2.0 Characteristics of Wellington Sewage

2.1 Composition of Sewage

A waterborne sewerage system uses a very large volume of water to convey a small quantity of solid and liquid wastes. A typical design dry weather flow for a sewerage system is of the order of 200 litres per person per day, or 20 buckets of water to transport the daily waste produced for each person in the community.

Sewage comes from domestic, commercial, institutional and industrial sources and contains:

- debris and inert materials;
- organic materials;
- nutrients
- pathogens
- oil and grease
- toxicants

2.2 Sewage Flows and Loadings

The future flows and loadings are shown below:

- limit oxygen depletion;
- control discharge of toxics;
- control release of nutrients which could lower water clarity or promote unacceptable weed growth and;
- meet public expectations of environmental protection.

Hence the minimum amount of treatment given to sewage is normally related to the capacity of the receiving waters to assimilate wastewater without undesirable effects.

2.4 Effluent Standards

Wellington raw sewage has the following characteristics:

$B.O.D._5$	$280g/m^3$
S.S.	$265g/m^3$
faecal coliforms	10,000,000 per 100ml

(i.e. 280: 265: 10,000,000)

Table 1
Design Flows and Loadings

Parameter	Unit	Year				
		1990 (Present)	1995 (Commissioning)	2020 (Design)	2040	Ultimate
ADWF	l/s m^3/d	620 53600	640 55300	738 63800	808 69800	915 79100
BOD	g/m^3 kg/d	280 15000	280 15500	280 17900	280 19550	280 22150
SS	g/m^3 kg/d	265 14200	265 14650	265 16900	265 18500	265 20960

The EIS Stage II investigations concluded that:

- The outfall should be designed for a peak flow of 3,600 l/sec;
- The treatment plant should be designed to fully treat up to 2,800 l/sec. with the ability to accommodate an expansion to increase the plant capacity to 3,600 l/sec.

2.3 Objectives of Sewage Treatment

For Wellington it is acknowledged that land disposal of effluent is not a viable option, and that the treated wastewater must be discharged to Cook Strait.

The objectives of sewage treatment are to:

- protect public health;
- maintain aesthetic conditions of receiving water;

In September 1989, Council resolved that the guaranteed effluent quality for the treatment plant should be: 20: 30: 200 (statistically defined in the February 1989 RFP).

This effluent standard represents:

- 90% reduction in BOD
- 90% reduction in SS
- 99.998% reduction in faecals.

Secondary treatment without disinfection will achieve the BOD and SS reductions, but will achieve only a 95% reduction in faecals. To achieve 200 faecals per 100ml, disinfection of the secondary effluent will be required.

The bacteriological standard of 200FC/100ml is very high, and presently exceeds the standard of any other sewage treatment plant in New Zealand.

9.0 Summary and Conclusions

Outfall Location. The EIS Stage II concludes that although influenced by airport development during the construction phase, the Lyall Bay outfall location has a lower estimated cost and lesser overall impact than the Moa Point location, and is to be preferred.

Effluent Standard. The EIS Stage II notes that while Council has adopted an effluent standard of 20:30:200, an effluent standard of 20:30:4,400 would meet the Water Classification Standard, would have the same impact on the marine environment and would save money.

Outfall Length. The EIS Stage II concludes that the length of the Lyall Bay outfall should be 1800 metres.

Treatment Plant Sites. Since neither of the two preferred sites has notable historical significance and both have considerable construction impacts, the South of Golf Course site is preferred because of its greater flexibility, lower cost, and lesser impact on the golf course.

Above or Below Ground. Council has to decide whether the higher costs and disadvantages of an underground plant are offset by the environmental benefits.

Sludge. The EIS Stage II concludes that anaerobic digestion is the preferred sludge treatment option.

Energy Recovery. The EIS Stage II concludes that power generation from sludge biogas is economic.

10.0 Cost Estimates

Cost estimates for the Golf Course and the South of Golf Course sites are shown in Table 10.1. These estimates show that the lowest capital cost option is an above ground treatment on the south of golf course site, with a disinfected effluent. When capitalised operating costs are also included, the option without disinfection and a longer outfall is favoured.

Is this acceptable ?

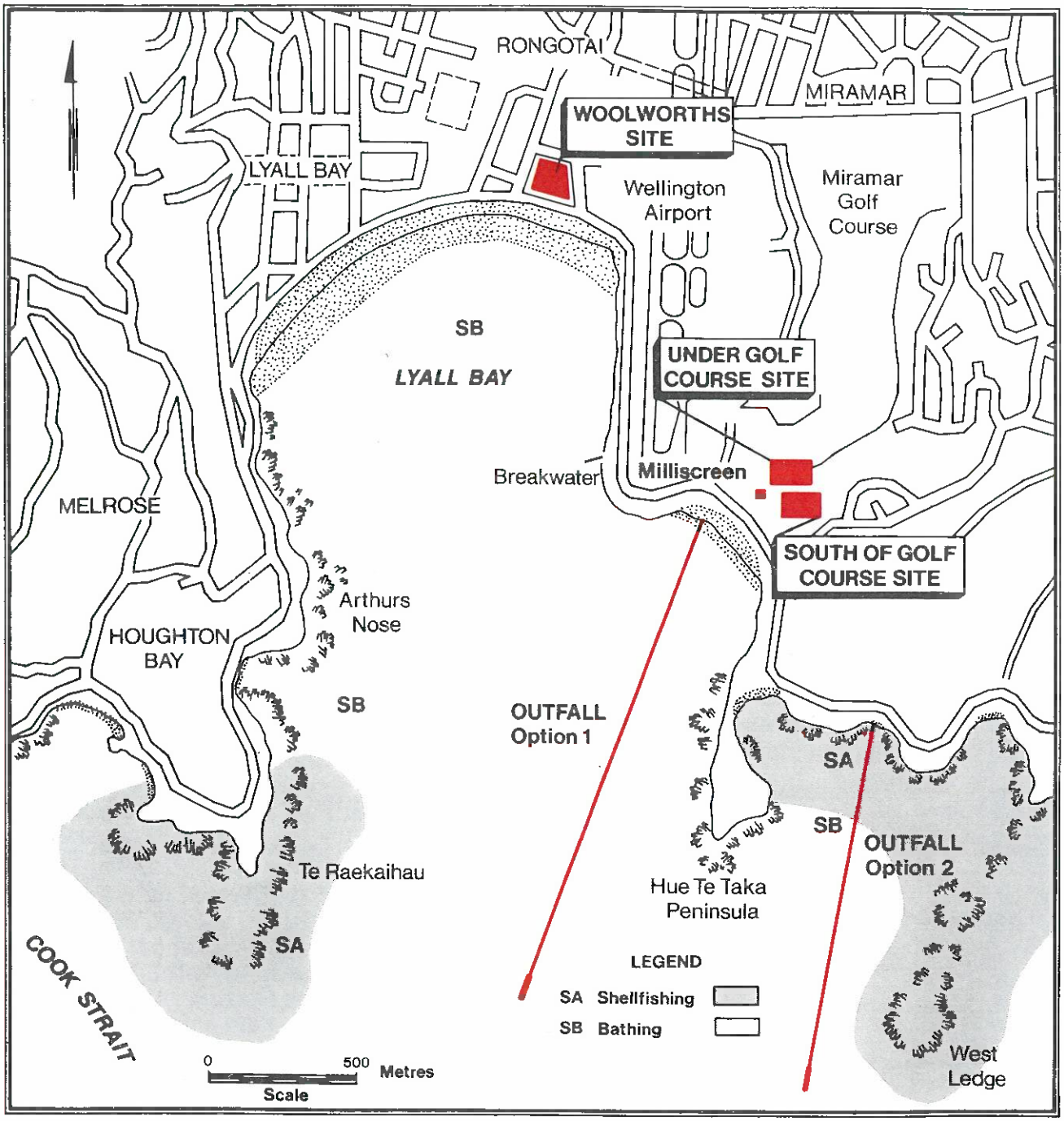
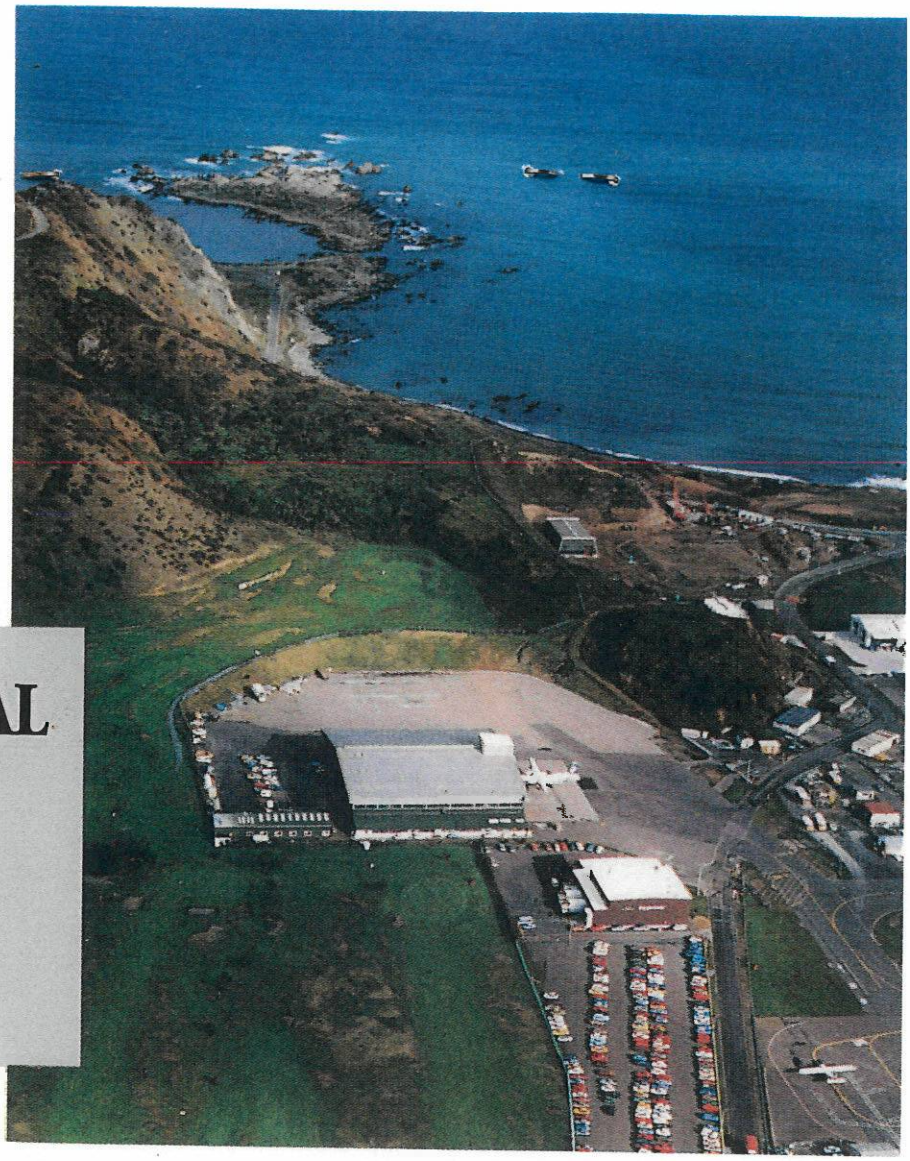


Figure 2 Treatment Plant and Outfall Sites



ENVIRONMENTAL IMPACT STATEMENT STAGE II

Wellington Sewage Treatment and Disposal.

Summary Report.

WELLINGTON CITY COUNCIL

April 1990