Northwest Territories Baffin Region

PUBLIC WORKS
PROJECTS

FILE: 4-200-700
PROJECT: 90-4440/43

57P Clyde River 640.

December 27, 1990

MR. RICK ARMSTRONG
MUNICIPAL TECHNICAL OFFICER
MUNICIPAL & COMMUNITY AFFAIRS
IQALUIT, N.W.T.
XOA OHO

RE: SEWAGE/SOLID WASTES RELOCATION REPORT

Please find enclosed for your perusal one copy of our report entitled 'An overview and recommendations for the relocation of existing sewage and solid waste sites in Pond Inlet, Clyde River and Broughton Island, N.W.T. dated November, 1990.

We will be pleased to receive your agreement or otherwise as soon as possible so that arrangement will be made to proceed with proposal call for engineering services as recommended in our report.

Please call if you have further queries. We apologize for the delay in forwarding the report to you.

Yours sincerely,

Wing Yeung
Project Officer

Enclosure

c.c. Mike Ferris - MACA, Iqaluit

Bill Maher - DPW

Malli Aulakh - DPW

019/WY/lf

GOVERNMENT OF THE N.W.T.
PUBLIC WORKS
BAFFIN REGION

FILE:4-200-700
PROJECT: 90-4440-43

AN OVERVIEW AND RECOMMENDATIONS FOR THE RELOCATION OF EXISTING SEWAGE AND SOLID WASTE SITES IN POND INLET, CLYDE RIVER AND BROUGHTON ISLAND, NT.

PREPARED BY

WING YEUNG
PROJECT OFFICER

NOVEMBER, 1990

1.0 Introduction

The Department of Municipal and Community Affairs (MACA) has identified in their capital project plan for water and sanitation programs that there is a need to improve existing sewage and solid waste disposal sites in various communities in the Baffin Region in order to meet the latest environmental and engineering standards. In this respect, funding has currently been budgeted in FY 90/91 to 93/94 to carry out the sanitation improvements in Pond Inlet, Clyde River, Broughton Island and Lake Harbour.

In connection with the water license renewal, Hamlets of Pond Inlet, Clyde River and Broughton Island have also initiated a process during 1989 to develop plans to improve existing sewage/solid waste sites. Their action were largely prompted in response to recommendations set out in the water license - 1989 compliance reports prepared by David Jessiman of DIAND in August, 1989.

As requested by MACA, the Department of Public Works (DPW) conducted a field study of existing and proposed sewage/solid waste sites in Pond Inlet, Clyde River and Broughton Island between October 3 & 4 1990. The field party included Mr. David Jessiman, water resource officer of DIAND, Mr. Malli Aulakh and Mr. Wing Yeung, Project Manager and project officer respectively of DPW. General on-site discussions were held in each community visited between the field party and Hamlet personnels typically including the Senior Administration officer and Hamlet foreman.

The purpose of the field trip was to collect information relating to existing sewage/solid waste sites of the communities concerned and to review and develop alternatives to address the problem.

2.0 Present Situation

Generally in Arctic communities with population under 1,000 for economic reasons, water supply systems and therefore collection of sewage have been designed based on truck distribution/collection services. It is presumed for the purpose of this study and following discussion that the communities under consideration will continue with trucked services in the 20 year planning horizon.

2.1 Pond Inlet

Sewage site

The existing sewage site is located about 1 km east from the community and contains a sewage holding pond of about 80m x 30m in plan area. The pond was developed from a natural ravine and has an earth berm at its east end to retain solids in the sewage. The pond appears in good condition and well maintained. An outlet culvert in the berm provides drainage of effluent from the pond to the ocean, where the effluent travels a few hundred meters down a sandy slope to reach the seashore. (see photo #1)

It is reported that all but five houses have been fitted with internal pressure water systems, drainage piping, water and sewage holding tanks. The community has two 4500 liter sewage trucks to provide regular pump-out services and its contents are emptied into the sewage holding pond.

Solid Waste Sites

The solid waste sites are located adjacent to the sewage pond and contain separate areas for bulky metals and domestic garbage. Burning of garbage is practiced frequently, however, volume reduction of the waste is hindered because of the mixing of scrap metals in the domestic waste. It appears that the wastes are not generally covered adequately with granular materials.

Access to the sewage/solid waste sites is provided by an all weather gravel road.

2.2 Clyde River

Sewage Site

The community has two 4500 liter sewage trucks to provide pump-out services for houses fitted with holding tanks. The community, however, has no sewage holding pond. The trucks simply discharge the raw sewage at the abandoned domestic waste site located about 1km west of the community. The site inspection indicates that the effluent flows over a fairly long overland flow to the Patricia Bay (see photo #2).

It is reported that presently 15 houses continue to use honey bags.

Solid Waste Sites

The old domestic waste site was abandoned in 1989 when a new site located 2km west of the community was selected and developed. However, this abandoned domestic waste site continues to be used for sewage disposal by the Hamlet. the site is presently partially covered with granular materials (see photo #2).

The new solid waste sites contain garbage, bulky materials and oil storage drums in separate areas. Garbage is burnt frequently to reduce the volume of waste. Overall, the sites appear to be well maintained and covered with sand/gravel.

2.3 BROUGHTON ISLAND

Sewage Site

The community has two 4500 liter sewage trucks to provide sewage pump-out services. At present, the two trucks empty the sewage into a small pit of about 10m x 20m in plan area located approximately 1.5km northeast of the community. It is apparent that this pit is inadequate to hold the expected sewage quantities thereby resulting in ponding of sewage in the low lying areas in the vicinity of the pit (see photo #3).

It is reported that presently 24 houses continue to use honey bags.

Solid Waste Sites

The domestic waste site is located to the immediate north of the sewage pit. Garbage is burnt and covered periodically at the domestic waste site. The bulky metal site consists of several separate areas scattered along the seashore (see photo #4).

3.0 The Problems

On site discussion and inspection show that existing sewage/solid waste facilities of the communities visited have similar problems in respect of site developments and management. They include:

-Sewage and solid waste facilities are within the same site area which is located in an exposed location relatively close to the community. The sites are generally visible to incoming aircraft and may be directly on one of the routes from the airport to the town.

-Untreated sewage is either discharged into the domestic waste site or to a sewage pond inadequately sized for treatment purposes.

-Domestic garbage sites are generally inadequately covered and compacted to meet requirements of a modified landfill site.

-A considerable amount of bulky metal waste is not dumped in a confined and orderly manner; sometimes scrap metal and construction debris are mixed with the domestic waste.

-Occasionally, smoke and garbage are blown back to the community or scattered around the site by wind.

-No warning signs at the sewage/solid waste sites.

-Abandoned domestic and bulky waste sites are not properly consolidated and cleaned up.

4.0 Recommendations to alleviate the problems

4.1 Sewage Treatment and Disposal

Objectives

The underlying objective of any sewage treatment and disposal is to discharge used water and water borne waste to the receiving water in a manner acceptable for public health, environmental and aesthetic points of views. It should be noted that sewage collection, treatment and disposal are presently governed by standards administered by the Nothwest Territories Water Board, and a license from the Board is needed before discharge will be permitted.

Past experience has demonstrated that lagoon treatment of wastewater performs reasonably well in northern, small remote communities and is often the treatment method of choice because of its simplicity of operation and low cost of maintenance.

Lagoon Site Planning

In general, lagoons must be sited well away from the community and communities activities, off existing water sheds and preferably downwind from the townsite. Other principal factors considered include the terrain, drainage and soil characteristic, potential environmental or public health impact, existing population and its expected development of townsite, the wishes of the Hamlet council and its people.

It is sometimes much more economical to use a natural pond or lake to receive wastewater. Usually, a low dike has to be constructed around the pond to provide sufficient depth in the pond. At Pond Inlet, Clyde River and Broughton Island, it is not readily apparent if an appropriate natural pond or lake exists that can be used as treatment lagoon. The alternative is to construct a lagoon with the normal fill or cut -fill method.

Areas with permafrost consisting of fine-textured, ice-rich soils should be avoided because thawing can result in failure or in the need for frequent repair and restoration of dikes or berms. To overcome difficulty in permafrost excavation, it is expedient to construct the lagoon by placing fill over the permafrost rather than attempting to partially excavate an area in frozen ground.

A lagoon facility typically comprises an access road, a truck turnaround area, bumper rail, means of sewage discharge and outflow structures. Fencing to lagoon may be desirable to keep out public and animals.

4.2 Solid Waste Management & Disposal

Factors to be considered for solid waste site selection are fairly similar to those for sewage lagoon. Principal factors considered include prevailing wind directions, availability of cover materials, natural screening and buffering, haul distances, site development costs, potential environmental or public health impact, drainage and risk to airport operations.

Standard disposal alternatives include open dump/landfill, modified landfill, sanitary landfill, burning and landfill, incineration and landfill. The method typically being used in most northern communities is the open dump/landfill method in which the wastes are burnt and covered with sand at least once a year.

Careful choice of site and good site maintenance are of paramount importance leading to a satisfactory operation of a landfill site program. At present, different community experiences varying degree of success in the operation of a landfill program. The experience of the communities so far indicated strongly the need for a simple but effective management process to be developed.

A solid waste area typically includes truck access and a turn around laid out to serve current and future disposal cells effectively as possible. Preferably, stock piles of cover materials should be near at hand to facilitate the covering of accumulated garbage.

4.3 Treatment of Abandoned Solid Waste Sites

When existing solid waste disposal sites have been developed to capacity or abandoned for being too close to the community, they should be closed and cleaned up for aesthetics and public health reasons.

The site closure operation should include stabilization of the garbage waste slope by regrading, covering of all exposed waste materials by sand and general clean-up of the area. Bulky metal wastes are best crushed to reduce the volume as possible followed by burial or orderly stockpiling.

5.0 Investigation of Incineration

Incineration is a controlled process for oxidizing combustible waste to carbon dioxide, water and ash. Some years ago, attempts were made in Pangnirtung to use incineration to reduce the volume of municipal garbage/refuse but apparently with little success.

However, incineration could be a viable alternative as a means to reduce the volume of waste and to eliminate the nuisance/health hazard posed by smoke and ash due to the opening burning of garbage. This is particularly relevant as it is virtually impossible to find a dump site effectively screened and buffered from the community due to the featureless landscape of most northern communities.

Detailed investigation should be carried out to review and evaluate if a suitable type of incinerator is available on the market to meet the specific needs of the small northern community with acceptable capital, operation and maintenance costs.

6.0. Conclusions

Based on findings reported earlier, we consider that a unique problem exists in the site development, management and operation of existing sewage/solid waste sites in most, if not all, communities in the Baffin Region.

We recommend that a consultant be engaged to do the following which will be applicable to small northern Arctic communities

1. Carry out detailed generic study of sewage and solid waste sites selected by Hamlet.

2. Develop a standard design of sewage lagoon complete with flow control systems.

3. Develop a simple but effective management process for the site development management and operation of municipal garbage, bulky metal waste and honey bag sites.

4. Evaluate the potential of waste incineration with particular emphasis on its practicality, management, capital, operation and maintenance costs.

We note that under MACA's 90/91 capital project plan, a total capital funding of $ 200,000 has been provided for the sewage/solid waste site improvements in Pond Inlet' Clyde River,Broughton Island and Lake Harbour, ie. $ 50,000 for each community. Expenditure to date is estimated to be $ 10,000, with a free balance of about $ 190,000.

We recommend that funding of $ 45,000 be used in this fiscal year (90/91) for the proposed engineering services by a consultant as recommended above.

021/WY/ck

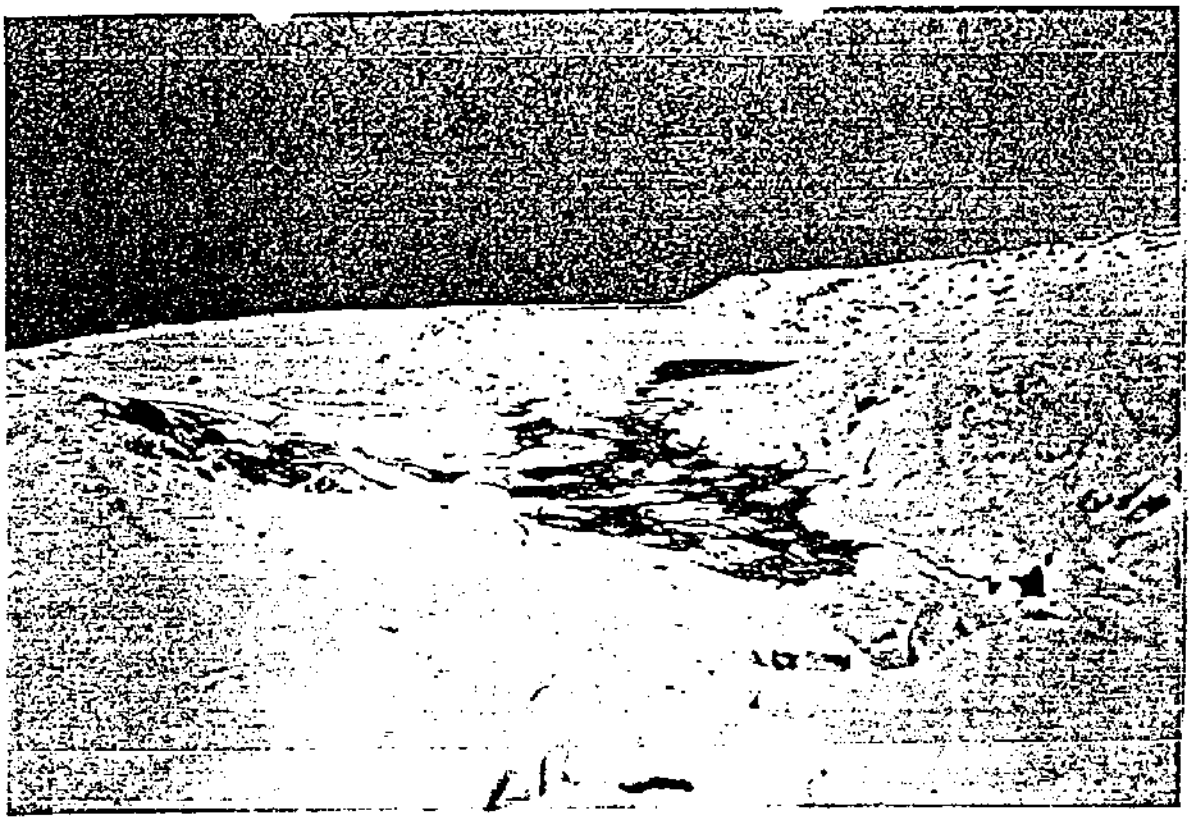

PHOTO # 1

PHOTO # 2

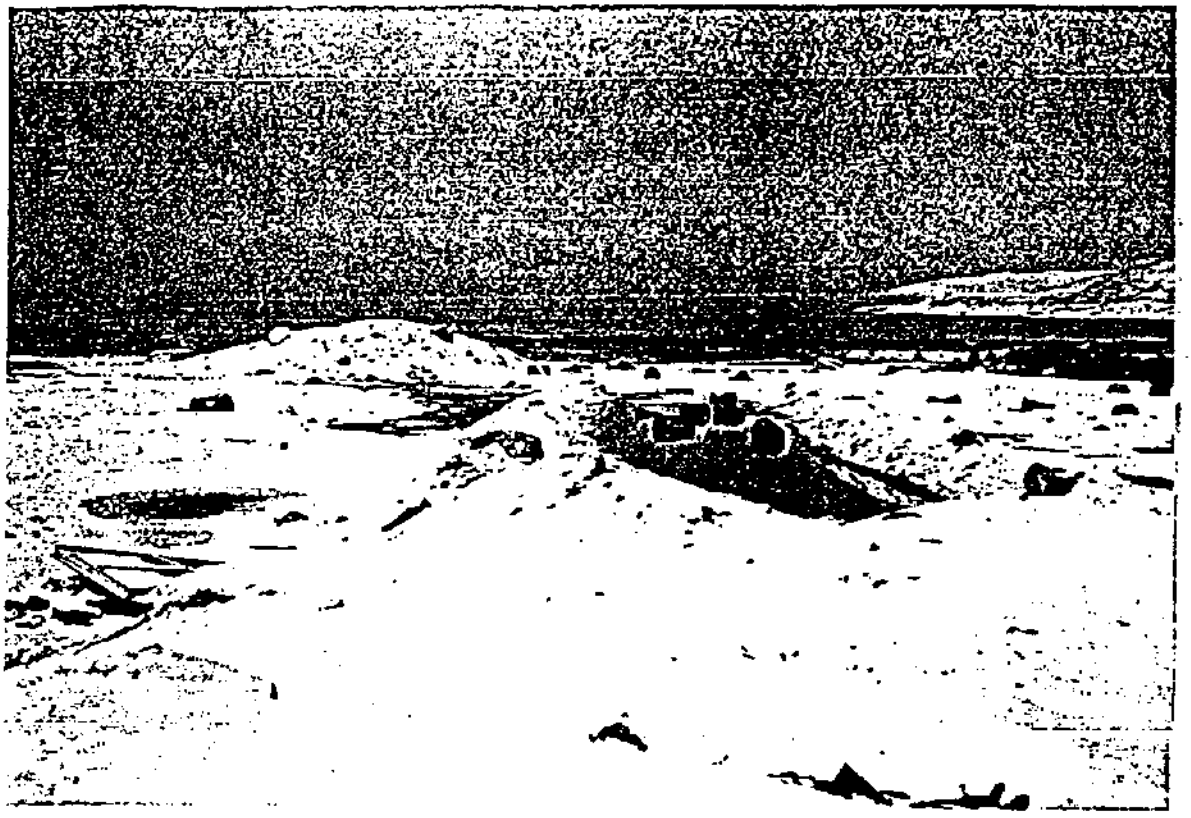

PHOTO # 3

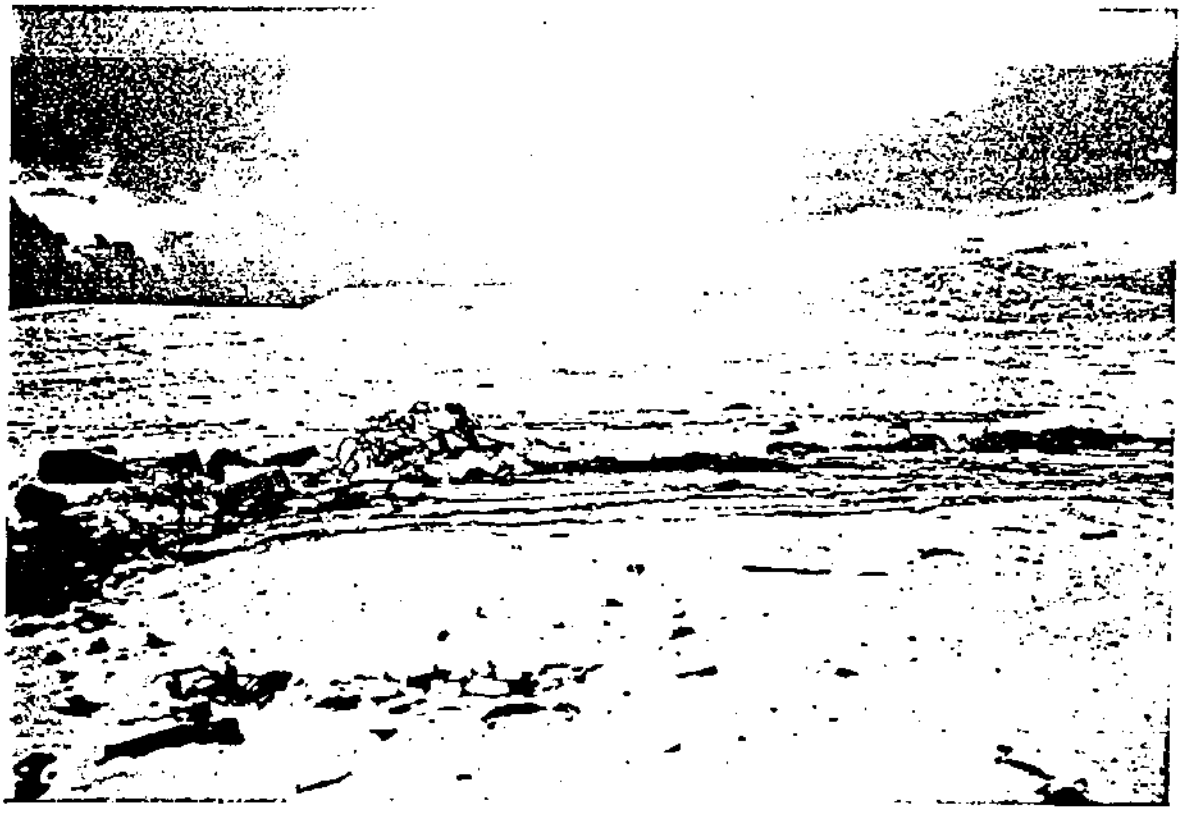

PHOTO # 4