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Halifax Regional Council
August 8, 2006

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY: Wayne Anstey

Wayne Anstey, Acting Chief Administrative Officer

DATE: July 28, 2006

SUBJECT: **Bedford/Halifax Fast Ferry Cultivation Study**

ORIGIN

At the April 5, 2005 Halifax Regional Council meeting, Council awarded a contract to TDV Global Inc. for the Bedford/Halifax Fast Ferry Cultivation Study. The purpose of the study is to assess the opportunity for high speed ferry service between Bedford and downtown Halifax.

RECOMMENDATION

It is recommended that Halifax Regional Council:

1. Approve the Bedford /Halifax Fast Ferry project in principle subject to funding, and

2. Authorize staff to begin detailed work on the various aspects of the project including land development, facility design, regulatory issues, vessel design and construction and funding opportunities.

BACKGROUND

HRM's Regional Plan relies heavily on the use of expanded and improved public transportation and includes new services like Bus Rapid Transit (MetroLink) and high speed ferry (HarbourLink). The recent success of the (MetroLink) project has shown that there is a demand for fast, efficient, limited stop public transit. With recent advances in high speed water craft technology, ferries can travel between locations in the harbour with travel times short enough to attract mass commuter traffic.

In July 2004, Halifax Regional Council authorized the exploration of a fast ferry connection between Mill Cove in Bedford and the existing downtown Halifax Ferry terminal. In October 2005, a fast ferry from Massachusetts demonstrated the potential for high speed travel in Halifax Harbour.

DISCUSSION

The Bedford/Halifax Fast Ferry Cultivation Study included a market study, assessment of vehicle trip reduction, passenger connectivity, economic analysis, wake-wash measurement and stakeholder consultations. A copy of the executive summary is attached.

Prior to this study, staff did preliminary market research to determine the popularity of the proposed Bedford/Halifax fast ferry with potential commuters. The more detailed market analysis undertaken during TDV Global's study shows the Bedford/Halifax fast ferry to be more popular with potential commuters than originally thought. As a result, the recommended ferry size and corresponding costs/revenues have increased.

Key Findings:

1. There is strong support for high speed ferry service between Bedford and downtown Halifax,. This support was expressed by Bedford residents, surrounding communities and developers.
2. Parking and schedule reliability are important to potential high speed ferry users.
3. Potential commuters want good connections between ferries and busses. In addition, they want customer amenities at the ferry terminal.
4. Commuters are prepared to pay a premium fare for a fast, reliable ferry service.
5. Wake wash and safety can be addressed through vessel hull design and establishment of an operating track on the harbour for the high speed ferries.

Recommendations:

1. Implement two 350 passenger, 35 knot vessels at an estimated cost of $8 million each.
2. The total project cost is $30 million. This includes parking, supporting transit service, terminal/site preparation and start-up expenses.
3. Advanced equipment and material should be used in the vessel construction.
4. Charge a $5 one way fare, with discounted monthly passes. Provide free terminal parking and downtown shuttle bus service.

5. Work with the Waterfront Development Corporation to accelerate Phase ll of the Bedford waterfront.
6. Develop a crew training and development program using the DND Harbour Trainer.

BUDGET IMPLICATIONS

There are no budget implications at this time.

FINANCIAL MANAGEMENT POLICIES / BUSINESS PLAN

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Capital and Reserve budgets, policies and procedures regarding withdrawals from the utilization of Capital and Operating reserves, as well as any relevant legislation.

ALTERNATIVES

Regional Council may choose to delay or not proceed with the project. This is not recommended as HRM should position itself for potential federal funding of transportation infrastructure projects by developing a sound feasibility and implementation strategy for any recommended transportation projects.

ATTACHMENTS

Executive summary of the Bedford/Halifax Fast Ferry Cultivation Study.

A copy of this report can be obtained online at http://www.halifax.ca/council/agendasc/cagenda.html then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

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EXECUTIVE SUMMARY

The Halifax Regional Municipality (HRM) has invested significantly in the last thirty years in revitalizing the downtown core – bringing energy to the city that is comparable to other successful cities in North America. There is fine dining, culture, recreation and accommodations that are considered world class. Attracting people to the downtown core increases their demand for a space that is constrained by the geography of the peninsula. Today there is growing demand for access to the city core in its continued role as the major business centre of Atlantic Canada. Along with this success, residents of the Halifax Regional Municipality transit to the city centre in growing numbers, stressing the road systems that feed it. The same geographic features that stimulated rapid growth (e.g. proximity, and ease of access, to water and a protected deep water port) are now challenging the limits of that growth. One in particular is the traffic routing into the city through a roadway system that constricts traffic flow. The HRM uses a number of transit options in moving people into the city, relying on ferries, rapid transit buses and "park and ride" options to mitigate against increasing numbers of vehicles, and the inherent traffic woes that result.

Worsening traffic is a clear indication of economic success of a city. In the case of the HRM this traffic is concentrated through the core of the city, adding to mounting pollution, noise and traffic congestion. Increasing traffic accelerates road deterioration and road repair expenditures. Some might say that the associated increase in cost might well be worth the economic benefit of vehicles navigating through a congested city core, but when this traffic decreases the quality of life, or introduces increased occurrences of serious accident, then it is important to look at other transportation options.

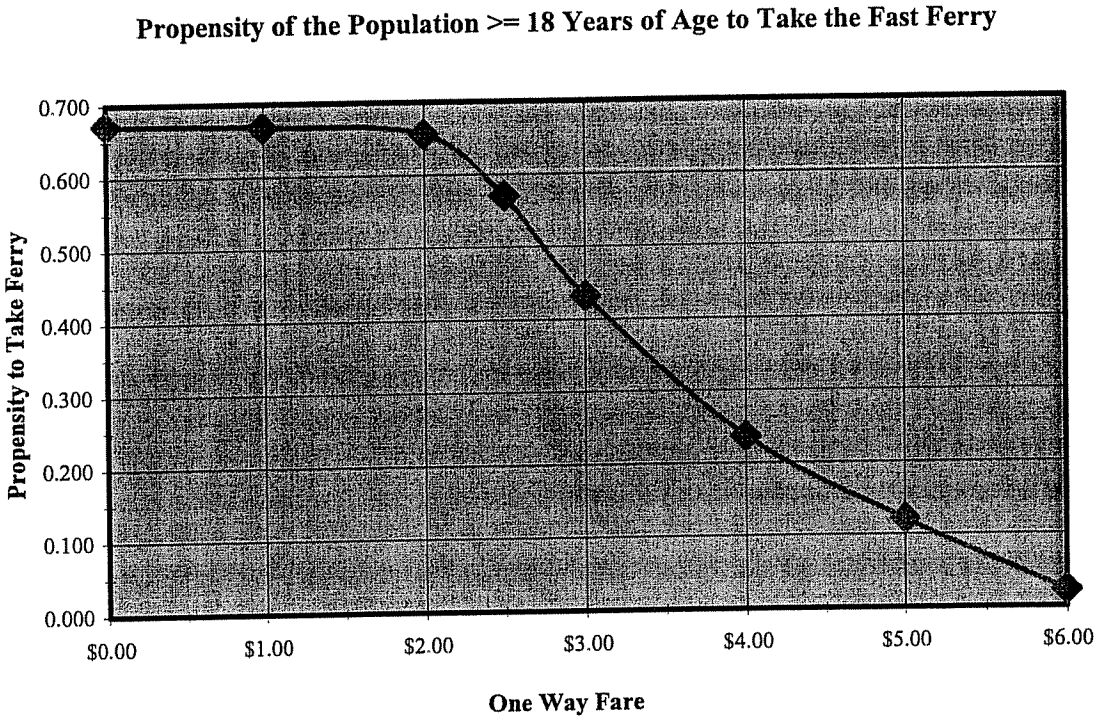
As one option in providing transportation choice the commuting public of the region, the HRM began investigating the introduction of a Fast Ferry service to take advantage of the Bedford Basin and other accessible waterways as transit options. Initial high level research in 2004 led to a commitment by the municipality to look at the feasibility in more depth. This study represents the next phase in collecting information, the purpose of which is to clarify risks and opportunities related to Fast Ferry implementation. The results of this study will assist in the decision taking of the Regional Council to move the project forward. All elements of the project were guided by the business objectives highlighted in the Regional Strategic Plan.

The business case was developed around the following methods: market analysis, operational analysis, and scenario development and benefit cost. In addition work was conducted in the areas of wake wash analysis, terminal development and environmental considerations. The following represent the key points of the report:

Market Study:

The market study was undertaken in the June/July period and provided the necessary information for all elements of the work undertaken. The survey development was supported with three community focus groups, which led into a comprehensive telephone survey of 774 individuals from the core market (Bedford) and tertiary market (surrounding areas). This represented a confidence level o $\pm$ 3.5% 19 times out of 20. This confidence level is strong and therefore we can draw the conclusion that the sample population results are representative of the population as a whole.

The market analysis resulted in a number of demand curves that represented the propensity for a commuter (over 18 years of age) to choose the Fast Ferry to commute. The following graph represents one of six demand curves developed:



Findings from the data collected included travel patterns, costs incurred for current travel method, reason for commuting, fare tolerance, as well as other features that would be considered essential and desirable as part of the service.

Case Studies:

Case studies were developed for operations in New York, Boston and San Francisco, in all cases these were private operations and not part of the public transportation system. The following are considered the most relevant points:

- There is an increasing demand for Ferry transit – much of it looking for Fast Ferries that address the time to commute and parking for commuters;
- The commuter is prepared to pay a premium if these issues are addressed;
- Most important success criteria hang on parking, connectivity and schedule reliability;
- Market considers this mode of transportation very secure; and

- A lot of success surrounding collaborative bundling of FF with special events such as sports and the arts.

Operational Model:

The operational modeling was initiated in the month of August with the model itself being completed end of March 2006. The model looks at the following elements as variables: commuter and tourist markets; vessel characteristics; crewing; operating costs (fuel, maintenance, staff, marketing, insurance, tickets production and distribution, etc.,) and schedule. This information is being used as input variables to analyze a number of scenarios to determine the best fit for the present and future markets.

The model enabled the team to:

- Develop a list of technical characteristics for vessel selection and the development of a solid RFP;
- Design an operational schedule to meet the needs of the market;
- Provide recommendations of a fare schedule that will meet the revenue expectations of the transit system; and
- Develop a budget for capital and operations over a 10 year period.

The model was tested with two vessels that were thought to be appropriate for the market – 206 passengers with an operating speed of 28 knots and an expected route time of 60 minutes end-to-end return; and 350 passengers with an operating speed of 35 knots and an expected route time of 40 minutes end to end return. These vessels on the market have a cost for acquisition of approximately $5.5 million and $8.0 million respectively.

Wake Wash Analysis:

The analysis was undertaken at the end of October. The report was received at the end of November by US experts brought in specifically to run this specialized trial. The report highlighted the following:

- Fast Ferries under way at slow speed have poor wake wash characteristics;
- Public awareness regarding the realities of wake and safety of high speed operations is weak;
- Fast Ferries are very maneuverable, as demonstrated by the Whaling City Express. Vessels can stop within 1.5 boat lengths; and
- The trials vessel (Whaling City Express) is not a good example of a low wake design. Poor wake performance caused a number of harbour stakeholders to complain through the trial and request slower speeds on passing.

Wake wash is defined by both wave height and wave energy. Both of these characteristics can be minimized through advanced design techniques, and are available in current low wake fast ferry designs.

Safety:

The project team met with Port stakeholders on a number of occasions to discuss operations. Together with Harbour Pilots, DND and the Port Authority a set of operating guidelines were ironed out, in particular the need to establish a Fast Ferry operating track and a clear understanding of right-of-way. The DND trainer was used to understand the challenges of the Fast Ferry meeting a Post Panamax container ship in the narrows. It was concluded that there was ample room to maneouver safely. This dialogue was continued further toward using the "DND Trainer" as a training platform for Ferry Captains.

Terminal Development:

The downtown terminal was looked at for ease of integrating the Fast Ferry operation into the existing terminal. It was agreed through analysis that the best placement for ferry loading and off-loading would be on the court house side of the terminal enabling ease of access to exiting flow of passengers and minimal disruption to the existing infrastructure using a simple and inexpensive covered walkway.

Keeping it simple is the best approach, and most ferrry operations have gone to a front end loading ferry. This is the simplest way to maneuver the ferry into position (no back and forth) the Captain simply drives into the loading slot. Using this approach reduces the cost of jetty configuration, requiring only a simple ramp system to be lowered to the front of the vessel. It also alleviates issues created by bad weather that could hamper maintaining schedule because of difficulty coming alongside.

All potential jetties will meet the needs of supporting front end loading vessels with minor enhancements (included were Downtown Halifax, Bedford Basin and China Town).

Mill Cove Terminal:

Terminal placement work was centred around the land and the current jetty. Discussions took place with the Halifax Waterfront Development Corporation and the Development community to better understand the current plan for Bedford Phase II development, HRM could use the Fast Ferry Project to increase the value of the land and leverage the implementation of the ferry and the terminal. The analysis used the development of a new tax base and the acceleration of development as the key variables. The following represent some of the issues:

- Time to create the property – landfill availability and more importantly land zoning which could take upwards of two years;
- Development restrictions around density and height of buildings – although this land would not necessarily be subjected to the density restrictions currently enforced in Bedford; and

- Access to property off the Bedford Highway.

The current ten year development plan is too long. With $9 million investment this process could be accelerated to complete the fill operation to coincide with the ferry and terminal implementation.

Sobeys are interested in developing Moir's Pond and have raised some potential to undertake a joint project in this area. This is a new opportunity that may have an impact on the overall Terminal development decisions, specifically as it relates to parking.

The Scenarios Analyzed:

Each of the six baseline scenarios (described below) was analyzed for two different vessels and at three different fare price points. As well, they were also assessed for the procurement of two and three vessels. In total 72 scenarios were evaluated.

Vessel 1 – 206 Passenger NQEA:

- 28 knots
- 2,200 hp
- two high speed marine diesel engines
- .38 tons/hour fuel consumption at full speed
- 90% MCR
- low wake design
- propeller

Vessel 2 – 350 Passenger BMT Nigel Gee:

- 35 knots
- 4,200 hp
- four high speed marine diesel engines
- .63 tons/hour fuel consumption at full speed
- 90% MCR
- low wake design
- water jets

Three fare price points were evaluated based on the demand information drawn from the market analysis. Along the demand curves we looked at $4, $5 and $6 fares. Given these parameters, when applied to the scenario descriptions below for two different vessel types, there were a total of 72 scenarios.

Baseline Fast Ferry scenarios are described as follows:

Scenario 1 - No parking at the Mill Cove Terminal and no downtown shuttle service.

Scenario 2 – Free parking at Hammonds Plains/Highway 102 and no downtown shuttle service. This scenario is based on 500 car free parking facility with a shuttle service from the parking to the terminal every 7 minutes during peak operations.

Scenario 3 - Pay parking at the Mill Cove Terminal and no downtown shuttle service. Same scenario as Scenario 2 with a parking fee.

Scenario 4 – No parking at the Mill Cove Terminal with a downtown shuttle service from the terminal to the Universities and the Hospitals.

Scenario 5 - Pay parking at the Mill Cove Terminal with a downtown shuttle service from the terminal to the Universities and the Hospitals.Same scenario as Scenario 4 with a parking fee.

Scenario 6 – Free parking at the Mill Cove Terminal with a downtown shuttle service from the terminal to the Universities and the Hospitals.

Results

The following table represents the results of the analysis:

Scenario Descriptions:

P+S = Parking with Downtown Shuttle
PNS = Parking No Shuttle
FP+S = Fee Parking with Downtown Shuttle
FPNS = Fee Parking No Shuttle
NP+S = No Parking with Downtown Shuttle
NPNS = No Parking No Shuttle

These figures represent $Millions. Red denotes an increasing debt. All other figures demonstrate some contribution to achieving return on investment.

206 PAX by Scenario Comparison (2 Ferries)

Fare	P+S	PNS	FP+S	FPNS	NP+S	NPNS
$4	-14.7	-18.1	-19.3	-22.1	-20.3	-16.7
$5	-11.5	-15.6	-17.6	-18.2	-16.4	-14
$6	-30.8	-39.5	-35.5	-45.1	-44.6	-44.3

206 PAX by Scenario Comparison (3 Ferries)

P+S	PNS	FP+S	FPNS	NP+S	NPNS
-18.8	-23.7	-24.3	-28.4	-26.5	-23.4
-25.6	-29.6	-21.6	-22.6	-20.8	-26.6
-38	-54.4	-50.4	-60	-59.5	-59.2

350 PAX by Scenario (2 Ferries)

Fare	P+S	PNS	FP+S	FPNS	NP+S	NPNS
$4	-0.5	-2.8	-11.1	-2.6	-1.2	0.7
$5	6.9	-0.7	-1	-5.6	-4.4	-32.9
$6	-45.6	-61.9	-57.9	-67.5	-65.9	-65.6

350 PAX by Scenario (3 Ferries)

P+S	PNS	FP+S	FPNS	NP+S	NPNS
2.4	-2.1	-8.1	-2.7	0.9	-22.3
14.7	-0.3	6.8	-28.5	-28.8	-59.8
-72.4	-88.7	-84.7	-94.3	-92.8	-92.4

Notes:

1. All scenarios with parking also include costs for shuttle to and from parking, fee revenue for fee parking not included
2. All table values include capital for additional buses, Mill Cove Terminal, and Fast Ferries
3. All scenarios include start-up costs which include training, legal, marketing, purchase of operations management SW and Project Management
4. 350 PAX vessels are 4 engine and do not reflect savings in off-peak operations when 2 engine ops would be possible

Key Conclusions

Viability: This project is viable. The market analysis showed a strong desire to use alternative transportation modes for commuting into the downtown core other than single occupancy vehicles. This market information should be considered conservative in that fuel prices have increased from $0.86/l at the start of the project to $1.16/l. Growth in this area is strong at 3% per year or greater, and if the Bedford Phase II development project goes forward there is the potential of creating additional prime demand from ~1,500 new commuters.

Operations: Because the demand is so high at peak commute times the optimal solution is a large fast vessel, in lieu of many smaller slower vessels. Operations would be characterized by having a ferry arrive and depart every 20 minutes, with a 15 minute transit time. Off-peak operations would be reduced to a single ferry every hour using less power (and therefore less fuel).

The Vessel: The vessel should be able to achieve the following performance standards:

Design Parameter	Requirement
Cost:	$8 M or less
# Passengers:	350 plus
Speed:	35 knots + fully loaded
Fuel Consumption:	.6 - .7 Tons/hour at full speed
Range at Full Pwr:	300 nautical miles*
Wake Wash:	Low Wake Design
	Wash Ht: 25 cm or less
	Energy: 2,000 joules/meter
Fuel Tanks	Prohibits biodiesel cloud formation
Engine Design	Meets EPA Standards for emissions

Fare Structure: The fare structure should be based on a $5 one way cash fare. Monthly subscribers should be given a discount based on 20 commutes of 80% of the cash fare, or $160/month. Child and Senior discounts should be consistent with the current rates throughout the system. For those holding other passes, or tickets from other systems, individuals should pay an additional amount to be determined. It is also suggested that there would be potential to drive in additional revenue if a Premium Class of Ticket option were available. Other fare strategies should be looked into as the operation commences in

an effort to flatten out the high peak demand at 8:00 a.m. Some revenue should be collected to this operation from the UPass system, but it was not determined what this amount should be.

Key Issues:

The Rising Cost of Fuel

The cost of this service was a prime consideration as observed from the demand curves which show a steady and rapid decline in propensity to take the Fast Ferry for fares greater than $2.00.

The rising price of fuel and its availability will eventually constrain the operations of the vessel and the profitability of the service. This being said when the Ferry service is feeling the impact of these increases so will the commuter who chooses to drive. Therefore, should the price of fuel reach a value that challenges profitability there should be adequate support to increase fares to compensate.

The fuel prices would have to reach $1,000/ton to push the preferred option into the red. This represents in excess of 25% rise from the value used in the model.

- **Risk Mitigation: Raise fare prices as the cost of fuel increases. Communicate, through targeted marketing, the need and justification to increase the costs.**

Zoning and Time to Develop Bedford Phase II

The zoning is a fairly complicated process that could take upwards of two years iterating between the plan and the policy. This could result in some disruption to the terminal construction, or just as importantly, the development of residences that will house new commuters.

- **Risk Mitigation: Establish the development plan as part of the process. With the terminal linked to the development plan there is in fact a chance that the development approval cycle (which is very slow) and the completion of the Phase II may be done more quickly.**

Performance of the Vessel

The ferry schedule will be an important parameter in attracting and keeping passengers. The schedule must be responsive to the traveling needs of the public, the frequency must be such that it provides for flexibility in travel times and it must be consistently on-time. If the vessel cannot perform to specification then these parameters cannot be met and the Ferry system will lose clientele. Passengers will be sympathetic to inclement weather, but will not be if there are no obvious reasons.

The risk that the delivered vessel does not meet the operational requirement specified in the contract for build could result in vessel schedule frequency not being attained. This frequency is critical to moving large numbers of during peak operating times.

- **Risk Mitigation: Set performance requirements and contract penalties associated with vessel speed and fuel consumption.**

Other Benefits

The following are considered additional considerations in assessing this case, but have not been quantified:

- Job Creation – the Fast Ferry will add jobs to the Nova Scotia economy. Jobs could be categorized as direct long term – for example:
    - the vessel crewing,
    - training and ferry maintenance,
    - direct short term if Nova Scotia ship builders were to build the ferries; and
    - indirect long term services that support the ferry operation.
- Reduction in Number of Cars on the Road – the majority of commuters traveling from this area are single passengers in their vehicles. Reducing the number of vehicles will result in reduced road deterioration and green house gas emissions;
- Tourism – adding to a tourist's impression of interesting things to do in Halifax. Providing improved access for tourists to areas outside of the central urban core; and
- Cost Avoidance – using the Ferry to offset the need to undertake major road changes in the immediate future.

Recommendations

Implement the 2 – 350 35 knot Passenger Vessel Option

This is the preferred solution that will realize improved transportation for commuters in the Bedford and surrounding area.

Recommend a contract arrangement for Design and Build that encourages the designer and builder to work together in delivering a vessel that meets the performance specifications such as speed, fuel consumption and engine emission levels.

The contracting period should take no longer than 6 months, with an anticipated first vessel:

- in 12 months if it is in aluminium; and
- in 18 months if it is in advanced composite material.

The RFP should also encourage bidders to consider Nova Scotia shipbuilding in the construction of these ferries.

Adopt the Preferred Technical Characteristics as the Basis of the RFP

Use the technical characterstics that emerged from the study to go to RFP as follows:

Design Parameter	Requirement
Cost	$8 M or less
# Passengers:	350 plus
Speed:	35 knots + fully loaded
Fuel Consumption:	.6 - .7 Tons/hour at full speed
Range at Full Pwr:	300 nautical miles*
Wake Wash:	Low Wake Design
	Wash Ht: 25 cm or less
	Energy: 2,000 joules/meter
Fuel Tanks	Prohibits biodiesel cloud formation
Engine Design	Meets EPA Standards for emissions

*Note: This will allow for three days of operations at full power without fueling.

Recommend Charge $5 Cash Fare and Include Free Parking and Downtown Shuttle Services

Recommend charge a $5 cash fare and $160 monthly fare for the Fast Ferry. Other fare reductions would follow suit for Children and Seniors. Those holding fare payments for other transportation options would have to pay an additional amount to compensate for the Fast Ferry service. This amount has not been determined.

Serious considerations should be given to an Executive Service from Bedford. This should be preceeded with a solid market analysis to determine if this would be something of interest.

Parking was a key consideration of commuters in making the decision to use the Ferry service. Establishing a transportation hub which includes parking has the additional potential to integrate this with retail providing additional revenue for the HRM. Free parking could become Fee Parking in time should there be a reason to collect fees – such as increased demand for parking. The Downtown shuttle service would be to Saint Mary's, Dalhousie and the Universities. The route directions should be contrary to traffic patterns.

All services should be ready with the delivery of the first vessel. This could be a challenge for the terminal, which will sit on land that is not currently zoned.

Do What is Necessary to Accelerate the Bedford Phase II Development Project

This land development and population increase is not necessary for this Ferry to succeed, however the development of the land will help to secure the ridership from the study catchment area. Critical to this is the construction of an overpass which would give the terminal a second access a south and north access route.

By accelerating the landfill project the Development Community will be much more interested in what is happening with the Fast Ferry. This community is somewhat cynical in the development process today which is upwards of 10 years. Any improvements in this area might attract investment dollars for infrastructure.

As the principal agent in negotiating the acceleration of this project the HRM will have influence on the land development, thereby ensuring a good fit with the overall strategic plan.

Encourage the Use of Advanced Equipment and Material in Ferry Construction

By using materials/equipment that have the potential to save fuel or reduce pollution, the HRM may have access to investment dollars to offset the cost of the project from other levels of government.

Develop a Training Program Using the DND Harbour Trainer

A detailed harbour trainer model can be done quite quickly with minimal expense. Ferry design characteristics will need to be known prior to this work being completed.

It is recommended that the HRM establish a long term training relationship that will use the trainer for induction training, certification training and re-certification training.