Alert Sewage Treatment Options Analysis - Brief

INTRODUCTION

The aim of this options analysis report is to satisfy the requirements of the Nunavut Water Board agreed to submission in order to improve the current Alert Sewage Treatment System. In order to do so, three potential solutions were identified and highlighted below.

Option 1: Maintain Existing System.

This option requires annual repairs to the parts of the system that have that have been damaged during the winter and spring. For the effluent from the terrace to be acceptable for Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), sampling using the low flow method would need to be done to calibrate and verify the Total Suspended Solids (TSS) results are within the acceptable range.

Based on the current lack of maintenance due to equipment restraints, it has been shown that this work is unlikely to be completed on an annual basis resulting in contravening the established requirements for waste water management. This option is the least desirable.

Option 2: Redesign Waste Water Terrace.

The terrace has the issue of required annual maintenance due to seasonal damage. This is likely due to the extreme arctic environment not being considered in the design process. A redesign would require that the system be designed to take advantage of the freeze thaw cycle that the region experiences on an annual basis.

The freeze thaw cycle of water is ideal for the overall reduction in suspended solids within the waste water. The slow release of fluid from a frozen mass provided the ideal environment to encourage the growth of plant life during the short growing season in the North. This in turn has resulted in Alert being a key stop over location for many different types of birds that fly that far North during the summer months. The areas close to the waste water outflow in Lower Dumbbell Bay has a significant diversity of aquatic life for the Arctic region.

The amount of maintenance required for a redesigned system would be significantly reduced. The key concerns of erosion, water quality, and management need to be directly addressed in a redesign. The approximate area of ice storage, the concrete drainage path and weir are indicated in the conceptual site plan found in Annex B.

Option 3: Install package plant for waste treatment.

The installation of a waste water package plant would ensure with a level of certainty that the required water quality will be achieved, independent of the methods used for effluent sampling. There are at least three different systems that are available that would be able to achieve the required standards.

Waste Water Reduction. A key consideration of the entire system is minimizing the total amount of waste that needs to be treated. This also needs to be balanced with the requirement to reduce the amount of maintenance and emergency repair that are caused by the extreme cold environment.

Please see Attached direction on preferred Option or combination thereof.