# SANDSPIT AIRPORT

# ASSESSMENT REPORT

by

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Environmental Protection Service
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# SUMMARY

The sewage disposal system at Sandspit Airport, a facility operated by Transport Canada, consists of both individual subsurface disposal systems (septic tanks and rock pits) and a piped collection system that includes two lift stations. The collection system terminates with a short outfall that discharges raw sewage to a beach on Shingle Bay above the low tide mark. Cursory flow measurements indicate that sewage is exfiltrating from the collection system; this possibility combined with the subsurface discharges from the rock pits raises concern for the long term quality of the airport well water.

The community of Sandspit does not have a sewage collection and treatment system but they have had an engineering study carried out to develop alternate schemes for water supply and sewage disposal.

It is concluded that the discharge of raw sewage to the beach of Shingle Bay does not satisfy the intent of the Federal Activities Clean-Up program, the sewage requires treatment and disposal via an extended outfall in Shingle Bay, and the collection system requires some upgrading.

It is recommended that Transport Canada extend the outfall as soon as possible, investigate participation in a joint treatment scheme with the community of Sandspit, and initiate upgrading procedures for the collection system.

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## 1 INTRODUCTION

Sandspit Airport, Figure 1, is located on the northeast corner of Moresby Island of the Queen Charlottes, adjacent to the community of Sandspit. Transport Canada owns and operates the airport which serves the Queen Charlotte Islands as the main terminus for passengers and air freight.

The purpose of this report is to assess the present means of sewage disposal and develop upgrading measures.

## 2 AIRPORT SEWERAGE

Within the airport property there are nineteen single family and four duplex dwellings, six mobile homes, cafe, gift shop, terminal building, workshops and service facilities. Two small hanger/office structures are in the process of being constructed and a third is planned, all by private businesses.

Sewage generated at the airport either flows to individual subsurface disposal systems or is directed to an outfall in Shingle Bay. Refer to Figure 2.

Sewage from the three duplexes and one single family dwelling on the west side of the airport, the recreation hall, four mobile homes, and a garage on the east side of the airport discharge to septic tanks and rock pits.

All remaining dwellings and buildings discharge to sewage collection systems either directly or through a septic tank. The collection system consists primarily of six inch diameter vitrified tile pipe. There are two pumping stations. One, a wet well/dry well with two 2-HP pumps, is

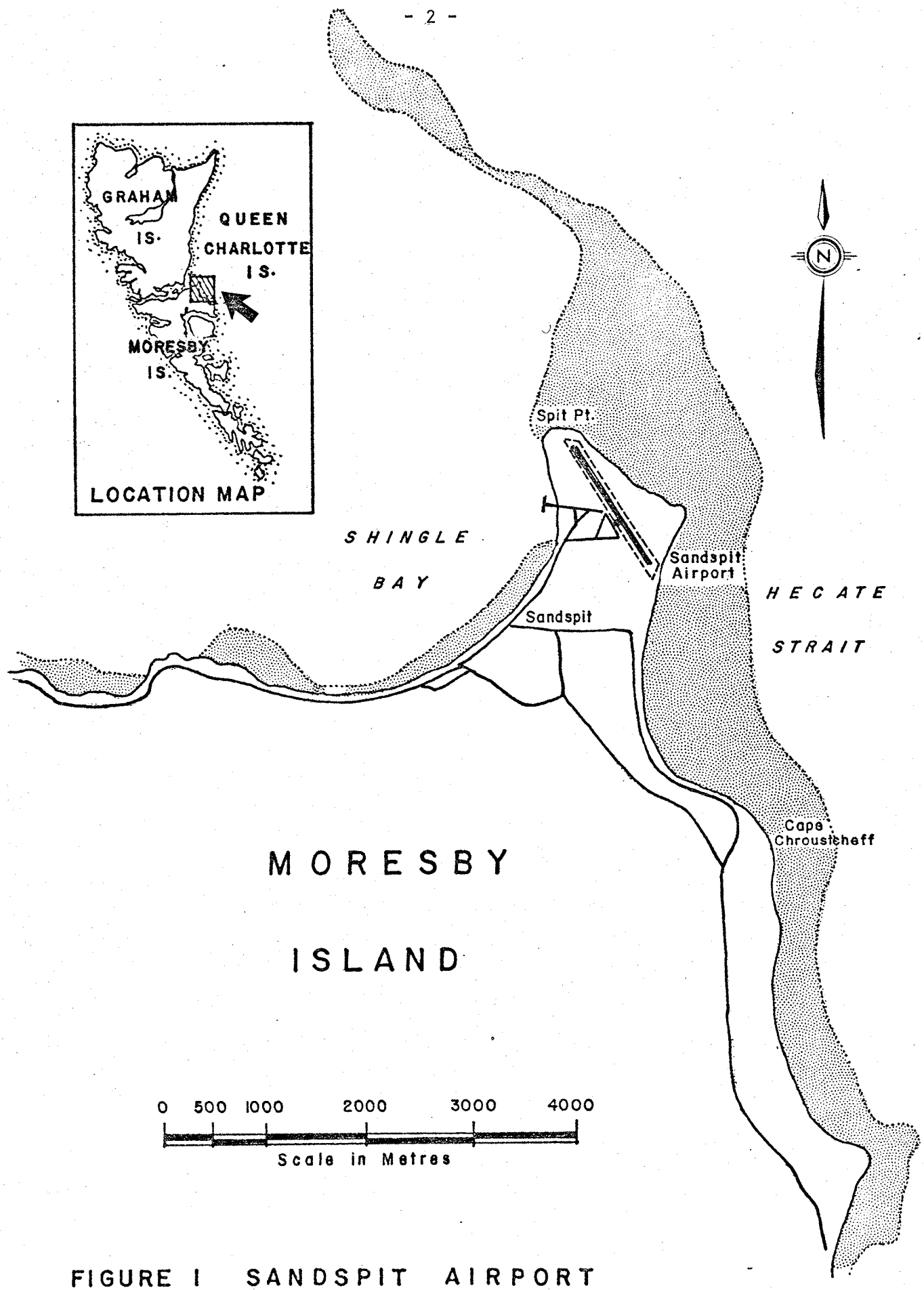


FIGURE I SANDSPIT AIRPORT

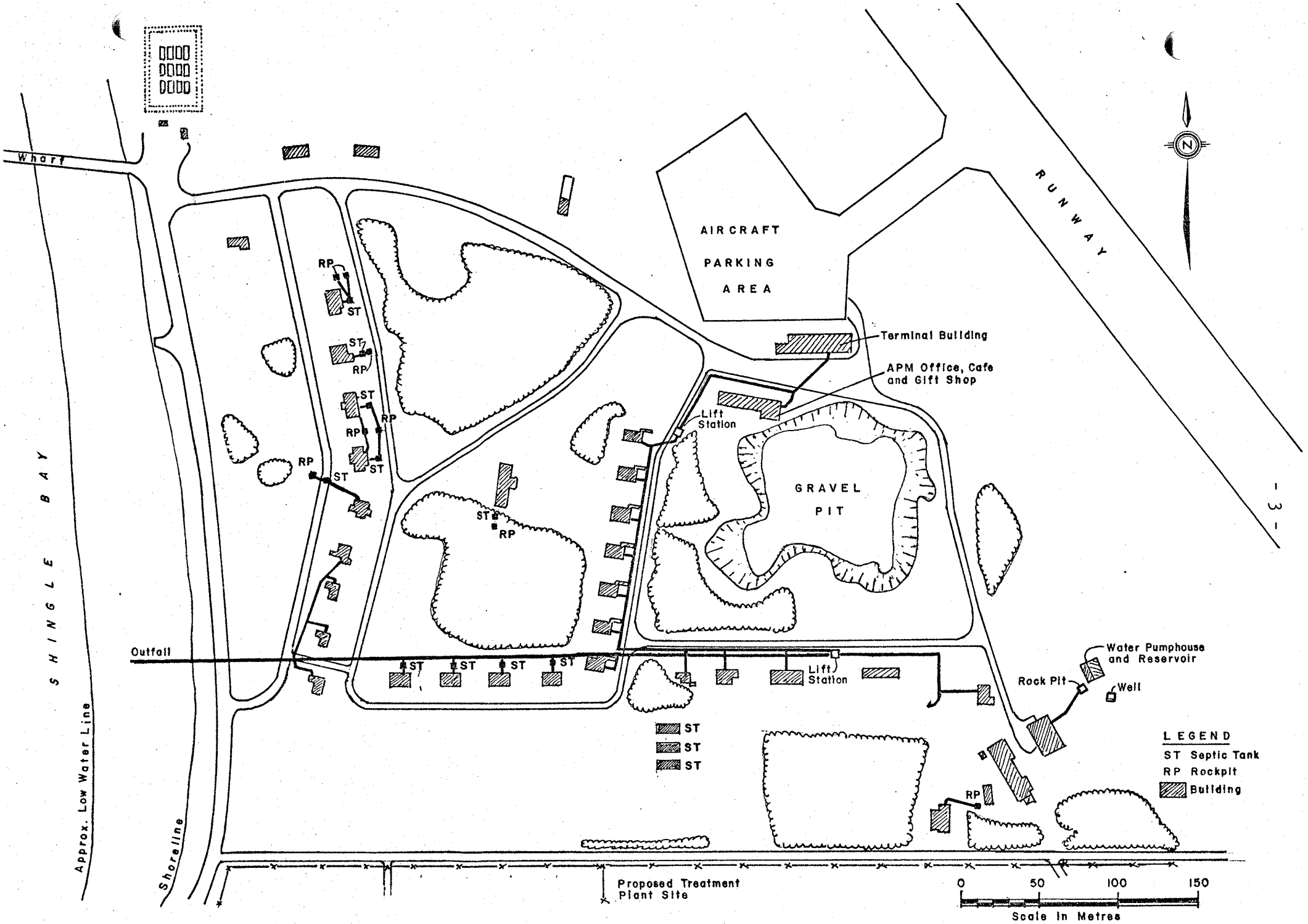


FIGURE 2 SANDSPIT AIRPORT SEWERAGE

located 150 feet southwest of the building housing the airport cafe. This station collects sewage from the terminal building and cafe building. The sewage is lifted to a collector serving nine residences and discharges to a second pump station, located just south of the old gravel pit, consisting of a wet well with two submersible pumps. The discharge from this second pump station is to Shingle Bay via a short steel force main and gravity line. Eight residences discharge into the gravity line.

The outfall presently discharges to the shore of Shingle Bay above the low water mark. Raw sewage is, therefore, deposited directly on the beach during low tide. Originally the outfall discharged some 800 feet from shore, however, it has long since broken off at its present bulkhead terminus.

The condition of the existing sewage collection works, while not assessed in any great detail, would appear to be in need of upgrading. During a cursory flow measurement assessment in 1975, there was evidence of loss of sewage in the main discharge line. The results of the test which was carried out using a weir installed at the outfall discharge and a measurement of the wet well draw down indicated a 37% loss. The data is attached as Appendix A.

## 3 WATER SUPPLY

Water for the airport is supplied from a concrete encased well and distributed from a 50,000 gallon concrete storage tank. Their location is shown in Figure 2. Consumption is about 14,000 gpd. and there is no treatment or chlorination.

## 4 STORM DRAINAGE AND ROOF DRAINAGE

Due to the permeable nature of the sandy soil, there is no storm catchment or drainage on the airport. Roof drains discharge to the

to the ground via rock pits in some instances.

## 5 SOLID WASTE DISPOSAL

Solid wastes including household garbage are collected and trucked to an isolated disposal site approximately five miles from the airport. The disposal site is owned by Crown Zellerback Limited and is under a Pollution Control Branch permit. Presently the garbage is covered once per week by MOT equipment.

## 6 MISCELLANEOUS

### 6.1 Fuel Storage

Fuel is shipped in and off-loaded at the government wharf. There are three main fuel storage areas:

- main Imperial Oil storage area; dyked above ground storage tanks;
- Imperial Oil underground storage tanks located near the terminal building;
- Shell Oil above ground storage tanks located in the old gravel pit south of the terminal building.

According to the airport manager there have been no problems or major spills.

### 6.2 Fire Fighter Training

There is approximately one training fire per month. Fuel used for the fires is contaminated fuels or gasoline. Approximately 800 gallons of foam and 300 pounds of chemical are used per month.

### 6.3 De-Icing/Anti-Icing

6.3.1 Urea usage for anti-icing and de-icing runway aprons and taxiways is used in amounts up to 40 tons per year.

6.3.2 Glycol usage for de-icing aircraft is low, with about ninety gallons used per year. This has been as high as 450 gallons per year.

## 7 REGIONAL SEWERAGE

At this time there is no other sewage system in the area. The unincorporated community of Sandspit (estimated January 1975 population 550) immediately adjacent to the airport is served by septic tanks and subsurface disposal systems. There are, however, reportedly some sewage discharges to the beach from adjacent facilities.

The community wishes to upgrade its sewage collection and disposal; in 1974 Associated Engineering Services Limited was commissioned by the Skeena-Queen Charlotte Regional District to carry out an engineering study* that would provide the community with sufficient data on the general layout and requirements of a water and sewage system, including sewage treatment and alternatives, so that preliminary cost estimates and sources of financing could be outlined.

For sewage collection and disposal the study developed three schemes involving a new collection system and sewage treatment plant discharging to an outfall in Shingle Bay. Two involved a new outfall, one with a force main collection system from the airport, and the sewage treatment plant in the southwestern area of the community. The third involved a collection system for a community with a new long outfall at the site of the airport outfall with a sewage treatment plant between the community and the airport designed to serve both.

## 8 DISCUSSION

The present raw sewage discharge to the beach is unacceptable. Being above the low-water mark it is a health hazard and an aesthetic

* Skeena-Queen Charlotte Regional District - Sandspit Utilities Study, January 1975, Associated Engineering Services Limited. Vancouver, B.C.

nuisance. It should be extended into deep water to permit adequate dispersion of effluent. The lack of sewage treatment is also not acceptable under the intent of the Federal Activities Program and the planning for a sewage treatment system should be initiated. Since the community of Sandspit is in the planning stages for sewerage, a joint system should be considered. Transport Canada are already planning along these lines and to-date the concept is supported by the local representatives of the Skeena-Queen Charlotte Regional District. Because of funding limitation the community is looking at a treatment system in four or five years time. They favour the third scheme developed by A.E.S.L., a sewage treatment plant located between the airport and community and there is land available that could be used. Refer to Figure 2 for the suggested location of the sewage treatment plant.

Since MOT should extend the outfall as soon as possible, it is suggested they consider an agreement to size it to accomodate the total sewage flow from the airport and community and let the community connect when they have a system. In turn, the community would treat the airport sewage when the treatment system became available.

The limited flow measurement assessment in the sewer system described in section 2 indicates that there could be significant loss of raw sewage through probable joint exfiltration to the ground. When this suspected collection system loss is included with the existing rock pit discharges the total subsurface sewage discharge could account for an excess of 50% of the total airport sewage volume. Given the sandy nature of the soils in the vicinity of the airport there could be significant movement of sewage through the subsurface. Since the airport water well is on-site

nearby sewage exfiltration raises concern for the long-term quality of the ground water.

## 9 CONCLUSIONS

1. The present raw sewage discharge to shoreline of Shingle Bay must be considered as unacceptable both in terms of general public health considerations and the federal facilities Effluent Guidelines.

2. The existing sewage collection and disposal system involving septic tanks with rockpits and outfall results in subsurface ground discharge both directly via the rockpits and indirectly by presumed collection system joint exfiltration.

3. Due to the subsurface discharges of sewage and the location of the well water supply, there is concern for the long term quality of the water supply.

4. Upgrading of the outfall and sewage collection system and the provision of treatment is necessary.

5. The most practical solution for the area is a shared system between the community of Sandspit and the airport.

## 10 RECOMMENDATIONS

It is recommended that:

1. The existing airport outfall be extended beyond the low-water mark to a depth providing adequate dispersion.

2. The upgrading of the airport collection system be considered to reduce subsurface disposal of sewage.

3. Transport Canada investigate a joint sewage treatment venture with the Skeena-Queen Charlotte Regional District.

CONTACTS

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Mr. J. Hawkins, Airport Manager, Sandspit

Chairman, Moresby Island Advising Planning Committee

# Appendix A

## Sewage Balance Test

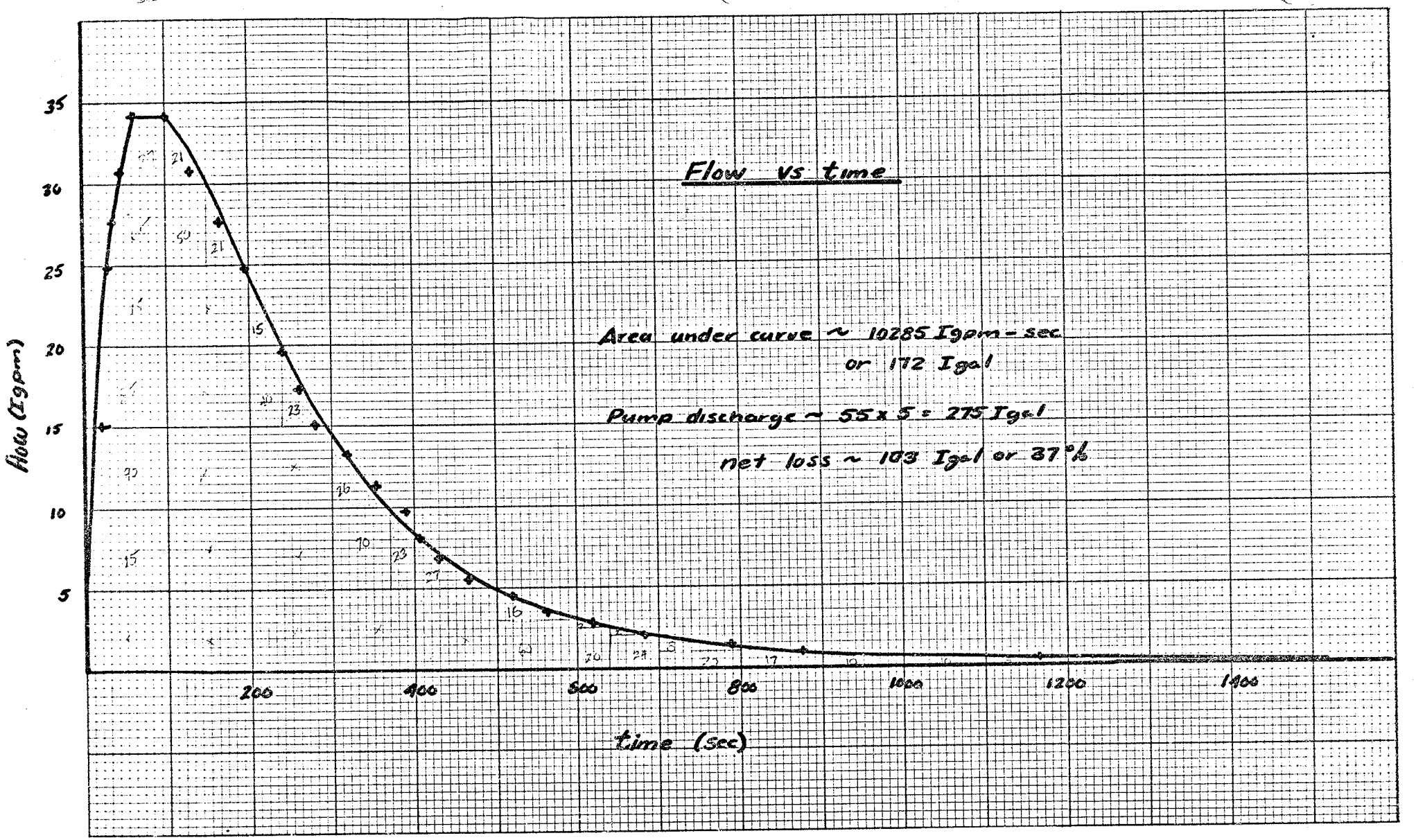
## Sewage Balance Test on Outfall Line from Small Wet Well

Small wet well pump rate of 55 IGPM

- Pumping time 5 minutes
- h behind 5 inch 90° weir at measured over the flow period converted to Igpm and plotted against t
- Area under the curve calculated as 10285 Igpm - sec or 172 Igal.
- Pump discharge 55 x 5 = 275 Igal.
- Calculated net loss = 102 Igal or 37%

### DATA

| time (sec) | depth (in) | h (d-6¼") | $942\ (\overline{h}/12)^{2.47}$ IGPM |
|---|---|---|---|
| 0 | 6.25 | 0 | |
| 20 | 8.5 | 2.25 | 15.1 |
| 30 | 9.0 | 2.75 | 24.8 |
| 35 | 9.13 | 2.88 | 27.7 |
| 45 | 9.25 | 3.0 | 30.7 |
| 60 | 9.38 | 3.13 | 34.1 |
| 100 ) same | 9.38 | 3.13 | 34.1 |
| 130 | 9.25 | 3.0 | 30.7 |
| 165 | 9.13 | 2.88 | 27.7 |
| 195 | 9.0 | 2.75 | 24.8 |
| 240 | 8.75 | 2.50 | 19.6 |
| 260 | 8.63 | 2.38 | 17.3 |
| 280 | 8.5 | 2.25 | 15.1 |
| 320 | 8.38 | 2.13 | 13.2 |
| 355 | 8.25 | 2.0 | 11.3 |
| 390 | 8.13 | 1.88 | 9.7 |
| 405 | 8.0 | 1.75 | 8.1 |
| 430 | 7.88 | 1.63 | 6.8 |
| 465 | 7.75 | 1.50 | 5.5 |
| 520 | 7.63 | 1.38 | 4.5 |
| 565 | 7.50 | 1.25 | 3.5 |
| 620 | 7.38 | 1.13 | 2.8 |
| 685 | 7.25 | 1.0 | 2.0 |
| 790 | 7.13 | 0.88 | 1.5 |
| 875 | 7.00 | 0.75 | 1.0 |
| 1100 | 6.88 | 0.63 | .65 |
| 1165 | 6.81 | 0.56 | .5 |


Flow vs time
Area under curve ~ 10285 Igpm - sec
or 172 Igal
Pump discharge ~ 55 x 5 = 275 Igal
net loss ~ 103 Igal or 37 %
Flow (Igpm)
time (sec)
35
30
25
20
15
10
5
200
400
600
800
1000
1200
1400