development							
Storm water collection			16	hectare	203,306	$	3,252,899
Septic system/domestic sewer			1	each	126,408	$	126,408
Paving/roadwork	-	-	90,000	sq m	8	$	758,448
Storage tank (drilling mud)			500	bbl	42	$	21,068
Site lighting & utility			5	hectare	21,068	$	105,340
Water intake, pump and piping			6,000	m	400	$	2,401,752
Water treatment			1	each	29,495	$	29,495
Power supply		-	5.5	Km	342,355	$	1,882,953
Power substation & transformer			1.0	each	1,053,400	$	1,053,400
					Site Development Subtotal:	**$**	**9,631,763**
Wharf Development							
Loading platform structure	200.0	30.3	6,060	sq m	2,107	$	12,767,208
Trestle structure	260.0	20.0	5,200	sq m	1,949	$	10,133,708
Piping	1,500	-	1,500	m	395	$	592,538
					Wharf Development Subtotal:	**$**	**23,493,454**
Buildings							
Office Building			550	sq m	2,267	$	1,246,804
Warehouse / M&R Building			5,000	sq m	1,133	$	5,667,292
					Buildings Subtotal:	**$**	**6,914,096**
					Sub-Total (Site Development):	$	44,975,545
Contingency (30%)						$	13,492,664
					Sub-Total (Contingency):	$	58,468,209
Engineering & Supervision						$	7,016,185
					Total:	**$**	**65,484,394**

Site K includes a 23 hectare Liquid Bulk terminal with an associated tank farm and the cost estimate is provided in Table 10-6.

Table 10-6 **Site K – ROM Cost Estimate**

Line Item	Length (m)	Width (m)	Quantity	Units	Unit Rate ($ CAN)	Cost ($ CAN)
Site Prep						
Clearing & grubbing	-	-	23	hectare	29,495	$ 678,390
Cut and fill	-	-	115,000	cu m	26	$ 3,028,525
Grading	-	-	23	hectare	63,204	$ 1,453,692
					Site Prep Subtotal:	**$ 5,160,607**
Site Development						
Storm water collection			17	hectare	203,306	$ 3,456,205
Septic system/domestic sewer			1	each	126,408	$ 126,408
Paving/roadwork	-	-	50,000	sq m	8	$ 421,360
Storage tanks			4,000,000	bbl	16	$ 65,310,800
Site lighting & utility			5	hectare	21,068	$ 105,340
Water intake, pump and piping			2,500	m	400	$ 1,000,730
Water treatment			1	each	29,495	$ 29,495
Power supply		-	2.5	Km	342,355	$ 855,888
Power substation & transformer			1.0	each	1,580,100	$ 1,580,100
					Site Development Subtotal:	**$ 72,886,326**
Wharf Development						
Pier head structure	379	30.3	11,484	sq m	2,844	$ 32,661,710
Trestle structure	220	10.0	2,200	sq m	2,107	$ 4,634,960
Piping	3,100	-	3,100	m	395	$ 1,224,578
					Wharf Development Subtotal:	**$ 38,521,248**
Buildings						
Office Building			750	sq m	2,267	$ 1,700,188
M&R Building			2,500	sq m	1,133	$ 2,833,646
					Buildings Subtotal:	**$ 4,533,834**
					Sub-Total (Site Development):	$ 121,102,015
Contingency (30%)						$ 36,330,605
					Sub-Total (Contingency):	$ 157,432,620
Engineering & Supervision						$ 18,891,914
					Total:	**$ 176,324,534**

A summary of the overall terminal development cost estimates is provided in Table 10-7.

Table 10-7 **All Sites – Summary ROM Cost Estimate**

Site	Terminal Type	Site Area (Hectares)	Vessel Size (Largest)	Development Cost ($ CAN)
Site D - Byers Cove				
Area 1	Dry Bulk Transhipment	16	Cape Size	$ 104,565,000
Area 2	Dry Bulk Transhipment	26	Cape Size	$ 115,985,000
Area 3	Dry Bulk Transhipment	22	Cape Size	$ 122,275,000
			Subtotal:	$ 342,825,000
Site E - Eddy Cove				
	Liquid Bulk - Petroleum	35	VLCC	$ 188,986,000
Site J - Bear Head				
	Off Shore Oil Field Support	22	Support Vessels	$ 65,484,000
Site K - Ship Point				
	Liquid Bulk - Petroleum	23	VLCC	$ 176,325,000

10.4 Utility Service Extension Considerations

As discussed in Section 2: Existing Conditions, public utilities in the region are primarily available to residential and commercial land uses in the semi-urban portions of the region. Industrial developments require private investment to extend or expand utilities to the project site.

Potable water is collected at local reservoirs and piped to on-site treatment facilities. The cost estimate provides provisions for a small system capable of providing potable water for a staff of 50 personnel and fire suppression. Water rights will need to be assessed and approved before designing a potable water system. Additionally, process water for industrial or manufacturing purposes is not considered in the cost estimates. Natural gas is provided in the region with pipeline services. Industrial land uses are provided with gas service from a pipeline operated by M&NP. The M&NP pipeline consists of two 8-inch pipelines; one for liquids and one for gases. The pipeline traverses the channel between the Melford Industrial Land Reserve and Point Tupper. Future industrial development in the region will need to extend gas service to their development site for natural gas service. Capacity and use of the system will need to be coordinated with M&NP.

Future terminal development in the region will require off site gas main connections to the existing M&NP pipeline in the Point Tupper and Melford industrial regions. Utility right-of-way provisions will need to be coordinated with local municipalities and private land owners. It will be the responsibility of the independent terminal developers to construct these extensions.

Electrical power is provided by Nova Scotia Power. Based on recent review by the Bear Head LNG project, there appears to be some capacity limitations on the radial power system in the region on both sides of the Strait of Canso. This will require further research for the individual terminal developers based on the anticipated power requirements. On the west side of the Strait, Maher Melford Terminal will be extending power service radials into the Melford Industrial Land Reserve. There may be an opportunity to provide additional capacity in the new system during the design stages, as opposed to upgrading services in the future. This will need further coordination with Maher Melford Terminal.

10.5 Rail Access Considerations

The proposed terminals are not anticipated to require rail access on-site during initial start up operations. Future access to rail may be necessary at the dry bulk and liquid bulk terminal facilities to promote enhanced cargo throughputs. The cost estimates do not include provisions for mainline track extensions, turnouts, storage tracks or rail loading equipment. Individual private terminal developers will need to assess the need for rail access as part of their development concept.

Based on recent rail work completed in the area, rail extensions are generally estimated at approximately CAN $650,000 per kilometer for new track with limited site preparation and infrastructure.

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11.0 Master Plan Implementation Program

Full implementation of the port master plan recommendations will require development of funding to support the development of a domestic and international marketing program. The Strait of Canso Superport Corporation is the logical organization to lead this initiative. Access to the Harbour dues in the Strait of Canso is viewed as the logical source of funds for re-investment in the Strait of Canso. Under the current federal legislation, SCSCL would need to acquire CPA status to legally collect the Harbour dues. The port status conversion process is a lengthy process that may take years of discussion and negotiations with Transport Canada.

SCSCL has formally requested reconsideration of the port status to a CPA. The Strait of Canso port has become one of the largest ports in the country and has continued to grow in an organic fashion in spite of a lack of focused marine leadership presence. The eventual vision of the port over the next 20 years will require designation of the Strait of Canso as a CPA. There are a significant level of master plan goals that can be accomplished by SCSCL and the stakeholders concurrently with the review of the governance structure. NSBI and the municipalities surrounding the Strait of Canso own and manage the remaining parcels of waterfront land identified as potential terminal development sites. As an example of potential immediate implementation goals, the land areas will require rezoning, parcel assembly and potential roadway access modifications to attract developers to the region. Much of these administrative efforts can occur outside of the governance discussions and start now.

The following section provides suggestions and recommendations for implementing various measures identified in the port master plan.

11.1 Governance Structure

Modification of the port's governance structure is critical to the long term success and growth of the Strait of Canso region to bolster international trade opportunities and expand the terminal base. Modification of the port status from Regional/Local Port to CPA is critical to the regional and national economy. By enhancing cargo throughput and adding to the diversity in the mix of cargoes will insure the long-term viability of the marine industry in eastern Canada and expand the Strait of Canso as the Atlantic Gateway. The Strait of Canso has been one of the leading cargo ports in the country as well as the largest tonnage port on the Canadian east coast. Designating the port to a CPA status will allow the port to develop a funding source from the Harbour dues and other financial instruments available through the Letters Patent for Canada Port Authorities. These additional funds will allow the port to maintain existing facilities, create opportunities for new marine facilities, implement the recommendations of the port master plan, and create a focused international marketing program.

The SCSCL has filed an application requesting designation as a CPA. The Superport Corporation has maintained dialogue with Transport Canada in an attempt to secure a positive response. The port has also worked diligently to foster the political support of the Province of Nova Scotia and surrounding municipalities and worked closely with the other Atlantic regional ports through the IMPAC organization to underline the economic significance of the Strait of Canso to Transport Canada.

SCSCL should conduct an outreach program with all stakeholders to explain the benefits of local CPA governance and planned use of the Harbour dues. The implementation of a new governance structure should be viewed as a way to enhance the existing terminal operations and expand the relationship to work together for the benefit of the entire marine community. The culmination of this outreach program should be a regional show of support for the creation of a Canada Port Authority in the Strait of Canso.

Recognizing that the process to become a CPA will be time consuming and expensive, SCSCL should approach Enterprise Cape Breton Corporation for funding support to help take the Superport Corporation through the process. This funding assistance should be similar to the assistance provided to the Port of Sydney to assist with the implementation of their governance strategy.

11.2 Port Marketing Strategy

The focused marketing plan envisioned in the port master plan will require commitment of resources and staff to be effective. Currently, Transport Canada, Province of Nova Scotia and the local municipalities do very little in the way of structured marketing for the Strait of Canso as a whole, in addition to marketing their individual land parcels. As an example, NSBI has been responsible for marketing the Melford Industrial Land Reserve for over 20 years and the single land transaction involves the Maher Melford Container Terminal. NSBI is also responsible for marketing for all of the ports in Nova Scotia as well as encouraging economic investment throughout the province with non-marine projects. To attract the level of investment necessary to develop state of the art marine facilities requires an aggressive international marketing program that is focused on marine terminal projects in the Strait of Canso.

In addition to marketing the potential development of new terminals in the Strait of Canso, the marketing plan should be used to drive cargo through the existing public and private marine terminals. This should be a coordinated effort through the private terminal operators to enhance their existing marketing programs. This part of the marketing program will require international travel to foreign countries to conduct trade missions to specific targeted business to use the port facilities. Use of international trade representatives would also be considered to assist with marketing in the countries that are trading partners with the Strait of Canso terminals. This same approach will be used to target domestic shippers exporting cargo from Canada.

The marketing program would also likely include trade delegations to industry conferences and seminars with information booths, along with regular ad campaigns in the industry trade magazines. This multi-layered marketing approach would include trade delegations to foreign and domestic consignees, trade representatives, trade conferences and printed advertisement campaigns to promote the Strait of Canso as the preferred Atlantic Gateway to reach the Canadian and North American markets.

The market forecast section of this report included recommendations for a potential marketing strategy for implementation of the market analysis findings. Specific shipping lines and terminal operators are identified for future contact. One of the potential cargo opportunities includes the potential development of a dry bulk cargo transshipment facility to handle iron ore, metallurgical coal, and other dry bulk cargoes. This cargo currently moves through the ports in Baltimore and Virginia, and then moves by rail to/from the Great Lakes region.
The market analysis identified a potential for significant logistics costs savings from moving the cargo by Laker vessel through the Strait of Canso and transferring it onto Cape Size vessels for international shipping. The cost savings was attributed to the cost differential between rail shipments and Laker all-water services. This potential market has recently begun to take place with coal from Baltimore using the sheltered waters of the Strait of Canso for ship to ship transfers prior to sailing to international markets. The promise of attracting a portion of the Great Lakes dry bulk business will require additional detailed market analysis along with identification of key commodities and shippers that could benefit from this potential cost savings. Once the key commodities and shippers are identified, a focused trade delegation would reach out to those individuals and present a case for shifting trade routes to the Strait of Canso.

This is an example of how one specific idea can develop into a trade mission and potential pursuit of a new terminal operation or cargo shipment using the Strait of Canso. The additional ship calls generated by the enhanced trade would benefit the regional and national economy, and increase Harbour dues receipts. The marketing effort will require significant funding to bring the program into reality. This is only one of many cargo opportunities potentially evolving in the Strait of Canso. Development of a local focused marketing program is necessary for the port to continue growing and attracting new business.

11.3 Immediate Terminal Opportunities

The market analysis identified a range of potential market opportunities. Some of these opportunities will occur sooner than others and others will mature over time as the market matures in the given sectors. The immediate opportunities are based on actual terminal operator interests or potential logistics advantage observations. The immediate terminal opportunities include:

- Coal transshipment (Donkin mine option)
- Great Lakes dry bulk transshipment

Of the two immediate terminals, coal transshipment is the most near-term opportunity. Coal transshipment between two deep sea vessels started recently in the sheltered waters of the Strait of Canso. This is an all-water transfer that occurs when two vessels are anchored. Under this approach the vessels wait at anchorage while self-unloading vessels shuttle coal to a vessel taking on full load for shipments to international destinations. This can be time consuming and costly to the vessel operator while cargo is shuttled.
If this type of operation continues, it may be more beneficial for a coal transshipment terminal to act as a receiving station that stockpiles materials for the deep sea vessel. Using stockpiles and automatic loading equipment will provide faster turnaround times for the deep sea vessel and return the vessel to sea voyage quicker. The terminal layout and facilities will need to be designed and evaluated by a private shipping line or third party terminal operator.

The Donkin mining operation is proposed to start production of metallurgical coal from Cape Breton Island in the next two years. Initial logistics evaluation has shown that it is more cost effective to use barges to transport the coal to the Strait of Canso with transfer to deep sea vessels, than to use the existing coal export terminal in the Port of Sydney due to the lack of regional rail infrastructure between the port and mining operation. The cost of extending the track to Sydney is cost prohibitive compared to barging cargo through the Strait of Canso. The mining consortium has approached the port to evaluate their options and will be making a decision within the next year.

During the site development study, Site D, located within the Melford Industrial Land Reserve, was identified as the most appropriate location for a future bulk cargo transshipment facility. The site is large enough to accommodate a very large third party operator that handles multiple bulk cargoes, such as the consolidation of multiple Great Lakes dry bulk transshipment cargoes such as iron ore, coal and other bulk products. The site could also be divided into two to three smaller terminals for dedicated operations and single purpose cargoes. As an alternative, Site J on Bear Head provides a relatively flat site that could accommodate a smaller dedicated dry bulk facility such as the Donkin mining coal transshipment terminal.

11.4 Long Term Terminal Opportunities

The market analysis identified a number of opportunities that could be potentially attracted to the Strait of Canso region due to emerging markets and future demand. Long-term terminal opportunities are related to markets that are dependent on new technologies and world market pricing structures related to energy related products. The long-term terminal opportunities include:

- Petroleum/Refinery
- Offshore Energy Support Facility

The site selection process identified the hillside sites, such as Sites E and K, as more suitable to liquid and gas product related cargoes. The higher terrain could be used for cargo storage with pump stations and tank farms. These types of cargoes also tend to have higher potential revenue streams to absorb the higher site development costs associated with hillside development conditions. There have been some interests in development of refineries in the Strait of Canso region in the past as well. Refineries could be developed in conjunction with a petroleum terminal or as a standalone operation. Refineries could also be developed in the hillside areas. The future development of a petroleum or refinery in the Strait of Canso is dependent on the demand for products in eastern Canada and the northeastern US market place.

The offshore energy support facility is envisioned to cater to the potential oil and gas field developments under consideration in the Sable Island region off of the coast of Nova Scotia. Most of the oil field support industry is currently located in Halifax and as the development of the Sable Island fields occurs, they may be better served by terminal facilities in the Strait of Canso. The anticipation of near term exploration and development of the field has diminished somewhat as the price of natural gas has dropped worldwide. This gas pricing structure collapse has also impacted the development of the Bear Head LNG Terminal.

In addition to oil field support, this terminal could provide support for the emerging offshore wind farms under consideration in the region as well as future tidal/wave projects. Wind farms are currently being planned and designed for installation in the Atlantic Ocean off North America. A land based terminal will be necessary for support during initial construction/installation and on-going maintenance. Additional use of this type of terminal could be supplemented by general cargo uses that are beyond the scope and scale of the Mulgrave Marine Terminal, including special oversized project cargo, mined materials, and other break bulk type cargoes. This type of facility generally generates limited revenues to cover the expense of building and operating the terminal. A private terminal developer would be better suited to attracting multiple cargo bases. Development Site J is the preferred terminal site for an energy support facility due to the size and relatively flatter terrain.

11.5 Developer Attraction

Developer attraction is directly tied to the proposed marine marketing program. The immediate terminal opportunities have been identified as the near term priorities for development. This includes the Donkin coal mine shipments and possible attraction of the Great Lakes dry bulk cargo transshipment.

Further economic analysis is required to identify the specific commodities and trade lanes that would benefit the most financially from changing the logistics paths used today for moving these cargoes to the Strait of Canso. Today most of the dry bulk cargo moving in or out of the Great Lakes region moves by rail to the US eastern seaboard ports. The additional focused market study will be necessary to identify the potential operators and shippers handling that cargo, as well as providing further background on the potential cost saving associated with switching transshipment by all-water services to the Strait of Canso. This work can be built on the work previously completed for this port master plan and started as soon as funding is identified.

It would be beneficial to future developers to assess some of the administrative zoning and land assembly issues early to avoid project delays as the potential terminal developers are contacted. The future coal and Great Lakes dry bulk transshipment terminals are identified as potential terminals on development Site D. Site D is located within and adjacent to the Melford Industrial Land Reserve and much of the site is zoned industrial with pockets of residential zoning. As a matter of precaution and protection of the limited deep water potential development sites, the master plan has recommended that this area be rezoned to industrial land and identified for future deep water port terminal development. As the developer is attracted to the site and negotiations mature with NSBI, the Municipality of the District of Guysborough will need to assist with land assembly to methodically acquire the limited remaining private parcels along the waterfront. This could also be accomplished by NSBI when the parcels become available on the local market with willing seller/willing buyer procedures.
Similar efforts will be necessary at Site E as the liquid bulk market matures. Because this is a long term opportunity, there is not an immediate need to change the zoning of ownership patterns. As a precaution, the site should be identified as a potential deep water port terminal site.

Sites J and K are owned by NSBI and are zoned industrial. Although no administrative actions are necessary at this time, that relocation of Bear Head Road at the LNG terminal will require initial study to identify potential roadway alignments to avoid crossing the future LNG terminal site. This road is the only road right of way for access to Site J. NSBI should lead this effort to comply with agreements with Bear Head LNG and NSBI future development plans.

In addition to providing immediate administrative re-zoning efforts, there is an immediate need in the region to create better communication with future terminal developers that are interested in the Strait of Canso. There has not been a single point of contact for potential developers interested in the region. The developers will sometimes meet with NSBI, and other times the local municipalities get involved with developer discussions, other times SCSCL may be involved. The developers can become confused with the process and lack of a chain of command to help shepherd them through the maze of bureaucracy. The adoption of the new port master plan will act as a guide for future marine development in the Strait of Canso. SCSCL would make a logical choice for local representation of the terminal sites available in the region and could act as that single point of contact in coordination with NSBI and the other local municipalities. In this capacity SCSCL would simply act as a guide to funnel developers to the appropriate agencies. Similar support will be necessary for collecting infrastructure resource information such as water rights, power company contacts, and other infrastructure requirements. Dialogue should begin immediately with all organizations involved with industrial land transactions in the Strait of Canso to develop a more cohesive and user friendly approach to responding to industrial enquiries.

Appendix A

Terminal Inventory
(TranSystems 2009)

Appendix A: Strait of Canso Terminal Inventories

The conditions of marine facilities and applicable equipment along the Strait of Canso were determined by reviewing existing port facility drawings, field observations, and through interviews with the terminal operators. The following list of items were evaluated and documented through standardized terminal questionnaires:

- Summary of storage areas, buildings, terminal operating areas, and waterfront facilities
- Description of key terminal equipment and operation
- Cargo handling equipment and other ship-to-shore cargo delivery systems capacities
- Navigational approach issues, including water depth at berth and channel geometry
- Truck and rail loading facilities and current hours of operation
- Current and historical terminal throughput

Terminal inventories were created using information gathered in the baseline analysis, interviews, and terminal questionnaires. The inventories are divided into the following sections that detail characteristics of each terminal:

- General terminal characteristics
- Wharf characteristics
- Ship to storage characteristics
- Storage characteristics
- Inland transfer characteristics
- Terminal notes

Each inventory was distributed to its respective operator for review, edits and approval. Seven independent terminal operators on the Strait of Canso are represented in the terminal inventory: Mulgrave Marine Terminal, Martin Marietta Materials, Georgia Pacific, Federal Gypsum Co., NewPage Corp., NS Power, and NuStar Energy LP.

Mulgrave Marine Terminal Inventory

General Terminal Characteristics

Terminal Name	Mulgrave Marine Terminal
Terminal Operator	Strait of Canso Superport
Terminal Area	2.8 hectares
Access Channel	26 meters deep 1.5 kilometres wide
Transportation Modes	Truck, Vessel
Commodities	Salt, Kraft Pulp, Stone Aggregate
Primary Function	Storage and shipment of cargo
Value-Added Operations	Construction lay down
Operation Schedule	Schedule is determined by inbound vessels – 2 shifts

Historical Throughput

Year	Salt	Kraft Pulp	Stone Aggregate
2007	232,000 tons	37,500 tons	40,000 tons

	Commodity	Rail	Truck	Vessel
Inbound Shipments	Salt	N/A	< 1%	99%
	Kraft Pulp	N/A	100%	0%
	Stone Aggregate	N/A	100%	0%
Outbound Shipments	Salt	N/A	6.8%	93.2%
	Kraft Pulp	N/A	0%	100%
	Stone Aggregate	N/A	0%	100%

Navigational Approach Issues	None

Wharf Characteristics

Number of Berths	2
Water Depth at Berth	10 meters
Total Berth Length	457 meters
Wharf Configuration	Marginal wharf
Wharf Structural Type	The South Berth of the Mulgrave Marine Terminal is constructed of a steel sheet pile bulkhead tied to a concrete deadman. The North Berth is constructed of concrete cribs.
Vessel Utilities Available	Water
Average Vessel Berthing Time	N/A
Tidal Fluctuation	0.5 meter to 2 meters
Vessel Accommodation	Largest vessel carries 35,000 tons of bulk cargo
Vessel Calls Per Year	32 (on average)

Storage to Ship Transfer

Type of Transfer Equipment	Crane, Conveyor
Quantity	Crane: 1 (Leased on an as required basis) Conveyor: 1 (Privately owned by a contractor)
Transfer Equipment Characteristics	Crane: Self-unloading vessel (Kraft Pulp only) Conveyor: Self-unloading vessel (Salt only)

Storage Characteristics

Mode of Storage	Closed, Open
Type of Storage	Warehouse: Heated (Kraft Pulp) Open: Stockpile (Salt & Stone Aggregate)
Storage Capacity	Warehouse: 25,000 ft² or 7,500 tons Open : 2 acres 60,000 tons – Salt 30,000 tons – Stone Aggregate
Peaking Characteristics	September to January
Turnover Rate	N/A
Limiting Factor	N/A
Potential Storage Area Expansion	N/A

Inland Transfer

Type of Transfer Equipment	Front-end loader, Forklift
Quantity	Front-end loaders: 4 (2 privately owned, 2 owned by the Strait Superport Corp.) Forklifts: 2 (Privately owned by a contractor)
Type of Cargo	Front-end loader: Salt Forklift: Kraft Pulp
Transfer Equipment Productivity	Front-end loader: 1,000 to 1,200 tons/hr Forklift: 7.5 ton lifting capacity (15,000 lbs)
% of Cargo In by Truck	< 1% (Salt), 100% (Kraft Pulp)
% of Cargo Out by Truck	6.8% (Salt)
% of Cargo In by Rail	N/A
% of Cargo Out by Rail	N/A
Number of Loading Tracks	N/A
Rail Loading Spots	N/A

Notes

Kraft pulp is produced at a mill in Pictou County. Northern Pulp Nova Scotia Corporation uses rail to transport its product to the North American market; product is also shipped by vessel at Pictou and Mulgrave.

Figure A-1: Mulgrave Marine Terminal Aerial

Source: Satellite Imaging Corporation

Martin Marietta Terminal Inventory

General Terminal Characteristics

Terminal Name	Martin Marietta
Terminal Operator	Martin Marietta
Terminal Area	320 hectares Actively mining 162 hectares
Access Channel	26 meters deep 1.5 kilometres wide
Transportation Modes	Rail, Truck, Vessel
Commodities	Stone Aggregate
Primary Function	Producer and shipper of construction stone aggregates
Value-Added Operations	N/A
Operation Schedule	March to December is a 24/7 operation December to March is the slow period

Historical Throughput

Year	Stone Aggregate Production	Stone Aggregate Shipments
2006	4,400,000 tons	4,900,000 tons
2005	4,000,000 tons	3,800,000 tons
2004	3,800,000 tons	3,200,000 tons
2003	3,200,000 tons	3,250,000 tons
2002	2,750,000 tons	2,700,000 tons
2001	3,050,000 tons	2,850,000 tons
2000	2,550,000 tons	2,450,000 tons
1999	2,400,000 tons	2,400,000 tons
1998	2,000,000 tons	1,800,000 tons
1997	1,800,000 tons	2,000,000 tons
1996	1,950,000 tons	1,900,000 tons
1995	400,000 tons	400,000 tons

Inbound Shipments	Rail: 0%	Truck: 0%	Vessel: 0%
Outbound Shipments	Rail: 1%	Truck: 24%	Vessel: 75%
Navigational Approach Issues	None		

Wharf Characteristics

Number of Berths	2: Vessel & Barge
Water Depth at Berth	13 meters
Total Berth Length	Vessel 192 meters Barge 50 meters
Wharf Configuration	Vessel: Pier Barge: Two finger piers 50 meters apart
Wharf Structural Type	The vessel wharf consists of a steel sheet pile bulkhead with a concrete cap and fascia. Mooring points are located behind the bulkhead and at a few locations landside.

Vessel Utilities Available	N/A
Average Vessel Berthing Time	N/A
Tidal Fluctuation	0.5 meter to 2 meters
Vessel Accommodation	Typical vessel carries up to 70,000 tons of bulk cargo Typical barge carries up to 4,000 tons of bulk cargo
Vessel Calls Per Year	75 vessels and 75 barges (2007)

Apron to Ship Transfer

Type of Transfer Equipment	Conveyor
Quantity	1
Transfer Equipment Characteristics	Belt driven: 1,400 to 2,000 tons/hr

Storage to Apron Transfer

Type of Transfer Equipment	Conveyor, Crusher
Quantity	1
Transfer Equipment Characteristics	Conveyor: Belt driven - 1,400 to 2,000 tons/hr Crusher: Belt driven – 1,000 tons/hr

Storage Characteristics

Mode of Storage	Open
Type of Storage	Stockpile
Storage Capacity	2,000,000 tons storage area adjacent to the pier
Peaking Characteristics	Summer
Turnover Rate	N/A
Limiting Factor	Primary crusher on top of the mountain has a rate of 1,000 tons/hour Martin Marietta experiences some congestion when loading trucks and vessels simultaneously
Potential Storage Area Expansion	The five-year planning horizon indicates an increase in production to 8,000,000 tons and double the conveyor's capacity

Inland Transfer

Type of Transfer Equipment	Front-end loader, Conveyor
Quantity	N/A
Type of Cargo	Stone Aggregate
Transfer Equipment Productivity	N/A
% of Cargo In by Truck	0%
% of Cargo Out by Truck	Less than 200,000 tons/year; 3,000 trucks annually
% of Cargo In by Rail	0%
% of Cargo Out by Rail	Less than 1,000 tons/year
Number of Loading Tracks	1
Rail Loading Spots	8 to 10 cars

Notes

There is an asphalt plant on site (on top of the mountain) and a concrete batch plant (sea level).
Martin Marietta's largest market opportunity is in the Southeast U.S. and Gulf Coast.
Martin Marietta's international market consists of Caribbean nations.
CAT equipment; CAT provides maintenance.
There is an opportunity to sell waterfront property to a non-competitive user.
In the past, vessels have backhauled stone aggregate after unloading coal at NSP.

Figure A-2: Martin Marietta Aerial

Source: Satellite Imaging Corporation

Georgia Pacific Terminal Inventory

General Terminal Characteristics

Terminal Name	Point Tupper
Terminal Operator	Georgia Pacific Canada Inc.
Terminal Area	6 hectares
Access Channel	26 meters deep 1.5 kilometres wide
Transportation Modes	Vessel, truck, rail
Commodities	Gypsum rock
Primary Function	Storage and distribution of raw gypsum
Value-Added Operations	N/A
Operation Schedule	24/7 year round (3, 8 hr shifts); do not work berth on weekends
Historical Throughput	2007: 1,800,000 tons
Inbound Shipments	100% truck
Outbound Shipments	100% vessel

Wharf Characteristics

Number of Berths	1
Water Depth at Berth	9.45 meters MLW (18 meters channel depth)
Total Berth Length	300 meters
Wharf Configuration	Pier
Wharf Structural Type	The Georgia Pacific Terminal consists of seven cellular cofferdam dolphins (five berthing dolphins and two mooring dolphins). All the dolphins have concrete caps, mooring hardware, and are accessed by steel catwalks.
Vessel Utilities Available	N/A
Average Vessel Berthing Time	42 hours
Tidal Fluctuation	0.5 meter to 2 meters
Vessel Accommodation	Typical vessel carries 38,000 tons of bulk cargo
Vessel Calls Per Year	52 to 78 per year(1 to 1.5 per week)

Apron to Ship Transfer

Type of Transfer Equipment	Chute (Deflector)
Quantity	1
Transfer Equipment Characteristics	Avg. transfer rate 1,500 tons/hr Peak transfer rate 2,000 tons/hr

Storage to Apron Transfer

Type of Transfer Equipment	Conveyor belt
Quantity	1

Transfer Equipment Characteristics	Current productivity 2,000 tons/hr Rated productivity 2,000 tons/hr

Storage Characteristics

Mode of Storage	Open
Type of Storage	Stockpile
Storage Capacity	0.8 hectare or 362,874 tons Average amount stored on site: 100,000 tons
Peaking Characteristics	June, July, August
Dwell Time	Minimum: 10 days Average: 60 days Maximum: 365 days
Turnover Rate	~15 times per year
Limiting Factor	None
Potential Storage Area Expansion	N/A

Inland Transfer

Type of Transfer Equipment	A total of 20 B-Train and Tri-axle trucks
Type of Cargo	Bulk gypsum rock
Transfer Equipment Productivity	Average 600 tons/hr Peak 923 tons/hr
% of Cargo In by Truck	100%
% of Cargo Out by Truck	0%
% of Cargo In by Rail	None
% of Cargo Out by Rail	None
Number of Loading Tracks	None
Rail Loading Spots	None
Truck Loading Bays	Area 1: 1 Bay – Conveyor Area 2: 1 Bay – Front-end loader

Gate Processing

Total Lanes	1 lane
Scales	1
Inbound Loads Per Day	96
Inbound Processing Time	5 minutes
Outbound Loads Per Day	N/A
Outbound Processing Time	N/A
Peak	20% per day Monday - Friday
Inbound Staff	1 clerk
Average Inbound Processing Rate	12 trucks/hr
Average Outbound Processing Rate	N/A
Shifts Per Day	3 (8 hour shifts, Monday - Friday)
Days per Week	5

Notes

2,400 ft² Maintenance and Repair building, two 4,000 ft² parking areas.
1.5 hours to berth, tie down, remove/stow hatch covers.
Facility is never at maximum or minimum capacity.
Twenty percent of terminal area is used for value-added operations.

Figure A-3: Georgia Pacific Aerial

Source: Satellite Imaging Corporation

Federal Gypsum Terminal Inventory

General Terminal Characteristics

Terminal Name	Federal Gypsum		
Terminal Operator	N/A		
Terminal Area	19 hectares		
Access Channel	26 meters deep 1.5 kilometres wide		
Transportation Modes	Rail, Truck		
Commodities	Gypsum		
Primary Function	Manufacturer and supplier of gypsum wallboard products		
Value-Added Operations	N/A		
Operation Schedule	Year round 24/7 operation		
Historical Throughput	N/A		
Inbound Shipments	Rail: N/A	Truck: N/A	Vessel: N/A
Outbound Shipments	Rail: N/A	Truck: N/A	Vessel: N/A
Navigational Approach Issues	Low water depth at berth		

Wharf Characteristics

Number of Berths	1
Water Depth at Berth	6.7 meters MLW
Total Berth Length	N/A
Wharf Configuration	Pier
Wharf Structural Type	The wharf is constructed of fill, protected by an outermost layer of armor rock. Two breasting dolphins, two mooring dolphins, and two loading ramps are pile supported with concrete caps. The dolphins are accessed by steel catwalks, and the mooring dolphin access catwalks are supported at mid-span by a piled bent.
Vessel Utilities Available	No vessel activity
Average Vessel Berthing Time	No vessel activity
Tidal Fluctuation	0.5 meter to 2 meters
Vessel Accommodation	The wharf was designed specifically for a Ro/Ro barge handling gypsum fibreboard.

Storage Characteristics

Mode of Storage	Open
Type of Storage	Stockpile
Storage Characteristics	On-dock warehouse for overflow production storage
Peaking Characteristics	N/A

Turnover Rate	N/A
Limiting Factor	N/A
Potential Storage Area Expansion	N/A

Inland Transfer

Type of Transfer Equipment	Forklift
Quantity	N/A
Type of Cargo	Finished gypsum board (PlasterRock)
Transfer Equipment Productivity	N/A
% of Cargo In by Truck	N/A
% of Cargo Out by Truck	N/A
% of Cargo In by Rail	N/A
% of Cargo Out by Rail	N/A
Number of Loading Tracks	2

Notes

Gypsum is hauled inbound via truck from a mine in Nova Scotia.
There is a natural gas pipeline onsite.
Federal Gypsum has 18 acres of waterfront land.
The pier cannot handle or store rock salt because of possible contamination to raw gypsum ore.
Federal Gypsum is under a long term lease with the Province of Nova Scotia.

Figure A-4: Federal Gypsum Aerial

Source: Satellite Imaging Corporation

NewPage Terminal Inventory

General Terminal Characteristics

Terminal Name	NewPage
Terminal Operator	NewPage
Terminal Area	121 hectares
Access Channel	26 meters deep 1.5 kilometres wide
Transportation Modes	Rail, Truck, Vessel
Commodities	Kaolin, Peroxide, Caustic, Sulfur Dioxide, Kraft Pulp, Ground Calcium Carbonate (GCC), Slurry, Round Wood
Primary Function	Manufacturer of Supercalendar paper and newsprint
Value-Added Operations	N/A
Operation Schedule	Year round 24/7 operation
Historical Throughput	2007 / 2007 Filler (Kaolin & GCC): ~ 143,000 tons Timber (Woodyard): 900,000 wet tons Newsprint Production: 190,000 tons Supercalendar Production: 360,000 tons
Inbound Shipments	Rail: 30% Truck: 60% Vessel: 10%
Outbound Shipments	Rail: 90% Truck: 9% Vessel: 1%
Navigational Approach Issues	None

Wharf Characteristics

Number of Berths	1
Water Depth at Berth	8.5 meters MLW
Total Berth Length	154 meters
Wharf Configuration	Pier
Wharf Structural Type	The wharf is constructed with a steel sheet pile cellular cofferdam structure with a single cell cofferdam mooring dolphin to the north. A southern mooring dolphin was removed leaving a berth of approximately 154 meters in length. The cells are filled and capped with concrete. The steel sheets are protected from corrosion by an impressed current cathodic protection system.
Vessel Utilities Available	N/A
Average Vessel Berthing Time	Less than 24 hours
Tidal Fluctuation	0.5 meter to 2 meters
Vessel Accommodation	Typical vessel carries 9,000 to 12,000 tons of filler
Vessel Calls Per Year	12 to 13

Ship to Storage/Production Transfer

Type of Transfer Equipment	Conveyor, Pipeline, and Reclaimer
Quantity	Conveyor: 1 Pipeline: 1 Reclaimer: 1
Transfer Equipment Characteristics	Conveyor: 9,000 tons/20 hours; Design capacity is 800 tons/hour Pipeline: Operates at the vessel's capacity Reclaimer: Front-end loader to hopper with a screening process

Storage Characteristics

Mode of Storage	Closed
Type of Storage	Warehouse
Storage Capacity	~ 10,000 tons
Peaking Characteristics	Commodities are ordered as needed
Turnover Rate	Approximately once a month
Limiting Factor	N/A
Potential Storage Area Expansion	~ 15,000 tons

Inland Transfer

Type of Transfer Equipment	Forklift with roll clamps
Type of Cargo	Rolled paper stock
Transfer Equipment Productivity	N/A
% of Cargo In by Truck	60%
% of Cargo Out by Truck	9%, 10 to 15 trucks per day
% of Cargo In by Rail	30%
% of Cargo Out by Rail	90%, 18 to 20 railcars per day
Number of Loading Tracks	2
Rail Loading Spots	23
Truck Loading Bays	4

Notes

NewPage has a forest base totalling 600,000 hectares of licensed Crown Lands in eastern Nova Scotia which supplies approximately 50 percent of the wood requirement. The remainder comes from private woodlots.
The main tree species are spruce and balsam fir.
Inbound round wood is weighed at an on-site scale house.
Fifteen percent of the wood supply is chips from sawmills.
Slurry is imported from Norway and Kaolin is imported from Brazil.
There is a pipeline crossing the Strait of Canso that provides water to the mill.
NewPage consumes 1.7 billion kilowatt hrs/yr (13% of the total amount of energy consumed in Nova Scotia).
Kaolin vessels have received backhauls from Martin Marietta.
NewPage's market is the USA, Canada, and some offshore container shipments.
NewPage receives 65 to 75 inbound trucks per day.

Figure A-5: NewPage Aerial

Source: Satellite Imaging Corporation

Nova Scotia Power Terminal Inventory

General Terminal Characteristics

Terminal Name	Point Tupper Marine Terminal		
Terminal Operator	Savage Canac Corporation		
Terminal Area	8 hectares Excludes the fly ash site		
Access Channel	26 meters deep 1.5 kilometres wide		
Transportation Modes	Rail, Truck, Vessel		
Commodities	Coal, Petroleum Coke		
Primary Function	Storage and distribution of coal to Nova Scotia Power		
Value-Added Operations	N/A		
Operation Schedule	Year round 24/7 operation		
Historical Throughput	Year 2007 (IB)	Coal 1.25 million tons	Petroleum Coke 300,000 tons
Inbound Shipments	Rail: 0%	Truck: 0%	Vessel: 100%
Outbound Shipments	Rail: 99%	Truck: 1%	Vessel: 0%
Navigational Approach Issues	None		

Wharf Characteristics

Number of Berths	1
Water Depth at Berth	17 meters
Total Berth Length	134 meters plus mooring dolphins
Wharf Configuration	Pier
Wharf Structural Type	The wharf is constructed of concrete caissons filled with rock to create a berth supporting a crane and a hopper. The caissons were constructed locally in the harbour and floated into position. A steel conveyor structure connects the berth to the landside and is supported by piled bents. A single concrete mooring dolphin is accessed from the main pier by a steel catwalk.
Vessel Utilities Available	No
Average Vessel Berthing Time	Less than 24 hours
Tidal Fluctuation	0.5 meter to 2 meters
Vessel Accommodation	Typical vessel carries ~ 50,000 tons of bulk cargo
Vessel Calls Per Year	30

Ship to Storage Transfer

Type Transfer Equipment	Conveyor: Ship to storage Reclaimer: Storage to production (Runs underground)
Quantity	Conveyor: 1 Reclaimer: 2 (Blends the products)
Transfer Equipment Characteristics	Conveyor: Belted self-unloader – 3,000 tons/hr Conveyor: Bulk Carrier – 800 tons/hr Reclaimer: 300 to 400 tons/hr

Storage Characteristics

Mode of Storage	Open
Type of Storage	Stockpile
Storage Capacity	140,000 tons
Peaking Characteristics	Production is steady year round
Turnover Rate	N/A
Limiting Factor	N/A
Potential Storage Area Expansion	Demise of coal facility in Stellarton will increase capacity

Inland Transfer

Type of Transfer Equipment	Front-end loader
Quantity	2
Type of Cargo	Coal
Transfer Equipment Productivity	300 to 600 tons/hour
% of Cargo In by Truck	N/A
% of Cargo Out by Truck	N/A
% of Cargo In by Rail	N/A
% of Cargo Out by Rail	N/A
Number of Loading Tracks	1
Rail Loading Spots	20

Notes

Low sulfur coal is imported from South America.
Medium sulfur coal is imported from Baltimore.
Petroleum coke is imported from Texas/Houston.
Railcars are leased from Nova Scotia Power.
2,000 to 2,400 tons of coal per day is shipped outbound via rail five to seven days per week.
Approximately 520,000 to 624,000 tons annually (five days per week).

Figure A-6: Nova Scotia Power Aerial

Source: Satellite Imaging Corporation

NuStar Energy Terminal Inventory

General Terminal Characteristics

Terminal Name	NuStar Energy
Terminal Operator	NuStar Energy
Terminal Area	791 hectares 162 to 202 hectares cleared
Access Channel	26 meters deep 1.5 kilometres wide
Transportation Modes	Truck, Vessel
Bulk Commodities	Crude Oil Distillates, Gasolines, Aviation Fuel, Intermediate Petroleum Products and Blend Components, Residual Fuels, Butane, Condensate
Primary Function	The storage and transhipment of crude oil and petroleum products; gasoline blending; distillate and residual capability; bunker sales
Value-Added Operations	Point Tupper Marine Services: Emergency response
Operation Schedule	Year round 24/7 operation with 4, 6 hour shifts
Historical Throughput	

Year	Crude (bbls)	Gasoline (bbls)	Fuel Oil (bbls)
2007	93,880,000	15,086,000	719,000
2006	93,094,000	16,774,000	440,000
2005	93,681,000	12,304,000	223,000
2004	67,460,000	9,903,000	220,000
2003	51,620,000	22,839,000	150,000
2002	27,624,000	26,889,000	210,000

Inbound Shipments	Vessel: 100%
Outbound Shipments	Vessel: 100%
Navigational Approach Issues	None

Wharf Characteristics

Number of Berths	2
Water Depth at Berth	Berth 1: 26 meters Berth 2: 18 meters
Total Berth Length	Berth 1: 379 meters Berth 2: 228 meters
Wharf Configuration	T-shaped; Pier with concrete deck and catwalk to mooring dolphins
Wharf Structural Type	The wharf is constructed with steel pipe bearing piles drilled and socketed into the rock bottom. The piles are spaced closely together with steel bracing to provide the required strength for berthing supertankers.
Vessel Utilities Available	N/A

Average Vessel Berthing Time	Berth 1: 36 to 48 hours Berth 2: 24 hours or less
Tidal Fluctuation	0.5 meter to 2 meters
Vessel Accommodation	Berth 1: Capable of handling vessels up to 400,000 DWT Berth 2: Capable of handling vessels up to 100,000 DWT
Vessel Calls Per Year	305

Ship to Apron Transfer

Type of Transfer Equipment	Loading Arms	
Transfer Equipment Pumping Rates	6 x 16": 28,400 bbls/hr 2 x 12": 17,430 bbls/hr 4 x 10": 12,000 bbls/hr 2 x 8": 7,340 bbls/hr	
Transfer Equipment Breakdown	<u>Berth 1</u> 4 x 16": Crude Oil 1 x 16": Gas, Condensate, Diesel 1 x 10": Gas, Condensate, Diesel 1 x 10": Fuel Oil 1 x 16": Out of Service	<u>Berth 2</u> 1 x 8": Crude Oil, Fuel Oil 2 x 12": Crude Oil 2 x 10": Gas, Condensate, Diesel 1 x 8": Gas, Condensate, Diesel
Transfer Equipment Used Per Vessel	Four loading Arms available, primarily utilize three arms	

Apron to Storage Transfer

Type of Transfer Equipment	Pipelines
Transfer Equipment Pumping Rates	2 x 42": 80,000 bbls/hr 120,000 bbls/hr for two lines 5 x 16": 12,000 bbls/hr 20,000 bbls/hr for two lines 1 x 30": Restricted to the vessel's line size 1 x 30": Restricted to the vessel's line size
Transfer Equipment Breakdown	42": Crude Oil Lines 16": Diesel (Clean Product Lines) 30": Fuel Oil Line 30": Crude Oil Line

Storage Characteristics

Mode of Storage	Closed
Type of Storage	Tanks

Storage Capacities

# of Tanks	Nominal Capacity (bbls)	Commodity
1	20,200	Glycol
3	498,800	Fuel Oil
4	521,500	Condensate
19	2,390,020	Gasoline
10	4,070,472	Crude Oil
37	**7,500,992**	

Dead Tank Storage	90% “safe fill” tank limit
Peaking Characteristics	2 to 3 times per month
Turnover Rate	Crude oil: 3 to 4 times per month Gasoline: 2 times per month Anything else (i.e. Fuel Oil, Condensate, etc.) once per month
Limiting Factor	Tank storage
Potential Storage Area Expansion	2 to 5 million barrels of available storage on-site

Inland Transfer

Type of Transfer Equipment	Truck rack with blender
Quantity	1
Type of Cargo	Heavy Fuel, Diesel
Transfer Equipment Productivity	30 to 50 trucks per day inbound (rate, not actual) 30 to 50 trucks per day outbound (rate, not actual)
% of Cargo In by Truck	0%
% of Cargo Out by Truck	0%
% of Cargo In by Rail	0%
% of Cargo Out by Rail	0%

Notes

No rail lines extend into NuStar’s property.
Vessels greater than 150,000 DWT are restricted to daytime navigation.
Possible expansion of the wharf by adding 1 to 2 docks.
Does not currently ship product via truck but has the infrastructure.

Figure A-7: NuStar Energy Aerial

Source: Satellite Imaging Corporation

Appendix B

Existing Conditions Assessment (TranSystems 2009)

Appendix B: Existing Conditions Assessment

The Strait of Canso marine terminals are located approximately 242 km northeast of Halifax on the mainland of Nova Scotia and Cape Breton Island. These facilities are situated along the Strait of Canso, which offers a deep-water harbour with an average channel depth of 36.5 metres. The Canso Causeway, built in the mid 1950's, joins the mainland of Nova Scotia and Cape Breton Island and ensures that the port, on the south side, remains ice-free year round. It also marks the northern extent of the master plan area of assessment.

The Cape Breton and Central Nova Scotia Railway (CBNS) provides rail service to the Strait of Canso. The CBNS railway extends from its connection with Canadian National Railway (CN) at Truro to Port Hawkesbury, and beyond on Cape Breton Island via the Canso Causeway. The principal road to the Strait of Canso Superport is Highway 104, connecting Truro on the mainland with Cape Breton Island. Highway 344 is a two-lane unlimited access highway that maintains an alignment along the western shore of the Straight of Canso and connects Mulgrave and Melford to Highway 104. Refer to Figure 2-1 for a regional landside access map.

2.1 Facilities Inventory

The area under consideration by this master plan is the land bordering the Strait of Canso along the Inverness County, Richmond County and Guysborough County shorelines. Existing maritime industries located along the Point Tupper shoreline on Cape Breton Island and on the mainland near Mulgrave were evaluated for this report. As shown in Figure 2-2, these industries include:

- Mulgrave Marine Terminal (MMT) general cargo terminal
- Martin Marietta stone aggregate quarry and terminal at Cape Porcupine
- Port Hawkesbury general purpose pier
- Georgia Pacific building products manufacturing facility
- Federal Gypsum wallboard manufacturing facility
- NewPage supercalendered paper mill (formerly Stora Enso)
- Savage Canac Corp. coal import and transhipment terminal serving the Nova Scotia Power (NS Power) thermal generation plant
- NuStar Energy LP petroleum products, storage and transhipment facility (formerly Statia Terminals)

The consultant team interviewed the terminal operators on the Strait to inquire about existing operations and anticipated plans for trade expansion or contraction. The interviews and site evaluations identified each terminal's physical characteristics and operational attributes including: wharf length, cargo handling equipment and transfer rates, terminal size, storage area, historical throughput and vessel calls. The historical vessel data provided information on vessels that called at each terminal (except Georgia Pacific) from 1997 to 2007 (not all of the data was complete). The inventory of these facilities along the Strait of Canso is provided for reference in Appendix A.

Two other major terminals being considered for development along the Strait of Canso that will have an influence on the master plan include the Anadarko liquefied natural gas (LNG) terminal (construction on-hold); and the Melford container terminal.

Anadarko planned to construct a LNG import facility on Bear Head, near Point Tupper. The LNG site had been prepared and concrete pads poured for two tanks. However, Anadarko mothballed the terminal in 2007stating that it was unable to secure an adequate long-term LNG supply. Anadarko maintains ownership of the site and may revive the project if market conditions change.

Melford International Terminals (MIT) plans to construct and operate a container complex on the Strait of Canso at Melford Point in the Melford Industrial Reserve. The proposed terminal will occupy 165 hectares including 95 hectares for a container logistics terminal and intermodal rail yard, and 70 hectares of backlands to support new road and rail access. An additional 101 hectares is available for future expansion.

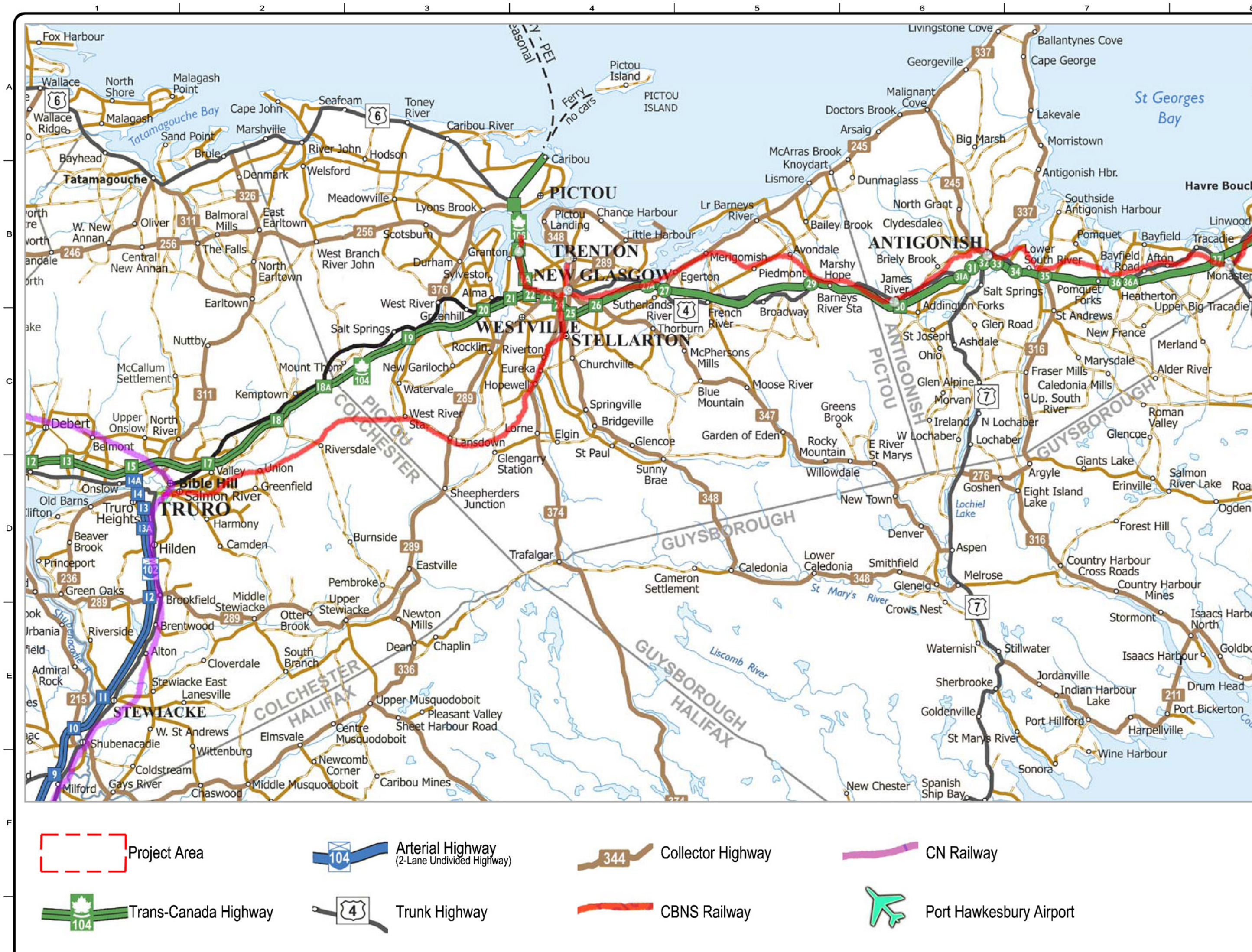

Figure 2-1: Regional Access Map

Regional Access Map

PRELIMINARY NOT FOR CONSTRUCTION

SCALE:	AS SHOWN
DESIGNED BY:	TNT2/SEM
DRAWN BY:	TNT2
CHECKED BY:	GOS
APPROVED BY:	CBM
DATE:	02/18/2009
PROJECT NO.:	P307070026

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phone (757) 627 - 1112
fax (757) 627 - 1113
web www.transystems.com

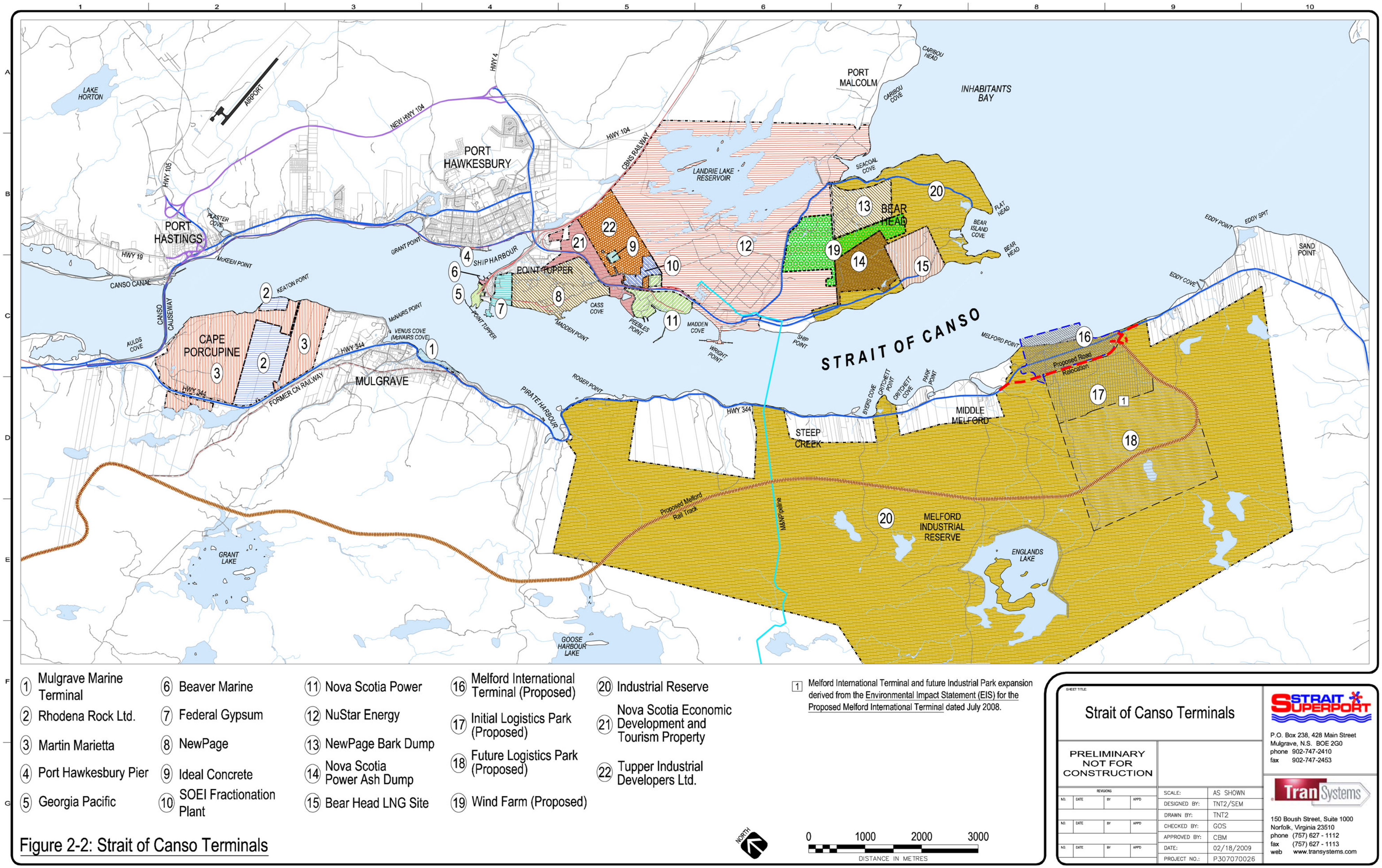


Figure 2-2: Strait of Canso Terminals

2.2 Terminal Throughput and Capacity Comparison

A capacity analysis was performed to quantify the existing throughput capacity of the dry and liquid bulk cargo terminals and their current operations and infrastructure at the Strait of Canso. The marine terminal annual throughput capacities[1] were compared to the total volume of cargo handled during the 2007 calendar year. The methods employed, the assumptions and results of the annual throughput capacity models are provided in Appendix B.

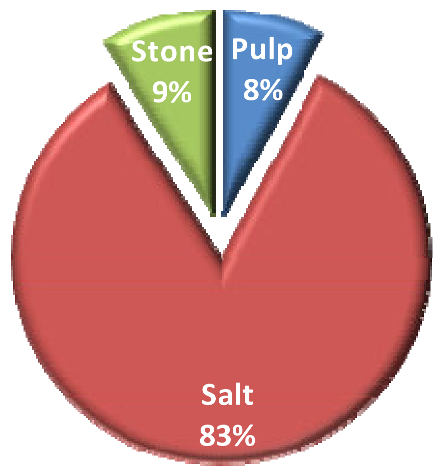
2.2.1 Mulgrave Marine Terminal (MMT)

The Mulgrave Marine Terminal (MMT) is made up of more than two hectares of land on the mainland side of the Strait of Canso in Port Mulgrave. The general cargo terminal is managed by the Strait of Canso Superport Corporation and currently handles three primary commodities: salt, stone product and baled wood pulp. A breakdown of the bulk cargo loaded/unloaded at the port in 2007 is shown in Figure 2-3.

2.2.1.1 Salt

De-icing salt is the main cargo handled at MMT accounting for 83 percent of the total tonnage in 2007. Conversations with staff at MMT indicated the Canadian Salt Company has a contractual agreement to provide Nova Scotia Department of Transportation with a maximum of 50,000 metric tons of salt for use in north eastern Nova Scotia during a winter season. Normally, the balance of the tonnage that goes through MMT is delivered to the New England States.

Figure 2-3: 2007 MMT Percentage by Cargo Type



Source: TranSystems

2.2.1.2 Aggregate/Armour Stone

Currently, the Rhodena Rock Quarry is the source of the aggregate exported from MMT. However, sporadic exports of aggregate and armour stone have also come from Martin Marietta Materials and Weeks Construction. A majority of the recent aggregate shipments are destined for Prince Edward Island, Canada and are usually 5,000 metric ton shipments. There are no contractual agreements for aggregate export, as it is on an order-by-order basis.

2.2.1.3 Kraft Pulp

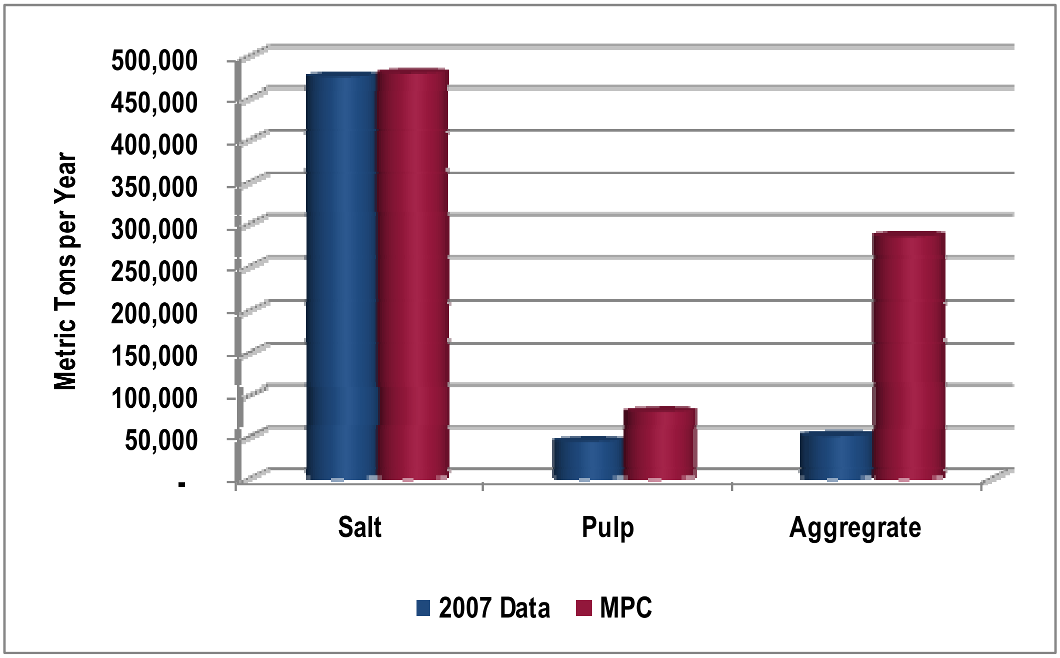
Kraft pulp exports occurring at the port are from a paper mill in Pictou County. Neenah Paper has historically been the principal source of baled pulp exports at MMT. However, Northern Pulp Nova Scotia Corporation recently acquired the pulp mill, taking over the existing operations and client obligations.

In 2007, MMT shipped 474,178 tons of rock salt, 44,271 tons of kraft pulp and 51,217 tons of aggregate/armour rock. The capacity model calculated that the MPC for rock salt is 478,450 tons, 78,750 tons for kraft pulp and 285,000 tons for stone aggregate. The MPC figures indicate that the salt operation is at 99 percent capacity, the pulp operation is at 56 percent of estimated capacity (based on warehouse and annual storage turns), and the aggregate operation is at 18 percent of estimated capacity. Storage capacity is the limiting component for all three operations. Due to the limitation of MMT's storage area, an increase in the cargo turnover rate for each operation would increase MPC.

[1] For the purposes of this report, analysis of facility capacity constraints will generally be discussed in terms of maximum practical capacity (MPC).

Figure 2-4 illustrates the capacity and historical throughput for MMT's various dry cargoes.

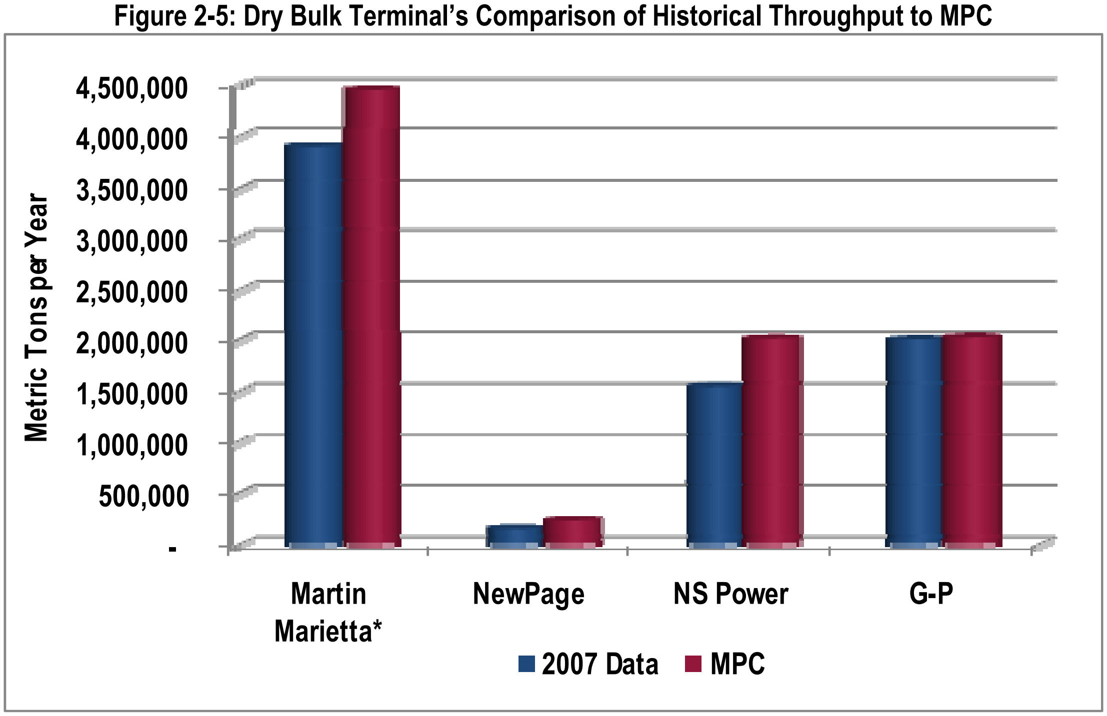
Figure 2-4: MMT's Comparison of Historical Throughput to MPC



Recently released MMT cargo volumes for 2008 included 422.1 MT of salt, 43.5 MT of kraft pulp and approximately 50 MT of aggregate.
Source: TranSystems and Strait of Canso Superport Corporation

In addition to MMT, there are four private dry bulk terminals on the Strait of Canso: Martin Marietta, Georgia Pacific NewPage, and Savage Canac (NS Power). The total volume of cargo handled by each terminal during the 2007 calendar year is compared to each terminal's calculated total capacity in Figure 2-5.

Figure 2-5: Dry Bulk Terminal's Comparison of Historical Throughput to MPC



Source: TranSystems

2.2.2 Martin Marietta Materials

Martin Marietta owns an aggregate export terminal on 320 hectares of land on Cape Porcupine, adjacent to the Canso Causeway. Martin Marietta's operation is unique because stone aggregate is mined and crushed on-site, transferred to storage by conveyor and gravity, and then exported.

The capacity model indicates the MPC of the current wharf is 4.4 million tons. In 2007 Martin Marietta mined 3.9 million tons of aggregate, slightly lower than its calculated capacity. The main constraint limiting production is the stone crusher's transfer rate of 1,000 tons per hour. Martin Marietta's MPC is misleading, because it is not operating at a peak level for long periods of time, and can easily replenish its storage upon demand due to the proximity and production of the mine. However, the terminal operator recognizes that as demand increases, it may need additional wharf. Therefore, a second wharf is currently under consideration. Since the existing wharf recently suffered limited failure, future development of a new wharf should be designed to resist environmental conditions and seismic loads imposed by nearby blasting.

2.2.3 Port Hawkesbury Pier

The Port Hawkesbury Pier is located adjacent to the Yacht Club on the eastern side of the Strait of Canso. In 2000 -2001, the Strait of Canso Superport took ownership of the Port Hawkesbury Pier and invested $2.6 million to reconstruct the pier. The new pier offers five to six metre depths along the wharf face and provides berth space for various service vessels, pleasure craft, fishing boats, tugs, barges and patrol vessels. A capacity analysis of the facility was not performed as cargo is not handled at the pier.

2.2.4 Georgia Pacific

Georgia Pacific operates an export facility to supply its North American wallboard production facilities with gypsum mined on Cape Breton. The six-hectare terminal delivers gypsum from the mine by truck and exports 100 percent of its cargo by vessel. Georgia Pacific's operation is similar to Martin Marietta, except that its primary exported commodity, gypsum rock, is hauled to its terminal from a nearby mine. The Melford mine was activated in 2003, as the previous Sugar Camp facility was mined out. The mine has an annual production capacity of 1.63 million metric tons.

Approximately 1.8 million tons of gypsum was exported in 2007[2]. The capacity model indicates the limiting component is storage, with a MPC of two million tons. This has Georgia Pacific operating at 89 percent capacity. Like Martin Marietta, Georgia Pacific can easily replenish its stockpile (due to the proximity of the mine) and adjusts deliveries to maintain operation below MPC.

2.2.5 Federal Gypsum Co.

Federal Gypsum operated a wallboard plant at a 19-hectare terminal on Point Tupper. Since the inception of this analysis, the Federal Gypsum plant has closed. The land was leased from the Province of Nova Scotia, leaving the future use of the site and availability of the existing buildings undetermined.

2.2.6 NewPage

NewPage produces calendared paper and newsprint in a 121 hectare facility on Point Tupper. NewPage brings in all raw materials by truck, except for kaolin and slurry, and nearly all finished products are exported by rail. The terminal requires waterside access for receiving kaolin and slurry several times a year.

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[2] Export includes mine production plus stockpile and other sources.

NewPage imported approximately 143,000 tons of kaolin and slurry in 2007 for the production of various paper products. The capacity model indicates the annual MPC is 227,500 tons. The NewPage pier currently operates at 63 percent capacity and replenishes its imported commodities approximately once a month. Storage capacity (storage of kaolin) is the limiting component due to its size and how the operation dictates the amount of product necessary to sustain its monthly production.

2.2.7 Nova Scotia Power (NS Power)

NS Power maintains an eight hectare coal blending and transhipment terminal on Point Tupper. The terminal is operated by Savage Canac Corporation. NS Power imported approximately 1.5 million tons of coal and petroleum coke in 2007.

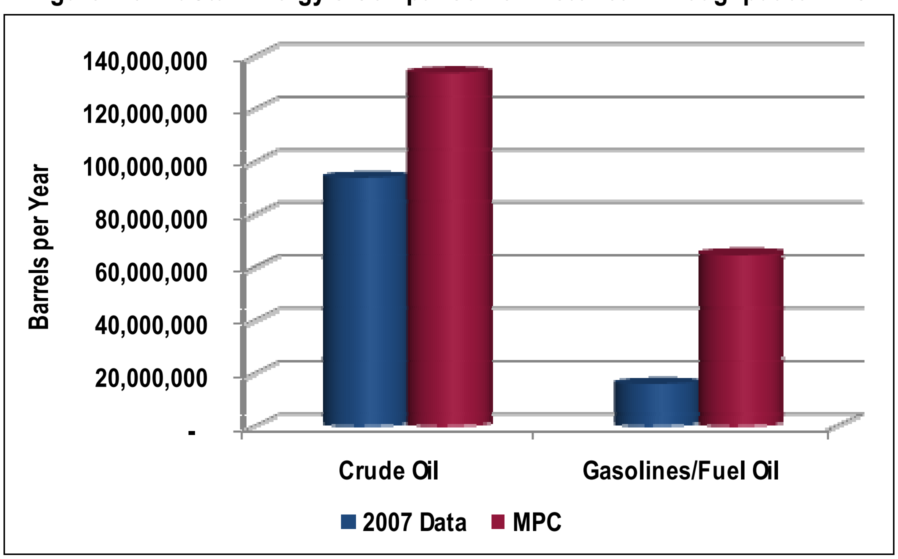
The capacity model indicates the limiting component is storage with a MPC of two million tons. NS Power is currently operating at 77 percent capacity. With a modest growth rate, the NS Power's storage area will have to be expanded to accommodate a greater throughput of cargo. This expansion is currently underway with road relocation to accommodate the coal storage area. However, the total capacity of the new storage area has not been determined.

2.2.8 NuStar Energy

NuStar operates a liquid bulk cargo storage and transhipment terminal at Point Tupper. Among cargoes handled at the terminal are crude oil, distillates, gasoline, aviation fuel, intermediate petroleum products and blend components, residual fuels, butane and condensate. The terminal has a land area of 791 hectares, of which 202 hectares is either in use or cleared.

In 2007, NuStar Energy's throughput was approximately 94 million barrels for crude oil and approximately 16 million barrels in fuel oil and gasoline. The capacity model indicates the limiting component is storage for both commodities with a MPC of 134 million barrels for crude oil and 64 million barrels for fuel oil and gasoline. Currently NuStar Energy is operating at 70 percent capacity for crude oil and 25 percent capacity for fuel oil and gasoline. To meet the increasing North American demand of petroleum products, NuStar Energy could increase its MPC by converting gasoline and fuel oil tanks to support crude oil and/or building additional storage tanks. In addition, NuStar believes the terminal could benefit from additional ship-loading capacity and has made plans for expanding the wharf.

Figure 2-6: NuStar Energy's Comparison of Historical Throughput to MPC



Source: TranSystems

2.2.9 *Capacity Analysis Conclusion*

The marine terminals in the Strait are privately owned operations that either store or ship raw materials for consumption at other inland points in Canada and abroad. Market demand for Strait of Canso products has experienced modest historical growth and terminal improvements have only been made when necessary to keep up with growth. Therefore, most of these terminals are operating comfortably, at or near capacity, with the constraining factor being cargo turnover rate in storage. Each of the terminals could increase their capacity by either increasing storage yard rotation, changing storage configurations, or by creating more storage on additional terminal areas. Beyond storage improvements, terminal owners are considering wharf expansion at the NuStar transhipment terminal and at the Martin Marietta site.

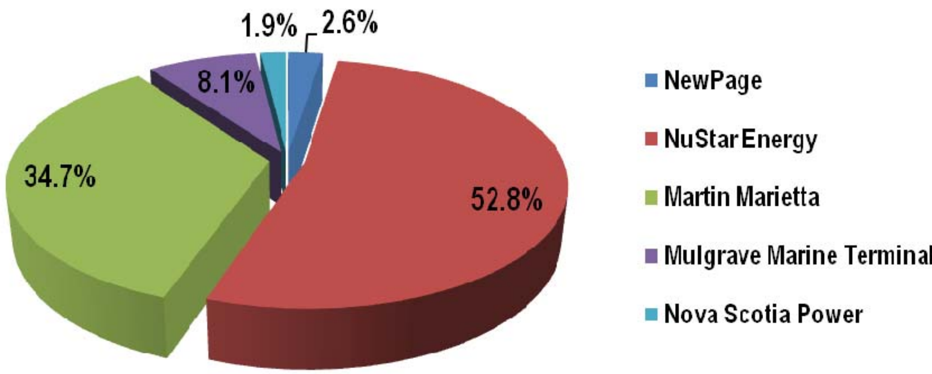
2.3 *Waterside Access*

The Strait runs in a north westerly direction from Eddy Point at the southeast entrance to the Canso Causeway. It has an overall length of 20 kilometres, a width of approximately 1.5 kilometres and a limiting depth of 27 metres. Its basic shoreline, navigational approaches and water depth characteristics are illustrated in Figure 2-9. Bottom conditions of the Strait were derived from the Nova Scotia Research Foundation, Report #4-68, and indicate the channel is steep sided, with coarse unconsolidated sediment present over most of the bottom. A natural turning basin exists in the vicinity of Pirate Harbour, located beyond all existing deep water berths. There are no specific vessel restrictions imposed when navigating the Strait of Canso due to its natural features. However, vessel restrictions can be imposed at a terminal because they are located closer to the shore.

A unique navigational feature of the Strait is the Seaway-size lock that was built into the Causeway on the Cape Breton side. The lock provides access to traffic transiting both the Saint Lawrence Seaway and the North Atlantic. The canal also serves as a common path for recreational vessels and barge traffic destined to Prince Edward Island. The lock can accommodate vessels with maximum dimensions of 250 metres in length, 24.4 metres in width and 9.8 metres in depth.

The Strait of Canso has hundreds of vessels and barges transiting its waters annually. Data provided by Transport Canada documents every vessel and barge that called to the Strait's marine cargo terminals from 2001 to 2007 (each terminal granted permission for data to be released except Georgia Pacific[3]). The data gives better insight into vessel characteristics by detailing the vessel and barge's type, name, length, tonnage transferred and reason in port. Figure 2-7 is a chart of the Strait's total vessels calls from 2001 to 2007. A vessel call is an actual scheduled appointment for a terminal's berthing space for loading or unloading cargo procedures. The five terminals totalled 3,328 calls during the seven year span. NuStar Energy accounted for 1,756 calls or 52.8 percent and Martin Marietta accounted for 1,154 calls or 34.7 percent. The two terminals combine for 87.5 percent of the vessels calling the Strait of Canso.

Figure 2-7: Strait of Canso – Historical Vessel Calls – 2001 to 2007

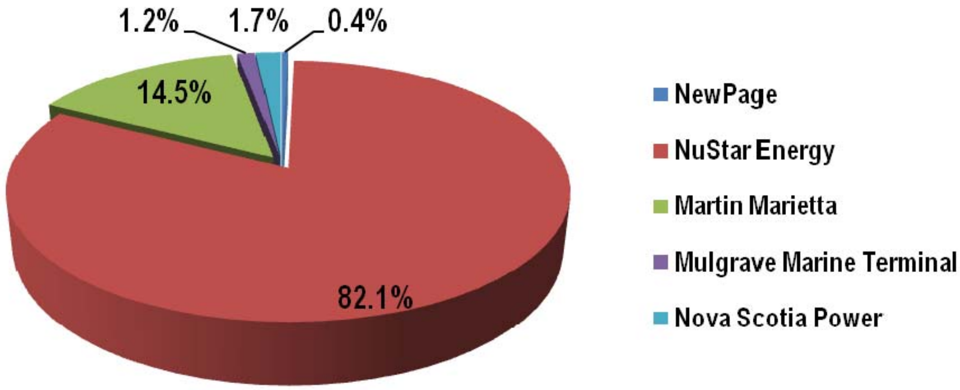


Source: Transport Canada

[3] Georgia Pacific loads approximately one vessel per week at 40,000 tons each (interview notes).

Figure 2-8 displays each terminal's tonnage share from 2001 to 2007. The total tonnage moved through the five terminals totalled 168.7 million tons. NuStar accounts for the majority of tonnage with 82.1 percent or 138.6 million tons. NuStar accommodates the largest vessels with liquid cargo resulting in large tonnage transfers. Martin Marietta's tonnage is disproportionate to its vessel calls because many of the vessel calls are comprised of barges. Barges hold approximately 2,000 tons per shipment as indicated in Table 2-1.

Figure 2-8: Strait of Canso – Historical Tonnage – 2001 to 2007



Source: Transport Canada

Table 2-1 documents the most frequent calling vessel (mode) to each terminal and its characteristics over the seven year span. The table represents 29 percent of total vessels calling to the Strait in the specified time period. It lists each vessel's dimensions, capacity requirements and tonnage transferred from ship to shore (or vice versa). The vessels listed are a good representation of the entire vessel fleet transiting the Strait of Canso and provide an idea of the common vessel handled at each terminal. Vessel mode lists the vessel's name that called the most. LOA is the length overall or the entire length of the vessel. Draft is the ship's depth, when fully loaded. Beam is the vessel's width. DWT, deadweight tonnage, is the measure of how much mass or weight of cargo a vessel can safely carry. Average tonnage is the average amount of cargo transferred at a terminal. Vessel calls is the number of times the vessel called to the terminal. Call share is the vessel's percentage of total calls for the individual terminal.

Table 2-1: Frequent Vessel Characteristics

Terminal	Vessel Mode	LOA (m)	Draft (m)	Beam (m)	DWT	Average Tonnage	Vessel Calls	Call Share
NS Power	Bernhard Oldendorff	245	14.0	32	77,499	42,676	7	11%
NewPage	Malmnes	127	7.7	16	9,891	9,398	44	52%
MM - Vessel	Yeoman Brook	245	14.0	32	77,548	57,582	67	14%
MM - Barge	G. of G. 270	56	3.7	13	2,540	2,262	257	38%
NuStar	Eagle - "B" Class (4 vessels)	253	12.8	44	99,400	80,375	550	31%
MMT	Sauniere	192	9.3	23	24,993	15,842	42	16%

Source: Transport Canada

2.3.1.1 Navigation Aids

Navigational aids and traffic control within the Strait is administered by the Canadian Coast Guard. The channel is presently buoyed for a channel depth of 27 metres, with onshore range lights delineating the channel centre lines. A radar-controlled marine traffic control system is used for monitoring the movement of all vessels in the Strait and its sea approaches.

2.3.1.2 Pilotage

The Atlantic Pilotage Authority serves vessels entering the Strait of Canso. Currently there are two pilot boats and 10 pilots stationed in the Cape Breton area. Pilots are compulsory in Cape Breton's Zone C and Zone D areas, which are located on the Strait of Canso, as shown in Figure 2-9. Zone C consists of all the navigable waters within a line drawn from Red Head to Crichton Island Lighthouse and a line drawn from North Canso Light to Heffernan Point. Zone D consists of all the navigable waters within a line drawn from Fox Island to Green Island in Chedabucto Bay and a line drawn from Red Head to Crichton Island Lighthouse.

Pilots are ordered at least 12 hours before the estimated time of arrival of the ship and give a notice confirming or correcting the estimated time of arrival. Vessels approaching from the Atlantic are met by the pilot approximately 31.4 kilometres east of NuStar Energy close to checkpoint No. 4a in Chedabucto Bay. At checkpoint No. 6 approximately 14.5 kilometres east of NuStar Energy, the vessel is met by tugs for entry into the Strait of Canso.

2.3.1.3 Tug Service

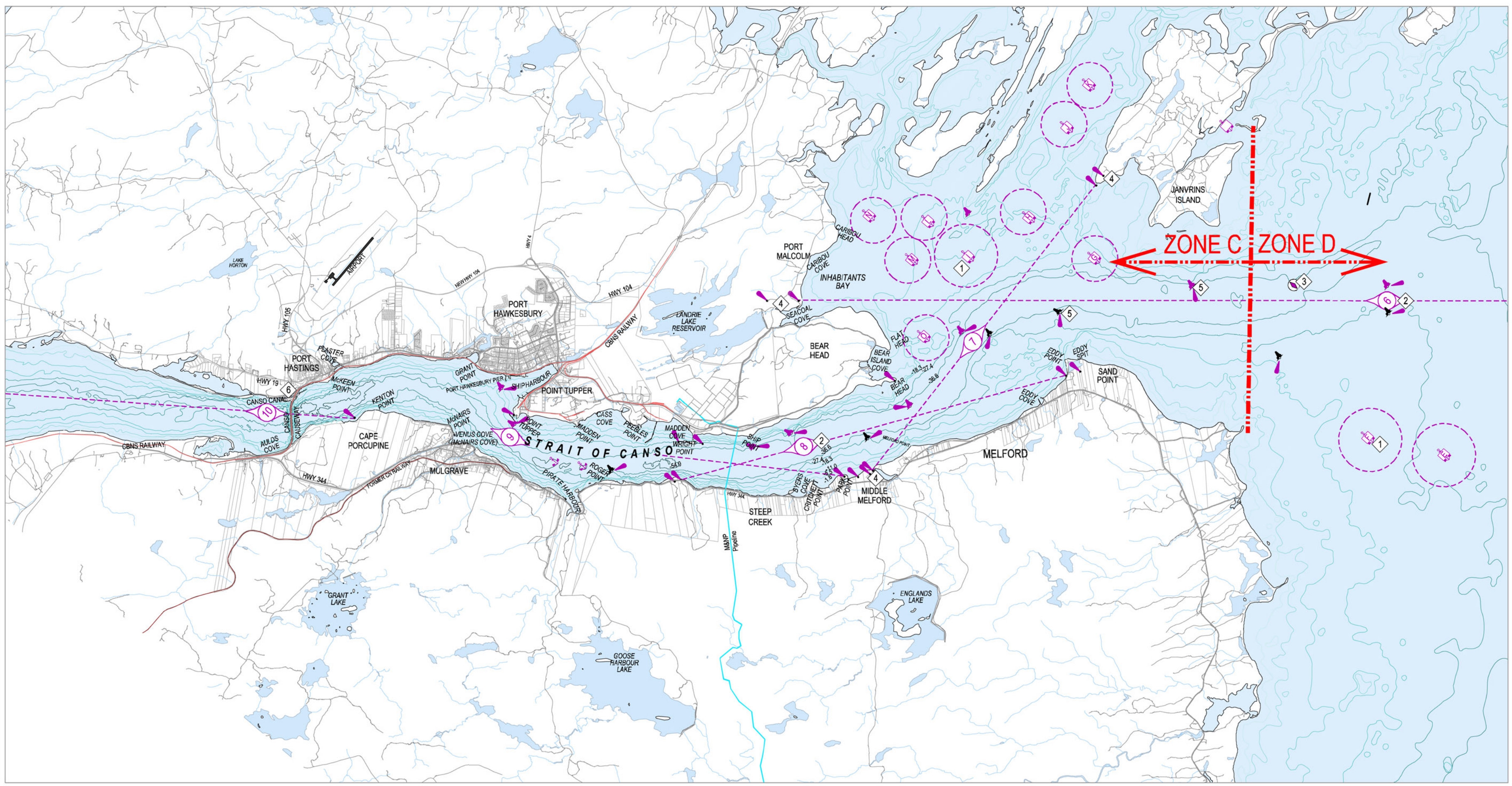
Atlantic Towing Limited is the sole provider of marine harbour services for vessels calling terminals on the Strait of Canso. The three primary marine services include vessel assistance for berthing and de-berthing, vessel escort service and assistance for vessels transiting the Canso Causeway locks. Atlantic Towing Limited uses a dock adjacent to NuStar in Point Tupper for berthing the following four tugs:

- Atlantic Fir: Z-drive reverse tractor tug with 5,000 horsepower
- Atlantic Willow: Z-drive reverse tractor tug with 4,004 horsepower
- Atlantic Beech: Conventional twin screw tug with 2,250 horsepower
- Atlantic Juniper: Conventional twin screw tug with 2,250 horsepower

Tug service is not compulsory in the Strait of Canso, but is dictated by each terminal's vessel requirements (including tug and vessel meeting locations). Generally a minimum of one tug is needed for all vessels calling to the terminals on the Strait of Canso. Tugs are ordered at least 12 hours before the estimated time of arrival and departure of the vessel. A six hour notice is needed to confirm or correct the estimated time of arrival, and a four hour notice is needed to confirm or correct the estimated time of departure.

2.3.1.4 Weather Conditions

The Strait of Canso (east of the lock) is open to navigation throughout the year. Disruptive weather is the greatest constraint affecting vessel activity, because it creates heavy seas and delays the pilot from boarding the vessel (less than seven days of downtime annually). Average tidal ranges in the Strait are two metres for Spring tides and 0.5 metre for Neap tides. The prevailing winds in the area are westerly to north westerly in the colder months and south to south easterly in the warmer months. Currents within the confines of the Strait have been estimated at extremes of 1.25 knots, with normal velocities, not exceeding 0.5 knots in the Strait and 1.0 knots in Chedabucto Bay approaches to the Strait.



1 Anchorage Location
2 Radio Waypoint
3 Pilot Boarding Location
4 Leading Lights
5 Light Buoy
6 Causeway Locks

Figure 2-9: Waterside Access

NORTH

0 2000 4000
DISTANCE IN METRES

Waterside Access

PRELIMINARY NOT FOR CONSTRUCTION

SCALE:	AS SHOWN
DESIGNED BY:	TNT2/SEM
DRAWN BY:	TNT2
CHECKED BY:	GOS
APPROVED BY:	CBM
DATE:	02/18/2009
PROJECT NO.:	P307070026

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2.4 Landside Access

Highway, rail and air access is a vital component of the freight transportation network that links inland origin/destination points with marine cargo terminals. Landside access infrastructure must be able to accommodate high volumes of freight traffic, while avoiding congestion and bottlenecks. The local landside access infrastructure associated with the Strait of Canso and inland origin/destination points typically associated with regional freight transportation are summarized in this section.

2.4.1 Roadway Facilities

A heavy volume of freight originating or destined for the Strait of Canso is transported via truck. This traffic is accommodated through the existing network of local roads and regional highways. The highways included in this assessment are generally constructed in accordance with Canadian standards and include permissible truck dimensions identified in Table 2-2.

Table 2-2: Permissible Maximum Truck Dimensions in Nova Scotia, Canada

Overall Height	Overall Width	Overall Length		
4.15 metres	2.6 metres	Truck & Full Trailer	Truck & Semi-trailer	A,B,C Train Double
		23 metres	23 metres	25 metres

Source: Transport Canada

The difference between a full trailer and a semi-trailer is a full trailer has a maximum length of 12.5 metres and a semi-trailer has a maximum length of 16.2 metres. The most common mode of truck transport is the semi-trailer, which has a maximum gross vehicle weight of 40 to 50 tons depending on vehicle configuration. The dimension restrictions presented in Table 2-2 vary as each province retains its authority to govern truck weights and dimensions.

2.4.1.1 Regional Highway Network

An analysis was performed to identify and define the existing roadway facilities serving the Strait of Canso from the Trans-Canada Highway. This includes the identification of significant origin and destination points for freight, and the major highways that connect them.

Highway 104 - Highway 104 is part of the Trans-Canada Highway and is the principal highway connector linking the Strait of Canso to Truro and points west. It is a four-lane divided highway starting from the New Brunswick border until east of New Glasgow. It then becomes a two-lane undivided highway, with portions having uncontrolled access. When Highway 104 reaches Heatherton, it becomes a two-lane freeway to Auld's Cove. Highway 104 crosses the Canso Causeway into Cape Breton Island where it is unsigned. It follows Trunk Highway 4 along the southern coast for approximately 37 kilometres to its end in St. Peter's. The Nova Scotia provincial government has designated the entire length of Highway 104 as a "strategic highway" to qualify for federal cost-sharing of maintenance and future upgrades. Major intersections include:

- Highway 102 in Truro
- Highway 106 in New Glasgow
- Highway 105 in Port Hawkesbury

Highway 105 - Highway 105 represents the Cape Breton leg of the Trans-Canada Highway. Its western terminus is located east of the Canso Causeway in Port Hastings and its eastern terminus is located in North Sydney at the Marine Atlantic ferry terminal. The highway is primarily composed of two-lanes with uncontrolled access. Major intersections include:

- Highway 162 near Bras d'Or
- Highway 125 to Sydney

Trunk Highway 4 - Trunk Highway 4 is part of Nova Scotia's system of Trunk Highways with its western terminus located near Oxford and its eastern terminus in Glace Bay. Trunk 4 parallels Highway 104 and uses part of the old Highway 104 before the Trans-Canada Highway was constructed. It is used as an alternate route to Highway 105 on Cape Breton Island to Sydney area, and as an alternate route to Highway 104 on Cape Breton Island to Ste. Peter's (Richmond County).

Trunk Highway 19 - Trunk Highway 19 has its western terminus in Port Hastings at the end of the Canso Causeway and runs along the western coastline of Cape Breton until it reaches its eastern terminus at an intersection with the Cabot Trail at Margaree Forks. The majority of Trunk 19 is known as the Ceilidh Trail.

Route 344 - Route 344 is a provincial collector road that runs from the western side of the Canso Causeway on Highway 104 through the town of Mulgrave and continues along the coastline until it reaches Trunk Highway 16 in Boylston, approximately 54 kilometres. It is designated as a part of Marine Drive which is a scenic route along the Nova Scotia's Eastern Shore.

2.4.1.2 Roadway Capacities

Roadway traffic counts are measured by annual average daily traffic (AADT). AADT is the total volume of vehicle traffic of a highway or road section divided by 365 days. AADT was designed to measure the road's level of activity, so it can be established into a correct class of road. Once the road is established into a class, it normally has associated capacities. AADT was not intended to measure a road's capacity. Currently Nova Scotia highway design standards are not available for public distribution, and therefore roadway capacities cannot be obtained. However, AADT is used in this report, as a tool for comparing actual daily traffic activity versus projected daily traffic.

Determining highway capacity calculations can be complex, because it is road specific and depends on an array of variables with some being difficult to obtain. The Nova Scotia Department of Transportation and Infrastructure Renewal (NSDTIR) offered a theoretical capacity of a two-lane rural road with ideal conditions. Ideal conditions include: speeds greater than 60 kilometres/hour, 3.65 metre lane width (minimum), 1.8 metre shoulders (minimum), traffic restricted to cars (no trucks), flat terrain, no passing allowed, traffic split equally in both directions of travel and low volumes of entering and exiting traffic. The maximum hourly capacity in this scenario is shown as 2,800 cars per hour or 67,200 cars per day.

Traffic data throughout the Strait of Canso region was obtained from the NSDTIR. The data is broken down by highway and section in Table 2-3 and illustrated in Figure 2-10. Traffic counts #9 and #10 were made in August of 2005 and the rest were made in June of 2008.

Highway 104, a 100 series controlled access highway, has an AADT of 5,740 with peak hourly traffic counts just over 750 vehicles per hour. This number indicates its use is well under the 2,800 cars per hour as stated above. Highway 104 reduces to 70 kilometres per hour in Auld's Cove, as it approaches the Canso Causeway, with access to Route 344 and several businesses along the roadside before reaching the Canso Causeway. Traffic counts in Auld's Cove were 8,860 per day in June 2008 with a maximum hourly count of 850 vehicles per hour.

The Canso Causeway is a bottleneck to the Strait of Canso area's roadway system, as it leads eastbound to a rotary connecting Route 19, Highway 105 and Trunk Highway 104 to Port Hawkesbury. A Tourist Visitor Centre is located within the rotary and is busy at times, because it is the only entry point to Cape Breton Island. The swing bridge (on Canso Causeway) also contributes to traffic congestion up to two kilometres along Trunk Highway 104 towards Port Hawkesbury, along Route 19, along Highway 105, along Highway 104 to Auld's Cove and as far as one kilometre towards Havre Boucher. Winter conditions at times require escorted one-way traffic across the Causeway, contributing to congestion on both sides. In times of extreme weather, the Causeway can be shutdown.

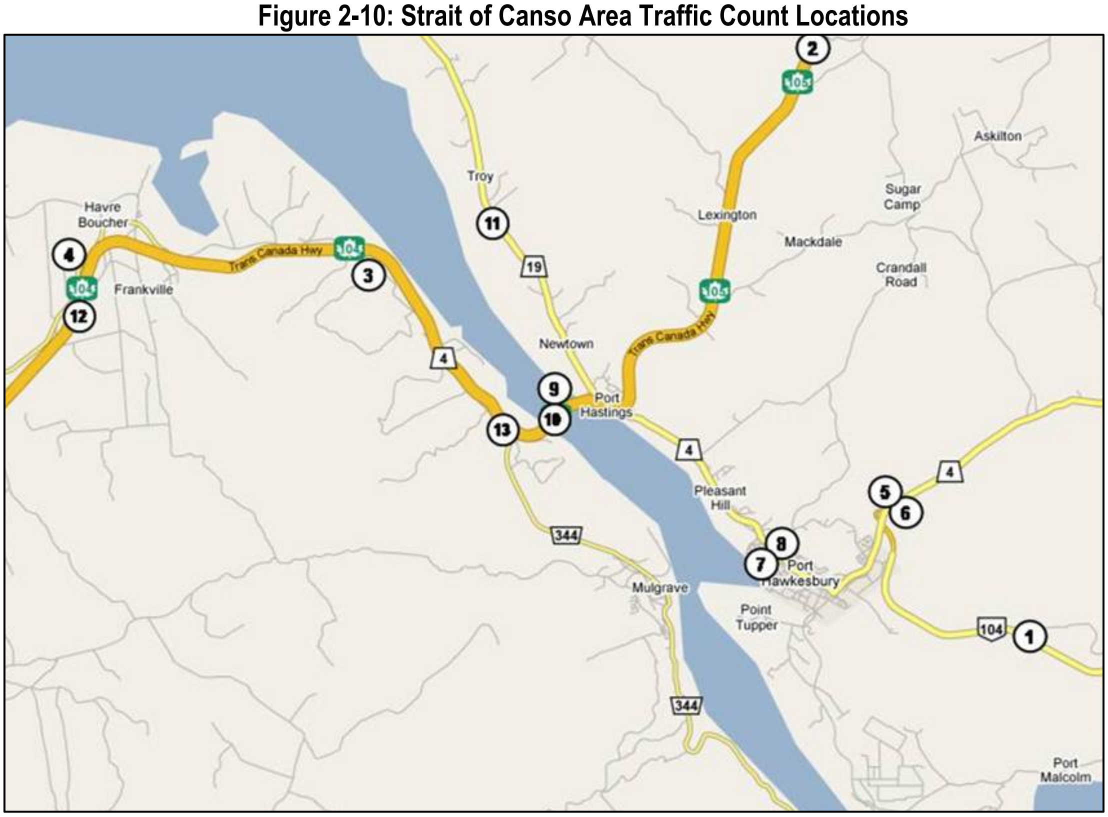
Access to the Melford Industrial Reserve currently is via Route 344, which runs through the Town of Mulgrave. The road from Auld's Cove to Mulgrave is a Class 'D' collector with no issues for additional traffic. The section of Route 344 that goes through Mulgrave could be a potential bottleneck, if there are notable increases in traffic. A bottleneck could occur due to a decreased speed limit through Mulgrave, access to side streets, and businesses and dwellings fronting the road. Beyond Mulgrave the traffic along Route 344 drops off dramatically to an AADT around 300. If new highway construction was to occur as a result of proposed container terminal, this scenario would change drastically.

Table 2-3: Strait of Canso Area AADT

Location (Town)	Specific Location Road		Lane	AADT	No.
Auld's Cove	Near Railway Overpass	104	-	8860	13
Havre Boucher	Just East of East End Havre Boucher Interchange	104	-	5740	12
Troy	Troy (South Boundary)	19	-	2930	11
Canso Causeway	Permanent Counter Port Hawkesbury	104	East & West	7610	10
Canso Causeway	Permanent Counter Port Hawkesbury	104	Eastbound	3710	9
Port Hawkesbury	Reeves St. - Just East of Shopping Centre Entrance	4*	Eastbound	6500	8
Port Hawkesbury	Reeves St. - Just East of Shopping Centre Entrance	4*	Westbound	6340	7
Port Hawkesbury	0.5 km West of HWY 104	4*	Westbound	3250	6
Port Hawkesbury	0.5 km West of HWY 104	4*	Eastbound	3090	5
Havre Boucher	3 km East of Havre Boucher	4	-	440	4
Auld's Cove	Just East of HWY 104 Overpass	4	Westbound	300	3
Queensville	0.25 km East of MacIntyre Mountain Road	105	-	4050	2
Port Malcolm	Halfway Between Exit 43 & 44	104	Westbound	1940	1

* Trunk 4 from rotary to Port Hawkesbury is called both Trunk 4 and Trunk 104.
Source: Transport Canada

Figure 2-10: Strait of Canso Area Traffic Count Locations



Source: Google Maps

2.4.1.3 Local Highway Planned Improvements

The NSDTIR are currently upgrading Highway 104 between New Glasgow and Sutherlands River (7.9 km) from two lanes to four lanes to better accommodate traffic traversing the Trans-Canada Highway. Highway 104 will also be upgraded in the Antigonish area starting in the Fall of 2008, by the construction of a new section (27.6 km), making it a four-lane rural freeway. The four-lane, divided, controlled-access highway planned to bypass the Town of Port Hawkesbury, is intended to start a short distance up the 105 Highway, where an interchange will be constructed. It will traverse to the north of Port Hastings and Port Hawkesbury and join the existing 104 Highway at exit 43, which is at the east end of Port Hawkesbury. All heavy truck traffic heading towards Point Tupper, the Port Hawkesbury Light Industrial Park and Bear Head Industrial Reserve will be directed around Port Hawkesbury, via this bypass route. Also, a new all-way interchange ramp will be added to the intersection of Trunk 4 and Highway 104. Funding for Phase 2 of the project was approved in early 2009.

2.4.2 Rail Facilities

Rail access plays an important role in connecting Nova Scotia's industrial and port facilities that provide trade opportunities with the national and international community. The CBNS is owned and operated by RailAmerica, Inc. and includes the following characteristics:

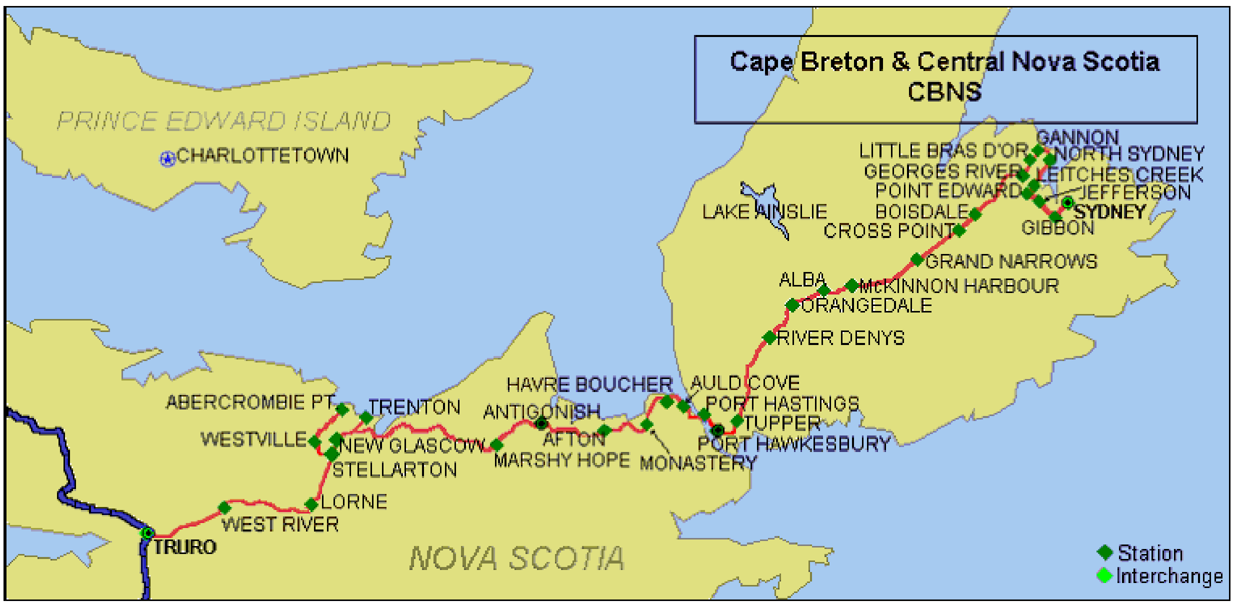
- One, 392-kilometre main line track
- 1,435 millimetre track gauge
- Maximum speed of 64 kilometres/hour
- Height Restrictions
    - All dimensional line-haul loads (wider than 3.2 metres, higher than 4.3 metres over the road (OTR), or longer than a railcar bed) will be subject to a charge in addition to the haulage fee. All dimensional moves must receive prior approval and are subject to clearance authorization.
    - Double stack containers are not subject to height restrictions and are not classified as dimensional line-haul loads.
- Weight Restrictions
    - Road bed restrictions for traffic traveling over CBNS lines limit gross weight on rails to 121,563 kilograms per railcar. All line-haul loads weighing in excess of 119,295 kilograms gross weight on rails will be subject to a charge in addition to the haulage fee.

The CBNS has rail interchanges with Canadian National (CN) Railway in Truro (Figure 2-11) and Sydney Coal Railway in Sydney. Rail yards are maintained in Sydney, North Sydney, Point Tupper, Havre Boucher, Stellarton and Truro. In addition to the main track, spurs are located in Sydney, Port Hawkesbury/Point Tupper, Trenton and Stellarton. Figure 2-12 displays the entire CBNS railway throughout Nova Scotia.

Figure 2-11: Interchange Yard at Truro, Facing East

Source: Google Images

Figure 2-12: Map of the Cape Breton and Central Nova Scotia Railway



Source: CN Website

Currently, CBNS accommodates an eastbound train that has daily service Monday through Saturday. It departs Truro at 0500, arrives in Stellarton at 0800, departs Stellarton at 1000 and arrives in Havre Boucher at 1500. A separate westbound train has daily service Sunday through Friday. It departs Havre Boucher at 1600, arrives in Stellarton at 2000, departs Stellarton at 2300 and arrives in Truro at 0200. Rail car switching occurs at the Havre Boucher Yard (switch rail cars 22 hours per day) and the Stellarton Yard (switch rail cars 20 hours per day).

CBNS moves approximately 20,000 to 30,000 rail cars per year. The typical east and west bound freight train transiting the Strait of Canso is comprised of 60 various rail cars creating a manifest train. A manifest train is a freight train made up of mixed rail cars and cargo. The maximum length of the train is dependent upon the train's total tonnage. RailAmerica has 12 locomotives of various sizes and matches the locomotive(s) to accommodate the train's tonnage.

The main commodities transiting the CBNS are coal, wood pulp, chemicals, newsprint, supercalendar paper, steel and railway equipment. There are four types of rail cars that carry these commodities. Each rail car type varies with the cargo it is intended to carry. According to RailAmerica data, the majority of rail cars transiting the CBNS over

2007 are box cars carrying paper (38%), followed by tank cars carrying petroleum products (26%), hopper cars carrying coal and petcoke (25%) and centre partition cars carrying lumber (10%). Refer to Appendix B for specific details on each car type.

2.4.2.1 Local Railroad Planned Improvements

Currently there are no major improvements planned for the CBNS, i.e. additional rail tracks. This decision is dictated by the historical and forecasted throughput on the CBNS. However, RailAmerica allocates approximately $2.2 to $4 million annually in its budget for capital/track improvements. These improvements include regular maintenance and minor upgrades to the 392-kilometre track.

The proposed development of Melford container terminal includes construction of a new rail line for a length of approximately 10 km from the site, as shown in Figure 2-9, with a portion of the new rail line in close proximity to the Strait of Canso Superport's MMT. The proposed new rail link will connect with an existing rail bed (the Mulgrave spur) approximately 24 km to the northwest of MIT. The length of the existing rail bed to be re-activated and used by MIT is approximately 10 km and joins the existing active rail line near Linwood Station, Antigonish County. The construction and operation of both the new rail bed and rail line, as well as the re-activation of the required section of the Mulgrave spur to Linwood Station, are part of the proposed project. The proposed rail line will be operated by CBNS.

2.4.3 *Airport Facilities*

There are three existing airport facilities serving the Strait of Canso: Port Hawkesbury Airport, Sydney Airport and Robert L. Stanfield International Airport in Halifax.

The Port Hawkesbury Airport is a local airport servicing the greater Port Hawkesbury community. It is located three kilometres east of Port Hastings, on the Trans-Canada Highway. The Port Hawkesbury Airport is capable of handling most corporate and commercial aircraft (up to a Boeing 737) due to its large runway. It features medium intensity lighting and runway identification lights for night and instrument flight rules operations. Maintenance is performed during the winter months to accommodate aircraft year round. The private aviation weather station's operates Monday through Saturday, 8 a.m. to 6 p.m.

The Sydney Airport is a regional airport servicing the greater Cape Breton community and is listed as an airport of entry by NAV Canada. It is located in Reserve Mines, which is within the Cape Breton Regional Municipality, approximately nine kilometres east northeast of Sydney. Passenger, air charter and cargo services are performed at the airport. On-site facilities include a Business Service Centre, an Environment Canada station, a Canada Border Services Agency office and a flight service station. In 2006 Sydney Airport processed 957 aircraft movements. The airport operates 24 hours per day, seven days a week.

The Stanfield International Airport is located approximately 40 kilometres northeast from downtown Halifax. It is Nova Scotia's principal full-service airport providing passengers and cargo clients with access to markets throughout Canada, the U.S. and Europe. It processed approximately 3.45 million passengers, 89,000 aircraft movements and 30 million kilograms of cargo in 2007. The airport operates 24 hours per day, seven days a week.

Figure 2-13: Regional Airport Map

Source: Canada Border Services Agency

2.5 Utility Infrastructure and Capacities

2.5.1 Water and Wastewater Infrastructure and Capacities

Water supply and wastewater disposal within the boundaries of the Port Master Plan consist of those services related to industrial and/or urban development. Three major industrial water supplies along the Strait of Canso have either existing or potential capacity for industrial development. Wastewater treatment plants are a product of the industries they serve and are site specific terminal investments.

Water supply and wastewater disposal for urban areas include the Towns of Mulgrave and Port Hawkesbury and the Village of Port Hastings. The location of the freshwater reservoirs and wastewater disposal sites are shown in Figure 2-14.

2.5.1.1 Industrial Water Supplies

The Englands Lake Reservoir serves the Melford Industrial Reserve, the Landrie Lake Reservoir serves the Point Tupper Industrial Reserve, and the combined Goose Harbour/ Grant and Summers Lake Reservoir is dedicated to NewPage Paper Mill. The Englands and Landrie Lake Reservoirs were developed by the Province of Nova Scotia to support industrial development. Landrie Lake also provides municipal water to the Town of Port Hawkesbury and the Communities of Port Hastings and Pleasant Hill (Inverness County). The Town of Mulgrave has an agreement to obtain their water requirements from the NewPage supply. The locations are provided on the Infrastructure Plan.

Englands Lake Reservoir

The Melford Industrial Reserve was developed in the early 1970s to meet the demand for anticipated petroleum, petrochemical and deepwater related industrial activity. The Englands Lake Reservoir was constructed between 1973 and 1975 to service such industries. It is a purpose-built, 494-acre freshwater reservoir, with a design safe yield of 9.4 million gallons per day (mgpd) of fresh water. This reservoir has an ultimate capacity of 36.5 mgpd with further construction.

Three thirty-inch diameter pipelines discharge from the reservoir to produce the ultimate capacity. Two pipelines end with a blind flange, at a valve chamber just downstream of the dam, for future extension. The third pipeline extends approximately 3,200 feet to a valve chamber for a take-off connection. The pipeline terminates 6,250 feet from the dam at a final valve chamber. A small water turbine is operated by Black River Hydro at the location of the last valve chamber. The discharge from the hydro operation is directed to the Melford Brook.

It has been proposed that the discharge from the hydro project could be intercepted and piped to the Industrial Reserve. The Englands Lake Reservoir is accessed by a Class 3 maintenance and service road under the ownership of NSDTIR.

Landrie Lake Reservoir

The Landrie Lake water supply system was originally comprised of the Landrie Lake, Little River and MacIntyre Lake watersheds. This combined system had a capacity of 27 mgpd and was mostly dedicated to four businesses in the Point Tupper Industrial Reserve. Landrie Lake's dedication to the Point Tupper Industrial Reserve has declined over the years. Two businesses are no longer in existence, one business supplies its own demand and the last business has minimal consumption.

The Macintyre Lake watershed was diverted to the Little River system from where it was pumped through a 24-inch wood stave pipeline to the Landrie Lake Reservoir. This reservoir offered more available storage capacity. The Landrie Lake system has multiple pumps and a 36-inch diameter pipeline. The original pipeline was mostly wood stave construction, with a portion of it replaced in 1999 with a 30-inch diameter ductile iron pipe.

With the demand on the Landrie Lake system reduced, the Little River pumping system and wood stave pipeline was decommissioned. This has reduced the present capacity of the system to 9.4 mgpd. The present demand on this system is approximately 3.0 mgpd. The main consumer on this system is the Town of Port Hawkesbury, with a domestic demand of approximately 1.0 mgpd.

Goose Harbour/Grant and Summers Lake Reservoir System
This system is dedicated to the operation of NewPage Corporation Paper Mill. The transmission line from the Reservoir system to the mill comes in from the bottom of the Strait of Canso. The Town of Mulgrave is granted rights to their domestic demand, which currently is approximately 0.5 mgpd. The system is reported to have a capacity of 21.0 mgpd.

2.5.1.2 Urban Municipal Infrastructure
Municipal infrastructure serving the urban area has design capacity for the domestic development including light commercial/industrial with capacity for growth. The Town of Mulgrave has capacity to supply water to marine traffic at the Strait of Canso Superport Corporation wharf. The extent of the servicing is shown In Figure 2-14.

Town of Port Hawkesbury
Wastewater – The Town of Port Hawkesbury is served by a system of central collector sewers to a new (2008) wastewater treatment plant which has a capacity of 3.0 mgpd. The Village of Port Hastings is in the process of redirecting its wastewater from their old wastewater treatment plant to the new Town of Port Hawkesbury facility. There is a small sewage pump out facility at the Port Hawkesbury Marina to service pleasure cruisers and small yachts.

Fresh Water – The Town of Port Hawkesbury is served by central water supply and distribution from the Landrie Lake Reservoir system. Current usage is just under 1.0 mgpd from the Dissolved Air Floatation water treatment plant with a capacity of 1.5 mgpd. The system has been extended to serve the community of Port Hastings in 2007 and connections are starting to be established. This will add another possible 0.14 mgpd of demand on the system.

There are three above ground water storage reservoirs in the Town of Port Hawkesbury and one in Port Hastings.

Town of Mulgrave
Wastewater – The Town of Mulgrave is served by central collector sewers to two wastewater treatment plants.

- An Extended Air Activated Sludge Plant was completed in 1971 with a designed capacity of 0.06 mgpd. The system is currently operating at capacity.
- A Sequencing Batch Reactor was completed in 2001 with a designed capacity of 0.09 mgpd. The system serves the Mulgrave Industrial Park and west end of the Town of Mulgrave. The system has 20 to 30 percent reserve capacity.

There are no facilities for vessel pump out of sewage on the wharf.

Fresh Water – The Town of Mulgrave is served by a central water supply and distribution system by way of a lateral off the NewPage Corporation plant raw water line from Grants Lake. A Dissolved Air Floatation water treatment plant (1999) handles 0.5 mgpd and is running at around 70 percent capacity. It should be noted that this varies substantially depending on the industrial component and their operations.

There are two above ground water storage reservoirs on line with storage capacities of 0.5 and 0.325 mg. In 2003, an in-ground 80,000 U.S. gallon concrete reservoir was constructed at the Strait of Canso Superport Corporation wharf to facilitate water supply to marine traffic including offshore activity.

Village of Port Hastings
Sewage and Water – In 2007-2008 the Town of Port Hawkesbury's water infrastructure was extended to serve the Village of Port Hastings. Prior to this, the community had central collector sewers and sewage treatment, but no

central water supply. As part of the water supply, a 200,000 U.S. gallon above-ground water storage reservoir was installed on line.

2.5.2 Electrical Power

A major transmission corridor crossing is located near the Canso Causeway. This electrical power source has the ability to serve multiple industrial or non-industrial facilities requiring the use of substantial power due to its proximity to the Strait of Canso surrounding areas. The transmission corridor contains transmission lines rated from 138 kV to 345 kV, with switching points on either side of the causeway tapping into the 138 kV (Auld's Cove side) and the 138 kV and 230 kV (Port Hasting's side). The distribution system on the Auld's Cove and Mulgrave area is supplied by 25 kV feeders from a substation on Cape Porcupine.

The distribution system on the Port Hastings and Port Hawkesbury area is supplied predominantly by 25 kV feeders from the Port Hastings, Point Tupper or Cleveland substations, with the core of the Port Hawkesbury Centre supplied at 4 kV from a smaller 25 kV to 4 kV substation in the town centre.

2.5.2.1 Communications

Town of Port Hawkesbury:
Conventional telephone service, Low speed circuits (56k), High speed circuits (T1), Fibre services (10-100Mb), High speed internet (DSL)

Point Tupper:
Conventional telephone service, Low speed circuits (56k), High speed circuits (T1), Fibre services (10-100Mb)

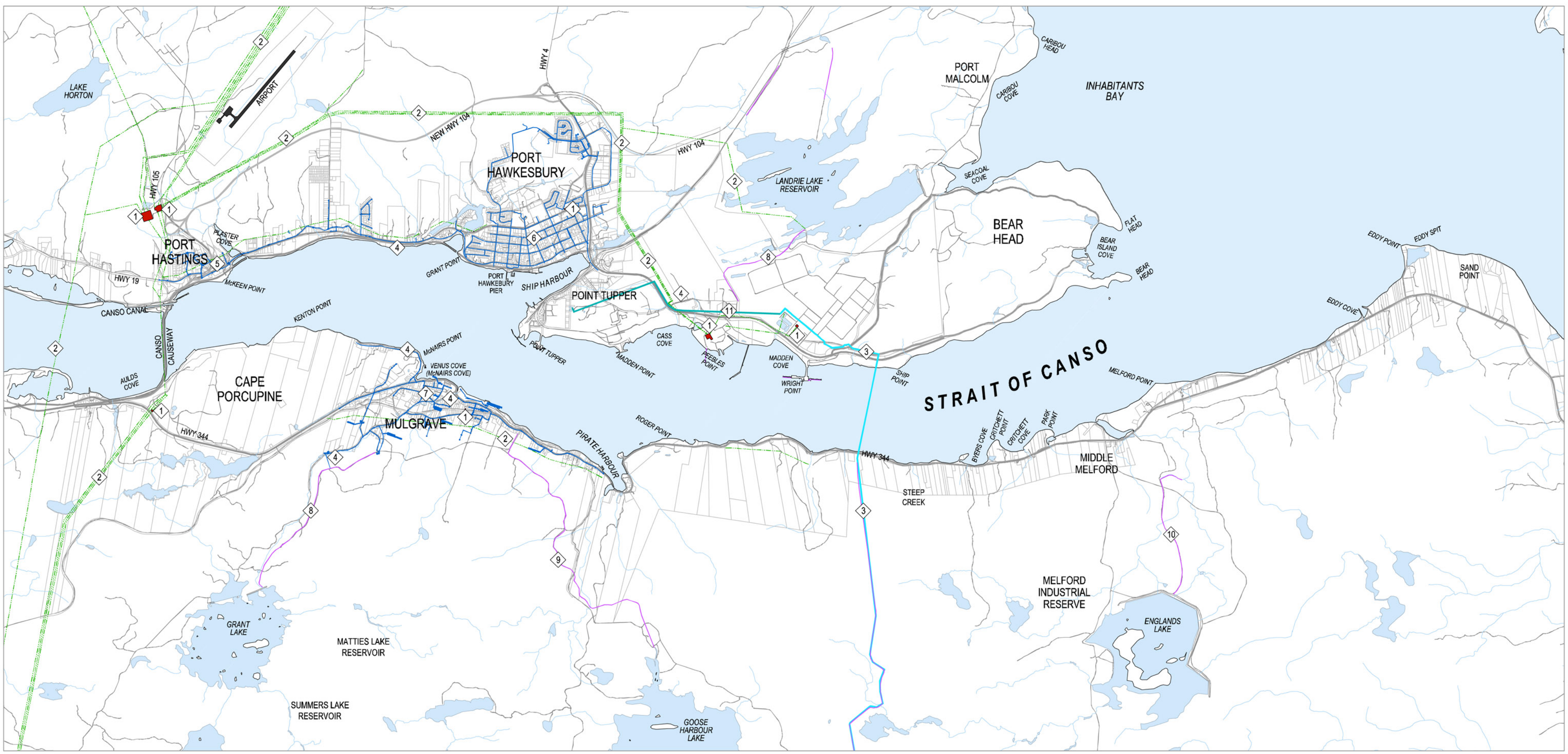
Bear Head:
Conventional telephone service, Low speed circuits (56k), High speed circuits (T1), Fibre services (10-100Mb)

Port Hastings:
Conventional telephone service, Low speed circuits (56k), High speed circuits (T1), Fibre services (10-100Mb), High speed internet (DSL)

Town of Mulgrave:
Conventional telephone service, Low speed circuits (56k), High speed circuits (T1), High speed internet (DSL)

Auld’s Cove:
Conventional telephone service, Low speed circuits (56k), High speed circuits (T1)

Melford Reserve:
Conventional telephone service, Low speed circuits (56k), High speed circuits (T1)



1. Electric Substation
2. Electric Power Transmission Lines
3. Maritimes and Northeast Pipeline (M&NP)
4. Water Treatment Plant
5. Port Hasting Water Supply System (from Port Hawkesbury)
6. Port Hakesbury Water Supply System
7. Mulgrave Water Supply System
8. Water Supply Line
9. Newpage Water Supply Line
10. Industrial water Supply Line
11. M&NP (Gas)

Figure 2-14: Strait of Canso Utilities

Strait of Canso Utilities

PRELIMINARY NOT FOR CONSTRUCTION

SCALE:	AS SHOWN
DESIGNED BY:	TNT2/SEM
DRAWN BY:	TNT2
CHECKED BY:	GOS
APPROVED BY:	CBM
DATE:	02/18/2009
PROJECT NO.:	P307070026

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2.6 Regulatory and Environmental Conditions

Port planning and development in the Strait of Canso must be undertaken with full consideration given to regulatory approval requirements. In particular, approvals resulting from federal and provincial environmental legislation are often necessary for port development projects with marine infrastructure components and/or large scale industrial facilities. These approvals often require relatively long lead times and supporting studies, which must be factored into project planning and scheduling. Engagement with government officials, potentially affected stakeholders, and Aboriginal groups, as well as the general public, is often required and/or encouraged as part of approval application processes. In order to increase clarity and certainty with respect to project approval processes, a "road map" of requirements at an early stage in project planning is recommended. This ensures that all regulatory requirements and timeframes can be accommodated and coordinated.

The following sections contain a generic overview and road map of environmental approvals for the Strait of Canso port planning based on the consultant's extensive experience with environmental assessment and permitting of port projects throughout Nova Scotia, including permitting requirements for nearby projects (Anadarko/Bear Head LNG; Melford Terminal). A summary of the regulatory requirements, as well as typical timelines, can be found in Tables 2-4 and 2-5. This information should be considered generic or typical to assist the port with conceptual planning exercises. Specific legal requirements for any particular development must be reviewed and confirmed by qualified professionals and regulatory officials in the context of detailed project descriptions.

2.6.1 Federal Regulatory Process

2.6.1.1 Canadian Environmental Assessment Act

The *Canadian Environmental Assessment Act* (*CEAA*) describes federal environmental assessment (EA) requirements and will be applicable to many port planning projects. EA under *CEAA* is generally triggered by one or more of the following: a federal proponent, federal funding, a transfer of interest in federal land, and/or permits or authorizations under the Law List Regulations. Most EAs under *CEAA* require screening-level assessments. This is a relatively simple process by which one or more federal Responsible Authorities under *CEAA* undertake the screening in order to allow the applicable federal action (e.g., funding, land interest transfer, permit, etc.) to take place. Other large-scale projects (e.g., some "Greenfield" marine terminal development, refineries, etc.) are included in the Comprehensive Study List Regulations under *CEAA* and require a more extensive process including mandatory public review at various stages in the EA process. Extremely large projects and/or those with potential for significant adverse environmental effects or high public concern may be referred by the federal Minister of the Environment to a Panel Review; but this is very rare.

To initiate the *CEAA* process, a project description must be filed with federal regulators describing the proposed undertakings in sufficient detail to enable them to identify which departments have responsibilities for undertaking the assessment (Responsible Authority) or relevant expert knowledge (Expert Departments). It is noted, that informal meetings are often held in advance of the submission to solicit input on the required level of detail and regulatory expectation with respect to the assessment. Following review of the project description, a scoping exercise will be undertaken in cooperation with regulators to develop a scoping document which will confirm the Valued Environmental Components and the specific EA process. Provincial regulators are often involved at this stage if provincial EA requirements also apply.

No legislated timelines exist for federal environmental assessment (besides the initial project description review and coordination period). A large-scale industrial project could expect an EA approval within approximately 12 – 16 months.

2.6.1.2 Navigable Waters Protection Act

One of the more common port projects triggering *CEAA* is construction and operation of any marine structure (e.g., terminal) in navigable waters. This would require an authorization under the *Navigable Waters Protection Act (*contained in the *CEAA* Law List Regulations*)*, administered by Transport Canada. In the Strait of Canso, this regulatory requirement was applied to the Bear Head LNG project, the Melford Terminal project, and others.

The *Navigable Waters Protection Act (NWPA)* ensures that the construction, placement, repair or modification of any work that may substantially interfere with navigation in, over, under, through or across any navigable waterway in

Canada requires approval. The process requires the proponent to submit an information package to Transport Canada. The information includes maps, charts, a detailed site plan, habitat description, and description of the undertaking, including the types of equipment and materials to be used for the project. If it is determined that an *NWPA* approval is required, there are a number of steps involved, including newspaper ads and *Canada Gazette* notifications.

Legislated timelines for this process do not exist. The application process can take between three and 12 months. Submission of an *NWPA* application is generally during the environmental assessment process; however, the *NWPA* approval will only be issued following environmental assessment approval.

2.6.1.3 Fisheries Act

Another common *CEAA* trigger for port developments is projects or activities resulting in potential destruction or loss of fish habitat, which require approval under Section 35(2) of the *Fisheries Act*. This is applicable for both freshwater and marine environments. The Responsible Authority, Fisheries and Oceans Canada (DFO), requires an environmental assessment of the proposed activity, authorization for fish habitat alteration, disruption or destruction (HADD), and a fish habitat compensation plan. In the Strait of Canso, this regulatory requirement was applied to the Bear Head LNG project, the Melford Terminal project, and others. This requirement would generally apply to projects requiring infilling of the marine environment.

The issuance of a HADD authorization by DFO is usually contingent upon the development of a fish habitat compensation plan acceptable to DFO. Fish habitat compensation requirements are generally in the order of 3:1 compensation. This means that three times the habitat destroyed must be created as compensation for the destruction. This ratio can vary according to the habitat quality lost and/or replaced. DFO has a hierarchy of preference for habitat compensation plans. The preferred compensation is a similar type of fish habitat in the same watershed area. There is no legislated timeframe for HADD application review. The application process can take between two and eight months. A HADD application can be submitted during the environmental assessment process; however, the HADD approval will only be issued following environmental assessment approval.

In order to alter fish habitat or divert watercourses in Nova Scotia, an application is to be submitted to Nova Scotia Department of Environment (NSE) for approval. In coordination with DFO, the application is reviewed and a decision is made as to whether the project can or cannot proceed. Should permission to proceed be granted, conditions of approval will be set that would likely include habitat compensation requirements. The protection of salmonid habitat is currently a priority for regulators in the province of Nova Scotia, and the proponent must be able to demonstrate that all reasonable efforts have been made to avoid habitat destruction through avoidance and/or redesign.

2.6.1.4 Other Federal Approvals

There are a number of other permits and authorizations that would potentially apply to port development. They may be specific to the project, for example a bulk petroleum terminal would enact the TERMPOL process. Another example may be Ocean Disposal authorizations under the *Canadian Environmental Protection Act* (*CEPA*), related to the disposal of dredged material at sea. Details on these and other approvals can be found in Tables 2-4 and 2-5.

2.6.2 Provincial Regulatory Process

Certain projects and activities require provincial environmental assessment as Class I Undertakings (e.g., affecting more than two hectares of a wetland; storing bulk petroleum products, etc.) under the Environmental Assessment Regulations, made pursuant to the Nova Scotia *Environment Act*. Other, typically larger industrial projects require assessment as Class II Undertakings (e.g., refineries, pulp mills, etc.), which is a more extensive assessment process including public hearings.

In the case of a Class I registration (including assessment), legislation requires the Minister to render a decision within 50 days of submission. The Minister may: release the project with conditions, require a focus report, require an environmental assessment report or reject the project. A thorough registration document precludes the necessity for further assessment in most cases. In addition, NSE usually entertains submission of a draft registration report for review and comment to ensure key issues are addressed before formal submission; this usually helps to expedite the formal review process.

In addition to provincial EA, one or more provincial approvals (permits) will likely be required for most large-scale port projects. See Table 2-5 for further information.

Given that both the provincial and federal environmental assessment legislation may be triggered for a development, a strategic approach would be to follow a harmonized environmental assessment process consistent with the combined requirements of the provincial Environmental Assessment Regulations and *CEAA*. The particular form of this joint assessment process (e.g., formal agreement or informal coordination) may be established with the relevant government authorities during the EA planning phase. Where EA is required federally or provincially, it must precede other permits and authorizations.

2.6.3 Public Engagement

Public and stakeholder consultation and Aboriginal engagement may be required as a mandatory component of certain approval processes (e.g., *CEAA* comprehensive studies; provincial EA Registration) and/or be highly recommended for effective EA and to obtain public support. Organizations engaged during the EA process typically include:

- Federal and provincial agencies [e.g., NSE, Nova Scotia Department of Natural Resources (NSDNR), DFO, Environment Canada, Transport Canada],
- Municipal government and/or local communities (unincorporated),
- First Nations and Aboriginal representatives (including potential Mi'kmaq Knowledge Study as conducted for the Bear Head LNG project),
- Specific stakeholders (e.g., the commercial fishing community has a keen interest in Canso port developments; existing port operators will also be interested in adjacent developments perceived to affect their operations).

Given the numerous regulatory requirements potentially triggered by these developments, it will be important to establish communications with both federal and provincial agencies from the earliest stages of environmental planning. Key agencies should be involved in the scoping of the environmental assessment requirements to ensure there is limited or no redundancy in the process and the information requirements are harmonized.

2.6.4 Typical Supporting Studies

To complete an acceptable environmental assessment, it is likely that, in addition to a detailed project description, port proponents will have to undertake a number of baseline studies, depending on the chosen development(s):

- A fish habitat study (benthic and sediment survey) in the marine footprint of the project;
- Baseline terrestrial surveys of any project area including vegetation surveys in late spring and late summer, breeding bird survey during the breeding season (late spring), evaluations of wetlands impacted by the project, herpetile survey, mammal survey and freshwater stream survey; and
- A baseline heritage resources study, including archival research and field reconnaissance of areas of high potential.

It is likely that the socioeconomic effects can be evaluated using available existing data, site reconnaissance information, stakeholder consultation and limited interviews of key agencies.

Table 2-4: Environmental Approvals for Large Scale Port Development Projects (Federal)

Permit / Approval	Responsible Organization	Additional Information	Approximate Timing
FEDERAL			
Federal Environmental Assessment	CEAA; likely Responsible Authorities include the Department of Fisheries and Oceans and Transport Canada	Required for all projects meeting relevant federal criteria (e.g., marine construction). Generally triggered by federal land transfer (water lot or land), federal funding, federal proponent, authorizations or permits under *CEAA* Law List Regulations (i.e., *Fisheries Act, NWPA, CEPA*). Projects on *CEAA* Comprehensive Study List Regulation require more extensive review process (e.g., refineries, some marine terminals, and other large scale industrial developments).	12-16 months
NWPA authorization	Transport Canada (NWP Branch)	Required prior to construction/obstruction within navigable waters including bathymetric height changes. Cannot be issued until Federal EA release. Requires detailed engineering drawings to be submitted with application. Triggers *CEAA*.	3-12 months
Fisheries Act [Section 35 (2)] Authorization (Harmful Alteration Disruption and Destruction of Fish Habitat)	DFO	Required prior to HADD of fish habitat. Cannot be issued until release from *CEAA* process. Benthic survey required for application. The HADD application requires the development of a proposed fish habitat compensation plan to be submitted and approved by DFO. Compensation plans require negotiation with DFO. Usual preference is compensation with like habitat in same watershed. Fish habitat compensation requirements are generally in the order of 3:1 compensation; however, this ratio is negotiated based on the volume/quality of the habitat. Proponents should design projects to avoid or minimize direct effects on fish habitat (e.g. avoid streams, reduce infill footprint). Suitable compensation programs can be expensive and difficult to locate. Typically, marine projects can range from $0.73-$90/m² when planning, permitting, implementation, and follow-up monitoring are considered. One known possibility for HADD compensation is the St. Francis Harbour restoration project.	2-8 months
TERMPOL Process	Transport Canada	TERMPOL is a government review process that applies to terminal projects if bulk petroleum cargo shipments are involved. Often made an EA condition. Additional requirement often include docking simulations, TERMPOL committee meetings, etc.	12 months (typically overlaps with EA requirements)
Waterlot Lease	Transport Canada	Typically a 99-year lease to occupy waterlot if determined to be owned by federal crown. Triggers *CEAA*.	Project dependent
Ocean Disposal provisions of *CEPA*	Environment Canada	Required for disposal of dredge spoils at sea. Material must meet criteria for dredge spoils. Extensive process. Best to avoid using upland disposal or behind contained facility for construction which does not trigger ODCA. Must be disposed of at approved disposal site - there may be requirement to establish a new disposal site which is a lengthy process requiring fisher consultation and extensive surveys and monitoring. Triggers *CEAA*.	6-10 months

Table 2-5: Environmental Approvals for Large Scale Port Development Projects (Provincial and Municipal)

Permit / Approval	Responsible Organization	Additional Information	Approximate Timing
PROVINCIAL			
Environmental Assessment Regulations pursuant to the NS *Environment Act*	NSE	Class I and Class II Undertakings (as scheduled in the EA Regulations) have widely different regulatory processes. In general Class I projects are relatively smaller with less potential environmental impacts. Class II projects require more extensive public review (typically including hearings) and much longer time frames; they include petrochemical plants, cement plants, oil refineries, radioactive materials, etc. (see http://www.gov.ns.ca/nse/ea/docs/ EAProponentsGuide.pdf for specific break down).	Class I: ~6 months Class II: 14-18 months
Water Approvals (freshwater culvert installations, watercourse diversion, water withdrawal, wetland alteration/compensation) Division 1 under Activities Designation Regulations	NSE	Local examples of wetland compensation are in the order of $20,000-$60,000/ha depending on site suitability, hydrology, substrate and engineering required. Federal approval required for fish habitat alteration (see HADD above). Proponents are encouraged to avoid or minimize direct and indirect impacts to wetlands because of increasing regulatory burden and suitable habitat compensation (3:1 typical). Compensation projects are often difficult to locate and undertake. Proponent is required to undertake long-term monitoring of compensation projects. Preferred approach is to create wetland habitat on-site. If more than 2 ha of a wetland is affected, a provincial EA registration is required.	~3 months; longer time may be required to find suitable wetland habitat compensation projects
Industrial Approvals Division 5 under Activities Designation Regulations	NSE	Covers construction and operations of a variety of industrial developments, although sometimes separate permits for construction and operations. http://www.canlii.org/ns/laws/ regu/1995r.47/20070117/whole.html	~3 months; longer time for large projects (could be phased)
Provincial *Special Places Protection Act*	NS Department of Tourism, Culture, and Heritage (NS Museum)	An act to provide for the preservation, regulation and study of archaeological and historical remains and palaeontological and ecological sites. Permit obtained through NS Museum specifically to conduct investigation during EA process.	1-2 weeks
Beaches Act	NSDNR	Beach is defined as land on the coastline lying seaward of the mean high water mark and that area of land to landward immediately adjacent thereto. Development of a beach requires authorization and approval.	~3 months
MUNICIPAL			
Land Use Planning Requirements	Local Municipalities	Land use plans/by-laws may require amendment according to current situation and project type.	Project dependent
Building Permits	Local Municipalities	For construction of buildings.	Project dependent

****NOTES****

1) Time includes application preparation and regulatory review
2) Rail development may trigger further federal permitting requirements
3) For large-scale industrial development, proponents should undertake public, stakeholder and First Nations consultation.
4) This is not an exhaustive list, as it is intended for preliminary planning purposes for industrial development in the Strait of Canso.

2.6.5 Stormwater Management Review

Currently, there are no specific stormwater management guidelines in place for the Strait area, such as those developed for the Halifax Regional Municipality and the Greater Vancouver Regional District. Therefore, the provincial regulatory process prevails. This section provides an overview of stormwater management practice in Nova Scotia, an overview of the provincial regulatory processes relating to stormwater management, and an overview of guidelines prepared for other districts that can provide information relevant to stormwater management in the Strait area. In addition, experience with storm water management at large-scale projects for the Strait of Canso and nearby areas has been included.

2.6.5.1 Stormwater Management during Site Development

The document *Erosion and Sedimentation Control: Handbook for Construction Sites*[4] (the handbook) was prepared by the NSE, in part to aid those persons involved in the design and construction of appropriate erosion and siltation control measures for specific sites in Nova Scotia.

The handbook outlines the five accepted principles for reducing erosion and sedimentation during active construction of a site. The first principle includes ensuring that the proposed activity fits the topography, soils, waterways and natural vegetation of a site, which in turn will minimize the costs associated with erosion and sedimentation control. The second principle states that exposing the smallest practical area of land during the construction phase of the activity for the shortest possible time, will reduce the area that is more susceptible to erosion and sedimentation. The third principle states that applying "soil erosion" control practices as a first line of defence against on-site damage, will prevent excessive sediment from being produced and, when adequate control measures are implemented, will reduce the cost of sediment control measures. The fourth principle states that "sediment control" practices should be applied as a perimeter protection to prevent off-site damage, which will control runoff and prevent sediment from leaving the site. The fifth principle states that the success of the other four principles is the implementation of a thorough maintenance and follow-up operation. The erosion and sediment control measures must be maintained in order for the measures to be most effective for a specific site.

As outlined in the handbook, an environmental assessment may be required for activities and/or undertakings that involve land disturbance that could potentially result in the sedimentation of fish bearing watercourses. The activities and/or undertakings would be assessed under the *CEAA* and/or require approval under the Nova Scotia *Environment Act* and their respective regulations. Erosion and sedimentation control plans are frequently required for such project approvals. Stormwater management programs are often included as a component in overall site and project planning to minimize environmental risk from run-off and to comply with regulatory requirements and guidelines where they exist. Stormwater management programs in Nova Scotia typically include the following details:

- The estimated amount of runoff from the project area and the upstream watershed;
- Runoff producing factors considered and the methods used to calculate runoff;
- A brief analysis of the potential problems posed by storm runoff on any downstream areas;
- An analysis of local drainage factors that may contribute to on-site or off-site problems (e.g., flooding, property damage, erosion); and,
- A brief description of the permanent measures and facilities designed to cope with the potential problems identified above.

The handbook includes fact sheets offering general guidance on erosion and sedimentation control measures. The fact sheets are grouped under two categories, surface stabilization and drainage control measures, and may be used as a reference in creating an effective erosion and sedimentation control plan for a particular site.

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[4] Nova Scotia Department of Environment. 1988. *Erosion and Sedimentation Control -Handbook for Construction Sites*. Canada: Nova Scotia Department of Government Services Information Services Division.

2.6.5.2 Post-Development Stormwater Management

Stormwater quantity management is meant to prevent or reduce ecosystem and property damages associated with flows from large or infrequent storms. The selection of criteria for peak flow management is dependent on the location of the development within the flow system of the watershed. In general, post-development peak flows in developments located in upstream areas should match pre-development levels for the 2-, 5-, 25-, 50-, and 100-year storm events. Balancing peak flow to pre-development levels is not as important in developments proposed in downstream environments as large receiving water bodies have capacity to accommodate the flows without significant effects.

Whenever feasible, post-development water quality should equal or exceed that of a pre-development scenario. The ultimate selection of acceptable water quality criteria for a new development is dependent on the capacity of the receiving water body to accommodate existing and new developments. In areas where existing development has caused degradation of receiving water bodies, the criteria for new developments would be to exceed the water quality leaving the site in pre-development conditions.

If the source of contaminants cannot be reduced, the interaction between the contaminant source and stormwater can be minimized through site level controls, which may include discharge of rooftop leaders to sub-surface infiltration trenches, cisterns for landscaping water use, and ponds; shallow lot gradient to reduce runoff; the use of porous and permeable paving materials and forested buffers. Additional treatment can be achieved by conveyance controls, which can include vegetated swales and perforated pipes. Conveyance controls allow treatment as stormwater is transmitted to the eventual discharge point of the development.

End-of-pipe controls are options to be considered to balance pre- and post- development water quality if source and conveyance controls do not achieve water quality objectives. End-of-pipe controls may include constructed wetlands, ponds, infiltration trenches, filters, and oil and grit separators. These controls can also be efficient in balancing peak flows to pre-development levels. It should be noted that The *Halifax Regional Municipality Stormwater Management Guidelines*[5] also identifies which Beneficial Management Practices (BMPs) are most effective with removing particular types of pollutants, and can be used as a reference.

2.6.5.3 Provincial Regulatory Process Related to Stormwater Management

The Nova Scotia *Environment Act*, 1994-95, c.1, s.1, outlines the environmental laws required by the Province to encourage and promote the protection, enhancement and prudent use of the environment, and is administered by NSE. The Activities Designation Regulations of the *Environment Act* outlines various types of activities requiring an approval from the Minister of the Environment, which includes approval for the construction, operation and/or reclamation of storm drainage works under Section 7 (2) of the regulation. Storm drainage works under the regulation include stormwater collection systems and pumping stations, stormwater retention and storage structures, stormwater treatment facilities, and stormwater outfalls.

For new developments, multiple approvals from the Minister of Environment may be required. In such cases, one approval may be issued by the Minister of the Environment that covers all of the proposed activities, and includes all the required approvals for a specific new development (generally, an Industrial Approval)[6]. For large projects, multiple industrial approvals may be issued to ensure that developers have the required approvals in place as they need them during the site development process. Discharge limits, identified in the Industrial Approval(s) issued by NSE are based on the type of industrial facility being constructed and the expected discharges from that facility during site preparation (earthwork), construction and operation of the facility.

The review of the application, by either the Minister of the Environment or a designated administrator (applications normally reviewed and issued from the regional NSE offices), will determine whether the impact on the environment from the construction, operation or reclamation of the stormwater drainage works meets the various regulations

[5] Dillon Consulting. March 2006. *Halifax Regional Municipality Stormwater Management Guidelines*

[6] Hart, Dean. 2008. Nova Scotia Environment. Port Hawkesbury, Nova Scotia. Personal Communication.

under the *Environment Act*, and any policies, standards or guidelines adopted by the Minister of the Environment (e.g., any federal standards or guidelines which have been adopted).

Freshwater samples are usually compared against the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Freshwater Aquatic Life[7] for the specific parameters of concern for which there are guidelines in place. In addition, NSE will generally require that total suspended solids (TSS) discharging from a site (both during site development and post-development) to a watercourse or wetland meet the following:

- For Clear Flows (Normal background conditions):
  - A maximum increase in TSS of 25 mg/L from background levels (over short-term durations); and
  - A maximum average increase of 5 mg/L from background levels (over long-term durations).

- For High Flows (Spring freshets and storm events):
  - A maximum increase of 25 mg/L from background levels, for background levels of 25 mg/L to 250 mg/L; and
  - A maximum increase of 10 percent over background levels, for background of greater than 250 mg/L.

The Industrial Approvals from NSE will include other parameters to test for depending on the construction activity or facility being constructed (i.e., mine site reclamation, LNG site, etc.), and the types of discharges that potentially could be expected to be discharged. As noted, the CCME Guidelines have been adopted by NSE and will be applied as a minimum.

2.6.5.4 Examples of Stormwater Management Programs in the Strait and Surrounding Areas

Bear Head Terminal LNG Site

In 2005, an environmental baseline study was performed for the Bear Head Terminal LNG Site near Port Hawkesbury. The study's objective was to establish pre-project conditions for key environmental parameters in order to clearly distinguish potential project related effects from those that were pre-existing at the site. The investigation involved a number of baseline studies that included freshwater sampling and analysis.

The pre-project study was carried out prior to construction activities involving the ship unloading facilities, LNG storage tank area, and the regasification areas (vaporization area) to ensure that true baseline conditions were established. This study provided the basis to measure the effectiveness of stormwater control during construction and operation of the facility. Freshwater samples were collected and submitted for laboratory analysis that included the following parameters:

- Full metals scan;
- Anions;
- pH;
- Volatile Organic Compounds (VOCs);
- Pesticides;
- Polychlorinated Biphenyls (PCBs);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Total Petroleum Hydrocarbons (TPH);
- Benzene, Toluene, Ethyl benzene, Xylenes (BTEX); and
- TSS for streams on site.

Earlier in this project, Jacques Whitford was responsible for overseeing the effectiveness of all erosion and sediment controls on site, and for carrying out environmental compliance monitoring during site development. This consisted of monitoring for TSS and pH on a weekly basis and every storm event where the rainfall and/or snowmelt exceeded 25 mm. This was to determine whether stormwater runoff during earthwork operations on the 78.5-hectare site being

[7] Canadian Council of Ministers of the Environment. 2007. Canadian water quality guidelines for the protection of aquatic life: Summary table. Updated September, 2007. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.

developed was compliant with the parameters for pH and TSS set in NSE's Industrial Approval for site preparation. On large sites, erosion control is the most cost effective means to reduce sediment impacts. However, on this project a large sediment pond was required where runoff was treated with a flocculent to ensure that the TSS remained below the NSE discharge limit for TSS, until site stabilization was achieved.

Keltic Petrochemical Facility

The Keltic Petrochemical Facility Project in Goldboro, a large industrial waterfront development, required fulfilling a number of terms and conditions for Environmental Assessment Approval, including the development of various monitoring programs for surface water. These programs have to be approved by NSE before the owner can apply for Industrial Approvals to proceed with site preparation, construction and operation of the facility.

To date, NSE has approved the surface water monitoring program to be incorporated during site preparation, which will require sampling for heavy metals and TSS (and other identified persistent compounds) for precipitation events exceeding 25 mm, to confirm compliance with surface water guidelines. Approval has also been given to the surface water monitoring program developed for arsenic and mercury as a result of past mining practices at the site. Jacques Whitford is presently working on obtaining approval from NSE for their modeling program that will predict the assimilative capacity of all relevant chemical parameters, which are expected to enter the environment during the operation of the petrochemical facility. The Industrial Approvals for site preparation, construction and operation of the facility will include surface water discharge limits for all the potential effluents identified in these pre-approved monitoring programs.

2.6.5.5 Review of Stormwater Management Guidelines for Other Jurisdictions

Other guidelines which should be considered in stormwater management planning in the Strait area include those prepared by the Halifax Regional Municipality and the Greater Vancouver Regional District.

Halifax Regional Municipality

The *Halifax Regional Municipality Stormwater Management Guidelines*[8] were developed to guide the development and design of appropriate and protective stormwater management systems. The guidelines describe a range of technologies or BMPs that can be used for managing stormwater quality and quantity to minimize the effects of development on downstream environments. The various BMPs may be implemented to control the source of water quality or quantity effects, or to reduce the impact by mitigating quality and quantity during stormwater conveyance or at the "end-of-pipe". The selection of the appropriate BMPs is guided by the type of downstream environment or receiving water body. In ideal circumstances, source control, conveyance controls and end-of-pipe controls are used in synergy and succession, and selection is based on an understanding of the watershed as a whole. For this reason, an evaluation of the key watershed sensitivities is evaluated in the context of stormwater management, and recommendations are provided for the appropriate priorities of stormwater management planning in the watershed.

Stormwater BMPs can be implemented in both existing developments and new developments to ameliorate the issues identified in the watershed. The selection of suitable BMPs must be site specific, considering the watershed sensitivities, site features, space requirements, cost, BMP performance estimates, cumulative effects and acceptability by the public. The inclusion of BMPs in the design phase of new developments is typically during the development agreement phase, when approvals are sought.

Greater Vancouver Regional District

The Greater Vancouver Regional District commissioned a study to create technical design guidelines for a series of BMPs related to stormwater management. The *Stormwater Source Control Design Guidelines*[9] provides a review of relevant technical literature and design guidelines. The study recognizes that municipalities are undertaking Integrated Stormwater Management Plans (ISMPs) on a watershed basis that creates source control targets and strategies.

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[8] Dillon Consulting. March 2006. *Halifax Regional Municipality Stormwater Management Guidelines*

[9] Lanarc Consultants. 2005. *Stormwater Source Control Design Guidelines (Final Report).*

The report notes that ISMPs may allow for tradeoffs on the impact of development in one part of the watershed if gains can offset these impacts in other areas that would result in no net loss of watershed health as a whole. Large scale developments may also create ISMPs that identify the role of the stormwater source control and may include 'rainfall capture targets' for roads and development parcels that would set out the amount of rainfall that should be captured on a development site.

Key to the development of stormwater source controls is defining the amount of space required for the controls. Modeling tools that assist in this analysis include the Water Balance Model for BC (WBM) – a tool that can model the impacts of land use planning decisions and stormwater source controls at a watershed scale as well as a site scale. The model can be accessed on a free trial basis at www.waterbalance.ca. Strategies that deal with limited infiltration rates and limited space are also discussed. Stormwater treatment chains are described as a way to combine a series of controls that are site specific and can respond to different development scenarios of low to high density.

2.6.6 Environmental and Zoning Conditions

There are a number of environmental conditions (e.g., protected water supply watershed or ecologically sensitive areas such as watercourses or wetlands) in the Strait of Canso area that may restrict developments or require site specific management plans. The absence of these constraints can provide opportunities or facilitate development in some cases. The two general study areas, industrial shoreline on Cape Breton Island and land bordering the Strait in Guysborough County, have different environmental characteristics with the exception of climatic conditions. Refer to Figure 2-15 for mapped key environmental features associated with the Strait of Canso.

Temperature Normals and Extremes

The annual temperature range for Eddy Point (closest monitoring station) is normally between +22°C and -9°C. However, extreme temperatures of +33°C in summer and -26°C in winter have been recorded. Based on historical climatic data at the Port Hastings climate station (39 years of data) the average annual precipitation is 1,350 mm. Average wind speeds vary from 12 to 15 km/h in summer to near 20 km/h in winter.

Fog and Visibility

Visibility of one-half nautical mile or less is common for the Chedabucto Bay area in all seasons. However, reduced visibility due to dense fog is more prevalent in late spring and early summer, when warm moist air from the south flows over relatively cold coastal waters. July is the foggiest month, but by early fall, a combination of cooler, drier air and warmer ocean temperatures contribute to a decrease in fog. During winter, poor visibility occurs less than 10 percent of the time and is often caused by snow.

2.6.6.1 Cape Breton Island

Cape Breton Island has various industrial development areas near Point Tupper, Bear Head, and Bear Island Cove along the southwest edge of the island.

The municipal planning strategy designated the Bear Head area as Port Industrial (I-2) zoning, which includes fuel bunkering, marine terminals and other heavy industrial or port activities as required. A development strategy document prepared for the Municipality of the County of Richmond[10] targeted this area for petrochemical and marine facility developments (refer to Figure 2-16 for zoning designations).

Stipulations related to Port Industrial (I-2) zoning include the following:

- Development in the zone must be a minimum lot area of 29, 000 ft^2; and
- In cases where a non-residential use (e.g., I-2 zoned activities) abuts a residential use: (i) the nonresidential use shall not have open storage or display open storage within 20 feet of a side or rear lot line, and (ii) no parking shall be permitted in an abutting yard within 20 feet of a residential lot line (RCBDPC 2000).

[10] Rural Cape Breton District Planning Commission (RCBDPC). 2000. West Richmond Municipal Planning Strategy. RCBDPC: Port Hawkesbury, NS.

To the northwest lies Point Tupper, the industrial park, beginning with the former refinery (approximately three to four kilometres northwest from Bear Head) at Wright Point (presently the NuStar Terminal), and extending a further six kilometres to the Town of Port Hawkesbury.

Tenants in the Point Tupper/Bear Head Industrial Park include:

- NuStar Terminals - An oil and gas trans-shipment terminal which has a staff of 80 employees;
- ExxonMobil Canada - A natural gas processing/fractionation plant which has a staff of 70 employees;
- Nova Scotia Power - A coal-fired electrical generating plant which has a staff of 75 employees; and
- NewPage - A pulp and paper mill which has a staff of 800 employees.

There are no commercial development or commercially zoned areas in Point Tupper.

In the 1970s, the Province of Nova Scotia expropriated the land in the Point Tupper area for industrial development. While most of the residents were relocated, a small group of homeowners stayed and continue to live within the industrial park. The Municipal Planning Strategy for West Richmond has designated their lands as residential (R-I). These roughly ten residents have formed a group called the Point Tupper Heritage Association, and the church has been developed by the association as a museum.

Topography

The area is characterized by low relief near the shoreline at the Bear Head area, with a shallow cove (Bear Island Cove) and several lagoons to the southeast of Bear Head. The relief is more pronounced in the area to the west of Bear Head and to the north where elevations range from 10 to 30 metres along the shoreline to 40 metres further inland (refer to Figure 2-16 for topographic details). Since the slope is more gradual on the waterfront east of the Strait of Canso and is typified by low bluffs with a sand and cobble beach, waterfront development is more favourable and is reflected in the various commercial marine industries at Ship Harbour and Point Tupper.

Surficial Geology

The two major types of surficial units in the Bear Head area are peat and glacial till. The peat bogs are generally of shallow depth and are situated in poorly drained depressions. However, in some areas the organic material can be over four metres in depth. The topography is suggestive of drumlin features. However, the bedrock surface and till surface are both irregular, resulting in a highly variable till thickness. Some apparent drumlin features are, in fact, thinly covered bedrock features and some are thick till deposits.

Water Supply

The Town of Port Hawkesbury's water supply comes from Landrie Lake, which is protected by provincial legislation. Part of the protection procedure is the development of a designated protection area surrounding the water body (i.e., protected watershed). Residents in the area who are not supplied water by the Town of Port Hawkesbury are likely to rely on domestic groundwater wells.

Hydrology

Surface drainage generally flows from the central area around Bear Head (approximately north of the LNG site) into two streams in a southerly direction. The smaller stream, located to the east, receives approximately half of the runoff. It directs flow in a south-easterly direction through a 0.6 metre culvert under the Bear Island Road, and into Bear Island Cove. The second stream, located just west of the LNG site receives approximately a quarter of the surface waters. This stream meanders south to a retaining structure, crosses the Bear Island Road and eventually discharges into the Strait of Canso. No recreational fishing occurs in the two streams due to the small size of the watercourses. The remaining quarter of the site drains directly into the Strait of Canso. The Landrie Lake Reservoir (watershed drainage area approximately 16 km^2), is located approximately 1.9 km north of the sites.

Species at Risk

Previously acquired Atlantic Canada Conservation Data Centre (ACCDC) and NSDNR data was reviewed for the study area. Wood Turtle is a herpetiles species of concern identified in the study area. For avifauna, the Common Loon, Common Tern, Northern Goshawk, Black-backed Woodpecker, Boreal Chickadee and Rusty Blackbird are of concern. Various raptors and seabirds have also been noted in the areas. Field visits would need to be conducted by an experienced terrestrial biologist to confirm and identify species with special status that exist in the area.

Rare Plants

Southern twayblade and northern commandra are examples of rare plants known to be in the general study area including on Bear Head (several sites actively monitored). Southern twayblade is considered to be rare throughout Canada with less than 20 records for the country. It is listed as rare in Ontario and Quebec and very rare in New Brunswick and Nova Scotia. Zorthern commandra has also been recorded in the same general area as southern twayblade. This species is considered to be sensitive to anthropogenic activities or natural perturbations.

Archaeological Potential – Historic

A map by A.F. Church of Richmond County dated 1883-1887 suggests that there is a high potential of the study area containing historic archaeological resources dating after the mid-nineteenth century. There are seven potential sites shown on the Church map that fall in the eastern portion of the areas of interest. However, there is a low potential for historic resources dating earlier than the mid-nineteenth century.

2.6.6.2 Guysborough County[11]

Potential industrial development areas in Guysborough County are located adjacent to the Strait of Canso and Chedabucto Bay in the Guysborough Highlands in Mulgrave and Middle Melford. The Provincial government maintains ownership of the Melford Industrial Reserve in which most industrial developments would fall into; however, NewPage Corporation (owner of a pulp and paper mill in Port Hawkesbury), holds Crown Licenses for cutting of a significant portion of land in the area.

The region is a mix of urbanized open space, second growth forest and rocky shoreline. Land use of the area is designated as Industrial Resource M-3 Zone, which includes marine/container terminals, wharfs and storage facilities. Any proposed developments are therefore considered an acceptable use of land for this area.

The general area has been inhabited since the early sixteenth century. Fishing and forestry have always dominated local resource use. The study area landscape is coastal barrens and mixed coniferous and deciduous forests. The windswept and rugged seacoast is preceded inland by mixed softwood and hardwood forests. Local inhabitants likely use the land and sea for sustenance activities such as wood cutting, fishing and hunting, as well as gathering edible plants such as berries and mushrooms.

Topography

The coastline topography for this area is an emergent shoreline that is typified by rolling hills that slope steeply towards the shore. On the west side of the Strait, this is more pronounced with slopes generally greater than 10 percent beginning at the water's edge and terminating at a plateau in the Melford Industrial Reserve that is about 120 meters above sea level. Some coastal areas in the vicinity of Melford community are low enough that with cut and infill they could be developed into marine terminal or industrial building sites. However, farther north near Steep Creek, Pirates Harbour and Mulgrave coastal topography limits development options.

Surficial Geology

The surficial geology of the area consists of varying composition and thickness of glacial deposits of the Lawrencetown and Upland tills. Lawrencetown till dominates the area, resulting in an even proportion of sand, clay, and silt with depths to 35 metres with an average of approximately eight metres. Rocky outcrops are predominantly Mississippian silt stone and greywacke with low grade metamorphism present in some areas.

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[11] Melford International Terminal Incorporated (MITI). 2008. Environmental Impact Statement for the Proposed Melford International Terminal: http://www.gov.ns.ca/nse/ea/melford.international.terminal.asp. Accessed October 2008.

Species at Risk

Previously acquired ACCDC data was reviewed for the study area. A total of 20 Red or Yellow-listed species have been recorded within a 100 kilometre radius of the study area. Based on a habitat modeling exercise, the area around the proposed developments contains suitable habitat for seven of these species, including Long-eared Owl (*Asio otus*), Barrow's Goldeneye (Eastern Population) (*Bucephala islandica*), Bobolink (*Dolichonyx oryzivorus*), Eastern Bluebird (*Sialia sialos*), Gaspe Shrew (*Sorex gaspensis*), Moose (mainland population) (*Alces alces*), and Wood Turtle (*Glyptemys insculpta*). Based on previous experience, it is unlikely that many of these species would be found on the two proposed development sites.

Field visits would need to be conducted by an experienced terrestrial biologist to confirm and identify species with special status that exist in the area.

Rare Plants

Rare plants (vascular and lichen species) such as *Erioderma pedicellatum*, *Sclerophora peronella*, and *Paludella squarrosa* have been recorded in the study area. Further exploration would be needed to confirm quantity and presence.

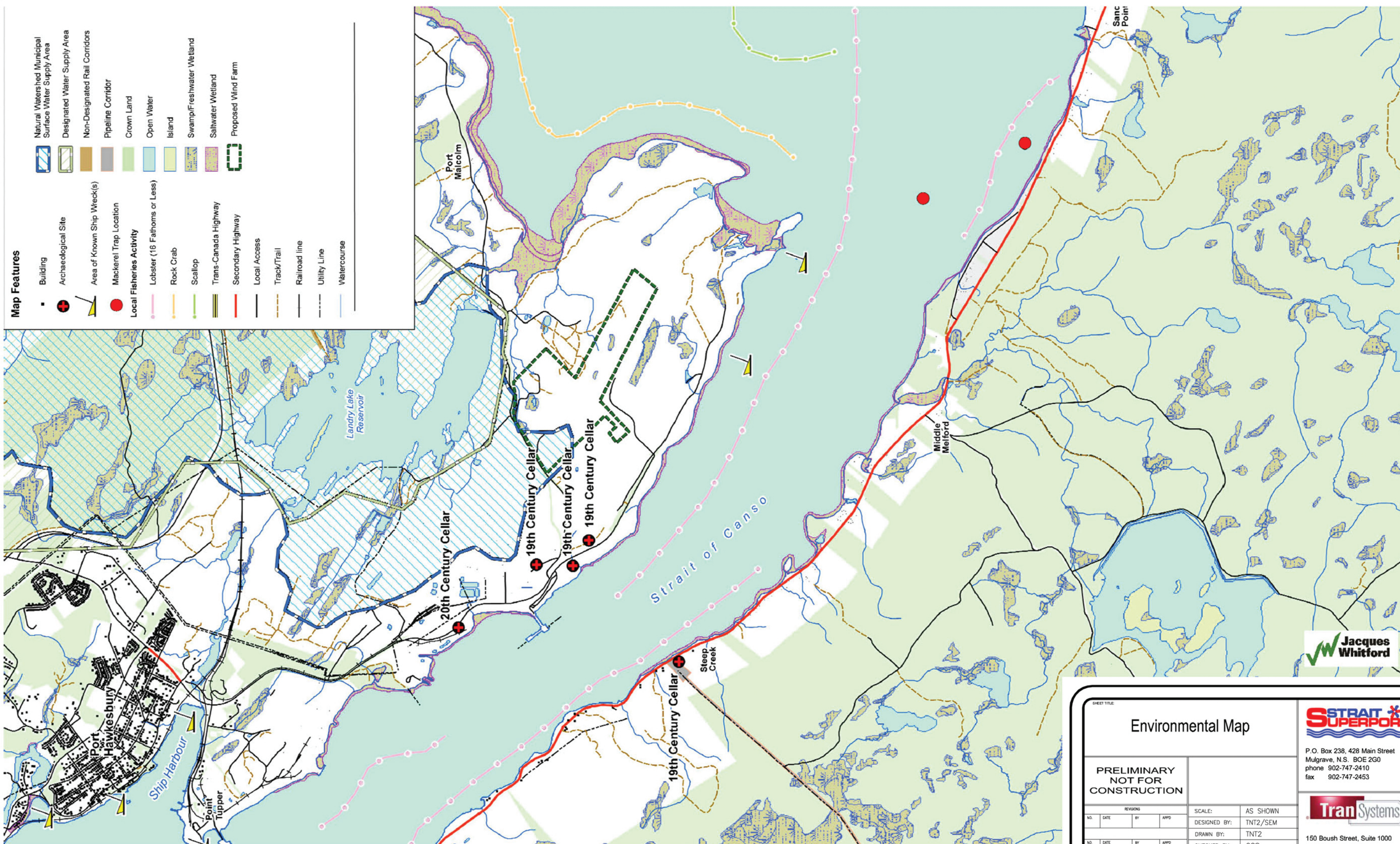

Figure 2-15: Environmental Map

SHEET TITLE: Environmental Map			
PRELIMINARY NOT FOR CONSTRUCTION			
SCALE:	AS SHOWN		
DESIGNED BY:	TNT2/SEM		
DRAWN BY:	TNT2		
CHECKED BY:	GOS		
APPROVED BY:	CBM		
DATE:	02/18/2009		
PROJECT NO.:	P307070026		

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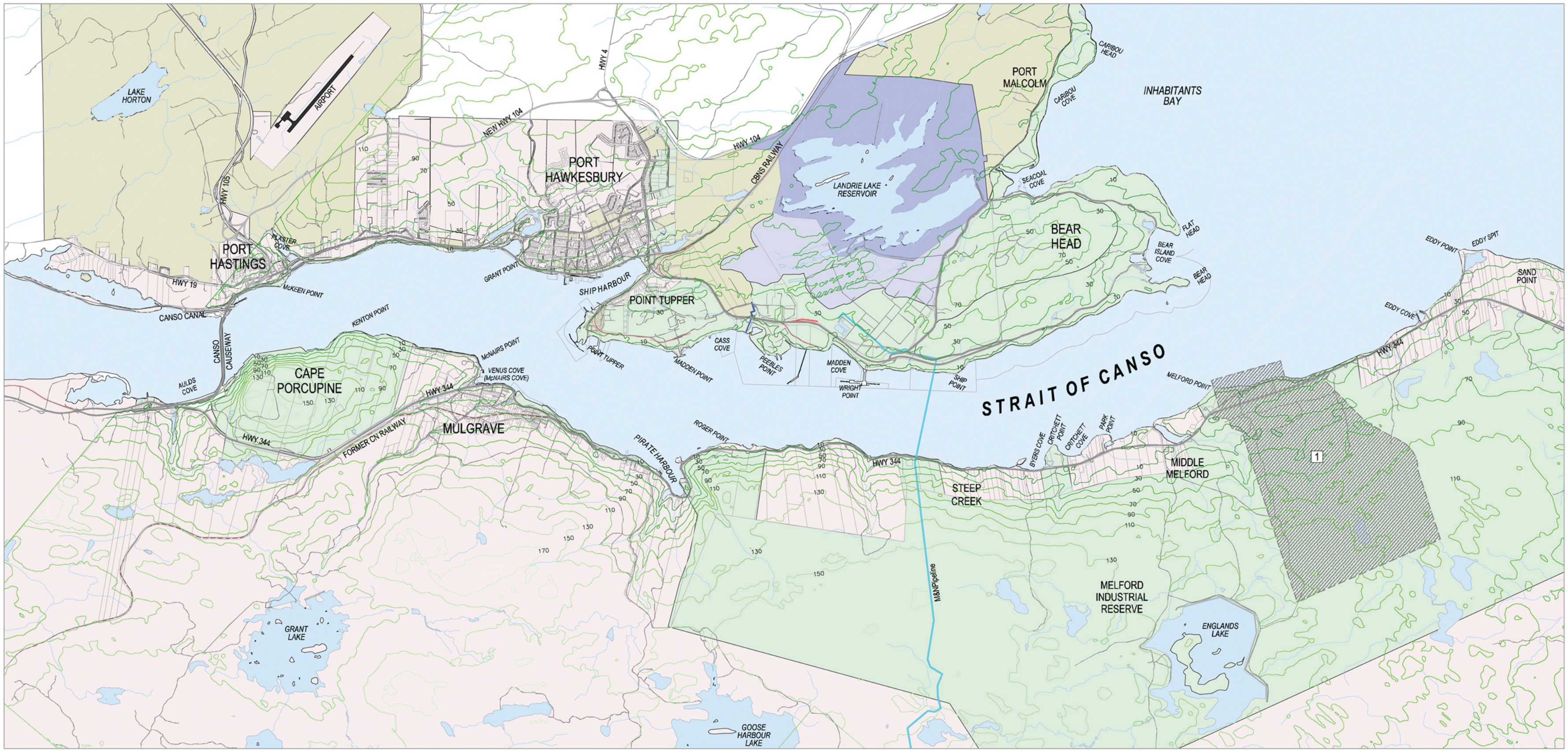

ZONING COMPATIBLE WITH INDUSTRIAL DEVELOPMENT	WATERSHED PROTECTION
ZONING FACILITATIVE WITH INDUSTRIAL DEVELOPMENT	WATERSHED PROTECTION PERIPHERY
ZONING UNFAVOURABLE FOR INDUSTRIAL DEVELOPMENT	

1. Melford International Terminal and future Industrial Park expansion derived from the Environmental Impact Statement (EIS) for the Proposed Melford International Terminal dated July 2008.

NORTH

0 1000 2000 3000
DISTANCE IN METRES

Figure 2-16: Development Zoning and Topographical Map

SHEET TITLE: Development Zoning and Topographical Map

PRELIMINARY NOT FOR CONSTRUCTION

SCALE:	AS SHOWN
DESIGNED BY:	TNT2/SEM
DRAWN BY:	TNT2
CHECKED BY:	GOS
APPROVED BY:	CBM
DATE:	02/18/2009
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2.7 Summary of Existing Conditions

The existing infrastructure in the Strait of Canso meets the requirements of local industry at their current rates of productivity without reaching capacity constraints. However, expansion of the existing industries could cause undue stress on the existing rail and road infrastructure. These future impacts should be anticipated through a program of infrastructure improvements designed to maintain the Strait of Canso as a significant part of the Canadian Atlantic Gateway.

There are certain conditions outside of the normal operating parameters that currently cause infrequent constraints to traffic flow in the Strait. Prior to expansion or development of industries in the Strait, the following issues should be addressed:

2.7.1 Navigation and Traffic

- The pilots in the Strait of Canso are compulsory, servicing the needs of both the Strait of Canso and Sydney customers alike. These ports are separated by over 130 kilometres by road or 200 kilometres by sea. It is anticipated with the development of the container terminal and proposed industry marine terminal expansions, a pilot service for each of the locations will be necessary.
- The Canso Causeway is a periodic bottleneck between Cape Breton and Guysborough county traffic. During periods of warm weather, the bridge does not cycle properly and can shut down the only route of passage from Cape Breton to mainland Nova Scotia. In the future, improvement of the Causeway Bridge may become necessary. This should be accompanied by improvements to the roundabout on the Cape Breton side and necessary signalization and signage.
- Currently there are plans in place to build a Highway 104 bypass around Port Hawkesbury in order to accommodate additional truck traffic. Although this may affect local businesses, it would mitigate some of the impacts of greater truck traffic due to proposed industrial developments at Point Tupper and Bear Head.
- Although the new Melford container terminal is designed for primarily rail distribution of cargo, about 10 percent of traffic is anticipated to go by truck as well. This relatively small fraction has the potential to add 750 truck trips per day to Highway 344. Therefore, in addition to requiring a highway bypass around the container terminal, MIT will also require significant upgrades to the existing Highway 344, particularly where it passes through Mulgrave and other coastal communities. In addition, the Highway 344 interchange will require upgrade to a full, four-way overpass to accommodate trucks turning onto Highway 104.
- In the long term, rail and roadway improvements along the Highway 104 corridor will be necessary to make the Strait of Canso an integral part of the Atlantic Gateway. This could include full, four-lane upgrades between Antigonish and the Highway 344 interchange, as well as track improvements to handle the anticipated intermodal volumes.

2.7.2 Regulatory Requirements

A number of provincial approvals (permits) to construct and operate industrial facilities and alter wetlands and watercourses will potentially apply to the Strait of Canso Master Plan. Large scale industrial projects will require provincial and/or federal environmental regulatory approval. This approval process must be accounted for early in project planning given potential requirements for seasonal surveys and potentially time consuming public and regulatory review components. Regulatory approvals can be fairly simple (e.g., provincial registration and approval for Class I Undertaking; minimum of six months) or complex (federal Comprehensive Study report under *CEAA* combined with Class 2 environmental assessment provincially that would require extensive process and likely public hearings; could take 18 months or more).

Projects that include development of marine infrastructure, federal funding, the transfer of federal land ownership/interest, or certain regulatory permits will require approval under *CEAA*. Some large scale projects isolated from marine environment may not require *CEAA* assessment unless, for example, they harmfully alter, destroy or disturb (HADD) fish habitat. *CEAA* assessment could be fairly simple (screening) or could be more complex (comprehensive study). Typical *CEAA* triggers for marine developments include permits required under the *NWPA* and Disposal at Sea (typically of dredge spoils).

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