Prepared By:

Township of Hamilton

Water Systems Capital Needs Assessment Report

GMBP File: 120024

AUGUST 2020

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Revision History:

Version	Date	Description	Revised by
0	7/6/2020	Draft Report	See below
1	7/21/2020	Second Draft – revised per Township comments	See below
2	7/27/2020	FINAL	See below
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WATER SYSTEMS CAPITAL NEEDS ASSESSMENT REPORT

TOWNSHIP OF HAMILTON

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1. INTRODUCTION

GM BluePlan (GMBP) was retained by the Township of Hamilton (the Township) to complete a condition assessment and develop a 10-year capital spending projection for its water systems, comprising two water treatment plants and three distribution systems.

This report summarizes the assessment and capital plan development methodology and results, including a summary of the observations and facility specific recommendations from the assessment activities, and a proposed capital plan in which recommendations have been prioritized based on a risk assessment.

2. BACKGROUND INFORMATION AND SYSTEM OVERVIEW

The Township owns and operates five water systems shown in Table 1: two water treatment plants and three distribution systems.

Table 1: Overview of Systems Assessed

Name	Description	Construction Year
Creighton Heights Water Treatment Plant	Groundwater well, treatment, storage, and distribution facility serving Creighton Heights Distribution System.	1996, major upgrade 2006
Creighton Heights Distribution System	Watermains, valves, hydrants, etc. distributing water to ~480 service connections	Varies, 1989 - 2015
Camborne Water Treatment Plant	Groundwater well, treatment, storage, and distribution facility serving Camborne Distribution System	2006
Camborne Distribution System	Watermains, valves, hydrants, etc. distributing water to ~85 service connections	Varies, 1983 - 2017
Cobourg Distribution System	Watermains, valves, hydrants, etc. distributing water to ~163 service connections	1995

The Township of Hamilton is located in Northumberland County between Lake Ontario and Rice Lake. The Creighton Heights system serves the communities of Baltimore and Creighton Heights and generally consists of 3 groundwater supply wells, a water treatment plant, and a water distribution system. The water distribution system has 4 pressure zones due to the significant change in topography of approximately 100 metres across the community. The Camborne system serves the community of Camborne and generally consists of 2 artesian groundwater supply wells, a water treatment plant, and a water distribution system. The Cobourg distribution system is located in the Township of Hamilton on the north side of Highway 401 and is supplied from the Town of Cobourg lake-based system by a watermain along Ontario Street.

There are no communal municipal sewage systems in the Township.

3. PROJECT METHODOLOGY

3.1 Overall Assessment Methodology

The methodology utilized as part of this study is summarized below.

1. Review background information and prepare preliminary asset inventory
2. Conduct site visit to gather data and complete asset inventory, including visual condition for each asset
3. Conduct desktop analysis of likelihood of failure, consequence of failure, and risk
4. Prepare draft capital plan considering risk analysis
5. Prepare draft report and submit for Township review
6. Update capital needs assessment based on Township feedback

3.2 Asset Inventory and Hierarchy

The asset inventory prepared in 2010 was updated to reflect current conditions and revised using an updated format including a structured hierarchy to support subsequent asset management analysis. The purpose of an asset hierarchy is to ensure that asset inventories are broken down into logical cohorts to support decisions that are made by subject matter experts about how, when, and why to spend money on assets. The asset hierarchy used in the database is presented in Table 2.

Table 2: Asset Hierarchy for the Asset Management Database

Facility	Asset Level 1	Asset Level 2	Asset Level 3	Asset Description
1 – CH WTP	Building	Building Architectural (BA)	Asset Type	Short description of asset
2 – CH DIST	Process	Building Electrical (BE)	Asset Type	
3 – CAM WTP	Site	Building Mechanical (BM)	Asset Type	
4 – CAM DIST		Building Structural (BS)	Asset Type	
5 – COBOURG DIST		Process Electrical (PE)	Asset Type	
		Process Instrumentation (PI)	Asset Type	
		Process Mechanical (PM)	Asset Type	
		Process Piping (PP)	Asset Type	
		Site Works (SW)	Asset Type	

3.3 Asset Information and Decision Support System Inputs

The data collected for each asset during field inspection includes, but is not limited to, the following items:

- Asset Description;
- Installation Date;
- Manufacturer;
- Model;
- Material;

- Size/Capacity;
- Code Concerns;
- General Inspection Notes;
- Visual Condition Rating;
- Unit and Total Replacement Costs; and
- Recommendations.

Replacement costs are intended to represent high-level materials and installation costs associated with like-for-like replacement, exclusive of any planning/studies, engineering, contingency, or additional costs related to the particulars of replacement such as bypass, shutdown, access or isolation.

Other database fields used in the decision support system, such as Estimated Service Life, Age Based Condition Rating, Likelihood of Failure, Consequence of Failure (COF), Risk, and Default Replacement Year were assigned to each asset after the inspection as described in the sections below.

3.4 Likelihood of Failure

Overall Likelihood of Failure (LOF) is made up of several factors. The physical condition or state of repair of an asset is often the primary factor used to make decisions about when and how it should be renewed (replaced or rehabilitated). Factors that may contribute to an assessment of likelihood of failure include the following:

- Visual appearance and other site observations – presence of visible deterioration (generally exterior only) or other signs of deterioration that can be directly observed without testing (e.g. sounds, temperature)
- Asset Age compared to Estimated Service Life (ESL)
- Condition based on specialized testing (e.g. vibration analysis, thermographic analysis) – generally utilized as a supplemental diagnostic tool when an asset's observed performance deviates from optimal operating conditions (for example, when a pump generates significant noise and vibration).
- Maintenance records reporting frequency of unplanned repairs or issues with equipment.

For the purposes of this project, overall likelihood of failure scores range from 1 to 5 (where 1 is the lowest likelihood and 5 is the highest likelihood) and are based on the data presented in Table 3. Specialized testing and maintenance records analysis were not included in the project scope but may be used in the future to refine the assessment.

Table 3: Data Fields Used to Calculate Likelihood of Failure

Field	Data Used
Age Based Condition	• Installation Year
	• Service Life
	• Asset Type and Material
Visual Condition	• Visual assessment of the asset's exterior physical condition

The LOF is calculated using the following formula:

$$LOF = x * C_{age} + y * C_v$$

Where LOF is the likelihood of failure, and C_{age} and C_v are age-based condition and visual condition, respectively, as defined in the following sections. The coefficients *x* and *y* represent the relative importance of C_{age} and C_v in the overall LOF assessment; these values have been set to 0.5 and 0.5, respectively, indicating that age and visual condition will be given equal weight. Where visual condition has not been ascertained (i.e. for buried or otherwise inaccessible assets), only C_{age} will be used to determine LOF.

Combining age based and visual condition scores in this way is intended to provide a balanced approach to address the limitations of each method alone:

- Considering age and ESL alone ignores the fact that ESL values are high level estimates and that actual service life depends on many factors such as environmental conditions, frequency of use, quality of equipment, and preventative maintenance. Assets may last much longer than the typical ESL, or may fail sooner.
- Asset age is not always known with certainty.
- Visual condition assessment is limited to the asset's exterior, which does not always correlate to the condition of important internal components.

3.4.1 Age Based Condition

C_{age} is based on installation year and service life and is calculated using the following formula:

$$C_{age} = 1 + 4 \times \left(\frac{Age}{ESL}\right)$$

If (Age/ESL) > 1 then the asset has surpassed its estimated service life, in which case C_{age} will be assigned a score of 5. The estimated service life (ESL) of an asset is assigned based on asset type and material using industry standard assumptions and engineering judgement. ESL values used in this analysis are listed in the asset database. These values may be refined in the future based on experience.

3.4.2 Visual Condition

Visual condition was assessed by GMBP inspectors in the field according to the definitions listed in Table 4. Typical signs of wear and tear used to assess condition include:

- Corrosion;
- Staining, discolouration, dampness, pooled water, or other evidence of leakage;
- Cracks or delamination;
- Dents, scratches, evidence of impacts or damage;
- Inadequate physical support for the asset; and
- Excessive noise, vibration or heat.

Table 4: Visual Condition Performance Ratings

Rating	Category	Description
NI	Not inspected	• Asset could not be visually inspected (e.g. submerged or buried asset)
1	Very Good	• Sound physical condition – no wear and tear, no or minimum risk of physical failure.
2	Good	• Acceptable physical condition – minor wear and tear, minimum risk of physical failure. • No immediate repair work required, or only minor work required (if any).
3	Fair	• Acceptable physical condition, moderate wear and tear, moderate risk of failure. • Minor work may be required, but asset is still serviceable.
4	Poor	• Poor physical condition – heavy wear and tear, failure is likely in short term. • Substantial work required in short term, asset barely serviceable.
5	Very Poor	• Failed or failure imminent. • Major work or replacement required urgently.

3.5 Consequence of Failure

Each asset was given a Consequence of Failure (COF) score that ranges from 1 to 5. The rating scale outlined in Table 5 reflects the consequence of failure of the individual asset relative to the overall functioning of the station as well as asset-specific health, safety, regulatory or financial risks. The following scale is based on COF ratings adopted by a number of major municipalities in Ontario and can be adjusted to suit the Township's specific risk management criteria.

Table 5: Asset Consequence of Failure Ratings

Weight	Category	Description
1	Very Low	• Service not affected or minimal impact • Redundancy based on demand and capacity is greater than 100% • Regulatory objectives and requirements met • Loss of equipment does not impact service or has minimal impact • Repair, loss of revenue, damages, losses or fines of <$10,000 • Negligible injuries
2	Low	• Localized disruption of service • Redundancy based on demand and capacity is >75%<100% • Regulatory objectives and requirements met • Loss of equipment causes localized disruption of non-essential service • Repair, loss of revenue, damages, losses or fines $10,000-$50,000 • Minor injuries, medical attention required
3	Moderate	• Localized disruption of service • Redundancy based on demand and capacity is <75% • Regulatory objectives not met but requirements met • Loss of equipment causes localized disruption of essential service • Repair, loss of revenue, damages, losses or fines $50,000-$500,000 • Serious injuries, multiple minor injuries
4	High	• Wide spread short disruption or long-term localization of disruption of service • No redundancy based on demand and capacity

Weight	Category	Description
		• Regulatory objectives and requirements not met • Loss of equipment causes wide spread short disruption or long-term localization of disruption of essential service • Repair, loss of revenue, damages, losses or fines $500,000-$1,000,000 • Multiple serious injuries, Loss of life
5	Very High	• Wide spread short disruption and long-term disruption of service • No redundancy based on demand and capacity • Regulatory objectives and requirements not met • Loss of equipment causes wide spread short disruption or long-term localization of disruption of essential service • Repair, loss of revenue, damages, losses or fines >$1,000,000 • Multiple loss of life

3.6 Risk Calculation

The risk associated with an asset failing was calculated as Risk = COF * LOF, which results in risk scores ranging from 1 to 25. Figure 1 shows the combinations of COF and LOF ratings and their corresponding risk scores. This approach to measuring risk is typical in many Ontario municipalities for prioritizing expenditures and the renewal of existing infrastructure. Risk scores of 9 or below would be considered "low" and are shaded green, risk scores of 10 to 15 would be considered "moderate" and are shaded yellow, and risk scores of 16 to 25 would be considered "high" and are shaded red.

		Likelihood of Failure (LOF)				
		1	2	3	4	5
Consequence of Failure (COF)	1	1	2	3	4	5
	2	2	4	6	8	10
	3	3	6	9	12	15
	4	4	8	12	16	20
	5	5	10	15	20	25

Figure 1: Risk Scores

3.7 Baseline Spending Forecast

Based on the asset LOF and COF scores and ESL values, a baseline 10-year spending forecast was prepared that calculates a default replacement year for each asset. This spending forecast is useful as a benchmark and as a starting point for capital planning. The baseline forecast assumes the following:

- LOF of each asset will increase over time at a rate proportional to its ESL
- For less critical assets with lower COF values (3 or less), replace when LOF reaches 5
- For more critical assets with COF values of 4 or 5, replace when LOF reaches 4.

3.8 Recommended Capital Plan

The baseline spending forecast was modified to create a recommended capital plan through the following steps:

1. Recommendations other than direct like-for-like asset replacement were assigned based on engineering judgment and in consultation with the Township; for example, asset repair, rehabilitation, upgrades, abandonment, twinning, or further studies. Costs and timing were adjusted accordingly using the columns "Recommended Action Cost" and "Recommended Action Year."
2. Asset replacements/repairs with similar timing were assigned into projects where like works allow for economical efficiencies, generally due to common elements, by building/location or by process stream. This was done using the columns "Project Name" and "Recommended Action Year.'
3. Total budgetary costs for each capital project were calculated based on the sum of all "Recommended Action Cost" values for a given project, with the following mark-ups applied: 10% Contingency, 15% Engineering.

4. CONDITION ASSESSMENT FINDINGS

Table 6 summarizes the number and replacement value of assets at each system, as well as average age, LOF, risk, and a summary of observations. All dollar figures presented are based on 2020 predicted cost rates in Canadian dollars intended to cover materials and installation and do not account for engineering and contingency.

Table 6: Condition Assessment Summary by Location

Location	No. Assets	Sum of Replacement Costs	Observations	Average Age	Average LOF[1]	Average Risk[2]
Creighton Heights WTP	134	$7,341,600	• Chronic issues related to well performance, water quality and treatment complexity; operator concerns regarding meeting demand in peak periods • Original equipment is aging and approaching end of service life • Indoor standby power generator does not meet latest TSSA/CSA B139 code • Roof of original building may be reaching end of life	17	2.9	7.9
Creighton Heights Distribution System	81	$8,243,960	• Did not inspect directly. • Most water meters are out of date and should be upgraded	22	2.3	5.1
Camborne WTP	79	$2,171,290	• Generally good performance • Some equipment approaching end of life in the next 10 years • Outdoor standby power generator has some compliance issues with latest TSSA/CSA B139 code	13	2.6	6.6
Camborne Distribution System	19	$838,180	• Did not inspect directly. • Most water meters are out of date and should be upgraded	33	3.0	7.8
Cobourg Distribution System	15	$1,584,320	• Did not inspect directly.	25	2.6	6.8
Total	**328**	**$20,179,350**		**18**	**2.7**	**6.8**

Notes

1. 1=Lowest Likelihood of Failure, 5=Highest Likelihood of Failure
2. 1=Lowest Risk, 25 = Highest Risk

On an average basis, assets had moderate LOF (average 2.7 out of 5) and low risk (average 6.8 out of 25.). However, on an individual basis there were several assets with high LOF and medium to high risk, which should be addressed in the short term. In addition, compliance issues with the TSSA/CSA B139 code for the standby power generator systems should be addressed, as non-compliance can cause fuel suppliers to refuse fuel delivery.

Figure 2 and Figure 3 below show the distribution of LOF scores and risk scores, respectively, by replacement cost and by asset count. Refer to the complete asset management database for detailed findings for each asset.

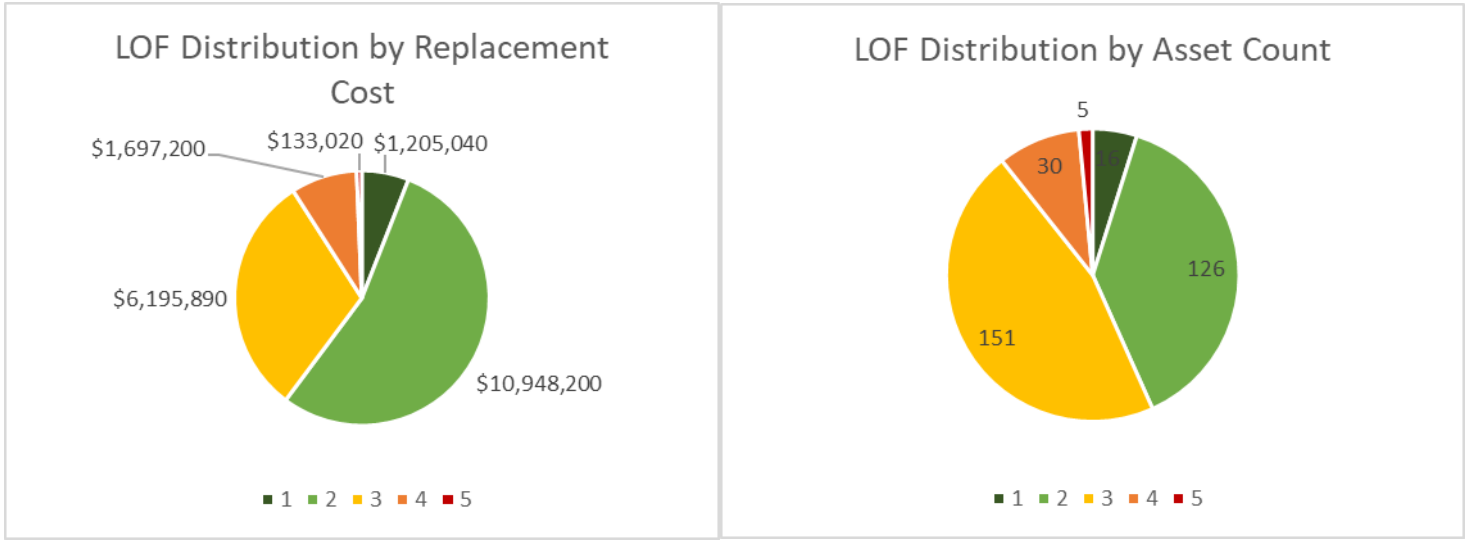


Figure 2: LOF Distribution

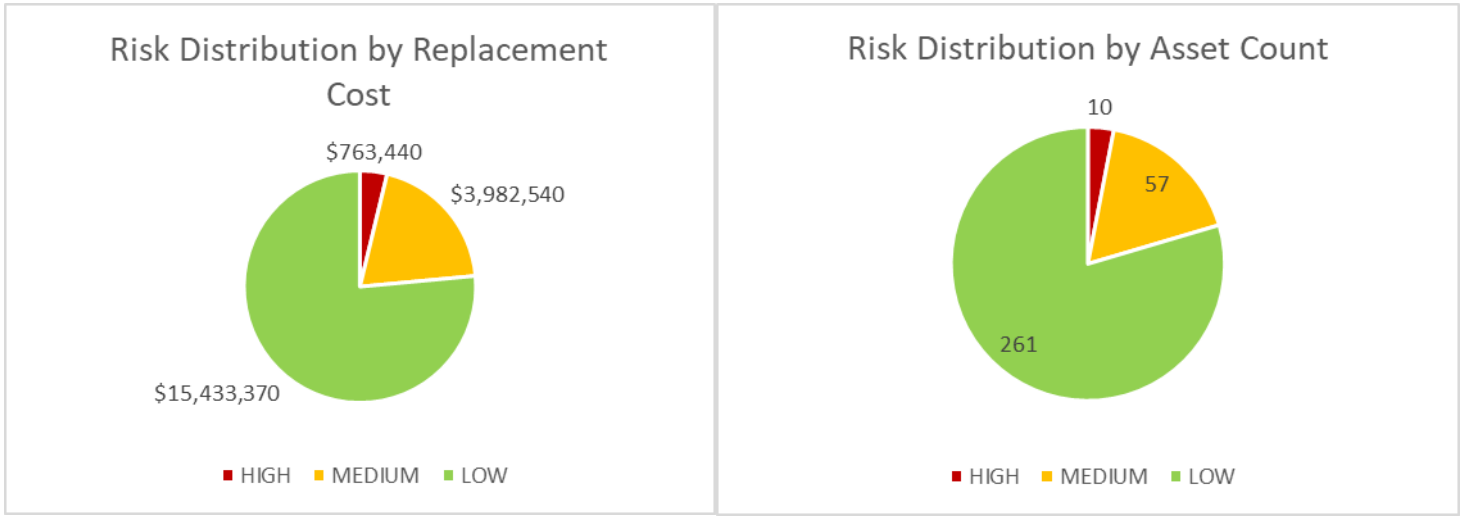


Figure 3: Risk Distribution

5. CAPITAL PLAN AND SPENDING FORECAST

5.1 Default Spending Forecast

Figure 4 below shows the baseline 10-year spending forecast. Predicted expenditures are $2,708,880 over the next 10 years, excluding any engineering or contingency.

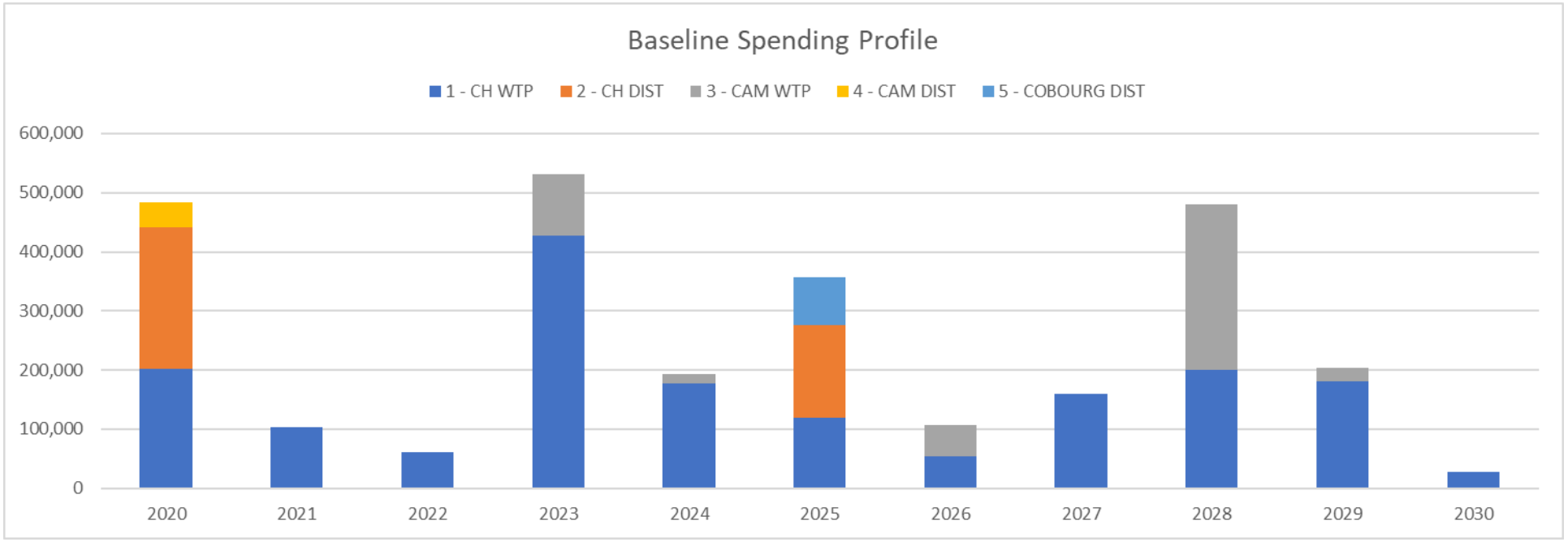


Figure 4: Baseline Spending Profile

5.2 Recommended Capital Plan

The 10-year recommended capital plan is summarized in Table 7 and Figure 5. As shown, when accounting for engineering and contingency, recommended expenditures are $3,181,100 over the next 10 years. This excludes an immediate project to upgrade Creighton Heights Well Instrumentation, which has already been approved for 2020.

Additional details for each capital project are included in the detailed asset database. This recommended plan is based on a one-time, high-level assessment only. Project planning and execution should take into account more up-to-date specialist assessments as well as any planned capital projects related to system optimization or growth. In particular, as discussed in more detail in Section 6, the Creighton Heights Water Supply Master Plan Study has been recommended to determine the optimal long-term water supply solution. Depending on the preferred alternative, the recommended capital plan may change.

Table 7: Recommended Capital Plan

Project Name	Suggested Project Year	Sum of Individual Costs	Total Project Cost	Comments
Creighton Heights Water Supply Master Plan Study	2021	$150,000.00	$150,000.00	Determine long-term water supply solution, considering chronic issues, water quantity and quality challenges experienced at this facility. High-level cost of study. See Section 6.
Creighton Heights Well Inspections & Upgrades	2021	$96,800.00	$121,000.00	Inspect wells, test pumps, replace pump for TW7, and upgrade chambers
Camborne Repairs	2021	$31,080.00	$38,900.00	Repair or replace aging pressure tank, rate of flow control valves
Water Meter Upgrades	2021	$282,500.00	$282,500.00	Upgrade all obsolete water meters in Creighton Heights and Camborne distribution systems. No additional costs required.
Creighton Heights Priority Treatment Equipment Upgrades	2022	$236,700.00	$295,900.00	Upgrades include: UV replacement, replacing methane blower with twinned system
Generator Code Upgrades	2022	$50,000.00	$62,500.00	Upgrade standby generators at both plants to ensure compliance with latest CSA B139/TSSA requirements or apply for variances
Priority Instrumentation & Control Upgrades	2023	$438,120.00	$547,700.00	Replace aging instruments and control panel hardware at both plants
Creighton Heights Priority Electrical Upgrades	2024	$284,600.00	$355,800.00	Replace aging MCC and automatic transfer switch; inspect transformer
Camborne Filter Media	2024	$15,400.00	$19,300.00	Replace filter media
Distribution System Preventative Maintenance	2025	$46,000.00	$57,500.00	Retain firm to inspect valves, hydrants and valve chambers, exercise valves, and repair or replace as needed.
Creighton Heights Roof and Site Repairs	2025	$125,000.00	$156,300.00	Replace roofing on older section of building and address site grading and drainage issues

Project Name	Suggested Project Year	Sum of Individual Costs	Total Project Cost	Comments
Creighton Heights High Lift Pumps	2027	$181,300.00	$226,700.00	Replace all high lift pumps
Camborne E,I&C Upgrades	2028	$179,290.00	$224,200.00	Replace electrical, instrumentation and control equipment reaching end of life, including MCC, automatic transfer switch, various instruments
Camborne Roof	2028	$75,000.00	$93,800.00	Replace roof
Creighton Heights Valve and Equipment Replacements	2029	$410,920.00	$513,700.00	Replace miscellaneous process equipment reaching end of life, including generator, well pumps, chemical feed system mixers, valves, instruments
Creighton Heights HVAC	2030	$28,170.00	$35,300.00	Replace aging HVAC equipment
TOTALS		**$2,630,880.00**	**$3,181,100.00**	

Notes :

1. The Recommended Capital Plan may be revised to bring some project forward if the Township has budget available.
2. The Suggested Project Year is general and some projects could be implemented slightly earlier or later based on actual operating conditions. The Suggested Year is not intended to define a precise date when equipment must be replaced to avoid failure.

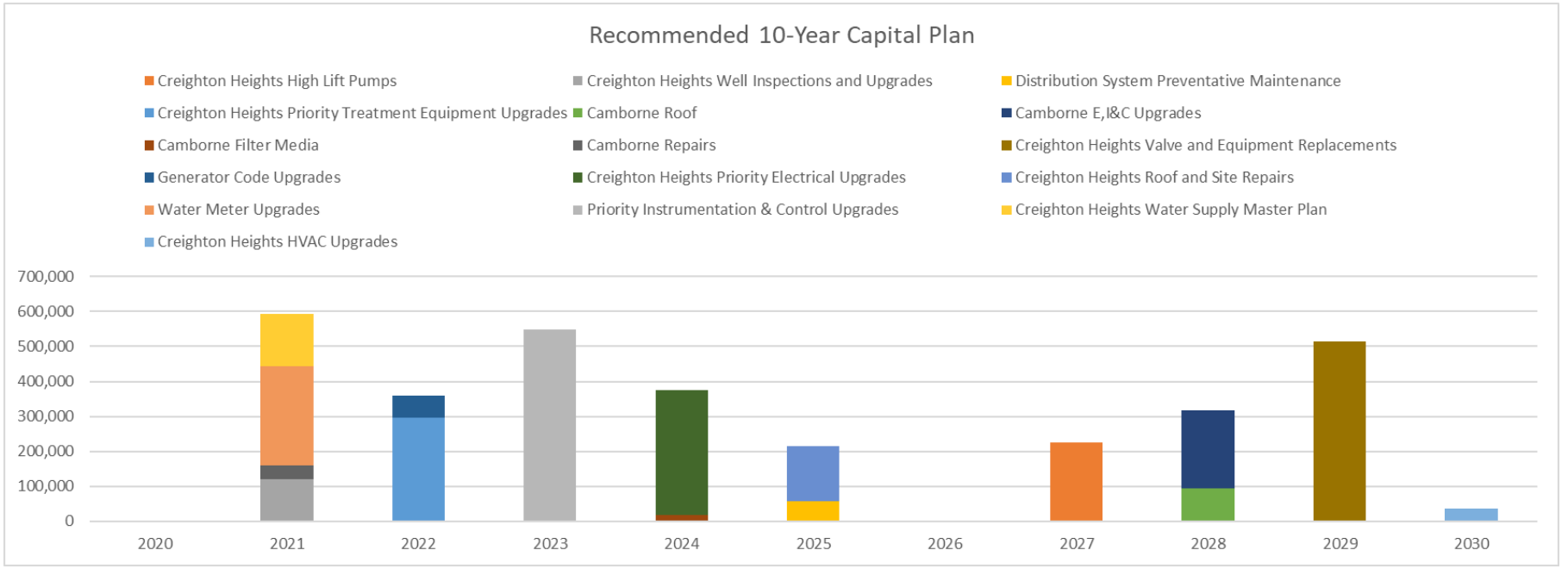


Figure 5: Recommended 10-Year Capital Plan

6. RECOMMENDED INFRASTRUCTURE PLANNING STUDIES

Based on recent discussions with the Township, it was suggested to start assessing the long-range status of the Creighton Heights water supply and treatment system to meet future water demands in the communities of Baltimore and Creighton Heights.

6.1 Background

The Township of Hamilton owns and operates two (2) water supply systems; the Creighton Heights Water System and the Camborne Water System. The Camborne system consistently operates well below capacity and is considered to have sufficient capacity to meet expected growth for at least the next 10 years. The Creighton Heights system occasionally operates near capacity during periods of high demand such as hot summer periods and is not considered to have sufficient capacity to meet expected growth for the next 10 years. The following table provides a general summary of capacities for the 2 Township water supply systems.

Table 8: Summary of Water System Capacities

Facility Description	Permits / Approvals	Rated Capacity	Operational Capacity	Capacity Utilization
Creighton Heights Water Supply System				
Wells TW1, TW6, and TW7	PTTW 7265-8W9HLX	979 cu.m./day	~700 cu.m./day	50 to 85%
Treatment Plant	MDWL 139-102 DWWP 139-202	979 cu.m./day	979 cu.m./day	30 to 60%
Camborne Water Supply System				
Wells 1A and 2A	PTTW 2140-AP5P6D	412 cu.m./day	~300 cu.m./day	20 to 40%
Treatment Plant	MDWL 139-103 DWWP 139-203	415 cu.m./day	415 cu.m./day	15 to 30%

Notes :

MDWL : Municipal Drinking Water License
DWWP : Drinking Water Works Permit
PTTW : Permit To Take Water

Capacity Utilization values indicated in the above table are based on Operational Capacity. Operational capacity is based on recent operating experience of Township staff.

6.2 Planning for Future Water Supply Alternatives

It is common practice in the municipal water and wastewater industry to begin long range planning when a facility reaches 80% of its production capacity. Planning typically takes the form of a Master Plan for broad-based studies or a Municipal Class Environmental Assessment (EA) for more project-specific studies. Typical alternatives that are evaluated to address municipal servicing constraints may include :

- Do Nothing (base case scenario)
- Limit Community Growth
- Water Conservation
- Optimize Existing Facilities
- Expand Existing Facilities
- Develop New Sources or Facilities

Based on recent operating experience with supply and demand at the Creighton Heights water plant, it would be prudent for the Township to be aware of the need to begin long-term planning for water supply alternatives for the Baltimore – Creighton Heights community. The intent of the following sections is to explore technical and financial considerations in developing a new water supply to replace the existing Creighton Heights water supply wells and treatment plant located at 9235 Dale Road (County Road 74).

The existing water treatment facility was originally put into service in 1996, with major upgrades completed in 2006 along with minor upgrades since original construction. The plant is supplied with raw water from 3 drilled groundwater wells. Although the raw water quality is considered bacteriologically safe for potable water supply, complex treatment is required due to several naturally-occurring chemicals in the groundwater, including ammonia, iron, manganese, methane, and organics. Incremental plant upgrades and expansions along with complex treatment makes the plant challenging to operate. The site for the existing wells and treatment plant is located on the side of a steep hill which would make future upgrades and expansion problematic.

Due to the above considerations, this Capital Needs Assessment Report includes the following discussion on potential future alternatives for a new water supply system for the Creighton Heights community, specifically a new water supply source and treatment facility. The new water supply would service the existing customers through the existing distribution system. A key consideration in the development of water supply alternatives is the range of ground elevations across the service area being approximately 100 metres from Baltimore Road at Division Street (~ 110 m) to Phase 2 of Deerfield Estates (~210 m).

Figures for the existing Creighton Heights water supply system and suggested alternative supply options are presented at the end of the text. Detailed line-item breakdowns for the budget estimates presented in this Section of the Report are included in Appendix A.

Figure 6 presents a topographic map (MNRF web site) of the Creighton Heights water service area with the locations of the various pressure zones, water supply wells, and water treatment plant. Figures 7 to 9 show hydraulic profiles of the existing system and Alternatives 2 and 3 described below.

Figures 10 to 12 show process flow diagrams for Alternatives 1, 2, and 3 described below. Figures 13 to 15 show aerial photographs (MNRF web site) of suggested locations for Alternatives 1, 2 and 3 described below. Alternative 1 would be a future Township-based water supply facility, and Alternatives 2 and 3 would be a future Township water supply from Cobourg. Figure 16 shows a graphic of a composite style elevated tank consisting of a steel bowl for elevated water storage mounted on a concrete pedestal.

6.3 Description of Water Supply Alternatives

Alternative No. 1 - Establish A New Water Supply in Township

This alternative is to construct a new water treatment facility including new wells at a suitable location in the community. The facility would continue to be owned and operated by the Township of Hamilton. Based on discussions with Township operation staff and for the purposes of exploring this option, the suggested site for new wells and treatment plant could be on the eastern side of the Baltimore Community Centre property as shown below in Figure 10. Further, it is assumed that raw water quality from new wells would be similar to the existing wells, and consequently the treatment processes would also be similar. The capacity of the treatment plant is chosen to be the same as the existing plant, but there is physical space at the new site to drill more wells and/or expand the treatment facility in future as demand warrants.

Key components of a new water supply under this alternative include :

- Well Development Program for two (2) new production wells
- Water treatment plant with filtration and disinfection
- Pumping equipment from wells to treatment plant
- Pumping equipment from treatment plant to the existing distribution system
- New Hydro service to facility
- New transmission main from plant to existing distribution system at Van Luven Road and Nagle Road
- Partial decommissioning of existing treatment plant
- Full decommissioning of existing wells
- Maintain Deerfield Estates distribution pumping system at the existing treatment plant
- Assume no property acquisition - use a small portion of the east side of the Baltimore community park for future water treatment facility

Key risks or unknowns with this alternative include :

- Finding productive municipal water supply wells that can meet demand
- Suitable wells may not be located on municipally-owned land

The following table presents a high-level breakdown of an opinion of probable costs for implementing this alternative.

Table 9: Budget Estimate for New Township Water Supply

	Category Description	Budget Estimate
1.	General	$ 230,000
2.	Site Works and New Production Wells	$ 1,360,000
3.	Buildings and Structural	$ 1,900,000
4.	Process Equipment	$ 2,080,000
5.	Power Supply and Electrical Work	$ 1,630,000
	Construction Sub-Total	**$ 7,210,000**
6.	Master Planning and Studies	$ 400,000
7.	Engineering – Design and Construction Support	$ 1,120,000
8.	Contingency – 15%	$ 1,310,000
	Total Capital Budget Estimate (excl. HST)	**$ 10,040,000**

Alternative No. 2 - Establish A New Water Supply from Cobourg

This alternative would involve re-establishing a connection to the Cobourg water supply system to deliver treated water from their system into the Township. The connection would be an underground pipeline along Baltimore Road under Highway 401. It is noted that there was a connection that supplied water from Cobourg into the Township for customers in the Carleton Blvd. area, but that connection was taken out of service by the Ministry of Transportation (MTO) in 2015 when Highway was upgraded. For the purposes of discussion, it is assumed that a future connection to the Cobourg water system would be in the same location.

This alternative will require consultations between the Township of Hamilton and the Town of Cobourg and MTO regarding the feasibility of this alternative. If it is determined to be viable, detailed technical and financial considerations will have to be worked out. Cobourg has a conventional surface water treatment plant that draws water from Lake Ontario for treatment and distribution to the Town of Cobourg which has approximately 20,000 residents. With this Alternative, the Creighton Heights distribution system would be converted from a combined chlorine (mono-chloramine) residual to a free chlorine residual for secondary disinfection.

A pipeline crossing under Highway 401 will require extensive consultations and approvals process with the Ministry of Transportation of Ontario (MTO).

Key components of a new water supply under this alternative include :

- Property acquisition in the vicinity of Baltimore Road and Carleton Blvd.
- Pipeline crossing under Highway 401
- Reservoir, booster pumping station, and re-chlorination facility at location of new property
- Inline booster pumps to deliver water to existing treatment plant on Dale Road
- High lift booster pumps to deliver water to Pressure Zone 3
- New Hydro service to new facility
- Water transmission main along Baltimore Road from new facility to existing treatment plant on Dale Rd. (approx. distance is 4.5 km)
- Modifications to distribution system for different pressure zones
- Partial decommissioning of existing treatment plant
- Full decommissioning of existing wells
- Maintain Deerfield Estates distribution pumping system at the existing treatment plant

Key risks or unknowns with this alternative include :

- The Township of Hamilton would have to purchase available capacity within the Cobourg water supply system. This cost could be substantial and is a significant unknown. The amount would be subject to extensive consultations and negotiations between the Township of Hamilton and the Town of Cobourg.
- Cost and approvals from MTO for a pipeline crossing under Highway 401
- Property acquisition in the vicinity of Baltimore Road and Carleton Blvd.

The following table presents a high-level breakdown of an opinion of probable costs for implementing this alternative.

Table 10: Budget Estimate for New Cobourg Water Supply

	Category Description	Budget Estimate
1.	General	$ 230,000
2.	Site Works	$ 2,270,000
3.	Buildings and Structural	$ 670,000
4.	Process Equipment	$ 510,000
5.	Power Supply and Electrical Work	$ 480,000
	Construction Sub-Total	**$ 4,160,000**
6.	Master Planning and Studies	$ 50,000
7.	Engineering – Design and Construction Support	$ 670,000
8.	Contingency – 15%	$ 730,000
	Total Capital Budget Estimate (excl. HST)	**$ 5,610,000**
9.	Capacity Payment from Township of Hamilton to Town of Cobourg	**$ 5M to $15M** ***(See Note 1.)***

1. ***It is noted that the cost to purchase available capacity within the Cobourg water supply system is a significant unknown. That amount may be proportional to the relative demand applied to the cost of Cobourg's treatment and transmission infrastructure. Creighton Heights has approximately 480 customers while Cobourg has approximately 7,700 customers. The value shown in the table above is not known at this time and would be subject to extensive consultations and negotiations between the Township of Hamilton and the Town of Cobourg.***

The location for the Highway 401 crossing will be established during a Master Plan or EA. Options may include :

- Connection to the 400mm watermain on Division Street and continuing with a 300mm watermain along Baltimore Road under Highway 401 to Hamilton Township
- Connection to the 400mm watermain at Division Street and Veronica Street, continuing with a 300mm water along Division Street, then crossing Highway 401 towards Division Street N. in Hamilton Township, and extending to Baltimore Road.
- Connection to the 300mm watermain at the east end of Densmore Road, continuing with a 300mm water along Densmore Road/Division Street, then crossing Highway 401 towards the east end of Slater Street in Hamilton Township.
- Connection to the 300mm watermain at the east end of Densmore Road, continuing with a 300mm water along Densmore Road/Division Street eastward to Nagle Road. Cross Highway 401 and continue along Nagle Road northward into the Creighton Heights community.

Alternative No. 3 - Establish A New Water Supply from Cobourg with Elevated Storage

This alternative would be very similar to Alternate 2, except booster pumping would be at high head to a new elevated water tank, and the existing Creighton Heights water treatment plant would be completely decommissioned.

Key components of a new water supply under this alternative include :

- Property acquisition in the vicinity of Baltimore Road and Carleton Blvd. for booster pumping and re-chlorination facility

- Property acquisition on west side of Baltimore Road and Carleton Blvd. just south of Roxburgh golf course for new water tower
- Pipeline crossing under Highway 401
- Reservoir, booster pumping station, and re-chlorination facility at location of new property
- Water Tower at location of new property
- Hydro services to new facilities (2)
- Water transmission main along Baltimore Road from new booster pumping station to new Water Tower (approx. distance is 1.5 km)
- Water transmission main along Baltimore Road from new Water Tower to Deerfield Estates (approx. distance is 1.8 km)
- Full decommissioning of existing treatment plant
- Full decommissioning of existing wells
- New Deerfield Estates booster pumping station from new water tower

Key risks or unknowns with this alternative include :

- The Township of Hamilton would have to purchase available capacity within the Cobourg water supply system. This cost could be substantial and is a significant unknown. The amount would be subject to extensive consultations and negotiations between the Township of Hamilton and the Town of Cobourg.
- Cost and approvals from MTO for a pipeline crossing under Highway 401
- Property acquisition for a new booster pumping facility and for elevated water storage

The following table presents a high-level breakdown of an opinion of probable costs for implementing this alternative.

Table 11: Budget Estimate for New Cobourg Water Supply with Elevated Storage

	Category Description	**Budget Estimate**
1.	General	$ 300,000
2.	Site Works	$ 2,050,000
3.	Buildings and Structural	$ 170,000
4.	Process Equipment	$ 400,000
5.	Power Supply and Electrical Work	$ 480,000
	Construction Sub-Total	**$ 3,400,000**
6.	Master Planning and Studies	$ 50,000
7.	Engineering – Design and Construction Support	$ 560,000
8.	Contingency – 15%	$ 600,000
	Supply from Cobourg - Budget Estimate (excl. HST)	**$ 4,610,000**
9.	**Elevated Storage - Budget Estimate (excl. HST)**	**$ 3,450,000**
10.	**Total Capital Budget Estimate (excl. HST)**	**$ 8,060,000**
11.	Capacity Payment from Township of Hamilton to Town of Cobourg	**$ 5M to $15M** ***(See Note 1.)***

1. ***It is noted that the cost to purchase available capacity within the Cobourg water supply system is a significant unknown. That amount may be proportional to the relative demand applied to the cost of Cobourg's treatment and transmission infrastructure. Creighton Heights has approximately 480 customers while Cobourg has approximately 7,700 customers. The value shown in the table above is not known at this time and would be subject to extensive consultations and negotiations between the Township of Hamilton and the Town of Cobourg.***

Alternative No. 4 - Provide Elevated Storage

Construction of elevated storage could be implemented independently of the water supply source for Creighton Heights. Key considerations for site selection are community aesthetic considerations, proximity to the customer base, proximity to large diameter watermains, and favourable ground elevation.

Some of the key components of this alternative include :

- No property acquisition - assume use of a small portion of the east side of the Baltimore Community Centre park for future water tower
- Access road to new water tower
- New Hydro service to new water tower
- Water Transmission main from new water tower to the nearest large diameter watermain which is located at the intersection of Van Luven Road and Nagle Road.

The following table presents a high-level breakdown of an opinion of probable costs for constructing elevated storage in the community.

Table 12: Budget Estimated for Elevated Storage

	Category Description	Budget Estimate
1.	General	$ 200,000
2.	Site Works and New Production Wells	$ 610,000
3.	Buildings and Structural	$ 2,020,000
4.	Process Equipment	$ 100,000
5.	Power Supply and Electrical Work	$ 290,000
	Construction Sub-Total	**$ 3,220,000**
6.	Master Planning and Studies	$ 75,000
7.	Engineering – Design and Construction Support	$ 200,000
8.	Contingency – 15%	$ 530,000
	Total Budget Estimate (excl. HST)	**$ 4,030,000**

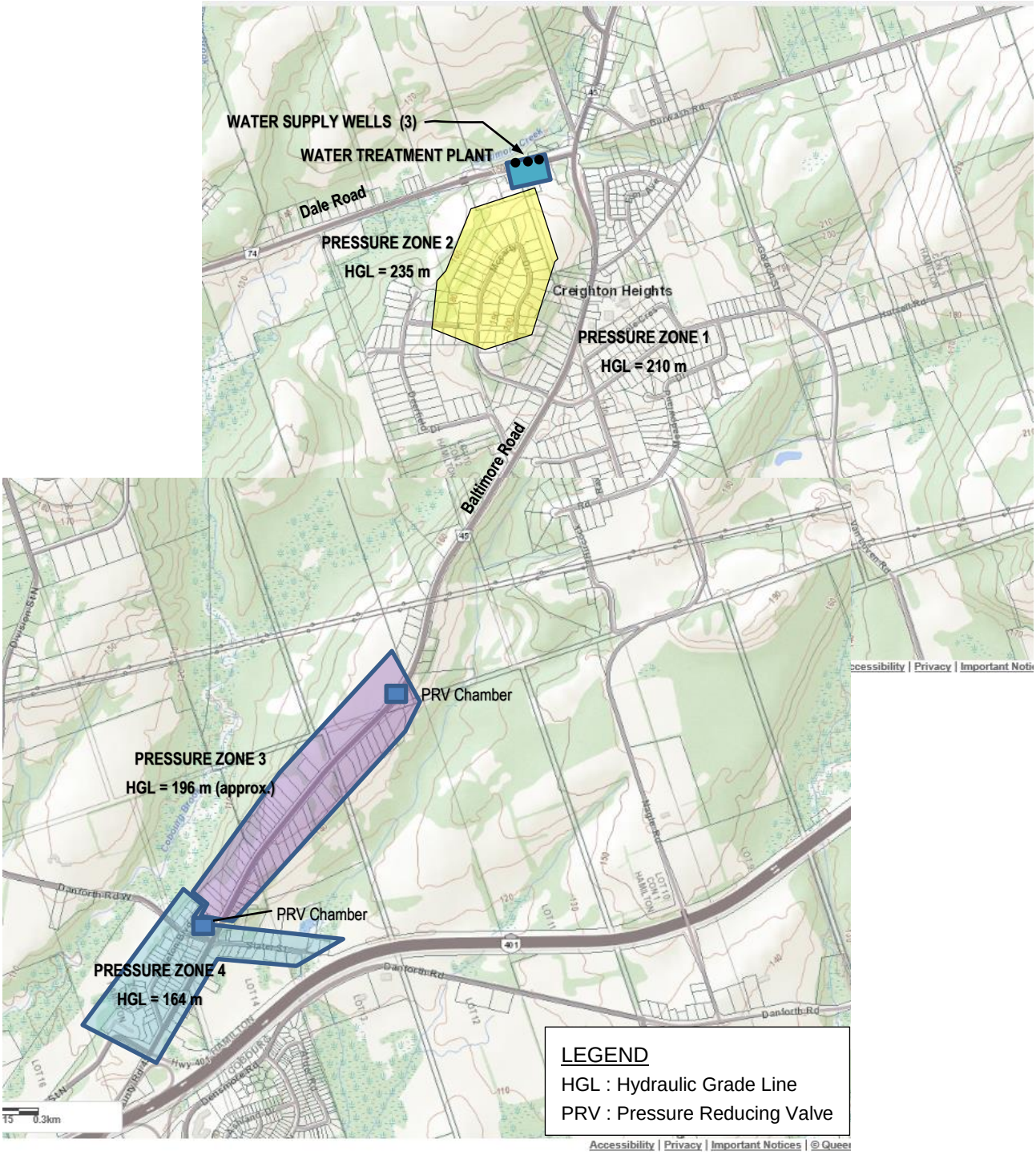
It is noted that there are potential savings of approx. $700,000 to $800,000 for an access road, water transmission main, and Hydro service if an elevated tank is combined with a new treatment facility at the same site since those items would be common.

7. CONCLUSIONS AND RECOMMENDATIONS

In conclusion, GMBP created an updated asset inventory database and capital plan based on a visual condition assessment and desktop risk assessment. The assessment found that the majority of assets were considered to have moderate likelihood of failure (LOF) and low risk overall; however, several individual assets were found to have high LOF, medium to high risk, and/or code concerns, which should be addressed in the short term. The recommended capital plan includes a total of $3,181,100 of proposed spending over the next 10 years.

GMBP recommends that the Township initiate a Water Supply Master Plan or a Schedule "C" Municipal Class EA in the next 1-3 years to identify and evaluate alternatives for long-term water supply for the communities of Baltimore and Creighton Heights. These planning studies should include a component with discussions between the Township of Hamilton and Town of Cobourg to explore the mutual benefit of extending the water supply from Cobourg north of Highway 401 to supply the Township and to provide inground storage at a favourable elevation to serve Cobourg. Budget for a Master Plan has been included the recommended capital plan for initiation in 2021. Results of the Master Plan may alter the recommended capital plan.

We recommend that this Capital Needs Assessment be repeated in 5 years to provide an updated capital outlook and to support regular updates of the Township Water Rate Studies.



Base Map Source : MNRF Satellite Imagery

Figure 6: Topographic Map of Creighton Heights Water Supply System

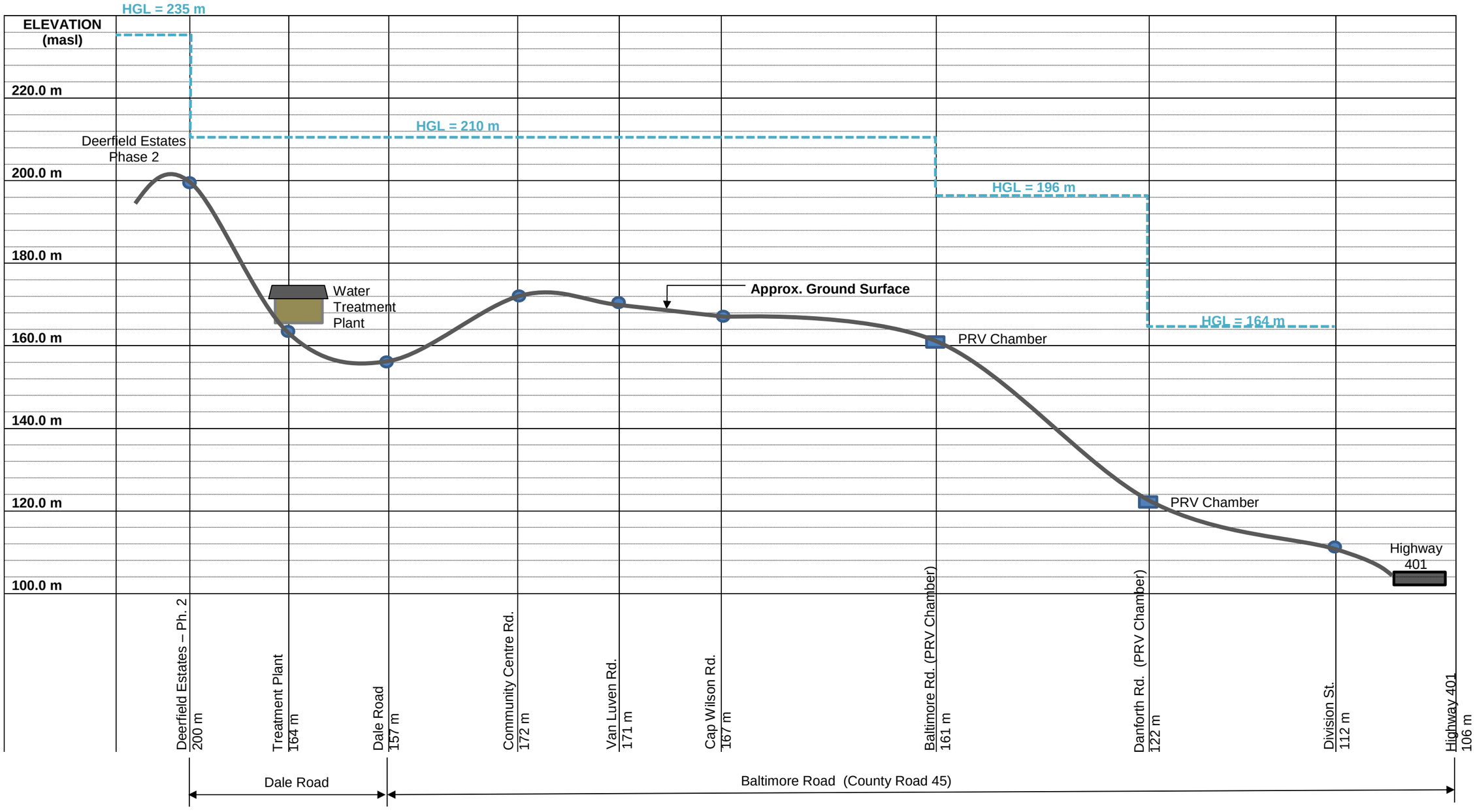


Figure 7: Creighton Heights Water Supply Hydraulic Profile (Existing System)

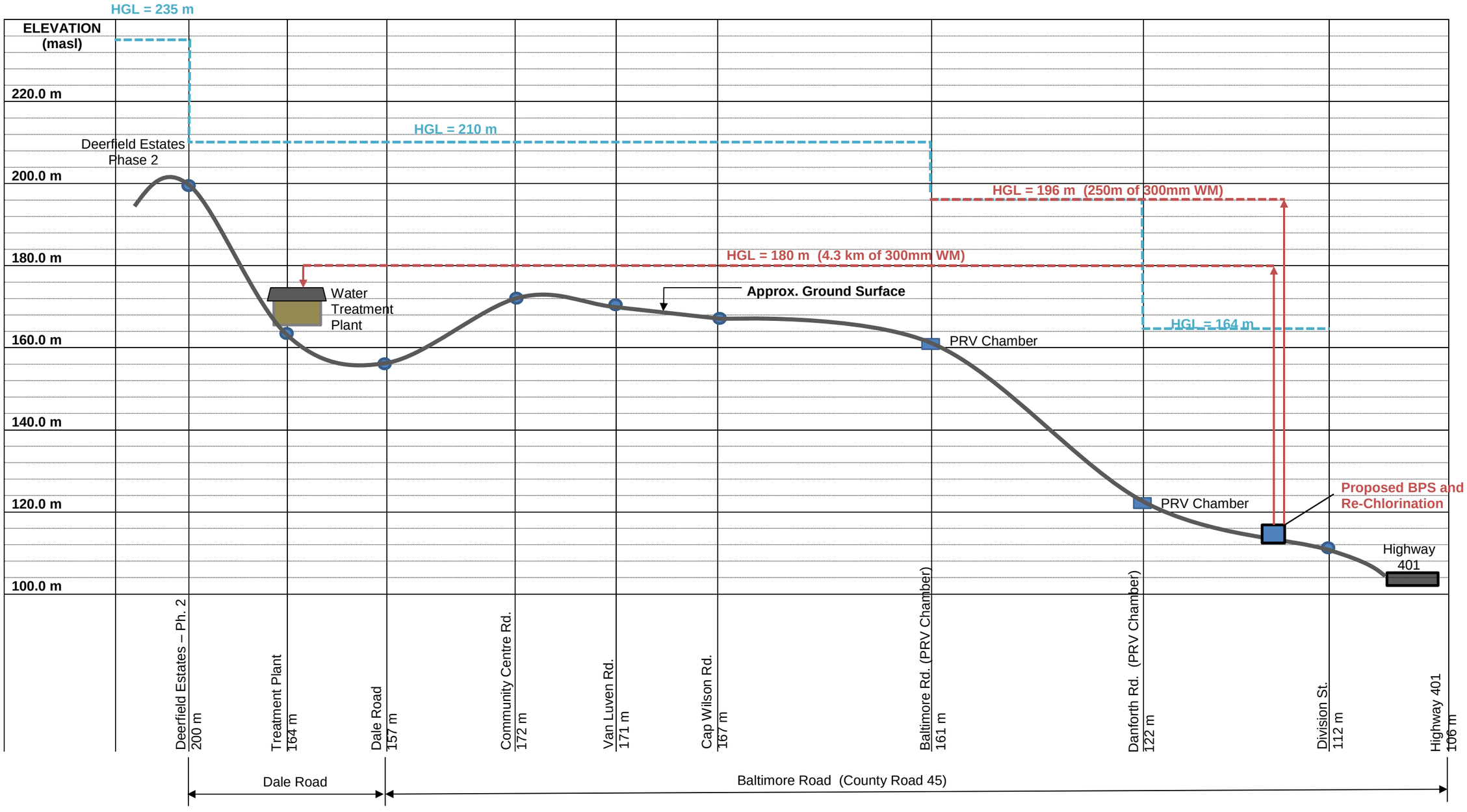


Figure 8: Creighton Heights Water Supply Hydraulic Profile (Alternative 2)

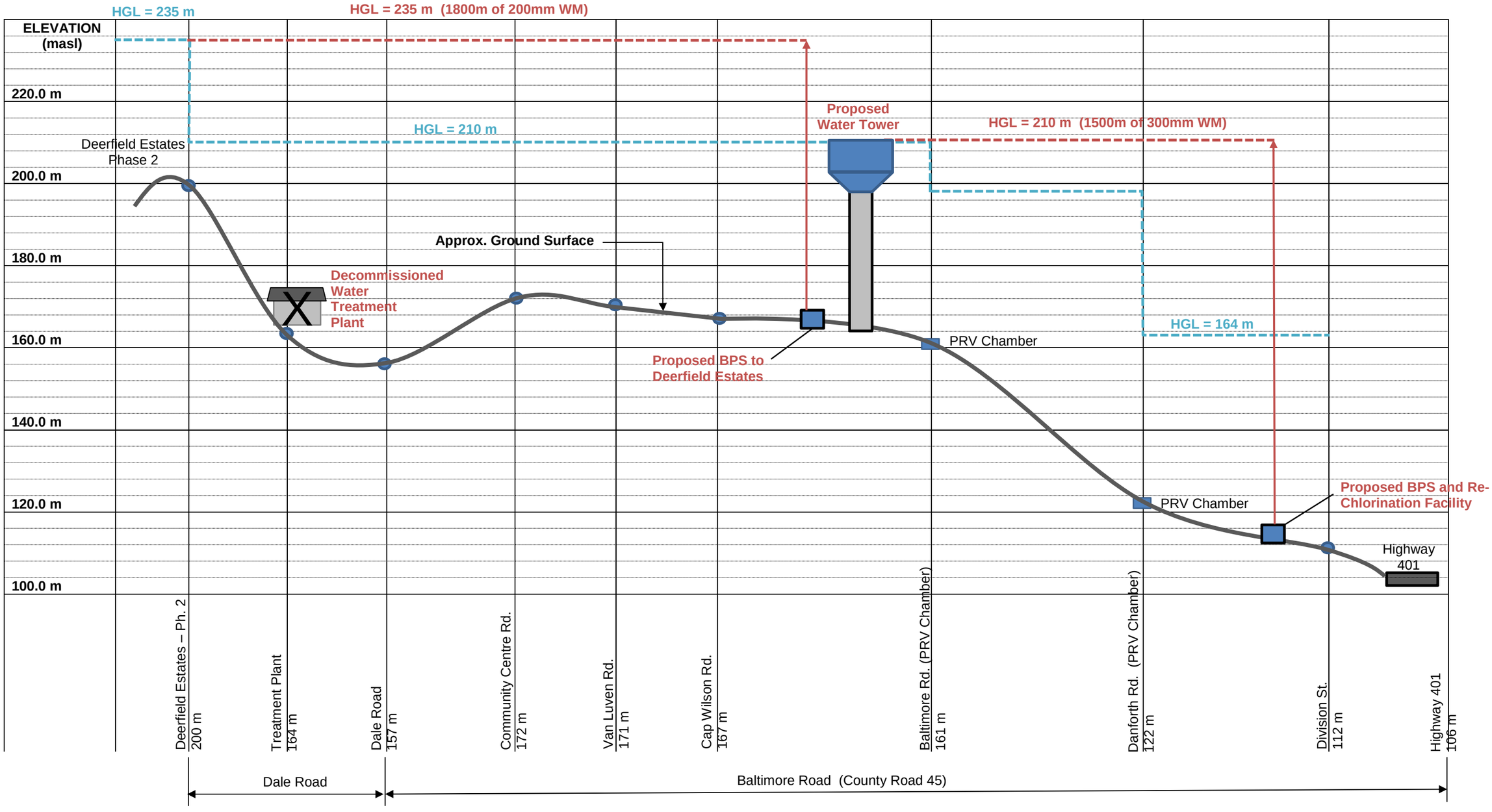
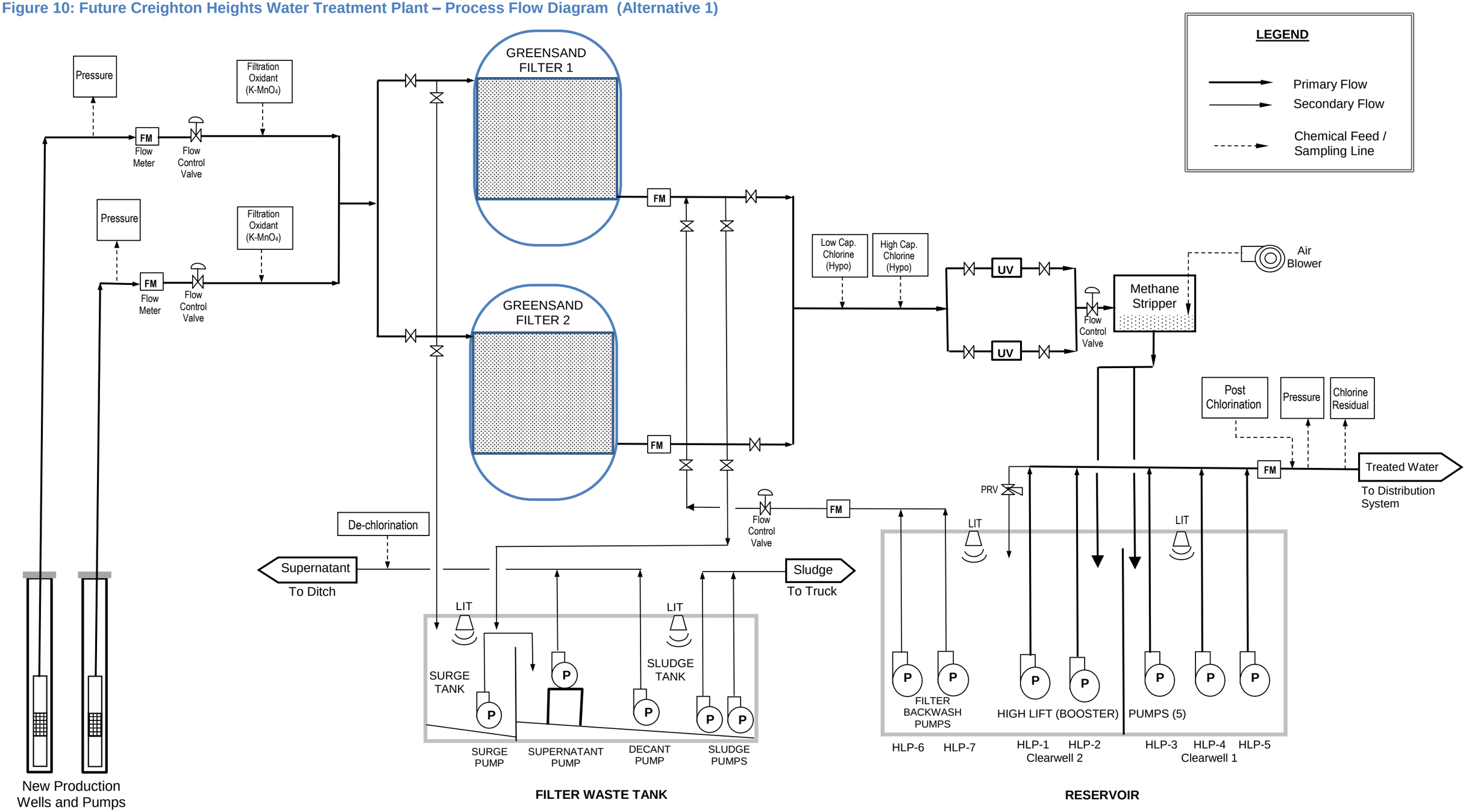


Figure 9: Creighton Heights Water Supply Hydraulic Profile (Alternative 3)

Figure 10: Future Creighton Heights Water Treatment Plant – Process Flow Diagram (Alternative 1)



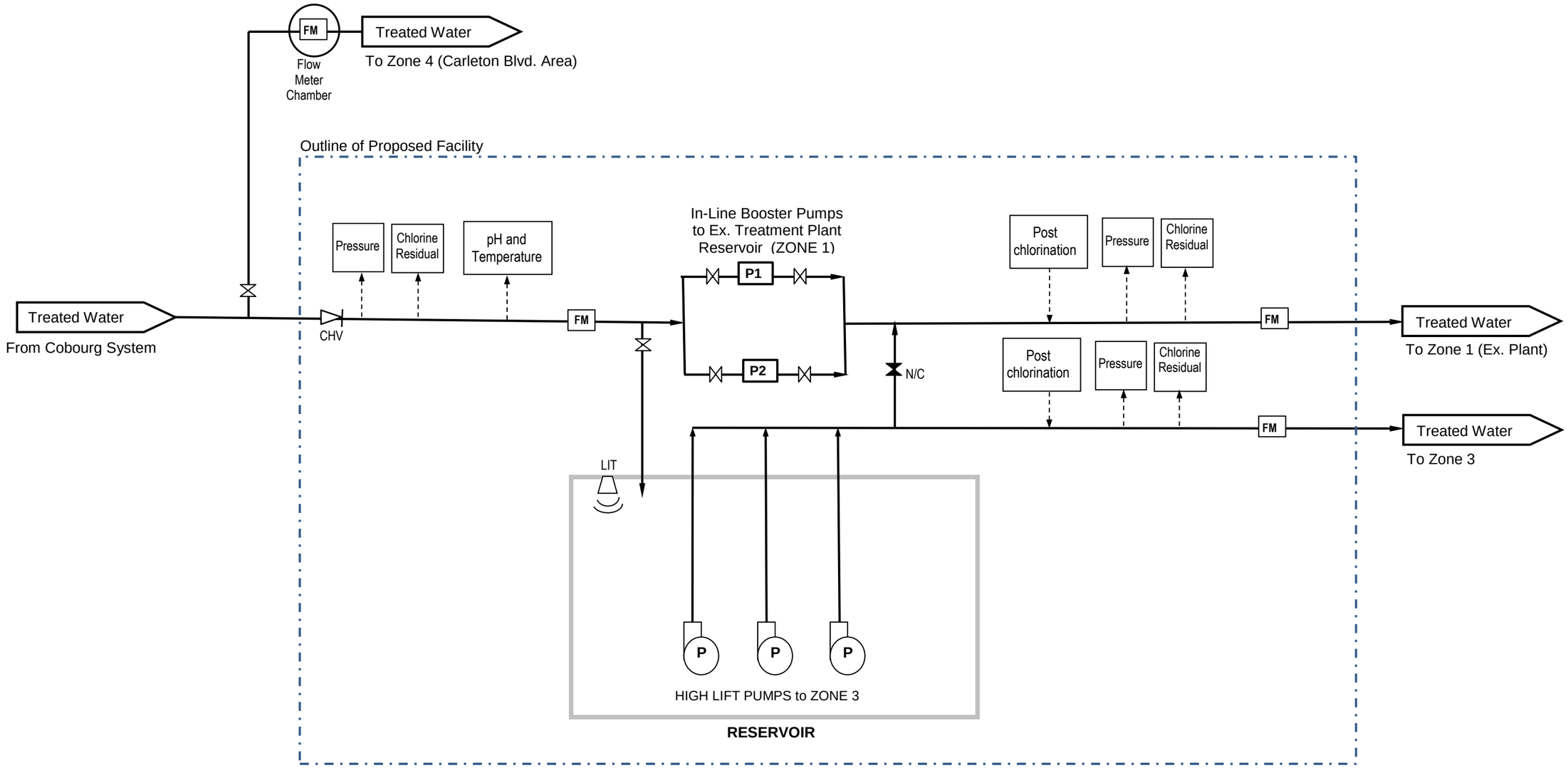


Figure 11: Future Water Supply from Cobourg – Process Flow Diagram (Alternative 2)

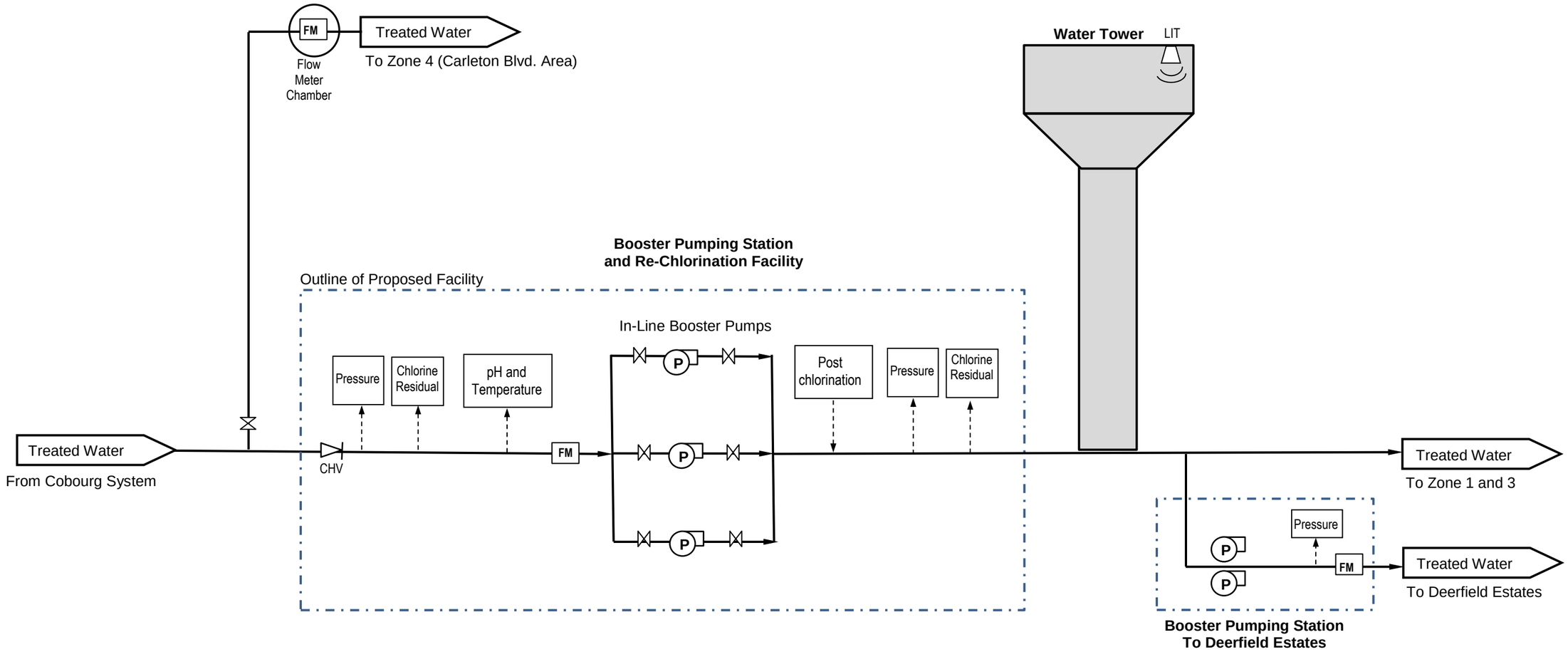
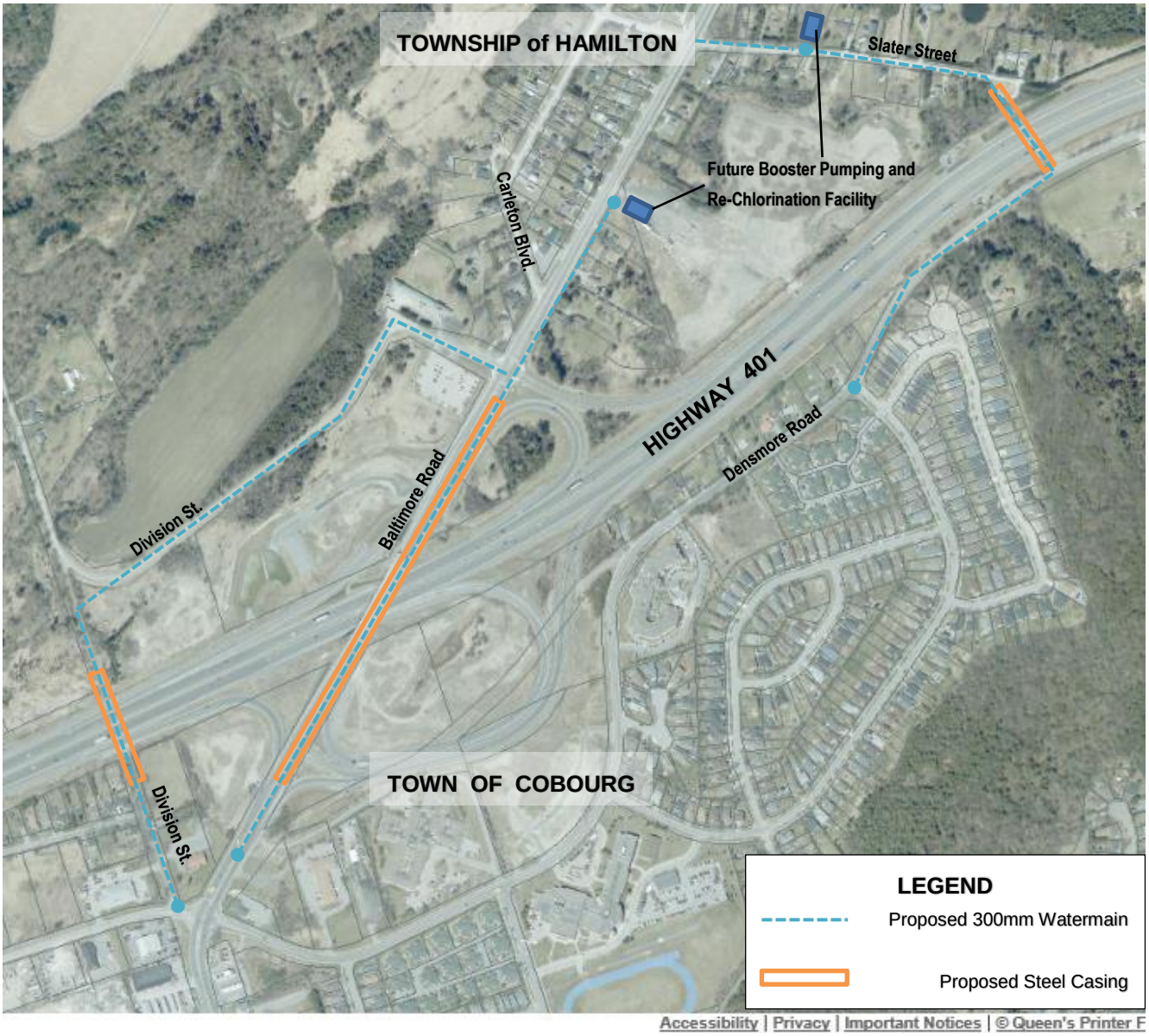


Figure 12: Future Water Supply from Cobourg with Elevated Storage – Process Flow Diagram (Alternative 3)

Base Map Source : MNRF Satellite Imagery

Figure 13: Suggested Location for Future Water Treatment Facilities (Alternative 1)

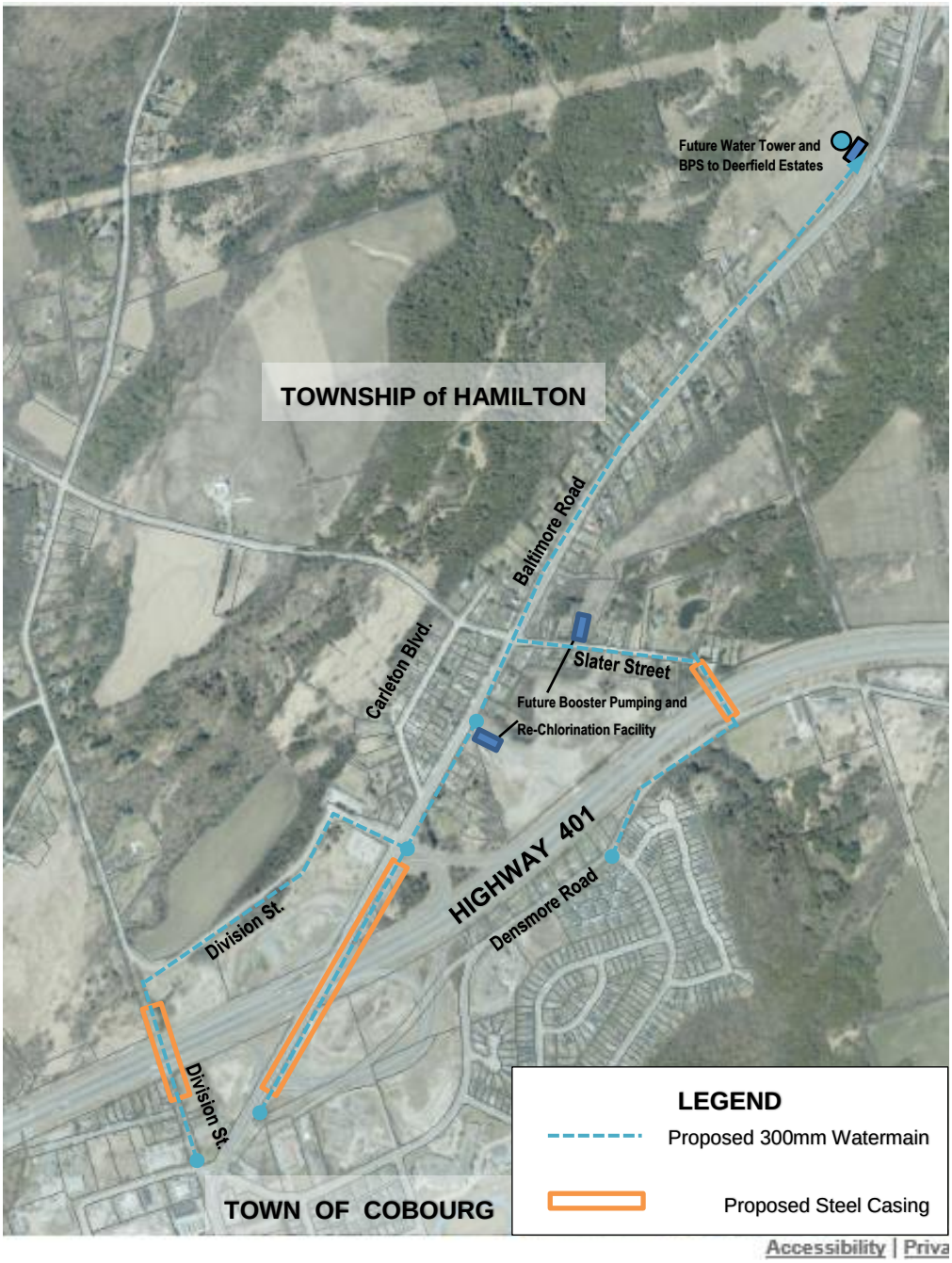


Note

Suggested locations for proposed pipeline crossing under Highway 401 and for a proposed booster pumping and re-chlorination facility would be assessed under a separate water supply study.

Base Map Source : MNRF Satellite Imagery

Figure 14: Suggested Locations for Supply from Cobourg (Alternative 2)



Note
Suggested locations for proposed pipeline crossing under Highway 401 and for a proposed booster pumping and re-chlorination facility would be assessed under a separate water supply study.

Base Map Source : MNRF Satellite Imagery

Figure 15: Suggested Locations for Supply from Cobourg with Elevated Storage (Alternative 3)

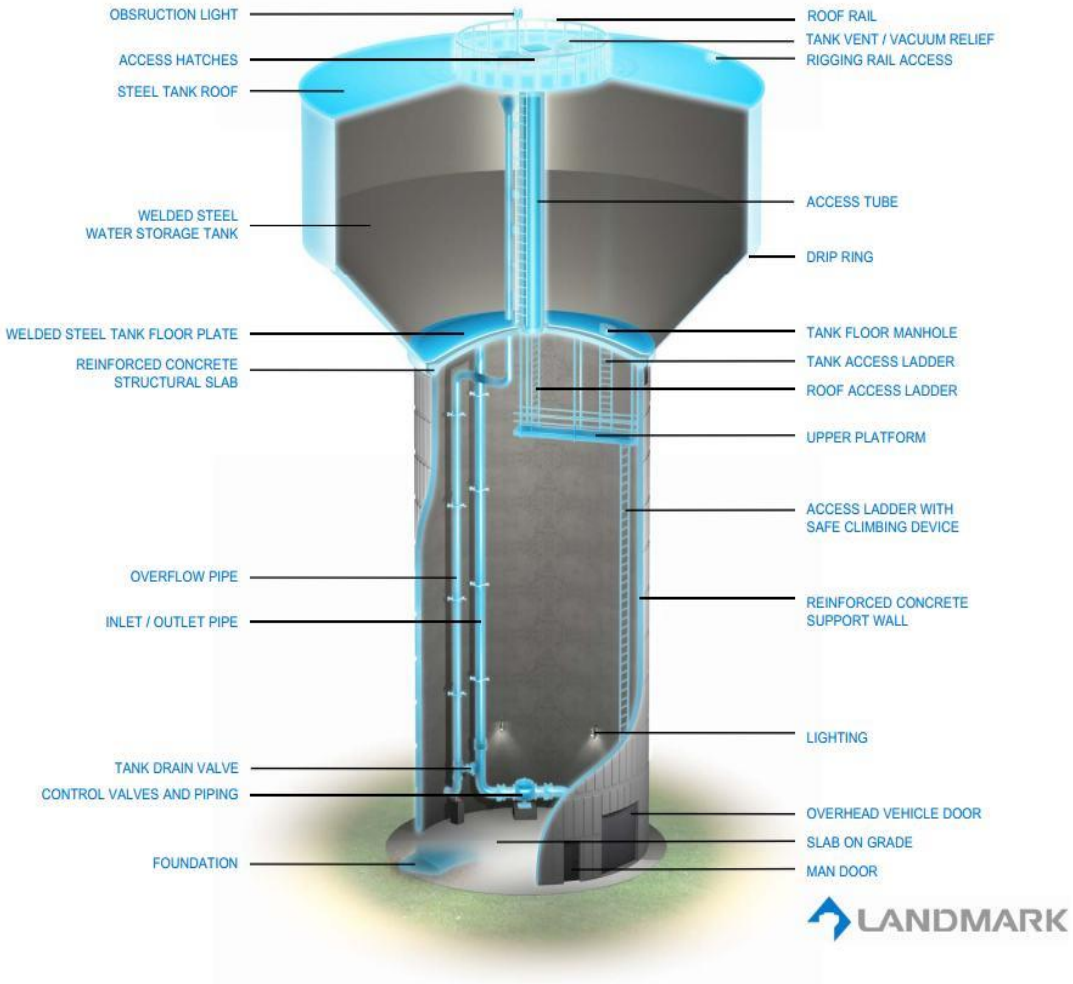


Photo from Landmark Structures.

Figure 16: Cut-Away View of Elevated Water Storage

APPENDIX A

DETAILED BUDGET ESTIMATE BREAKDOWNS

CREIGHTON HEIGHTS WATER SUPPLY
BUDGET ESTIMATE FOR ESTABLISHING A NEW TOWNSHIP WATER SUPPLY FACILITY

Current Year : 2020

Item No.	Description	Qty.	Unit of Measure	Unit Cost ($2020)	Total Cost ($2020)
Division 1 - General Requirements					
1	Miscellaneous construction costs (mobilization and demobilization, bonding, insurance, submittals, commissioning)	3%	L.S.	209,000.00	209,000.00
2	Cost for transition from old supply to new supply	100%	L.S.	25,000.00	25,000.00
3	Property acquisition for new facility, including wells and treatment plantat east side of Baltimore Community Centre property	100%	L.S.	0.00	0.00
	Division 1 - General Requirements Sub-Total				**$ 234,000.00**
Division 2 - Site Construction					
4	Site preparation, excavation, soil removal and engineered fill, erosion and sediment control, grading, landscaping, fencing, site lighting, etc.	100%	L.S.	100,000.00	100,000.00
5	Slope stabilization, retaining walls and erosion control works	100%	L.S.	75,000.00	75,000.00
6	Rough grading and sub-base preparation for roads and parking areas	1,800	sq.m.	10.00	18,000.00
7	Granular B base for access road (300 m long) and parking area	1,782	tonne	20.00	35,640.00
8	Granular A base for access road and parking area	621	tonne	25.00	15,525.00
9	Asphalt paving for access road and parking area	346	tonne	120.00	41,472.00
10	Drilled Test Well 150mm dia. x 60m deep (drilling, casing, permitting, pump testing)	100%	L.S.	50,000.00	50,000.00
11	Drilled Production Well No. 1 : 250mm dia. x 60m deep (drilling, casing, permitting, pump testing)	100%	L.S.	200,000.00	200,000.00
12	Drilled Production Well No. 2 : 250mm dia. x 60m deep (drilling, casing, permitting, pump testing)	100%	L.S.	200,000.00	200,000.00
13	Well Chambers for Production Wells complete with piping, valves, heat, access hatches	2	each	15,000.00	30,000.00
14	300mm PVC Watermain from New Treatment Plant to Van Luven and Nagle	1,000	l.m.	300.00	300,000.00
15	Sewage Holding Tank (8,000 L) with high level float switch at New Treatment Plant Site	100%	L.S.	12,000.00	12,000.00
16	Stormwater management, storm sewers, manholes, and catchbasins	100%	L.S.	20,000.00	20,000.00
17	Site water piping, valves, and appurtenances at New Treatment Plant Site	100%	L.S.	40,000.00	40,000.00
18	Decommission Existing Wells (TW1, TW6, TW7)	100%	L.S.	20,000.00	20,000.00
19	Partial Decommissioning, demolition, and disposal of existing Treatment Facility on Dale Road	100%	L.S.	200,000.00	200,000.00
	Division 2 - Site Construction Sub-Total				**$ 1,357,637.00**
Division 3 - Concrete					
20	Building construction - all inclusive (foundation, exterior walls, floor, roof, doors, windows, thermal and moisture protection) Treatment Building : approx. 14m x 28m x 6m H	400	m^2	1,800.00	720,000.00
21	Reservoir construction (CIP concrete, waterproofing, insulation, etc.)	1000	cu.m.	1,000.00	1,000,000.00
22	Backwash Waste Tankage (concrete, waterproofing, etc.)	140	cu.m.	1,000.00	140,000.00
	Division 3 - Concrete Sub-Total				**$ 1,860,000.00**
Division 4 - Masonry					
23	*included in unit price for buildings*	0%	L.S.	0.00	0.00
	Division 4 - Masonry Sub-Total				**$ -**
Division 5 - Metals					
24	Miscellaneous metals (handrails, stairs, pipe supports, etc.)	100%	L.S.	25,000.00	25,000.00
	Division 5 - Metals Sub-Total				**$ 25,000.00**
Division 6 - Wood and Plastics					
25	*included in unit price for buildings*	0%	L.S.	0.00	0.00
	Division 6 - Wood and Plastics Sub-Total				**$ -**
Division 7 - Thermal and Moisture Protection					
26	*included in unit price for buildings*	0%	L.S.	0.00	0.00
	Division 7 - Thermal and Moisture Protection Sub-Total				**$ -**
Division 8 - Doors and Windows					
27	Exterior Doors - included in unit price for buildings	0%	L.S.	0.00	0.00
28	Interior Doors - included in unit price for buildings	0%	L.S.	0.00	0.00
29	Overhead Door - insulated roll-up	100%	L.S.	20,000.00	20,000.00
	Division 8 - Doors and Windows Sub-Total				**$ 20,000.00**
Division 9 - Finishes					
30	*included in unit price for buildings*	0%	L.S.	0.00	0.00
	Division 9 - Finishes Sub-Total				**$ -**
Division 10 - Specialties					
31	*Not applicable*	0%	L.S.	0.00	0.00
	Division 10 - Specialties Sub-Total				**$ -**
Division 11 - Equipment					
32	Production Well No. 1 : Well pump, submersible, 700 L/min. at 60m TDH, 10 kW motor, riser pipe	1	each	40,000.00	40,000.00
33	Production Well No. 2 : Well pump, submersible, 700 L/min. at 60m TDH, 10 kW motor, riser pipe	1	each	30,000.00	30,000.00
34	High lift pump - One 300 L/min. at 46m TDH, 3.7 kW	1	each	20,000.00	20,000.00
35	High lift pumps - Two 780 L/min. at 46m TDH, 11 kW	2	each	30,000.00	60,000.00
36	Fire pumps - Two 2,700 L/min. at 39m TDH, 30 kW	2	each	60,000.00	120,000.00
37	Filter Backwash pumps (2) vertical turbine, 2820 L/min. at 29m TDH, 18.7 kW motor	2	each	60,000.00	120,000.00
38	Filter Backwash pumps process control equipment (150mm magmeter, hydraulic rate-of-flow control valve, controller)	100%	L.S.	60,000.00	60,000.00
39	Main process piping - low lift (75mm - 150mm dia. Sch. 80 PVC), fittings	100%	L.S.	100,000.00	100,000.00
40	Main process piping - high lift (150, 200mm dia. SS, flanged), fittings	100%	L.S.	100,000.00	100,000.00
41	Main process isolation valves (AWWA)	100%	L.S.	150,000.00	150,000.00
42	Hydraulic flow control valves (pressure sustaining, pressure relief, rate-of-flow control)	100%	L.S.	150,000.00	150,000.00
43	Manganese Greensand Filtration System, each 500 L/min. cap (Duplex 2400mm dia. vessels, valve nest, ……..)	100%	L.S.	500,000.00	500,000.00
44	Air Compressor and Dryer, common for valve actuation on both filters	100%	L.S.	40,000.00	40,000.00
45	Filter backwash waste management system (pumps, controls)	100%	L.S.	50,000.00	50,000.00
46	Methane Stripper, 1325 L/min. hyd cap, 1070 cu.m./day methane reduction cap., 3.7 kW blower, associated works	100%	L.S.	100,000.00	100,000.00
47	Ultra-violet (UV) disifection systems (Duplex 700 L/min. each)	100%	L.S.	150,000.00	150,000.00

Item No.	Description	Qty.	Unit of Measure	Unit Cost ($2020)	Total Cost ($2020)
48	Bulk water dispenser incl. BFP, flow meter, control box, piping, valves	100%	L.S.	40,000.00	40,000.00
49	Chemical feed equipment for potassium permanganate (200L solution tank, containment, 2 pumps, duplex control panel, mixer, tubing, flow monitor)	100%	L.S.	25,000.00	25,000.00
50	Chemical feed equipment for low-dose chlorination i.e. chloramination (200L solution tank, containment, 2 pumps, duplex control panel, tubing, flow monitor)	100%	L.S.	20,000.00	20,000.00
51	Chemical feed equipment for high-dose chlorination i.e. free chlorine (200L solution tank, containment, 2 pumps, duplex control panel, tubing, flow monitor)	100%	L.S.	20,000.00	20,000.00
52	Chemical feed equipment for de-chlorination (200L solution tank, containment, 2 pumps, duplex control panel, mixer, tubing)	100%	L.S.	15,000.00	15,000.00
	Division 11 - Equipment Sub-Total				**$ 1,910,000.00**
Division 12 - Furnishings					
53	Washroom (piping and fixtures)	100%	L.S.	5,000.00	5,000.00
54	Lab equipment and furniture	100%	L.S.	12,000.00	12,000.00
	Division 12 - Furnishings Sub-Total				**$ 17,000.00**
Division 13 - Special Construction					
55	*Not applicable*	0%	L.S.	0.00	0.00
	Division 13 - Special Construction Sub-Total				**$** -
Division 14 - Conveying Systems					
56	*Not applicable*	0%	L.S.	0.00	0.00
	Division 14 - Conveying Systems Sub-Total				**$** -
Division 15 - Mechanical					
57	Building HVAC system incl. fans, dampers, actuators, heaters, etc.	100%	L.S.	100,000.00	100,000.00
58	Building plumbing, drains, vents, backflow preventors, and fixtures	100%	L.S.	50,000.00	50,000.00
59	Safety equipment (eye/face wash, personal protective equipment, etc.)	100%	L.S.	2,500.00	2,500.00
	Division 15 - Mechanical Sub-Total				**$ 152,500.00**
Division 16 - Electrical					
60	Site power supply from local grid including service fee, overhead line to property, and poles	100%	L.S.	100,000.00	100,000.00
61	Power supply from grid to building - power supply duct bank	100%	L.S.	50,000.00	50,000.00
62	Site Transformer - pad mounted	100%	L.S.	200,000.00	200,000.00
63	Hydro Metering and power quality monitoring	100%	L.S.	100,000.00	100,000.00
64	Main Switchgear including main disconnect and ATS	100%	L.S.	100,000.00	100,000.00
65	Site communication system (phone lines, radio transmitter, etc.)	100%	L.S.	50,000.00	50,000.00
66	Backup power supply (150 kW diesel generator, fuel system, noise attenuation, exhaust stack)	100%	L.S.	250,000.00	250,000.00
67	Motor control centre (MCC)	100%	L.S.	300,000.00	300,000.00
68	Lighting panel, lighting transformer, conduits, and cables	100%	L.S.	100,000.00	100,000.00
69	Lighting fixtures including emergency lighting	100%	L.S.	30,000.00	30,000.00
70	Miscellaneous electrical equipment, smoke detectors, security system, intrusion alarms, limit switches on doors and access hatches, etc.	100%	L.S.	25,000.00	25,000.00
71	Pressure transducer/transmitter for water level measurement each well	3	each	5,000.00	15,000.00
72	Flow meter, magnetic 100mm dia., raw water from Production Well No. 1	1	each	10,000.00	10,000.00
73	Flow meter, magnetic 100mm dia., raw water from Production Well No. 2	1	each	10,000.00	10,000.00
74	Flow meter, magnetic 150mm dia. on each filter	2	each	7,500.00	15,000.00
75	Chlorine analyzer/transmitter	1	each	10,000.00	10,000.00
76	Turbidity analyzer/transmitter	1	each	10,000.00	10,000.00
77	Pressure sensor/transmitter	3	each	5,000.00	15,000.00
78	Ultrasonic Level sensor/transmitter, for each reservoir pumping cell	2	each	5,000.00	10,000.00
79	Ultrasonic Level sensor/transmitter, for filter backwash supply tank	0	each	5,000.00	0.00
80	Ultrasonic Level sensor/transmitter, for filter backwash waste tanks	2	each	5,000.00	10,000.00
81	Flow meter, magnetic 100mm dia., treated water	1	each	10,000.00	10,000.00
82	Flow meter, magnetic 150mm dia., fire water	1	each	10,000.00	10,000.00
83	Methane Sensors	2	each	5,000.00	10,000.00
84	Level Switches (backup control for well pumps, backwash pumps, high lift pumps, waste pumps)	10	each	2,500.00	25,000.00
85	Pressure gauges and switches	100%	L.S.	10,000.00	10,000.00
86	Building and Well Chamber flood detection (float switch)	3	each	2,000.00	6,000.00
87	SCADA system equipment (control panel, PLC, UPS, etc.), modems and auto dialers	100%	L.S.	150,000.00	150,000.00
	Division 16 - Electrical Sub-Total				**$ 1,631,000.00**
				Construction Sub-Total	**$ 7,207,137.00**
ENGINEERING SERVICES					
88	Master Plan for Water Supply for Creighton Heights Service Area	100%	L.S.	150,000.00	150,000.00
89	Municipal Schedule "C" EA for New Water Supply for Creighton Heights Service Area	100%	L.S.	100,000.00	100,000.00
90	Analysis of performance of Test Well(s)	100%	L.S.	50,000.00	50,000.00
91	Hydro-geological Assessment of New Production Wells	100%	L.S.	100,000.00	100,000.00
92	Ppreliminary and detailed design, approvals, tendering, contract administration, site inspection, materials testing, testing and commissioning	15%	L.S.	1,021,000.00	1,021,000.00
93	SCADA system programming	100%	L.S.	100,000.00	100,000.00
	ENGINEERING SERVICES Sub-Total				**$ 1,521,000.00**
				SUB-TOTAL	**$ 8,728,137.00**
				CONTINGENCY ALLOWANCE 15%	**$ 1,309,000.00**
				TOTAL CAPITAL BUDGET ESTIMATE ($2020)	**$ 10,037,000.00**

AVAILABLE INFORMATION

1. The above costs do not include GST / HST.
2. The above costs no not include the value of the facility property.
3.

CREIGHTON HEIGHTS WATER SUPPLY
BUDGET ESTIMATE FOR ESTABLISHING A NEW WATER SUPPLY FROM COBOURG

Current Year : 2020

Item No.	Description of Item	Quantity	Unit of Measure	Unit Cost ($2020)	Total Cost ($2020)
Division 1 - General Requirements					
1	Miscellaneous construction costs (mobilization and demobilization, bonding, insurance, submittals, commissioning)	3%	L.S.	117,830.00	117,830.00
2	Cost for transition from old supply to new supply	100%	L.S.	10,000.00	10,000.00
3	Property acquisition for new facility for reservoir, booster pumping station and re-chlorination facility located on Baltimore Rd. near Carleton Blvd.	100%	L.S.	100,000.00	100,000.00
4	Direct Payment to from Township to Cobourg - Purchase Capacity in Cobourg system	100%	L.S.	0.00	0.00
				Division 1 - General Requirements Sub-Total	**$ 227,830.00**
Division 2 - Site Construction					
5	Site preparation, excavation, soil removal and engineered fill, erosion and sediment control, grading, landscaping, fencing, site lighting, etc.	100%	L.S.	100,000.00	100,000.00
6	Slope stabilization, retaining walls and erosion control works	100%	L.S.	10,000.00	10,000.00
7	Rough grading and sub-base preparation for roads and parking areas	360	sq.m.	10.00	3,600.00
8	Granular B base for access road and parking area	356	tonne	20.00	7,128.00
9	Granular A base for access road and parking area	124	tonne	25.00	3,105.00
10	Asphalt paving for access road and parking area	69	tonne	120.00	8,294.40
11	Crossing under Highway 401, trenchless for water supply line crossing in casing	100%	L.S.	500,000.00	500,000.00
12	300mm PVC Water Transmission Main along Baltimore Road from Highway 401 to the Existing Treatment Plant on Dale Road	4,500	l.m.	300.00	1,350,000.00
13	300mm PVC Water Transmission Main along Baltimore Road from New BPS Facility to Danforth Road	250	l.m.	300.00	75,000.00
14	Air/Vacuum Chamber, Drain Chamber	2	ea.	20,000.00	40,000.00
15	Sewage Holding Tank (8,000 L) with high level float switch at New Booster Station Site	100%	L.S.	12,000.00	12,000.00
16	Stormwater management, storm sewers, manholes, and catchbasins	100%	L.S.	15,000.00	15,000.00
17	Site water piping, valves, and appurtenances at New Booster Station Site	100%	L.S.	25,000.00	25,000.00
18	Decommission Existing Wells (TW1, TW6, TW7)	100%	L.S.	20,000.00	20,000.00
19	Partial Decommissioning, demolition, and disposal of existing Treatment Facility on Dale Road	100%	L.S.	100,000.00	100,000.00
				Division 2 - Site Construction Sub-Total	**$ 2,269,127.40**
Division 3 - Concrete					
20	Reservoir construction (CIP concrete, waterproofing, insulation, etc.)	500	cu.m.	1,000.00	500,000.00
21	Booster Pumping and Re-chlorination Facility (all inclusive unit price)	84	sq.m.	2,000.00	168,000.00
				Division 3 - Concrete Sub-Total	**$ 668,000.00**
Division 4 - Masonry					
22	*included in unit price for buildings*	0%	L.S.	0.00	0.00
				Division 4 - Masonry Sub-Total	**$ -**
Division 5 - Metals					
23	Misc. Metals - gratings, ladders, access hatches	100%	L.S.	10,000.00	10,000.00
				Division 5 - Metals Sub-Total	**$ 10,000.00**
Division 6 - Wood and Plastics					
24	*included in unit price for buildings*	0%	L.S.	0.00	0.00
				Division 6 - Wood and Plastics Sub-Total	**$ -**
Division 7 - Thermal and Moisture Protection					
25	*included in unit price for buildings*	0%	L.S.	0.00	0.00
				Division 7 - Thermal and Moisture Protection Sub-Total	**$ -**
Division 8 - Doors and Windows					
26	Exterior Doors - included in unit price for buildings	0%	L.S.	0.00	0.00
27	Interior Doors - included in unit price for buildings	0%	L.S.	0.00	0.00
28	Windows - included in unit price for buildings	0%	L.S.	0.00	0.00
29	Overhead Door - insulated roll-up	100%	L.S.	20,000.00	20,000.00
				Division 8 - Doors and Windows Sub-Total	**$ 20,000.00**
Division 9 - Finishes					
30	*included in unit price for buildings*	0%	L.S.	$ -	0.00
				Division 9 - Finishes Sub-Total	**$ -**
Division 10 - Specialties					
31	*not applicable*	0%	L.S.	0.00	0.00
				Division 10 - Specialties Sub-Total	**$ -**
Division 11 - Equipment					
32	Duplex In-line Booster Pumps - horizontal centrifugal, 1800 L/min. at 50m TDH, 20 kW	2	ea.	25,000.00	50,000.00
33	High Lift Pumps - vertical turbine, 1800 L/min. at 80m TDH, 37 kW	2	ea.	40,000.00	80,000.00
34	Fire Pump - vertical turbine, 4000 L/min. at 80m TDH, 45 kW	0	ea.	0.00	0.00
35	Main inlet process piping (Sched. 80 PVC), fittings	100%	L.S.	50,000.00	50,000.00
36	Main discharge process piping (Sched. 10 SS, flanged), fittings	100%	L.S.	100,000.00	100,000.00
37	Main process isolation valves (AWWA)	100%	L.S.	50,000.00	50,000.00

CREIGHTON HEIGHTS WATER SUPPLY
BUDGET ESTIMATE FOR ESTABLISHING A NEW WATER SUPPLY FROM COBOURG

Current Year : 2020

Item No.	Description of Item	Quantity	Unit of Measure	Unit Cost ($2020)	Total Cost ($2020)
38	Hydraulic flow control valves (pressure sustaining, pressure relief, rate-of-flow control)	100%	L.S.	100,000.00	100,000.00
39	Chemical feed equipment for re-chlorination (200L solution tank, containment, 2 pumps, duplex control	100%	L.S.	10,000.00	10,000.00
				Division 11 - Equipment Sub-Total	**$ 440,000.00**
Division 12 - Furnishings					
40	*not applicable*	0%	L.S.	0.00	0.00
				Division 12 - Furnishings Sub-Total	**$ -**
Division 13 - Special Construction					
41	*not applicable*	100%	L.S.	0.00	0.00
				Division 13 - Special Construction Sub-Total	**$ -**
Division 14 - Conveying Systems					
42	*not applicable*	0	L.S.	0.00	0.00
				Division 14 - Conveying Systems Sub-Total	**$ -**
Division 15 - Mechanical					
43	Building HVAC system incl. fans, dampers, actuators, heaters, etc.	100%	L.S.	30,000.00	30,000.00
44	Building plumbing, drains, vents, and fixtures	100%	L.S.	5,000.00	5,000.00
45	Safety equipment (eye/face wash, personal protective equipment, etc.)	100%	L.S.	3,000.00	3,000.00
				Division 15 - Mechanical Sub-Total	**$ 38,000.00**
Division 16 - Electrical					
46	New customer connection to Hydro One grid including drop pole and disconnect switch	100%	L.S.	75,000.00	75,000.00
47	Underground primary service from grid to new on-site transformer	100%	L.S.	25,000.00	25,000.00
48	New Transformer, pad-mounted, 100 kVA	100%	L.S.	50,000.00	50,000.00
49	Underground secondary feed from new transformer to Building	100%	L.S.	10,000.00	10,000.00
50	New Hydro meter, main switchgear, power monitor	100%	L.S.	50,000.00	50,000.00
51	Standby diesel generator, 50 kW, complete package, installed indoors	100%	L.S.	75,000.00	75,000.00
52	Automatic transfer switch (ATS), 150A capacity	100%	L.S.	15,000.00	15,000.00
53	MCC for new process equipment	100%	L.S.	50,000.00	50,000.00
51	Instrumentation - 150mm magnetic flow meter - inlet	1	ea.	10,000.00	10,000.00
52	Instrumentation - 200mm magnetic flow meter - outlet	1	ea.	10,000.00	10,000.00
53	Instrumentation - Chlorine analyzer - inlet	1	ea.	10,000.00	10,000.00
54	Instrumentation - Chlorine analyzer - outlet	1	ea.	10,000.00	10,000.00
53	Instrumentation - Turbidity analyzer - inlet	1	ea.	10,000.00	10,000.00
54	Instrumentation - level, pressure	2	ea.	5,000.00	10,000.00
55	Instrumentation - backup level switches	5	each	2,500.00	12,500.00
56	Lighting panels, lighting transformer, conduits, and cables	100%	L.S.	10,000.00	10,000.00
57	SCADA system hardware (control panel, PLC, UPS, etc.)	100%	L.S.	50,000.00	50,000.00
				Division 16 - Electrical Sub-Total	**$ 482,500.00**
				Construction Sub-Total	**$ 4,155,457.40**
Engineering Services					
58	Master Plan for Water Supply for Creighton Heights Service Area	0%	L.S.	0.00	0.00
59	Municipal Class EA - Schedule A+ (crossing municipal boundary, retiring a facility)	100%	L.S.	50,000.00	50,000.00
60	Detailed design, approvals, tendering, contract administration, site inspection, materials testing, testing	100%	L.S.	15%	623,300.00
61	SCADA system programming	100%	L.S.	50,000.00	50,000.00
				Engineering Services Sub-Total	**$ 723,300.00**
				SUB-TOTAL	**$ 4,878,757.40**
				CONTINGENCY ALLOWANCE 15%	**$ 731,800.00**
				TOTAL CAPITAL BUDGET ESTIMATE ($2020)	**$ 5,611,000.00**

Notes

1. The above costs do not include GST / HST.
2. This option includes 2 significant unknown costs; one is purchase of capacity cost to Town of Cobourg, and the other is the pipeline crossing under Highway 401 requiring approval from MTO.
3.

CREIGHTON HEIGHTS WATER SUPPLY
BUDGET ESTIMATE FOR ESTABLISHING A NEW WATER SUPPLY FROM COBOURG WITH ELEVATED STORAGE

Current Year : 2020

Item No.	Description of Item	Quantity	Unit of Measure	Unit Cost ($2020)	Total Cost ($2020)
Division 1 - General Requirements					
1	Miscellaneous construction costs (mobilization and demobilization, bonding, insurance, submittals, commissioning)	3%	L.S.	92,930.00	92,930.00
2	Cost for transition from old supply to new supply	100%	L.S.	10,000.00	10,000.00
3	Property acquisition for new facility for reservoir, booster pumping station and re-chlorination facility, and for elevated water storage	200%	L.S.	100,000.00	200,000.00
4	Direct Payment to from Township to Cobourg - Purchase Capacity in Cobourg system	100%	L.S.	0.00	0.00
				Division 1 - General Requirements Sub-Total	**$ 302,930.00**
Division 2 - Site Construction					
5	Site preparation, excavation, soil removal and engineered fill, erosion and sediment control, grading, landscaping, fencing, site lighting, etc.	100%	L.S.	100,000.00	100,000.00
6	Slope stabilization, retaining walls and erosion control works	100%	L.S.	10,000.00	10,000.00
7	Rough grading and sub-base preparation for roads and parking areas	360	sq.m.	10.00	3,600.00
8	Granular B base for access road and parking area	356	tonne	20.00	7,128.00
9	Granular A base for access road and parking area	124	tonne	25.00	3,105.00
10	Asphalt paving for access road and parking area	69	tonne	120.00	8,294.40
11	Crossing under Highway 401, trenchless for water supply line crossing in casing	100%	L.S.	500,000.00	500,000.00
12	300mm PVC Water Transmission Main along Baltimore Road from Highway 401 to new BPS Facility	500	l.m.	300.00	150,000.00
13	300mm PVC Water Transmission Main along Baltimore Road from New BPS Facility to new Water Tower (opposite Roxburgh golf course)	1,500	l.m.	300.00	450,000.00
14	200mm PVC Water Transmission Main along Baltimore Road from new Water Tower to Deerfield Estates	1,800	l.m.	225.00	405,000.00
15	Air/Vacuum Chamber, Drain Chamber	2	ea.	20,000.00	40,000.00
16	Sewage Holding Tank (8,000 L) with high level float switch at New Booster Station Site	100%	L.S.	12,000.00	12,000.00
17	Stormwater management, storm sewers, manholes, and catchbasins	100%	L.S.	15,000.00	15,000.00
18	Site water piping, valves, and appurtenances at New Booster Station Site	100%	L.S.	25,000.00	25,000.00
19	Decommission Existing Wells (TW1, TW6, TW7)	100%	L.S.	20,000.00	20,000.00
20	Complete Decommissioning, demolition, and disposal of existing Treatment Facility on Dale Road	100%	L.S.	300,000.00	300,000.00
				Division 2 - Site Construction Sub-Total	**$ 2,049,127.40**
Division 3 - Concrete					
21	Reservoir construction (CIP concrete, waterproofing, insulation, etc.)	0	cu.m.	0.00	0.00
22	Booster Pumping and Re-chlorination Facility (all inclusive unit price)	84	sq.m.	2,000.00	168,000.00
				Division 3 - Concrete Sub-Total	**$ 168,000.00**
Division 4 - Masonry					
23	*included in unit price for buildings*	0%	L.S.	0.00	0.00
				Division 4 - Masonry Sub-Total	**$ -**
Division 5 - Metals					
24	Misc. Metals - gratings, ladders, access hatches	100%	L.S.	10,000.00	10,000.00
				Division 5 - Metals Sub-Total	**$ 10,000.00**
Division 6 - Wood and Plastics					
25	*included in unit price for buildings*	0%	L.S.	0.00	0.00
				Division 6 - Wood and Plastics Sub-Total	**$ -**
Division 7 - Thermal and Moisture Protection					
26	*included in unit price for buildings*	0%	L.S.	0.00	0.00
				Division 7 - Thermal and Moisture Protection Sub-Total	**$ -**
Division 8 - Doors and Windows					
27	Exterior Doors - included in unit price for buildings	0%	L.S.	0.00	0.00
28	Interior Doors - included in unit price for buildings	0%	L.S.	0.00	0.00
29	Windows - included in unit price for buildings	0%	L.S.	0.00	0.00
30	Overhead Door - insulated roll-up	100%	L.S.	20,000.00	20,000.00
				Division 8 - Doors and Windows Sub-Total	**$ 20,000.00**
Division 9 - Finishes					
31	*included in unit price for buildings*	0%	L.S.	$ -	0.00
				Division 9 - Finishes Sub-Total	**$ -**
Division 10 - Specialties					
32	*not applicable*	0%	L.S.	0.00	0.00
				Division 10 - Specialties Sub-Total	**$ -**
Division 11 - Equipment					
33	Duplex In-line Booster Pumps - horizontal centrifugal, 1800 L/min. at 100m TDH, 45 kW	2	ea.	40,000.00	80,000.00
34	High Lift Pumps - vertical turbine, 1800 L/min. at 80m TDH, 37 kW	0	ea.	0.00	0.00
35	Fire Pump - vertical turbine, 4000 L/min. at 80m TDH, 45 kW	1	ea.	40,000.00	40,000.00
36	Main inlet process piping (Sched. 80 PVC), fittings	100%	L.S.	50,000.00	50,000.00
37	Main discharge process piping (Sched. 10 SS, flanged), fittings	100%	L.S.	60,000.00	60,000.00

CREIGHTON HEIGHTS WATER SUPPLY
BUDGET ESTIMATE FOR ESTABLISHING A NEW WATER SUPPLY FROM COBOURG WITH ELEVATED STORAGE

Current Year : 2020

Item No.	Description of Item	Quantity	Unit of Measure	Unit Cost ($2020)	Total Cost ($2020)
38	Main process isolation valves (AWWA)	100%	L.S.	30,000.00	30,000.00
39	Hydraulic flow control valves (pressure sustaining, pressure relief, rate-of-flow control)	100%	L.S.	60,000.00	60,000.00
40	Chemical feed equipment for re-chlorination (200L solution tank, containment, 2 pumps, duplex control panel, tubing, flow monitor)	100%	L.S.	10,000.00	10,000.00
				Division 11 - Equipment Sub-Total	**$ 330,000.00**
Division 12 - Furnishings					
41	*not applicable*	0%	L.S.	0.00	0.00
				Division 12 - Furnishings Sub-Total	**$ -**
Division 13 - Special Construction					
42	*not applicable*	100%	L.S.	0.00	0.00
				Division 13 - Special Construction Sub-Total	**$ -**
Division 14 - Conveying Systems					
43	*not applicable*	0	L.S.	0.00	0.00
				Division 14 - Conveying Systems Sub-Total	**$ -**
Division 15 - Mechanical					
44	Building HVAC system incl. fans, dampers, actuators, heaters, etc.	100%	L.S.	30,000.00	30,000.00
45	Building plumbing, drains, vents, and fixtures	100%	L.S.	5,000.00	5,000.00
46	Safety equipment (eye/face wash, personal protective equipment, etc.)	100%	L.S.	3,000.00	3,000.00
				Division 15 - Mechanical Sub-Total	**$ 38,000.00**
Division 16 - Electrical					
47	New customer connection to Hydro One grid including drop pole and disconnect switch	100%	L.S.	75,000.00	75,000.00
48	Underground primary service from grid to new on-site transformer	100%	L.S.	25,000.00	25,000.00
49	New Transformer, pad-mounted, 100 kVA	100%	L.S.	50,000.00	50,000.00
50	Underground secondary feed from new transformer to Building	100%	L.S.	10,000.00	10,000.00
51	New Hydro meter, main switchgear, power monitor	100%	L.S.	50,000.00	50,000.00
52	Standby diesel generator, 50 kW, complete package, installed indoors	100%	L.S.	75,000.00	75,000.00
53	Automatic transfer switch (ATS), 150A capacity	100%	L.S.	15,000.00	15,000.00
54	MCC for new process equipment	100%	L.S.	50,000.00	50,000.00
52	Instrumentation - 150mm magnetic flow meter - inlet	1	ea.	10,000.00	10,000.00
53	Instrumentation - 200mm magnetic flow meter - outlet	1	ea.	10,000.00	10,000.00
54	Instrumentation - Chlorine analyzer - inlet	1	ea.	10,000.00	10,000.00
55	Instrumentation - Chlorine analyzer - outlet	1	ea.	10,000.00	10,000.00
54	Instrumentation - Turbidity analyzer - inlet	1	ea.	10,000.00	10,000.00
55	Instrumentation - level, pressure	2	ea.	5,000.00	10,000.00
56	Instrumentation - backup level switches	5	each	2,500.00	12,500.00
57	Lighting panels, lighting transformer, conduits, and cables	100%	L.S.	10,000.00	10,000.00
58	SCADA system hardware (control panel, PLC, UPS, etc.)	100%	L.S.	50,000.00	50,000.00
				Division 16 - Electrical Sub-Total	**$ 482,500.00**
				Construction Sub-Total	**$ 3,400,557.40**
Engineering Services					
59	Master Plan for Water Supply for Creighton Heights Service Area	0%	L.S.	0.00	0.00
60	Municipal Class EA - Schedule A+ (crossing municipal boundary, retiring a facility)	100%	L.S.	50,000.00	50,000.00
61	Detailed design, approvals, tendering, contract administration, site inspection, materials testing, testing	100%	L.S.	15%	510,100.00
62	SCADA system programming	100%	L.S.	50,000.00	50,000.00
				Engineering Services Sub-Total	**$ 610,100.00**
				SUB-TOTAL	**$ 4,010,657.40**
				CONTINGENCY ALLOWANCE 15%	**$ 601,600.00**
				SUPPLY from COBOURG - TOTAL CAPITAL BUDGET ESTIMATE ($2020)	**$ 4,612,000.00**
				ELEVATED STORAGE - TOTAL CAPITAL BUDGET ESTIMATE ($2020)	**$ 3,451,307.55**
				TOTAL CAPITAL BUDGET ESTIMATE ($2020)	**$ 8,063,000.00**

Notes

1. The above costs do not include GST / HST.
2. This option includes 2 significant unknown costs; one is purchase of capacity cost to Town of Cobourg, and the other is the pipeline crossing under Highway 401 requiring approval from MTO.
3.

CREIGHTON HEIGHTS WATER SUPPLY
BUDGET ESTIMATE FOR ESTABLISHING ELEVATED STORAGE

Current Year : 2020

Item No.	Description of Item	Quantity	Unit of Measure	Unit Cost ($2020)	Total Cost ($2020)
Division 1 - General Requirements					
1	Miscellaneous construction costs (mobilization and demobilization, bonding, insurance, submittals, commissioning)	3%	L.S.	90,680.00	90,680.00
2	Cost for transition from old supply to new supply	100%	L.S.	10,000.00	10,000.00
3	Property acquisition for new elevated storage at east side of Baltimore Community Centre property	100%	L.S.	100,000.00	100,000.00
				Division 1 - General Requirements Sub-Total	**$ 200,680.00**
Division 2 - Site Construction					
4	Site preparation, excavation, soil removal and engineered fill, erosion and sediment control, grading, landscaping, fencing, site lighting, etc.	100%	L.S.	50,000.00	50,000.00
5	Slope stabilization, retaining walls and erosion control works	100%	L.S.	25,000.00	25,000.00
6	Rough grading and sub-base preparation for roads and parking areas	1,800	sq.m.	10.00	18,000.00
7	Granular B base for access road (300 m long) and parking area	1,782	tonne	20.00	35,640.00
8	Granular A base for access road and parking area	621	tonne	25.00	15,525.00
9	Asphalt paving for access road and parking area	346	tonne	120.00	41,472.00
10	300mm PVC Water Transmission Main from Van Luven and Nagle to New Water Tower	1,000	l.m.	300.00	300,000.00
11	Stormwater management, drainage, overflow swales, and erosion protection	100%	L.S.	100,000.00	100,000.00
12	Site water piping, valves, and appurtenances at New Water Tower Site	100%	L.S.	25,000.00	25,000.00
13	Partial Decommissioning, demolition, and disposal of existing Treatment Facility on Dale Road	0%	L.S.	0.00	0.00
				Division 2 - Site Construction Sub-Total	**$ 610,637.00**
Division 3 - Concrete					
14	Composite Elevated Water Tank - concrete pedestal, steel bowl, 1000 cu.m., HWL = 205 masl, ground elev. ~ 180 masl	1,000	cu.m.	2,000.00	2,000,000.00
15		0%	L.S.	0.00	0.00
				Division 3 - Concrete Sub-Total	**$ 2,000,000.00**
Division 4 - Masonry					
16	*included in unit price for buildings*	0%	L.S.	0.00	0.00
				Division 4 - Masonry Sub-Total	**$ -**
Division 5 - Metals					
17	Misc. Metals - gratings, ladders, access hatches	100%	L.S.	10,000.00	10,000.00
				Division 5 - Metals Sub-Total	**$ 10,000.00**
Division 6 - Wood and Plastics					
18	*included in unit price for buildings*	0%	L.S.	0.00	0.00
				Division 6 - Wood and Plastics Sub-Total	**$ -**
Division 7 - Thermal and Moisture Protection					
19	Winterized control room in base of pedestal	100%	L.S.	10,000.00	10,000.00
				Division 7 - Thermal and Moisture Protection Sub-Total	**$ 10,000.00**
Division 8 - Doors and Windows					
20	Exterior Doors - included in unit price for buildings	100%	L.S.	5,000.00	5,000.00
21	Interior Doors - included in unit price for buildings	0%	L.S.	0.00	0.00
22	Windows - included in unit price for buildings	0%	L.S.	0.00	0.00
23	Overhead Door - insulated roll-up	0%	L.S.	0.00	0.00
				Division 8 - Doors and Windows Sub-Total	**$ 5,000.00**
Division 9 - Finishes					
24	*included in unit price for buildings*	0%	L.S.	$ -	0.00
				Division 9 - Finishes Sub-Total	**$ -**
Division 10 - Specialties					
25	*not applicable*	0%	L.S.	0.00	0.00
				Division 10 - Specialties Sub-Total	**$ -**
Division 11 - Equipment					
26	Main process piping and valves in base of pedestal - Sched. 10 SS	100%	L.S.	50,000.00	50,000.00
27	Hydraulic flow control valves (pressure sustaining, rate-of-flow control)	100%	L.S.	25,000.00	25,000.00
28	Chemical feed equipment for re-chlorination (200L solution tank, containment, 2 pumps, duplex	100%	L.S.	10,000.00	10,000.00
				Division 11 - Equipment Sub-Total	**$ 85,000.00**
Division 12 - Furnishings					
29	*not applicable*	0%	L.S.	0.00	0.00
				Division 12 - Furnishings Sub-Total	**$ -**
Division 13 - Special Construction					
30	*not applicable*	100%	L.S.	0.00	0.00
				Division 13 - Special Construction Sub-Total	**$ -**
Division 14 - Conveying Systems					
31	*not applicable*	0	L.S.	0.00	0.00

CREIGHTON HEIGHTS WATER SUPPLY
BUDGET ESTIMATE FOR ESTABLISHING ELEVATED STORAGE

Current Year : 2020

Item No.	Description of Item	Quantity	Unit of Measure	Unit Cost ($2020)	Total Cost ($2020)
				Division 14 - Conveying Systems Sub-Total	**$ -**
Division 15 - Mechanical					
32	Building HVAC system incl. fans, dampers, actuators, heaters, etc.	100%	L.S.	10,000.00	10,000.00
33	Building plumbing, drains, vents, and fixtures	100%	L.S.	5,000.00	5,000.00
34	Safety equipment (eye/face wash, personal protective equipment, etc.)	100%	L.S.	2,000.00	2,000.00
				Division 15 - Mechanical Sub-Total	**$ 17,000.00**
Division 16 - Electrical					
35	New customer connection to Hydro One grid including drop pole and disconnect switch	100%	L.S.	75,000.00	75,000.00
36	Underground primary service from grid to new on-site transformer	100%	L.S.	25,000.00	25,000.00
37	New Transformer, pole-mounted, 25 kVA	100%	L.S.	25,000.00	25,000.00
38	Underground secondary feed from new transformer to Tower	100%	L.S.	10,000.00	10,000.00
39	New Hydro meter, main switchgear, power monitor	100%	L.S.	50,000.00	50,000.00
40	Instrumentation - 250mm magnetic flow meter	1	ea.	20,000.00	20,000.00
41	Instrumentation - Chlorine analyzer - outlet	1	ea.	10,000.00	10,000.00
42	Instrumentation - level, pressure	2	ea.	5,000.00	10,000.00
43	Lighting panels, lighting transformer, conduits, and cables	100%	L.S.	10,000.00	10,000.00
44	Communication system hardware	100%	L.S.	50,000.00	50,000.00
				Division 16 - Electrical Sub-Total	**$ 285,000.00**
				Construction Sub-Total	**$ 3,223,317.00**
Engineering Services					
45	Master Plan for Water Supply for Creighton Heights Service Area	0%	L.S.	0.00	0.00
46	Municipal Class EA - Schedule B (Establish new water storage facility)	100%	L.S.	75,000.00	75,000.00
47	Detailed design, approvals, tendering, contract administration, site inspection, materials testing, testing	100%	L.S.	15%	183,500.00
48	SCADA system programming	100%	L.S.	20,000.00	20,000.00
				Engineering Services Sub-Total	**$ 278,500.00**
				SUB-TOTAL	**$ 3,501,817.00**
				CONTINGENCY ALLOWANCE 15%	**$ 525,300.00**
				TOTAL CAPITAL BUDGET ESTIMATE ($2020)	**$ 4,027,000.00**

Notes

1. The above costs do not include GST / HST.
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