



To: Public Works and Transportation Committee
From: John Irving, P.Eng. MPA
Director, Engineering
Re: Mid Island Dike Scoping Study

Date: April 2, 2009
File: 10-6340-20-P.08309/Vol 01

Staff Recommendation

- 1. That, while the perimeter dikes and a future Mid Island Dike are recognized as two critical components of the City's flood protection strategy, the improvement of perimeter dikes is endorsed as a priority over construction of a Mid Island Dike.
2. That the Mid Island Dike be recognized as a critical component to the City's 2008 -2031 Flood Protection Strategy.
3. That a letter be sent to the Provincial Government presenting the Mid Island Dike Scoping Study Report and requesting;
i) Provincial acknowledgement that perimeter dike improvements are a priority over the construction of the Mid Island Dike, and
ii) Provincial funding be dedicated to complete the perimeter dike improvements and construction of the Mid Island Dike.

Handwritten signature of John Irving

John Irving, P.Eng. MPA
Director, Engineering
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ROUTED TO: CONCURRENCE CONCURRENCE OF GENERAL MANAGER
Roads & Dykes... Y [checked] / N []
Policy Planning... Y [checked] / N []
REVIEWED BY TAG YES [checked] / NO []
REVIEWED BY CAO YES [checked] / NO []

Staff Report

Origin

At the June 23, 2008 Council meeting, Council adopted the Richmond 2008 – 2031 Flood Protection Strategy. This strategy identifies a future Mid Island Dike as a key component in flood protection for Richmond. Council approved \$150,000 funding as part of the 2008 Capital Program to complete a Mid Island Dike Scoping Study.

The purpose of this staff report is to present the results of the Mid-Island Dike Scoping Study.

Findings

The concept of a Mid Island Dike for flood protection dates back to 1989. The purpose of a Mid Island Dike is to provide a secondary line of defence for the developed western areas of the City. The City's perimeter dike provides the City's primary flood protection and has remained the focus and priority for flood prevention.

In December 2006, the Ministry of Environment confirmed (Attachment 1) that a Mid Island Dike represents a "critical component" of the City's flood protection strategy.

The purpose of the Mid Island Dike Scoping Study was to identify the best alignment for a Mid Island Dike and to assess the priority of completing perimeter dike improvement versus construction of a Mid Island Dike. This study was completed in consultation with the Provincial Dike Authority and Ministry of Transportation. Key findings of the study are as follows.

Proposed Mid Island Dike Alignment

Potential Mid Island Dike alignments were considered within the bounds of approximately Shell Road and No. 6 Road (refer to Attachment 2). The best alignment was found to follow the Highway 99, Highway 91 and Knight Street corridors.

The Ministry of Transportation endorsed in principle the idea of a Mid Island Dike alignment along the Highway 99 corridor prior to commencing the study (refer to Attachment 3).

Mid Island Dike Versus Perimeter Dike Improvements

An economic assessment concluded that flood protection spending would have twice the cost benefit ratio by focusing on perimeter dike improvements first as opposed to constructing a Mid Island Dike first. Construction of a Mid Island Dike to meet the current Provincial standard of a 1:200 year level of protection without consideration for sea level rise, along the recommended Highway 99, Highway 91 and Knight Street alignments is estimated to cost \$31.7 million. In comparison, for an estimated \$33.8 million, the perimeter dike system could be upgraded to a 1:1000 year level of protection.

Analysis

Regardless of the economic assessment, the City needs to raise the perimeter dike by approximately 0.5 metre to address the median level of the projected sea level rise to Year 2100 (the determination of future sea level rise will be discussed in the "Sea Level Rise" staff report). Incremental

improvements to the perimeter dike also provide immediate incremental improvements to flood protection, while the Mid Island Dike would have to be substantially completed to be effective.

In the short to medium term, completion of perimeter dike improvements as opposed to constructing a Mid Island Dike represents the best value option for the City. A comprehensive list of perimeter dike improvements has been developed by staff through several engineering reviews and operational observations. The next steps are to further refine and quantify perimeter dike improvements and continue to proceed with implementation, subject to funding availability.

The City would also realize significant flood protection benefit by constructing a Mid Island Dike over the long term as an added critical component to the City's overall flood protection system following perimeter dike upgrades.

In 2003 the Province commenced transfer of ownership and the associated capital improvement activities associated with dikes to local authorities. The Province's role was reduced to a regulatory role only. There was no dedicated funding transferred to the City from the Province as a result of this transition of responsibilities.


In 2003, the City created a Drainage and Dikes Utility in order to develop secure funding for drainage works and dike upgrades. This Utility currently collects approximately \$650,000 annually. In 2009 and in past years, Council has approved a funding level of approximately \$350,000 to complete annual dike operations and maintenance activities. This level of funding is not adequate to fund the \$60 million estimated cost of perimeter and Mid Island dike improvements. The City has maintained its position that this is a Provincial funding responsibility.

Financial Impact

There is no financial impact at this time.

Conclusion

The Mid Island Dike Scoping Study found the best alignment to be the Highway 99, Highway 91 and Knight Street corridors. An economic analysis showed that improvements to the perimeter dike system could achieve equal or better levels of flood protection at half the cost of building a Mid Island Dike. Significant levels of provincial funding are needed to complete perimeter dike improvements and construction of a Mid Island Dike.



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JVY:jvy

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

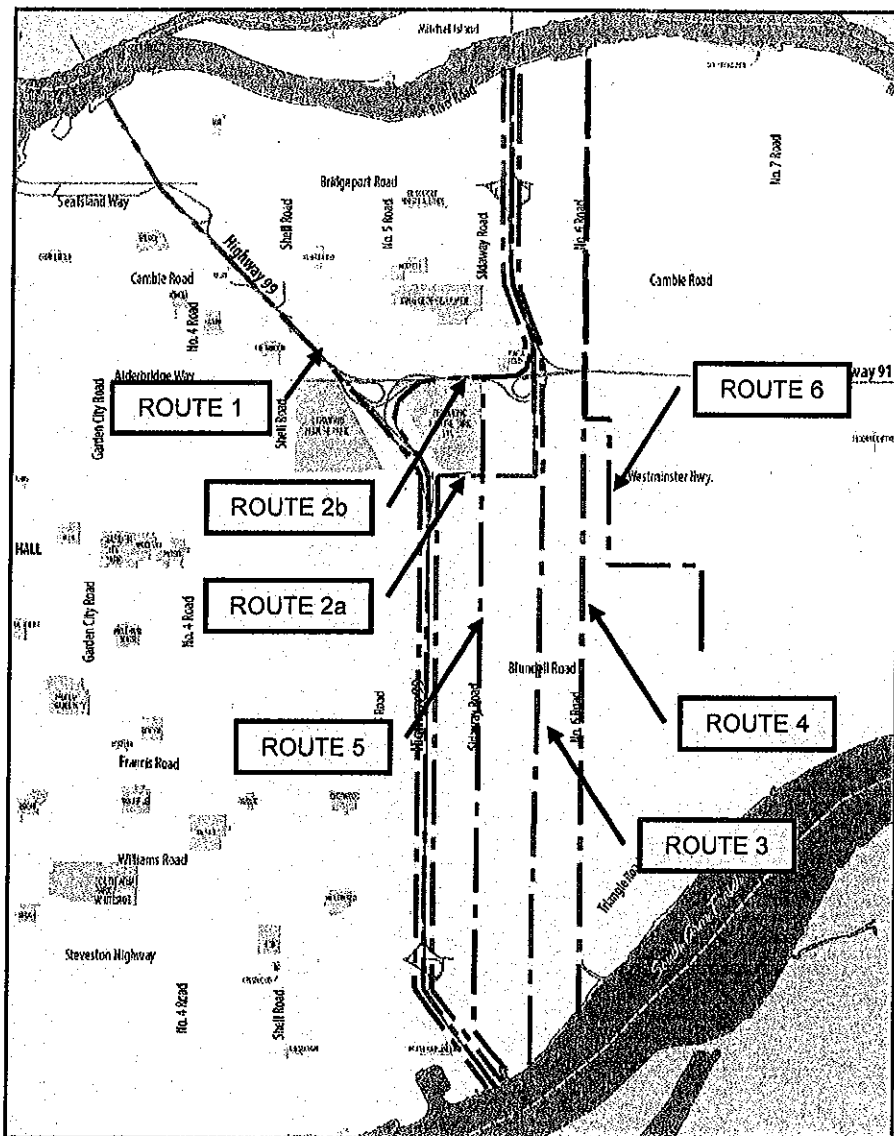
(Reference – Attachment 2, section 6(1), and Strategy, Attachment 8, section 4.2)

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



CITY OF RICHMOND
MID ISLAND DIKE SCORING STUDY

Preliminary Potential Mid Island Dike Routes





February 21, 2007

Jim Young, P.Eng.
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City of Richmond
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Dear Jim,

Re: Mid Island Dike - Richmond

I appreciated being able to meet with yourself, Robert Gonzalez, Victor Wei and David Brownlee on your concept for a mid-island dike system that would utilize the topographical advantage of the Hwy 99-Knight Street highways to achieve some level of flood protection for greater Richmond.

We acknowledge that the plans at this stage are very preliminary and that many details need to be worked out before such a plan could be implemented, but the Ministry of Transportation has no objection in principle to this approach.

We look forward to working with Richmond Mayor, Council and staff on achieving a plan which affords a second level of defense for your important community.

Yours truly,

Tracy Cooper
Regional Director

TC/ltn

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