

# HJA Water Management Consulting

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509 Foul Bay Road, Victoria, BC., V8S 4G9 5T6 | 250-885-3711 | Jack.Hull@telus.net

To: Committee of the Whole, District of Oak Bay

From: Jack Hull MBA, P.Eng. Project Manager

Date: September 28, 2016

Subject: Uplands Combined Sewer Separation Project Pre-design – Final Report

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## INTRODUCTION

The Uplands neighbourhood was constructed with a single pipe to convey stormwater and sanitary sewage to the CRD East Coast Interceptor trunk sewer. The Provincial Government's Municipal Wastewater Regulation requires all BC municipalities to eliminate combined sewer overflows (CSO) by having separate stormwater and sanitary sewer systems. Compliance with the provincial regulation is mandatory for the District of Oak Bay (District) as it is for other jurisdictions, for example, Burnaby, New Westminster and the City of Vancouver where combined single pipe infrastructure also exists.

For the last eighteen months a project team comprised of District staff, the Project Manager and McElhanney Consulting Services Ltd., (McElhanney) has undertaken a comprehensive pre-design study to examine the technical, environmental, financial and social aspects of this major Oak Bay infrastructure project.

A key project priority for Council has been public engagement. Open Houses, a Public Opinion Survey and regular Council meeting updates have provided residents with opportunities to learn about the project and express their views. Feedback from public engagement in late 2015 was brought back to Council in February 2016 at a Special Committee of the Whole meeting which was well attended with residents providing strong and constructive feedback. The District website continues to host all of the information presented at the Open Houses and all of the updates and reports that have come before Council. In response to feedback from the public engagement, and as the study has progressed, Council has made a number of decisions that have further defined the project scope.

The purpose of this report is to:

1. Summarize how the recommendation to implement Option 4 presented in the pre-design report was reached;
2. Present the proposed timeline for a staged approach to implementation;
3. Address the amendment to the Core Area Liquid Waste Management Plan;
4. Emphasize the importance of making a decision to implement the preferred option.

## THE OPTIONS

Initially, six options were evaluated namely:

1. A deep new gravity sanitary sewer, existing pipe for stormwater conveyance;
2. A deep new gravity storm sewer, existing pipe for sanitary sewage conveyance;
3. A new pumped sanitary sewer system, existing pipe for stormwater conveyance;
4. A new shallower storm sewer, localized municipal stormwater pumping stations, existing pipe for sanitary sewage conveyance;
5. A hybrid shallower gravity sanitary sewer, pumped where necessary, existing pipe for stormwater conveyance; and
6. A variation on Option 5, with localized municipal pumping stations, existing pipe for stormwater conveyance.

As directed by the District a seventh option was considered namely, a deeper gravity sewer system to eliminate pumps. This option was found to be impractical to construct because of the required depth of some pipe trenches (greater than 8 metres).

## PROJECT SUMMARY

A comprehensive project summary and update was provided to Council on September 19, 2016. This report is a summary of the key project milestones in reaching a conclusion on the recommended option.

- May 2015 – the District retained the services of McElhanney Consulting Services Ltd to undertake a pre-design study;
- May to October, 2015 - McElhanney developed technical details and cost estimates for the six options identified for sewer separation;
- October, 2015 – Council decision on criteria for mandatory sewer separation, responsibility for connection costs and Heritage Inspection Permits
- November 2015 Archaeological Overview Assessment by Golder & Associates on potential issues and areas of importance for First Nations;
- October – November, 2015 formal public engagement open houses, web site and on-line survey. In response to public feedback, the District directed staff and the project team to;
  - Explore the possibility of a deep sewer option to eliminate the need for pumps;
  - Explore the opportunities for on-site stormwater management on municipal property;
  - Report on the effect of service installation on the mature tree canopy;
  - Explore alternative construction methods and arranged a for a presentation by an industry expert on trenchless technologies including cured in place pipe rehabilitation, slip lining, pipe jacking, pipe bursting, and horizontal drilling.

As a result of these investigations the following decisions/actions were taken:

- June 2016 - Resolution from Council that no further consideration be given to the use of horizontal directional drilling for the new sewer installation on municipal property, with the exception of small diameter lateral connections from property lines as appropriate;

- June 2016 Resolution from Council to remove the use of easements from further consideration due to the significant impacts on the landscape that construction of a second pipe would cause.
- June 2016 - Retained WSP Canada Inc. to undertake a geotechnical study to better define geological conditions, in particular the occurrence of rock, to further refine the cost estimates.
- August/September 2016 - Updated project cost estimates based on the result of the geotechnical investigation.

A key consideration in the decision on which option to implement is the future use of the existing pipe. If it is to be used as a sanitary sewer, then only options 2 and 4 are applicable. Options 1, 3, 5 and 6 are applicable if the pipe is to be used as a storm sewer. The analysis in the pre-design report presents the reasons for and against the use of the existing pipe for sanitary or stormwater conveyance.

With the completion of the pre-design study, McElhanney, recommends that the District implement Option 4, namely, a new shallow gravity stormwater system with localized areas requiring municipally owned stormwater pumping stations and the existing pipe used to convey sanitary sewerage. The estimated cost of Option 4 is \$21,500,000 including contingencies and soft costs, with \$15,100,000 the responsibility of the District and \$6,400,000 the responsibility of the residents of the Uplands for private sanitary pumping systems and service connections to the new storm sewer.

Below is a summary of estimated costs for each of the options:

Option No.	Capital cost			Average Annual Operation and Maintenance Costs			Aggregate 50-year duration net present value
	Totals	To the municipality	To the private landowners	Totals	To the municipality	To the private landowners	
	\$Millions			\$1,000s			\$Millions
1	30.9	24.3	6.6	78	65	13	35.9
2	31.9	25.1	6.7	77	64	13	36.8
3	14.2	7.2	7.0	110	9	101	21.3
4	21.5	15.1	6.4	91	46	45	27.4
5	21.4	15.0	6.4	89	48	41	27.2
6	23.4	16.9	6.5	90	54	36	29.2

Option No.	Total Capital Cost (per residential unit, including 50% contingencies)			
	To the Private Landowners (\$1,000s)			
	Costs to Landowners with new pumps		Costs to Landowners without new pumps	
	High	Low	High (deep and long)	Low (shallow and short)
1	20	17	38	14
2	20	17	38	14
3	20	17	n/a	n/a
4	20	17	38	14
5	20	17	38	14
6	20	17	38	14

During the study new information on the condition of the existing sewer pipe has indicated that rehabilitation should proceed as soon as possible. Estimated costs for rehabilitation, as a separate District maintenance initiative, are in the order of \$3 million.

Option 4 provides a balance between environmental, social and financial considerations. Environmentally it provides progression towards compliance with the MWR through incremental reductions in combined sewer overflows and will result in less disruption to mature landscapes. A new sanitary sewer would require one hundred percent of residents to connect before any CSO reductions would be realized. Socially, District residents brought different perspective on the issue of affordability and fairness, depending on where they lived. Many Uplands residents impacted by the project felt that gravity service should be maintained as a priority for the District. For property owners living in neighbourhoods outside of the Uplands, minimizing capital costs to the District was the most important consideration recognizing that capital costs for this project would be borne by all Oak Bay residents. Given the Uplands residents preference for gravity service, Option 4 provides a compromise between Option 1 with an estimated 66 pumps and Option 3 with 391 pumps. Financially, Option 3, while the least cost option, does not allow for a phased approach to CSO reductions. Also a low pressure system will not function reliably if only a few homes are connected due to insufficient volume in the system. It requires one hundred percent of residents to install pumps and connect prior to their being any positive impact on CSO. Option 3 was the least favoured by Uplands residents. The shallow sewer options (Options 3, 4 and 5) are similar in cost.

The McElhanney Pre-Design report is available on the Oak bay web site ([www.oakbay.ca](http://www.oakbay.ca)).

#### SEPARATION OF COMBINED SEWERS – IMPLEMENTATION SCHEDULE

The timeframe for separating the combined sewers will depend on the available funding from the District and success in obtaining grants from Federal and Provincial governments. Recognizing the need for other infrastructure investments, it is suggested that the District plan to separate the combined sewers over the next thirty years. The Humber catchment, the smaller

of the two, could be completed within the first ten years, thereby eliminating the CSO at the Humber pump station.

The Rutland catchment could be completed in the subsequent 20 years. If government funding is received, then the sewers could be separated sooner. While the District will not mandate sewer separation on private property except under the established criteria, it is expected that the majority of homes will comply with the separation criteria over the next three decades as replacement and renovation of homes occurs.

#### AMENDMENT TO THE CORE AREA LIQUID WASTE MANAGEMENT PLAN

Approval of an amendment to the current CALWMP is required to implement the proposed sewer separation plan. As the Capital Regional District is responsible for the liquid waste management plan for the Core Area municipalities, a request for an amendment of the CALWMP will have to be submitted by the CRD to the Ministry of Environment. The submission to request an amendment to the LWMP will include the following:

1. Covering letter from the Mayor to the CRD Board Chair requesting an amendment to the Core Area Liquid Waste Management Plan. (Draft attached)
2. Attachments to the letter:

Attachment 1 - A summary of work undertaken to develop the plan to eliminate the combined sewers in Uplands (Project Manager's Report to Council, September 19, 2016.);

Attachment 2 - Resolution by Council to adopt the plan to separate the combined sewers in Uplands. (Project Manager's report to the Committee of the Whole, October 5, 2016 and the Pre-design Report by McElhanney Consulting Services Ltd., dated September 22, 2016).

Attachment 3 - The updated Table 5.5 of the CALWMP 'Prioritized Order of Oak Bay Overflow Reduction Plan'. (Draft attached).

Prior to a final submission it is recommended that a meeting be arranged between the staff of the District, the CRD and the Ministry of Environment to review the proposed submission to ensure that it provides all of the information required by the Ministry to support the District's request to amend the Core Area Liquid Waste Management Plan.

#### THE IMPORTANCE OF MAKING A DECISION

Separation of the Uplands combined sewers has been studied and discussed for several decades. This current study is the most comprehensive ever undertaken involving not only a detailed evaluation of various options but also a comprehensive public engagement process. Every effort has been made to respond to information requests from the public and council to enable Council to make a fully informed decision.

The District is in violation of the MWR. The District has been subjected to criticism from other municipalities for failing to eliminate the combined sewers and their perceived impact on sewage treatment planning. At the recent meeting with the Ministry of Environment, the Minister

expressed the expectation that Oak Bay will promptly move from the study phase to the implementation phase.

## RECOMMENDATION

1. That the District of Oak Bay approve the recommendations of the pre-design report namely:
  - a. Option 4, a shallower gravity based storm system, including two isolated areas requiring municipal stormwater pumps;
  - b. Design by catchment area and not by construction phase;
  - c. Construction on a phased project basis, beginning with the Humber catchment, with contract packages at a minimum of \$2 million each; and.
  - d. Development of a plan for rehabilitation of the existing pipes.
  
2. That the District of Oak Bay approve the submission to the CRD requesting an amendment to the Capital Regional District's Core Area Liquid Waste Management Plan.

Capital Regional District  
625 Fisgard Street  
Victoria, BC  
V8W 1R7

Attention: Director Barbara Desjardins, Board Chair

Re: Oak Bay Combined Sewer Separation Plan

Dear Chair Desjardins,

On behalf of the District of Oak Bay it is my pleasure to submit the District's plan for the elimination of combined sewer overflows at the Humber and Rutland pump stations. This will be achieved by separating the combined sewers in the Uplands neighbourhood of Oak Bay and will bring the District into compliance with the provincial Municipal Wastewater Regulation and the CRD Core Area Liquid Management Plan (CALWMP). The District is requesting an amendment to the CALWMP to incorporate the District's plan for sewer separation.

The plan proposes to eliminate combined sewer overflows in stages starting with the Humber catchment area. The District will incrementally install a new storm sewer which will progressively reduce the flows in the existing combined sewers as road catch basins and dwellings are connected to the new sewer.

The District has undertaken a technical evaluation of the options for separating the combined sewers and has also conducted a comprehensive public engagement process. Six technical options were developed and prior to approving the plan the District considered the environmental, social and economic implications of the various options. Given the topography of the Uplands and the decision not to use existing easements on private property to avoid significant environmental impact and property impact, the plan will employ both gravity and pumped service connections.

In support of our request we have attached the following documentation:

Attachment 1 - A summary of work undertaken to develop the plan to eliminate the combined sewers in Uplands (Project Manager's Report to Council September 19, 2016).

Attachment 2 - Resolution by Council to adopt the plan to separate the combined sewers in Uplands. (Project Manager's report to the Committee of the Whole October 5, 2016 and the Pre-design Report by McElhanney Consulting Services Ltd., dated September 22, 2016).

Attachment 3 - The updated Table 5.5 of the CALWMP 'Prioritized Order of Oak Bay Overflow Reduction Plan'. (Draft attached).

It is estimated the plan will cost the District and individual home owners in the Uplands \$15,500,000 and \$6,400,000 respectively.

We would appreciate the CRD Board's endorsement of the plan and its submission to the Minister of Environment with a request to amend the CALWMP.

Should you have any questions about the attached documents, please have your staff contact Dan Horan, Director of Engineering Services by telephone at 250-598- 3311 Ext 7421 or by email at [dhoran@oakbay.ca](mailto:dhoran@oakbay.ca)

Yours sincerely,

Nils Jensen

Mayor, District of Oak Bay

DRAFT



Prioritized Order of Oak Bay Overflow Reduction Plan

Item No.	Work name	Description	Estimated Year of Completion	Estimated Cost (\$2016) to Complete
1	Uplands Sewer Separation Humber Catchment	Construction of new storm sewer	2027	\$5,425,000
2.	Uplands Sewer Separation Rutland Catchment	Construction of a new storm sewer	2047	\$10,075,000
3	Oak Bay I&I Rehabilitation Projects	Continue with phased rehabilitation projects in various catchments	Annual	\$500,000
4	CCTV Inspection	Video inspection of sewer mains	2025	\$80,000 annually
5	Sewer system maintenance	Maintenance to keep sewers clean and free of defects	Annual	\$240,000