5 April 2023

Gerry Essenberg
Clutha District Council
1 Rosebank Terrace
Balclutha, 9230

6-CO082.00

Dear Gerry,

Mt Cooee Landfill Development Plan – Sheet Pile Cut-off Wall Review Report (Final Issue)

1 Introduction

WSP has been commissioned by the Clutha District Council (CDC) to provide engineering services for the resource consent renewal and expansion of the existing Mount Cooee Landfill (the 'Landfill') near Balclutha.

As part of this commission, WSP has recently carried out a deep geotechnical investigation consisting of machine boreholes to assess the nature and variability of ground and groundwater conditions across the site. In addition to this, WSP has reviewed the available information related to an existing sheet pile wall, which currently provides cut off for leachate from the landfill.

This letter presents a brief summary of the findings from the review of available information and provides recommendations for further assessments.

2 Reviewed Information

A summary of the sources of information cited to inform the properties of the sheet pile cut off wall is listed below.

- 'Mount Cooee Landfill – Management Plan: 2022', by Clutha District Council (CDC), dated August 2022.
- 'Contract No. 209: Development of the Mount Cooee Landfill Certificate of Payment No 2; Variations 209/8 and 209/9', by Royds Consulting Limited, dated 10 July 1995.
- Drawings titled 'Mt. Cooee Landfill Construction Details', For Tender Issue, dated March 1995.
- 'A Report of Site Investigations at the Mount Cooee Landfill' by Royds Consulting Limited, dated May 1994.

The reviewed information is presented in Attachment A of this letter.

3 State of Knowledge

A summary of the findings based on the review of available information is presented below.

WSP
Dunedin
197 Rattray Street
Dunedin 9016
New Zealand
+64 3 471 5500
wsp.com/

- The existing sheet pile cut off wall is approximately 46 m long, situated along the crest of a clay bund immediately to the north of the 'leachate storage' and 'stormwater retention' ponds at the south-western corner of the site. The wall was constructed circa 1995.

- Based on the review of records by Royds Consulting Limited, the sheet pile wall appears to have been constructed of a total of 115 sheet pile sections, each nominally 0.4m wide. The records indicate the wall was driven to refusal on top of weathered greywacke bedrock, with pile lengths ranging between 6 to 11 m along the wall.

- The records by Royds Consulting Limited suggest two machine boreholes (BH1 and BH2) and two Scala penetrometer tests were carried out close to the location of the wall. The wall refusal depths corresponded well against the bedrock depths encountered within the boreholes, though was found to be deeper compared to the refusal depths of the Scala penetrometer tests. A typical cross section of the bund and the cut off wall is presented in Figure 1 below.

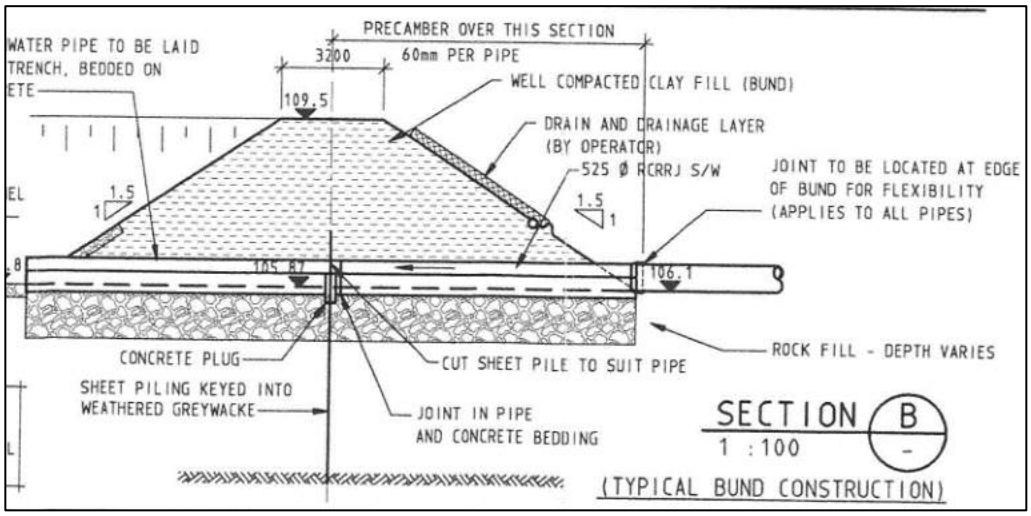

Figure 1: Typical bond construction detail (Courtesy of Royds Consulting, 1995)

- The historic drawings indicate the top of the cut off wall is likely in the order of 2m to 3m below the crest of the clay bund. A rock fill layer has been constructed within the footprint of the clay bund and behind the sheet pile wall, though its thickness has not been recorded on the drawings.

- A historic drawing with a schematic elevation of the cut off wall suggests the sheet pile wall is situated along the central section of the clay bund, where the bedrock is deepest at the valley floor (in the order of 10m or so). Instead of the sheet pile wall, it appears that an approximately 1.0m wide low permeability clay barrier was constructed along the clay bund beyond the two ends of the sheet pile wall, where bedrock becomes progressively shallower. An extract from the drawing is presented as Figures 2 and 3 below.

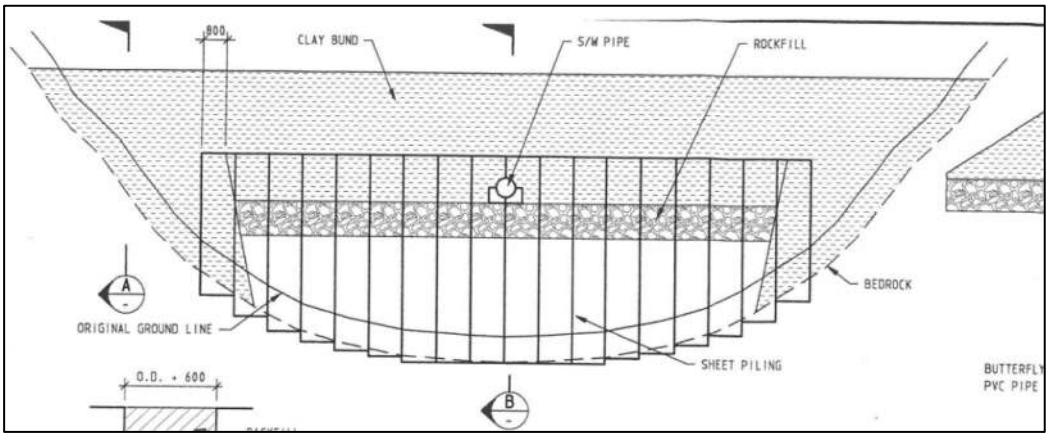

Figure 2: Schematic elevation of cut off wall (image courtesy of Royds Consulting 1995)

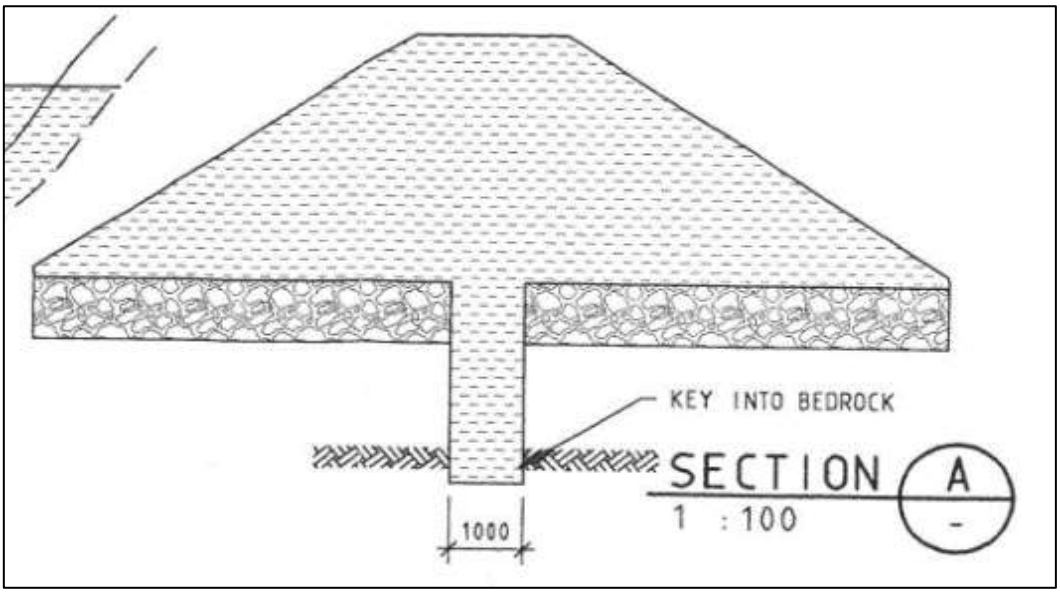

Figure 3: Detail of the clay barrier beyond the two ends of the sheet pile wall (image courtesy of Royds Consulting 1995)

- The drawings indicate a 525mm diameter stormwater culvert protrudes through the sheet pile wall. We understand the inlet to the culvert has recently been concreted to reduce the likelihood of stormwater adding to the leachate entering the Clutha River escaping through the cut-off wall.

  A new manhole and pump station to capture the leachate into the culvert has been installed to pump this into the leachate containment system. The sewer pump station is to be renewed. There are currently no details of how this culvert was sealed through the wall.
- An existing groundwater bore (GW2) is situated in the expected downgradient groundwater flow path from the cut-off wall. We understand the bore is regularly monitored for the presence of leachate and other contaminants. In addition to this, WSP has recently installed a new borehole (BH1) to the south of GW2 to collect further information regarding the presence of leachate.

- We understand the sheet pile has not been visually inspected and photographs from construction are not available. No materials testing has been carried out to determine the condition of the existing sheet piles. Given the sheet pile has been in ground for almost 28 years, it is likely that some corrosion loss of the steel section has occurred to date, though the degree of corrosion loss cannot be confirmed. Based on the recent investigation results, the soils above bedrock generally consist of alluvial deposits are not considered to be aggressive.

4 Recommendations

In the absence of physical testing of the sheet pile or more detailed construction records, the condition of the existing sheet pile wall cannot be quantitatively assessed.

On this basis, we recommend the suitability of the wall to contain leachate be qualitatively assessed through regular monitoring of the levels of contaminants in both GW2 and the recent BH01. Subject to the findings from the monitoring, it may be prudent to install further monitoring points along the wall, in particular beyond the ends of the wall where the low permeability clay barrier has been utilised to provide cut-off.

Given the cut off wall is embedded on top of the rock, the potential for leachate escape through weathered bedrock below the toe of the wall should be assessed through regular monitoring of the wells.

Prepared by:

Nima Taghipouran
Principal Geotechnical Engineer

Reviewed by:

Peter Askey
Principal Environmental Engineer

Approved for Release by:

Chris Fox
Project Director

Encl.
Attachment A – Available Information

ROYDS CONSULTING

26597

AAW 46831 08

10 July 1995

Clutha District Council
P O Box 25
BALCLUTHA

SC70/39
10239

Attention: **Mr Charles Hakkaart**

Dear Sir

Contract No. 209: Development of the Mount Cooee Landfill Certificate of Payment No 2; Variations 209/8 and 209/9

We enclose Certificate of Payment No 2 for your attention.

Also enclosed is a full set of Site Instructions and Variations issued to date and fully signed:

Nos 209/1-209/7 previously copied to you
Nos 209/8-209/9 now issued.

209/7: Item 3.2

This extra resulted from the need to place excavated material to waste in a similar manner to that specified for excavation for bund wall. This material was originally intended to be placed as fill. However, due to the winter weather conditions this wet material could not be dried for use as fill.

209/7: Item 3.3

Clause C.4.3 of the Specification provided for a variation in the depth of the rockfill, depending on the soil conditions at the foundation of the bund wall. This implies that the rockfill quantity is subject to remeasure on site. This remeasure certified a larger quantity of rockfill than was scheduled.

ENGINEERING & ENVIRONMENTAL CONSULTANTS
ROYDS CONSULTING LIMITED, 31 STAFFORD STREET.
PO BOX 4, DUNEDIN, NEW ZEALAND.
FACSIMILE 64-3-477-0616. TELEPHONE 64-3-477-0885.
CHRISTCHURCH, DUNEDIN, INVERCARGILL, BALCLUTHA, QUEENSTOWN, OAMARU, TIMARU, GREYMOUTH, BLENHEIM, NELSON, WELLINGTON, PALMERSTON NORTH, AUCKLAND.

ROYDS CONSULTING

209/8: Item 2.2

This is the most significant variation encountered on this contract. The additional area of sheet-piling has resulted from a deeper embedment of the sheetpiling into the weathered bedrock than was anticipated from the subsoil investigation. A copy of the Contractor's sheetpiling records is attached on which the predicted rock profile has been plotted. It shows that:

(a) at the positions of the boreholes, points 2 and 3, the rock profile was predicted with reasonable accuracy.

(b) at the positions of the scalar penetrometer probes, points 1 and 4, the actual level of competent rock was significantly lower than predicted. Excavations to rock at both extremities of the bund wall revealed 1½m to 2m of weathered greywacke which was removed with the excavator to ensure a seal between the bund wall and competent rock. It now appears that the scalar penetrometer, used for testing the depth to rock, met refusal at the upper layer of weathered greywacke. This additional sheetpile founding depth has significantly increased the area of sheetpile required

    (a) by the greater depth required

    (b) by the greater width required to enable the same depth of excavation for the bund wall to be achieved at both extremities of the sheetpiling.

We acknowledge the cost implications of this additional area of sheetpiling. However, we wish to confirm the quality of the cut off constructed structure. The sheetpile records indicate that a very good sheetpile/bedrock seal has been achieved. In addition, a tight interlock has been achieved between sheetpile sections. These results point to a very effective cut off for leachate.

We will submit a detailed estimate of the final cost of the contract.

Yours faithfully
ROYDS CONSULTING LTD

AA Wright

Per: Andy Wright

ROYDS CONSULTING

ENGINEERING & ENVIRONMENTAL CONSULTANTS
ROYDS CONSULTING LIMITED

PAYMENT CERTIFICATE

~~TAX INVOICE~~

TO Clutha District Council
P O Box 25, Balclutha

PROJECT NO. 46831.08

DATE 7 July 1995

CONTRACT PRICE (EX GST) $ 464,755

AUTHORISED VARIATIONS $

ADJUSTED CONTRACT PRICE $

CONTRACT No. 209: Development of the Mount Cooee Landfill

THIS IS TO CERTIFY THAT Progress Payment No.* 2 FOR WORK COMPLETED TO 30 June 1995

IS NOW DUE TO Contract Cultivation

OF P O Box 892, Dunedin ~~GST No.~~

AND IS ENTITLED TO PAYMENT OF $ 195,183.69 (INCLUDING GST) MADE UP AS FOLLOWS:

VALUE OF WORK COMPLETED TO DATE		$	278,645.58
LESS RETENTION	10 %	$	27,864.56
		$	250,781.02
OTHER ADJUSTMENTS (IF ANY)		$	0
SUB TOTAL		$	250,781.02

LESS PREVIOUS PAYMENTS (NOT INCLUDING GST)

NO. 1	$	77,284.41
NO. 2	$	
NO. 3	$	
NO. 4	$	
NO. 5	$	
NO. 6	$	
NO. 7	$	
NO. 8	$	
NO. 9	$	

NOTES/ATTACHMENTS:

- ~~THIS IS A BUYER CREATED INVOICE. NO SEPARATE TAX INVOICE WILL BE ISSUED BY THE CONTRACTOR.~~
- PLEASE CHECK THE PREVIOUS PAYMENTS.
- ALL QUANTITIES AND AMOUNTS DETAILED ON THIS CERTIFICATE AND ATTACHMENTS (IF ANY) ARE SUBJECT TO CHECK AND REVIEW BEFORE FINAL CERTIFICATE ISSUED.
- A COPY OF THIS CERTIFICATE HAS BEEN SENT TO THE CONTRACTOR.
- THE CONDITIONS OF CONTRACT REQUIRE THAT PAYMENT MUST BE MADE WITHIN 10 WORKING DAYS OF THE DATE OF THIS CERTIFICATE.
- CHEQUE TO BE MADE PAYABLE TO THE CONTRACTOR, AND SENT DIRECT.

PREVIOUS PAYMENTS TOTAL	$	77,284.41
AMOUNT CERTIFIED	$	173,496.61
+ GST @ 12.5 %	$	21,687.08
AMOUNT NOW PAYABLE TO	$	195,183.69
Contractor		

* DELETE IF NOT APPLICABLE

A C Wright
ENGINEER TO THE CONTRACT
P.P. ROYDS CONSULTING LIMITED

ROYDS CONSULTING LTD.

Action		Info
	- 6 JUL 1995	
	RECEIVED	

TO: ROYDS CONSULTING Attn: ANDY
P.O. Box 4
DUNEDIN
Attn: Andy Wright

BUDGET PRINT LTD DUNEDIN

CONTRACT CULTIVATION LTD
21 DONALD STREET, P.O. BOX 892
KAIKORAI VALLEY, DUNEDIN
TELEPHONE 488-2125
FAX 488-2124

BEING SITE DEVELOPMENT MT COOEE LANDFILL CLUTHA D.C. CONTRACT No 209

PROGRESS CLAIM No 2. 30 June 1995

ITEM	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
1.	Preliminary & General:	LS	30%	10,000	3,000.00
2.	Sheetpiling:				
	- Establishment	LS			5,600.00
	- Construct S/P Wall	m²	448.04	300.00	134,412.00
3.	Earthworks:				
3.1	- Strip Topsoil	m³	1500	6.50	9,750.00
3.2	Variation 209/7 - Excavate to Bund Wall	m³	~~1750~~ 2038	6.50	~~11,375.00~~ 13,247.00
3.3	Variation 209/7 - Rockfill to Bund Wall	m³	694	15.00	10,410.00
3.4	- Fill to Bund Wall	m³	~~2186~~ 2400	11.00	~~24,046.00~~ 26,400.00
3.5	- Construct Pond & Open Channel	m³	~~3752~~ 2750	11.00	~~41,272.00~~ 30,250.00
3.6	~~Variation 209/7~~ - Embankment Liner	m²	995	10.00	9,950.00
3.7	- Dewater - Bund Wall	LS			2,000.00
	- Ponds	LS			1,000.00
4	Drainage:				
4.2.1	- 525 Ø Pipeline	m	14.6	290.00	4,234.00
4.5	- Excavate Unsuitable	m³	988	7.00	6,916.00
4.6	- Rockfill to Trench	m³	988	15.00	14,820.00
4.8	- Concrete Plug - Replaced with Bentonite Plug - see Item E				
4.9	- Groundwater Bore				3,000.00

cont'd on page 2.

TO: .....

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CONTRACT CULTIVATION LTD
21 DONALD STREET, P.O. BOX 892
KAIKORAI VALLEY, DUNEDIN
TELEPHONE 488-2125
FAX 488-2124

BUDGET PRINT LTD DUNEDIN

BEING .....

.....

.....

ITEM	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	cont'd from page 1.				
	Additional Items: (Dayworks).				
A.	Excavate Test Pits - Certified Claim No 1.				900. 00
B.	Extra Exploration Pits: - Certified Claim No 1.				315. 00
C.	5.1.3 - Repair Roading Culvert - Yet to Claim				
	- Remove Sediment Buildup				
	- Labour	hr	11.00	30.00	330. 00
	- Hire of Pump	day	2.00	35.00	70. 00
D.	5.1.4 - 16 No 252 Ø Pipes Surplus to requirements - Yet to Claim				
	- Clear out Open Channel on Railway Embankment				
	13/6/95 - Excavator	hr	6	105.00	630. 00
	- Truck	hr	6	65.00	390. 00
	- Labour	hr	4	30.00	120. 00
	Investigate Location of 225Ø Pipe at Railway:				
	- Excavator	hr	1	105.00	105. 00
	- Labour	hr	1	30.00	30. 00
E.	5.1.7 - Bentonite Plug				
	- Bentonite				301. 32
	Material Markup 20%				60. 26
	- Excavator	hr	2	105.00	210. 00
	- Loader	hr	1	75.00	75. 00
	- Labour	hr	4	30.00	120. 00

cont'd on page 3.

TO: .....

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BUDGET PRINT LTD DUNEDIN

CONTRACT CULTIVATION LTD
21 DONALD STREET, P.O. BOX 892
KAIKORAI VALLEY, DUNEDIN
TELEPHONE 488-2125
FAX 488-2124

BEING .....

.....

.....

ITEM	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	cont'd from page 2.				
	Value of Works to Date				278645 58 ~~285,441. 58~~
	Less 10% Retention				27,864 56 ~~28,544. 16~~
					~~256,897. 42~~ 250 781 02
	Less Previous Payments				~~77,284 41~~ ~~77,284. 41~~
					~~179,613. 01~~ 173,496 61
	Plus GST				21,687 08 ~~22,451. 63~~
	THIS CLAIM			$	195,183 69 ~~202,064. 64~~

Sheet Pile Records

Sheet 2 of 2

③

BH1.

④

adfill Sheet Pile wall
4/1/95

83×0.4 = 33.2m.

predicted rock profile

1.5 steel backing

cut off

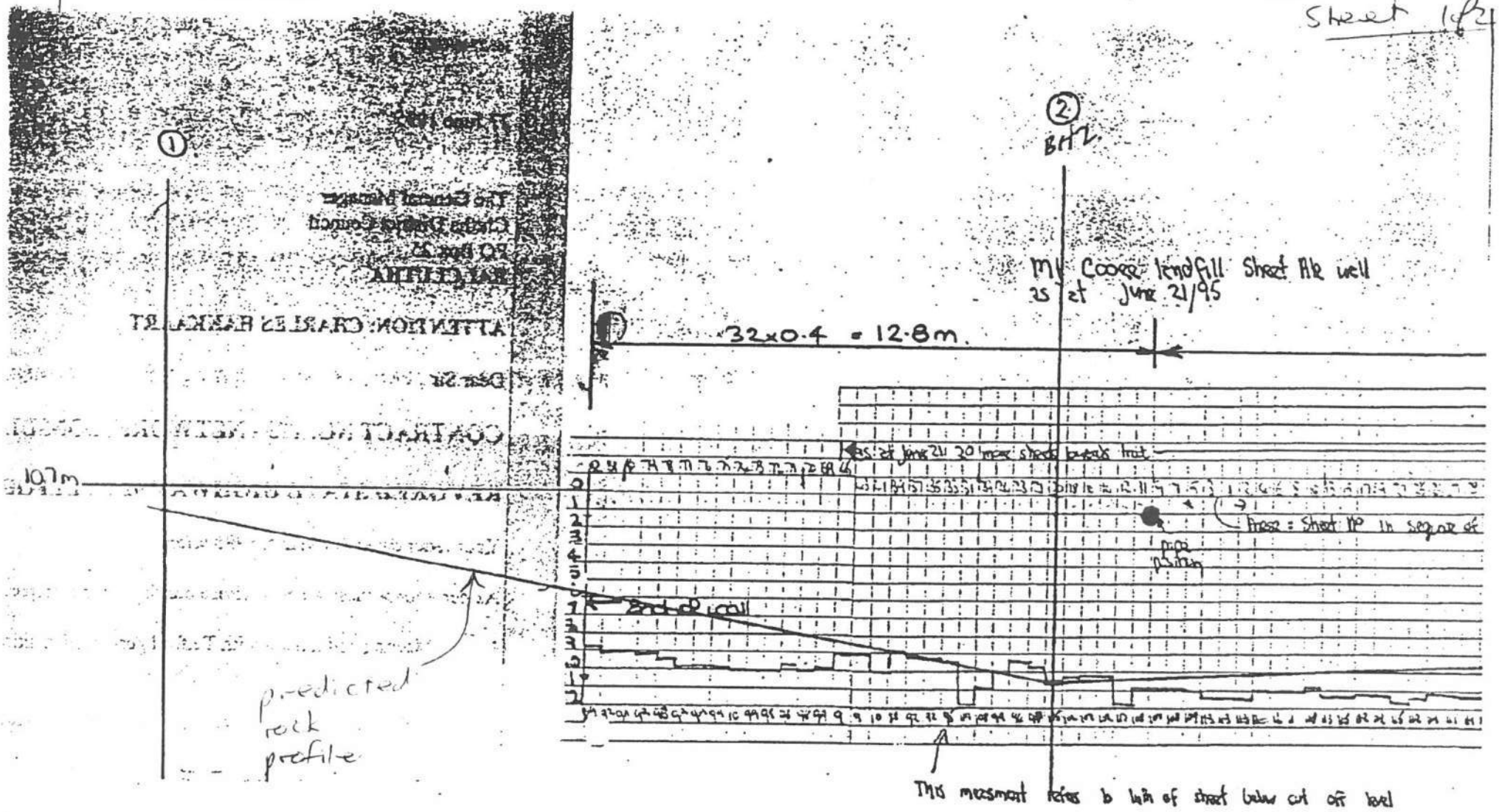
cut off

of steel below cut off level

2.

Sheet Pile Records

Sheet 1 of 2



EXISTING 225 Ø CULVERT
I.L. 114.2 APPROX

RAILWAY EMBANKMENT

TRANSITION MANHOLE
I.L. 108.6 APPROX

REMOVABLE INLET GRILLE: 50X50 ANGLE FRAME WITH R20 VERTICAL RODS AT 200 CRS. HOT DIP GALVANISE AFTER FABRICATION. DYNABOLT ANGLE FRAME TO END OF CULVERT

EXISTING RAILWAY CULVERT

EMBANKMENT LINER

RELOCATE WATERMAIN

EXISTING 32 Ø POLY WATERMAIN

NEW 225 Ø RCRRJ CLASS 2 Z S/W PIPE

INITIAL SURFACE WATER CHANNEL (BY OPERATOR)

MANHOLE 2

MANHOLE 3

BM4

BM1

REF PEG B

225Ø RC RRJ CLASS X S/W PIPE (BY OPERATOR)

NEW 525 Ø RCRRJ CLASS 2 Z S/W PIPE, LINE TO BE CONFIRMED ON SITE BY THE ENGINEER

EXISTING LANDFILL

TRIAL HOLE 2

EMERGENCY LEACHATE STORAGE POND

GROUNDWATER MONITORING BORE

LEACHATE PUMPSTATION

S/W RETENTION POND

BUND

INITIAL DRAINAGE DITCH (BY OPERATOR)

OPEN CHANNEL

S/W RETENTION POND

TRIAL HOLE 1

REF PEG B

TRUCK WASH (POSITION TO BE FINALISED ON SITE)

EXISTING OPERATOR'S BUILDING

PEG A

BM7

FUTURE EXTENT OF BUND WALL (BY OPERATOR)

EXISTING 900 Ø CULVERT I.L. 105.56

EXISTING ACCESS ROAD

PROPOSED TRANSFER STATION SITE (BY OTHERS)

WATERTANK

DESIGNATED AREA BOUNDARY

0 10 20 40 60 80 m
GRAPHIC SCALE 1:1000

ALL LEVELS ARE RELATIVE TO OTAGO METRIC DATUM

	INIT	DATE
SCALES 1:1000		
FIELDBOOK –		
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	GSM	2/95
APPROVED	RAW	3/95

Original Size A3

No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	10/3/95	RAW

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

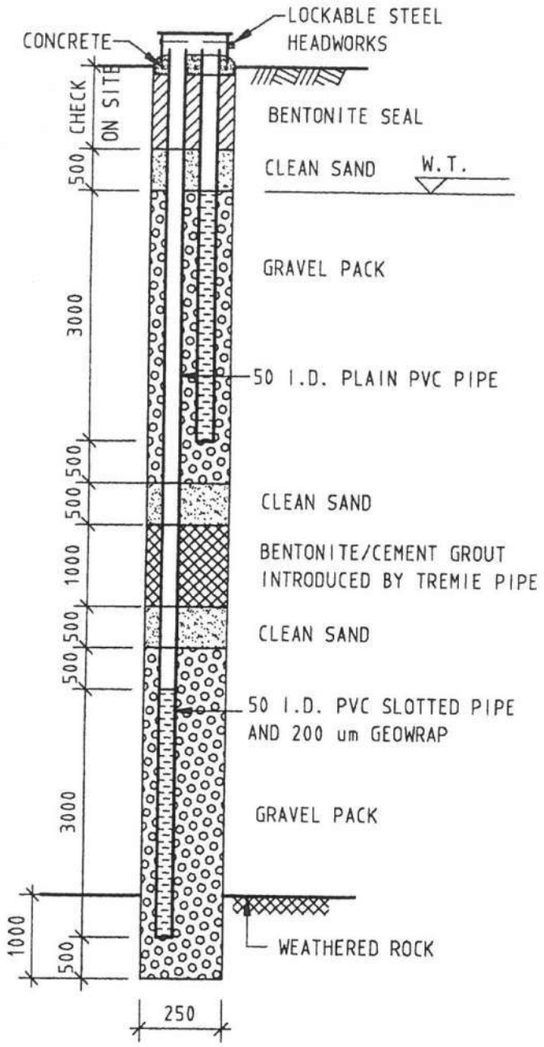
SITE LAYOUT PLAN

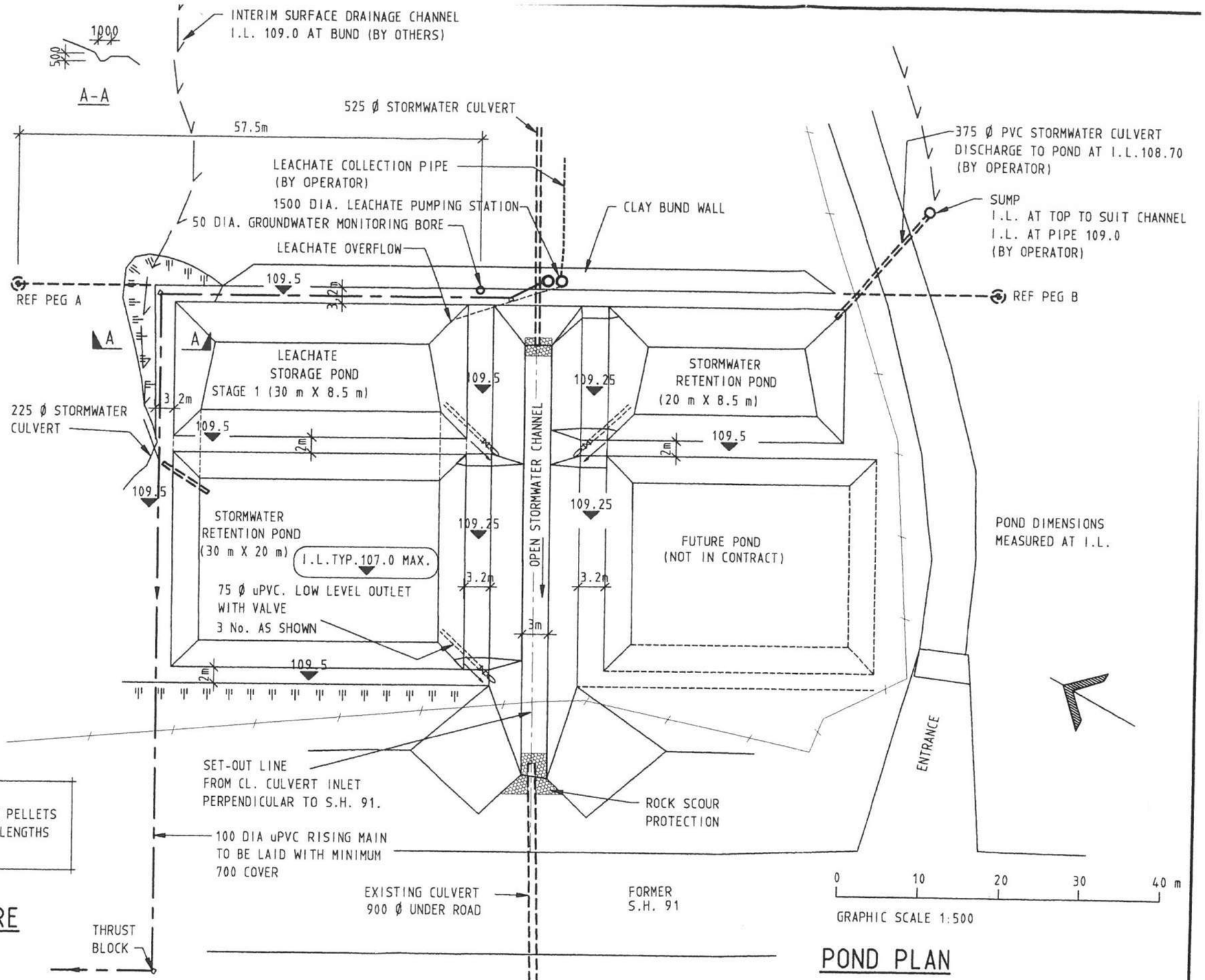
ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

Status Stamp: FOR TENDER

Date Stamp: 14 MAR 1995

Job No. 46831.01 Sheet No. 51 Rev.





NOTES:
- BENTONITE SEALS FORMED FROM HYDRATED BENTONITE PELLETS
- NO LUBRICANTS OR ADHESIVES TO BE USED TO JOIN LENGTHS OF PLASTIC CASING

GROUNDWATER MONITORING BORE

POND PLAN

SCALES 1:500, N.T.S.
FIELDBOOK –

	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	aaw	3/95

Original Size A3

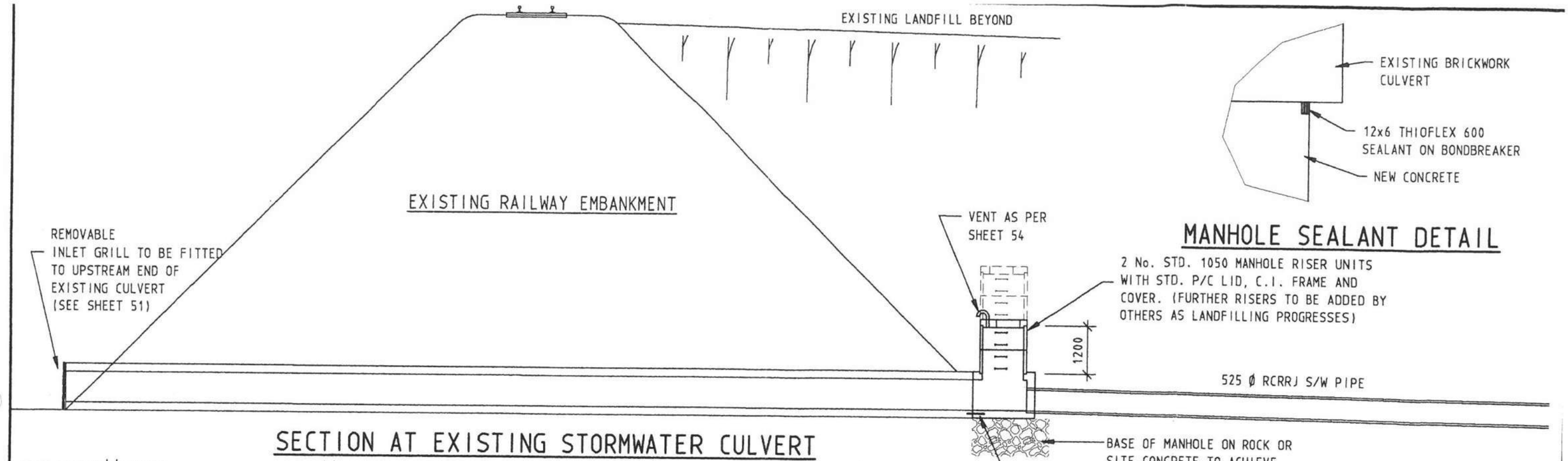
No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	10/3/95	aaw

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

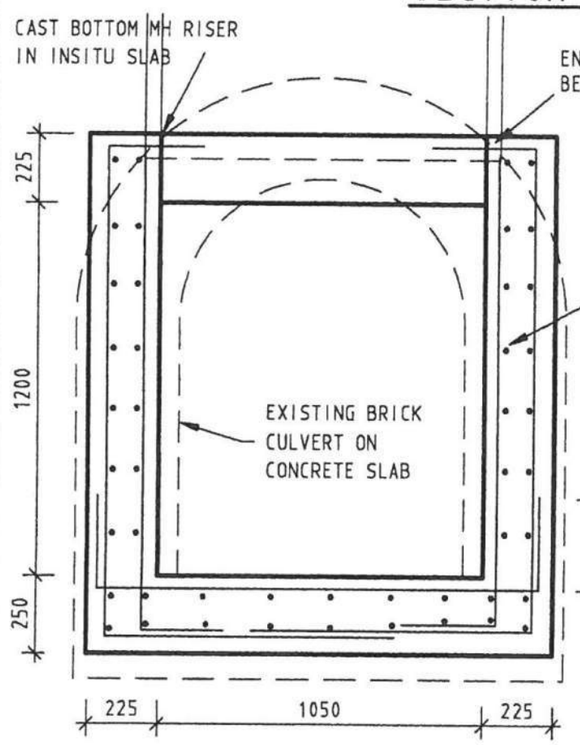
PLAN AT PONDS AND DETAIL OF GROUNDWATER MONITORING BORE

ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

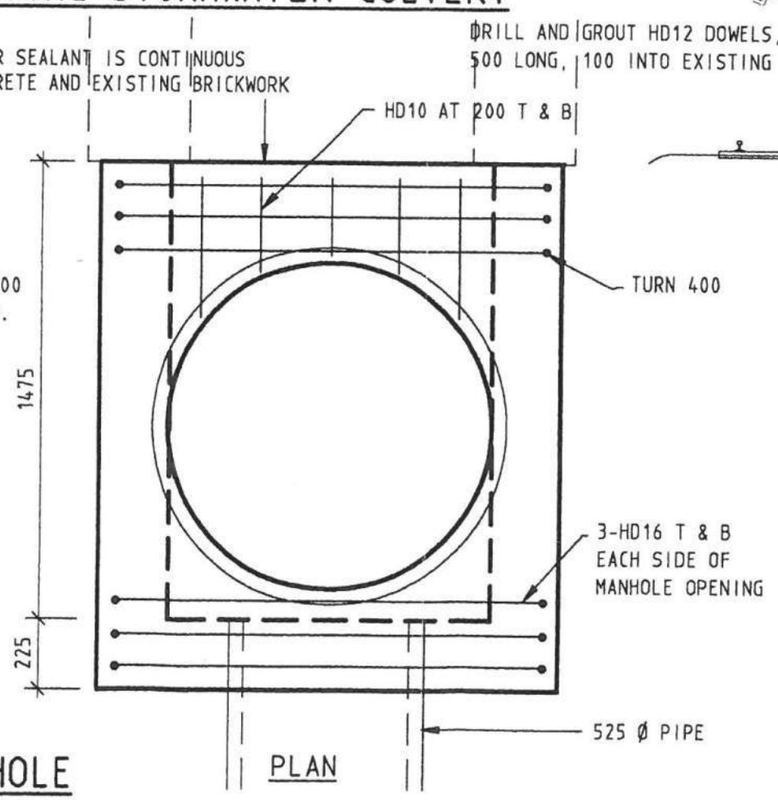
Status Stamp: FOR TENDER
Date Stamp: 14 MAR 1995
Job No. 46831.01/52
Sheet No.
Rev.



SECTION AT EXISTING STORMWATER CULVERT



SECTION

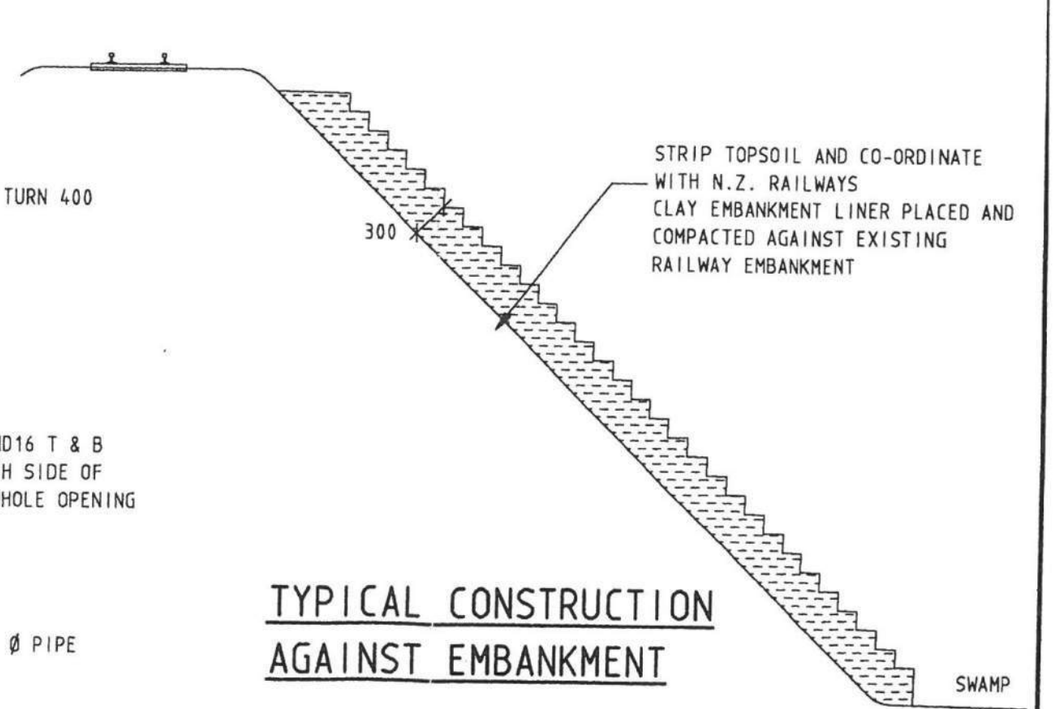


PLAN

TRANSITION MANHOLE

MANHOLE SEALANT DETAIL

2 No. STD. 1050 MANHOLE RISER UNITS WITH STD. P/C LID, C.I. FRAME AND COVER. (FURTHER RISERS TO BE ADDED BY OTHERS AS LANDFILLING PROGRESSES)



TYPICAL CONSTRUCTION AGAINST EMBANKMENT

SCALES 1:100 1:20		
FIELDBOOK –		
	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	aaw	3/95

Original Size A3

No		Date	Initial
–	APPROVED FOR CONSTRUCTION	10/3/95	aaw
No	AMENDMENTS	Date	Initial

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

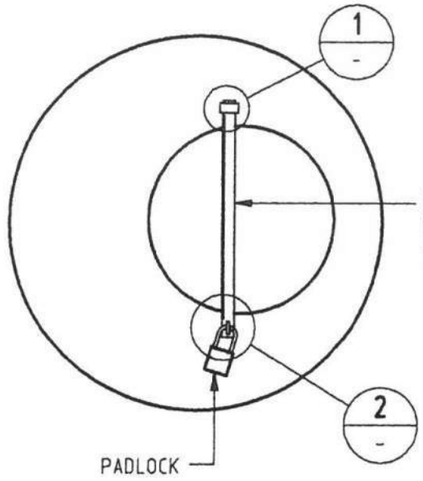
SECTIONS AT RAILWAY EMBANKMENT & TRANSITION MANHOLE

ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

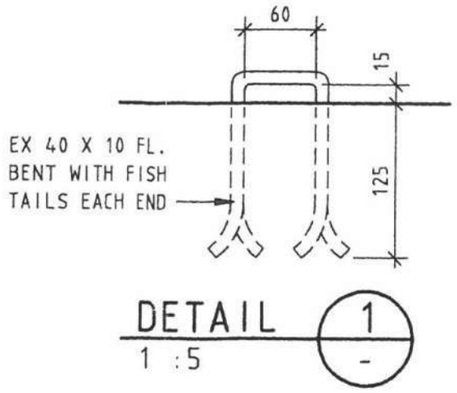
Status Stamp: FOR TENDER

Date Stamp: 14 MAR 1995

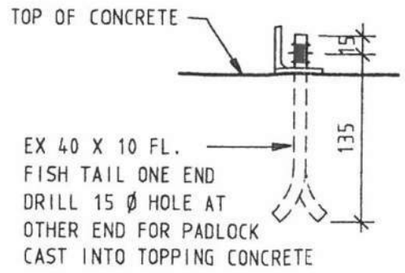
Job No. 46831.01 / Sheet No. 53 / Rev.



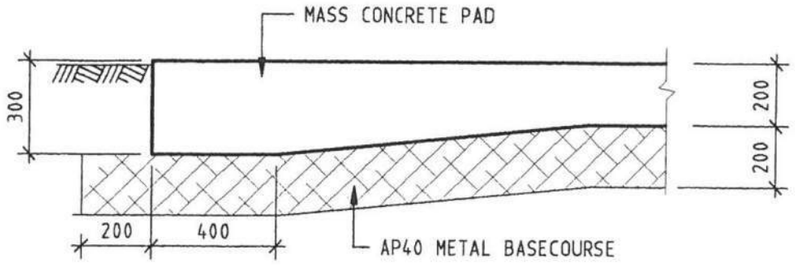
TYPICAL MANHOLE LID LOCKING BAR
1 : 20



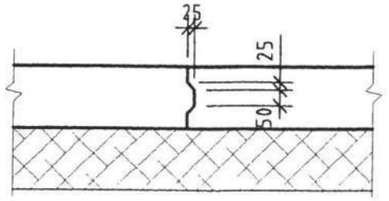
DETAIL 1 / -
1 : 5



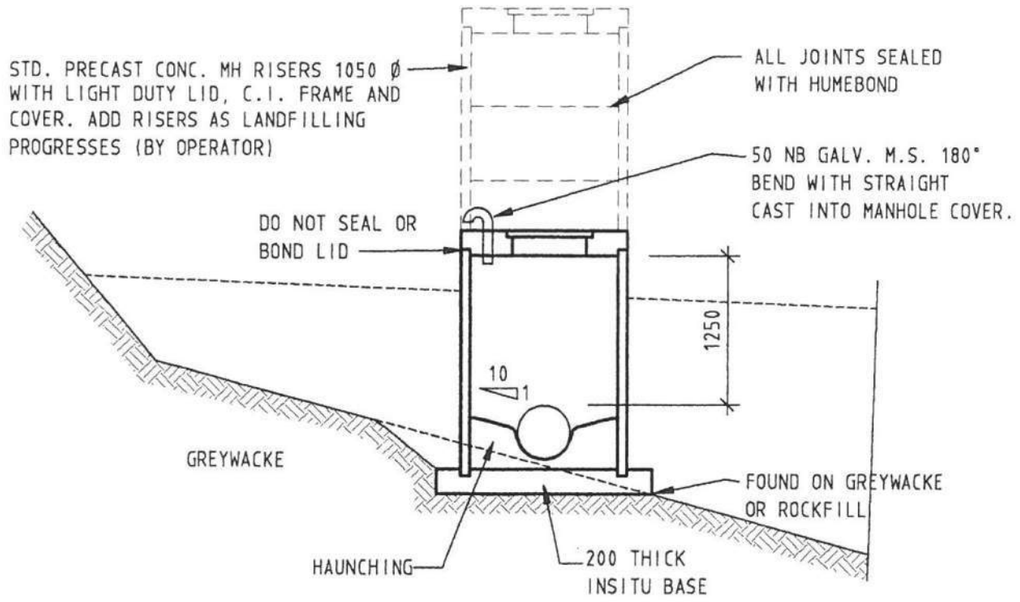
DETAIL 2 / -
1 : 5



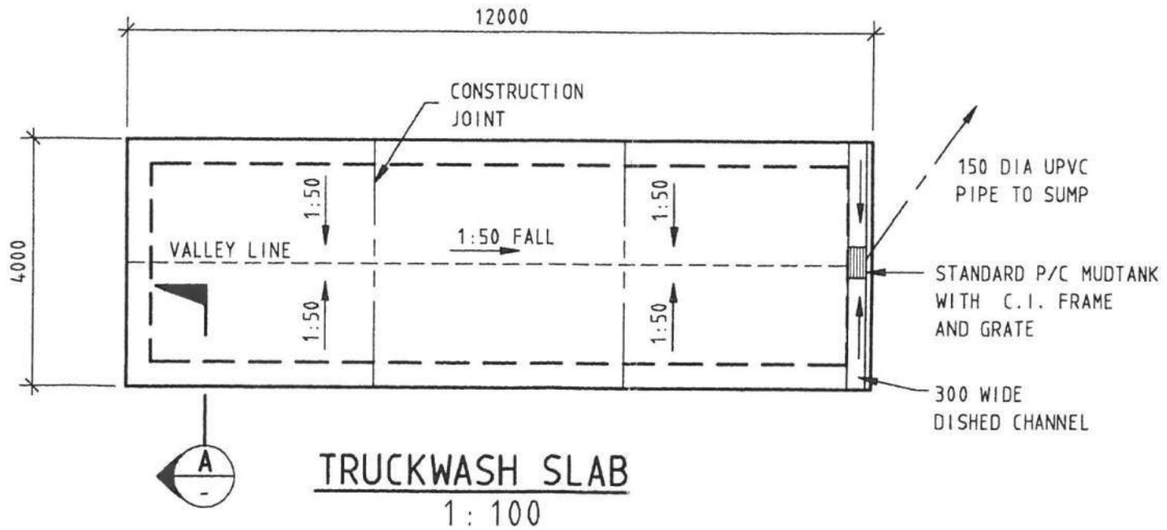
SECTION A / -
1 : 20



CONSTRUCTION JOINT
1 : 20



STORMWATER MANHOLE DETAIL



TRUCKWASH SLAB
1 : 100

SCALES 1:100 1:50 1:20 1:5		
FIELDBOOK –		
	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	GSM	2/95
APPROVED	aaw	3/95

Original Size **A3**

No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	10/3/95	aaw

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

MANHOLE AND TRUCKWASH DETAILS

ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

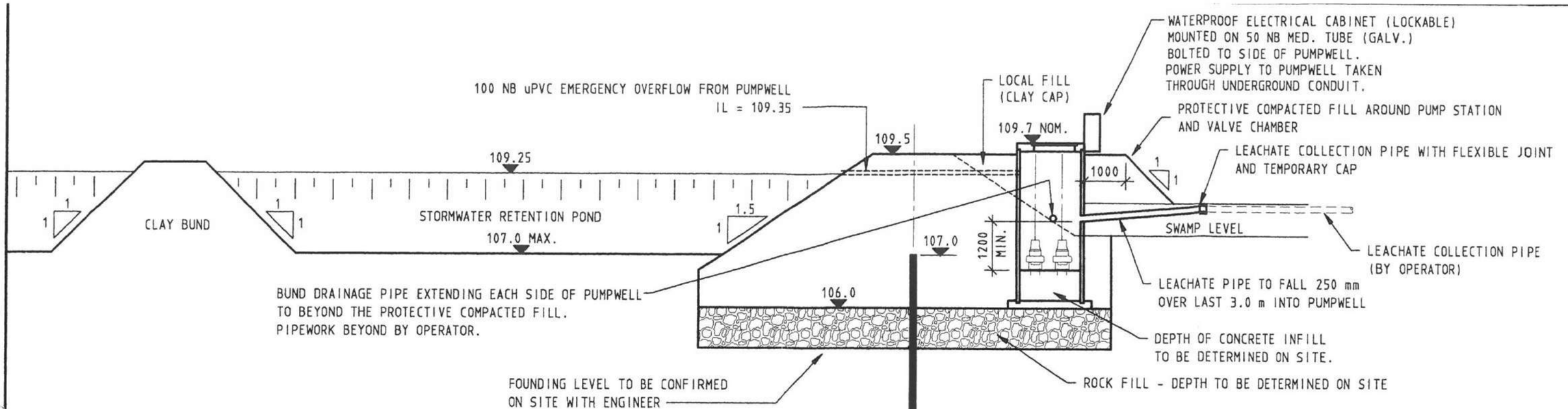
Status Stamp: FOR TENDER

Date Stamp: 14 MAR 1995

Job No. 46831.01/54

Sheet No.

Rev.

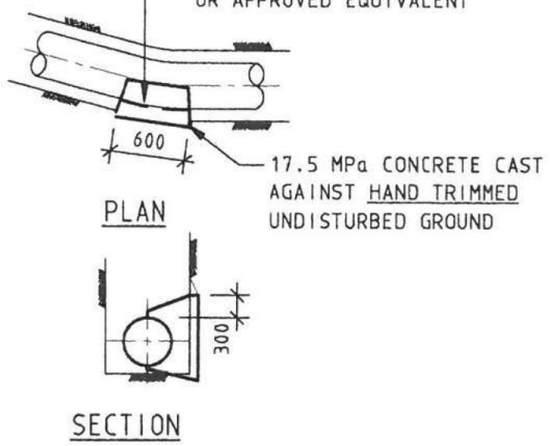


BUND SECTION AT LEACHATE PUMP STATION

PUMPWELL AND VALVE CHAMBER
1500 Ø RC MANHOLE RISERS
WITH P/C LID AND CAST-IN
STEEL FRAME AND COVER
REFER TO DWG'S. 46831.01/56,57,58

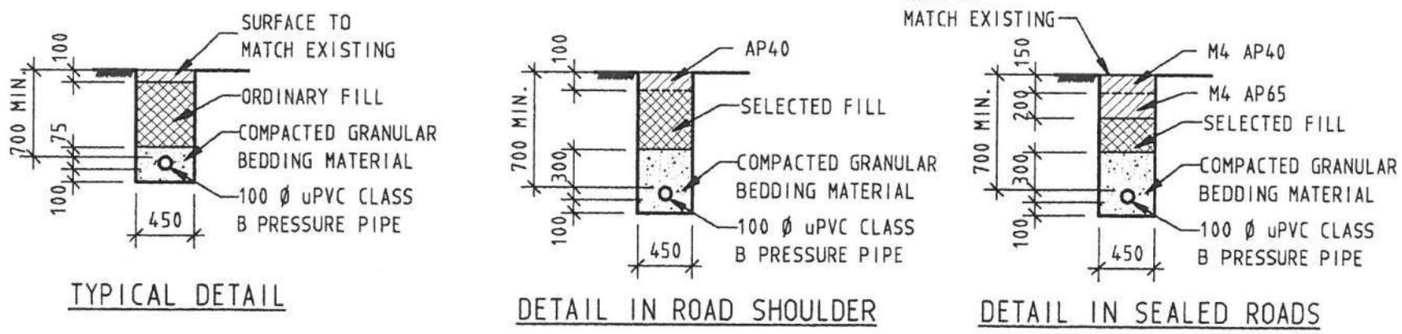
STEEL SHEET PILE DRIVEN TO
REFUSAL INTO BEDROCK.
(DEPTH VARIES ACROSS BUND)

GREYWACKE



RISING MAIN THRUST BLOCK DETAILS

N.T.S.



RISING MAIN BEDDING DETAILS

SCALES 1:100		
FIELDBOOK –		
	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	AAW	3/95

Original Size A3

No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	13/3/95	AAW

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

BUND SECTION AT PUMP STATION AND RISING MAIN DETAILS

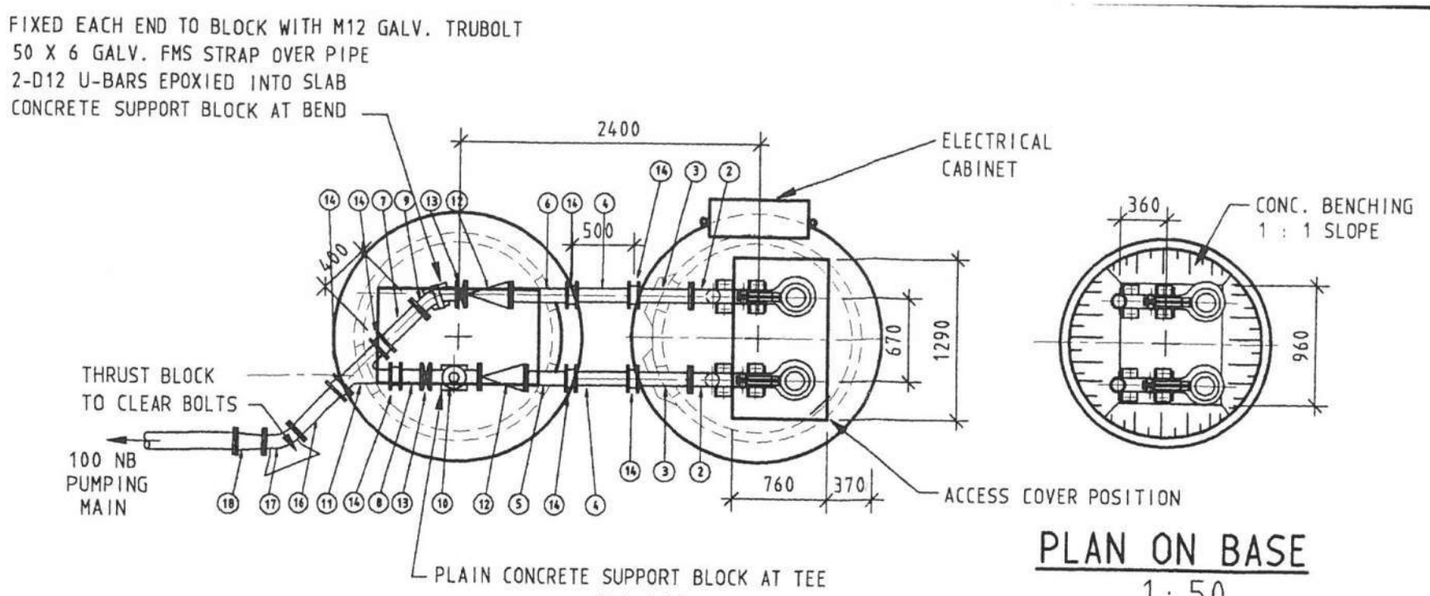
ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

Status Stamp: FOR TENDER
Date Stamp: 14 MAR 1995

Job No. 46831.01/55
Sheet No.
Rev. –

FITTINGS SCHEDULE

ITEM	No OFF	DESCRIPTION
(1)	1	80NB DF STRAIGHT - LENGTH TO BE DETERMINED BY CONTRACTOR
(2)	2	80NB DF SHORT RADIUS BEND
(3)	2	80NB F/P STRAIGHT X 450 LG
(4)	2	80NB PE STRAIGHT X 500 LG
(5)	1	80NB F/P STRAIGHT - LENGTH TO SUIT
(6)	1	80NB F/P STRAIGHT - LENGTH TO SUIT
(7)	1	80NB F/P STRAIGHT - LENGTH TO SUIT
(8)	1	80NB ADAPTOR
(9)	1	80NB DF 45° BEND
(10)	1	75 ON 80 AF TEE
(11)	1	80NB PE WYE
(12)	2	80NB NON-RETURN VALVE
(13)	2	80NB KNIFEGATE VALVE
(14)	7	80NB GIBAULT JOINT
(15)	1	75NB BLANK FLANGE
(16)	1	80NB F/P STRAIGHT - LENGTH TO SUIT
(17)	1	80NB F/P 45° BEND
(18)	1	80/100 AF CONCENTRIC REDUCER

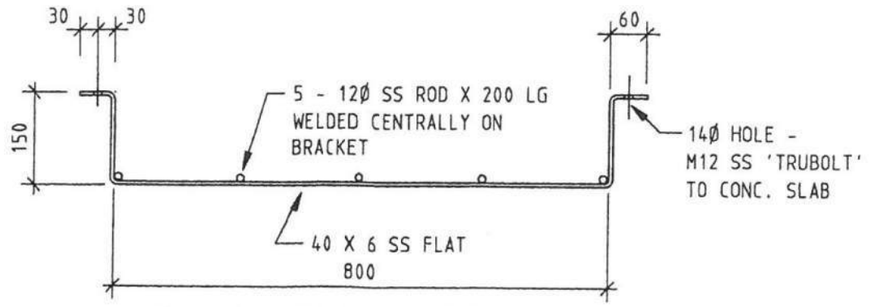


PLAN

1 : 50

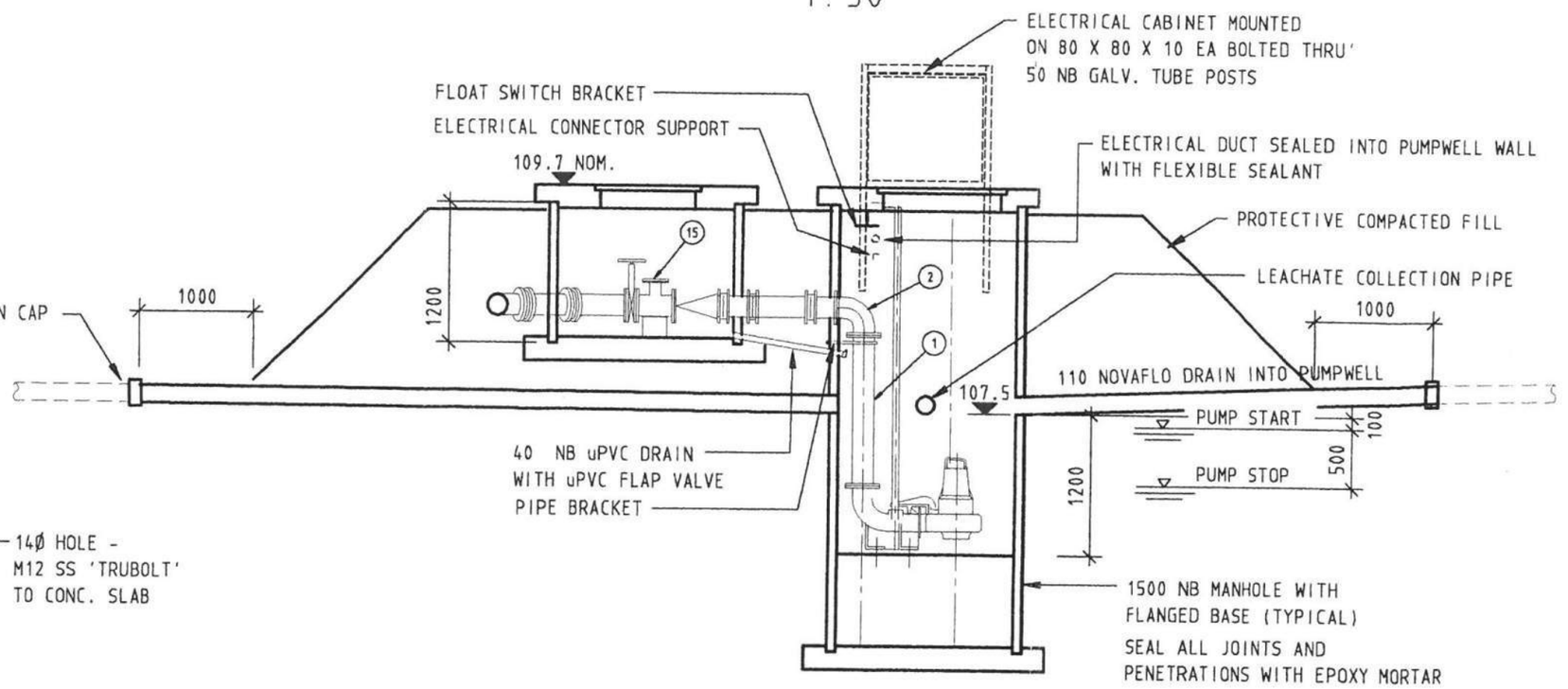
PLAN ON BASE

1 : 50



FLOAT SWITCH BRACKET

1 : 10



SECTION

1 : 50

	INIT	DATE
SCALES 1:100		
FIELDBOOK -		
SURVEYED	-	-
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	aaw	3/95

Original Size A3

No	AMENDMENTS	Date	Initial
-	APPROVED FOR CONSTRUCTION	19/3/95	aaw

CLUTHA DISTRICT COUNCIL

MT. COOEE LANDFILL

CONSTRUCTION DETAILS

PUMP STATION DETAILS 1

ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

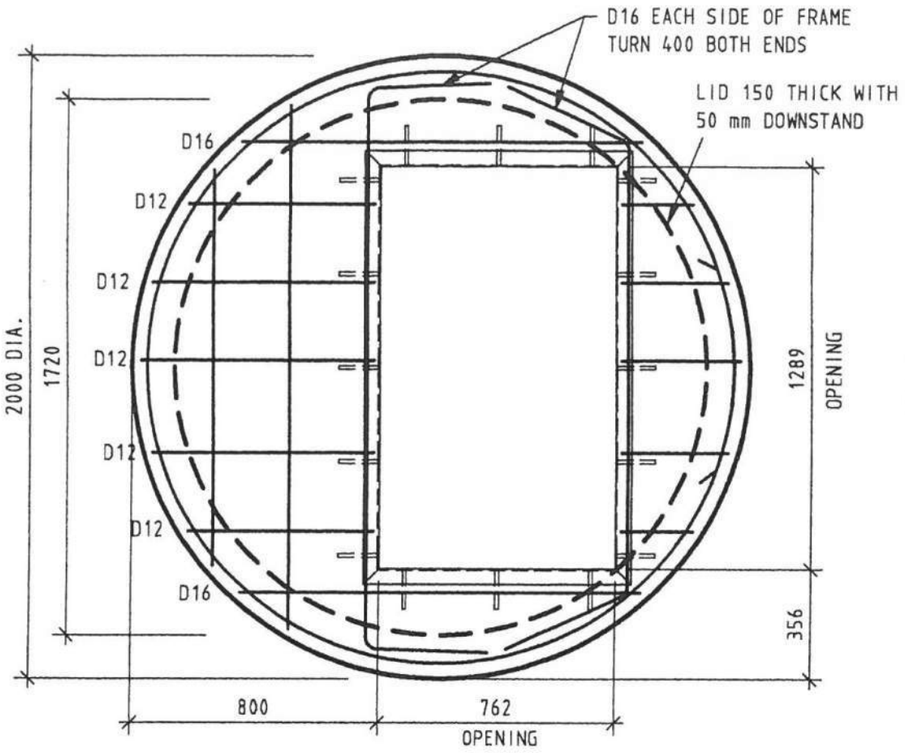
Status Stamp: FOR TENDER

Date Stamp: 14 MAR 1995

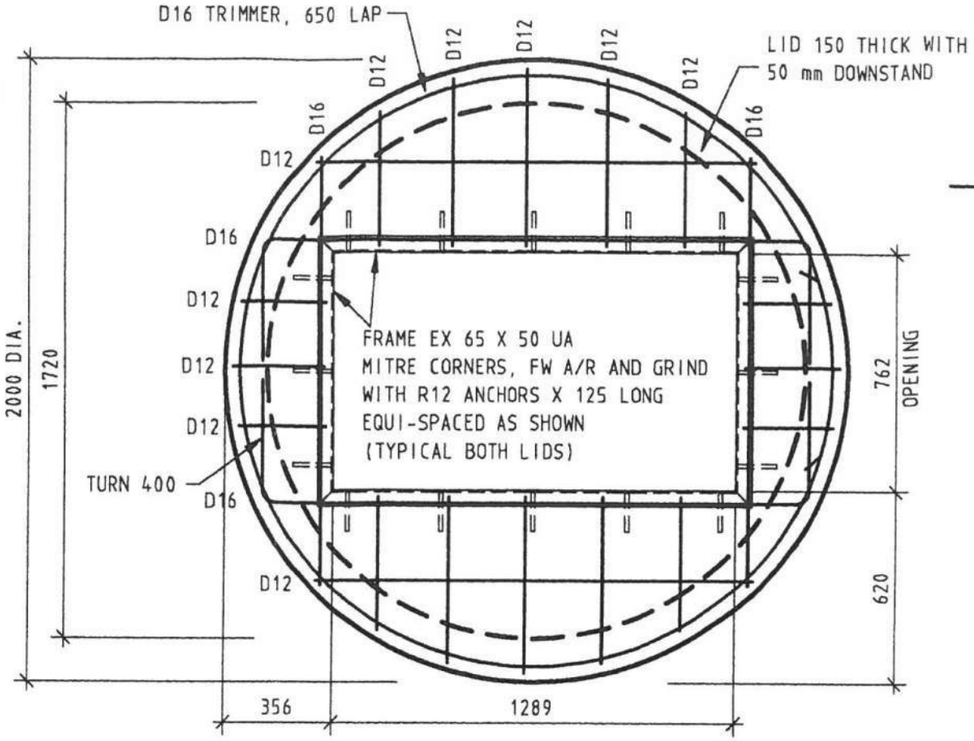
Job No. 46831.01/56

Sheet No. 56

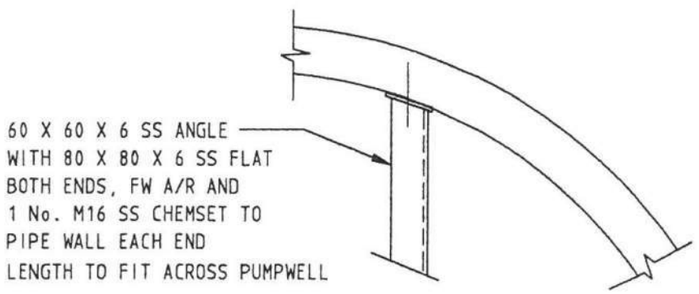
Rev



PUMPWELL LID
1 : 20

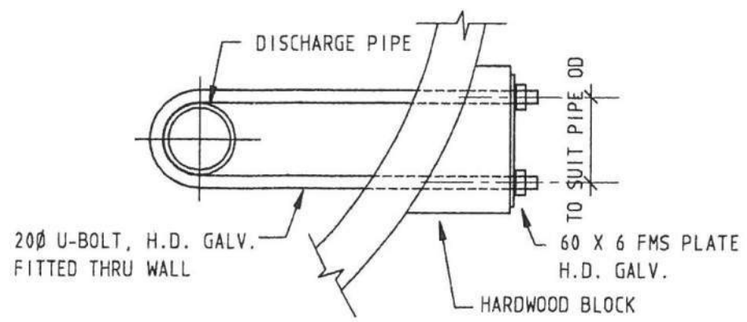


VALVE CHAMBER LID
1 : 20

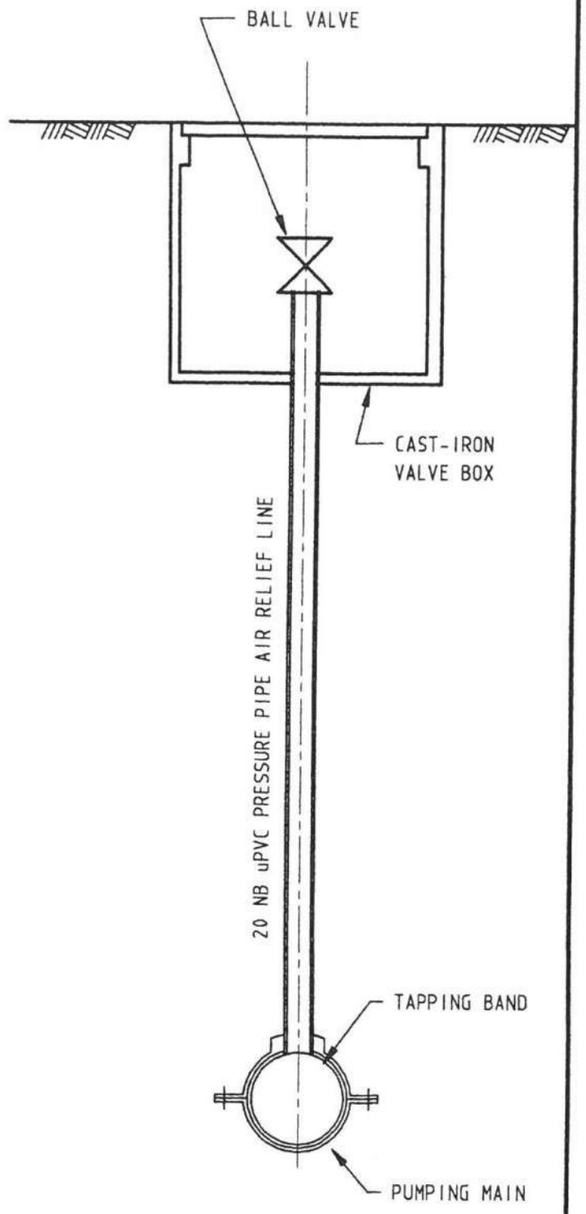


ELECTRICAL CONNECTION SUPPORT
1 : 10

ELECTRICAL CONTRACTOR TO DRILL ON SITE AS REQUIRED FOR MOUNTING ELECTRICAL CONNECTORS FOR PUMPS. USE SS BRACKETS AND BOLTS AS REQUIRED.



PIPE BRACKET
1 : 10



PUMPING MAIN
AIR RELIEF DETAIL
1:5

LOCATED AT HIGHEST POINT ON MAIN

SCALES 1:100		
FIELDBOOK –		
	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	QAW	3/95

Original Size **A3**

No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	19/3/95	QAW

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

PUMP STATION DETAILS 2 AND PUMPING MAIN AIR RELIEF VALVE

ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

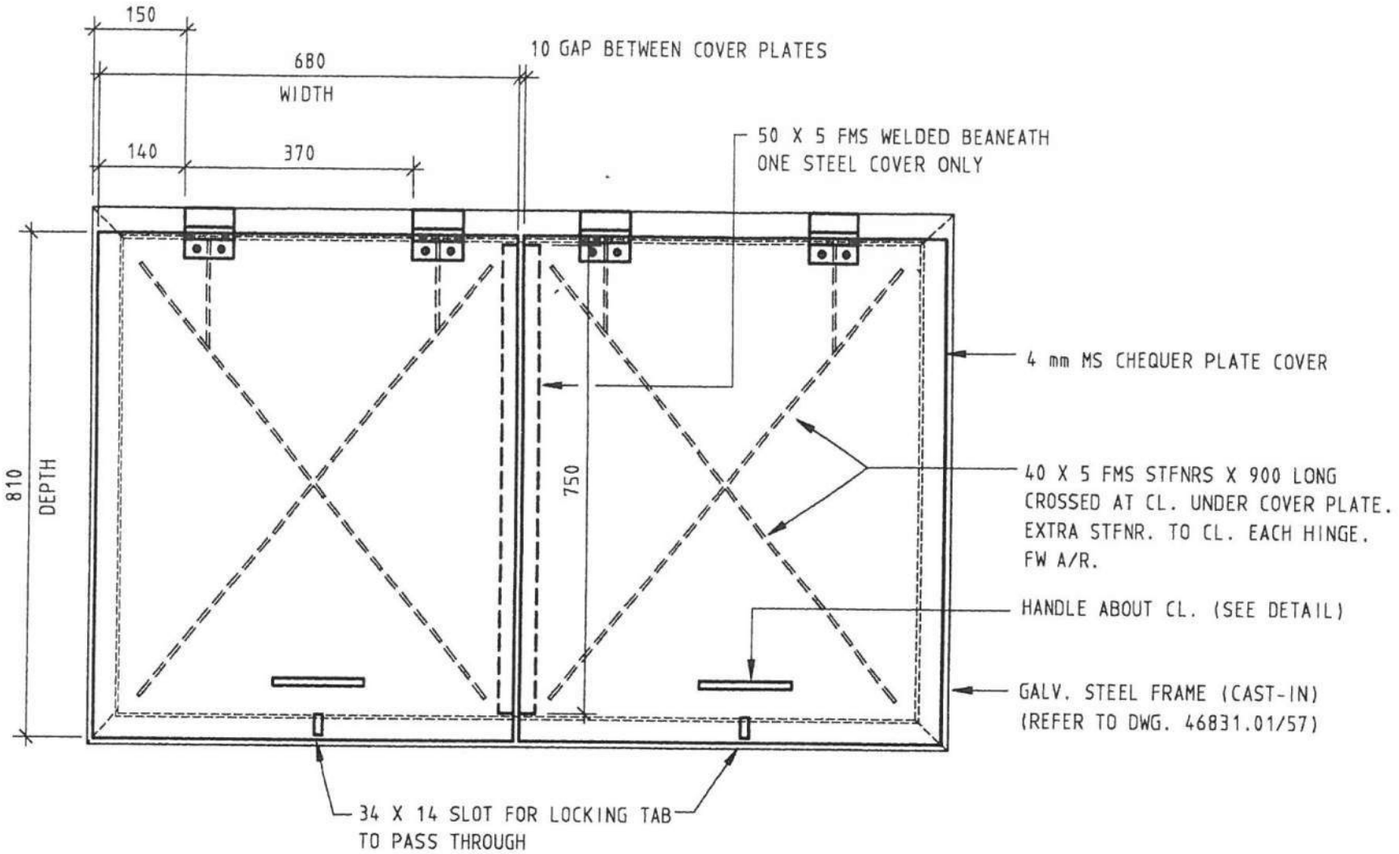
Status Stamp: FOR TENDER

Date Stamp: 14 MAR 1995

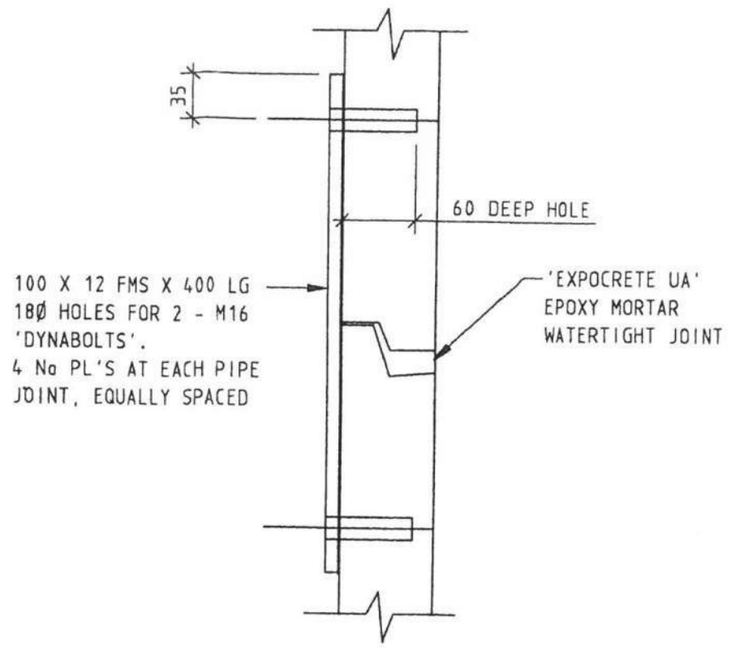
Job No. 46831.01/57

Sheet No.

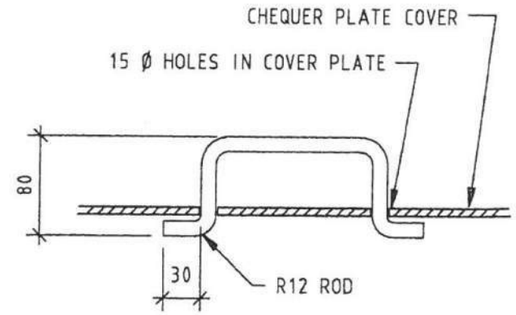
Rev.



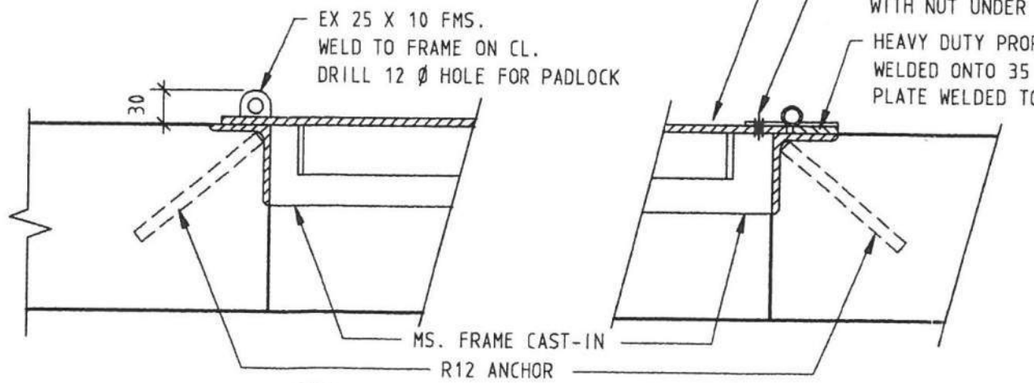
PLAN ON STEEL COVERS
1 : 10



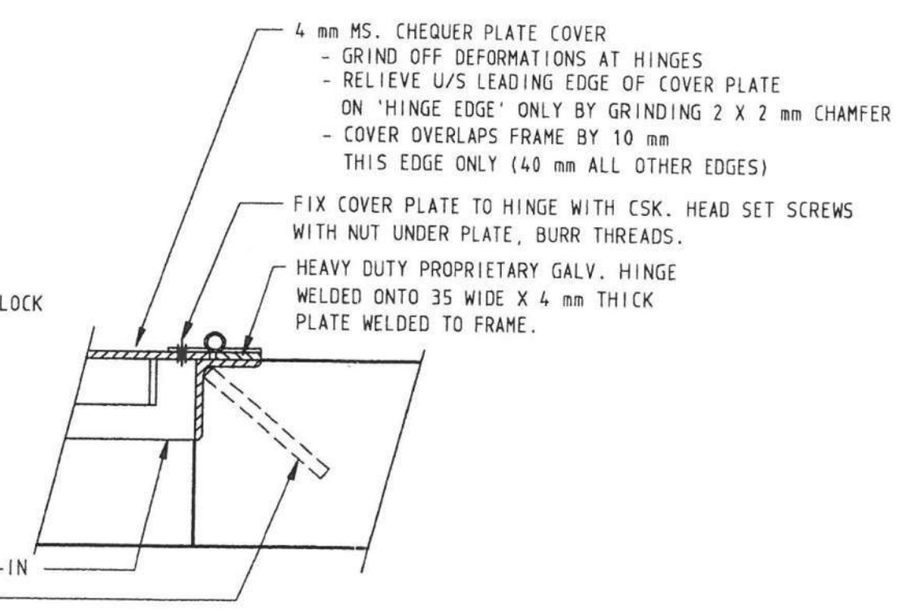
PUMPWELL JOINT DETAIL
1 : 5



HANDLE DETAIL
1 : 5



DETAIL 1
1 : 5



DETAIL 2
1 : 5

SCALES AS SHOWN		
FIELDBOOK –		
	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	aaw	3/95

Original Size A3

No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	10/3/95	aaw

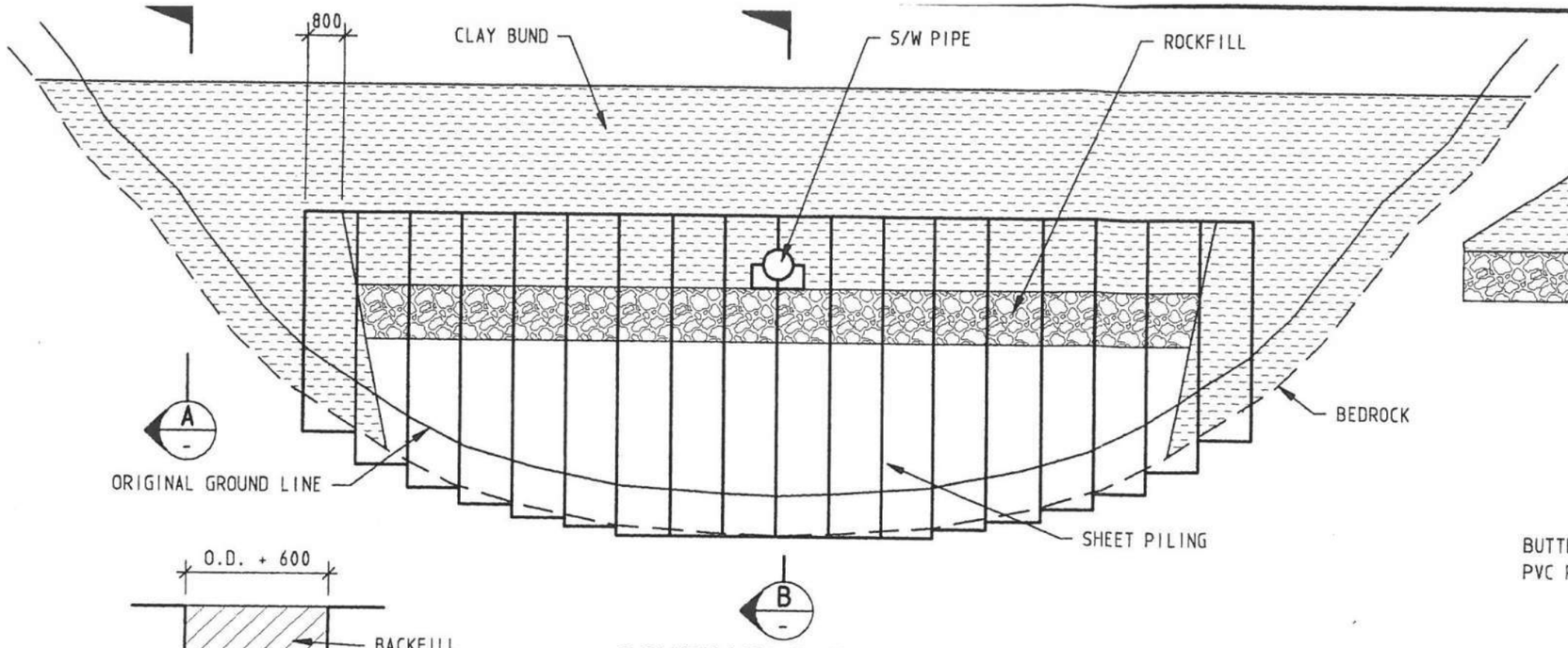
CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

PUMP STATION DETAILS 3 (STEEL COVERS)

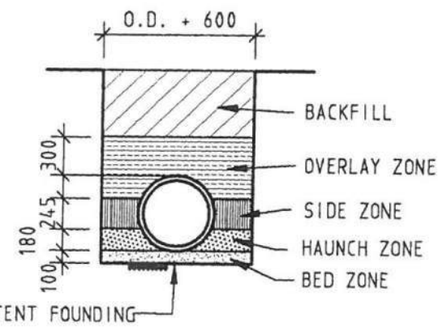
ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

Status Stamp: FOR TENDER
Date Stamp: 14 MAR 1995

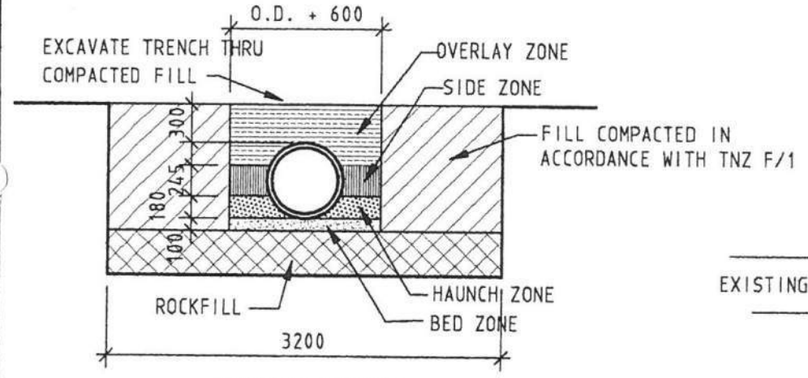
Job No. 46831.01/58
Sheet No.
Rev. –



SCHEMATIC ELEVATION OF CUT OFF WALL



ACROSS CENTRAL AREA OF COMPETENT MATERIAL

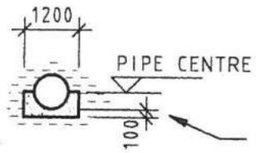


ACROSS SWAMP

PIPE BEDDING DETAILS

1 : 50

BEDDING ZONES AS PER AS 3725:1986



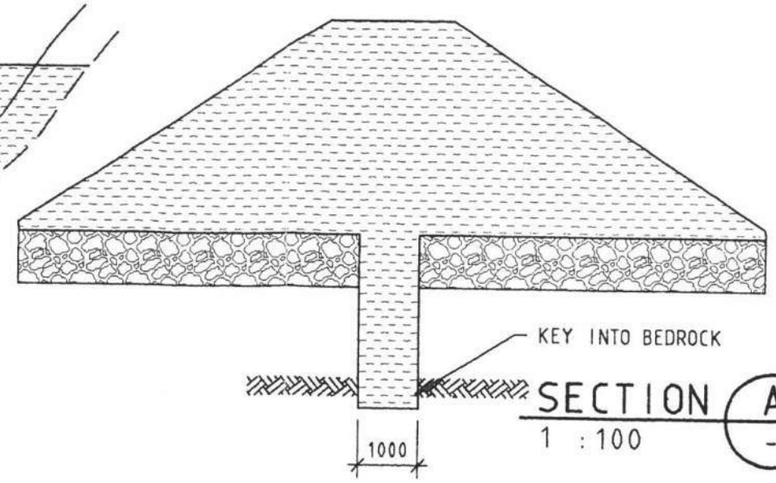
STORMWATER PIPE TO BE LAID IN A TRENCH, BEDDED ON CONCRETE

OPEN CHANNEL

EXISTING 900 Ø CULVERT

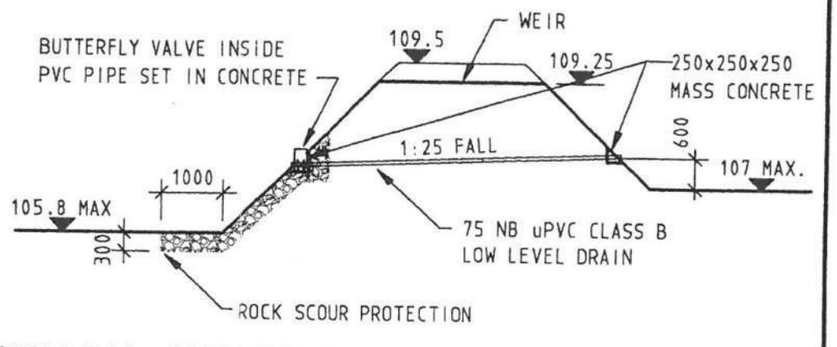
ROCK SCOUR PROTECTION

CONTRACTOR TO CHECK INVERT LEVELS AT CULVERT INLET TO ENSURE FALL IN DRAINAGE CHANNEL PRIOR TO CONSTRUCTION

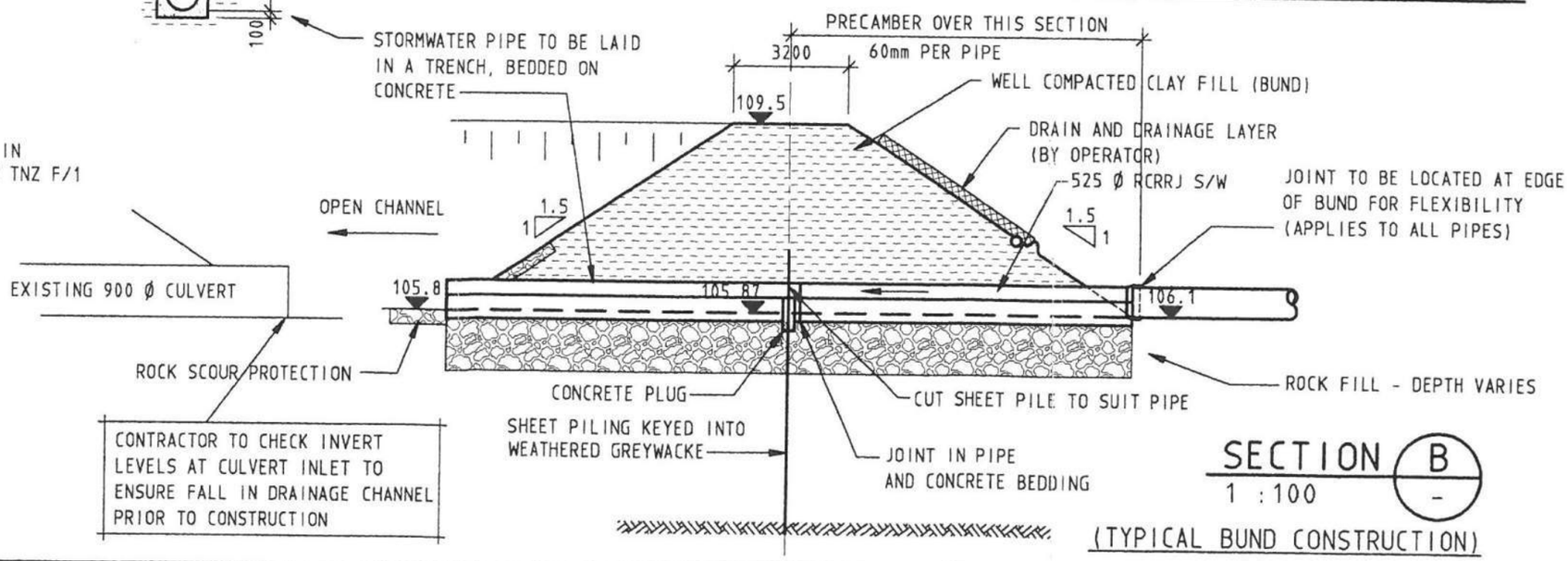


SECTION A

1 : 100



TYPICAL OUTLET WEIR AND POND DRAIN



SECTION B

1 : 100

(TYPICAL BUND CONSTRUCTION)

SCALES 1:100 1:50		
FIELDBOOK –		
	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	aaw	3/95

Original Size A3

No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	10/3/95	aaw

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

POND, BUND AND PIPE CULVERT BEDDING DETAILS

ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

Status Stamp: FOR TENDER

Date Stamp: 14 MAR 1995

Job No. 46831.01/59

Sheet No. –

Rev. –

Clutha District Council

ID 743394

MOUNT COOEE LANDFILL MANAGEMENT PLAN: 2022

Document Details:

Date: August 2022 ID 743394
Originally Based on WSP: 2-34090.03
Status: For Issue

Prepared by
Gerry Essenberg
Clutha District Council

Reviewed by
Thyagu Gopalan
Clutha District Council

Landfill Contractor Document Issue History

Issued to	Date	Issued By	For	Received by	Induction and Briefing Completed
Wasteco	Aug 2022	L Gourley	Landfill Operations	G Wilson	Aug 2022

Contents

1 KEY CONTACT DETAILS

The contact numbers for the Mt Cooee landfill are as follows. Note abbreviations as used in subsequent text.

Table 1.1. Contact numbers

Contact's Position	Contact's Name	Phone Number
Waste Management Officer	Clutha District Council (CDC): Laura Gourley	03 419 0245
Water & Wastes Operations Manager (WWOM)	Clutha District Council (CDC): Gerry Essenberg	027 224 6597
Leader Compliance Management (LCM)	Clutha District Council (CDC): Thyagu Gopalan	022 010 0496
Contractor's Operations Manager Balclutha (COM)	WasteCo: Graeme Wilson	027 825 8811
Compliance Officer	Otago Regional Council (ORC):	03 474 0827

2 INTRODUCTION

2.1 Background

The Mt Cooee Landfill is currently the only sanitary landfill in the Clutha District. Serving a population of 17,550 (4,000 in Balclutha), the landfill handles refuse from Council's kerbside collection service, ten waste transfer stations and from residential, commercial and some industrial customers.

Locations and Opening Hours of transfer stations

Transfer Station	Location	Opening Hours	Accepted Waste
Beaumont	Opposite Dee St	24/7 - key system registered through Council Beaumont transfer station application for key	Household Waste
Clinton	18 Hillfoot Rd	10am-12pm Sundays	Household Waste Household Recycling
Clydevale	69 Allangrange Rd - Community Centre	**Closed -** Replaced with wheelie bin collection trial. Application forms for service can be found here. More information can be found about the trial here.	Household Waste
Lawrence	5 Peel St - Council Service Centre	10am-12pm Saturdays	Household Waste Household Recycling
Maclennan	270 Centre Rd	1pm - 3pm Saturdays	Household Waste Household Recycling
Milton	Bruce Street	1.30-3.30pm Friday, Saturday and Sunday***(not open on Sunday during winter NZ standard time hours)***	Household Waste Household Recycling
Owaka	Waikawa Rd - opposite Police Station	1-3pm Sundays	Household Waste Household Recycling
Papatowai	250 Papatowai Highway - Papatowai Store	24/7 coin operated "Jack Trash" bin CURRENTLY OUT OF SERVICE	Household Waste
Taieri Mouth	Leitch Memorial Hall - 1388 Taieri Mouth Road	Recycling bins accessible 24/7	Household Waste
Tapanui	Whiskey Gully Rd	1.30-3.30pm Friday and Saturdays***(not open on Friday during winter NZ standard time hours)***	Household Waste Household Recycling

Around 8,000 tonnes of refuse is currently landfilled per year. Predominantly this is from residences, businesses and farms. Facilities for diverting waste from landfill have been implemented including facilities for recycling and greenwaste diversion.

The Landfill is operated as "a "Class 1" landfill in terms of the WasteMINZ Technical Guidelines to Land 2018, accepting general municipal refuse.

The landfill has been operating at its present location for over 35 years. The site is close to Balclutha town but is well screened from adjoining land and residential areas.

2.2 Objectives of this Management Plan

The following objectives are set for the Landfill operation:

- To operate in compliance with the site resource consents
- To minimise discharges of contaminants to the wider environment
- To minimise nuisance effects on adjoining property
- To ensure safety of people on the site
- To make optimum use of the site capacity
- To maximise diversion of waste from the landfill
- To minimise Clutha District Council's long-term liability
- To provide a friendly and helpful service to the landfill customers
- To operate in compliance with Waste Levy and Emissions Trading Scheme requirements
- To operate the site at least cost consistent with the above objectives
- To optimise long term waste disposal within Clutha District

This management plan documents how the site will be managed and operated to achieve these objectives.

2.3 Plan Description

This Plan provides a detailed description of the management and operation of the site. The Plan is divided into the following key sections:

- Landfill management and administration
- Site features and Landfill design
- Landfill routine operations
- Management of leachate, stormwater and landfill gas
- Health and Safety
- Site and environmental monitoring
- Reporting and documentation of activities
- Contingency planning for unlikely events
- Aftercare provisions

- Assessment of Effects and Consideration of Alternatives
- Management in accordance with Long Term Objectives

2.4 Related documents

The following documents are relevant to the site operation:

Document	Source Organisation	Notes	Issue date
Mt Cooee Landfill: Application for Resource Consent Vols 1 & 2	Royd's Consulting	Provides a full description of the landfill environment, geohydrology and effects of operations to date	September 1994
Mt Cooee Landfill Development and Management Plan	Royd's Consulting	Outlines development proposals for the site	September 1994
Site Development of the Mt Cooee Landfill : Contract No. 209	Royd's Consulting	Construction contract for landfill development works	March 1995
Regional Plan: Waste for Otago	Otago Regional Council (ORC)		Operative April 1997
Solid Waste Management 2012/17 Contract 670	Clutha District Council	Contract covers operations, fee collection and site monitoring	April 2012
Mt Cooee Landfill resource consents	Otago Regional Council	Full schedule of consent conditions (Included as Appendix 2)	Various 1995 - 2001
Solid Waste Bylaw 2019	Clutha District Council	Included as Appendix 4	July 2019

Table 2.1 Related Documents

2.5 Resource Consents

(a) Otago Regional Council

The following resource consents from ORC are held in relation to the landfill (Appendix 2):

Consent Number	Consent Type	Issue date	Expiry date	Conditions
94509	Discharge permit - stormwater	May 1995, reissued August 2001	2023	7 Conditions, monitoring provisions
94508	Discharge permit – waste to land	May 1995	2023	8 Conditions, Management Plan
95953	Groundwater abstraction	February 1996 Note supersedes 94545	2023	4 conditions
94511	Diversion of stream	June 1995	2023	2 Conditions No ongoing requirements
94543	Install culvert	June 1995	2023	2 Conditions No ongoing requirements
94510	Air discharge	May 1995	2023	6 Conditions
95954	Discharge leachate to ground	February 1996	2023	8 Conditions Groundwater monitoring

Consent Number	Consent Type	Issue date	Expiry date	Conditions
		Note supersedes 94512		

Table 2.2 Resource Consents

Note: Frequent reference to the consent conditions are made in this text, in the form (Consent/Condition number). For example (94509/2)

(b) Clutha District Council

The entire site (Lots 1 and 2, DP 12203 and Part Sections 4 and 5, Blk XIV, North Molyneux SD) is designated (D120) in the Operative Clutha District Plan as Mt Cooee Landfill (Rural) with the Notation "Refuse Disposal". Designation D120 is not subject to any conditions.

Pt Lot 61 DP2254 has been purchased by the Council and will be incorporated in any future designation.

2.6 Files

The following CDC electronic files hold information relevant to the landfill operation:

Electronic File number	Coverage
fA245 – Mt Cooee Landfill	Complaints, diversion, ETS, hazards, landfill closure, enquiries, site plans and surveys, resource consents, special waste, waste levy.
qA126549 – Contract 670 Solid Waste Management 2012-15	Contract 670; monthly reports

Table 2.3: Electronic Files

The following CDC files hold historic information relevant to the landfill operation:

File number	Coverage
SW10/0005	Mt Cooee Landfill : General
SW10/0006	Mt Cooee Landfill : Special Waste
SC70/0022	Mt Cooee Landfill : Operation Contract 192
SC70/0562	Mt Cooee Landfill : Operation Contract 562

Table 2.4 Historic Files

2.7 Issue register

The issues of this Management Plan are as follows:

Date of Issue	Author	Revisions
February 2004 (Draft Issue #1)	Opus International Consultants Ltd (Peter Askey)	
January 2005 (Issue # 2)	Opus International Consultants Ltd (Peter Askey)	Includes review comment from CDC
July 2011 (Issue # 3)	Opus International Consultants Ltd (updated, John O'Neill, Area Engineer (CDC)	Updated contact names and numbers etc...

Date of Issue	Author	Revisions
September 2011 (Issue # 4)	Opus International Consultants Ltd (updated Peter Askey and John O'Neill, (CDC)	Updated for site changes and new contracts
September 2012 (Issue #5)	Updated Brendon Harper, Waste Minimisation Officer, (CDC)	Annual review/update. Includes updates to reflect new contract
October 2013 (Issue #6)	Updated Laura Gourley, Waste Minimisation Officer, (CDC)	Annual review/update. Includes updated contact names and numbers.
July 2017 (Issue 7)	Updated Steve Clarke Waste Minimisation Officer (CDC)	Annual review/update Includes minor wording changes to reflect the date of this update. Updated 2.6 from AssetFinda to Ozone. Updated 4.4.1 to include 2017/18 works programme activities. Updated 5.2 Landfill Charges to remove volume references. Updated 7.5 to remove reference to waste volume and added in Councils access to the weighbridge software. Updated 9.3.6 to remove reference to volume. Updated Table 6 with further landfill survey photos
July 2018	Updated Steve Clarke Solid Waste Officer CDC	Updated 9.3.6 Power/Weighbridge Failure procedures
May 2021	Updated Peter Askey WSP.	General Update, Section added on Assessment of Effects
August 2022	Updated Gerry Essenberg CDC	General Update

Table 2.5 Issues of Management Plan

2.8 Revision of Management Plan is a Condition of Consent

The Plan is to be reviewed annually or as agreed with Otago Regional Council (94508/5).

It is to be noted that this is an update to the 2021 version and with there being a substantial body of work being undertaken in anticipation of a new consent in 2023, the next version will be written to recognise the proposed works.

2.9 Contractor Induction to Management Plan

Upon engagement of a new landfill contractor firm or incumbent Contractor's Site Operations Manager, the Landfill Owner will conduct an induction of the Contractor and "hand over' of this Management Plan. This is to be recorded on the table on Page ii inside the cover page.

3 LANDFILL MANAGEMENT STRUCTURE

3.1 Management structure diagram

The landfill management and administration is summarised on Figure 3.1.

3.2 Resource Consent Holder

Resource consents (Otago Regional Council) for the site operation are held in the name of the Clutha District Council (CDC). A full copy of the resource consents is included as Appendix 2.

3.3 Land Ownership

The land on which the site is located is owned by CDC and designated for refuse disposal purposes in the District Plan. The balance of the site not used for the landfill is leased for grazing.

3.4 Personnel

3.4.1 Key functions and interactions of named personnel

The key job functions (in regards the landfill operation) and interactions of the identified personnel are set out in Table 2.1

Position	Functions	Primary interactions
Landfill Owner (CDC)	Holder of consents Responsibility for consent compliance Engineer to Contract 670	Water & Waste Operations Manager, Engineering and Contracts Manager
Water & Waste Operations Manager (WWOM), CDC *(Thyagu Gopalan)*	Main Contact to the Solid Waste Services contract 670 Consent Compliance Monitor operational procedures	With Engineering and Contracts Manager, CDC With ORC Compliance Officer With Landfill contractor site manager
Water & Waste Operations Manager, CDC (Gerry Essenberg)	Engineer to the Solid Waste Services contract 670 Overview of landfill operation	With CDC Water & Waste Operations Manager With Landfill contractor site manager
Solid Waste Services Contractor's Contract manager (COM) Graeme Wilson	Implementation of operational procedures Site monitoring for consent compliance	With CDC Water & Waste Operations Manager
Otago Regional Council compliance officer	Monitoring and enforcement of resource consent compliance	With CDC Water & Waste Operations Manager
Landfill Designer (WSP)	Advice on landfill infrastructure extensions, waste acceptance advice	With CDC Water & Waste Operations

Table 3.1: Key job functions

3.4.2 Staffing level

The solid waste services contractor is required to maintain on site at all times when the refuse disposal part of the landfill is open a minimum staff of 2, generally employed in the following operational functions:

- Waste reception and collection of landfill charges at kiosk
- Materials recovery and waste diversion
- Refuse placement, compaction and cover
- Leachate system operation
- General maintenance

3.5 Otago Regional Council

The ORC is responsible for the monitoring and enforcement of resource consent compliance. A Compliance Officer is assigned to the Landfill. The primary contact for the ORC compliance officer should in the first instance is to CDC Water & Waste Operations.

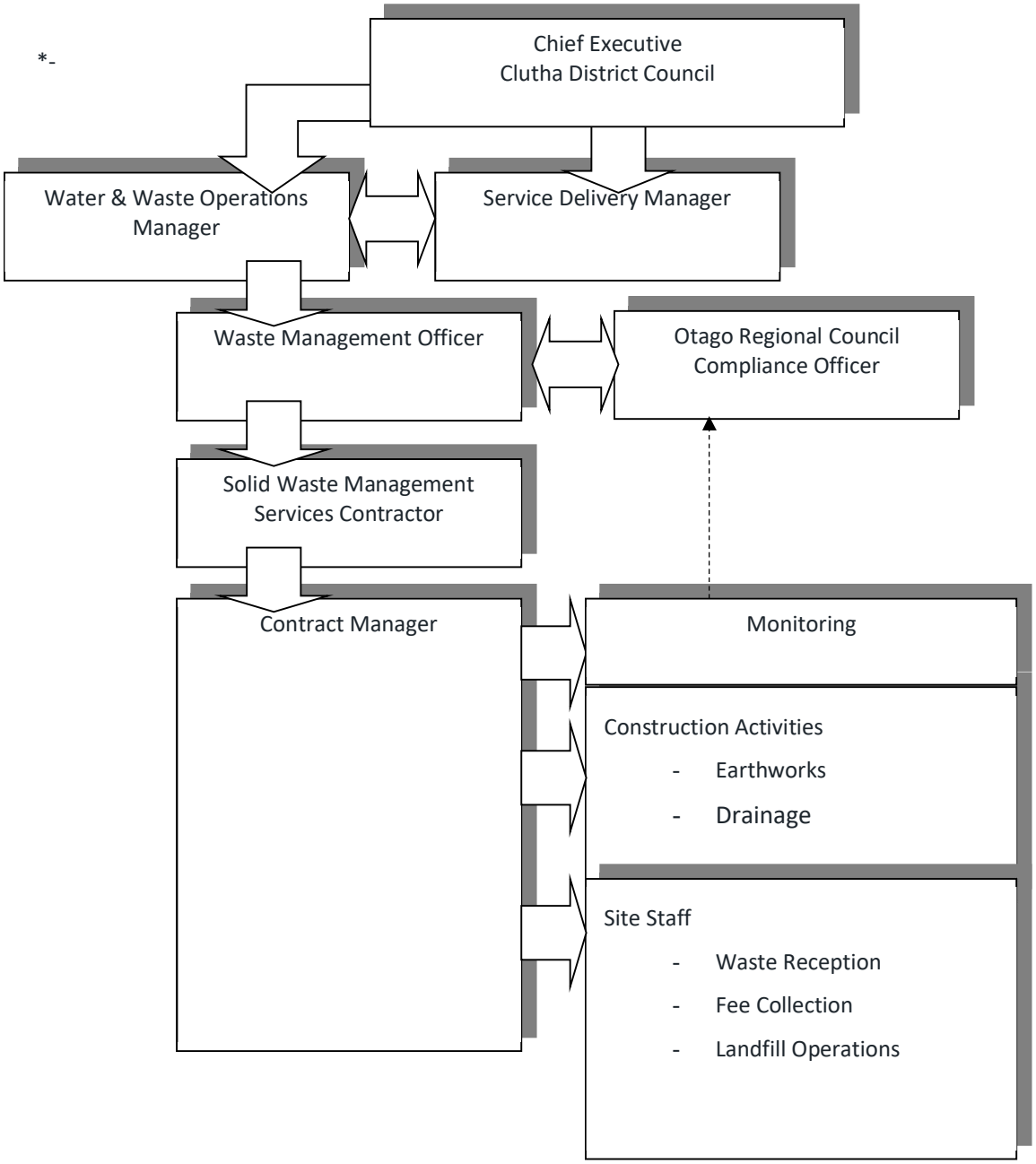


Figure 3.1: Landfill Project Structure

4 SITE FEATURES

4.1 Location and Surrounding Land Use

The Mt Cooee landfill is located off the Kaitangata Highway, approximately 1.2 km from Balclutha. The landfill is located on a 15.77 ha farm property owned by CDC. The site is bounded by the Balclutha golf course across the railway line to the north, farmland to the east, and across the highway, the Clutha River. The railway line runs on the north boundary and the Kaitangata Highway on the south (river) side.

The landfill occupies a shallow valley sloping out to the river at the site entrance. At the current top platform level, the site is reasonably well screened by the landform and vegetation from neighbouring residences.

The closest residences are approximately 400m to the northwest (Arthur Terrace) and 450 to the southeast (rural residence).

4.2 Site Layout

An overview of the site is shown on Figure 1. The site consists of the following main areas:

- Site entrance and stormwater ponds at landfill toe
- Kiosk and recycling area
- Greenwaste processing area on old landfill
- Landfill face for disposal of residual waste
- Borrow area for cover soil and future refuse cells

The general public do have access to the tip face. There is currently no on site transfer area for smaller loads of residual waste, this is in design.

4.3 Existing Vegetation

The balance of the landfill property not in use for waste activities is in pasture and is grazed. There is a high row of pines on the east boundary (rooted in the neighbouring land title). Various tall exotic trees at the site entrance help to screen the site from the Kaitangata Highway.

There are no areas of native vegetation on the property.

4.4 Climate

The site climate is relatively dry with an average rainfall of 670 mm. The dry climate limits leachate generation and would also slow waste degradation (and gas production) compared to more humid climates.

The prevailing wind is from the west blowing generally down the Clutha River valley and so away from town. Winds from the south easterly quarter are less frequent but blow odour towards the main residential areas of town.

The local topography of the site influences the wind regime in the immediate vicinity. It is expected that under low general wind speed conditions, particularly during the night, when katabatic (downhill) flows of cooler air will tend to occur from the elevated areas north of the site, drifting in a southerly direction. These conditions direct airflow from the landfill across the road and out over the Clutha River where any odour would dissipate well clear of any residences.

A weather station has not been installed to record rainfall and wind direction. This data would be useful for managing leachate flows and activities that could be potentially odorous.

4.5 Geohydrology

Bedrock of weathered greywacke is exposed on the valley sides and is generally encountered at shallow (ie less than 3m) depth. Soils on the valley sides comprise topsoil overlying clay soils derived from weathering,

typically 2-4 m deep. The valley floor consists of soft alluvial infill and swamp deposits. Investigations for the landfill construction found greywacke bedrock at a maximum of 11m below ground level in the centre of the valley. This places it some 6- 7 m below the normal level of the Clutha River. To the rear and sides of the site the rock rapidly rises to the surface and is well above the valley floor.

The in-situ permeability of the greywacke rock was found to be in the order of 1 x10^{-8} m/s, although it was acknowledged that permeability in fracture zones could be much higher (Royd's 1994). Groundwater at the site is within the greywacke and generally discharges to the swamp area in the valley floor, with a combination of groundwater and surface water then exiting the site at the entrance through the road culvert to the river.

Any discharges of leachate from the site which are not captured by the leachate collection system are therefore inferred to remain in the shallow groundwater and discharge off the site to the Clutha River predominantly with the surface stormwater as opposed to percolating deeper into the underlying greywacke (See Section 22).

A fuller assessment of the environmental effects of the site is included as Section 22. The Geohydrology is covered in Reference 1 of Table 2.1 (Royds Consulting 1994).

5 LANDFILL DESIGN AND FEATURES

5.1 General principles

The Mt Cooee landfill to date has been constructed as an unlined fill. The natural containment provided by the underlying greywacke rock and the site geohydrology are used to maximise the capture of leachate. As part of the landfill development works in 1995 (note the site had been in use for some 10 years prior to this), a steel sheet pile cut-off wall was installed across the valley floor at the landfill toe. The sheet piles were driven to refusal effectively extending the wall down into the bedrock across the full width of the valley. The sheet pile wall was capped with a low permeability compacted clay bund. The wall and bund have thus formed a dam for groundwater minimising deeper percolation of leachate and making the preferential flow path for groundwater out of the site via the leachate collection system. Some leachates may still infiltrate into the deeper greywacke formation, but this is expected to be at very low levels.

Given the above circumstances the design principles for work on the site can be summarised as:

- Divert upstream catchments and stormwater around/through the active landfill
- Provide a cut-off barrier to deeper groundwater flow
- Provide a system to capture leachate contaminated groundwater for removal to offsite treatment

Future stages of the landfill may include a base liner, in which case the Management Plan will be updated at the time.

The design and specification of materials allows for the site operational life of 30 years and an aftercare period of at least 35 years. Where materials or equipment are utilised which have a lesser operational life, they will be accessible for replacement/refurbishment.

When considered in terms of the landfill classification as set out in the “Technical Guidelines for Disposal to Land” (WasteMINZ 2018), the Mt Cooee site would classify as a “Class 1” site, suitable for general municipal waste. While the site does not have a base lining to the waste cells, the cut-off wall construction and leachate collection system does provide substantial containment to the site and limits offsite migration of contaminants.

5.2 Certifications

5.2.1 Design

All design work will be carried out under the direction of a suitably experienced chartered engineer with specialist experience in the design and management of landfills.

5.2.2 Construction

Construction shall be carried out under the supervision of a suitably experienced chartered engineer.

On completion of each section of physical works the supervising engineer shall certify the works as having been constructed in accordance with the design.

5.3 Reference to design drawings

Design drawings for the landfill are held on Council files SC70/0022.

Design drawings are included as Appendix 3.

5.4 Stormwater Control

The storm water management approach is:

- Separation of 'clean', 'dirty' and 'contaminated ‘water sources.
- Storm water treated at source wherever possible; and

- Storm water management and transport designed such that site stability is maintained and erosion avoided
- Stormwater is detained on site to reduce loads on downstream reticulation

Runoff from the upstream catchment is captured at the boundary with the Golf Course and was diverted beneath the landfill in a 525mm diameter RCRRJ concrete pipe (accessible via 2 intermediate manholes). This culvert discharges at the downstream landfill face and flowed under the Kaitangata Highway to the Clutha River without further treatment. The culvert passes through the sheet pile wall and is encased in concrete at the wall to prevent leakage of leachate/groundwater around the outside of the pipe.

Monitoring of water quality downstream of the culvert had shown that it was discharging water with high ammoniacal nitrogen levels (a sign that leachate is entering the pipe). CCTV inspection has been repeated and identified isolated faults in the culvert and between the riser sections on the manholes. Options for remediating the identified faulty sections of pipe were investigated and remedial repairs to two joints of the main culvert pipes were carried out in 2013. However, this repair did not result in any substantial improvement. Subsequent monitoring of the waterway helped to assess the effectiveness of the remediation works. Following further assessment of the culvert and options for relining, it was decided to completely divert the stormwater around the north side of the landfill, running a new stormwater channel alongside the north side of the railway line. This work was undertaken in May 2021 and the upstream catchment of the main drain was captured on the west side of the railway line and directed to the Clutha River thus bypassing the landfill. The culvert under the railway line was sealed with concrete. The main drain under the landfill may still receive some minimal infiltration from north of the railway line but it is now essentially a leachate collection drain.

In 2022 a manhole and pumping system was installed in the drainage channel to the Clutha River below the sheetpile wall to collect any potential runoff and leachate and divert this into the sewer pump station.

Refer also to the Assessment of Effects in Section 22

Two stormwater ponds capture runoff from the general site including access roads and completed landfill areas, but not the active landfill face. The ponds are 600 m^3 and 1000 m^3 respectively.

Runoff from the active tip face is held in the immediate tip face area for ground soakage and is then captured by the leachate collection system.

5.5 Groundwater Control

There is no infrastructure in place to control groundwater levels. The sheet pile wall effectively dams off the shallow groundwater flowing down the valley and it either infiltrates to deeper groundwater in the greywacke or is picked up by the leachate system.

The greywacke base is of very low permeability.

Future lined cells may include groundwater control drains if subsequent investigations show this to be necessary.

5.6 Leachate Control System

The leachate control system comprises of:

(a) A drainage system comprising leachate collection lines of perforated pipes (primarily drilled DN 100 mm HDPE and DN 110 mm Novaflo) laid on the original valley floor and leachate collection manholes. All lines are designed to allow cleaning with sewer jet cleaning equipment.

(b) A pump station at the downstream face of the landfill transfers leachate/contaminated groundwater to the CDC sewer for treatment. On average 28,600 litres are transferred each day.

(c) A sheet pile cut-off wall driven down to the greywacke rock to contain groundwater

(d) A pond of volume 770 m^3 (lined with 600mm clay with a permeability of < 10^{-9} m/s) is provided as an emergency storage for leachate overflow from the pump station

(e) Groundwater bores around the site perimeter are monitored for parameters indicative of leachate contamination (Section 16)

5.7 Landfill Gas

The main health and safety concerns with landfill gas are the potential for explosions or asphyxiation of personnel on site where gas may accumulate in confined spaces. The primary objectives of gas control are to minimise the risk for unmanaged point source discharges or accumulation of gases; protect adjacent properties from potential gas discharges; reduce odour nuisance; minimise greenhouse gas discharges and reduce damage to vegetation on the landfill cap.

There is currently no gas collection infrastructure in place. To date gas has diffused through the waste and intermediate capping. The site incurs Emissions Trading Scheme liabilities at present based upon the tonnage of waste disposed in a year. Increasingly the ETS costs will be a driver for installation of gas control or possibly even site closure. This situation will be reviewed by CDC on a regular basis. The site management plan will be updated accordingly.

For now the emphasis with landfill gas is on health and safety for the site staff and control of odour nuisance.

5.8 Landfill cap

The landfill cap is to be constructed so as to allow for use of the site for grazing or revegetation. Specific requirements for the cap are:

- 200 mm final cover over refuse
- 500 mm of compacted silt or quarry strippings– permeability range 10^{-6} – 10^{-8} m/s.
- 150 - 200 mm topsoil and /or green waste mulch or other supplement

While not required by the current consent, it would be desirable to include a subsoil layer between the compacted capping and the topsoil. This will improve the resilience of the capping and ultimately make the site more useful.

Capping of a finished cell is to be complete within 6 months of final refuse placement to the cell.

5.9 Design Contour and Filling Rate

Final design contours for the site are shown on Plans 46831.01/19 and 46831.01/20 in Appendix 3. This provides for some additional fill over and above that filled to date. With extension onto adjacent ground the fill volume of approximately30,000 m^3 is achievable. These plans are being revised for the next consent.

5.10 Ancillary Facilities

(i) Hazardous Waste Temporary Storage building

A lockable concrete shed is provided on a bunded concrete slab for temporary storage of small amounts of hazardous waste.

(ii) Staff Facilities Building

This is required to provide adequate and safe facilities for operations staff. Ablution facilities include toilets and adequate washing areas.

Safety equipment shall be stored in a dry, accessible area, ready for emergency use.

(i) Kiosk

All traffic must pass the kiosk and weighbridge before entering the resource recovery and disposal areas of the site.

5.11 Ash pit

A separate area is provided for the disposal of ash. This is to ensure hot ash will not ignite refuse. The pit is hazardous and must be fenced and signposted.

5.12 Septage and liquid waste disposal

Presently the site accepts septage and grease trap waste plus occasional other liquid organic wastes from food processing. This is disposed of by excavating a pit of approximately 20 m^2 by 2 m deep into old refuse. Each pit lasts approximately 1 to 2 months and is covered with old refuse on completion.

Both the initial excavation and the on-going operation of the liquid waste pits are significant sources of odour from the site. This needs to be managed by timing operations for appropriate wind directions and covering material immediately after dumping. The liquid also contributes to leachate from the fill.

This process is to be reviewed as part of the Development Plan.

5.13 Site Roading

Roading is designed for safe, economic, all-weather access. Horizontal alignment shall be designed to encourage operating speeds of no more than 20 km/hr. Vertical alignment shall be designed for a safe margin above 20 km/hr. Site roading is unsealed. Waste oil is no longer used for dust control.

The roading is to be reviewed as part of the Development Plan.

6 LANDFILL OPERATIONS AND GENERAL SITE MANAGEMENT

6.1 Relevant Code of Practice

The site is operated generally as per the WasteMINZ "*Technical Guidelines for Disposal to Land (2018)*", being the most up to date NZ waste industry Code of Practice.

6.2 Control of site access

6.2.1 Right of access

All access is under the control and at the discretion of the CDC. The landfill Contractor may refuse entry to any vehicle which does not comply with the waste acceptance requirements of Section 7.

Public access to the landfill disposal area of the site is currently permitted. An on-site transfer station for the general public may be added in future.

Public after-hours access to the landfill site is prohibited. In emergency situations the landfill Contractor will be available to provide access.

Staff and agents of the consent authority, being the ORC, have right of access to relevant parts of the site at all times for purposes related to monitoring and enforcement of the resource consents as per s332 of the Resource Management Act. Normally the Water & Waste Operations Manager (WWOM) from CDC or his representative would be contacted in advance to accompany such staff. To cover Health and Safety responsibilities of the site operator, consent authority staff with responsibility for the site inspections will be asked to complete a site induction so they are familiar with the site hazards should they be on the site unaccompanied by the operator.

6.2.2 Hours

Hours open to public are:

Monday to Friday	8.00 am to 4.30 pm
Saturday and Sunday	10.00 am to 4.30 pm

Christmas day, New Year's Day, Good Friday, Anzac morning: Closed to all private vehicles.

6.2.3 Signage

Signs at the Entrance Gate

Signs will be maintained at the entrance to the site throughout the life of the landfill. These signs identify the following:

- *Hours of access.*
- *The type of wastes that are non-complying and prohibited at the landfill site.*
- *Any safety issues relating to the site including safe traffic management matters.*

The entrance sign includes a list of emergency after-hour contacts and associated telephone numbers.

Signs at the Kiosk

Signs will be maintained at the kiosk area throughout the life of the landfill. These signs identify the following:

- *Wastes that are accepted at the recycling facilities.*
- *Wastes that are accepted at the re-usables shed.*
- *Wastes that are accepted in the hazardous substances store.*
- *Wastes that are not accepted at the transfer station and landfill.*

Specific warning signs to be placed around potentially hazardous areas including liquid waste (septage) pits, leachate chambers, gas vents (if in place) etc.

6.2.4Security

The site entrance is securely locked after operating hours. The entire site perimeter is provided with a stock proof post and batten fence.

6.2.5 Scavenging

Scavenging of the waste after placement on the face is not permitted.

6.3 Landfill charges

Charges are set by Council annually and publicly notified. A weighbridge is used to capture weights of all vehicles and provides a charging basis for all loads with the exception being a charge for up to 4 x 70l bags. Recycling drop offs are free and a 50% discount is given on greenwaste that is separated and placed in the designated greenwaste area.

E-waste is charged as per the receiving recycler.

6.4 Complaints procedure

A register of all complaints received (directly or through another party) in relation to the landfill operation is kept by the Area Engineer. Complaints are logged initially in Council's customer feedback system Ozone. This records:

- Source of complaint, name of complainant and address (if given)
- Nature and cause of complaint
- Response made and actions taken
- Comment on any unusual activities onsite or weather conditions at the time

The target time frames for complaints are to acknowledge the complaint same day of receipt (if received indirectly) and to provide a response or explanation within 5 working days.

6.5 Staff Training

Annual training for all site staff shall be provided on site waste acceptance criteria, hazardous waste identification, emergency procedures, and the contractor shall ensure that all site staff attend. Written evidence and attendance to be provided.

Supervisory staff are to be familiar with this Management Plan. The formal induction procedure is covered in 2.9, above, and is to be recorded on Page ii inside the cover.

6.6 Inspections

Regular visual inspections of all the key aspects of the site will be undertaken by the landfill staff at the frequency as set out in the table below:

Table 6.1. Inspections of landfill site

Item for Inspection	Personnel	Frequency
Leachate drains, manholes and pumpstation Note – leachate system manholes are painted red, stormwater blue (ideally should be green).	Landfill staff, WWOM	Every day site is attended, monthly overview and before and after heavy rain.
Perimeter stormwater drains	Landfill staff, WWOM	Monthly and before and after heavy rain

Tip face and landfill cover – extent of cover and size of active face	Landfill staff, WWOM	Daily at conclusion of refuse compaction operations
Tip face – fire risk	Landfill staff	Daily at conclusion of refuse compaction operations. Visual check for any smoke prior to leaving site
Stormwater ponds	Landfill staff	Weekly and after heavy rain
Litter inspection	Landfill staff, WWOM	Whole site monthly, access road daily
Birds and vermin	Landfill staff, WWOM	Monthly
Dust nuisance	Landfill staff, WWOM	Daily during dry conditions
General site inspection	Water & Waste Operations Manager	Biannually
Hazardous waste holding facility	COM	Weekly
Inspect Groundwater and surface water sampling points for access, damage to well heads etc[1]	Environmental Scientist	Quarterly (Refer Figure 1 for monitoring points)
Refuse Compaction	Water & Waste Operations Manager	Annually
Ground Stability and geotechnical issues	Specialist Geotechnical Engineer	Annually

A general site diary, recording the date and time of site inspections will be kept.

[1] *Groundwater sampling should be undertaken by a trained technician, and in accordance with an ORC approved procedure*.

7 WASTE ACCEPTANCE

7.1 Transport of waste to site

All waste is to be transported to the site either in a fully enclosed vehicle/container or otherwise secured to avoid loss of material in transit to and within the site.

7.2 Domestic waste

The site is operated as "Class 1"landfill. Primarily the site is available for the disposal of general municipal waste of a domestic/household nature or from businesses and farms. By nature, this waste will contain small quantities of hazardous wastes or special wastes and this waste is accepted. Such wastes would normally constitute less than 1.0 % of the overall waste stream.

7.3 Hazardous and Special wastes

7.3.1 Definitions

The following definitions are used herein:

Hazardous Waste:

Wastes which require special measures in handling and disposal due to some inherent hazardous property. Hazardous wastes are not suitable for general landfilling.

Hazardous wastes involve a danger to human health/safety or potentially harmful environmental effects. Properties which could cause this include toxicity, carcinogenicity, flammability, chemical reactivity etc. Effects could be immediate or accumulative in the environment. Examples include solvents or heavy metals in a readily leachable form.

Special wastes:

Materials which require special measures in their handling and disposal but are not necessarily hazardous. Examples could be wastes which are noxious due to odour, produce excessive dust or require confidential disposal. Included are some wastes which will be neutralized or stabilised by processes within the landfill.

7.3.2 Hazardous wastes acceptance

Hazardous wastes are generally not accepted in the Mt Cooee landfill except:

- In small quantities as can be reasonably be expected to be found in normal domestic refuse (Section 5.3.2)
- If subject to a specific application and approval for disposal as special wastes

Large hazardous waste consignments will not be accepted, and the generator of such waste will be responsible for the secure transport, treatment and disposal out of the district.

7.3.3 Special wastes acceptance

Special wastes are accepted under a licensing procedure. The waste generator is required to contact CDC in advance requesting disposal. An application to CDC as set out in the Solid Waste Bylaw is required (refer Appendix 4 attached). The application is assessed in terms of the Bylaw "Schedule B: Special Waste Definition and Classification" and the waste disposal approved with conditions as appropriate. A specific permit is issued for a special waste disposal and must be produced at the kiosk. A waste manifest is kept at the kiosk that records the waste type and quantity and also provides for a record of the location in the fill where the material is placed. Location of special wastes is only recorded for selected materials where future location could be relevant. Examples would be asbestos wastes.

7.3.4 Storage of Unacceptable Wastes

For wastes that are not acceptable for landfill disposal in terms of the preceding sections of this plan, a building is provided (at the landfill site) for the storage of some of these materials until such time as they can be removed off site.

Unacceptable wastes will be stored in this building provided that the material is:

- Accompanied by documentation identifying the material (where known)
- Packaged in a safe and secure container appropriate to the waste type
- Appropriately labelled
- A quantity that can reasonably be stored in the building
- Able to be separated from incompatible waste by an appropriate separation distance
- Allowed to be thus stored under appropriate regulations

Wastes will be removed from this building as soon as an appropriate disposal method is available. It is envisaged that small quantities of agricultural chemicals would be the main type of material falling under these provisions.

Each week an inspection of the wastes stored in the storage building will be carried out. The person carrying out the inspection will look for signs of leakage, build-up of gas (bulging containers), indications of reaction or any other indication that the wastes are not properly contained or are becoming unstable.

The results of these inspections will be recorded.

Emergency Procedures

Refer Management Plan Section 18.

7.3.5 Odorous and Dusty Wastes

Some materials require special measures for disposal at the landfill as if incorrectly disposed of they can give rise to nuisances.

Wastes that can be included under this heading are:

- Grease trap wastes
- Septage from septic tanks
- Fish and animal wastes

These wastes are accepted in the landfill. Solid wastes of this type are discharged at the landfill face and covered immediately. Septage and grease trap waste is to be discharged to the purpose built septage pits and not to the general tip face.

Odorous wastes to be covered with soil immediately.

7.3.6 Inspection of waste

Incoming waste is inspected visually at the kiosk. The compactor operator also observes the waste as it is spread. A log is kept of the waste load type, which generally will be municipal waste. Special wastes are recorded in the Waste Manifest as per Section 7.3.3.

8 RESIDUAL WASTE DISPOSAL OPERATIONS

8.1 Equipment

Adequate plant, equipment and machinery in good working order is to be kept on site at all times. The normal site plant is to consist of:

- a specialised compactor for refuse compaction
- A front-end loader and/or hydraulic excavator

When plant is unavailable due to maintenance etc alternative plant shall be hired as required. The landfill operator shall have arrangements in place to provide alternative plant for the compaction and cover of refuse.

8.2 Tip faces

The general public has access to the tip face. The width of the tip face is to be kept to the smallest practicable consistent with the expected vehicle numbers and not to exceed 30 m if possible.

8.3 Placement of refuse

Incoming refuse to be deposited at top or bottom of face and bladed into a layer of 0.5 m thickness for compaction.

The intended filling sequence is:

- Commence by end tipping from entrance end of cell
- fill in lifts across the cell width
- Each lift to be a height of approximately 2.5 m

See Appendix 5 for planned filling sequence.

8.4 Compaction

Placed refuse is to be compacted by sufficient passes of the compaction plant to ensure that a reasonable density is consistently achieved and adequate control over nuisances is able to be maintained.

8.5 Cover (Daily, intermediate)

Daily cover of refuse is not routinely applied. Nuisances (odour, litter, birds, vermin) are controlled via other means, such as compaction of the final surface at day end, and wind fence.

Additional sources of cover include clean fill delivered to site, which is required to be stockpiled separately for use as required. Alternative cover materials such as shredded green waste, bark or netting may be used on occasion, provided adequate control over nuisances is maintained at all times.

8.6 Site Roading

Site roading is to be maintained in a trafficable condition at all times without excess dust nuisance or mud.

9 STORMWATER MANAGEMENT

9.1 Stormwater on refuse face

The compacted cover to the active tip face, uncovered refuse and immediate access area will be shaped and sloped to ensure that runoff ponds on the completed fill, for soakage to underlying landfill cells and ultimately to the landfill leachate system.

9.2 Stormwater from access areas

Stormwater from areas of intermediate cover, internal roading and vehicle turning areas shall be directed to the landfill face or to the stormwater ponds, as appropriate. The amount directed to the landfill face shall be minimised consistent with operational constraints.

9.3 Stormwater from rehabilitated areas

Stormwater from areas of the landfill which have received final cover and have been grassed can be discharged directly offsite through the existing network of stormwater drains and culverts.

10 LEACHATE MANAGEMENT

10.1 Collection drains and sumps

A leachate collector drain is provided to the landfill. This collects a mixture of leachate and groundwater.

Leachate is pumped from the sump to the sewer as required. A clay-lined pond is provided for emergency leachate storage

10.2 Operation and maintenance of leachate pumping

The leachate pump station has two pumps in the sump. Operation of the leachate pumping is as follows:

- Pump station left to operate on float switches
- Every day when the site is attended (all weekdays) the following checks are to be made and documented: *confirm pump operating ok, volume pumped since last visit (hours run on pump), level of leachate in holding pond, rainfall, volume of leachate removed.*

10.3 Procedures for heavy rain

In event of heavy rainfall at the site (say > 25 mm over 24 hours) the following actions are to be taken:

- If heavy rainfall warning is issued by Met Service, the site is to be visited to ensure stormwater drains are clear and the leachate level in the wetwell is pumped down
- The site is to be inspected by 12.00 midday on the day after any heavy rain (holidays or weekends not withstanding). The leachate level is to be checked and any accumulation pumped away as necessary. Stormwater drains and ponds are to be checked. Inspections to be recorded in the site diary.

10.4 Maintenance of leachate lines

Maintenance procedures include:

- Water flushing
- Sewer jet cleaning
- Rodding
- Chemical cleaning (if necessary). Chemical cleaning is more likely to be required on leachate rising mains

The efficiency of the leachate drainage system is monitored by tracking volumes by the pump station removed against rainfall. A lengthening of the time between rainfall and response of the pumpstation would be indicative of a loss of performance.

10.5 Recirculation of leachate

Leachate is not currently recirculated.

10.6 Removal of leachate from site

Leachate/groundwater from the site is accepted as a trade waste to the Balclutha sewer system for treatment in the Balclutha oxidation ponds.

11 LANDFILL GAS AND ODOUR

11.1 Landfill Gas

11.1.1 Management of Gas Emissions – to date and current

To date the landfill gas emissions from the Mt Cooee landfill have been managed by passive venting through the active fill area and the intermediate capping. Gas also accumulates in the leachate collection system and all parts of the leachate collection system shall be assumed to be so contaminated.

The site is remote from any adjoining property that could be affected by gas migration.

11.1.2 Management of Gas Emissions – future

Flaring or use of gas is not currently proposed but may be an outcome of future reviews of landfill gas management.

11.2 Odour

11.2.1 Key Performance Requirement

There shall be no objectionable or offensive odour detected beyond the boundary of the consent holder's property as a result of the activities on site. Odour discharge shall be kept to the minimum practicable.

11.2.2 Management of Odours

The main potential sources of odour at a landfill are:

- *General waste deposited on site at the working face;*
- *Odorous waste;*
- *Excavations in old waste; and*
- *Landfill gas generated from waste decomposition.*

Odours from incoming waste can periodically occur, especially when the waste contains putrescent materials or when odorous waste is deposited at the landfill.

Odorous waste is considered as a “Special waste” as per Section 7.3.3 and is only accepted by prior arrangement. Generators of odorous waste will be required to deliver such waste prior to putrefaction or to treat it with deodorant chemical sprays to reduce nuisance odours. Highly odorous loads of waste will generally not be accepted at the landfill without pre-treatment to reduce the odour.

Sound day to day management practices on the site such as the regular covering of waste and only having small sections open at any one time, reduce the risk of such effects. The necessity for excavations in old waste will be kept to minimum and deodorant chemicals will be applied to control odour production when required. If instances occur when the acceptance of particularly odorous waste will be unavoidable, these will be scheduled for delivery early in the day so they are well covered before completion of the day's operations. Deposition of odorous waste will be avoided on days when wind direction may carry the odours to neighbouring properties. The weather station is an important tool for managing odour effect from specific operations.

11.2.3 Monitoring for and prevention of Odour

Odour is the main cause of complaint from landfills and one of the most difficult aspects to control. Odour management must be proactive. Specifically:

- Daily when opening the site check the wind direction and check for odour at the Kaitangata Road gate and at the kiosk
- If odour is noticeable at these locations scout around the fill itself to see if there is any obvious source/cause
- Use the weather forecasts and known wind flows to time any potentially odour releasing operations.
- Be aware that wet weather is often worse for odour as the refuse decomposes more rapidly. Be prepared with additional cover in stockpile. Maintain surface drainage away from the active tip face. Do not allow

leachate to pool on the fill surface. If necessary excavate pits to break through any sealing layers that are preventing drainage.

12 NUISANCE CONTROL

Nuisance control measures are summarised in Table 12.1 below

Nuisance factor	Compliance requirement	Routine control	Inspection/ Monitoring	Contingency control
Noise	None specific	All plant and equipment to be appropriately muffled Adherence to hours of operation	Periodic assessment by WWOM.	Non-complying plant to be removed or repaired. Alter hours of operation
Dust	Cause least practicable emission (94510/3)	Water cart in dry weather Grassing to all areas of temporary capping or areas waiting final capping as soon as conditions permit. Waste oil	By Landfill Contract manager in dry weather .	Water cart Change dumping location to minimise trafficking of dusty surfaces Provide seal areas
Odour Birds	(94510/2 & 4)	Cover and compact incoming refuse. All odorous wastes to be buried into the landfill mass and immediately covered with at least 300 mm of cover or refuse Compact refuse Bird scaring (Gas gun)	Daily by COM Periodic assessment by WWOM. Assessment by WWOM	Increased use of cover to provide deep burial of odorous material. Odour suppressants
Vermin		Compact refuse Maintain bait stations on landfill perimeter	6-monthly assessment by WWOM	More extensive poisoning if infestations develop
Insects		Compact refuse Immediate burial of putrescible waste	Assessment by WWOM	Spraying of problem areas as required
Smoke	(94508/4)	Burning on site is **NOT** permitted		Extinguish immediately – refer contingency plan
Litter	(94508/1)	Movable screens to tip face, maintain and clear screens weekly or as required Debris fences to site perimeter Daily (when site operative) litter collection to general site,	Monthly assessment by WWOM Remove litter from stormwater ponds as required.	Increase litter collection. Additional fences

Nuisance factor	Compliance requirement	Routine control	Inspection/ Monitoring	Contingency control
		access roading and adjoining property Education to landfill users regarding load security Monitor wind forecast and cover in advance of high winds when possible		
Stock		Maintain fences to exclude stock	Monthly inspection by WWOM	Repair as necessary

Table 12.1: Nuisance control

12.1 Birds

12.1.1 Birds

Bird control is essential to avoid the build-up of large colonies of birds such as seagulls at the landfill site. While daily cover of the waste avoids encouragement of birds, should they become a problem, bird poisoning programmes and as a last resort a shooting cull down of the numbers may become necessary. The bird populations on site shall be controlled in a manner approved by the Water & Waste Operations Manager.

Note: Some population control action such as the culling of gulls may require permissions from other government agencies. Note that the smaller red billed and black billed gulls are a protected species.

12.1.2 Avian Botulism

Avian botulism infects ducks and other waterfowl in hot summers when water conditions in ponds becomes poor. The disease is transmitted from carcasses of dead birds to live birds via maggots. This cycle can lead to severe outbreaks with high mortality of birds. The spores of the bacteria that causes botulism are persistent and can survive in sediments in ponds for years. Unfortunately, once a site has had an outbreak, the botulism spores are much more prevalent and the likelihood of another outbreak in future years increases dramatically.

There are some common indicators of when botulism is likely to occur, e.g. temperatures >25 degrees for sustained periods with low or no rainfall, low dissolved oxygen in stormwater retention ponds, or anoxia. Fish or invertebrate kills can be an early sign that the disease is becoming active.

The key to minimising the disease is to recognise the causative factors early, and take action to break the infection cycle as best can be done:

12.1.3 Prevention:

If any of the above indicators are observed at the site, it should start to raise red flags. If lots of healthy birds are present it will help to disperse them using bird scaring measures such walk up disturbance, shotguns, bird fright, lasers, electric fences, and so on. Surveillance should commence leading into Christmas and into the New Year. Aeration of the ponds may be a useful preventative measure (e.g. using a floating solar powered mixer or a pump to spray water back over the surface).

12.1.4 Outbreak underway:

Immediate carcass removal before the maggot cycle establishes is the only way to help an outbreak abate once birds are falling sick and dying. The carcasses should be removed to the landfill for immediate burial at a depth where any maggots will not be able to surface. Use PPE when handling carcasses and observe good hygiene. Disperse remaining birds.

13 OPERATION OF WASTE DIVERSION FACILITIES

13.1 Recycling drop-off facilities

Receptacles for recyclables are provided adjacent to the Operators Booth. These include;

- 240L bins for co-mingled consumer recyclables including;
- Clean, rigid plastics - Types 1, 2 & 5
- Paper and flattened cardboard
- Aluminium and steel cans
- 240 litre wheelie bins for clean, glass bottles and jars

Co-mingled recyclables are collected and transported to Dunedin for sorting and recycling as part of the kerbside recycling collection.

Glass is stockpiled on-site for beneficial reuse within six months. Beneficial re use includes use on-site as a construction material for maintenance of access roads and drainage.

13.2 Greenwaste area

An area for greenwaste area is provided, away from the tip-face, for customers to place their greenwaste including lawn and hedge clippings, leaves, weeds and tree trimmings (branches must be less than 150mm in diameter). The greenwaste area is located over the landfilled ground so that leachate from it is collected into the leachate system. Greenwaste can be a source of strongly tannin-stained leachate.

At least once every six months this greenwaste is shredded. The mulch is given away to customers for free or reused on site.

13.3 Steel & whiteware

An area for storage of steel, car bodies and whiteware is provided. Material is stored awaiting collection and removal from site by a scrap metal collector. Metal is removed at a maximum of 6-month intervals. Bait stations for vermin are maintained in the stockpile.

Car bodies are not to be stored more than four high.

The Landfill Contractor is required to ensure oils and hydraulic fluids are removed from all vehicles and CFC's or other refrigerants are removed from whiteware prior to disposal, as required by the CDC Solid Waste Bylaw. Any oils or hydraulic fluids removed at the Landfill can be disposed of to the waste oil collection tank on site.

LPG gas bottles and stored separately and are managed by the contractor.

13.4 Operation of septage site

Specific requirements for the disposal of septage and liquid waste are:

(i) Pit excavated into old refuse, fenced off and signs erected

(ii) Excavated pit refuse to either be incorporated into the active face and covered at the end of the day, or spread and covered with intermediate cover adjacent to the pit excavation

(iii) Only Septage haulers approved by CDC are to use site

(iv) Logbook to be kept on site of date/names of hauler/volume/source of waste

(v) Vermin to be controlled

(vi) Lime to be added as necessary to control odour

(vii) Pit to be covered when full.

(viii) Only septage and grease trap to be deposited in pits. NO OIL.

14 HEALTH AND SAFETY

14.1 Hazard register

The landfill is by nature a potentially hazardous site. The table below lists the main hazard areas.

Hazard	Specific measures to mitigate
Heavy machinery	• Maintain adequate roading and turning areas • Public prohibited from scavenging tip face • Site staff and visitors to wear safety jackets on site • Heavy machinery operations around materials recovery areas ideally undertaken when site is not open to public, or if unavoidable, use appropriate traffic control
Liquid waste disposal (septage) area	Fence and signpost
Leachate drain manholes – gas hazard	No entry to manholes or pump chamber without testing and the use of breathing apparatus
Landfill gas: General	Gas monitoring procedures and precautions to be undertaken for any ground disturbance, trenching, manhole work etc. Regular monitoring around all buildings
Fire	No smoking. Electrical installations to be appropriate for gas conditions
Firearms	Secure storage for any firearms used in pest control – note any shooting is by contract
Fridges etc – hazard to children	Destroy door locks immediately on receipt
Hazardous materials	Provide secure storage for limited quantities of hazardous materials and appropriate protective clothing
Asbestos containing materials	Refer waste acceptance. Asbestos wastes to be immediately buried. PPE as appropriate.
Chemical Spillages	• Visual inspection of loads at kiosk and on face prior to spreading • Use of PPE including respirator • Refer Contingency Plan Watch for any fumes, strong odours associated with loads or spilt material
Noise	Ear protection for site staff
Dust	Face masks or respirators as appropriate for site staff Enclosed cab with filtered air for all compaction and earthmoving plant working on the landfill face
Infection	Provide hygienic wash facilities and ensure staff use them. Require current tetanus vaccination. (Hepatitis not required)
Trips and falls	• Maintain a tidy site and remove unnecessary trip hazards. • Avoid any foot access on landfill face itself until refuse compacted and covered
Sharp objects	• Site staff and visitors to wear appropriate PPE – e.g. Footwear and gloves.

Hazard	Specific measures to mitigate
	• Avoid any foot access on landfill face itself until refuse compacted and covered
Confined Space at pump station and on leachate network	• Appropriately trained personnel only are to enter the site

Table 14.1: Hazard register

14.2 Equipment

The following safety related equipment to be kept on site:

- First aid kit
- Face masks, respirators and earmuffs
- Spare safety jackets and hard hats
- Potable water
- Warning tape, cones and safety fencing mesh
- Firefighting equipment appropriate to likely fire types e.g. foam etc
- Tyvek protective suit, rubber boots and gloves (3 sets minimum)
- Clean 200litre HDPE drums, with appropriate pump that can work from a vehicle battery, for spill containment
- Clean sand or sawdust for liquid spill absorption

14.3 Training

All operators will be licensed for heavy plant operation and have received adequate safety training.

At least yearly, all staff will receive periodic training in landfill operation emergency procedures, and other relevant skills, including identification and handling/storage of hazardous wastes.

Full training shall be given to any back-up staff and/or temporary staff as appropriate for the work being undertaken. The training shall include emergency procedures.

Refer Section 6.4 also.

14.4 Health & Safety Meetings

Regular review of health and safety matters is a key part of building a health and safety culture for the operation. The following are held:

- Weekly health and safety tailgate meeting by/for contractor's staff
- Specific health and safety plan and start up meeting for any one off construction or maintenance activities.
- 3 monthly joint review by the Water & Waste Operations Manager (CDC) and the Contractor's Operations Manager.

14.5 Emergency Contacts

A list of emergency contact telephone numbers is held at the landfill office at all times. A sign at the entrance to the site also displays the afterhours emergency contact telephone numbers.

14.6 First Aid

First aid kits are kept on site at all times. Kits are of sufficient content to provide for the number of staff, contractors, and general public expected on site at any one time and to provide for the nature of the hazards the site may pose.

At least two on-site staff members have a first aid certificate to a NZ Red Cross CPR and Basic First Aid level or equivalent standard.

One phone is available at all times on site (either a fixed line or a mobile phone) for emergency purposes.

15 MONITORING

15.1 Visual inspections

Regular visual inspections of all the key aspects of the site are undertaken by the staff at the frequency as set out in the table below:

Item for inspection	By Who	Frequency	Comment
Leachate drains, pump station and holding pond	Landfill contractor WWOM	Every day site attended Monthly overview	Inspection required in advance and after heavy rain
Perimeter stormwater drains	Landfill contractor WWOM	Prior to forecast heavy rain and after rain Monthly	Remove litter as required
Stormwater ponds	Landfill Contractor	Weekly or after significant rainfall	Remove litter as required
Litter inspection	WWOM Contractor	Monthly Access road daily	
Bird and vermin	WWOM	Monthly	
Dust nuisance	Landfill Contractor	Daily in dry conditions	
General site inspection	WWOM	6 Monthly	
Hazardous waste storage	WWOM	Monthly Weekly by Site Contractor	
Groundwater and surface water sampling points	WWOM		
Refuse compaction	WWOM	Annual	
Landscape plantings	WWOM	3 monthly	
Gas Monitoring	Landfill Contractor	3 monthly	

Table 15.1: Inspection schedule

A general site diary recording inspections, incidents etc is kept. Records filed to CDC files fA245 (SC70/0022 & SC70/0670).

15.2 Refuse composition & site usage

A daily record of customer numbers and waste types shall be kept by the operator and provided to Council monthly.

15.3 Refuse volume

The fill volume is assessed on 6-monthly basis by topographic survey and is arranged by the Water and Wastewater Operations Manager to occur in April and October each year

15.4 Waste deposited

Incoming refuse is weighed across the site weighbridge. Council has accessed the weighbridge software for purposes of returns under the Waste Minimisation Act 2008 and Emissions Trading Scheme.

The incoming waste tonnage divided by the 6-month volume assessment is a key parameter for assessing the efficiency of the site filling and degree of compaction.

16 ENVIRONMENTAL MONITORING

16.1 Responsibilities

Environmental monitoring for consent compliance and general status information is undertaken by CDC staff working under the direction of the Water & Waste Operations Manager. The WWOM is responsible for ensuring data is collected according to the timetable and reported to WRC in the specified timeframes.

The Operations Contractor (Led by the COM) is responsible for day-to-day visual observation of the site and notifying the WWOM of any unusual conditions such as discolouration of water channels. The COM is responsible for protecting all the monitoring points from damage, keeping them clear of vegetation and ensuring easy access for monitoring and compliance staff.

16.2 Leachate characterisation

Leachate is to be monitored according to schedule LEA 1 in Appendix 1. Leachate is monitored at the Pump station.

16.3 Surface water

Surface water is to be monitored according to schedules SW 1 and WC 1 in Appendix 1.

Surface water is monitored at the following locations:

- WC1 – watercourse upstream of landfill in Golf Course
- WC2 – watercourse downstream of landfill in drain immediately before discharge to river
- WC3 – drain from landfill at discharge point of culvert under fill
- SP1 – Silt Pond 1
- SP2 – Silt Pond 2

16.4 Groundwater

Groundwater is to be monitored according to schedule GW 1 in Appendix 1.

- GW1 – Upstream control bore in Golf course
- GW2 – Bore at landfill toe immediately downstream of sheet pile cut-off wall
- GW3 – Bore at site entrance beside access road
- GW4 – Bore at south end of landfill toe
- GW5 – Bore at middle south edge of landfill
- GW6 – Bore at middle north edge of landfill west of the TMH
- GW7 – Bore at east end/head of landfill adjacent to railway line

16.5 Landfill gas

Visual inspection for landfill gas is required (94510/4). All enclosed structures where practicable are constructed with an airspace under the floor fully vented to the atmosphere.

16.6 Dust

Visual inspection according to Table 15.1. No specific measurement of particle deposition is required.

17 REPORTING

17.1 Reporting of monitoring data

Reporting of compliance monitoring data to ORC is required as per table 17.1

Monitoring data	Reporting frequency
Leachate quality	3 Monthly
Groundwater quality & Quantity	3 Monthly
Surface water quality	3 Monthly
Gas Monitoring	3 Monthly

Table 17.1: Reporting schedule

17.2 Annual Audit Reports

Each year for the year ending 30 June, by 31 August, a report will be prepared on the landfill operation summarising the following matters

- Operation of surface water control structures
- Height and shape of fill (results of contour survey)
- Capping and restoration including landscaping activities
- Training records
- Consent compliance
- General comment on status of operations, problems experienced, upcoming works

The annual report will be issued to ORC and is public record.

17.3 Contingency reporting

In event of untoward discharges to natural water the following reporting schedule to be followed:

- Notify ORC, within **24 hours**
- Report in writing to ORC, within **7 days** on manner and cause of escape, control measures taken, and steps taken to prevent a recurrence

18 CONTINGENCY PLAN

18.1 Contact numbers

The following contact numbers apply:

Person or Organisation	Contact	Contact Nos
ORC	Compliance Officer	03 474 0827
CDC	Water & Waste Operations	03 419 0245
Landfill Operator	Landfill Manager	027 825 8811
Fire service	NZ Fire Service – Balclutha VFB	111
For advice on special wastes	WSP (Peter Askey)	0274 766 459 or 07 308 0139

Table 18.1: Emergency contact numbers

18.2 Emergency equipment/resources

Equipment kept on site:

- First aid kit and protective gear (section 5)
- Soil stockpile for smothering fires, containing liquids
- Absorbents (sand, sawdust)
- Oil absorbent boom for stormwater ponds or stream
- Lime
- Fire extinguisher

Equipment/materials available on call:

- earthmoving gear, water tanker

18.3 Specific situations

Indicative responses to possible contingency situations are given below. In all cases outside advice should be sought where uncertainty as to the appropriate response exists.

18.4 Fire

No Fires will be deliberately lit at the site. All fires must be extinguished immediately. A water tanker and associated equipment that is fit for purpose for extinguishing landfill fires will be available on call.

In recent years there has been a low probability of fire at landfills due to the compactness of refuse, prompt daily cover and no deliberate lighting of fires as historically practiced at older refuse tips. However recently landfills have seen an increase in fires. This is most likely caused by lithium batteries being disposed of in mixed refuse. When crushed the batteries can ignite, leading to flare ups which may not surface until some hours later.

A visual inspection of the active fill area for smoke is made at the conclusion of each working day before leaving the site. In future if landfill fires become a problem remote sensing of fire may prove necessary.

Should a fire occur, the immediate action would be to smother the fire with sand or soil to hold the situation until the fire service can respond. An obvious surface fire should be doused with water. The fire service will be called immediately a fire is detected.

Once a fire has established and is burning down into the refuse then soil smothering or surface water application will probably be insufficient. An excavator will be needed to expose the burning material so it can be doused with water, if necessary, by helicopter and monsoon bucket.

A deep-seated fire may require specialist techniques such as nitrogen injection. Specialist advice will need to be sought. Note that if a fire burns deep in the refuse the fill will become unstable with large voids and be a hazard for machinery.

After A Fire

The consent holder shall notify the ORC within 24 hours of emergency services needing to attend the site to respond to a fire or a landfill gas related incident.

As soon as practicable after any fire or smoke where emergency services are called, the consent holder will provide an investigation report to the ORC setting out:

- *The cause, or likely cause, of the fire/smoke*
- *When it was first noticed*
- *Actions taken*
- *Whether the liner or any other landfill infrastructure was, or is likely to be, damaged*
- *Any remedial actions necessary (to the liner or the environment)*
- *Measures that shall be taken to avoid re-occurrence and subsequently updating the relevant parts of the Site Management Plan as necessary with these measures as well as other relevant lessons learned*

18.5 Hazardous waste spillage

Immediate response by site staff:

(a) Isolate spillage area with safety fence/warning tape

(b) Don protective clothing, masks etc

(c) Identify material – If unknown seek specialist advice

(d) Apply absorbents for liquid waste and /or contain the liquid with bunds of clay

(e) If small quantity can be safely contained in drum or canister – do so. Clearly label and identify contents, remove to secure storage.

(f) Notify Area Engineer

(g) <u>Do not hose *any* material away until cleared to do so</u>

Follow up by Area Engineer:

(h) Notify ORC

(i) Obtain advice re treatment, storage and disposal

(j) Prepare and implement emergency response

18.6 Leachate overflow or breakout

In event of a leachate overflow or breakout being apparent:

(a) Ensure all pumps are operating to capacity

(b) Call in tanker truck or portable pump to remove surplus

(c) If feasible, block any contaminated surface drains for removal of contaminated water back to landfill

(d) Assess cause of overflow and measures to prevent recurrence

18.7 Flooding

Flooding from outside the landfill may affect drainage off site. The Area Engineer to be on the notification list by ORC Technical Services for any predicted high river levels. The following actions to be taken in advance of high water or heavy rainfall warning:

(a) Inspect site perimeter and ensure all toe bunds etc at level.

(b) Ensure leachate levels pumped down as low as possible

18.8 Groundwater bore contamination

Groundwater bore contamination would be detected as a result of routine sampling and analysis. The response required will depend upon the nature of the contamination and its extent. It is difficult to be prescriptive in this Plan as to what response would be required. Immediate actions would include:

(a) Resample bore(s) with suspect results

(b) Immediately inspect the landfill perimeter in the vicinity of the suspect bore for any signs of surface flow that could have caused the contamination, such as a leachate breakout etc

(c) Immediately commence to lower leachate levels in the suspect area of the landfill as low as possible

Further contingency responses could include, depending upon specific advice received:

(d) Shift filling to another area of the landfill; place an intermediate capping of low permeability silt over the affected area to reduce water ingress and leachate generation.

(e) Install leachate abstraction wells at the affected location

(f) Install further bores for monitoring of groundwater down gradient of the affected area.

(g) Installation of a cut-off trench for leachate interception

In any event, any contingency response should be developed in consultation with the ORC.

18.9 Power/Weighbridge Failure

A power failure would impact operation of the weighbridge, EFTPOS and the onsite computer used to record customer numbers, weights and record transactions against accounts. The ability to continue operations would be assessed on a case-by-case basis. A weighbridge failure while not ideal it would have a lesser impact on operations.

For a short-term failure (less than 1 day)

- Bag charges as per normal, domestic waste just use minimum charge if more than 3 bags equivalent, no need to estimate weight
- Weighbridge Operator to access and estimate weight of load if a commercial/special waste If agreement can’t be reached with the customer then refer customer to offsite weighbridge for weight recording. Vehicle Tare Weight to be used as ‘out’ weight in this circumstance.
- Fill in Manual Entry Form

- Cash or Account only

For longer term outages (more than 1 day) the landfill may be closed, if permission is granted by the Engineer.

18.10 Earthquake

In the event of a significant earthquake event (>1:50 year return period), the landfill surface and surrounds should be inspected within seven days. A report should then be provided to the ORC within one month of completing the inspection, which shall include any damage caused to the landfill by the earthquake, any necessary repairs, and timeframes for completion of repairs. The following specific measures in event of seismic activity affecting the area are to be undertaken:

18.10.1 In Event of Period of Heightened Seismic Activity

While earthquakes of magnitude sufficient to affect the landfill infrastructure are most likely to occur without warning, some events are preceded by smaller earthquakes or swarms (e.g., the Edgecumbe earthquake of 1987). If the area is subject to increased minor seismic activity, then as a precaution any construction work should be reviewed for proximity to any slopes or batters that could fail.

18.10.2 After a significant earthquake

Following any significant earthquake affecting the locality, a thorough inspection of the site shall be undertaken. No specific threshold is defined in this Plan for a "significant" earthquake and the WWOM should err on the side of caution and seek professional geotechnical advice as soon as possible.

Immediately following:

COM and/or WWOM to conduct a walk over and look for any obvious signs such as fresh cracks in the fill or bunds.

Monitor leachate flows from the fill for any unusual reduction in quantity. If leachate is unable to freely drain from the fill due to settlement/faulting or pipe damage, then it will pond in the fill with possible loss outside of the containment or reduction in landfill stability.

Geotechnical Inspection

A suitably experienced geotechnical engineer is to be engaged as soon as available to conduct a more thorough site inspection. This will involve among other things:

- Checking for signs of deformation as above
- Possibly repeat a drone survey and conduct a surface-to-surface comparison to identify settlement
- Until report and specific recommendations are received, keep operations away from any areas suspected to be affected by ground movement.

18.11 Reporting

Reporting of contingency events and responses is to be as per Section 17.

18.12 Gas Detection

Where gas limits, greater than normal, in a building are discovered the Contractor will immediately inform the Water and Wastewater Operations Manager. Where the gas monitoring within the sewer pump station or the leachate manholes exceed a level "to be determined" the Contractor will immediately inform the Water and Wastewater Operations Manager."

19 LANDSCAPING

Landscaping is to be developed. Specific maintenance activities include:

- Replacement plantings
- Maintaining irrigation lines
- Fertilising as required
- Weed and pest control, maintaining stock proof fencing

Topsoil is stockpiled on site, in windrows not to exceeding 1.5 m in height, and adequately drained. Clean fill suitable for top soiling may be added to topsoil stockpiles.

20 LANDFILL CLOSURE AND AFTERCARE

20.1 Projected Life

The life of the landfill will depend heavily on the affordability of obtaining resource consents following the expiration of current consents in 2023. Provided that new consents can be obtained, the site has enough capacity to last until approximately 2044 based on the current volumes being landfilled. With a decline expected in the amount of waste being landfilled, it is likely that the site will have capacity beyond this.

20.2 End Use of the Site

The end use of the site is expected to be for passive recreation or grazing. For grazing the site would likely be leased to a neighbouring farmer for light stock (sheep or calves) which would not damage the capping soil. The restrictions around future use of the site and activity on it will need to be carefully set out to ensure clear responsibility for the site in future and to be able to confirm that no activities which would damage the capping are undertaken.

20.3 Landfill capping

The site is to be capped on completion as per section 5.8.

20.4 Site monitoring

Monitoring of the site will continue as per schedules SW1, GW1 and LEA1 unless specifically varied by change of any consent conditions.

Regular inspections of the site will be carried out as per table 21.1:

Aspect of site	Inspection by	frequency
Landfill cap (for integrity, grass vigour, leachate breakout, cracking etc)	WWOM	6 monthly
Leachate drainage	WWOM	6 Monthly
Stormwater ponds	WWOM	6 Monthly
Site fencing and perimeter	WWOM	6 monthly
Landscaping and plantings	Parks and reserves, CDC or Arborist contractor	3 monthly

Aspect of site	Inspection by	frequency
Monitoring points (Bores etc)	WWOM	Coincident with sampling

Table 20.1: Aftercare monitoring

20.5 Remedial actions

The site will be maintained in a safe condition suitable for future use as necessary. Specific maintenance actions may include as per Table 10.2:

Aspect of site	Remedial action
Landfill cap (for integrity, grass vigour, leachate breakout, cracking etc)	Dig out, refill with new capping, re-grass Tap leachate flows and drain to pumpstation
Leachate drainage	Clear leachate lines by jetting etc
Stormwater ponds (while in place, ponds to be removed or converted to permanent water features/habitat once capping established , nominally at least two growing seasons)	Clean out debris etc
Site fencing and perimeter	Repair as required
Landscaping and plantings	Replace as required
Monitoring points (Bores etc)	Protect bore heads

Table 20.2: Aftercare maintenance

20.6 Aftercare Period

Aftercare will continue until such time as the leachate monitoring shows the volume and strength of leachate to be reduced sufficiently for active management of leachate to cease. The period for this will be determined in consultation with the ORC.

21 ASSESSMENT OF ENVIRONMENTAL EFFECTS

21.1 General

This section provides a brief overview of the environmental effects of the Mt Cooee landfill, as required by consent condition 5. A detailed assessment of environmental effects is not appropriate for a Site Management Plan and is undertaken as part of the initial consent process. Noting that the existing consents expire in 2023, at that time, whether the site continues for refuse disposal or changes to a transfer station with a closed landfill, then a full AEE will be undertaken.

A full description of the site including geohydrology is given in the original Resource Consent Application by Royds Consulting in 1994 (Refer Table 1.1).

21.2 Discharges to Surface water

To date the site has had a significant adverse effect on the water quality and ecology of the stream draining the landfill. Effects have also been discernible in the Clutha River for a short distance (10m approx.) below the discharge point of the landfill stream. These effects were documented in the 2011 report "*Ecological Effects of Mt Cooee Landfill Discharge*", Opus Consultants 2011.

Key findings were:

- Leachate was contaminating the stormwater line beneath the landfill and hence the landfill stream
- High levels of ammoniacal nitrogen in the landfill stream were well in excess of water quality guidelines
- Diminished invertebrate life in the stream with only pollution tolerant species present
- Evidence of nutrient enrichment (sewage fungus) on the bank of the Clutha River

The summary and conclusions of the 2011 report are:

"Sampling of aquatic macroinvertebrates in the tributary upstream and downstream of the Mt Cooee landfill and on the Clutha River margin upstream and downstream of the tributary confluence found that nearly all sites had MCI-sb and SQMCI-sb scores indicating poor water quality. Low scores at the upstream sites can partially be explained by poor habitat quality and, in the case of the Mt Cooee tributary, by very low stream flow.

Downstream sites showed a further decline in MCI-sb and SQMCI-sb scores. The decline was statistically significant, and an equivalence test found there to be moderate evidence of a 20% decline in scores.

Molluscs almost completely disappeared from the Mt Cooee tributary downstream of the landfill, despite very high abundances upstream. This included both Sphaerium sp. which is particularly sensitive to total ammonia concentrations and Potamopyrgus sp. snails which are usually tolerant of poor water quality. In the Clutha River there were fewer mayfly (Deleatidium sp.) sensitive Trichoptera taxa downstream of the confluence, but Potamopyrgus sp. snails and Sphaerium sp. were abundant, indicating a substantial dilution of total ammonia concentrations within 10 metres of mixing with the Clutha River.

Further evidence of effects of the landfill leachate was observed with an increase in the cover of filamentous green algae downstream of both the landfill and the confluence with the Clutha River. Furthermore, heterotrophic growths (sewage fungus) were observed on submerged willow branches in the Clutha River – indicating that the tributary has contributed high concentrations of dissolved carbon and/or biological oxygen demand (BOD). The guideline for controlling heterotrophic growths is to maintain soluble BOD_5 < 2 mg/l as an average (MfE 1992). Quarterly monitoring has found average $cBOD_5$ in stormwater pond 1 and 2 to be 6.5 mg/l and 20.5 mg/l respectively (Downer EDI Works 2011). Suggesting that the heterotrophic growths could have been caused by the landfill leachate.

The total ammonia concentrations measured in the tributary downstream of the Mt Cooee landfill are about 52 mg/l (Downer EDI Works 2011). This is very high and substantially exceeds the USEPA guidelines for acute toxicity (i.e. 8.4 at pH =8 if salmonids absent), let alone the ANZECC guideline values based on chronic toxicity

(i.e. 0.9 mg/l at pH 8). High total ammonia concentrations could exclude fish from entering the Mt Cooee tributary but the habitat in the stream is poor and a perched culvert at the road also prevents upstream fish passage. The toxicity effect of high total ammonia in the tributary is unlikely to extend more than 10 metres downstream of the confluence with the Clutha River based on the presence of Sphaerium sp. at this point."

The 2011 report has not been subsequently updated but given that the leachate discharge was not remediated then the effects noted can be assumed to have continued.

The source of the leachate was established to be infiltration into the deteriorated pipes and manholes of the stormwater culvert. Work is now underway to rectify this (Section 5.4). Once this remedial work is completed then any remaining leachate contamination of the stream would be either from:

- Stormwater from the landfill face
- Groundwater leakage past the sheetpile cut off wall – evidenced by groundwater monitoring to be minor
- Recharge from deep groundwater contaminated by leachate – again expected to be minor

Once completed, the effect of the stormwater diversion is expected to show immediately in the landfill surface water monitoring results. Further assessment of ecological and habitat values in the stream and Clutha River below the discharge point would be appropriate to be undertaken 12 months post the stormwater diversion ie autumn 2022. At that point the effects of the diversion will be clear and the need for any further leachate containment established.

21.3 Discharges to Groundwater

There are currently 7 monitoring bores on the site. Bores GW4,5,6& 7 are upgradient of the cutoff wall and penetrate refuse in the unlined site. Bore GW1 is to the north of the railway line and is an upgradient control with high water quality. Bore GW3 is adjacent the site entrance and downgradient but off to one side of the fill. Bore GW2 is the clear downgradient bore. This is screened in the shallow alluvium immediately downgradient of the cutoff wall in the valley centre. GW2 is therefore the indicator bore for the integrity of the cutoff.

Golder Associates, who do the consent compliance monitoring at the Mt Cooee site, comment as follows in regards the groundwater:

"Groundwater monitoring undertaken at Mt Cooee Landfill confirms that leachate discharge from the landfill is influencing measured water quality parameters. Long term groundwater quality trend analysis was undertaken by Golder in December 2020 for monitoring wells GW1, GW2 and GW3. Long-term increasing trends for measured water quality parameters analysed were noted for boron, nitrate-nitrogen, and chloride (Golder 2020). Clutha District Council plans to undertake further assessment of the significance of these trends with consideration of these influences to support a future application for replacement resource consents.

Recent and ongoing changes and upgrades to the landfill infrastructure including capping, stormwater management and leachate collection at the site will have an influence in the significance of leachate impact on the environment. It is anticipated this work will reduce the overall volume of leachate produced by the landfill.

In summary, landfill leachate is having a measurable effect on groundwater quality at the site. However, detailed environmental assessment considering the influence of recent and ongoing work at the has not been undertaken. Further assessment of the impact on groundwater quality is planned to support future resource consent application for the site.

Reference:
Golder 2020. Mt Cooee Detailed Quarterly Environmental Monitoring Report – December 2020. Report prepared by Golder Associates (NZ) Limited for Clutha District Council on behalf of WasteCo NZ (Southern) Limited, December 2020."

Further to the above, a brief perusal of the recent (November 2020) monitoring data shows:

- Bore GW1 is of high quality with very low levels of both ammoniacal and nitrate nitrogen (0.023 g/m^3 and 0.005 g/m^3 respectively)
- Bores GW 4, GW5, GW6 and GW7 are all within the refuse and not surprisingly show degrees of leachate contamination. GW4 is intercepting a strong leachate plume with ammoniacal nitrogen at 620 g/m^3 , potassium at 530 g/m^3, and Boron at 87 g/m^3. This level of Boron is unusually high for a landfill. The most likely source is coal ash, which is disposed of in large amounts from Silver Fern Farms. Boron (and also potassium) is mobile in groundwater and is thus a good indicator of leachate contamination beyond the site.
- Bores GW5,6&7 show a more dilute leachate signature, consistent with their location on the margin of the filled ground.
- Bore GW3 has slightly elevated Boron and nitrate compared to GW1. Boron 0.45 g/m^3 cf 0.056 in GW1. Nitrate 2.6 g/m^3 cf 0.005 in GW1. While slightly elevated, these levels are a small fraction of that in the landfill bores.
- Bore GW2 has results for Boron and Nitrate-N intermediate between GW1 and GW3 (Boron 0.170 g/m^3, nitrate-N 1.43 g/m^3, ammoniacal-N 0.071 g/m^3, potassium 2.0 g/m^3). These results are not inconsistent with the shallow alluvial nature of the groundwater. Given the very low levels compared to the in-landfill bores, bore GW 2 provides a large degree of confidence around the integrity and effectiveness of the sheetpile cutoff wall.

Effects on groundwater are therefore largely limited to the shallow groundwater immediately beneath the fill material. This is contained by the cut off wall and contaminated groundwater diverted to the leachate.

Significant contamination of the underlying greywacke formation is unlikely. This is massive rock with low transmissivity. The preferential flow path for groundwater is to the leachate system. Any leachate that does infiltrate the underlying groundwater in the greywacke would ultimately discharge to the Clutha River. At that point the combined effects of attenuation in the soil and massive dilution in the river would make the environmental effects of any leachate discharge via the deep groundwater insignificant.

21.4 Discharges to Air

21.4.1 Odour

<Need to comment on odour complaints>

Odour is the major source of complaint from all landfills. Given the nature of landfill activity it is the hardest external effect to control. The site operations recognise the need to control odour (Section 11 above).

1 complaining about the terrible smell from the dump, we live right next to it and it is never this bad. Makes it unbearable to live here. we were told when we bought this house that the dump would be relocating but this has not happened so now, we have to put up with stinking dump and rubbish on our deck on windy days. We cannot have our windows open anymore; this is not good enough!

Name: Wilson Address (include rapid number if applicable) 36 Golfers drive

2 Have complained bitterly in the past regarding offensive smell emanating from the rubbish dump. Our upstairs area in our house is uninhabitable today and I'm sure wherever you live you'd not expect to suffer this. Need some action and NOW! (previous complaints not in system)

Name: Ted Bensemann and Rosie Jackson Address (include rapid number if applicable) 1 Arthur Terrace, Balclutha.

Response: Firstly, thanks you for taking the time to provide this feedback. After some investigating the odour was put down to a product being received from the Danone factory. This product is now being buried on acceptance in the meantime until Danone find an alternative site to dispose of it, they have until April 5th.

All other complaints relate to operations and not to the landfill

Greenhouse gas emissions

The Mt Cooee site to date has had no gas collection and destruction infrastructure. Landfill gas dissipates to air through the active face and the intermediate capping.

The site will be generating landfill gas, as a roughly 50/50 mix of methane and CO_2 plus traces of H_2S and odorous organic compounds, in proportions to incoming refuse typical of other NZ municipal waste sites. Noting that the Balclutha climate is relatively dry at 670 mm/annum, then gas generation would likely be at the lower end of the range of typical NZ sites.

Applying the standard generation rates as per the ETS (Emissions Trading Scheme), then for the 8,000 tonnes pa of mixed refuse disposed some 9,520 tonnes of CO_2 equivalent are being discharged. Under the ETS, CDC are required to surrender the equivalent number of NZUs to cover this discharge. At current price of NZU this is some $343,000 pa.

The landfill gas discharge, apart from the odour potential of the trace constituents as covered above, is of no localised significance to air quality in the landfill vicinity. Its significance arises as a contributor to NZ's overall GHG emissions.

CDC are currently (2021) reviewing the whole landfill operation and site economics, of which the GHG emissions and ETS liability are a significant part. As the price of NZU rises in coming years, the cost driver to reduce the gas emissions will only rise.

21.5 Nuisance Effects

The landfill can potentially have effects on adjoining property by way of litter blowing off site, birds that are attracted to the site and roost on neighbouring property, breeding vermin and insects.

All these effects are inherent to landfill activity. The site operational procedures as documented in this Plan are standard practice for landfill sites and are effective at containing effects to the landfill property. No complaints have been received.

21.6 Issues significant to Iwi

Comments from Iwi were sought upon application for the original resource consents in 1994 and again in 2011 and 2012. No concerns in relation to the site were raised in these discussions or are known to have been made known to Council at any other time. Council will be engaging with Iwi as part of the upcoming consent renewal.

22 ALTERNATIVES TO LANDFILLING AT MT COOEE

22.1 Waste Minimisation

Minimising the amount of waste created is a resource- and cost-efficient alternative to landfilling.

The quantity and composition of waste generated in the district is a result of the decisions and behaviours of manufacturers and consumers. Council provides information on waste minimisation and responsible disposal options to reduce the amount of waste individuals, households and the community as a whole send to landfill.

22.2 Recycling

Recycling post-consumer resources is one of the more cost-effective methods of reducing the amount of waste sent to landfill. Council currently diverts co-mingled rigid plastics, paper, cardboard, aluminium and steel through a kerbside collection and transfer station drop-off facilities. Recyclables are transported to Dunedin for sorting and shipping onwards to recyclers (both domestically and internationally).

22.3 Glass Recycling

Glass is not collected as part of the co-mingled kerbside recycling collection as the material recovery facility used to sort the district's recyclables is not equipped to handle glass and there are currently no cost-effective options for large scale collection and recycling of glass within the district.

Glass bottles and jars are accepted for free at the Mount Cooee Landfill and the Clinton, Lawrence, Milton, Owaka and Tapanui transfer stations. This glass is collected separately and stockpiled at Mount Cooee and utilised on-site as a construction material for maintenance of access roads and drainage. The glass at the transfer stations in comingled with waste and disposed to landfill until an alternative is identified.

Glass is an inert material and poses minimal risk to the receiving environment when landfilled.

22.4 Composting

Kitchen and garden waste can be diverted from landfill through mulching and composting. Diverting these wastes from landfill reduces greenhouse gas emissions, as aerobic decomposition (which occurs in composting) produces less harmful gases than anaerobic decomposition (which occurs in a landfill). The end product (compost or mulch) is a resource which can be used beneficially.

Council investigated introducing a separated kerbside collection for greenwaste, however the cost was prohibitive and there was not enough community support for the service. Resident surveys have consistently shown that two thirds of households in the district already compost at home, although it is unknown to what degree these households do so.

Council promotes home composting and provides information brochures on its website to help householders begin composting, using traditional compost bins, bokashi buckets or worm farms.

Facilities are also provided at Mount Cooee for the diversion of greenwaste from landfill. The use of this is encouraged by providing a 50% discount to customers who separate and place their greenwaste in the designated area.

22.5 Multiple 'local landfills'

Mount Cooee became the site of the district's only sanitary landfill in the mid 1990's. Prior to this, Council operated 20 small landfills throughout the district. The move away from operating numerous small landfills provided a more cost-efficient service for ratepayers. It also ensured that the environmental impacts of landfilling could be more easily monitored and managed by having just one site for controlled and engineered landfilling.

A return to numerous 'local landfills' is not an efficient or desirable option, economically or environmentally.

22.6 Closure and Cartage out of District

An alternative option to landfilling at Mount Cooee is to landfill at another site, which accepts waste from a wider (regional) area. Council has undertaken some preliminary investigations into this option. Current options are Dunedin City Council (approx. 70 km) or AB Lime at Winton (120 km). AB Lime currently have a volume restriction on their consent which would preclude accepting CDC waste although this is currently subject of a consent change application (May 2021).

Out of District landfill options will be investigated further nearer to the time that Mount Cooee's resource consents are due to expire or when landfills used by neighbouring Councils face capacity and consent limits.

Appendix 1

Monitoring Schedules

1 Schedule SW 1

2 Schedule WC 1

3 Schedule GW 1

3 Schedule LEA 1

SCHEDULE SW #1

SURFACE WATER ANALYSIS

ID	Location	Analyses
		List A
SP1	Silt pond 1	3 Monthly
SP2	Silt pond 2	3 Monthly

List A: pH, conductivity, suspended solids, turbidity, BOD5, NH_4-N

SCHEDULE WC #1

WATER COURSE ANALYSIS

ID	Location	Analyses
		List B
WC1	Watercourse upstream of landfill in Golf Course	3 Monthly
WC2	Drain from site immediately before discharge to river	3 Monthly
WC3	Drain from landfill at discharge point of culvert under fill	3 Monthly

List B: pH, conductivity, chloride, NH_4-N

SCHEDULE GW #1

GROUNDWATER ANALYSIS

ID	Location	Analyses	
		List C	List D
GW1	Upstream control bore in Golf course	3 Monthly	Annually (during September or October)
GW2	Bore at landfill toe immediately downstream of sheet pile cut-off wall	3 Monthly	Annually (during September or October)
GW3	Bore at site entrance beside access road	3 Monthly	Annually (during September or October)
GW4	Bore at south end of landfill toe	3 Monthly	Annually (during September or October)
GW5	Bore at middle south edge of landfill	3 Monthly	Annually (during September or October)
GW6	Bore at middle north edge of landfill west of the TMH	3 Monthly	Annually (during September or October)
GW7	Bore at east end/head of landfill adjacent to railway line	3 Monthly	Annually (during September or October)

List C: pH, conductivity, chloride, potassium, nitrate-nitrogen, boron (soluble), NH_3-N.
List D: BOD_5, Na, K, Mg, Ca, sulphate, iron, lead, zinc, cation/anion ratio, bicarbonate, COD, nitrate.

SCHEDULE LEA #1

LEACHATE ANALYSIS

Location	Analyses		
	List E	List F	List G
Leachate pump station wetwell	3 Monthly	Annually	2 Yearly

List E: pH, conductivity, NH_3-N, chloride.

List F: COD, BOD_5, Na, K, Mg, Ca, sulphate, iron, lead, zinc, cation/anion ratio, nitrate, bicarbonate.

List G: volatile organic contaminants, acid herbicides and semi-volatile contaminants as per RJ Hill Leachate Set or equivalent.

Appendix 2

Consent Conditions

Otago Regional Council

COUNTERPART

Consent No.: 94508

DISCHARGE PERMIT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Clutha District Council

Address: P O Box 25, Balclutha

to discharge to land an average of 105 cubic metres per day of municipal, domestic, special waste and industrial waste

for the purpose of operating a sanitary landfill facility and a composting operation for the Clutha District at Mount Cooee

for a term expiring on 1 October 2023.

Legal description of consent location: Lots 1 and 2 DP 12203, being Part Section 43 Block I Hillend Survey District and Part Sections 4 and 5 Block XIV North Molyneux District.

Map references generally in the vicinity of NZMS 260 H46: 598 357

The granting of the Consent will be subject to the following conditions:.

Conditions

1 The consent holder shall take appropriate measures to prevent landfilled material from moving off site.

2 No wastes, including hazardous materials, will be disposed of in the landfill which will have an adverse effect on the environment.

3 Any hazardous waste approved for disposal must be deposited in an appropriate way to prevent any adverse environmental effect. It must be characterised and the disposal location and date recorded.

4 The consent holder shall not dispose of any material in the landfill by burning it. Should any fire arise in the landfill it shall be extinguished immediately upon being detected.

5 The consent shall be exercised in conformity with the Landfill Management Plan prepared by the consent holder. The Management Plan shall be reviewed at least annually or at such lesser frequency as the Regional Council may approve. The Management Plan shall include:

Otago Regional Council

General description of site, including topography, natural water sources, geotechnical investigations.

Description of the operation of the disposal facility.

Types of waste to be treated or disposed of.

Assessment of Environment Effects including assessment of alternatives to landfilling.

Any implications of site management and operation of landfill for Iwi.

A manifest system identifying types and quantities received including the source, and where within the landfill any hazardous substances are placed.

Identification of discharges and environmental effects and the safeguards in place to avoid or reduce the environmental effects.

Sensitivity of the Receiving Environment.

Procedures for monitoring (including detection of leakage of contaminants in contravention of resource consent) and controlling adverse effects of spillages and leachate on groundwater and surface water, as well as the monitoring and control of odours.

Outline of proposals to report to the Otago Regional Council regarding environmental compliance.

Outline of emergency response procedures and contingency plans including:
- power failure
- emergency contacts
- fire

Works to be undertaken to establish the landfill.

Description of the waste collection, treatment, and disposal system.

Projected life of the landfill.

Reinstatement and possible end use of the site.

For hazardous wastes, describe wastes which are acceptable and unacceptable, and wastes which can only be accepted under special (specified) conditions.

Water control including stormwater and leachate.

Identify corporate environmental performance standards, national or industry group codes of practice, or other recognised environmental safety standards to which the operation of the facility will comply, and a description of the means for auditing compliance.

Otago Regional Council

Land fill Consents

Consent No. 94509

DISCHARGE PERMIT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Clutha District Council

Address: P O Box 25, Balclutha

to discharge collected and treated "dirty" stormwater

for the purpose of operating a sanitary landfill facility for the Clutha District at Mount Cooee

for a term expiring on 1 October 2023

Legal description of consent location: Lots 1 and 2 DP 12203, being Part Section 43 Block I Hillend Survey District and Part Sections 4 and 5 Block XIV North Molyneux District

Map references: Generally in the vicinity of NZMS 260 H46:598357

The granting of the consent will be subject to the following conditions:

Conditions:

1. Appropriate silt retention ponds shall be in place prior to the exercise of this right, with the design taking into account the maximum recorded flood level in the Clutha River.

2. All silt retention ponds shall be designed for the runoff arising from the highest estimated storm event with a design storm duration of 24 hours.

3. The grantee shall ensure that all practicable steps are taken to prevent contamination of stormwater by suspended solids or exposed landfill material or runoff via appropriate landfill management practices.

4. Monitoring silt pond discharge
   The grantee shall, once every 3 months, collect a representative sample of the discharge from each of the silt ponds.

   The sample shall be analysed for:
   - pH
   - conductivity
   - suspended solids
   - turbidity
   - ammonia — NH_4
   - BOD_5

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The results shall be forwarded to the Regional Council as soon as possible, and the Regional Council shall be notified immediately if any sudden change in chemistry is detected or if a trend of increasing concentration is indicated.

The Regional Council may direct or agree in writing that additional sampling and analyses be undertaken if monitoring results indicate amendments are appropriate.

5. All laboratory analysis undertaken in connection with this permit must be performed at a Telarc registered laboratory or otherwise as specifically approved by the Regional Council in writing.

6. Prior to the expiry or surrender of this consent, the grantee shall prepare a management, monitoring and contingency plan for the future management of the landfill to the satisfaction of the Regional Council and shall seek appropriate consents for any ongoing activity identified by the Resource Management Act 1991 as requiring a consent.

7. In accordance with S.128 of the Resource Management Act 1991, the conditions of this consent may be reviewed on and in the period within 3 months upon each fifth anniversary of the date of this consent, if on reasonable grounds the consent authority finds that:
   (a) there is or is likely to be an adverse environmental effect as a result of the exercise of this consent, which was unforeseen when the consent was granted.
   (b) monitoring of the exercise of the consent as required by condition 4 has revealed that there is or is likely to be an adverse environmental effect on the environment.
   (c) there has been a change in circumstances that the conditions of the consent are no longer in terms of the above Act.

Issued at Dunedin this 25th day of May 1995.
Reissued at Dunedin this 10th day of August 2001.

M E Weaver
Manager Consents
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Otago Regional Council

COUNTERPART

Consent No.: 94510

DISCHARGE PERMIT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Clutha District Council

Address: P O Box 25, Balclutha

to discharge landfill gases, dust and odour to air

for the purpose of operating a sanitary landfill facility for the Clutha District at Mount Cooee

for a term expiring on 1 October 2023.

Legal description of consent location: Lots 1 and 2 DP 12203, being Part Section 43 Block I Hillend Survey District and Part Sections 4 and 5 Block XIV North Molyneux District.

Map references generally in the vicinity of NZMS 260 H46: 598 357

The granting of the Consent will be subject to the following conditions:

1 The consent holder shall adopt the best practicable option to avoid and/or mitigate any adverse effect on the environment resulting from the discharge of contaminants to air. This shall require that the consent holder operate, supervise and maintain the landfill and monitor the discharge so as to ensure that any adverse effect on the environment is avoided or mitigated.

2 Beyond the boundary of the landfill site there shall be no odour caused by discharges which, in the opinion of an enforcement officer is objectionable or offensive.

3 Dust emissions shall be kept to a practicable minimum. The consent holder shall ensure that dust emissions from the site do not create nuisance conditions beyond the boundary which, in the opinion of an enforcement officer are objectionable or offensive.

4 The consent holder shall undertake regular routine weekly inspections of the landfill for evidence of landfill gas nuisance such as odours, gas bubbling in puddles, or fissures in the landfill cover. The inspection shall comprise a minimum of walking around the perimeter and traversing the top of the landfill and where potential nuisance is identified, the consent holder shall investigate and remedy or mitigate the nuisance. Such actions shall include, where appropriate, taking samples for analysis, and repairing any leaks in the landfill.

Otago Regional Council

5 All laboratory analysis undertaken in connection with this permit must be performed at a Telarc registered laboratory or otherwise as specifically approved by the Regional Council in writing.

6 In accordance with S 128 of the Resource Management Act 1991, the conditions of this consent may be reviewed on and in the period within 3 months upon each fifth anniversary of the date of this consent, if on reasonable grounds the consent authority finds that:

(a) there is or is likely to be an adverse environmental effect as a result of the exercise of this consent, which was unforseen when the consent was granted.

(b) monitoring of the exercise of the consent as required by condition 4 has revealed that there is or is likely to be an adverse environmental effect on the environment.

(c) there has been a change in circumstances that the conditions of the consent are no longer in terms of the above Act.

Issued at Dunedin this 25th day of May 1995.

S A McArthur
Director Resource Management
lkw sl1 cdcdp

Otago Regional Council

COUNTERPART

Consent Number 94511

WATER PERMIT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council frants consent to:

Name: Clutha District Council

Address: C/- Royds Consulting, P O Box 4, Dunedin

to divert a small unnamed tributary of the Clutha River into another small unnamed tributary of the Clutha River via a channel

for a term expiring 1 October 2023

for the purpose of stormwater control for operating a sanitary landfill facility for the Clutha District at Mount Cooee.

Legal description of consent location: Lots 1 & 2 DP 12203, being Part Section 43 Block 1 Hillend Survey District and Part Sections 4 & 5 Block XIV North Molyneux District.

Map References: generally in the vicinity of NZMS 260: H46:598357

Conditions:

1 The diverting of the unnamed tributary of the Clutha River shall be done as proposed in the plans and specifications submitted to the Council.

2 In accordance with S 128 of the Resource Management Act 1991, the conditions of this consent may be reviewed on and in the period within 3 months upon each fifth anniversary of the date of this consent, if on reasonable grounds the consent authority finds that:

(a) there is or is likely to be an adverse environmental effect as a result of the exercise of this consent, which was unforseen when the consent was granted.

(b) there has been a change in circumstances that the conditions of the consent are no longer in terms of the above Act.

Issued at Dunedin this 9th day of June 1995

M E Weaver
Manager Resource Administration
Sgsl2 WatPer

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COUNTERPART

Consent Number 94543

LAND USE CONSENT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Clutha District Council

Address: C/- Royds Consulting, P O Box 4, Dunedin

to install a culvert upstream of the existing culvert under State Highway 91 to the existing railway culvert

for a term expiring 1 October 2023

for the purpose of stormwater control for operating a sanitary landfill facility for the Clutha District at Mt Cooee

Legal description of consent location: Lots 1 & 2 DP12203, being Part Section 43 Block 1 Hillend Survey District & Part Sections 4 & 5 Block XIV North Molyneux District.

Map references generally in the vicinity of NZMS 260: H46:598357.

Conditions:

1 The diverting of the unnamed tributary of the Clutha River shall be done as proposed in the plans and specifications submitted to the Council.

2 In accordance with S 128 of the Resource Management Act 1991, the conditions of this consent may be reviewed on and in the period within 3 months upon each fifth anniversary of the date of this consent, if on reasonable grounds the consent authority finds that:

(a) there is or is likely to be an adverse environmental effect as a result of the exercise of this consent, which was unforseen when the consent was granted.

(b) there has been a change in circumstances that the conditions of the consent are no longer in terms of the above Act.

Issued at Dunedin this 9th day of June 1995.

M E Weaver
Manager Resource Administration
Sgsl2 LandCon

Otago Regional Council

Consent No.: 95953

WATER PERMIT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Clutha District Council

Address: P O Box 25, Balclutha

to take an average of 208 cubic metres per day of groundwater containing leachate

for a term expiring 1 October 2023

for the purpose of operating a landfill at Mount Cooee and subsequent treatment of this groundwater at the Clutha District Council's waste water treatment plant

Legal description of consent location: Lots 1 & 2 DP 12203, being Part Section 43 Block 1 Hillend Survey District, and Part Sections 4 & 5 Block XIV, North Molyneux Survey District

Map reference at activity point: In the vicinity of NZMS 260: H46: 598357

Conditions

1 That the consent holder surrenders consent 94545.

2 The consent holder shall monitor the volume of groundwater taken and report the mean daily flow together with the monitoring results required by consent 95954 to the consent authority at three monthly intervals.

3 Prior to the expiry or surrender of this consent, the consent holder shall prepare a management, monitoring and contingency plan for the future management of the landfill, to the satisfaction of the consent authority, and shall seek appropriate consents for any ongoing activity as required by the Resource Management Act.

4 The consent authority may, within three months of each anniversary of the date of this consent or within one month upon receiving monitoring results under Condition 1, in accordance with S129 of the Resource Management Act, serve notice on the consent holder of its intention to review the conditions of this consent for the purposes of determining whether the conditions of this consent are adequate to deal with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage, or if it is necessary, to increase the number of parameters which are to be monitored under Condition 1.

Issued at Dunedin this 13th day of February 1996

S A McArthur
Director Resource Management
Sgsl2 WPCDC

Otago Regional Council

Consent No.: 95954

DISCHARGE PERMIT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Clutha District Council

Address: P O Box 25, Balclutha

to discharge on average 36 cubic metres per day of landfill and composting facility leachate to land in a manner in which this may enter water

for a term expiring 1 October 2023

for the purpose of operating a landfill at Mount Cooee

Legal description of consent location: Lots 1 and 2 DP 12203, being Part Section 43 Block 1 Hillend Survey District, and Part Sections 4 and 5 Block XIV North Molyneux Survey District

Map reference at activity point: In the vicinity of NZMS 260: H46: 598357

Conditions

1 That the consent holder surrenders consent 94512.

2 That an appropriate emergency leachate retention pond with the capacity of 48 hour retention (for a 1 in 2 year return period rainfall event from the landfill site) shall be in place prior to the exercise of this consent, with the design taking into account the maximum recorded flood level in the Clutha River.

3 The consent holder shall continuously monitor and record the flow of the pumped discharge from the combined leachate collection sumps/pumps. The results shall be forwarded to the consent authority at three monthly intervals.

4 *(a) Leachate collection system*

The consent holder shall once every three months collect a representative sample of the combined groundwater/leachate pumped from the leachate collector sumps/pumps (prior to the leachate being discharged to the Balclutha sewer system). The sample shall be analysed for :

- pH
- conductivity
- ammonia
- chloride

The consent holder shall, at least annually and once every three months for the first year, collect a representative sample of the combined groundwater/leachate pumped from the leachate collector sumps/pumps (prior to the leachate being discharged to the Balclutha sewer system). The sample shall be analysed for :

- calcium
- magnesium
- potassium
- sodium
- bicarbonate
- sulphate
- COD
- BOD_5
- nitrate
- iron
- lead
- zinc

- cation/anion ratio

On one occasion every two years the sample shall be analysed on a screening basis for volatile organic contaminants, acid herbicides and semi-volatile contaminants. The results shall be forwarded to the consent authority as soon as practicable.

(b) Leachate monitoring wells

The consent holder shall once every three months collect a representative sample of the groundwater/leachate from each of :

(i) monitoring wells outside the landfill (which are to be specified once the leachate collection system is installed)
(ii) monitoring wells within the landfill

The sample shall be analysed for :

- pH
- conductivity
- ammonia
- chloride

On one occasion each year, during September or October, the following parameters shall also be analysed in the monitoring wells outside the landfill :

- calcium
- magnesium
- potassium
- sodium
- bicarbonate
- sulphate
- COD

- BOD_5
- nitrate
- iron
- lead
- zinc
- cation/anion ratio

The results shall be forwarded to the consent authority at three monthly intervals and the consent authority shall be notified immediately if any sudden change in chemistry is detected or if a trend of increasing concentration is indicated.

5 Groundwater beyond the boundary of the landfill site shall at all times be substantially free of contaminants, resulting from activities at the Mount Cooee landfill conducted during the exercise of this permit, which adversely affect, directly or indirectly, water use or ecosystems.

6 All sampling procedures, including collection and transportation of samples, and laboratory analysis undertaken in connection with this permit must be performed to TELARC registered standards or otherwise as specifically approved by the consent authority in writing.

7 Prior to the expiry or surrender of this consent, the consent holder shall prepare a management, monitoring and contingency plan for the future management of the landfill, to the satisfaction of the consent authority, and shall seek appropriate consents for any ongoing activity as required by the Resource Management Act.

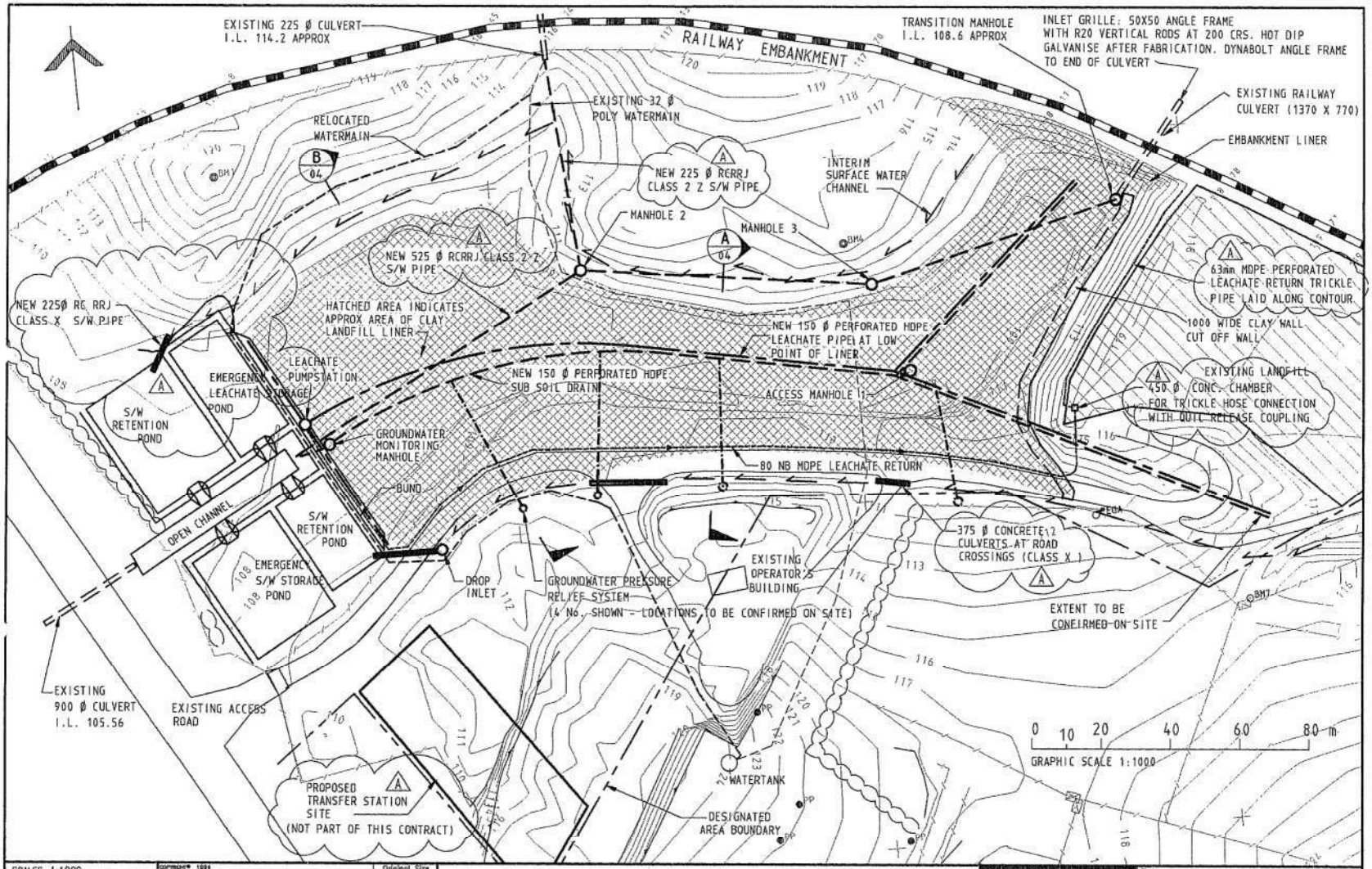
8 The consent authority may, within three months of each anniversary of the date of this consent or within one month upon receiving monitoring results under Condition 3, in accordance with S129 of the Resource Management Act, serve notice on the consent holder of its intention to review the conditions of this consent for the purposes of determining whether the conditions of this consent are adequate to deal with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage, or if it is necessary, to increase the number of parameters which are to be monitored under Condition 3.

Issued at Dunedin this 13th day of February 1996

S A McArthur
Director Resource Management
Sgsl2 DPCDC

Appendix 3

Construction Plans



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APPROVED		

Original Size A3

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–	ISSUED FOR TENDER	21/10/94	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
STAGE 1 CONSTRUCTION DETAILS

SITE LAYOUT PLAN

ROYDS CONSULTING
31 Stafford St., PO Box 4, Dunedin
Phone 64-3-477-0885

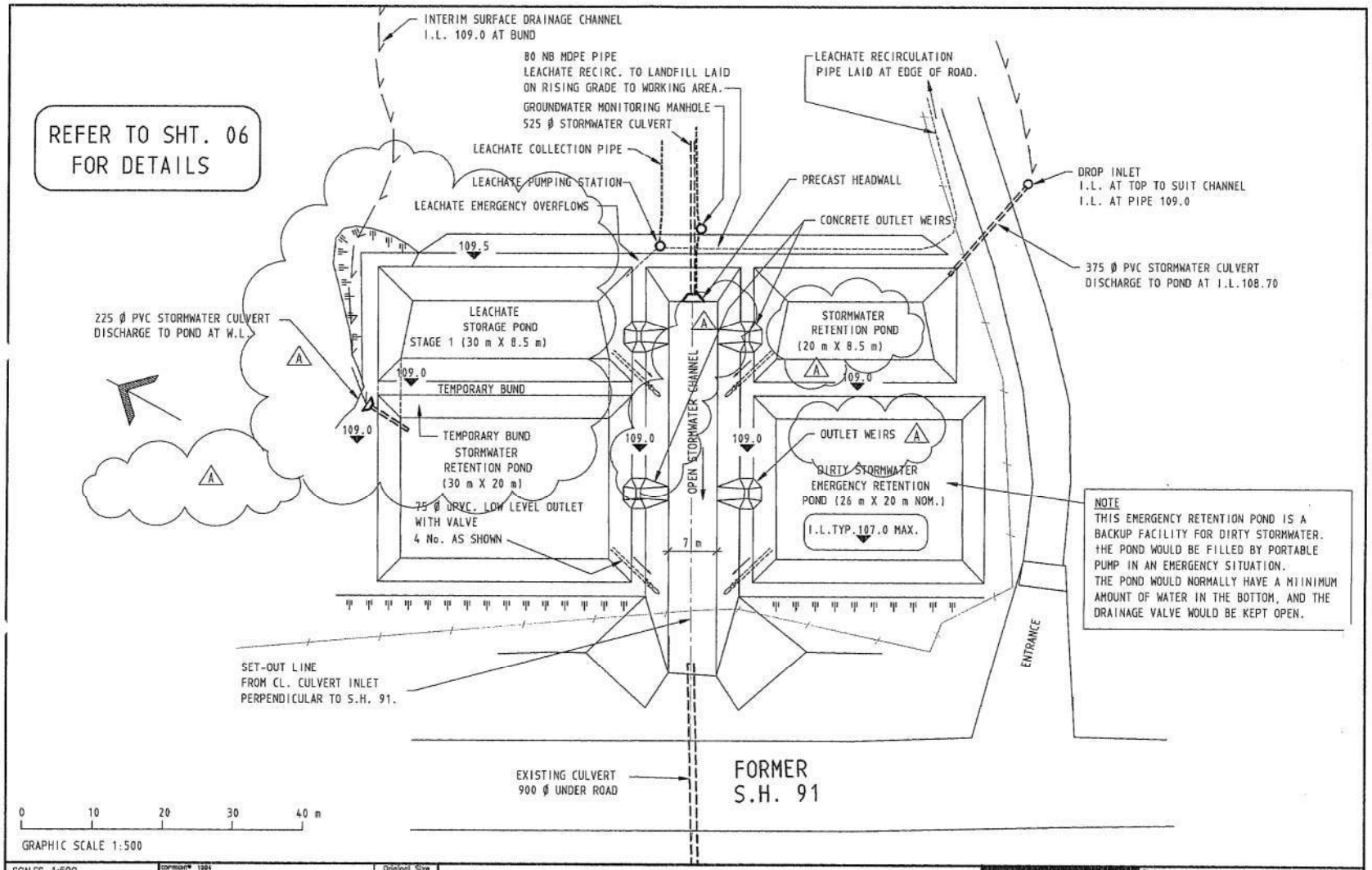
Status Stamp

Date Stamp

Job No. 46831.01/01

Sheet No. A

Rev.



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APPROVED		

Original Size A3

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–	ISSUED FOR TENDER	21/10/94	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
STAGE 1 CONSTRUCTION DETAILS

PLAN AT PONDS

ROYDS CONSULTING
31 Stafford St., PO Box 4, Dunedin
Phone 64-3-477-0885

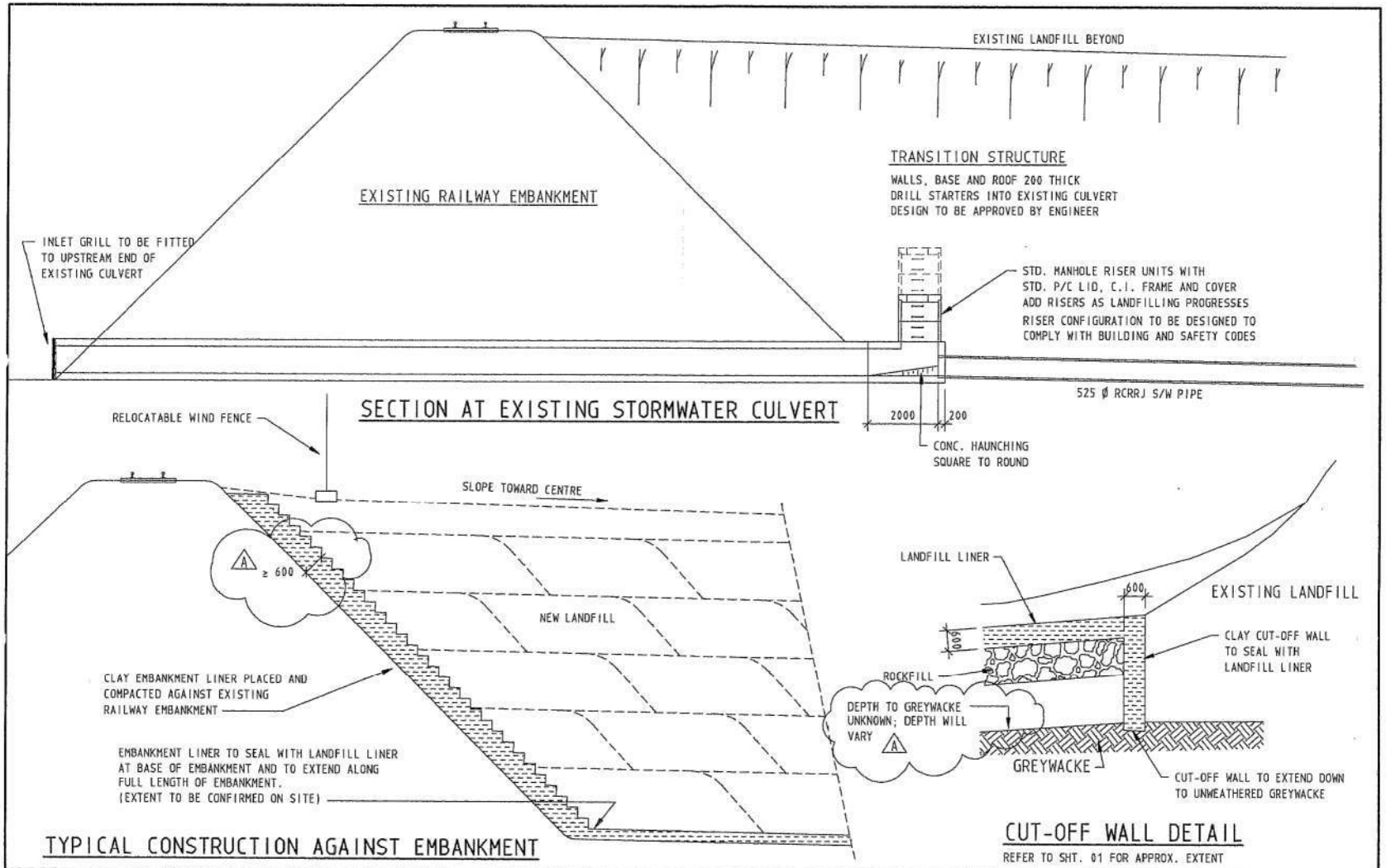
Status Stamp

Date Stamp

Job No. 46831.01/02

Sheet No. –

Rev. A



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APPROVED		

Original Size A3

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–	ISSUED FOR TENDER	21/10/94	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
STAGE 1 CONSTRUCTION DETAILS

TYPICAL SECTIONS AT RAILWAY EMBANKMENT AND CUT-OFF DETAIL

ROYDS CONSULTING
31 Stafford St., PO Box 4, Dunedin
Phone 64-3-477-0885

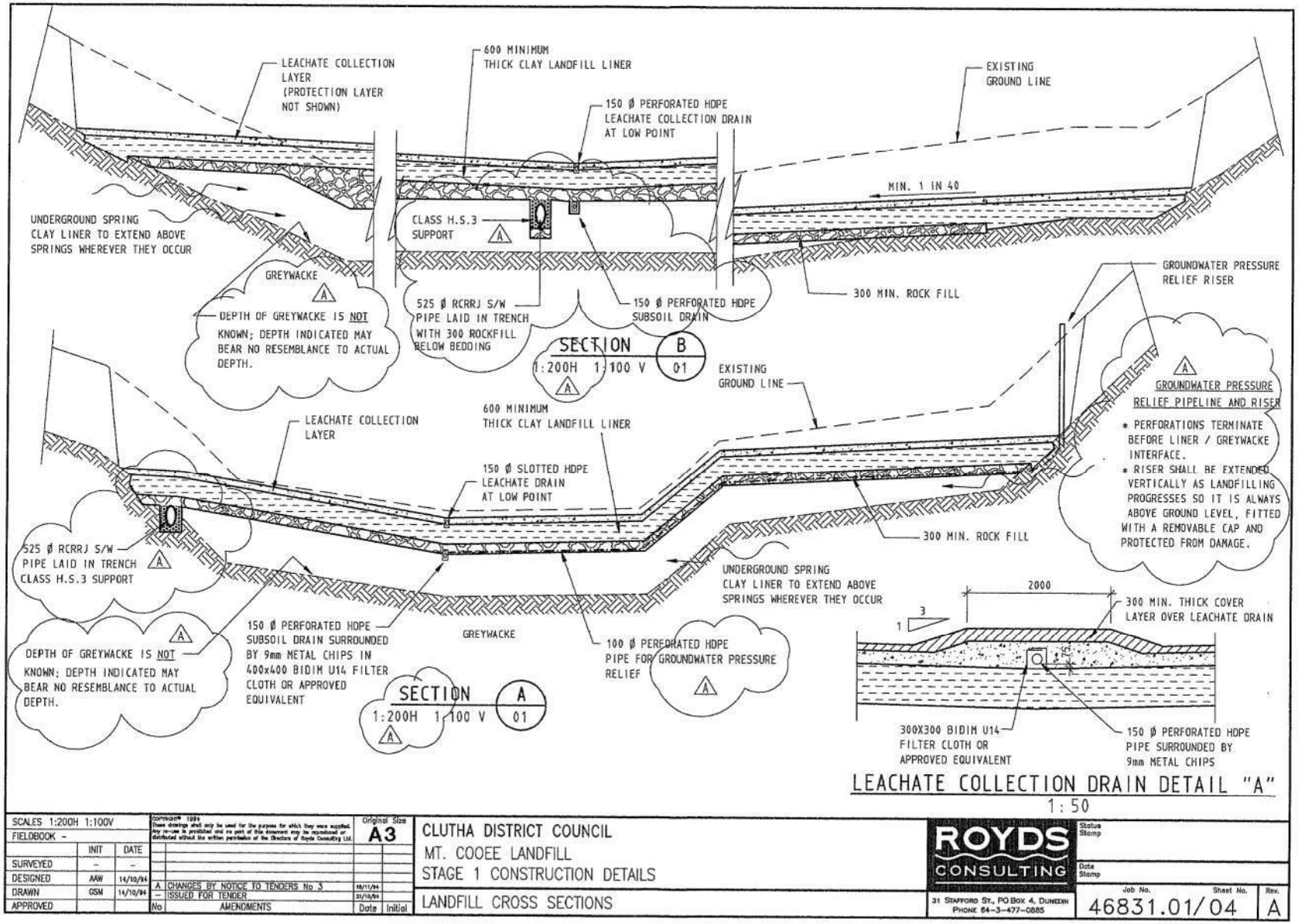
Status Stamp

Date Stamp

Job No. 46831.01/03

Sheet No. 03

Rev. A



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Original Size A3

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–	ISSUED FOR TENDER	31/10/94	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
STAGE 1 CONSTRUCTION DETAILS

LANDFILL CROSS SECTIONS

ROYDS CONSULTING
31 Stafford St., PO Box 4, Dunedin
Phone 64-3-477-0885

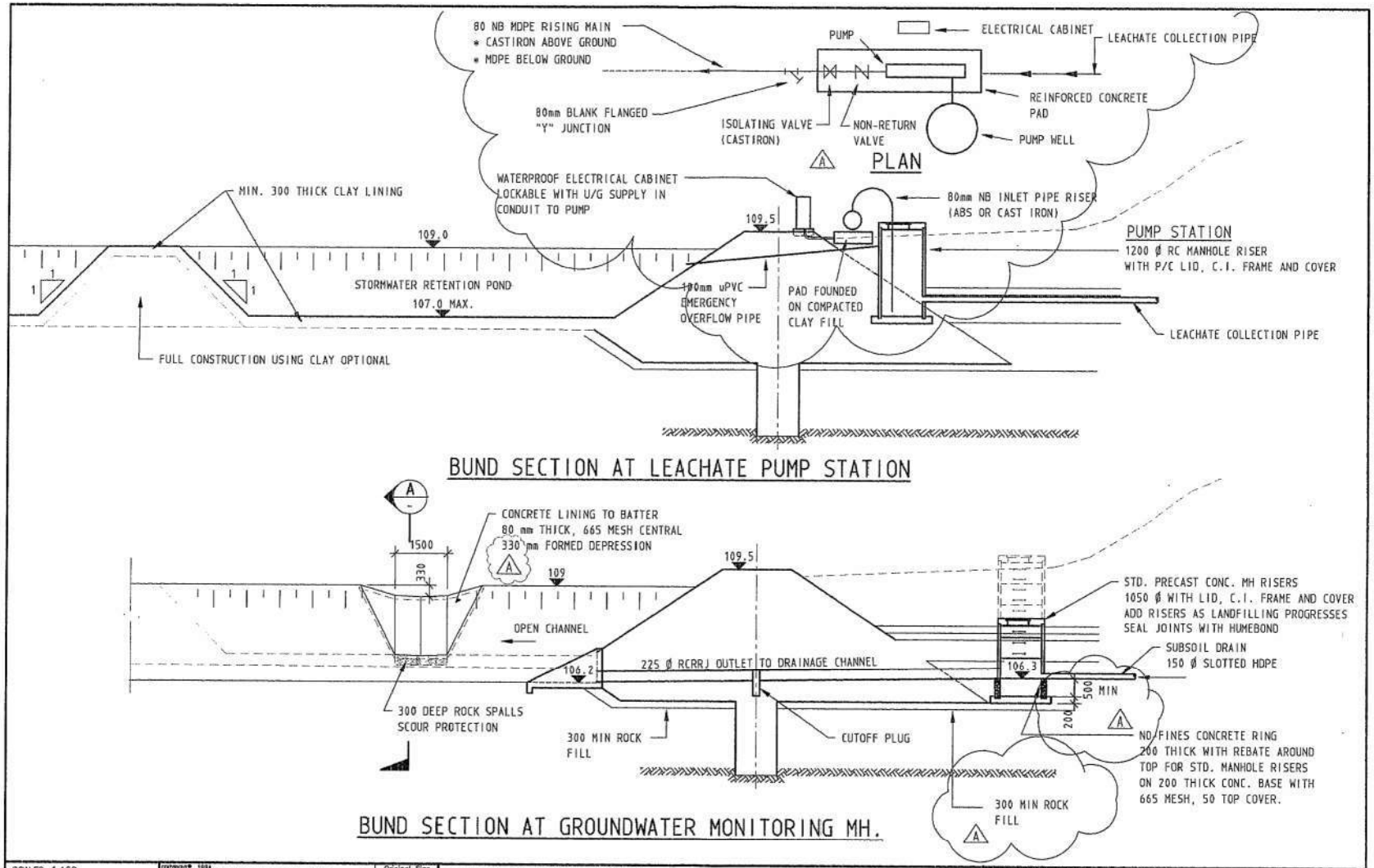
Status Stamp

Date Stamp

Job No. 46831.01/04

Sheet No. –

Rev. A



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–	ISSUED FOR TENDER	21/10/94	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
STAGE 1 CONSTRUCTION DETAILS

LEACHATE PUMP STATION AND GROUNDWATER MONITORING MANHOLE

ROYDS CONSULTING
31 Stafford St., PO Box 4, Dunedin
Phone 64-3-477-0885

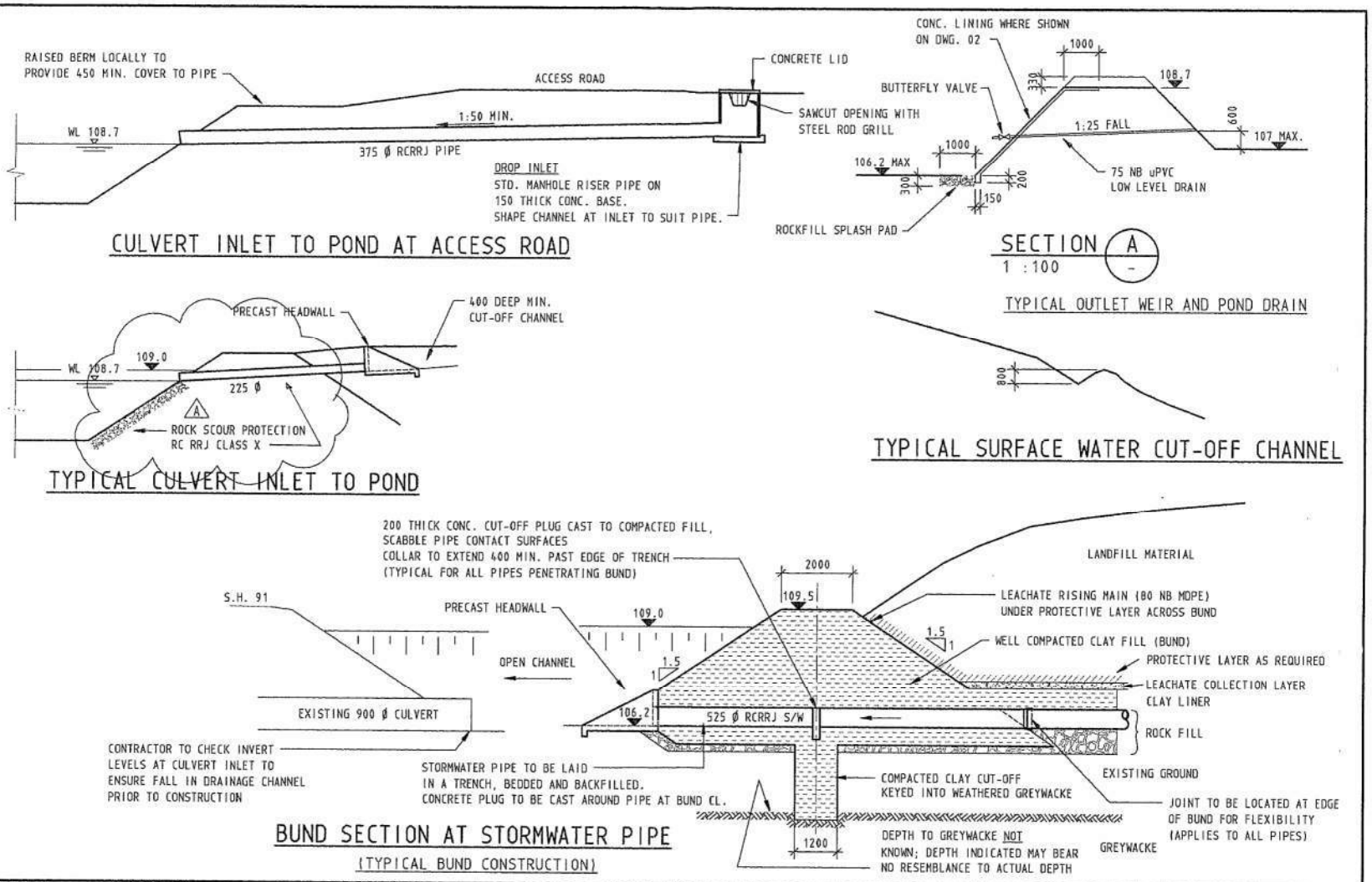
Status Stamp

Date Stamp

Job No. 46831.01/06

Sheet No.

Rev. A



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–	ISSUED FOR TENDER	21/10/04	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
STAGE 1 CONSTRUCTION DETAILS

POND AND BUND CONSTRUCTION DETAILS

ROYDS CONSULTING
31 Stafford St., PO Box 4, Dunedin
Phone 64-3-477-0885

Status Stamp

Date Stamp

Job No. 46831.01/07

Sheet No. 07

Rev. A

Appendix 4
CDC Solid Waste Bylaw 2019

Clutha District Council
Solid Waste Bylaw 2019

1 Commencement and repeal

a) This bylaw comes into force on 1 July 2019.

b) On the day this bylaw comes into force all previous bylaws of the Clutha District Council that relate to Solid Waste are repealed.

Preliminary Provisions

2 Application

This bylaw applies to the Clutha District.

3 Authority

This bylaw is made under Part 8 of the Local Government Act 2002 and Parts 4 and 5 of the Waste Minimisation Act 2008.

4 Delegation of power

Council delegates to any authorised officer or agent of Council the power to take any and all actions that Council may take under this bylaw, except where a statute or this bylaw requires a resolution or special order of Council.

5 Interpretation

The following table sets out the meanings that apply in this part of the Bylaw. Where a difference in meaning arises between interpretations in this bylaw and an Act, the Act shall prevail.

acceptable waste	waste with characteristics that comply with the requirements of Council as scheduled in this bylaw.
approval	approved in writing by Council, either by resolution of Council or by an authorised officer of Council.
approved receptacle	a receptacle for containing the waste left out for collection that has been approved by Council.
authorised agent	any person who is not an employee of the Council but is authorised by Council to act on its behalf.
authorised officer	any person appointed or authorised by Council to act on its behalf and with its authority including a member of the police.
authorised operator	any person employed or contracted (including any subcontractor) by Council to operate a facility.
characteristic	any of the physical or chemical characteristics of waste referred to in the Solid Waste Bylaw.
clean fill	material that has no potential to produce harmful effects on the environment. This is generally a natural material such as clay, soil and rock and such other materials as concrete, brick or demolition products that are free from combustible or organic materials and are therefore not subject to biological or chemical breakdown.
Council	Clutha District Council
difficult waste	waste that can cause a nuisance or has properties which cause it to require extra care in disposal, and includes waste described in Schedule 1. Difficult waste may be disposed of at a landfill provided it is either; scheduled as difficult waste or has been issued a permit by Council.
drop off facility	a facility where Council provides a receptacle for the free disposal of recyclable materials.
E-Waste	discarded electronic appliances such as mobile phones, computers, and televisions.
facility	a transfer station, drop off facility or landfill operated by Council.
general solid waste	domestic, institutional, agricultural, industrial, or commercial waste excluding hazardous waste, difficult waste, green waste, clean fill, and recyclable materials.
green waste	material that is organic or vegetable, and generally in a natural state (i.e. has not been other than physically modified) as prescribed in the Solid Waste Services Information document. May include soil attached to plant roots.
hazardous waste	any waste or combinations of waste that poses, or has the potential to pose, a hazard to human health or living organisms.

Household	a house and its occupants regarded as a separately used or inhabited part of a rating unit.
kerbside collection	collection by Council of approved wheelie bins put out on the kerbside.
kerbside collection area	an area nominated by resolution of Council for kerbside collection.
person	a natural person, corporation sole or a body of persons whether corporate or otherwise.
prohibited waste	waste of a type or quantity which must not be put out for wheelie bin collection or disposed of at a facility.
public holiday	refers only to Christmas Day, New Year's Day, Good Friday, and ANZAC Day morning unless otherwise stipulated in contract specifications.
public notice	a notice published in— 1 or more daily newspapers circulating in the region or district of the local authority; or 1 or more other newspapers that have at least an equivalent circulation in that region or district to the daily newspapers circulating in that region or district; and includes any other public notice that the local authority thinks desirable in the circumstances.
recyclable material	a material which can be processed in such a manner that the product can be reused.
residual waste	general solid waste and green waste that cannot be diverted from landfill by reuse or recycling; Does not include hazardous waste, difficult waste, or clean fill.
special waste	hazardous or difficult waste
landfill	a facility for the controlled disposal of solid waste and nominated by the Council for that purpose.
transfer station	a facility at which a receptacle is provided for the collection and storage of waste (and in some instances recyclables) prior to being transferred to landfill or diversion facilities.

Waste Disposal

6 Public litter bins

a) Public litter bins may be provided solely for the disposal of waste generated within public areas.

b) Only litter and recyclables may be put in these bins.

c) General solid waste (household, commercial, industrial, or rural waste), green waste or clean fill are prohibited in public litter bins.

7 Kerbside collection

7.1 Approved containers

a) All waste and recycling for kerbside collection must be fully contained within an approved container.

b) Council will specify the maximum weight permitted within the approved container.

7.2 Waste that is prohibited from kerbside collection

a) The following waste is prohibited from kerbside collection and must not be left at the kerb-

- Hazardous waste and difficult waste
- Waste articles that are too large to fit into the approved containers • Ashes or dusty material unless it is cold and wrapped
- Waste that may damage the collection vehicle.

b) From time to time Council may specify other waste that is prohibited from kerbside collection.

7.3 Recyclable materials

Only approved recyclable materials may be put out for kerbside collection. The Chief Executive of Council will advise by public notice, from time to time, the list of recyclable materials that may be collected.

7.4 Interference with waste for collection

Only authorised collection agents may remove an approved container or its contents when waste has been placed for collection at the kerbside.

7.5 Refusal to collect

a) Council may refuse to collect and dispose of any waste, including recyclables, that does not comply with this bylaw.

7.6 Retrieval of reusable approved container

a) Whether full or empty, approved containers that are reusable, must be removed from the kerbside before 8.30am on the day following the day for collection.

b) Reusable approved containers must be removed by the occupier and the owner of the property from which the reusable approved container came.

7.7 Removal of uncollected waste

Any waste which is not collected because of non-compliance with this bylaw, shall be removed from the roadside by the occupier on the day it was placed for collection.

8 Transfer stations and drop off facilities

8.1 Limits on quantities of waste

a) Council transfer stations and drop off facilities are for the disposal of domestic waste quantities as opposed to commercial or industrial quantities.

b) Council specifies the maximum quantity of waste that may be deposited at a transfer station by any one household.

8.2 Waste that is prohibited at transfer stations and drop off facilities

The following waste is prohibited at transfer stations and drop off facilities and must not be left at a transfer station-

- Hazardous waste and difficult waste
- Vehicle bodies
- Large farm implements
- Fridges or freezers
- Waste articles that are too large to fit into the provided receptacles
- Waste that may damage the collection vehicle.

8.3 Unauthorised removal

Removal of recyclables from a landfill, transfer station or drop off facility by anyone other than the occupier of the property of origin or those authorised by Council to do so, is prohibited.

9 Responsibilities

It is the responsibility of each person using a landfill, transfer station or drop off facility to-

- pay the specified user charge to the site operator, if present
- observe the advice or direction of an operator, if present
- observe the sign posted directions
- not light fires or undertake any action that may lead to a fire on the site
- separate green waste and put it in the place designated for green waste, where that is provided.
- where recyclables are collected, separate and deposit them in the appropriate bins, where bins are also provided
- not disturb or remove any article or material of any kind except with the express approval of the authorised operator at a facility
- not leave waste outside the facility
- abstain from any act which is inconsistent with this bylaw.

10 Authorised operators

Where there is an operator present at a landfill or transfer station, that operator has the authority to collect user charges and instruct site users on best practice use of the facility and to abstain from any act which is inconsistent with this bylaw.

Waste Materials

11 Changes to the types of waste that may be deposited

a) An authorised officer of Council may specify prohibited types of waste from time to time in any of the waste categories given in the schedule to this bylaw.

b) The information will be publicly notified and published on Council's website.

12 Recycling materials

a) An authorised officer of Council will determine which materials are acceptable for reuse or recycling.

b) The information will be publicly notified and published on the Council's website.

c) Details of acceptable materials must be displayed on suitable signs at each facility.

13 Clean fill

The Council may accept specified clean fill at the landfill. Where clean fill is accepted, a sign at the entrance to the site will specify-

- the type and quantity of clean fill accepted
- the schedule of fees.

14 Green waste

a) Green waste may only be deposited at a green waste facility.

b) Only green waste that is approved for disposal may be deposited.

c) An authorised officer of Council will determine which green waste materials are acceptable.

d) The information will be publicly notified and published on the Council's website.

15 Car bodies

a) Car bodies will be accepted for disposal if they comply with disposal requirements.

b) Anyone who wishes to deposit a car body must sign a declaration that the waste complies with the requirements.

c) An authorised officer of Council will determine whether car bodies meet requirements for disposal.

17 Fridges or freezers

a) Fridges and freezers will only be accepted for disposal when they have been degassed.

b) Anyone who wishes to deposit a fridge or freezer must sign a declaration that the waste complies with the requirements.

c) An authorised officer of Council will determine whether fridges and freezers meet the requirements for disposal.

18 Hazardous, difficult, and special waste

Refer to Schedule 1 for waste categories and classifications referred to in this section.

18.1 Special waste

a) No Category C or D waste will be accepted at any Council facility.

b) Hazardous waste (Category A) and difficult waste (Category B) are collectively known as special waste. Council will only accept special waste at the landfill when- ○ a Council permit accompanies it, or ○ the special waste has been specified by an authorised officer of Council.

c) Any person who has, or suspects they have, special waste may apply for a permit authorising its disposal in Council landfill.

d) Permits for special waste disposal will be issued at Council's sole discretion and may have conditions attached.

e) Where Council has permitted the disposal of special waste, the waste must be delivered to and deposited at a landfill in accordance with this bylaw and any provision attached to the permit.

f) Council may seek specialist advice with respect to the granting of, and conditions of, any permit. Any costs incurred in obtaining this specialist advice may be invoiced to the applicant.

g) Council may issue a standing permit for regular disposal of special waste, subject to any conditions or special pre-disposal treatment that is deemed necessary.

h) Council may only issue a standing permit if it can be confident that the classification, contents, and physical properties of the waste will remain unchanged from the application.

i) Council may revoke any such permit or consent held by such person where any person fails to comply with, or does any act or acts in contravention of, any condition, term, restriction, obligation, prohibition, specification or requirement of any permit or consent granted or issued pursuant to this bylaw.

j) Before revoking any permit or consent, Council must give written notice to the holder of the permit or consent of its intention to revoke that permit or consent.

k) Within 5 working days after receipt of any notice given under this section of the Bylaw, the holder of any permit or consent may advise Council that they wish to be heard by Council concerning the intended revocation of the permit or consent.

l) Until Council has considered and made its decision in respect of any contested revocation of a permit or consent, the permit or consent subject to the hearing, must be suspended.

m) The applicant is fully responsible for complying with all conditions of the permit and all costs of compliance.

Penalties and payments

19 Breaches, offences, and penalties

a) Council may apply to the District Court for an injunction to restrain a person from committing a breach of this bylaw.

b) It is an offence to fail to comply with this bylaw.

c) It is an offence to do anything that is in contravention of any provision of this bylaw.

d) It is an offence to do anything that is in contravention of any condition, term, restriction, obligation, prohibition, specification or requirement of any permit or notice granted or issued pursuant to this bylaw.

e) Every person commits an offence who breaches this bylaw and is liable-

   i. on summary conviction to a fine not exceeding $20,000 as set out under section 242 of the Local Government Act 2002; or

   ii. where another enactment specifies the penalty for a breach of the Bylaw, that other penalty.

20 Fees and charges

a) Council may by resolution prescribe fees or charges payable in respect of the use of any facility or service provided for by this bylaw or the processing and consideration of any application of permits made under this bylaw.

b) Any such fees or charges payable must be publicly notified and published in Council's Schedule of Fees and Charges.

c) All costs over and above any application fee for the processing and consideration of any application for a permit under this bylaw (including costs and disbursements incurred in obtaining independent specialist advice) must be paid by the applicant.

d) Council may require a deposit, which may be refunded when the costs incurred by Council are less than the amount of the application fee and deposit paid.

e) Council will not process an application until the application fee and any deposit are paid in full.

Schedule 1 – Waste categories and classification

Terminology refers to untreated waste.

Waste categories

Special Waste

Category A hazardous waste may, at Council's sole discretion, only be accepted at a landfill.

Category B difficult waste may, at Council's sole discretion, only be accepted at a landfill.

Category C and D hazardous waste is prohibited at a Council facility.

Category A - Hazardous waste

Waste that has these characteristics

H6.1	Poisonous substances - Substances or waste, liable either to cause death or serious injury or to harm human health if swallowed or inhaled or by skin contact.
H11	Toxic (delayed or chronic) - Substances or waste which, if they are inhaled or ingested or if they penetrate the skin, may involve delayed or chronic effects, including carcinogenicity.
H12	Ecotoxic - Substances or waste which if released, present or may present immediate or delayed adverse impacts to the environment by means of bioaccumulation and/or toxic effects upon biotic systems.

These types of waste

Y2	Waste from the production and preparation of pharmaceutical products
Y3	Waste pharmaceuticals, drugs, and medicines
Y5	Waste from the manufacture, formulation and use of wood preserving chemicals
Y7	Waste from heat treatment and tempering operations containing cyanides
Y8	Waste mineral oils unfit for their originally intended use
Y9	Waste oils/water, hydrocarbons/water mixtures, emulsions
Y12	Waste from production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish
Y13	Waste from production, formulation and use of resins, latex, plasticisers, glues/adhesives
Y16	Waste from production, formulation and use of photographic chemicals and processing materials
Y17	Waste resulting from surface treatment of metals and plastics

Y18 Residues arising from industrial waste disposal operations

Y46 Hazardous waste collected from households

Y47 Residues arising from the incineration of household waste

Y49 E-waste materials

Waste that contains the following

Y20 Beryllium, beryllium compounds.
Y21 Hexavalent chromium compounds.
Y22 Copper compounds.
Y23 Zinc compounds.
Y24 Arsenic, arsenic compounds.
Y25 Selenium, selenium compounds.
Y26 Cadmium, cadmium compounds.
Y27 Antimony, antimony compounds.
Y28 Tellurium, tellurium compounds.
Y29 Mercury, mercury compounds.
Y30 Thallium, thallium compounds.
Y31 Lead, lead compounds.
Y32 Inorganic fluorine compounds excluding calcium fluoride.
Y36 Asbestos (dust and fibres).
Y37 Organic phosphorous compounds.

Category B - Difficult waste

Waste that is difficult to manage including:

- fish, animal or other putrescible waste
- sludge
- dust
- foam
- hot ashes
- liquids
- documents requiring disposal under special conditions
- timber processing waste
- tree stumps or branches over 150mm diameter
- any other waste which the Council may prescribe as difficult waste.

Fish, animal or other putrescible waste, dust or foam in a quantity that is generated in a typical household in a period of two weeks or less is categorised as normal waste.

Category C - Hazardous waste

Waste with the following characteristics, of the following types or containing the following substances must constitute Category C hazardous waste: **Waste that has these characteristics**

H1 Explosives - An explosive substance or waste is a solid or liquid substance or waste (or mixture of substances or wastes) that is, in itself, capable of chemical reaction of producing gas at such a temperature and pressure, and at such a speed, as to cause damage to the surroundings.

H3 Flammable liquids - The word ‘flammable’ has the same meaning has ‘inflammable’.

Flammable liquids are liquids or mixtures of liquids containing solids in solution or suspension (for example, paints, varnishes, lacquers etc but not including substances or waste otherwise classified because of their dangerous characteristics) which give off a flammable vapour at temperatures of not more than 61°C.

H4.1 Flammable solids - Solids or waste solids, other than those classed as explosives, which under conditions encountered in transport are readily combustible, or may cause or contribute to fire though friction.

H4.2 Substances or waste liable to spontaneous combustion - Substances or waste that are liable to spontaneous heating under normal conditions encountered in transport, or to heating up on contract with air, and then being liable to catch fire.

H4.3 Substances or waste which, in contact with water, emit flammable gases, Substances or waste which by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

H5.1 Oxidising substances - Substance or waste that is not necessarily combustive, but may, generally by yielding oxygen, cause or contribute to the combustion of other materials.

H5.2 Organic peroxides - Organic substances or waste which contain the bivalent O=O structure are thermally unstable substances which may undergo exothermic self- accelerating decomposition.

H6.2 Infectious substances - Substances or waste containing viable micro-organisms or their toxins which are known or suspected to cause disease in animals or humans.

H7 Radioactive material - Spontaneously emits radiation greater than background level. Includes alpha, beta, gamma, x-rays, neutrons, high energy electrons, protons, and other atomic particles.

H8 Corrosives - Substances or waste which, by chemical action, will cause severe damage when in contact with living tissue, or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport. They may also cause other hazards.

H10 Liberation of toxic gases in contact with air or water - Substances or waste which, by interaction with air or water, are liable to give off toxic gases in dangerous quantities.

H13 Capable of yielding another material - Capable, by any means, after disposal of yielding another material, e.g. leachate which possesses any of the characteristics listed above.

These types of waste

Y1 Clinical waste from medical care in hospitals, medical centres and clinics.

Y4 Waste from the production, formulation and use of biocides and phytopharmaceuticals.

Y5 Waste from the manufacture, formulation and use of (pentachlorophenol) wood preserving chemicals.

Y6 Waste from the production, formulation and use of organic solvents.

Y10 Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) polybrominated biphenyls (PBBs).

Y11 Waste tarry residues arising from refining, distillation, and any pyrolytic treatment.

Y14 Waste chemical substances arising from research and development or teaching activities which are not identified and/or are new and whose effects on man and/or the environment are not known.

Y15 Waste of an explosive nature.

Waste containing the following

Y19 Metal carbonyls.
Y33 Inorganic cyanides.
Y34 Acidic solutions or acids in solid form.
Y35 Basic solutions or bases in solid form.
Y38 Organic cyanides.
Y39 Phenols, phenol compounds including chlorophenols.
Y40 Ethers.
Y41 Halogenated organic solvents.
Y42 Organic solvents excluding halogenated solvents.
Y43 Any congener of polychlorinated dibenzo-furan.
Y44 Any congener of polychlorinated dibenzo-p-dioxin.
Y45 Organohalogen compounds other than substances referred to in this appendix (e.g. Y39, Y41, Y42, Y43, Y44).
Y48 Radioactive substances.

Category D – Hazardous waste

This waste includes all classes of hazardous waste not listed in Categories A and C. This waste is only acceptable in hazardous waste containment facilities, and there is no such facility in the Clutha District.

Appendix 5
Landfill Site Plan

(To be updated)

DELTA
THINK.INFRASTRUCTURE

CLUTHA DISTRICT LANDFILLS

INITIAL DATA CAPTURE SURVEY - APRIL 2012

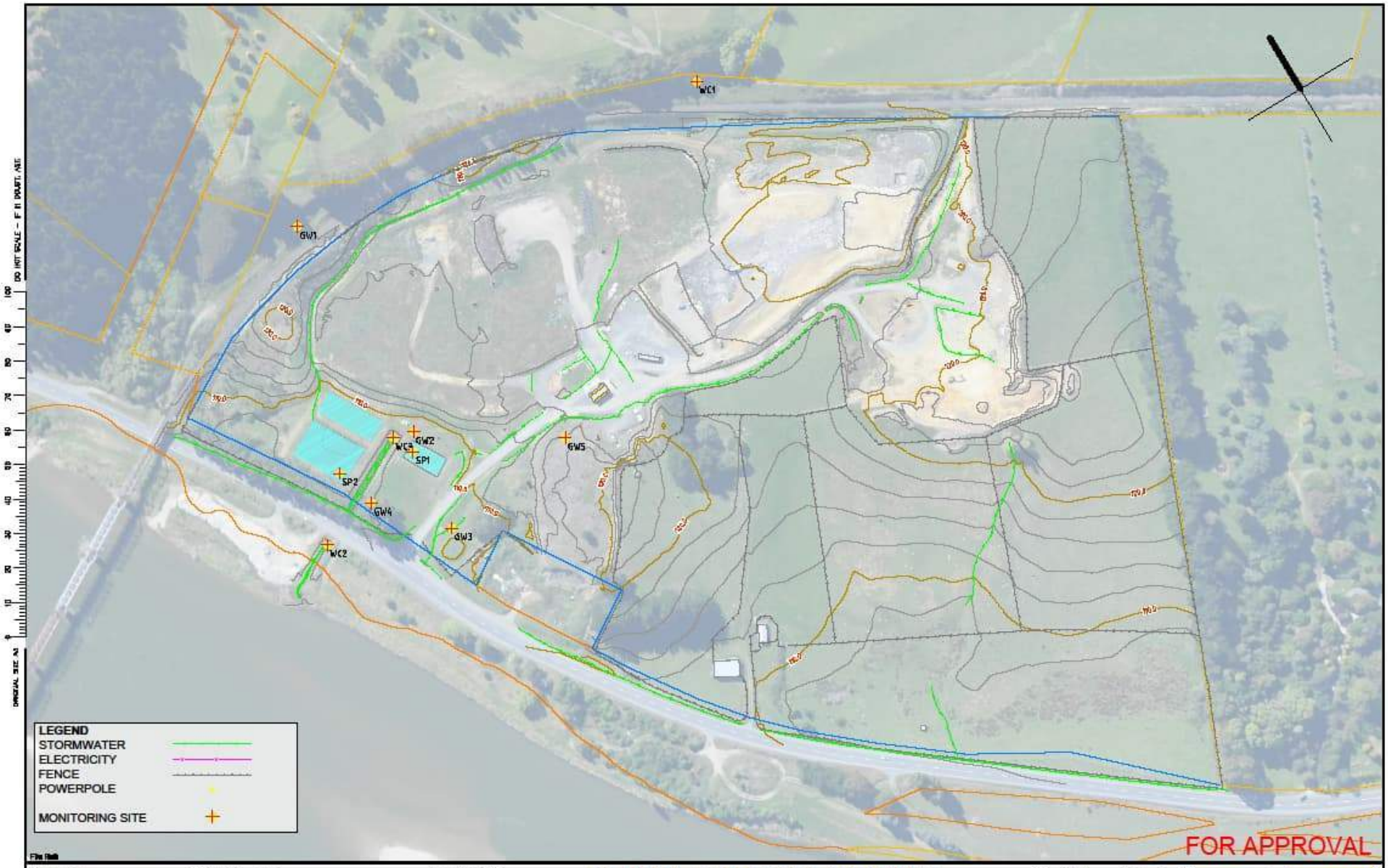
MOUNT COOEE LANDFILL
MONITORING SITES PLAN

Project No.: 12009	Surveyed: DS
Scale: 1:1000	Designed:
Date: APRIL 2012	Drawn: DS
Sheet: MC02	Checked: DH

Survey Services — Surveying Consultants
TL Survey Services Limited
P.O. Box 904 DUNEDIN
Phone (03) 477 1139

Appendix 6

Historical Landfill Development Sequence



DELTA
THINK.INFRASTRUCTURE

CLUTHA DISTRICT LANDFILLS

INITIAL DATA CAPTURE SURVEY - APRIL 2012

MOUNT COOEE LANDFILL
MONITORING SITES PLAN

Project No.: 12009	Surveyed: DS
Scale: 1:1000	Designed:
Date: APRIL 2012	Checked: DS
Sheet: MC02	Checked: DH

Survey Services — Surveying Consultants
TL Survey Services Limited
P.O. Box 901 DUNEDIN
Phone (03) 477 1139

NOTES

- HEIGHTS IN TERMS OF OTAGO METRIC DATUM
- DATUM POINT BALCLUTHA FUNDAMENTAL, 112.77M OMD
- CONTOUR INTERVAL 2.5/0.5

LEGEND

STORMWATER
ELECTRICITY
FENCE
POWERPOLE

File Ref:

FOR APPROVAL

Prepared For: DELTA THINK.INFRASTRUCTURE

No.	Amendments	Drawn	Date

CLUTHA DISTRICT LANDFILLS

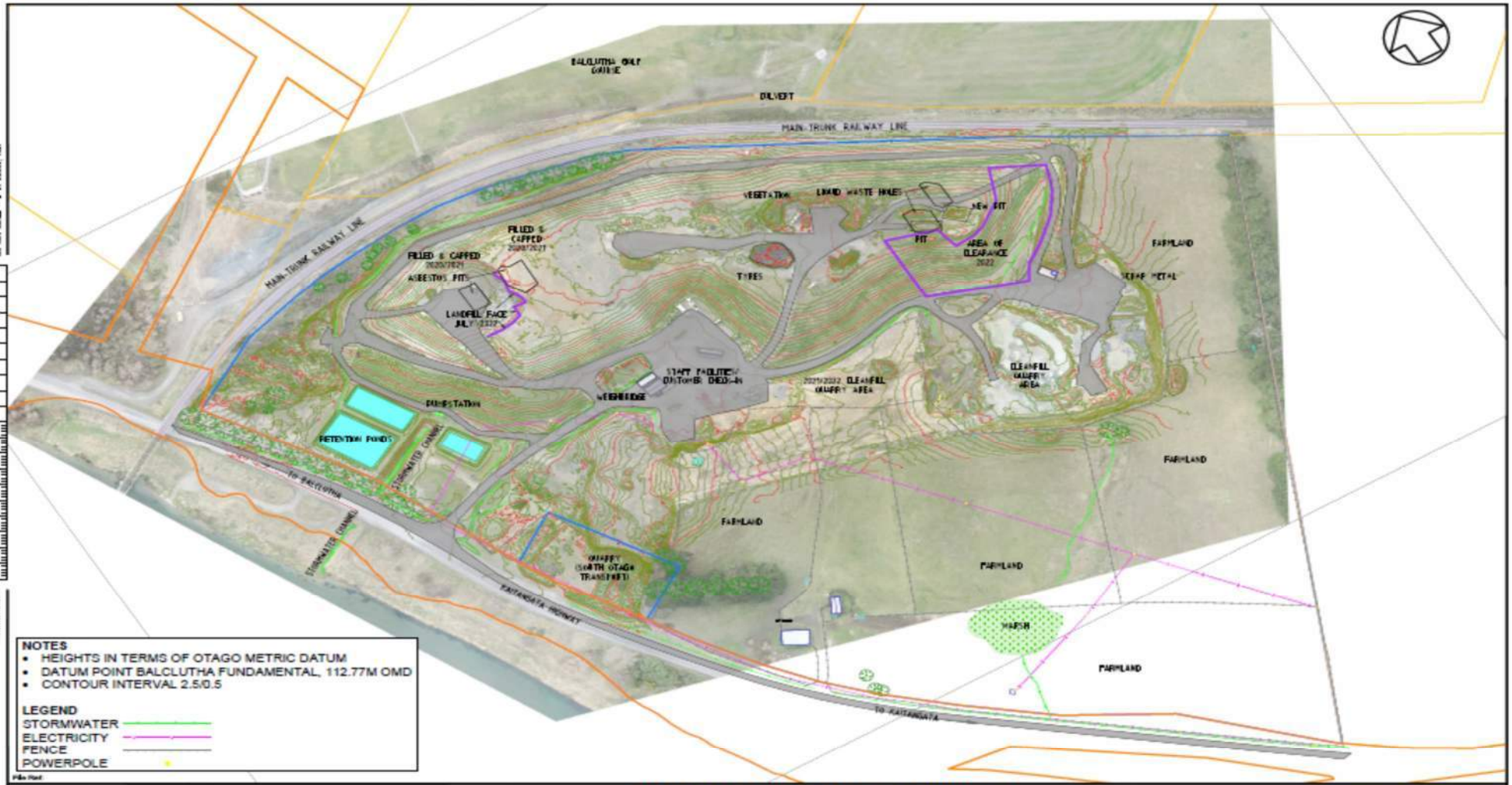
OCTOBER 2014 SURVEY

MOUNT COOEE LANDFILL

PLAN VIEW

Project No.:	14180	Surveyed:	DS
Scale:	1:2000	Designed:	
Date:	OCT 2014	Drawn:	DS
Sheet:	01	Checked:	DH

Survey Services Surveying Consultants
TL Survey Services Limited
P.O. Box 901 DUNEDIN
Phone (03) 477 1133



NOTES

- HEIGHTS IN TERMS OF OTAGO METRIC DATUM
- DATUM POINT BALCLUTHA FUNDAMENTAL, 112.77M OMD
- CONTOUR INTERVAL 2.5/0.5

LEGEND

STORMWATER
ELECTRICITY
FENCE
POWERPOLE

Prepared For: WASTECO NZ LTD

No.	Amendments	Drawn	Date

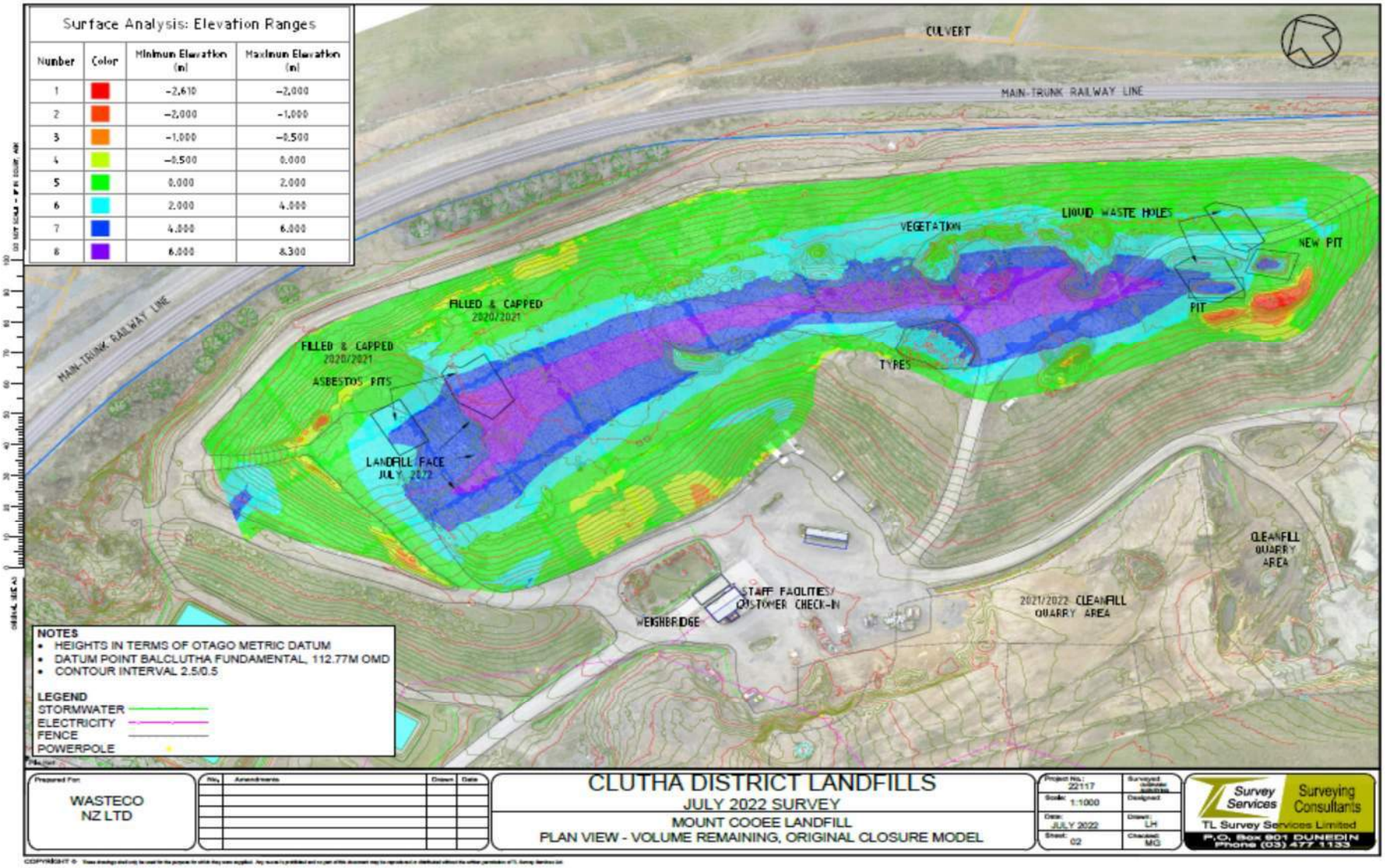
CLUTHA DISTRICT LANDFILLS

JULY 2022 SURVEY

MOUNT COOEE LANDFILL
PLAN VIEW

Project No.: 22117	Surveyed:
Scale: 1:2000	Designed:
Date: JULY 2022	Drawn: LH
Sheet: 01	Checked: MG

Survey Services Surveying Consultants
TL Survey Services Limited
P.O. Box 901 DUNEDIN
Phone (03) 477 1133



Prepared For: WASTECO NZ LTD

No.	Amendments	Drawn	Date

CLUTHA DISTRICT LANDFILLS

JULY 2022 SURVEY

MOUNT COOEE LANDFILL

PLAN VIEW - VOLUME REMAINING, ORIGINAL CLOSURE MODEL

Project No.: 22117	Surveyed:
Scale: 1:1000	Designed:
Date: JULY 2022	Drawn: LH
Sheet: 02	Checked: MG

Survey Services Surveying Consultants

TL Survey Services Limited

P.O. Box 901 DUNEDIN

Phone (03) 477 1133

ROYDS CONSULTING

26597

CLUTHA DISTRICT COUNCIL
DATE RECEIVED
14 JUL 1995
TO BE ACTD BY: CH
COPY TO: WI
RESPONSE:

AAW 46831 08

10 July 1995

Clutha District Council
P O Box 25
BALCLUTHA

SC70/39
10239

Attention: **Mr Charles Hakkaart**

Dear Sir

Contract No. 209: Development of the Mount Cooee Landfill Certificate of Payment No 2; Variations 209/8 and 209/9

We enclose Certificate of Payment No 2 for your attention.

Also enclosed is a full set of Site Instructions and Variations issued to date and fully signed:

Nos 209/1-209/7 previously copied to you
Nos 209/8-209/9 now issued.

209/7: Item 3.2

This extra resulted from the need to place excavated material to waste in a similar manner to that specified for excavation for bund wall. This material was originally intended to be placed as fill. However, due to the winter weather conditions this wet material could not be dried for use as fill.

209/7: Item 3.3

Clause C.4.3 of the Specification provided for a variation in the depth of the rockfill, depending on the soil conditions at the foundation of the bund wall. This implies that the rockfill quantity is subject to remeasure on site. This remeasure certified a larger quantity of rockfill than was scheduled.

ENGINEERING & ENVIRONMENTAL CONSULTANTS
ROYDS CONSULTING LIMITED, 31 STAFFORD STREET.
PO BOX 4, DUNEDIN, NEW ZEALAND.
FACSIMILE 64-3-477-0616. TELEPHONE 64-3-477-0885.
CHRISTCHURCH, DUNEDIN, INVERCARGILL, BALCLUTHA, QUEENSTOWN, OAMARU, TIMARU, GREYMOUTH, BLENHEIM, NELSON, WELLINGTON, PALMERSTON NORTH, AUCKLAND.

ROYDS CONSULTING

209/8: Item 2.2

This is the most significant variation encountered on this contract. The additional area of sheet-piling has resulted from a deeper embedment of the sheetpiling into the weathered bedrock than was anticipated from the subsoil investigation. A copy of the Contractor's sheetpiling records is attached on which the predicted rock profile has been plotted. It shows that:

(a) at the positions of the boreholes, points 2 and 3, the rock profile was predicted with reasonable accuracy.

(b) at the positions of the scalar penetrometer probes, points 1 and 4, the actual level of competent rock was significantly lower than predicted. Excavations to rock at both extremities of the bund wall revealed 1½m to 2m of weathered greywacke which was removed with the excavator to ensure a seal between the bund wall and competent rock. It now appears that the scalar penetrometer, used for testing the depth to rock, met refusal at the upper layer of weathered greywacke. This additional sheetpile founding depth has significantly increased the area of sheetpile required

    (a) by the greater depth required

    (b) by the greater width required to enable the same depth of excavation for the bund wall to be achieved at both extremities of the sheetpiling.

We acknowledge the cost implications of this additional area of sheetpiling. However, we wish to confirm the quality of the cut off constructed structure. The sheetpile records indicate that a very good sheetpile/bedrock seal has been achieved. In addition, a tight interlock has been achieved between sheetpile sections. These results point to a very effective cut off for leachate.

We will submit a detailed estimate of the final cost of the contract.

Yours faithfully
ROYDS CONSULTING LTD

AA Wright

Per: Andy Wright

ROYDS CONSULTING

ENGINEERING & ENVIRONMENTAL CONSULTANTS
ROYDS CONSULTING LIMITED

PAYMENT CERTIFICATE

~~TAX INVOICE~~

TO Clutha District Council
P O Box 25, Balclutha

PROJECT NO. 46831.08

DATE 7 July 1995

CONTRACT PRICE (EX GST) $ 464,755

AUTHORISED VARIATIONS $

ADJUSTED CONTRACT PRICE $

CONTRACT No. 209: Development of the Mount Cooee Landfill

THIS IS TO CERTIFY THAT Progress Payment No.* 2 FOR WORK COMPLETED TO 30 June 1995

IS NOW DUE TO Contract Cultivation

OF P O Box 892, Dunedin ~~GST No.~~

AND IS ENTITLED TO PAYMENT OF $ 195,183.69 (INCLUDING GST) MADE UP AS FOLLOWS:

VALUE OF WORK COMPLETED TO DATE		$	278,645.58
LESS RETENTION	10 %	$	27,864.56
		$	250,781.02
OTHER ADJUSTMENTS (IF ANY)		$	0
SUB TOTAL		$	250,781.02

LESS PREVIOUS PAYMENTS (NOT INCLUDING GST)

NO. 1	$	77,284.41
NO. 2	$	
NO. 3	$	
NO. 4	$	
NO. 5	$	
NO. 6	$	
NO. 7	$	
NO. 8	$	
NO. 9	$	

NOTES/ATTACHMENTS:

- ~~THIS IS A BUYER CREATED INVOICE. NO SEPARATE TAX INVOICE WILL BE ISSUED BY THE CONTRACTOR.~~
- PLEASE CHECK THE PREVIOUS PAYMENTS.
- ALL QUANTITIES AND AMOUNTS DETAILED ON THIS CERTIFICATE AND ATTACHMENTS (IF ANY) ARE SUBJECT TO CHECK AND REVIEW BEFORE FINAL CERTIFICATE ISSUED.
- A COPY OF THIS CERTIFICATE HAS BEEN SENT TO THE CONTRACTOR.
- THE CONDITIONS OF CONTRACT REQUIRE THAT PAYMENT MUST BE MADE WITHIN 10 WORKING DAYS OF THE DATE OF THIS CERTIFICATE.
- CHEQUE TO BE MADE PAYABLE TO THE CONTRACTOR, AND SENT DIRECT.

PREVIOUS PAYMENTS TOTAL	$	77,284.41
AMOUNT CERTIFIED	$	173,496.61
+ GST @ 12.5 %	$	21,687.08
AMOUNT NOW PAYABLE TO	$	195,183.69
Contractor		

* DELETE IF NOT APPLICABLE

A C Wright
ENGINEER TO THE CONTRACT
P.P. ROYDS CONSULTING LIMITED

ROYDS CONSULTING LTD.

Action		Info
	- 6 JUL 1995	
	RECEIVED	

TO: ROYDS CONSULTING Attn: ANDY
P.O. Box 4
DUNEDIN
Attn: Andy Wright

BUDGET PRINT LTD DUNEDIN

CONTRACT CULTIVATION LTD
21 DONALD STREET, P.O. BOX 892
KAIKORAI VALLEY, DUNEDIN
TELEPHONE 488-2125
FAX 488-2124

BEING SITE DEVELOPMENT MT COOEE LANDFILL CLUTHA D.C. CONTRACT No 209

PROGRESS CLAIM No 2. 30 June 1995

ITEM	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
1.	Preliminary & General:	LS	30%	10,000	3,000.00
2.	Sheetpiling:				
	- Establishment	LS			5,600.00
	- Construct S/P Wall	m^2	448.04	300.00	134,412.00
3.	Earthworks:				
3.1	- Strip Topsoil	m^3	1500	6.50	9,750.00
3.2	Variation 209/7 - Excavate to Bund Wall	m^3	~~1750~~ 2038	6.50	~~11,375.00~~ 13,247.00
3.3	Variation 209/7 - Rockfill to Bund Wall	m^3	694	15.00	10,410.00
3.4	- Fill to Bund Wall	m^3	~~2186~~ 2400	11.00	~~24,046.00~~ 26,400.00
3.5	- Construct Pond & Open Channel	m^3	~~3752~~ 2750	11.00	~~41,272.00~~ 30,250.00
3.6	~~Variation 209/7~~ - Embankment Liner	m^2	995	10.00	9,950.00
3.7	- Dewater - Bund Wall	LS			2,000.00
	- Ponds	LS			1,000.00
4	Drainage:				
4.2.1	- 525 Ø Pipeline	m	14.6	290.00	4,234.00
4.5	- Excavate Unsuitable	m^3	988	7.00	6,916.00
4.6	- Rockfill to Trench	m^3	988	15.00	14,820.00
4.8	- Concrete Plug - Replaced with Bentonite Plug - see Item E				
4.9	- Groundwater Bore				3,000.00

cont'd on page 2.

TO: .....

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BUDGET PRINT LTD DUNEDIN

page 2.

CONTRACT CULTIVATION LTD
21 DONALD STREET, P.O. BOX 892
KAIKORAI VALLEY, DUNEDIN
TELEPHONE 488-2125
FAX 488-2124

BEING .....

.....

.....

ITEM	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	cont'd from page 1.				
	Additional Items: (Dayworks)				
A.	Excavate Test Pits - Certified Claim No 1.				900. 00
B.	Extra Exploration Pits: - Certified Claim No 1.				315. 00
C.	5.1.3 - Repair Roading Culvert - Yet to Claim				
	- Remove Sediment Buildup				
	- Labour	hr	11.00	30.00	330. 00
	- Hire of Pump	day	2.00	35.00	70. 00
D.	5.1.4 - 16 No 252 Ø Pipes Surplus to requirements - Yet to Claim				
	- Clear out Open Channel on Railway Embankment				
	13/6/95 - Excavator	hr	6	105.00	630. 00
	- Truck	hr	6	65.00	390. 00
	- Labour	hr	4	30.00	120. 00
	Investigate Location of 225Ø Pipe at Railway:				
	- Excavator	hr	1	105.00	105. 00
	- Labour	hr	1	30.00	30. 00
E.	5.1.7 - Bentonite Plug				
	- Bentonite				301. 32
	Material Markup 20%				60. 26
	- Excavator	hr	2	105.00	210. 00
	- Loader	hr	1	75.00	75. 00
	- Labour	hr	4	30.00	120. 00

cont'd on page 3.

TO: .....

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BUDGET PRINT LTD DUNEDIN

CONTRACT CULTIVATION LTD
21 DONALD STREET, P.O. BOX 892
KAIKORAI VALLEY, DUNEDIN
TELEPHONE 488-2125
FAX 488-2124

BEING .....

.....

.....

ITEM	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	cont'd from page 2.				
	Value of Works to Date				278645 58 ~~285,441. 58~~
	Less 10% Retention				27,864 56 ~~28,544. 16~~
					~~256,897. 42~~ 259 781 02
	Less Previous Payments				~~77,284 41~~ ~~77,284. 41~~
					~~179,613. 01~~ 173,496 61
	Plus GST				21,687 08 ~~22,451. 63~~
	THIS CLAIM			$	195,183 69 ~~202,064. 64~~

Sheet Pile Records

Sheet 2 of 2

③ BH1. ④

DANIEL SMITH

adfill Sheet Pile well 4/95

83×0.4 = 33.2m

predicted rock profile

1.5 steel backs

Fence = Sheet No in sequence of installation

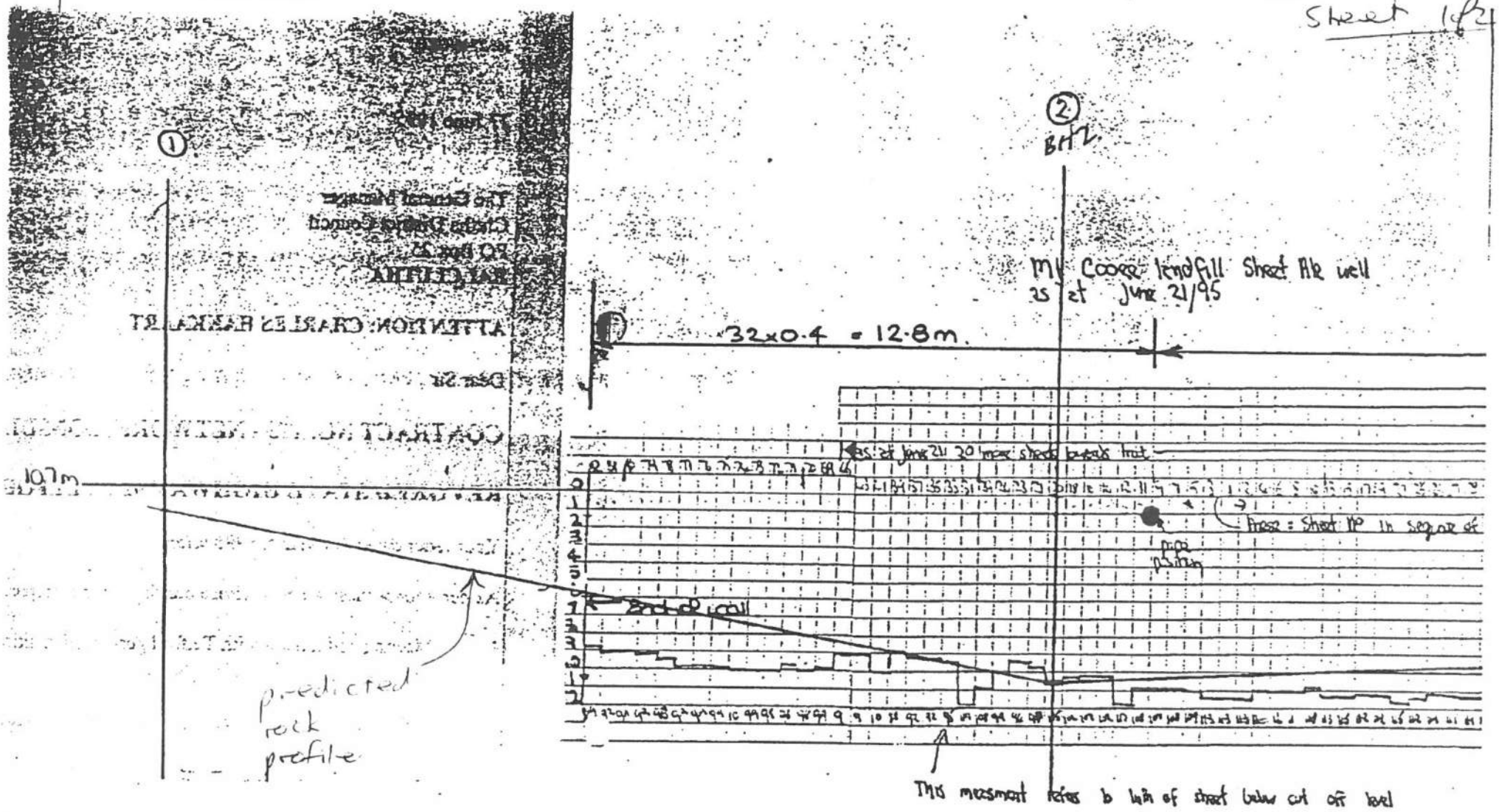
cut off

cut off

of steel below cut off level

Sheet Pile Records

Sheet 1 of 2



EXISTING 225 Ø CULVERT
I.L. 114.2 APPROX

RAILWAY EMBANKMENT

TRANSITION MANHOLE
I.L. 108.6 APPROX

REMOVABLE INLET GRILLE: 50X50 ANGLE FRAME WITH R20 VERTICAL RODS AT 200 CRS. HOT DIP GALVANISE AFTER FABRICATION. DYNABOLT ANGLE FRAME TO END OF CULVERT

EXISTING RAILWAY CULVERT

EMBANKMENT LINER

RELOCATE WATERMAIN

EXISTING 32 Ø POLY WATERMAIN

NEW 225 Ø RCRRJ CLASS 2 Z S/W PIPE

INITIAL SURFACE WATER CHANNEL (BY OPERATOR)

MANHOLE 2

MANHOLE 3

BM4

BM1

REF PEG B

225Ø RC RRJ CLASS X S/W PIPE (BY OPERATOR)

NEW 525 Ø RCRRJ CLASS 2 Z S/W PIPE, LINE TO BE CONFIRMED ON SITE BY THE ENGINEER

EXISTING LANDFILL

TRIAL HOLE 2

EMERGENCY LEACHATE STORAGE POND

GROUNDWATER MONITORING BORE

LEACHATE PUMPSTATION

S/W RETENTION POND

BUND

INITIAL DRAINAGE DITCH (BY OPERATOR)

OPEN CHANNEL

TRIAL HOLE 1

REF PEG B

TRUCK WASH (POSITION TO BE FINALISED ON SITE)

EXISTING OPERATOR'S BUILDING

PEG A

BM7

FUTURE EXTENT OF BUND WALL (BY OPERATOR)

EXISTING 900 Ø CULVERT I.L. 105.56

EXISTING ACCESS ROAD

PROPOSED TRANSFER STATION SITE (BY OTHERS)

WATERTANK

DESIGNATED AREA BOUNDARY

0 10 20 40 60 80 m
GRAPHIC SCALE 1:1000

ALL LEVELS ARE RELATIVE TO OTAGO METRIC DATUM

SCALES 1:1000		
FIELDBOOK –		
	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	GSM	2/95
APPROVED	raw	3/95

Original Size A3

No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	10/3/95	aaw

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

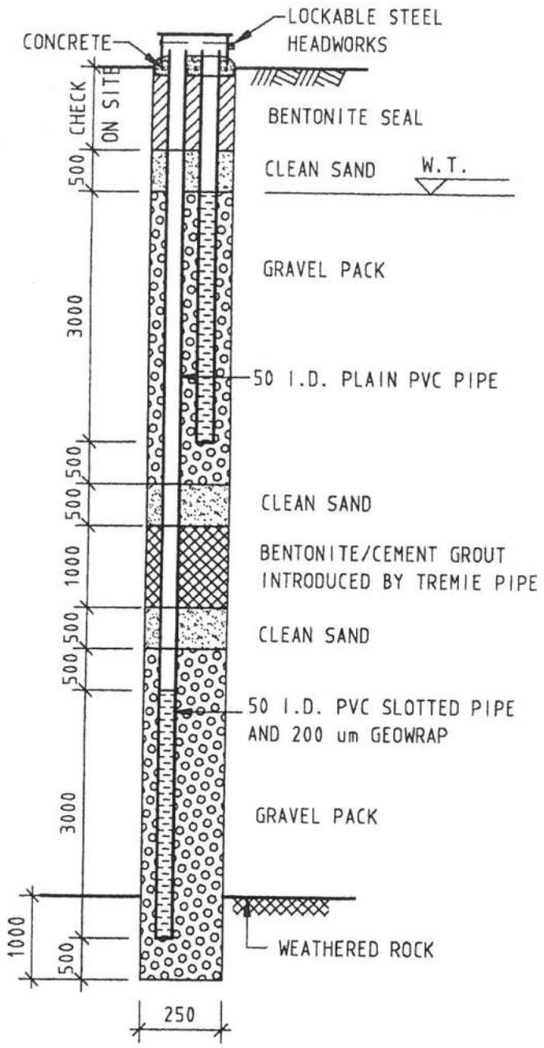
SITE LAYOUT PLAN

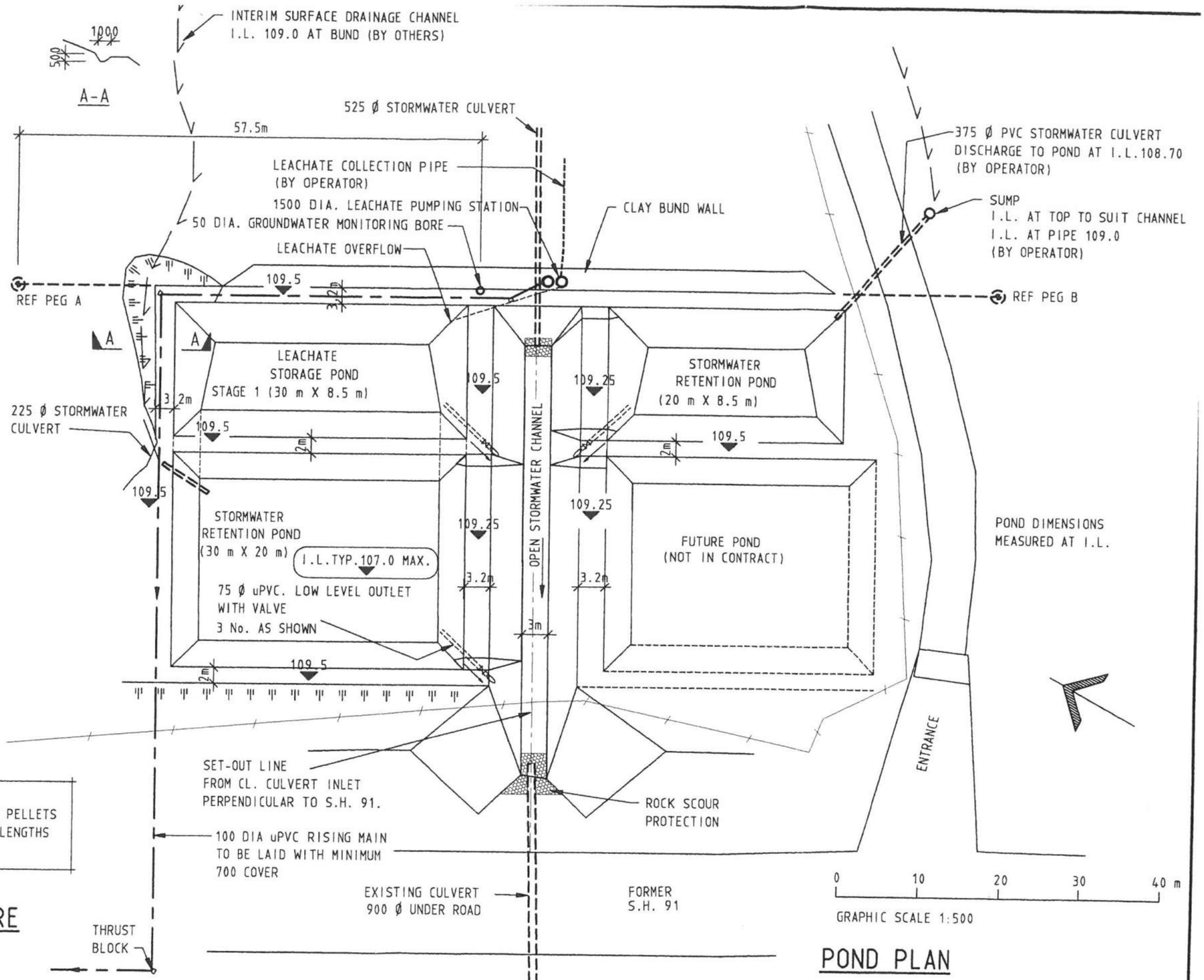
ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

Status Stamp: FOR TENDER

Date Stamp: 14 MAR 1995

Job No. 46831.01 | Sheet No. 51 | Rev.





NOTES:
- BENTONITE SEALS FORMED FROM HYDRATED BENTONITE PELLETS
- NO LUBRICANTS OR ADHESIVES TO BE USED TO JOIN LENGTHS OF PLASTIC CASING

GROUNDWATER MONITORING BORE

POND PLAN

SCALES 1:500, N.T.S.
FIELDBOOK –

	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	aaw	3/95

Original Size A3

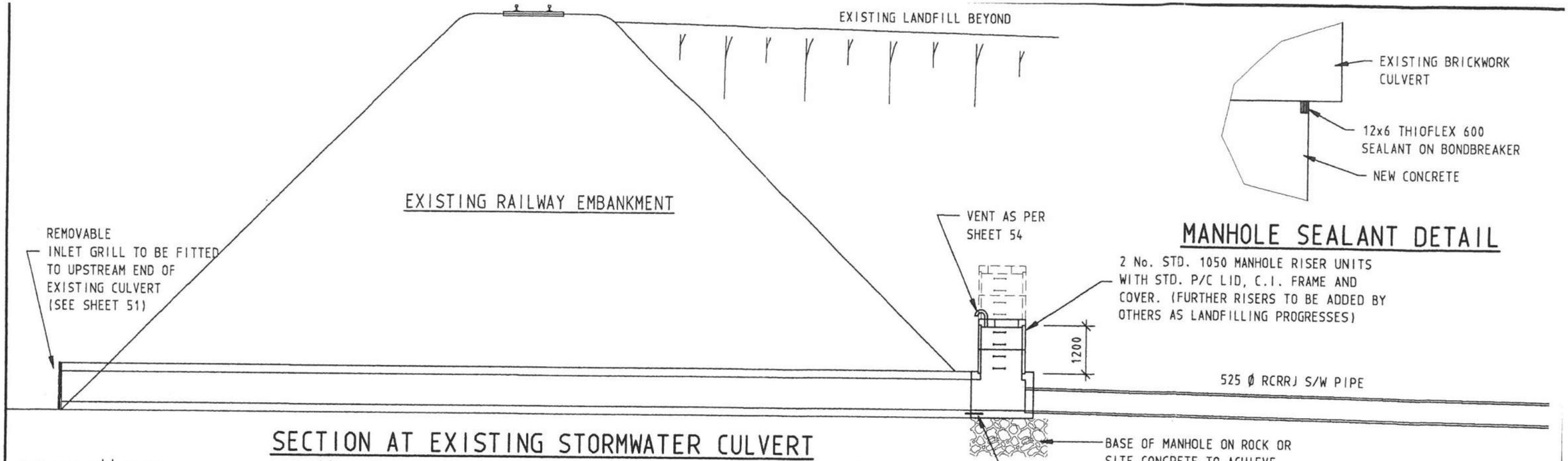
No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	10/3/95	aaw

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

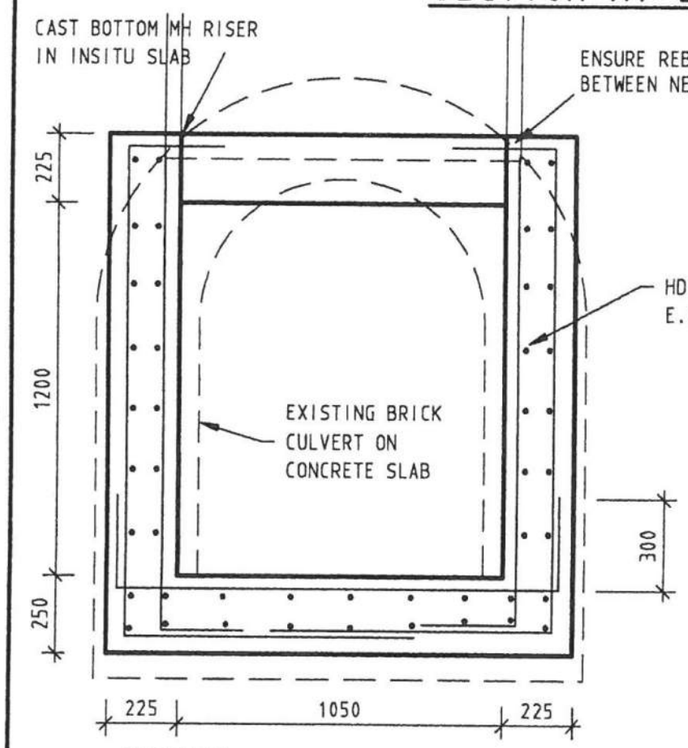
PLAN AT PONDS AND DETAIL OF GROUNDWATER MONITORING BORE

ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

Status Stamp: FOR TENDER
Date Stamp: 14 MAR 1995
Job No. 46831.01/52
Sheet No.
Rev.



SECTION AT EXISTING STORMWATER CULVERT



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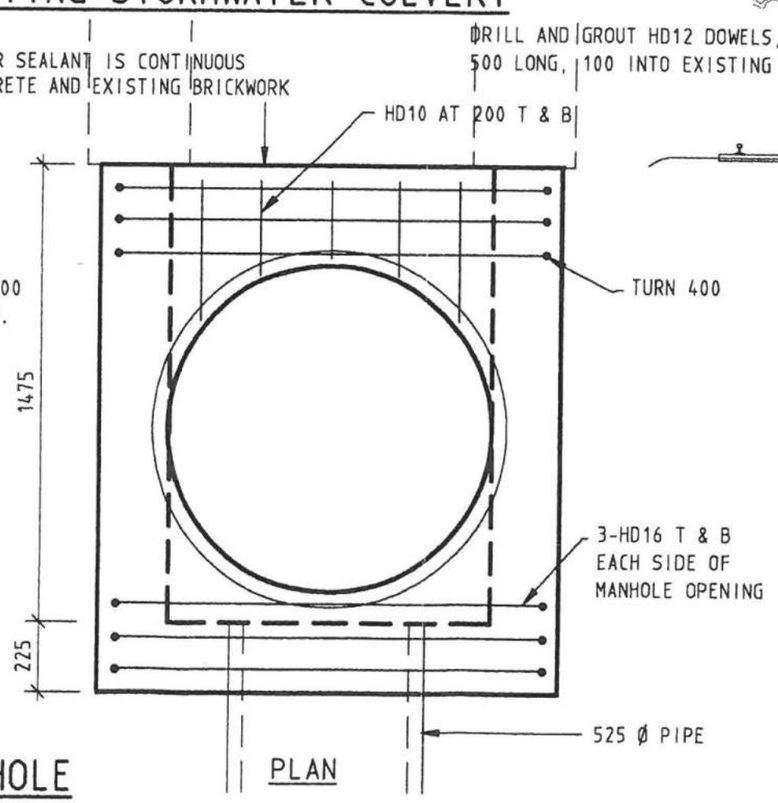
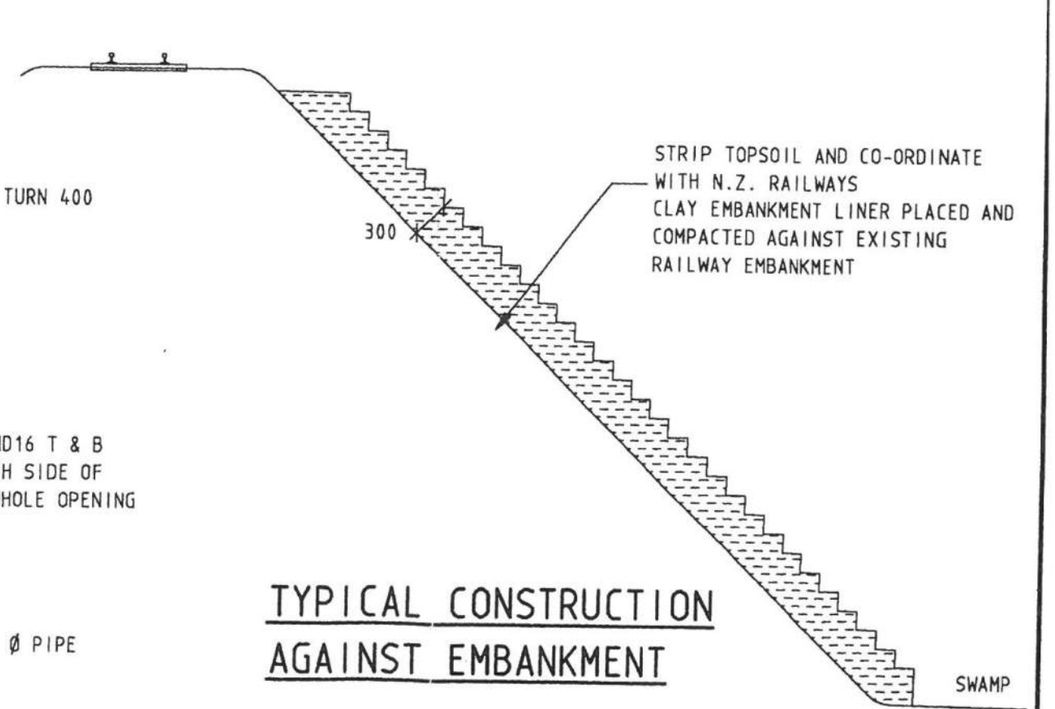


PLAN

TRANSITION MANHOLE

MANHOLE SEALANT DETAIL

2 No. STD. 1050 MANHOLE RISER UNITS WITH STD. P/C LID, C.I. FRAME AND COVER. (FURTHER RISERS TO BE ADDED BY OTHERS AS LANDFILLING PROGRESSES)



TYPICAL CONSTRUCTION AGAINST EMBANKMENT

SCALES 1:100 1:20		
FIELDBOOK –		
	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	aaw	3/95

Original Size A3

No		Date	Initial
–	APPROVED FOR CONSTRUCTION	10/3/95	aaw
No	AMENDMENTS	Date	Initial

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

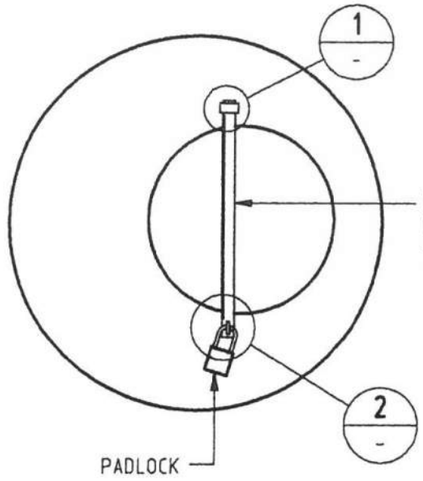
SECTIONS AT RAILWAY EMBANKMENT & TRANSITION MANHOLE

ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

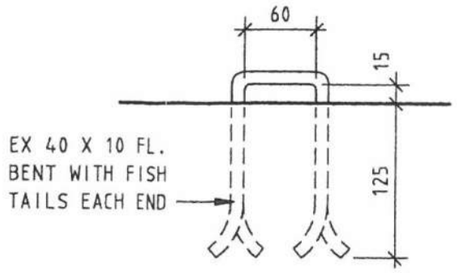
Status Stamp: FOR TENDER

Date Stamp: 14 MAR 1995

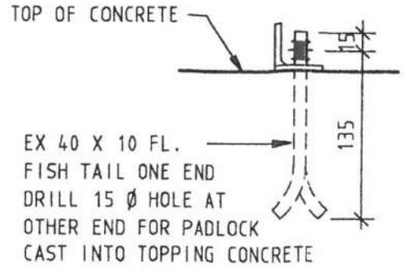
Job No. 46831.01 / Sheet No. 53 / Rev.



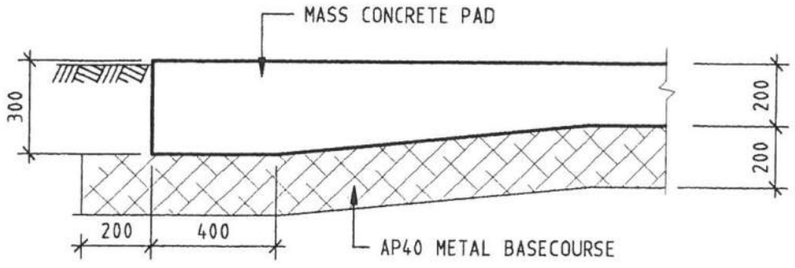
TYPICAL MANHOLE LID LOCKING BAR
1 : 20



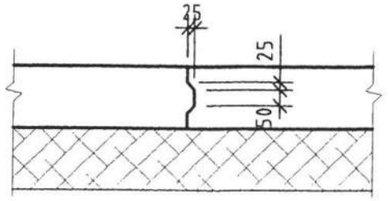
DETAIL 1 / -
1 : 5



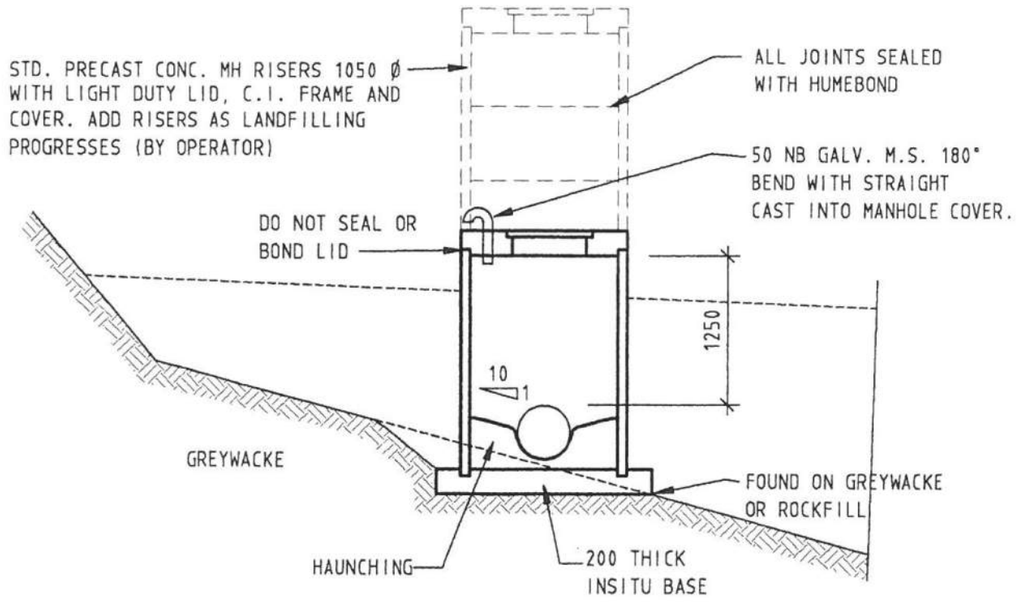
DETAIL 2 / -
1 : 5



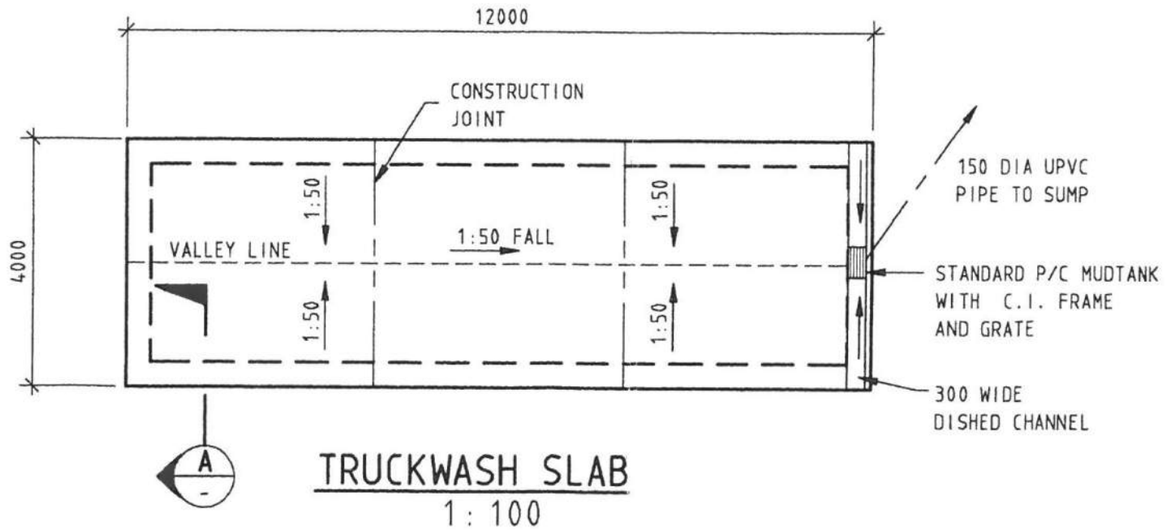
SECTION A / -
1 : 20



CONSTRUCTION JOINT
1 : 20



STORMWATER MANHOLE DETAIL



TRUCKWASH SLAB
1 : 100

SCALES 1:100 1:50 1:20 1:5		
FIELDBOOK –		
	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	GSM	2/95
APPROVED	aaw	3/95

Original Size **A3**

No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	10/3/95	aaw

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

MANHOLE AND TRUCKWASH DETAILS

ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

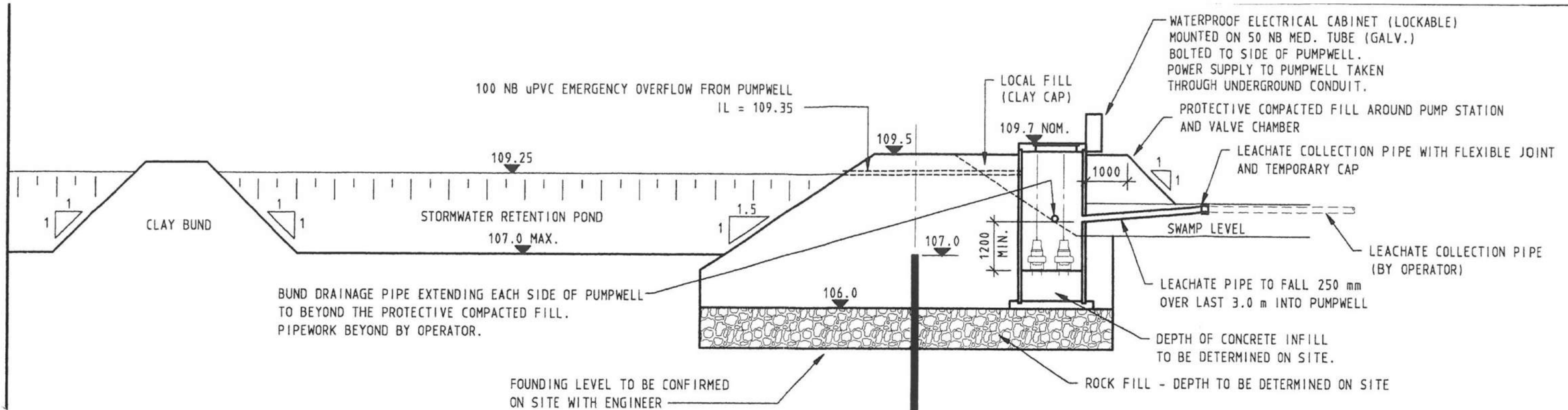
Status Stamp: FOR TENDER

Date Stamp: 14 MAR 1995

Job No. 46831.01/54

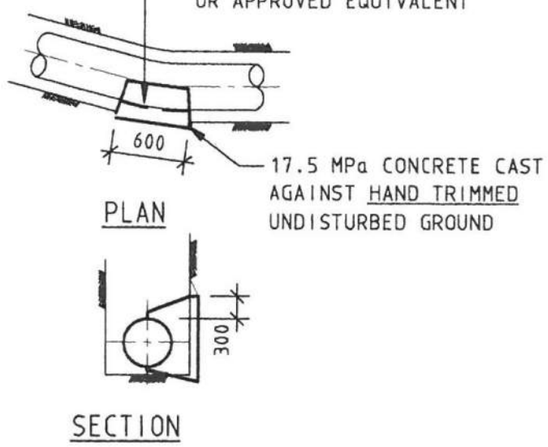
Sheet No.

Rev.



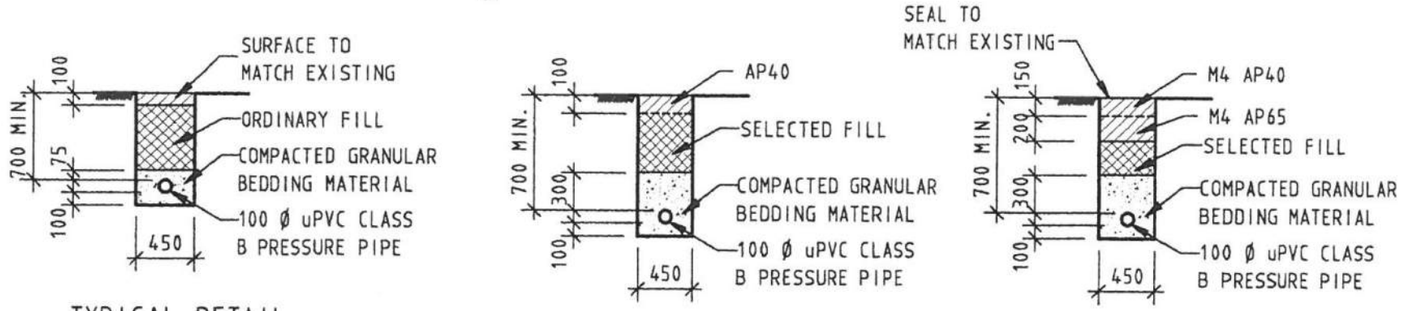
BUND SECTION AT LEACHATE PUMP STATION

PUMPWELL AND VALVE CHAMBER
1500 Ø RC MANHOLE RISERS
WITH P/C LID AND CAST-IN
STEEL FRAME AND COVER
REFER TO DWG'S. 46831.01/56,57,58



RISING MAIN THRUST BLOCK DETAILS

N.T.S.



RISING MAIN BEDDING DETAILS

SCALES 1:100		
FIELDBOOK –		
	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	AAW	3/95

Original Size A3

No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	19/3/95	AAW

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

BUND SECTION AT PUMP STATION AND RISING MAIN DETAILS

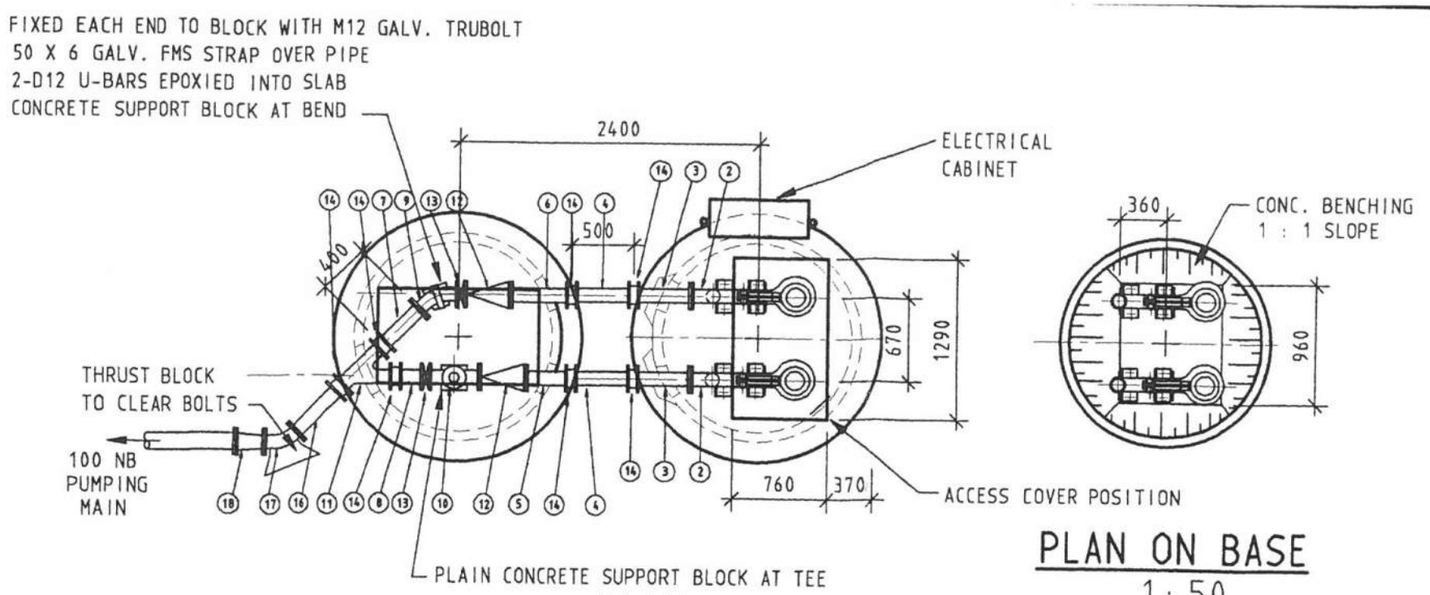
ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

Status Stamp: FOR TENDER
Date Stamp: 14 MAR 1995

Job No. 46831.01/55
Sheet No.
Rev. –

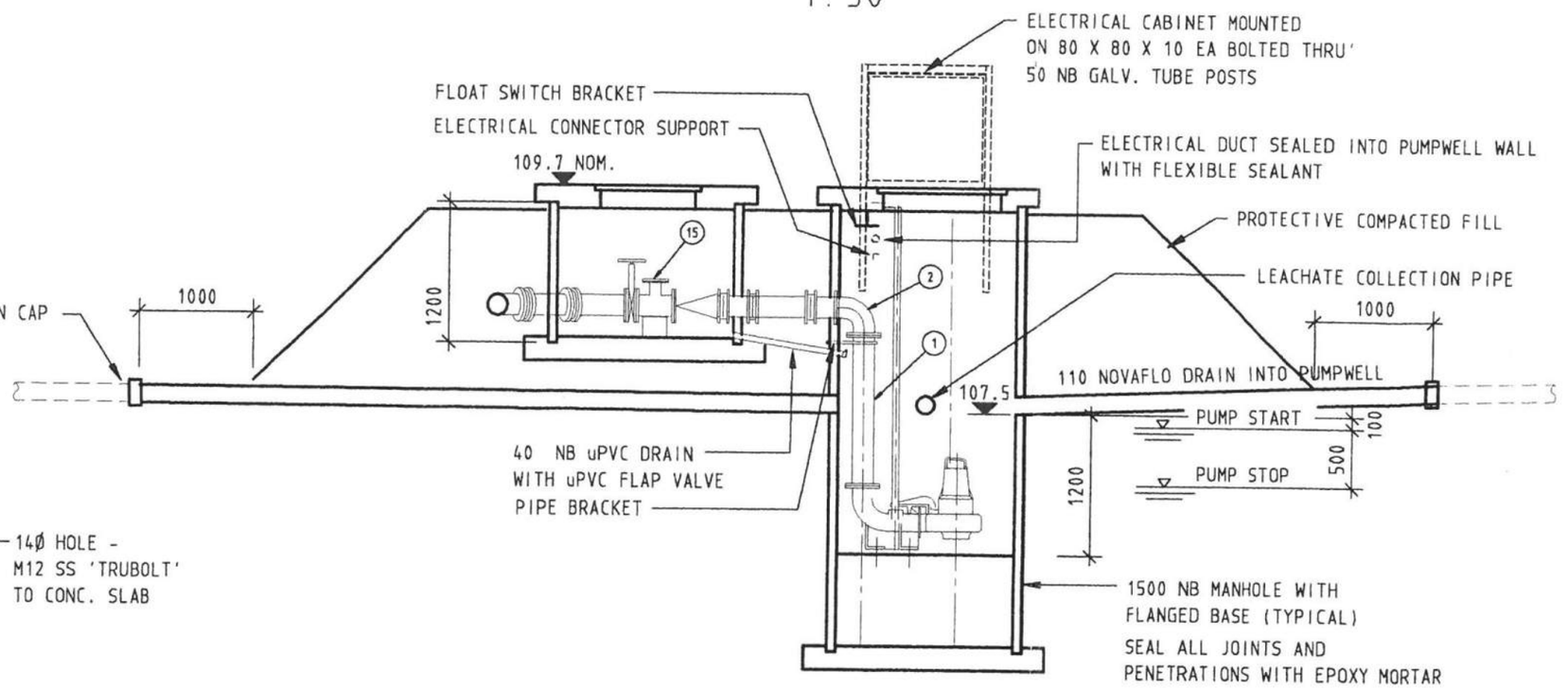
FITTINGS SCHEDULE

ITEM	No OFF	DESCRIPTION
(1)	1	80NB DF STRAIGHT - LENGTH TO BE DETERMINED BY CONTRACTOR
(2)	2	80NB DF SHORT RADIUS BEND
(3)	2	80NB F/P STRAIGHT X 450 LG
(4)	2	80NB PE STRAIGHT X 500 LG
(5)	1	80NB F/P STRAIGHT - LENGTH TO SUIT
(6)	1	80NB F/P STRAIGHT - LENGTH TO SUIT
(7)	1	80NB F/P STRAIGHT - LENGTH TO SUIT
(8)	1	80NB ADAPTOR
(9)	1	80NB DF 45° BEND
(10)	1	75 ON 80 AF TEE
(11)	1	80NB PE WYE
(12)	2	80NB NON-RETURN VALVE
(13)	2	80NB KNIFEGATE VALVE
(14)	7	80NB GIBAULT JOINT
(15)	1	75NB BLANK FLANGE
(16)	1	80NB F/P STRAIGHT - LENGTH TO SUIT
(17)	1	80NB F/P 45° BEND
(18)	1	80/100 AF CONCENTRIC REDUCER

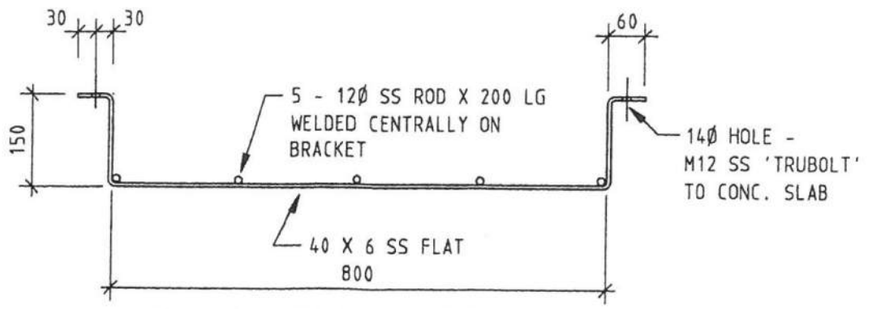


PLAN
1 : 50

PLAN ON BASE
1 : 50



SECTION
1 : 50



FLOAT SWITCH BRACKET
1 : 10

	INIT	DATE
SCALES 1:100		
FIELDBOOK -		
SURVEYED	-	-
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED		3/95

Original Size A3

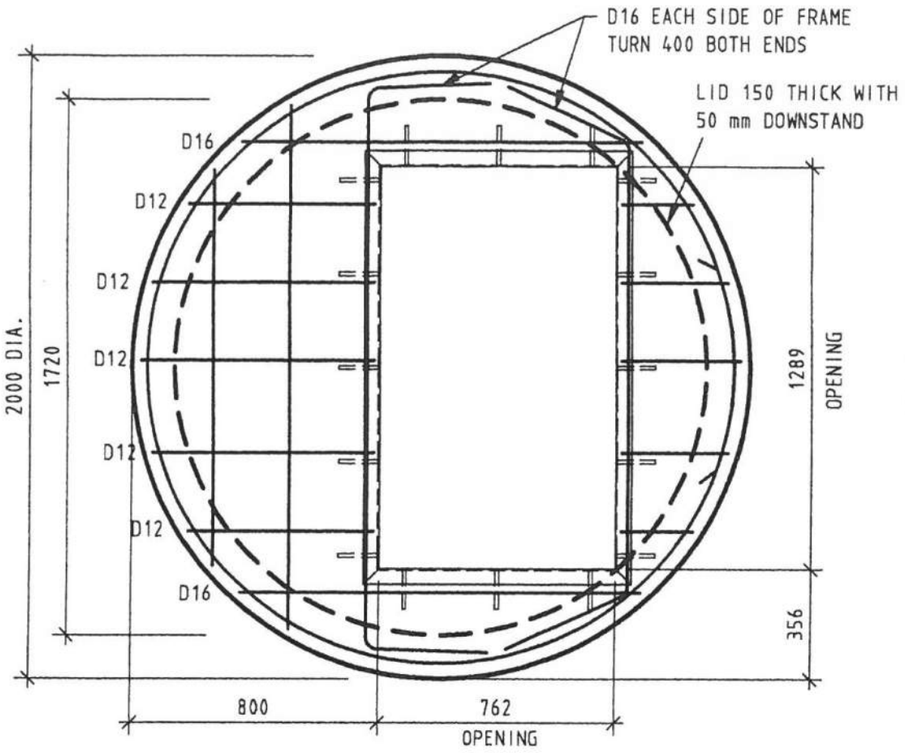
No	AMENDMENTS	Date	Initial
-	APPROVED FOR CONSTRUCTION	19/3/95	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

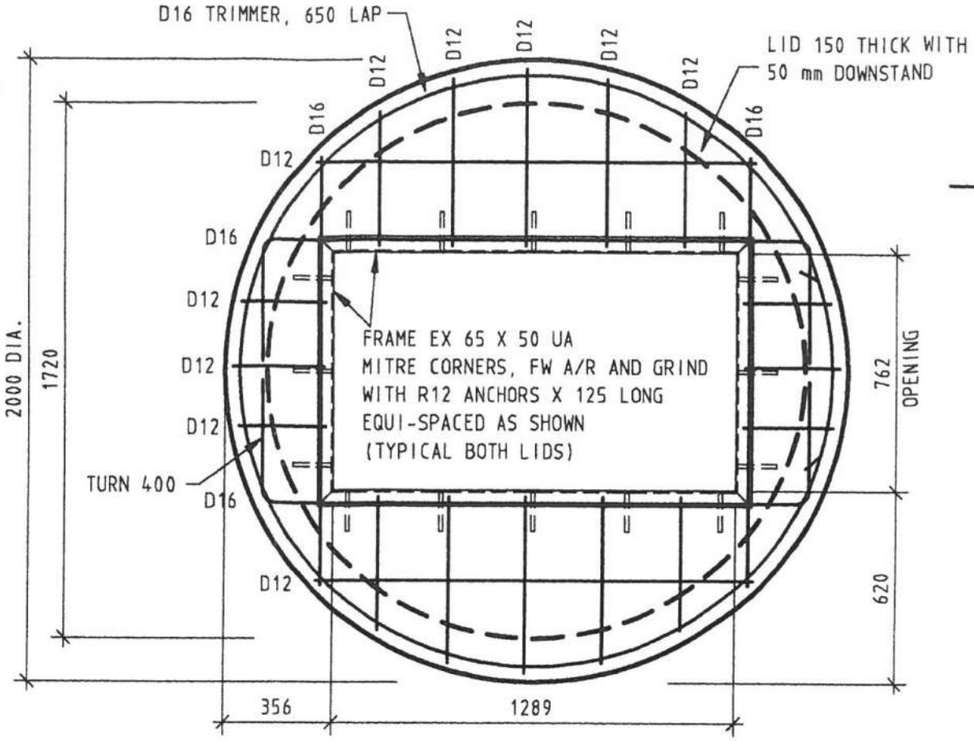
PUMP STATION DETAILS 1

ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

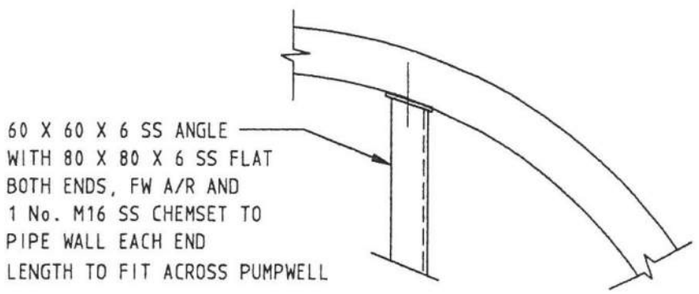
Status Stamp: FOR TENDER
Date Stamp: 14 MAR 1995
Job No. 46831.01/56
Sheet No. 56
Rev



PUMPWELL LID
1 : 20

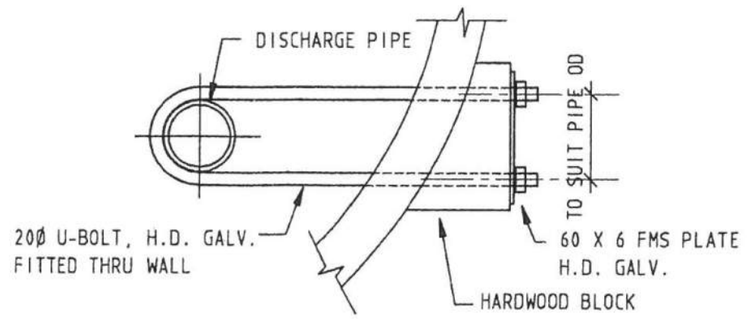


VALVE CHAMBER LID
1 : 20

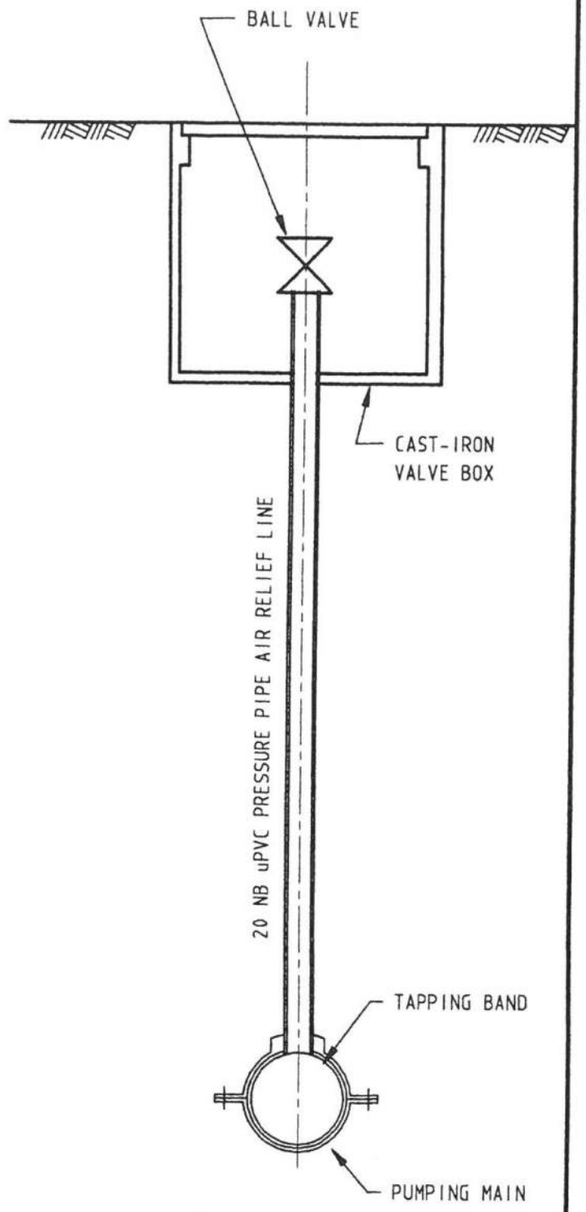


ELECTRICAL CONNECTION SUPPORT
1 : 10

ELECTRICAL CONTRACTOR TO DRILL ON SITE AS REQUIRED FOR MOUNTING ELECTRICAL CONNECTORS FOR PUMPS. USE SS BRACKETS AND BOLTS AS REQUIRED.



PIPE BRACKET
1 : 10



PUMPING MAIN
AIR RELIEF DETAIL
1:5

LOCATED AT HIGHEST POINT ON MAIN

SCALES 1:100		
FIELDBOOK –		
	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	qaw	3/95

Original Size **A3**

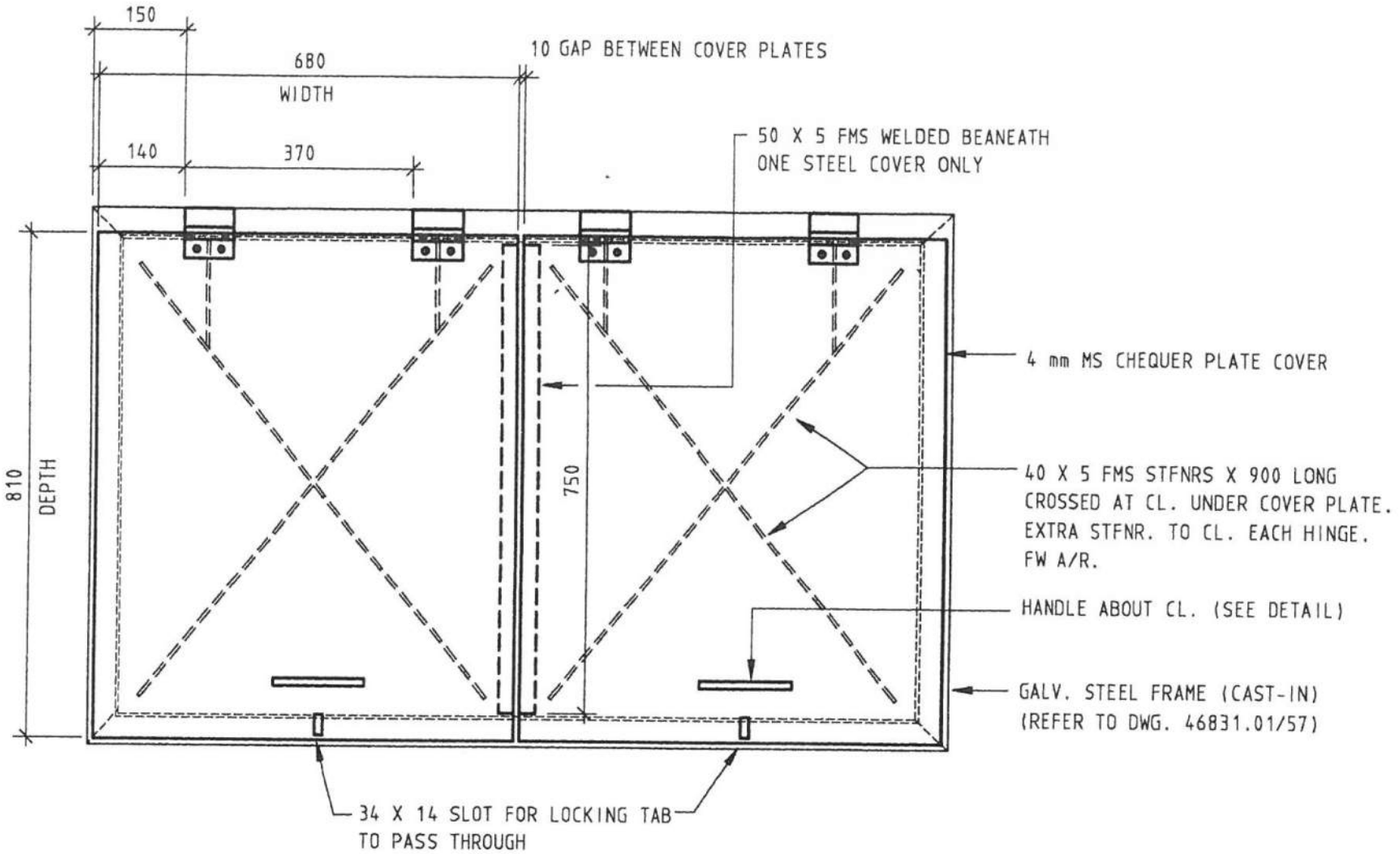
No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	14/3/95	qaw

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

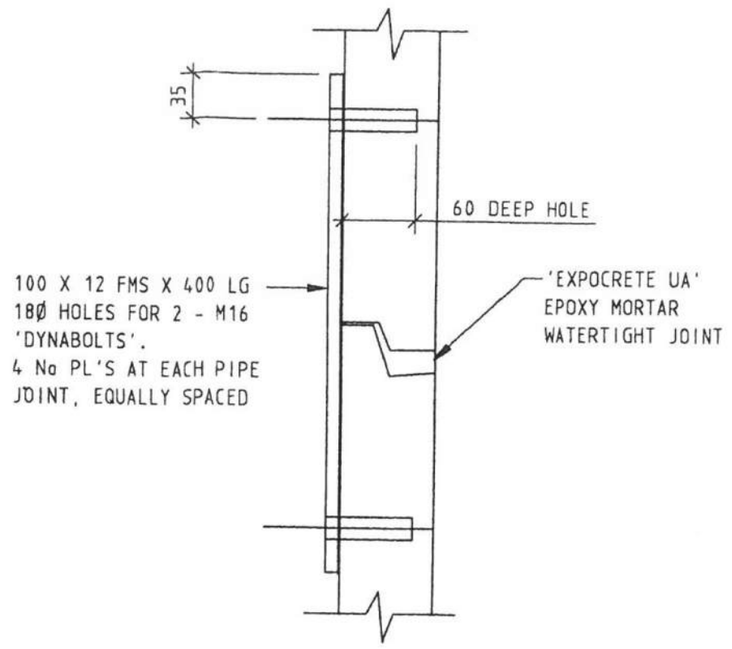
PUMP STATION DETAILS 2 AND PUMPING MAIN AIR RELIEF VALVE

ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

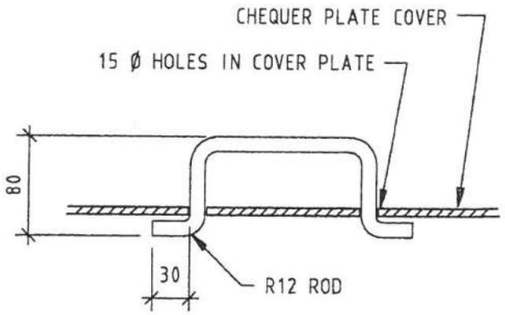
Status Stamp: FOR TENDER
Date Stamp: 14 MAR 1995
Job No.: 46831.01/57
Sheet No.:
Rev.:



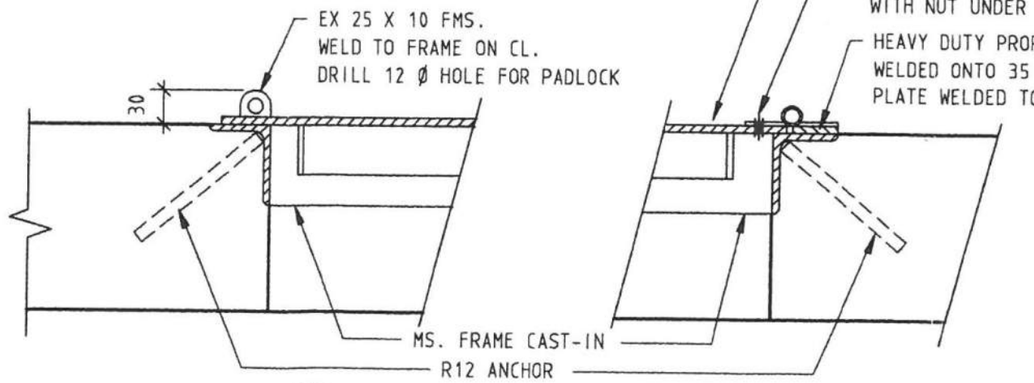
PLAN ON STEEL COVERS
1 : 10



PUMPWELL JOINT DETAIL
1 : 5



HANDLE DETAIL
1 : 5



DETAIL 1
1 : 5

DETAIL 2
1 : 5

SCALES AS SHOWN		
FIELDBOOK –		
	INIT	DATE
SURVEYED	–	–
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	aaw	3/95

Original Size A3

No	AMENDMENTS	Date	Initial
–	APPROVED FOR CONSTRUCTION	10/3/95	aaw

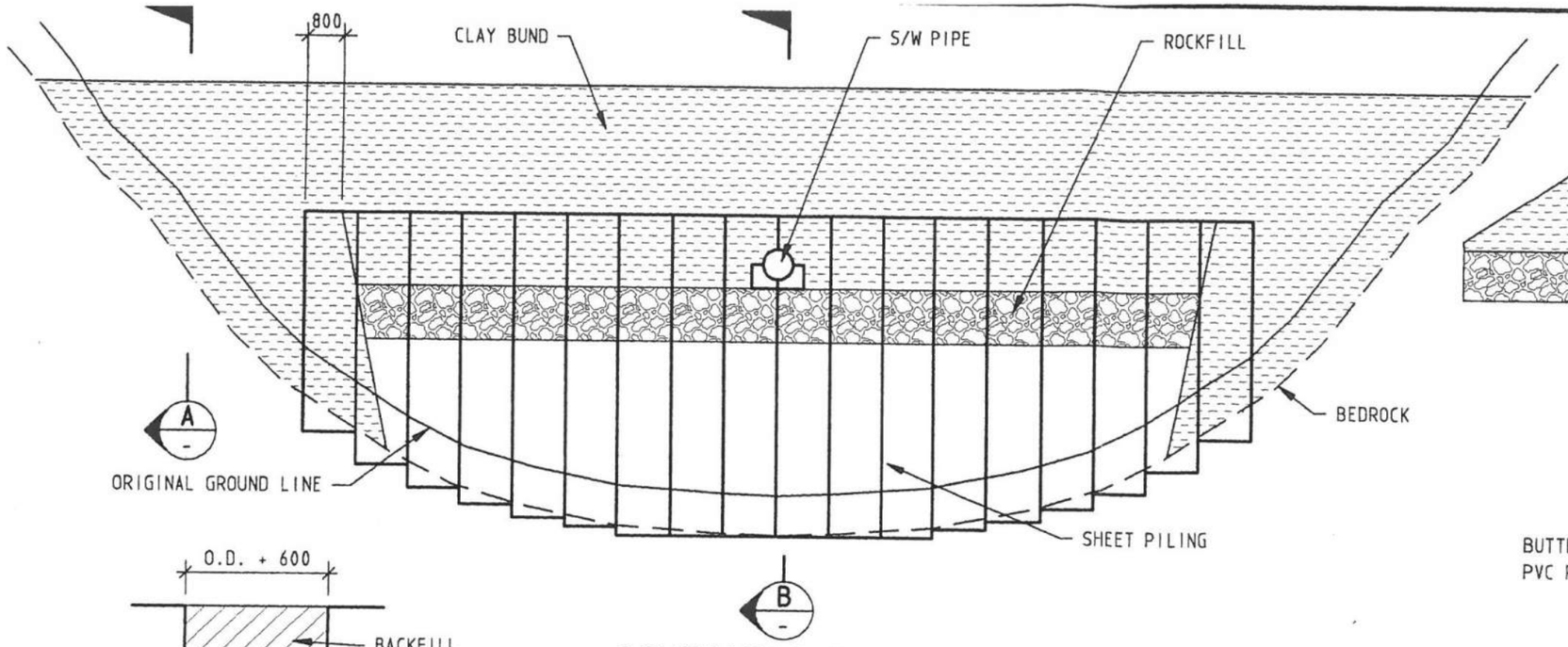
CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

PUMP STATION DETAILS 3 (STEEL COVERS)

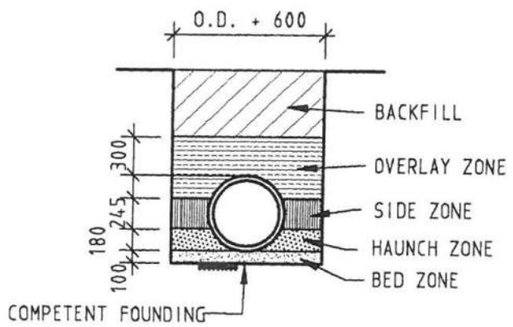
ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

Status Stamp: FOR TENDER
Date Stamp: 14 MAR 1995

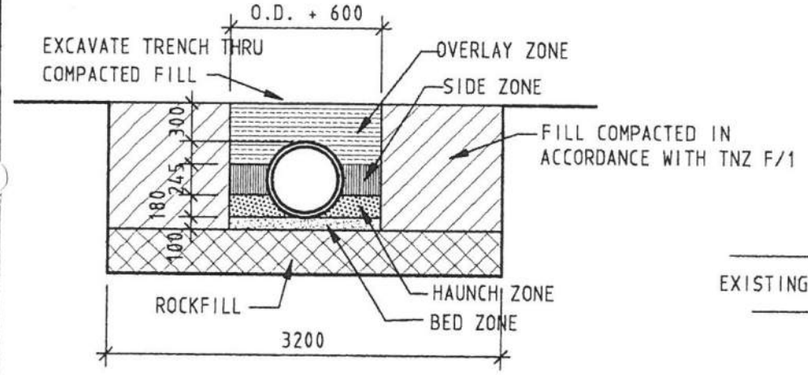
Job No. 46831.01/58
Sheet No. –
Rev. –



SCHEMATIC ELEVATION OF CUT OFF WALL



ACROSS CENTRAL AREA OF COMPETENT MATERIAL

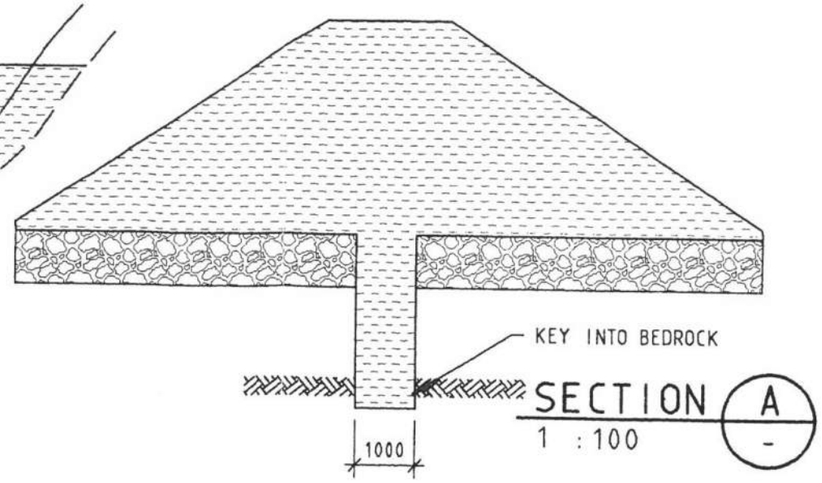


ACROSS SWAMP

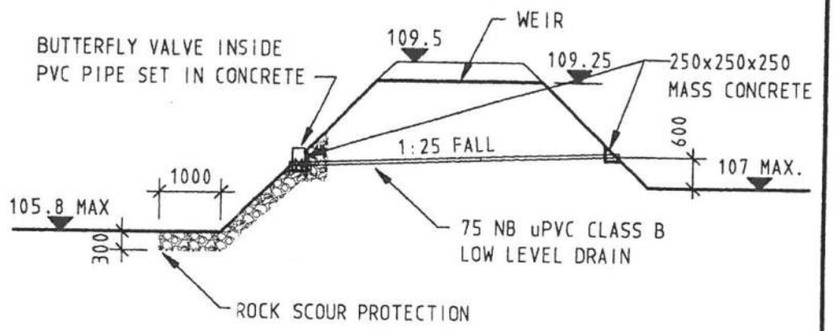
PIPE BEDDING DETAILS

1 : 50

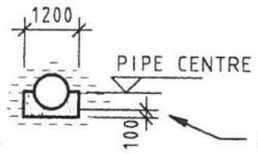
BEDDING ZONES AS PER AS 3725:1986

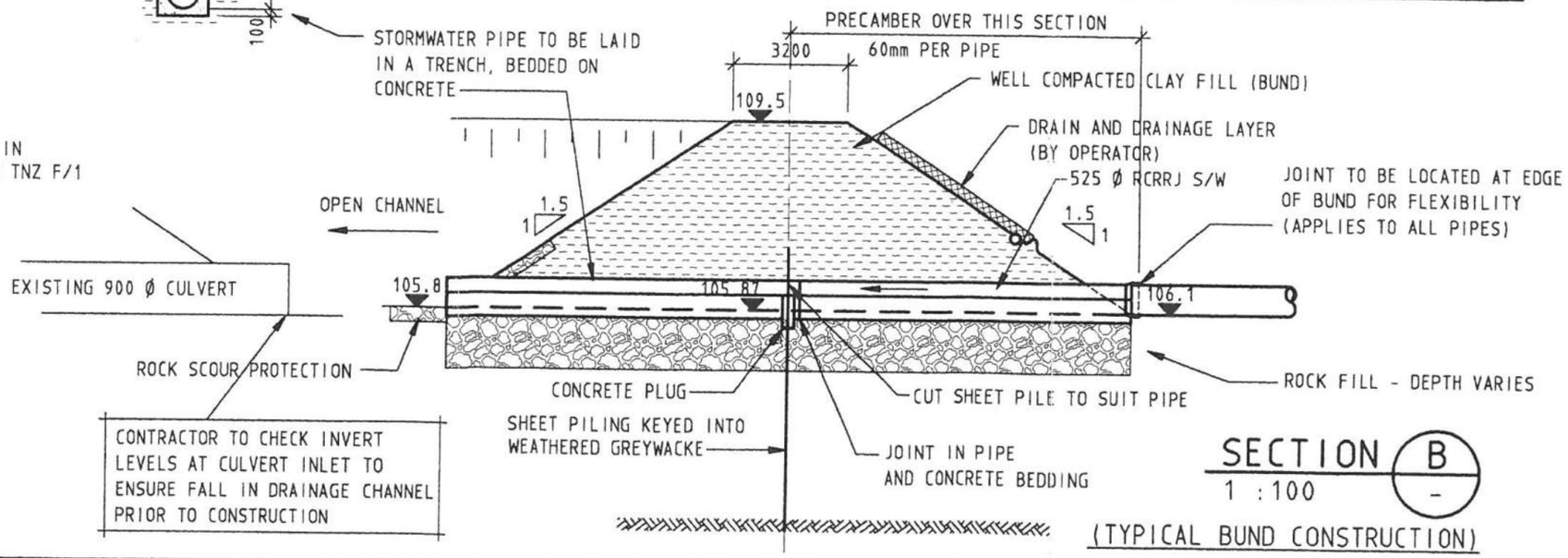


SECTION A
1 : 100



TYPICAL OUTLET WEIR AND POND DRAIN





SECTION B
1 : 100

(TYPICAL BUND CONSTRUCTION)

SCALES 1:100 1:50		
FIELDBOOK -		
	INIT	DATE
SURVEYED	-	-
DESIGNED	AAW	2/95
DRAWN	PAT	2/95
APPROVED	aaw	3/95

Original Size A3

No	AMENDMENTS	Date	Initial
-	APPROVED FOR CONSTRUCTION	10/3/95	aaw

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
CONSTRUCTION DETAILS

POND, BUND AND PIPE CULVERT BEDDING DETAILS

ROYDS CONSULTING
31 STAFFORD ST., PO BOX 4, DUNEDIN
PHONE 64-3-477-0885

Status Stamp: FOR TENDER

Date Stamp: 14 MAR 1995

Job No. 46831.01/59

Sheet No. -

Rev. -

Clutha District Council

ID 743394

MOUNT COOEE LANDFILL MANAGEMENT PLAN: 2022

Document Details:

Date: August 2022 ID 743394
Originally Based on WSP: 2-34090.03
Status: For Issue

Prepared by
Gerry Essenberg
Clutha District Council

Reviewed by
Thyagu Gopalan
Clutha District Council

Landfill Contractor Document Issue History

Issued to	Date	Issued By	For	Received by	Induction and Briefing Completed
Wasteco	Aug 2022	L Gourley	Landfill Operations	G Wilson	Aug 2022

Contents

1 KEY CONTACT DETAILS

The contact numbers for the Mt Cooee landfill are as follows. Note abbreviations as used in subsequent text.

Table 1.1. Contact numbers

Contact's Position	Contact's Name	Phone Number
Waste Management Officer	Clutha District Council (CDC): Laura Gourley	03 419 0245
Water & Wastes Operations Manager (WWOM)	Clutha District Council (CDC): Gerry Essenberg	027 224 6597
Leader Compliance Management (LCM)	Clutha District Council (CDC): Thyagu Gopalan	022 010 0496
Contractor's Operations Manager Balclutha (COM)	WasteCo: Graeme Wilson	027 825 8811
Compliance Officer	Otago Regional Council (ORC):	03 474 0827

2 INTRODUCTION

2.1 Background

The Mt Cooee Landfill is currently the only sanitary landfill in the Clutha District. Serving a population of 17,550 (4,000 in Balclutha), the landfill handles refuse from Council's kerbside collection service, ten waste transfer stations and from residential, commercial and some industrial customers.

Locations and Opening Hours of transfer stations

Transfer Station	Location	Opening Hours	Accepted Waste
Beaumont	Opposite Dee St	24/7 - key system registered through Council Beaumont transfer station application for key	Household Waste
Clinton	18 Hillfoot Rd	10am-12pm Sundays	Household Waste Household Recycling
Clydevale	69 Allangrange Rd - Community Centre	**Closed -** Replaced with wheelie bin collection trial. Application forms for service can be found here. More information can be found about the trial here.	Household Waste
Lawrence	5 Peel St - Council Service Centre	10am-12pm Saturdays	Household Waste Household Recycling
Maclennan	270 Centre Rd	1pm - 3pm Saturdays	Household Waste Household Recycling
Milton	Bruce Street	1.30-3.30pm Friday, Saturday and Sunday***(not open on Sunday during winter NZ standard time hours)***	Household Waste Household Recycling
Owaka	Waikawa Rd - opposite Police Station	1-3pm Sundays	Household Waste Household Recycling
Papatowai	250 Papatowai Highway - Papatowai Store	24/7 coin operated "Jack Trash" bin CURRENTLY OUT OF SERVICE	Household Waste
Taieri Mouth	Leitch Memorial Hall - 1388 Taieri Mouth Road	Recycling bins accessible 24/7	Household Waste
Tapanui	Whiskey Gully Rd	1.30-3.30pm Friday and Saturdays***(not open on Friday during winter NZ standard time hours)***	Household Waste Household Recycling

Around 8,000 tonnes of refuse is currently landfilled per year. Predominantly this is from residences, businesses and farms. Facilities for diverting waste from landfill have been implemented including facilities for recycling and greenwaste diversion.

The Landfill is operated as "a "Class 1" landfill in terms of the WasteMINZ Technical Guidelines to Land 2018, accepting general municipal refuse.

The landfill has been operating at its present location for over 35 years. The site is close to Balclutha town but is well screened from adjoining land and residential areas.

2.2 Objectives of this Management Plan

The following objectives are set for the Landfill operation:

- To operate in compliance with the site resource consents
- To minimise discharges of contaminants to the wider environment
- To minimise nuisance effects on adjoining property
- To ensure safety of people on the site
- To make optimum use of the site capacity
- To maximise diversion of waste from the landfill
- To minimise Clutha District Council's long-term liability
- To provide a friendly and helpful service to the landfill customers
- To operate in compliance with Waste Levy and Emissions Trading Scheme requirements
- To operate the site at least cost consistent with the above objectives
- To optimise long term waste disposal within Clutha District

This management plan documents how the site will be managed and operated to achieve these objectives.

2.3 Plan Description

This Plan provides a detailed description of the management and operation of the site. The Plan is divided into the following key sections:

- Landfill management and administration
- Site features and Landfill design
- Landfill routine operations
- Management of leachate, stormwater and landfill gas
- Health and Safety
- Site and environmental monitoring
- Reporting and documentation of activities
- Contingency planning for unlikely events
- Aftercare provisions

- Assessment of Effects and Consideration of Alternatives
- Management in accordance with Long Term Objectives

2.4 Related documents

The following documents are relevant to the site operation:

Document	Source Organisation	Notes	Issue date
Mt Cooee Landfill: Application for Resource Consent Vols 1 & 2	Royd's Consulting	Provides a full description of the landfill environment, geohydrology and effects of operations to date	September 1994
Mt Cooee Landfill Development and Management Plan	Royd's Consulting	Outlines development proposals for the site	September 1994
Site Development of the Mt Cooee Landfill : Contract No. 209	Royd's Consulting	Construction contract for landfill development works	March 1995
Regional Plan: Waste for Otago	Otago Regional Council (ORC)		Operative April 1997
Solid Waste Management 2012/17 Contract 670	Clutha District Council	Contract covers operations, fee collection and site monitoring	April 2012
Mt Cooee Landfill resource consents	Otago Regional Council	Full schedule of consent conditions (Included as Appendix 2)	Various 1995 - 2001
Solid Waste Bylaw 2019	Clutha District Council	Included as Appendix 4	July 2019

Table 2.1 Related Documents

2.5 Resource Consents

(a) Otago Regional Council

The following resource consents from ORC are held in relation to the landfill (Appendix 2):

Consent Number	Consent Type	Issue date	Expiry date	Conditions
94509	Discharge permit - stormwater	May 1995, reissued August 2001	2023	7 Conditions, monitoring provisions
94508	Discharge permit – waste to land	May 1995	2023	8 Conditions, Management Plan
95953	Groundwater abstraction	February 1996 Note supersedes 94545	2023	4 conditions
94511	Diversion of stream	June 1995	2023	2 Conditions No ongoing requirements
94543	Install culvert	June 1995	2023	2 Conditions No ongoing requirements
94510	Air discharge	May 1995	2023	6 Conditions
95954	Discharge leachate to ground	February 1996	2023	8 Conditions Groundwater monitoring

Consent Number	Consent Type	Issue date	Expiry date	Conditions
		Note supersedes 94512		

Table 2.2 Resource Consents

Note: Frequent reference to the consent conditions are made in this text, in the form (Consent/Condition number). For example (94509/2)

(b) Clutha District Council

The entire site (Lots 1 and 2, DP 12203 and Part Sections 4 and 5, Blk XIV, North Molyneux SD) is designated (D120) in the Operative Clutha District Plan as Mt Cooee Landfill (Rural) with the Notation "Refuse Disposal". Designation D120 is not subject to any conditions.

Pt Lot 61 DP2254 has been purchased by the Council and will be incorporated in any future designation.

2.6 Files

The following CDC electronic files hold information relevant to the landfill operation:

Electronic File number	Coverage
fA245 – Mt Cooee Landfill	Complaints, diversion, ETS, hazards, landfill closure, enquiries, site plans and surveys, resource consents, special waste, waste levy.
qA126549 – Contract 670 Solid Waste Management 2012-15	Contract 670; monthly reports

Table 2.3: Electronic Files

The following CDC files hold historic information relevant to the landfill operation:

File number	Coverage
SW10/0005	Mt Cooee Landfill : General
SW10/0006	Mt Cooee Landfill : Special Waste
SC70/0022	Mt Cooee Landfill : Operation Contract 192
SC70/0562	Mt Cooee Landfill : Operation Contract 562

Table 2.4 Historic Files

2.7 Issue register

The issues of this Management Plan are as follows:

Date of Issue	Author	Revisions
February 2004 (Draft Issue #1)	Opus International Consultants Ltd (Peter Askey)	
January 2005 (Issue # 2)	Opus International Consultants Ltd (Peter Askey)	Includes review comment from CDC
July 2011 (Issue # 3)	Opus International Consultants Ltd (updated, John O'Neill, Area Engineer (CDC)	Updated contact names and numbers etc...

Date of Issue	Author	Revisions
September 2011 (Issue # 4)	Opus International Consultants Ltd (updated Peter Askey and John O'Neill, (CDC)	Updated for site changes and new contracts
September 2012 (Issue #5)	Updated Brendon Harper, Waste Minimisation Officer, (CDC)	Annual review/update. Includes updates to reflect new contract
October 2013 (Issue #6)	Updated Laura Gourley, Waste Minimisation Officer, (CDC)	Annual review/update. Includes updated contact names and numbers.
July 2017 (Issue 7)	Updated Steve Clarke Waste Minimisation Officer (CDC)	Annual review/update Includes minor wording changes to reflect the date of this update. Updated 2.6 from AssetFinda to Ozone. Updated 4.4.1 to include 2017/18 works programme activities. Updated 5.2 Landfill Charges to remove volume references. Updated 7.5 to remove reference to waste volume and added in Councils access to the weighbridge software. Updated 9.3.6 to remove reference to volume. Updated Table 6 with further landfill survey photos
July 2018	Updated Steve Clarke Solid Waste Officer CDC	Updated 9.3.6 Power/Weighbridge Failure procedures
May 2021	Updated Peter Askey WSP.	General Update, Section added on Assessment of Effects
August 2022	Updated Gerry Essenberg CDC	General Update

Table 2.5 Issues of Management Plan

2.8 Revision of Management Plan is a Condition of Consent

The Plan is to be reviewed annually or as agreed with Otago Regional Council (94508/5).

It is to be noted that this is an update to the 2021 version and with there being a substantial body of work being undertaken in anticipation of a new consent in 2023, the next version will be written to recognise the proposed works.

2.9 Contractor Induction to Management Plan

Upon engagement of a new landfill contractor firm or incumbent Contractor's Site Operations Manager, the Landfill Owner will conduct an induction of the Contractor and "hand over' of this Management Plan. This is to be recorded on the table on Page ii inside the cover page.

3 LANDFILL MANAGEMENT STRUCTURE

3.1 Management structure diagram

The landfill management and administration is summarised on Figure 3.1.

3.2 Resource Consent Holder

Resource consents (Otago Regional Council) for the site operation are held in the name of the Clutha District Council (CDC). A full copy of the resource consents is included as Appendix 2.

3.3 Land Ownership

The land on which the site is located is owned by CDC and designated for refuse disposal purposes in the District Plan. The balance of the site not used for the landfill is leased for grazing.

3.4 Personnel

3.4.1 Key functions and interactions of named personnel

The key job functions (in regards the landfill operation) and interactions of the identified personnel are set out in Table 2.1

Position	Functions	Primary interactions
Landfill Owner (CDC)	Holder of consents Responsibility for consent compliance Engineer to Contract 670	Water & Waste Operations Manager, Engineering and Contracts Manager
Water & Waste Operations Manager (WWOM), CDC *(Thyagu Gopalan)*	Main Contact to the Solid Waste Services contract 670 Consent Compliance Monitor operational procedures	With Engineering and Contracts Manager, CDC With ORC Compliance Officer With Landfill contractor site manager
Water & Waste Operations Manager, CDC (Gerry Essenberg)	Engineer to the Solid Waste Services contract 670 Overview of landfill operation	With CDC Water & Waste Operations Manager With Landfill contractor site manager
Solid Waste Services Contractor's Contract manager (COM) Graeme Wilson	Implementation of operational procedures Site monitoring for consent compliance	With CDC Water & Waste Operations Manager
Otago Regional Council compliance officer	Monitoring and enforcement of resource consent compliance	With CDC Water & Waste Operations Manager
Landfill Designer (WSP)	Advice on landfill infrastructure extensions, waste acceptance advice	With CDC Water & Waste Operations

Table 3.1: Key job functions

3.4.2 Staffing level

The solid waste services contractor is required to maintain on site at all times when the refuse disposal part of the landfill is open a minimum staff of 2, generally employed in the following operational functions:

- Waste reception and collection of landfill charges at kiosk
- Materials recovery and waste diversion
- Refuse placement, compaction and cover
- Leachate system operation
- General maintenance

3.5 Otago Regional Council

The ORC is responsible for the monitoring and enforcement of resource consent compliance. A Compliance Officer is assigned to the Landfill. The primary contact for the ORC compliance officer should in the first instance is to CDC Water & Waste Operations.

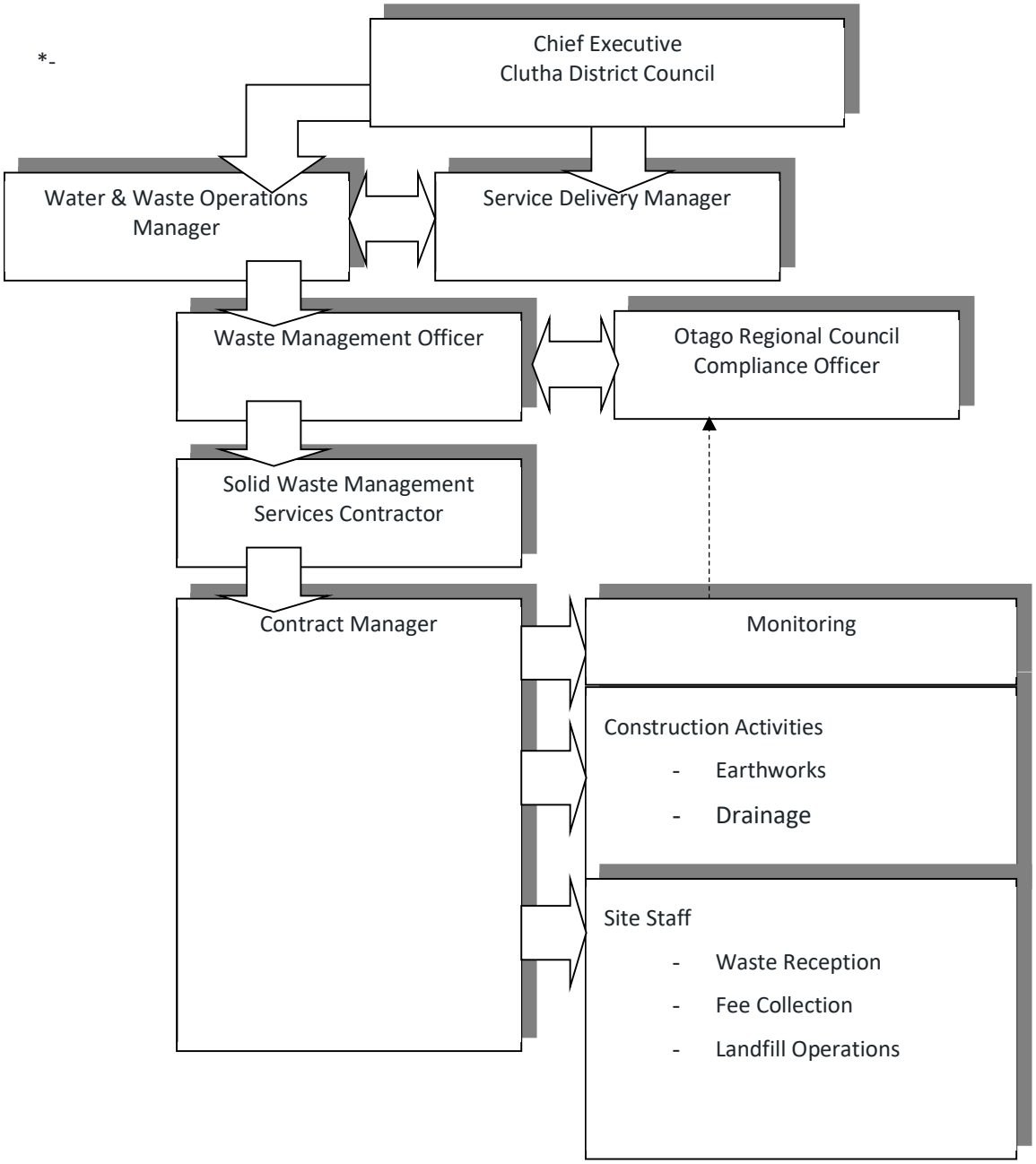


Figure 3.1: Landfill Project Structure

4 SITE FEATURES

4.1 Location and Surrounding Land Use

The Mt Cooee landfill is located off the Kaitangata Highway, approximately 1.2 km from Balclutha. The landfill is located on a 15.77 ha farm property owned by CDC. The site is bounded by the Balclutha golf course across the railway line to the north, farmland to the east, and across the highway, the Clutha River. The railway line runs on the north boundary and the Kaitangata Highway on the south (river) side.

The landfill occupies a shallow valley sloping out to the river at the site entrance. At the current top platform level, the site is reasonably well screened by the landform and vegetation from neighbouring residences.

The closest residences are approximately 400m to the northwest (Arthur Terrace) and 450 to the southeast (rural residence).

4.2 Site Layout

An overview of the site is shown on Figure 1. The site consists of the following main areas:

- Site entrance and stormwater ponds at landfill toe
- Kiosk and recycling area
- Greenwaste processing area on old landfill
- Landfill face for disposal of residual waste
- Borrow area for cover soil and future refuse cells

The general public do have access to the tip face. There is currently no on site transfer area for smaller loads of residual waste, this is in design.

4.3 Existing Vegetation

The balance of the landfill property not in use for waste activities is in pasture and is grazed. There is a high row of pines on the east boundary (rooted in the neighbouring land title). Various tall exotic trees at the site entrance help to screen the site from the Kaitangata Highway.

There are no areas of native vegetation on the property.

4.4 Climate

The site climate is relatively dry with an average rainfall of 670 mm. The dry climate limits leachate generation and would also slow waste degradation (and gas production) compared to more humid climates.

The prevailing wind is from the west blowing generally down the Clutha River valley and so away from town. Winds from the south easterly quarter are less frequent but blow odour towards the main residential areas of town.

The local topography of the site influences the wind regime in the immediate vicinity. It is expected that under low general wind speed conditions, particularly during the night, when katabatic (downhill) flows of cooler air will tend to occur from the elevated areas north of the site, drifting in a southerly direction. These conditions direct airflow from the landfill across the road and out over the Clutha River where any odour would dissipate well clear of any residences.

A weather station has not been installed to record rainfall and wind direction. This data would be useful for managing leachate flows and activities that could be potentially odorous.

4.5 Geohydrology

Bedrock of weathered greywacke is exposed on the valley sides and is generally encountered at shallow (ie less than 3m) depth. Soils on the valley sides comprise topsoil overlying clay soils derived from weathering,

typically 2-4 m deep. The valley floor consists of soft alluvial infill and swamp deposits. Investigations for the landfill construction found greywacke bedrock at a maximum of 11m below ground level in the centre of the valley. This places it some 6- 7 m below the normal level of the Clutha River. To the rear and sides of the site the rock rapidly rises to the surface and is well above the valley floor.

The in-situ permeability of the greywacke rock was found to be in the order of 1 x10^{-8} m/s, although it was acknowledged that permeability in fracture zones could be much higher (Royd's 1994). Groundwater at the site is within the greywacke and generally discharges to the swamp area in the valley floor, with a combination of groundwater and surface water then exiting the site at the entrance through the road culvert to the river.

Any discharges of leachate from the site which are not captured by the leachate collection system are therefore inferred to remain in the shallow groundwater and discharge off the site to the Clutha River predominantly with the surface stormwater as opposed to percolating deeper into the underlying greywacke (See Section 22).

A fuller assessment of the environmental effects of the site is included as Section 22. The Geohydrology is covered in Reference 1 of Table 2.1 (Royds Consulting 1994).

5 LANDFILL DESIGN AND FEATURES

5.1 General principles

The Mt Cooee landfill to date has been constructed as an unlined fill. The natural containment provided by the underlying greywacke rock and the site geohydrology are used to maximise the capture of leachate. As part of the landfill development works in 1995 (note the site had been in use for some 10 years prior to this), a steel sheet pile cut-off wall was installed across the valley floor at the landfill toe. The sheet piles were driven to refusal effectively extending the wall down into the bedrock across the full width of the valley. The sheet pile wall was capped with a low permeability compacted clay bund. The wall and bund have thus formed a dam for groundwater minimising deeper percolation of leachate and making the preferential flow path for groundwater out of the site via the leachate collection system. Some leachates may still infiltrate into the deeper greywacke formation, but this is expected to be at very low levels.

Given the above circumstances the design principles for work on the site can be summarised as:

- Divert upstream catchments and stormwater around/through the active landfill
- Provide a cut-off barrier to deeper groundwater flow
- Provide a system to capture leachate contaminated groundwater for removal to offsite treatment

Future stages of the landfill may include a base liner, in which case the Management Plan will be updated at the time.

The design and specification of materials allows for the site operational life of 30 years and an aftercare period of at least 35 years. Where materials or equipment are utilised which have a lesser operational life, they will be accessible for replacement/refurbishment.

When considered in terms of the landfill classification as set out in the “Technical Guidelines for Disposal to Land” (WasteMINZ 2018), the Mt Cooee site would classify as a “Class 1” site, suitable for general municipal waste. While the site does not have a base lining to the waste cells, the cut-off wall construction and leachate collection system does provide substantial containment to the site and limits offsite migration of contaminants.

5.2 Certifications

5.2.1 Design

All design work will be carried out under the direction of a suitably experienced chartered engineer with specialist experience in the design and management of landfills.

5.2.2 Construction

Construction shall be carried out under the supervision of a suitably experienced chartered engineer.

On completion of each section of physical works the supervising engineer shall certify the works as having been constructed in accordance with the design.

5.3 Reference to design drawings

Design drawings for the landfill are held on Council files SC70/0022.

Design drawings are included as Appendix 3.

5.4 Stormwater Control

The storm water management approach is:

- Separation of 'clean', 'dirty' and 'contaminated ‘water sources.
- Storm water treated at source wherever possible; and

- Storm water management and transport designed such that site stability is maintained and erosion avoided
- Stormwater is detained on site to reduce loads on downstream reticulation

Runoff from the upstream catchment is captured at the boundary with the Golf Course and was diverted beneath the landfill in a 525mm diameter RCRRJ concrete pipe (accessible via 2 intermediate manholes). This culvert discharges at the downstream landfill face and flowed under the Kaitangata Highway to the Clutha River without further treatment. The culvert passes through the sheet pile wall and is encased in concrete at the wall to prevent leakage of leachate/groundwater around the outside of the pipe.

Monitoring of water quality downstream of the culvert had shown that it was discharging water with high ammoniacal nitrogen levels (a sign that leachate is entering the pipe). CCTV inspection has been repeated and identified isolated faults in the culvert and between the riser sections on the manholes. Options for remediating the identified faulty sections of pipe were investigated and remedial repairs to two joints of the main culvert pipes were carried out in 2013. However, this repair did not result in any substantial improvement. Subsequent monitoring of the waterway helped to assess the effectiveness of the remediation works. Following further assessment of the culvert and options for relining, it was decided to completely divert the stormwater around the north side of the landfill, running a new stormwater channel alongside the north side of the railway line. This work was undertaken in May 2021 and the upstream catchment of the main drain was captured on the west side of the railway line and directed to the Clutha River thus bypassing the landfill. The culvert under the railway line was sealed with concrete. The main drain under the landfill may still receive some minimal infiltration from north of the railway line but it is now essentially a leachate collection drain.

In 2022 a manhole and pumping system was installed in the drainage channel to the Clutha River below the sheetpile wall to collect any potential runoff and leachate and divert this into the sewer pump station.

Refer also to the Assessment of Effects in Section 22

Two stormwater ponds capture runoff from the general site including access roads and completed landfill areas, but not the active landfill face. The ponds are 600 m^3 and 1000 m^3 respectively.

Runoff from the active tip face is held in the immediate tip face area for ground soakage and is then captured by the leachate collection system.

5.5 Groundwater Control

There is no infrastructure in place to control groundwater levels. The sheet pile wall effectively dams off the shallow groundwater flowing down the valley and it either infiltrates to deeper groundwater in the greywacke or is picked up by the leachate system.

The greywacke base is of very low permeability.

Future lined cells may include groundwater control drains if subsequent investigations show this to be necessary.

5.6 Leachate Control System

The leachate control system comprises of:

(a) A drainage system comprising leachate collection lines of perforated pipes (primarily drilled DN 100 mm HDPE and DN 110 mm Novaflo) laid on the original valley floor and leachate collection manholes. All lines are designed to allow cleaning with sewer jet cleaning equipment.

(b) A pump station at the downstream face of the landfill transfers leachate/contaminated groundwater to the CDC sewer for treatment. On average 28,600 litres are transferred each day.

(c) A sheet pile cut-off wall driven down to the greywacke rock to contain groundwater

(d) A pond of volume 770 m^3 (lined with 600mm clay with a permeability of < 10^{-9} m/s) is provided as an emergency storage for leachate overflow from the pump station

(e) Groundwater bores around the site perimeter are monitored for parameters indicative of leachate contamination (Section 16)

5.7 Landfill Gas

The main health and safety concerns with landfill gas are the potential for explosions or asphyxiation of personnel on site where gas may accumulate in confined spaces. The primary objectives of gas control are to minimise the risk for unmanaged point source discharges or accumulation of gases; protect adjacent properties from potential gas discharges; reduce odour nuisance; minimise greenhouse gas discharges and reduce damage to vegetation on the landfill cap.

There is currently no gas collection infrastructure in place. To date gas has diffused through the waste and intermediate capping. The site incurs Emissions Trading Scheme liabilities at present based upon the tonnage of waste disposed in a year. Increasingly the ETS costs will be a driver for installation of gas control or possibly even site closure. This situation will be reviewed by CDC on a regular basis. The site management plan will be updated accordingly.

For now the emphasis with landfill gas is on health and safety for the site staff and control of odour nuisance.

5.8 Landfill cap

The landfill cap is to be constructed so as to allow for use of the site for grazing or revegetation. Specific requirements for the cap are:

- 200 mm final cover over refuse
- 500 mm of compacted silt or quarry strippings– permeability range 10^{-6} – 10^{-8} m/s.
- 150 - 200 mm topsoil and /or green waste mulch or other supplement

While not required by the current consent, it would be desirable to include a subsoil layer between the compacted capping and the topsoil. This will improve the resilience of the capping and ultimately make the site more useful.

Capping of a finished cell is to be complete within 6 months of final refuse placement to the cell.

5.9 Design Contour and Filling Rate

Final design contours for the site are shown on Plans 46831.01/19 and 46831.01/20 in Appendix 3. This provides for some additional fill over and above that filled to date. With extension onto adjacent ground the fill volume of approximately30,000 m^3 is achievable. These plans are being revised for the next consent.

5.10 Ancillary Facilities

(i) Hazardous Waste Temporary Storage building

A lockable concrete shed is provided on a bunded concrete slab for temporary storage of small amounts of hazardous waste.

(ii) Staff Facilities Building

This is required to provide adequate and safe facilities for operations staff. Ablution facilities include toilets and adequate washing areas.

Safety equipment shall be stored in a dry, accessible area, ready for emergency use.

(i) Kiosk

All traffic must pass the kiosk and weighbridge before entering the resource recovery and disposal areas of the site.

5.11 Ash pit

A separate area is provided for the disposal of ash. This is to ensure hot ash will not ignite refuse. The pit is hazardous and must be fenced and signposted.

5.12 Septage and liquid waste disposal

Presently the site accepts septage and grease trap waste plus occasional other liquid organic wastes from food processing. This is disposed of by excavating a pit of approximately 20 m^2 by 2 m deep into old refuse. Each pit lasts approximately 1 to 2 months and is covered with old refuse on completion.

Both the initial excavation and the on-going operation of the liquid waste pits are significant sources of odour from the site. This needs to be managed by timing operations for appropriate wind directions and covering material immediately after dumping. The liquid also contributes to leachate from the fill.

This process is to be reviewed as part of the Development Plan.

5.13 Site Roading

Roading is designed for safe, economic, all-weather access. Horizontal alignment shall be designed to encourage operating speeds of no more than 20 km/hr. Vertical alignment shall be designed for a safe margin above 20 km/hr. Site roading is unsealed. Waste oil is no longer used for dust control.

The roading is to be reviewed as part of the Development Plan.

6 LANDFILL OPERATIONS AND GENERAL SITE MANAGEMENT

6.1 Relevant Code of Practice

The site is operated generally as per the WasteMINZ "*Technical Guidelines for Disposal to Land (2018)*", being the most up to date NZ waste industry Code of Practice.

6.2 Control of site access

6.2.1 Right of access

All access is under the control and at the discretion of the CDC. The landfill Contractor may refuse entry to any vehicle which does not comply with the waste acceptance requirements of Section 7.

Public access to the landfill disposal area of the site is currently permitted. An on-site transfer station for the general public may be added in future.

Public after-hours access to the landfill site is prohibited. In emergency situations the landfill Contractor will be available to provide access.

Staff and agents of the consent authority, being the ORC, have right of access to relevant parts of the site at all times for purposes related to monitoring and enforcement of the resource consents as per s332 of the Resource Management Act. Normally the Water & Waste Operations Manager (WWOM) from CDC or his representative would be contacted in advance to accompany such staff. To cover Health and Safety responsibilities of the site operator, consent authority staff with responsibility for the site inspections will be asked to complete a site induction so they are familiar with the site hazards should they be on the site unaccompanied by the operator.

6.2.2 Hours

Hours open to public are:

Monday to Friday	8.00 am to 4.30 pm
Saturday and Sunday	10.00 am to 4.30 pm

Christmas day, New Year's Day, Good Friday, Anzac morning: Closed to all private vehicles.

6.2.3 Signage

Signs at the Entrance Gate

Signs will be maintained at the entrance to the site throughout the life of the landfill. These signs identify the following:

- *Hours of access.*
- *The type of wastes that are non-complying and prohibited at the landfill site.*
- *Any safety issues relating to the site including safe traffic management matters.*

The entrance sign includes a list of emergency after-hour contacts and associated telephone numbers.

Signs at the Kiosk

Signs will be maintained at the kiosk area throughout the life of the landfill. These signs identify the following:

- *Wastes that are accepted at the recycling facilities.*
- *Wastes that are accepted at the re-usables shed.*
- *Wastes that are accepted in the hazardous substances store.*
- *Wastes that are not accepted at the transfer station and landfill.*

Specific warning signs to be placed around potentially hazardous areas including liquid waste (septage) pits, leachate chambers, gas vents (if in place) etc.

6.2.4Security

The site entrance is securely locked after operating hours. The entire site perimeter is provided with a stock proof post and batten fence.

6.2.5 Scavenging

Scavenging of the waste after placement on the face is not permitted.

6.3 Landfill charges

Charges are set by Council annually and publicly notified. A weighbridge is used to capture weights of all vehicles and provides a charging basis for all loads with the exception being a charge for up to 4 x 70l bags. Recycling drop offs are free and a 50% discount is given on greenwaste that is separated and placed in the designated greenwaste area.

E-waste is charged as per the receiving recycler.

6.4 Complaints procedure

A register of all complaints received (directly or through another party) in relation to the landfill operation is kept by the Area Engineer. Complaints are logged initially in Council's customer feedback system Ozone. This records:

- Source of complaint, name of complainant and address (if given)
- Nature and cause of complaint
- Response made and actions taken
- Comment on any unusual activities onsite or weather conditions at the time

The target time frames for complaints are to acknowledge the complaint same day of receipt (if received indirectly) and to provide a response or explanation within 5 working days.

6.5 Staff Training

Annual training for all site staff shall be provided on site waste acceptance criteria, hazardous waste identification, emergency procedures, and the contractor shall ensure that all site staff attend. Written evidence and attendance to be provided.

Supervisory staff are to be familiar with this Management Plan. The formal induction procedure is covered in 2.9, above, and is to be recorded on Page ii inside the cover.

6.6 Inspections

Regular visual inspections of all the key aspects of the site will be undertaken by the landfill staff at the frequency as set out in the table below:

Table 6.1. Inspections of landfill site

Item for Inspection	Personnel	Frequency
Leachate drains, manholes and pumpstation Note – leachate system manholes are painted red, stormwater blue (ideally should be green).	Landfill staff, WWOM	Every day site is attended, monthly overview and before and after heavy rain.
Perimeter stormwater drains	Landfill staff, WWOM	Monthly and before and after heavy rain

Tip face and landfill cover – extent of cover and size of active face	Landfill staff, WWOM	Daily at conclusion of refuse compaction operations
Tip face – fire risk	Landfill staff	Daily at conclusion of refuse compaction operations. Visual check for any smoke prior to leaving site
Stormwater ponds	Landfill staff	Weekly and after heavy rain
Litter inspection	Landfill staff, WWOM	Whole site monthly, access road daily
Birds and vermin	Landfill staff, WWOM	Monthly
Dust nuisance	Landfill staff, WWOM	Daily during dry conditions
General site inspection	Water & Waste Operations Manager	Biannually
Hazardous waste holding facility	COM	Weekly
Inspect Groundwater and surface water sampling points for access, damage to well heads etc[1]	Environmental Scientist	Quarterly (Refer Figure 1 for monitoring points)
Refuse Compaction	Water & Waste Operations Manager	Annually
Ground Stability and geotechnical issues	Specialist Geotechnical Engineer	Annually

A general site diary, recording the date and time of site inspections will be kept.

[1] *Groundwater sampling should be undertaken by a trained technician, and in accordance with an ORC approved procedure*.

7 WASTE ACCEPTANCE

7.1 Transport of waste to site

All waste is to be transported to the site either in a fully enclosed vehicle/container or otherwise secured to avoid loss of material in transit to and within the site.

7.2 Domestic waste

The site is operated as "Class 1"landfill. Primarily the site is available for the disposal of general municipal waste of a domestic/household nature or from businesses and farms. By nature, this waste will contain small quantities of hazardous wastes or special wastes and this waste is accepted. Such wastes would normally constitute less than 1.0 % of the overall waste stream.

7.3 Hazardous and Special wastes

7.3.1 Definitions

The following definitions are used herein:

Hazardous Waste:

Wastes which require special measures in handling and disposal due to some inherent hazardous property. Hazardous wastes are not suitable for general landfilling.

Hazardous wastes involve a danger to human health/safety or potentially harmful environmental effects. Properties which could cause this include toxicity, carcinogenicity, flammability, chemical reactivity etc. Effects could be immediate or accumulative in the environment. Examples include solvents or heavy metals in a readily leachable form.

Special wastes:

Materials which require special measures in their handling and disposal but are not necessarily hazardous. Examples could be wastes which are noxious due to odour, produce excessive dust or require confidential disposal. Included are some wastes which will be neutralized or stabilised by processes within the landfill.

7.3.2 Hazardous wastes acceptance

Hazardous wastes are generally not accepted in the Mt Cooee landfill except:

- In small quantities as can be reasonably be expected to be found in normal domestic refuse (Section 5.3.2)
- If subject to a specific application and approval for disposal as special wastes

Large hazardous waste consignments will not be accepted, and the generator of such waste will be responsible for the secure transport, treatment and disposal out of the district.

7.3.3 Special wastes acceptance

Special wastes are accepted under a licensing procedure. The waste generator is required to contact CDC in advance requesting disposal. An application to CDC as set out in the Solid Waste Bylaw is required (refer Appendix 4 attached). The application is assessed in terms of the Bylaw "Schedule B: Special Waste Definition and Classification" and the waste disposal approved with conditions as appropriate. A specific permit is issued for a special waste disposal and must be produced at the kiosk. A waste manifest is kept at the kiosk that records the waste type and quantity and also provides for a record of the location in the fill where the material is placed. Location of special wastes is only recorded for selected materials where future location could be relevant. Examples would be asbestos wastes.

7.3.4 Storage of Unacceptable Wastes

For wastes that are not acceptable for landfill disposal in terms of the preceding sections of this plan, a building is provided (at the landfill site) for the storage of some of these materials until such time as they can be removed off site.

Unacceptable wastes will be stored in this building provided that the material is:

- Accompanied by documentation identifying the material (where known)
- Packaged in a safe and secure container appropriate to the waste type
- Appropriately labelled
- A quantity that can reasonably be stored in the building
- Able to be separated from incompatible waste by an appropriate separation distance
- Allowed to be thus stored under appropriate regulations

Wastes will be removed from this building as soon as an appropriate disposal method is available. It is envisaged that small quantities of agricultural chemicals would be the main type of material falling under these provisions.

Each week an inspection of the wastes stored in the storage building will be carried out. The person carrying out the inspection will look for signs of leakage, build-up of gas (bulging containers), indications of reaction or any other indication that the wastes are not properly contained or are becoming unstable.

The results of these inspections will be recorded.

Emergency Procedures

Refer Management Plan Section 18.

7.3.5 Odorous and Dusty Wastes

Some materials require special measures for disposal at the landfill as if incorrectly disposed of they can give rise to nuisances.

Wastes that can be included under this heading are:

- Grease trap wastes
- Septage from septic tanks
- Fish and animal wastes

These wastes are accepted in the landfill. Solid wastes of this type are discharged at the landfill face and covered immediately. Septage and grease trap waste is to be discharged to the purpose built septage pits and not to the general tip face.

Odorous wastes to be covered with soil immediately.

7.3.6 Inspection of waste

Incoming waste is inspected visually at the kiosk. The compactor operator also observes the waste as it is spread. A log is kept of the waste load type, which generally will be municipal waste. Special wastes are recorded in the Waste Manifest as per Section 7.3.3.

8 RESIDUAL WASTE DISPOSAL OPERATIONS

8.1 Equipment

Adequate plant, equipment and machinery in good working order is to be kept on site at all times. The normal site plant is to consist of:

- a specialised compactor for refuse compaction
- A front-end loader and/or hydraulic excavator

When plant is unavailable due to maintenance etc alternative plant shall be hired as required. The landfill operator shall have arrangements in place to provide alternative plant for the compaction and cover of refuse.

8.2 Tip faces

The general public has access to the tip face. The width of the tip face is to be kept to the smallest practicable consistent with the expected vehicle numbers and not to exceed 30 m if possible.

8.3 Placement of refuse

Incoming refuse to be deposited at top or bottom of face and bladed into a layer of 0.5 m thickness for compaction.

The intended filling sequence is:

- Commence by end tipping from entrance end of cell
- fill in lifts across the cell width
- Each lift to be a height of approximately 2.5 m

See Appendix 5 for planned filling sequence.

8.4 Compaction

Placed refuse is to be compacted by sufficient passes of the compaction plant to ensure that a reasonable density is consistently achieved and adequate control over nuisances is able to be maintained.

8.5 Cover (Daily, intermediate)

Daily cover of refuse is not routinely applied. Nuisances (odour, litter, birds, vermin) are controlled via other means, such as compaction of the final surface at day end, and wind fence.

Additional sources of cover include clean fill delivered to site, which is required to be stockpiled separately for use as required. Alternative cover materials such as shredded green waste, bark or netting may be used on occasion, provided adequate control over nuisances is maintained at all times.

8.6 Site Roading

Site roading is to be maintained in a trafficable condition at all times without excess dust nuisance or mud.

9 STORMWATER MANAGEMENT

9.1 Stormwater on refuse face

The compacted cover to the active tip face, uncovered refuse and immediate access area will be shaped and sloped to ensure that runoff ponds on the completed fill, for soakage to underlying landfill cells and ultimately to the landfill leachate system.

9.2 Stormwater from access areas

Stormwater from areas of intermediate cover, internal roading and vehicle turning areas shall be directed to the landfill face or to the stormwater ponds, as appropriate. The amount directed to the landfill face shall be minimised consistent with operational constraints.

9.3 Stormwater from rehabilitated areas

Stormwater from areas of the landfill which have received final cover and have been grassed can be discharged directly offsite through the existing network of stormwater drains and culverts.

10 LEACHATE MANAGEMENT

10.1 Collection drains and sumps

A leachate collector drain is provided to the landfill. This collects a mixture of leachate and groundwater.

Leachate is pumped from the sump to the sewer as required. A clay-lined pond is provided for emergency leachate storage

10.2 Operation and maintenance of leachate pumping

The leachate pump station has two pumps in the sump. Operation of the leachate pumping is as follows:

- Pump station left to operate on float switches
- Every day when the site is attended (all weekdays) the following checks are to be made and documented: *confirm pump operating ok, volume pumped since last visit (hours run on pump), level of leachate in holding pond, rainfall, volume of leachate removed.*

10.3 Procedures for heavy rain

In event of heavy rainfall at the site (say > 25 mm over 24 hours) the following actions are to be taken:

- If heavy rainfall warning is issued by Met Service, the site is to be visited to ensure stormwater drains are clear and the leachate level in the wetwell is pumped down
- The site is to be inspected by 12.00 midday on the day after any heavy rain (holidays or weekends not withstanding). The leachate level is to be checked and any accumulation pumped away as necessary. Stormwater drains and ponds are to be checked. Inspections to be recorded in the site diary.

10.4 Maintenance of leachate lines

Maintenance procedures include:

- Water flushing
- Sewer jet cleaning
- Rodding
- Chemical cleaning (if necessary). Chemical cleaning is more likely to be required on leachate rising mains

The efficiency of the leachate drainage system is monitored by tracking volumes by the pump station removed against rainfall. A lengthening of the time between rainfall and response of the pumpstation would be indicative of a loss of performance.

10.5 Recirculation of leachate

Leachate is not currently recirculated.

10.6 Removal of leachate from site

Leachate/groundwater from the site is accepted as a trade waste to the Balclutha sewer system for treatment in the Balclutha oxidation ponds.

11 LANDFILL GAS AND ODOUR

11.1 Landfill Gas

11.1.1 Management of Gas Emissions – to date and current

To date the landfill gas emissions from the Mt Cooee landfill have been managed by passive venting through the active fill area and the intermediate capping. Gas also accumulates in the leachate collection system and all parts of the leachate collection system shall be assumed to be so contaminated.

The site is remote from any adjoining property that could be affected by gas migration.

11.1.2 Management of Gas Emissions – future

Flaring or use of gas is not currently proposed but may be an outcome of future reviews of landfill gas management.

11.2 Odour

11.2.1 Key Performance Requirement

There shall be no objectionable or offensive odour detected beyond the boundary of the consent holder's property as a result of the activities on site. Odour discharge shall be kept to the minimum practicable.

11.2.2 Management of Odours

The main potential sources of odour at a landfill are:

- *General waste deposited on site at the working face;*
- *Odorous waste;*
- *Excavations in old waste; and*
- *Landfill gas generated from waste decomposition.*

Odours from incoming waste can periodically occur, especially when the waste contains putrescent materials or when odorous waste is deposited at the landfill.

Odorous waste is considered as a “Special waste” as per Section 7.3.3 and is only accepted by prior arrangement. Generators of odorous waste will be required to deliver such waste prior to putrefaction or to treat it with deodorant chemical sprays to reduce nuisance odours. Highly odorous loads of waste will generally not be accepted at the landfill without pre-treatment to reduce the odour.

Sound day to day management practices on the site such as the regular covering of waste and only having small sections open at any one time, reduce the risk of such effects. The necessity for excavations in old waste will be kept to minimum and deodorant chemicals will be applied to control odour production when required. If instances occur when the acceptance of particularly odorous waste will be unavoidable, these will be scheduled for delivery early in the day so they are well covered before completion of the day's operations. Deposition of odorous waste will be avoided on days when wind direction may carry the odours to neighbouring properties. The weather station is an important tool for managing odour effect from specific operations.

11.2.3 Monitoring for and prevention of Odour

Odour is the main cause of complaint from landfills and one of the most difficult aspects to control. Odour management must be proactive. Specifically:

- Daily when opening the site check the wind direction and check for odour at the Kaitangata Road gate and at the kiosk
- If odour is noticeable at these locations scout around the fill itself to see if there is any obvious source/cause
- Use the weather forecasts and known wind flows to time any potentially odour releasing operations.
- Be aware that wet weather is often worse for odour as the refuse decomposes more rapidly. Be prepared with additional cover in stockpile. Maintain surface drainage away from the active tip face. Do not allow

leachate to pool on the fill surface. If necessary excavate pits to break through any sealing layers that are preventing drainage.

12 NUISANCE CONTROL

Nuisance control measures are summarised in Table 12.1 below

Nuisance factor	Compliance requirement	Routine control	Inspection/ Monitoring	Contingency control
Noise	None specific	All plant and equipment to be appropriately muffled Adherence to hours of operation	Periodic assessment by WWOM.	Non-complying plant to be removed or repaired. Alter hours of operation
Dust	Cause least practicable emission (94510/3)	Water cart in dry weather Grassing to all areas of temporary capping or areas waiting final capping as soon as conditions permit. Waste oil	By Landfill Contract manager in dry weather .	Water cart Change dumping location to minimise trafficking of dusty surfaces Provide seal areas
Odour Birds	(94510/2 & 4)	Cover and compact incoming refuse. All odorous wastes to be buried into the landfill mass and immediately covered with at least 300 mm of cover or refuse Compact refuse Bird scaring (Gas gun)	Daily by COM Periodic assessment by WWOM. Assessment by WWOM	Increased use of cover to provide deep burial of odorous material. Odour suppressants
Vermin		Compact refuse Maintain bait stations on landfill perimeter	6-monthly assessment by WWOM	More extensive poisoning if infestations develop
Insects		Compact refuse Immediate burial of putrescible waste	Assessment by WWOM	Spraying of problem areas as required
Smoke	(94508/4)	Burning on site is **NOT** permitted		Extinguish immediately – refer contingency plan
Litter	(94508/1)	Movable screens to tip face, maintain and clear screens weekly or as required Debris fences to site perimeter Daily (when site operative) litter collection to general site,	Monthly assessment by WWOM Remove litter from stormwater ponds as required.	Increase litter collection. Additional fences

Nuisance factor	Compliance requirement	Routine control	Inspection/ Monitoring	Contingency control
		access roading and adjoining property Education to landfill users regarding load security Monitor wind forecast and cover in advance of high winds when possible		
Stock		Maintain fences to exclude stock	Monthly inspection by WWOM	Repair as necessary

Table 12.1: Nuisance control

12.1 Birds

12.1.1 Birds

Bird control is essential to avoid the build-up of large colonies of birds such as seagulls at the landfill site. While daily cover of the waste avoids encouragement of birds, should they become a problem, bird poisoning programmes and as a last resort a shooting cull down of the numbers may become necessary. The bird populations on site shall be controlled in a manner approved by the Water & Waste Operations Manager.

Note: Some population control action such as the culling of gulls may require permissions from other government agencies. Note that the smaller red billed and black billed gulls are a protected species.

12.1.2 Avian Botulism

Avian botulism infects ducks and other waterfowl in hot summers when water conditions in ponds becomes poor. The disease is transmitted from carcasses of dead birds to live birds via maggots. This cycle can lead to severe outbreaks with high mortality of birds. The spores of the bacteria that causes botulism are persistent and can survive in sediments in ponds for years. Unfortunately, once a site has had an outbreak, the botulism spores are much more prevalent and the likelihood of another outbreak in future years increases dramatically.

There are some common indicators of when botulism is likely to occur, e.g. temperatures >25 degrees for sustained periods with low or no rainfall, low dissolved oxygen in stormwater retention ponds, or anoxia. Fish or invertebrate kills can be an early sign that the disease is becoming active.

The key to minimising the disease is to recognise the causative factors early, and take action to break the infection cycle as best can be done:

12.1.3 Prevention:

If any of the above indicators are observed at the site, it should start to raise red flags. If lots of healthy birds are present it will help to disperse them using bird scaring measures such walk up disturbance, shotguns, bird fright, lasers, electric fences, and so on. Surveillance should commence leading into Christmas and into the New Year. Aeration of the ponds may be a useful preventative measure (e.g. using a floating solar powered mixer or a pump to spray water back over the surface).

12.1.4 Outbreak underway:

Immediate carcass removal before the maggot cycle establishes is the only way to help an outbreak abate once birds are falling sick and dying. The carcasses should be removed to the landfill for immediate burial at a depth where any maggots will not be able to surface. Use PPE when handling carcasses and observe good hygiene. Disperse remaining birds.

13 OPERATION OF WASTE DIVERSION FACILITIES

13.1 Recycling drop-off facilities

Receptacles for recyclables are provided adjacent to the Operators Booth. These include;

- 240L bins for co-mingled consumer recyclables including;
- Clean, rigid plastics - Types 1, 2 & 5
- Paper and flattened cardboard
- Aluminium and steel cans
- 240 litre wheelie bins for clean, glass bottles and jars

Co-mingled recyclables are collected and transported to Dunedin for sorting and recycling as part of the kerbside recycling collection.

Glass is stockpiled on-site for beneficial reuse within six months. Beneficial re use includes use on-site as a construction material for maintenance of access roads and drainage.

13.2 Greenwaste area

An area for greenwaste area is provided, away from the tip-face, for customers to place their greenwaste including lawn and hedge clippings, leaves, weeds and tree trimmings (branches must be less than 150mm in diameter). The greenwaste area is located over the landfilled ground so that leachate from it is collected into the leachate system. Greenwaste can be a source of strongly tannin-stained leachate.

At least once every six months this greenwaste is shredded. The mulch is given away to customers for free or reused on site.

13.3 Steel & whiteware

An area for storage of steel, car bodies and whiteware is provided. Material is stored awaiting collection and removal from site by a scrap metal collector. Metal is removed at a maximum of 6-month intervals. Bait stations for vermin are maintained in the stockpile.

Car bodies are not to be stored more than four high.

The Landfill Contractor is required to ensure oils and hydraulic fluids are removed from all vehicles and CFC's or other refrigerants are removed from whiteware prior to disposal, as required by the CDC Solid Waste Bylaw. Any oils or hydraulic fluids removed at the Landfill can be disposed of to the waste oil collection tank on site.

LPG gas bottles and stored separately and are managed by the contractor.

13.4 Operation of septage site

Specific requirements for the disposal of septage and liquid waste are:

(i) Pit excavated into old refuse, fenced off and signs erected

(ii) Excavated pit refuse to either be incorporated into the active face and covered at the end of the day, or spread and covered with intermediate cover adjacent to the pit excavation

(iii) Only Septage haulers approved by CDC are to use site

(iv) Logbook to be kept on site of date/names of hauler/volume/source of waste

(v) Vermin to be controlled

(vi) Lime to be added as necessary to control odour

(vii) Pit to be covered when full.

(viii) Only septage and grease trap to be deposited in pits. NO OIL.

14 HEALTH AND SAFETY

14.1 Hazard register

The landfill is by nature a potentially hazardous site. The table below lists the main hazard areas.

Hazard	Specific measures to mitigate
Heavy machinery	• Maintain adequate roading and turning areas • Public prohibited from scavenging tip face • Site staff and visitors to wear safety jackets on site • Heavy machinery operations around materials recovery areas ideally undertaken when site is not open to public, or if unavoidable, use appropriate traffic control
Liquid waste disposal (septage) area	Fence and signpost
Leachate drain manholes – gas hazard	No entry to manholes or pump chamber without testing and the use of breathing apparatus
Landfill gas: General	Gas monitoring procedures and precautions to be undertaken for any ground disturbance, trenching, manhole work etc. Regular monitoring around all buildings
Fire	No smoking. Electrical installations to be appropriate for gas conditions
Firearms	Secure storage for any firearms used in pest control – note any shooting is by contract
Fridges etc – hazard to children	Destroy door locks immediately on receipt
Hazardous materials	Provide secure storage for limited quantities of hazardous materials and appropriate protective clothing
Asbestos containing materials	Refer waste acceptance. Asbestos wastes to be immediately buried. PPE as appropriate.
Chemical Spillages	• Visual inspection of loads at kiosk and on face prior to spreading • Use of PPE including respirator • Refer Contingency Plan Watch for any fumes, strong odours associated with loads or spilt material
Noise	Ear protection for site staff
Dust	Face masks or respirators as appropriate for site staff Enclosed cab with filtered air for all compaction and earthmoving plant working on the landfill face
Infection	Provide hygienic wash facilities and ensure staff use them. Require current tetanus vaccination. (Hepatitis not required)
Trips and falls	• Maintain a tidy site and remove unnecessary trip hazards. • Avoid any foot access on landfill face itself until refuse compacted and covered
Sharp objects	• Site staff and visitors to wear appropriate PPE – e.g. Footwear and gloves.

Hazard	Specific measures to mitigate
	• Avoid any foot access on landfill face itself until refuse compacted and covered
Confined Space at pump station and on leachate network	• Appropriately trained personnel only are to enter the site

Table 14.1: Hazard register

14.2 Equipment

The following safety related equipment to be kept on site:

- First aid kit
- Face masks, respirators and earmuffs
- Spare safety jackets and hard hats
- Potable water
- Warning tape, cones and safety fencing mesh
- Firefighting equipment appropriate to likely fire types e.g. foam etc
- Tyvek protective suit, rubber boots and gloves (3 sets minimum)
- Clean 200litre HDPE drums, with appropriate pump that can work from a vehicle battery, for spill containment
- Clean sand or sawdust for liquid spill absorption

14.3 Training

All operators will be licensed for heavy plant operation and have received adequate safety training.

At least yearly, all staff will receive periodic training in landfill operation emergency procedures, and other relevant skills, including identification and handling/storage of hazardous wastes.

Full training shall be given to any back-up staff and/or temporary staff as appropriate for the work being undertaken. The training shall include emergency procedures.

Refer Section 6.4 also.

14.4 Health & Safety Meetings

Regular review of health and safety matters is a key part of building a health and safety culture for the operation. The following are held:

- Weekly health and safety tailgate meeting by/for contractor's staff
- Specific health and safety plan and start up meeting for any one off construction or maintenance activities.
- 3 monthly joint review by the Water & Waste Operations Manager (CDC) and the Contractor's Operations Manager.

14.5 Emergency Contacts

A list of emergency contact telephone numbers is held at the landfill office at all times. A sign at the entrance to the site also displays the afterhours emergency contact telephone numbers.

14.6 First Aid

First aid kits are kept on site at all times. Kits are of sufficient content to provide for the number of staff, contractors, and general public expected on site at any one time and to provide for the nature of the hazards the site may pose.

At least two on-site staff members have a first aid certificate to a NZ Red Cross CPR and Basic First Aid level or equivalent standard.

One phone is available at all times on site (either a fixed line or a mobile phone) for emergency purposes.

15 MONITORING

15.1 Visual inspections

Regular visual inspections of all the key aspects of the site are undertaken by the staff at the frequency as set out in the table below:

Item for inspection	By Who	Frequency	Comment
Leachate drains, pump station and holding pond	Landfill contractor WWOM	Every day site attended Monthly overview	Inspection required in advance and after heavy rain
Perimeter stormwater drains	Landfill contractor WWOM	Prior to forecast heavy rain and after rain Monthly	Remove litter as required
Stormwater ponds	Landfill Contractor	Weekly or after significant rainfall	Remove litter as required
Litter inspection	WWOM Contractor	Monthly Access road daily	
Bird and vermin	WWOM	Monthly	
Dust nuisance	Landfill Contractor	Daily in dry conditions	
General site inspection	WWOM	6 Monthly	
Hazardous waste storage	WWOM	Monthly Weekly by Site Contractor	
Groundwater and surface water sampling points	WWOM		
Refuse compaction	WWOM	Annual	
Landscape plantings	WWOM	3 monthly	
Gas Monitoring	Landfill Contractor	3 monthly	

Table 15.1: Inspection schedule

A general site diary recording inspections, incidents etc is kept. Records filed to CDC files fA245 (SC70/0022 & SC70/0670).

15.2 Refuse composition & site usage

A daily record of customer numbers and waste types shall be kept by the operator and provided to Council monthly.

15.3 Refuse volume

The fill volume is assessed on 6-monthly basis by topographic survey and is arranged by the Water and Wastewater Operations Manager to occur in April and October each year

15.4 Waste deposited

Incoming refuse is weighed across the site weighbridge. Council has accessed the weighbridge software for purposes of returns under the Waste Minimisation Act 2008 and Emissions Trading Scheme.

The incoming waste tonnage divided by the 6-month volume assessment is a key parameter for assessing the efficiency of the site filling and degree of compaction.

16 ENVIRONMENTAL MONITORING

16.1 Responsibilities

Environmental monitoring for consent compliance and general status information is undertaken by CDC staff working under the direction of the Water & Waste Operations Manager. The WWOM is responsible for ensuring data is collected according to the timetable and reported to WRC in the specified timeframes.

The Operations Contractor (Led by the COM) is responsible for day-to-day visual observation of the site and notifying the WWOM of any unusual conditions such as discolouration of water channels. The COM is responsible for protecting all the monitoring points from damage, keeping them clear of vegetation and ensuring easy access for monitoring and compliance staff.

16.2 Leachate characterisation

Leachate is to be monitored according to schedule LEA 1 in Appendix 1. Leachate is monitored at the Pump station.

16.3 Surface water

Surface water is to be monitored according to schedules SW 1 and WC 1 in Appendix 1.

Surface water is monitored at the following locations:

- WC1 – watercourse upstream of landfill in Golf Course
- WC2 – watercourse downstream of landfill in drain immediately before discharge to river
- WC3 – drain from landfill at discharge point of culvert under fill
- SP1 – Silt Pond 1
- SP2 – Silt Pond 2

16.4 Groundwater

Groundwater is to be monitored according to schedule GW 1 in Appendix 1.

- GW1 – Upstream control bore in Golf course
- GW2 – Bore at landfill toe immediately downstream of sheet pile cut-off wall
- GW3 – Bore at site entrance beside access road
- GW4 – Bore at south end of landfill toe
- GW5 – Bore at middle south edge of landfill
- GW6 – Bore at middle north edge of landfill west of the TMH
- GW7 – Bore at east end/head of landfill adjacent to railway line

16.5 Landfill gas

Visual inspection for landfill gas is required (94510/4). All enclosed structures where practicable are constructed with an airspace under the floor fully vented to the atmosphere.

16.6 Dust

Visual inspection according to Table 15.1. No specific measurement of particle deposition is required.

17 REPORTING

17.1 Reporting of monitoring data

Reporting of compliance monitoring data to ORC is required as per table 17.1

Monitoring data	Reporting frequency
Leachate quality	3 Monthly
Groundwater quality & Quantity	3 Monthly
Surface water quality	3 Monthly
Gas Monitoring	3 Monthly

Table 17.1: Reporting schedule

17.2 Annual Audit Reports

Each year for the year ending 30 June, by 31 August, a report will be prepared on the landfill operation summarising the following matters

- Operation of surface water control structures
- Height and shape of fill (results of contour survey)
- Capping and restoration including landscaping activities
- Training records
- Consent compliance
- General comment on status of operations, problems experienced, upcoming works

The annual report will be issued to ORC and is public record.

17.3 Contingency reporting

In event of untoward discharges to natural water the following reporting schedule to be followed:

- Notify ORC, within **24 hours**
- Report in writing to ORC, within **7 days** on manner and cause of escape, control measures taken, and steps taken to prevent a recurrence

18 CONTINGENCY PLAN

18.1 Contact numbers

The following contact numbers apply:

Person or Organisation	Contact	Contact Nos
ORC	Compliance Officer	03 474 0827
CDC	Water & Waste Operations	03 419 0245
Landfill Operator	Landfill Manager	027 825 8811
Fire service	NZ Fire Service – Balclutha VFB	111
For advice on special wastes	WSP (Peter Askey)	0274 766 459 or 07 308 0139

Table 18.1: Emergency contact numbers

18.2 Emergency equipment/resources

Equipment kept on site:

- First aid kit and protective gear (section 5)
- Soil stockpile for smothering fires, containing liquids
- Absorbents (sand, sawdust)
- Oil absorbent boom for stormwater ponds or stream
- Lime
- Fire extinguisher

Equipment/materials available on call:

- earthmoving gear, water tanker

18.3 Specific situations

Indicative responses to possible contingency situations are given below. In all cases outside advice should be sought where uncertainty as to the appropriate response exists.

18.4 Fire

No Fires will be deliberately lit at the site. All fires must be extinguished immediately. A water tanker and associated equipment that is fit for purpose for extinguishing landfill fires will be available on call.

In recent years there has been a low probability of fire at landfills due to the compactness of refuse, prompt daily cover and no deliberate lighting of fires as historically practiced at older refuse tips. However recently landfills have seen an increase in fires. This is most likely caused by lithium batteries being disposed of in mixed refuse. When crushed the batteries can ignite, leading to flare ups which may not surface until some hours later.

A visual inspection of the active fill area for smoke is made at the conclusion of each working day before leaving the site. In future if landfill fires become a problem remote sensing of fire may prove necessary.

Should a fire occur, the immediate action would be to smother the fire with sand or soil to hold the situation until the fire service can respond. An obvious surface fire should be doused with water. The fire service will be called immediately a fire is detected.

Once a fire has established and is burning down into the refuse then soil smothering or surface water application will probably be insufficient. An excavator will be needed to expose the burning material so it can be doused with water, if necessary, by helicopter and monsoon bucket.

A deep-seated fire may require specialist techniques such as nitrogen injection. Specialist advice will need to be sought. Note that if a fire burns deep in the refuse the fill will become unstable with large voids and be a hazard for machinery.

After A Fire

The consent holder shall notify the ORC within 24 hours of emergency services needing to attend the site to respond to a fire or a landfill gas related incident.

As soon as practicable after any fire or smoke where emergency services are called, the consent holder will provide an investigation report to the ORC setting out:

- *The cause, or likely cause, of the fire/smoke*
- *When it was first noticed*
- *Actions taken*
- *Whether the liner or any other landfill infrastructure was, or is likely to be, damaged*
- *Any remedial actions necessary (to the liner or the environment)*
- *Measures that shall be taken to avoid re-occurrence and subsequently updating the relevant parts of the Site Management Plan as necessary with these measures as well as other relevant lessons learned*

18.5 Hazardous waste spillage

Immediate response by site staff:

(a) Isolate spillage area with safety fence/warning tape

(b) Don protective clothing, masks etc

(c) Identify material – If unknown seek specialist advice

(d) Apply absorbents for liquid waste and /or contain the liquid with bunds of clay

(e) If small quantity can be safely contained in drum or canister – do so. Clearly label and identify contents, remove to secure storage.

(f) Notify Area Engineer

(g) <u>Do not hose *any* material away until cleared to do so</u>

Follow up by Area Engineer:

(h) Notify ORC

(i) Obtain advice re treatment, storage and disposal

(j) Prepare and implement emergency response

18.6 Leachate overflow or breakout

In event of a leachate overflow or breakout being apparent:

(a) Ensure all pumps are operating to capacity

(b) Call in tanker truck or portable pump to remove surplus

(c) If feasible, block any contaminated surface drains for removal of contaminated water back to landfill

(d) Assess cause of overflow and measures to prevent recurrence

18.7 Flooding

Flooding from outside the landfill may affect drainage off site. The Area Engineer to be on the notification list by ORC Technical Services for any predicted high river levels. The following actions to be taken in advance of high water or heavy rainfall warning:

(a) Inspect site perimeter and ensure all toe bunds etc at level.

(b) Ensure leachate levels pumped down as low as possible

18.8 Groundwater bore contamination

Groundwater bore contamination would be detected as a result of routine sampling and analysis. The response required will depend upon the nature of the contamination and its extent. It is difficult to be prescriptive in this Plan as to what response would be required. Immediate actions would include:

(a) Resample bore(s) with suspect results

(b) Immediately inspect the landfill perimeter in the vicinity of the suspect bore for any signs of surface flow that could have caused the contamination, such as a leachate breakout etc

(c) Immediately commence to lower leachate levels in the suspect area of the landfill as low as possible

Further contingency responses could include, depending upon specific advice received:

(d) Shift filling to another area of the landfill; place an intermediate capping of low permeability silt over the affected area to reduce water ingress and leachate generation.

(e) Install leachate abstraction wells at the affected location

(f) Install further bores for monitoring of groundwater down gradient of the affected area.

(g) Installation of a cut-off trench for leachate interception

In any event, any contingency response should be developed in consultation with the ORC.

18.9 Power/Weighbridge Failure

A power failure would impact operation of the weighbridge, EFTPOS and the onsite computer used to record customer numbers, weights and record transactions against accounts. The ability to continue operations would be assessed on a case-by-case basis. A weighbridge failure while not ideal it would have a lesser impact on operations.

For a short-term failure (less than 1 day)

- Bag charges as per normal, domestic waste just use minimum charge if more than 3 bags equivalent, no need to estimate weight
- Weighbridge Operator to access and estimate weight of load if a commercial/special waste If agreement can’t be reached with the customer then refer customer to offsite weighbridge for weight recording. Vehicle Tare Weight to be used as ‘out’ weight in this circumstance.
- Fill in Manual Entry Form

- Cash or Account only

For longer term outages (more than 1 day) the landfill may be closed, if permission is granted by the Engineer.

18.10 Earthquake

In the event of a significant earthquake event (>1:50 year return period), the landfill surface and surrounds should be inspected within seven days. A report should then be provided to the ORC within one month of completing the inspection, which shall include any damage caused to the landfill by the earthquake, any necessary repairs, and timeframes for completion of repairs. The following specific measures in event of seismic activity affecting the area are to be undertaken:

18.10.1 In Event of Period of Heightened Seismic Activity

While earthquakes of magnitude sufficient to affect the landfill infrastructure are most likely to occur without warning, some events are preceded by smaller earthquakes or swarms (e.g., the Edgecumbe earthquake of 1987). If the area is subject to increased minor seismic activity, then as a precaution any construction work should be reviewed for proximity to any slopes or batters that could fail.

18.10.2 After a significant earthquake

Following any significant earthquake affecting the locality, a thorough inspection of the site shall be undertaken. No specific threshold is defined in this Plan for a "significant" earthquake and the WWOM should err on the side of caution and seek professional geotechnical advice as soon as possible.

Immediately following:

COM and/or WWOM to conduct a walk over and look for any obvious signs such as fresh cracks in the fill or bunds.

Monitor leachate flows from the fill for any unusual reduction in quantity. If leachate is unable to freely drain from the fill due to settlement/faulting or pipe damage, then it will pond in the fill with possible loss outside of the containment or reduction in landfill stability.

Geotechnical Inspection

A suitably experienced geotechnical engineer is to be engaged as soon as available to conduct a more thorough site inspection. This will involve among other things:

- Checking for signs of deformation as above
- Possibly repeat a drone survey and conduct a surface-to-surface comparison to identify settlement
- Until report and specific recommendations are received, keep operations away from any areas suspected to be affected by ground movement.

18.11 Reporting

Reporting of contingency events and responses is to be as per Section 17.

18.12 Gas Detection

Where gas limits, greater than normal, in a building are discovered the Contractor will immediately inform the Water and Wastewater Operations Manager. Where the gas monitoring within the sewer pump station or the leachate manholes exceed a level "to be determined" the Contractor will immediately inform the Water and Wastewater Operations Manager."

19 LANDSCAPING

Landscaping is to be developed. Specific maintenance activities include:

- Replacement plantings
- Maintaining irrigation lines
- Fertilising as required
- Weed and pest control, maintaining stock proof fencing

Topsoil is stockpiled on site, in windrows not to exceeding 1.5 m in height, and adequately drained. Clean fill suitable for top soiling may be added to topsoil stockpiles.

20 LANDFILL CLOSURE AND AFTERCARE

20.1 Projected Life

The life of the landfill will depend heavily on the affordability of obtaining resource consents following the expiration of current consents in 2023. Provided that new consents can be obtained, the site has enough capacity to last until approximately 2044 based on the current volumes being landfilled. With a decline expected in the amount of waste being landfilled, it is likely that the site will have capacity beyond this.

20.2 End Use of the Site

The end use of the site is expected to be for passive recreation or grazing. For grazing the site would likely be leased to a neighbouring farmer for light stock (sheep or calves) which would not damage the capping soil. The restrictions around future use of the site and activity on it will need to be carefully set out to ensure clear responsibility for the site in future and to be able to confirm that no activities which would damage the capping are undertaken.

20.3 Landfill capping

The site is to be capped on completion as per section 5.8.

20.4 Site monitoring

Monitoring of the site will continue as per schedules SW1, GW1 and LEA1 unless specifically varied by change of any consent conditions.

Regular inspections of the site will be carried out as per table 21.1:

Aspect of site	Inspection by	frequency
Landfill cap (for integrity, grass vigour, leachate breakout, cracking etc)	WWOM	6 monthly
Leachate drainage	WWOM	6 Monthly
Stormwater ponds	WWOM	6 Monthly
Site fencing and perimeter	WWOM	6 monthly
Landscaping and plantings	Parks and reserves, CDC or Arborist contractor	3 monthly

Aspect of site	Inspection by	frequency
Monitoring points (Bores etc)	WWOM	Coincident with sampling

Table 20.1: Aftercare monitoring

20.5 Remedial actions

The site will be maintained in a safe condition suitable for future use as necessary. Specific maintenance actions may include as per Table 10.2:

Aspect of site	Remedial action
Landfill cap (for integrity, grass vigour, leachate breakout, cracking etc)	Dig out, refill with new capping, re-grass Tap leachate flows and drain to pumpstation
Leachate drainage	Clear leachate lines by jetting etc
Stormwater ponds (while in place, ponds to be removed or converted to permanent water features/habitat once capping established , nominally at least two growing seasons)	Clean out debris etc
Site fencing and perimeter	Repair as required
Landscaping and plantings	Replace as required
Monitoring points (Bores etc)	Protect bore heads

Table 20.2: Aftercare maintenance

20.6 Aftercare Period

Aftercare will continue until such time as the leachate monitoring shows the volume and strength of leachate to be reduced sufficiently for active management of leachate to cease. The period for this will be determined in consultation with the ORC.

21 ASSESSMENT OF ENVIRONMENTAL EFFECTS

21.1 General

This section provides a brief overview of the environmental effects of the Mt Cooee landfill, as required by consent condition 5. A detailed assessment of environmental effects is not appropriate for a Site Management Plan and is undertaken as part of the initial consent process. Noting that the existing consents expire in 2023, at that time, whether the site continues for refuse disposal or changes to a transfer station with a closed landfill, then a full AEE will be undertaken.

A full description of the site including geohydrology is given in the original Resource Consent Application by Royds Consulting in 1994 (Refer Table 1.1).

21.2 Discharges to Surface water

To date the site has had a significant adverse effect on the water quality and ecology of the stream draining the landfill. Effects have also been discernible in the Clutha River for a short distance (10m approx.) below the discharge point of the landfill stream. These effects were documented in the 2011 report "*Ecological Effects of Mt Cooee Landfill Discharge*", Opus Consultants 2011.

Key findings were:

- Leachate was contaminating the stormwater line beneath the landfill and hence the landfill stream
- High levels of ammoniacal nitrogen in the landfill stream were well in excess of water quality guidelines
- Diminished invertebrate life in the stream with only pollution tolerant species present
- Evidence of nutrient enrichment (sewage fungus) on the bank of the Clutha River

The summary and conclusions of the 2011 report are:

"Sampling of aquatic macroinvertebrates in the tributary upstream and downstream of the Mt Cooee landfill and on the Clutha River margin upstream and downstream of the tributary confluence found that nearly all sites had MCI-sb and SQMCI-sb scores indicating poor water quality. Low scores at the upstream sites can partially be explained by poor habitat quality and, in the case of the Mt Cooee tributary, by very low stream flow.

Downstream sites showed a further decline in MCI-sb and SQMCI-sb scores. The decline was statistically significant, and an equivalence test found there to be moderate evidence of a 20% decline in scores.

Molluscs almost completely disappeared from the Mt Cooee tributary downstream of the landfill, despite very high abundances upstream. This included both Sphaerium sp. which is particularly sensitive to total ammonia concentrations and Potamopyrgus sp. snails which are usually tolerant of poor water quality. In the Clutha River there were fewer mayfly (Deleatidium sp.) sensitive Trichoptera taxa downstream of the confluence, but Potamopyrgus sp. snails and Sphaerium sp. were abundant, indicating a substantial dilution of total ammonia concentrations within 10 metres of mixing with the Clutha River.

Further evidence of effects of the landfill leachate was observed with an increase in the cover of filamentous green algae downstream of both the landfill and the confluence with the Clutha River. Furthermore, heterotrophic growths (sewage fungus) were observed on submerged willow branches in the Clutha River – indicating that the tributary has contributed high concentrations of dissolved carbon and/or biological oxygen demand (BOD). The guideline for controlling heterotrophic growths is to maintain soluble BOD_5 < 2 mg/l as an average (MfE 1992). Quarterly monitoring has found average $cBOD_5$ in stormwater pond 1 and 2 to be 6.5 mg/l and 20.5 mg/l respectively (Downer EDI Works 2011). Suggesting that the heterotrophic growths could have been caused by the landfill leachate.

The total ammonia concentrations measured in the tributary downstream of the Mt Cooee landfill are about 52 mg/l (Downer EDI Works 2011). This is very high and substantially exceeds the USEPA guidelines for acute toxicity (i.e. 8.4 at pH =8 if salmonids absent), let alone the ANZECC guideline values based on chronic toxicity

(i.e. 0.9 mg/l at pH 8). High total ammonia concentrations could exclude fish from entering the Mt Cooee tributary but the habitat in the stream is poor and a perched culvert at the road also prevents upstream fish passage. The toxicity effect of high total ammonia in the tributary is unlikely to extend more than 10 metres downstream of the confluence with the Clutha River based on the presence of Sphaerium sp. at this point."

The 2011 report has not been subsequently updated but given that the leachate discharge was not remediated then the effects noted can be assumed to have continued.

The source of the leachate was established to be infiltration into the deteriorated pipes and manholes of the stormwater culvert. Work is now underway to rectify this (Section 5.4). Once this remedial work is completed then any remaining leachate contamination of the stream would be either from:

- Stormwater from the landfill face
- Groundwater leakage past the sheetpile cut off wall – evidenced by groundwater monitoring to be minor
- Recharge from deep groundwater contaminated by leachate – again expected to be minor

Once completed, the effect of the stormwater diversion is expected to show immediately in the landfill surface water monitoring results. Further assessment of ecological and habitat values in the stream and Clutha River below the discharge point would be appropriate to be undertaken 12 months post the stormwater diversion ie autumn 2022. At that point the effects of the diversion will be clear and the need for any further leachate containment established.

21.3 Discharges to Groundwater

There are currently 7 monitoring bores on the site. Bores GW4,5,6& 7 are upgradient of the cutoff wall and penetrate refuse in the unlined site. Bore GW1 is to the north of the railway line and is an upgradient control with high water quality. Bore GW3 is adjacent the site entrance and downgradient but off to one side of the fill. Bore GW2 is the clear downgradient bore. This is screened in the shallow alluvium immediately downgradient of the cutoff wall in the valley centre. GW2 is therefore the indicator bore for the integrity of the cutoff.

Golder Associates, who do the consent compliance monitoring at the Mt Cooee site, comment as follows in regards the groundwater:

"Groundwater monitoring undertaken at Mt Cooee Landfill confirms that leachate discharge from the landfill is influencing measured water quality parameters. Long term groundwater quality trend analysis was undertaken by Golder in December 2020 for monitoring wells GW1, GW2 and GW3. Long-term increasing trends for measured water quality parameters analysed were noted for boron, nitrate-nitrogen, and chloride (Golder 2020). Clutha District Council plans to undertake further assessment of the significance of these trends with consideration of these influences to support a future application for replacement resource consents.

Recent and ongoing changes and upgrades to the landfill infrastructure including capping, stormwater management and leachate collection at the site will have an influence in the significance of leachate impact on the environment. It is anticipated this work will reduce the overall volume of leachate produced by the landfill.

In summary, landfill leachate is having a measurable effect on groundwater quality at the site. However, detailed environmental assessment considering the influence of recent and ongoing work at the has not been undertaken. Further assessment of the impact on groundwater quality is planned to support future resource consent application for the site.

Reference:
Golder 2020. Mt Cooee Detailed Quarterly Environmental Monitoring Report – December 2020. Report prepared by Golder Associates (NZ) Limited for Clutha District Council on behalf of WasteCo NZ (Southern) Limited, December 2020."

Further to the above, a brief perusal of the recent (November 2020) monitoring data shows:

- Bore GW1 is of high quality with very low levels of both ammoniacal and nitrate nitrogen (0.023 g/m^3 and 0.005 g/m^3 respectively)
- Bores GW 4, GW5, GW6 and GW7 are all within the refuse and not surprisingly show degrees of leachate contamination. GW4 is intercepting a strong leachate plume with ammoniacal nitrogen at 620 g/m^3 , potassium at 530 g/m^3, and Boron at 87 g/m^3. This level of Boron is unusually high for a landfill. The most likely source is coal ash, which is disposed of in large amounts from Silver Fern Farms. Boron (and also potassium) is mobile in groundwater and is thus a good indicator of leachate contamination beyond the site.
- Bores GW5,6&7 show a more dilute leachate signature, consistent with their location on the margin of the filled ground.
- Bore GW3 has slightly elevated Boron and nitrate compared to GW1. Boron 0.45 g/m^3 cf 0.056 in GW1. Nitrate 2.6 g/m^3 cf 0.005 in GW1. While slightly elevated, these levels are a small fraction of that in the landfill bores.
- Bore GW2 has results for Boron and Nitrate-N intermediate between GW1 and GW3 (Boron 0.170 g/m^3, nitrate-N 1.43 g/m^3, ammoniacal-N 0.071 g/m^3, potassium 2.0 g/m^3). These results are not inconsistent with the shallow alluvial nature of the groundwater. Given the very low levels compared to the in-landfill bores, bore GW 2 provides a large degree of confidence around the integrity and effectiveness of the sheetpile cutoff wall.

Effects on groundwater are therefore largely limited to the shallow groundwater immediately beneath the fill material. This is contained by the cut off wall and contaminated groundwater diverted to the leachate.

Significant contamination of the underlying greywacke formation is unlikely. This is massive rock with low transmissivity. The preferential flow path for groundwater is to the leachate system. Any leachate that does infiltrate the underlying groundwater in the greywacke would ultimately discharge to the Clutha River. At that point the combined effects of attenuation in the soil and massive dilution in the river would make the environmental effects of any leachate discharge via the deep groundwater insignificant.

21.4 Discharges to Air

21.4.1 Odour

<Need to comment on odour complaints>

Odour is the major source of complaint from all landfills. Given the nature of landfill activity it is the hardest external effect to control. The site operations recognise the need to control odour (Section 11 above).

1 complaining about the terrible smell from the dump, we live right next to it and it is never this bad. Makes it unbearable to live here. we were told when we bought this house that the dump would be relocating but this has not happened so now, we have to put up with stinking dump and rubbish on our deck on windy days. We cannot have our windows open anymore; this is not good enough!

Name: Wilson Address (include rapid number if applicable) 36 Golfers drive

2 Have complained bitterly in the past regarding offensive smell emanating from the rubbish dump. Our upstairs area in our house is uninhabitable today and I'm sure wherever you live you'd not expect to suffer this. Need some action and NOW! (previous complaints not in system)

Name: Ted Bensemann and Rosie Jackson Address (include rapid number if applicable) 1 Arthur Terrace, Balclutha.

Response: Firstly, thanks you for taking the time to provide this feedback. After some investigating the odour was put down to a product being received from the Danone factory. This product is now being buried on acceptance in the meantime until Danone find an alternative site to dispose of it, they have until April 5th.

All other complaints relate to operations and not to the landfill

Greenhouse gas emissions

The Mt Cooee site to date has had no gas collection and destruction infrastructure. Landfill gas dissipates to air through the active face and the intermediate capping.

The site will be generating landfill gas, as a roughly 50/50 mix of methane and CO_2 plus traces of H_2S and odorous organic compounds, in proportions to incoming refuse typical of other NZ municipal waste sites. Noting that the Balclutha climate is relatively dry at 670 mm/annum, then gas generation would likely be at the lower end of the range of typical NZ sites.

Applying the standard generation rates as per the ETS (Emissions Trading Scheme), then for the 8,000 tonnes pa of mixed refuse disposed some 9,520 tonnes of CO_2 equivalent are being discharged. Under the ETS, CDC are required to surrender the equivalent number of NZUs to cover this discharge. At current price of NZU this is some $343,000 pa.

The landfill gas discharge, apart from the odour potential of the trace constituents as covered above, is of no localised significance to air quality in the landfill vicinity. Its significance arises as a contributor to NZ's overall GHG emissions.

CDC are currently (2021) reviewing the whole landfill operation and site economics, of which the GHG emissions and ETS liability are a significant part. As the price of NZU rises in coming years, the cost driver to reduce the gas emissions will only rise.

21.5 Nuisance Effects

The landfill can potentially have effects on adjoining property by way of litter blowing off site, birds that are attracted to the site and roost on neighbouring property, breeding vermin and insects.

All these effects are inherent to landfill activity. The site operational procedures as documented in this Plan are standard practice for landfill sites and are effective at containing effects to the landfill property. No complaints have been received.

21.6 Issues significant to Iwi

Comments from Iwi were sought upon application for the original resource consents in 1994 and again in 2011 and 2012. No concerns in relation to the site were raised in these discussions or are known to have been made known to Council at any other time. Council will be engaging with Iwi as part of the upcoming consent renewal.

22 ALTERNATIVES TO LANDFILLING AT MT COOEE

22.1 Waste Minimisation

Minimising the amount of waste created is a resource- and cost-efficient alternative to landfilling.

The quantity and composition of waste generated in the district is a result of the decisions and behaviours of manufacturers and consumers. Council provides information on waste minimisation and responsible disposal options to reduce the amount of waste individuals, households and the community as a whole send to landfill.

22.2 Recycling

Recycling post-consumer resources is one of the more cost-effective methods of reducing the amount of waste sent to landfill. Council currently diverts co-mingled rigid plastics, paper, cardboard, aluminium and steel through a kerbside collection and transfer station drop-off facilities. Recyclables are transported to Dunedin for sorting and shipping onwards to recyclers (both domestically and internationally).

22.3 Glass Recycling

Glass is not collected as part of the co-mingled kerbside recycling collection as the material recovery facility used to sort the district's recyclables is not equipped to handle glass and there are currently no cost-effective options for large scale collection and recycling of glass within the district.

Glass bottles and jars are accepted for free at the Mount Cooee Landfill and the Clinton, Lawrence, Milton, Owaka and Tapanui transfer stations. This glass is collected separately and stockpiled at Mount Cooee and utilised on-site as a construction material for maintenance of access roads and drainage. The glass at the transfer stations in comingled with waste and disposed to landfill until an alternative is identified.

Glass is an inert material and poses minimal risk to the receiving environment when landfilled.

22.4 Composting

Kitchen and garden waste can be diverted from landfill through mulching and composting. Diverting these wastes from landfill reduces greenhouse gas emissions, as aerobic decomposition (which occurs in composting) produces less harmful gases than anaerobic decomposition (which occurs in a landfill). The end product (compost or mulch) is a resource which can be used beneficially.

Council investigated introducing a separated kerbside collection for greenwaste, however the cost was prohibitive and there was not enough community support for the service. Resident surveys have consistently shown that two thirds of households in the district already compost at home, although it is unknown to what degree these households do so.

Council promotes home composting and provides information brochures on its website to help householders begin composting, using traditional compost bins, bokashi buckets or worm farms.

Facilities are also provided at Mount Cooee for the diversion of greenwaste from landfill. The use of this is encouraged by providing a 50% discount to customers who separate and place their greenwaste in the designated area.

22.5 Multiple 'local landfills'

Mount Cooee became the site of the district's only sanitary landfill in the mid 1990's. Prior to this, Council operated 20 small landfills throughout the district. The move away from operating numerous small landfills provided a more cost-efficient service for ratepayers. It also ensured that the environmental impacts of landfilling could be more easily monitored and managed by having just one site for controlled and engineered landfilling.

A return to numerous 'local landfills' is not an efficient or desirable option, economically or environmentally.

22.6 Closure and Cartage out of District

An alternative option to landfilling at Mount Cooee is to landfill at another site, which accepts waste from a wider (regional) area. Council has undertaken some preliminary investigations into this option. Current options are Dunedin City Council (approx. 70 km) or AB Lime at Winton (120 km). AB Lime currently have a volume restriction on their consent which would preclude accepting CDC waste although this is currently subject of a consent change application (May 2021).

Out of District landfill options will be investigated further nearer to the time that Mount Cooee's resource consents are due to expire or when landfills used by neighbouring Councils face capacity and consent limits.

Appendix 1

Monitoring Schedules

1 Schedule SW 1

2 Schedule WC 1

3 Schedule GW 1

3 Schedule LEA 1

SCHEDULE SW #1

SURFACE WATER ANALYSIS

ID	Location	Analyses
		List A
SP1	Silt pond 1	3 Monthly
SP2	Silt pond 2	3 Monthly

List A: pH, conductivity, suspended solids, turbidity, BOD5, NH_4-N

SCHEDULE WC #1

WATER COURSE ANALYSIS

ID	Location	Analyses
		List B
WC1	Watercourse upstream of landfill in Golf Course	3 Monthly
WC2	Drain from site immediately before discharge to river	3 Monthly
WC3	Drain from landfill at discharge point of culvert under fill	3 Monthly

List B: pH, conductivity, chloride, NH_4-N

SCHEDULE GW #1

GROUNDWATER ANALYSIS

ID	Location	Analyses	
		List C	List D
GW1	Upstream control bore in Golf course	3 Monthly	Annually (during September or October)
GW2	Bore at landfill toe immediately downstream of sheet pile cut-off wall	3 Monthly	Annually (during September or October)
GW3	Bore at site entrance beside access road	3 Monthly	Annually (during September or October)
GW4	Bore at south end of landfill toe	3 Monthly	Annually (during September or October)
GW5	Bore at middle south edge of landfill	3 Monthly	Annually (during September or October)
GW6	Bore at middle north edge of landfill west of the TMH	3 Monthly	Annually (during September or October)
GW7	Bore at east end/head of landfill adjacent to railway line	3 Monthly	Annually (during September or October)

List C: pH, conductivity, chloride, potassium, nitrate-nitrogen, boron (soluble), NH_3-N.
List D: BOD_5, Na, K, Mg, Ca, sulphate, iron, lead, zinc, cation/anion ratio, bicarbonate, COD, nitrate.

SCHEDULE LEA #1

LEACHATE ANALYSIS

Location	Analyses		
	List E	List F	List G
Leachate pump station wetwell	3 Monthly	Annually	2 Yearly

List E: pH, conductivity, NH_3-N, chloride.

List F: COD, BOD_5, Na, K, Mg, Ca, sulphate, iron, lead, zinc, cation/anion ratio, nitrate, bicarbonate.

List G: volatile organic contaminants, acid herbicides and semi-volatile contaminants as per RJ Hill Leachate Set or equivalent.

Appendix 2

Consent Conditions

Otago Regional Council

COUNTERPART

Consent No.: 94508

DISCHARGE PERMIT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Clutha District Council

Address: P O Box 25, Balclutha

to discharge to land an average of 105 cubic metres per day of municipal, domestic, special waste and industrial waste

for the purpose of operating a sanitary landfill facility and a composting operation for the Clutha District at Mount Cooee

for a term expiring on 1 October 2023.

Legal description of consent location: Lots 1 and 2 DP 12203, being Part Section 43 Block I Hillend Survey District and Part Sections 4 and 5 Block XIV North Molyneux District.

Map references generally in the vicinity of NZMS 260 H46: 598 357

The granting of the Consent will be subject to the following conditions:.

Conditions

1 The consent holder shall take appropriate measures to prevent landfilled material from moving off site.

2 No wastes, including hazardous materials, will be disposed of in the landfill which will have an adverse effect on the environment.

3 Any hazardous waste approved for disposal must be deposited in an appropriate way to prevent any adverse environmental effect. It must be characterised and the disposal location and date recorded.

4 The consent holder shall not dispose of any material in the landfill by burning it. Should any fire arise in the landfill it shall be extinguished immediately upon being detected.

5 The consent shall be exercised in conformity with the Landfill Management Plan prepared by the consent holder. The Management Plan shall be reviewed at least annually or at such lesser frequency as the Regional Council may approve. The Management Plan shall include:

Otago Regional Council

General description of site, including topography, natural water sources, geotechnical investigations.

Description of the operation of the disposal facility.

Types of waste to be treated or disposed of.

Assessment of Environment Effects including assessment of alternatives to landfilling.

Any implications of site management and operation of landfill for Iwi.

A manifest system identifying types and quantities received including the source, and where within the landfill any hazardous substances are placed.

Identification of discharges and environmental effects and the safeguards in place to avoid or reduce the environmental effects.

Sensitivity of the Receiving Environment.

Procedures for monitoring (including detection of leakage of contaminants in contravention of resource consent) and controlling adverse effects of spillages and leachate on groundwater and surface water, as well as the monitoring and control of odours.

Outline of proposals to report to the Otago Regional Council regarding environmental compliance.

Outline of emergency response procedures and contingency plans including:
- power failure
- emergency contacts
- fire

Works to be undertaken to establish the landfill.

Description of the waste collection, treatment, and disposal system.

Projected life of the landfill.

Reinstatement and possible end use of the site.

For hazardous wastes, describe wastes which are acceptable and unacceptable, and wastes which can only be accepted under special (specified) conditions.

Water control including stormwater and leachate.

Identify corporate environmental performance standards, national or industry group codes of practice, or other recognised environmental safety standards to which the operation of the facility will comply, and a description of the means for auditing compliance.

Otago Regional Council

Land fill Consents

Consent No. 94509

DISCHARGE PERMIT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Clutha District Council

Address: P O Box 25, Balclutha

to discharge collected and treated "dirty" stormwater

for the purpose of operating a sanitary landfill facility for the Clutha District at Mount Cooee

for a term expiring on 1 October 2023

Legal description of consent location: Lots 1 and 2 DP 12203, being Part Section 43 Block I Hillend Survey District and Part Sections 4 and 5 Block XIV North Molyneux District

Map references: Generally in the vicinity of NZMS 260 H46:598357

The granting of the consent will be subject to the following conditions:

Conditions:

1. Appropriate silt retention ponds shall be in place prior to the exercise of this right, with the design taking into account the maximum recorded flood level in the Clutha River.

2. All silt retention ponds shall be designed for the runoff arising from the highest estimated storm event with a design storm duration of 24 hours.

3. The grantee shall ensure that all practicable steps are taken to prevent contamination of stormwater by suspended solids or exposed landfill material or runoff via appropriate landfill management practices.

4. Monitoring silt pond discharge
   The grantee shall, once every 3 months, collect a representative sample of the discharge from each of the silt ponds.

   The sample shall be analysed for:
   - pH
   - conductivity
   - suspended solids
   - turbidity
   - ammonia — NH_4
   - BOD_5

MM

Otago Regional Council

The results shall be forwarded to the Regional Council as soon as possible, and the Regional Council shall be notified immediately if any sudden change in chemistry is detected or if a trend of increasing concentration is indicated.

The Regional Council may direct or agree in writing that additional sampling and analyses be undertaken if monitoring results indicate amendments are appropriate.

5. All laboratory analysis undertaken in connection with this permit must be performed at a Telarc registered laboratory or otherwise as specifically approved by the Regional Council in writing.

6. Prior to the expiry or surrender of this consent, the grantee shall prepare a management, monitoring and contingency plan for the future management of the landfill to the satisfaction of the Regional Council and shall seek appropriate consents for any ongoing activity identified by the Resource Management Act 1991 as requiring a consent.

7. In accordance with S.128 of the Resource Management Act 1991, the conditions of this consent may be reviewed on and in the period within 3 months upon each fifth anniversary of the date of this consent, if on reasonable grounds the consent authority finds that:
   (a) there is or is likely to be an adverse environmental effect as a result of the exercise of this consent, which was unforeseen when the consent was granted.
   (b) monitoring of the exercise of the consent as required by condition 4 has revealed that there is or is likely to be an adverse environmental effect on the environment.
   (c) there has been a change in circumstances that the conditions of the consent are no longer in terms of the above Act.

Issued at Dunedin this 25th day of May 1995.
Reissued at Dunedin this 10th day of August 2001.

M E Weaver
Manager Consents
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Otago Regional Council

COUNTERPART

Consent No.: 94510

DISCHARGE PERMIT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Clutha District Council

Address: P O Box 25, Balclutha

to discharge landfill gases, dust and odour to air

for the purpose of operating a sanitary landfill facility for the Clutha District at Mount Cooee

for a term expiring on 1 October 2023.

Legal description of consent location: Lots 1 and 2 DP 12203, being Part Section 43 Block I Hillend Survey District and Part Sections 4 and 5 Block XIV North Molyneux District.

Map references generally in the vicinity of NZMS 260 H46: 598 357

The granting of the Consent will be subject to the following conditions:

1 The consent holder shall adopt the best practicable option to avoid and/or mitigate any adverse effect on the environment resulting from the discharge of contaminants to air. This shall require that the consent holder operate, supervise and maintain the landfill and monitor the discharge so as to ensure that any adverse effect on the environment is avoided or mitigated.

2 Beyond the boundary of the landfill site there shall be no odour caused by discharges which, in the opinion of an enforcement officer is objectionable or offensive.

3 Dust emissions shall be kept to a practicable minimum. The consent holder shall ensure that dust emissions from the site do not create nuisance conditions beyond the boundary which, in the opinion of an enforcement officer are objectionable or offensive.

4 The consent holder shall undertake regular routine weekly inspections of the landfill for evidence of landfill gas nuisance such as odours, gas bubbling in puddles, or fissures in the landfill cover. The inspection shall comprise a minimum of walking around the perimeter and traversing the top of the landfill and where potential nuisance is identified, the consent holder shall investigate and remedy or mitigate the nuisance. Such actions shall include, where appropriate, taking samples for analysis, and repairing any leaks in the landfill.

Otago Regional Council

5 All laboratory analysis undertaken in connection with this permit must be performed at a Telarc registered laboratory or otherwise as specifically approved by the Regional Council in writing.

6 In accordance with S 128 of the Resource Management Act 1991, the conditions of this consent may be reviewed on and in the period within 3 months upon each fifth anniversary of the date of this consent, if on reasonable grounds the consent authority finds that:

(a) there is or is likely to be an adverse environmental effect as a result of the exercise of this consent, which was unforseen when the consent was granted.

(b) monitoring of the exercise of the consent as required by condition 4 has revealed that there is or is likely to be an adverse environmental effect on the environment.

(c) there has been a change in circumstances that the conditions of the consent are no longer in terms of the above Act.

Issued at Dunedin this 25th day of May 1995.

S A McArthur
Director Resource Management
lkw sll cdcdp

Otago Regional Council

COUNTERPART

Consent Number 94511

WATER PERMIT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council frants consent to:

Name: Clutha District Council

Address: C/- Royds Consulting, P O Box 4, Dunedin

to divert a small unnamed tributary of the Clutha River into another small unnamed tributary of the Clutha River via a channel

for a term expiring 1 October 2023

for the purpose of stormwater control for operating a sanitary landfill facility for the Clutha District at Mount Cooee.

Legal description of consent location: Lots 1 & 2 DP 12203, being Part Section 43 Block 1 Hillend Survey District and Part Sections 4 & 5 Block XIV North Molyneux District.

Map References: generally in the vicinity of NZMS 260: H46:598357

Conditions:

1 The diverting of the unnamed tributary of the Clutha River shall be done as proposed in the plans and specifications submitted to the Council.

2 In accordance with S 128 of the Resource Management Act 1991, the conditions of this consent may be reviewed on and in the period within 3 months upon each fifth anniversary of the date of this consent, if on reasonable grounds the consent authority finds that:

(a) there is or is likely to be an adverse environmental effect as a result of the exercise of this consent, which was unforseen when the consent was granted.

(b) there has been a change in circumstances that the conditions of the consent are no longer in terms of the above Act.

Issued at Dunedin this 9th day of June 1995

M E Weaver
Manager Resource Administration
Sgsl2 WatPer

WORKING FOR YOU & YOUR ENVIRONMENT

Otago Regional Council

COUNTERPART

Consent Number 94543

LAND USE CONSENT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Clutha District Council

Address: C/- Royds Consulting, P O Box 4, Dunedin

to install a culvert upstream of the existing culvert under State Highway 91 to the existing railway culvert

for a term expiring 1 October 2023

for the purpose of stormwater control for operating a sanitary landfill facility for the Clutha District at Mt Cooee

Legal description of consent location: Lots 1 & 2 DP12203, being Part Section 43 Block 1 Hillend Survey District & Part Sections 4 & 5 Block XIV North Molyneux District.

Map references generally in the vicinity of NZMS 260: H46:598357.

Conditions:

1 The diverting of the unnamed tributary of the Clutha River shall be done as proposed in the plans and specifications submitted to the Council.

2 In accordance with S 128 of the Resource Management Act 1991, the conditions of this consent may be reviewed on and in the period within 3 months upon each fifth anniversary of the date of this consent, if on reasonable grounds the consent authority finds that:

(a) there is or is likely to be an adverse environmental effect as a result of the exercise of this consent, which was unforseen when the consent was granted.

(b) there has been a change in circumstances that the conditions of the consent are no longer in terms of the above Act.

Issued at Dunedin this 9th day of June 1995.

M E Weaver
Manager Resource Administration
Sgsl2 LandCon

Otago Regional Council

Consent No.: 95953

WATER PERMIT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Clutha District Council

Address: P O Box 25, Balclutha

to take an average of 208 cubic metres per day of groundwater containing leachate

for a term expiring 1 October 2023

for the purpose of operating a landfill at Mount Cooee and subsequent treatment of this groundwater at the Clutha District Council's waste water treatment plant

Legal description of consent location: Lots 1 & 2 DP 12203, being Part Section 43 Block 1 Hillend Survey District, and Part Sections 4 & 5 Block XIV, North Molyneux Survey District

Map reference at activity point: In the vicinity of NZMS 260: H46: 598357

Conditions

1 That the consent holder surrenders consent 94545.

2 The consent holder shall monitor the volume of groundwater taken and report the mean daily flow together with the monitoring results required by consent 95954 to the consent authority at three monthly intervals.

3 Prior to the expiry or surrender of this consent, the consent holder shall prepare a management, monitoring and contingency plan for the future management of the landfill, to the satisfaction of the consent authority, and shall seek appropriate consents for any ongoing activity as required by the Resource Management Act.

4 The consent authority may, within three months of each anniversary of the date of this consent or within one month upon receiving monitoring results under Condition 1, in accordance with S129 of the Resource Management Act, serve notice on the consent holder of its intention to review the conditions of this consent for the purposes of determining whether the conditions of this consent are adequate to deal with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage, or if it is necessary, to increase the number of parameters which are to be monitored under Condition 1.

Issued at Dunedin this 13th day of February 1996

S A McArthur
Director Resource Management
Sgsl2 WPCDC

Otago Regional Council

Consent No.: 95954

DISCHARGE PERMIT

Pursuant to Section 105 of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Clutha District Council

Address: P O Box 25, Balclutha

to discharge on average 36 cubic metres per day of landfill and composting facility leachate to land in a manner in which this may enter water

for a term expiring 1 October 2023

for the purpose of operating a landfill at Mount Cooee

Legal description of consent location: Lots 1 and 2 DP 12203, being Part Section 43 Block 1 Hillend Survey District, and Part Sections 4 and 5 Block XIV North Molyneux Survey District

Map reference at activity point: In the vicinity of NZMS 260: H46: 598357

Conditions

1 That the consent holder surrenders consent 94512.

2 That an appropriate emergency leachate retention pond with the capacity of 48 hour retention (for a 1 in 2 year return period rainfall event from the landfill site) shall be in place prior to the exercise of this consent, with the design taking into account the maximum recorded flood level in the Clutha River.

3 The consent holder shall continuously monitor and record the flow of the pumped discharge from the combined leachate collection sumps/pumps. The results shall be forwarded to the consent authority at three monthly intervals.

4 *(a) Leachate collection system*

The consent holder shall once every three months collect a representative sample of the combined groundwater/leachate pumped from the leachate collector sumps/pumps (prior to the leachate being discharged to the Balclutha sewer system). The sample shall be analysed for :

- pH
- conductivity
- ammonia
- chloride

The consent holder shall, at least annually and once every three months for the first year, collect a representative sample of the combined groundwater/leachate pumped from the leachate collector sumps/pumps (prior to the leachate being discharged to the Balclutha sewer system). The sample shall be analysed for :

- calcium
- magnesium
- potassium
- sodium
- bicarbonate
- sulphate
- COD
- BOD_5
- nitrate
- iron
- lead
- zinc

- cation/anion ratio

On one occasion every two years the sample shall be analysed on a screening basis for volatile organic contaminants, acid herbicides and semi-volatile contaminants. The results shall be forwarded to the consent authority as soon as practicable.

(b) Leachate monitoring wells

The consent holder shall once every three months collect a representative sample of the groundwater/leachate from each of :

(i) monitoring wells outside the landfill (which are to be specified once the leachate collection system is installed)
(ii) monitoring wells within the landfill

The sample shall be analysed for :

- pH
- conductivity
- ammonia
- chloride

On one occasion each year, during September or October, the following parameters shall also be analysed in the monitoring wells outside the landfill :

- calcium
- magnesium
- potassium
- sodium
- bicarbonate
- sulphate
- COD

- BOD_5
- nitrate
- iron
- lead
- zinc
- cation/anion ratio

The results shall be forwarded to the consent authority at three monthly intervals and the consent authority shall be notified immediately if any sudden change in chemistry is detected or if a trend of increasing concentration is indicated.

5 Groundwater beyond the boundary of the landfill site shall at all times be substantially free of contaminants, resulting from activities at the Mount Cooee landfill conducted during the exercise of this permit, which adversely affect, directly or indirectly, water use or ecosystems.

6 All sampling procedures, including collection and transportation of samples, and laboratory analysis undertaken in connection with this permit must be performed to TELARC registered standards or otherwise as specifically approved by the consent authority in writing.

7 Prior to the expiry or surrender of this consent, the consent holder shall prepare a management, monitoring and contingency plan for the future management of the landfill, to the satisfaction of the consent authority, and shall seek appropriate consents for any ongoing activity as required by the Resource Management Act.

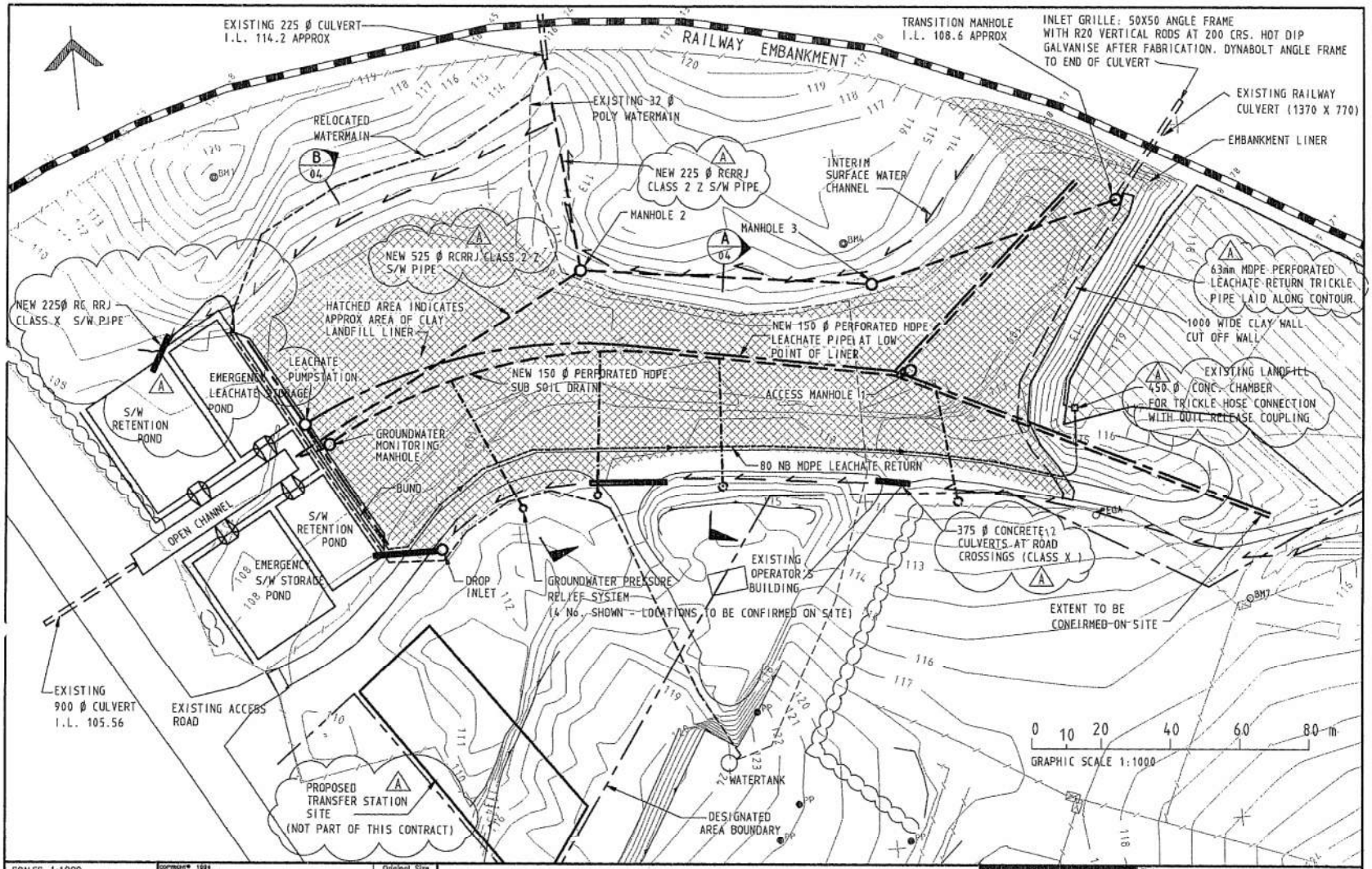
8 The consent authority may, within three months of each anniversary of the date of this consent or within one month upon receiving monitoring results under Condition 3, in accordance with S129 of the Resource Management Act, serve notice on the consent holder of its intention to review the conditions of this consent for the purposes of determining whether the conditions of this consent are adequate to deal with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage, or if it is necessary, to increase the number of parameters which are to be monitored under Condition 3.

Issued at Dunedin this 13th day of February 1996

S A McArthur
Director Resource Management
Sgsl2 DPCDC

Appendix 3

Construction Plans



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DRAWN	GSM	14/10/94
APPROVED		

Original Size A3

No	AMENDMENTS	Date	Initial
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–	ISSUED FOR TENDER	21/10/94	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
STAGE 1 CONSTRUCTION DETAILS

SITE LAYOUT PLAN

ROYDS CONSULTING
31 Stafford St., PO Box 4, Dunedin
Phone 64-3-477-0885

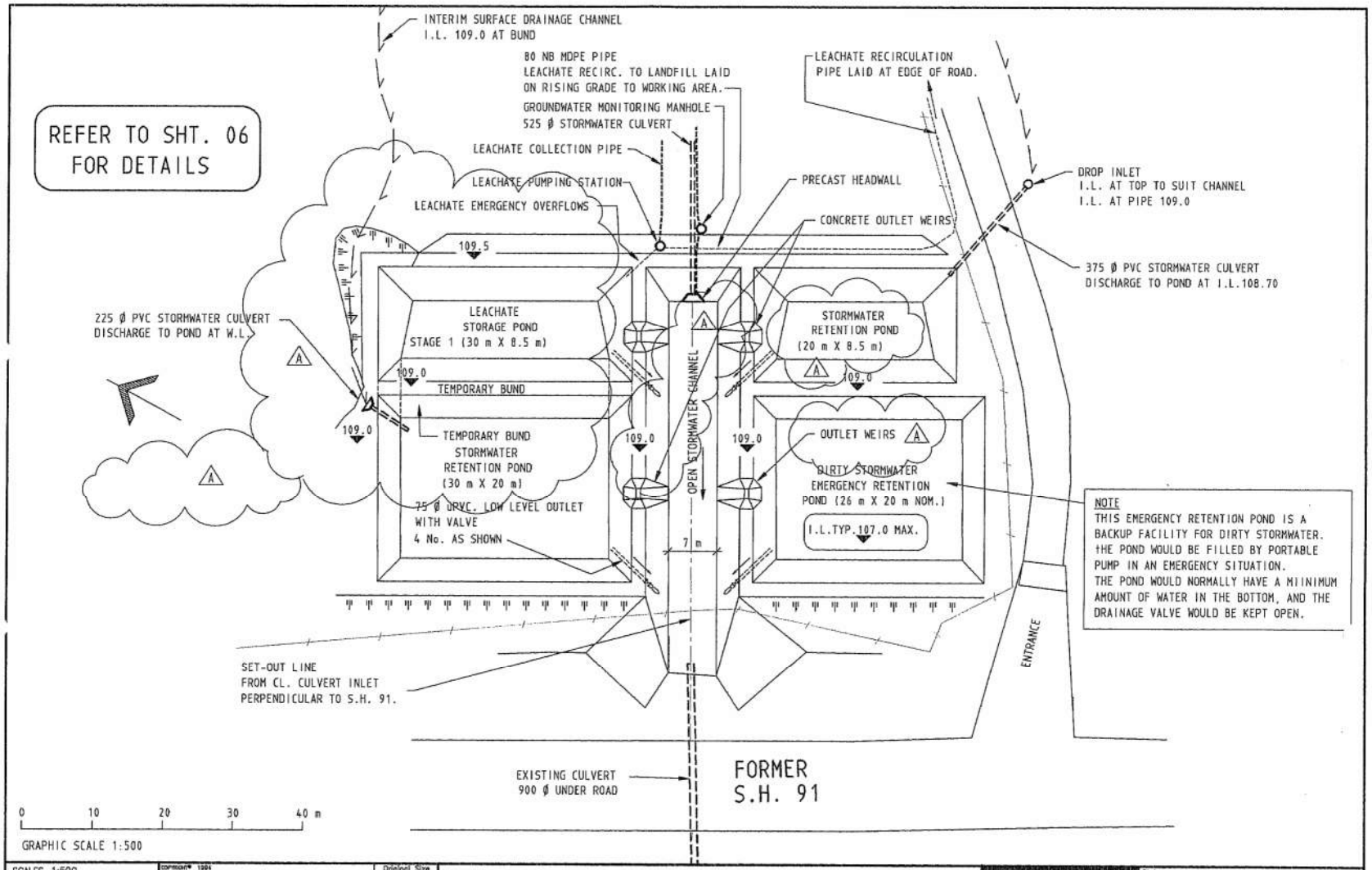
Status Stamp

Date Stamp

Job No. 46831.01/01

Sheet No.

Rev. A



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APPROVED		

Original Size A3

No	AMENDMENTS	Date	Initial
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–	ISSUED FOR TENDER	21/10/94	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
STAGE 1 CONSTRUCTION DETAILS

PLAN AT PONDS

ROYDS CONSULTING
31 Stafford St., PO Box 4, Dunedin
Phone 64-3-477-0885

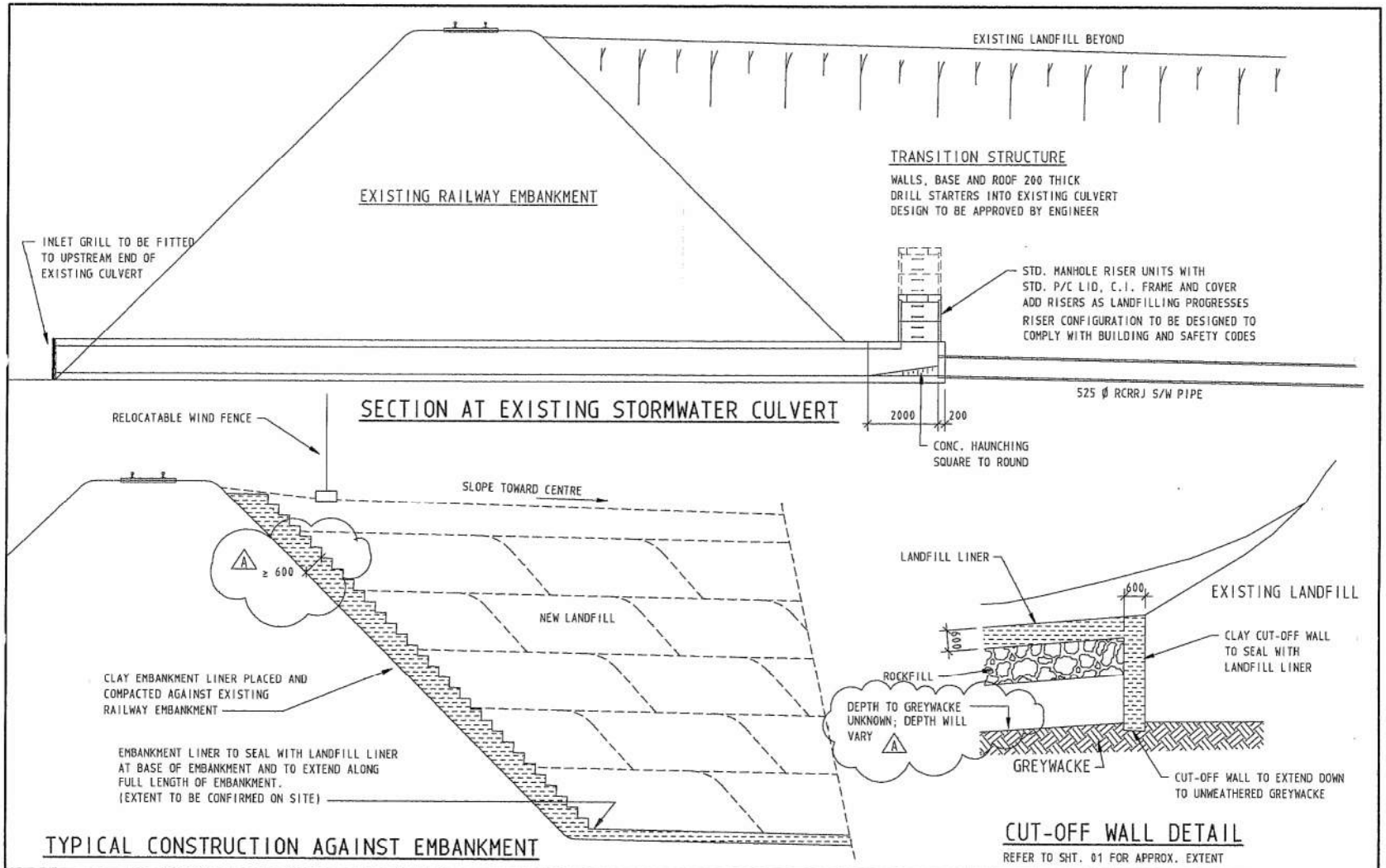
Status Stamp

Date Stamp

Job No. 46831.01/02

Sheet No. –

Rev. A



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APPROVED		

Original Size A3

No	AMENDMENTS	Date	Initial
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–	ISSUED FOR TENDER	21/10/94	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
STAGE 1 CONSTRUCTION DETAILS

TYPICAL SECTIONS AT RAILWAY EMBANKMENT AND CUT-OFF DETAIL

ROYDS CONSULTING
31 Stafford St., PO Box 4, Dunedin
Phone 64-3-477-0885

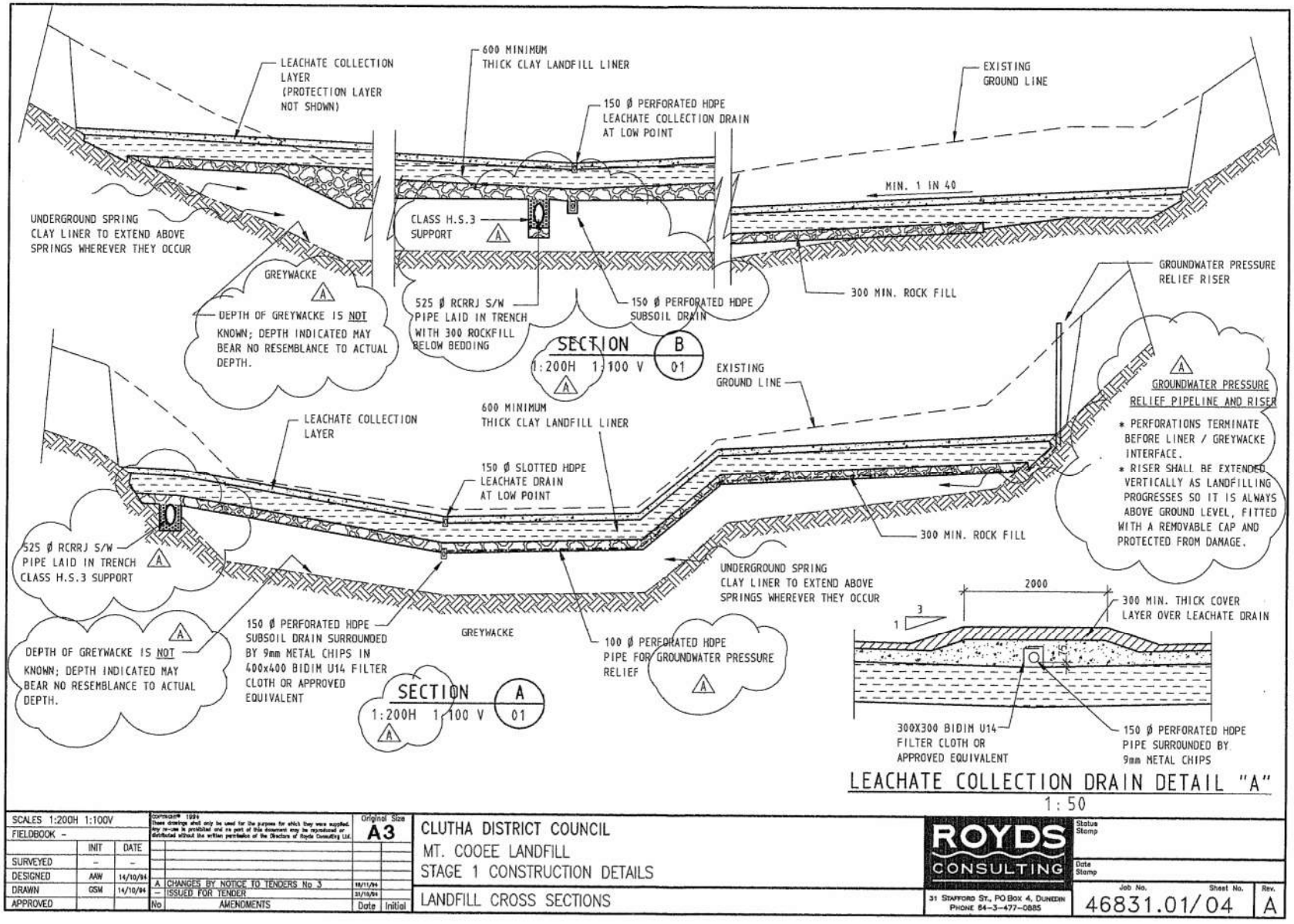
Status Stamp

Date Stamp

Job No. 46831.01/03

Sheet No.

Rev. A



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APPROVED		

Original Size A3

No	AMENDMENTS	Date	Initial
A	CHANGES BY NOTICE TO TENDERS No 3	18/11/94	
–	ISSUED FOR TENDER	31/10/94	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
STAGE 1 CONSTRUCTION DETAILS

LANDFILL CROSS SECTIONS

ROYDS CONSULTING
31 Stafford St., PO Box 4, Dunedin
Phone 64-3-477-0885

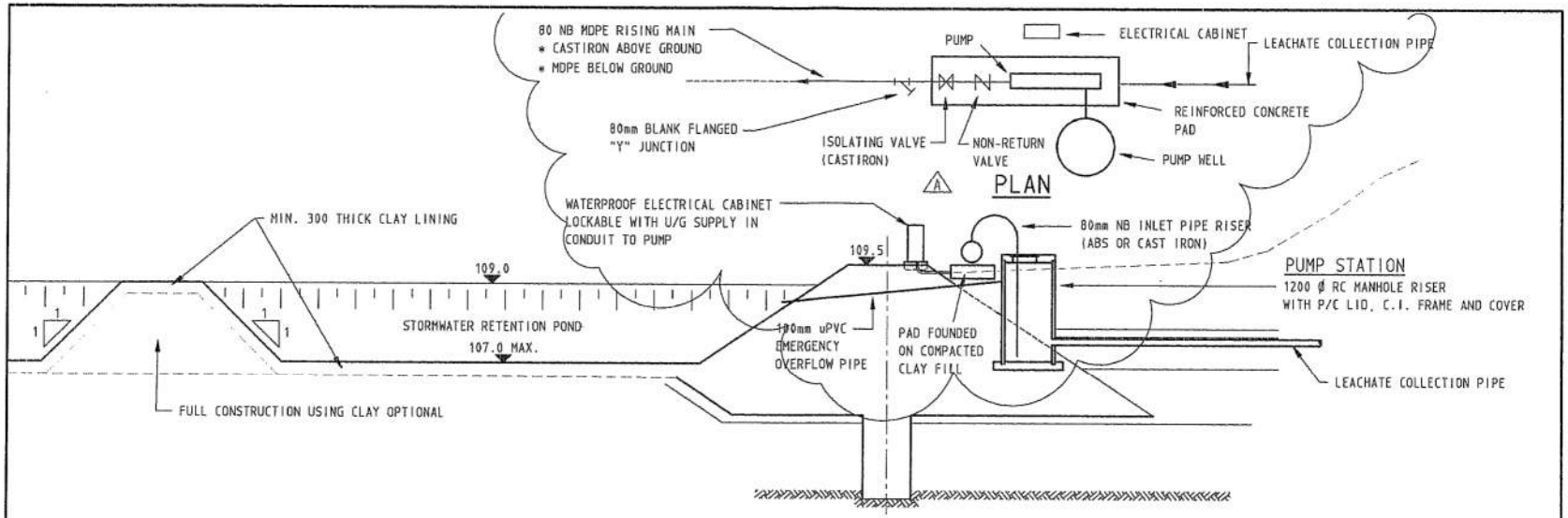
Status Stamp

Date Stamp

Job No. 46831.01/04

Sheet No.

Rev. A



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APPROVED		

Original Size A3

No	AMENDMENTS	Date	Initial
A	CHANGES BY NOTICE TO TENDERS No 3	18/11/94	
–	ISSUED FOR TENDER	21/10/94	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
STAGE 1 CONSTRUCTION DETAILS

LEACHATE PUMP STATION AND GROUNDWATER MONITORING MANHOLE

ROYDS CONSULTING
31 Stafford St., PO Box 4, Dunedin
Phone 64-3-477-0885

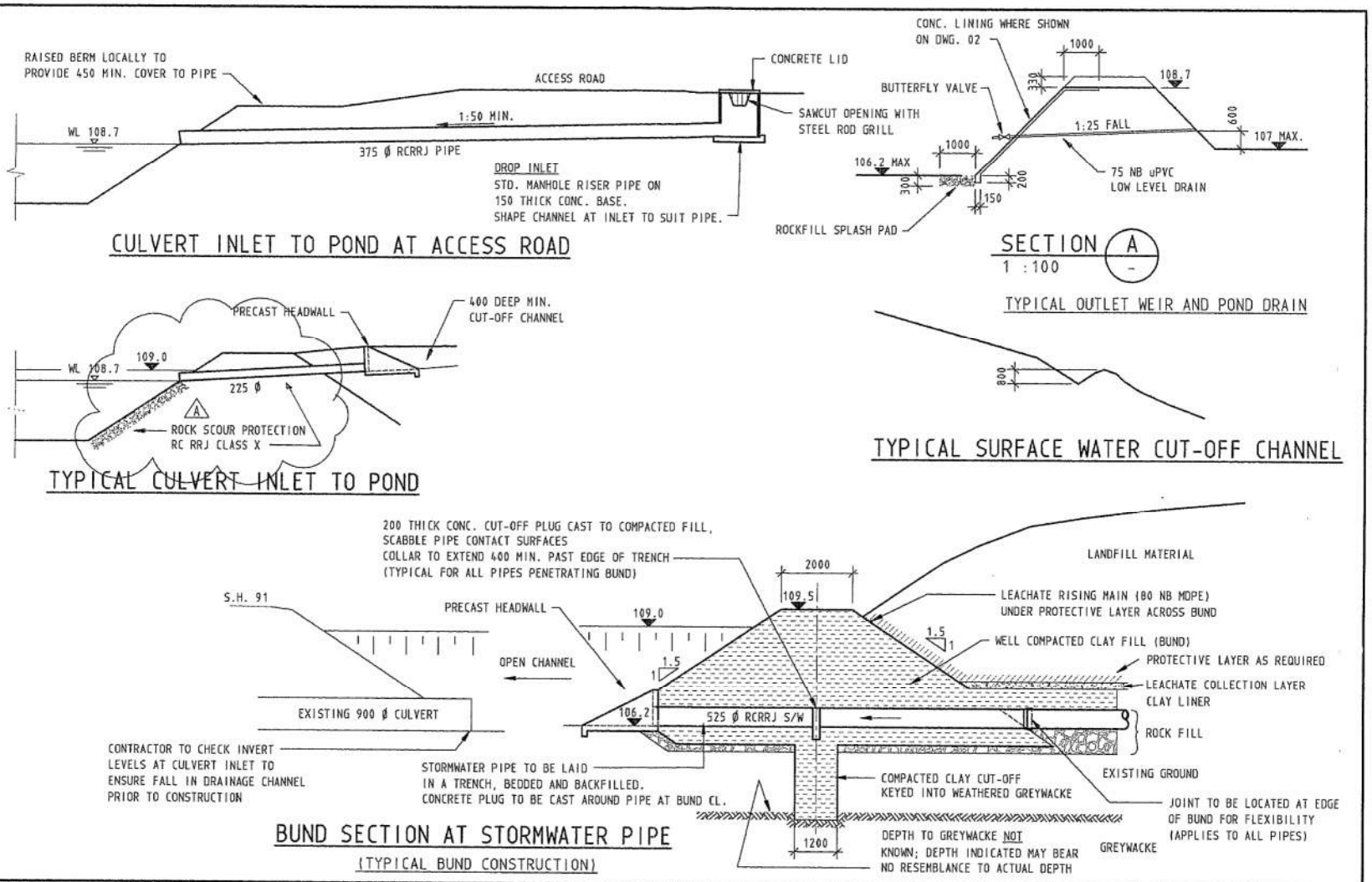
Status Stamp

Date Stamp

Job No. 46831.01/06

Sheet No.

Rev. A



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Original Size A3

No	AMENDMENTS	Date	Initial
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–	ISSUED FOR TENDER	21/10/04	

CLUTHA DISTRICT COUNCIL
MT. COOEE LANDFILL
STAGE 1 CONSTRUCTION DETAILS

POND AND BUND CONSTRUCTION DETAILS

ROYDS CONSULTING
31 Stafford St., PO Box 4, Dunedin
Phone 64-3-477-0885

Status Stamp

Date Stamp

Job No. 46831.01/07

Sheet No. 07

Rev. A

Appendix 4
CDC Solid Waste Bylaw 2019

Clutha District Council
Solid Waste Bylaw 2019

1 Commencement and repeal

a) This bylaw comes into force on 1 July 2019.

b) On the day this bylaw comes into force all previous bylaws of the Clutha District Council that relate to Solid Waste are repealed.

Preliminary Provisions

2 Application

This bylaw applies to the Clutha District.

3 Authority

This bylaw is made under Part 8 of the Local Government Act 2002 and Parts 4 and 5 of the Waste Minimisation Act 2008.

4 Delegation of power

Council delegates to any authorised officer or agent of Council the power to take any and all actions that Council may take under this bylaw, except where a statute or this bylaw requires a resolution or special order of Council.

5 Interpretation

The following table sets out the meanings that apply in this part of the Bylaw. Where a difference in meaning arises between interpretations in this bylaw and an Act, the Act shall prevail.

acceptable waste	waste with characteristics that comply with the requirements of Council as scheduled in this bylaw.
approval	approved in writing by Council, either by resolution of Council or by an authorised officer of Council.
approved receptacle	a receptacle for containing the waste left out for collection that has been approved by Council.
authorised agent	any person who is not an employee of the Council but is authorised by Council to act on its behalf.
authorised officer	any person appointed or authorised by Council to act on its behalf and with its authority including a member of the police.
authorised operator	any person employed or contracted (including any subcontractor) by Council to operate a facility.
characteristic	any of the physical or chemical characteristics of waste referred to in the Solid Waste Bylaw.
clean fill	material that has no potential to produce harmful effects on the environment. This is generally a natural material such as clay, soil and rock and such other materials as concrete, brick or demolition products that are free from combustible or organic materials and are therefore not subject to biological or chemical breakdown.
Council	Clutha District Council
difficult waste	waste that can cause a nuisance or has properties which cause it to require extra care in disposal, and includes waste described in Schedule 1. Difficult waste may be disposed of at a landfill provided it is either; scheduled as difficult waste or has been issued a permit by Council.
drop off facility	a facility where Council provides a receptacle for the free disposal of recyclable materials.
E-Waste	discarded electronic appliances such as mobile phones, computers, and televisions.
facility	a transfer station, drop off facility or landfill operated by Council.
general solid waste	domestic, institutional, agricultural, industrial, or commercial waste excluding hazardous waste, difficult waste, green waste, clean fill, and recyclable materials.
green waste	material that is organic or vegetable, and generally in a natural state (i.e. has not been other than physically modified) as prescribed in the Solid Waste Services Information document. May include soil attached to plant roots.
hazardous waste	any waste or combinations of waste that poses, or has the potential to pose, a hazard to human health or living organisms.

Household	a house and its occupants regarded as a separately used or inhabited part of a rating unit.
kerbside collection	collection by Council of approved wheelie bins put out on the kerbside.
kerbside collection area	an area nominated by resolution of Council for kerbside collection.
person	a natural person, corporation sole or a body of persons whether corporate or otherwise.
prohibited waste	waste of a type or quantity which must not be put out for wheelie bin collection or disposed of at a facility.
public holiday	refers only to Christmas Day, New Year's Day, Good Friday, and ANZAC Day morning unless otherwise stipulated in contract specifications.
public notice	a notice published in— 1 or more daily newspapers circulating in the region or district of the local authority; or 1 or more other newspapers that have at least an equivalent circulation in that region or district to the daily newspapers circulating in that region or district; and includes any other public notice that the local authority thinks desirable in the circumstances.
recyclable material	a material which can be processed in such a manner that the product can be reused.
residual waste	general solid waste and green waste that cannot be diverted from landfill by reuse or recycling; Does not include hazardous waste, difficult waste, or clean fill.
special waste	hazardous or difficult waste
landfill	a facility for the controlled disposal of solid waste and nominated by the Council for that purpose.
transfer station	a facility at which a receptacle is provided for the collection and storage of waste (and in some instances recyclables) prior to being transferred to landfill or diversion facilities.

Waste Disposal

6 Public litter bins

a) Public litter bins may be provided solely for the disposal of waste generated within public areas.

b) Only litter and recyclables may be put in these bins.

c) General solid waste (household, commercial, industrial, or rural waste), green waste or clean fill are prohibited in public litter bins.

7 Kerbside collection

7.1 Approved containers

a) All waste and recycling for kerbside collection must be fully contained within an approved container.

b) Council will specify the maximum weight permitted within the approved container.

7.2 Waste that is prohibited from kerbside collection

a) The following waste is prohibited from kerbside collection and must not be left at the kerb-

- Hazardous waste and difficult waste
- Waste articles that are too large to fit into the approved containers • Ashes or dusty material unless it is cold and wrapped
- Waste that may damage the collection vehicle.

b) From time to time Council may specify other waste that is prohibited from kerbside collection.

7.3 Recyclable materials

Only approved recyclable materials may be put out for kerbside collection. The Chief Executive of Council will advise by public notice, from time to time, the list of recyclable materials that may be collected.

7.4 Interference with waste for collection

Only authorised collection agents may remove an approved container or its contents when waste has been placed for collection at the kerbside.

7.5 Refusal to collect

a) Council may refuse to collect and dispose of any waste, including recyclables, that does not comply with this bylaw.

7.6 Retrieval of reusable approved container

a) Whether full or empty, approved containers that are reusable, must be removed from the kerbside before 8.30am on the day following the day for collection.

b) Reusable approved containers must be removed by the occupier and the owner of the property from which the reusable approved container came.

7.7 Removal of uncollected waste

Any waste which is not collected because of non-compliance with this bylaw, shall be removed from the roadside by the occupier on the day it was placed for collection.

8 Transfer stations and drop off facilities

8.1 Limits on quantities of waste

a) Council transfer stations and drop off facilities are for the disposal of domestic waste quantities as opposed to commercial or industrial quantities.

b) Council specifies the maximum quantity of waste that may be deposited at a transfer station by any one household.

8.2 Waste that is prohibited at transfer stations and drop off facilities

The following waste is prohibited at transfer stations and drop off facilities and must not be left at a transfer station-

- Hazardous waste and difficult waste
- Vehicle bodies
- Large farm implements
- Fridges or freezers
- Waste articles that are too large to fit into the provided receptacles
- Waste that may damage the collection vehicle.

8.3 Unauthorised removal

Removal of recyclables from a landfill, transfer station or drop off facility by anyone other than the occupier of the property of origin or those authorised by Council to do so, is prohibited.

9 Responsibilities

It is the responsibility of each person using a landfill, transfer station or drop off facility to-

- pay the specified user charge to the site operator, if present
- observe the advice or direction of an operator, if present
- observe the sign posted directions
- not light fires or undertake any action that may lead to a fire on the site
- separate green waste and put it in the place designated for green waste, where that is provided.
- where recyclables are collected, separate and deposit them in the appropriate bins, where bins are also provided
- not disturb or remove any article or material of any kind except with the express approval of the authorised operator at a facility
- not leave waste outside the facility
- abstain from any act which is inconsistent with this bylaw.

10 Authorised operators

Where there is an operator present at a landfill or transfer station, that operator has the authority to collect user charges and instruct site users on best practice use of the facility and to abstain from any act which is inconsistent with this bylaw.

Waste Materials

11 Changes to the types of waste that may be deposited

a) An authorised officer of Council may specify prohibited types of waste from time to time in any of the waste categories given in the schedule to this bylaw.

b) The information will be publicly notified and published on Council's website.

12 Recycling materials

a) An authorised officer of Council will determine which materials are acceptable for reuse or recycling.

b) The information will be publicly notified and published on the Council's website.

c) Details of acceptable materials must be displayed on suitable signs at each facility.

13 Clean fill

The Council may accept specified clean fill at the landfill. Where clean fill is accepted, a sign at the entrance to the site will specify-

- the type and quantity of clean fill accepted
- the schedule of fees.

14 Green waste

a) Green waste may only be deposited at a green waste facility.

b) Only green waste that is approved for disposal may be deposited.

c) An authorised officer of Council will determine which green waste materials are acceptable.

d) The information will be publicly notified and published on the Council's website.

15 Car bodies

a) Car bodies will be accepted for disposal if they comply with disposal requirements.

b) Anyone who wishes to deposit a car body must sign a declaration that the waste complies with the requirements.

c) An authorised officer of Council will determine whether car bodies meet requirements for disposal.

17 Fridges or freezers

a) Fridges and freezers will only be accepted for disposal when they have been degassed.

b) Anyone who wishes to deposit a fridge or freezer must sign a declaration that the waste complies with the requirements.

c) An authorised officer of Council will determine whether fridges and freezers meet the requirements for disposal.

18 Hazardous, difficult, and special waste

Refer to Schedule 1 for waste categories and classifications referred to in this section.

18.1 Special waste

a) No Category C or D waste will be accepted at any Council facility.

b) Hazardous waste (Category A) and difficult waste (Category B) are collectively known as special waste. Council will only accept special waste at the landfill when- ○ a Council permit accompanies it, or ○ the special waste has been specified by an authorised officer of Council.

c) Any person who has, or suspects they have, special waste may apply for a permit authorising its disposal in Council landfill.

d) Permits for special waste disposal will be issued at Council's sole discretion and may have conditions attached.

e) Where Council has permitted the disposal of special waste, the waste must be delivered to and deposited at a landfill in accordance with this bylaw and any provision attached to the permit.

f) Council may seek specialist advice with respect to the granting of, and conditions of, any permit. Any costs incurred in obtaining this specialist advice may be invoiced to the applicant.

g) Council may issue a standing permit for regular disposal of special waste, subject to any conditions or special pre-disposal treatment that is deemed necessary.

h) Council may only issue a standing permit if it can be confident that the classification, contents, and physical properties of the waste will remain unchanged from the application.

i) Council may revoke any such permit or consent held by such person where any person fails to comply with, or does any act or acts in contravention of, any condition, term, restriction, obligation, prohibition, specification or requirement of any permit or consent granted or issued pursuant to this bylaw.

j) Before revoking any permit or consent, Council must give written notice to the holder of the permit or consent of its intention to revoke that permit or consent.

k) Within 5 working days after receipt of any notice given under this section of the Bylaw, the holder of any permit or consent may advise Council that they wish to be heard by Council concerning the intended revocation of the permit or consent.

l) Until Council has considered and made its decision in respect of any contested revocation of a permit or consent, the permit or consent subject to the hearing, must be suspended.

m) The applicant is fully responsible for complying with all conditions of the permit and all costs of compliance.

Penalties and payments

19 Breaches, offences, and penalties

a) Council may apply to the District Court for an injunction to restrain a person from committing a breach of this bylaw.

b) It is an offence to fail to comply with this bylaw.

c) It is an offence to do anything that is in contravention of any provision of this bylaw.

d) It is an offence to do anything that is in contravention of any condition, term, restriction, obligation, prohibition, specification or requirement of any permit or notice granted or issued pursuant to this bylaw.

e) Every person commits an offence who breaches this bylaw and is liable-

   i. on summary conviction to a fine not exceeding $20,000 as set out under section 242 of the Local Government Act 2002; or

   ii. where another enactment specifies the penalty for a breach of the Bylaw, that other penalty.

20 Fees and charges

a) Council may by resolution prescribe fees or charges payable in respect of the use of any facility or service provided for by this bylaw or the processing and consideration of any application of permits made under this bylaw.

b) Any such fees or charges payable must be publicly notified and published in Council's Schedule of Fees and Charges.

c) All costs over and above any application fee for the processing and consideration of any application for a permit under this bylaw (including costs and disbursements incurred in obtaining independent specialist advice) must be paid by the applicant.

d) Council may require a deposit, which may be refunded when the costs incurred by Council are less than the amount of the application fee and deposit paid.

e) Council will not process an application until the application fee and any deposit are paid in full.

Schedule 1 – Waste categories and classification

Terminology refers to untreated waste.

Waste categories

Special Waste

Category A hazardous waste may, at Council's sole discretion, only be accepted at a landfill.

Category B difficult waste may, at Council's sole discretion, only be accepted at a landfill.

Category C and D hazardous waste is prohibited at a Council facility.

Category A - Hazardous waste

Waste that has these characteristics

H6.1	Poisonous substances - Substances or waste, liable either to cause death or serious injury or to harm human health if swallowed or inhaled or by skin contact.
H11	Toxic (delayed or chronic) - Substances or waste which, if they are inhaled or ingested or if they penetrate the skin, may involve delayed or chronic effects, including carcinogenicity.
H12	Ecotoxic - Substances or waste which if released, present or may present immediate or delayed adverse impacts to the environment by means of bioaccumulation and/or toxic effects upon biotic systems.

These types of waste

Y2	Waste from the production and preparation of pharmaceutical products
Y3	Waste pharmaceuticals, drugs, and medicines
Y5	Waste from the manufacture, formulation and use of wood preserving chemicals
Y7	Waste from heat treatment and tempering operations containing cyanides
Y8	Waste mineral oils unfit for their originally intended use
Y9	Waste oils/water, hydrocarbons/water mixtures, emulsions
Y12	Waste from production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish
Y13	Waste from production, formulation and use of resins, latex, plasticisers, glues/adhesives
Y16	Waste from production, formulation and use of photographic chemicals and processing materials
Y17	Waste resulting from surface treatment of metals and plastics

Y18 Residues arising from industrial waste disposal operations

Y46 Hazardous waste collected from households

Y47 Residues arising from the incineration of household waste

Y49 E-waste materials

Waste that contains the following

Y20 Beryllium, beryllium compounds.
Y21 Hexavalent chromium compounds.
Y22 Copper compounds.
Y23 Zinc compounds.
Y24 Arsenic, arsenic compounds.
Y25 Selenium, selenium compounds.
Y26 Cadmium, cadmium compounds.
Y27 Antimony, antimony compounds.
Y28 Tellurium, tellurium compounds.
Y29 Mercury, mercury compounds.
Y30 Thallium, thallium compounds.
Y31 Lead, lead compounds.
Y32 Inorganic fluorine compounds excluding calcium fluoride.
Y36 Asbestos (dust and fibres).
Y37 Organic phosphorous compounds.

Category B - Difficult waste

Waste that is difficult to manage including:

- fish, animal or other putrescible waste
- sludge
- dust
- foam
- hot ashes
- liquids
- documents requiring disposal under special conditions
- timber processing waste
- tree stumps or branches over 150mm diameter
- any other waste which the Council may prescribe as difficult waste.

Fish, animal or other putrescible waste, dust or foam in a quantity that is generated in a typical household in a period of two weeks or less is categorised as normal waste.

Category C - Hazardous waste

Waste with the following characteristics, of the following types or containing the following substances must constitute Category C hazardous waste: **Waste that has these characteristics**

H1 Explosives - An explosive substance or waste is a solid or liquid substance or waste (or mixture of substances or wastes) that is, in itself, capable of chemical reaction of producing gas at such a temperature and pressure, and at such a speed, as to cause damage to the surroundings.

H3 Flammable liquids - The word ‘flammable’ has the same meaning has ‘inflammable’.

Flammable liquids are liquids or mixtures of liquids containing solids in solution or suspension (for example, paints, varnishes, lacquers etc but not including substances or waste otherwise classified because of their dangerous characteristics) which give off a flammable vapour at temperatures of not more than 61°C.

H4.1 Flammable solids - Solids or waste solids, other than those classed as explosives, which under conditions encountered in transport are readily combustible, or may cause or contribute to fire though friction.

H4.2 Substances or waste liable to spontaneous combustion - Substances or waste that are liable to spontaneous heating under normal conditions encountered in transport, or to heating up on contract with air, and then being liable to catch fire.

H4.3 Substances or waste which, in contact with water, emit flammable gases, Substances or waste which by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

H5.1 Oxidising substances - Substance or waste that is not necessarily combustive, but may, generally by yielding oxygen, cause or contribute to the combustion of other materials.

H5.2 Organic peroxides - Organic substances or waste which contain the bivalent O=O structure are thermally unstable substances which may undergo exothermic self- accelerating decomposition.

H6.2 Infectious substances - Substances or waste containing viable micro-organisms or their toxins which are known or suspected to cause disease in animals or humans.

H7 Radioactive material - Spontaneously emits radiation greater than background level. Includes alpha, beta, gamma, x-rays, neutrons, high energy electrons, protons, and other atomic particles.

H8 Corrosives - Substances or waste which, by chemical action, will cause severe damage when in contact with living tissue, or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport. They may also cause other hazards.

H10 Liberation of toxic gases in contact with air or water - Substances or waste which, by interaction with air or water, are liable to give off toxic gases in dangerous quantities.

H13 Capable of yielding another material - Capable, by any means, after disposal of yielding another material, e.g. leachate which possesses any of the characteristics listed above.

These types of waste

Y1 Clinical waste from medical care in hospitals, medical centres and clinics.

Y4 Waste from the production, formulation and use of biocides and phytopharmaceuticals.

Y5 Waste from the manufacture, formulation and use of (pentachlorophenol) wood preserving chemicals.

Y6 Waste from the production, formulation and use of organic solvents.

Y10 Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) polybrominated biphenyls (PBBs).

Y11 Waste tarry residues arising from refining, distillation, and any pyrolytic treatment.

Y14 Waste chemical substances arising from research and development or teaching activities which are not identified and/or are new and whose effects on man and/or the environment are not known.

Y15 Waste of an explosive nature.

Waste containing the following

Y19 Metal carbonyls.
Y33 Inorganic cyanides.
Y34 Acidic solutions or acids in solid form.
Y35 Basic solutions or bases in solid form.
Y38 Organic cyanides.
Y39 Phenols, phenol compounds including chlorophenols.
Y40 Ethers.
Y41 Halogenated organic solvents.
Y42 Organic solvents excluding halogenated solvents.
Y43 Any congener of polychlorinated dibenzo-furan.
Y44 Any congener of polychlorinated dibenzo-p-dioxin.
Y45 Organohalogen compounds other than substances referred to in this appendix (e.g. Y39, Y41, Y42, Y43, Y44).
Y48 Radioactive substances.

Category D – Hazardous waste

This waste includes all classes of hazardous waste not listed in Categories A and C. This waste is only acceptable in hazardous waste containment facilities, and there is no such facility in the Clutha District.

Appendix 5
Landfill Site Plan

(To be updated)

DELTA
THINK.INFRASTRUCTURE

CLUTHA DISTRICT LANDFILLS

INITIAL DATA CAPTURE SURVEY - APRIL 2012

MOUNT COOEE LANDFILL
MONITORING SITES PLAN

Project No.: 12009	Surveyed: DS
Scale: 1:1000	Designed:
Date: APRIL 2012	Drawn: DS
Sheet: MC02	Checked: DH

Survey Services — Surveying Consultants
TL Survey Services Limited
P.O. Box 904 DUNEDIN
Phone (03) 477 1139

Appendix 6

Historical Landfill Development Sequence

DELTA
THINK.INFRASTRUCTURE

No.	Amendments	Drawn	Date

CLUTHA DISTRICT LANDFILLS

INITIAL DATA CAPTURE SURVEY - APRIL 2012

MOUNT COOEE LANDFILL
MONITORING SITES PLAN

Project No.: 12009	Surveyed: DS
Scale: 1:1000	Designed:
Date: APRIL 2012	Drawn: DS
Sheet: MC02	Checked: DH

Survey Services — Surveying Consultants
TL Survey Services Limited
P.O. Box 901 DUNEDIN
Phone (03) 477 1139

Prepared For: DELTA THINK.INFRASTRUCTURE

No.	Amendments	Drawn	Date

CLUTHA DISTRICT LANDFILLS

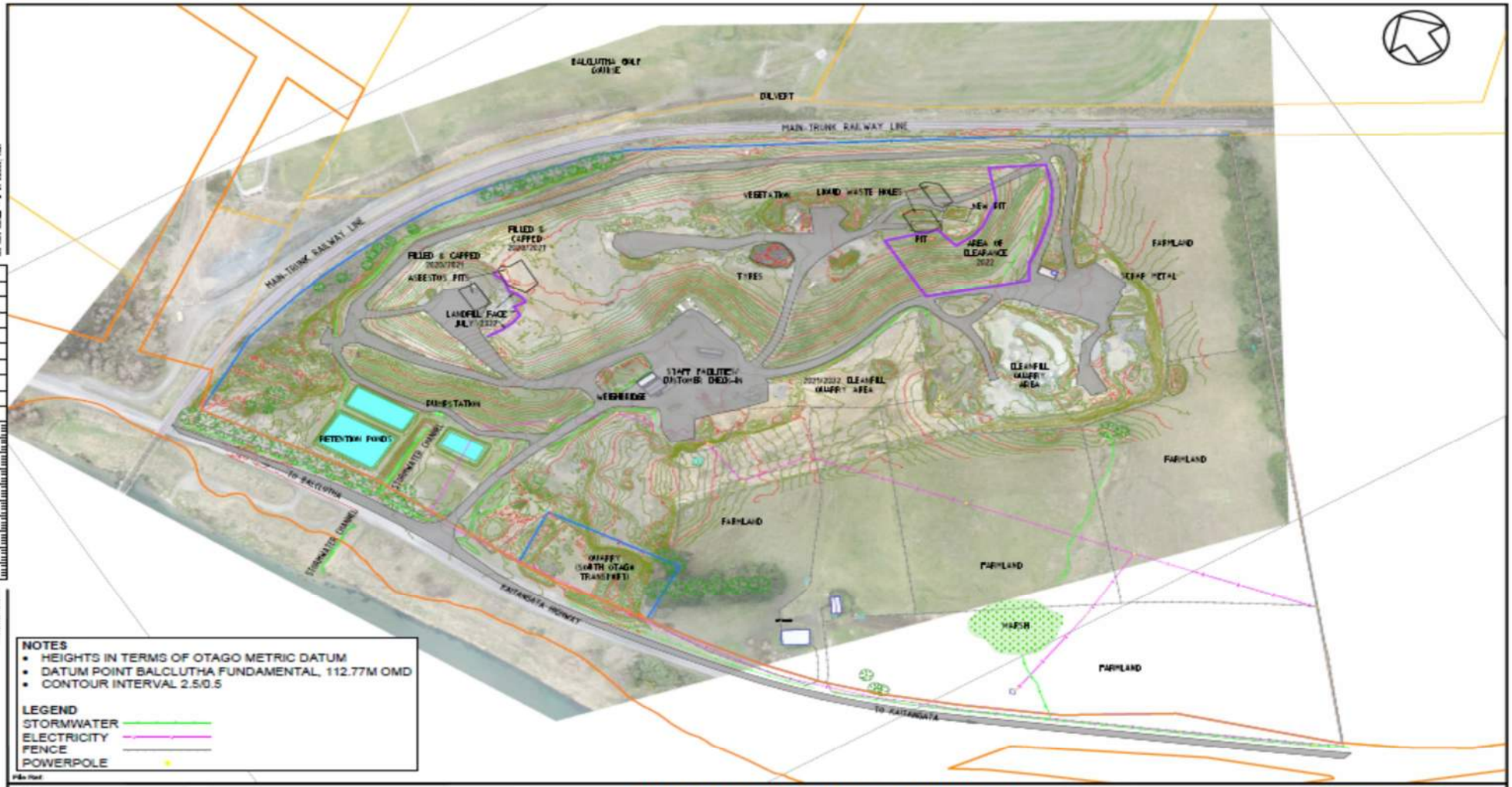
OCTOBER 2014 SURVEY

MOUNT COOEE LANDFILL

PLAN VIEW

Project No.:	14180	Surveyed:	DS
Scale:	1:2000	Designed:	
Date:	OCT 2014	Drawn:	DS
Sheet:	01	Checked:	DH

Survey Services Surveying Consultants
TL Survey Services Limited
P.O. Box 901 DUNEDIN
Phone (03) 477 1133



NOTES

- HEIGHTS IN TERMS OF OTAGO METRIC DATUM
- DATUM POINT BALCLUTHA FUNDAMENTAL, 112.77M OMD
- CONTOUR INTERVAL 2.5/0.5

LEGEND

STORMWATER
ELECTRICITY
FENCE
POWERPOLE

Prepared For: WASTECO NZ LTD

No.	Amendments	Drawn	Date

CLUTHA DISTRICT LANDFILLS

JULY 2022 SURVEY

MOUNT COOEE LANDFILL
PLAN VIEW

Project No.: 22117	Surveyed:
Scale: 1:2000	Designed:
Date: JULY 2022	Drawn: LH
Sheet: 01	Checked: MG

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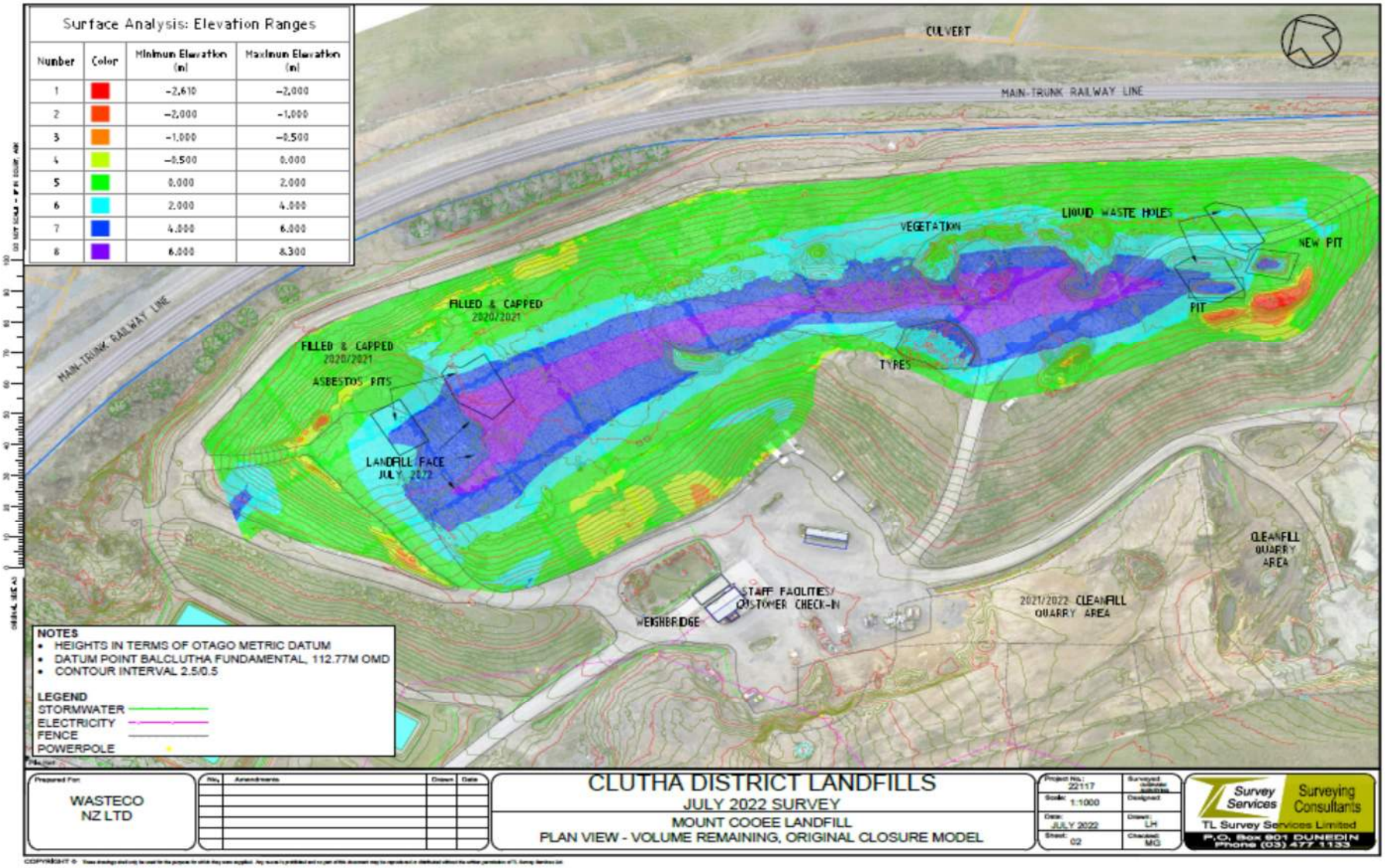

Prepared For: WASTECO NZ LTD

No.	Amendments	Drawn	Date

CLUTHA DISTRICT LANDFILLS

JULY 2022 SURVEY

MOUNT COOEE LANDFILL

PLAN VIEW - VOLUME REMAINING, ORIGINAL CLOSURE MODEL

Project No.: 22117	Surveyed:
Scale: 1:1000	Designed:
Date: JULY 2022	Drawn: LH
Sheet: 02	Checked: MG

Survey Services Surveying Consultants

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