



**City of Richmond**

**Report to Committee**

**To:** Public Works and Transportation Committee      **Date:** March 16, 2007  
**From:** Robert Gonzalez, P.Eng.      **File:** 10-6045-09-06/2007-Vol  
Director, Engineering      01  
**Re:** **Mid-Island Barrier Scoping and Options Study**

**Staff Recommendation**

That staff submit a 2008 capital funding request of \$100,000 to allow completion of a Mid-Island Barrier scope and alignment options study.

Robert Gonzalez, P.Eng.  
Director, Engineering  
(4150)

Att. 4

FOR ORIGINATING DEPARTMENT USE ONLY					
ROUTED TO:		CONCURRENCE		CONCURRENCE OF GENERAL MANAGER	
Budgets .....	Y	<input checked="" type="checkbox"/>	N		
Roads & Dykes .....	Y	<input checked="" type="checkbox"/>	N		
Policy Planning .....	Y	<input checked="" type="checkbox"/>	N		
Transportation.....	Y	<input checked="" type="checkbox"/>	N		
<b>REVIEWED BY TAG</b>	YES	<input checked="" type="checkbox"/>	NO	<b>REVIEWED BY CAO</b>	YES
			<input type="checkbox"/>		<input checked="" type="checkbox"/>
					<input type="checkbox"/>

## **Staff Report**

### **Origin**

At the July 10, 2006 meeting Council received the Richmond 2006 – 2031 Draft Flood Protection Management Strategy. This strategy specifically made reference that staff pursue a Mid-Island Barrier along the Knight Street/Highway 99 corridor and commence detailed discussions with the Ministry of Transportation.

The purpose of this report is to update Council on the status of the Mid-Island Barrier and the discussion held with the Ministry of Transportation.

### **Analysis**

The 1996 Memorandum of Understanding (Attachment 1) between the City and the GVRD allowed development within the City under the premise that the City prepare improved implementation plans for City flood protection and that the City and Province are to agree upon the plans. In December 2006, the Ministry of Environment confirmed (Attachment 2) that a Mid Island Dike represents a “critical component” of the City’s flood protection strategy.

The concept of a Mid-Island Barrier for flood protection dates back to 1989. The purpose of a Mid-Island Barrier is to provide a secondary line of defence to protect the areas west of Highway 99/Knight Street from flooding. The City’s perimeter dike provides the City’s primary flood protection and will remain the focus and priority for flood prevention.

A Mid-Island Barrier would specifically contain Fraser River flood water to the largely undeveloped areas of the City in the unlikely event of a perimeter dike breach to the east of the Highway 99/Knight Street alignment. If a Mid-Island Barrier is not constructed, flooding of the areas west of its proposed location, including the City Centre, is possible following a breach of the perimeter dike. Under this scenario it is possible that there could be considerable property damage as well as a potential for a loss of life. A Mid-Island Barrier would offer no protection to the areas west of its location should the perimeter dike be breached west of the Highway 99/Knight Street alignment.

Staff met with the Ministry of Transportation on February 20, 2007 and received their letter dated February 21, 2007 (Attachment 3) confirming they have no objection in principle to a dike system that would utilize the topographical advantages of a Highway 99/Knight Street Barrier alignment.

The medium implementation phase (Attachment 4) of the 2006 – 2031 Draft Flood Protection Management Strategy received by Council in July 2006 highlighted an estimated cost of \$100,000 to complete a study to scope and evaluate options for a Mid-Island Barrier. Completion of this study is of paramount importance to find the most cost effective solution and to provide the necessary details to proceed further with the Ministry of Transportation.

Staff recommend that a 2008 capital funding request of \$100,000 to allow completion of a Mid-Island Barrier scope and alignment options study be submitted in 2008. Once the study is complete, staff will present Council with the findings and a long term funding strategy. The

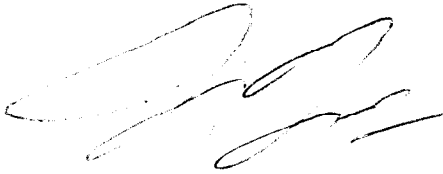
order of magnitude cost estimate to complete Mid-Island Barrier construction as presented to Council in July 2006 in the absence of a scoping or options study, was \$16 million.

**Financial Impact**

There will be a financial impact of \$100,000 should Council approve the capital funding request to complete a Mid-Island Barrier scope and alignment options study as part of the 2008 Capital Program.

**Conclusion**

Construction of a Mid-Island Barrier would provide a secondary level of protection for flooding of the western portions of the City. The Ministry of Environment has characterized the Mid-Island barrier as a critical component of the City's flood protection system and the Ministry of Transportation has endorsed the concept of a Highway 99/Knight Street alignment. It is necessary to complete a detailed evaluation of scope and alignment options in order to proceed further with the Mid-Island Barrier concept.



Jim V. Young, P. Eng.  
Manager Engineering Design and Construction  
(4610)

JVY:jvy

**Memorandum of Understanding Between Richmond and GVRD Regarding  
Resolution of Objections to the Livable Regional Strategic Plan**

The Greater Vancouver Regional District and the City of Richmond agree:

- a) that historic growth patterns in Richmond are established and Richmond will continue to grow under the guidance of Official Community Plans, which when modified shall continue to be complementary to regional plans adopted under the Growth Strategies Statutes Amendment Act;
- b) that these historic patterns have already concentrated growth in Richmond and established Richmond as a major centre for residence as well as business in Greater Vancouver; that the conditions for those growth patterns are unique to Richmond (i.e. the location of the international airport within the City, the culturally diverse population, the existing concentration of employment particularly in areas related to international trade, visitor services, and hi-tech activity, the strategic geographic location between downtown Vancouver, the airport, and the U.S. border, and the island amenity and quality of life) and will continue to shape Richmond and benefit the region's well-being; that Richmond should develop as a complete community, balancing job growth with housing opportunities while protecting the Agricultural Land Reserve;
- c) that the "Livable Region Strategic Plan" recognizes that rapid transit to Richmond, which will shape and serve the growth in the Richmond Regional Town Centre, is a fundamental requirement for the success of the plan;
- d) that the Board will continue to press the Province and BC Transit for commitments to construct all three transit lines on the basis that all those lines are necessary for the full realization of the Livable Region Strategic Plan's objectives;
- e) that West Richmond is a strategic growth area and should Richmond and the Province agree on a mutually acceptable implementation plan for flood and seismic protection, and should Richmond have adopted land use policies and bylaws consistent with the achievement of a future Richmond population comparable to objectives for growth within the Growth Concentration Area, then West Richmond would be considered as an area qualifying for priority in transportation services and facilities, as described in the Livable Region Strategic Plan policy;
- f) that should the condition in (e) be fulfilled, then an amendment to the Livable Region Strategic Plan to include West Richmond in the Growth Concentration Area shall be prepared and brought forward for consideration by the GVRD Board; and,
- g) that the City of Richmond withdraws its objection to the Livable Region Strategic Plan on the basis set out in this agreement.

*Approved by Richmond City Council, January 22, 1996*

*Approved by GVRD Board January 26, 1996*

#### 4. *Mid Island Barrier*

*(References – Attachments 1 (Policy Manual) and 9 (Strategy Priorities and Discussion))*

- A review of Ministry correspondence to the City reveals that the construction of the mid-island barrier has been a key factor in subdivision approval and in setting related Flood Construction Levels (FCLs).
- While the plans for a mid-island barrier project would eventually have to be reviewed from a regulatory perspective by the IOD, the Ministry agrees that the mid-island barrier is a critical component of the Strategy to the extent that it protects heavily developed west Richmond from a “worst case” river dike breach.
- In support of the statement on page 2 of Attachment 9 (i.e., “*this barrier must be constructed now...*”), the Ministry recommends that the City set a target completion date firmer than “Ongoing and Longer Term” as proposed in the Implementation Program.
- The FCLs specified in subdivision covenants for approximately the last 15 years have been based on the 1989 policy (see Attachment 1) to construct the mid-island barrier. The covenant wording typically was as follows:

*“The FCL is 3.5m GSC. However, the Ministry of Environment and the Township of Richmond have adopted a Floodplain Management Implementation Policy and Program, and based on that program the following floodproofing requirements apply: ...2.6m GSC...”*

If the mid-island barrier is not constructed, then the 1989 FCLs for west Richmond, as set out in the subdivision covenants, would not provide protection against a breach in the river dikes upstream from the proposed mid-island barrier alignment.

#### **Dike Issues – Technical**

Please refer to the attached December 7, 2006 memorandum to me from the Inspector of Dikes.

#### **Flood Hazard Land Use Management Issues**

##### *Provincial and Local Government Roles*

*(Reference – Attachment 2, section 6(1), and Strategy, Attachment 8, section 4.2)*

The last sentence in section 6(1) of Attachment 2 may be taken to imply that there is uncertainty in regard to the provincial role in flood hazard area land use management. However, as you have noted, the roles of the Ministry and local government were changed by legislative amendments in 2003 and 2004. The legislation is clear that local governments have the authority to develop flood hazard area bylaws without Ministry approval. Local governments do have to consider Provincial guidelines (i.e. Ministry



Key Actions	Implementation Program Flood Protection Management Strategy		
	Short Term (2006)	Medium Term (2007)	On-going and Longer Term (now - 2031)
<p>1. <b>Planning</b></p> <p>1. Refer the Flood Protection Management Strategy (FPMS) to the Ministry of Environment (MoE) Water Stewardship Division for review and comment (PLANNING)</p> <p>2. Discuss with Ministry of Transportation (MoT) the mid-island barrier along Highway 99/Knight Street corridor (PLANNING; TRANSPORTATION; ENGINEERING)</p> <p>3. Consultation with Provincial and Federal Governments to determine direction for increased perimeter dike standards (ENGINEERING)</p> <p>4. Review the upcoming Fraser Basin Council study to determine the implications for setting a new perimeter dike standard (ENGINEERING; PUBLIC WORKS)</p> <p>5. Examine and pursue senior government cost sharing to implement the FPMS (ENGINEERING; PUBLIC WORKS; FINANCE)</p> <p>6. Review the City's Development Cost Charge Bylaw and Drainage &amp; Dike Utility to determine municipal funding sources for the mid-island barrier and perimeter dike upgrading (ENGINEERING; PUBLIC WORKS; FINANCE)</p> <p>7. Collaborate between Engineering and Planning to develop a phased plan for overall land grade increases (ENGINEERING; PLANNING)</p>	<p>1. Work with the MoT on a plan for the development of the Highway 99/Knight Street mid-island barrier (may require a Multiple Account Evaluation of interior barrier options - study cost estimate ~\$100,000) (ENGINEERING)</p> <p>2. Improve the City's ability to get data and undertake direct measurements (e.g., monitoring local sea level changes through City operated gauging stations) (ENGINEERING; PUBLIC WORKS)</p> <p>3. Direct staff to prepare an updated Flood Response Plan as part of the overall Emergency Response Plan (updated on basis of new modeling and technical information) (ENGINEERING; EMERGENCY &amp; ENVIRONMENTAL PROGRAMS)</p> <p>4. Establish a protocol for obtaining dike rights of way for Mitchell Island (ENGINEERING)</p> <p>5. Work with VIAA to clarify jurisdiction, maintenance standards and improvement programs for the Sea Island dikes (ENGINEERING)</p> <p>6. Encourage the City of New Westminster to harmonize their flood protection levels with Richmond's strategy (ENGINEERING)</p> <p>7. Work with Department of Fisheries and Oceans on a plan for widening the perimeter dikes -- inside and outside existing dikes, addressing related mitigation and compensation requirements (ENGINEERING)</p> <p>8. Work with external agencies (such as the Agricultural Land Commission) to develop a</p>	<p>1. Prepare a plan to support increased density adjacent to dikes but require grade increases and contributions to dike improvements. Retain dike rights of ways and access (PLANNING)</p> <p>2. Remove and relocate or replace toe ditches adjacent to dikes (ENGINEERING)</p> <p>3. Co-ordinate between emergency facilities and development planning (e.g., ensure refuge areas are located in areas not subject to flooding) (ENGINEERING; EMERGENCY &amp; ENVIRONMENTAL PROGRAMS; PLANNING)</p> <p>4. Review plans and implement for refuge areas, emergency routes, and create public awareness (ENGINEERING; EMERGENCY &amp; ENVIRONMENTAL PROGRAMS)</p> <p>5. Direct staff to review the FPMS approximately every 5 years (to ensure new information is reflected) (ALL)</p> <p>6. Consult at timely intervals with experts (MoE, Canadian Hydrographic Service, etc.) and monitor the latest long-range ocean/climate change forecasts for their implications (ENGINEERING)</p>	