



January 15, 2019

Mrs. Darlene Berthier Sampson
Town Engineer
Interim CAO
Town of Mulgrave
PO Box 129
Mulgrave, NS B0E 2G0

Dear Mrs. Sampson:

RE: Town of Mulgrave: Sewage Treatment Plant – Project Budget

The Town of Mulgrave engaged CBCL Limited to assist the Town in developing a budget for the Town's proposed Sewage Treatment Plant project. The Town intends to submit an application for infrastructure funding under the current Investing in Canada Infrastructure Program. CBCL were asked to develop a cost budget for full development of the proposed Sewage Treatment Plant project, including construction costs, professional fees and other applicable contingencies. The following report describes CBCL's methodology and assumptions used in developing the scope and costs to construct the infrastructure for the project.

The project involves pumping and treating the sewage flows, presently being treated at the Town's existing Main Street sewage treatment plant. The consolidated flows, at the Main Street plant, will be directed to a new pumping station and then pumped to a new treatment plant facility to be constructed at the site of the Town's second treatment plant. This second existing treatment plant is known as the Venus Cove treatment plant. For the purposes of this report, the new treatment plant will be referred to as the Loggie Street treatment plant.

CBCL Limited previously conducted a study to evaluate options for the replacement of the main street treatment plant. This 2010 study, named Town of Mulgrave – Main Street Sewage Treatment Plant Study, describes the project as well as the rationale for consolidation of flows and construction of a new treatment plant at the Venus Cove treatment plant site. The study describes the flows, infrastructure requirements and general scope of the project. The project and the costs, in the attached budget summary, have been broken down as follows:

- Sewage Treatment Plant (STP),
- Main Street Pumping Station,
- Sewer Consolidation at Main Street & Old Plant Decommissioning,
- Forcemain Extension to New STP Site,

Sewage Treatment Plant (STP)

The existing Venus Cove STP is a sequencing batch reactor (SBR) treatment plant which was constructed in 2001. The existing plant presently treats wastewater from a portion of the Town, however it is too small to accommodate the required capacity of the full Town. It appears that the concrete tanks for this existing plant have some remaining life and could be converted into an aerobic digester or an equalization basin for the new treatment facility.

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The existing outfall, constructed in 2001, appears to have sufficient hydraulic capacity to serve the new treatment facility. The design aspects for the outfall must be determined through a risk assessment to be confirmed during subsequent design work. However, it has been assumed that the existing outfall is adequate.

It appears that the Town owns sufficient land around the existing Venus Cove STP site to construct the new plant. The Town of Mulgrave – Main Street Sewage Treatment Plant Study identified treated water effluent limits of 25 mg/L for Carbonaceous Biological Oxygen Demand (CBOD) and Total Suspended Solids (TSS) as well as 0.02 mg/L Total Residual Chlorine (TRC) and that all new facilities must undergo a site-specific environmental risk assessment to determine the Effluent Discharge Objectives (EDOs). This will also have to be confirmed during subsequent design work.

The Town's serviced population is approximately 722 persons, based on 2016 census information. Though the Town's 2010 wastewater flows are high compared to other similarly sized collection systems, no other updated wastewater flows or wastewater characteristics were available at this time. Based on the information contained in the Town of Mulgrave – Main Street Sewage Treatment Plant Study, we have assumed the following hydraulic capacity for the proposed Loggie Street treatment plant:

Average Daily Flow (ADF) = 700 m³/d

Peak Daily Flow (PDF) = 3000 m³/d

The 2010 study identified SBR treatment or aerated stabilization ponds as applicable options and recommended a further pre-design study to confirm design parameters and select the most appropriate treatment technology. For the purposes of this exercise we have assumed SBR treatment and have costed the plant on a similarly sized sequencing batch sewage treatment facility designed in 2017 and constructed in 2018. We used previous process equipment costs for the components that might be expected for the proposed treatment plant construction.

Main Street Pumping Station

The existing main street pumping station is an aged, undersized, submersible lift station that pumps a portion of the Town's flow to the existing main street treatment plant. This station will be abandoned and will be replaced by a new Main Street pumping station to be located on the land where the existing station is located. For the purposes of this exercise we have assumed a tri-plex submersible, pumping station, with discharge valves and piping; variable frequency drives; controls; and a standby generator, all housed in an above ground building. To further refine the costs, CBCL obtained pricing for the proposed pumps to be installed at the new Main Street pumping station. This station will include monitoring via the Town's SCADA system. Remote monitoring should be investigated for the Town's other existing lift stations.

Sewer Consolidation at Main Street & Old Plant Decommissioning

The flow into the Town's existing main street pumping station and main street treatment plant will be diverted to the proposed, new Main Street pumping station. Furthermore, Town staff say that there are infrequent or perhaps minimal overflows that occur within the collection system before this flow reaches the existing main street treatment plant. For the purposes of this exercise we have assumed that the two gravity sewers that flow into the abandoned main street pump station and treatment plant, respectively, will be consolidated in a manhole and directed to the new Main Street pumping station. The Mill Stream vehicle bridge, is in poor condition and must be replaced in the future under a separate project. Though this has been an issue for some time, it has not been replaced. We have assumed that this project will proceed before this bridge is replaced, thus we have assumed the cost for the new gravity sewer will cross the Mill Stream on a newly constructed, dedicated steel bridge inside an insulated carrier pipe. The existing main street treatment plant will need to be de-commissioned and an allowance has been included for this activity.

Forcemain Extension to New STP Site

According to Town staff, a new 200mm diameter PVC forcemain has been installed from the existing main street station to the location of the Kelly Pump Station on Loggie Road. This forcemain was installed recently but has not been placed into service. The Town of Mulgrave – Main Street Sewage Treatment Plant Study identified this as a task as well as the upgrade of the Kelly Pump Station. According to Town staff, the Kelly Pump Station was replaced recently and presently pumps to the Venus Cove STP via a 150mm forcemain. For the purposes of this exercise, we have assumed that the 200mm forcemain will be extended to the new plant and that flows from both the 200mm and 150mm force mains will be consolidated at a new headworks at the new plant.

CBCL met with the Town staff on January 4, 2019 to review the Town's existing infrastructure and discuss the scope of the proposed project. Following a review of existing information, CBCL then developed a plan of the required construction work, in three dimensions, and in sufficient detail to generate reasonable estimates of quantities for concrete, excavation, equipment, piping and building elements. Such quantities include concrete tanks, manholes, piping, etc. which were sized, somewhat conservatively, based on experience on previously completed projects of a similar nature and size to what is being proposed. It is important to note that limited engineering was carried out during this exercise and that additional pre-design and preliminary design work will be required for the development of this project. The attached budget summary shows the breakdown of our Class 'D' estimate for the construction, and includes labour, labour burdens material, equipment, subcontractor's overheads and profits.

Based on the information described herein, CBCL recommends that the Town budget an amount not less than \$ [REDACTED] for this proposed project.

The project is expected to be tendered in 2020. The construction costs were prepared based on 2019 dollars and then escalated at 2.5% (per annum) inflation to a mid-point

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construction period in 2020. A Design Development Contingency of 10% has been included to cover the anticipated unknowns that may be required to be designed and built into the works during the remaining design document stages. This amount of contingency is not high for the level of information available but may be sufficient where we have tended to assume a conservative scope for the project. Future scope changes could therefore be considered and still meet the overall environmental objectives. An example of this is dewatering equipment. We have assumed the capital costs for dewatering equipment, however the costs for such equipment may not be warranted for this size of a facility.

An allowance of 15% was applied to the predicted construction cost for engineering. An additional allowance for Project Management fees was included and was estimated at [REDACTED] of the predicted construction cost. This cost may also cover additional pre-design work for the project. Also note that additional allowances, for other non-construction related costs, were also included.

CBCL Limited has prepared this budget summary in accordance with generally accepted principles and practices. This opinion of probable cost is presented on the basis of experience, qualifications and best judgement. Changes in project scope, sudden market trends, non-competitive bidding situations, unforeseen labour and material adjustments, and the like, are beyond the control of CBCL Limited, and as such, we cannot warrant or guarantee that actual costs will not vary significantly from the opinion provided.

Please feel free to contact the undersigned to discuss the above or any issues relating to our findings.

Yours very truly,

CBCL Limited



Prepared by:
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Project Manager



Reviewed by:
Mike Abbott, P.Eng.
Manager of Process Engineering

Attachment: Project Budget Summary – January 15, 2019

cc Jim Davis Town of Mulgrave

Project No: 191800.00

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