KPMG

Gartner Lee

Executive Summary

Yukon Ports Access Strategy for Yukon Economic Development

KPMG LLP and Gartner Lee

CONTENTS

1 INTRODUCTION

Expanding markets worldwide, combined with promising Yukon economic potential are increasingly prompting questions about the current and future possible state of transportation infrastructure in northern Canada. Although ports form a vital component of an effective and sustainable logistics chain, many factors, such as inadequate surface transportation linkages to the ports and uncertainty about resource and project developments, can challenge the successful development of a viable ports access strategy in northern Canada.

The Yukon Ports Access Strategy Study (the "Study") aims at understanding both the current and potential future state of economic markets and infrastructure, as well as identifying feasible alternatives for a port development strategy. The objective of the Study is to understand and analyze the link among the following:

- Global demand and supply for products (i.e., trade levels and forecasts)
- The flows of trade through the transportation infrastructure (accounting for modes of transportation, commercial trade corridors and geographical gateways)
- The current and future ability of the identified gateways to respond to trade pressures (including future sustainability)
- The strategic decisions that can be taken by various stakeholders in response to the opportunities.

2 METHODOLOGY

This executive summary provides a synopsis of the key analyses and findings of the work of KPMG LLP on the ports strategy (Contract A) and the environmental, regulatory and land use considerations for that strategy identified by Gartner Lee (Contract B). Due to the high level of interdependency and the many linkages with a potential Alaska Canada rail corridor, the Study draws on the output of the Alaska Canada Rail Link Study ("ACRLS"), a joint initiative by the governments of the Yukon and Alaska.

Outputs from the ACRLS that have been used include:

- Estimates of potential traffic.
- Background information on regional ports.
- Estimates of railway capital and operating costs.

The methodology employed in the development of the Ports Strategy entailed:

1. Developing potential scenarios for economic development (and associated port traffic).
2. Assessing the current capacity and future capability of port and associated infrastructure.
3. Identifying potential elements of a practical ports strategy.
4. Assessing the elements of the ports strategy in terms of financial feasibility and socio-economic, land use, regulatory, environmental governance and implementation considerations.

2.1 Scenarios for Economic Development

Due to the high degree of uncertainty associated with future events and economic development opportunities, the Study finds its roots in a high level description of the economic potential of the Yukon. The resulting analysis relies on a framework of assumption-based scenarios which outline what can happen, rather than what will happen. The interrelated assumptions in each scenario capture the different levels of future economic development that could occur in the Yukon. Each economic development scenario corresponds to a particular outlook on the demand and supply of commodities in the Yukon. Exhibit 2-1 illustrates this conceptual framework.

Exhibit 2-1
Conceptual Framework for Economic Development

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Commodity Potential Perspective	Pessimistic	Conservative	Optimistic	Optimistic + Crest Iron Ore Development
Potential Commodity Volume	Low	Medium	High	Very High
Indicative Timeframe	Short-term (0-5 years)	Medium-term (5-10 years)	Long-term (10+ years)	Long-term (10+ years)

This conceptual framework allows for an analysis of the potential traffic impact on the options for port development. The Study does not include traditional traffic forecasts due to the high level of uncertainty about mineral development and the timing/feasibility of the proposed major projects in the Yukon (e.g., Alaska Highway Gas Pipeline).

2.2 Infrastructure Assessment

The assessment of the current infrastructure and its future potential entailed:

- Site visits and discussions with users, owners and operators of existing infrastructure
- Identification of capacity and potential uses through an examination of infrastructure condition, current and historical levels of traffic and identification of potential constraints or opportunities for infrastructure development.
- A high level screening analysis of port development options on the basis of capital costs, operating costs, environmental/community considerations, capacity and consistency with local/regional plans.

The result of this process was a short list of options for further consideration as to inclusion in the ports strategy.

2.3 Elements of a Port Strategy

Each of the conceptual options was examined in more detail in terms of the potential capital costs, operating costs and revenues. This information was used to develop a financial model to test the financial feasibility of implementation. This assessment also looked at a number of other factors including:

- Trigger points for infrastructure development (e.g., traffic volumes)
- Socio-community considerations (e.g., traffic)
- Environmental, regulatory and land use considerations

2.4 Implementation Plan

The implementation plan is based on an assessment of the actions required to remove barriers and take advantage of enablers for the successful implementation of the ports strategy. While the implementation plan is time-based in the short term, many of the actions required for future infrastructure development are trigger-based (i.e., based on the occurrence of certain events such as the opening of a particular mine or the construction of a pipeline). The implementation plan identifies the major tasks for implementation and the decisions that need to be made by key stakeholders.

3 ECONOMY

A picture of the economic potential of the Yukon with corresponding traffic flows helped to determine transportation and in turn port and port access requirements for the Yukon. For this purpose, the study provides a discussion of the types, quantities and direction (inbound / outbound) of potential Yukon port traffic. Due to uncertainties about the future development of mineral resources, forest resources and major projects such as the planned pipelines, the study uses a scenario-based approach to assess future demand. The following traffic types were examined: mineral products, project supplies, community re-supply and forest products.

3.1 Mineral Products

The complex and varied geological terrain underlying the Yukon is host to a number of past-producing mines of gold, copper, lead, zinc, tungsten, silver and cadmium. Aggregate future potential shipments from the mineral deposits that are most likely to go into production in pessimistic, conservative and optimistic scenarios is estimated at a total of approximately 1.3 billion tonnes or 25.5 million tonnes annually. This can be summarized as presented in Exhibit 3-1, ordered by mineral concentrate type. For each deposit, the volume, location and annual expected shipment are indicated.

Exhibit 3-1
Summary of Shippable Volumes of Minerals

Commodity	Property Name	Likely Shippable Commodity (in tonnes)			
		Project Life	Scenario	Total Shippable Commodity	Annual Shipment
Iron	Crest	30+	O	1,219,500,000	23,076,923
Coal	Illtyd Creek	12	O	10,119,048	337,000
	Division Mt.	22	C,O	27,500,000	917,000
Base Metals	Howard's Pass	21	P, C, O	14,009,249	467,000
	Grizzly / Dy	11.5	O	2,330,889	78,000
	Grum	5	O	1,837,500	367,500
	Swim	9	O	491,000	53,000
	Tom & Jason	14	O	3,289,635	234,974
	Wolverine	12	C, O	1,400,000	47,000
	Kudz Ze Kayah	9	C, O	1,492,650	50,000
	Fyre (Kona)	4	C, O	711,600	24,000
	Minto	12	P, C, O	322,800	11,000
Other Minerals	Logtung	30	O	293,700	10,000
	Red Mountain	17	O	102,098	3,000
	Mactung	30	O	140,986	5,000
ALL MINERALS	**TOTAL**	**-**	**-**	**1,283,541,155**	**25,681,397**

"O" *indicates the mine might be developed in an optimistic scenario only,*
"C" *stands for development under conservative circumstances and*
"P" *indicates the mine will likely be developed even under pessimistic circumstances.*

Source: Information based on Table 4-4 BC & Yukon Mineral Resource Shippable Commodity Summary

3.2 Project Commodities

Major resource and infrastructure projects will cause a large amount of construction materials (machinery and equipment, fuel, tractor services, timber, iron, pipes, steel and camp buildings, consumables, parts and supplies) to be transported into and throughout the Yukon. In estimating the associated (largely inbound) freight volumes the following projects were considered.

- *Mackenzie Gas Pipeline (Alberta):*
  The total volumes are estimated to be required throughout the implementation of this project is 699,400 over 2 years.

- *Alaska Highway Natural Gas Pipeline:*
  Total tonnage of approximately 1.1 million tonnes is expected to be shipped into the territory over a period of 2 years for this project.

- *Mine Construction Projects:*
  The analytical model used by Gartner Lee indicates that a total of 1.594 million tonnes of construction freight will be moved to and from the Yukon if all priority mineral deposits (1,292 million shippable tonnes of resources) in BC and the Yukon go into production.

- *Mine Operations:*
  According to Gartner Lee's analysis, inbound freight volumes for mining operations support is approximately 4.5 million tonnes over a 30 year period.

3.3 Re-Supply Commodities

The southern ports of Alaska (Haines, Skagway, Seward, Whittier) and the northern ports of BC (Stewart, Prince Rupert) currently service northern British Columbia, Alaska and Yukon with re-supply traffic. Inbound community re-supply commodities include agricultural products, household goods, livestock, mobile homes, construction materials, timber, petroleum products, vehicles and general merchandise. Based on the current total of 29,240 tonnes of re-supply freight moving through Skagway and Haines during 2004, and an assumed growth rate of 1.5%[1] per annum, an average of 31,380 tonnes of re-supply commodities is projected to be shipped through Skagway or Haines on an annual basis in the short term. In the medium-term, this could be as much as 33,800 tonnes per annum and in the long-term it could be 35,300 and up.

[1] Based on the average growth of the Yukon population over the last 4 years.

3.4 Forest Products

According to the Yukon Conservation Society, the maximum annual allowable cut in the Yukon is approximately 350,000 m3 – 400,000 m3. It is however not likely that this amount will be realized in the near future. Exhibit 3-4 presents the projected amounts of harvested round wood and processed timber from the Yukon territories in the short, medium and long-term.

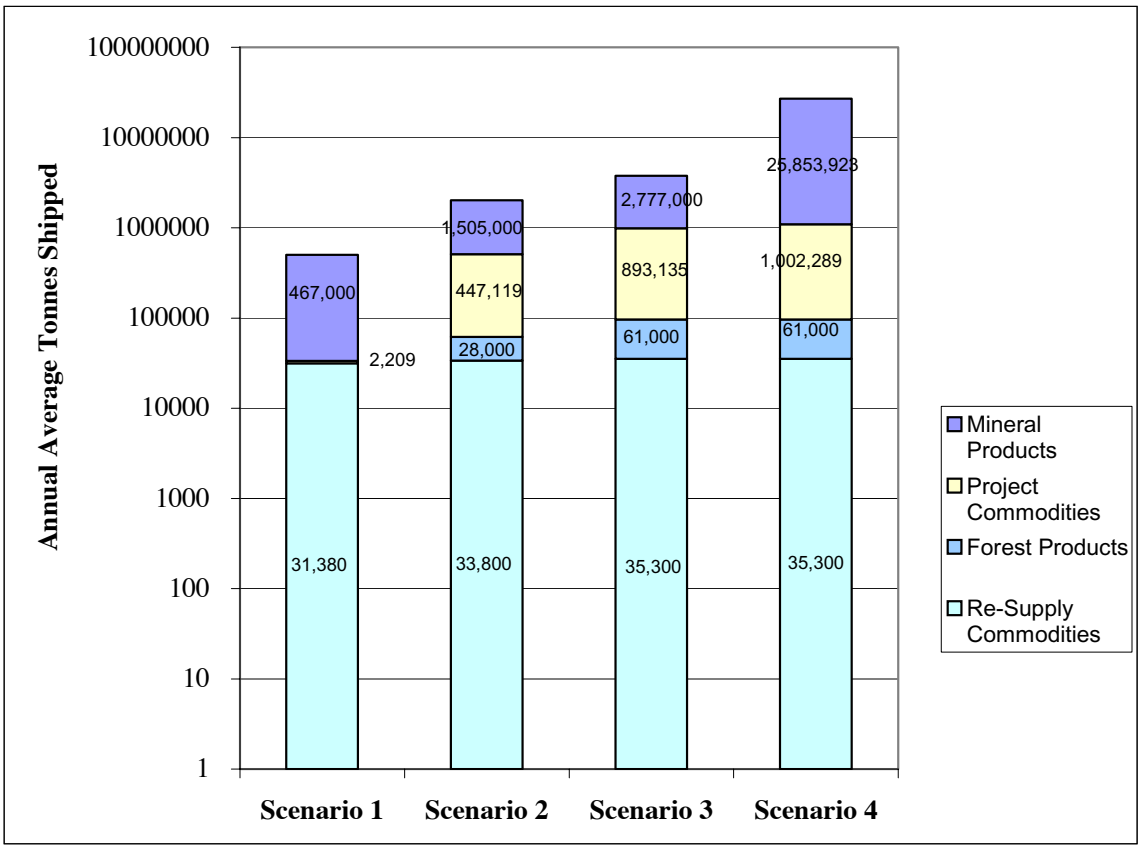
Exhibit 3-4
Timber Projections Short, Medium and Long-Term

	Year	Harvested Round Wood (m3)	Processed Timber (fbm)
Short-Term	2006	7,250	0
	2007	7,975	0
	2008	8,770	0
	2009	9,650	0
	2010	10,615	0
Medium-Term	2011	128,000	34,560,000
	2012	128,000	34,560,000
	2013	128,000	34,560,000
	2014	128,000	34,560,000
	2015	128,000	34,560,000
Long-Term	2016+	281,000	75,870,000

3.5 Summary of Potential Traffic Implications

Exhibit 3-5 provides a summary of the total potential traffic that could move through ports linked to the economic hinterland of the Yukon.

Exhibit 3-5
Annual Volumes for Mineral Products, Project Commodities, Forest Products and Re-Supply Commodities



These scenarios indicate distinct outcomes that will have a bearing on port development:

- Annual traffic is unlikely to be higher than 3 million tonnes, except under the most optimistic scenario.
- Pipeline project traffic, while significant, is only an issue for 18 – 24 months.

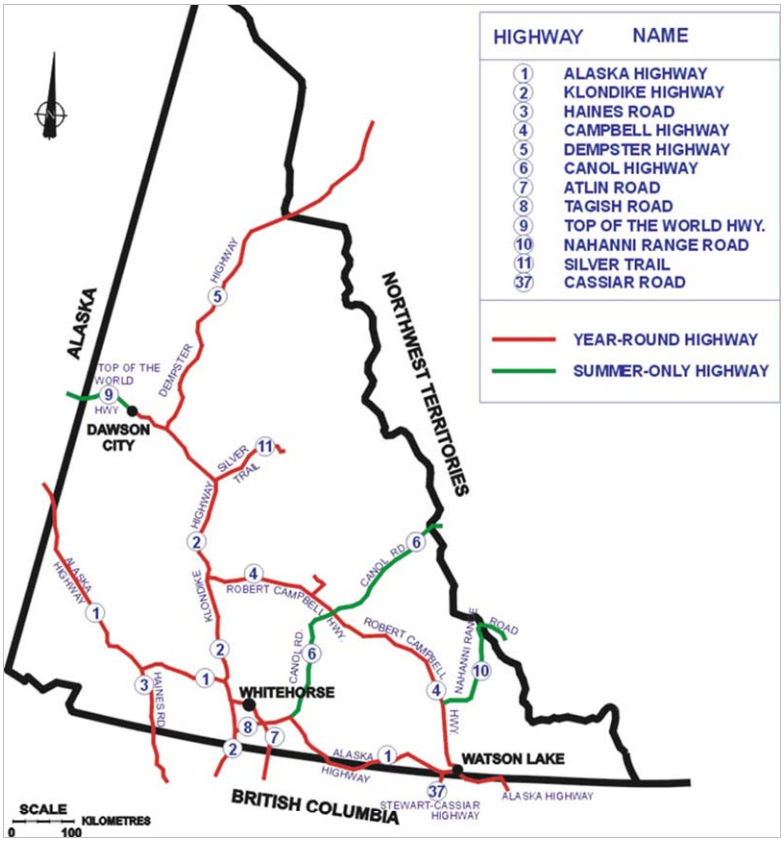
4 BASIC SURFACE TRANSPORTATION INFRASTRUCTURE

4.1 Current Surface Infrastructure

4.1.1 Road

The Yukon is well served with surfaced roads traversing the populated south-western part of the Territory and providing access to various ports in Southeast Alaska. Exhibit 4-1 depicts the current road infrastructure of the Yukon.

Exhibit 4-1
Yukon Highways



The Alaska Highway and the Haines Highway carry a small amount of traffic compared with provincial highways in BC and Alberta. The highest vehicle movements are within the Whitehorse area, between Whitehorse and Skagway and between Whitehorse and Haines Junction. There appears to be sufficient capacity on Yukon highways to accommodate significantly more vehicles than the current traffic levels. Current traffic levels are generally less than 10 percent of highway capacity.

All principal roads in the Yukon have been designed to withstand standard highway loading based on approximately 2,000 standard truck movements per day. At present, approximately 50 trucks use the Alaska Highway per day. Most of these trucks are carrying goods for the re-supply of Yukon and interior Alaska communities.

4.1.2 Rail

The White Pass & Yukon Route is the only operational rail line in the region at present. It is a narrow gauge railway running from Skagway to Whitehorse over a distance of approximately 180 km. The only section of this rail link currently in operation is the section from Skagway to Lake Bennett, though the railway can be operated as far as Carcross.

The ACRLS was initiated in 2005 to explore the benefits of additional rail and is due for completion in fall 2006. The study focuses on regional re-supply, mineral exports and pipeline material as the main sources of revenue for the rail link. The purpose of the study is to examine the feasibility of connecting the existing rail systems in Alaska, Yukon and British Columbia.

4.2 Required Surface Infrastructure

In light of the potential economic development of the territory, the required road, rail, barge and ports systems in the Yukon were assessed for the short-, medium- and long-term. The corresponding potential increase in traffic volumes was assumed to mostly depend on mining activities and pipeline projects.

4.2.1 Short-term (Scenario 1)

In the short-term, a number of smaller mines are likely to be developed. The volume associated with the development, operation and export commodities of these mines is relatively small (approx. half a million tonnes per year). Minerals would be shipped directly to Skagway or to Haines. One-half million tonnes of mineral ore or concentrate per annum will be shipped using standard B-Train highway truck combinations carrying 50 net tonnes per load, 35 one-way (and 70 two-way) truck movements will be required over a 300-day year. 40 one-way movements (80 two-way) would be required over a 250-day year (5 days per week and a two-week Christmas break). If one truck is equivalent to three passenger vehicles, 80 two-way truck movements would be equivalent to adding 240 vehicles to the highway system. The number of trucks could be reduced if B-Train bulk carriers carrying larger loads were to be used. Pavements may have to be further strengthened to carry these heavier loads. Any of the Yukon highways can accommodate this volume. Therefore, the short-term impact on the Yukon road system will not be significant as a result of the additional movements of trucks.

4.2.2 Medium-term (Scenario 2)

In the medium-term, several mineral deposits, as well as one of the pipeline projects are likely to go into development and operation. The volume associated with the development, operation and export commodities of these mines is in the range of 1.5 million tonnes per year. If all of this volume is moved by truck, the number of two-way truck movements would be in the order of 210 to 240 trucks per day. With a passenger car equivalence of 3.0 this equates to about 600 – 700 passenger car equivalents per day – still well below the capacity of existing highways.

4.2.3 Long-term without Crest (Scenario 3)

In the long-term scenario without development of the Crest iron ore deposit, all other ore deposits as well as both pipeline projects are likely to go into development and operation. The volume associated with the development, operation and export commodities of these mines is about 2.5 million tonnes per year. If all of this volume is moved by truck, the number of two-way truck movements would be in the order of 350 to 400 trucks per day. With a passenger car equivalence of 3.0 this equates to about 1,050 to 1,200 passenger car equivalents per day.

The presence of 350 two-way truck movements per day on a highway represents approximately one truck passing a given point every three minutes. This number of trucks could tend to form convoys that may inhibit the movement of other road users. If this number of trucks were to use a public highway, investments will have to be made in widening curves and providing additional climbing and passing lanes. If existing summer general traffic increases at 7% per annum due to increased economic activity, baseline traffic on Yukon highways will double in 10 years. If the mineral and project traffic is added to this mix, the total traffic will increase significantly, but all highways will still be well below capacity.

4.2.4 Long-term with Crest Development (Scenario 4)

In the long-term scenario with development of the Crest deposit, all mineral deposits, as well as both pipeline projects are likely to go into development and operation. The minerals could be transported to southern ports such as Skagway, Haines, Stewart or Prince Rupert.

Mining production of approximately 27 million tonnes per year would require over 1,800 one-way (3,600 two-way) truck movements; equivalent to 11,000 passenger car units per day, assuming 300 working days per year. This would require the construction and reconstruction of roads to very high standards, and the logistics of loading, hauling and unloading this many trucks would not be economical. Therefore, consideration would have to be given to a rail spur following the Dempster Highway and connecting the Crest Deposit to Haines at a distance of 970 km.

5 PORTS

5.1 Current & Required Ports Infrastructure

The Yukon is presently serviced by several ports in Alaska and BC. Exhibit 5-1 illustrates the hinterlands of the Yukon, Alaska and BC port areas. The southern Alaskan ports of Skagway and Haines are the Yukon's main port outlets at present.

Exhibit 5-1
Hinterland and Focal Ports

In light of the potential economic development of the territory, the ports of Whittier, Port Mackenzie and Seward were assumed viable for connection with the Yukon. The ports in Stewart, Kitimat and Prince Rupert were also considered to be potential outlets for the Yukon's bulk exports.

5.2 Assessment of Potential Port Options

The process and results of the assessment of the full range of potential options for port and infrastructure development is summarized in Exhibit 5-2.

As indicated in this exhibit, Skagway, Haines and Stewart are the preferred ports based on the identified development scenarios and the assessment criteria.

Exhibit 5-2
Summary of Key Criteria Affecting Assessment of Options

	Less Than 1 Million Tonnes				1 -5 Million Tonnes				Over 5 Million Tonnes			
Port	Truck	Rail - Narrow Gauge	Rail Standard Gauge	Slurry Pipeline	Truck	Rail - Narrow Gauge	Rail Standard Gauge	Slurry Pipeline	Truck	Rail - Narrow Gauge	Rail Standard Gauge	Slurry Pipeline
Skagway	1 - 2	1 - 2	1 - 3 - 6	2 - 5 - 7	1 - 2	1 - 2	1	2 - 5 - 7	1 - 2 - 4 - 6	1	6	2 - 5 - 7
Haines	1 - 2	N/A	1 - 3 - 5	2 - 5 - 7	1 - 2	N/A	2 - 3	2 - 5 - 7	1 - 2 - 6	N/A	1 - 2	2 - 5 - 7
Stewart	1 - 2	N/A	1 - 3 - 5	2 - 5 - 7	1 - 2	N/A	2 - 3 - 5	2 - 5 - 7	1 - 2 - 6	N/A	2 - 3	2 - 5 - 7
Prince Rupert	2	N/A	1 - 2 - 3	2 - 5 - 7	2	N/A	2	2 - 5 - 7	1 - 2 - 6	N/A	2 - 3	2 - 5 - 7
Kitimat	2	N/A	1 - 2 - 3	2 - 5 - 7	2	N/A	2	2 - 5 - 7	1 - 2 - 6	N/A	2 - 3	2 - 5 - 7
Seward	2	N/A	1 - 2 - 3	2 - 5 - 7	2	N/A	2	2 - 5 - 7	1 - 2 - 6	N/A	2 - 3	2 - 5 - 7
Whittier	2	N/A	1 - 2 - 3	2 - 5 - 7	2	N/A	2	2 - 5 - 7	1 - 2 - 6	N/A	2 - 3	2 - 5 - 7
Port Bradfield	2	N/A	1 - 2 - 3	2 - 5 - 7	2	N/A	2	2 - 5 - 7	1 - 2 - 6	N/A	2 - 3	2 - 5 - 7
Port Mackenzie	2	N/A	1 - 2 - 3	2 - 5 - 7	2	N/A	2	2 - 5 - 7	1 - 2 - 6	N/A	2 - 3	2 - 5 - 7
King Point	2	N/A	1 - 2 - 3	2 - 5 - 7	2	N/A	2 - 3	2 - 5 - 7	1 - 2 - 6	N/A	4 - 5 - 6	2 - 5 - 7
Other North	2	N/A	N/A	2 - 5 - 7	2	N/A	N/A	2 - 5 - 7	1 - 2 - 6	N/A	N/A	2 - 5 - 7

Key

- Infeasible Option
- Feasible Option
- Potential Option

Assessment Criteria	
1 - Capacity	5 - Environmental Considerations
2 - Transportation Costs	6 - Community Acceptability
3 - Capital Intensity	7 - Proven Technology
4 - Consistency with Local Plans	N/A - Not Available

5.3 Preferred Port Options

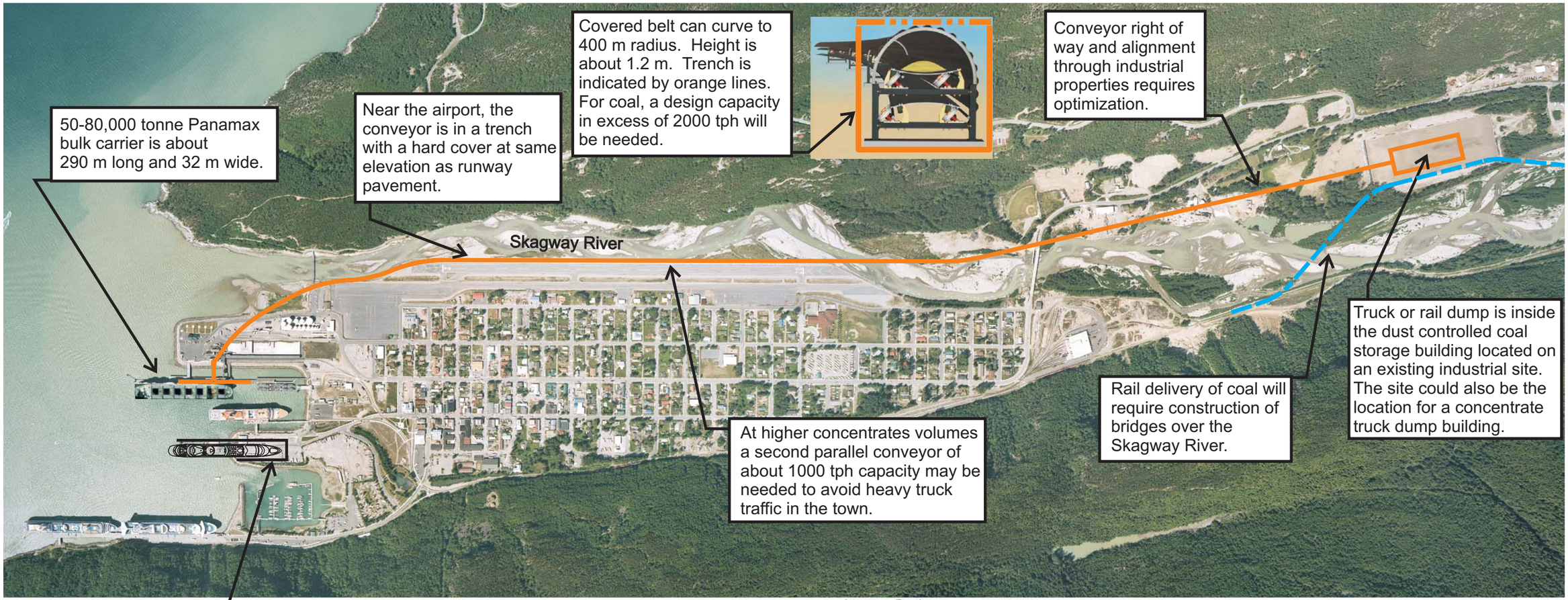
The feasibility analysis and financial assessment of the options identified Skagway and Haines as the preferred port options. These two options were then further explored with regard to detailed infrastructure requirements, capital and operating costs, timing and expected key issues of potential scenarios. While Stewart is considered to be a viable option for Yukon products as well, it is not addressed further as the port facilities are in private hands, are expandable and are available for use as required without government involvement.

5.3.1 Skagway

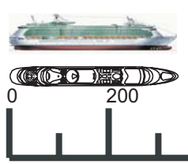
The Port of Skagway offers the opportunity to utilize a pre-existing network of roads, rail line and port facilities that are sufficient to handle export volumes of up to about 3 million tonnes of mineral concentrates and coal. The port can also handle ongoing volumes of re-supply traffic and project traffic, particularly related to pipeline construction programs. In this respect, Skagway can be characterized as the low to moderate volume option, and can be brought into play very quickly. A key consideration is that the necessary infrastructure for the industrial traffic cannot significantly impact on the tourism and cruise ship activities that are important to the economic vitality of the City.

Exhibits 5-3 and 5-4 illustrate the two primary development concepts for the Port of Skagway. Exhibit 5-5 provides details of the proposed development concepts.

Exhibit 5-3: Port of Skagway - Detailed Long Term Conceptual Layout



339 m
Freedom of the Seas loa 339 m, beam 38 m
Ship is shown to scale at new cruise wharf. Alaska ferry terminal is removed.



Project: Yukon Port Access Study		Deep Sea Bulk Shipping Concept for Coal via Deep Sea Vessel
Scale: 1 :: 12,000	Date: 27/06/06	Dwg # 2
		Client: Yukon Economic Development

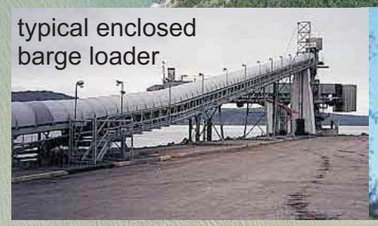
Notes:
Coal can be delivered to the coal storage building by truck or rail. Coal is conveyed from the coal storage building to a travelling shiploader at the concentrate berth. Concentrates trucks can deliver directly to the concentrate terminal or to a truck dump near the coal storage building. Cruise ships no longer use the concentrate berth. They use a new dedicated cruise berth.

Prepared by:

Lauga & Associates Consulting Ltd.
www.port-plan.com

Yukon Government

Exhibit 5-4: Port of Skagway - Alternative Arrangement for Coal



typical enclosed barge loader

typical coal storage dome

Ferry Columbia at new terminal
loa 127 m
beam 26 m
(Not required if Juneau to Skagway highway is built.)

Covered 1000 tph conveyor in trench with hard cover at same elevation as runway pavement. (Optional 2nd conveyor for concentrates shown by dashed line.)

Skagway River

Covered belt can curve to 400 m radius. Height is about 1.2 m. Trench is indicated by orange lines.

Underground "beltavator" conveyor facilitates vehicle traffic.

Covered 15,000 tonne coal storage dome about 41 m diameter

Coal truck dump is inside dust control building located upstream or downstream from highway bridge.

10,000 tonne self-unloading coal barge links to coal terminal in Haines.
loa 138 m, beam 32 m

339 m
Freedom of the Seas
loa 339 m, beam 38 m
Ship is shown to scale at new cruise wharf. Alaska ferry terminal is removed.

Truck dump building with cladding to suit historic styles. Exact location to be determined; location options are shown.

0 200 400 600 800 1000 metres

Project: Yukon Port Access Study			Bulk Shipping Concept for Coal via Barge and for Mineral Concentrates
Scale: 1 :: 8,000	Date: 27/06/06	Dwg # 1	Client: Yukon Economic Development

Notes:
Coal is received at enclosed truck dump building and conveyed to coal storage dome. Concentrates are trucked directly to terminal. High truck traffic may require that a second conveyor for concentrates be built. Cruise ships no longer use concentrate berth; they use a new dedicated cruise berth.

Prepared by:
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www.port-plan.com

Yukon Government

Exhibit 5-5
Potential Scenarios for Port Development in Skagway

Scenario	Throughput (Commodity & Volume)	Key Infrastructure Elements	Capital Cost (Million)	Principal Commercial Parties
1	Concentrates – 100,000 tonnes	Truck Dumper (at terminal) Concentrate Shed (30,000 square feet – about 1/3 the size of the old building) Shiploader (new or rebuilt) **Or** Same as above with a new traveling shiploader and upgrade to the wharf	$3 - $5 (AIDEA estimate) **Or** $14 - 16 million	AIDEA Mining Companies
2	Concentrates – 500,000 tonnes	Truck Dumper (at terminal) Concentrate Shed (100,000 square feet – same size as the old building) Shiploader (new traveling loader) Wharf upgrade	$22 million	AIDEA Mining Companies
3	Concentrates – 500,000 tonnes Coal – 1,000,000 + tonnes	Truck Dumper (at terminal) Concentrate Shed (100,000 square feet – same size as the old building). Shiploader for concentrates (new traveling loader) Coal Dome & Coal Barge Loader Cruise Ship Dock 2.5 Kilometre Bypass Conveyor Rail or Truck Dumper **Total** **Or**	$22 million $20 million $14 million $6 million $2 million **$64 million**	AIDEA City of Skagway White Pass Mining Companies Alaska DoT

Scenario	Throughput (Commodity & Volume)	Key Infrastructure Elements	Capital Cost (Million)	Principal Commercial Parties
3 (continued)		Truck Dumper (at terminal) Concentrate Shed (100,000 square feet – same size as the old building). Shiploader for concentrates (new traveling loader) Coal Shed Dock Improvement & Coal Ship Loader Cruise Ship Dock 4.0 Kilometre Bypass Conveyor Rail Dumper Rail Bridges/Track Other **Total**	$22 million $10 million $15 million $14 million $17 million $13 million $14 million $31 million **$136 million**	AIDEA City of Skagway White Pass Mining Companies Alaska DoT
4	Concentrates – 1,000,000 + tonnes	Truck Dumper (at terminal) Concentrate Shed (100,000 square feet – same size as the old building) Shiploader for concentrates (new traveling loader) 2.5 Kilometre Bypass Conveyor Truck Dumper for Conveyor **Total**	$22 million $6 million $2 million **$30 million**	AIDEA City of Skagway White Pass Mining Companies

Scenario	Throughput (Commodity & Volume)	Key Infrastructure Elements	Capital Cost (Million)	Principal Commercial Parties
5	Concentrates – 1,000,000 + tonnes Coal – 1,000,000 + tonnes	Truck Dumper (at terminal) Concentrate Shed (100,000 square feet – same size as the old building) Shiploader for concentrates (new traveling loader) Coal Dome Coal Barge Loader Cruise Ship Dock 2 X 2.5 Kilometre Bypass Conveyor 2 X Truck Dumper **Total** **Or** Truck Dumper (at terminal) Concentrate Shed (100,000 square feet – same size as the old building) 2.5 Kilometre Concentrate Bypass Conveyor Concentrate Truck Dump Coal Shed Dock Improvement & Coal Ship Loader Cruise Ship Dock 4.0 Kilometre Coal Bypass Conveyor Rail Dumper Rail Bridges/Track Other **Total**	$22 million $20 million $14 million $12 million $4 million **$72 million** **Or** $22 million $6 million $2 million $10 million $15 million $14 million $17 million $13 million $14 million $31 million **$144 million**	AIDEA City of Skagway White Pass Mining Companies Alaska DoT

For port development to proceed, a number of critical success factors must be addressed:

- Public and municipal acceptance of the concept must be achieved.
- The solution must be affordable and fair for shippers.
- The necessary financing must be available.
- All of the permits and processes related to construction and operation of the proposed facilities must be received.
- For scenarios 3 and 5, four additional success factors must be addressed:
  - The State of Alaska and Alaska Marine Highway must agree to the move of the ferry terminal.
  - A new cruise ship berth must be funded and built.
  - A land swap must occur between the State of Alaska, City of Skagway and White Pass & Yukon Route.
  - Approval of the construction and operation of a transshipment facility in Haines must be received.

5.3.2 Haines

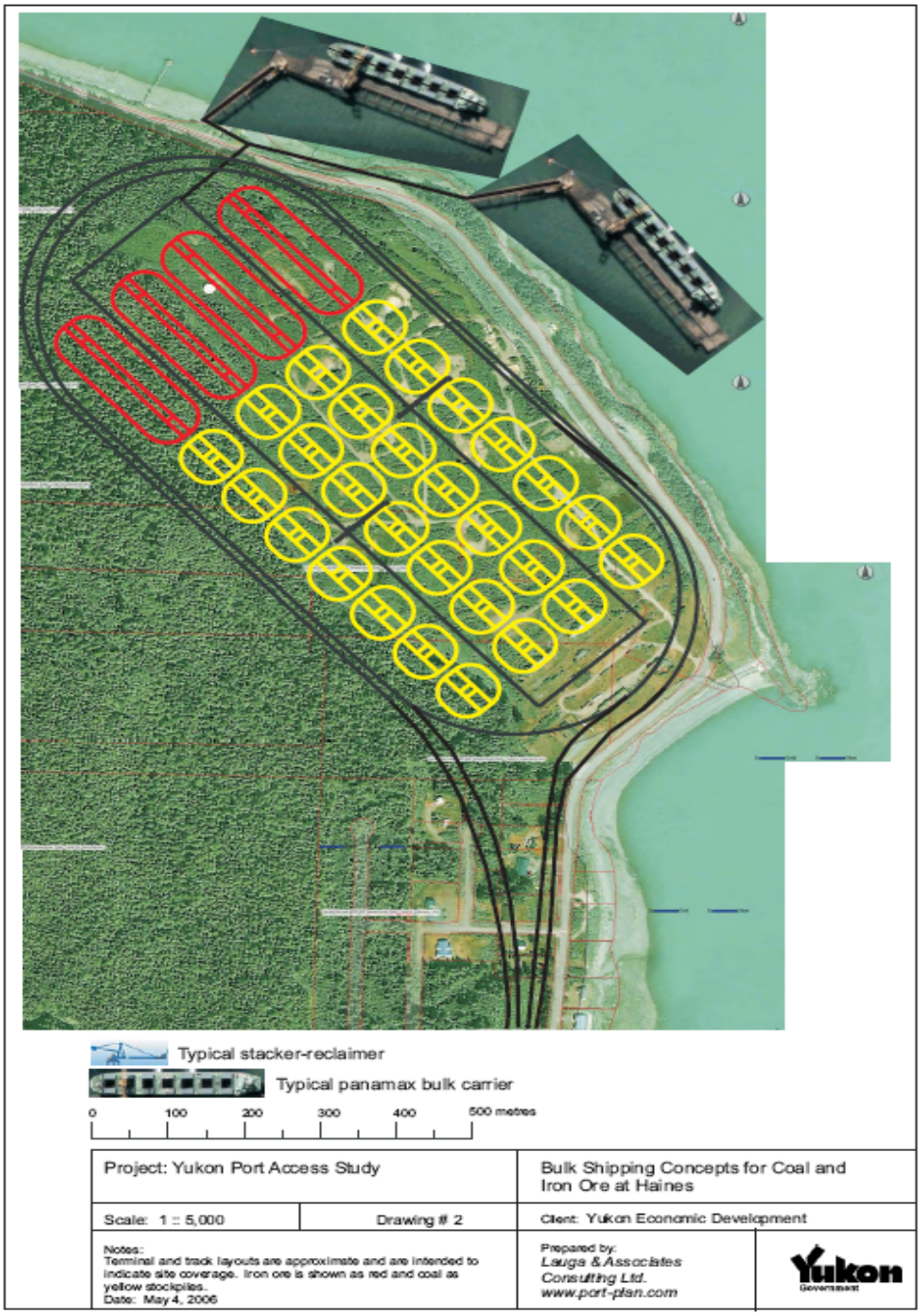
The long term development concept for Haines is based on the utilization of the old Army Fuel Tank Farm as a site for a major bulk terminal for either coal or iron ore. This site is about 200 acres in size, is relatively flat and can easily access the foreshore for the loading of deep sea vessels. Exhibit 5-6 illustrates the conceptual layout of the planned bulk terminal at the port of Haines.

The estimated cost of construction of this terminal and associated railway linkage to the mineral deposits in northeastern Yukon are as follows:

- Port Facilities – $1.3 billion
- Rail Line – $5.4 billion

The principal issues with this development are cost and potential land use / environmental issues associated with the need to construct a new railway. In addition, dust from the loading and unloading of coal must be mitigated and community acceptability of a major industrial facility could play a role.

Figure 5-6
Conceptual Port Layout for Haines



5.3.3 Critical Success Factors

For port development to proceed as proposed, a number of critical success factors must be addressed:

- Public and municipal acceptance of the concept must be achieved.
- A right-of-way for a potential rail line must be identified and protected for future development
- The site for the bulk terminal must be remediated and protected for future industrial development.
- The solution must be affordable and fair for shippers.
- The necessary financing must be available.
- A detailed feasibility study of the transshipment option should be completed.
- A detailed feasibility study of constructing and operating a rail line along the proposed alignment must be undertaken.
- All of the permits and processes related to construction and operation of the proposed facilities must be received.

Insofar as Haines is a long term solution, there is time to do the detailed studies and planning. However, it is important now to protect the lands that would be required to access and operate the proposed facility. Haines Borough needs to be engaged and involved in this process.

6 REGULATORY, LAND USE AND ENVIRONMENTAL IMPACT CONSIDERATIONS

The Public Interest Analysis of the Yukon Ports Access Strategy Study examined the regulatory, land use and environmental challenges and issues associated with the utilization and development of northern ports for the export of Yukon commodities to market. Initial examination of port options included preliminary assessment of five ports: Skagway, Alaska; Haines, Alaska; Stewart, B.C.; Hyder, Alaska; North Yukon and a NWT port in the Mackenzie Delta region. As the study progressed and most-probable port scenarios were identified, detailed examination focused on the ports of Skagway and Haines, Alaska.

The findings of the Study confirmed early predictions of a highly complex "weave" of jurisdictional, land use and environmental challenges unique to each port scenario. There were no substantive "surprises" during this high level review, however, numerous data gaps come to light and have been identified for further consideration.

6.1 Skagway

Key regulatory and land use issues associated with substantive port development in Skagway include securing multi-party land use agreements between a complex range of interested parties, establishing ownership of the proposed conveyor route along the Skagway River, and various multi-jurisdictional regulatory approvals from federal, state and municipal agencies. These approvals may include a requirement for an environmental assessment or development of an environmental impact statement dependent on the scope of port expansion activities. Liability associated with sediment contamination in the Skagway Harbour from previous ore shipping activities has not been defined to date and will require further consideration to evaluate potential implications to new users of the ore dock facilities.

Main environmental concerns related to port utilization or expansion activities include the potential release of commodity, particularly ore dust, into nearby lands and receiving waters, and the preservation of fish habitat. Given the proximity of the ore dock, conveyor system and newly proposed location for the ferry terminal to the Skagway River and associated estuaries, careful attention will be required during port construction activities to minimize disturbance of this import fish habitat area. Proper containment of commodity during transport, storage and handling activities will be necessary to ensure protection of nearby aquatic and terrestrial environments. Implementation of the long-term port development scenario in Skagway will prompt the need for further environmental analysis including establishment of baseline conditions. This is particularly important for characterization of pre-existing sediment contamination within the Skagway Harbour.

Regardless of the extent of port development or expansion within Skagway, obtaining a sustainable balance between tourist and industrial land use of the Skagway waterfront is anticipated to be the main driver for all future port development initiatives.

6.2 Haines

Based on the examination of land use and regulatory issues surrounding development of a bulk terminal facility and new dock structures in Haines, preservation of the current recreational, subsistence and commercial use of, and access to, local resources represent key challenges associated with this port development scenario.

Location of the bulk terminal facility at the old army tank farm is considered ideal based on its location outside of main residential areas, previous industrial use and close proximity to tidewater. Environmental considerations include noise generation from rail shunting activities, historic hydrocarbon contamination issues, commodity dust generation, and storm water run-off. It should be noted that a culturally significant native historical site may be present within or near the old tank farm site; therefore further archeological investigations will be required prior to development.

The more significant challenges and unknowns for this scenario relate to the access to port by way of rail through Alaska, northern British Columbia and in the Yukon. The Yukon Environmental and Socio-Economic Assessment Act ("YESAA") process has not been "tried" for this kind of large linear corridor development (though it might be at time of development depending on the timing for the Alaska Highway Pipeline). A related challenge is the coordination of the environmental processes in Canada and between Canada and the United States for the corridor so described. As the rail corridor will transect several First Nation's settled and traditional lands in Alaska, BC and Yukon, early engagement of all affected groups will be necessary to gauge stakeholder interests and identify concerns related to construction of the transportation corridor.

In addition, without an actual route selected for the rail, it is difficult to identify, with any degree of confidence, the kinds of environmental challenges resulting from rail construction and use. Environmental implications that will require further consideration during evaluation of a specific corridor route include assessment of the rail line proximity to bald eagle nesting grounds, including the Chilkat Bald Eagle Preserve; water-crossing impacts to fish habitat; and affects of the proposed line to subsistence use in the area. It will also be important to secure the old tank farm as the rail terminus for ore shipments through Haines; securing the route for rail through or adjacent to Haines will also be an important consideration. It is understood that there are plans for a multi-year clean up of the old tank farm. From an environmental standpoint, it is reasonable to assume that this would be a precondition for the use of that property depending on the extent of the contamination.

6.3 Conclusion

There do not appear to be insurmountable challenges of an environmental, land use or regulatory kind that would prevent moving forward with the ports scenarios considered most promising. The work associated with environmental management, securing necessary land and obtaining approvals, however, appears to be substantial. In addition, developments of the magnitude proposed for Skagway and Haines will have significant time and cost implications. These are difficult to pinpoint with any degree of accuracy until a formal development proposal is received. Suffice it to say that a significant realignment of the Skagway dock facilities or the construction of a rail-ship link at Haines will require multi-year staging for the design, environmental assessment and subsequent construction.

7 ECONOMIC & SOCIO-CULTURAL IMPACT CONSIDERATIONS

The Study identifies and, where feasible, estimates the economic and socio-cultural impacts of the development and operation of the Skagway and Haines ports. The Study does not provide mitigation and enhancement measures to address the impacts.

7.1 Economic Impacts

Economic impacts are presented separately for the construction phase and for the operation or life of the project[2]. As the economic impacts of port reconstructions will occur alongside the economic impacts of the increased mining activity in the Yukon, the impact of increased mining activity in the Yukon is provided for illustrative purposes.

7.1.1 Yukon Mining Impact

The impact of increased mining activity in the Yukon can be summed up as follows: $100 million of mining output will create total direct and indirect employment of nearly 3,000 full-time equivalent jobs, $50 million of labour income, Yukon GDP of $66 million and over $3 million in taxes on productions. This is representative of the output of the Division Mountain coal deposit north of Whitehorse.

7.1.2 Port Construction Impact

Depending on the commodity volume that is planned and constructed for, total capital expenditure on (re-)construction of the Skagway port is estimated to amount to up to $144 million. Total capital expenditure on (re-)construction of the Haines port is estimated to amount to approximately US$1.3 billion. Using the economic development tool developed by the Yukon Department of Economic Development, and assuming an exchange rate of 1.15, this leads to the projected range of direct and indirect impacts[3] on the Alaskan economy shown in Exhibit 7-1.

[2] Please note that the Yukon projections do not capture induced impact or resulting government income (taxation); the Alaskan projections also do not exclude American inter-state or international (Canadian) effects. For simplicity reasons it is assumed that all economic benefits in housing construction, retail and the service sector are included in indirect impacts.

[3] These projections do not include the impacts on other American states or Canadian provinces, induced impacts or resulting government income.

Exhibit 7-1
Economic Impacts of Port Construction on Alaska

Direct and Indirect Impact		
	Skagway	**Haines**
Ports Construction Cost	**US$144 million**	**US$1.3 billion**
Employment Income	US$50.6 million	US$456.4 million
Total GDP	US$65.1 million	US$587.3 million
Employment (FTE Positions)	1,056	9,538

7.1.3 Railway Construction Impact

The total expenditure on construction of the rail link to Haines is estimated at approximately US$5.7 billion, of which 85% (US$4.845 billion) is expected to fall to the Yukon and 15% (US$855 million) to Alaska, leading to projected direct and indirect impacts on the Alaskan and Yukon economies as indicated in Exhibit 7-2.

Exhibit 7-2
Economic Impact of Haines Railway Construction on Alaska and the Yukon

Direct and Indirect Impacts		
	Alaska	**Yukon**
Railway Construction Cost	**US$855 million**	**US$4.845 billion**
Employment Income	US$300 million	US$1,701 million
Total GDP	US$386 million	US$2,188 million
Employment (FTE Positions)	6,271	30,909

7.1.4 Port Operations Impact

Ongoing operation of the Skagway port facility, including the truck dumper, the concentrate shed, the ship-loader, the coal dome, the conveyor and the coal barge loader, will require approximately 5-30 Full Time Equivalent ("FTE") employees, depending on the amount of concentrate and coal shipped. All permanent employment is expected to fall to the population of Alaska, in particular Skagway.

Ongoing operation of the Haines port facility will result in approximately 200 FTEs of employment in Haines. All employment is expected to fall within Alaska. This leads to the projected range of direct and indirect impacts on the Alaskan economy shown in Exhibit 7-3.

Exhibit 7-3
Economic Impacts of Port Operations on Alaska

Direct and Indirect Impact within Alaska			
	Skagway		Haines
Required Employment (FTE Positions)	**5**	**30**	**200**
Estimated Port Operation Output (derived)	US$0.3 million	US$1.8 million	US$10.0 million
Employment Income	US$0.1 million	US$0.6 million	US$3.8 million
Total GDP	US$0.2 million	US$1.0 million	US$5.8 million

7.1.5 Trucking Activity Impact

The total number of positions projected for the trucking industry ranges from 20 to 504 FTE depending on volumes shipped. All employment is expected to fall to the Yukon. This leads to a projected range of direct and indirect impacts on the Yukon economy shown in Exhibit 7-4.

Exhibit 7-4
Economic Impact of Trucking Activity

Direct and Indirect Impact within the Yukon		
Required Employment (FTE Positions)	**20**	**504**
Estimated Trucking Activity Output (derived)	CAD$62 million	CAD$1,562.4 million
Employment Income	CAD$38.1 million	CAD$960.2 million
Total GDP	CAD$14.2 million	CAD$357.0 million

7.2 Social/Community Impacts

The Study also identifies the social and community impacts resulting from the improvements to the local economy. Although the general effect of these impacts on lifestyle can be viewed differently by different individuals, the study identifies both positive and negative impacts. The following list presents a summary:

7.2.1 Positive Social / Community Impacts

- Improved access to the town and recreational sites
- Improved public services (such as utilities, health care, police, education)
- An increase in revenues from sales taxes
- Increased demand in housing, food, clothing, recreational and hospitality services
- Higher quality and greater variety.

7.2.2 Negative Social / Community Impacts

- Potential sudden and significant pressure on public services
- Noise pollution from traffic & construction
- Dust pollution from traffic & construction
- Air pollution (CO2 emissions)
- Safety risk to other traffic
- Local / State / National Parks may be reduced in size
- Workplace accidents.
- Damage to the communities' historical, cultural or indigenous values and image.

8 FINANCIAL ANALYSIS AND GOVERNANCE

8.1 Financial Analysis

8.1.1 Skagway

Financial Model

A financial model was developed to assess the potential commercial viability of each of the scenarios for port development in Skagway.

The key outputs of the model were as follows:

- Cash flow – on an annual basis
- Net income – on an annual basis
- Internal Rate of Return – over a 30 year period

The internal rate of return (IRR) has been used as a proxy for determining project viability. Typically, a project of this nature will require an IRR of at least 10 to 12 percent to be commercially viable. This can be equated to a weighted average cost of capital (WACC). Thus if any scenario achieves an IRR of say 12 percent, it would be able to afford the required amount of capital expenditure with a WACC of 12 percent.

This is an appropriate level of financial analysis for this study for a number of reasons:

- The estimates of capital costs are based on very conceptual development plans
- Some of the development concepts need to be reviewed by regulatory and other agencies for acceptability before more detailed cost estimates can be prepared.
- The timing of mine development is impossible to predict, hence the revenue stream is very uncertain
- Detailed operating costs need to be developed in conjunction with a more fulsome design on the terminal and assessment of its requirements for staffing, utilities, etc.

Model Assumptions and Inputs

The following describes each of the model inputs and the assumptions behind those inputs. All revenues and costs are expressed in terms of 2006 $ US.

Capital Costs

Exhibit 8-1 provides a summary of the amount and timing of capital expenditures for each scenario.

Exhibit 8-1
Capital Cost Assumptions

Scenario	Capital Cost	Timing
1A	$5,000,000 or $16,000,000	2006/07
2	$16,000,000 $6,000,000	2006/07 2009/10
3	$16,000,000 $6,000,000 $42,000,000 or $114,000,000	2006/07 2009/10 2010/2011
4	$16,000,000 $6,000,000 $8,000,000	2006/07 2009/10 2013/14
5	$16,000,000 $6,000,000 $42,000,000 or 114,000,000 $8,000,000	2006/07 2009/10 2010/11 2013/14

Traffic Volumes

Exhibit 8-2 provides a summary of the volume and timing of traffic development for both coal and concentrates for each scenario.

Exhibit 8-2
Traffic Assumptions

Scenario	Volume	Timing
1	**Concentrates** – 100,000 tonnes per year	2007/08
2	**Concentrates** – Increasing from 100,000 tonnes in first year of operations to 500,000 tonnes in fourth year of operations and thereafter	2007/08 to 2010/11
3	**Concentrates** – Increasing from 100,000 tonnes in first year of operations to 500,000 tonnes in fourth year of operations and thereafter **Coal** – 1,200,000 tonnes per year commencing in fifth year of operations	2007/08 to 2010/11 2011/12
4	**Concentrates** – Increasing from 100,000 tonnes in first year of operations to 1,000,000 tonnes in ninth year of operations and	2006/07 to 2015/16
5	**Concentrates** – Increasing from 100,000 tonnes in first year of operations to 1,000,000 tonnes in ninth year of operations and thereafter **Coal** – 1,200,000 tonnes per year commencing in fifth year of operations – all shipped by barge	2006/07 to 2015/16 2011/12

Operating Costs

Exhibit 8-3 provides a summary of the operating costs for the coal and concentrate facilities. Operating costs include general and administrative costs, utilities, operating and maintenance labour, purchased services, operating and maintenance supplies and other miscellaneous costs.

Exhibit 8-3
Operating Cost Assumptions

Traffic	Operating Cost Per Tonne	Basis
Concentrates	$6.00 per tonne for 100,000 tonnes per year to $4.00 per tonne for 1,000,000 tonnes per year (extrapolated on a straight line basis)	Based on a review of small bulk terminals in Anacortes and Los Angeles
Coal – Barge	$1.30 per tonne	Based on operating costs for Middle Point barge terminal (Quinsam Coal) plus allowance for conveyor and northern cost premium
Coal – Deep Sea Vessel	$3.50 per tonne	Based on the higher end of operating costs for Ridley Terminal and Westshore Terminal

Revenues

The proposed unit prices for use of the terminal are shown in Exhibit 8-4.

Exhibit 8-4
Revenue Assumptions

Traffic	Revenue Per Tonne	Basis
Concentrates	$10.00 per tonne	Based on knowledge of current market rates for similar facilities plus a premium due to the location vis-vis competing facilities
Coal	$6.00	Based on average rates for Ridley Terminal and Westshore Terminal plus 10 percent

Other

The other principal assumptions are as follows:

- Inflation – 2.0 percent per annum
- Depreciation – straight line over 30 years

Results of Analysis

The results of the analysis are presented in Exhibit 8-5.

Exhibit 8-5
Results of Financial Analysis

	Internal Rate of Return		
Scenario	Concentrate	Coal	Combined
1	Shed/Upgrade – 9.0% New Dock Req'd – (0.1%)	N/A	9.0% (0.1%)
2	11.7%	N/A	11.7%
3	11.7%	Barge – 15.0% Deepsea – (1.1%)	13.5% 2.4%
4	16.6%	N/A	16.6%
5	16.6%	Barge – 15.0% Deepsea – (1.1%)	15.9% 5.6%

As demonstrated in this exhibit, Scenarios 2 and 4 show potential to be commercially viable, with an internal rate of return of about 12 percent or higher. Scenario 1 shows a lower rate of return, particularly if a new dock and ship loader are required, but this becomes more viable as the tonnage increases. This investment is recouped if the tonnage goes up to the levels predicted in either Scenario 2 or 4.

Scenarios 3 and 5 are viable as barge loading terminals, though they are not viable as deepsea vessel terminals given the rates which are proposed.

The analyses of development Scenarios 3 and 5 is a little misleading in that in the barge option, only the cost of the terminal is considered. A true comparison would look at the barge cost to Haines and the transshipment costs at a new terminal in Haines. This is examined below.

Options to Improve Financial Viability

The financial viability of Scenario 1 could be improved through the use of a deferred interest loan, repayable once volumes reached a level significantly above 100,000 tonnes. The same infrastructure delivers an internal rate of return of nearly 12 percent at a throughput of 500,000 tonnes of concentrate, hence a threshold of say 400,000 tonnes would allow for repayment of the loan at that time.

Another option to improve the financial viability of all of the scenarios is to look for a contribution to fund a portion of the construction costs. Such an infrastructure investment provides benefits to a wide number of parties beyond those involved in the operation of the Ore Dock, hence it could be argued that the contribution would be provided on the basis of the benefits to these other parties. For example, movement of the cruise ship dock would improve security in the port, provide a more defined and attractive entrance to the commercial area of Skagway for cruise ship passengers and provide operational efficiencies to operators of both the Ore Dock and the cruise ship facilities.

8.1.2 Haines

A detailed financial model of Haines has not been developed due to the significant level of uncertainty in the capital costs, the question of the acceptability of constructing the railway and the potential for mineral development that would use the facility. Nonetheless, a high level financial analysis was conducted using the following assumptions:

- Throughput – 25 million tonnes per year (iron ore and coal)
- Throughput charge – $6.00 per tonne
- Operating costs – $3.50 per tonne
- Inflation – 2 percent per annum

- Capital Cost – $1.3 billion (3 year construction period)
- Depreciation – 30 years straight line

Using these assumptions, the internal rate of return is calculated to be about 4 percent. Given the uncertainty in many of the inputs, this is not bad. Once there is more certainty about the rail route, acceptability of the project to Haines Borough and the capital costs of construction, the financial analysis should be revised.

8.2 Governance

The Study provides a summary of options for port governance and concludes with an assessment of the option(s) that may be most suitable for consideration in the context of the Yukon Ports Access Strategy.

8.2.1 Skagway

While the Port of Skagway currently matches the local port model of the U.S., in the future it would be desirable to overlay features of the Regional Port Model in Canada. In the longer term, this is a development where the private sector may be quite interested in taking an ownership position. The City may be able to create a public private partnership for this development.

The following aspects should be considered for an appropriate model for Skagway.

- **AIDEA** – as the owner of the concentrate facility, this organization must be accounted for due to its interest and ownership of the facility. AIDEA is looking to divest itself of this facility in the short to medium term.
- **The City of Skagway** – the City could take a financial interest in the Ore Dock in order to gain greater control over its economic and community development. The City already owns most of the underlying lands.
- **The private sector** – attracting private sector interest could bring capital, operating expertise and technology that are required to effectively develop and operate the port.
- **First Nations** –the Yukon Indian Development Corporation (YIDC) has expressed an interest to invest in economic development opportunities that are both viable and provide direct benefit to local first nations.
- **Environment** – the status of the contamination of the seabed adjacent to the Ore Dock from historical operations is a significant potential liability that needs to be resolved.
- **Grants and funding –** financial viability of the development could be enhanced if grant funding were to be made available for infrastructure such as a new cruiseship dock.

8.2.2 Haines

In Haines, the situation is different. The Borough could negotiate with the Army Corps of Engineers to turn over the fuel depot once remediation of the site is complete. This would give the Borough a valuable asset for future port development and would ensure that the land can be kept available for this potential use. This land could be provided to a local port authority set-up as a subsidiary of the Borough to manage the port.

8.2.3 Yukon's Role in Port Governance

The Yukon has significant economic interests in the potential development of port facilities in both Skagway and Haines. Given these economic interests, it would be desirable for Yukon to have representation on the Board of either of the port authorities.

9 STEPS TO IMPLEMENTATION

The Study identifies a potential implementation plan, which focuses on Skagway, however, several activities of which are relevant for Haines as well. The implementation plan covers three phases of activity – immediate (1-2 years), medium term (2-4 years) and long term.

9.1.1 Immediate Term

The following actions are proposed for the immediate term**:**

1. Create an implementation organization
2. Review funding options
3. Develop communications strategy/program
4. Develop full project description
5. Engage regulatory agencies
6. Identify and undertake the appropriate environmental baseline studies
7. Clarify all issues related to land ownership/rights
8. Determine governance model

9.1.2 Medium Term

The following actions are proposed for the medium term**:**

1. Develop detailed engineering plans
2. Apply for environmental permits and approvals
3. Conduct community consultation process
4. Initiate land acquisition arrangements
5. Complete and submit funding applications for relevant pieces of infrastructure
6. Engage first nations on economic development opportunities and northern port potential
7. Survey private sector interest in the project
8. Create local port authority

9.1.3 Long Term

The following actions should be considered for the long term**:**

1. Major construction needed to deal with future increases in volumes beyond that initially contemplated.
2. While the principles for the land swap need to be agreed upon earlier, the actual land swap can occur later.
3. A detailed feasibility study on Haines rail route and bulk terminal should be considered when there is information suggesting that development of the coal fields and iron ore deposits in northeastern Yukon are being considered more seriously.

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