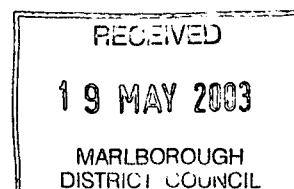


Department of Conservation

**Momorangi Bay
and French Pass Camps
Land Disposal of Effluent**

Geotechnical Report



Department of Conservation

Momorangi Bay and French Pass Camps Land Disposal of Effluent Geotechnical Report

Prepared by

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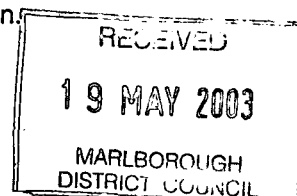
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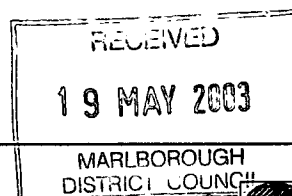


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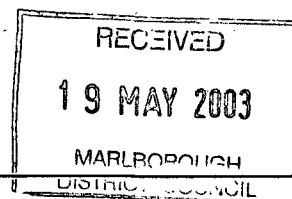
1 Introduction

The Department of Conservation are considering improvements to the disposal of effluent from its camps at Momorangi Bay and French Pass, as part of its renewal of resource consents. Opus International Consultants have been engaged to provide professional services in connection with these improvements:

Land disposal of effluent by pumping the effluent up onto the hillsides behind these camps and drip irrigation through pipes buried just below the surface is being considered to dispose of the effluent in an environmentally sustainable manner.

As part of this work, a preliminary geotechnical appraisal of the sites for land disposal was commissioned by the Department of Conservation (DoC).

This report presents the results of a desk study and site reconnaissance carried out by a geotechnical engineer from Opus, and a preliminary appraisal of the issues associated with the land disposal of the effluent.



3 French Pass

3.1 The Site

The Department of Conservation camp at French Pass is located at the northern end of Elmslie Bay. The camp is located on the beach side of the access road. The NZMS 260 map grid reference is P26 809 308.

It is proposed that effluent is to be irrigated on the hillside slopes northwest and west of the camp. The two alternative sites under consideration are presented in Table 3.

Table 3 - Possible Irrigation Sites at French Pass

Irrigation Site	Location	Comments
Site F1	Located northwest of the camp, between the access road into the French Pass settlement and the ridgeline immediately to the west.	Preferred Site.
Site F2	Site located west of the camp on the hillside on the northern side of the ridge (facing out to Durville Island).	Alternative Site.

The locations of the sites are shown on Figure 2, and photographs of Sites F1 and F2 are shown on Plates 3 and 4 respectively.

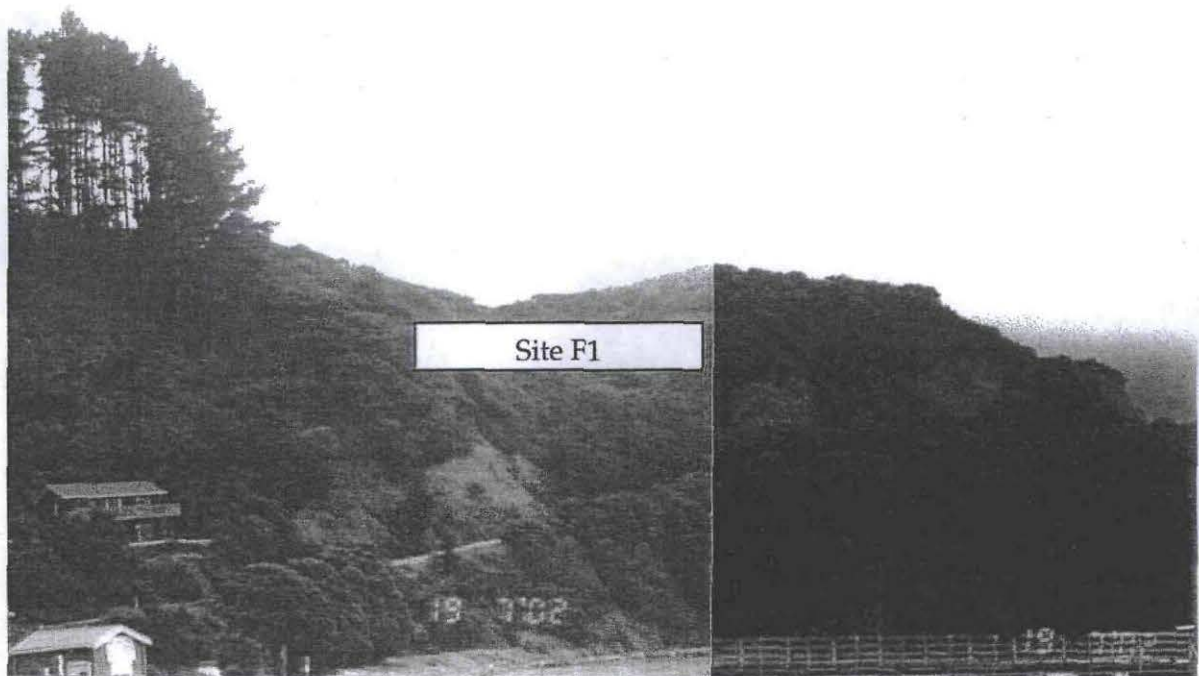


Plate 3 - French Pass : Possible Effluent Disposal Site F1

3.2 Desk Study and Site Reconnaissance

A desk study was carried out for the site including a review of the geology of the area and available information. Plans of the site were obtained from the Department of Conservation office in Picton on 19 July 2002.

A site reconnaissance visit was made by a geotechnical engineer to the French Pass site on the afternoon of Thursday, 19 July 2002. The weather conditions were dry and fine during the visit. The site reconnaissance included walking along the access road and up the slope to site F1. A shallow pit to about 200 mm depth was excavated to log the near surface soils and a small sample was collected. Site F2 was observed from the access road at the bottom of the slope.



Plate 3 - French Pass : Possible Effluent Disposal Site F2

3.3 Geology

The New Zealand Geological Map 1:250,000 Sheet 14 Marlborough Sounds (Department of Scientific and Industrial Research, 1964) indicates the geology of the French Pass area to be Permian to Carboniferous age, Lee River Series rocks of the Rai Group, comprising argillite and igneous conglomerate with interbedded spilitic lavas.

The geological map shows faults inferred either side of the peninsula on which the French Pass settlement is located. These faults are not indicated to be active.

Bedrock exposures were evident throughout the site, and the hillsides are covered with residual soil and colluvium.

3.4 Topography and Ground Conditions

The access road into the French Pass village has been formed by cutting on either side of a southwest to northeast spur protrusion into the sounds, see Figure 2. The northern side of the ridge has a very steep 50° to 60° cutting into bedrock that extends almost up to the top of the ridge. There are signs that the cutting has a number of failures along joints and shear surfaces within the bedrock. There is a large depression on the hillside slopes on the southern side of the ridge, where there appears to have been an old landslide.

Site F1

Site F1 proposed for effluent irrigation is in the vicinity of this depression and on the adjacent spurs. The slope of the depression is variable, and on average is about 20° to 35°. Bedrock spurs with a thin (200 mm or so) cover of residual soil or colluvium are located on either side of the depression. The slopes of these hillsides are steep at 35° to 40°. The upper part of the hillside has gentler slopes of about 15° to 25°. The hillside has a steep 40° slope with a stand of pine trees and a holiday house, south of Site F1. There are signs of slope instability in this area, evident as hummocky ground, a leaning power pole and some small trees that lean downslope.

A small pit was excavated in the upper slope, south of the depression. A thin layer of residual soil of about 150 mm to 200 mm in thickness was encountered in the pit and is likely to be underlain by bedrock. This residual soil is a light brown, clayey silt with humus and organic matter. The overburden soil thickness is likely to vary across the slope and is about 0.5 m in the middle of depression. The slopes were generally dry at the time of the site visit.

There is an existing effluent soakage field on the southern side of the proposed irrigation area, and there were signs of slope instability in this area. It is not known whether the effluent soakage field contributed to the instability.

Site F2

Site F2 is located on the northwestern side of the ridge facing Durville Island, west of the DoC camp, see Figure 2. This site is also located in a depression in the bedrock, which may have been an old failure. However, there are currently no visible signs of instability. The depression has a slope of about 15° to 25°. This slope has larger trees than at site F1.

Although no pits were excavated on this slope, the soils are likely to be similar to Site F1, with a relatively thin cover of overburden of about 0.5 m, based on exposures at the bottom of the slope.



3.5 Geotechnical Appraisal

3.5.1 Proposed Effluent Application Rates

It is understood that effluent is to be applied at a rate of between 2 mm per day and 5 mm per day at peak periods. The peak periods occur in the summer holiday / tourist seasons. The effluent irrigation will increase the groundwater within the slope, particularly where the application rates exceed the loss of moisture from evapo-transpiration.

3.5.2 Stability of Hillsides

The slopes at the French Pass sites have very small catchments, and effluent irrigation is proposed at the upper part of the slope, with virtually no catchment. The slopes do extend further downslope below the access road.

Site F1 shows signs of slope instability, despite the absence of a catchment above and the limited potential for overland flow or high groundwater conditions. It is possible that the depressions may have been formed at times of higher sea level or earthquakes in past geological times. However, the signs of recent movements at Site F1 suggest that the slopes are marginally stable. This is a reflection of the steep slopes at the site. Increased groundwater pressures are likely to exacerbate the slope instability. Therefore, irrigation of effluent beyond the likely evapo-transpiration rates is not prudent. Given that the evapo-transpiration is likely to be variable, Site F1 is not suitable for irrigation of effluent.

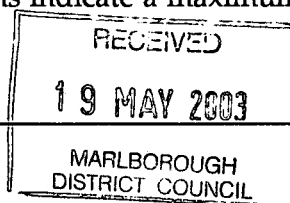
Site F2 has similar catchment characteristics, but has slightly gentler slopes, and there are no obvious signs of slope instability. Also this slope has larger trees of moderate size and may have a higher groundwater loss from evapo-transpiration. The slope does receive direct rainfall during the year. Therefore, it is likely to be able to sustain some effluent irrigation, particularly in drier periods and at the peak periods of summer when evaporation is higher.

However, even at Site F2, it would be prudent to limit the effluent irrigation rates as much as possible. It would be prudent to inspect the slopes after the effluent irrigation has been established to ensure that slope instability, erosion or concentration is not occurring.

3.5.3 Capacity to Take Effluent

The soil cover is generally thin and of moderate permeability and overlies hard bedrock, which is essentially impermeable. This would limit the amount of effluent that can be absorbed by the soils. Any excess effluent that is not absorbed by the soil or lost by evapo-transpiration, is likely to flow along the soil-bedrock interface and exit the slope as concentrated seepage where the soil cover is thin or along streams.

It is recommended that the capacity of the soil to take moisture and in particular the loss by evapo-transpiration should be assessed to enable appropriate application rates to be chosen. It is understood that preliminary calculations indicate a maximum loss by evapo-



transpiration to be about 4.5 mm per day given ideal weather conditions. The existing average evapo-transpiration rates at the site are not known and are difficult to ascertain.

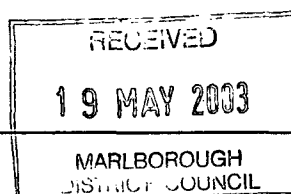
Given the uncertainties, it would be prudent to start the effluent irrigation at a conservatively low rate such as 2 mm per day to ensure adequate performance. If further field trials show that higher application is possible without leading to surface run-off of effluent or hillside instability, then consideration may be given to increase the application rates.

Infiltration tests and / or field trials using water may help reduce the uncertainty over the capacity of the soil to take effluent and confirm the rates of application.

3.6 Recommendations

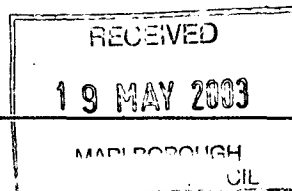
It recommended that :

- (a) Area F2 could be used for effluent irrigation at the site.
- (b) Consideration should be given to the evapo-transpiration capacity of the sites in deciding on the rate of application. Based on the assessments of evapo-transpiration, the rates of application should be kept low, such as at 2 mm per day during peak season only and lower application rates during off season.
- (c) There are signs of existing slope instability in the vicinity of Site F1 and it would be prudent to avoid this area.
- (d) The application rates be limited to 2 mm per day during initial trials, and the hillsides should be inspected to ensure that there is no instability and to confirm that it is prudent to continue or increase the rate of application of effluent.
- (e) Consideration should be given to carry out a trial to check the effectiveness of the effluent irrigation given the site conditions.
- (f) Infiltration tests or a small irrigation trial using water would help reduce the uncertainty over the capacity of the soil to take effluent and confirm the rates of application.



4 References

Department of Scientific and Industrial Research (1964). New Zealand Geological Map 1:250,000. Sheet 14 – Marlborough Sounds. 1st Edition. Prepared by AC Beck, New Zealand Geological Survey. Wellington, New Zealand.



Appendix 5

Consultation Feedback

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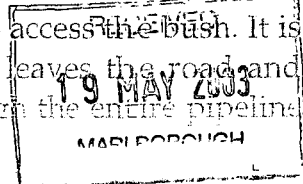
**Notes From French Pass Workshop
Held at the French Pass Community Hall
On Monday 7th April 2003 at 10.30am**

Topic: Proposed Sewerage System Upgrade for the DoC Campground

Present: Peter King (French Pass School Principal)
Bill Webber (President of the French Pass Residents Association)
Ngawaiehu Webber
John Webber
Charlotte Townsend (French Pass Public Health Nurse)
Kim Forbes (Department of Conservation)
Jonathan Thorpe (Opus)
Karen Warren (Opus)

At the commencement of the workshop Jonathan Thorpe talked through the information provided in the handout (attached). This describes the investigation undertaken to date and features of the proposed upgraded sewerage system. Questions were asked throughout the presentation and informal discussion clarified various issues. These are generally outlined below:

- Other treatment/disposal options have had to be discounted because they are not suitable for a variety of reasons. In particular, composting requires very high maintenance, is susceptible to chemicals and thrown away litter and requires regular utilisation, i.e. is not suited to handle peak loadings.
- Marlborough District Council (MDC) and the local community are currently combining to fund a new public toilet which will service the community hall.
- The Department of Conservation (DoC) campground is located on flattened fill material which does not drain well.
- The level of treatment proposed for the new system includes primary treatment through the installation of a new enlarged septic tank followed by secondary treatment. Tertiary treatment e.g. ultraviolet treatment, is not required because the effluent will pass through soil and will not enter directly into any waterway.
- The new septic tank will be located at an appropriate site within the campground and will be 2-2.3m below ground level at its base.
- There is insufficient area to dispose of effluent through the subsurface dripper system within the camp but the effluent will be treated to the same standard prior to disposal off-site within the bush.
- A polyethylene pipe will be buried in the road and take treated effluent from the septic tank back along the road westward to a point suitable to access the bush. It is likely to be encased in a steel casing (to protect it) where it leaves the road and traverses the bank to the bush. Effluent will be pumped through the entire pipeline



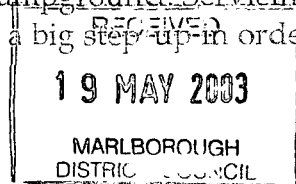
system. The polyethylene pipe within the bush will be flexible but of a higher more robust grade than the basic garden hose.

- The disposal fields are remote from the campground/residential area. They are on the far side of the ridge, on a north slope facing out towards D'Urville Island and outside of the Elmslie Bay area.
- The disposal fields are in a heavily vegetated area. Geotechnical assessments have shown them to be suitable, e.g. in terms of size, soil characteristics, slope, stability etc.
- Disposal will consist of dispersal of the treated effluent through pipelines and drippers which will be buried below the leaf litter. They will be inspected before each peak summer period and maintained as necessary, e.g. by flushing clean water through the lines. The system will also be inspected after the first summer period to monitor its operation.
- Stand-alone maintenance/operation/monitoring plans will be implemented. The system will be installed by a suitably qualified system installer and all subsequent maintenance undertaken by a trained person. DoC will be responsible for the entire performance of the system.
- The proposed level of disposal will be conservative (i.e. 2-5mm/day) and is designed to cater for the period of peak usage combining with a period of heavy rain. During heavy rain the camp typically empties in any instance. Therefore it is unlikely that heavy rain and peak use will coincide for any length of time. During the remainder of the year disposal rates will be even more conservative, e.g. 1mm/day because of very low camper numbers.
- The total level of nutrients to be disposed of is small, especially when compared, for example, with around 300kg/ha/yr permitted for the application of nutrients in the form of fertilisers on farmland.
- The nutrients in the effluent will be taken up by plants. Water will also be dispersed through evapotranspiration.
- The disposal area will be divided into sectors to enable resting of part of the disposal field for any reason and utilise other portions of the same field or another field.
- A basic requirement of the system is to keep it simple, with low maintenance requirements.
- The system will not use any additional water than is currently used and is not affected during periods when the camp runs out of water.
- Major power failures occur at French Pass approximately 2-3x/yr. There are numerous very brief outages. The system will be designed to cope with these minor power failures and a facility to plug in a generator will deal with major power failures.

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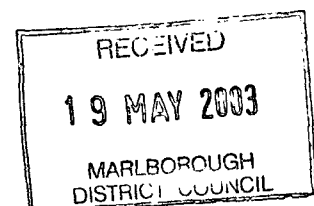
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- The existing water bore in the vicinity of the camp services the toilets at the camp but is also available to the motel, school and some houses. It used mostly by the camp and water from it should be boiled first.
- The disposal fields will be well away from the water bore. A minimum separation distance e.g. 30m is required in any instance between any watercourse/supply and a disposal field. The disposal fields will be approximately 150m away from the camp area at their closest point and located on a separate away-facing slope.
- The proposed system has the capacity to have additional treatment and storage units added to it, and extension of the disposal fields. This provides the ability in the future to dispose of additional effluent through the same system. Once the pipes are installed the only constraints to the disposal of increased effluent will be sufficient land area. This would require investigation at the time. The use of additional disposal fields further up the hill may require upgrading of the pump.
- However, DoC does not propose to open the system up for connection by the public. It plans to deal with campground effluent only. DoC is not tasked with providing public sewerage reticulation systems and wishes to resolve the existing problems at the campground as soon as possible.
- Other residences at French Pass currently have their own septic tank/ disposal systems. Any future expansion of the system proposed by DoC would require some form of buy-in from the MDC and probably also the local community. This is a longer term issue not addressed in the current proposal which seeks to deal with existing effluent problems at the camp prior to the next summer season.
- Workshop participants indicated that it may be appropriate for the French Pass Residents Association to consider making its own approach to MDC with a view to potentially securing a more widely scoped effluent disposal system in the future. The participants were keen to ensure the system is not short-sighted and that MDC is made aware of the need to take a long term view to disposal options for the entire community. This is particularly in light of MDC's current intention to provide a new toilet for the community hall where the existing subground structures may already require some upgrading. Other existing septic tanks elsewhere in the community are also experiencing problems.
- Kim Forbes indicated that DoC may consider renewed approaches to MDC along the lines of its discussions re Momorangi Bay and the potential for MDC to consider longer term sewerage solutions for small communities where DoC is currently undertaking upgrades of its own facilities.
- If the system was to be designed to cater for the entire existing population, e.g. an additional 9-10 residences, it is estimated an additional 1000l/day/house would produce an extra 10cum of effluent. This is in contrast to the proposed system which will cater for up to 4cum, i.e. peak discharge from the campground. Servicing of the whole community via the proposed system will require a big step-up in order of magnitude of its capacity.



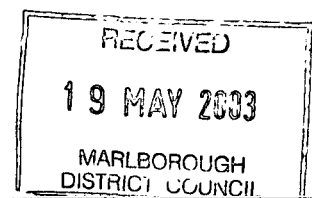
- Any increase in effluent volumes from the system as currently proposed is therefore anticipated to come solely through increased use of the campground, e.g. more campers in the shoulder seasons and from increased use from day visitors. The system is not planned to encourage or provide for the disposal of effluent from boats or campervans.
- Kim Forbes confirmed that it is the intention of DoC that the camp remain as is and not be superseded by a large carparking area.
- Jonathan Thorpe confirmed that there are smaller versions of the proposed system which can cater for lesser volumes of effluent e.g. from individual residences. Therefore, local residents have this as an option for their own disposal systems.
- The workshop participants expressed their general support of the proposed system and thanked DoC for their initiative in pursuing an upgraded system and seeking its installation before next summer.

The workshop concluded at around noon.



Appendix 6

**Effluent Monitoring Plan
Operation And Maintenance Plan**



Effluent Monitoring Plan

- The Marlborough District Council or an agreed independent party will undertake monitoring.
- Treated effluent is to be monitored before discharge to the disposal fields for Total Nitrogen, BOD₅ and Suspended Solids. This will be two-monthly during the first year of operation and weekly during the peak month of January. The target limits will be:

BOD	15g/m ³
Suspended Solids	15g/m ³
Total Nitrogen	20 g/m ³

The Consent limits sought are:

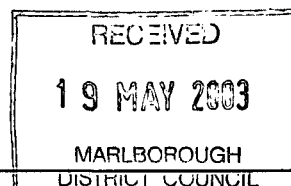
BOD 20mg/l median limit
 Suspended Solids 30mg/l, median limit
 and a 90th percentile limit of 40mg/l BOD and 50mg/l Suspended Solids over any one year period.

The maximum Total Nitrogen limit shall be 300 kg/ha/yr (calculated based on TN concentration, and total annual flow applied over the disposal area).

- A permanent flow meter will be installed on the outlet to the disposal fields. The limit will be 5m³/day. The flow will be recorded weekly during the off-season and daily during the months of December-February and over public holiday weekends.
- Disposal Field Monitoring

The disposal field shall be monitored as detailed below to ensure irrigation does not exceed 2mm/day as averaged over any one week period. Operational and maintenance shall be carried out as detailed in the Operation and Maintenance Plan.

All monitoring results shall be kept and incorporated in the annual report to the consent Authority, as defined at the end of this section.



Effluent Monitoring Schedule: Momorangi Camp									
Year: Date	Num- ber of days	Flow (m ³)	Flow (m ³ /d)	BOD (g/m ³)	SS (g/m ³)	TN (g/m ³)	Irriga- tion zones in use	Total irri- gation area (m ²)	Hydraulic Application rate (mm/day)
Eg	30	60	2				2	2,500	0.8
December 25-31	7								
Jan 1-7	7								
Jan 7-14	7								
Jan 15-21	7								
Jan 21-28	7								
Feb 28	31								
March 31	31								
April 30	30								
May 31	31								
June 30	30								
July 31	31								
August 31	31								
Sept 30	30								
October 31	31								
Nov 30	30								
Dec 24	24								

Note: Each zone area is 1,250 m². Total 2 zones = 2,500 m²
 Hydraulic Application rate = $\frac{\text{flow per day} \times 1000 \text{ (litres)}}{\text{Area used (m}^2\text{)}}$

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Operation and Maintenance Plan

Maintenance Contract

A qualified maintenance contractor experienced in maintaining wastewater treatment components shall be retained on an annual contract to be available for emergency callouts, and to complete the pre-season maintenance visit.

Normal Operation and Maintenance

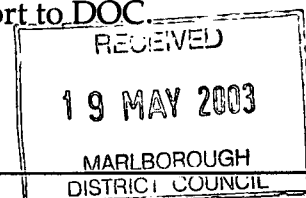
Day to day operation of the treatment plant, and irrigation areas will be carried out by the local camp supervisor. Training will be provided by the supplier, to enable this day-to-day operation.

The degree of operation and maintenance input will vary depending on the season, with daily operational monitoring leading up to and during the peak season to ensure optimum operation. The level of monitoring during the off season will be significantly less.

Operation and Maintenance Procedures

In addition to operational and maintenance procedures provided by the treatment plant supplier, the following operational and maintenance procedures shall be followed:

- **Daily Surveillance**
 - (a) By camp supervisor to monitor for alarms from treatment system, and report to maintenance contractor if necessary.
 - (b) Camp supervisor to monitor flow rates, application areas, and hence application rate to ensure application of 2mm/day is not exceeded.
- **Monthly Check**
 - Record monthly flow, pump run hours, pump run pressures, and any other metering.
 - Check alarm systems are operational.
 - Check and clean filters if necessary.
 - Check operation of all components of the treatment process are as they should be.
 - Record detail of which irrigation zones have been used and for how long during the month.
 - Check application rate is less than 2mm/day.
 - Walk over irrigation areas, check for any leaks causing surface runoff or ponding.
 - Check for any signs of ground slipping, slumping, or movement that may indicate instability. If these are seen, report to DOC.
 - Flush disposal field laterals if necessary.



- **Pre-season Check (In October-November)**
 - (a) Carry out all tasks normally completed during monthly checks
 - (b) Complete annual comprehensive maintenance procedures and address all issues identified. These procedures should include:
 - check and necessary maintenance for all mechanical parts,
 - check correct operation of all components of the treatment process,
 - check correct function of controls and alarm systems
 - check correct operation of all air and pressure relief valves.
 - check sludge levels and arrange desludging as required and recommended by the supplier.
- **In the week before Christmas**
or as required by the supplier the operator shall re-commission the system to meet full design capacity.
- **Following the first peak season,**
and following a significant rain event, complete an inspection of the irrigation area by a suitably experienced person to assess any changes in stability.

Contingency Plan

In the case that the effluent treatment and disposal system stops working, check through trouble shooting list as provided by the supplier.

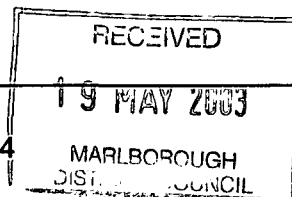
If the system cannot be re-started, call out the maintenance contractor.

If there is a power cut, proceed as follows:

- If it is the off season, monitor the effluent level in the system. Reduce water use where possible. If the power has not come on after several hours, contact the power company and ask when power may resume. If power is likely to be off for more than 24 hours, and if effluent levels are near to overflow, bring in an emergency generator to re-start the treatment plant.
- If it is the peak season, reduce water use immediately. Monitor effluent levels, and plan to get an emergency generator on site within 24 hours. If power does not resume, use generator prior to any overflow occurring. Use generator as needed to maintain effluent levels below overflow until power resumes. (note, it can probably be turned off at night time).
- After mains power resumes, carry out monthly checks to confirm that the treatment and disposal is operating normally.
- If any overflows occur, campers may need to be evacuated from the area. Call out effluent removal truck to empty or clean up any spills.

Reporting

All information gathered is to be included within the annual report. The Maintenance Contractor shall provide a written report to the operator immediately following the pre-season check detailing what has been checked, what maintenance completed, and any items requiring further work. This further work shall be approved by DoC and completed prior to the peak season if necessary.



Parties consulted with during preparation of this application for resource consent

FirstName	LastName	Company	Address1	Address2	City
Ms M	Wedge	President, Lochmara Residents Association	PO Box 319		Picton
Ms J	McDonald	Te Runanga a Rangitane o Wairau	PO Box 883		Blenheim
Mr Carl	Elkington	Ngati Koata Ki Te Tonga Trust	PO Box 63		Nelson
B. and P.	Jones		French Pass	Rai Valley	
Mr Al	Campbell	Nelson Marlborough District Health Board	Hospital Road	Blenheim	
Mr Kim Forbes		Department of Conservation	Private Bag 5	Nelson	
R. and S.	Burrige		7 Bail Street	Stoke	Nelson
Mr D.	Boulton	French Pass Motel	RD 3	Rai Valley	
Mr R. Amberger &	Tex Beloe	13B Elizabeth Street	Richmond	Nelson	
Mr John Buckland		Ministry of Education	Private Bag 19	Nelson	
The Board of Trustees		French Pass School	RD 3	Rai Valley	
Mr John Webber &	Mr William Webber &	Ngawaiehu Webber	RD 3	Rai Valley	
Francis Monopoli &	Mr Michael Riddell &	Mr Denis Daly	PO Box 618	Nelson	
Mr Peter	Meihana	Te Runanga o Ngati Kuia	Flat 2 86 Main Street	Blenheim	
Mr Robin	Cox	Department of Conservation	P O Box 161	Picton	
Mr Robin	Dunn	Marlborough District Council	P O Box 443	Blenheim	

No need to forward to DOE. They have a copy and are the applicant

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FRENCH PASS CHANNEL

DENSE BUSH

RIISING MAIN LAID ABOVE GROUND THROUGH DENSE BUSH ANCHORED TO PREVENT MOVEMENT

RIISING MAIN WITHIN STEEL PIPE PROTECTION SLEEVE LAID ON SURFACE OF ROAD CUT BATTER, ANCHORED TOP AND BOTTOM (HIDDEN BY VEGETATION).

RIISING MAIN INSTALLED WITHIN EXISTING ROAD

RIISING MAIN INSTALLED WITHIN FOOTPATH UP TO THE ROAD

ELMSLIE BAY

ACCESS ROAD

DENSE BUSH

BOUNDARY LINE ALONG RIDGE

HOUSE

EXISTING SEPTIC TANK TO BE DECOMMISSIONED AND BACKFILLED

PROPOSED UNDER GROUND TREATMENT SYSTEM TO BE INSTALLED ADJACENT TO EXISTING TOILET BLOCK.

EXISTING TOILETS

WATER BORE

D.O.C. CAMP GROUND

SEPTIC TANK

EXISTING TOILETS

WATER BORE

D.O.C. CAMP GROUND

SEPTIC TANK

EXISTING TOILETS

WATER BORE

D.O.C. CAMP GROUND

SEPTIC TANK

EXISTING TOILETS

WATER BORE

D.O.C. CAMP GROUND

SEPTIC TANK

SINGLE WIRE FENCE AROUND PERIMETER OF IRRIGATION SITE.

LARGE PINE TREES WITHIN PRIVATE PROPERTY

TOTAL AREA 2500m²

RECEIVED
19 MAY 2003

MARLBOROUGH DISTRICT COUNCIL

DENSE BUSH WITHIN CONSERVATION RESERVE

PROPOSED EFFLUENT IRRIGATION AREA:

MAX RL 100m
MIN RL 80m
AREA TOTAL 2500m²
ZONE 1=1250m²
ZONE 2=1250m²
MAXIMUM AVERAGE IRRIGATION RATE: 2mm/DAY
TYPICAL SLOPES: 10° - 25°

KEY

- EXISTING FENCE
- TREATED EFFLUENT PUMPING MAIN
- PROPOSED WARNING FENCE
- PROPERTY BOUNDARY
- ROAD (APPROXIMATE LOCATION)
- EFFLUENT IRRIGATION AREA

	BY	CHECKED	DATE
DESIGN	JEC	JFT	
DRAWN	JEC	JFT	
APPROVED			
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AMENDMENT	APP'D	DATE	

CONSERVATION
TE PAPA ATAWHAI

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DEPARTMENT OF CONSERVATION					
FRENCH PASS CAMP GROUND EFFLUENT TREATMENT AND DISPOSAL					
STATUS	PRELIMINARY	FILE	5G416A.00		
SCALE	1:1000 (A3)	PLOT DATE	30/04/03 @ 13:26	FEATURE IDENTIFIER	5/1642/1
CODE	5544	SHEET	1	REVISION	