Crandall File: 17047-10
March 14, 2017

Greater Shediac Sewerage Commission
25 chemin Cap-Brule Rd.
Boudreau-Ouest, N.B.
E4P 6H8

ATTENTION: Mr. Joey Frenette, B. Sc., PTech - General Manager

Dear Sir:

Review of Various Items
Province of NB Parlee Beach Reviews and Analysis

Crandall Engineering Ltd. is pleased to provide the Greater Shediac Sewerage Commission (GSSC) with information to assist in responding to questions from the Province of NB on the above. A response to the various questions asked by Mr. Paynter of the NBDELG is provided as follows:

1. Summary of Past Funding Requests by the GSSC with Reasons for Rejection

The following more recent funding applications were made by the GSSC but not approved:

.1 West Shediac Sanitary Sewer Renewals

Initial Date of Application: June, 2016

Re-Application Date Following Initial Rejection: September, 2016

Net Eligible Cost: $3,056,504

Brief Description: The GSSC has been studying the infiltration and inflow (I/I) in its system for several years now. Based on these studies, it was found that the old pipes in the west portion of the sewer system are a major source of infiltration. We estimate that this renewal will reduced the annual discharge of wastewater by 43.5 Million Litres per year.

Funding Program: Clean Water Fund
Reason for Rejection: Not provided

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.2 Lift Stations Renewal - Environment Protection and Overflow Reduction

Initial Date of Application: June, 2016

Re-Application Date Following Initial Rejection: September, 2016

Net Eligible Cost: $2,016,829

Brief Description: Upgrade 5 lift stations that are over 30 years old and operating along the Shediac Bay. This upgrade would increase capacity and reliability, use more modern technology and reduce the occurrence of overflows.

Funding Program: Clean Water Fund
Reason for Rejection: Not provided

.3 Long-Term Wastewater Management Strategy for the Shediac East Region

Initial Date of Application: June, 2016

Re-Application Date Following Initial Rejection: September, 2016

Net Eligible Cost: $86,036

Brief Description: The ERA completed in 2014 indicated that the WWTF outfall does not presently meet CCME. A subsequent study found that this upgrade would cost in the order of $3.0 Million. Given the WWTF is 23 years old and approaching its design life, this study would evaluate all options for the long-term upgrade of the facility and the outfall.

Funding Program: Clean Water Fund
Reason for Rejection: Not provided

.4 Wastewater System Upgrades

Initial Date of Application: October, 2014

Net Eligible Cost: $6,049,570

Brief Description: This project requested funding for upgrades of old sewer mains in the central and west portion of the Commission`s system. Some of the lines date from the 1950`s and others from 1970-1972. It was found that these lines are major contributors in the overall I/I problems in the system. Their upgrade and replacement would reduce overall flows discharge to the Shediac Bay and reduce the severity of any emergency overflows.

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Funding Program: Building Canada Fund
Reason for Rejection: Not provided

.5 Shediac Central and West Water and Wastewater System Upgrades

(submitted jointly with the Town of Shediac)

Date of Application: November, 2016

Net Eligible Cost: $15,811,950 (Town and GSSC combined)

Net Eligible Cost GSSC Only: $6,696,347 (replaces 1.4 above)

Brief Description: This project is similar to item 4 except that it would also allow for upgrades to aging water and storm sewer lines by the Town of Shediac with this project. This upgrade and replacement would reduce overall flows discharge to the Shediac Bay and reduce the severity of any emergency overflows.

Funding Program: Building Canada Fund
Reason for Rejection: Not provided

.6 Point-du-Chêne Sewer System Improvements

Date of Application: September, 2014

Net Eligible Cost: $757,640.14 (in 2014 dollars) - $827,893 (2017 dollars)

Brief Description: The Pointe-du-Chêne sewer system is in an area near Parlee Beach with high groundwater and its 1971 sewer pipes show signs of infiltration and inflow (I/I). This project would reduce this I/I and also make improvements to Lift Station 7 and upgrade its forcemain.

Funding Program: Gas Tax (Point-du-Chêne is in an LSD)
Reason for Rejection: Not provided

2. Adding Stand-By Generators at Lift Station 5, 6, 11 and 12
Crandall Engineering completed a preliminary design for this work including preliminary siting of these units at each facility. A report was provided to the Greater Shediac Sewerage Commission on March 15, 2017. The preliminary cost estimate for this work is **$315,000** with net HST, to be detailed in the report. The Commission could proceed with this design package immediately if funds are available.

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3. Plan of Overall GSSC System Showing Pipes, Lift Stations and Overflows
This drawing is attached.

4. Costs to Upgrade Parlee Beach Lift Station to GSSC Standards
The existing lift station likely does not meet the GSSC standards at present as it was apparently built in the early 1980's. Also, it is not known what condition the existing sewer system may be in, or whether there is infiltration or overflows in the existing system as this could affect the operation of this facility. In order for the Commission to quantify the cost to upgrade the system upon transfer, it would require the following:

- As-built drawings of the existing piping system and lift station
- Power consumption records
- Access to the lift station site for an inspection by Crandall and the GSSC
- CCTV video of the existing sewer system
- Flow metering or at least records on pumping times

With this information, the Commission could determine the required work and cost to upgrade the systems at transfer, as well as a better understanding for user costs. This study would allow the GSSC to determine the capital costs but also the operating and maintenance costs should this facility be transferred to the Commission by the Province of NB. Crandall can provide you with a cost for this study if required.

5. Lift Station No. 4 Overflow Retention
Crandall has evaluated the possibility of adding retention to Lift Station No. 4`s overflow on Hamilton Street. The GSSC owns land to the north of its lift station, but this is in a residential area. It would not be recommended to construct an open pond for odour and aesthetic concerns. We have evaluated the possibility of using a concrete reservoir. Its retention volume will be limited to the footprint of the GSSC land and the active volume below the overflow pipe elevation.

- Possible on site storage: 210 m^3 (210,000 Litres)
- Retention time at peak flow of 60 L/s: 1 hour
- Retention time at average flow of 11.5 L/s: 5 hours

We estimate the cost of this outfall structure to be in the order of **$825,000**. with net HST. Given the cost of this work and the minimal improvements it would generate, we would not recommend this investment.

ALTERNATE SOLUTION: In our opinion, a better investment would be to upgrade Lift Station 5 and change its discharge point from Lift Station 4 to the trunk sewer. This could

be done by constructing a new 500 m forcemain on Weldon Street and upgrading the pumps at Lift Station 5. This would reduce the amount of flows at Lift Station 4 and the severity of any overflows. Please advise if you would like for Crandall to develop this cost.

6. Increasing Capacity of the Shediac UV Disinfection System

The present UV system is used at present from May to October based on the GSSC Certificate of Approval to Operate by the NBDELG and has a hydraulic capacity is as follows:

- Peak Disinfection flow rate @40%UVT: 19,300 m^3/d (5.1 mUSgpd)
- Peak Hydraulic flow rate: 37,850 m^3/d (10.0 mUSgpd)

Based on the GSSC`s SCADA system, peak flows higher than the peak hydraulic flow rate were observed occasionally in recent years. As opposed to increasing the hydraulic capacity of the system, the Commission`s approach has been to improve its system to reduce infiltration and inflow to reduce this peak flow, which is why it has applied for funding for these types projects in recent years.

To increase the hydraulic capacity of the UV System requires an increase of the hydraulic capacity of the WWTF as a whole which is a complex analysis. This would be developed in the study for which funding has been requested in item 1.3.

7. Increased Operating Costs for Year-Round UV System

The estimated cost of operating the UV system year-round instead of seasonally as is required by the NBDELG Certificate of Approval to Operate is in the order of $15,000 per year plus equipment depreciation.

8. Shediac UV Disinfection System Stand-By Generator

A short-term investment could be to add a generator to the UV system to maintain this in operation during power outages, in particular during summer months. The present UV system does not operate during power outages. The cost of adding a stand-by generator at this location is estimated to be $105,000. with net HST.

9. Unserviced Homes and Campground - Gould Beach Road

Presently, Gould Beach Road has three (3) homes and seven (7) campsite locations that are not connected to the GSSC sewer system. In order to connect these units a new sewer would need to be installed from Civic 13 to the trunk sewer near Honey Suckle Lane. The cost for this work is estimated to be $365,000. with net HST.

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10. Overall System Hydraulic and Treatment Capacity / Performance

The Cap-Brule WWTF was designed in 1994 with a maximum hydraulic capacity of 37,850 m^3/d (10.0 mUSgpd). The operation of this facility by the Commission is governed by the NBDELG Certificate of Approval to Operate which requires it to meet effluent levels of 25 mg/L $CBOD_5$ and 25 mg/L TSS. The averages for 2016 were 7.5 mg/L $CBOD_5$ and 14 mg/L TSS.

Other critical elements in the GSSC system capacity include Lift Station 2, 3, 4, 10 and the Trunk Sewer. The trunk sewer was upgraded in 2010 and the various funding applications provided previously would increase the remaining capacity of most of these other key pieces of infrastructure by reducing infiltration and inflow.

Please do not hesitate to contact us should you require any additional information.

Yours very truly,

CRANDALL ENGINEERING LTD.

Michel Cormier, P. Eng.
President

cc. Chris Gallant, P. Eng. - Crandall Engineering Ltd.

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