



**To:** Public Works and Transportation Committee      **Date:** February 1, 2017  
**From:** John Irving, P.Eng. MPA      **File:** 10-6340-20-  
Director, Engineering      P.16201/Vol 01  
**Re:** **Drainage Box Culvert Rehabilitation**  
**No. 2 Road from Steveston Highway to London Road**

**Staff Recommendation**

That funding of \$3,700,000 from the Drainage Improvement Reserve be included as an amendment to the 5 Year Financial Plan (2017-2021) to complete rehabilitation of the drainage box culvert on No. 2 Road from Steveston Highway to London Road.

John Irving, P.Eng. MPA  
Director, Engineering  
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Att. 1

REPORT CONCURRENCE		
<b>ROUTED TO:</b>	<b>CONCURRENCE</b>	<b>CONCURRENCE OF GENERAL MANAGER</b>
Finance Department	<input checked="" type="checkbox"/>	
Engineering Planning	<input checked="" type="checkbox"/>	
Sewerage & Drainage	<input checked="" type="checkbox"/>	
<b>REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE</b>	<b>INITIALS:</b> DW	<b>APPROVED BY CAO</b> 

## Staff Report

### Origin

This report supports Council's 2014-2018 Term Goal #6 Quality Infrastructure Networks:

*Continue diligence towards the development of infrastructure networks that are safe, sustainable, and address the challenges associated with aging systems, population growth, and environmental impact.*

The No. 2 Road Widening Project was approved by Council as part of the 2016 Capital Budget. This project consists of improvements from Steveston Highway to London Road, including a new shared cycling/pedestrian pathway, upgrades to the intersections at Steveston Highway and Moncton Road, and widening portions of No. 2 Road between Moncton Road and London Road to provide additional parking. The City has secured cost share funding from the federal government (Transport Canada) under the Asia-Pacific Gateway and Corridor Transportation Infrastructure Fund. The current agreement end date is March 2018, staff are coordinating with Transport Canada to extend the end date to March 2019. The total project budget is currently \$7.3M including \$3.5M of grant funding.

There is an existing box culvert in the No. 2 Road corridor that is directly underneath the new pathway and road works. As part of the detailed design process for the road widening project, a detailed condition assessment has been performed on the box culvert. This assessment has revealed issues with a large number of the joints in the existing box culvert that are best addressed before the surface works are completed. There is also one section of box culvert that has settled and replacement of this section will yield the best long term results.

### Analysis

There are approximately 629 kilometres of drainage mains owned and maintained by the City, including approximately 56 kilometres of box culverts. Box culverts are the large rectangular concrete conveyance systems that deliver drainage water to the 49 perimeter drainage pump stations. The height and width of each box section is approximately 1.5m by 2.5m. It is the joints between each section of box culvert that are susceptible to seepage.

#### No. 2 Road from Steveston Highway to London Road

The box culvert on No. 2 Road south of Steveston Highway is located in the eastern portion of the road corridor, mostly in the boulevard area east of the existing two lane roadway (Attachment 1). Assessment of approximately 1.7 kilometres of box culvert between Steveston Highway and London Road has revealed joint separation and/or infiltration in 257 locations, as well as significant settlement in one section of the culvert. In order to ensure the long term stability of the proposed new pathway and roadworks, rehabilitation work on this box culvert is required. This consists of replacing the settled section, repairing the compromised joints, and filling potential voids outside of the box culvert. The estimated cost to complete these works is \$3,700,000.

### Aging Infrastructure Strategy

To date, box culvert settlement, cracking and infiltration has been addressed on an on-demand basis, however, as much of the box culvert system is approaching 50 years of service, maintenance demands are increasing. Most recently, major repairs at No. 2 Road by Walton Road and on No. 1 Road north of Westminster Highway (Terra Nova) have been successfully undertaken. However, these examples are indicative of the maintenance requirements. As noted in previous Aging Infrastructure reports, preventative maintenance programs are far more financially prudent as compared to repairing failures. Failures are also far more disruptive.

As part of the 2017 Utility Budget, an annual program for \$240,000 was authorized for a Box Culvert Preventative Maintenance Program. This program will provide condition assessment and perform preventative maintenance activities resulting in more efficient repairs, less service and public disruptions and extending the life of the box culverts. The intention of this preventative maintenance program is to conduct a review and perform repairs to the 56km of box culverts over a ten year period. The condition assessment will be reported to Council via the City's Aging Infrastructure report in mid-2017 and further capital projects will be brought forward as required through the annual Capital Budget process for Council consideration.

### **Financial Impact**

The total estimated capital cost for the repairs to the box culvert on No. 2 Road from Steveston Highway to London Road is \$3,700,000 and is proposed to be funded from the Drainage Improvement Reserve. These funds would be added to Capital Project CR00020 – No. 2 Road Widening. There is approximately \$28M available in the Drainage Improvement Reserve.

The 5 Year Financial Plan (2017-2021) will also be amended to reflect this allocation of funds should Council endorse the recommendation.

### **Conclusion**

The box culvert along No. 2 Road between Steveston Highway and London Road is experiencing cracking and infiltration at the joints, and one section has settled. Rehabilitation of the box culvert is required to prevent settlement and damage to the future pathway and roadworks.



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Att.1: No. 2 Road Box Culvert Alignment

No. 2 Road Box Culvert Alignment

