

Deep Bay Improvement District
5031 Mountainview Road
Deep Bay, BC
V0R 1G0

MCSL File No.: 27309-01
September 2, 2014

Attention: Leslie Carter
Administrator

Dear Ms. Carter

**Re: Deep Bay Improvement District
Water System Evaluation Report – February 2008
2014 Report Review and Update**

1. INTRODUCTION

McElhanney Consulting Services Ltd. (MCSL) completed a Water System Evaluation Report for the Deep Bay Improvement District (DBID) in February 2008. That 2008 Report included the following components:

- A review of the existing data and system information;
- Development of a water model for the system;
- Estimates of future growth;
- A system analysis to identify deficiencies and recommend improvements;
- Updates to the existing Capital Works Plan; and,
- Recommendations for the Capital Expenditure Cost Bylaw.

The purpose of this letter is to:

- Review and update the list of Capital Works Projects;
- Review and update the list of Capital Expenditure Charge Projects;
- Provide current cost estimates;
- Review the current Capital Expenditure Cost Charge; and,
- Outline the procedure for constructing Capital Expenditure Charge projects in response to developer requests.

2. SYNOPSIS OF THE 2008 WATER SYSTEM EVALUATION

Following provides a summary of the key conclusions and recommendations contained in the 2008 DBID Water System Evaluation:

- System served 565 customers with an estimated population of 1243 persons;
- Total growth to build-out was estimated to be 1081 connections with a population of 2376 persons;
- The historical growth rate is 3%. Projecting that growth rate forward we anticipated that build-out will be realized by year 2030;
- Storage is provided by a single reservoir constructed in 1975 with a capacity of 545 cubic meters;

- DBID implemented a universal metering program in 2004 which resulted in a drop in Average Day Demand from 1.49 m³/service to 0.80 m³/service;
- The system has eight wells with a total capacity of 48.8 litres per second. The year 2030 Projected Maximum Day Demand was 31.9 litres per second;
- Eleven Capital Projects were identified to meet current and future demand with a total estimated construction cost of \$4.9 Million;
- Five of these projects, valued at \$1.6 Million, were identified as “Capital Works Projects” that are required to serve existing customers;
- A Capital Works Plan was presented that will see these five projects completed by year 2018 based on a renewal reserve fund of \$150,000 per year
- The remaining six projects, valued at \$3.3 Million, were identified as “Capital Expenditure Projects” that were required to serve future development;
- The recommended Capital Expenditure Cost Charge for new development was \$6,500 per door.

3. CURRENT STATUS OF THE 2008 CAPITAL PROJECTS

The current status of Capital Projects identified in the 2008 Water System Evaluation is presented in Table 1:

Table 1: Current Status of 2008 Capital Projects

Capital Works Projects	2008 Estimate	Current Status
Miscellaneous Improvements to Wells and Reservoir	\$59,3523	Partly Complete
Shoreline Main Replacement (200 mm)	\$521,307	Partly Complete
Deep Bay Watermain Replacement (200 mm)	\$549,413	Proposed
Longview Main Replacement (200 mm)	\$210,870	Complete
Crome Point/Burne Road Watermain Replacement (200 mm)	\$236,434	Proposed
Total	\$1,577,376	
Capital Expenditure Projects		
DL 28 Main	\$259,009	Proposed
Additional Reservoir(s)	\$1,296,165	Proposed
Dedicated Reservoir Feed Line (200 mm)	\$275,080	Proposed
Morgan Loop (150 mm)	\$180,895	Proposed
Pumping Main (300 mm)	\$248,170	Proposed
Western Trunk Main (250 mm)	\$1,080,427	Proposed
Total	\$3,339,756	

4. AREA GROWTH POTENTIAL

Projects identified above have been developed based on population estimates within the current Improvement District Boundaries. Growth was developed using existing Regional District of Nanaimo Zoning requirements and anticipated re-zoning of existing ALR lands (2008 Water Study Figure 2.1).

It is possible that future zoning amendments could allow for greater densification than currently anticipated. From a planning perspective, some allowance for an increased population to ensure water supply, storage and distribution piping are not undersized has been made. The total projected population estimate of 2376 persons is somewhat conservative and provides a reasonable estimate for the foreseeable future.

Should a zoning amendment allow greater densification in particular areas of the DBID, the District will need to review those projects on a case by case basis. If it is identified that additional works are required for servicing that are not current CEC projects, then it will be the responsibility of the developer to undertake those works as directed by DBID staff and board.

5. CAPITAL PROJECT REVIEW

We have reviewed the list of Capital Projects presented in the 2008 Water System Evaluation Report and recommend the following revisions / additions:

Supervisory Control and Data Acquisition (SCADA)

The Improvement District has identified the need for a SCADA system to allow system operation to be monitored and controlled from a central location. This work will address the electrical pump control and water supply control requirements identified in the 2008 Report. This project is required to service existing customers and should therefore be funded through the District's Capital Works Plan.

Longview and Seaview Drive Watermain Replacement

The existing 100 mm diameter Asbestos Cement water mains and services on Longview Drive and Seaview Drive have experienced breaks in recent years and the Improvement District is planning to replace these lines in 2017. This project is required to service existing customers and should therefore be funded through the District's Capital Works Plan.

Crome Point/Burne Road Watermain Replacement (200 mm)

The Crome Point/Burne Road Watermain Replacement project is identified in the 2008 report as a Capital Works Project, however these lines will also need to be up-sized in conjunction with the Western Trunk Main Project in order to provide adequate capacity to service development at the north end of the system (in particular to service Areas 'B', 'C' and 'D'). We therefore recommend that the cost of this project be shared and pro-rated between the Capital Works Plan and the Capital Expenditure Plan. The 2008 Report identifies a total potential yield of 308 lots for Areas B, C and D and fifteen existing lots front this water line. The pro-rata split would therefore be 95% (attributed to development) and 5% (attributed to existing customers).

Existing Reservoir Replacement

The existing concrete reservoir was built in 1975 and provides 545 cubic meters of storage. The reservoir is now 40 years old and showing signs of age and deterioration. Planning should be undertaken in anticipation of replacement. The project is required to service the existing customers and should therefore be funded through the District's Capital Works Plan. The proposed reservoir should

be designed to accommodate current fire, emergency and equalization storage requirements. Therefore, for the purpose of budgeting we recommend that the District plan to construct a new reservoir of 600 cubic meters of storage.

Storage Reservoir Future Growth

The 2008 report identifies the need for 1494 cubic meters of storage to serve the build-out development of 1080 services (2376 persons). The District has subsequently adopted MMCD design standards and construction specifications. As such, the reservoir sizing should follow these standards to be consistent with current bylaws. Based on the MMCD, the revised total future storage requirement is 1010 cubic meters. For the purpose of budgeting we recommend that the District plan to construct a new reservoir of 410 cubic meters of storage. This project is attributed directly to development.

6. CURRENT COST ESTIMATES

Cost estimates presented in the 2008 report have been updated and revised to include the Capital Project Revisions identified above. Current cost estimates are included as Appendix 1 and summarized in Table 2 with appropriation of cost between Capital Works Projects and Capital Expenditure Projects.

Table 2: Appropriation of Project Costs

Project	2008 Estimate	2014 Estimate	Existing Customers (Capital Works Projects)	Future Development (CEC)
Miscellaneous Improvements to Wells and Reservoir (Includes New SCADA Project)	\$59,352	\$246,376	\$246,376	
Shoreline Main Replacement (150 mm)	\$ 521,307	\$418,376	\$418,376	
Deep Bay Watermain Replacement (200 mm)	\$549,413	\$570,342	\$570,342	
Longview and Seaview Drive Watermain Replacement (200 mm)	-	\$579,910	\$579,910	
Crome Point / Burne Road Watermain Replacement (200mm)	\$236,434	\$244,657	\$12,233	\$232,424
Existing Reservoir Replacement	-	\$725,075	\$725,075	
Storage Reservoir Future Growth	\$1,296,165	\$548,665		\$548,665
DL 28 Main (200mm)	\$259,009	\$273,959		\$273,959
Western Trunk Main (250 mm)	\$1,080,427	\$1,113,326		\$1,113,326
Dedicated Reservoir Feed Line (200 mm)	\$275,080	\$275,080		\$275,080
Morgan Loop (150 mm)	\$180,895	\$195,770		\$195,770
Pumping Main (300 mm)	\$248,170	\$265,811		\$265,811
Total	\$4,917,122	\$5,457,347	\$2,552,312	\$2,905,035

7. DEVELOPMENT PROJECT FUNDING SCENARIOS

The Improvement District has executive authority to set priorities and schedule the expenditure of Capital Expenditure Charge funds at their sole discretion. In practice the District may decide to advance a project or a developer can apply to the District to have a CEC project funded. This will inevitably lead to a negotiation between the District and a given developer and the District is responsible to administer Capital Expenditure Charge funds in a manner that is fair and equitable to both existing customers and developers.

Every development proposal will need to be assessed by the District on a case by case basis to determine the best way to apply these available funding methods.

In cases where a developer proposes to develop land that requires construction of a Capital Expenditure Project there are a number of potential funding scenarios, some of which are illustrated by the following Examples based on the current CEC Bylaw.

Scenario 1 – Project Cost is not identified as CEC Charge

In cases where the cost of a project has not been included or cannot be attributed to a CEC project. The developer will be responsible for the construction the project at their cost as a condition of development. This Scenario is illustrated as follows:

- Project requires construction of a new water supply to address increased densification and demand
- The District provides conditional acceptance of the project pending water supply improvements
- The developer pays for and delivers the project in conformance with District Standards
- Upon acceptance of the works the District provides formal approval of the development
- Upon registration of the subdivision the developer still must pay standard CEC charges.

Scenario 2 – Project Cost is less than the CEC Charges

In cases where the cost of the CEC project is less than the total CEC charges for the development the developer may offer to construct the project at his cost on the agreement that he will receive a 'CEC Credit' for the amount expended. This Scenario is illustrated as follows:

- Project requires construction of a CEC designated project with an estimated cost of \$100,000 to design and construct
- Project will create 20 lots, thus generating \$130,000 in CEC charges
- The District agrees to provide the developer CEC Credits for the cost of the project
- The developer delivers the project in conformance with District Standards and provides certification of the actual cost of the project, say \$110,000.
- Upon registration of the subdivision the developer must pay a CEC charge of \$20,000.

Scenario 3 – Project Cost is less than the sum of CEC Charges plus CEC Reserve

In cases where the cost of the CEC project is more than the total CEC charges for the development, but less than the sum of the CEC Charges and the District's CEC Reserve Fund, then the District may elect to fund the difference. This Scenario is illustrated as follows:

- Project requires construction of a CEC designated project with an estimated cost of \$200,000 to design and construct
- Project will create 20 lots, thus generating \$130,000 in CEC charges.
- The District has a CEC Reserve of \$100,000

- The District agrees to provide the developer CEC Credits towards the cost of the project and agrees to fund the difference
- The developer delivers the project in conformance with District Standards and provides certification of the actual cost of the project, say \$220,000.
- Upon registration of the subdivision the developer pays no CEC charges
- The District reimburses the developer the difference between the project cost and his CEC obligation from their CEC Fund. In this case \$90,000

Scenario 4 – Project Cost is more than the sum of CEC Charges plus CEC Reserve

- Project requires construction of a CEC designated project with an estimated cost of \$300,000 to design and construct
- Project will create 20 lots, thus generating \$130,000 in CEC charges.
- The District agrees to provide the developer with CEC Credits and \$100,000 from their CEC Reserve Fund towards the cost of the project.
- The developer delivers the project in conformance with District Standards and provides certification of the actual cost of the project, say \$330,000.
- Upon registration of the subdivision the developer pays no CEC charges
- The District contributes \$100,000 towards the cost of the project from their CEC Fund
- The developer is responsible for the additional cost of the project. In this case \$100,000.

Note that under Scenario 4 the developer is not eligible to apply for a Latecomer's Bylaw to cover the excess cost of the CEC designated project.

8. PROPOSED REVISIONS TO THE CAPITAL EXPENDITURE COST BYLAW

The District currently services 603 properties. Analysis of the land base presented in the 2008 Report indicates the potential to develop a total of 1080 units within the current District boundaries leaving 478 customers to Build-out. Based on the projects and costs presented in Table 2 we recommend that the Capital Expenditure Charge be revised to \$6,078 per door. The recommended list of Capital Projects to be funded through CEC should be revised as presented in Table 3.

Table 3: Proposed CEC Works

Project	Priority	2014 Estimate
Crome Point / Burne Road Watermain Replacement (200mm)	Highest	\$232,424
Storage Reservoir Future Growth		\$548,665
DL 28 Main (200mm)		\$273,959
Western Trunk Main (250 mm)		\$1,113,326
Dedicated Reservoir Feed Line (200 mm)		\$275,080
Morgan Loop (150 mm)		\$195,770
Pumping Main (300 mm)	Lowest	\$265,811
	Total	\$2,905,035

Please contact our office if you have any questions, or require additional information. We would be pleased to meet with you to discuss these recommendations

Yours Truly,
McElhanney Consulting Services Ltd.

A handwritten signature in blue ink, appearing to read "Chris Pogson", is written over a light grey rectangular background.

Chris Pogson, P.Eng.
Division Manager, Engineering

APPENDIX 1: 2014 PROJECT COST ESTIMATES

Deep Bay Waterworks District 2014 Report Review and Update			McElhanney Consulting Services Ltd 2231-27309-01.4		
Capital Works Cost Estimate			September 24, 2014		
Description	Quantity	Unit	Rate	Extension	Total
1-1 Water Supply and Storage					
- Miscellaneous Improvements to Wells and Reservoir					
Install BFPD at wellheads	4 each		\$ 1,200	\$ 4,800	
Install exterior supply line	1 LS		\$ 10,000	\$ 10,000	
SCADA system	1 LS		\$ 150,000	\$ 150,000	
			Sub total	\$ 164,800	
			Contingency (30%)	\$ 49,440	
			Sub total	\$ 214,240	
			Engineering (15%)	\$ 32,136	
			Total	\$ 246,376	\$ 246,376
1-2 Distribution System					
- Shoreline Drive Watermain Replacement (150 mm)					
Asphalt cutting	650 m.		\$ 5	\$ 3,250	
200 mm Gate Valve	4 each		\$ 1,500	\$ 6,000	
200 mm main	650 m.		\$ 200	\$ 130,000	
Crushed Gravel	200 cu.m.		\$ 50	\$ 10,000	
Pit Run Backfill	1000 cu.m.		\$ 35	\$ 35,000	
Hot Mix Asphalt	325 tonnes		\$ 200	\$ 65,000	
Shoulder Gravel	100 cu.m.		\$ 60	\$ 6,000	
Hydrants	3 each		\$ 4,000	\$ 12,000	
150 mm Hydrant Lead	20 m.		\$ 180	\$ 3,600	
Blow Offs	2 each		\$ 2,000	\$ 4,000	
Tie to existing main	1 each		\$ 5,000	\$ 5,000	
			Sub total	\$ 279,850	
			Contingency (30%)	\$ 83,955	
			Sub total	\$ 363,805	
			Engineering (15%)	\$ 54,571	
			Total	\$ 418,376	\$ 418,376
1-3 Distribution System					
- Deep Bay Drive Watermain Replacement (200 mm)					
200 mm Gate Valve	5 each		\$ 1,500	\$ 7,500	
200 mm main	970 m.		\$ 200	\$ 194,000	
Asphalt cutting	1000 m.		\$ 5	\$ 5,000	
Crushed Gravel	500 cu.m.		\$ 50	\$ 25,000	
Pit Run Backfill	1800 cu.m.		\$ 35	\$ 63,000	
Hot Mix Asphalt	250 tonnes		\$ 200	\$ 50,000	
Shoulder Gravel	100 cu.m.		\$ 60	\$ 6,000	
Hydrants	4 each		\$ 4,000	\$ 16,000	
Tie to existing main	3 each		\$ 5,000	\$ 15,000	
			Sub total	\$ 381,500	
			Contingency (30%)	\$ 114,450	
			Sub total	\$ 495,950	
			Engineering (15%)	\$ 74,393	
			Total	\$ 570,343	\$ 570,343

Deep Bay Waterworks District 2014 Report Review and Update			McElhanney Consulting Services Ltd 2231-27309-01.4		
Capital Works Cost Estimate			September 24, 2014		
Description	Quantity	Unit	Rate	Extension	Total
1-4 Distribution System					
- Longview and Seaview Drive Watermain Replacement (200 mm)					
Asphalt cutting	1300 m.		\$ 5	\$ 6,500	
200 mm Gate Valve	7 each		\$ 1,500	\$ 10,500	
200 mm main	740 m.		\$ 200	\$ 148,000	
Crushed Gravel	300 cu.m.		\$ 50	\$ 15,000	
Pit Run Backfill	1900 cu.m.		\$ 35	\$ 66,500	
Hot Mix Asphalt	350 tonnes		\$ 200	\$ 70,000	
Shoulder Gravel	740 cu.m.		\$ 60	\$ 44,400	
Hydrants	3 each		\$ 4,000	\$ 12,000	
Tie to existing main	3 each		\$ 5,000	\$ 15,000	
				Sub total	\$ 387,900
				Contingency (30%)	\$ 116,370
				Sub total	\$ 504,270
				Engineering (15%)	\$ 75,641
				Total	\$ 579,911
					\$ 579,911
1-11 Distribution System					
- Crome Point Road/Burne Road Watermain Replacement (200 mm)					
200 mm Gate Valve	4 each		\$ 1,500	\$ 6,000	
200 mm main	370 m.		\$ 200	\$ 74,000	
Asphalt cutting	750 m.		\$ 5	\$ 3,750	
Crushed Gravel	200 cu.m.		\$ 50	\$ 10,000	
Pit Run Backfill	700 cu.m.		\$ 35	\$ 24,500	
Hot Mix Asphalt	100 tonnes		\$ 200	\$ 20,000	
Shoulder Gravel	40 cu.m.		\$ 60	\$ 2,400	
Hydrants	2 each		\$ 4,000	\$ 8,000	
Tie to existing main	3 each		\$ 5,000	\$ 15,000	
				Sub total	\$ 163,650
				Contingency (30%)	\$ 49,095
				Sub total	\$ 212,745
				Engineering (15%)	\$ 31,912
				Total	\$ 244,657
					\$ 244,657
1-5a Water Storage					
- Existing Reservoir Replacement					
Bolted Steel Reservoir	600 Cubic Meters		\$ 675	\$ 405,000	
Site Preparation	1 LS		\$ 30,000	\$ 30,000	
Pipework	1 LS		\$ 50,000	\$ 50,000	
				Sub total	\$ 485,000
				Contingency (30%)	\$ 145,500
				Sub total	\$ 630,500
				Engineering (15%)	\$ 94,575
				Total	\$ 725,075
					\$ 725,075
1-5b Water Storage					
- Storage Reservoir Future Growth					
Bolted Steel Reservoir	410 Cubic Meters		\$ 700	\$ 287,000	
Site Preparation	1 LS		\$ 30,000	\$ 30,000	
Pipework	1 LS		\$ 50,000	\$ 50,000	
				Sub total	\$ 367,000
				Contingency (30%)	\$ 110,100
				Sub total	\$ 477,100
				Engineering (15%)	\$ 71,565
				Total	\$ 548,665
					\$ 548,665

Capital Works Cost Estimate

September 24, 2014

Description	Quantity	Unit	Rate	Extension	Total
1-6 Distribution System					
- DL 28 main (200mm)					
Right of Way Acquisition	0.25 ha		\$ 50,000	\$ 12,500	
Clear and grub	0.25 ha		\$ 15,000	\$ 3,750	
Highway Crossing	1 LS		\$ 60,000	\$ 60,000	
200 mm main	430 m.		\$ 200	\$ 86,000	
200 mm Gate Valve	2 each		\$ 1,500	\$ 3,000	
Hydrants	2 each		\$ 4,000	\$ 8,000	
Tie to existing main	2 ea		\$ 5,000	\$ 10,000	
			Sub total	\$ 183,250	
			Contingency (30%)	\$ 54,975	
			Sub total	\$ 238,225	
			Engineering (15%)	\$ 35,734	
			Total	\$ 273,959	\$ 273,959
1-7 Distribution System					
- Western Trunk Main (250mm)					
Right of Way Acquisition	1.2 ha		\$ 50,000	\$ 60,000	
Clear and grub	1.2 ha		\$ 15,000	\$ 18,000	
Highway Crossing	1 LS		\$ 60,000	\$ 60,000	
Railwayway Crossing	1 LS		\$ 60,000	\$ 60,000	
250 mm main	1950 m.		\$ 250	\$ 487,500	
250 mm Gate Valve	8 each		\$ 2,400	\$ 19,200	
Hydrants	7 each		\$ 4,000	\$ 28,000	
Tie to existing main	2 ea		\$ 6,000	\$ 12,000	
			Sub total	\$ 744,700	
			Contingency (30%)	\$ 223,410	
			Sub total	\$ 968,110	
			Engineering (15%)	\$ 145,217	
			Total	\$ 1,113,327	\$ 1,113,327
1-8 Distribution System					
- Dedicated Reservoir Feed Line (200mm)					
200 mm main	850 m.		\$ 200	\$ 170,000	
200 mm Gate Valve	6 each		\$ 1,500	\$ 9,000	
Tie to existing main	1 ea		\$ 5,000	\$ 5,000	
			Sub total	\$ 184,000	
			Contingency (30%)	\$ 55,200	
			Sub total	\$ 239,200	
			Engineering (15%)	\$ 35,880	
			Total	\$ 275,080	\$ 275,080

Deep Bay Waterworks District 2014 Report Review and Update			McElhanney Consulting Services Ltd 2231-27309-01.4		
Capital Works Cost Estimate			September 24, 2014		
Description	Quantity	Unit	Rate	Extension	Total
1-9 Distribution System					
- Morgan Loop (150mm)					
Asphalt cutting	400 m.		\$ 5	\$ 2,000	
Crushed Gravel	125 cu.m.		\$ 50	\$ 6,250	
Pit Run Backfill	1500 cu.m.		\$ 35	\$ 52,500	
Hot Mix Asphalt	65 tonnes		\$ 200	\$ 13,000	
Shoulder Gravel	25 cu.m.		\$ 60	\$ 1,500	
150 mm main	250 m.		\$ 180	\$ 45,000	
150 mm Gate Valve	2 each		\$ 1,100	\$ 2,200	
Hydrants	1 each		\$ 4,000	\$ 4,000	
Tie to existing main	1 ea		\$ 4,500	\$ 4,500	
			Sub total	\$ 130,950	
			Contingency (30%)	\$ 39,285	
			Sub total	\$ 170,235	
			Engineering (15%)	\$ 25,535	
			Total	\$ 195,770	\$ 195,770
1-10 Distribution System					
-Pumping Main (300mm)					
300 mm Gate Valve	2 each		\$ 3,500	\$ 7,000	
300 mm main	480 m.		\$ 310	\$ 148,800	
Hydrants	2 each		\$ 4,000	\$ 8,000	
Tie to existing main	2 ea		\$ 7,000	\$ 14,000	
			Sub total	\$ 177,800	
			Contingency (30%)	\$ 53,340	
			Sub total	\$ 231,140	
			Engineering (15%)	\$ 34,671	
			Total	\$ 265,811	\$ 265,811
Estimated costs are derived from recent experience locally, but there is no warranty that actual costs will not vary. McElhanney accepts no liability for actual costs which may vary from the estimated construction costs provided herein.					