Township of Frontenac Islands

Howe Island Transportation Study

Prepared by:
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Project Number:
60280418

Date:
September, 2013
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September 30, 2013

Carol Dwyre  
Deputy Clerk/ Treasurer and Planning Co-ordinator  
Township of Frontenac Islands  
Box 130, Road 96  
Wolfe Island, ON

Dear Ms. Dwyre:

Project No: 60280418  
Regarding: Howe Island Transportation Study

Please find enclosed the final version of the Howe Island Transportation Study. It includes a review of existing conditions, an assessment of future conditions, and development and analysis of alternatives to address identified problems. The final report is submitted as three (3) bound copies and one (1) unbound copy. We also include a CD with the report in pdf format.

If you have any enquiries or wish to discuss further, please contact this office.

Sincerely,

AECOM Canada Ltd.

Vanessa Skelton, P. Eng.  
Senior Transportation Engineer
Distribution List

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Revision Log

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AECOM Signatures

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Senior Transportation Engineer
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1. **Introduction**

The Township of Frontenac Islands is a community near the City of Kingston. The intent of this study was to evaluate the existing transportation load to Howe Island and to determine the ability in the long-term for the ferry service to meet the travel demand. As residential growth occurs on the island, the existing ferry service will, at some point, cease to be able to adequately serve the population. As part of this study, we investigated various methods of improving ferry operations, managing travel demand and controlling growth. We developed recommendations to balance the population growth with travel demand.

2. **Existing Conditions**

Data was collected from both the Township Ferry and the County Ferry. Based on information from previous reports, we knew that the winter period was the lowest for ferry usage, summer was the highest and that spring and fall were similar. Sample days were considered from each period to confirm these expectations. Using the data provided by the Township and County, it was determined that the peak hourly demand from the island was morning in the fall. The peak hourly demand from the mainland was evening in the summer. The data from these two time periods was examined in more detail.

**Township Ferry**

We reviewed data for ferry trips on weekdays from the island for the month of September 2012. We considered the peak period to be between 7:00 and 8:30 AM. When considering the number of vehicles wanting to cross during this time period, there was an average demand of between 2 and 3 vehicles per trip. The demand per trip is measured as the vehicles on the ferry as well as the vehicles waiting for the ferry. The trend for the month was an average of 2 vehicles per trip. There were between 9 and 13 ferry trips during this time period on each of the weekdays. Within the peak period there was no specific trend with respect to a higher demand at any given time.

![Township Ferry Fall - AM from Island](image)

**Figure 1 - Township Ferry AM Peak Demand**
The summer demand to the island was determined through a review of data from August 2012. We considered the peak period to be between 4:30 and 6:00 PM. Throughout the month, there was an average demand of 3 vehicles per trip and there were between 9 and 13 trips during the peak period of 1.5 hours. No definite trend was observed regarding a peak demand time within the peak period.

For the County Ferry, we reviewed data from the same months and time periods. Travel from the island was evaluated in the morning during the fall. In September 2012, during the time period between 7:00 and 8:30 AM, the vehicular demand for the ferry was an average of 13 vehicles per trip and there were between 5 and 6 trips in the morning peak period. Throughout the month the average demand for the ferry in the morning varied between 11 and 15 vehicles per trip. During this time period 20% of the trips had a demand greater than the capacity of the ferry. Demand was greatest between 7:00 and 7:30 with all of the trips that exceeded capacity occurring during this time. Between 7:00 and 7:30, 51% of the ferry trips left vehicles behind.
Data was reviewed for the month of August 2012 to capture the peak travel time to the island in the PM peak period. Between the hours of 4:30 and 6:00 PM, over the entire month there were an average of 13 vehicles wanting to board each ferry trip, although the average number of vehicles ranged between 9 and 16 each day throughout the month. There were between 5 and 6 trips over the 1.5 hours of the afternoon peak period. No definite trend was observed regarding a peak demand time within the peak period. When considering all of the ferry trips made in the PM peak period, 15% of the trips had a demand greater than the capacity of the ferry.

![County Ferry Summer - PM from Mainland](image)

**Figure 4 - County Ferry PM Peak Demand**

### 3. Future Demand

We used the growth data for Howe Island as provided in the study, “Population, Housing, and Employment Projections for the Frontenacs”, April 20, 2011, Table F-3a, page F-4. This table indicated the population and the number of households every five years starting in 2006. We considered the current situation to match the population and household count listed as 2011. Using the average demand for ferry service as counted in August and September, a rate for the number of trips per household was determined.

We looked at two scenarios for each future year (2016, 2021, 2026, 2031, 2036):
- a scenario where new trips arrived at an average rate throughout the peak period and
- a scenario where new trips arrived during one 15 minute interval.

The first scenario would be the optimal scenario since trips would be spread out over time but the second scenario is more likely since people typically leave for work at approximately the same time of day.

In order to evaluate the demand for ferry service, we considered a capacity problem to occur when vehicles are left behind twice. In other words, the vehicles are not served by the first or second ferry that arrives at the dock but they have to wait for a third ferry.
Township Ferry
The peak period of 7:00-8:30 AM was again used as the peak travel time from the island. It is expected that there will be an increase of 9 trips on the Township Ferry during the AM peak periods between 2013 and 2036. In the first scenario of an average trip arrival rate, the existing ferry service is able to handle the additional vehicles. This considers that there is a constant arrival rate for existing trips as well for new trips due to increased number of households. In the scenario where new trips arrive within a 15 minute period, capacity problems begin in 2021. In 2021 and 2026, 7 vehicles have to wait for a third ferry while in 2031 and 2036 there are 18 and 24 vehicles respectively waiting for a third ferry. The queue would take approximately 30 minutes to clear starting in 2021 and approximately 55 minutes to clear by the year 2036.

During the PM peak period between 4:30 and 6:00 PM, it is expected that there will be an increase of 12 trips on the Township Ferry during the PM peak periods between 2013 and 2036. In the first scenario of an average trip arrival rate, capacity problems begin to appear in 2021. At this time horizon, the queue continues to grow from 5:00 PM and it would take approximately 65 minutes for the backlog to clear. A total of 8 vehicles would have to wait for the third ferry trip to cross the channel. The conditions are similar in 2026 but the number of vehicles waiting for a third ferry increases to 15. By the year 2036, the capacity problems occur between 4:30 and 6:30 PM with 59 vehicles having to wait for two ferries before being able to cross the channel.

If the new trip arrival is concentrated within a 15 minute period, capacity problems begin in 2021 with 20 vehicles having to wait for a third ferry and a queue clearing time of 65 minutes. Between 2026 and 2036 the number of vehicles waiting for a third ferry increases from 21 to 74 and the time to disperse the queue increases from 65 minutes to 95 minutes.

County Ferry
The County Ferry is better able handle an increase in trips to and from the island. It is expected that there will be an increase of 23 trips in the AM peak period (7:00-8:30) between 2013 and 2036. Based on an average trip arrival rate and assuming that the existing demand is spread evenly throughout the peak period, there will be vehicles that have to wait for the next ferry but no vehicles that will have to wait for two ferries. With all new trips arriving during a single 15 minute interval, at the time horizon of 2026 there will be 1 vehicle that has to wait for two ferries and by 2036, it is expected that 13 vehicles will have to wait for two ferries. This is almost the capacity of one ferry trip.
The scenario for the PM peak period (4:30-6:00) is similar to the AM peak period with the same increase in the number of trips and the similar capacity results. Based on an average trip arrival rate and assuming that the existing demand is spread evenly throughout the peak period, there will be vehicles that have to wait for the next ferry but no vehicles that will have to wait for two ferries. With all new trips arriving during a single 15 minute interval, at the time horizon of 2031 there will be 4 vehicles that have to wait for two ferries and by 2036, it is expected that 11 vehicles will have to wait for two ferries. Because the ferry trips are longer for the County Ferry, this backlog is expected to take about an hour and 15 minutes to clear.

![Figure 6 - County Ferry Future Peak Demand](image)

### 4. Policy Development

The expected future demand for ferry service at both the Township Ferry and County Ferry exceeds the existing capacity provided by the current service model. Improvements can be expected through the provision of additional capacity or through the management of the demand.

#### 4.1 Increasing Capacity

Additional hourly capacity can be provided through the increase in ferry size or through increasing the number of ferry trips per hour.

**Increase in Ferry Size**

Several sizes of ferry were used to assess the ability to provide sufficient capacity to meet the expected future demand. We considered a capacity problem to occur when vehicles are left behind twice. In other words, the vehicles are not served by the first or second ferry that arrives at the dock but they have to wait for a third ferry. It was determined that a 5 car ferry for the Township Ferry and an 18 car ferry for the County Ferry would be sufficient to reduce the number of vehicles waiting for a third ferry trip to one vehicle in 2036 on the Township Ferry in the PM peak and 2 vehicles in 2036 on the County Ferry in the AM peak.

The increase in ferry capacity would eliminate the 55 minutes projected queue dispersal time in the AM peak in 2036 for the Township Ferry and reduce the 95 minute projected queue dispersal time in 2036 in the PM peak to 10
minutes. For the County Ferry, the 2036 queue will be eliminated in the AM peak and the expected queue dispersal time in the PM peak of 75 minutes will diminish to about 20 minutes.

**Reduce Ferry Trip Time**
Another method to increase hourly capacity for the ferry is to reduce the ferry trip time. If the ferry trip time is reduced, more ferry trips could occur in an hour. This could be accomplished through several methods. This would include operations such as the duration of raising and lowering the transfer bridge, or the amount of time to dock the ferry on either side of the Bateau Channel. The mechanical operations of the ferry or docking system were not examined as part of this study.

There is the possibility of improving the embarkation and disembarking methods to also reduce the ferry trip time. Adjustments could be made at the landing area around the County Ferry to reduce delay at the docking location on both sides of the channel. This would involve making adjustments to the current lane arrangements and adding one lane to increase the efficiency of vehicles disembarking from the ferry. With an additional exit lane, two lines of vehicles could disembark simultaneously. The new lane would merge into the existing lane at approximately 85m downstream of the ferry. The width of the docking area may not be make this option feasible.

### 4.2 Demand Management

In order to spread the peak demand for the ferry service, several potential methods were reviewed. These demand management methods include:

- Providing a published ferry schedule
- Encouraging carpooling
- Implementing development policy
- Booking passage times
- Priority boarding passes (HI-Pass)
- Discount pricing

A transportation committee comprised of Howe Island residents could assist with the development of these options.

**Published Ferry Schedule**

By providing commuters with a published ferry schedule with departure and arrival times set in place, it would make it possible for commuters to plan their travel schedule ahead of time. Due to the fact that most ferry passengers use the ferry every day, they will know how long the commute time from their home to the ferry and from their work to the ferry. It would be possible, therefore, to determine the appropriate scheduled time to arrive. There would be an initial adjustment period for commuters to adapt to the scheduled ferry times, but once the adjustment is made, the peak volume times should spread out, resulting in shorter queue times for the ferry.

It is important to note that the demand management alternative of a set schedule applies only to the County Ferry. The shorter travel time for the Township Ferry would make a published schedule unsupportable.

**Encourage Carpooling**

The overall volume of traffic utilizing the ferries will be reduced if carpooling to and from work is instituted. Fewer vehicles on the ferry will result in shorter queues at both ferries. There currently exists parking areas on the island that can be used by ferry users. Commuters could park their vehicles for the day and then share a vehicle to cross the channel and continue to their destination. Another carpooling option is to utilize space on the mainland to park vehicles and commuters who live near the ferry can take the ferry as pedestrians and pick up their vehicles on the opposite side. The reduction in the volume of vehicles using the ferries will decrease the delay.
The Township could encourage carpooling by promoting it on their website and by facilitating ride matching. The City of Ottawa has a ride match program that in a scaled down version could assist the residents of Howe Island to find a carpool. As an incentive for carpooling, the cost for the annual ferry pass could be reduced for carpooling customers.

**Implementing Development Policy**
Modifications to the planning policies for the Township of Frontenac Islands may be used as a tool for managing growth on Howe Island. The Provincial Policy Statement (PPS) (2005) issued by Ontario Ministry of Municipal Affairs and Housing provides direction to municipalities on land use planning matters as they relate to provincial interests. The PPS is currently undergoing a review which began in 2010 and policy revisions are intended to build healthy communities, support a strong economy and protect the environment. The Official Plan (OP) and Zoning By-law for the Township of Frontenac Islands need to be consistent with the PPS and the OP for the County of Frontenac. Limiting growth opportunities on Howe Island may not be consistent with the objective of the PPS to provide sufficient development areas to meet housing and employment needs for a 20 year horizon. The Township of Frontenac Islands can consider how to direct growth and identify appropriate land use changes to meet the Township’s needs while remaining in keeping with the PPS.

**Booking Passage Times**
A reservation system would allow ferry users to book specific sailing times in conjunction with a set schedule for the County Ferry. The reserved time would give the user certainty to plan their trip. The ferry operators can also use the system to be aware of the peak travel times. There would be no cost to use the reservation system and there would be limited spaces that could be reserved. The remaining spaces would be designated as ‘open’ slots on each ferry crossing to allow random users who are unaware of the booking procedure to use the ferry. Drivers would book their space on-line and would print their passage time. Alternately they could have an e-ticket on their mobile device. This type of demand management technique has been shown to be effective for managing demand in Washington State.

**Priority Boarding Pass**
The Howe Island Pass, or HI-Pass, option is similar to booking a spot on the ferry. However, for the HI-Pass, ferries would remain unscheduled and drivers could reserve a designated HI-Pass time slot. The time slot would give the driver a designated half hour time period in which they would receive priority boarding on the ferry. This alternative would require a separate boarding lane to be added for a queuing area for HI-Pass users.

As an example of HI-Pass operation, if a user’s HI-Pass time was 8:00 – 8:30 and the ferry came at 8:13, the user would have access to the HI-Pass lane for this ferry and would be able to board the ferry ahead of cars not using the HI-Pass lane. As with the alternative of booking time slots, a certain number of spaces would be available for non HI-Pass users on each ferry trip. The HI-Pass would be a free service and would require booking a time slot through a webpage a maximum of 24 hours in advance of the ferry time and a minimum of one hour ahead of the ferry time.

**Discount Pricing**
A discount pass could be available for residents who use the ferry during non-peak travel times. This would encourage users to select non-peak ferry trip times. If they used the ferry during peak hours then the discount pass could not be used, and the standard ferry fee would have to be paid.
5. Evaluation

The alternatives for managing the demand for the ferry service to Howe Island were evaluated based on the impacts to the Township and the impacts to the citizens.

Table 1. Evaluation of Potential Alternatives

<table>
<thead>
<tr>
<th>Number</th>
<th>Alternative</th>
<th>Township Impacts</th>
<th>Citizen Impacts</th>
<th>Result</th>
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<tbody>
<tr>
<td>1</td>
<td>Increase Ferry Capacity</td>
<td>• Negotiate with MTO for purchase of new ferries</td>
<td>• No impacts</td>
<td>Carry Forward</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Uncertainty related to MTO response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Increase Ferry Trips</td>
<td>• Negotiate with MTO to investigate benefits of increased motor efficiency and docking procedures - Uncertainty related to MTO response</td>
<td>• No impacts</td>
<td>Carry Forward</td>
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<td>3</td>
<td>Improve Embarkation &amp; Disembarking Methods</td>
<td>• Install new lane for vehicles disembarking from ferry - Land purchase and implementation could be costly and longer than other options - Width of docking area may be a limiting factor • Advise commuters of new disembarking procedures</td>
<td>• Awareness of new disembarking procedures</td>
<td>Screened Out</td>
</tr>
<tr>
<td>4</td>
<td>Published Schedule</td>
<td>• Responsible for creating schedule &amp; posting online - Simple and low cost • Ferry operators responsible for following schedule as accurately as possible</td>
<td>• Must adjust to new scheduling times</td>
<td>Screened Out</td>
</tr>
<tr>
<td>5</td>
<td>Encouraging Carpooling</td>
<td>• Responsible for promoting carpooling and providing support for facilitating ride matching. - Time/cost involved with managing system - Potential for questions &amp; inquiries from community • Administer reduced fare for annual pass - Policy required and management of policy requires time/effort</td>
<td>• Accept ride sharing opportunities with fellow Howe Island residents • Must use various resources to find carpool partner</td>
<td>Carry Forward</td>
</tr>
<tr>
<td>6</td>
<td>Land Development Policy</td>
<td>• Requires changes to Official Plan and/or Zoning by-laws</td>
<td>• Limits development possibilities</td>
<td>Screened Out</td>
</tr>
<tr>
<td>7</td>
<td>Reserve Passage Time</td>
<td>• Responsible for creating online reservation resource - Cost involved with setting up and monitoring reservation system • Ferry operators responsible to allocate spaces to commuters who have reserved their space - Potential for complaints from commuters required to wait for next ferry • Ferry operators responsible for following schedule as accurately as possible</td>
<td>• Benefits those who use online reservation service • Potential waiting time for drivers without reservations</td>
<td>Screened Out</td>
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<tr>
<td>Number</td>
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<td>Citizen Impacts</td>
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| 8      | HI-Pass Priority Boarding      | • Responsible for creating online HI-Pass service  
- Cost involved with setting up and monitoring reservation system  
- Potential for questions & inquiries from community  
- Installation of new lane for HI-Pass users  
- Implementation could be costly and longer than other options  
- Ferry operators responsible for giving priority to those in HI-Pass lane  
- Potential confusion over correct lane usage and boarding procedures  
- Potential for complaints from commuters required to wait for next ferry | • Benefits those who use online HI-Pass service  
• Understand lane utilization rules when approaching ferry docking terminal  
• Potential waiting time for drivers without HI-Pass | Screened Out |
| 9      | Discount Pricing              | • Responsible for policy and fee changes  
• Discussions required with County and MTO regarding ferry budget | • Could generate complaints about changes in pricing | Carry Forward |

Options Number 3 and Number 8, which required physical modifications to the ferry terminal facilities, were screened out because available space for additional infrastructure is limited. Other options (Numbers 4, 6, and 7) were screened out due to the complex nature related to the creation and/or management of the system. These options were also considered to be confusing or disruptive for the users.

Other options were carried forward for action by the Township in the future.

### 6. Conclusion

A review of the existing ferry service was completed and was compared to the projected traffic volumes every five years to the year 2036. The expected future demand for ferry service at both the Township Ferry and County Ferry exceeds the existing capacity provided by the current service model. Improvements can be expected through the provision of additional capacity or through the management of the demand.

Several alternatives were considered to manage demand or to increase ferry capacity. Based on an evaluation of the alternatives the following options were carried forward:

- Increase ferry capacity
- Increase ferry frequency
- Encourage carpooling
- Provide discount pricing for off-peak passes

It is recommended that the Township move forward with these options in the future.