

Appendix 1

Mapping - Zone, CCCL Submission Area & Designation # 76

LEGEND

OPERATIVE DISTRICT PLAN:

LANDFILL BUFFER ZONE ODP 

GIBBSTON CHARACTER ZONE 

RURAL ZONE 

PROPOSED DISTRICT PLAN:

OUTSTANDING NATURAL LANDSCAPE 

LANDFILL BUFFER ZONE 

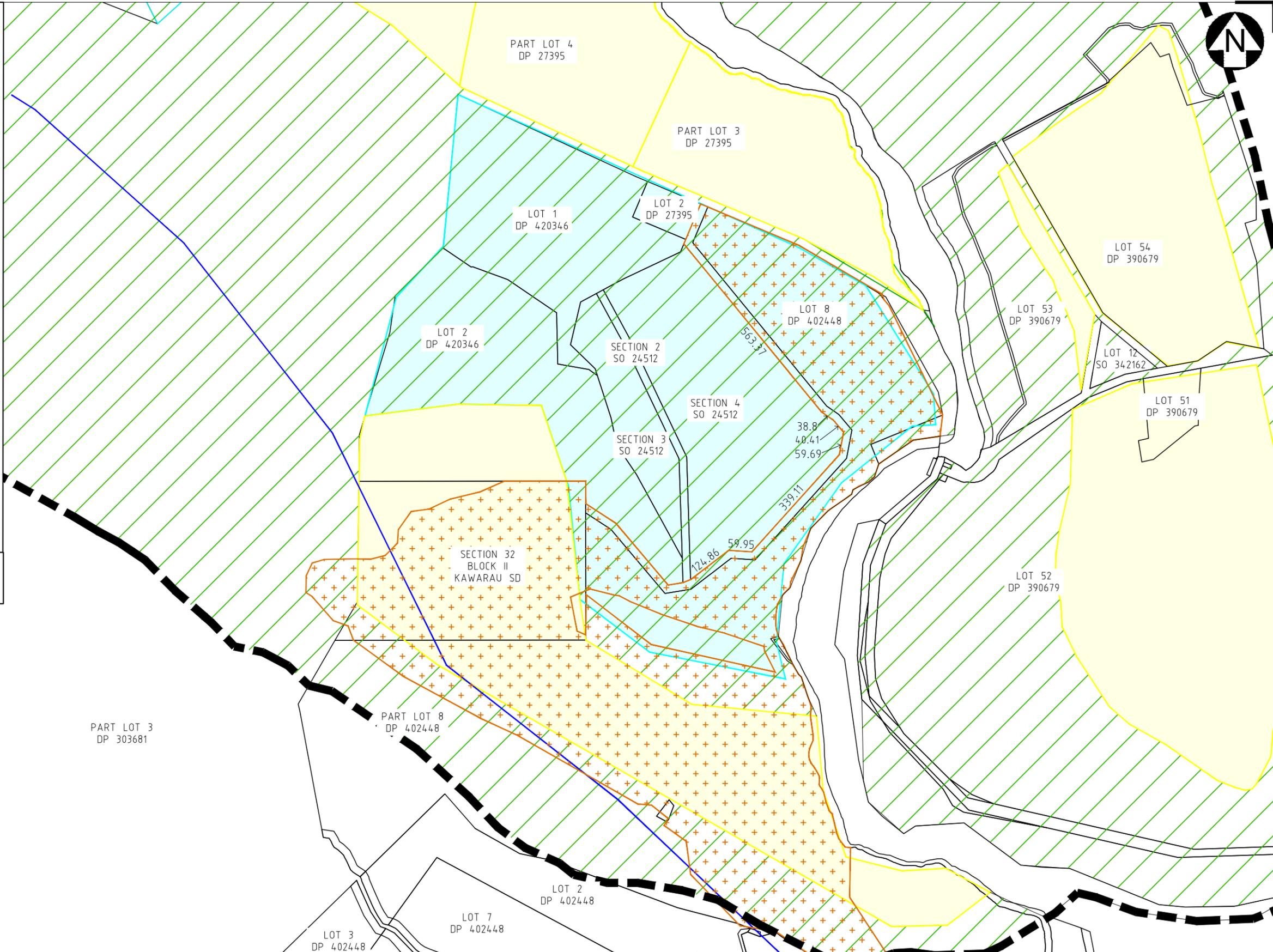
GIBBSTON CHARACTER ZONE 

RURAL ZONE 

TRANSMISSION LINE 

PROPOSED REZONING 

PROPOSED REZONING IN LANDFILL BUFFER AREA: 25.9ha



CLIENT REVIEW

Shotover Design Limited trading as

Clark Fortune McDonald & Associates
 Licensed Cadastral Surveyors - Land Development - Planning Consultants

309 Lower Shotover Road, P.O.Box 553 Queenstown
 Tel. (03)441-6044, Fax (03)442-1066, Email admin@cfma.co.nz

Shop 2, Otago House, 475 Moray Place, P.O. Box 5960
 Tel. (03)470-1582, Fax (03)470-1583, Email admin@cfma.co.nz

Rev.	Date	Revision Details	By

AREA CLASSIFICATION OF VICTORIA FLATS FROM OPERATIVE AND PROPOSED DISTRICT PLANS

Client	GRANT HENSMAN	Surveyed	Date	Checked	Job No.	Drawing No.
				TO BE CHECKED	14244	01
				TO BE CHECKED	Scale	1:5000 @ A1
				TO BE CHECKED	1:10000 @ A3	
				TO BE CHECKED	Datum & Level	Rev.
				TO BE CHECKED	NZGD2000 / MSL	-

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LEGEND

OPERATIVE DISTRICT PLAN:

LANDFILL BUFFER ZONE ODP 

GIBBSTON CHARACTER ZONE 

RURAL ZONE 

PROPOSED DISTRICT PLAN:

OUTSTANDING NATURAL LANDSCAPE 

LANDFILL BUFFER ZONE 

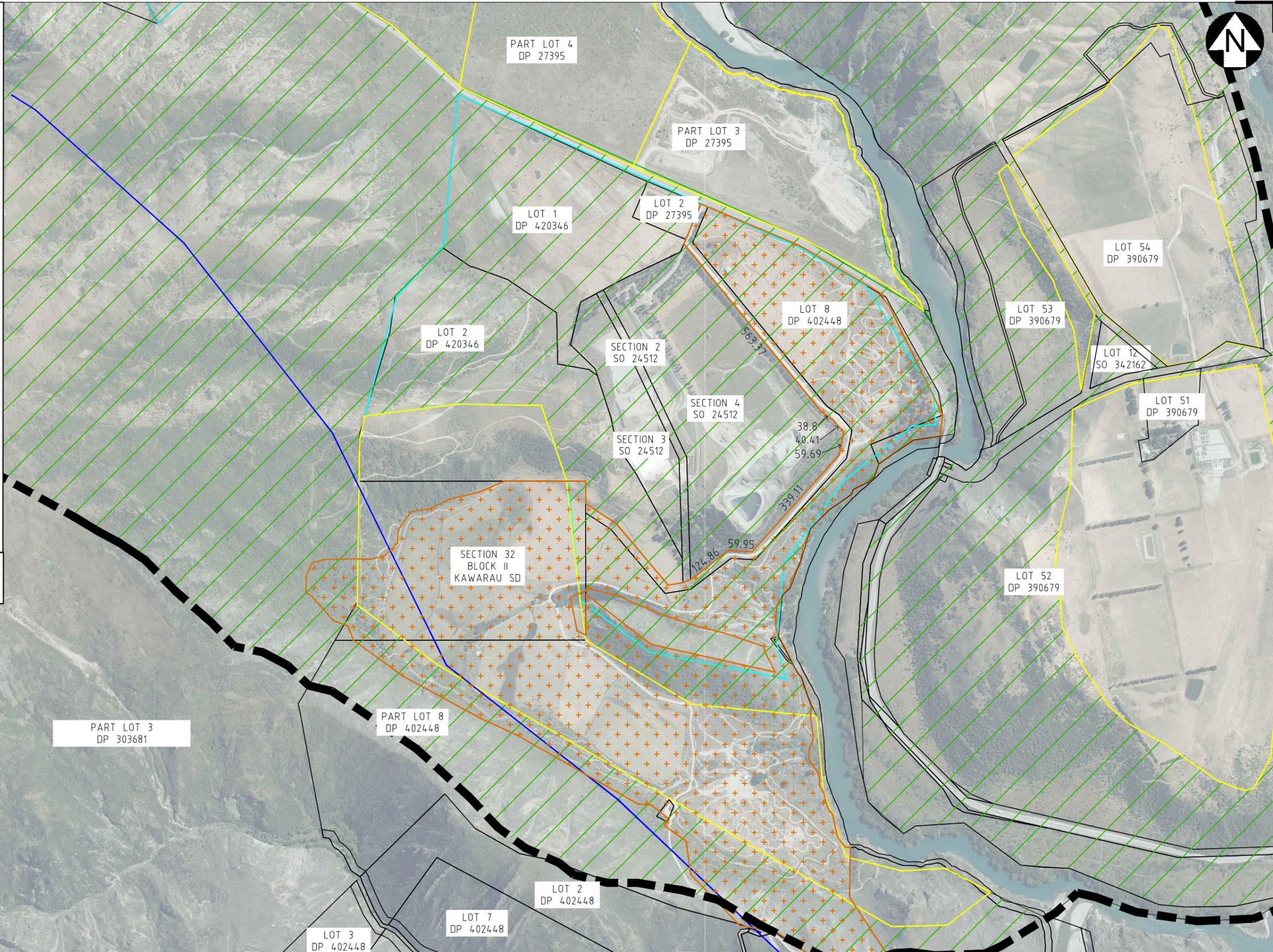
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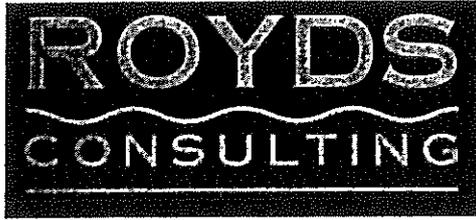
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				TO BE CHECKED	14244	01
				TO BE CHECKED	Scale	1:5000 @ A1
		Drawn	Date	TO BE CHECKED	1:10000 @ A3	
		BM	07.05.20	TO BE CHECKED	Datum & Level	Rev.
		Designed	Date	TO BE CHECKED	NZGD2000 / MSL	-

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Appendix 2

RM970116 AEE, Vol I, Application Forms & AEE



A MONTGOMERY WATSON COMPANY

Queenstown Lakes District Council

**Victoria Flats Sanitary Landfill
Notice of Requirement and Resource Consent
Applications
Volume I—Application Forms and AEE**

February 1997—*Final*

Preface

These applications comprise three documents (Volumes I to III):

- Volume I Application forms and Assessment of Environmental Effects
- Volume II Appendices in support of the Assessment of Environmental Effects
- Volume III The Landfill Development and Management

These documents contain the applications necessary under the Resource Management Act to authorise the proposed Victoria Flats sanitary landfill and information in support of the applications.

The Queenstown Lakes District Council (QLDC) is facing critical solid waste management issues. The Wakatipu Basin's existing landfill at Tucker Beach has limited capacity remaining and is required to close by June 1999. Thus alternate solid waste disposal site and methods will need to be implemented soon. It is not possible to extend the life of the Tucker Beach landfill.

Following a comprehensive consultative process in the formulation of a district-wide Solid Waste Management Strategy, a proposal to construct and operate of a new sanitary landfill at Victoria Flats for both the Wakatipu and Wanaka Basins was endorsed by Council.

Having recently completed land negotiations, the QLDC now wishes to apply for all the required RMA authorisations for the development of a district sanitary landfill at Victoria Flats. The authorisations being applied for include the land use consent through designation from the Planning Department of the QLDC and discharge and water permits from the Otago Regional Council.

Applications for all consents and the notice of requirement are included in Volume I. Supporting information is included in the Assessment of Environmental Effects (AEE) which forms the second part of Volume I and in Volume II and III.

The resource consents being applied for are:

- **Discharge Permits** to discharge solid waste and leachate to land; landfill gas, and other emissions to air, and storm water to land.
- **Water Permit** to take groundwater for a site water supply

pursuant, respectively, to Sections 15 and 14 of the RMA.

The notice of requirement for designation of the proposed landfill site for solid waste management activities, an associated buffer zone and access road are pursuant to Section 168 of the RMA. The designation of the proposed site will ensure that provision is made in the QLDC District Plan for the future disposal of solid waste from the Queenstown Lakes District at the Victoria Flats landfill. The buffer zone is required to ensure that activities which could be adversely affected by the landfill operation can not establish in the immediate landfill vicinity.

Queenstown Lakes District Council
Victoria Flats Sanitary Landfill
Notice of Requirement and Resource Consent Applications
Volume I—Application Forms and AEE

The consent applications and notice of requirement are being lodged on the basis of a concept design and performance standards for landfill activities in order to avoid, remedy or mitigate the identified potential environmental effects.

Volume II of the document summarises a series of detailed reports on the Victoria Flats site, addressing physical characteristics and historical matters. These detailed reports are available upon request.

A landfill development and management plan for Victoria Flats has been developed to address the range of issues highlighted in the investigation and consultation stages of this project. In particular, it focuses on the future life of the landfill, a concept design, leachate and stormwater control, operations and monitoring of effects. This plan forms Volume III of the application.



Queenstown Lakes District Council

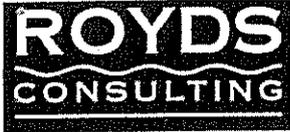
Victoria Flats Sanitary Landfill Notice of Requirement and Resource Consent Applications Volume I—Application Forms and AEE

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Quality Assurance Statement	
Royds Consulting Ltd 31 Stafford Street PO Box 4, Dunedin Ph 0-3-477 0885 Fax 0-3-477 0616	Prepared by: Carmen Taylor <i>CW Taylor</i>
	Reviewed by: Andy Garland / Paul Whyte <i>AG PW</i>
	Approved for issue by: John Cocks <i>JC</i> Project Manager
February 1997—CWT 47186 00	

Form 5—1 of 4

To: Consents Administration Officer
Otago Regional Council
Private Bag 1954
DUNEDIN

Queenstown Lakes District Council, P O Box 50072, Queenstown, hereby applies for the resource consents described below.

Address for Service Documents: Royds Consulting Ltd
P O Box 4
DUNEDIN

Name for Service of Documents: John Cocks
Phone 0-3-477 0885
Fax 0-3-477 0616

1 Applicants Name

Queenstown Lakes District Council
P O Box 50072
QUEENSTOWN

Attention: Mr Ken Fox

Phone: 0-3-442 7333
Fax: 0-3-442 7334

Owner / Occupier: Lake District Trust Limited
P O Box 5463
DUNEDIN

A purchase agreement under S17 of the Public Works Act will facilitate the transfer of the land to QLDC ownership.

2 Location

The proposed Victoria Flats sanitary landfill site is approximately 27km from Frankton along the Kawarau Gorge Road, State Highway 6. It is located approximately 300m off State Highway 6 on the Queenstown side of Victoria Bridge.

Map Reference: NZMS 260 F41 968657

Legal Description: Part Run 330C, Block II, Kawarau Survey District
Certificate of Title: 338/69 (Otago Land District)

3 Type of Consents Applied For

Discharge Permit to discharge solid waste in/on/under land (S.15)

To discharge mixed solid waste in, on or under the land for treatment and disposal as part of the normal operations at the Victoria Flats sanitary landfill.

This will result in the discharge of contaminants into air and ground.

4 A Full Description of the Activity and Purpose of the Activity for Which Consent is Sought

Consent is required to enable the development and operation of a sanitary landfill at the proposed Victoria Flats site. The landfill will, eventually, handle all municipal solid waste, in accordance with the landfill development and management plan, for the Queenstown Lakes District. The site will be developed and engineered to ensure adverse effects on the environment are avoided or reduced to acceptable levels.

5 Full Description of Works to be Constructed

This is contained in the attached AEE document and the Landfill Development and Management Plan (Volume II). In summary, the works will involve:

- construction of a leachate control system
- installation of a storm water management system
- earthworks to form landfill foundation and liner system and associated drainage work
- formation of access road and site roading
- screen planting and fences.

6 Names and Addresses of Parties Likely to be Affected by the Proposed Activity

Interested Parties

Department of Conservation
Otago Conservancy
P O Box 5244
Dunedin

Otago Fish and Game Council
Queenstown Branch
37 Shotover Street
Queenstown

Hokonui Runaka
c/- Rena Fowler
Secretary
School Road
Waipahi

Te Runanga o Otakou
c/- Eleanor Murphy
Executive Officer
P O Box 40
Portobello

Kati Huirapa ki Puketeraki
c/- Joy Ellison
Post Office
Karitane

Edward Ellison
Otago Regional Council
Private Bag 1954
Dunedin

The State Highway Regional Manager
Transit New Zealand
P O Box 5241
Dunedin

Adjoining Landowners

Wakatipu Environment Society
P O Box 697
Queenstown

Lakes District Trust Limited
P O Box 5463
Dunedin

Mr R H Chalmers
5 Arron Street
Ellerslie
Auckland

Part 2, Section 8 provides a record of consultation undertaken for the proposed sanitary landfill.

7 Other Consents Required in Respect of the Proposed Activity

An application for a notice of requirement for designations for the landfill operation, a landfill buffer zone and a road to the landfill has been lodged concurrently with the consent applications to the Otago Regional Council. The designation will authorise the "land use" part of the landfill operation.

This notice of requirement will be considered with the resource consent applications following a process of public input.

The consents being applied for from the Otago Regional Council are:

- Discharge Permit - to Discharge Solid Waste In/On/Under Land (S15)
- Discharge Permit - Air Emissions (S15)
- Discharge Permit - Leachate and Dirty Stormwater (S15)
- Water Permit - To Take Groundwater (S14)

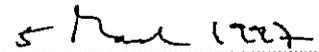
8 This Application is for new Consents.

9 A description of the proposal and an assessment of effects that the proposal may have on the environment in accordance with the Fourth Schedule of the Resource Management Act 1991 are included in the attached document.

10 Plans showing the location and layout of the proposal are attached.



Signature of Applicant
[or signature of person authorised to sign on behalf of the applicant]



Date

Form 5—2 of 4

To: Consents Administration Officer
Otago Regional Council
Private Bag 1954
DUNEDIN

Queenstown Lakes District Council, P O Box 50072, Queenstown, hereby applies for the resource consents described below.

Address for Service Documents: Royds Consulting Ltd
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Name for Service of Documents: John Cocks
Phone . 0-3-477 0885
Fax 0-3-477 0616

1 Applicants Name

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Attention: Mr Ken Fox

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Fax: 0-3-442 7334

Owner / Occupier: Lake District Trust Limited
P O Box 5463
DUNEDIN

A purchase agreement under S17 of the Public Works Act will facilitate the transfer of the land to QLDC ownership.

2 Location

The proposed Victoria Flats sanitary landfill site is approximately 27km from Frankton along the Kawarau Gorge Road, State Highway 6. It is located approximately 300m off State Highway 6 on the Queenstown side of Victoria Bridge.

Map Reference: NZMS 260 F41 968657

Legal Description: Part Run 330C, Block II, Kawarau Survey District
Certificate of Title: 338/69 (Otago Land District)

3 Type of Consents Applied For

Air Emissions—Discharge Permit (S.15)

To discharge landfill gases and dust to air. The main landfill gases are carbon dioxide (CO₂) and methane (CH₄).

4 A Full Description of the Activity and Purpose of the Activity for Which Consent is Sought

Consents are required to enable the development and operation of a sanitary landfill at the proposed Victoria Flats site. The landfill will, eventually, handle all municipal solid waste, in accordance with the landfill development and management plan, for the Queenstown Lakes District. The site will be developed and engineered to ensure adverse effects on the environment are avoided or reduced to acceptable levels.

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This is contained in the attached AEE document and the Landfill Development and Management Plan (Volume II). In summary, the works will involve:

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Edward Ellison
Otago Regional Council
Private Bag 1954
Dunedin

The State Highway Regional Manager
Transit New Zealand
P O Box 5241
Dunedin

Adjoining Landowners

Wakatipu Environment Society
P O Box 697
Queenstown

Lakes District Trust Limited
P O Box 5463
Dunedin

Mr R H Chalmers
5 Arron Street
Ellerslie
Auckland

The section on consultation in the attached AEE document provides a record of consultation undertaken for this proposed sanitary landfill.

7 Other Consents Required in Respect of the Proposed Activity

An application for a notice of requirement for designations for the landfill operation, a landfill buffer zone and a road to the landfill has been lodged concurrently with the consent applications to the Otago Regional Council. The designation will authorise the "land use" part of the landfill operation.

This notice of requirement will be considered with the resource consent applications following a process of public input.

The consents being applied for from the Otago Regional Council are:

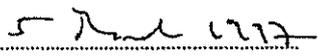
- Discharge Permit - to Discharge Solid Waste In/On/Under Land (S15)
- Discharge Permit - Air Emissions (S15)
- Discharge Permit - Leachate and Dirty Stormwater (S15)
- Water Permit - To Take Groundwater (S14)

8 This Application is for new Consents

9 A description of the proposal and an assessment of effects that the proposal may have on the environment in accordance with the Fourth Schedule of the Resource Management Act 1991 are included in the attached document.

10 Plans showing the location and layout of the proposal are attached.


Signature of Applicant
[or signature of person authorised to sign on behalf of the applicant]


Date

Form 5—3 of 4

To: Consents Administration Officer
Otago Regional Council
Private Bag 1954
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Fax 0-3-477 0616

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Attention: Mr Ken Fox

Phone: 0-3-442 7333
Fax: 0-3-442 7334

Owner / Occupier: Lake District Trust Limited
P O Box 5463
DUNEDIN

A purchase agreement under S17 of the Public Works Act will facilitate the transfer of the land to QLDC ownership.

2 Location

The proposed Victoria Flats sanitary landfill site is approximately 27km from Frankton along the Kawarau Gorge Road, State Highway 6. It is located approximately 300m off State Highway 6 on the Queenstown side of Victoria Bridge.

Map Reference: NZMS 260 F41 968657

Legal Description: Part Run 330C, Block II, Kawarau Survey District
Certificate of Title: 338/69 (Otago Land District)

3 Type of Consents Applied For

Leachate and Dirty Stormwater—Discharge Permit (S.15)

Leachate generated in the landfill will be collected and treated by a leachate control system. The system will comprise a low permeability liner, a leachate collection system and leachate storage facilities. Treatment and disposal of leachate at the site will be by land treatment.

In addition, "dirty" storm water from the landfill site will be collected and transferred to the leachate storage facilities before treatment and disposal.

4 A Full Description of the Activity and Purpose of the Activity for Which Consent is Sought

Consents are required to enable the development and operation of a sanitary landfill at the proposed Victoria Flats site. The landfill will, eventually, handle all municipal solid waste, in accordance with the landfill development and management plan, for the Queenstown Lakes District. The site will be developed and engineered to ensure adverse effects on the environment are avoided or reduced to acceptable levels.

5 Full Description of Works to be Constructed

This is contained in the attached AEE document and the Landfill Development and Management Plan (Volume II). In summary, the works will involve:

- construction of a leachate control system
- installation of a storm water management system
- earthworks to form landfill foundation and liner system and associated drainage work
- formation of access road and site roading
- screen planting and fences.

6 Names and Addresses of Parties Likely to be Affected by the Proposed Activity

Interested Parties

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Otago Conservancy
P O Box 5244
Dunedin

Otago Fish and Game Council
Queenstown Branch
37 Shotover Street
Queenstown

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c/- Rena Fowler
Secretary
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Mr R H Chalmers
5 Arron Street
Ellerslie
Auckland

Part 2, Section 8 provides a record of consultation undertaken for the proposed sanitary landfill.

7 Other Consents Required in Respect of the Proposed Activity

An application for a notice of requirement for designations for the landfill operation, a landfill buffer zone and a road to the landfill has been lodged concurrently with the consent applications to the Otago Regional Council. The designation will authorise the "land use" part of the landfill operation.

This notice of requirement will be considered with the resource consent applications following a process of public input.

The consents being applied for from the Otago Regional Council are:

- Discharge Permit - to Discharge Solid Waste In/On/Under Land (S15)
- Discharge Permit - Air Emissions (S15)
- Discharge Permit - Leachate and Dirty Stormwater (S15)
- Water Permit - To Take Groundwater (S14)

8 This Application is for Consents

9 A description of the proposal and an assessment of effects that the proposal may have on the environment in accordance with the Fourth Schedule of the Resource Management Act 1991 are included in the attached document.

10 Plans showing the location and layout of the proposal are attached.



Signature of Applicant
[or signature of person authorised to sign on behalf of the applicant]

5 June 1997

Date

Form 5—4 of 4

To: Consents Administration Officer
Otago Regional Council
Private Bag 1954
DUNEDIN

Queenstown Lakes District Council, P O Box 50072, Queenstown, hereby applies for the resource consents described below.

Address for Service Documents: Royds Consulting Ltd
P O Box 4
DUNEDIN

Name for Service of Documents: John Cocks
Phone 0-3-477 0885
Fax 0-3-477 0616

1 Applicants Name

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P O Box 50072
QUEENSTOWN

Attention: Mr Ken Fox

Phone: 0-3-442 7333
Fax: 0-3-442 7334

Owner / Occupier: Lake District Trust Limited
P O Box 5463
DUNEDIN

A purchase agreement under S17 of the Public Works Act will facilitate the transfer of the land to QLDC ownership.

2 Location

The proposed Victoria Flats sanitary landfill site is approximately 27km from Frankton along the Kawarau Gorge Road, State Highway 6. It is located approximately 300m off State Highway 6 on the Queenstown side of Victoria Bridge.

Map Reference: NZMS 260 F41 968657

Legal Description: Part Run 330C, Block II, Kawarau Survey District
Certificate of Title: 338/69 (Otago Land District)

3 Type of Consents Applied For

Water Permit—To Take Groundwater

To collect groundwater at the site via a bore for the purposes of a site water supply. Maximum rate of take will not exceed 5l/s.

4 A Full Description of the Activity and Purpose of the Activity for Which Consent is Sought

Consents are required to enable the development and operation of a sanitary landfill at the proposed Victoria Flats site. The landfill will, eventually, handle all municipal solid waste, in accordance with the landfill development and management plan, for the Queenstown Lakes District. The site will be developed and engineered to ensure adverse effects on the environment are avoided or reduced to acceptable levels.

This water permit will be for the provision of a local water supply at the landfill site. The water will be taken from a groundwater bore at a maximum rate of 5l/s and stored onsite in water tanks. The onsite water supply will be utilised for fire fighting purposes, dust suppression and the site operators kitchen and toilet facilities.

At the time of lodging these consents the precise location of the groundwater bore had not been identified. However, in the future, at the time that the bore consent is lodged, the location of the take will be specified.

5 Full Description of Works to be Constructed

This is contained in the attached AEE document and the Landfill Development and Management Plan (Volume II). In summary, the works will involve:

- construction of a leachate control system
- installation of a storm water management system
- earthworks to form landfill foundation and liner system and associated drainage work
- formation of access road and site roading
- screen planting and fences.

6 Names and Addresses of Parties Likely to be Affected by the Proposed Activity

Interested Parties

Department of Conservation
Otago Conservancy
P O Box 5244
Dunedin

Hokonui Runaka
c/- Rena Fowler
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School Road
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Kati Huirapa ki Puketeraki
c/- Joy Ellison
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P O Box 5241
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Private Bag 1954
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Adjoining Landowners

Lakes District Trust Limited
P O Box 5463
Dunedin

Mr R H Chalmers
5 Arron Street
Ellerslie
Auckland

Part 2, Section 8 provides a record of consultation undertaken for the proposed sanitary landfill.

7 Other Consents Required in Respect of the Proposed Activity

An application for a notice of requirement for designations for the landfill operation, a landfill buffer zone and a road to the landfill has been lodged concurrently with the consent applications to the Otago Regional Council. The designation will authorise the "land use" part of the landfill operation.

This notice of requirement will be considered with the resource consent applications following a process of public input.

The consents being applied for from the Otago Regional Council are:

- Discharge Permit - to Discharge Solid Waste In/On/Under Land (S15)
- Discharge Permit - Air Emissions (S15)
- Discharge Permit - Leachate and Dirty Stormwater (S15)
- Water Permit - To Take Groundwater (S14)

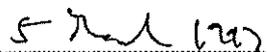
8 This Application is for new Consents

9 A description of the proposal and an assessment of effects that the proposal may have on the environment in accordance with the Fourth Schedule of the Resource Management Act 1991 are included in the attached document.

10 Plans showing the location and layout of the proposal are attached.



Signature of Applicant
[or signature of person authorised to sign on behalf of the applicant]



Date

FORM 12

Notice of Requirement for a Designation to be Included in the Queenstown-Lakes District Plan Under Section 168 of the Resource Management Act 1991

To : The Chief Executive
Queenstown Lakes District Council
PO Box 50072
QUEENSTOWN

The QUEENSTOWN-LAKES DISTRICT COUNCIL, c/- Royds Consulting Limited, at the address for service given below, HEREBY GIVES NOTICE of a requirement for a designation to be included in the Queenstown-Lakes District Plan, pursuant to section 168A of the Resource Management Act 1991, for a "Landfill", "Landfill Buffer Area" and "Road".

1 The Reasons Why the Designation is Needed

1.1 Landfill

Recognising the potential for adverse environmental effects that may be generated from a proliferation of small inadequately managed solid waste landfills throughout the district, the Queenstown Lakes District Council has resolved to close all of the small landfills in the Queenstown Lakes area and develop a new purpose built solid waste landfill capable of catering for the public's long term solid waste disposal needs. In order to maintain an adequate level of service throughout the community it will be necessary to provide a number of "transfer stations" at strategic locations in the district. These transfer stations will serve as points to which solid waste can be delivered, sorted in purpose built containers and subsequently removed for final disposal at the purpose built landfill proposed for Victoria Flats. At this stage transfer stations are being considered for Makarora, Wanaka, Frankton, Glenorchy, Kingston and possibly Hawea.

This particular requirement relates to the proposed landfill at Victoria Flats.

Until now the solid waste disposal requirements of the Wakatipu Basin have been met by the existing landfill site at Tucker Beach, three kilometres upstream of the State Highway 6 Shotover River Bridge. This site is now almost completely full and needs to be replaced. It is therefore necessary to identify another site suitable for development as a landfill.

The Queenstown Lakes District Council believes the Victoria Flats site to be the most appropriate in physical, environmental and economic terms for a single sanitary landfill for the Queenstown Lakes district.

The reason why this designation is needed, therefore, is to provide for the long term solid waste disposal requirements of the Wakatipu Basin.

1.2 Landfill Buffer Area

The "Landfill" designation relates only to the area associated with the operation of the landfill. In addition to this operational area, it is also necessary to manage the activities which take place on the immediately adjoining area to avoid any incompatible activities, for example, residential use, taking place which could be adversely affected as a consequence of the landfill operations, or which can impact on the efficient operation of the landfill.

The reason why this designation is needed, therefore, is to maintain a buffer area around the proposed Victoria Flats Landfill.

1.3 Road

Legal access to the proposed landfill is by way of an unformed legal road. Following consultation with Transit New Zealand it has been determined that the new intersection to be formed with the highway is in a location considered by Transit New Zealand to be unsafe. An alternative access to the proposed landfill is therefore required.

In addition, the construction of the proposed landfill will sever an existing legal road which provides access to land held in private ownership at the rear of the proposed landfill site. It is therefore necessary to establish and form alternative access around the proposed landfill site.

2 **The Physical and Legal Descriptions (Noting Any Distinguishing Characteristics) of the Site to which the Requirement Applies**

The proposed landfill site and associated buffer area is located approximately 27 kilometres from Frankton adjacent to State Highway 6 situated near Victoria Bridge and the true right bank of the Kawarau River. The site contains a level area adjoining the highway, moderately to steeply sloping land adjoining the river, wide shallow gully, and the lower portions of the steeper ridges of backdrop hills. The site is covered with grass, tussock and low sporadic scrubby bush. The surface of the terrace has a large number of varying sized boulders.

An old water race traverses the valley side to the south west of the landfill site. This water race provides irrigation water to the area including that to be developed as a landfill. Otherwise the valley is dry, and has only one minor side gully entering it. A prominent abandoned meander of the Kawarau River forms extensive flats immediately south of the site.

The area of the site is 33.12ha. The site is detailed in Appendix B, Volume II and comprises areas B, C, D and E.

The land is zoned Rural B in the Queenstown-Lakes Transitional District Plan and Rural Downlands in the Queenstown-Lakes District Council Proposed District Plan. It is on freehold land which is currently used for grazing, and also includes a small area of freehold land which is currently unused.

The legal description of the land is:

- (a) Landfill: Part Run 330C Block II Kawarau Survey District being the land contained and described in Certificate of Title 338/69 (Otago Land District). This land is owned by Lake District Trust Limited.
- (b) Buffer Zone: Part Run 330C Block II Kawarau Survey District being the land contained and described in Certificate of Title 338/69 (Otago Land District). This land is owned by Lake District Trust Limited and part of Section 8 Block II Kawarau Survey District containing 6399 square metres more or less being all the land contained and described in Certificate of Title 76/190 (Otago Land District), owned by Raymond Hector Chalmers. (Refer Appendix I).
- (c) Road: Part Run 330C Block II Kawarau Survey District being the land contained and described in Certificate of Title 338/69 (Otago Land District). This land is owned by Lake District Trust Limited.

The purchase agreement under S.17 of the Public Works Act will facilitate the transfer of the landfill site and road to QLDC ownership.

A legal but unformed road line from the highway to a freehold section passes through the proposed landfill site. It is proposed to stop a portion of this road and take land for a new legal road to provide access to the landfill site and the freehold section.

The proposed site is approximately one kilometre from the nearest dwelling, and there are no other residential dwellings within three kilometres. There is no evidence of significant ecological values associated with the site, nor any significant recreational or cultural values known to be associated with the land resources at the site.

3 The Nature of the Proposed Work and any Proposed Restrictions

3.1 Landfill

The nature of this proposed work is to provide a sanitary landfill at Victoria Flats in place of the existing landfill at Tucker Beach. It is proposed that this landfill will consist of facilities for solid waste disposal.

The proposed activities for which the designation is required are those for the receipt and management of solid waste.

The sequencing of construction of the proposed Victoria Flats Landfill will be scheduled in a manner designed to minimise environmental impact. Special care in this design shall be given to reducing erosion and limiting the visual impact during construction.

Parts of the site will be visible from the north west and the south east, from State Highway 6, towards the later stages of the life of the landfill. Site screening will be achieved by fences and a three row belt of trees. The screening belt along the perimeters is to consist primarily of evergreen native trees such as native beech, however if necessary, Douglas Firs and Gums will be used as an initial planting.

Due to the site's distance from urban areas, delivery of waste to the site would be through transfer stations throughout the district and by pre-arranged commercial loads. Public access to the landfill would be excluded. Greenwaste could also be disposed of at the site. Selected cleanfill from commercial/industrial users would be accepted by arrangement and could be used for cover material.

Water supply to the site, for fire fighting, irrigation and dust control, will be provided from a groundwater bore. Some repair work will be necessary to the piped water race on the top, north west side of the site.

Protection of groundwater from contamination will be provided by a leachate control system.

The site will have a liner leachate control system and only a small tipping face will be in use and exposed at any one time. There will be measures taken to eliminate any smell, sound or visual impact from the operation.

The fully lined sanitary landfill is proposed in order to minimise any adverse effects on the environment. Any leachate would be removed from the collection system and stored prior to being recirculated over the landfill. Due to the low rainfall at this site, evaporation provide another possible solution for leachate disposal.

Throughout the life of the landfill site much of the site will continue to be grazed. Grazing could continue after use as part of the progressive use and restoration of the site.

Waste encapsulated in a landfill undergoes anaerobic decomposition. The process generates a landfill gas comprised about 55% methane, 45% carbon dioxide and a low percentage of nitrogen, oxygen and other gases. However, landfill gas emissions will be managed and are considered likely not to be a problem at this remote site.

Solid waste will be collected by way of the usual kerbside collections in main centres or from transfer stations.

At transfer stations a number of large commercial waste type bins will be used to collect solid waste. The bins containing the solid waste will be emptied on a regular basis (either by replacing full bins with empty ones or by emptying the bins into a refuse removal vehicle on site) and all the waste they contain will be removed from the site for disposal at the central refuse landfill proposed at Victoria Flats.

The general public will not be able to deposit material directly at the landfill.

3.2 Landfill Buffer Area

This designation seeks to establish a buffer area around the Victoria Flats landfill. The extent of the buffer area has been determined having regard to the topography of the site and is of sufficient size taking into account health and amenity issues.

Within this site there is variable topography and as a consequence the mix of the above factors results in the need for a buffer area of an irregular shape (Appendix I, Volume II).

- Within the steep area between the landfill operation and the Kowarau River, which is at a lower elevation than the landfill, the extent of the buffer is determined on the basis of the minimum distance of 150 metres. The presence of the Kowarau River enables the buffer to extend along the boundary of the legal road adjoining the river and along the 280 metre contour to the state highway.
- At the rear of the site at its southern end furthest from the highway, the rising nature of the ground means that in addition to a margin for health reasons, an allowance is also required for amenity purposes, resulting in all of the sloping land facing the landfill being included in the buffer. In this area therefore, the boundary follows the top of the rocky knoll.
- Between the southern ridge and a more significant ridge which extends to the land to be used for landfill purposes, is an area which is generally level. As much of this area, at its north-western end is out of sight of much of the proposed landfill, the buffer is able to be progressively reduced towards the main ridge.
- The buffer boundary then follows the main spur to the property boundary, a distance some 480 metres from the landfill. All of the slopes facing the landfill in this locality are included for amenity reasons.
- The level area to the north of the landfill and towards the highway is included for amenity reasons. The boundary and highway provide an appropriate edge to the buffer both because of being a suitable distance away and being identifiable.

Activities that will be prohibited within the landfill buffer area are:

- All buildings, and activities associated with residential and other accommodation purposes;
- Buildings and activities associated with the public or private assembly of people;
- Commercial activities such as the display, offering, provision, sale or hire of goods, equipment, takeaway food bars, professional, commercial and administrative offices, service stations, motor vehicle sales and the sale of liquor; and
- Recreational activities, including land and/or buildings for the primary purpose of recreation and/or entertainment.

3.3 Road

A formed metalled access to the site and the land to the rear is located off State Highway 6 at the south east corner of the proposed landfill site. This access is unsatisfactory due to its close proximity to a corner and lack of sufficient visibility for vehicles entering and exiting the site. A legal access to the proposed landfill site is located on a sharp corner 600 metres from the formed access. This too has poor visibility and is unsuited for use by heavy vehicles.

A new access is proposed to be located 460 metres to the north of the current formed access. This will allow safe visibility for traffic entering and exiting the site. A new legal road will be constructed to provide access to the freehold section to the west of the site (section 32). The new part of the proposed road will be connected to the existing formed metalled access (Appendix I, Volume II). This plan also shows the road to be stopped and land to be taken for road.

The proposed road will have a width of 20 metres. That part between the state highway and the proposed landfill will be sealed with two 3.5 metre lanes. The remainder of the proposed road will be formed and metalled.

It is Council's intention to purchase the land to be used for "road" purposes.

4 Alternative Methods Considered

4.1 Landfill

A full assessment of alternative methods of solid waste management and disposal was undertaken during the development of the Districts solid waste management strategy. The final summary and recommendations are included in Appendix A, Volume II.

The identification of the site at Victoria Flats best meets the objective of the Queenstown-Lakes District Council to provide for the future waste disposal requirements of the residents of the Wakatipu Basin.

(i) **Alternative Means of Providing for the Landfill**

The alternative means of providing for the landfill on the proposed site would be by way of resource consent for a non-complying activity in the Rural B Zone of the Transitional District Plan and Rural Downlands in the Proposed District Plan. However, it is considered that a designation is the best way of securing this public work.

The designation procedure is seen by the Queenstown-Lakes District Council as being the most effective way of ensuring that its interests in a site are protected. The primary reason for adopting this technique is the greater certainty that it provides in terms of future management options for a site relative to other available methods.

Designation also clearly identifies in the District Plan the likely long-term location of this particular resource use. This is also seen as being beneficial to other resource users.

This notice of requirement for a designation is seen as being a more desirable option for protecting the interest of the Council and providing for the long term waste disposal needs of the Wakatipu Basin. Further, a requirement for a designation is seen to be consistent with the manner in which waste disposal facilities are presently provided for within the Queenstown-Lakes District Plan, for example, the Tuckers Beach Landfill is currently provided for as a designation for "Refuse Disposal" purposes.

4.2 **Landfill Buffer Area**

(i) **Alternative Methods**

Two principle alternative methods of protecting the area surrounding the landfill from inappropriate development were considered.

The first option was for the Queenstown Lakes District Council to buy the land. However, the Council has no use for the land and this could unduly impact on its use. The land is currently used for the grazing of stock and it is appropriate for this activity to continue.

The second option was to create a buffer area surrounding the landfill and restrict the activities which may locate there. This option protects the land from incompatible land uses while still allowing the current owner fair and reasonable use of the land.

(ii) **Alternative Means of Providing for the Landfill Buffer Area**

The designation process is seen by the Queenstown-Lakes District Council as being the most effective way of ensuring that its interests in a site are protected. The primary reason for adopting this technique is the greater certainty that it provides in terms of future management options for a site relative to other available methods.

This notice of requirement for a designation is seen as being a more desirable option for protecting the interest of the Council and protecting the area surrounding the landfill from inappropriate uses. Further, a requirement for a designation is seen to be consistent with the manner in which waste disposal facilities are presently provided for within the Queenstown-Lakes District Plan.

4.3 Road

(i) Alternative Locations

Three alternative locations for providing access to the proposed landfill and the private land at the rear were considered:

- using the existing formed access
- creating a new access using the existing legal road which passes through the site
- creating a new access in the proposed location.

The third option has been selected for road safety reasons. It is the only option which provides safe access to and from the state highway.

(ii) Alternative Means of Providing for the Access

The proposed road will be retained in perpetuity. As a consequence it is desirable that it be purchased by Council and shown in the district plan. As the proposed road is a public work to be constructed by Council, the designation procedure has been adopted. This provides a process of notification to the landowner and the public and a formal means by which Council can negotiate the acquisition of the land. It also provides the landowner with rights under the Resource Management Act 1991.

Alternatively, the resource consent procedure could have been adopted, but this does not provide the certainty of process to either the Council or the landowner.

5 **A Statement of the Other Resource Consents Required in Relation to the Activity to which the Application Relates and Whether or Not Such Consents Have Been Applied For**

In accordance with the Resource Management Act 1991, resource consents are required by the Otago Regional Council for:

- (i) Discharge permit to discharge solid waste in/on/under land (section 15).
- (ii) Discharge permit to discharge landfill gases and dust to air (section 15).
- (iii) Discharge permit to discharge leachate and "dirty" stormwater to land (section 15).
- (iv) Water permit to take groundwater from a bore (section 14).

Such resource consents are being sought from the Otago Regional Council.

6 Consultation Undertaken with Parties Likely to be Affected by the Designation

6.1 Landfill

The landfill has been considered by the District's wider community as an integral component of the development of the District's Solid Waste Management Strategy.

The landowner of Section 8 which adjoins the buffer zone has also been consulted (Appendix L, Volume II).

In this instance the above consultation was seen as sufficient as no other party or persons were considered to be affected by the proposal and adequate consultation had preceded the preparation of this notice of requirement.

6.2 Landfill Buffer Area

Consultation has been undertaken with the owner of the land, the Lakes District Trust Limited. The landowner has agreed to the designation of a buffer area.

The landowner of Section 8 which adjoins the buffer zone has also been consulted (Appendix L, Volume II).

Consultation has also been undertaken with iwi who raise no concerns over the designation of the land (Appendix J, Volume II).

6.3 Road

Consultation has been undertaken with the owner of the land, the Lakes District Trust Limited. The landowner has agreed to the designation of land for "road" purposes. As a new road is to be formed, the existing paper road is to be stopped with part of the land subject to that paper road remaining with the landowner and the part of the former road becoming part of the overall landfill site title.

Consultation has been undertaken with Transit New Zealand. Transit have indicated that the access is satisfactory (Appendix K, Volume II).

Consultation has also been undertaken with iwi who raise no concerns over the designation of the land (Appendix J, Volume II).

7 Additional Information

No additional information is required by the Lakes-Queenstown Wakatipu Combined Section of the Queenstown-Lakes Transitional District Plan, or by any regional plan or regulation.

The proposed Queenstown-Lakes District Plan requires further information to be submitted with this notice of requirement as follows:

- (i) **Details of the Order in Council or Empowering Legislation which allows the Applicant to be a Requiring Authority, Including any Specified Terms or Conditions Attached to the Order in Council**

The Queenstown - Lakes District Council is a requiring authority pursuant to section 166 of the Resource Management Act 1991.

- (ii) **A Statement of how the Requirement Meets Part II of the Act**

This designation is to provide a landfill, buffer area and road, and will contribute to promoting sustainable management of waste for Queenstown for the following reasons:

- The proposal will enable people to meet their reasonably foreseeable needs for waste disposal in the future.
- The proposal will in no way effect the safeguarding of the life-supporting capacity of air, water, soil or ecosystems with regard to the land on which the designations will be located.
- The proposal compared with other options will have the least adverse effect on the environment.

- (iii) **A Statement of the Objectives the Project or Work is Aiming to Achieve**

Refer above to Section 1 "Reasons Why The Designation is Needed".

- (iv) **The Degree to which the Requirement meets the Objectives and Policies of the Plan**

The subject site is zoned Rural B in the Lakes-Queenstown Wakatipu Combined Section of the Queenstown Lakes Transitional District Plan and zoned Rural Downlands in the Proposed Queenstown Lakes District Plan.

Transitional District Plan

It is considered that there are no relevant objectives or policies contained in the Transitional District Plan and as a consequence the proposal is not inconsistent with the Transitional District Plan.

Proposed District Plan

The following objectives and policies in the Proposed District Plan are considered relevant to the proposal:

Landscape and Visual Amenity Objective (4.2.5)

Activities and development being undertaken in the District in a manner which avoids potential adverse effects on landscape values, particularly areas of landscape importance, being the skyline and upper slopes of the hills, the semi-enclosed rural valleys, prominent topographical features and areas, the open character of the rural area and the shoreline of the lakes and rivers.

Landscape and Visual Amenity Policy (4.2.5) 10 - Transport Infrastructure

To preserve the open nature of the rural landscape and the compact townscape by avoiding increasing levels of apparent modification by:

- encouraging the location of roads, car-parks and tracks along the edges of existing landforms and vegetation patterns
- by encouraging imaginative roading designs including a range of carriageway widths, different surface materials, grass berms and protection of existing mature trees where these can enhance the quality of design and the visual experience
- encouraging the alignment of roads and tracks based on the dominant lines of the landscape and along the edges of other patterns in the landscape and by discouraging roads and tracks on highly visible slopes
- requiring that all construction be with minimum cut and fill batters and that all batters be shaped in sympathy with, existing landforms
- requiring that all disturbed areas be revegetated at the end of construction.

Takata Whenua Objective(s) 11 - Protection of Water Resources

- 1 The collection, treatment, storage and disposal of wastes in a way that minimises the adverse effects on the natural resources of the District.
- 2 Minimising the quantities of waste requiring disposal within the District.

Takata Whenua Policies - Protection of Water Resources

- 1 To consult with the appropriate Kai Tahu Runanga when developing waste management strategies for the District.
- 2 To ensure that all human and domestic wastes are treated to a high standard.

Waste Management Objective 4.7.3

The collection, treatment, storage and disposal of solid and hazardous wastes in a manner which meets the needs of current and future generations of residents and visitors to the District, and avoids, remedies or mitigates adverse effects on the environment.

Waste Management Policies

- 1 To ensure that the risks to soil, groundwater and water contamination and other adverse effects on the health, safety and amenity values of residents, visitors and environment from the disposal wastes are avoided, remedied or mitigated.
- 2 To minimise the quantities of waste requiring collection, treatment, storage or disposal within the District and to maximise opportunities for reuse, recycling and recovery of materials from the waste stream.
- 3 To ensure the safe and efficient collection, treatment, storage and disposal of all solid and hazardous wastes within the District.

Rural Objective 3 - Rural Amenity Values

Protection of rural amenity values by encouraging the establishment of a range of activities which require a rural location, but which do not create unacceptably unpleasant living or working conditions for the District's residents and visitors, nor a significant deterioration of the quality of the rural environment.

This proposal is not inconsistent with any of the above objectives and policies of the Proposed District Plan.

(v) The Relationship of the Work to, or Effect on, any Relevant Provisions of National or Regional Policy Statements and Regional Plans

There are no matters relevant to the proposed works within the Proposed Regional Policy Statement for Otago or the Transitional Regional Plan for Otago.

(vi) Details of Land Ownership, Acquisition and Site Clearance

The site was previously Crown pastoral leasehold land which is currently used for grazing. The land was purchased from the Crown by the Lake District Trust Limited in 1996. The Queenstown Lakes District Council has recently negotiated the purchase of an area of the land for the proposed sanitary landfill. This agreement, being dated 20 December 1996, has been entered into under Section 17 of the Public Works Act 1981 providing for transfer of the land and the payment of compensation.

(vii) The Proposed Sequence and Timing of the Work, Clearly Identifying any Part which may not be Commenced or Completed within 5 years time

The designation will be given effect as soon as the requirement is confirmed. Works will be completed within 5 years. Future works will be carried out on an "as required" basis as set out in the attached Landfill Development and Management Plan.

(viii) Proposals for the Use and Maintenance of those Parts of the Land which will not be Developed for 5 years or more, In Particular, Identification of those Buildings and Structures which could Continue to be used and Maintained in the Meantime

The land designated for the buffer area will not be developed at any time.

(ix) Identification of any other Designation or Heritage Order Applying to the Site, whether it has been given effect to and the effect the Requirement may have on the Existing Designation or Heritage Order

This site is the subject of a designation for "landfill" purposes in the proposed Queenstown Lakes District Plan, however that designation has not yet been approved or given effect to. This requirement is an alteration to that designation as it includes designations for a buffer area and road.

If this designation is granted then it would be appropriate for the proposed designation for "landfill" purposes contained in the Proposed District Plan to be withdrawn.

Dated in Queenstown this5..... day of ..March..... 1997



.....
Property Services Manager
Queenstown-Lakes District Council
(Signature of applicant or person authorised to sign on behalf of applicant)

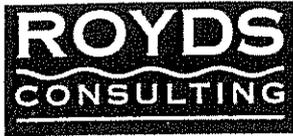
Address for service of Applicant:

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DUNEDIN

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Contact Person: John Cocks



Part One—Application Forms

Part Two—Assessment of Environmental Effects

1. Introduction

1.1.1 Purpose

Any new activity, including the proposed Victoria Flats Sanitary Landfill, is required to be authorised. The purpose of this document, its appendices (Volume II) and the Landfill Development and Management Plan (Volume III) is to provide the information required by

- Section 88 of the RMA
- Regional Plan Waste Appendix 2.

1.1.2 Scope

Consents being sought under the RMA include:

- (i) Discharge Permits (pursuant to Section 15 of the Act) to:
 - discharge of solid waste onto/into land
 - discharge of treated leachate and 'dirty' stormwater to land
 - discharge of gas, odour and dust to air.
- (ii) Water Permits (pursuant to Section 14 of the Act) to:
 - take groundwater for use on site.

In addition, notice of requirement for a land use designation for the landfilling activity, a buffer zone around the proposed sanitary landfill and site access at the Victoria Flats site are being sought under the RMA from the Queenstown Lakes District Council. These have been lodged concurrently with the consent applications to the Otago Regional Council.

1.1.3 Structure

Volume I, Section 2 of the resource consent application reports outlines the statutory framework under which these resource consents must be considered.

Section 3 then briefly outlines the process of developing a solid waste management strategy for the District and the final outcomes of that process.

The location, ownership and principal activities that will be taking place as part of the landfill activity are outlined in Section 4.

Section 5 describes the existing environment of the proposed landfill site.



Section 6 outlines the potential environmental effects that the landfill operation may have, as well as identifying the management tools to minimise these effects.

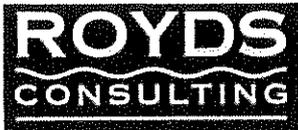
The alternatives to the proposed site and various management techniques are briefly discussed in Section 7.

The consultation undertaken as part of the process is briefly described in Section 8.

Finally, Section 9 outlines the methods proposed to monitor the effects of the landfill on the environment.

Volume II of the resource consent reports contain all appendices referred to in Volume I.

Volume III contains the landfill development and management plan which addresses matters required by the Regional Plan: Waste, Appendix 2.



2. Statutory Framework

2.1 Resource Management Act 1991

The overriding purpose of the Resource Management Act (RMA) 1991 “is to promote the sustainable management of natural and physical resources” (Section 5(1)). Part II of the RMA, Sections 5 to 8, outlines the broader principles that are to be considered in the use, development or protection of a resource.

Any proposed activity, such as the proposed Victoria Flats landfill, must be authorised by a rule, either in a regional plan or district plan, or by a resource consent.

When processing resource consents applications, the consent authority shall have regard to those matters set out under S104 of the RMA. These matters include:

- The nature of the discharge and the sensitivity of the proposed receiving environment to adverse effects.
- The applicants reasons for making the proposed choice.
- Any possible alternative methods of discharge, including discharge into any other receiving environment (S104[3]).

The land use aspect of the proposed Victoria Flats landfill will be considered under a notice of requirement by the Council (the requiring authority) for a designation (Part VIII of the RMA). As indicated earlier the notice of requirement provide for the landfill operation, site access and a buffer zone.

The sanitary landfill operation will also require water and discharge permits under the RMA as outlined in S14 and S15.

2.2 Otago Regional Council—Proposed Regional Policy Statement for Otago

Policy 13.5.2 of the Regional Policy Statement (RPS) states that in order to avoid, remedy or mitigate the adverse effects of solid waste disposal in Otago, all new landfills, such as the proposed Victoria Flats landfill, will be appropriately located and account will be taken of the Landfill Guidelines (MfE, 1992). In addition, the policy requires that safeguards be incorporated into landfill design which ensure adverse effects on the environment are avoided.

2.3 Otago Regional Council—Proposed Regional Plan: Waste

The proposed Regional Plan: Waste provides detailed policies, methods and rules to address waste management issues, including landfill management.

Section 7 of the Plan sets out the Issues, Objectives, Policies and Rules specifically relating to landfills.

Policy 7.4.4 states that all landfills including new ones are both sited and managed in a manner whereby adverse effects on the environment are avoided, or minimised.

Rule 7.6.1 states that new landfills are a discretionary activity as are discharges of any contaminants into or onto land, or any contaminants or water into water, or any contaminants into air resulting from the landfill operation. This rule also requires that a landfill development and management plan, addressing matters listed in Appendix 2 of the Plan, be submitted with any resource consent application.

2.4 Ministry for the Environment—Environmental Landfill Guidelines

The Ministry for the Environment produced the Landfill Guidelines in November 1992 following the enactment of the RMA 1991. The RMA provides the framework for the management of all wastes and associated impacts, with the overall objective of sustainable management of the environment.

The Landfill Guidelines provide a national waste management policy and landfill engineering guidelines. The Guidelines also have the following sections: consultation with tangata whenua; Planning in Waste Management - Guidelines for Maori (An Extract); general principles for waste management identified by Maori waste consultants; economic guidelines for landfill management; and local strategies for waste management.

The Government's waste management policy states that waste generators should meet the costs of the waste they produce and it also aims to encourage the hierarchy of reduction, reuse, recycling, recovery and residual management.

The landfill engineering guidelines were prepared by the Centre for Advanced Engineering and provide guidance on landfills and legislation, landfill siting, design considerations, landfill operation and aftercare. In addition guidelines for existing and closed landfills are also considered.

3. The District's Solid Waste Management Strategy

3.1 Background

In 1992, Royds Consulting Ltd began to assist the Queenstown Lakes District Council (QLDC) in the development of a solid waste management strategy for the District.

Throughout the development phase of the strategy, which included an initial strategy report outlining various options made available for public consultation, aspects of a solid waste management strategy evaluated were:

- an estimation of present and future solid waste quantities
- development of a solid waste minimisation plan for the District
- examination of both bag and wheelie bin refuse collection services
- examination of the potential use of transfer stations and the investigation of potential sites
- examination of the development and use of sanitary landfills
- refinement of cost estimates for strategy options
- development of a hazardous waste management strategy.

3.2 Review and Decision Making Process

An initial solid waste management strategy was prepared and made available for public consultation and QLDC review.

Structured public consultation included a series of public meetings held both in Queenstown and Wanaka over the 1992 to 1994 period, public newsletters sent to all ratepayers, the establishment of a community liaison group, and feature articles in the Council's *Queenstown Lakes News*. In addition submissions were also sought from the public. All views and concerns expressed throughout this process were recorded and considered while finalising the solid waste management strategy.

While the public consultation process was underway, the costs associated with each option were carefully evaluated along with an assessment of the opportunities for cost recovery.

Other factors which assisted in identifying the Council's solid waste management strategy included the opportunity for staged implementation, system flexibility and the level of service provided.

All of the above were evaluated and balanced in order to establish the strategy which is summarised in the following sections. The report presenting a summary and recommendations of the solid waste management strategy forms Appendix A (Volume II).

3.3 Solid Waste Management Strategy

3.3.1 Central Landfill

3.3.1.1 General

The existing principal landfills, at Tucker Beach in the Wakatipu Basin and at Riverbank Road in the Wanaka Basin, would not be considered for landfill selection under the criteria used these days. This fact required the Council to either make their existing landfills meet the modern landfill guideline requirements or develop a new site or sites which would be engineered to minimise effects on the environment.

As a result, throughout the process of strategy review a number of options for sanitary landfill disposal within the district were considered. These options included having two sanitary landfills to serve the Wakatipu and Wanaka basins individually or one landfill to serve both basins. Also, within each basin, a number of potential sanitary landfill sites were considered as options.

3.3.1.2 Site Selection

As part of the initial stages of site selection, a desktop geological investigation of the District was undertaken to identify any likely areas with natural containment characteristics. Also community liaison group meetings were held to seek input from interested parties. Areas of natural containment were determined to be limited and tended to coincide with socially sensitive areas.

In the Wakatipu Basin, sites at Tucker Beach (alongside the existing landfill), Hansen Road, Remarkable's Gravel Pit (near the Remarkables ski field turn-off on SH 6) and near Victoria Flats were shortlisted for site investigation. The Hansen's Road site and the Tucker Beach site were considered inappropriate after carrying out desk top investigations.

Wanaka Basin site investigation included two sites alongside the existing Riverbank Road landfill (Option 1 and Option 2) and sites off Studholme Road and Beacon Point Road. Following desk top investigations both Studholme Road and Beacon Point Road sites were also considered inappropriate and were thus discounted as possible sites for sanitary landfills.

Detailed site investigations were then undertaken at the four remaining sites - Remarkables Gravel Pit and Victoria Flats in the Wakatipu Basin and Options 1 and 2 alongside the existing Riverbank Road landfill in the Wanaka Basin. These sites were found to be potentially suitable for future sanitary landfill purposes (Appendix C, Volume III).

Of the two Wakatipu Basin sites, the Victoria Flats site was selected as the preferred site as potentially it has a longer life, good road access, and an area of relatively flat land that can be readily engineered for a sanitary landfill. Importantly, it was assessed to be the more socially

acceptable site, especially given its distance from residential dwellings (Appendix F, Volume II).

However, in the Wanaka Basin, the preferred site was Option 2 adjacent to the existing Riverbank Road landfill. It has an estimated life of 40 years or more, has good access and could readily be visually screened.

The optimum solution was considered to be the development of only one sanitary landfill at the Victoria Flats site to serve the whole district. This is seen as a cost effective solution for Wanaka ratepayers as well as eliminating the additional costs associated with the land purchase of two sites and the after care of these sites. It was assessed that the transfer of Wanaka's solid waste to the Victoria Flats site will not significantly shorten the life of the site.

3.3.1.3 Geological Considerations

It is noted that at all sites the underlying geology is morainic or alluvial gravels. As such, no site provided good natural containment conditions. Further it is noted that of all the sites, the Victoria Flats has, what is considered to be, the most favourable hydrogeology. This is because the underlying bedrock is reported to be in the form of channels (refer to Volume II, Appendix C) which facilitate targeted groundwater monitoring.

The Wanaka and Victoria Flats sites are all in the vicinity of Cardrona - Nevis fault system. There have been extensive studies of the seismic tectonic hazards in the system during the site investigations for the Upper Clutha hydro-electric power schemes.

3.3.2 Transfer Stations

Transfer stations in both the Wakatipu and Wanaka Basins will maximise flexibility of the solid waste system as well as provide convenient, modern and hygienic waste disposal facilities for the community. Transfer stations also provide the flexibility to handle increases in waste generated by a growing population and high tourist numbers over certain periods of the year.

For these reasons, the solid waste management strategy is to provide larger transfer station facilities in the Frankton area for the Wakatipu Basin and at Wanaka. In addition, smaller transfer stations will be provided at Kingston, Glenorchy and Makarora.

3.3.3 Collection Systems

The strategy review investigated a range of collections options for each basin including plastic bags, paper bags, tins and wheelie bins. The Council is currently reviewing methods of refuse collection and has undertaken a community survey in January 1997, as part of the ongoing waste management system development.



3.3.4 Waste Minimisation and Recycling

Waste minimisation and recycling are important to the district, the region and the nation. The strategy investigated waste minimisation including waste avoidance, waste reduction, waste recycling and reuse and finally, energy recovery. Many of these techniques can be implemented by Council, private enterprise and community groups. Some of these methods are already in practice in the district.

The strategy fully endorses recycling schemes whether Council operated or not. However, it should be noted that the viability of recycling some materials (eg. plastic and newspaper) is governed by unstable economics and in particular transportation costs.

The composting of greenwaste can be an effective method of waste minimisation. Total waste volumes can be reduced by up to 20%. The strategy includes investigating greenwaste management options which involve the community and maybe commercial operators.

3.4 Waste Quantities

Based on census data, the 1986 population of the district was 11,730 and the 1991 population 15,123. Over this period the population increased by 25.8 percent, making the QLDC the fastest growing local authority in the country.

Solid waste generation factors utilised in developing the strategy were:-

- Maximum solid waste generation per person of 938kg per year.
- Minimum solid waste generation per person of 782kg per year.

In 1991, taking into account both permanent residents and transient residents (averaged over the year), the Wakatipu Basin was likely to generate between 8,820 t/yr to 10,580t/yr while the Wanaka Basin would generate between 3,980 t/yr to 4,770 t/yr. By the year 2011, it was estimated that solid waste generation would have increased to between 14,500 t/yr to 17,460 t/yr in the Wakatipu Basin and between 6,560 t/yr to 7,860 t/yr in the Wanaka Basin due to the increase in population within the region.

The solid waste management strategy was developed using these projections. However, the Council monitors the rate of filling at the Tucker Beach site (the largest landfill in the district) by carrying out 3 monthly topographical surveys. The results of recent surveys, extrapolated for a district population, indicate a waste disposal rate of 22,000 tonnes/year.

4. Proposed Sanitary Landfill

4.1 Location

The proposed landfill site is approximately 27 kilometres from Frankton along the Kawarau Gorge Road. It is located approximately 300 metres off State Highway 6 near Victoria Bridge (Figure 4.1).

The site is located approximately 120m in a horizontal direction from the right bank of the Kawarau River in a shallow north west tending valley, between a steep hill and a gently sloping terrace area (known as Victoria Flats) and approximately 40 metres above the river level.

The land is zoned Rural B in the Queenstown Lakes Transitional District Plan and Rural Uplands in the Queenstown-Lakes District Council Proposed District Plan.

4.2 Ownership

The site was previously Crown pastoral leasehold land which is currently used for grazing. The land was purchased from the Crown by the Lake District Trust Limited in 1996. The Queenstown-Lakes District Council has recently negotiated the purchase of an area for the proposed Victoria Flats sanitary landfill (Appendix B, Volume II).

The legal description of the land is Part Run 330C Block II, Kawarau Survey District, Certificate of Title 338/69 (Otago Land District). (Appendix B, Volume III).

4.3 Landfill Operation

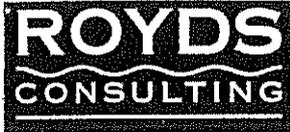
The development and operation of the proposed Victoria Flats landfill is fully described in the Volume III - *Victoria Flats Landfill Development and Management Plan*.

The proposed landfill will serve the district once all other landfills are closed. The Tucker Beach landfill discharge permit expires in July 1999.

The site will contain all waste and cover material within the site boundaries. A proposed final contour plan is provided in the Landfill Development and Management Plan.

The scope of work undertaken at the proposed Victoria Flats landfill, as part of daily operation and maintenance, includes:

- landfilling of solid waste utilising a cell construction technique and landfill compaction equipment
- a storm water management incorporating the construction of a system of storm water collection and diversion bunds and drains to divert storm water runoff from operational areas



- management of the leachate storage and treatment system in conjunction with managing the leachate collection and drainage system
- the management of a leachate land treatment and disposal system
- co-disposal of pre-approved special wastes and full record keeping
- storage or disposal of pre-approved hazardous wastes (consistent with any regional hazardous waste management plan)
- daily toll booth and weigh bridge operation, toll collection and accounting, vehicle counting and waste type logging
- managing site users including sign posting, information boards etc.
- daily landfill cell operation and maintenance including; control of landfill users, preparing for, spreading, compacting and covering waste
- periodic operation and maintenance work including; reinstating, relocation and maintaining as necessary all access roads, hard standing areas, turning areas etc, surface water drainage channels, shifting of stockpiled cover material closer to the landfill and dealing with special wastes
- environmental monitoring; recording and reporting on regular sampling and testing of groundwater, surface water and leachate for water quality parameters and testing monitoring bores and manholes for the presence of landfill gas
- landscaping, tree planting and maintenance to visually enhance the landfill site and screen its view and to provide wind breaks
- litter control by means of wind fencing and cleanup including regular inspections and immediate responses to complaints
- general site maintenance; maintaining security and litter fences, touching up / replacing signs
- controlling of storm water runoff
- fulfilling responsibilities assigned to the Operation with respect to resource consents.

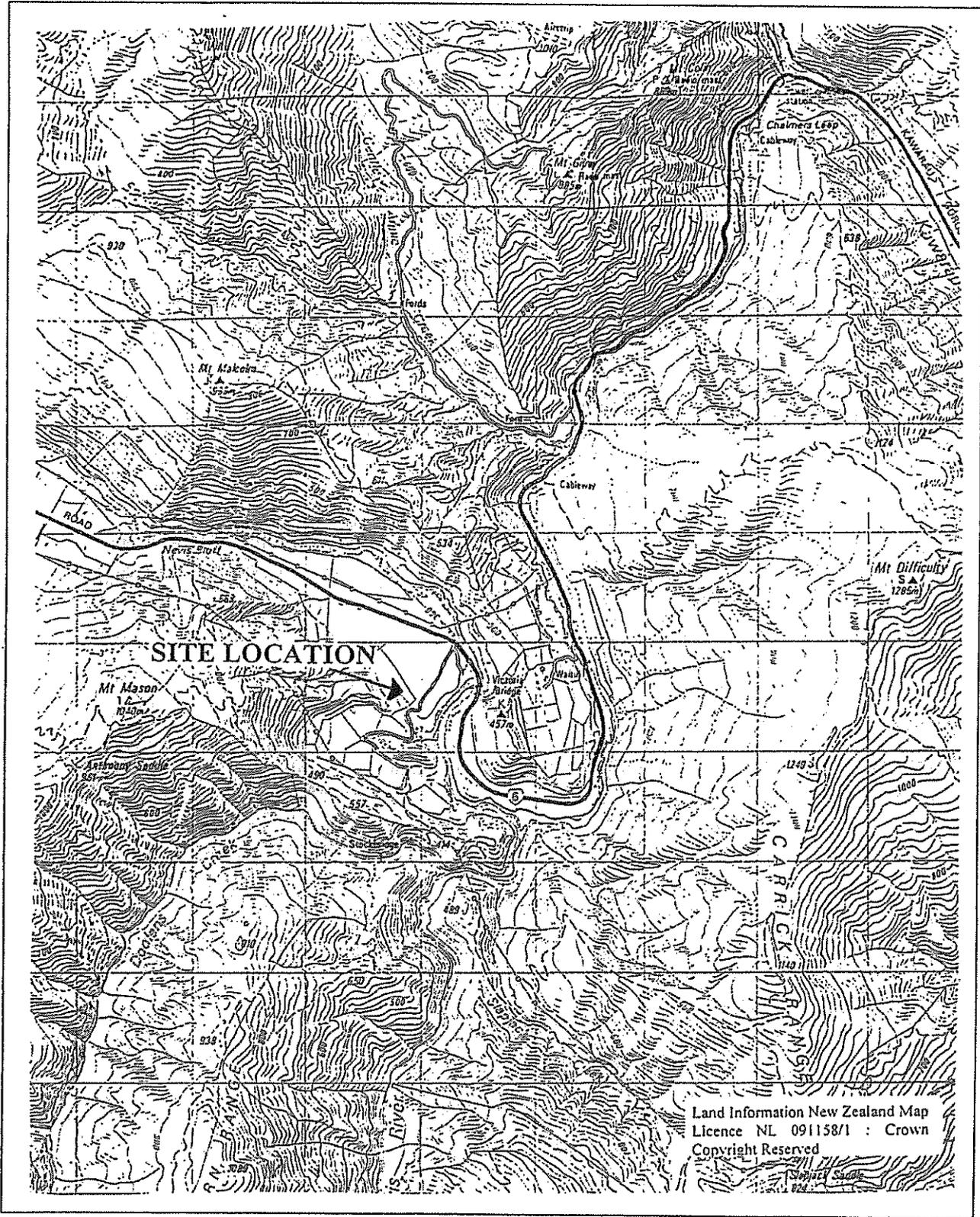


Figure 4.1 - Site Location

5. The Existing Environment

5.1 Site Description and Current Land Use

The proposed landfill site is situated approximately 120m away from Victoria Bridge on the true right bank of the Kawarau River. The site is part of a terrace area known as Victoria Flats. The land is generally gently rolling in the immediate vicinity of the proposed landfill with steeper hills and ridges providing a backdrop to the proposed landfill on its south western boundary. The Kawarau River flows in a gorge approximately 40 metres below the level of the proposed site. A large number of varying sized boulders are embedded in the terrace surface.

The land is currently used for pastoral grazing.

5.2 Geology

The proposed Victoria Flats landfill site was topographically and geologically surveyed during the 1980s for both electricity generation and mining purposes. The information gathered forms a significant database. A site investigation, which included the drilling of three bore holes and the installation of piezometer tubes, was carried out as part of the landfill site selection process.

During the site investigation phase the geology of the site was assessed and detailed (Appendix C, Volume II).

The site is underlain predominantly by fan deposits, alluvial deposits and bedrock.

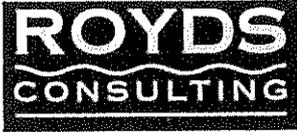
Fan deposits form the head of the site and comprise angular schist fragments in a sandy silt matrix. These deposits are approximately 10m thick and overly alluvium.

Alluvial deposits comprise stratified fine to coarse gravels with sandy interbeds and some silt. The deposits directly overlay bedrock. The thickness of the deposits (and hence depth to bedrock) varies across the site from approximately 10m at the north western and south eastern boundaries, to greater than 15m in the centre of the site. This is probably due to the presence of a buried meander of the course of a previous Kawarau River eroded into the bedrock.

The predominant bedrock consists of light greenish grey quartz-rich schist darker grey finely laminated mica-rich schist and green schist. Bedrock depth is variable.

The bedrock is completely deformed by folding and faulting of various ages. Schistosity dips mainly between east and southeast at angles between 50° and 70°. Sheared zones generally trend N-S and are up to 20 metres wide, particularly in the mica-rich schists.

The Gentle Annie Fault Zone lies just to the northwest of the proposed landfill site.



The slopes surrounding the site area show no signs of instability within the bedrock, nor in the colluvium on the slopes above.

The main indirect hazard is considered to be from landslides in nearby parts of the Kawarau Valley which result in damming the river and in turn cause flooding of the site. Since there is no evidence of this having occurred in historical time, the risk is considered very low.

Seisomotectonic hazard was assessed as part of previous hydro-electric investigations. The major fault in the vicinity is the Gentle Annie fault zone, and although no active fault traces were identified it is potentially active in view of its relationship within the Cardrona-Nevis Fault System. The closest active trace, ca 4000 years ago, crosses the flats at Gibbston.

The maximum credible earthquake is estimated to be 7.4 generated on any of the faults within the Cardrona-Nevis fault system, with a probability of occurrence over the next 150 years judged to be between 2-11%.

There is no risk of settlement, owing to the lack of compressible geological material on the site.

5.3 Soils

Soils at the proposed landfill site are likely to be the semi-arid sandy loam soils common in Central Otago. This sandy loam would have developed from weathered schist material and debris, loess and alluvial deposits from the Kawarau River.

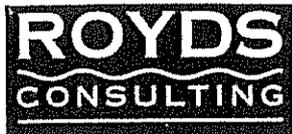
5.4 Wildlife

5.4.1 Terrestrial

The present environment has been significantly modified from that which existed prior to European settlement. The site is pastoral farmland presently utilised for the grazing of animals, predominantly sheep and cattle.

There is evidence that introduced pests, primarily rabbits, also inhabit the site and immediate vicinity.

Paradise ducks and pied oyster catchers have been observed on a pond about 300m south west of the proposed site.



5.4.2 Aquatic

Aquatic wildlife inhabit the nearby surface waterways. The Kawarau River maintains stocks of both trout and salmon.

5.5 Vegetation

The site is covered with grassland, tussock and sparse hardy woody scrub. The scrub consists of matagouri and rosehip.

There are exotic trees on the Victoria Flats, primarily conifers. These are located at the site of an old pub beside Victoria Bridge and associated old mining areas. An extensive stand of sycamores along the riverbank is also evident near the bridge.

5.6 Climate

The following data from the two nearest climate stations, as summarised by the New Zealand Meteorological Service, provide a good indication of the climatic conditions at the proposed Victoria Flats landfill.

Queenstown Airport (I58074)

Average rainfall is 681mm per annum, ranging from 362mm per annum to 1006mm per annum. This consists, on average, of 92 rain days (over 1mm) per annum spread relatively consistently throughout the year.

Temperature has ranged from -9.0°C to 32°C with the annual average being 9.7°C. The average daily temperature range is in the order of 10°C.

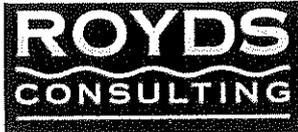
Also, on average there are 79 air frost days per annum and 6.3 days of snow per annum.

Cromwell (I59021)

Average rainfall is 401mm per annum, ranging from 274mm per annum to 542mm per annum. This consists, on average, of 68 rain days (over 1mm) per annum spread relatively consistently throughout the year.

Temperature has ranged from -9.6°C to 36.6°C with the annual average being 10.8°C. The average daily temperature range is in the order of 12°C.

Also, on average there are 87.6 air frost days per annum and 3.4 days of snow per annum.



In summary, given the location in the Kawarau River Valley between Queenstown and Cromwell, the site's climate is likely to be between those of the two climate stations. Thus the Victoria Flats site is expected to have a low rainfall and to experience the extremes of seasonal temperatures, ie. hot summers and cold winters.

5.7 Hydrogeology

A hydrogeological assessment of the proposed site was undertaken as part of the landfill site selection process. This assessment is included in Appendix C, Volume II. The major groundwater body beneath the site occurs within the superficial alluvial deposits, and is partially supported by the underlying schist bedrock. The surface of this groundwater body has been shown by bore hole monitoring to normally lie at approximately 7.5 to 15m below ground level (Appendix N, Volume II).

Drill hole logs and seismic lines indicate three buried channels beneath the Victoria Flats. The landfill site overlies portions of two of these channels. These channels are infilled with alluvium and colluvium, and groundwater is present within these materials. Ground water depth monitoring in the western most channel indicates that groundwater flow in the in-fill will be contained within the channel. Groundwater depth monitoring in the central channel indicates that groundwater may flow both along the channel and over-top the channel and flow into the most easterly channel.

The average permeability of the alluvial deposits is calculated from the results of the site investigation to be approximately 5×10^{-3} m/s. The permeability of the underlying basement rock is likely to be extremely variable due to faulting, folding and jointing beneath the site. Rock of this type is reported to have a permeability in the range of 1×10^{-4} m/s and 1×10^{-8} m/s.

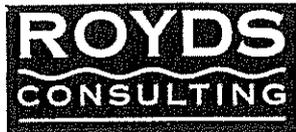
The theoretical average linear velocity of groundwater within the superficial deposits is 45m/day, assuming a hydraulic gradient normal to the bedrock surface.

Laboratory certificates from initial water quality tests of the groundwater resource are provided in Appendix M, Volume II.

5.8 Surface Water

A water race traverses the valley side to the south west. This water race provides irrigation water to the Victoria Flats area, including the area which is to be developed as a landfill. Otherwise the valley is dry, and has only one minor side gully entering it.

The Kawarau River flows through a gorge, approximately 40 metres below the Victoria Flats, from the north east around to the south east of the proposed landfill site. The south eastern boundary of the proposed landfill site will be the closest boundary to the river at approximately 120 metres in a linear direction.



A draft Water Conservation Order on the Kawarau River recognises many of its outstanding features amongst which are its wild and scenic character and a rugged river gorge in a broader schistose landscape. The river itself is also known for its fast flowing white water and rapids.

Under the Consultative draft of the Otago Regional Council's Regional Plan: Water, the proposed water classification for the Kawarau River is to provide for secondary contact recreation.

There are no watercourses in the area capable of flooding the site completely. The only transient water course is a minor gully entering the head of the proposed site.

The Kawarau River is most unlikely to flood the site given its location 40m below the proposed landfill. Refer to 5.2 Geology.

5.9 Social

The site has been fully evaluated for potential hydro-electric generation as part of the investigations into Upper Clutha hydro developments.

Social "interaction" with the landscape of the proposed site is, for most people, visual as they drive through the Kawarau Gorge along SH 6. There are two locations where the site is visible - one is to the east of the site from across the river and the other is to the west as the highway crosses an outwash fan midway across the terrace between the Nevis Bluff and the Victoria Bridge. The general scenic effect of the whole area is highly dramatic.

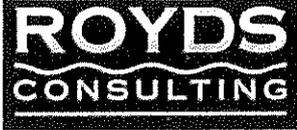
There are no houses or other developments in close proximity, at present. The nearest house is 1km away over a hill ridge but generally there are no dwellings within 3km.

5.10 Infrastructure

Access to the site is provided by SH 6 from which an access road will be formed to provide access to the proposed landfill. In addition the existing legal road will be realigned to provide access to the freehold section to the west of the site.

Although no water is supplied to the site specifically, water can be sourced from either the existing water race or a bore.

No power is presently provided at the site.



5.11 Historical and Cultural Values

There is no evidence that the area was used historically by Maori (Appendix D, Volume II). Given the sites arid nature, it would have been relatively unattractive to Maori.

The Victoria Bridge itself, has long been a crossing point of the Kawarau River and a staging point for travellers. Historically, a hotel was located near the bridge. The hotel no longer exists.

The Victoria Flats area has been extensively investigated for mining during New Zealand's European history. No commercial quantities have ever been removed.

6. Potential Environmental Effects and Measures for Mitigation, Remediation and Avoidance

6.1 Wildlife

6.1.1 Terrestrial

Solid waste disposal sites can attract birds, especially seagulls, and vermin due to the potential food source they can provide.

Birds enmassed at a landfill site can also be a danger to aircraft near airports and can cause nuisance and damage to neighbouring properties from noise, fouling and scavenging crops.

Queenstown airport is approximately 27km away from the proposed Victoria Flats landfill site. Given this distance birds in the flight path are unlikely to be a problem. (Correspondence with Civil Aviation Authority - Appendix H, Volume II).

Vermin utilise waste disposal sites as a food source. Also, vermin can burrow readily into uncompacted wastes.

Through appropriate management of a landfill site operation it is possible to significantly reduce the potential adverse effects of birds and vermin. These measures are outlined in the Landfill Development and Management Plan, and include:

- compacting all waste and covering daily
- minimising the working face of the landfill.

Nevertheless, if the proposed operation does attract birds and vermin, measures will be implemented to eliminate them.

6.1.2 Aquatic

Leachate contamination of surrounding surface water from a landfill operation could theoretically occur. However, the proposed sanitary landfill will be lined and leachate will be collected, treated and disposed of to land within the site boundary.

No natural surface water courses exist within the site boundary.

For these reasons, leachate contamination of surface water and thus potential adverse effects on aquatic wildlife should not occur.

6.2 Vegetation

The present vegetation, predominantly pasture interspersed with scrubby woody shrubs, will be stripped as a part of the landfill operation. Pasture will be re-established on areas of landfill at both intermediate and final development stages.

Returning the landfill cover to pasture will not adversely affect the site in the longer term as it is consistent with the area's present vegetation.

The Otago Conservancy of the Department of Conservation support the proposed location at Victoria Flats in principle (Appendix G, Volume II).

In addition, a requirement of the land purchase agreement is that the perimeter of the site be planted with screening trees. The trees are to be evergreen such as native beech, Douglas Firs or gums (Appendix E, Volume II).

6.3 Hydrogeology

Pollution of groundwater by leachate or contaminated storm water is a potential effect of any waste disposal site. However, a fundamental feature of this proposed sanitary landfill is that the leachate control will include full lining to collect the leachate and the treatment of the leachate on site.

The liner will be either a low permeability natural material or an artificial membrane or a combination of both.

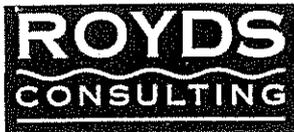
Owing to the lining and leachate management on site, it is expected that the operation of the Victoria Flats landfill will not have an adverse effect on groundwater. This will be confirmed using a groundwater monitoring programme. Bores upstream and downstream of the landfill will facilitate sampling of the groundwater.

The landfill lining system will extend up the hillside to the level of the water race to ensure that water soaking out of the water race does not enter the landfill. An overflow drain and vehicle access alongside the water race will be provided.

Details of the leachate control system are given in Volume III.

6.4 Seismic Activity

The amount of disturbance caused by an earthquake is not necessarily dependent on the earthquake 'magnitude' alone.



The amount of disturbance experienced at any location will be a function of:

- the earthquake magnitude
- distance from the earthquake source
- the geological materials between the source and the locality in question
- and the geotechnical properties at the locality itself.

It is estimated that significant distortion of the final (waste filled) landfill at Victoria Flats would require an earthquake of intensity IX, which has an estimated return period of roughly 2,000 years.

Significant distortion of an exposed lining system (not protected by waste) might result from an intensity VIII earthquake, with an estimated return period of 400 years. It is noted that the lining systems are only likely to be exposed for short periods, during the construction phase, and can be readily repaired should earthquake damage occur during this phase.

The range of effects on a landfill which might be experienced at different earthquake intensities is given in the table below.

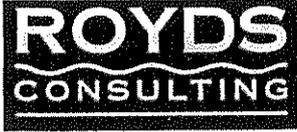
Intensity	Mean Return Period ¹	Effects on Integrity of Landfill ²
VII	c 100 years	Little or no effect on final landfill. Some disturbance of exposed liner material during construction phase.
VIII	c 400 years	Minor distortion of final landfill. Little structural effects. Significant distortion and some damage to exposed liner in construction phase.
IX	c 2,000 years	Some distortion of final landfill. Possible slope failure of capping in steeper batters, possible damage to leachate collection drains. Significant damage to exposed liner in construction phase.
X	> 3,500 years	Damage of final landfill. Slope failures of capping layer, some damage to leachate collection drains. Severe damage to exposed liner in construction phase.

It is considered that the development of a sanitary landfill at the site will not create unreachable potential effects in the unlikely event of a major earthquake during the course of its operational and pressure life's.

It is noted that the landfill will stabilise with time following closure and the potential for adverse effects from leachate liner rupture will reduce with time.

¹ Taken from Smith and Berryman, 1992

² Adapted from Modified Mercalli Intensity Scale, 1992



It is further noted that it is proposed to develop the landfill liner on modules with an isolated leachate collection system serving each module. This will be a safety feature for leachate control. Details are provided in Volume III.

6.5 Hydrology

6.5.1 Surface Water

There are no permanent water courses running through the site.

It is noted that the site with generally coarse, non-cohesive soils and the shallow slopes is not prone to subsurface erosion. However, surface water runoff diverted around the landfill will be contained in grassed swales so as to minimise concentration storm water runoff.

A water race contours along the hillside on the western boundary of the site. This race will not be affected by the landfill operation as it will remain up-gradient and outside of the site.

The landfill lining system will extend up the hillside to the level of the water race to ensure that water soaking out of the water race does not enter the landfill. An overflow drain and vehicle access alongside the water race will be provided.

Any rainfall runoff from the open tipping face will be collected by the leachate control system, and treated as landfill leachate. Rainfall runoff from outside the site will be diverted around the site by drains and bunds.

Details of the leachate control system are given in Volume III.

6.5.2 Kawarau River

Only a catastrophic land failure and blockage of the river would result in flooding of the site, either from a bursting dam upstream or a backwater from a downstream dam.

The risk of such an event is very low (Appendix C1).

The consequences of flooding from a catastrophic event, such as a landslide blocking the river, would be to render the landfill unusable, the loss of some refuse from the active cell and the loss of leachate to a surface water. The districts waste would therefore have to be transferred out of the district.

The loss of leachate to a surface water is likely not to be detectable given the significant dilution that would occur.



In developing communities in geologically active areas, such as exist in the district, some risks are accepted.

It is considered that the development of a sanitary landfill at the site it will not create unreasonable potential effects in the unlikely event of flooding.

It is noted that the landfill will stabilise with time following closure and thus the potential for adverse effects from such an event will reduce towns zone potential.

6.6 Air Emissions

Air pollution can potentially be caused by solid waste management operations.

Pollution can be in the form of:

- odour
- dust
- landfill gas
- smoke from fires.

6.6.1 Odour and Dust

Odour discharge from solid waste decomposition can potentially result in an unpleasant smell to persons at or near the site. Also, dust can potentially be generated by heavy vehicle movement and exposed unconsolidated cover material.

The exclusion of the public from the landfill tipping face will greatly reduce the amount of odour and dust generated from the site because of the reduced area of exposed waste and earthworks.

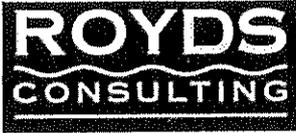
Daily coverage of wastes, with cover material, will prevent or limit nuisance from odours.

Areas of landfill that will not be used for filling within 12 months will be top-soiled and grassed.

The inclusion of a landfill buffer area around the site will also prevent incompatible land uses from locating in the area and which could be affected by odours and dust.

6.6.2 Landfill Gas

The use of onsite materials as final cover, the low filling rate and the arid climatic conditions should result in low quantities of gas being generated. The monitoring of the closed landfill at Cromwell, as reported in the monitoring reports submitted to the Otago Regional Council, provide evidence of low gas concentrations.



The quantity of solid waste to be disposed of at the site is small relative to major landfills in New Zealand. It would not be economic to recover landfill gas. An estimate of gas production is given in Volume III, Appendix E.

It is proposed to install a passive landfill gas control system. The landfill liner will prevent gas moving laterally away from the site. Gas that is generated will diffuse through the capping layers to the atmosphere.

The nearest residence is 1km away from the proposed site on the other side of a hill ridge. State Highway 6 is within approximately 300m of the proposed sanitary landfill site. The concentrations of landfill gas will be low and not detectable at this distance.

There will be no danger on the site but, as a precaution, naked flames and smoking will not be permitted. Special care will be taken to vent structures such as manholes and pumping stations associated with the leachate collection system.

The rate of landfill gas production will be relatively low on a site of this size and combined with the site's "remote" location, it is currently uneconomic to consider capture and utilisation of gas as an energy source.

6.6.3 Smoke

Although deliberate burning of waste will not be practised at this proposed landfill spontaneous combustion of waste in a landfill can occur.

The daily covering and compacting of waste will substantially reduce the risk as oxygen is eliminated from the system.

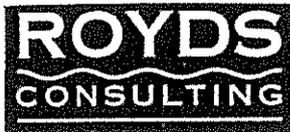
In case of fire, a water supply will be provided on site. The landfill development and management plan (Volume III) contains details of fire suppression and control.

6.7 Social

6.7.1 General

There is a perception by many people that a landfill, even a sanitary landfill, is a Locally Undesirable Land Use (LULU). However, it is also recognised that people produce waste and that proper management of solid waste is necessary for the general good of the environment.

Historic dumps, sadly, have had adverse effects on the surrounding environment. The effects of such uncontrolled dumping often included windblown litter, vermin, odour, loss of visual amenity and contamination of the surrounding land and water. People's knowledge of these older sites and



management often cloud their perception of what the reality of a sanitary landfill can be. If developed and managed properly, adverse environmental effects can be minimal.

The landfill buffer area will prevent incompatible land uses from locating within the vicinity of the proposed Victoria Flats landfill and thus being affected by it. The buffer area will not prevent compatible land uses from taking place in the area such as the grazing of stock. For this reason the QLDC does not seek to purchase the land subject to the buffer area designation. The extent of the buffer area will enable reasonable use to be made of the adjoining freehold property, described as Section 8 (Appendix I and L, Volume II).

6.7.2 Visual

A landscape values and effects study undertaken as part of investigation work explores the landscape issues. This report is available upon request.

The proposed landfill site is visible, briefly, from two points on State Highway 6.

Visual impacts to people will occur as a result of the landfilling operation itself and the modified new landform but the impact will reduce the site screening and management. In addition, the separation distance provided by the landfill buffer area is considered to be sufficient to minimise adverse effects.

Screening of the operation is proposed to be provided by three rows of screening plants on the site boundary as required by the land purchase agreement (Appendix E, Volume II). This will be complemented with bunding on the site boundary to shield the landfilling activity from public view.

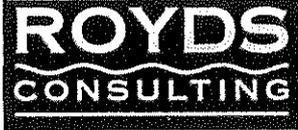
Over the life of the proposed landfill, a new landform will be created. This will have the finished appearance of a new terrace raised about 5 to 10 metres above the existing landform on the south-western side of the valley floor.

The visual impacts of the access road will be minimal as only that portion of the road near the highway will be visible. Also given the level nature of the land over which the road will be constructed, no significant cuts and fill will be formed.

6.7.3 Noise

Noise will arise from traffic entering and leaving the site, the on-site operations, and during the construction and development of the site.

There will be no general public access to the site and, as a result, vehicle movements are likely to be an estimated 30 transfer vehicles per week on average and peaking at times to 60 transfer vehicles per week. In addition site personnel will generate some traffic.



The proposed site will be laid out and activities will be conducted in a manner to control noise levels. The landfill buffer area will also assist in reducing the perception of noise. These requirements are outlined in the Development and Management Plan, Volume III.

6.8 Cultural and Historical Values

The site has been investigated on behalf of Ngai Tahu for areas of cultural or spiritual significance and nothing matching the criteria of the Historic Places Act was found (Appendix D, Volume II).

In addition, Te Runanga Otakou have no concerns about the proposed landfill site (Appendix J, Volume II).

6.9 Infrastructure

6.9.1 Access

The existing access to the site does not meet Transit New Zealand standards for safe access (Appendix K, Volume II). Accordingly a new access road is proposed and is included in the notice of requirement for the proposed Victoria Flats sanitary landfill.

The proposed new access road will be located in a position which maximises visibility along both directions of the State Highway 6. Visibility is 450m to the east (Cromwell) and 600m to the west (Queenstown). The new intersection to be formed will be built to Transit New Zealand standards in conformity with the attached plan (Appendix K, Volume II).

Visibility from:

- the existing formed road is:
 - 500m east
 - 300m west
- the legal road, 550m from the formed road is:
 - 170m east
 - 400m west

Construction of new legal road will therefore significantly improve traffic safety and provided an access which complies with the Transit New Zealand standards for visibility at intersections. The entering sight distance of 250m or an 85 percentile approach speed of 100km/hr.

It is anticipated that there will be 30 transfer vehicle movements per week on average to the proposed landfill site, peaking at 60 vehicles at times. The landfill will not be open for use by the public, rather public transfer facilities will be strategically located within the district. Vehicle trips generated by the private property to the rear (Section 32) are not expected to be significant. At this level of use the proposed road will not effect the safe and efficient operation of the State Highway.

7. Alternatives

A sanitary landfill for the Queenstown Lakes District is an essential component of any solid waste management system. A landfill is able to accommodate 100% of the total waste stream subject to the appropriate siting, leachate control and landfill gas control. Also, at present, a landfill is the most cost-effective disposal option compared with the alternatives. For example, it is estimated that incineration, neutralisation or composting/biodigestion would be 4 to 10 times more expensive. These alternative disposal options would not dispose of the total waste stream (up to 40% for some of these alternatives) and a landfill would still be required.

The sanitary landfill site selection process is set out in Section 3.3.1 of this report. Details of alternative sites considered, and the reasons for rejection of these sites and adoption of the Victoria Flats site as the preferred option are outlined in this section.

Having chosen the preferred landfill site, Victoria Flats, through the process of public consultation, there were then a number of design alternatives to consider, particularly with regard to leachate control. These alternatives include:

(i) Do Nothing Option

This option was rejected for obvious reasons, particularly the need to control and minimise adverse effects and also the legal obligations under the RMA.

(ii) Part Liner/Formal Monitoring Programme

This option can be a cost effective solution to leachate control. However, this alternative relies on the natural impermeability of the bedrock underlying a site being high.

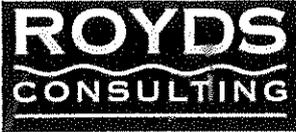
Given the permeable nature of the gravel and schist bedrock underlying the proposed Victoria Flats site, this option was not considered further.

(iii) Full Liner Option

This option can be high cost as it involves:

- Benching the site to form a foundation for a leachate collection system
- Installing a low permeability layer (eg. clay or HPDE) on the founding soils.
- Placing of a high permeability layer of granular material on the low permeability layer to form a leachate collection system. This layer will be augmented by a "herring bone" arrangement of perforated piping connected to a central length of perforated drain running the length of the site.

Leachate would flow through the high permeability layer above the liner and collect within a sump located at the lowest part of the site. If necessary, leachate can be pumped from here to a treatment area.



Although costly, a fully lined sanitary landfill is the option proposed for the Victoria Flats landfill. The nature of the strata underlying the site means that such a system is necessary in order to adequately control and minimise adverse effects while meeting the legal obligations of the RMA.

- Otago Regional Council
- Arrowtown and District Residents Association
- Glenorchy Community Association
- Hawea Development Association Inc
- Kelvin Peninsula Community Association
- Luggate Community Association
- Makarora Township and Water Supply Inc
- Makarora Community Association
- Albert Town Community Association
- Arthurs Point Community Association
- Kingston Community Association
- Fernhill/Sunshine Bay Ratepayers Association
- Glenorchy Branch of Federated Farmers
- Mid Wakatipu Ratepayers Association
- Ngai Tahu Maori Trust Board
- Wakatipu Advisory Group
- Wakatipu Basin Tip Contractor and the Collection Contractor
- Wanaka Basin Tip Contractor and the Collection Contractor
- Queenstown Lakes District Councillors
- Plus other interested individuals.

In addition, the following iwi organisations have been contacted specifically for their comment on the solid waste strategy:

- Iwi Liaison Officer, Otago Regional Council
- Kati Huirapa Runanga
- Te Runanga Otakou (Appendix J, Volume II)
- Te Runanga Hokonui
- Te Runanga Oraka

The following site concerns were raised by the public on the Victoria Flats landfill site as a result of the public questionnaire.



8. Consultation

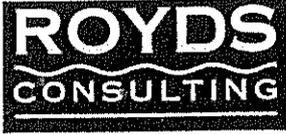
The proposed Victoria Flats sanitary landfill has been considered by the wider community as an integral component of the development of the District's Solid Waste Management Strategy. The Council's solid waste management project has involved community consultation throughout.

A summary of public consultation activities include:

- Public meetings, Queenstown and Wanaka, 2 November 1992
- Newsletter No. 1, October 1992
- Information package No. 1 to the Community Liaison Group
- Community Liaison Group meeting, 20 November 1992
- Progress report (identifying possible landfill sites) sent to Liaison Group members, 7 December 1992
- Community Liaison Group meeting, 14 December 1992 (workshop session)
- Contact and consultation with owners of preferred alternative landfill sites, April/May 1993
- Newsletter No. 2, July 1993 (separate, Queenstown and Wanaka editions including a questionnaire)
- Summary and recommendation report forwarded to Community Liaison Group members (Appendix A)
- Letter to Community Liaison Group members advising what decisions the QLDC plan to make
- Public meeting, Queenstown, 27 July 1994
- Public meetings, Queenstown and Wanaka, 7 and 8 September 1994.

Community Liaison Group membership consists of the following organisations:

- Otago Area Health Board
- Southland Area Health Board
- Ministry for the Environment
- Department of Conservation (Queenstown and Wanaka)
- Fish and Game Council
- Federated Farmers Upper Clutha Branch
- New Zealand Fruit Growers Federation
- Royal Forest and Bird Protection Society
- Maruia Society
- Chamber of Commerce
- Wakatipu Environmental Society



9. Monitoring

Monitoring is a necessary tool to ensure that the operation of the landfill is appropriately managed and to identify any indications of adverse effects on the environment.

Proposed monitoring requirements are outlined in Section 5.7 of the Victoria Flats Landfill Development and Management Plan. These requirements are outlined in this section.

9.1 Solid Waste

Quantities of solid waste received at the site will be monitored by annual topographical surveys and recording the number of transfer loads from transfer stations.

The Council also plans to install a weigh bridge. Solid waste quantities will be monitored in terms of weight and delivery patterns.

The site operator will monitor broad composition characteristics of the solid waste by appropriate observation. This will be recorded on a three monthly basis. Periodically a full waste analysis will also be undertaken.

9.2 Cover Material

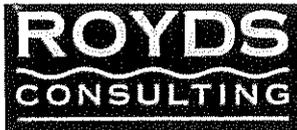
Quantities and location of cover material placed will be recorded.

9.3 Leachate

Quantities and qualities of leachate and dirty stormwater will be monitored regularly prior to discharge via surface irrigation within the site.

9.4 Landfill Gas

The leachate collection system, bores, and the gas venting system will be monitored regularly for the presence of gas using a gas sensor and analyser.



Victoria Flats Site Concerns

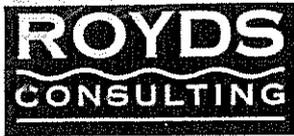
Area of Development (too close)	2
Too far from Queenstown	44
Leaching into River/Water Supplies	8
Litter from Transport to tip/illegal dumping	9
Too small	1
Too close to river	3
People will think it is too distant	1
Urban encroachment on rural land	1
Fires	1
Aesthetics	2

All these issues, as far as practicable and where relevant, have been addressed in the landfill site design.

As adjoining landowners and present owner of the site, the Lakes District Trust Limited have been consulted about the proposal. The Lakes District Trust Limited has agreed for the QLDC to purchase the site for the proposed landfill operation (Appendix E, Volume II) and they have no outstanding concerns about the buffer zone.

Mr Chalmers, the landowner of Section 8 which adjoins the landfill buffer zone has been consulted with concerning the proposed landfill (Appendix L, Volume II).

In addition, the Department of Conservation, the Civil Aviation Authority and Transit New Zealand Ltd have been consulted with concerning the proposed landfill (Appendices G, H and K, Volume II).



References

Royds Consulting Ltd and Riddolls Consultants Ltd (March 1994) *Solid Waste Management Project - Stages 3 and 4 - Landfill Site Investigations*, Report to the Queenstown Lakes District Council.

Royds Consulting Ltd (April 1994) *Solid Waste Management Project - Stage 3 - Solid Waste Management Strategy Review*, Report to the Queenstown Lakes District Council.

Royds Consulting Ltd (October 1996) *Victoria Bridge Landfill - Comparison with an Alternative*, Report to the Queenstown Lakes District Council.

Royds Garden Ltd (December 1992) *Alternative Landfill Sites and Waste Management Strategy*, Report to the Queenstown Lakes District Council.

Royds Garden Ltd (March 1993) *Alternative Landfill Sites*, Report to the Queenstown Lakes District Council.

Royds Garden Ltd (March 1993) *Development of a Waste Management Strategy*, Report to the Queenstown Lakes District Council.

McIntosh P D (1992) *Soils for Horticulture in Central Otago*, Landcare Research. New Zealand.

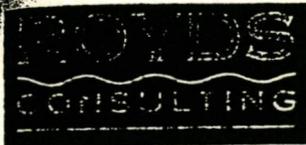
New Zealand Meteorological Service (1983) *Summaries of Climatological Observations to 1980*, New Zealand Meteorological Service Miscellaneous Publication 177, Government Printer, Wellington.

Transit New Zealand (1994) *Planning for a Safe and Efficient State Highway Network under the Resource Management Act 1991*.

Appendix 3

RM970116 AEE, Appendix B, Provisional Staged Management Plan Drawings

Appendix B: Provisional Staged Management Plan Drawings



1. Landfill Development

1.1 Development Stages

Two development stages are proposed as:

- Stage 1 to fill the existing natural gully at the west side of the site
- Stage 2 to raise the whole site in a series of phases.

It is emphasised that the time scales provided on the associated drawings are strictly indicative and are based on an average between the waste quantities given in the Solid Waste Management Strategy Review (1994) and reported filling rates at Tucker Beach landfill.

1.2 Operational Phases

Each stage will be developed in a series of phases.

- Drawing 47186.01 Sheets 10 to 13 show development phases during Stage 1
- Drawing 47186.01 Sheets 20 to 23 show development phases during Stage 2.

2. Stage 1

Stage 1 will be developed as outlined below. At any one time the fenced off area will be in the order of 5 to 6 hectares.

2.1 Phase 1

- access road formed
- fence installed
- top soil stripped and stockpiled for cover
- landscaping bund formed on southern boundary of operational area
- landfill liner installed
- leachate ponds and other leachate facilities constructed
- operators building and weighbridge installed
- filling starts

2.2 Phase 2

- fence installed
- top soil stripped and stockpiled for cover
- landfill liner installed
- filling starts
- pasture reinstated on Phase 1 area

2.3 Phase III

- fence installed
- top soil stripped and stockpiled for cover
- landfill liner installed
- filling starts
- pasture reinstated on Phase 2 area

2.4 Phase IV

- fence installed
- top soil stripped and stockpiled for cover
- landscaping mound formed at northern end of operational area
- landfill liner installed
- filling starts
- pasture reinstated on Phase 3 area
- stockpiling of cover material for Stage 2 Phases 1 and 2.

3. Stage 2

Stage 2 will be developed as outlined below.

3.1 Phase 1

- fence installed
- top soil stripped and stockpiled for cover
- landscaping bund formed on southern and eastern boundaries of operational area
- filling starts
- reinstate pasture on Stage 1 Phase 4 area.

3.2 Phase 2

- fence installed
- top soil stripped and stockpiled for cover
- landscaping bund formed on northern and eastern boundaries of operational area
- filling starts
- pasture reinstated on Phase 2 area
- relocate operators building and weighbridge (note access to ponds will be provided by vehicle track around inside of boundary).

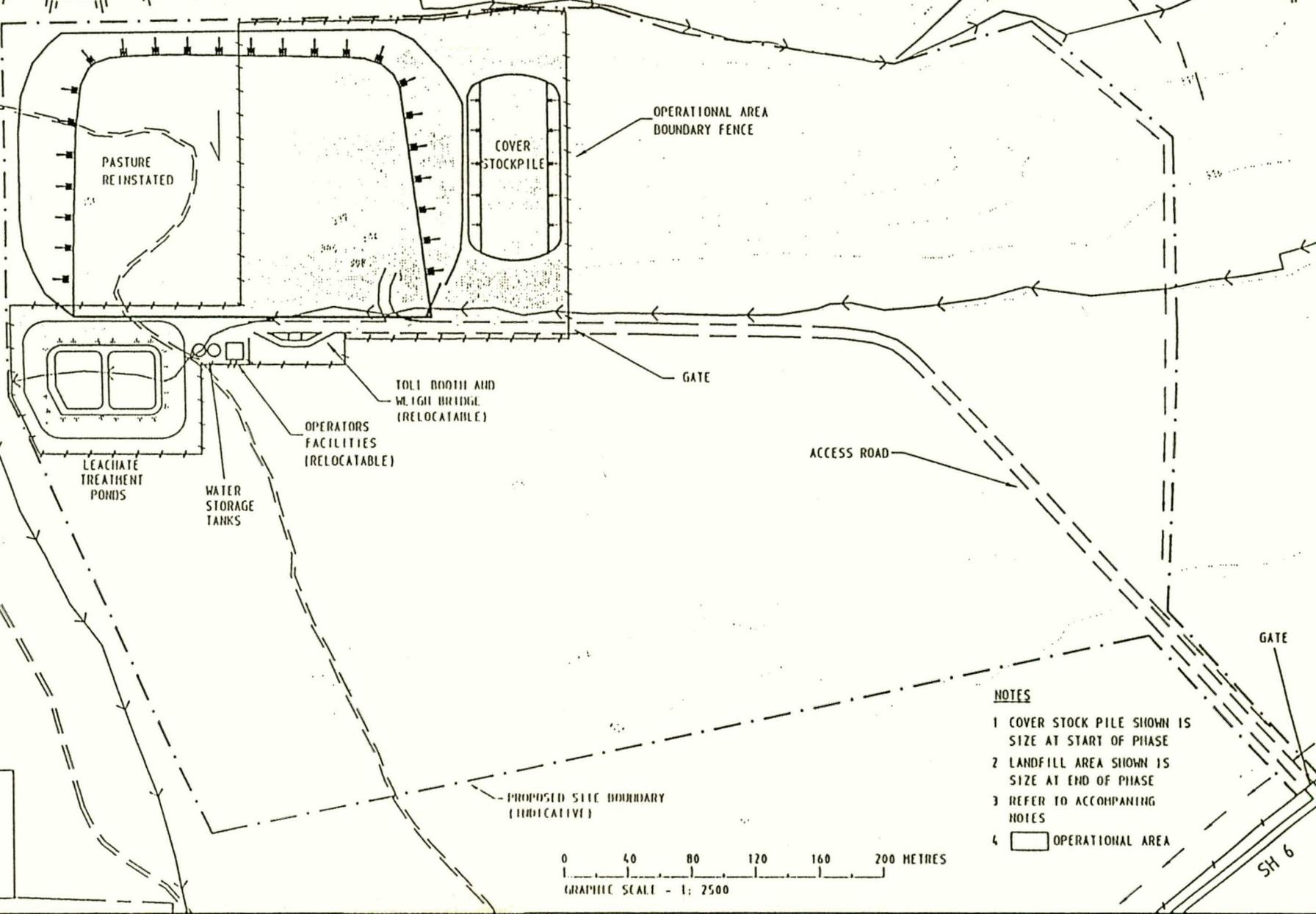
3.3 Phase III

- fence installed
- top soil stripped and stockpiled for cover
- landscaping bund formed on southern and eastern boundaries of operational area
- landfill liner installed
- filling starts
- pasture reinstated on Phase 2 area

3.4 Phase IV

- fence installed
- top soil stripped and stockpiled for cover
- landscaping mound formed on eastern and northern boundaries of operational area
- landfill liner installed
- filling starts
- pasture reinstated on Phase 3 area.

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 - 2 LANDFILL AREA SHOWN IS SIZE AT END OF PHASE
 - 3 REFER TO ACCOMPANYING NOTES
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			KPH	7/96	

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QUEENSTOWN LAKES DISTRICT COUNCIL
 VICTORIA BRIDGE LANDFILL SITE
 CONCEPTUAL OPERATIONS PLAN
 STAGE 1 - PHASE 2 - YEARS 8 TO 15

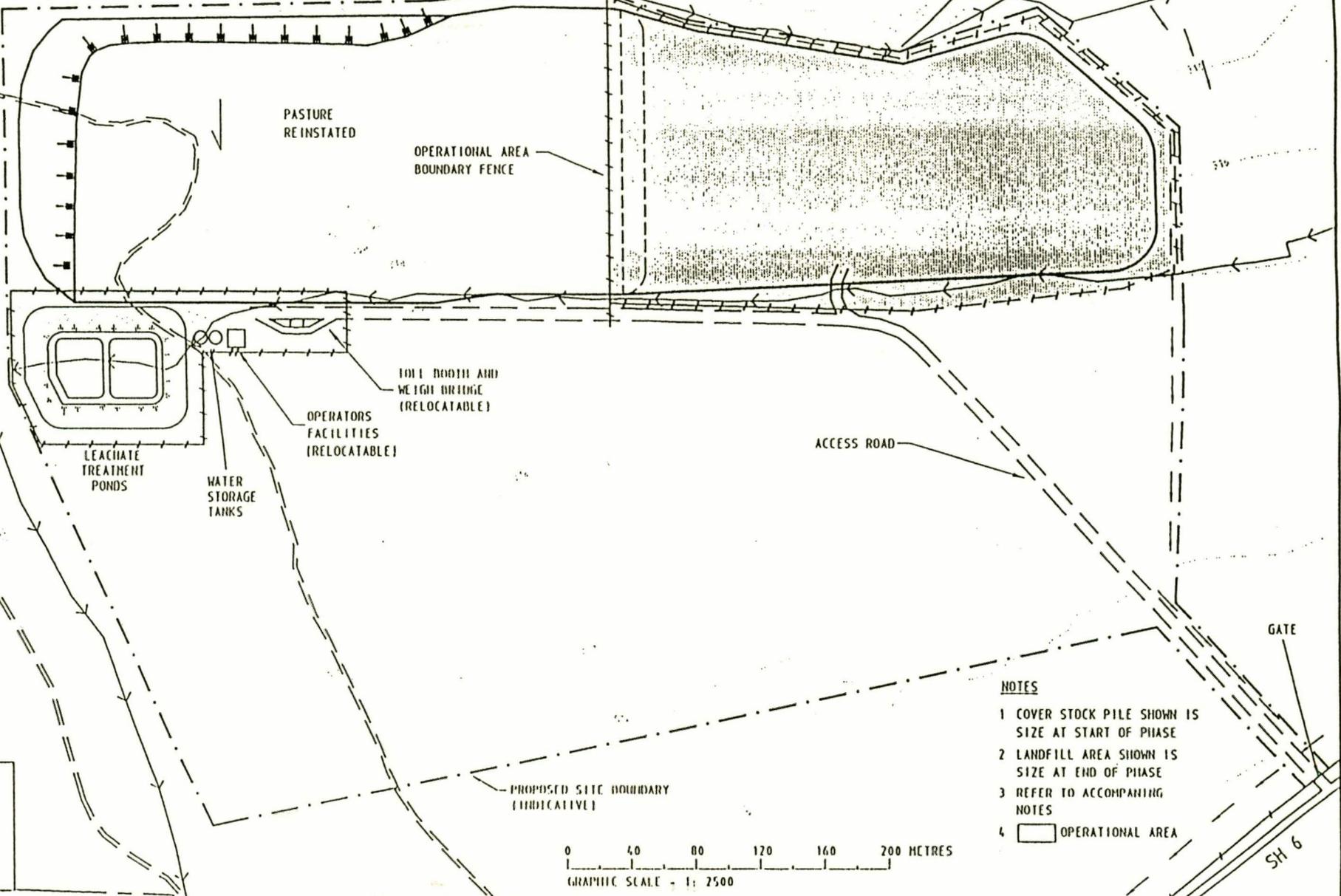
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	DRAIN OR BUND/DRAIN
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- NOTES**
- 1 COVER STOCK PILE SHOWN IS SIZE AT START OF PHASE
 - 2 LANDFILL AREA SHOWN IS SIZE AT END OF PHASE
 - 3 REFER TO ACCOMPANYING NOTES
 - 4 OPERATIONAL AREA

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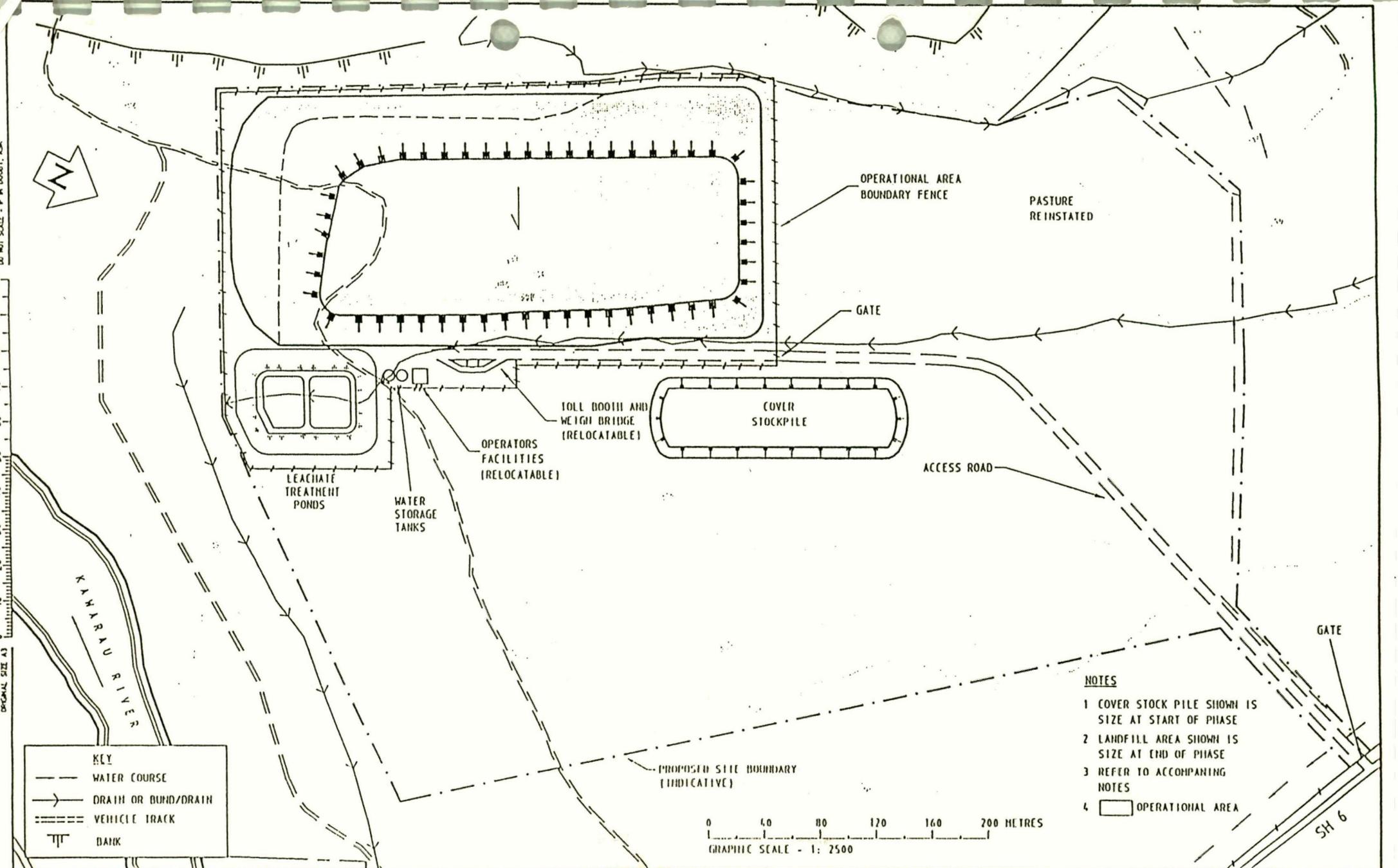
QUEENSTOWN LAKES DISTRICT COUNCIL
VICTORIA BRIDGE LANDFILL SITE
CONCEPTUAL OPERATIONS PLAN
STAGE 4 - PHASE 4 - YEARS 23 TO 29

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Date Stamp	47186.01	13	A

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	VEHICLE TRACK
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- NOTES**
- 1 COVER STOCK PILE SHOWN IS SIZE AT START OF PHASE
 - 2 LANDFILL AREA SHOWN IS SIZE AT END OF PHASE
 - 3 REFER TO ACCOMPANYING NOTES
 - 4 OPERATIONAL AREA

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QUEENSTOWN LAKES DISTRICT COUNCIL
VICTORIA BRIDGE LANDFILL SITE
CONCEPTUAL OPERATIONS PLAN
STAGE 2 - PHASE 1 - YEARS 30-40

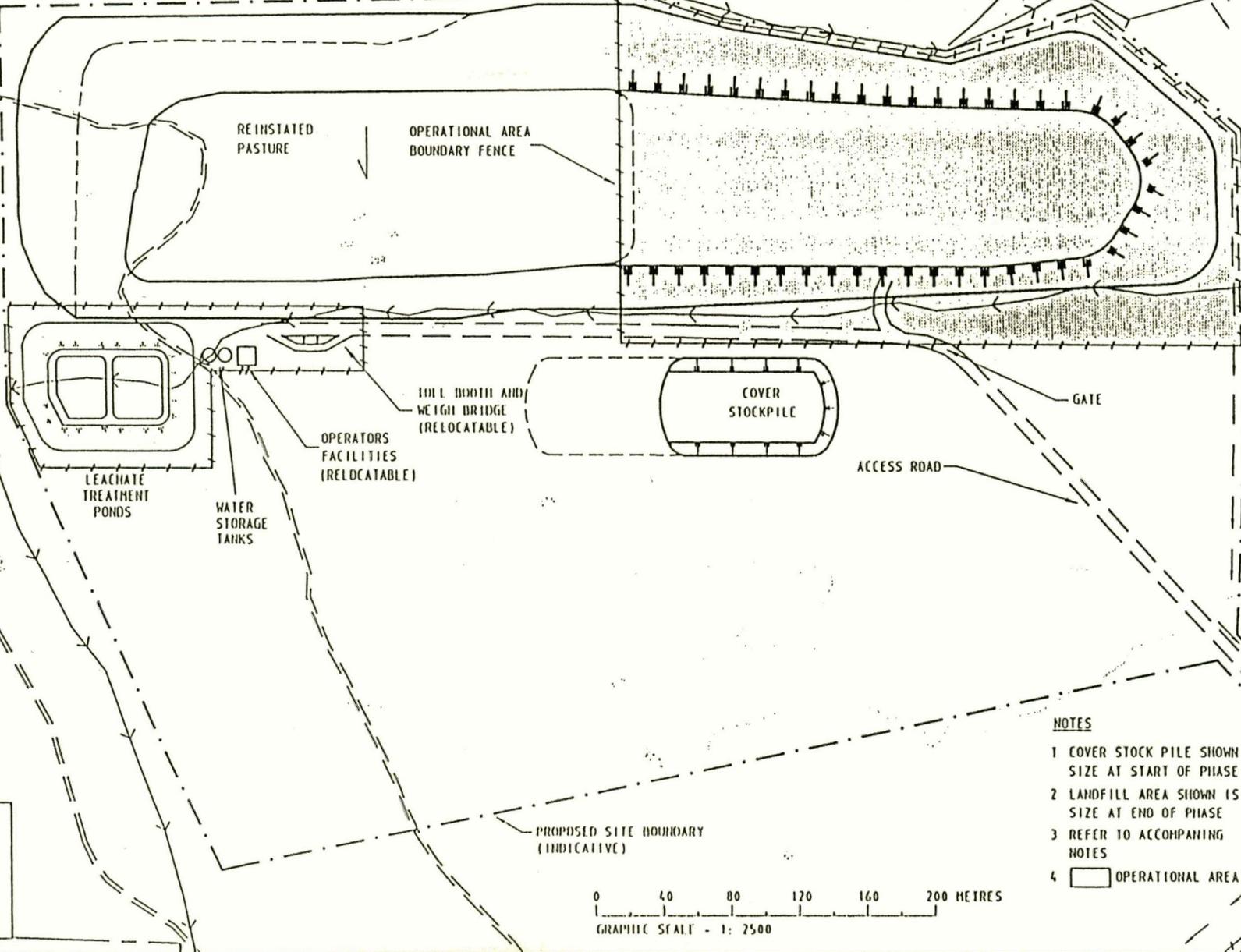
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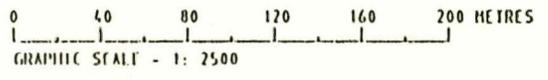


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	WATER COURSE
	DRAIN OR BUND/DRAIN
	VEHICLE TRACK
	BANK



- NOTES**
- 1 COVER STOCK PILE SHOWN IS SIZE AT START OF PHASE
 - 2 LANDFILL AREA SHOWN IS SIZE AT END OF PHASE
 - 3 REFER TO ACCOMPANYING NOTES
 - 4 OPERATIONAL AREA



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XRefs : X104-001	NAME	FIELDBOOK
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		APPROVED

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		JIC 7/96
		KMB 7/96
		APPROVED

ROYDS CONSULTING
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ENVIRONMENTAL & ENVIRONMENTAL SYSTEMS DIVISION

QUEENSTOWN LAKES DISTRICT COUNCIL
VICTORIA BRIDGE LANDFILL SITE
CONCEPTUAL OPERATIONS PLAN
STAGE 2 - PHASE 2 - YEARS 40-50

State Stamp	Job No.	Sheet No.	Rev.
	47186.01	21	A

Appendix 4

Acoustic Points of Measurement



Shotover Design Limited trading as
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 Licensed Cadastral Surveyors - Land Development - Planning Consultants
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 Tel. (03)441-6044, Fax (03)442-1066, Email admin@cfma.co.nz
 Shop 2, Otago House, 475 Moray Place, P.O. Box 5960
 Tel. (03)470-1582, Fax (03)470-1583, Email admin@cfma.co.nz

Rev.	Date	Revision Details	By

**POINTS OF ACOUSTIC MEASUREMENT
 VICTORIA FLATS, GIBBSTION**

Client	CCC	Surveyed	Date	Checked	Job No.	Drawing No.
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Designed		Date		Checked		1:500 @ A1 1:1 @ A3
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