WASTEWATER MANAGEMENT - CASE STUDY

Mangawhai Heads Motor Camp – Mangawhai Heads

The Mangawhai Heads Motor Camp is the largest camping facility in the Northland Region using an on site wastewater management system. It is situated at the mouth of the Mangawhai Heads harbour, which is about 1½ hours north of Auckland. This camp covers an area of approx. 10 hectares and consists of three distinct areas of wastewater production.

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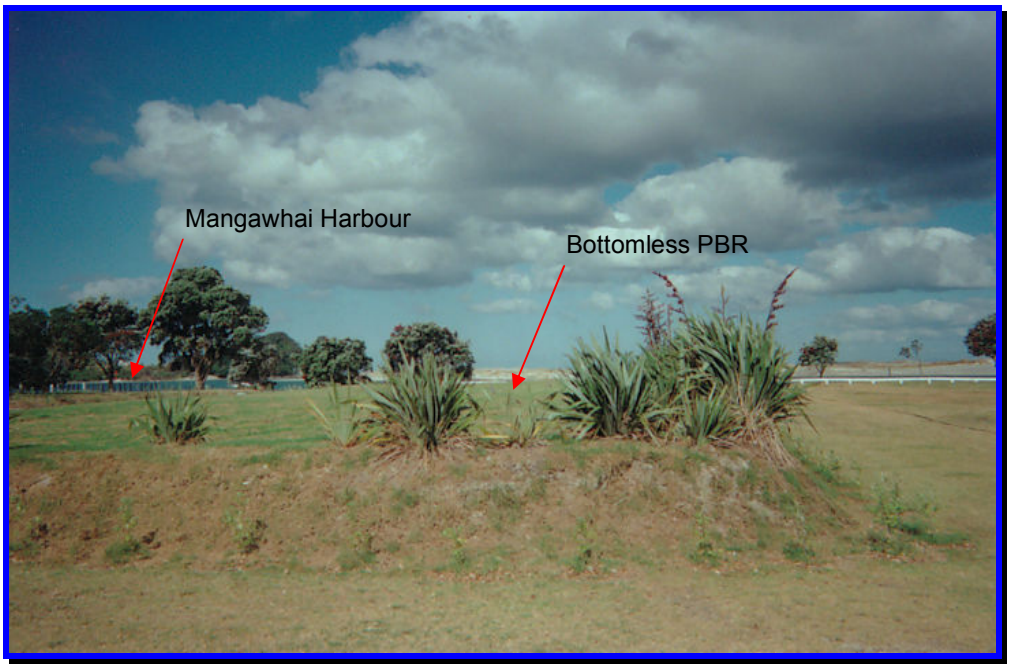

Figure 1. Mangawhai Heads Motor Camp – Bottomless Packed Bed Reactor.

The greatest site constraint was that the soil and sub-strata are predominantly sand. The danger of short circuiting and contamination of the ground water (and subsequently the harbour) had to be mitigated. In addition, the camp operator had limited land available for a treatment plant or disposal field, without significantly reducing the area available for camping.

Using this set of criteria Innoflow Technologies NZ Ltd. (ITNZL) produced a wastewater management solution that met with the business' operational limits, the council's environmental concerns and the campers aesthetic and practical expectations.

The existing geography was assessed and found to be suitable for the installation of point source primary treatment and Modified Effluent Drainage System (MEDS) pumped to a Bottomless Packed Bed Reactor (bPBR) treatment plant. This system acts as the final treatment point also, therefore no additional land was required for disposal.

This is the **first installation** of a commercial bottomless PBR in New Zealand. The following pages detail the system components and technical specifications. Also shown are the design constraints for this project.

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Limited area for treatment plant and disposal	Utilise sand on site to construct bottomless packed bed reactor	Use of the existing sand also meant significantly lower capital costs
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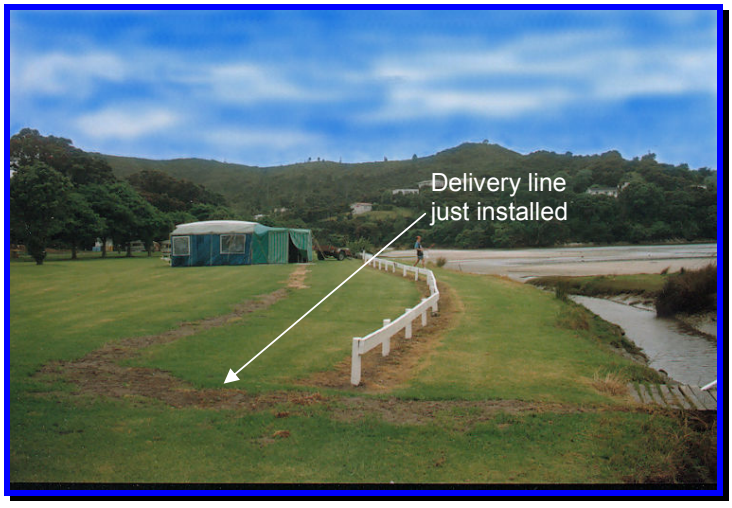

Figure 3. The delivery line was small bore polyethylene.

Using screened pump vaults at the primary treatment stage meant that small bore polyethylene could be used to deliver the effluent to the treatment plant.

The installation of the 40 mm effluent sewer was a simple, cost-effective operation with minimal disturbance to the camp grounds.

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Design Flow	100 m^3/day	Varies from a minimum of ~700 ltr/day to its peak over the Christmas period
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Water meter model	50 mm vane type	These were retro-fitted in Dec. 2000 to provide information for the renewal of the resource consent
Sequencing valve	Hydrotek V6606A	These were critical in allowing the use of single phase pumps, by rotational dosing of the rPBR

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Three 27 m^3 septic tanks were installed at the main facilities block of the camp ground near the shore line (first picture).

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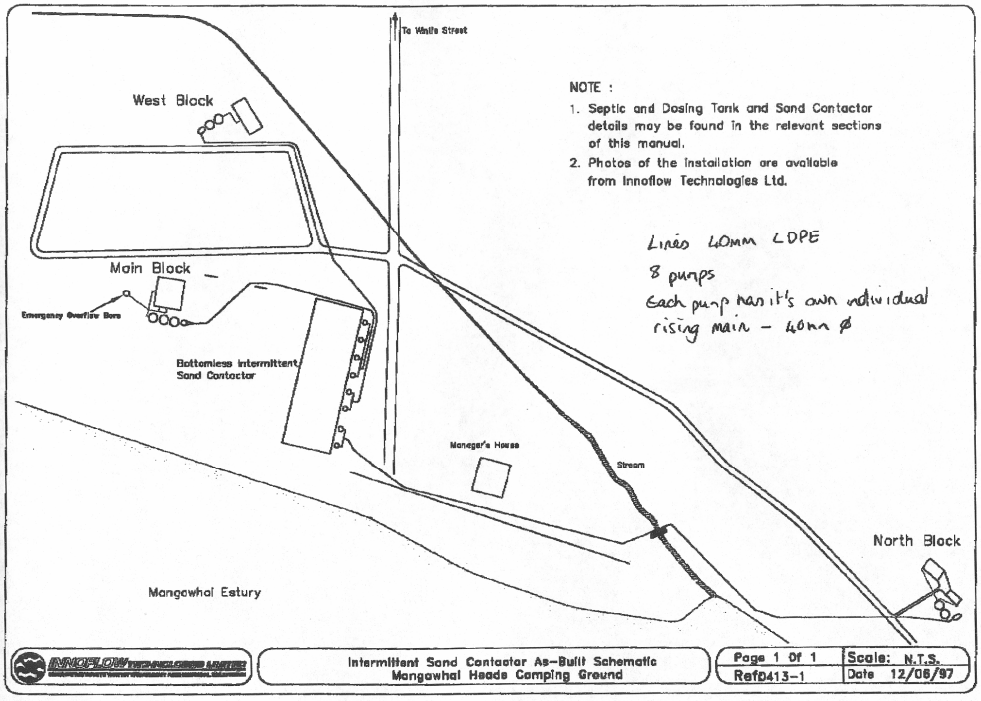

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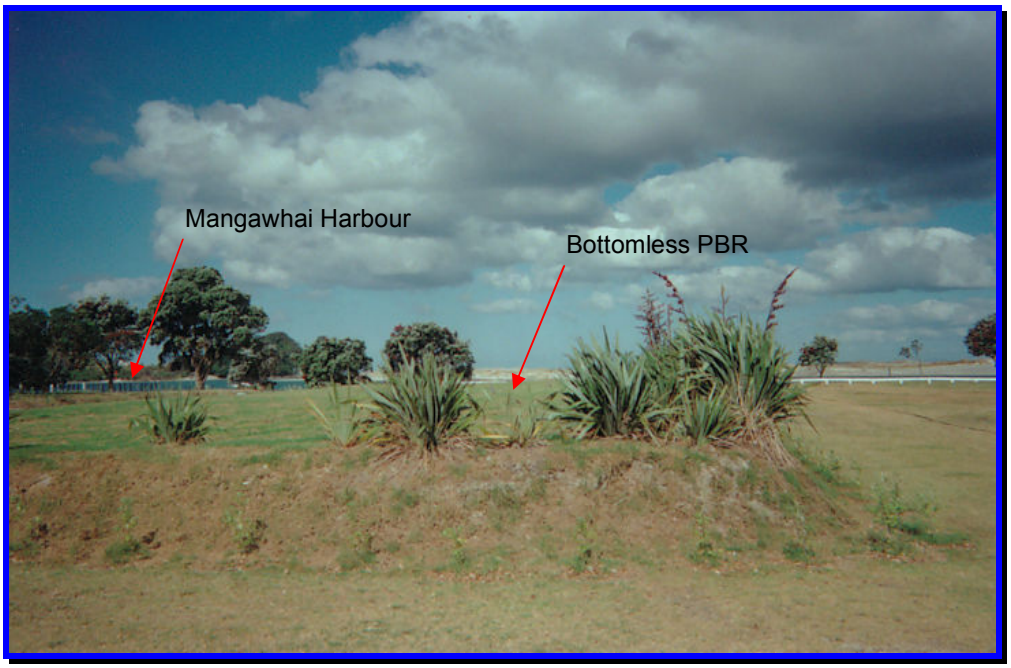

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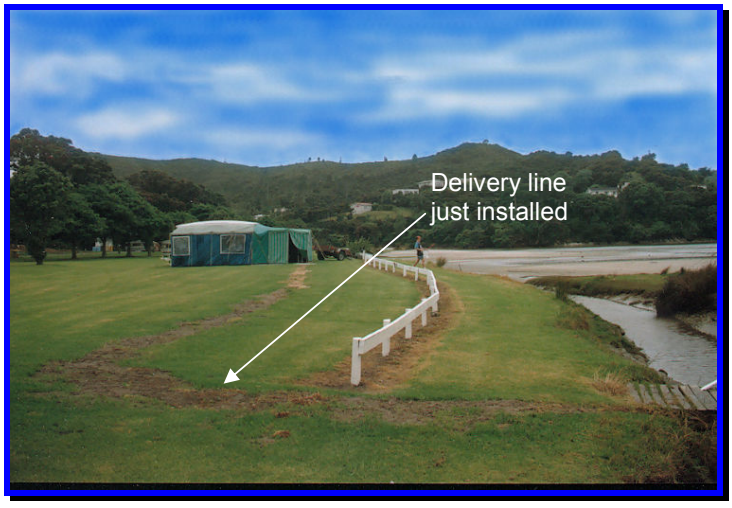

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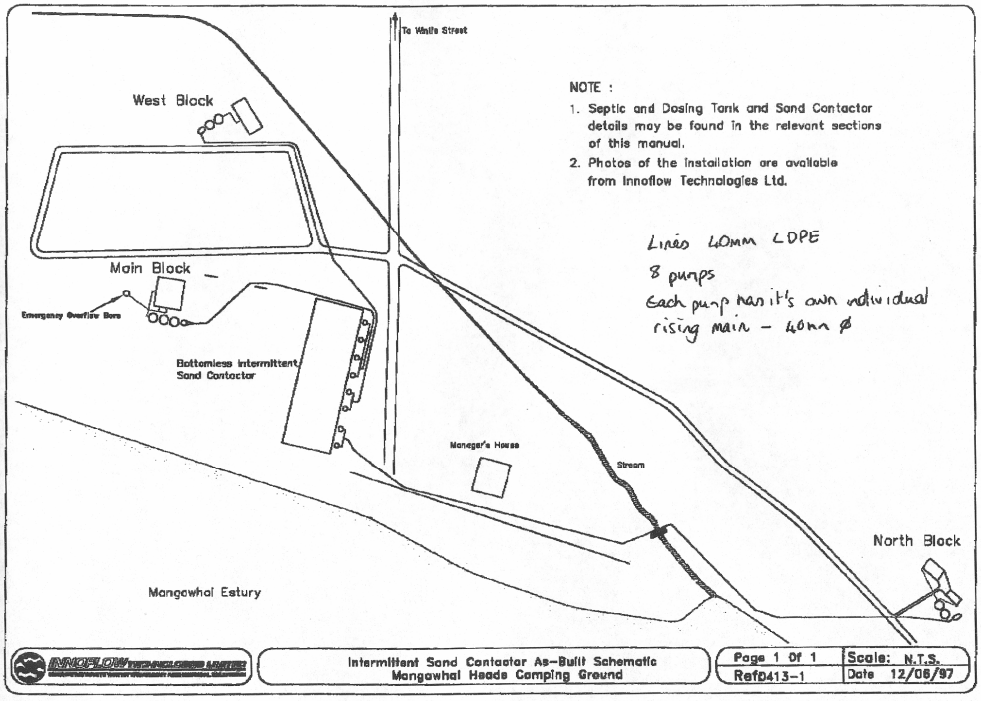

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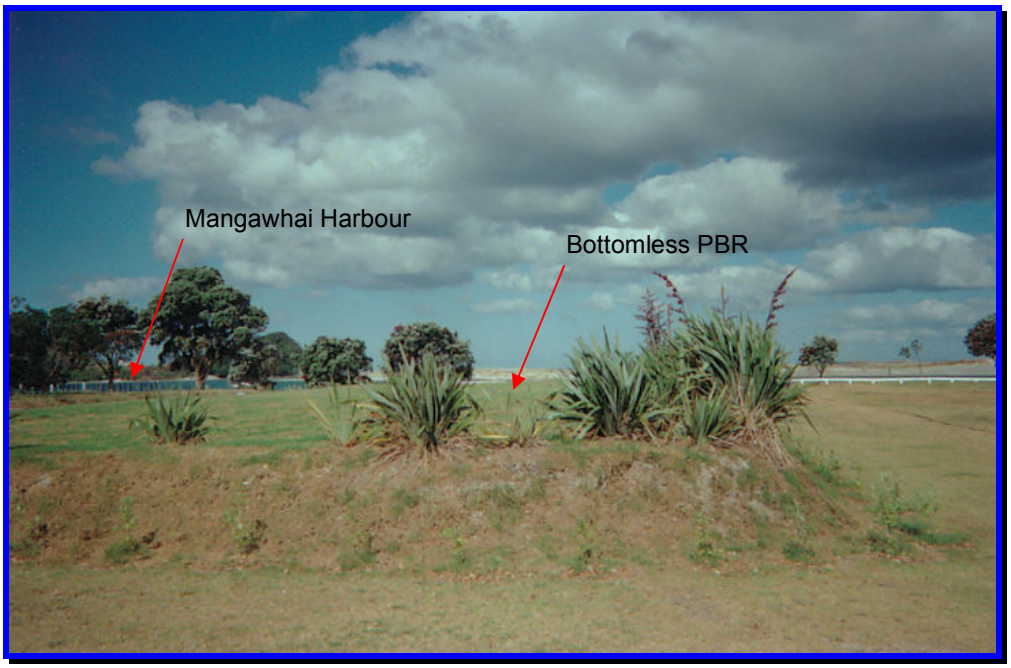

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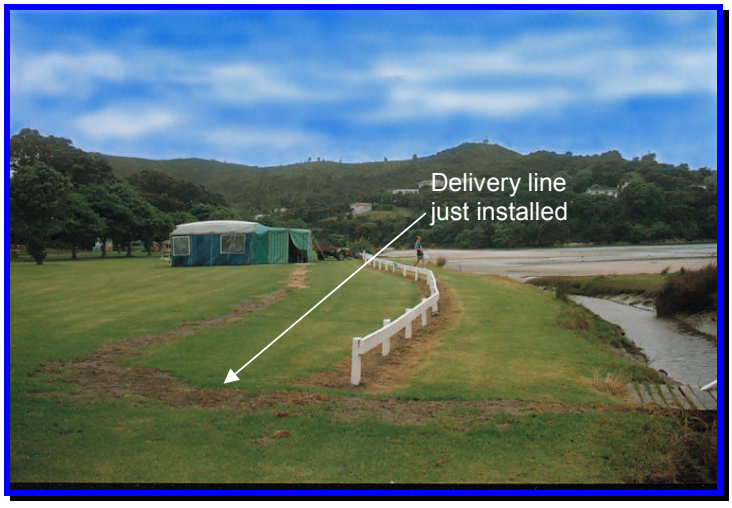

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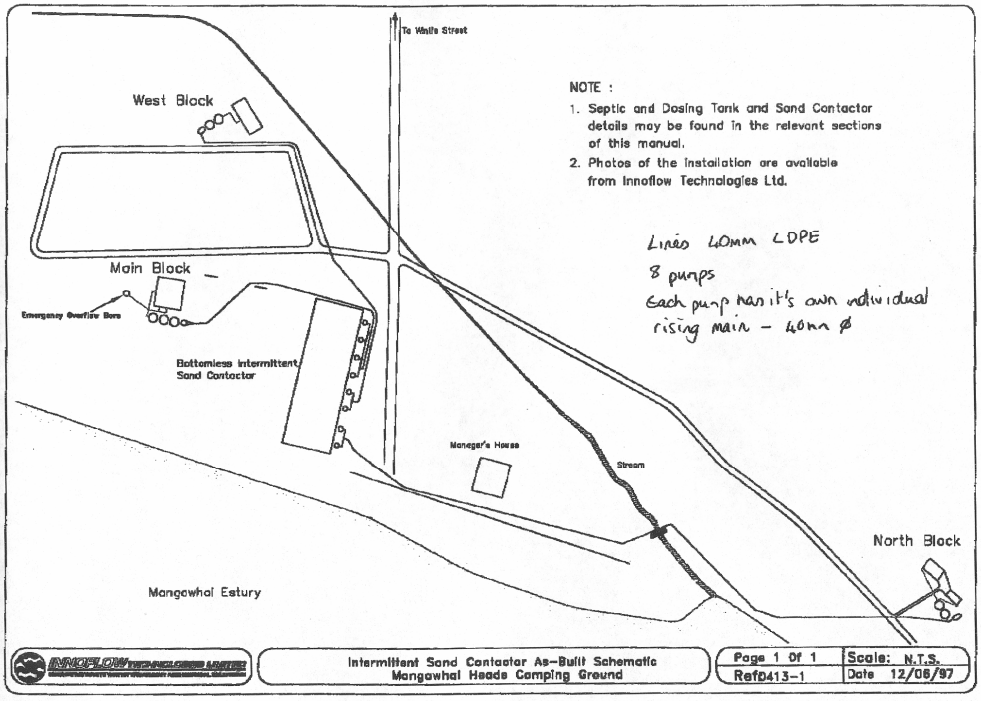

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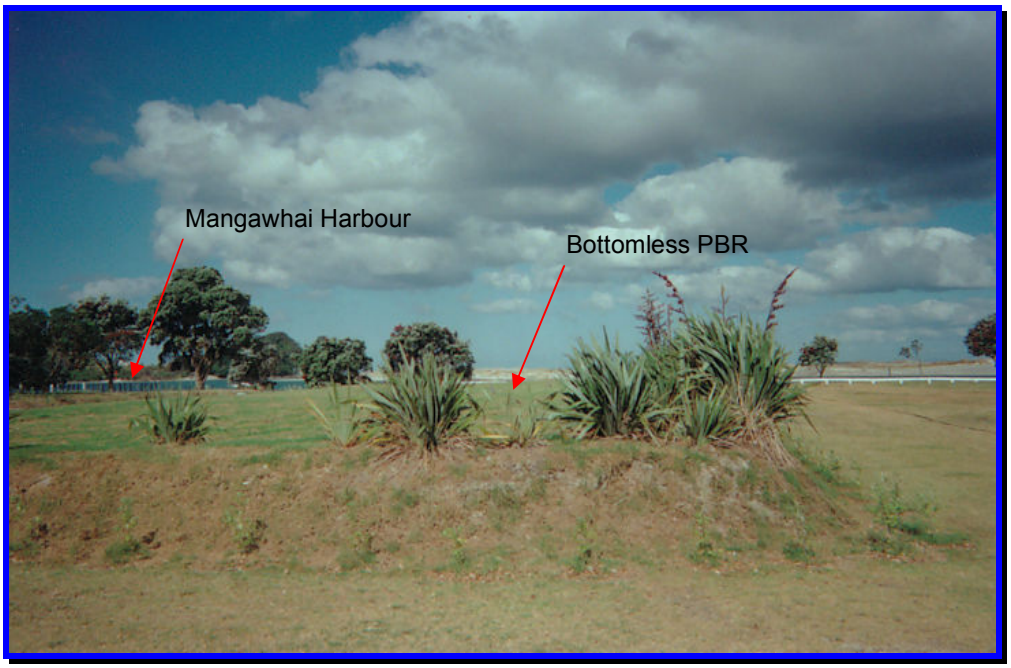

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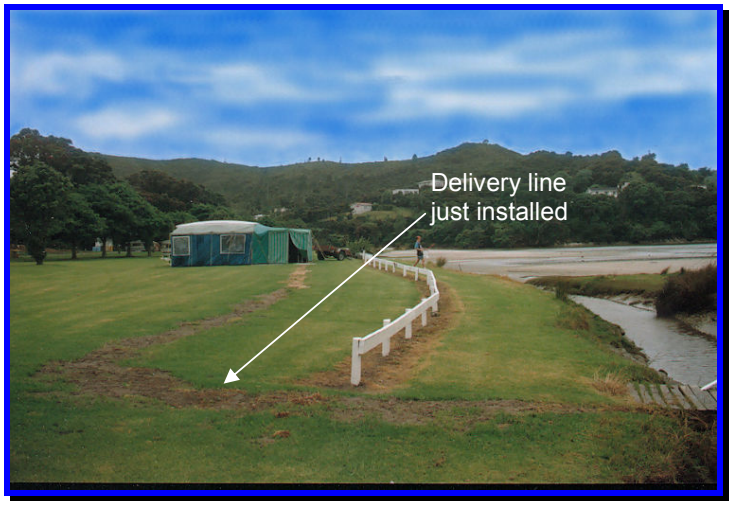

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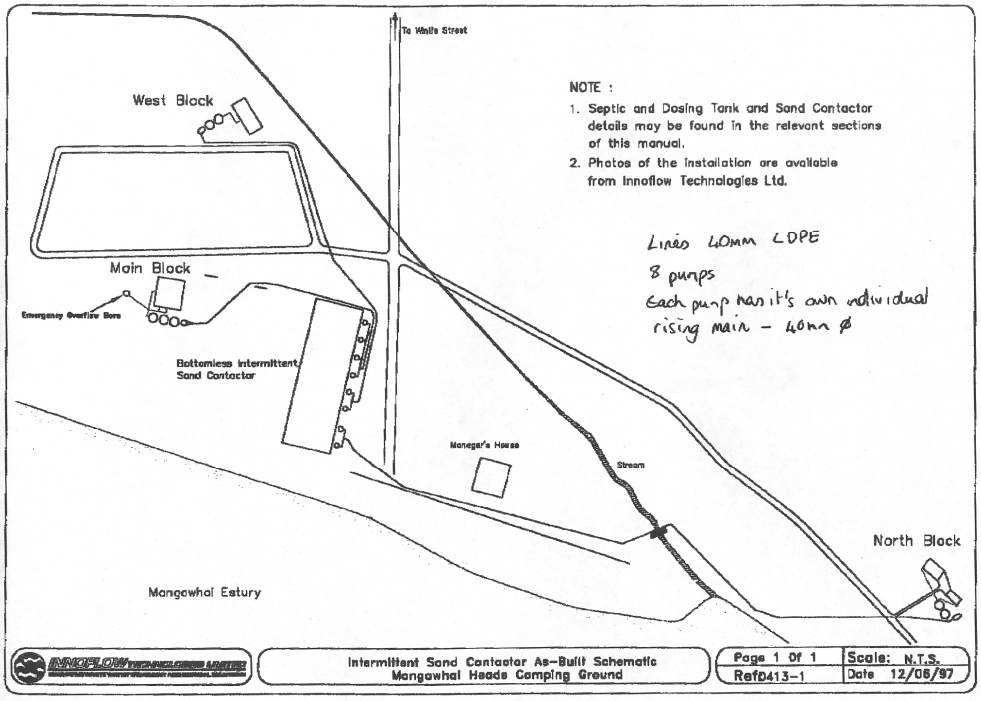

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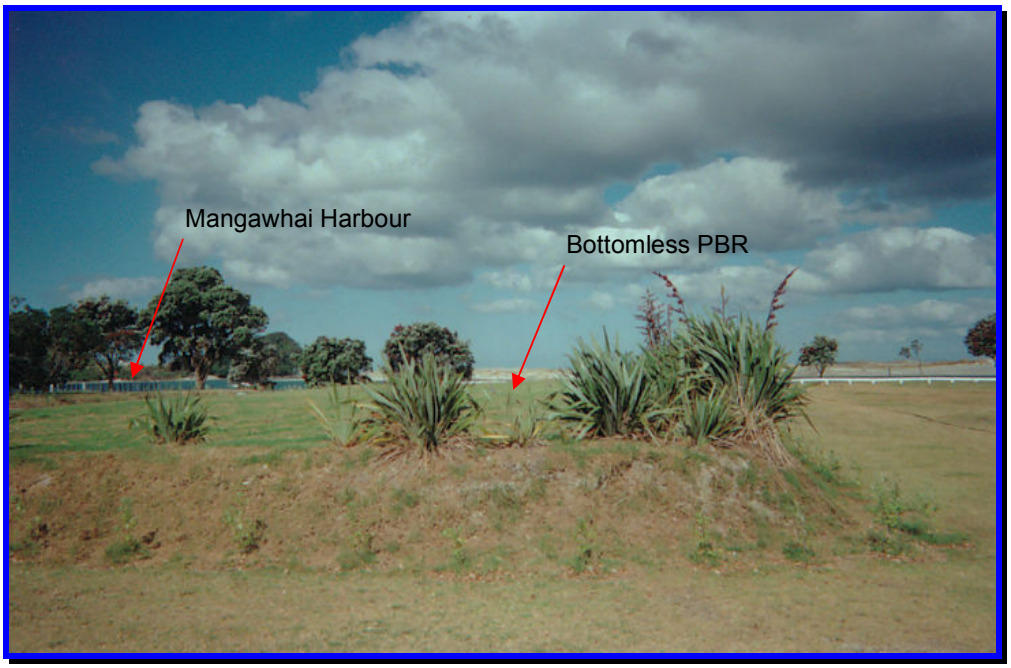

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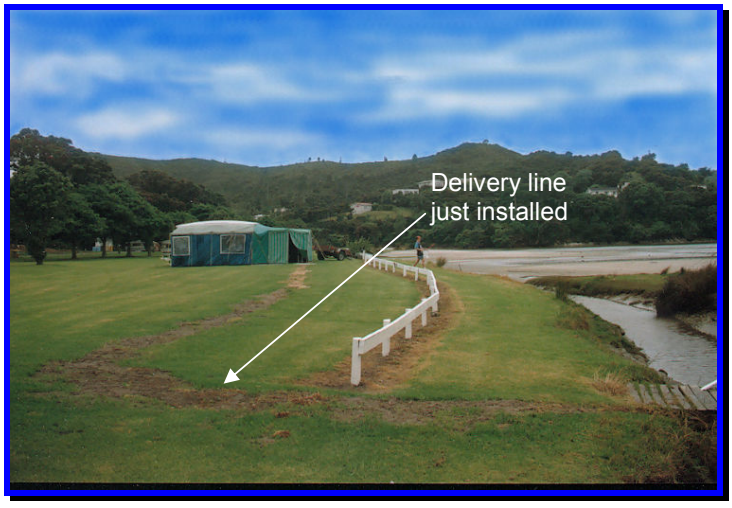

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One of the keys to acheiving a controlled level of treatment consistently is the distribution of the effluent over the top of the reactor. The distribution system consists of a computer designed lateral arrangement and this is fed by a series of 8 sequencing valves. Each of the sequencing valves has six outlet ports and is operated by a separate pump at the primary treatment stage delivering a calculated volume of liquid using timer controls.

Using this method the packed bed reactor receives a controlled biological loading and will maintain a high level of treatment in the long term. The local authority has four monitoring peizometers installed around the plant and tests for faecal coliforms. The most recent results show no adverse impact on the receiving environment.

Figure 4. The distribution system and sequencing valve layout.

Three 27 m^3 septic tanks were installed at the main facilities block of the camp ground near the shore line (first picture).

Due to the very high water table, as can be seen in relation to the ground level in the second picture, a local operator was contracted to provide continuous de-watering during the installation of these tanks (third picture). In addition, the sandy conditions added an extra challenge to project.

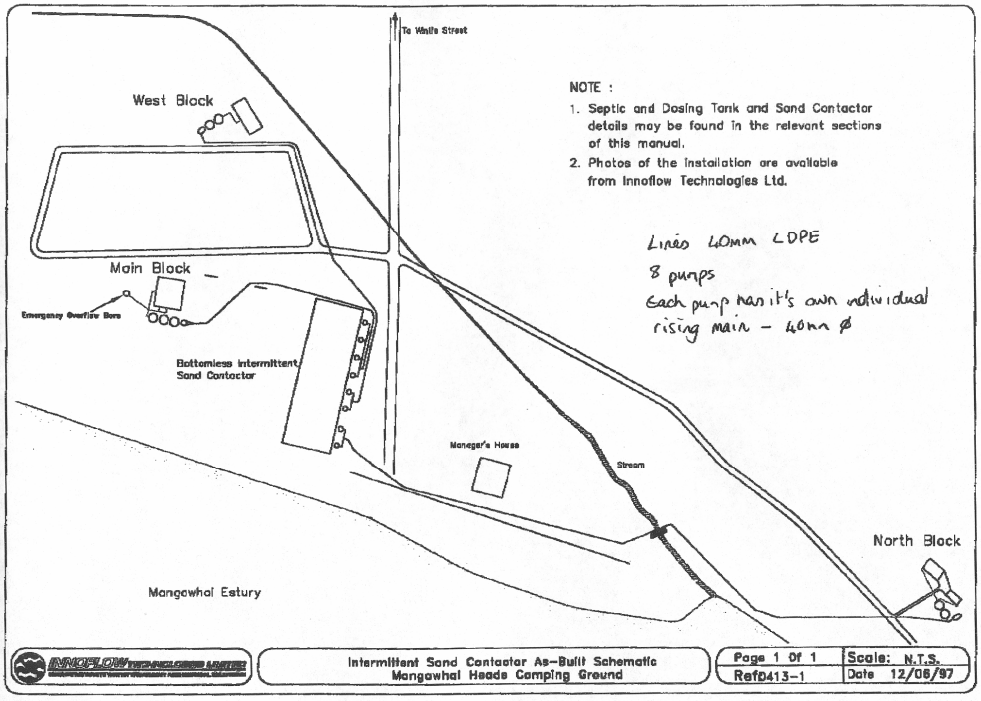

Figure 6. Copy of as built schematic for MEDS to bPBR wastewater system at Mangawhai Camp