MEMO

To:	Auckland Council	**Date:**	14 January 2019
From:	Sam Ballam – Engineer	**CC:**	
Reviewed:	Sam Jackman – Engineering Manager	**CKL Ref:**	A18188
Re:	Ministry of Education – Orewa North-West Primary School, Sunnyheights Road, Orewa Civil Engineering Design Memo		

1 Introduction

CKL has been engaged by the Ministry of Education (MoE) to undertake the civil engineering design for providing services and access up to the boundary of the proposed Orewa North-West Primary School located at Sunnyheights Road, Orewa (the site).

This site is located on a 2.893 ha portion of land within the Halls Farm residential subdivision being developed by Orewa Developments Ltd (ODL) at 264 West Hoe Heights. Resource and subdivision consent for the underlying Halls Farm residential subdivision was obtained by ODL in 2015 and two stages of that development have recently been completed. The MoE have acquired the subject portion of land from ODL to develop a primary school and are to seek the necessary approvals for the proposal for the change from residential to school use.

The purpose of this memo is to provide further information with respect to the connection of services and access to the proposed Orewa North-West Primary School. It should be noted that as the design and construction of infrastructure within the site are being competed by others, these works have been excluded from this report.

2 Earthworks and Sediment & Erosion Control

2.1 Earthworks

The earthworks for the subject site will be designed and completed by others so are excluded from this application.

2.2 Sediment & Erosion Control

Due to the contour of the existing landform it is anticipated that sediment and erosion controls will be integrated with the neighbouring Halls Farm Stage 2A Development. A control plan for this site has been approved through EPA, refer to drawing S3278-03-230 in Appendix A for information. All controls will be constructed in accordance with Auckland Council Guideline Document 2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region.

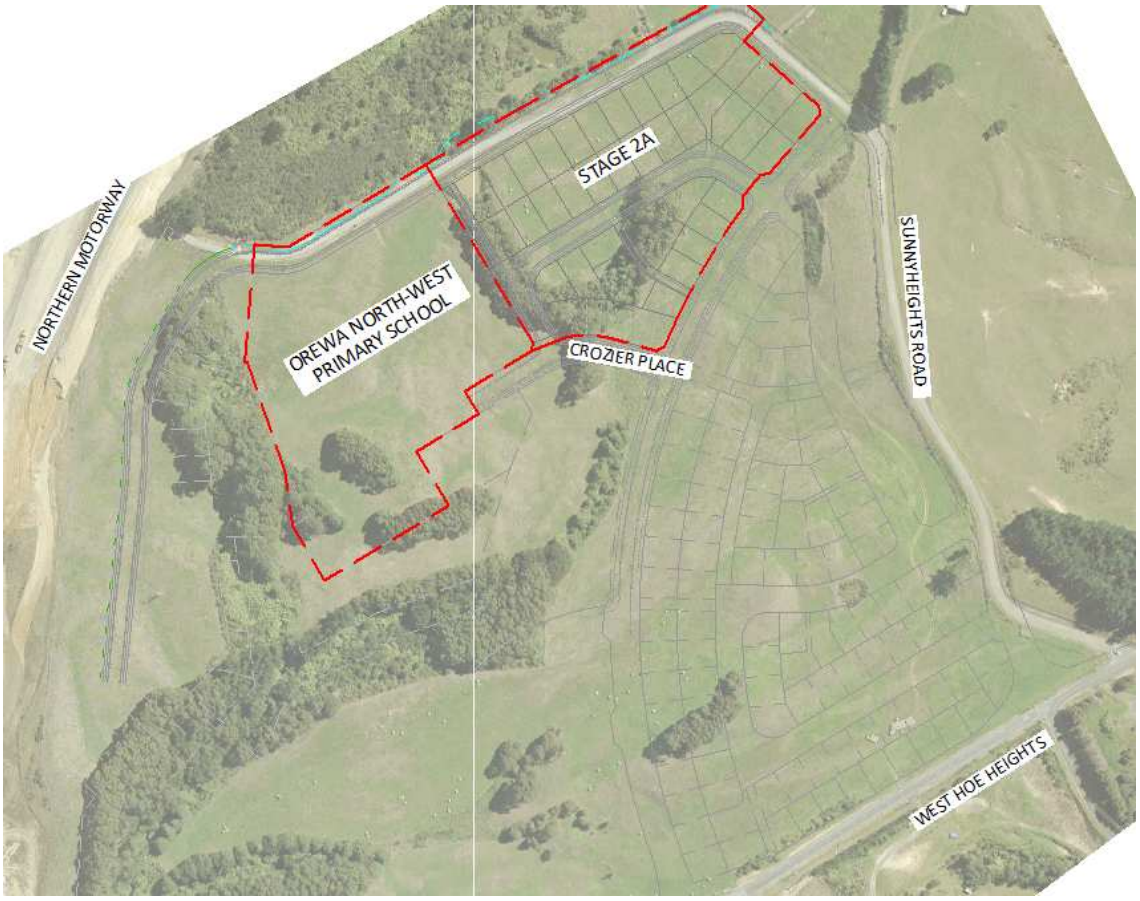
3 Roading and Access

3.1 Road Typologies

Access to the site is via Crozier Place to the south and Sunnyheights Road to the north. The section of Sunnyheights Road over the frontage extents of the subject site will be upgraded as part of the works, as construction of the carriageway east of the site boundary will be completed as part of the approved Halls Farm Stage 2A works. The public road typology proposed for Sunnyheights Road extension has been detailed below:

- 20m legal width road reserve. The carriageway formation will be 8.5m wide, with a 3m wide shared path to be constructed on the southern side. No footpath is proposed on the northern/eastern side of the road, it is anticipated this will be formed by others as part of the future neighbouring developments.

Refer to location diagram below:



3.2 Carparking

With the 8.5m formed carriageway widths on street parking will be provided on all road edges.

3.3 Pavement Design

The proposed roads comprise of the following pavement design, note these pavement structures are a continuation of the design approved for the neighbouring stage of the development. Refer to drawing S3278-02-340 in Appendix A for information.

- Lime/cement stabilised subgrade with 2% lime/cement to min. 250mm deep to provide a minimum CBR strength of 7% overlying natural CBR of 3% (Note: application rate to be confirmed via reactivity testing prior to road construction)
- 250mm compacted depth GAP65 (Manarc or similar approved)
- 180mm compacted depth TNZ M/4 basecourse
- 40mm depth DG10 asphaltic concrete on first coat chipseal (Grade 4 chip)
- The target Benkelman beam deflections on the finished pavement surface is 1.0mm in accordance with ATCOP (Collector Road).

3.4 Street Lighting

The street light configuration along Sunnyheights Road will be a continuation of the design prepared by LDP Ltd which was submitted as part of the neighbouring Stage 2A EPA application. Detailed design for the lighting configuration will be submitted for Engineering Plan Approval in due course.

4 Stormwater Drainage

4.1 Proposed Network

It is expected that all internal stormwater drainage will be private designed in accordance with the NZ Building Code.

An existing 2050mm dia stormwater manhole has been installed in the south-eastern corner of the site has part of the Halls Farm Development, which will allow for future connection and discharge of stormwater from the school site. The existing infrastructure has been sized to accommodate the runoff from the subject site, refer to the stormwater catchment plan on drawing S3278-2A 470 in Appendix A for an illustration. Details of the hydraulic design report have also been included in Appendix B.

Runoff from the site will drain to ‘Wetland A’ (as completed as part of the Halls Farm Stage 1 works) via an existing wingwall structure which were constructed as part of Halls Farm Stage 1. Allowance has also been made for the upstream catchment (north of Sunnyheights Road) using a runoff coefficient of 0.75, the catchment area was calculated based on GIS contours.

Note: Catchments associated with the subject site under the Stage 2A application allowed for residential development. Calculations have been carried out to determine the overall runoff co-efficient for the site, producing a C factor of 0.725.

4.2 Stormwater Management and Overland Flow Paths

Wetland A has been constructed to provide water quality treatment of the road runoff as well as extended detention for the road runoff and developed lots. Overland flowpaths for rainfall events in excess of the 10 year ARI design event i.e. 100 year (1%) ARI events have been accommodated within the design and will be conveyed to Wetland A via the ROW and road alignments.

Calculations for the wetland were provided previously as part of the Stage 1 EPA application. Construction of the wetland is now complete, with final sign off being sought from Healthy Waters (Auckland Council) at the time of reporting.

5 Wastewater Drainage

5.1 Proposed Network

It is proposed to extend the public gravity wastewater system to the site boundary as part of the neighbouring Halls Farm Stage 2A works. The approved EPA plans for this network have been included in Appendix A, refer to drawing S3278-2A 501 for information.

5.2 Flow Estimation

Estimation of peak wastewater flows from the subdivision and potential wider catchment at the northern end of Sunnyheights Road have been carried out based on the following assumptions:

1. Orewa North-West Primary School (700 Students)
2. ODL's development site (98 lots)
3. Potential future subdivision at No. 52 Sunnyheights Road (50 Lots)
4. Potential future subdivision at No. 60 Sunnyheights Road (50 Lots)

The total development allowance was therefore 198 lots with a primary school of 700 students. Based on the receiving catchment, the estimated PDWF and PWWF is 4.04 and 11.40 L/s respectively. Refer attached calculations in Appendix C for further information.

6 Water Supply

6.1 Proposed Network

It is proposed to extend the public water supply network to the site boundary as part of the neighbouring Halls Farm Stage 2A works. The approved EPA plans for this network have been included in Appendix A, refer to drawing S3278-2A-600 for an illustration.

As detailed on the supporting EPA plan set, 100mm (internal diameter) pipes will be provided along both Sunny Heights Road and Crozier Place to enable supply for the subject site. The internal reticulation within the school site will be designed separately and included in a subsequent application.

6.2 Flow Estimation

Based on the proposed school roll (700 students), the estimated peak demand for the gravity network is 0.41 L/s. Refer attached calculations in Appendix D for further information.

An estimate of the flow from the future development has also been undertaken which allows for Stage 4 of Halls Farm to the west. The additional peak flow calculated for this area is 0.66 L/s, with a total peak demand flow of 1.06 L/s.

7 Utility Services

New underground power and telecommunications infrastructure will be extended as part of the neighbouring Stage 2A works to reticulate the site. Service connection points will be installed at the boundary of the school site at the time of those works.

8 Limitations

This report has been prepared solely for the benefit of our client with respect to the particular brief and it may not be relied upon in other contexts for any other purpose without the express approval by CKL. Neither CKL nor any employee or sub-consultant accepts any responsibility with respect to its use, either in full or in part, by any other person or entity. This disclaimer shall apply notwithstanding that the memo/report may be made available to other persons including Council for an application for consent, approval or to fulfil a legal requirement.

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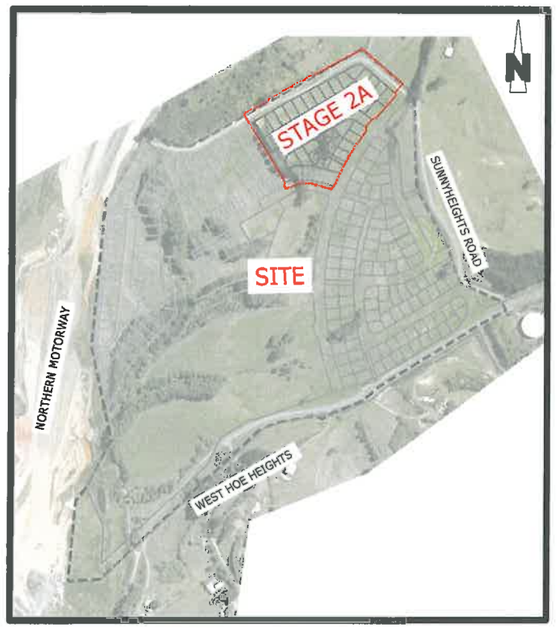
Appendix A

Halls Farm Stage 2A – Approved EPA Plans

OREWA DEVELOPMENTS LTD

HALLS FARM STAGE 2A SUBDIVISION - 264 WEST HOE HEIGHTS, OREWA

CIVIL ENGINEERING DRAWINGS



LOCALITY PLAN
N.T.S.

DRAWING INDEX		ISSUE DATE & REVISION			
Sheet Number	**Sheet Title**	13 MAY 18			
S3278-2A-000	COVER AND INDEX SHEET	-			
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S3278-2A-210	EARTHWORKS FINISHED CONTOURS PLAN	A			
S3278-2A-220	EARTHWORKS ISOPACH PLAN	A			
S3278-2A-230	EROSION AND SEDIMENT CONTROL PLAN	A			
S3278-2A-240	EROSION AND SEDIMENT CONTROL STANDARD DETAILS SHEET1	A			
S3278-2A-241	EROSION AND SEDIMENT CONTROL STANDARD DETAILS SHEET2	A			
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S3278-2A-310	ROADING LONG SECTION SHEET 1 OF 4	A			
S3278-2A-311	ROADING LONG SECTION SHEET 2 OF 4	A			
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S3278-2A-340	ROADING CROSS SECTIONS SHEET 1 OF 2	A			
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S3278-2A-401	STORMWATER LAYOUT PLAN SHEET 1 OF 3	A			
S3278-2A-402	STORMWATER LAYOUT PLAN SHEET 2 OF 3	A			
S3278-2A-403	STORMWATER LAYOUT PLAN SHEET 3 OF 3	A			
S3278-2A-420	STORMWATER LONG SECTION SHEET 1 OF 5	A			
S3278-2A-421	STORMWATER LONG SECTION SHEET 2 OF 5	A			
S3278-2A-422	STORMWATER LONG SECTION SHEET 3 OF 5	A			
S3278-2A-423	STORMWATER LONG SECTION SHEET 4 OF 5	A			
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DRAWING INDEX		ISSUE DATE & REVISION			
Sheet Number	**Sheet Title**	13 MAY 18			
WASTEWATER					
S3278-2A-500	WASTEWATER LAYOUT PLAN OVERALL	A			
S3278-2A-501	WASTEWATER LAYOUT PLAN SHEET 1 OF 3	A			
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S3278-2A-513	WASTEWATER TYPICAL DETAILS SHEET 4 OF 5	A			
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S3278-2A-615	WATERMAIN TYPICAL DETAILS SHEET 6 OF 7	A			
S3278-2A-616	WATERMAIN TYPICAL DETAILS SHEET 7 OF 7	A			

Engineering plans approved
ENG 60325596 12/11/18
Refer covering letter and ensure meeting held with Council's Development Engineer prior to works commencing
Auckland Council

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CKL PROJECT NO: S3278-2A
DATE OF ISSUE: 13 JUNE 2018
ISSUED FOR CONSTRUCTION

SUNNYHEIGHTS ROAD

LOT 608 372m²

LOT 607 248m²

LOT 505 6342m²

LOT 506 22m²

ROW 12

LOT 124 652m²

LOT 123 572m²

LOT 122 580m²

LOT 121 575m²

LOT 120 562m²

LOT 119 549m²

LOT 118 536m²

LOT 117 523m²

LOT 116 510m²

LOT 115 524m²

LOT 114 557m²

LOT 113 511m²

LOT 125 600m²

LOT 126 540m²

LOT 127 540m²

LOT 128 540m²

LOT 129 540m²

LOT 130 540m²

LOT 131 540m²

LOT 132 540m²

LOT 133 532m²

LOT 134 567m²

LOT 112 541m²

LOT 135 572m²

LOT 111 510m²

LOT 136 575m²

LOT 110 563m²

LOT 137 598m²

18.00 LEGAL WIDTH

ROAD 08

LOT 505 4474m²

LOT 143 552m²

LOT 142 624m²

LOT 141 457m²

LOT 609 418m²

LOT 140 578m²

LOT 139 581m²

LOT 144 492m²

LOT 150 525m²

LOT 138 489m²

LOT 149 462m²

LOT 145 471m²

LOT 148 458m²

LOT 147 457m²

LOT 106 2021m²

LOT 146 440m²

ROW 13

CROZIER PLACE

CELESTIAL CRESCENT

Engineering plans approved
ENG 60321562/ 08/18
K.S.
Refer covering letter and ensure meeting held with council's Development Engineer prior to works commencing
Auckland Council

NOTES

1. AREAS AND DIMENSIONS ON THIS PLAN MAY BE SUBJECT TO CHANGE FOLLOWING FINAL FIELD SURVEY.
2. THE COPYRIGHT AND INTELLECTUAL PROPERTY RIGHTS FOR THE INFORMATION SHOWN ON THE PLAN REMAIN THE PROPERTY OF CKL SURVEYS LTD.

LEGEND:

- LOT BOUNDARIES
- FUTURE LOT BOUNDARIES
- EXISTING SITE BOUNDARIES
- PROPOSED EARTHWORKS BOUNDARY

FOR CONSTRUCTION

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Te Awamutu Office
A: 103 Market Street, Te Awamutu
P: 07 871 6144

OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

SCHEME PLAN

Issue	Description	Checked	Date
A	FOR CONSTRUCTION	SB	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08 05.18

Scale: 1:750 (A3 Original)

Job No: S3278-2A | Dwg No: 150 | Rev: A

EARTHWORKS NOTES:

1. ALL WORKS TO COMPLY WITH THE RELEVANT LOCAL AUTHORITY STANDARDS.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE OPERATIONAL PRIOR TO ANY WORKS COMMENCING AND SHALL BE INSTALLED IN ACCORDANCE WITH AC GD005 'EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES'.
3. REFER TO EARTHWORKS SPECIFICATION FOR EARTHFILL REQUIREMENTS AND STANDARDS OF COMPACTION. ALL EARTHWORKS TO BE UNDERTAKEN IN ACCORDANCE WITH GEOTECHNICAL INVESTIGATION REPORT, CONTRACTOR TO VIEW THE REPORT TO INFORM THEMSELVES.
4. ALL MATERIAL DEEMED BY THE ENGINEER TO BE UNSUITABLE SHALL BE EXCAVATED AND REPLACED WITH ENGINEERED FILL.
5. TOPSOIL AND OTHER RELATIVELY DRY ORGANIC MATERIAL THAT CAN BE STRIPPED FROM STEEP AREAS/GULLIES USING EXCAVATOR/TRACTOR AND SCOOP SHALL BE CLASSIFIED AS SUBSOIL/TOPSOIL STRIPPING.
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11. FINAL QUANTITIES AND EXTENT OF EARTHWORKS TO BE DETERMINED BY THE ENGINEER.

Engineering plans approved
ENS 6032/596 21/08/18
R.S.
Prior to starting work and ensure meeting held with Council's Development Engineer prior to works commencing
Auckland Council

LEGEND:
- 60.0 — EXISTING CONTOURS - MAJOR (5.0m)
- 59.0 — EXISTING CONTOURS - MINOR (1.0m)
- STAGE BOUNDARY

FOR CONSTRUCTION

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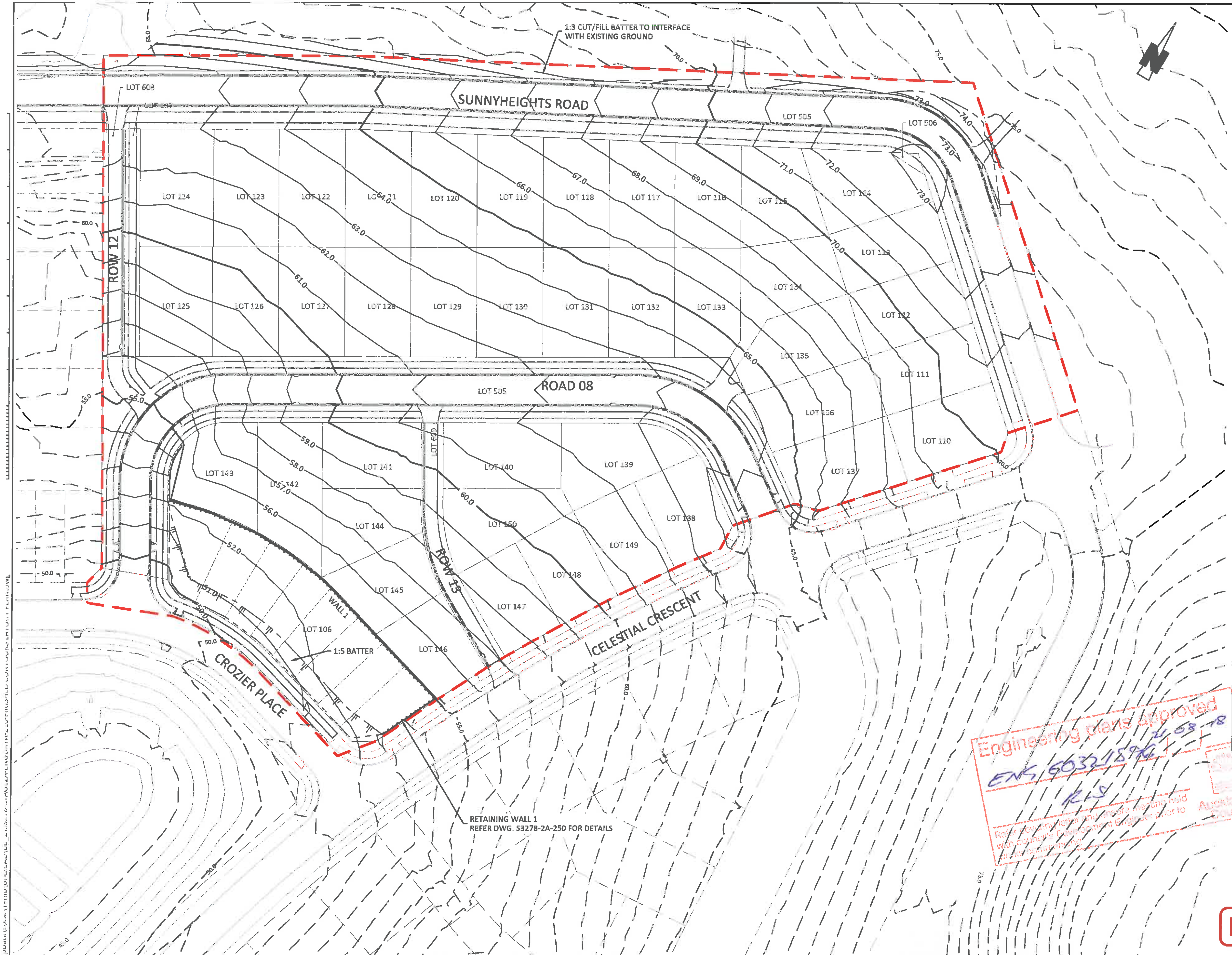
OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

EXISTING CONTOUR LAYOUT PLAN

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:1000 (A3 Original)
Job No: S3278-2A
Dwg No: 200
Rev: A



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EARTHWORKS LEGEND:

- 60.0 — FINISHED GROUND CONTOURS - MAJOR (5.0m)
- 59.0 — FINISHED GROUND CONTOURS - MINOR (1.0m)
- 60.0 — EXISTING CONTOURS - MAJOR (5.0m)
- 59.0 — EXISTING CONTOURS - MINOR (1.0m)
- BERM/BATTER INTERFACE
- STAGE BOUNDARY
- RETAINING WALL
- BATTER STRING

FOR CONSTRUCTION

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FINISHED CONTOUR LAYOUT PLAN

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Job No:	Dwg No:	Rev:
S3278-2A	210	A

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7. UNSUITABLE MATERIAL SHALL BE CLASSIFIED AS SOILS DEEMED BY THE ENGINEER TO HAVE EXCESSIVE NATURAL WATER CONTENT AND/OR ORGANIC CONTENT REQUIRING MULTIPLE HANDLING, DRYING/CONDITIONING AND STOCKPILING/ RESPREADING AS DIRECTED.
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LEGEND:

- -0.25 — ISOPACH CUT CONTOUR 0.25m INTERVAL
- 0.25 — ISOPACH FILL CONTOUR 0.25m INTERVAL
- 0 — ISOPACH CONTOUR - ZERO CUT/FILL
- EARTHWORKS BOUNDARY

Engineering plans approved
ENG 60321596 21/08/18
K.S.
Refer covering letter and engure meeting held with council's Development Engineer prior to works commencing
Auckland Council

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

EARTHWORKS ISOPACH PLAN

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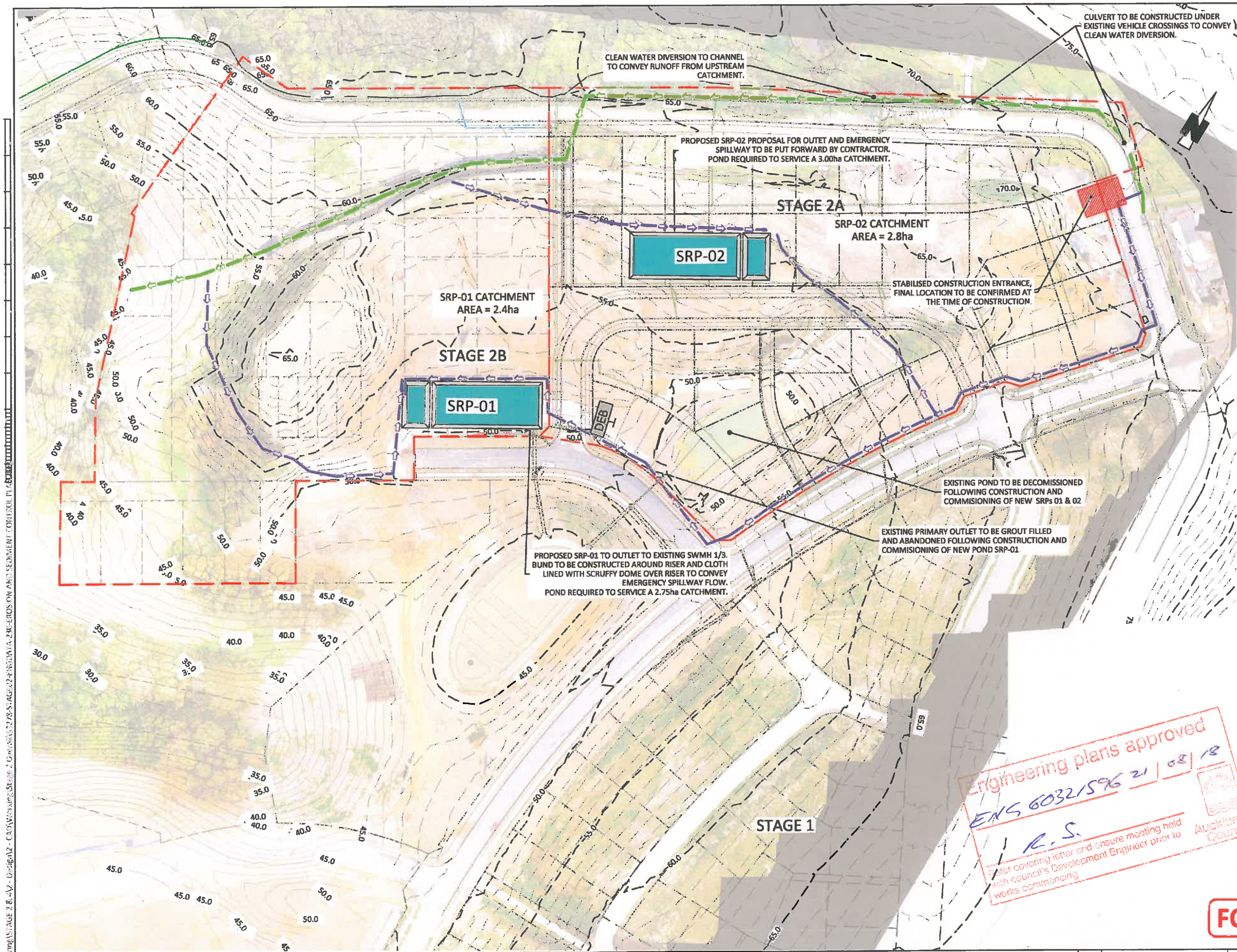

EARTHWORKS NOTES:

1. ALL WORKS TO COMPLY WITH THE RELEVANT LOCAL AUTHORITY STANDARDS.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE OPERATIONAL PRIOR TO ANY WORKS COMMENCING AND SHALL BE INSTALLED IN ACCORDANCE WITH AC GD005 'EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES'.
3. REFER TO EARTHWORKS SPECIFICATION FOR EARTHFILL REQUIREMENTS AND STANDARDS OF COMPACTION. ALL EARTHWORKS TO BE UNDERTAKEN IN ACCORDANCE WITH GEOTECHNICAL INVESTIGATION REPORT, CONTRACTOR TO VIEW THE REPORT TO INFORM THEMSELVES.
4. ALL MATERIAL DEEMED BY THE ENGINEER TO BE UNSUITABLE SHALL BE EXCAVATED AND REPLACED WITH ENGINEERED FILL.
5. TOPSOIL AND OTHER RELATIVELY DRY ORGANIC MATERIAL THAT CAN BE STRIPPED FROM STEEP AREAS/GULLIES USING EXCAVATOR/TRACTOR AND SCOOP SHALL BE CLASSIFIED AS SUBSOIL/TOPSOIL STRIPPING.
6. WET AREAS SHALL BE SURVEYED AFTER CLEARING OPERATIONS (PRIOR TO REMOVAL OF UNSUITABLE) AND THEN AGAIN AFTER UNSUITABLE REMOVAL FOR VOLUMES.
7. THE LOCATIONS OF ALL STOCKPILES ARE WHOLLY THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE LOCATED CLEAR OF ALL EARTHWORKS OPERATIONS AND AWAY FROM GEOTECHNICALLY UNSTABLE LAND. NO PAYMENT SHALL BE MADE FOR RELOCATION OF ANY STOCKPILES THAT HAVE BEEN FOUND TO HAVE BEEN PLACED IN THE INCORRECT LOCATION.
8. ALL SETOUT TO BE UNDERTAKEN BY THE CONTRACTOR.
9. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL SERVICES PRIOR TO ANY EXCAVATION.
10. IT IS THE CONTRACTORS RESPONSIBILITY FOR HEALTH & SAFETY & SECURITY ON SITE, APPROPRIATE FENCING AND SIGNAGE SHALL BE ERECTED AND MAINTAINED AT ALL TIMES TO KEEP THE GENERAL PUBLIC OFF SITE.
11. FINAL QUANTITIES AND EXTENT OF EARTHWORKS TO BE DETERMINED BY THE ENGINEER.
12. ALL SRPs TO BE APPROVED BY THE GEOTECHNICAL ENGINEER FOR STABILITY PRIOR TO CONSTRUCTION.

LEGEND

— 15.0 —	EXISTING CONTOURS
	CATCHMENT AREAS
	PROPOSED STAGE
	PERMANENT STREAM
	INTERMITTENT STREAM
	CLEAN WATER DIVERSION
	DIRTY WATER DIVERSION
	SILT FENCE
DEB	DECANTING EARTH BUND
	STABILISED SITE ENTRANCE

CKL
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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2
264 WEST HOE HEIGHTS, OREWA

EROSION AND SEDIMENT CONTROL PLAN PHASE 1

Issue	Description	Checked	Date
A	ISSUED FOR TENDER	SB	15.08.18

		Date
Designed:	SB	08.05.18
Drawn:	GN	25.07.18
Checked:	SJ	30.07.18

Scale: 1:1500 (A3 Original)

Job No:	Dwg No:	Rev:
S3278-02	230	A

CLEAN WATER DIVERSION TO CHANNEL TO CONVEY RUNOFF FROM UPSTREAM CATCHMENT.

CULVERT TO BE CONSTRUCTED UNDER EXISTING VEHICLE CROSSINGS TO CONVEY CLEAN WATER DIVERSION.

STAGE 2A

SRP-01 CATCHMENT AREA = 2.75ha

SRP-03 CATCHMENT AREA = 3.2ha

STABILISED CONSTRUCTION ENTRANCE, FINAL LOCATION TO BE CONFIRMED AT THE TIME OF CONSTRUCTION.

STAGE 2B

SRP-01

DEB

DEB CATCHMENT AREA = 0.2ha

SRP-03

PROPOSED SRP-03 TO OUTLET TO VIA LAY FLAT PIPE. EMERGENCY SPILLWAY TO FLOW TO STREAM. POND REQUIRED TO SERVICE A 3.6ha CATCHMENT.

PROPOSED SRP-01 TO OUTLET TO EXISTING SWMH 1/3. BUND TO BE CONSTRUCTED AROUND RISER AND CLOTH LINED WITH SCRUFFY DOME OVER RISER TO CONVEY EMERGENCY SPILLWAY FLOW. POND REQUIRED TO SERVICE A 2.75ha CATCHMENT.

DEB TO BE CONSTRUCTED TO TREAT RUNOFF FROM AREA BELOW RETAINING WALL.

STAGE 1

EARTHWORKS NOTES:

1. ALL WORKS TO COMPLY WITH THE RELEVANT LOCAL AUTHORITY STANDARDS.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE OPERATIONAL PRIOR TO ANY WORKS COMMENCING AND SHALL BE INSTALLED IN ACCORDANCE WITH AC GD005 'EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES'.
3. REFER TO EARTHWORKS SPECIFICATION FOR EARTHFILL REQUIREMENTS AND STANDARDS OF COMPACTION. ALL EARTHWORKS TO BE UNDERTAKEN IN ACCORDANCE WITH GEOTECHNICAL INVESTIGATION REPORT, CONTRACTOR TO VIEW THE REPORT TO INFORM THEMSELVES.
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8. ALL SETOUT TO BE UNDERTAKEN BY THE CONTRACTOR.
9. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL SERVICES PRIOR TO ANY EXCAVATION.
10. IT IS THE CONTRACTORS RESPONSIBILITY FOR HEALTH & SAFETY & SECURITY ON SITE, APPROPRIATE FENCING AND SIGNAGE SHALL BE ERECTED AND MAINTAINED AT ALL TIMES TO KEEP THE GENERAL PUBLIC OFF SITE.
11. FINAL QUANTITIES AND EXTENT OF EARTHWORKS TO BE DETERMINED BY THE ENGINEER.
12. ALL SRPs TO BE APPROVED BY THE GEOTECHNICAL ENGINEER FOR STABILITY PRIOR TO CONSTRUCTION.

LEGEND

- 15.0 — EXISTING CONTOURS
- CATCHMENT AREAS
- PROPOSED STAGE
- PERMANENT STREAM
- INTERMITTENT STREAM
- CLEAN WATER DIVERSION
- DIRTY WATER DIVERSION
- SILT FENCE
- DEB — DECANTING EARTH BUND
- STABILISED SITE ENTRANCE

Engineering plans approved
ENG 60325596 21/08/18
R.S.
Refer covering letter and ensure meeting held with council's Development Engineer prior to works commencing
Auckland Council

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2
264 WEST HOE HEIGHTS, OREWA

EROSION AND SEDIMENT CONTROL PLAN PHASE 2

Issue	Description	Checked	Date
A	ISSUED FOR TENDER	SB	15.08.18

		Date
Designed:	SB	08.05.18
Drawn:	GN	25.07.18
Checked:	SJ	30.07.18

Scale: 1:1500 (A3 Original)
Job No: S3278-02
Dwg No: 231
Rev: A

STABILISED CONSTRUCTION ENTRANCE SPECIFICATIONS:

APPLICATION

USE A STABILISED CONSTRUCTION ENTRANCE AT ALL POINTS OF CONSTRUCTION SITE INGRESS AND EGRESS WITH A CONSTRUCTION PLAN LIMITING TRAFFIC TO THESE ENTRANCES ONLY. THEY ARE PARTICULARLY USEFUL ON SMALL CONSTRUCTION SITES BUT CAN BE UTILISED FOR ALL PROJECTS.

DESIGN:

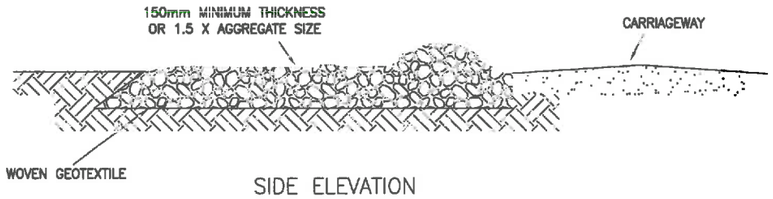
1. CLEAR THE ENTRANCE AND EXIT AREA OF ALL VEGETATION, ROOTS AND OTHER UNSUITABLE MATERIAL AND PROPERLY GRADE IT.
2. LAY WOVEN GEOTEXTILE; PIN DOWN EDGES AND OVERLAP JOINTS.
3. PROVIDE DRAINAGE TO CARRY RUNOFF FROM THE STABILISED CONSTRUCTION ENTRANCE TO A SEDIMENT CONTROL MEASURE.
4. PLACE AGGREGATE TO THE SPECIFICATIONS BELOW AND SMOOTH IT.

STABILISED CONSTRUCTION ENTRANCE AGGREGATE SPECIFICATIONS:

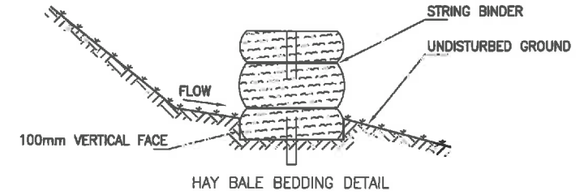
AGGREGATE SIZE	5–150mm WASHED AGGREGATE
THICKNESS	150mm MINIMUM OR 1.5 X AGGREGATE SIZE
LENGTH	10m MINIMUM
WIDTH	4m MINIMUM

MAINTENANCE

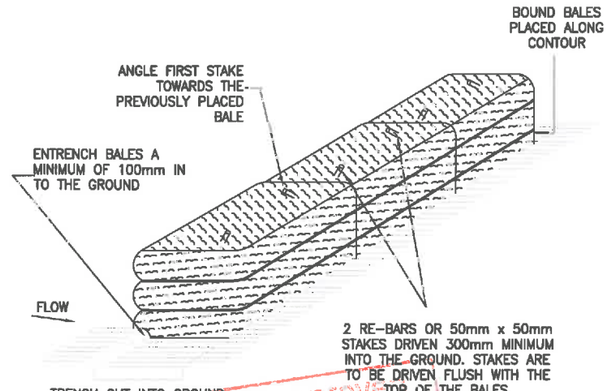
1. MAINTAIN THE STABILISED CONSTRUCTION ENTRANCE IN A CONDITION TO PREVENT SEDIMENT FROM LEAVING THE CONSTRUCTION SITE. AFTER EACH RAINFALL INSPECT ANY STRUCTURE USED TO TRAP SEDIMENT FROM THE STABILISED CONSTRUCTION ENTRANCE AND CLEAN OUT AS NECESSARY.
2. WHEN WHEEL WASHING IS ALSO REQUIRED, ENSURE THIS IS DONE ON AN AREA STABILISED WITH AGGREGATE WHICH DRAINS TO AN APPROVED SEDIMENT RETENTION FACILITY.



STABILISED CONSTRUCTION ENTRANCE



HAY BALE BEDDING DETAIL



HAY BALE BARRIER

NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE OPERATIONAL PRIOR TO ANY OTHER WORKS COMMENCING ON SITE. THE CONTRACTOR SHALL ARRANGE FOR AND ATTEND A PRELIMINARY SEDIMENT CONTROL MEETING ON–SITE WITH THE ENGINEER AND THE EW SOIL CONSERVATOR.
2. A COPY OF THE EROSION MANAGEMENT PLAN SHALL BE AVAILABLE ON THE SITE DURING WORK HOURS AND ALL PERSONNEL INVOLVED IN EARTHWORK ACTIVITIES ON THE SITE (INCLUSIVE OF SUB–CONTRACTORS) SHALL BE FAMILIAR WITH THE CONSENT AND PLAN REQUIREMENTS AS THEY RELATE TO EROSION AND SEDIMENT CONTROL.
3. THAT ALL "CLEANWATER" RUNOFF FROM STABILISED SURFACES INCLUDING CATCHMENT AREAS ABOVE THE SITE SHALL BE DIVERTED AWAY FROM EARTHWORK AREAS VIA STABILISED SYSTEM, SO AS TO PREVENT SURFACE EROSION.
4. ALL EROSION AND SEDIMENT CONTROL SHALL COMPLY WITH THE "EROSION AND SEDIMENT CONTROL GUIDELINES FOR LAND DISTURBING ACTIVITIES" ARC TECHNICAL PUBLICATION NO. 90 UPDATED MARCH 1999 AND ANY AMENDMENTS TO THIS DOCUMENT.
5. THE SITES FOR SEDIMENT RETENTION PONDS SHALL BE SELECTED ONSITE BY THE EW OFFICER, THE ENGINEER AND THE CONTRACTOR WITH DUE CONSIDERATION TO THE NATIVE VEGETATION, TOPOGRAPHY AND ANY OTHER SPECIFIC REQUIREMENTS. THE MAIN SILT CONTROL MEASURES FOR THIS SITE ARE:

(I) DIVERSION OF "CLEAN WATER" FROM THE ABOVE CATCHMENTS AROUND THE EARTHWORKS AREA BY MEANS OF DIVERSION DRAINS, AND/OR OTHER APPROVED METHOD.

(II) CONSTRUCTION OF CUT OFF DRAINS, CONTOUR DRAINS AND EARTH BUNDS TO INTERCEPT SILT LADEN WATERS AND DIRECT INTO RETENTION PONDS AND OTHER SEDIMENT CONTROL FACILITIES. CONTOUR DRAINS ARE TO BE SPREAD AT 100m INTERVALS WITH THE SLOPE LIMITED TO 2%

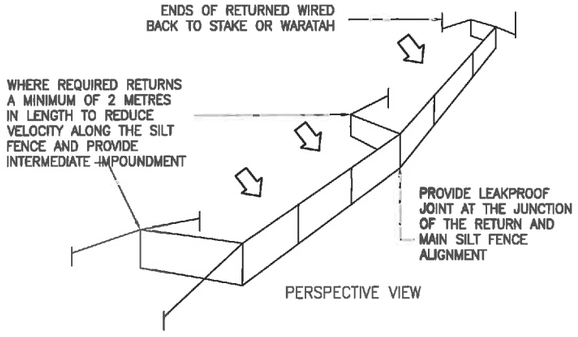
(III) CONSTRUCTION OF SEDIMENT RETENTION POND TO COLLECT SILT FROM (II) ABOVE WITH THE ADDITIONAL TEMPORARY CONSTRUCTION OF HAY BALE BARRIER/SILT FENCES AS REQUIRED.

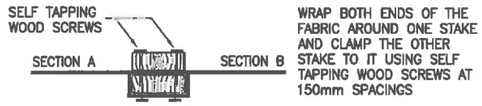
(IV) THAT THE SITE BE STABILISED AGAINST EROSION AS SOON AS PRACTICABLE AND IN A PROGRESSIVE MANNER AS EARTHWORKS ARE FINISHED OVER VARIOUS AREAS OF THE SITE. REVEGETATION IS TO BE COMPLETED BY 30 APRIL IN THE YEAR OF EARTHWORKS CONSTRUCTION, UNLESS A LATER DATE IS APPROVED IN WRITING BY THE AUCKLAND COUNCIL.

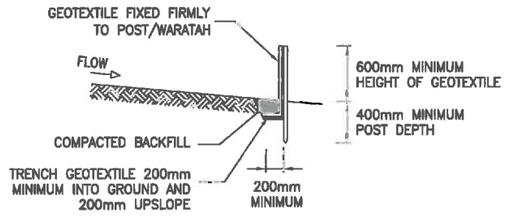
(V) MAINTENANCE OF ALL SEDIMENT CONTROL FACILITIES AS REQUIRED.

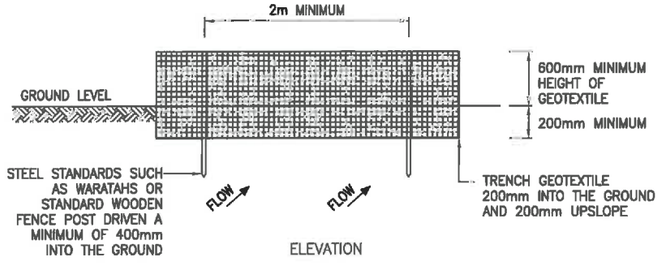
(VI) THE CONTRACTOR SHALL SUBMIT ASBUILTS SHOWING ALL THE APPROPRIATE SEDIMENT CONTROL MEASURES ARE INSTALLED AND IS TO BE SUBMITTED TO THE ARC WITHIN 7 DAYS FOLLOWING THE CONSTRUCTION OF THE CONTROLS.

6. FURTHER SEDIMENT CONTROL WORKS MAY BE REQUIRED BY THE ENGINEER AS THE PROJECT ADVANCES. THESE WILL BE INSTALLED AS AND WHERE DIRECTED BY THE ENGINEER. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ENSURING THAT THE SITE HAS EFFECTIVE SILT DETENTION FACILITIES OPERATING AT ALL TIMES.







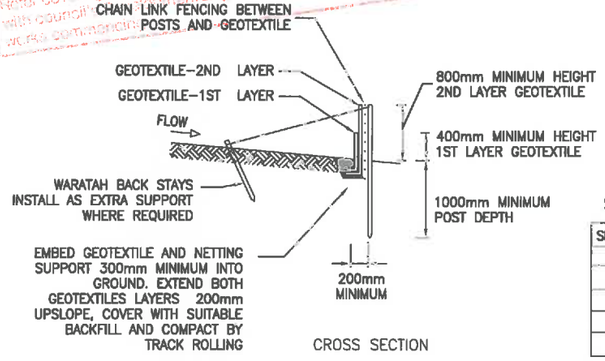


SILT FENCE DESIGN CRITERIA:

SLOPE STEEPNESS %	SLOPE LENGTH (m) (MAXIMUM)	SPACING OF RETURNS (m)
< 2%	N/A	UNLIMITED
2–10%	40	60
10–20%	30	50
20–33%	20	40
33–50%	15	30
>50%	6	20

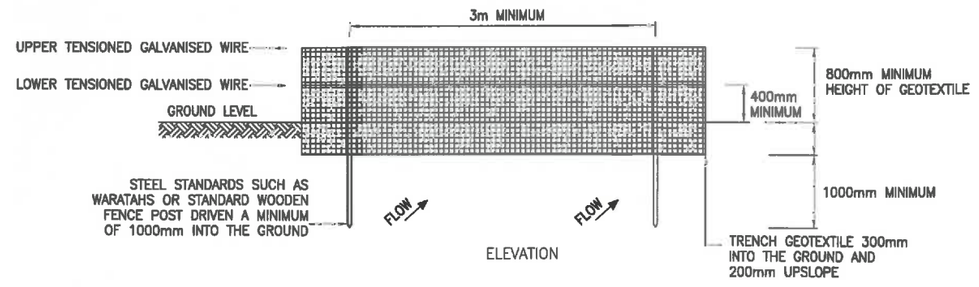
GRAB TENSILE STRENGTH: >440N (ASTM D4632)
TENSILE MODULUS: 0.140 pa (MINIMUM)
APPARENT OPENING SIZE: 0.1–0.5mm (ASTM D4751)

SILT FENCE CONSTRUCTION



SUPER SILT FENCE DESIGN CRITERIA:

SLOPE STEEPNESS %	SLOPE LENGTH (m) (MAXIMUM)	SPACING OF RETURNS (m)
0–10%	UNLIMITED	60
10–20%	60	50
20–33%	30	40
33–50%	30	30
>50%	15	20



SUPER SILT FENCE CONSTRUCTION

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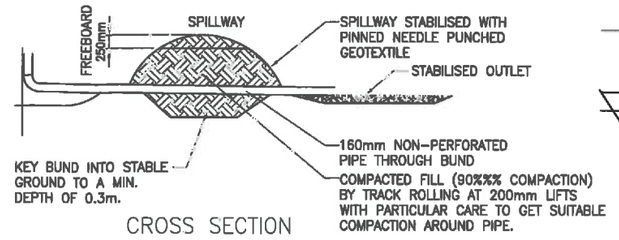
OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

EROSION & SEDIMENT CONTROL STANDARD DETAILS SHEET 1

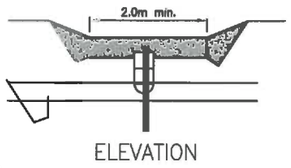
Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

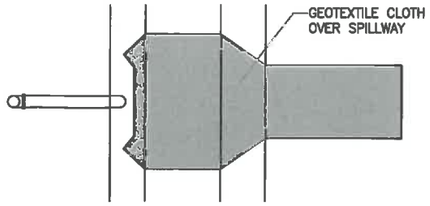
Scale: NOT TO SCALE (A3 Original)
Job No: S3278-2A
Dwg No: 240
Rev: A



CROSS SECTION



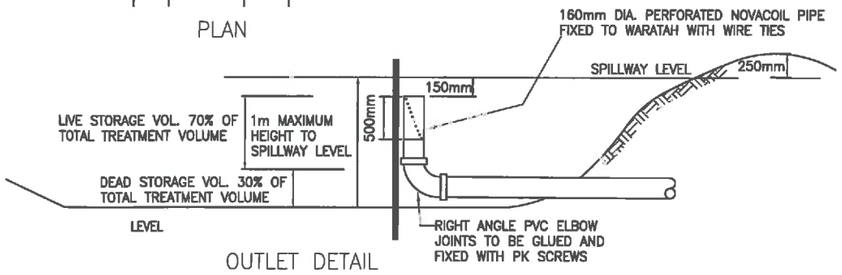
ELEVATION



PLAN

DECANTING EARTH BUND

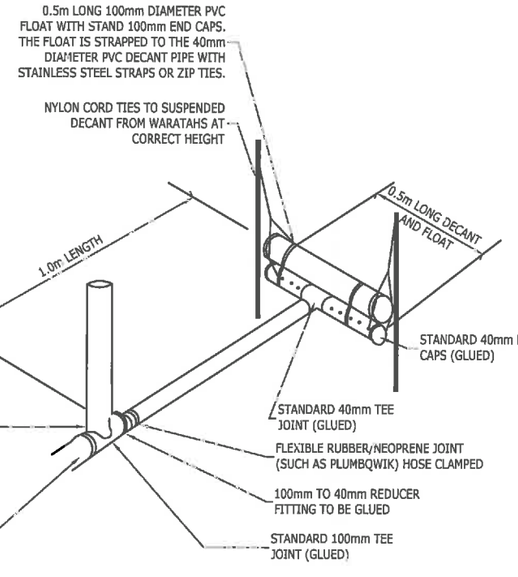
MAXIMUM CATCHMENT 0.3ha
2% VOLUME (80m[3] PER 0.3ha CATCHMENT)



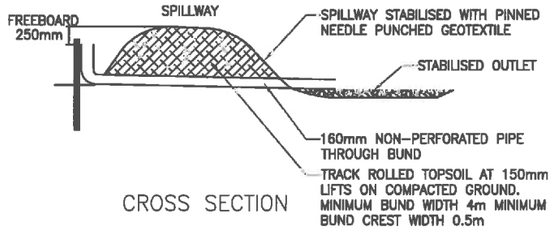
OUTLET DETAIL

NOTE: THE 100mm DIAMETER PVC PIPE UPSTAND IS ONLY REQUIRED WHERE THE 2m WIDE EMERGENCY SPILLWAY DISCHARGES TO VULNERABLE AREA OR WHERE THE DISCHARGE IS REQUIRED TO BE PIPED TO A SAFE OUTFALL SUCH AS A STORMWATER MANHOLE. IF THE UPSTAND IS NOT REQUIRED THE DECANT CAN BE CONNECTED DIRECT TO A 40mm DIAMETER OUTFALL PIPE AND THE TREATMENT VOLUME IS MEASURED TO THE INVERT OF THE EMERGENCY SPILLWAY.

NOTE: THE DECANT HAS A 40mm DIAMETER PVC PIPE WITH A 1.3m LONG ARM (INCLUDING FLEXIBLE JOINT), A 0.5m LONG DECANT AND 20 x 10mm DIAMETER EQUALLY SPACED HOLES POSITIONED HORIZONTALLY AT 10 AND 2 OCLOCK



40mm DECANT WITH UPSTAND FOR DECANTING EARTH BUND



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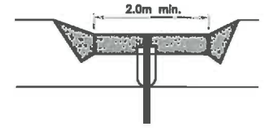
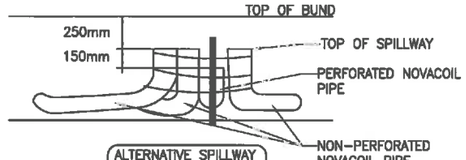
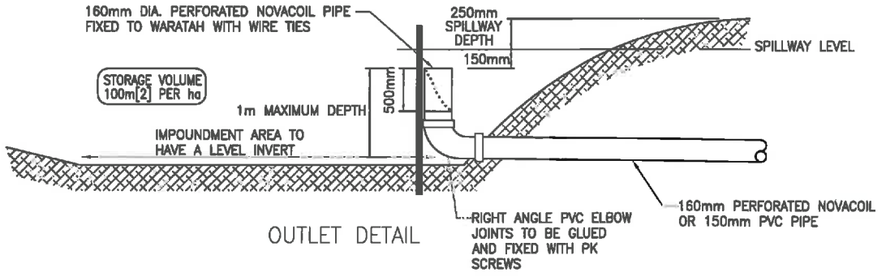


ELEVATION

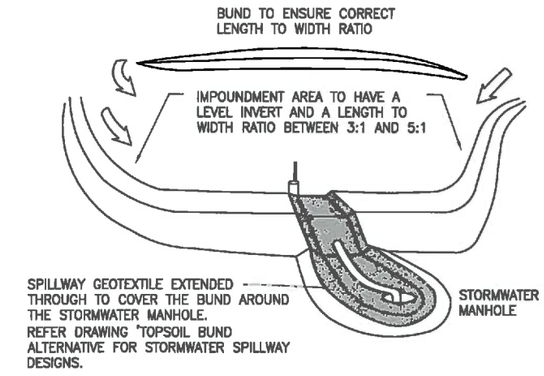


1% DECANTING TOPSOIL BUND

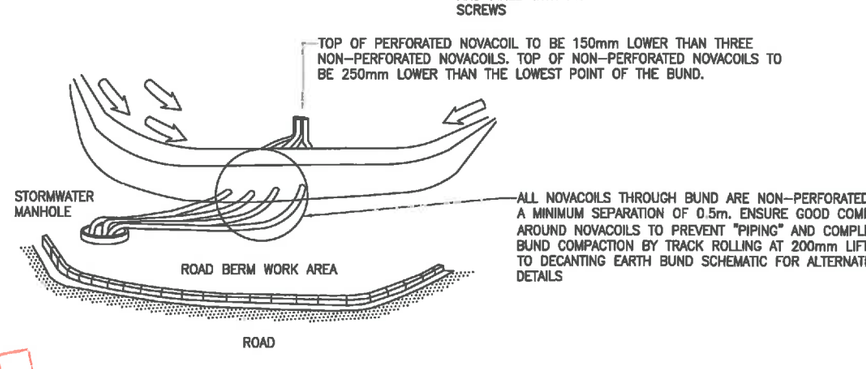
MAXIMUM CATCHMENT IS 1ha IF THE MAXIMUM SLOPE IS LESS THAN 10% AND THE SLOPE LENGTH IS LESS THAN 200m OTHERWISE THE MAXIMUM CATCHMENT IS 0.3ha. DECANTING TOPSOIL BUNDS ARE ONLY TO BE USED FOR TOPSOILED/STABILISED CATCHMENTS.



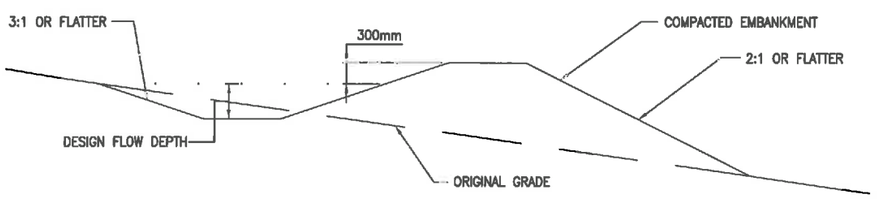
OUTLET DETAIL



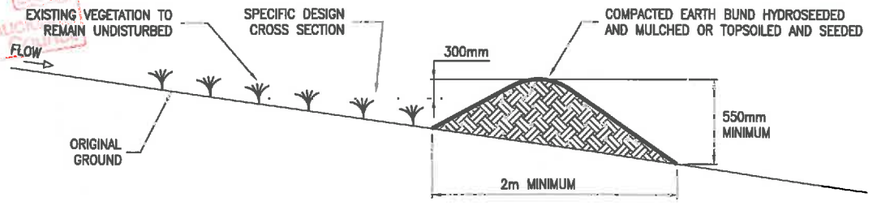
DECANTING EARTH BUND



DECANTING TOPSOIL BUND



RUNOFF DIVERSION BUND – CROSS SECTION



CLEANWATER RUNOFF DIVERSION BUND – CROSS SECTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

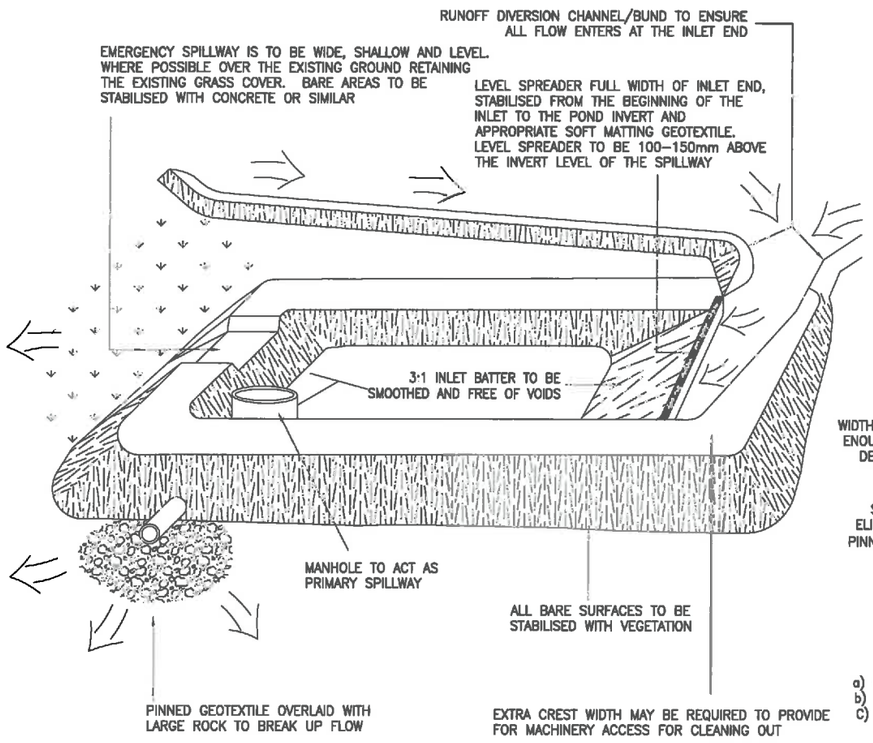
SEDIMENT & EROSION CONTROL STANDARD DETAILS SHEET 2

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

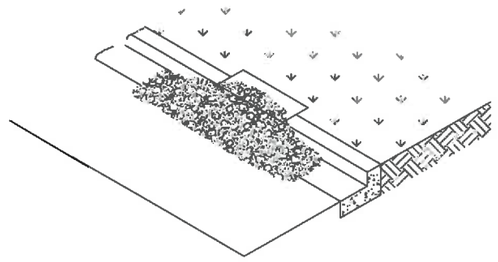
		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NOT TO SCALE (A3 Original)

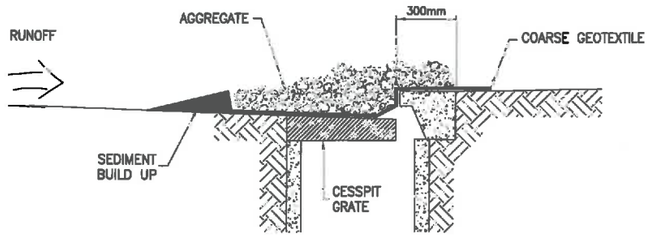
Job No: S3278-2A | Dwg No: 241 | Rev: A



SEDIMENT RETENTION POND

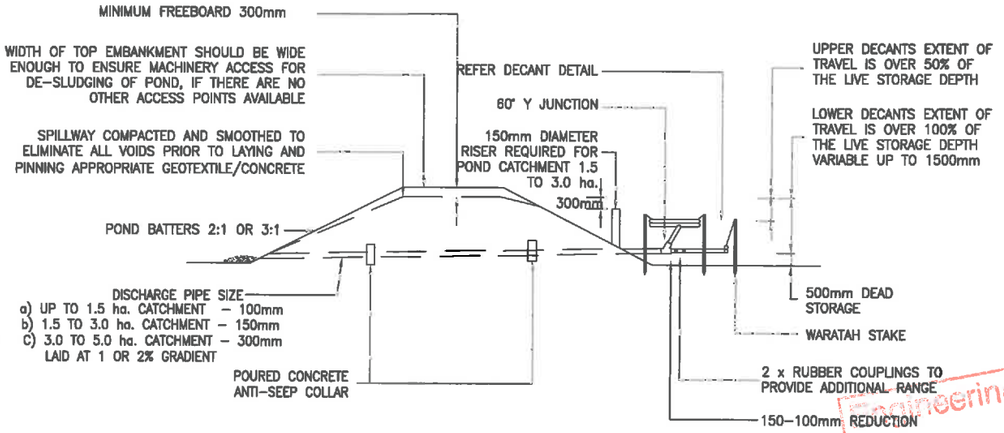


PERSPECTIVE VIEW

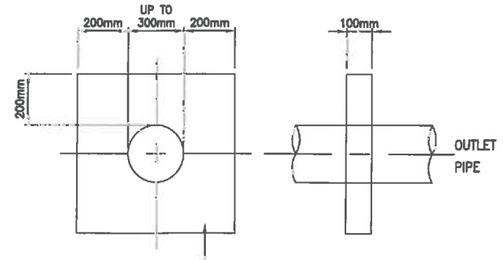


CROSS SECTION

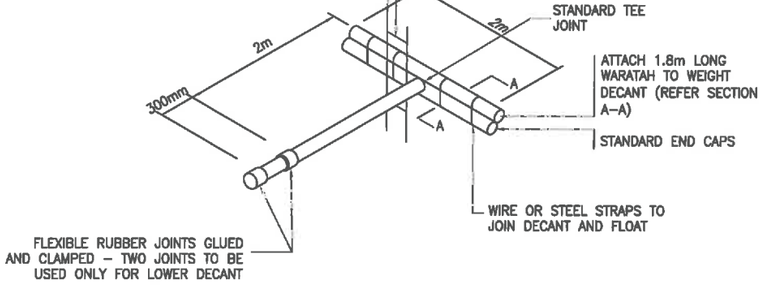
STORMWATER INLET PROTECTION – FILTER MEDIA DESIGN

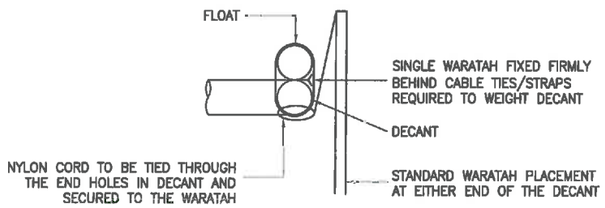


TYPICAL CROSS SECTION
1.5 – 3.0 CATCHMENT



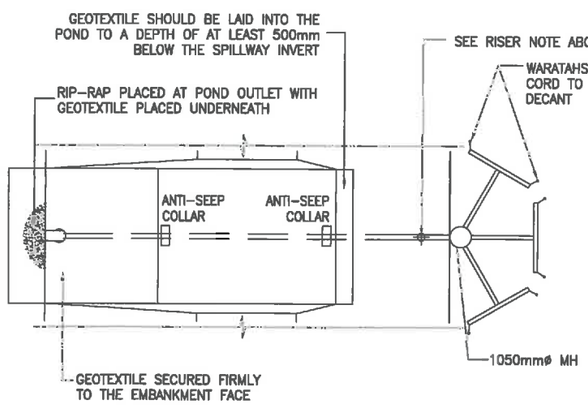
ANTI–SEEP COLLAR





SECTION A–A

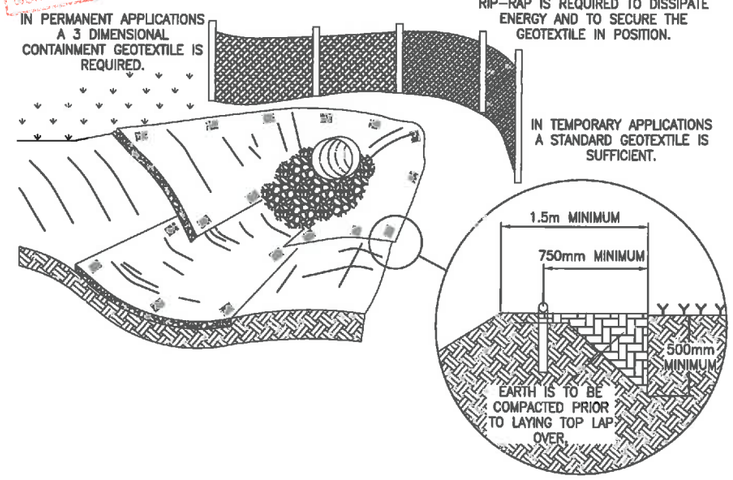
SEDIMENT RETENTION POND – DECANT DETAIL



TYPICAL PLAN 3.0–5.0 ha CATCHMENT

SEDIMENT RETENTION POND EMBANKMENT

NUMBER OF DECANTS FOR EACH POND SHALL BE AS FOLLOWS:
i) UP TO 1.5ha CATCHMENT – 1 DECANT
ii) 1.5–3.0ha CATCHMENT – 2 DECANTS
iii) 3 TO 5 ha CATCHMENT – 3 DECANTS–CONNECTED TO 1050 ø MH



GEOTEXTILE AT CULVERT OUTLET

INFORMATION FROM AUCKLAND REGIONAL COUNCIL TP10–EROSION & SEDIMENT CONTROL

CKL
Planning | Surveying | Engineering | Environmental
Auckland Office:
A: 25 Broadway, Newmarket
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Hamilton Office
A: 58 Church Road, Hamilton
P: 07 849 9921
Te Awamutu Office
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P: 07 871 6144

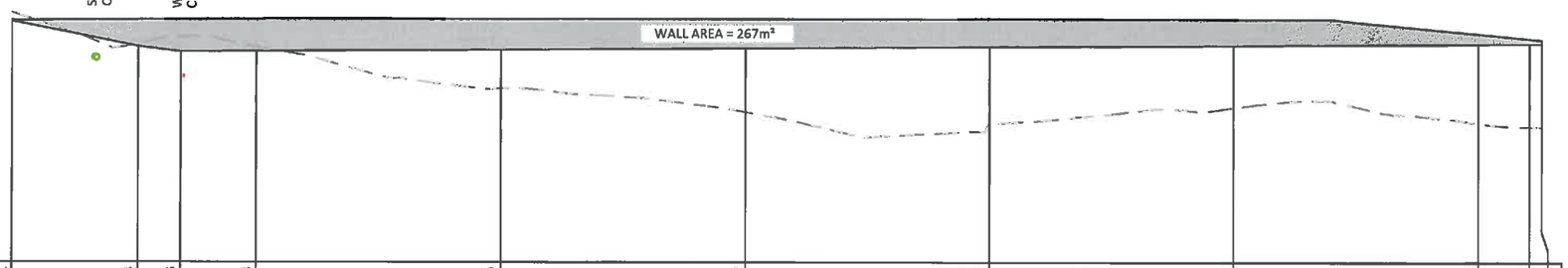
OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

EROSION & SEDIMENT CONTROL STANDARD DETAILS SHEET 3

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

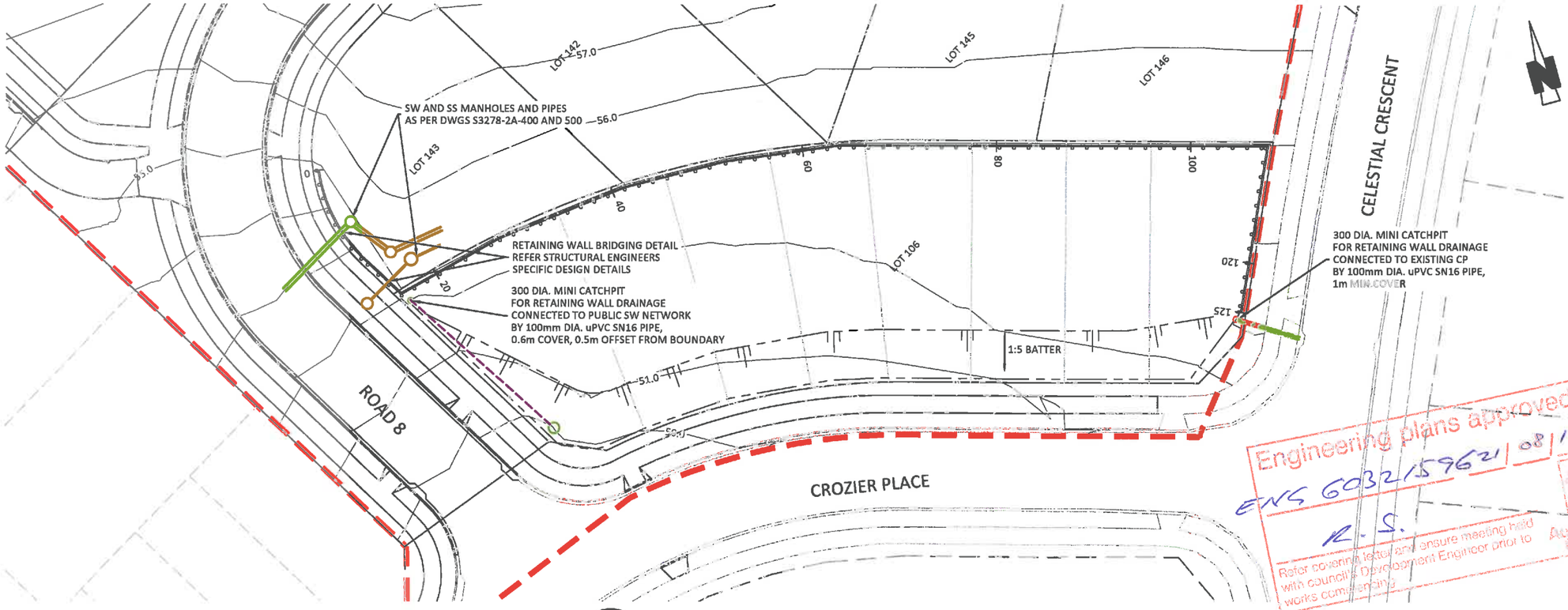
Scale: NOT TO SCALE (A3 Original)
Job No: S3278-2A
Dwg No: 242
Rev: A



DATUM R.L. = 35.00

TOP OF WALL	54.91	54.94	54.96	54.98	55.00	55.00	55.00	55.00	53.80	53.39	53.29			
RETAINED HEIGHT	0.10	2.21	2.66	2.65	2.54	2.41	2.28	2.16	0.82	0.39	0.29			
BOTTOM OF WALL	54.81	52.73	52.29	52.33	52.46	52.59	52.72	52.84	52.97	53.00	53.00			
CHAINAGE	0	10.35	13.83	20	40	60	80	100	120	124.19	125.19			

2 / - RETAINING WALL 1 LONG-SECTION
SCALE : 1:500



1 / - RETAINING WALL 1 LAYOUT PLAN
SCALE 1:500

EARTHWORKS NOTES:

1. ALL WORKS TO COMPLY WITH THE RELEVANT LOCAL AUTHORITY STANDARDS.
2. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL NEW AND EXISTING SERVICES BEFORE COMMENCING CONSTRUCTION.
3. ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE OPERATIONAL PRIOR TO ANY WORKS COMMENCING AND SHALL BE INSTALLED IN ACCORDANCE WITH AC GD005 'EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES'.
4. REFER TO EARTHWORKS SPECIFICATION FOR EARTHFILL REQUIREMENTS AND STANDARDS OF COMPACTION. ALL EARTHWORKS TO BE UNDERTAKEN IN ACCORDANCE WITH GEOTECHNICAL INVESTIGATION REPORT, CONTRACTOR TO VIEW THE REPORT TO INFORM THEMSELVES.
5. ALL MATERIAL DEEMED BY THE ENGINEER TO BE UNSUITABLE SHALL BE EXCAVATED AND REPLACED WITH ENGINEERED FILL.
6. TOPSOIL AND OTHER RELATIVELY DRY ORGANIC MATERIAL THAT CAN BE STRIPPED FROM STEEP AREAS/GULLIES USING EXCAVATOR/TRACTOR AND SCOOP SHALL BE CLASSIFIED AS SUBSOIL/TOPSOIL STRIPPING.
7. WET AREAS SHALL BE SURVEYED AFTER CLEARING OPERATIONS (PRIOR TO REMOVAL OF UNSUITABLE) AND THEN AGAIN AFTER UNSUITABLE REMOVAL FOR VOLUMES.
8. THE LOCATIONS OF ALL STOCKPILES ARE WHOLLY THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE LOCATED CLEAR OF ALL EARTHWORKS OPERATIONS AND AWAY FROM GEOTECHNICALLY UNSTABLE LAND. NO PAYMENT SHALL BE MADE FOR RELOCATION OF ANY STOCKPILES THAT HAVE BEEN FOUND TO HAVE BEEN PLACED IN THE INCORRECT LOCATION.
9. ALL SETOUT TO BE UNDERTAKEN BY THE CONTRACTOR.
10. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL SERVICES PRIOR TO ANY EXCAVATION.
11. IT IS THE CONTRACTORS RESPONSIBILITY FOR HEALTH & SAFETY & SECURITY ON SITE, APPROPRIATE FENCING AND SIGNAGE SHALL BE ERECTED AND MAINTAINED AT ALL TIMES TO KEEP THE GENERAL PUBLIC OFF SITE.
12. FINAL QUANTITIES AND EXTENT OF EARTHWORKS TO BE DETERMINED BY THE ENGINEER.

LEGEND:

- EXISTING GROUND LINE
- TOP/BOTTOM OF RETAINING WALL
- STAGE BOUNDARY
- SW (PUBLIC)
- SW (PRIVATE)
- WW (PUBLIC)
- RETAINING WALL
- BATTER STRING

Engineering plans approved
ENG 6032/59621/08/18
R. S.
Refer covering letter and ensure meeting held with council's Development Engineer prior to works commencing
Auckland Council

FOR CONSTRUCTION

CKL
Planning | Surveying | Engineering | Environmental

Auckland Office:
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Hamilton Office
A: 58 Church Road, Hamilton
P: 07 849 9921
Te Awamutu Office
A: 103 Market Street, Te Awamutu
P: 07 871 6144

OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

RETAINING WALL 1
LAYOUT PLAN
AND LONG SECTION

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: AS NOTED (A3 Original)
Job No: S3278-2A
Dwg No: 250
Rev: A

ROADING AND PAVEMENT NOTES:

1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH AUCKLAND COUNCIL AND AUCKLAND TRANSPORT (ATCOP) ENGINEERING STANDARDS.
2. ALL EXTRUDED/INSITU CONCRETE TO BE MIN. 20 MPa STRENGTH AT 28 DAYS.
3. ALL UNDERCHANNEL DRAINS TO BE LAID IN TNZ F/2 DRAINAGE MATERIAL AND HAVE FREE-FLOWING OUTLET TO NEAREST DOWNSTREAM CATCHPIT.
4. ALL FOOTPATHS TO COMPRISE 100mm THICK 20MPa BROOM FINISH CONCRETE ON MIN. 100mm COMPACTED DEPTH GAP40 BASECOURSE.
5. ALL REINFORCING SHALL BE PLACED ON APPROVED CHAIRS AND IS TO BE PLACED CENTRALLY OR AS PER DESIGN PLANS.
6. ALL FOOTPATH SAWCUTS ARE TO COINCIDE WITH KERB SAWCUTS AT 3m CRS TYP. UNLESS NOTED OTHERWISE.
7. PAVEMENT DESIGN IS PROVISIONAL ONLY AND INSITU SUBGRADE STRENGTH SHALL BE CONFIRMED VIA SCALA PENETROMETER TESTING FOLLOWING GULLETTING OF THE CARRIAGEWAYS TO CONFIRM FINAL PAVEMENT THICKNESS AND ANY SUBGRADE IMPROVEMENT WORKS i.e. UNDERCUTTING OR STABILISATION. THE ENGINEER IS TO INSPECT, TEST AND APPROVE ALL SUBGRADES PRIOR TO AGGREGATE PLACEMENT.
8. ALL SUBGRADES SHALL BE TRIMMED WITHIN +/- 10mm TOLERANCE TO DESIGN LEVELS AND SHALL BE STRUNG AND APPROVED PRIOR TO METAL COURSE PLACEMENT.

LEGEND:

- PROPOSED LOT BOUNDARY
- PROPOSED ROAD CENTERLINE
- PROPOSED RETAINING WALL
- STANDARD 675mm x 450mm CATCHPIT
- PRAM CROSSING
- FOOTPATH
- ROAD
- BERM
- PLANTED BATTER
- GRASSED BATTER

Engineering plans approved
ENG 60321596 12/11/18
Refer covering letter and ensure meeting held with Council's Development Engineer prior to works commencing.

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

ROADING LAYOUT
OVERALL PLAN

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:1000 (A3 Original)

Job No: S3278-2A | Dwg No: 300 | Rev: A

CREST ELEV 71.86m
CREST CH 454.78m

VIP R.L. 71.97
VIP CH 471.64m
50.00m V.C.
K = 16.29

R.L. 71.84
VTP CH 446.64

R.L. 71.33
VTP CH 496.64

SAG R.L. 70.39m
SAG CH 540.42m

VIP R.L. 69.94
VIP CH 550.77m
50.00m V.C.
K = 5.7

R.L. 70.58
VTP CH 525.77

R.L. 71.49
VTP CH 575.77

CREST ELEV 73.01m
CREST CH 622.12m

VIP R.L. 74.42
VIP CH 623.17m
88.90m V.C.
K = 7

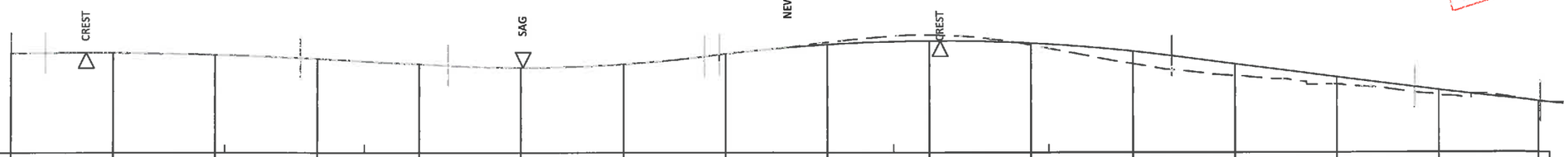
R.L. 71.67
VTP CH 578.72

R.L. 71.54
VTP CH 667.62

VIP R.L. 67.63
VIP CH 727.73m
25.20m V.C.
K = 15

R.L. 68.45
VTP CH 715.13

NEW CARRIAGEWAY TO TIE IN WITH EXISTING FORMATION



DATUM R.L. = 62.0

DESIGN GRADE		0.50%				-2.57%					6.20%				-6.50%				-4.82%			
DESIGN SURFACE LEVEL	72.82	72.85	72.67	72.24	70.73	70.39	70.75	71.75	72.66	73.01	72.79	71.99	70.73	69.43	68.14	67.04						
EXISTING SURFACE LEVEL	72.82	72.86	72.67	72.44	70.73	70.39	70.73	71.75	72.88	73.61	72.59	70.75	69.57	68.7	67.65	67.01						
CUT/FILL DEPTH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.21	-0.6	0.2	1.24	1.16	0.73	0.49	0.03						
CHAINAGE (m)	440	460	480	500	520	540	560	580	600	620	640	660	680	700	720	740						

LONG SECTION SUNNYHEIGHTS ROAD

HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:500

FOR CONSTRUCTION

CKL
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P: 07 871 6144

OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

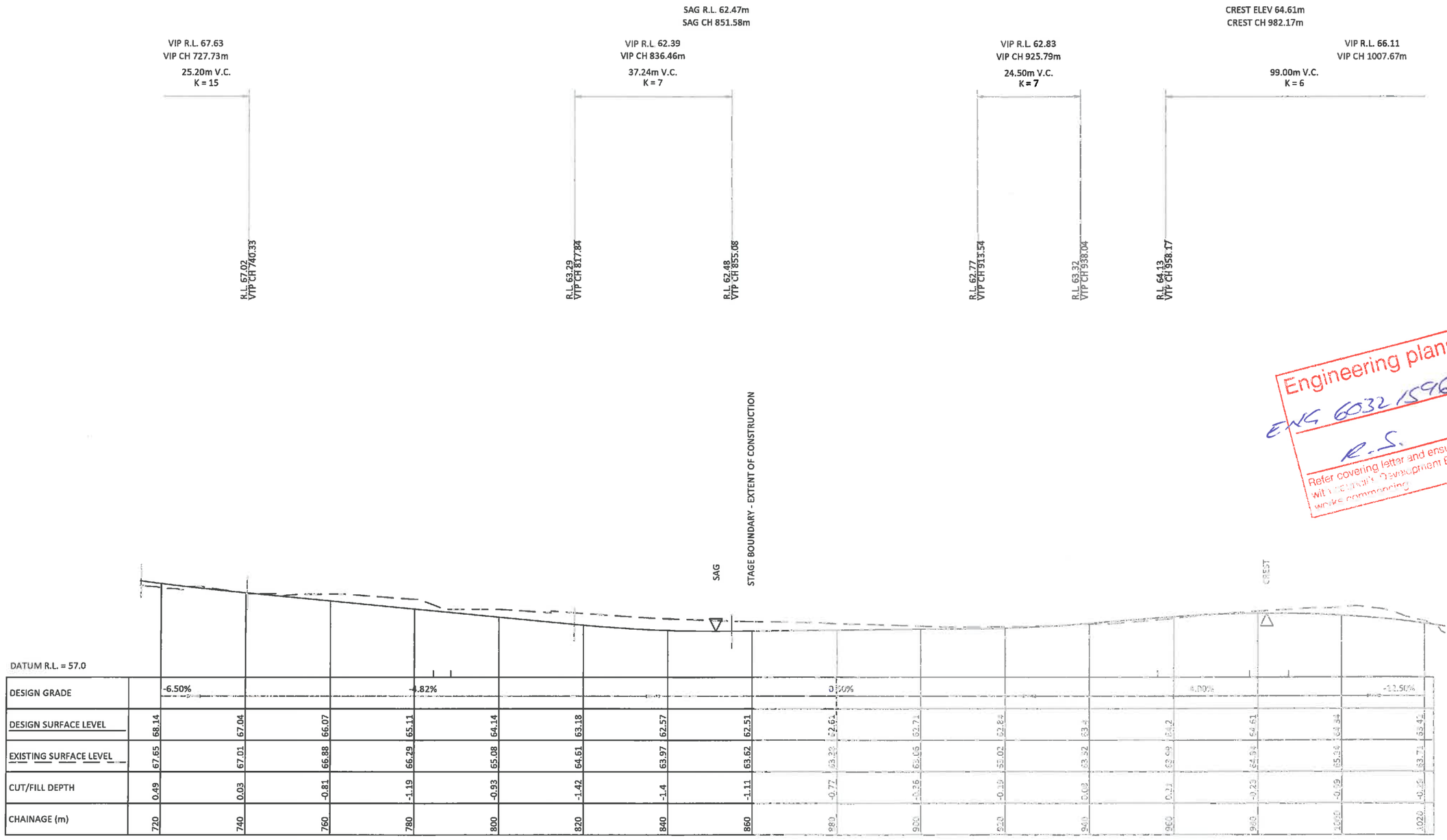
ROADING
LONG SECTION PLAN
SHEET 1 OF 4

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: AS SHOWN (A3 Original)

Job No: S3278-2A
Dwg No: 310
Rev: A



LONG SECTION SUNNYHEIGHTS ROAD CONT.
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:500

Engineering plans approved
ENG 6032/596 12/11/18
R.S.
Refer covering letter and ensure meeting held with Council's Development Engineer prior to works commencing

FOR CONSTRUCTION

CKL
Planning | Surveying | Engineering | Environmental

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

ROADING
LONG SECTION PLAN
SHEET 2 OF 4

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: AS SHOWN (A3 Original)
Job No: S3278-2A
Dwg No: 311
Rev: A

SAG R.L. 49.4m
SAG CH 3m

VIP R.L. 49.21
VIP CH 10.88m
21.75m V.C.
K = 1.5

R.L. 49.43
VTP CH 0

R.L. 50.57
VTP CH 21.75

VIP R.L. 60.11
VIP CH 98.09m
60.00m V.C.
K = 6.32

R.L. 56.36
VTP CH 68.09

R.L. 61.01
VTP CH 128.09

VIP R.L. 64.38
VIP CH 240.15m
10.50m V.C.
K = 7

R.L. 64.22
VTP CH 234.9

R.L. 64.61
VTP CH 245.4

DATUM R.L. = 44.0

DESIGN GRADE		-2.00%			12.50%						3.00%				4.50%
DESIGN SURFACE LEVEL	49.43	50.36	52.85	55.35	57.74	59.55	60.72	61.37	61.97	62.57	63.17	63.77	64.39	65.07	
EXISTING SURFACE LEVEL	50.3	52.26	53.23	54	55.21	56.83	58.68	58.93	57.15	62.98	64.39	62.4	65.14	64.36	
CUT/FILL DEPTH	-0.87	-1.9	-0.38	1.36	2.53	2.71	2.04	2.44	4.82	-0.41	-1.22	1.38	-0.75	0.71	
CHAINAGE (m)	0	20	40	60	80	100	120	140	160	180	200	220	240	255.66	

LONGSECTION ROAD 08

HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:500

Engineering plans approved
ENG 6032/596 12/11/18
K.S.
Refer covering letter and ensure meeting held with Land Development Engineer prior to works commencing
AUCKLAND COUNCIL

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

ROADING
LONG SECTION PLAN
SHEET 3 OF 4

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: AS SHOWN (A3 Original)

Job No: S3278-2A
Dwg No: 312
Rev: A

SAG R.L. 54.67m
SAG CH 91.57m

VIP R.L. **62.19**
VIP CH 20.06m

15.00m V.C.
K = 1.5

VIP R.L. 55.44 VIP R.L. 54.67
VIP CH 76.3m VIP CH 91.57m

14.00m V.C.
K = 2

R.L. 62.34
VTP CH 12.56

R.L. 61.29
VTP CH 27.56

R.L. 56.28
VTP CH 69.3

R.L. 55.09
VTP CH 83.3

SAG R.L. 61.04m
SAG CH 3.95m

CREST ELEV 61.44m
CREST CH 14.28m

VIP R.L. 61.04
VIP CH 3.95m

VIP R.L. **61.62**
VIP CH 15.53m

12.50m V.C.
K = 1

R.L. 61.31
VTP CH 9.28

R.L. 61.16
VTP CH 21.78

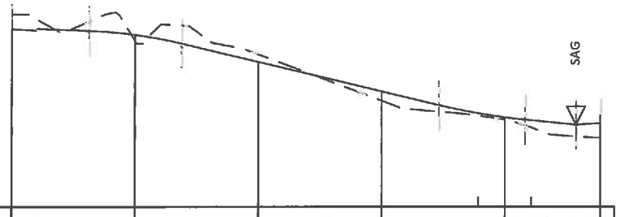
VIP R.L. 56.92
VIP CH 78.23m

3.75m V.C.
K = 1.5

R.L. 57.06
VTP CH 76.35

R.L. 56.83
VTP CH 80.1

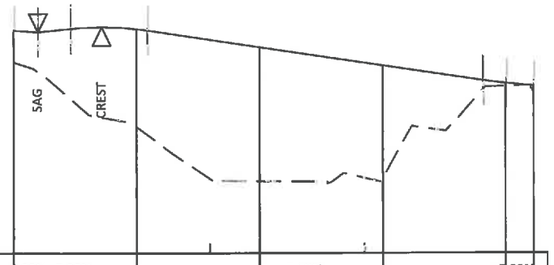
Engineering plans approved
ENG 60321596 12/11/18
K.S.
Refer covering letter and ensure meeting held with Council's Development Engineer prior to works commencing
Auckland Council



DATUM R.L. = 48.0

DESIGN GRADE	-3.00%		-2.00%		-12.00%				-5.00%		3.00%	
DESIGN SURFACE LEVEL	62.47		62	59.79		57.39		55.28		54.79		
EXISTING SURFACE LEVEL	63.7		61.53	60.41		56.63		55.08		53.6		
CUT/FILL DEPTH	-1.22		0.47	-0.61		0.76		0.2		1.19		
CHAINAGE (m)	0		20	40		60		80		95.52		

LONG SECTION ROW 12
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:500



DATUM R.L. = 43.0

DESIGN GRADE		-3.00%	5.00%		-7.50%				-5.00%			
DESIGN SURFACE LEVEL	61.16		61.27		59.79		58.29		56.83	56.6		
EXISTING SURFACE LEVEL	58.6		53.3		48.87		49.12		56.59	56.06		
CUT/FILL DEPTH	2.57		7.98		10.92		9.17		0.24	0.55		
CHAINAGE (m)	0		20		40		60		80	84.6		

LONG SECTION ROW 13
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:500

FOR CONSTRUCTION

CKL
Planning | Surveying | Engineering | Environmental

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

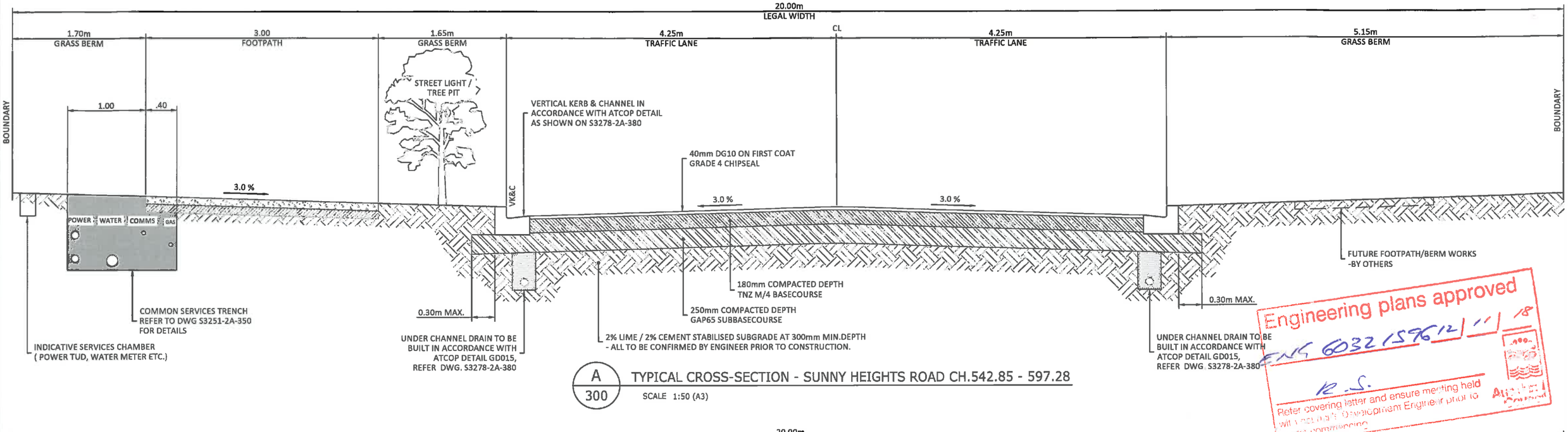
ROADING
LONG SECTION PLAN
SHEET 4 OF 4

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: AS SHOWN (A3 Original)

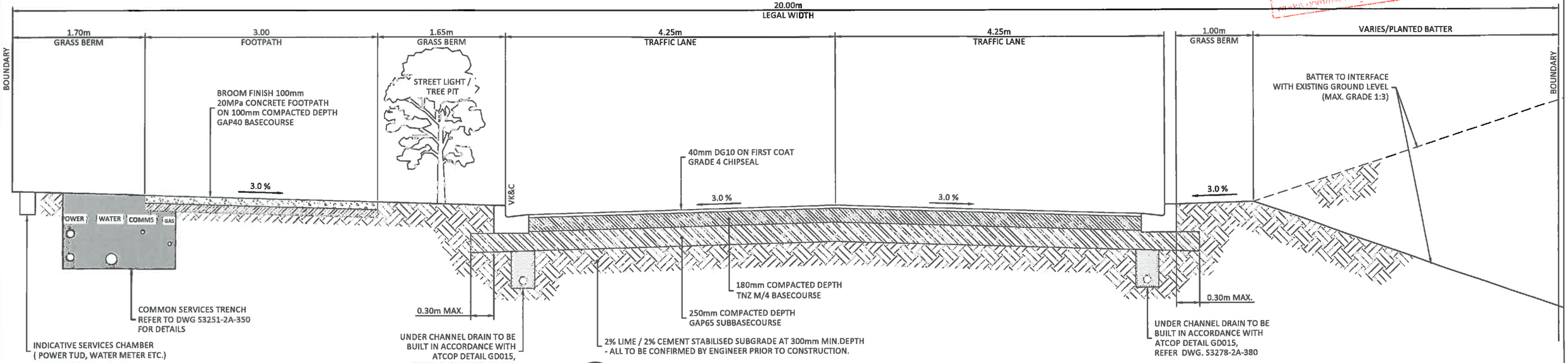
Job No: S3278-2A | Dwg No: 313 | Rev: A



A / 300 TYPICAL CROSS-SECTION - SUNNY HEIGHTS ROAD CH.542.85 - 597.28

SCALE 1:50 (A3)

Engineering plans approved
ENG 6032/596/12/11/18
R.S.
Refer covering letter and ensure meeting held with Land Development Engineer prior to works commencing



B / 300 TYPICAL CROSS-SECTION - SUNNY HEIGHTS ROAD CH.598.28 - 856.35

SCALE 1:50 (A3)

NOTES:

1. ROADS DESIGNED TO A MIN. CBR 7. SUBGRADE IMPROVEMENTS TO BE UNDERTAKEN ON THE INSTRUCTIONS OF THE ENGINEER SHOULD CBR VALUES NOT MEET WITH THE DESIGN VALUES.
2. BENKLEMAN BEAM DEFLECTION WITH 8.2 T ON FINAL SURFACE IS 1.0mm FOR SUNNYHEIGHTS ROAD (COLLECTOR ROAD).
3. BENKLEMAN BEAM DEFLECTION WITH 8.2 T ON FINAL SURFACE IS 1.2mm FOR ROAD 8.
4. LIME/CEMENT REACTIVITY TESTS TO BE COMPLETED PRIOR TO STABILISING TO CONFIRM APPLICATION RATE, CONFIRM WITH THE ENGINEER.

FOR CONSTRUCTION

CKL
Planning | Surveying | Engineering | Environmental

Auckland Office:
A: 25 Broadway, Newmarket
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Hamilton Office
A: 58 Church Road, Hamilton
P: 07 849 9921
Te Awamutu Office
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P: 07 871 6144

OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

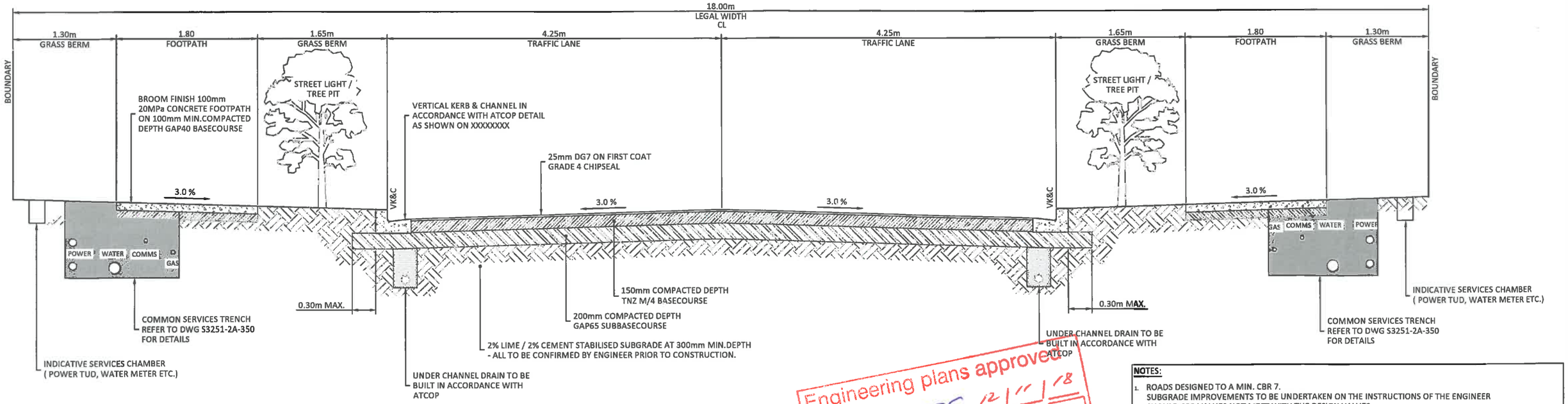
ROADING
CROSS SECTIONS
SHEET 1 OF 2

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SB	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:50 (A3 Original)

Job No: S3278-2A
Dwg No: 340
Rev: A



C/300 TYPICAL CROSS-SECTION - ROAD 8

SCALE 1:50 (A3)

Engineering plans approved
ENG6032596 12/11/18
Refer covering letter and ensure meeting held with Land Development Engineer prior to work commencing

NOTES:

1. ROADS DESIGNED TO A MIN. CBR 7.
   SUBGRADE IMPROVEMENTS TO BE UNDERTAKEN ON THE INSTRUCTIONS OF THE ENGINEER SHOULD CBR VALUES NOT MEET WITH THE DESIGN VALUES.
2. BENKLEMAN BEAM DEFLECTION WITH 8.2 T ON FINAL SURFACE IS 1.0mm FOR SUNNYHEIGHTS ROAD (COLLECTOR ROAD).
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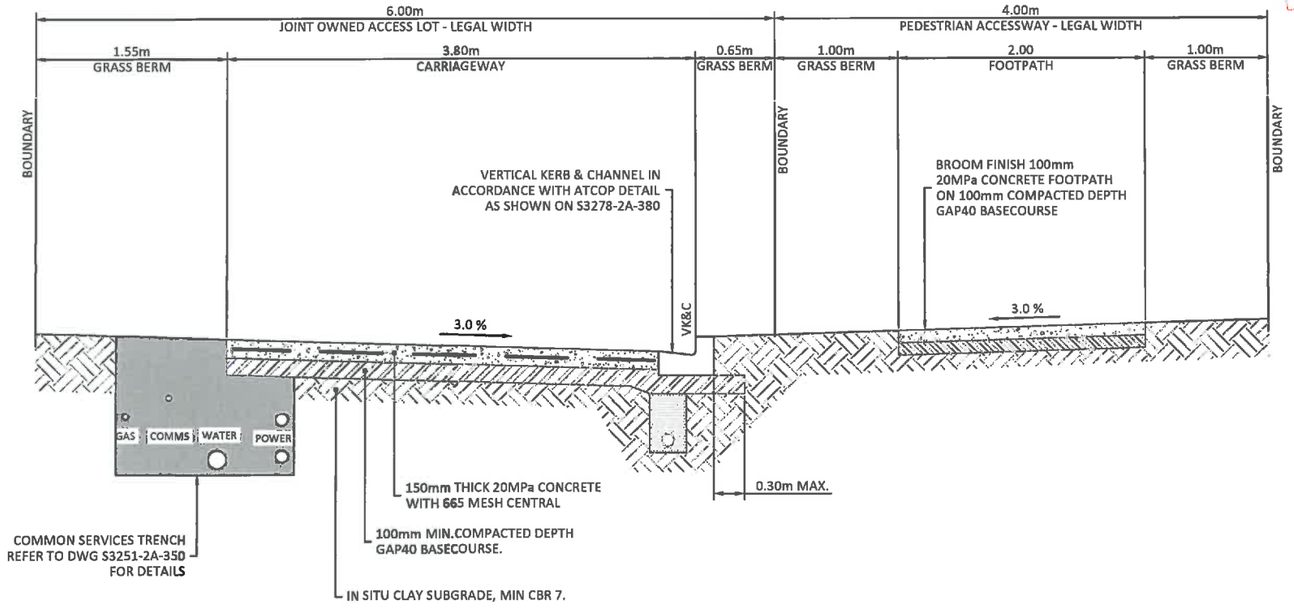
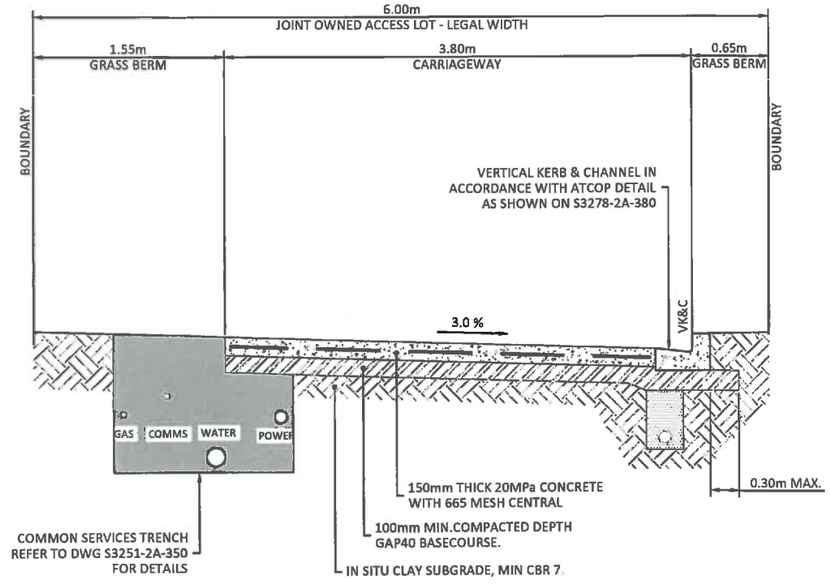


D/300 TYPICAL CROSS-SECTION - ROW 12

SCALE 1:50 (A3)



E/300 TYPICAL CROSS-SECTION - ROW 13

SCALE 1:50 (A3)

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

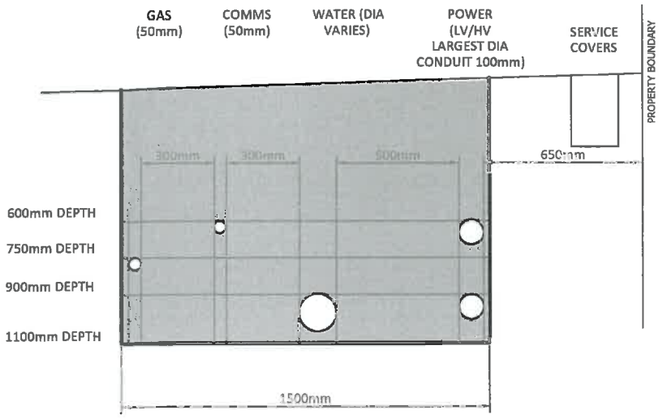
ROADING
CROSS SECTIONS
SHEET 2 OF 2

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SB	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

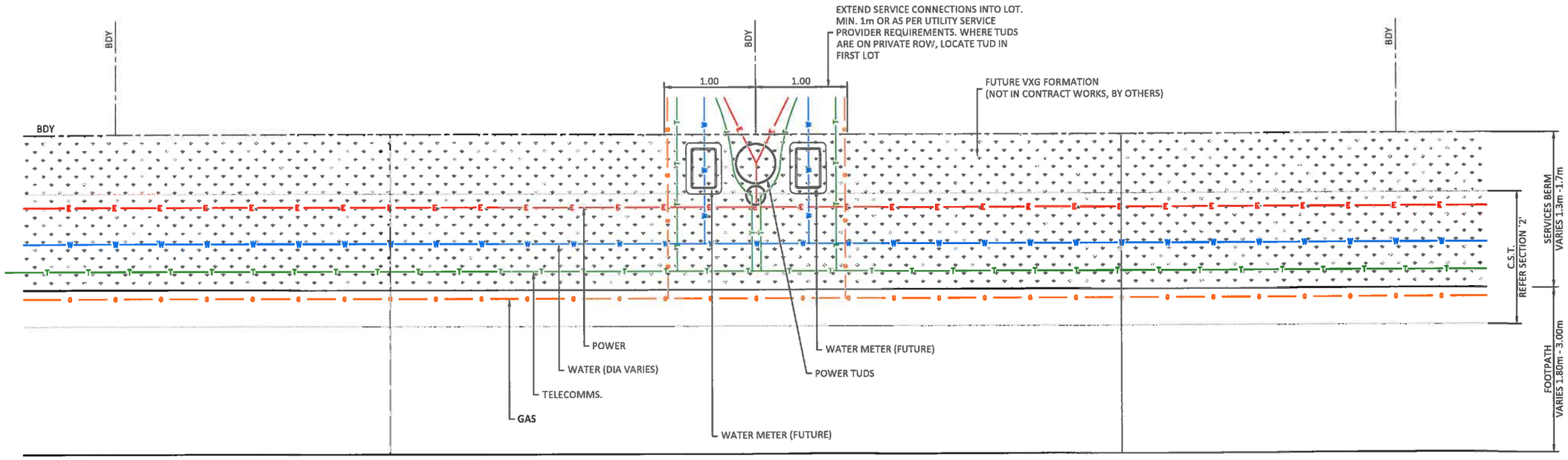
Scale: 1:50 (A3 Original)

Job No: S3278-2A | Dwg No: 341 | Rev: A



2 / - COMMON SERVICES TRENCH DETAIL
SCALE 1:25

Engineering plans approved
ENG 6032/596/2/11/18
Refer covering letter and ensure meeting held with Council Development Engineer prior to works commencing



1 / - BERM LAYOUT
SCALE 1:50

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

BERM LAYOUT AND SERVICE TRENCH DETAILS

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SB	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:50 (A3 Original)
Job No: S3278-2A
Dwg No: 350
Rev: A

ROADING AND PAVEMENT NOTES:

1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH AUCKLAND COUNCIL AND AUCKLAND TRANSPORT (ATCOP) ENGINEERING STANDARDS.
2. ALL EXTRUDED/INSITU CONCRETE TO BE MIN. 20 MPa STRENGTH AT 28 DAYS.
3. ALL UNDERCHANNEL DRAINS TO BE LAID IN TNZ F/2 DRAINAGE MATERIAL AND HAVE FREE-FLOWING OUTLET TO NEAREST DOWNSTREAM CATCHPIT.
4. ALL FOOTPATHS TO COMPRISE 100mm THICK 20MPa BROOM FINISH CONCRETE ON MIN. 100mm COMPACTED DEPTH GAP40 BASECOURSE.
5. ALL REINFORCING SHALL BE PLACED ON APPROVED CHAIRS AND IS TO BE PLACED CENTRALLY OR AS PER DESIGN PLANS.
6. ALL FOOTPATH SAWCUTS ARE TO COINCIDE WITH KERB SAWCUTS AT 3m CRS TYP. UNLESS NOTED OTHERWISE.
7. PAVEMENT DESIGN IS PROVISIONAL ONLY AND INSITU SUBGRADE STRENGTH SHALL BE CONFIRMED VIA SCALA PENETROMETER TESTING FOLLOWING GULLETTING OF THE CARRIAGEWAYS TO CONFIRM FINAL PAVEMENT THICKNESS AND ANY SUBGRADE IMPROVEMENT WORKS i.e. UNDERCUTTING OR STABILISATION. THE ENGINEER IS TO INSPECT, TEST AND APPROVE ALL SUBGRADES PRIOR TO AGGREGATE PLACEMENT.
8. ALL SUBGRADES SHALL BE TRIMMED WITHIN +/- 10mm TOLERANCE TO DESIGN LEVELS AND SHALL BE STRUNG AND APPROVED PRIOR TO METAL COURSE PLACEMENT.

ROAD SIGNAGE NOTES:

1. ROAD MARKINGS AND SIGNS TO BE IN STRICT ACCORDANCE WITH RELEVANT COUNCIL STANDARDS AND M.O.T.S.A.M.
2. ALL SIGNAGE TO BE CLEAR OF VEHICLE SWEEP PATH

LEGEND

- RG6 GIVE WAY SIGN (GIVE WAY)
- ROAD NAME SIGN
- CENTERLINE ROAD MARKING
- NSAAT LINE MARKING
- PRAM CROSSING
- GIVE WAY PAVEMENT MARKING WITHIN 10m OF HOLD LINE (1.8m, 0.75m, 0.2m, 4.0m)

Engineering plans approved
ENG 60321596 12 / 11 / 18
R.S.
Refer covering letter and ensure meeting held with Council's Development Engineer prior to works commencing

FOR CONSTRUCTION

CKL
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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

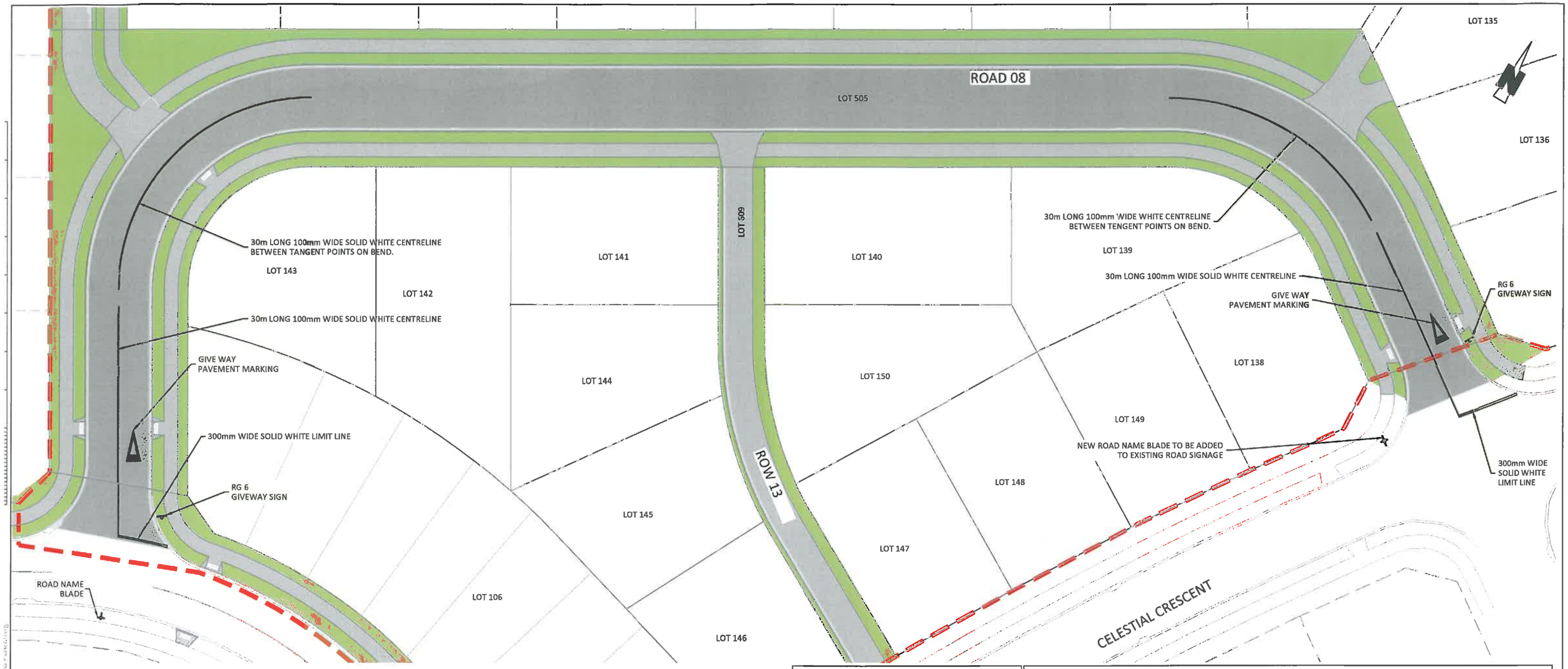
ROAD MARKING AND SIGNAGE PLAN

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SB	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:1000 (A3 Original)

Job No:	Dwg No:	Rev:
S3278-2A	360	A



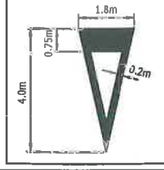
Engineering plans approved
ENG 60321596 12/11/18
Refer covering letter and ensure meeting held with Resource Management Engineer prior to commencing

ROAD SIGNAGE NOTES:

1. ROAD MARKINGS AND SIGNS TO BE IN STRICT ACCORDANCE WITH RELEVANT COUNCIL STANDARDS AND M.O.T S.A.M.
2. ALL SIGNAGE TO BE CLEAR OF VEHICLE SWEEP PATH

LEGEND

- RG6 GIVE WAY SIGN
- ROAD NAME SIGN
- CENTERLINE ROAD MARKING
- NSAAT LINE MARKING
- PRAM CROSSING
- GIVE WAY PAVEMENT MARKING WITHIN 10m OF HOLD LINE



ROADING AND PAVEMENT NOTES:

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2. ALL EXTRUDED/INSITU CONCRETE TO BE MIN. 20 MPa STRENGTH AT 28 DAYS.
3. ALL UNDERCHANNEL DRAINS TO BE LAID IN TNZ F/2 DRAINAGE MATERIAL AND HAVE FREE-FLOWING OUTLET TO NEAREST DOWNSTREAM CATCHPIT.
4. ALL FOOTPATHS TO COMPRISE 100mm THICK 20MPa BROOM FINISH CONCRETE ON MIN. 100mm COMPACTED DEPTH GAP40 BASECOURSE.
5. ALL REINFORCING SHALL BE PLACED ON APPROVED CHAIRS AND IS TO BE PLACED CENTRALLY OR AS PER DESIGN PLANS.
6. ALL FOOTPATH SAWCUTS ARE TO COINCIDE WITH KERB SAWCUTS AT 3m CRS TYP. UNLESS NOTED OTHERWISE.
7. PAVEMENT DESIGN IS PROVISIONAL ONLY AND INSITU SUBGRADE STRENGTH SHALL BE CONFIRMED VIA SCALA PENETROMETER TESTING FOLLOWING GULLETTING OF THE CARRIAGEWAYS TO CONFIRM FINAL PAVEMENT THICKNESS AND ANY SUBGRADE IMPROVEMENT WORKS i.e. UNDERCUTTING OR STABILISATION.
   THE ENGINEER IS TO INSPECT, TEST AND APPROVE ALL SUBGRADES PRIOR TO AGGREGATE PLACEMENT.
8. ALL SUBGRADES SHALL BE TRIMMED WITHIN +/- 10mm TOLERANCE TO DESIGN LEVELS AND SHALL BE STRUNG AND APPROVED PRIOR TO METAL COURSE PLACEMENT.

FOR CONSTRUCTION

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Planning | Surveying | Engineering | Environmental

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

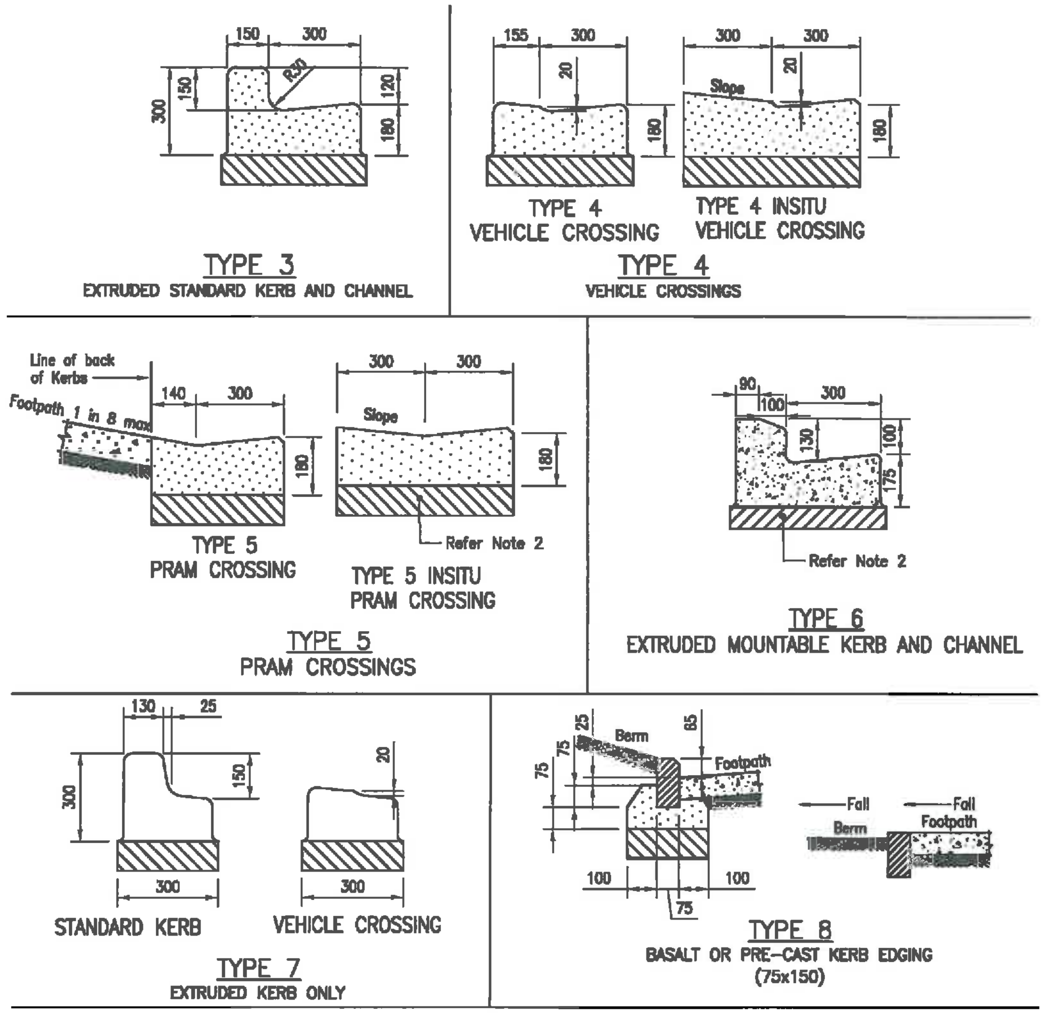
INTERSECTION ROAD MARKING AND SIGNAGE PLAN

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SB	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:500 (A3 Original)

Job No: S3278-2A
Dwg No: 361
Rev: A



NOTES KERB & DISH CHANNEL ONLY (EXTRUDED)

1. Jointing
Precast kerb neatly pointed with 10mm min. cement mortar. Extruded kerbs cracking control joints formed or saw cut to a minimum depth of 30mm at max. 3.00m. intervals to coincide with concrete footpath joints (where the kerb is adjacent to the footpath). Crack control joints between bluestone kerb blocks shall be approximately 20mm wide (measured at the top and front faces) with neat square jointing 2 to 4 mm proud. Joints must located either side of vehicle crossings.

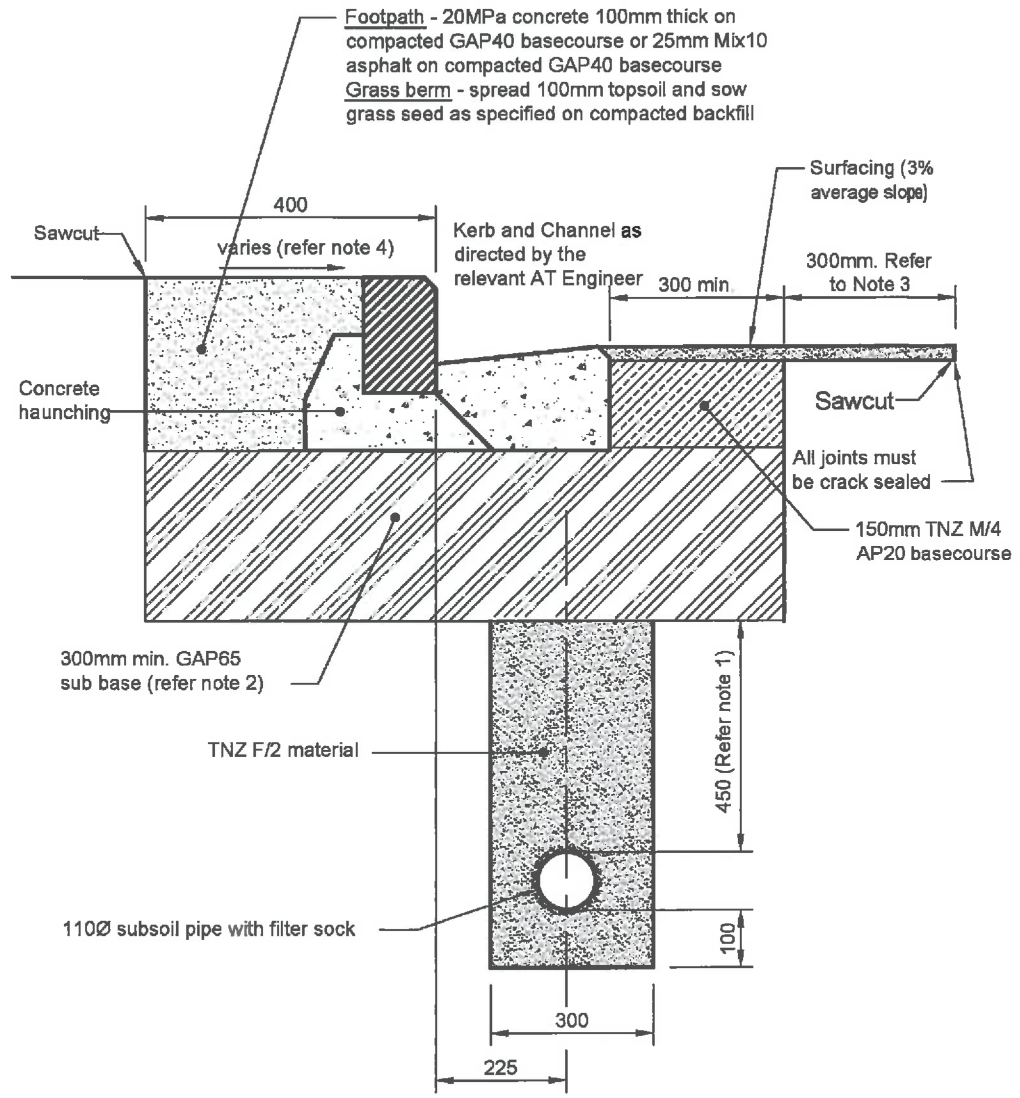
2. Bedding
Kerbing must be laid on 300mm. min. GAP65 subbase in roads and 100mm GAP40 in footpaths (where subgrade CBR>5). If the subgrade CBR<5 then roads and footpaths must be undercut and backfilled with appropriate backfill material.

3. Concrete Grades
Precast kerb blocks 20 MPa. In-Situ channel and haunching 20 MPa. Extruded concrete 20 MPa.

4. All chamfers 20mm

REVISION	BY	DATE		AUCKLAND TRANSPORT CODE OF PRACTICE	
			Auckland Transport – An Auckland Council Organisation	TITLE: KERB AND CHANNEL TYPES 3–8	SCALE: N.T.S. DRAWING No. GD009 VERSION 1.0

Drawing set for Chapter 7 - Road Layout and Geometric Design



NOTES

1. The subsoil drain is to connect to a downstream street catchpit above the soffit level of the outlet pipe. Subsoil depth can be adjusted to meet this criteria.
2. Increase depth to match adjacent pavement depth where required.
3. Increase width where required to achieve positive fall to the channel.
4. Positive fall to the kerb and channel must be achieved unless otherwise approved by the relevant AT Engineer.

REVISION	BY	DATE		AUCKLAND TRANSPORT CODE OF PRACTICE	
			Auckland Transport – An Auckland Council Organisation	TITLE: KERB & CHANNEL REPLACEMENT WITH SUBSOIL DRAIN	SCALE: N.T.S. DRAWING No. GD015 VERSION 1.0

FOR CONSTRUCTION

CKL
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Te Awamutu Office
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P: 07 871 6144

OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

ROADING
TYPICAL DETAILS
SHEET 1 OF 2

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

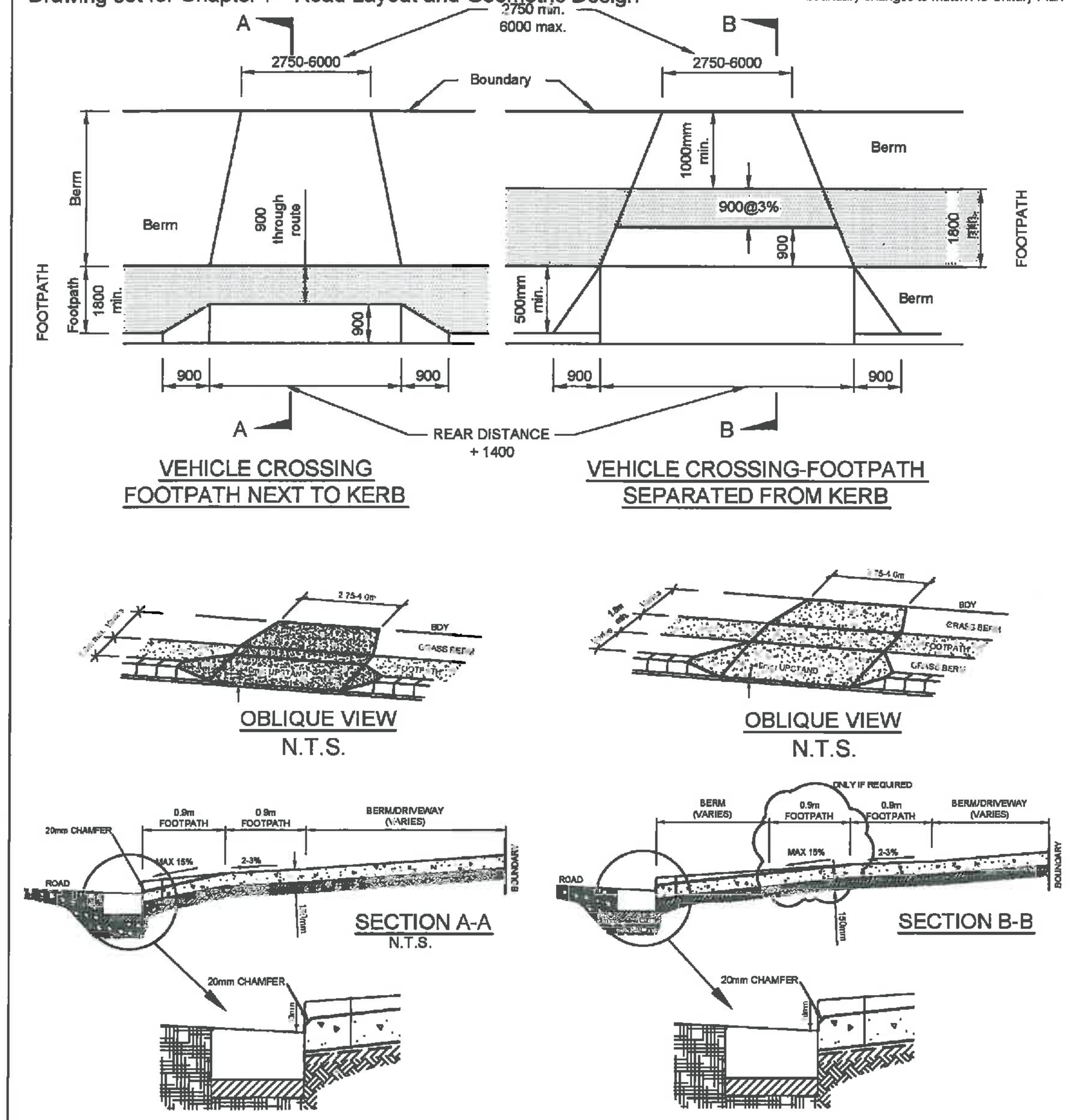
		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)

Job No:	Dwg No:	Rev:
S3278-2A	380	A

Drawing set for Chapter 7 - Road Layout and Geometric Design

Drawings subject to change due to boundary changes to match AC Unitary Plan

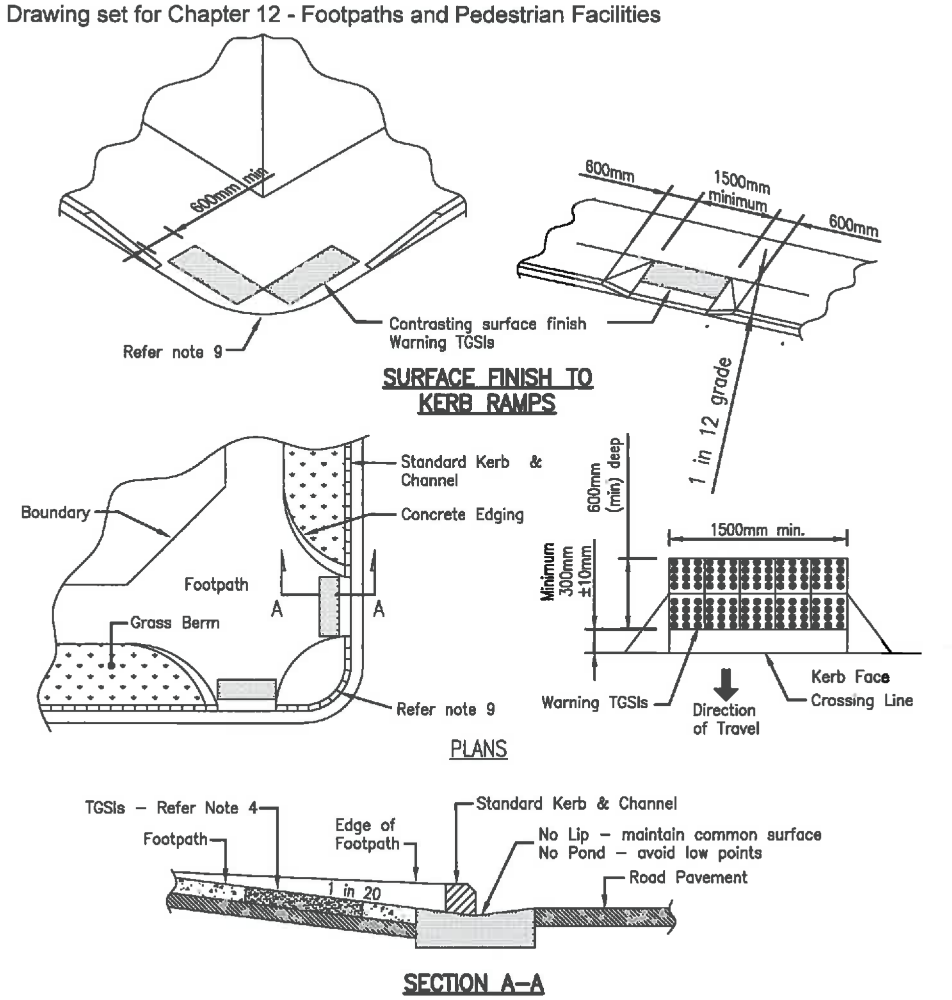


Notes:

1. All dimensions are in millimetres unless noted otherwise.
2. All concrete to be 20 Mpa and constructed in accordance with NZS 3109 with a broom finish.
3. Saw cut expansion joints at 4m centres maximum each way in addition to saw cuts shown on dwg.
4. All work must comply with the NZTA's 'CoPTTM' (code of practice for temporary traffic management).
5. Construct in same material as surrounding footpath.

REVISION	BY	DATE		AUCKLAND TRANSPORT CODE OF PRACTICE	SCALE: N.T.S.
			Auckland Transport AT	TITLE: RESIDENTIAL VEHICLE CROSSING	DRAWING No. GD017
					VERSION 1.0

Drawing set for Chapter 12 - Footpaths and Pedestrian Facilities



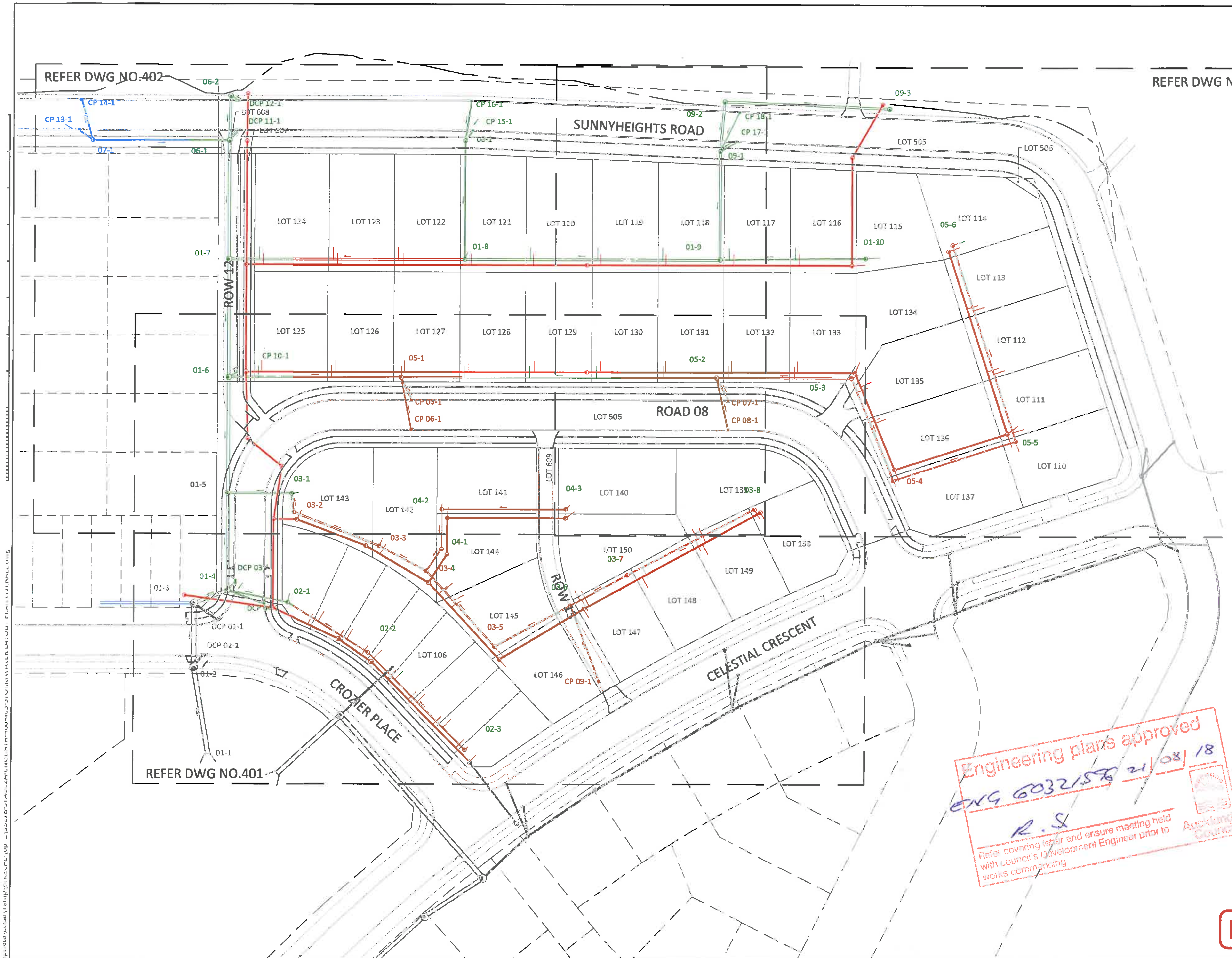
NOTES

1. This crossing design complies with the requirements of the Disabled Persons Act and the Building Act.
2. Desirable grade is 1 in 20, with maximum grade 1 in 12.
3. Edge of crossing to be finished flush with existing channel. (No Lip, maintain common surface).
4. Tactile Ground Surface Indicator (TGSI) must be installed in a accordance with:
   - NZTA RTS 14 Guidelines for facilities for blind and vision-impaired pedestrians.
   - AS/NZS 1428.4:2009 Design for access and mobility.
5. 300x300mm sealed yellow concrete warning TGSI tiles are to have a 100mm thick concrete slab under them.
6. The crossing point should be oriented such that the leading edge of the crossing is perpendicular to the direction of travel.
7. Consideration should be given to including Directional TGSIs in complex areas and where direction of travel needs to be made clear, but not at uncontrolled crossings.
8. Bluestone kerb blocks must not extend across a pram crossing.
9. The length of kerb upstand between kerb ramps shall be greater than 1m.
10. The pram crossing apart from the tactiles must be constructed in the same material and colour and/or texture as the adjacent footpath.
11. Unless otherwise approved by the relevant AT Engineer, the pram crossing must be constructed in accordance with the requirements for a concrete footpath (Drawing FP001).

REVISION	BY	DATE		AUCKLAND TRANSPORT CODE OF PRACTICE	SCALE: N.T.S.
			Auckland Transport AT	TITLE: PRAM CROSSING	DRAWING No. FP009
					VERSION 5.0

FOR CONSTRUCTION

CKL	Offices	Client / Project	Title	Issue	Description	Checked	Date			Date	Scale
CKL Planning | Surveying | Engineering | Environmental	**Auckland Office:** A: 25 Broadway, Newmarket P: 09 524 7029 **Hamilton Office** A: 58 Church Road, Hamilton P: 07 849 9921 **Te Awamutu Office** A: 103 Market Street, Te Awamutu P: 07 871 6144	OREWA DEVELOPMENTS LTD HALLS FARM STAGE 2A 264 WEST HOE HEIGHTS, OREWA	ROADING TYPICAL DETAILS SHEET 2 OF 2	A	ISSUED FOR CONSTRUCTION	SJ	13.06.18	Designed:	SB	08.05.18	NTS (A3 Original)
								Drawn:	SB	08.05.18	
								Checked:	SJ	08.05.18	
								Job No: S3278-2A	Dwg No: 381	Rev: A	



STORMWATER NOTES:

1. ALL WORKS AND MATERIALS TO COMPLY WITH AUCKLAND COUNCIL CODE OF PRACTICE FOR LAND DEVELOPMENT AND SUBDIVISION AND ANY AMENDMENTS.
2. ALL PRIVATE DRAINAGE WORKS TO COMPLY WITH THE NEW ZEALAND BUILDING CODE.
3. ALL DRAINAGE WORKS SHALL BE CARRIED OUT UNDER THE SUPERVISION OF A REGISTERED DRAIN LAYER AND IN ACCORDANCE WITH CURRENT HEALTH AND SAFETY PRACTICES. WHERE REQUIRED, DRAINAGE WORKS ARE TO BE UNDERTAKEN BY AN APPROVED LICENSED CONTRACTOR (A.L.C.).
4. ALL MANHOLES ARE TO BE MIN. DN 1050 WITH DN 600 OPENING INCLUDING D.I. LID AND COVERS UNLESS SHOWN OTHERWISE.
5. ALL ROAD CATCHPITS TO COMPRISE STANDARD 675x450 BACK ENTRY-TYPE IN ACCORDANCE WITH ATCOP GUIDELINES. WHERE LOCATED IN CYCLE LANES, CATCHPITS ARE TO INCLUDE CYCLE-FRIENDLY GRATES.
6. ALL CP LEADS ARE TO BE MIN. DN225 CLASS 4 PIPE UNLESS SHOWN OTHERWISE.
7. ALL ORDINARY TRENCH BACKFILL SHALL COMPRISE SUITABLE EARTHFILL FREE OF TOPSOIL/ORGANICS AND SHALL BE WELL COMPACTED IN LAYERS NOT EXCEEDING 200mm TO ACHIEVE MINIMUM SHEAR STRENGTHS OF 140 kPA/MAX. 10% AIR VOIDS OR AS PER THE EARTHWORKS SPECIFICATION.
8. ALL PIPE CROSSINGS UNDER CARRIAGEWAYS/TRAFFIC AREAS TO BE HARDFILL BACKFILLED WITH APPROVED GAP65 TO 1.0m BEYOND EXTENT CARRIAGEWAY. TRENCH HARDFILL BACKFILL TO BE WELL COMPACTED TO ACHIEVE MIN. CLEGG HAMMER CIV=20.
9. ALL PIPE CROSSOVERS TO BE HARDFILL BACKFILLED WITH GAP65 AGGREGATE, WHERE CLEARANCE BETWEEN PIPELINE CROSSOVERS IS LESS THAN 100mm THE GAP IS TO BE POLYSTYRENE PACKED IN ADDITION TO HARDFILL BACKFILL.
10. ALL CONNECTIONS ARE TO BE DN 100 UNLESS SHOWN OTHERWISE AND DIMENSIONED FROM THE DOWNSTREAM MANHOLE.
11. ALL EXISTING BERMS, CARRIAGEWAYS AND CROSSINGS TO BE RE-INSTATED AS PER COUNCIL/CONTROLLING AUTHORITY REQUIREMENTS.

PRE-CONSTRUCTION NOTES:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND ACCURATELY CONFIRM INVERT AND LID LEVELS OF EXISTING STORMWATER MANHOLES AND CONNECTION POINTS PRIOR TO COMMENCING CONSTRUCTION. WHERE LEVELS DIFFER TO THOSE SHOWN THE CONTRACTOR SHALL ADVISE THE ENGINEER ACCORDINGLY.
2. THE DRAWINGS DO NOT NECESSARILY SHOW ALL EXISTING SERVICES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ACCURATELY LOCATE AND PROTECT ALL EXISTING SERVICES DURING THE CONSTRUCTION PERIOD.
3. ALL LOT CONNECTION POINTS TO CAPPED 1m BELOW FINISH SURFACE AND MARKED WITH A BLUE STAKE.
4. ANY AMBIGUITY IS IDENTIFIED WITH SW PLANS IT IS TO BROUGHT TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION BEFORE PROCEEDING WITH WORKS.

SW DRAINAGE LEGEND:

- EXISTING SW (PUBLIC)
- PROPOSED SW (PUBLIC)
- FUTURE SW (PUBLIC)
- PROPOSED SW LOT CONNECTION
- PROPOSED WW (PUBLIC)
- EXISTING WW (PUBLIC)

FOR CONSTRUCTION

CKL
Planning | Surveying | Engineering | Environmental

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

STORMWATER LAYOUT PLAN OVERALL

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:1000 (A3 Original)

Job No:	Dwg No:	Rev:
S3278-2A	400	A

ROAD 08

CELESTIAL CRESCENT

CROZIER PLACE

LOT 125 | LOT 126 | LOT 127 | LOT 128 | LOT 129 | LOT 130 | LOT 131 | LOT 132 | LOT 133

LOT 505 | LOT 609 | LOT 141 | LOT 142 | LOT 143 | LOT 144 | LOT 145 | LOT 146 | LOT 147 | LOT 148 | LOT 149 | LOT 150 | LOT 138 | LOT 139 | LOT 140 | LOT 105

01-6 (1500Ø) LL 56.03

01-5 (1500Ø) LL 52.99

01-4 (1500Ø) LL 49.90

01-3 (2100Ø) LL 49.69

01-2 (2100Ø) LL 49.37

01-1 LL 48.55

FUTURE SW CONNECTION (INDICATIVE ONLY)

CP 10-1 FF 56.03

05-1 (1200Ø) LL 59.21

05-2 (1200Ø) LL 62.80

05-3 (1050Ø) LL 64.77

CP 05-1 LL 59.06

CP 06-1 LL 59.06

CP 07-1 LL 62.49

CP 08-1 LL 62.49

03-1 (1050Ø) LL 54.92

03-2 (1050Ø) LL 55.32

03-3 (1050Ø) LL 55.53

04-1 (1050Ø) LL 56.76

03-4 (1050Ø) LL 55.74

04-2 (1050Ø) LL 57.98

04-3 (1050Ø) LL 59.94

03-8 (1050Ø) LL 62.43

03-7 (1050Ø) LL 59.57

02-1 (1050Ø) LL 50.00

02-2 (1050Ø) LL 50.84

02-3 (1050Ø) LL 52.00

03-5 (1050Ø) LL 55.35

03-6 (1050Ø) LL 57.84

CP 09-1 LL 57.08

DCP 03-1 LL 50.07

DCP 04-1 LL 49.46

DCP 01-1 LL 49.36

DCP 02-1 LL 49.35

EXISTING 300mm ID RCRRJ PIPE TO BE GROUT FILLED AND ABANDONED.

Engineering plans approved
ENG 6032/596 2/04/18
Refer covering letter and onsite meeting held with council's Development Engineer prior to works commencing
Auckland Council

STORMWATER NOTES:

1. REFER TO DWG-400 FOR SW NOTES.

SW DRAINAGE LEGEND:

- EXISTING SW (PUBLIC)
- PROPOSED SW (PUBLIC)
- FUTURE SW (PUBLIC)
- PROPOSED SW LOT CONNECTION
- PROPOSED WW (PUBLIC)
- EXISTING WW (PUBLIC)

FOR CONSTRUCTION

CKL
Planning | Surveying | Engineering | Environmental

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Hamilton Office
A: 58 Church Road, Hamilton
P: 07 849 9921
Te Awamutu Office
A: 103 Market Street, Te Awamutu
P: 07 871 6144

OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

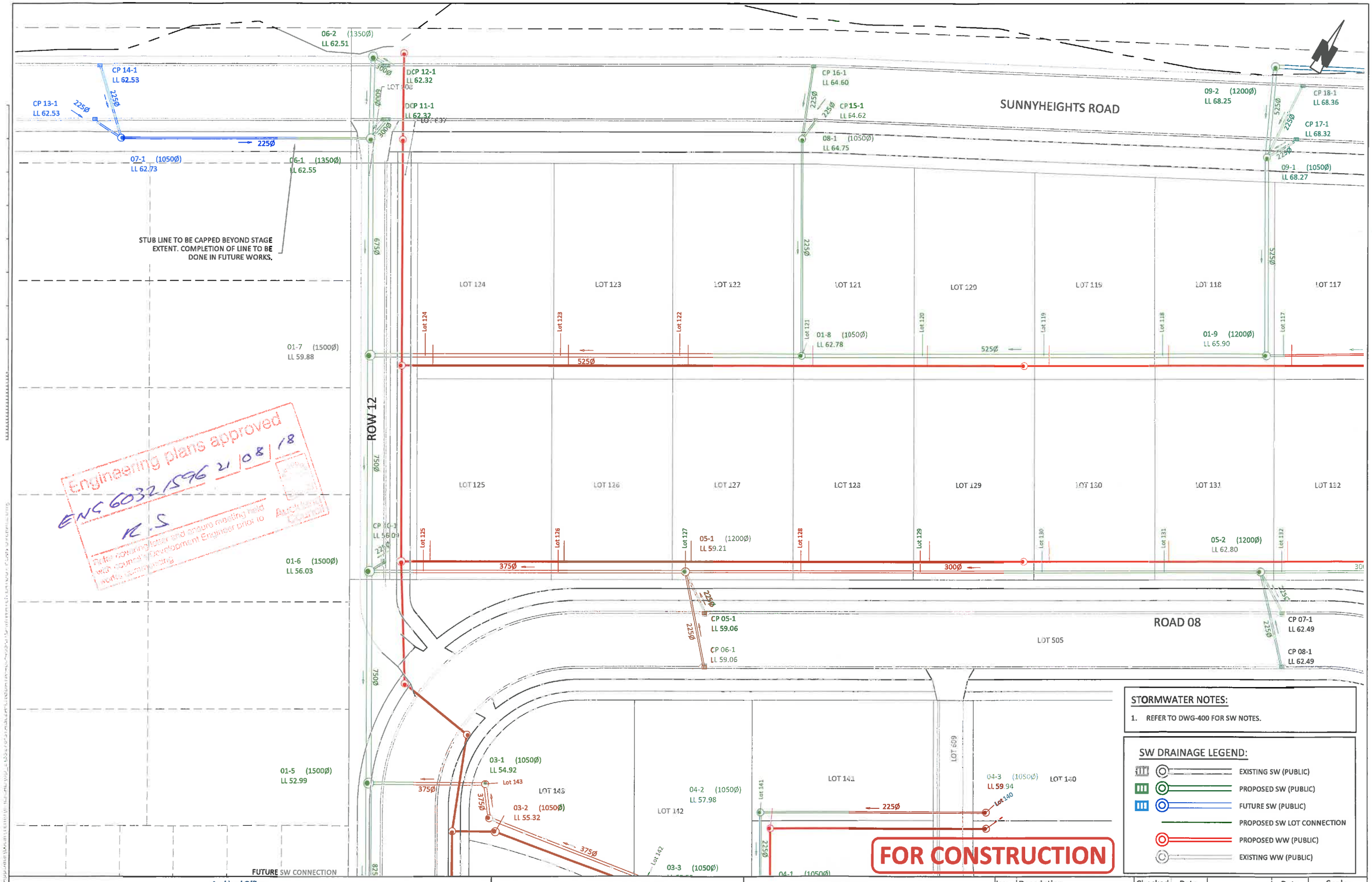
STORMWATER LAYOUT PLAN SHEET 1 OF 3

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:500 (A3 Original)

Job No: S3278-2A | Dwg No: 401 | Rev: A



STORMWATER NOTES:

1. REFER TO DWG-400 FOR SW NOTES.

SW DRAINAGE LEGEND:

- EXISTING SW (PUBLIC)
- PROPOSED SW (PUBLIC)
- FUTURE SW (PUBLIC)
- PROPOSED SW LOT CONNECTION
- PROPOSED WW (PUBLIC)
- EXISTING WW (PUBLIC)

FOR CONSTRUCTION

CKL
Planning | Surveying | Engineering | Environmental

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P: 07 849 9921
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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

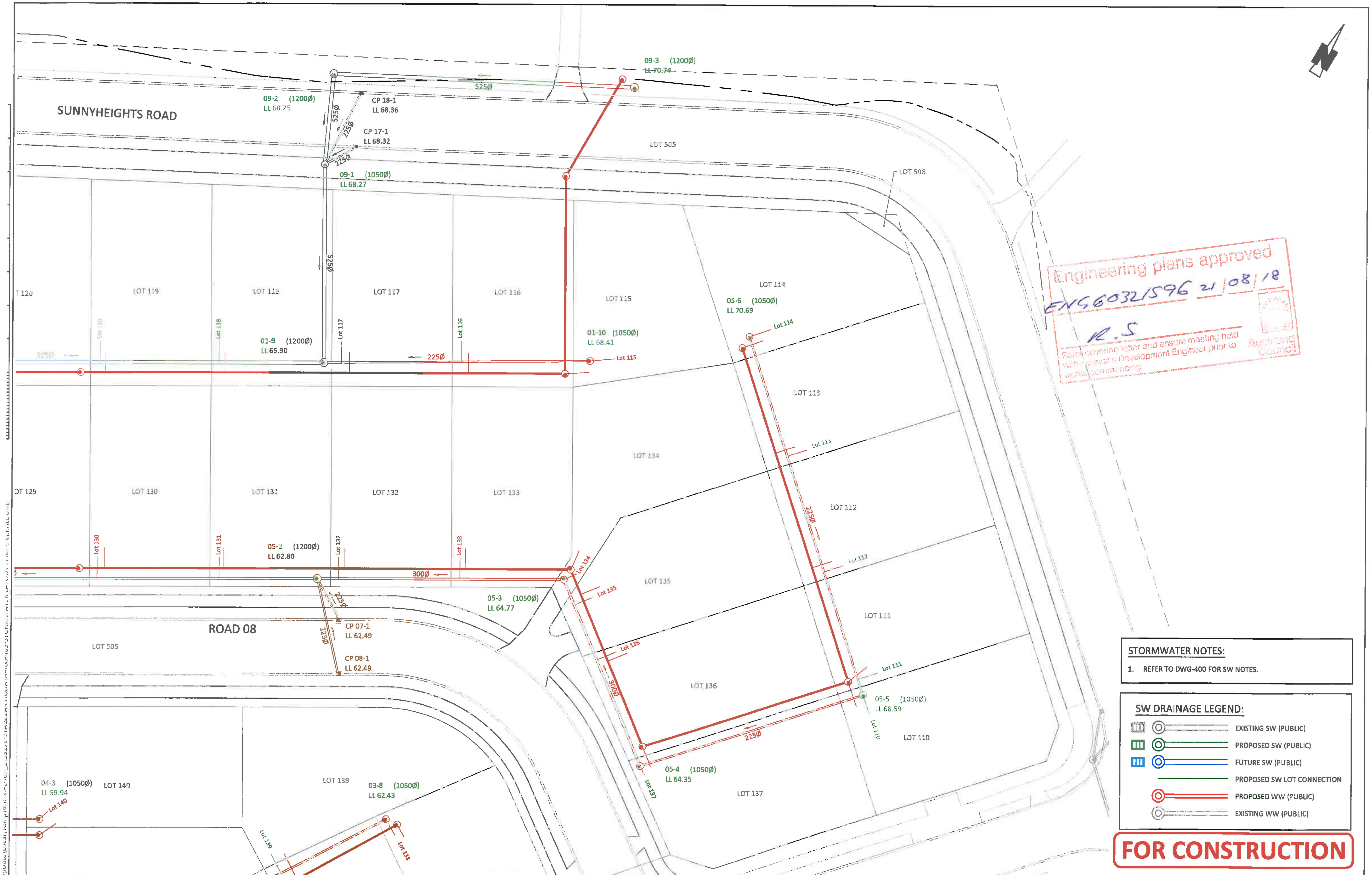
STORMWATER LAYOUT PLAN SHEET 2 OF 3

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:500 (A3 Original)

Job No: S3278-2A | Dwg No: 402 | Rev: A



SUNNYHEIGHTS ROAD
09-3 (1200Ø)
LL 70.74
525Ø
09-2 (1200Ø)
LL 68.25
CP 18-1
LL 68.36
CP 17-1
LL 68.32
225Ø
09-1 (1050Ø)
LL 68.27
LOT 505
LOT 506
LOT 119
LOT 118
LOT 117
LOT 116
LOT 115
LOT 114
05-6 (1050Ø)
LL 70.69
01-9 (1200Ø)
LL 65.90
01-10 (1050Ø)
LL 68.41
Lot 115
Lot 114
LOT 113
LOT 134
LOT 112
Lot 113
LOT 129
LOT 130
LOT 131
LOT 132
LOT 133
05-2 (1200Ø)
LL 62.80
300Ø
Lot 134
Lot 135
LOT 135
Lot 112
LOT 111
05-3 (1050Ø)
LL 64.77
ROAD 08
CP 07-1
LL 62.49
CP 08-1
LL 62.49
Lot 136
LOT 136
Lot 111
05-5 (1050Ø)
LL 68.59
Lot 110
LOT 110
05-4 (1050Ø)
LL 64.35
Lot 137
LOT 137
04-3 (1050Ø)
LL 59.94
Lot 140
LOT 140
LOT 139
03-8 (1050Ø)
LL 62.43
Lot 139
Lot 138
Engineering plans approved
ENG60321596 21/08/18
R.S
Refer covering letter and ensure meeting held with council's Development Engineer prior to works commencing
Auckland Council
STORMWATER NOTES:
1. REFER TO DWG-400 FOR SW NOTES.
SW DRAINAGE LEGEND:
EXISTING SW (PUBLIC)
PROPOSED SW (PUBLIC)
FUTURE SW (PUBLIC)
PROPOSED SW LOT CONNECTION
PROPOSED WW (PUBLIC)
EXISTING WW (PUBLIC)
FOR CONSTRUCTION

CKL

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

STORMWATER LAYOUT PLAN SHEET 3 OF 3

Issue	Description	Checked	Date			Date	Scale:
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18	Designed:	SB	08.05.18	1:500
				Drawn:	SB	08.05.18	
				Checked:	SJ	08.05.18	(A3 Original)

Job No:	Dwg No:	Rev:
S3278-2A	403	A

NOTES:

1. ALL DISTANCES AND GRADES SHOWN ARE FROM EDGE OF MANHOLE TO EDGE OF MANHOLE.
2. ALL PIPES (EXCLUDING CATCHPIT LEADS) TO BE RCRRJ CLASS 2 UNLESS OTHERWISE SHOWN.
3. ALL CATCHPIT LEADS TO BE RCRRJ CLASS 4 UNLESS OTHERWISE SHOWN.
4. ALL LINES TO HAVE A FLEXIBLE JOINT WITHIN 600mm OF THE MANHOLE/CATCHPIT.
5. LINES LAID AT GRADE GREATER THAN 10% TO HAVE 7mPA CEMENT TREATED BEDDING.
6. ALL PIPE CROSS OVERS TO BE BACKFILLED WITH GAP65 HARDFILL 1.0m EITHER SIDE OF THE INTERSECTION. WHERE CLEARANCE BETWEEN THE PIPES IS LESS THAN 100mm A POLYSTYRENE PACKER IS TO BE USED IN ADDITION TO HARDFILL.

LEGEND:

- EXISTING GROUND
- FINISHED GROUND
- HYDRAULIC GRADE LINE

Engineering plans approved
ENG 60321596 21/08/18
R.S.
Refer covering letter and ensure meeting held with council's Development Engineer prior to works commencing
Auckland Council

LINE 01

DATUM =

Manhole	LID LEVEL	INVERT LEVEL	DEPTH TO INVERT
(start)	49.68	46.42	3.26
SWMH 01-4	49.90	46.82 / 47.02	3.08 / 2.88
SWMH 01-5	52.99	50.43 / 50.58	2.56 / 2.41
SWMH 01-6	56.03	53.59 / 53.74	2.44 / 2.29
SWMH 01-7	59.88	57.83 / 58.05	2.05 / 1.82
SWMH 01-8	62.78	60.96 / 61.01	1.83 / 1.78
SWMH 01-9	65.90	64.33 / 64.63	1.58 / 1.28
SWMH 01-10	68.41	67.27	1.13

Pipe	DESIGN FLOW (L/s)	CAPACITY FLOW (L/s)	PIPE GRADE	SIZE AND TYPE	DISTANCE (M)
start – 01-4	1535.28	3819.59	5.07%	825ø	7.83
01-4 – 01-5	1460.09	6247.99	13.55%	825ø	25.14
01-5 – 01-6	1352.85	4157.89	9.98%	750ø	30.14
01-6 – 01-7	1143.33	4796.05	13.28%	750ø	30.81
01-7 – 01-8	493.87	1091.62	4.61%	525ø	63.02
01-8 – 01-9	426.38	1119.34	4.85%	525ø	68.47
01-9 – 01-10	27.12	139.08	6.86%	225ø	38.60

LINE 02

DATUM = 21.0

Manhole	LID LEVEL	INVERT LEVEL	DEPTH TO INVERT
SWMH 01-4	49.90	46.82 / 47.42	3.08 / 2.48
SWMH 02-1	50.00	47.58	2.42

Pipe	DESIGN FLOW (L/s)	CAPACITY FLOW (L/s)	PIPE GRADE	SIZE AND TYPE	DISTANCE (M)
01-4 – 02-1	34.61	53.09	1.00%	225ø Class 4	15.46

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P: 07 871 6144

OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

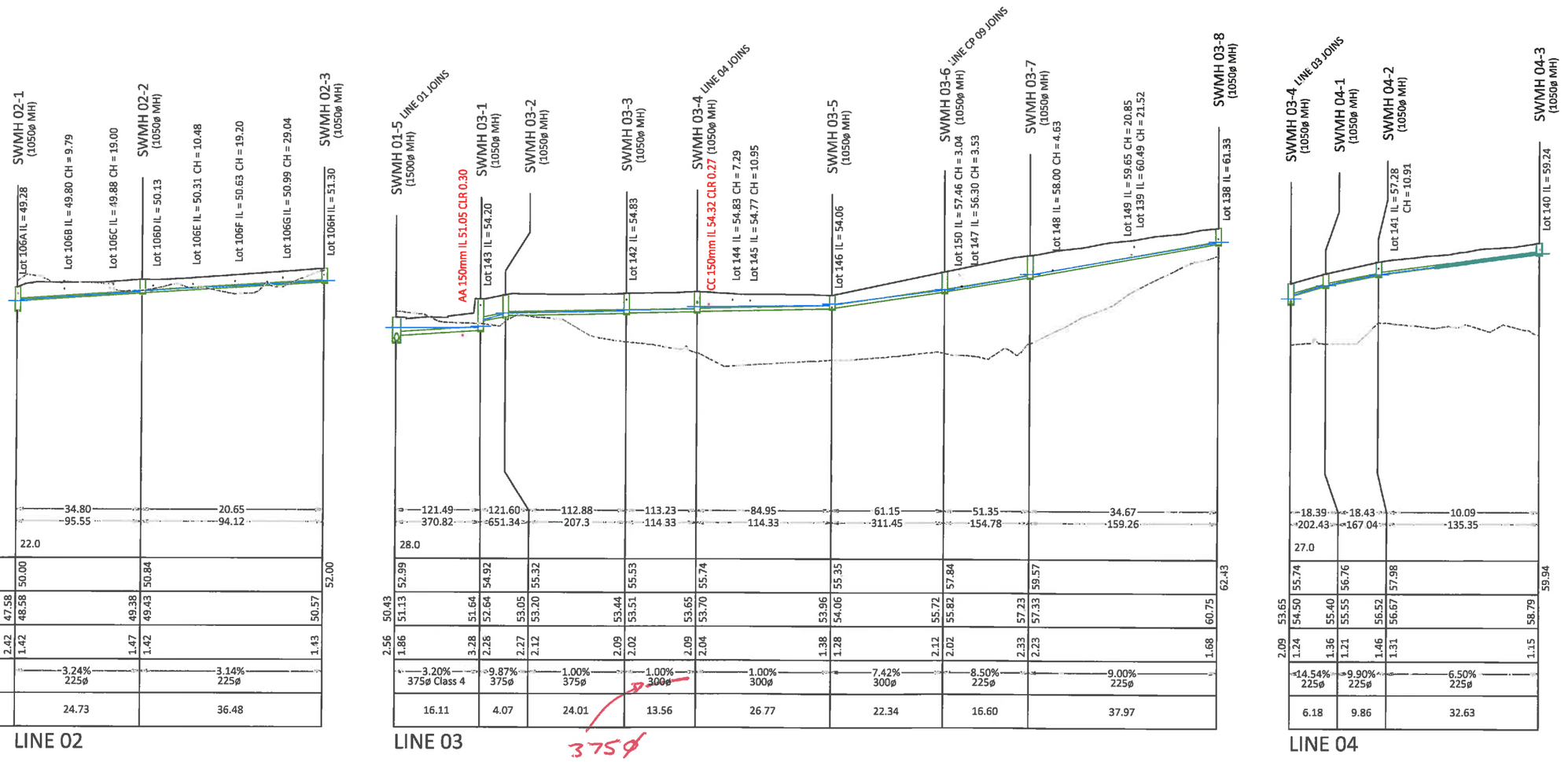
STORMWATER LONG-SECTION PLAN
SHEET 1 OF 5

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	25.05.18
Drawn:	SB	25.05.18
Checked:	SJ	02.06.18

Scale: H1:1000 V1:500 (A3 Original)

Job No: S3278-2A | Dwg No: 420 | Rev: A



NOTES:

1. ALL DISTANCES AND GRADES SHOWN ARE FROM EDGE OF MANHOLE TO EDGE OF MANHOLE.
2. ALL PIPES (EXCLUDING CATCHPIT LEADS) TO BE RCRRJ CLASS 2 UNLESS OTHERWISE SHOWN.
3. ALL CATCHPIT LEADS TO BE RCRRJ CLASS 4 UNLESS OTHERWISE SHOWN.
4. ALL LINES TO HAVE A FLEXIBLE JOINT WITHIN 600mm OF THE MANHOLE/CATCHPIT.
5. LINES LAID AT GRADE GREATER THAN 10% TO HAVE 7mPA CEMENT TREATED BEDDING.
6. ALL PIPE CROSS OVERS TO BE BACKFILLED WITH GAP65 HARDFILL 1.0m EITHER SIDE OF THE INTERSECTION. WHERE CLEARANCE BETWEEN THE PIPES IS LESS THAN 100mm A POLYSTYRENE PACKER IS TO BE USED IN ADDITION TO HARDFILL.

LEGEND:

EXISTING GROUND	‐ · ‐ · ‐ · ‐
FINISHED GROUND	────
HYDRAULIC GRADE LINE	────

Engineering plans approved
ENG 60321596 21/08/18
R.S
Refer covering letter and ensure meeting held with council's Development Engineer prior to works commencing
Auckland Council

LINE 02

LINE 03

375ø

LINE 04

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

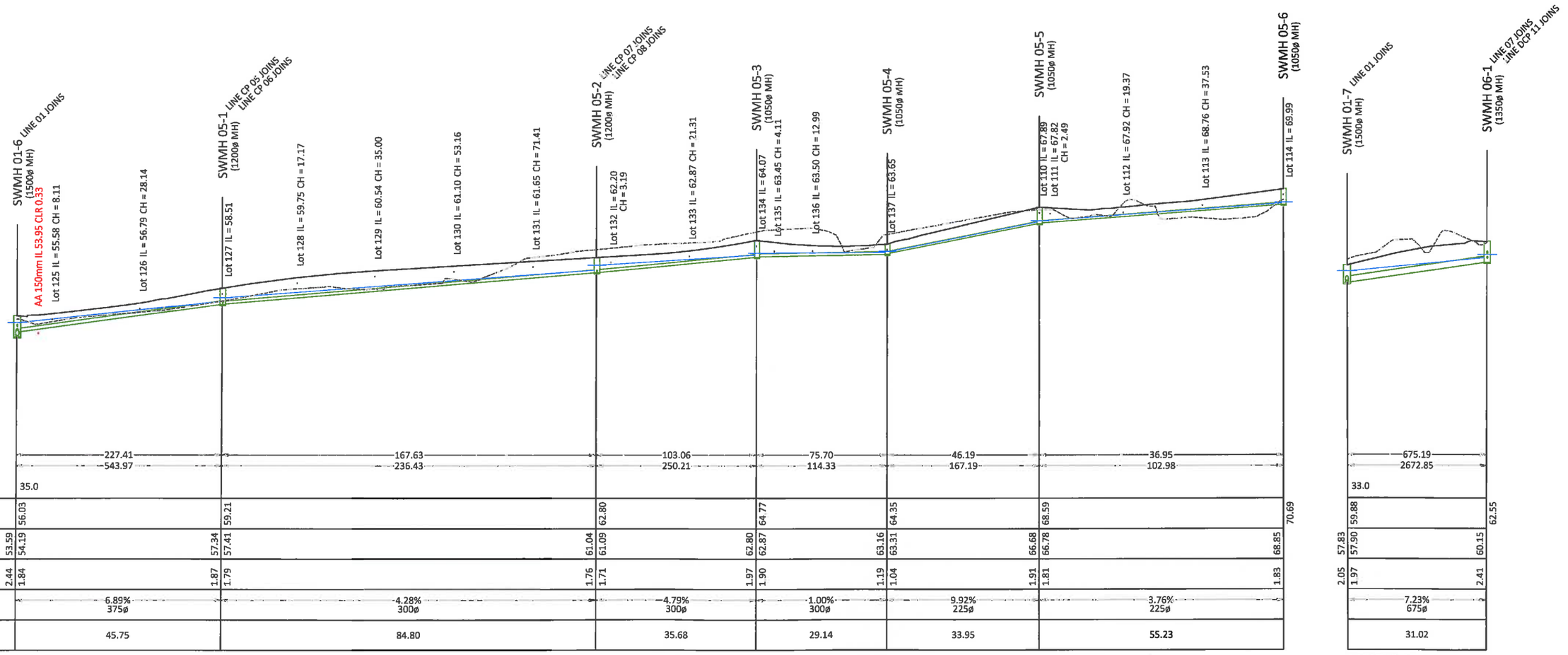
STORMWATER LONG-SECTION PLAN
SHEET 2 OF 5

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	25.05.18
Drawn:	SB	25.05.18
Checked:	SJ	02.06.18

Scale:
H1:1000 V1:500
(A3 Original)

Job No:	Dwg No:	Rev:
S3278-2A	421	A



NOTES:

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2. ALL PIPES (EXCLUDING CATCHPIT LEADS) TO BE RCRRJ CLASS 2 UNLESS OTHERWISE SHOWN.
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5. LINES LAID AT GRADE GREATER THAN 10% TO HAVE 7mPA CEMENT TREATED BEDDING.
6. ALL PIPE CROSS OVERS TO BE BACKFILLED WITH GAP65 HARDFILL 1.0m EITHER SIDE OF THE INTERSECTION. WHERE CLEARANCE BETWEEN THE PIPES IS LESS THAN 100mm A POLYSTYRENE PACKER IS TO BE USED IN ADDITION TO HARDFILL.

LEGEND:

EXISTING GROUND	------
FINISHED GROUND	——
HYDRAULIC GRADE LINE	——

Engineering plans approved
ENG 60324596 21/08/18
Refer covering letter and ensure meeting held with council's Development Engineer prior to works commencing
Auckland Council

DESIGN FLOW (L/s)		227.41		167.63		103.06		75.70		46.19		36.95	
CAPACITY FLOW (L/s)		543.97		236.43		250.21		114.33		167.19		102.98	
DATUM =	35.0												
LID LEVEL	56.03		59.21		62.80		64.77		64.35		68.59		70.69
INVERT LEVEL	53.59 54.19		57.34 57.41		61.04 61.09		62.80 62.87		63.16 63.31		66.68 66.78		68.85
DEPTH TO INVERT	2.44 1.84		1.87 1.79		1.76 1.71		1.97 1.90		1.19 1.04		1.91 1.81		1.83
PIPE GRADE SIZE AND TYPE		6.89% 375ø		4.28% 300ø		4.79% 300ø		1.00% 300ø		9.92% 225ø		3.76% 225ø	
DISTANCE (M)		45.75		84.80		35.68		29.14		33.95		55.23	

LINE 05

		675.19	
		2672.85	
	33.0		
	59.88		62.55
	57.83 57.90		60.15
	2.05 1.97		2.41
		7.23% 675ø	
		31.02	

LINE 06

W:\S3\S32\S3278\engineering\STAGE 2A\2 - Design\2 - CAD\Working\S3278-STAGE2A-ENGDATA-4.0-42A-STORMWATER LONG SECTIONS.dwg

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

STORMWATER
LONG-SECTION PLAN
SHEET 3 OF 5

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	25.05.18
Drawn:	SB	25.05.18
Checked:	SJ	02.06.18

Scale:
H1:1000 V1:500
(A3 Original)

Job No:	Dwg No:	Rev:
S3278-2A	422	A

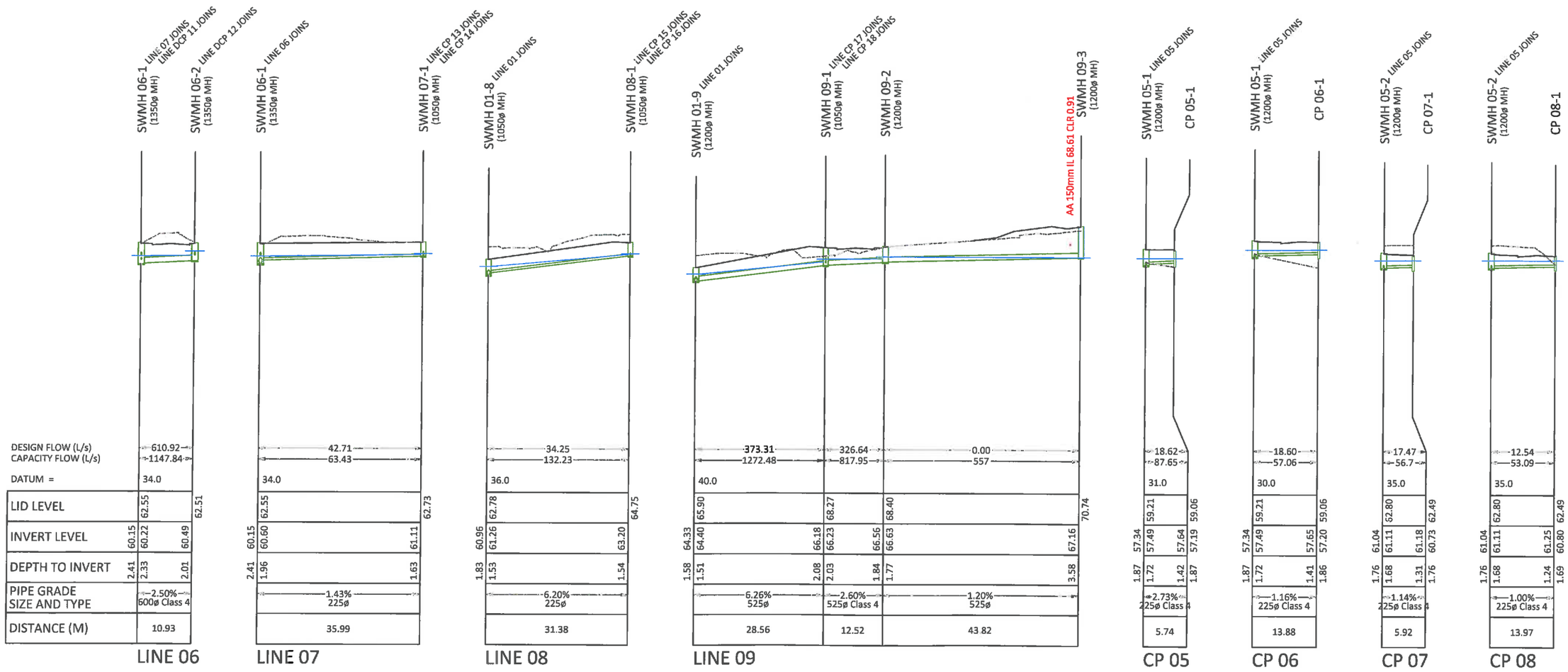
NOTES:

1. ALL DISTANCES AND GRADES SHOWN ARE FROM EDGE OF MANHOLE TO EDGE OF MANHOLE.
2. ALL PIPES (EXCLUDING CATCHPIT LEADS) TO BE RCRRJ CLASS 2 UNLESS OTHERWISE SHOWN.
3. ALL CATCHPIT LEADS TO BE RCRRJ CLASS 4 UNLESS OTHERWISE SHOWN.
4. ALL LINES TO HAVE A FLEXIBLE JOINT WITHIN 600mm OF THE MANHOLE/CATCHPIT.
5. LINES LAID AT GRADE GREATER THAN 10% TO HAVE 7mPA CEMENT TREATED BEDDING.
6. ALL PIPE CROSS OVERS TO BE BACKFILLED WITH GAP65 HARDFILL 1.0m EITHER SIDE OF THE INTERSECTION. WHERE CLEARANCE BETWEEN THE PIPES IS LESS THAN 100mm A POLYSTYRENE PACKER IS TO BE USED IN ADDITION TO HARDFILL.

LEGEND:

EXISTING GROUND
FINISHED GROUND
HYDRAULIC GRADE LINE

Engineering plans approved
ENG 60325962 21/08/18
K.S.
Refer covering letter and ensure meeting held with council's Development Engineer prior to works commencing.
Auckland Council



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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

STORMWATER LONG-SECTION PLAN SHEET 4 OF 5

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	25.05.18
Drawn:	SB	25.05.18
Checked:	SJ	02.06.18

Scale: H1:1000 V1:500 (A3 Original)

Job No: S3278-2A
Dwg No: 423
Rev: A

W:\S3278\S3278-2A\engineering\STAGE 2A\2 - Design\2 - CAD\Working\3278-2A-ENGDRG-423 - STORMWATER LONG SECTIONS.dwg

NOTES:

1. ALL DISTANCES AND GRADES SHOWN ARE FROM EDGE OF MANHOLE TO EDGE OF MANHOLE.
2. ALL PIPES (EXCLUDING CATCHPIT LEADS) TO BE RCRRJ CLASS 2 UNLESS OTHERWISE SHOWN.
3. ALL CATCHPIT LEADS TO BE RCRRJ CLASS 4 UNLESS OTHERWISE SHOWN.
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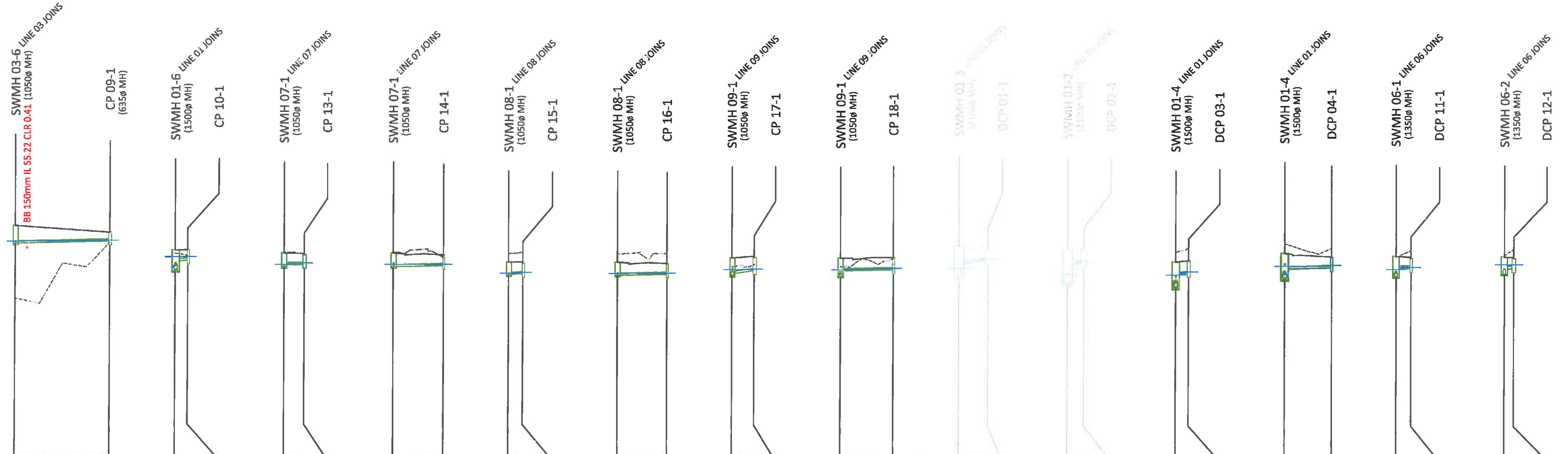
6. ALL PIPE CROSS OVERS TO BE BACKFILLED WITH GAP65 HARDFILL 1.0m EITHER SIDE OF THE INTERSECTION. WHERE CLEARANCE BETWEEN THE PIPES IS LESS THAN 100mm A POLYSTYRENE PACKER IS TO BE USED IN ADDITION TO HARDFILL.

LEGEND:

EXISTING GROUND	- - - - - -
FINISHED GROUND	———
HYDRAULIC GRADE LINE	——— (blue)

Engineering plans approved
ENG 60321596 21/08/18
R.S.
Refer covering letter and ensure meeting held with council's Development Engineer prior to works commencing
Auckland Council



Long-section	DESIGN FLOW (L/s)	CAPACITY FLOW (L/s)	DATUM =	LID LEVEL (MH)	LID LEVEL (CP)	INVERT LEVEL (MH)	INVERT LEVEL (pipe at MH)	INVERT LEVEL (pipe at CP)	INVERT LEVEL (CP)	DEPTH TO INVERT (MH)	DEPTH TO INVERT (pipe at MH)	DEPTH TO INVERT (pipe at CP)	DEPTH TO INVERT (CP)	PIPE GRADE	SIZE AND TYPE	DISTANCE (M)
CP 09	10.11	55.76	26.0	57.84	57.08	55.72	55.80	56.03	55.58	2.12	2.04	1.05	1.50	1.10%	225ø Class 4	20.88
CP 10	15.02	85.53	27.0	56.03	56.09	53.59	54.79	54.83	54.38	2.44	1.24	1.25	1.70	2.60%	225ø Class 4	1.85
CP 13	23.47	53.09	34.0	62.73	62.53	61.11	61.38	61.42	60.97	1.63	1.35	1.11	1.56	1.00%	225ø Class 4	3.76
CP 14	19.35	53.09	34.0	62.73	62.53	61.11	61.18	61.29	60.84	1.63	1.56	1.24	1.69	1.00%	225ø Class 4	10.80
CP 15	18.18	105.17	37.0	64.75	64.62	63.20	63.30	63.40	62.95	1.54	1.44	1.22	1.67	3.92%	225ø Class 4	2.50
CP 16	16.16	53.09	37.0	64.75	64.60	63.20	63.25	63.36	62.91	1.54	1.49	1.24	1.69	1.00%	225ø Class 4	10.53
CP 17	23.09	142.86	40.0	68.27	68.32	66.18	66.48	66.79	66.34	2.08	1.78	1.53	1.98	7.24%	225ø Class 4	4.22
CP 18	24.62	53.09	40.0	68.27	68.36	66.18	66.83	66.95	66.50	2.08	1.43	1.41	1.86	1.00%	225ø Class 4	11.44
DCP 01	[illegible]	[illegible]	20.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DCP 02	[illegible]	[illegible]	20.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DCP 03	25.16	117.08	22.0	49.90	50.07	46.82	48.48	48.57	48.12	3.08	1.42	1.50	1.95	4.86%	225ø Class 4	1.86
DCP 04	30.39	53.09	21.0	49.90	49.46	46.82	48.12	48.23	47.78	3.08	1.77	1.23	1.68	1.00%	225ø Class 4	10.05
DCP 11	28.33	114.33	34.0	62.55	62.32	60.15	61.11	61.14	60.69	2.41	1.44	1.19	1.64	1.00%	300ø Class 4	2.50
DCP 12	25.36	114.33	34.0	62.51	62.32	60.49	61.13	61.14	60.69	2.01	1.38	1.19	1.64	1.00%	300ø Class 4	1.10

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

STORMWATER LONG-SECTION PLAN SHEET 5 OF 5

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	25.05.18
Drawn:	SB	25.05.18
Checked:	SJ	02.06.18

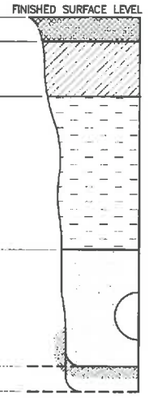
Scale: H1:1000 V1:500 (A3 Original)

Job No:	Dwg No:	Rev:
S3278-2A	424	A

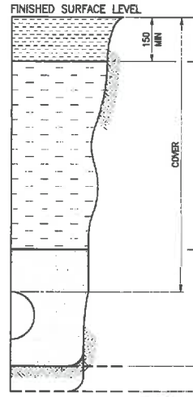
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. EMBEDMENT, TRENCH FILL AND COMPACTION SHALL MEET THE REQUIREMENT OF DESIGN DRAWINGS OR SPECIFICATIONS.
3. SIDES OF EXCAVATION SHALL BE KEPT VERTICAL TO AT LEAST 150mm ABOVE THE PIPE

MATERIAL	ZONE
TO AUCKLAND TRANSPORT REQUIREMENTS	SURFACE COURSE
TO MATCH EXISTING ROAD BASE OR TO AUCKLAND TRANSPORT REQUIREMENTS	ROAD BASE
TRENCH FILL MATERIALS IN ACCORDANCE WITH SW02 AND SW03, COMPACTED IN LAYERS OF NOT MORE THAN 300mm OR AS SPECIFIED	TRENCH FILL (AS SPECIFIED IN DESIGN DRAWINGS)
EMBEDMENT MATERIAL IN ACCORDANCE WITH SW02 AND SW03	EMBEDMENT
	OVER-EXCAVATION



VEHICULAR LOADING (CARRIAGEWAY)



ZONE	MATERIAL
TOPSOIL OR PAVEMENT	ORIGINAL OR IMPORTED MATERIAL TO MATCH EXISTING
TRENCH FILL (AS SPECIFIED IN DESIGN DRAWINGS)	INORGANIC FILL MATERIAL PLACED IN LAYERS NOT MORE THAN 300mm OR AS SPECIFIED
EMBEDMENT	EMBEDMENT MATERIAL IN ACCORDANCE WITH SW02 AND SW03
OVER-EXCAVATION	

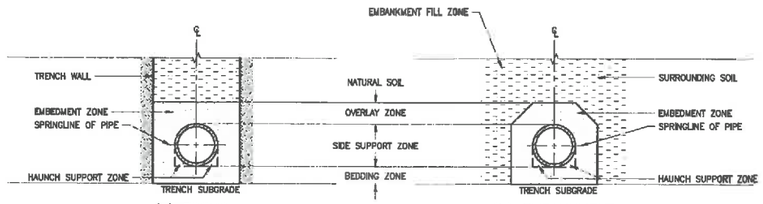
NO VEHICULAR LOADING (NON CARRIAGEWAY)
INCLUDES LOCATIONS WHERE OCCASIONAL VEHICLE LOADING OCCURS

STORMWATER CODE OF PRACTICE
STANDARD DETAILS
REVISION: 2
REV DATE: 1 NOVEMBER 2015
CAD FILENAME: AC-STD-SW01.DWG

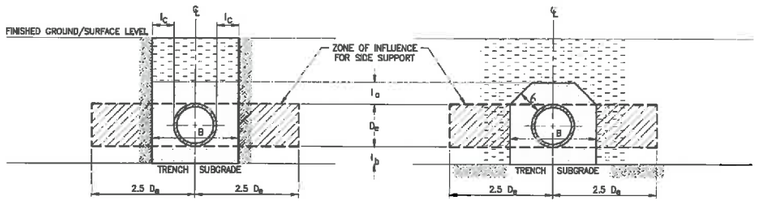
AUCKLAND COUNCIL

EMBEDMENT & TRENCHFILL
TYPICAL ARRANGEMENT

ENVIRONMENTAL-SW | ORIGINAL SCALE SCALE: N.T.S. | A3
DRAWING SET: SWCoP | SHEET: 1 OF 1
DRAWING No.: SW01 | REV: 2



(a) TRENCH (b) EMBANKMENT



(a) TRENCH (b) EMBANKMENT

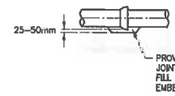
MINIMUM EMBEDMENT ZONE DIMENSIONS				
D_e (mm)	MINIMUM DIMENSION (mm)			
	l_b	l_c	l_o	$B=D_e+2l_c$
$75 \le D_e \le 150$	75	100	100	275 – 350
$150 < D_e \le 300$	100	150	150	450 – 600
$300 < D_e \le 450$	100	200	150	700 – 850
$450 < D_e \le 900$	150	300	150	1050 – 1500
$900 < D_e \le 1500$	150	350	200	1600 – 2200
$1500 < D_e \le 4000$	150	$0.25D_e$	300	2250 – 6000

DEFINITIONS OF SYMBOLS USED:

- B TRENCH WIDTH
- D_e EXTERNAL DIAMETER OF PIPELINE.
- l_b DEPTH OF BEDDING UNDER BARREL OF PIPELINE.
- l_c MINIMUM DISTANCE BETWEEN SPRINGLINE OF PIPE AND PERMANENT SIDE OF TRENCH.
- l_o MINIMUM DEPTH OF COVER OVER SOFFIT OF PIPELINE.

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH SW01.
2. FLEXIBLE PIPES INCLUDES PVC, GRP, PP AND PE.
3. PLACEMENT OF EMBEDMENT, TRENCHFILL, & COMPACTION SHALL MEET THE REQUIREMENTS OF DRAWINGS AND SPECIFICATIONS.
4. EXCAVATE OR COMPACT TRENCH FLOOR TO PROVIDE A FLAT FIRM BASE TO SUPPORT BEDDING MATERIAL AND MINIMISE PIPELINE SETTLEMENT. REPLACE EXCAVATED MATERIAL WITH SUITABLE GRANULAR MATERIAL FOR BEDDING.
5. ENSURE THAT THE BEDDING IS DEEP ENOUGH SO THAT PIPE JOINT PROJECTIONS (SOCKETS, FLANGES) DO NOT TOUCH THE TRENCH FLOOR (SEE DETAIL BELOW).
6. BEDDING MATERIALS SHALL BE GAP/SAP < 12.
7. THIS DRAWING IS BASED ON AS/NZS 2566 PART 2: 2002 "BURIED FLEXIBLE PIPELINES & INSTALLATION" AND REPRODUCED WITH THE PERMISSION OF STANDARDS NEW ZEALAND.



PIPE JOINT BEDDING POCKETS
FOR JOINT PROJECTIONS

STORMWATER CODE OF PRACTICE
STANDARD DETAILS
REVISION: 2
REV DATE: 1 NOVEMBER 2015
CAD FILENAME: AC-STD-SW02.DWG

AUCKLAND COUNCIL

PIPE EMBEDMENTS
STANDARD EMBEDMENT FOR FLEXIBLE PIPES

ENVIRONMENTAL-SW | ORIGINAL SCALE SCALE: N.T.S. | A3
DRAWING SET: SWCoP | SHEET: 1 OF 1
DRAWING No.: SW02 | REV: 2

Engineering plans approved
ENG60321596 21/05/18
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A: 103 Market Street, Te Awamutu
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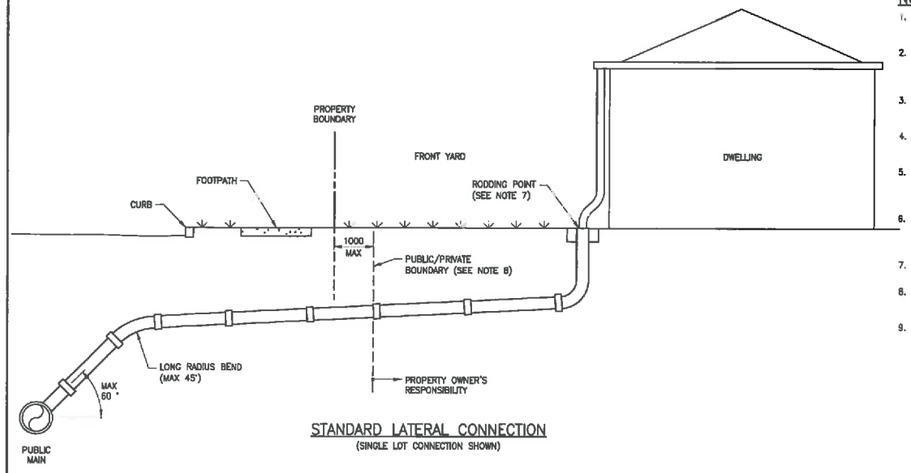
OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

STORMWATER
TYPICAL DETAIL PLAN
SHEET 1 OF 4

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)
Job No.: S3278-2A
Dwg No.: 440
Rev: A

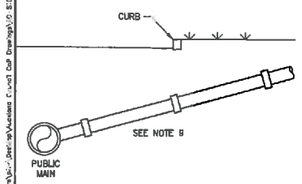


STANDARD LATERAL CONNECTION

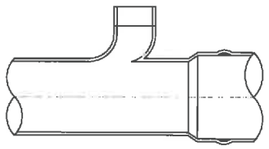
(SINGLE LOT CONNECTION SHOWN)

NOTES:

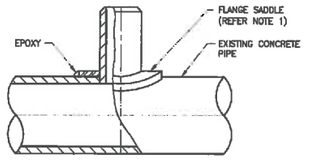
1. MAXIMUM LATERAL DIAMETER SHALL BE LESS THAN HALF THE DIAMETER OF THE MAIN PIPE, FOR SADDLE OR JUNCTION CONNECTIONS.
2. FOR A CONNECTION TO A PE MAIN A JUNCTION SHALL BE CUT IN WITH 'ELECTROFUSION' COUPLERS. ALTERNATIVELY A SADDLE MAY BE ELECTROFUSED INTO PIPE. SPECIFIC APPROVAL FROM AUCKLAND COUNCIL IS REQUIRED TO SADDLE INTO A PE MAIN.
3. IF THE LATERAL DIAMETER IS GREATER THAN HALF THE DIAMETER OF THE MAIN PIPE, THE JUNCTION SHALL ALWAYS BE THROUGH A CHAMBER.
4. FOR SADDLE INSERTS THE HOLE IN THE EXISTING PIPE SHALL BE DRILLED NO PROTRUSION WILL BE ALLOWED INSIDE THE BORE.
5. WHERE THE PRIVATE CONNECTION PIPE CANNOT BE CONSTRUCTED DUE TO PHASING OF THE DEVELOPMENT, THE POINT OF CONNECTION SHALL BE MARKED BY A BLUE 25mm DIA uPVC TUBE. SEE SECTION 4.3.11.
6. WHEN THE PIPELINE BEING CONNECTED TO THE PUBLIC MAIN IS LARGER THAN 300mm DIAMETER, OR WHERE THE PIPE SERVES MORE THAN THREE LOTS, THE CONNECTION SHALL BE MADE AT A MANHOLE.
7. A RODDING POINT SHALL BE PROVIDED ON THE PRIVATE LATERAL TO ALLOW CCTV ACCESS.
8. PUBLIC/PRIVATE BOUNDARY SHALL BE EITHER 1.0m INSIDE PRIVATE BOUNDARY OR AT THE FIRST PIPE JOINT, WHICHEVER IS THE LEAST.
9. THE CENTRELINE OF THE LATERAL SHALL BE ABOVE THE SPRING LINE OF THE MAIN.



ALTERNATIVE LATERAL CONNECTION

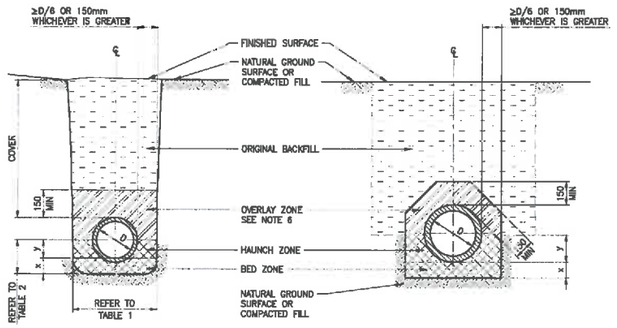


REINFORCED PVC JUNCTION



VITREOUS CLAY SADDLE ONTO CONCRETE MAIN

STORMWATER CODE OF PRACTICE STANDARD DETAILS REVISION: 2 REV DATE: 1 NOVEMBER 2015 CAD FILENAME: AC-STD-SW04.DWG	AUCKLAND COUNCIL STORMWATER SERVICE CONNECTIONS PVC AND CONCRETE PIPE	ENVIRONMENTAL-SW	ORIGINAL SCALE: M.T.S. A3 DRAWING SET: SWCoP SHEET: 1 OF 1 DRAWING No.: SW04 REV: 2	



TRENCH CONDITION

EMBANKMENT CONDITION

H2 TYPE BEDDING – CONCRETE PIPES

NOTES:

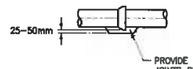
1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH SW01.
2. CONCRETE PIPE CLASS SHALL BE DESIGNED IN ACCORDANCE WITH AS/NZS 3725: 2007, USING H2 BEDDING, TO CONSTRUCTION OR FINAL CONDITION LOADINGS, WHICHEVER IS GREATER.
3. PLACEMENT OF EMBEDMENT, TRENCHFILL, & COMPACTION SHALL MEET THE REQUIREMENTS OF DRAWINGS AND SPECIFICATIONS.
4. EXCAVATE OR COMPACT TRENCH FLOOR TO PROVIDE A FLAT FIRM BASE TO SUPPORT BEDDING MATERIAL AND MINIMISE PIPELINE SETTLEMENT. REPLACE EXCAVATED MATERIAL WITH SUITABLE GRANULAR MATERIAL FOR BEDDING.
5. ENSURE BEDDING IS DEEP ENOUGH THAT PIPE JOINT PROJECTIONS (SOCKETS) DO NOT TOUCH TRENCH FLOOR (SEE DETAIL BELOW).
6. OVERLAY ZONE TO BE GAP65. OTHER INORGANIC FILL MATERIAL MAY BE SPECIFIED FOR NON-CARRIAGEWAY AREAS.
7. MATERIAL SHALL BE COMPACTED AS NECESSARY TO PREVENT EXCESSIVE SETTLEMENT IN THE GROUND SURFACE LEVEL OVER THE INSTALLED PIPE.
8. WHERE REQUIRED BY SITE CONDITIONS SPECIFIC DESIGN OF PIPE EMBEDMENT MAY BE REQUIRED. THIS SHOULD BE UNDERTAKEN IN ACCORDANCE WITH AS/NZS 3725: 2007 TO THE APPROVAL OF AUCKLAND COUNCIL.
9. EMBEDMENT FOR 'RIGID PIPES' OTHER THAN CONCRETE IS SUBJECT TO SPECIFIC DESIGN AND APPROVAL.

TABLE 1

MAXIMUM PERMISSIBLE TRENCH WIDTHS (IF TRENCH WIDER, USE EMBANKMENT CONDITION)														
NORMAL INTERNAL PIPE DIAMETER (mm)	150	225	300	375	450	525	600	675	750	825	900	975	1050	1200	>1200
MAXIMUM TRENCH WIDTH (mm)	600	600	700	800	900	1000	1100	1200	1300	1400	1500	1500	1600	1800	OD+700

TABLE 2

H2 SUPPORT TYPE	MINIMUM DEPTH (mm)	
	x BED ZONE (mm)	y HAUNCH ZONE (mm)
	100 IF D ≤ 1500 150 IF D > 1500	0.3D



PROVIDE POCKETS IN BED ZONE AT JOINTS PRIOR TO LAYING PIPES. FILL VOID DURING COMPLETION OF EMBEDMENT.

PIPE JOINT BEDDING POCKETS

FOR JOINT PROJECTIONS

STORMWATER CODE OF PRACTICE STANDARD DETAILS REVISION: 2 REV DATE: 1 NOVEMBER 2015 CAD FILENAME: AC-STD-SW03.DWG	AUCKLAND COUNCIL PIPE EMBEDMENTS STANDARD EMBEDMENT FOR CONCRETE PIPES	ENVIRONMENTAL-SW	ORIGINAL SCALE: N.T.S. A3 DRAWING SET: SWCoP SHEET: 1 OF 1 DRAWING No.: SW03 REV: 2	

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ENG 60325796 21/08/18
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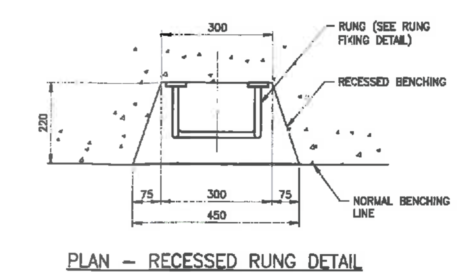
STORMWATER
TYPICAL DETAIL PLAN
SHEET 2 OF 4

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

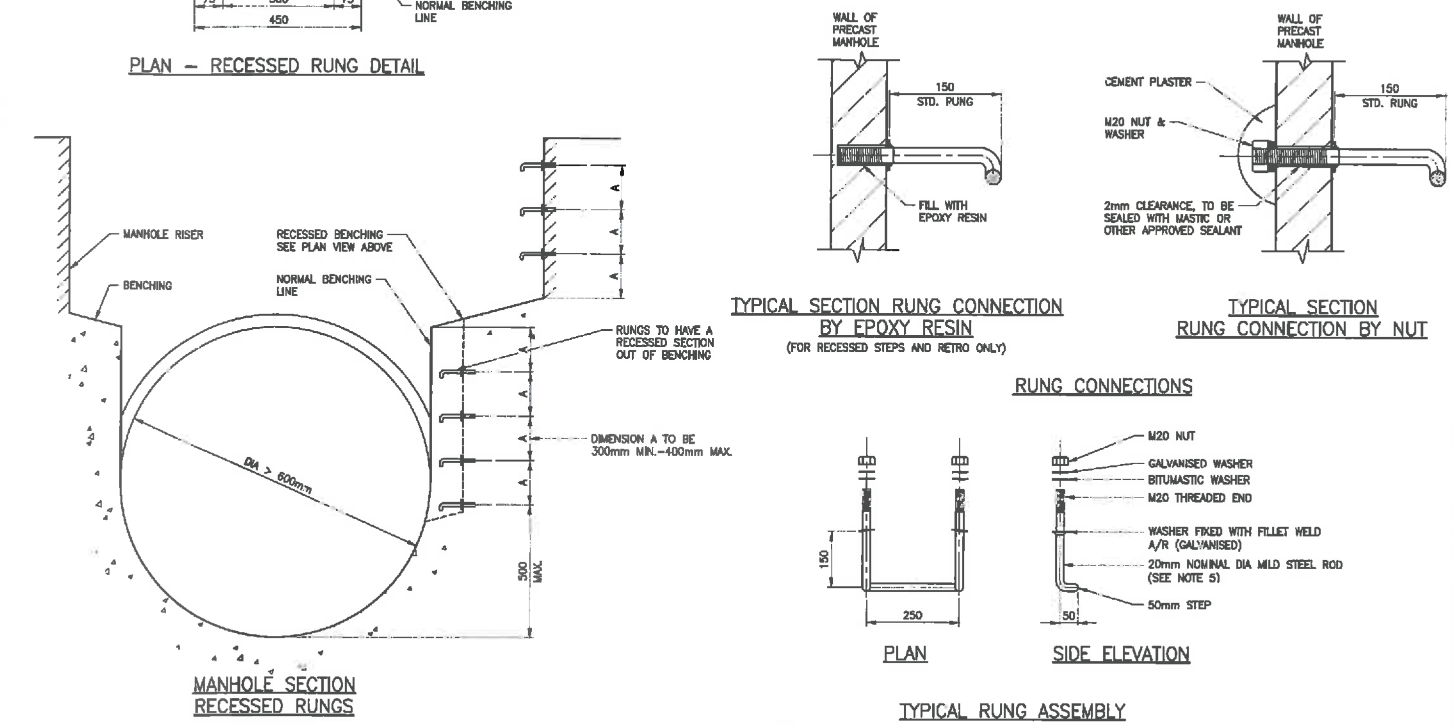
		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)
Job No: S3278-2A
Dwg No: 441
Rev: A

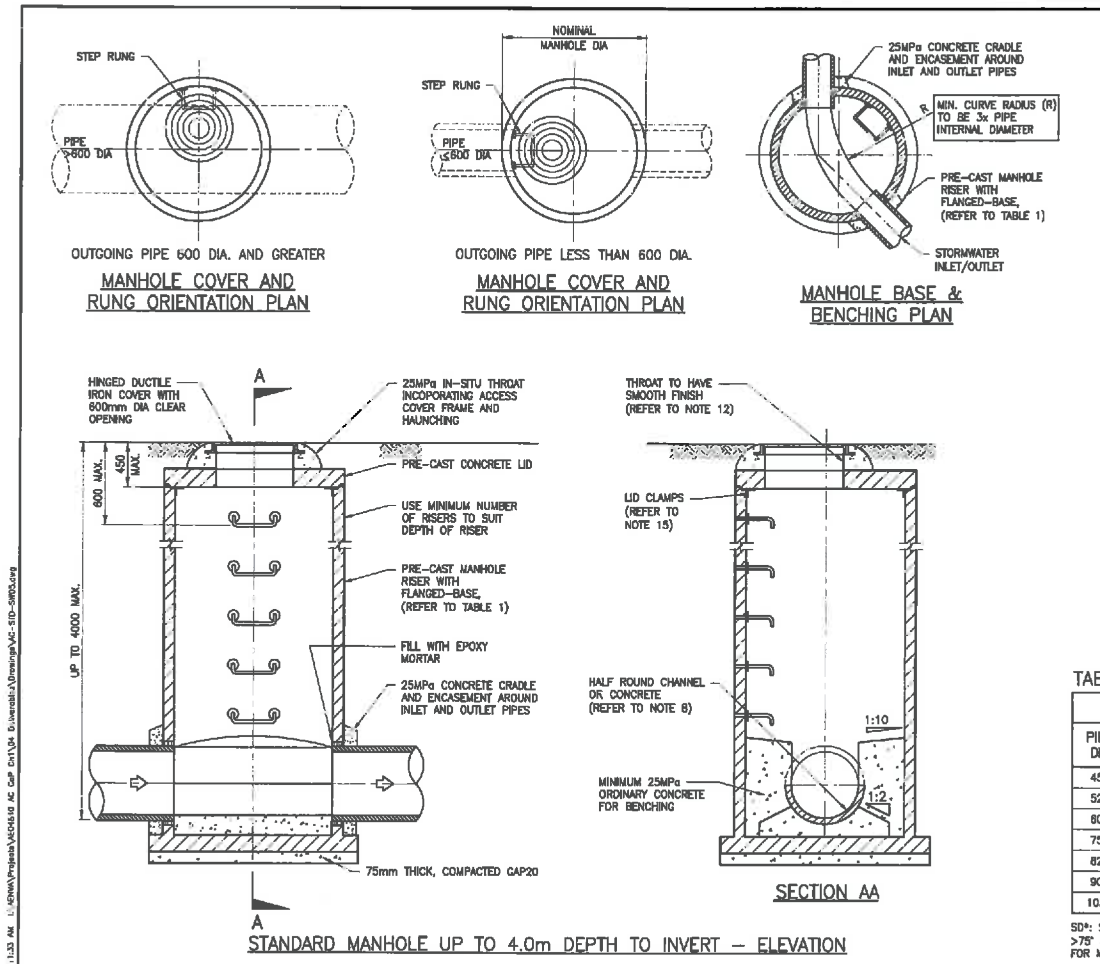


NOTES:

1. RECESSED RUNGS SHALL BE USED FOR PIPE DIAMETERS > 600mm.
2. RECESSED RUNGS SHALL BE LOCATED ON INSIDE CURVE OF BENCHING AND SHALL ALIGN WITH MANHOLE ACCESS RUNGS.
3. ALL STEELWORK SHALL BE 'HOT DIPPED GALVANISED' AFTER FABRICATION HAS BEEN COMPLETED, WITH A MINIMUM AVERAGE COATING WEIGHT OF ZINC=610g/sqm TO AS/NZS 4680–1999.
4. BELOW RL 4.00m OR IN SEVERE EXPOSURE CONDITIONS, PE COATED HOT DIPPED GALVANISED STEEL OR PE COATED 316 STAINLESS STEEL RUNGS SHALL BE USED.
5. STAINLESS STEEL RUNGS MAY BE 16mm DIA SUBJECT TO AUCKLAND COUNCIL APPROVAL.
6. OTHER RUNG SYSTEMS MAY BE UTILISED SUBJECT TO AUCKLAND COUNCIL APPROVAL.



STORMWATER CODE OF PRACTICE STANDARD DETAILS REVISION: 2 REV DATE: 1 NOVEMBER 2015 CAD FILENAME: AC-STD-SW09.DWG	AUCKLAND COUNCIL STORMWATER MANHOLE ACCESS RECESSED RUNGS AND GENERAL ACCESS RUNGS DETAILS	ENVIRONMENTAL–SW Auckland Council	ORIGINAL SCALE A3 SCALE: N.T.S. DRAWING SET: SWCoP SHEET: 1 OF 1 DRAWING No.: SW09 REV: 2



NOTES:

1. SAFE LANDING IS REQUIRED ON BENCHING AT BASE OF RUNGS.
2. ACCESS TO THE MANHOLE SHALL BE CLEAR OF ANY INCOMING PIPES.
3. SEE SECTION 4.3.10.9 OF THE SWCoP FOR 'MANHOLE COVER REQUIREMENTS'.
4. FOR PIPES <450 DIA, ALL PRE-CAST MANHOLE RISERS SHALL BE 1050mm DIA MAXIMUM. IF DEFLECTION ANGLE IS >90° THEN SPECIFIC DESIGN OF THE RISERS IS REQUIRED.
5. FOR PIPE DIAMETERS ≤600mm, ONE FLEXIBLE JOINT IS REQUIRED WITHIN 600mm OF THE RISER WALL. PIPE DIAMETERS GREATER THAN 600mm MAY NOT REQUIRE A FLEXIBLE JOINT.
6. MANHOLES SHALL BE DESIGNED TO USE THE MINIMUM NUMBER OF RISERS AND THE MINIMUM RISER HEIGHT SHALL BE 300mm. NO RISERS SHALL BE CUT DOWN TO HEIGHT.
7. FOR OUTLET PIPES WITH DIAMETERS GREATER THAN 600mm, REFER TO DRAWING SW09 FOR 'RECESSED RUNGS'.
8. WHERE HALF-ROUND CHANNELS ARE NOT AVAILABLE, THE CHANNEL SHALL BE FORMED WITH 25MPa CONCRETE, VIBRATED AND FINISHED SMOOTH. PLASTERING IS NOT PERMITTED.
9. ALL MANHOLE OPENINGS SHALL BE CUT WITH CONCRETE SAW. SLEDGE HAMMERS SHALL NOT BE USED.
10. FOR CONNECTIONS TO MANHOLES REFER TO SECTION 4.3.10.7 OF THE SWCoP.
11. MANHOLES WITH DEPTH TO INVERT LESS THAN 1.5m SHALL HAVE A CENTRALLY LOCATED COVER.
12. THE INSIDE OF THE MANHOLE THROAT SHALL BE PAINTED BLUE. RAISED THROATS ARE PERMITTED, BUT ARE SUBJECT TO SPECIFIC DESIGN.
13. ALL JOINTS BETWEEN RISERS SHALL BE EPOXIED. BUTYL MASTIC MAY BE USED IF APPROVED BY AUCKLAND COUNCIL.
14. WHERE A MANHOLE RISER IS GREATER THAN 2.4m IN HEIGHT ABOVE THE BENCHING, A REDUCER SLAB AND 1050mm RISER MAY BE USED FROM THAT POINT. SPECIFIC DESIGN IS REQUIRED.
15. CONCRETE MANHOLE LIDS SHALL BE FIXED DOWN USING CLAMPS. NO EPOXY OR MASTIC SEAL SHALL BE USED ON LIDS.
16. COVER/FRAME SHALL BE BOLTED TO LID SLAB WITH SS DYNABOLTS AND SEALED WITH EPOXY MORTAR.
17. MANHOLE CONCRETE LIDS AND CAST IRON COVERS SHALL BE DESIGNED IN ACCORDANCE WITH SECTIONS 4.3.10.3 AND 4.3.10.9 OF THE SWCoP.

TABLE 1

MINIMUM MANHOLE RISER DIAMETER

PIPE DIA	DEFLECTION					
	0°	15°	30°	45°	60°	75°
450	1050	1050	1050	1200	1500	1800
525	1050	1050	1200	1200	1500	1800
600	1200	1200	1500	1500	1800	1800
750	1500	1500	1800	1800	SD*	SD*
825	1800	1800	1800	SD*	SD*	SD*
900	1800	1800	SD*	SD*	SD*	SD*
1050	SD*	SD*	SD*	SD*	SD*	SD*

SD*: SPECIFIC DESIGN.
>75° DEFLECTION SHALL REQUIRE 'SPECIFIC DESIGN' FOR MANHOLE RISERS FOR ANY DIAMETER OF PIPE >375mm

STORMWATER CODE OF PRACTICE STANDARD DETAILS REVISION: 2 REV DATE: 1 NOVEMBER 2015 CAD FILENAME: AC-STD-SW05.DWG	AUCKLAND COUNCIL STANDARD STORMWATER MANHOLE SUITABLE FOR UP TO 4.0m DEPTH TO INVERT	ENVIRONMENTAL–SW Auckland Council	ORIGINAL SCALE A3 SCALE: N.T.S. DRAWING SET: SWCoP SHEET: 1 OF 1 DRAWING No.: SW05 REV: 2

Engineering plans approved 21/08/18
ENG 60321596
R.S.
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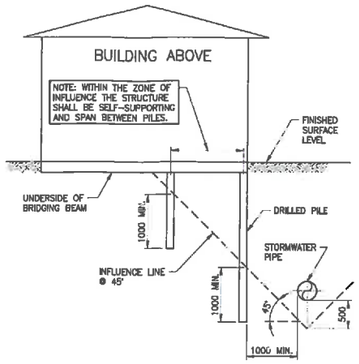
Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

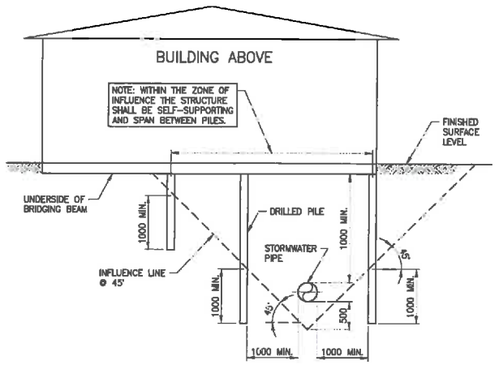
		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)

Job No:	Dwg No:	Rev:
S3278-2A	442	A



BUILD CLOSE



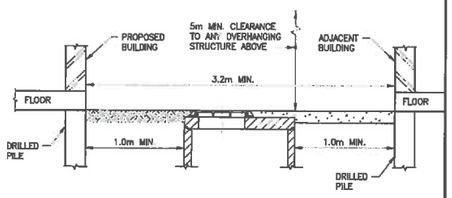
BUILD OVER

"BUILD CLOSE" NOTES:

1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. SPECIFIC APPROVAL IS REQUIRED FROM AUCKLAND COUNCIL IF BUILDING IS ADJACENT TO PIPES LARGER THAN 375mm INTERNAL DIAMETER, OR GREATER THAN 2.0m DEEP.
3. BUILDING SHALL GENERALLY BE OUTSIDE ALL OVERLAND FLOW PATHS AND FLOODPLAINS. SEE SECTION 4.3.5.6 AND 4.3.5.7 OF THE SWCoP FOR FURTHER DETAILS.
4. PILES SHALL BE CONSTRUCTED TO A DEPTH OF 1.0m BELOW INFLUENCE LINE.

"BUILD OVER" NOTES:

1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. THE DETAIL APPLIES TO STORMWATER PIPES 375mm NOMINAL DIAMETER OR LESS.
3. BRIDGING OVER PIPES LARGER THAN 375mm NOMINAL DIAMETER IS GENERALLY NOT ALLOWED.
4. PILES SHALL BE CONSTRUCTED TO A DEPTH OF 1.0m BELOW INFLUENCE LINE.
5. BRIDGING IS GENERALLY NOT ALLOWED OVER PIPES WHERE CLEAR VERTICAL SEPARATION DISTANCE FROM TOP OF PIPE TO UNDERSIDE OF BRIDGING BEAM IS LESS THAN 1.0m.



MANHOLE CONSTRUCTION CLEARANCE

GENERAL NOTES:

1. THE INFORMATION ON THIS PAGE IS INTENDED TO SHOW EXAMPLES OF TYPICAL SCENARIOS AND SHALL BE USED FOR GENERAL GUIDANCE PURPOSES ONLY. SIGNIFICANT VARIATIONS ON A SITE-BY-SITE BASIS ARE TO BE EXPECTED AND IT IS IN NO WAY IMPLIED THAT MEETING ANY OF THESE REQUIREMENTS WILL GUARANTEE APPROVAL.
2. REQUIREMENTS FOR FOUNDATION DESIGN, ETC. APPLY TO BOTH SIDES OF THE PIPE.
3. NO DRIVEN PILES ARE PERMITTED WITHIN 10m OF BRICK STORMWATER STRUCTURES, OR WITHIN 5m OF ALL OTHER STORMWATER STRUCTURES.
4. SPECIFIC APPROVAL IS REQUIRED FROM AUCKLAND COUNCIL FOR DRIVEN PILES IN PARTIALLY DRILLED HOLES, WITHIN THE 5m–10m ZONE.
5. PILES THAT MAY BE REQUIRED TO RESIST HORIZONTAL FORCES WILL REQUIRE SPECIFIC DESIGN.
6. PILE/FOOTING LOCATION POINT MUST BE BELOW 45° "ZONE OF INFLUENCE".
7. ALL MANHOLES SHALL HAVE 24 HOURS UNOBSTRUCTED ACCESS.
8. MANHOLES IN BASEMENTS, OR IN LOCATIONS WHERE SUFFICIENT CLEARANCE IS UNAVAILABLE, ARE NOT PERMITTED.
9. ALL PIPE BUILDOVERS WILL REQUIRE APPROVAL BY AUCKLAND COUNCIL.
10. REFER TO SECTION 4.3.23 OF THE SWCoP FOR PIPE BUILDOVER REQUIREMENTS.
11. FOR MANHOLES GREATER THAN 4m DEEP OR LARGER THAN 1200mm DIA. SPECIFIC DESIGN (INCLUDING CLEARANCE REQUIREMENTS) IS REQUIRED.

STORMWATER CODE OF PRACTICE
STANDARD DETAILS

REVISION: 2
REV DATE: 1 NOVEMBER 2015
CAD FILENAME: AC-STD-SW22.DWG

AUCKLAND COUNCIL

STORMWATER PIPE AND MANHOLE CONSTRUCTION CLEARANCE REQUIREMENTS

MANHOLES NEAR BUILDINGS AND BUILDING CLOSE OVER PIPES

ENVIRONMENTAL-SW

ORIGINAL SCALE A3
SCALE: N.T.S.
DRAWING SET SWCoP
SHEET 1 OF 1
DRAWING No. SW22
REV 2

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ENG 6032/596 21/06/18
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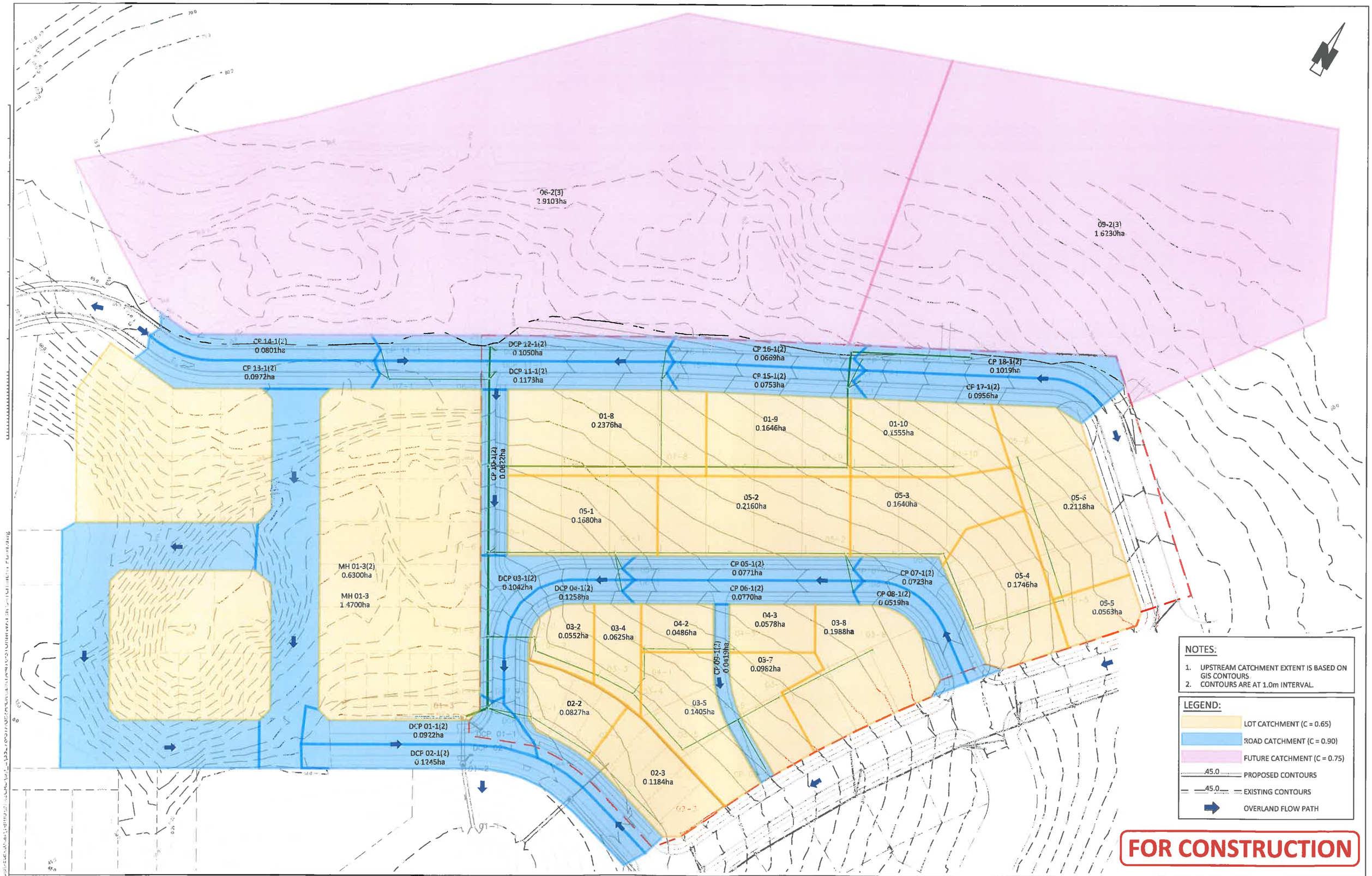
OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

STORMWATER
TYPICAL DETAIL PLAN
SHEET 4 OF 4

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)
Job No: S3278-2A
Dwg No: 443
Rev: A



NOTES:

1. UPSTREAM CATCHMENT EXTENT IS BASED ON GIS CONTOURS.
2. CONTOURS ARE AT 1.0m INTERVAL.

LEGEND:

- LOT CATCHMENT (C = 0.65)
- ROAD CATCHMENT (C = 0.90)
- FUTURE CATCHMENT (C = 0.75)
- 45.0 PROPOSED CONTOURS
- 45.0 EXISTING CONTOURS
- OVERLAND FLOW PATH

FOR CONSTRUCTION

CKL
Planning | Surveying | Engineering | Environmental

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

STORMWATER CATCHMENT PLAN

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:1250 (A3 Original)

Job No: S3278-2A
Dwg No: 470
Rev: A

REFER DWG NO.502

REFER DWG NO.503

REFER DWG NO.501

SUNNYHEIGHTS ROAD

ROAD 08

ROW 12

ROW 11

CROZIER PLACE

CELESTIAL CRESCENT

LOT 608 LOT 607 LOT 609 LOT 505 LOT 506 LOT 503 LOT 124 LOT 123 LOT 122 LOT 121 LOT 120 LOT 119 LOT 118 LOT 117 LOT 116 LOT 115 LOT 114 LOT 113 LOT 112 LOT 111 LOT 110 LOT 125 LOT 126 LOT 127 LOT 128 LOT 129 LOT 130 LOT 131 LOT 132 LOT 133 LOT 134 LOT 135 LOT 136 LOT 137 LOT 138 LOT 139 LOT 140 LOT 141 LOT 142 LOT 143 LOT 144 LOT 145 LOT 146 LOT 147 LOT 148 LOT 149 LOT 150

CP 14-1 CP 13-1 EE-1 EE-2 AA-1 AA-2 AA-3 AA-4 AA-5 AA-6 AA-7 AA-8 AA-9 BB-1 BB-2 BB-3 BB-4 BB-5 BB-6 CC-1 CC-2 CC-3 DD-1 DD-2 DD-3 DD-4 DD-5 P-1 P-2 P-3 P-4 P-5 P-6

Engineering plans approved
ENG 60321596 12/11/18
R.S.
Refer covering letter and ensure meeting held with Network Development Engineer prior to works commencing

WASTEWATER NOTES:

1. ALL WORKS AND MATERIALS TO COMPLY WITH WATERCARE SERVICES LIMITED CODE OF PRACTICE FOR LAND DEVELOPMENT AND SUBDIVISION AND ANY AMENDMENTS.
2. ALL PRIVATE DRAINAGE WORKS TO COMPLY WITH THE NEW ZEALAND BUILDING CODE.
3. ALL DRAINAGE WORKS SHALL BE CARRIED OUT UNDER THE SUPERVISION OF A REGISTERED DRAIN LAYER AND IN ACCORDANCE WITH CURRENT HEALTH AND SAFETY PRACTICES. WHERE REQUIRED, DRAINAGE WORKS ARE TO BE UNDERTAKEN BY AN APPROVED LICENSED CONTRACTOR (A.L.C.)
4. ALL WASTEWATER MAIN PIPELINES ARE TO BE MIN. DN 150 SN16 uPVC PIPE UNLESS SHOWN OTHERWISE.
5. ALL MANHOLES ARE TO BE MIN. DN 1050 FITTED WITH STAINLESS STEEL SAFETY GRILLE WITH HEAVY DUTY D.I. HINGED LID AND FRAME.
6. MANHOLES OVER 3.0m DEPTH TO BE DN 1200. INCL. MANHOLES WITH INTERNAL DROP CONNECTIONS.
7. ALL ORDINARY TRENCH BACKFILL SHALL COMPRISE SUITABLE EARTHFILL FREE OF TOPSOIL/ORGANICS AND SHALL BE WELL COMPACTED IN LAYERS NOT EXCEEDING 200mm TO ACHIEVE MINIMUM SHEAR STRENGTHS OF 140 KPA/MAX. 10% AIR VOIDS OR AS PER THE EARTHWORKS SPECIFICATION.
8. ALL PIPE CROSSINGS UNDER CARRIAGEWAYS/TRAFFIC AREAS TO BE HARDFILL BACKFILLED WITH APPROVED GAP65 TO 1.0m BEYOND EXTENT CARRIAGEWAY. TRENCH HARDFILL BACKFILL TO BE WELL COMPACTED TO ACHIEVE MIN. CLEGG HAMMER CIV=20.
9. ALL PIPE CROSS OVERS ARE TO BE HARDFILL BACKFILLED 1.0m EITHER SIDE OF CROSSOVER.
10. WHERE CLEARANCE BETWEEN PIPELINE CROSSOVERS IS LESS THAN 100mm THE GAP IS TO BE POLYSTYRENE PACKED IN ADDITION TO HARDFILLING OF CROSSOVERS.
11. ALL CONNECTIONS ARE TO BE DN 100 AT MIN. 1.7% GRADIENT UNLESS SHOWN OTHERWISE AND DIMENSIONED FROM THE DOWNSTREAM MANHOLE.

PRE-CONSTRUCTION NOTES:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND ACCURATELY CONFIRM INVERT AND LID LEVELS OF EXISTING WASTEWATER MANHOLES AND CONNECTION POINTS PRIOR TO COMMENCING CONSTRUCTION. WHERE LEVELS DIFFER TO THOSE SHOWN THE CONTRACTOR SHALL ADVISE THE ENGINEER ACCORDINGLY.
2. THE DRAWINGS DO NOT NECESSARILY SHOW ALL EXISTING SERVICES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ACCURATELY LOCATE AND PROTECT ALL EXISTING SERVICES DURING THE CONSTRUCTION PERIOD.

WW DRAINAGE LEGEND:

- EXISTING SW (PUBLIC)
- PROPOSED SW (PUBLIC)
- PROPOSED WW LOT CONNECTION
- PROPOSED WW (PUBLIC)
- EXISTING WW (PUBLIC)

FOR CONSTRUCTION

CKL
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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

WASTEWATER LAYOUT PLAN OVERALL

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:1000 (A3 Original)

Job No: S3278-2A
Dwg No: 500
Rev: A

ROAD 08

LOT 505

Engineering plans approved
ENG 60321596 12/11/18
E-S
Refer covering letter and ensure meeting held with Land Development Engineer prior to works commencing.

AA-4 (1200Ø)
LL 56.29

AA-3 (1050Ø)
LL 54.59

AA-2 (1050Ø)
LL 54.43

AA-1 (1050Ø)
LL 52.19

P-6 (1050Ø)
LL 49.86

P-5 (1050Ø)
LL 49.60

BB-1 (1200Ø)
LL 55.27

BB-2 (1050Ø)
LL 55.29

BB-3 (1200Ø)
LL 55.43

P-4 (1200Ø)
LL 50.33

P-3 (1200Ø)
LL 50.60

BB-4 (1050Ø)
LL 55.18

BB-5 (1050Ø)
LL 58.05

BB-6 (1050Ø)
LL 62.46

CC-1 (1050Ø)
LL 56.66

CC-2 (1050Ø)
LL 57.84

CC-3 (1050Ø)
LL 59.74

LOT 142 LOT 141 LOT 140 LOT 139 LOT 138 LOT 149 LOT 148 LOT 147 LOT 146 LOT 145 LOT 144 LOT 143 LOT 609

ROW 13

CROZIER PLACE

CELESTIAL

WATERCARE SERVICES LIMITED
Network Extension Peer Review
Application Number: 80902
Engineer: U Datt Date: 1-11-18
This is an approval for water and or wastewater only. All materials, workmanship and testing shall be in accordance with the current Watercare Services Code of Practice.
Watercare Services

WASTEWATER NOTES:

1. REFER TO DWG-500 FOR OVERALL WASTEWATER NOTES.

WW DRAINAGE LEGEND:

- EXISTING SW (PUBLIC)
- PROPOSED SW (PUBLIC)
- PROPOSED WW LOT CONNECTION
- PROPOSED WW (PUBLIC)
- EXISTING WW (PUBLIC)

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

WASTEWATER LAYOUT PLAN SHEET 1 OF 3

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:500 (A3 Original)

Job No: S3278-2A Dwg No: 501 Rev: A

Engineering plans approved
ENG 60325596 12/11/18
K.S.
Refer covering letter and ensure meeting held with Land Development Engineer prior to works commencing.
AUCKLAND COUNCIL

SUNNYHEIGHTS ROAD

ROW 12

ROAD 08

EE-2 (1050Ø)
LL 62.68

EE-1 (1050Ø)
LL 62.57

AA-5 (1050Ø)
LL 59.80

AA-6 (1050Ø)
LL 64.21

AA-7 (10
LL 67.93

AA-8 (105
LL 70.61

AA-4 (1200Ø)
LL 56.29

AA-3 (1050Ø)
LL 54.59

AA-2 (1050Ø)
LL 54.43

AA-1 (1050Ø)

DD-1 (1050Ø)
LL 61.84

DD-2 (1050Ø)
LL 64.99

CC-3 (1050Ø)

LOT 124 LOT 123 LOT 122 LOT 121 LOT 120 LOT 119 LOT 118 LOT 117 LOT 116 LOT 115

LOT 125 LOT 126 LOT 127 LOT 128 LOT 129 LOT 130 LOT 131 LOT 132 LOT 133

LOT 143 LOT 142 LOT 141 LOT 140 LOT 139 LOT 505 LOT 509

150Ø

WATERCARE SERVICES LIMITED
Network Extension Peer Review
Application Number 80902
Engineer U Datt Date 1-11-18
This is an approval for water and or wastewater only. All materials, workmanship and testing shall be in accordance with the current Watercare Services Code of Practice.
Watercare Services

WASTEWATER NOTES:

1. REFER TO DWG-500 FOR OVERALL WASTEWATER NOTES.

WW DRAINAGE LEGEND:

- EXISTING SW (PUBLIC)
- PROPOSED SW (PUBLIC)
- PROPOSED WW LOT CONNECTION
- PROPOSED WW (PUBLIC)
- EXISTING WW (PUBLIC)

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

WASTEWATER LAYOUT PLAN SHEET 2 OF 3

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:500 (A3 Original)

Job No: S3278-2A
Dwg No: 502
Rev: A

SUNNYHEIGHTS ROAD

AA-9 (1050Ø)
LL 70.47

AA-8 (1050Ø)
LL 70.61

AA-7 (1050Ø)
LL 67.93

AA-6 (1050Ø)
LL 64.21

DD-1 (1050Ø)
LL 61.84

DD-2 (1050Ø)
LL 64.99

DD-3 (1050Ø)
LL 64.43

DD-4 (1050Ø)
LL 68.34

DD-5 (1050Ø)
LL 70.43

CC-2 (1050Ø)
LL 57.84

CC-3 (1050Ø)
LL 59.74

BB-6 (1050Ø)
LL 62.46

LOT 122 LOT 121 LOT 120 LOT 119 LOT 118 LOT 117 LOT 116 LOT 115 LOT 114

LOT 127 LOT 128 LOT 129 LOT 130 LOT 131 LOT 132 LOT 133 LOT 134 LOT 135 LOT 136 LOT 137 LOT 138 LOT 139 LOT 140 LOT 141 LOT 144 LOT 150 LOT 609 LOT 505 LOT 506 LOT 111 LOT 112 LOT 113

Engineering plans approved
ENG 60321596 12/11/18
Refer covering letter and ensure meeting held with Land Development Engineer prior to works commencing

WATERCARE SERVICES LIMITED
Network Extension Peer Review
Application Number 80902
Engineer U Datt Date 1-11-18
This is an approval for water and or wastewater only. All materials, workmanship and testing shall be in accordance with the current Watercare Services Code of Practice.
Watercare Services

WASTEWATER NOTES:
1. REFER TO DWG-500 FOR OVERALL WASTEWATER NOTES.

WW DRAINAGE LEGEND:
- EXISTING SW (PUBLIC)
- PROPOSED SW (PUBLIC)
- PROPOSED WW LOT CONNECTION
- PROPOSED WW (PUBLIC)
- EXISTING WW (PUBLIC)

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

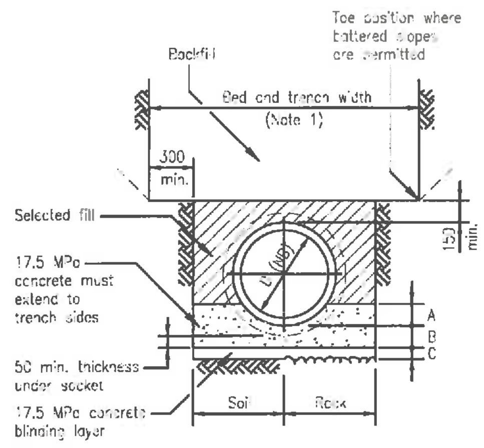
WASTEWATER LAYOUT PLAN SHEET 3 OF 3

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

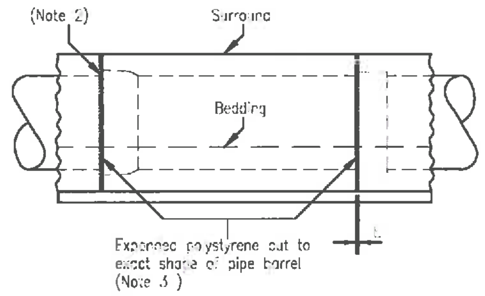
		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:500 (A3 Original)

Job No: S3278-2A Dwg No: 503 Rev: A



CONCRETE BEDDING



CONCRETE BEDDING AND SURROUND

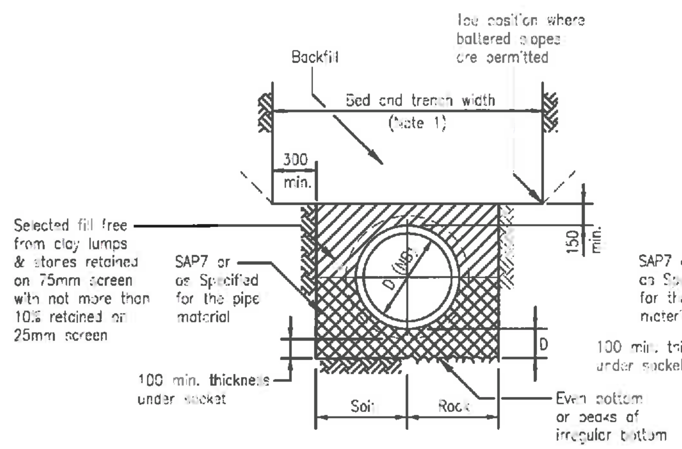
NOTES :

1. Concrete bedding O.A. Width = D+200mm
   Concrete Surround O.A. Width = D+D/2 with Min 50mm concrete either side.
   Granular bedding Min. 300mm either side of the pipe.
2. Fill joint gap outside the rubber ring with soft clay or other approved material.
3. Expanded polystyrene should extend the full cross-section of concrete.
4. Bedding and backfill shall be well compacted in layers not exceeding 200mm depth to AS/NZS 2566.2 clause 5.6.3

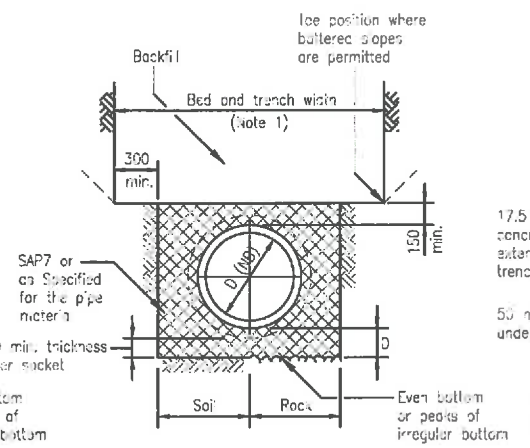
DIMENSION TABLE

	D≤250	D=300
A	0.5D	150
B	100	150
C	50	50
D	150	150
E*	25	25
E**	25	25

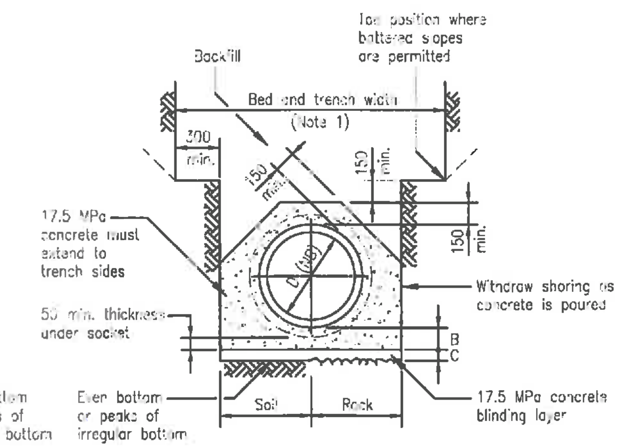
E*=E for concrete surround
E**=E for concrete bedding



GRANULAR BEDDING

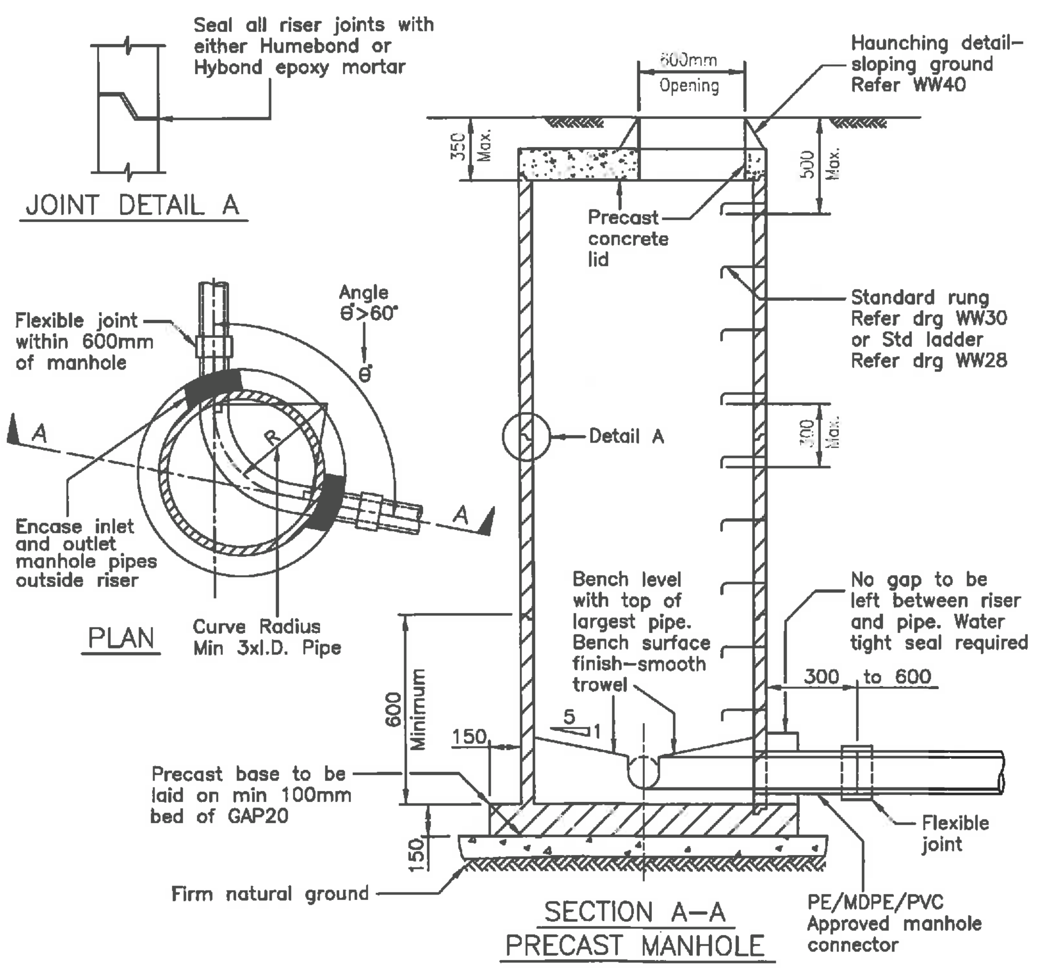


GRANULAR SURROUND



CONCRETE SURROUND

Watercare	BEDDING DETAILS	SCALE: N.T.S.
		ISSUE DATE: 14–04–2015
		DWG No. 2010070.005B
		REFERENCE No. WW 7



Notes:–

1. First joints of inlet and outlet pipes to be not more than 600mm from manholes.
2. Channel through manhole to be lined with vitrified clay half channel.
3. All manhole openings to be cut with concrete saw (Not sledge hammer).
4. All manhole precast risers to be 1050 dia. min. standard for pipes from 150mm dia. up to 300mm dia. Refer to WW13 where there is more than one incoming pipe.
5. If the difference between invert level of outlet and inlet pipes is > 300mm then refer to drawing WW24
6. The manhole diameter shall be increased to compensate for the reduced access space where more than two internal drop connections or more than three invert connections (in addition to the through line) are to be installed. Specific design will be required in sizing such manholes.
7. The manhole diameter shall be increased to 1200mm for all manholes greater than 3.5 metres deep.
8. Refer WW35 for manhole throat and cover details.

Watercare	PRECAST MANHOLE & PRECAST BASE	SCALE: N.T.S.
		ISSUE DATE: 14–04–2015
		DWG No. 2010070.012C
		REFERENCE No. WW 15

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

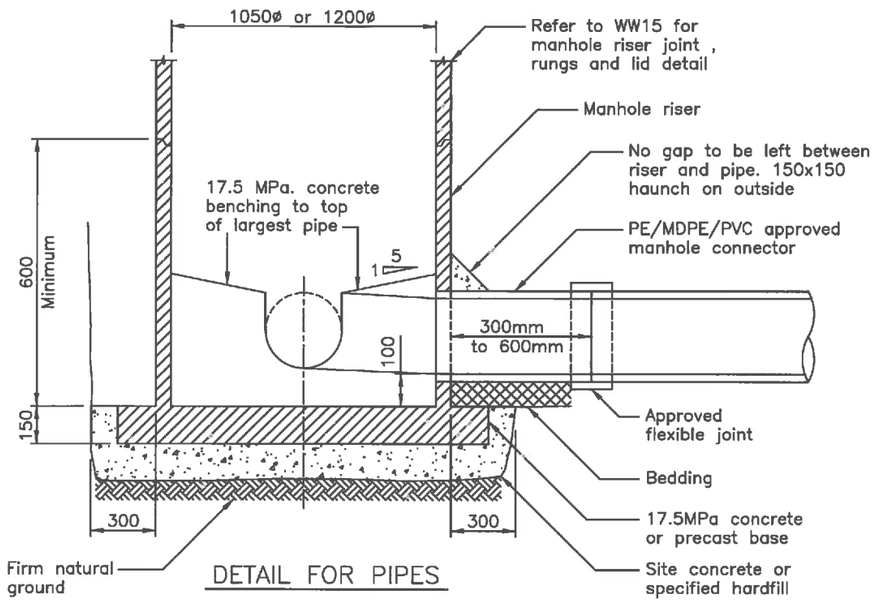
WASTEWATER TYPICAL DETAILS SHEET 1 OF 5

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13 06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)

Job No:	Dwg No:	Rev:
S3278-2A	510	A



DETAIL FOR PIPES

Notes:

1. First joints of inlet and outlet pipes to be not more than 600mm from manholes.
2. Where depth of manhole exceeds 3.5m from ground level to invert a minimum of 1200mmø manhole shall be used.
3. Channel through manhole to be lined with vitrified clay half channel.
4. Where half round channels are not available, the channel shall be formed with 25 MPa premix concrete formed & vibrated to a smooth finish. Plastering is not permitted.

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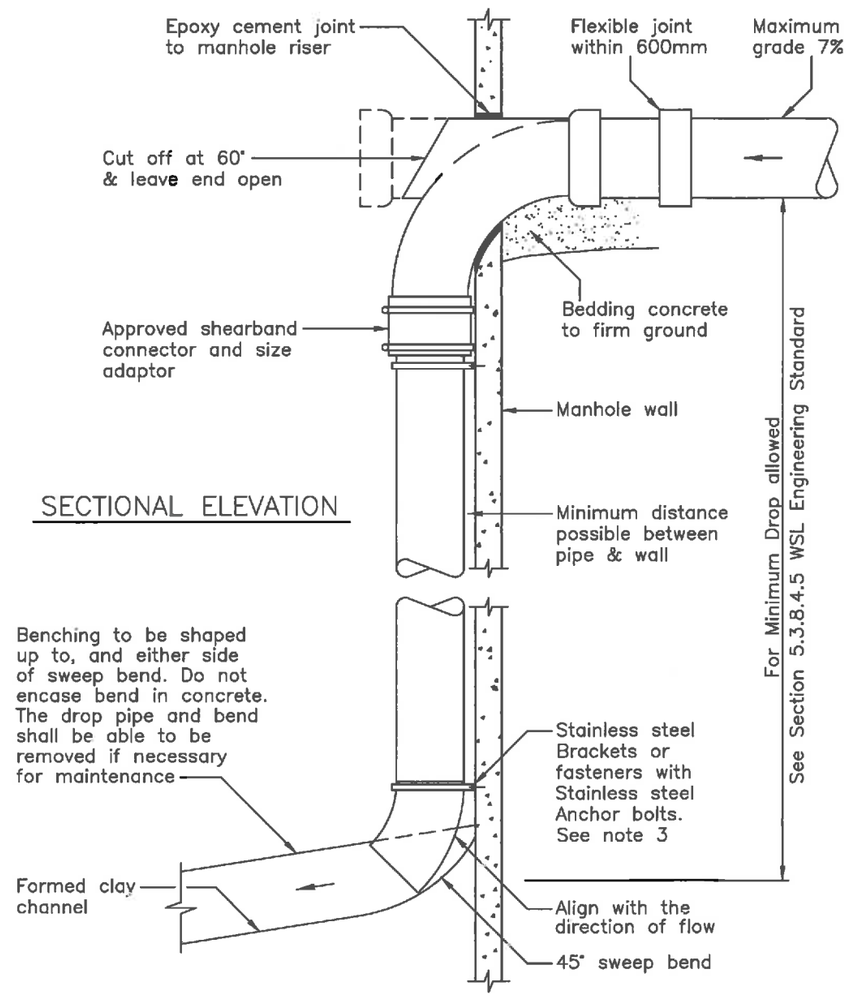
PRECAST MANHOLE BASE & PIPE CONNECTIONS

SCALE:	N.T.S.
ISSUE DATE:	14–04–2015
DWG No.	2010070.013C
REFERENCE No.	WW 16



SECTIONAL ELEVATION

NOTES:

1. Specific approval is required from Watercare for all internal drop connections to existing manholes. Considerations include space available in the existing manhole , number of existing internal drop connections etc.
2. Internal drop shall be clear of Manhole rungs/ladders.
3. 100ø to 225 ø mPVC drop pipe held in place by Stainless steel Brackets or fasteners with M10 Stainless steel Anchor bolts every 600 mm.
4. Specific design is required where the incoming grade exceeds 7%
5. The minium clear diameter in the manhole shall be 1m. Vertical droppers are not allowed in manholes under 1200mm diameter.

L:\---\ EGCADFI \ 2015 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.018B .DWG

INTERNAL MANHOLE DROP PIPE

SCALE:	N.T.S.
ISSUE DATE:	14–04–2015
DWG No.	2010070.018B
REFERENCE No.	WW 24

FOR CONSTRUCTION

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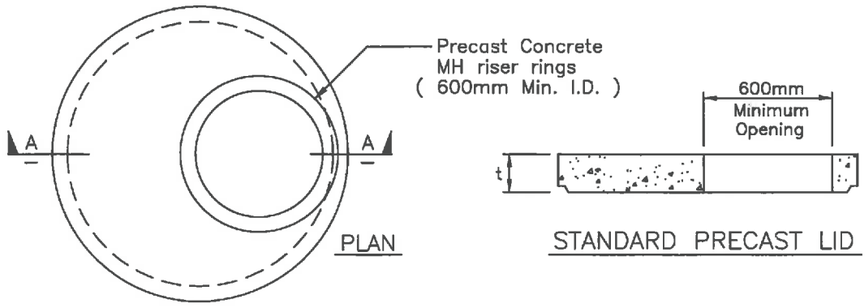
OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

WASTEWATER
TYPICAL DETAILS
SHEET 2 OF 5

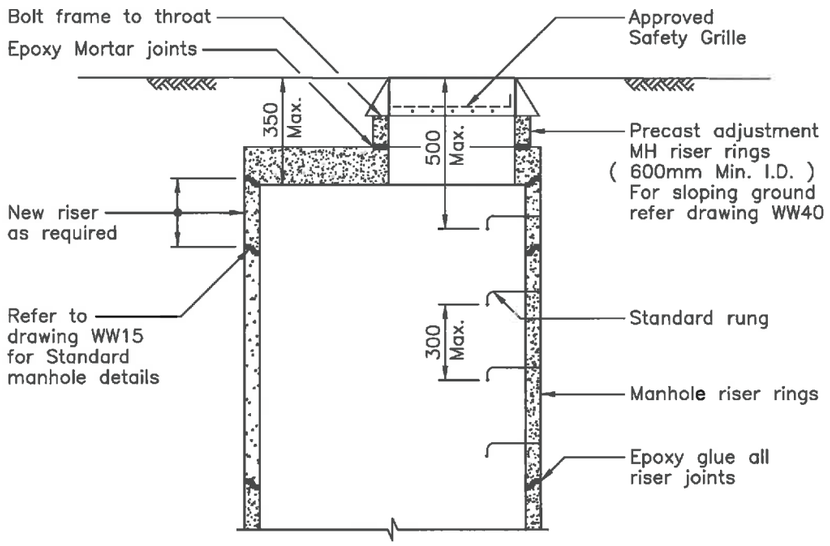
Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: **NTS** (A3 Original)
Job No: **S3278-2A** Dwg No: **511** Rev: **A**



STANDARD PRECAST LID



TYPICAL SECTION A–A
THROUGH MANHOLE

NOTES:

1. Lid supplied to HN–HO–72 loading and Producer Statement 1 (IPENZ)
2. When the height between the top of the existing precast concrete manhole lid and the cast iron frame is greater than 350mm, a new manhole riser is required with a new adjustment ring.
3. Refer drawing WW15 for precast concrete manhole construction details.
4. Refer drawing WW3 for General Construction Notes.
5. Approved Safety Grille below access manhole cover connected to frame.
6. Manhole covers in road shall be constructed so that the cover hinge is facing the oncoming traffic. (Refer Fig 1)
7. For all other covers the orientation should be so that the cover hinge is at 90 degrees from the ladder, Either side. (Refer Fig 2)

Fig 1

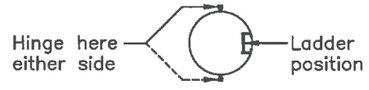
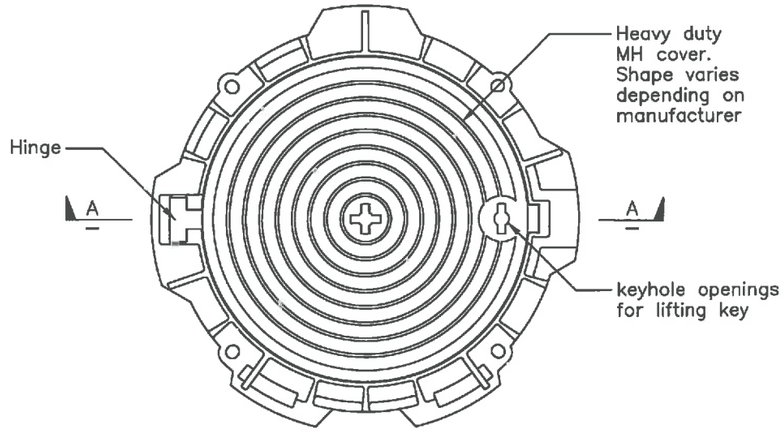


Fig 2

L:\---\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.029A .DWG

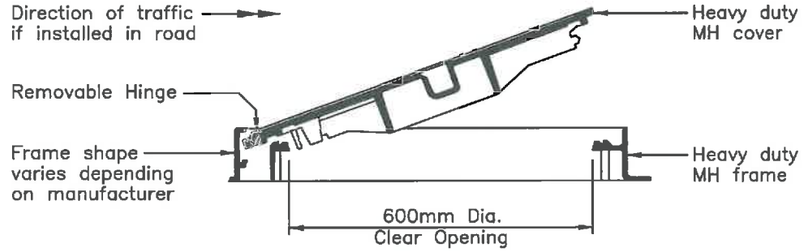
MANHOLE THROAT AND COVER DETAILS

SCALE:	N.T.S.
ISSUE DATE:	17–11–2014
DWG No.	2010070.029A
REFERENCE No.	WW 35



PLAN ON MANHOLE COVER AND FRAME

Not to scale



SECTION A–A

Not to scale

NOTES:

1. No light duty Manhole lids allowed.
2. Other covers and frames as approved by Watercare.
3. Locate lid opening over steps in manhole.
4. Ductile Iron Cover and Frame
5. Hinge shall face on coming traffic when installed in traffic area.
6. Provide an approved Safety Grille below manhole lid. Refer diagram on drawing WW40

MH cover
shape varies
depending on
manufacturer

L:\---\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.031 .DWG

600mm ø HEAVY DUTY
MANHOLE COVER AND FRAME

SCALE:	N.T.S.
ISSUE DATE:	20–9–2013
DWG No.	2010070.031
REFERENCE No.	WW 37

FOR CONSTRUCTION

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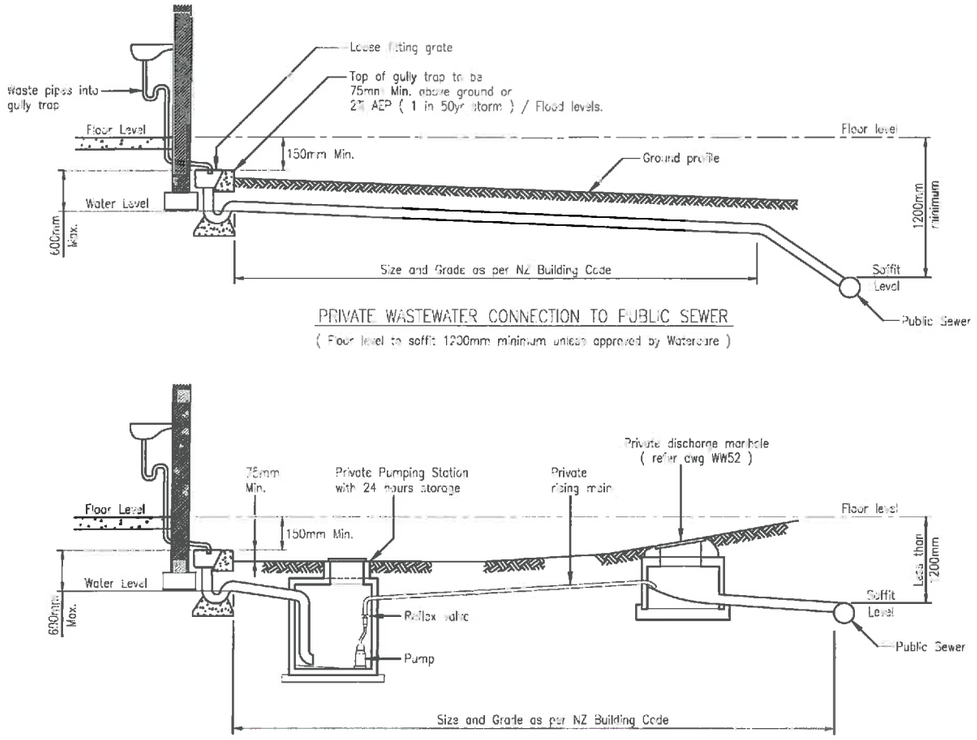
OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

WASTEWATER
TYPICAL DETAILS
SHEET 3 OF 5

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)
Job No: S3278-2A
Dwg No: 512
Rev: A



PRIVATE WASTEWATER CONNECTION TO PUBLIC SEWER

(Floor level to soffit 1200mm minimum unless approved by Watercare)

PRIVATE WASTEWATER PUMPING STATION CONNECTION TO PUBLIC SEWER

(Floor level to soffit less than 1200mm)

NOTE:

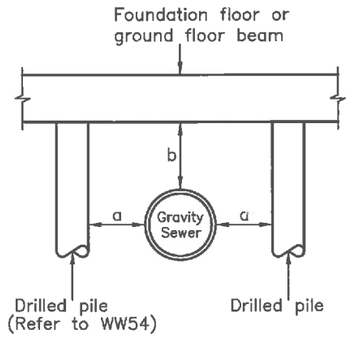
EXAMPLE OF HOUSE SERVICE CONNECTION TO A PUBLIC SEWER

1. Minimum requirements are satisfied when the floor level is at least 1200mm above the soffit of the receiving sewer.
2. Where the receiving sewer is less than 1200mm a private pumping station and discharge manhole shall be installed.
3. Ground around gully trap shall be at least 75mm below the gully trap or 2% of the AEP (Annual exceedance probability) – Rain fall flood levels.
4. Building floor shall be at least 150mm above the gully trap. Gully traps shall not be placed in over land flow paths.

L:\----\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.037A .DWG

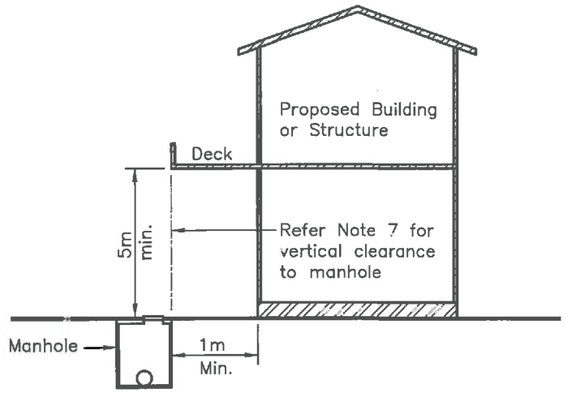
MINIMUM REQUIREMENTS
FOR PRIVATE CONNECTIONS
(FLOOR LEVEL TO SOFFIT OF SEWER)

SCALE:	N.T.S.
ISSUE DATE:	17–11–2014
DWG No.	2010070.037A
REFERENCE No.	WW 46



Minimum Pile Clearances						
Type of Sewer	Sewer Depth < 3m		Sewer Depth 3m–5m		Sewer Depth >5m	
	a	b	a	b	a	b
Local Wastewater Network	1m	0.6m	1m	0.6m	1.5m	0.6m
Transmission (Trunk) Sewer	1m	1m	2m	1m	3m	1.5m

PIPE CONSTRUCTION CLEARANCE



MANHOLE CONSTRUCTION CLEARANCE

NOTES:

1. Locate sewer to survey accuracy or by hand piloting.
2. No driven piles within 5m of a sewer or 10m of brick sewer.
3. All manholes shall have 24 hrs unobstructed access.
4. No construction shall occur above a manhole or within tolerances 'a' or 'b' in table above.
5. Rising mains shall not be built over.
6. Brick sewers and those sewers in poor condition shall not be built over unless they are replaced with new sewers which will be to current standard.
7. Vertical clearance from the top of the chamber shall be 5m Min. over the full width of the chamber.

L:\----\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.044B .DWG

PIPE AND MANHOLE
CONSTRUCTION CLEARANCE

SCALE:	N.T.S.
ISSUE DATE:	19–05–2015
DWG No.	2010070.044B
REFERENCE No.	WW 53

FOR CONSTRUCTION

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A: 103 Market Street, Te Awamutu
P: 07 871 6144

OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

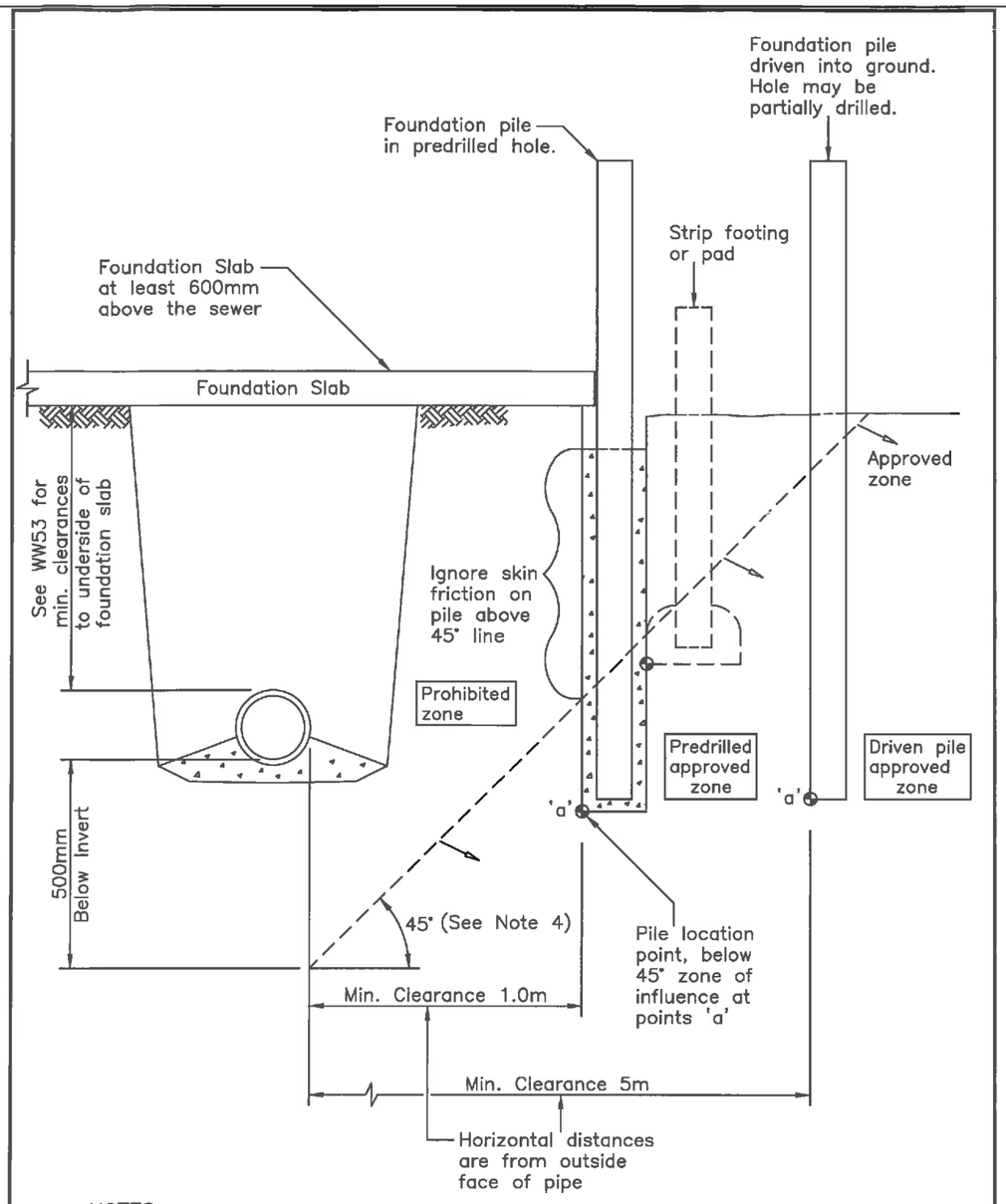
WASTEWATER
TYPICAL DETAILS
SHEET 4 OF 5

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)

Job No: S3278-2A | Dwg No: 513 | Rev: A



NOTES:

1. No driven piles are permitted within 10m of brick Sewers, or within 5m of all other sewers.
2. Piles that are required to resist horizontal forces will require specific design.
3. Pile/Footing location point must be below 45° zone of influence.
4. Zone of influence typically 45° or angle determined by a structural engineer.

L:\---\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.045 .DWG

Watercare

BUILDING CLOSE TO OR OVER LOCAL NETWORK SEWER

SCALE:	N.T.S.
ISSUE DATE:	20-9-2013
DWG No.	2010070.045
REFERENCE No.	WW 54

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

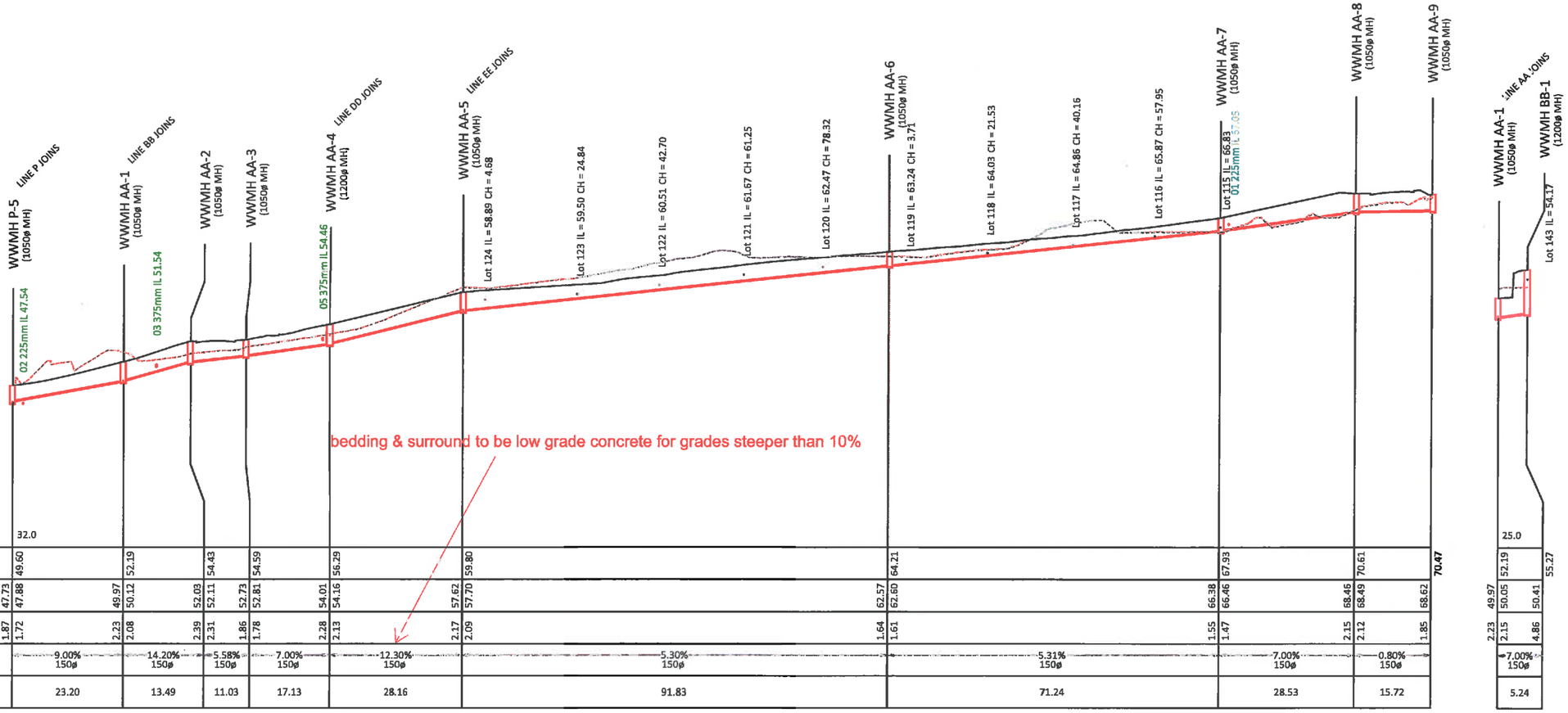
WASTEWATER
TYPICAL DETAILS
SHEET 5 OF 5

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)

Job No: S3278-2A | Dwg No: 514 | Rev: A



NOTES:

1. ALL DISTANCES ARE FROM EDGE OF MANHOEL TO EDGE OF MANHOLE.
2. ALL PIPES TO BE 150Ø uPVC SN16 UNLESS OTHERWISE SHOWN.
3. LOT CONNECTION ILs SHOWN INDICATE THE MAXIMUM ALLOWABLE RL FOR THE PIPE SO THE LOW POINT OF THE LOT IS SERVICED.

LEGEND:

EXISTING GROUND	- - - - - - - -
FINISHED GROUND	————————

Engineering plans approved
ENG 60321596 12/11/18
R.S
Refer covering letter and ensure meeting held with Council's Development Engineer prior to works commencing
Au[illegible]

WATERCARE SERVICES LIMITED
Network Extension Peer Review
Application Number 80902
Engineer U Datt Date 1-11-18
This is an approval for water and or wastewater only. All materials, workmanship and testing shall be in accordance with the current Watercare Services Code of Practice.
Watercare Services

bedding & surround to be low grade concrete for grades steeper than 10%

DATUM = 32.0

	P-5		AA-1		AA-2		AA-3		AA-4		AA-5		AA-6		AA-7		AA-8		AA-9
LID LEVEL	49.60		52.19		54.43		54.59		56.29		59.80		64.21		67.93		70.61		70.47
INVERT LEVEL	47.73 47.88		49.97 50.12		52.03 52.11		52.73 52.81		54.01 54.16		57.62 57.70		62.57 62.60		66.38 66.46		68.46 68.49		68.62
DEPTH TO INVERT	1.87 1.72		2.23 2.08		2.39 2.31		1.86 1.78		2.28 2.13		2.17 2.09		1.64 1.61		1.55 1.47		2.15 2.12		1.85
PIPE GRADE SIZE AND TYPE		9.00% 150ø		14.20% 150ø		5.58% 150ø		7.00% 150ø		12.30% 150ø		5.30% 150ø		5.31% 150ø		7.00% 150ø		0.80% 150ø	
DISTANCE (M)		23.20		13.49		11.03		17.13		28.16		91.83		71.24		28.53		15.72	

LINE AA

25.0

	AA-1		BB-1
LID LEVEL	52.19		55.27
INVERT LEVEL	49.97 50.05		50.41
DEPTH TO INVERT	2.23 2.15		4.86
PIPE GRADE SIZE AND TYPE		7.00% 150ø	
DISTANCE (M)		5.24	

LINE BB

C:\Users\GREG~1.NOY\AppData\Local\Temp\BricsCAD\bp_3\S3278-STAGE2A-ENGDATA-530-532-WASTEWATER LONG SECTIONS.dwg

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

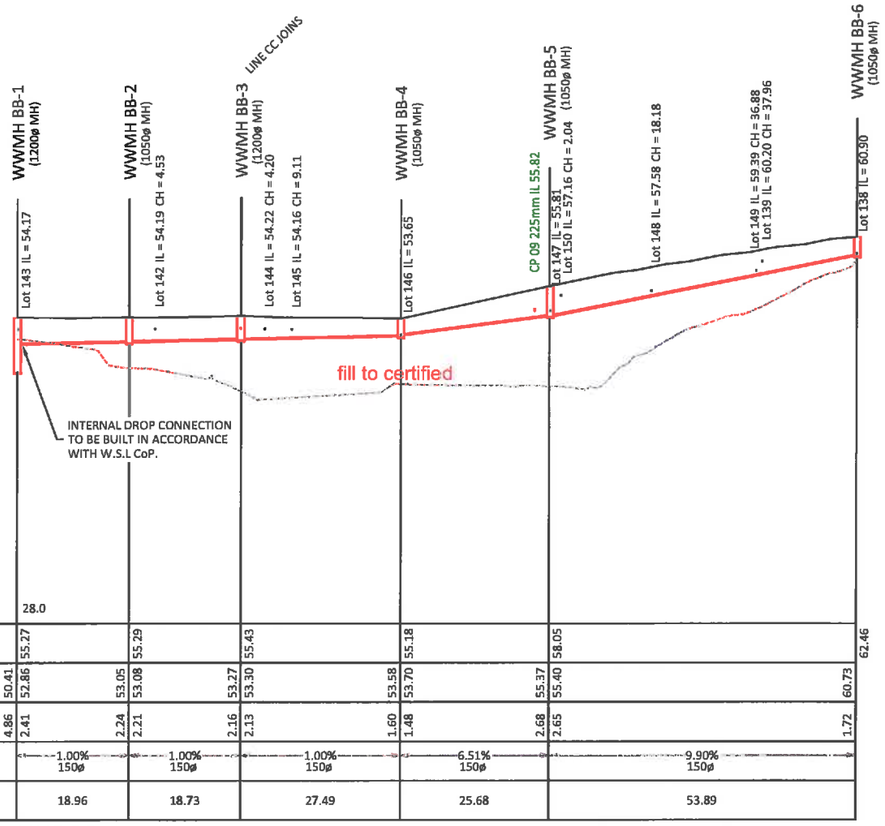
WASTEWATER
LONG-SECTION
SHEET 1 OF 3

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	25.05.18
Drawn:	SB	25.05.18
Checked:	SJ	02.06.18

Scale:
H1:1000 V1:500
(A3 Original)

Job No:	Dwg No:	Rev:
S3278-2A	530	A



NOTES:
1. ALL DISTANCES ARE FROM EDGE OF MANHOEL TO EDGE OF MANHOLE.
2. ALL PIPES TO BE 150Ø uPVC SN16 UNLESS OTHERWISE SHOWN.
3. LOT CONNECTION ILs SHOWN INDICATE THE MAXIMUM ALLOWABLE RL FOR THE PIPE SO THE LOW POINT OF THE LOT IS SERVICED.

LEGEND:

EXISTING GROUND	- - - - - - -
FINISHED GROUND	———————

Engineering plans approved
ENG60321596 12 / 11 / 18
R.S.
Refer covering letter and ensure meeting held with council's Development Engineer prior to works commencing

WATERCARE SERVICES LIMITED
Network Extension Peer Review
Application Number 80902
Engineer U Datt Date 1-11-18
This is an approval for water and or wastewater only. All materials, workmanship and testing shall be in accordance with the current Watercare Services Code of Practice.
Watercare Services

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P: 07 871 6144

OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

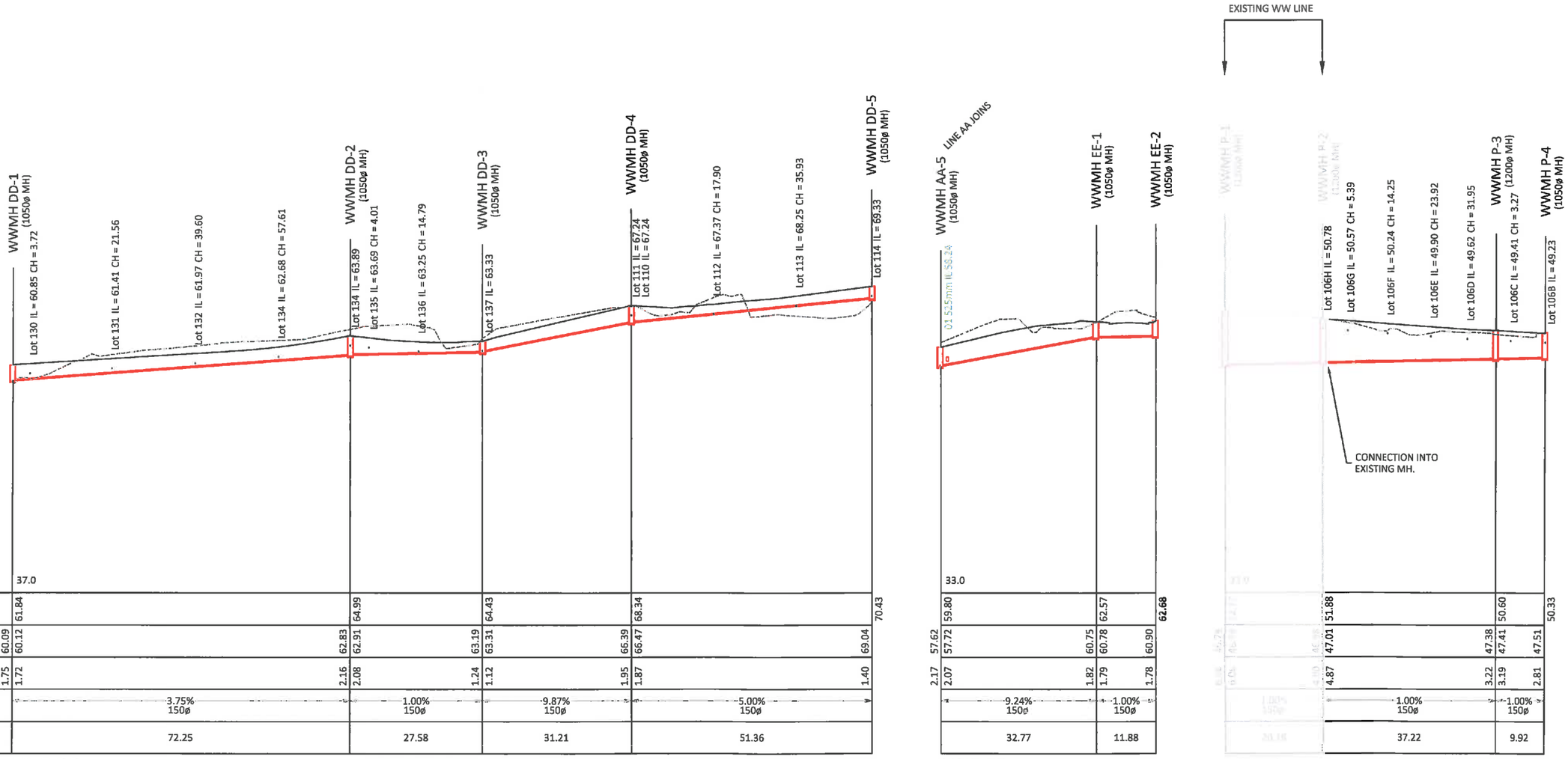
WASTEWATER
LONG-SECTION
SHEET 2 OF 3

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	25.05.18
Drawn:	SB	25.05.18
Checked:	SJ	02.06.18

Scale:
H1:1000 V1:500
(A3 Original)

Job No:	Dwg No:	Rev:
S3278-2A	531	A



NOTES:
1. ALL DISTANCES ARE FROM EDGE OF MANHOEL TO EDGE OF MANHOLE.
2. ALL PIPES TO BE 150Ø uPVC SN16 UNLESS OTHERWISE SHOWN.
3. LOT CONNECTION ILs SHOWN INDICATE THE MAXIMUM ALLOWABLE RL FOR THE PIPE SO THE LOW POINT OF THE LOT IS SERVICED.

LEGEND:	
EXISTING GROUND	- - - - - -
FINISHED GROUND	———

Engineering plans approved
ENG 60321596 12/11/18
R.S.
Refer covering letter and ensure meeting held wit[h] council's Development Engineer prior to works commencing
Auckland Council

DATUM =	37.0								
LID LEVEL	61.84		64.99		64.43		68.34		70.43
INVERT LEVEL	60.09 60.12		62.83 62.91		63.19 63.31		66.39 66.47		69.04
DEPTH TO INVERT	1.75 1.72		2.16 2.08		1.24 1.12		1.95 1.87		1.40
PIPE GRADE SIZE AND TYPE		3.75% 150ø		1.00% 150ø		9.87% 150ø		5.00% 150ø	
DISTANCE (M)		72.25		27.58		31.21		51.36	

LINE DD

33.0					
59.80		62.57		62.68
57.62 57.72		60.75 60.78		60.90
2.17 2.07		1.82 1.79		1.78
	9.24% 150ø		1.00% 150ø	
	32.77		11.88	

LINE EE

51.88		50.60		50.33
47.01		47.38 47.41		47.51
4.87		3.22 3.19		2.81
	1.00% 150ø		1.00% 150ø	
	37.22		9.92	

LINE P

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

WASTEWATER
LONG-SECTION
SHEET 3 OF 3

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	25.05.18
Drawn:	SB	25.05.18
Checked:	SJ	02.06.18

Scale:
H1:1000 V1:500
(A3 Original)

Job No:	Dwg No:	Rev:
S3278-2A	532	A

W:\S3\S32\S327\S3278\engineering\STAGE 2A\2 - Design\2 - CAD\Working\S3278-STAGE2A-ENGDATA-530-537-WASTEWATER LONG SECTIONS.dwg

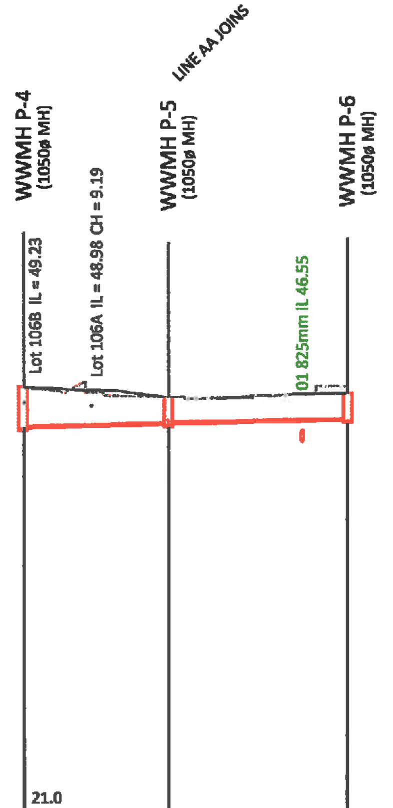
NOTES:

1. ALL DISTANCES ARE FROM EDGE OF MANHOEL TO EDGE OF MANHOLE.
2. ALL PIPES TO BE 150Ø uPVC SN16 UNLESS OTHERWISE SHOWN.
3. LOT CONNECTION ILs SHOWN INDICATE THE MAXIMUM ALLOWABLE RL FOR THE PIPE SO THE LOW POINT OF THE LOT IS SERVICED.

LEGEND:

EXISTING GROUND	- - - - - - - - -
FINISHED GROUND	————————

Engineering plans approved
ENG 60321596 12/11/18
K.S.
Refer covering letter and ensure meeting held with ... Development Engineer prior to works commencing



DATUM = 21.0

	WWMH P-4	P-4 to P-5	WWMH P-5	P-5 to P-6	WWMH P-6
LID LEVEL	50.33		49.60		49.86
INVERT LEVEL	47.51 / 47.54		47.73 / 47.76		47.99
DEPTH TO INVERT	2.81 / 2.78		1.87 / 1.84		1.86
PIPE GRADE SIZE AND TYPE		1.00% 150ø		1.00% 150ø	
DISTANCE (M)		18.66		23.43	

LINE P

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

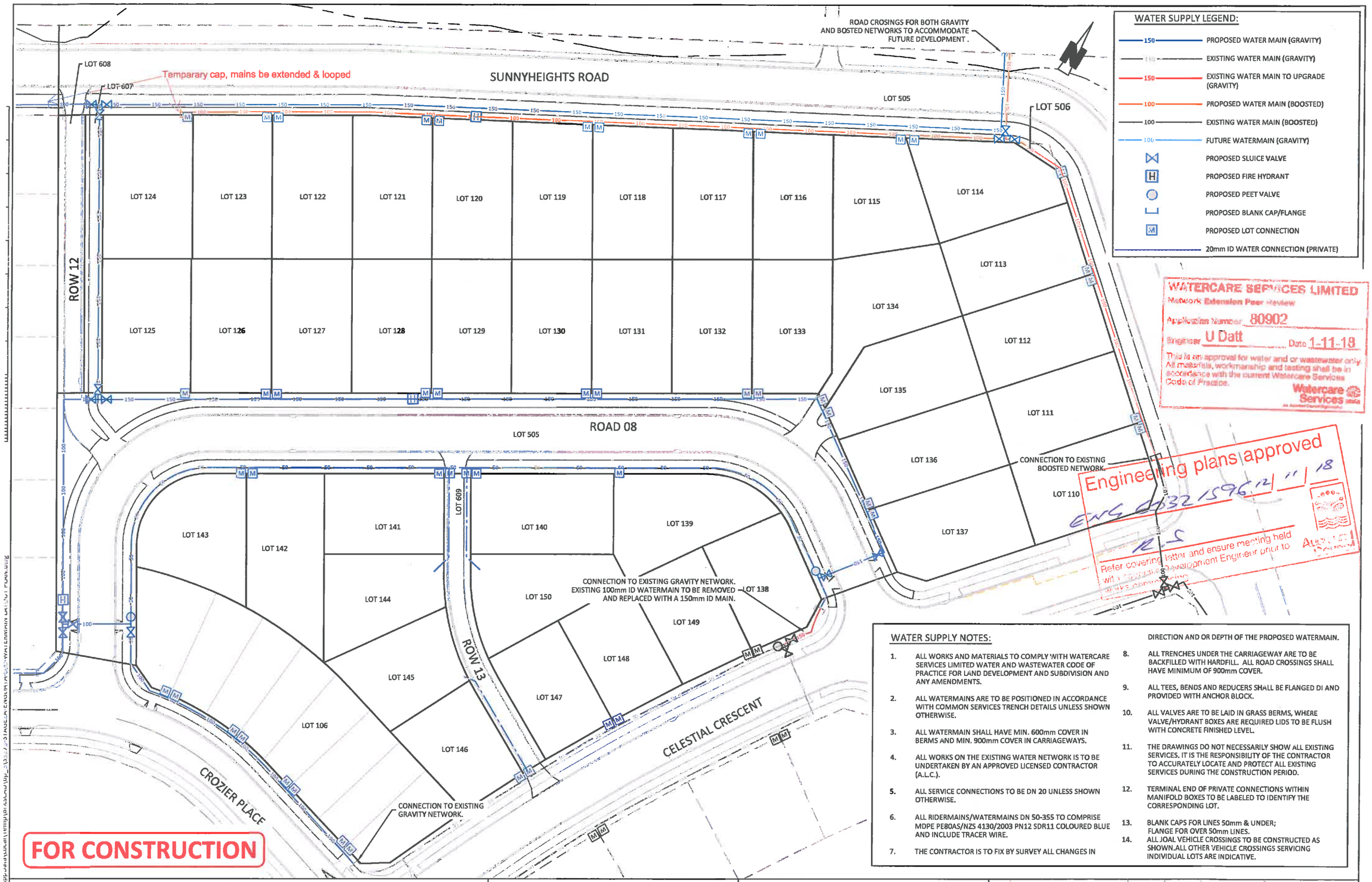
WASTEWATER LONG-SECTION SHEET 4 OF 4

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	25.05.18
Drawn:	SB	25.05.18
Checked:	SJ	02.06.18

Scale: H1:1000 V1:500 (A3 Original)

Job No: S3278-2A Dwg No: 533 Rev: A



WATERCARE SERVICES LIMITED
Network Extension Peer Review
Application Number: 80902
Engineer: U Datt Date: 1-11-18
This is an approval for water and or wastewater only. All materials, workmanship and testing shall be in accordance with the current Watercare Services Code of Practice.
Watercare Services

Engineering plans approved
ENG 0032596 12/11/18
Refer covering letter and ensure meeting held with Development Engineer prior to

FOR CONSTRUCTION

WATER SUPPLY NOTES:

1. ALL WORKS AND MATERIALS TO COMPLY WITH WATERCARE SERVICES LIMITED WATER AND WASTEWATER CODE OF PRACTICE FOR LAND DEVELOPMENT AND SUBDIVISION AND ANY AMENDMENTS.
2. ALL WATERMAINS ARE TO BE POSITIONED IN ACCORDANCE WITH COMMON SERVICES TRENCH DETAILS UNLESS SHOWN OTHERWISE.
3. ALL WATERMAIN SHALL HAVE MIN. 600mm COVER IN BERMS AND MIN. 900mm COVER IN CARRIAGEWAYS.
4. ALL WORKS ON THE EXISTING WATER NETWORK IS TO BE UNDERTAKEN BY AN APPROVED LICENSED CONTRACTOR (A.L.C.).
5. ALL SERVICE CONNECTIONS TO BE DN 20 UNLESS SHOWN OTHERWISE.
6. ALL RIDERMAINS/WATERMAINS DN 50-355 TO COMPRISE MDPE PE80AS/NZS 4130/2003 PN12 SDR11 COLOURED BLUE AND INCLUDE TRACER WIRE.
7. THE CONTRACTOR IS TO FIX BY SURVEY ALL CHANGES IN DIRECTION AND OR DEPTH OF THE PROPOSED WATERMAIN.
8. ALL TRENCHES UNDER THE CARRIAGEWAY ARE TO BE BACKFILLED WITH HARDFILL. ALL ROAD CROSSINGS SHALL HAVE MINIMUM OF 900mm COVER.
9. ALL TEES, BENDS AND REDUCERS SHALL BE FLANGED DI AND PROVIDED WITH ANCHOR BLOCK.
10. ALL VALVES ARE TO BE LAID IN GRASS BERMS, WHERE VALVE/HYDRANT BOXES ARE REQUIRED LIDS TO BE FLUSH WITH CONCRETE FINISHED LEVEL.
11. THE DRAWINGS DO NOT NECESSARILY SHOW ALL EXISTING SERVICES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ACCURATELY LOCATE AND PROTECT ALL EXISTING SERVICES DURING THE CONSTRUCTION PERIOD.
12. TERMINAL END OF PRIVATE CONNECTIONS WITHIN MANIFOLD BOXES TO BE LABELED TO IDENTIFY THE CORRESPONDING LOT.
13. BLANK CAPS FOR LINES 50mm & UNDER; FLANGE FOR OVER 50mm LINES.
14. ALL JOAL VEHICLE CROSSINGS TO BE CONSTRUCTED AS SHOWN.ALL OTHER VEHICLE CROSSINGS SERVICING INDIVIDUAL LOTS ARE INDICATIVE.

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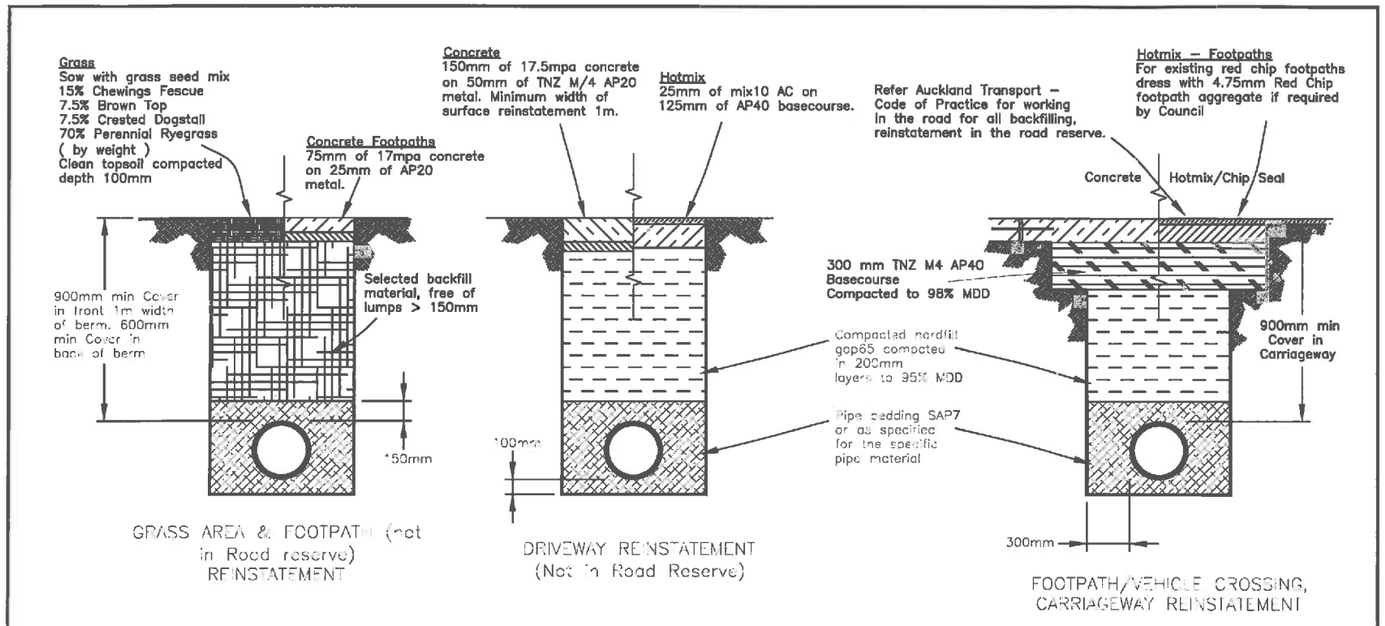
OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

WATERMAIN LAYOUT PLAN OVERALL

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: 1:750 (A3 Original)
Job No: S3278-2A
Dwg No: 600
Rev: A



NOTES

1. All trench reinstatement within the road reserve shall comply with the Auckland Transport "Code of Practice for Working in the Road" These are typical expectations for reinstatements. Contractors need to confirm with Auckland Transport.
2. All backfill is to be compacted in 200mm layers to obtain maximum density, as per standard specifications.
3. Where concrete or other stabilized layers exist in the roadway, the trench shall be reinstated with similar material or as directed by the roading engineer.
4. Minimum cover in carriageway for watermains 900mm. 900mm cover in front 1m of berm and Minimum 600mm in the back of berm.
5. Fill shall be clean, Non-contaminated material. Recyclec material is not acceptable.
6. Pipe bedding shall be compacted to AS/NZS 2566.2 clause 5.6.3 for compaction control.
7. Alternative embedment details by specific design for pipe at steep grades, inadequate trench foundation and erosion is not covered by this drawing.

TYPICAL TRENCH REINSTATEMENT
AND BEDDING DETAILS
FOR WATER SUPPLY

SCALE:	N.T.S.
ISSUE DATE:	14-04-2015
DWG No.	2010069.001B
REFERENCE No.	WS 2

GENERAL CONSTRUCTION NOTES

STANDARDS RELATING TO WORKS

All works are to be carried out to the requirements of the Health & Safety Act 1992

All works is to be carried out will be of the highest tradesman like standard.

MANUFACTURERS SPECIFICATIONS

All materials to be used and installed as per Manufacturers Specifications.

CONCRETE

All on-site concrete to be 17.5 Mpa unless otherwise stated.

WELDING & FIXINGS

All steelwork to be workshop fabricated , No on-site welding.

All steelwork to be Hot-Dip Galvanised to AS/NZS 46809

All metal nuts , bolts & washers to be Stainless steel 316 unless otherwise stated. A Nickel anti-seize free of copper , lead , sulphides , chlorides and carbons (graphite) shall be used on bolts.

REINFORCING STEEL

All steel to be ' deformed ' mild steel unless otherwise specified.

All steel to be placed central with minimum 60mm minimum cover for principal steel and 50mm elsewhere.

All radius required to be cold formed.

WORKS REQUIRING EPOXY

Any Stainless Steel fixings that are epoxied in place are required to be supplied from the manufacturer ' NOT OILED '.

All Metal fixings and or Stainless Steel to be epoxied will use EPCON C6 epoxy or similar , to Engineers recommendations.

PROTECTIVE WRAPPING

All fittings & valves (Non Plastic) to be wrapped with Denso Petrolatum system, as per the suppliers instructions ; Primer ; Densyl mastic for profiling ; Tape & protective membrane (Polythene).

For PE pipe application, a Butyl System shall be used ; (Densolen System) without primer on the PE surface. Alternatively Polyken 930 may be used.

GENERAL
CONSTRUCTION NOTES

SCALE:	N.T.S.
ISSUE DATE:	14-04-2015
DWG No.	2010069.002B
REFERENCE No.	WS 3

FOR CONSTRUCTION

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Planning | Surveying | Engineering | Environmental

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

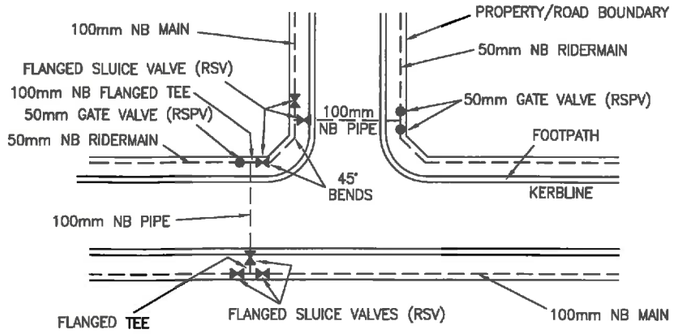
WATERMAIN TYPICAL DETAIL PLAN SHEET 1 OF 7

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

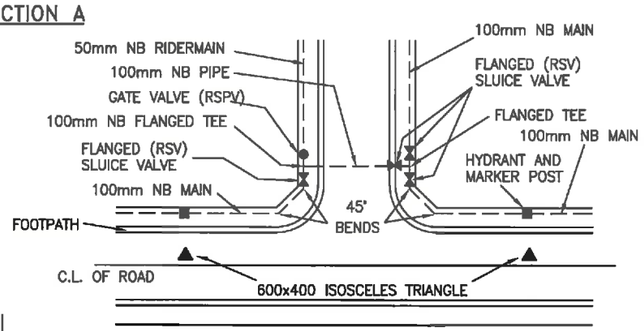
		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)

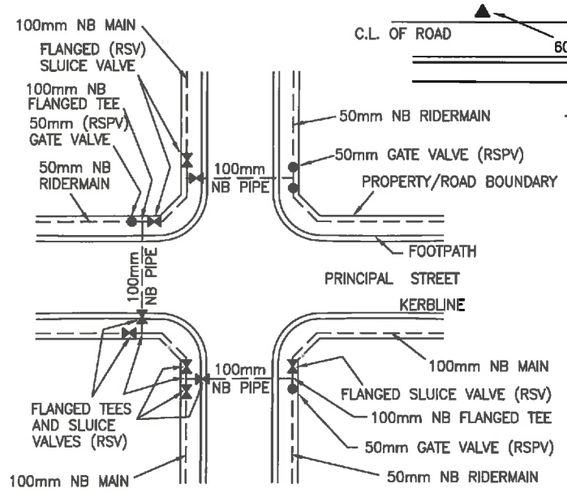
Job No: S3278-2A | Dwg No: 610 | Rev: A



TEE INTERSECTION A



TEE INTERSECTION B



CROSS INTERSECTION

NOTES

1. ALL PIPES SHALL BE LAID WITHIN 1400mm OF BOUNDARY WHERE PRACTICABLE.
2. ALL PRINCIPAL MAIN ROAD CROSSINGS SHALL BE 100mm DIA. (OR LARGER) DI, STEEL OR PE80, PIPES EXTENDING FROM MAIN TO MAIN.
3. BENDS ARE TO BE LONG RADIUS BENDS OR FLANGED BENDS.
4. ALL JOINTS UNDER ROADS TO BE EITHER FIELD WELDED OR FLANGED JOINTS (WRAPPED IN APPROVED WRAPPING SYSTEM).
5. THESE DETAILS APPLY TO 100mm NB AND 150mm NB PRINCIPAL MAINS. LARGER DIAMETER MAINS SHALL GENERALLY PASS STRAIGHT THROUGH INTERSECTIONS.
6. ALL 50 mm VALVES AND LARGER SHALL BE RESILIENT SEAT TYPE
7. GENERALLY, THERE SHALL BE A MINIMUM OF 5 VALVES ASSOCIATED WITH EACH ROAD CROSSING.

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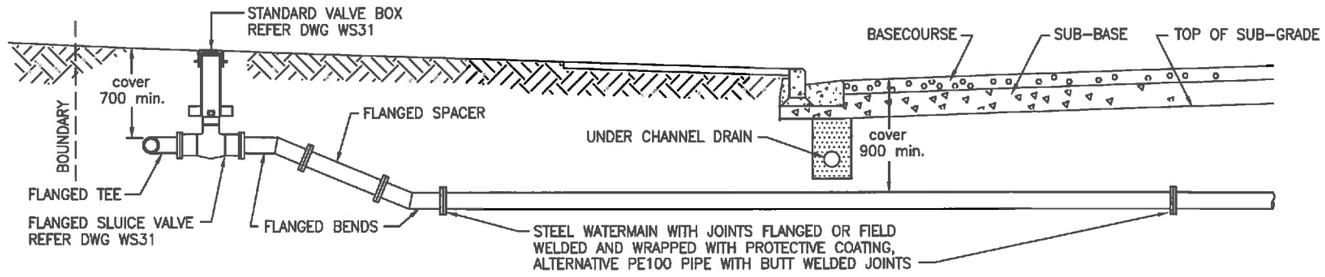
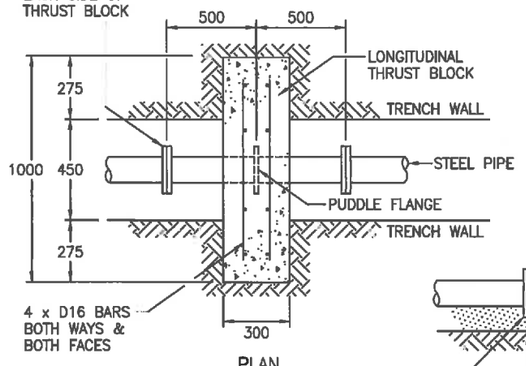
TYPICAL WATERMAIN INTERSECTION DETAILS

SCALE:	N.T.S.
ISSUE DATE:	25–11–2014
DWG No.	2010069.003A
REFERENCE No.	WS 5

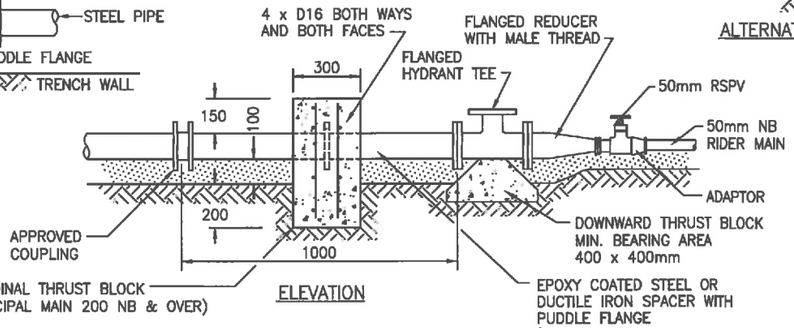


TYPICAL PRINCIPAL MAIN CROSSING UNDER ROAD
N.T.S.



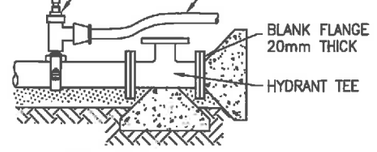
PLAN

NOTE: SPECIAL DESIGN IF NOMINAL DIAMETER OF MAIN PIPE >150mm NB.



ELEVATION

TYPICAL REDUCTION TO 50mm NB RIDERMAIN
N.T.S.



ALTERNATIVE TO FLANGED REDUCER
N.T.S.

NOTES

1. IF USING CONCRETE LINED STEEL, PIPE WALL THICKNESS SHALL BE 4.80mm UNDER CARRIAGEWAYS.
2. PIPE AND BENDS TO BE WRAPPED AS SPECIFIED.
3. ALL SPECIAL FITTINGS INCLUDING TEES AND BENDS TO BE FLANGED DUCTILE IRON.
4. ALL FLANGED SPACERS OR SPOOLS TO BE DUCTILE IRON OR EPOXY COATED STEEL.

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ROAD CROSSING DETAILS AND PRINCIPAL MAIN TO RIDER MAIN CONNECTIONS

SCALE:	N.T.S.
ISSUE DATE:	25–11–2014
DWG No.	2010069.004A
REFERENCE No.	WS 6

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

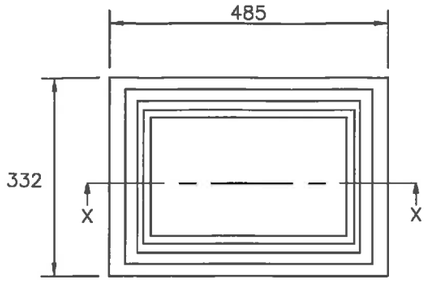
WATERMAIN TYPICAL DETAIL PLAN SHEET 2 OF 7

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

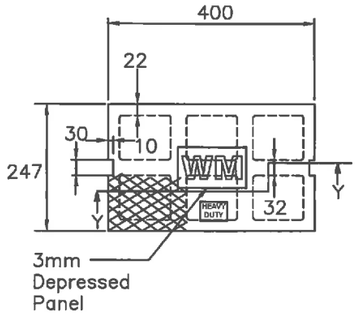
		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: **NTS** (A3 Original)

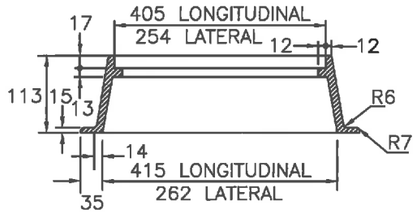
Job No: **S3278-2A** Dwg No: **611** Rev: **A**



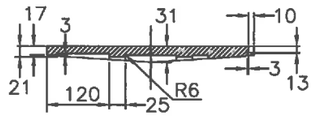
FRAME PLAN



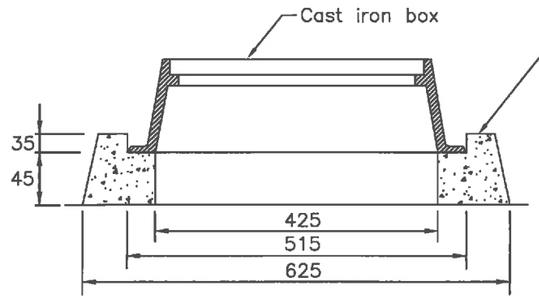
LID PLAN



SECTION X–X



SECTION Y–Y



INSTALLATION DETAIL

Notes:

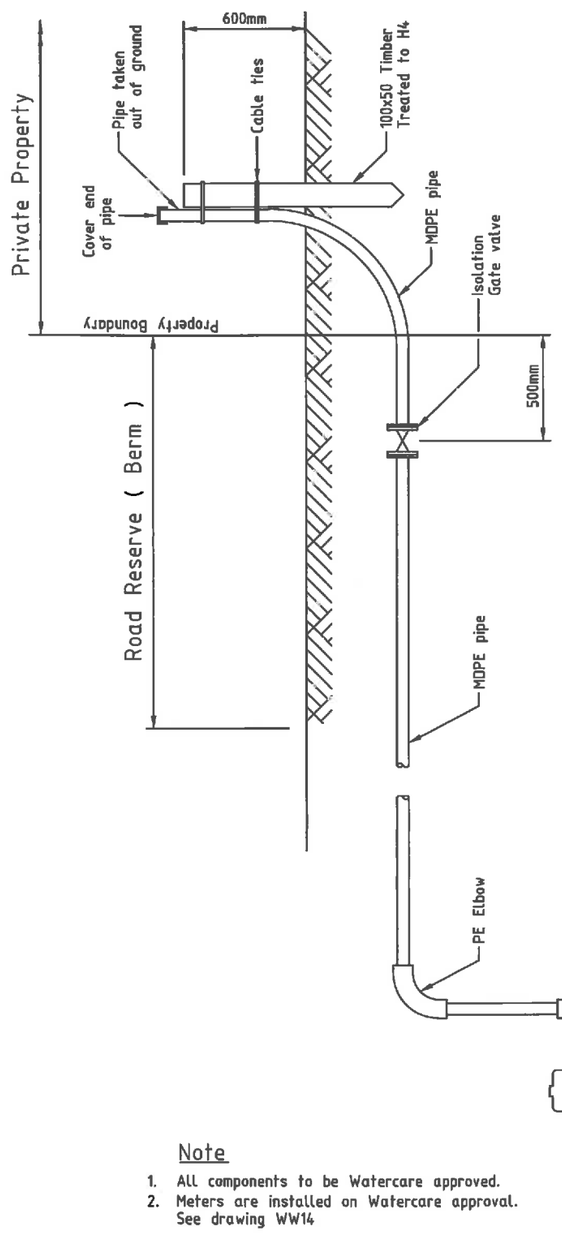
1. All cast iron to be made to AS 1830 grade H229 with finish of black bituminous paint.
2. Lid to show in depressed panel the letters 'WM' in raised lettering as shown.

L:\—\ EDCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010069.008 .DWG

Watercare

CAST IRON WATER METER BOX & LID
(TO BE USED IN CONCRETE AND PAVED AREAS ONLY)

SCALE:	N.T.S.
ISSUE DATE:	20–9–2013
DWG No.	2010069.008
REFERENCE No.	WS 10



Size of Meter	15mm	20mm	25mm
Male/ PE elbow OD	25	25	32
PE elbow OD	25	25	32
MDPE pipe & PE fittings OD	25	25	32

Note

1. All components to be Watercare approved.
2. Meters are installed on Watercare approval. See drawing WW14

L:\—\ EDCADFI \ 2015 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010069.011B .DWG

Watercare

LOT SERVICE CONNECTION DETAIL

SCALE:	N.T.S.
ISSUE DATE:	14–04–2015
DWG No.	2010069.011B
REFERENCE No.	WS 13

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

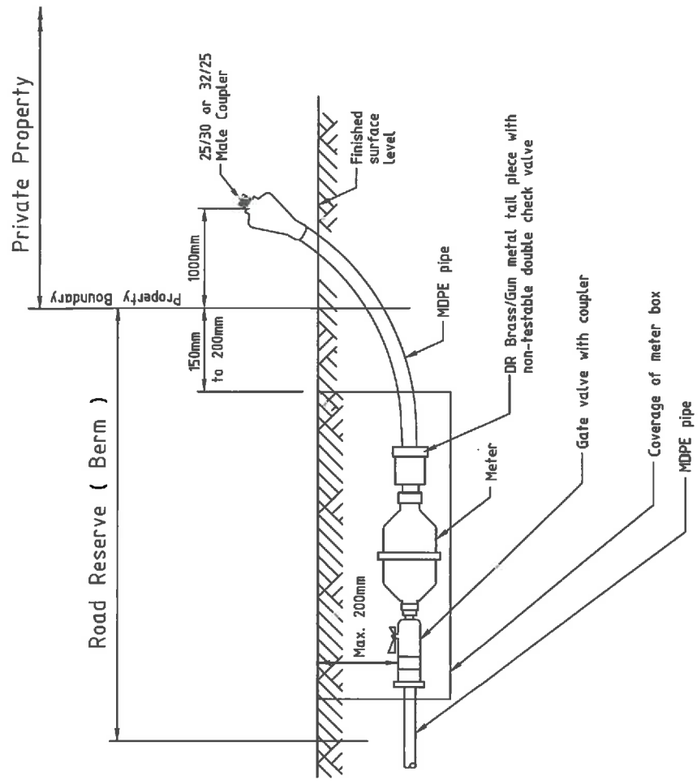
WATERMAIN TYPICAL DETAIL PLAN
SHEET 3 OF 7

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: **NTS** (A3 Original)

Job No: **S3278-2A** Dwg No: **612** Rev: **A**



Size of Meter	15mm	20mm	25mm
Male/ PE elbow OD	25	25	32
PE elbow OD	25	25	32
MDPE pipe & PE fittings OD	25	25	32

Note

1. All components to be Watercare approved.

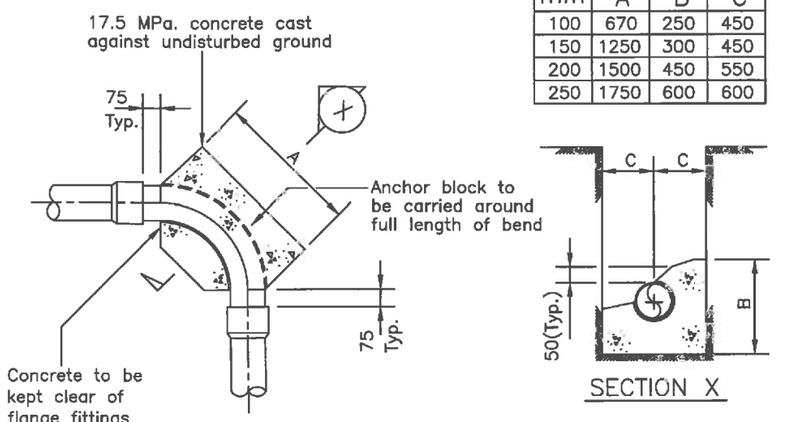
L:\---\ EGCADFI \ 2015 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010069.012A .DWG

Watercare	WATER METER CONNECTION DETAIL 15mm. 20mm & 25mm DIAMETER (BY WATERCARE CONTRACTOR ONLY)	SCALE:	N.T.S.
		ISSUE DATE:	14–04–2015
		DWG No.	2010069.012A
		REFERENCE No.	WS 14

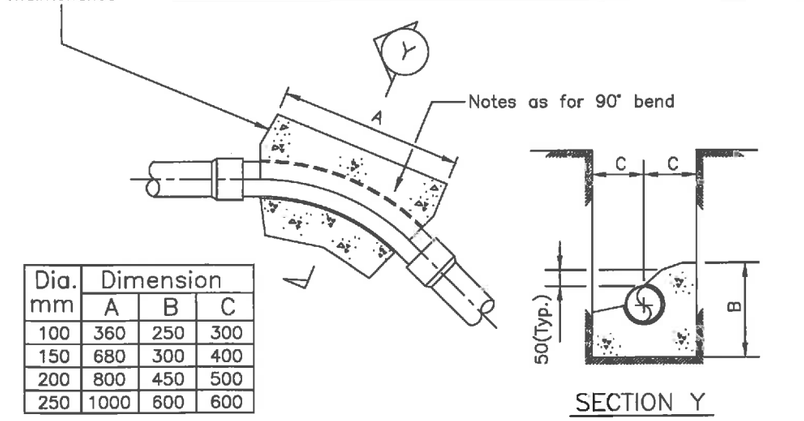
Notes :

1. Thrust block dimensions for firm soil conditions.
2. The dimensions to be increased or decreased for variation in soil conditions.
3. Allowable bearing stress used – 100KPa.
4. Internal pipe test pressure up to 1400KPa.
5. As built locations to be obtained prior to backfill.
6. Protective membrane (Polythene) between concrete & pipe.
7. 75mm clearance between fittings/flanges and concrete casting.
8. All fittings to be Denso wrapped to the product specification. (Butyl system for Plastic pipes)

Dia. mm	Dimension A	B	C
100	670	250	450
150	1250	300	450
200	1500	450	550
250	1750	600	600



ANCHOR BLOCKS FOR 90° BENDS



Dia. mm	Dimension A	B	C
100	360	250	300
150	680	300	400
200	800	450	500
250	1000	600	600

ANCHOR BLOCKS FOR 45° BENDS

L:\---\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010069.013A .DWG

Watercare	ANCHOR BLOCK DETAILS FOR 90° & 45° BENDS	SCALE:	N.T.S.
		ISSUE DATE:	25–11–2014
		DWG No.	2010069.013A
		REFERENCE No.	WS 15

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

WATERMAIN TYPICAL DETAIL PLAN
SHEET 4 OF 7

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

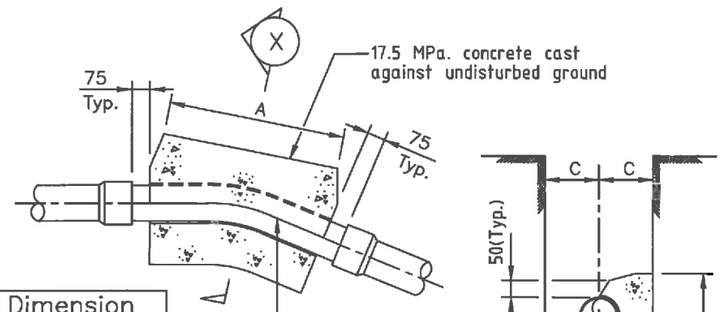
		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

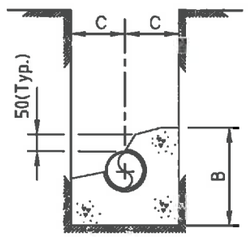
Scale: NTS (A3 Original)

Job No: S3278-2A | Dwg No: 613 | Rev: A

Notes :

1. Thrust block dimensions for firm soil conditions.
2. The dimensions to be increased or decreased for variation in soil conditions.
3. Allowable bearing stress used - 100KPa.
4. Internal pipe test pressure up to 1400KPa.
5. As built locations to be obtained prior to backfill.
6. Protective membrane (Polythene) between concrete & pipe.
7. 75mm clearance between fittings/flanges and concrete casting.
8. All fittings to be Denso wrapped to the product specification. (Butyl system for Plastic pipes)

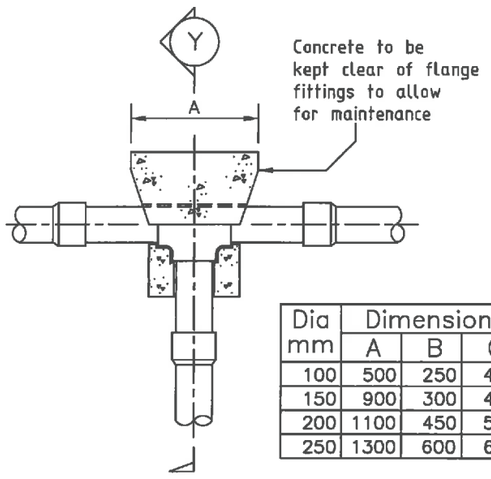


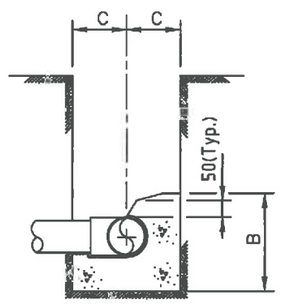


SECTION X

Dia mm	Dimension A	B	C
100	300	250	300
150	400	300	400
200	500	450	500
250	600	600	600

ANCHOR BLOCKS FOR 22½° & 11¼° BENDS





SECTION Y

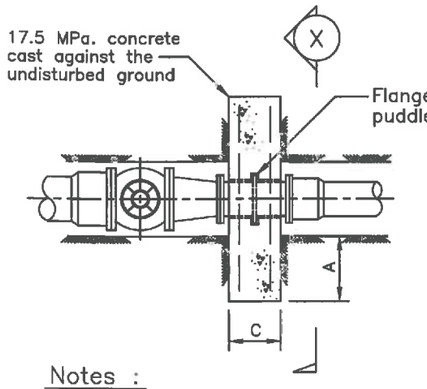
Dia mm	Dimension A	B	C
100	500	250	450
150	900	300	450
200	1100	450	550
250	1300	600	600

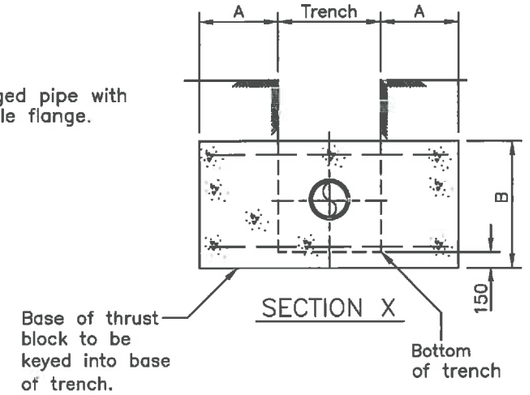
ANCHOR BLOCKS TEE JUNCTION & END CAPS

L:\---\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010069.014A .DWG

ANCHOR BLOCK DETAILS
FOR 22½° & 11¼° BENDS
AND TEE JUNCTION

SCALE:	N.T.S.
ISSUE DATE:	25-11-2014
DWG No.	2010069.014A
REFERENCE No.	WS 16





SECTION X

Notes :

1. Concrete thrust block dimensions for firm soil conditions.
2. The dimensions to be increased or decreased for variation in soil conditions.
3. Allowable bearing stress used - 100KPa.
4. Internal pipe test pressure up to 1400KPa.
5. As built locations to be obtained prior to backfill.
6. Protective membrane (Polythene) between concrete and pipe.
7. 75mm clearance between fittings/flanges and concrete casting.
8. All fittings to be Denso wrapped to the product specification. (Butyl system for Plastic pipes)

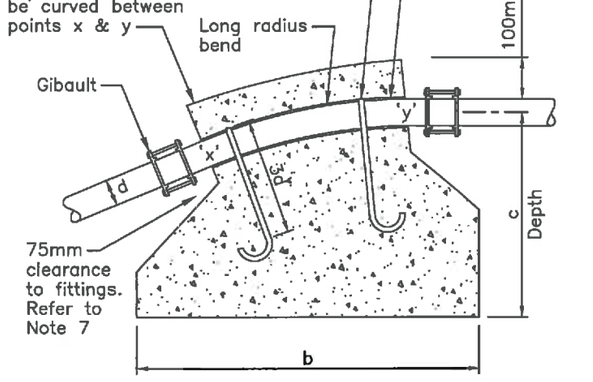
Reducer mm	Reducers A	B	C
100-150	250	350	300
100-200	500	350	300
150-200	250	500	300
150-250	500	500	300
200-250	250	600	300
200-300	400	700	300

ANCHOR BLOCKS AT REDUCERS

Pipe Dia	Vertical Bends-45° a	b	c
100mm	600	800	700
150mm	800	1000	800
200mm	1000	1200	800
250mm	1000	1600	1000

Pipe Dia	Vertical Bends-22.5° a	b	c
100mm	500	500	500
150mm	500	800	800
200mm	700	1000	800
250mm	800	1200	900

Pipe Dia	Vertical Bends-11.25° a	b	c
100mm	400	500	500
150mm	500	600	600
200mm	500	800	800
250mm	700	1000	800



a = Width of Anchor Block

VERTICAL SECTION

ANCHOR BLOCKS AT BENDS IN VERTICAL PLANE

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ANCHOR BLOCK DETAILS
REDUCERS AND VERTICAL BENDS

SCALE:	N.T.S.
ISSUE DATE:	25-11-2014
DWG No.	2010069.015A
REFERENCE No.	WS 17

FOR CONSTRUCTION

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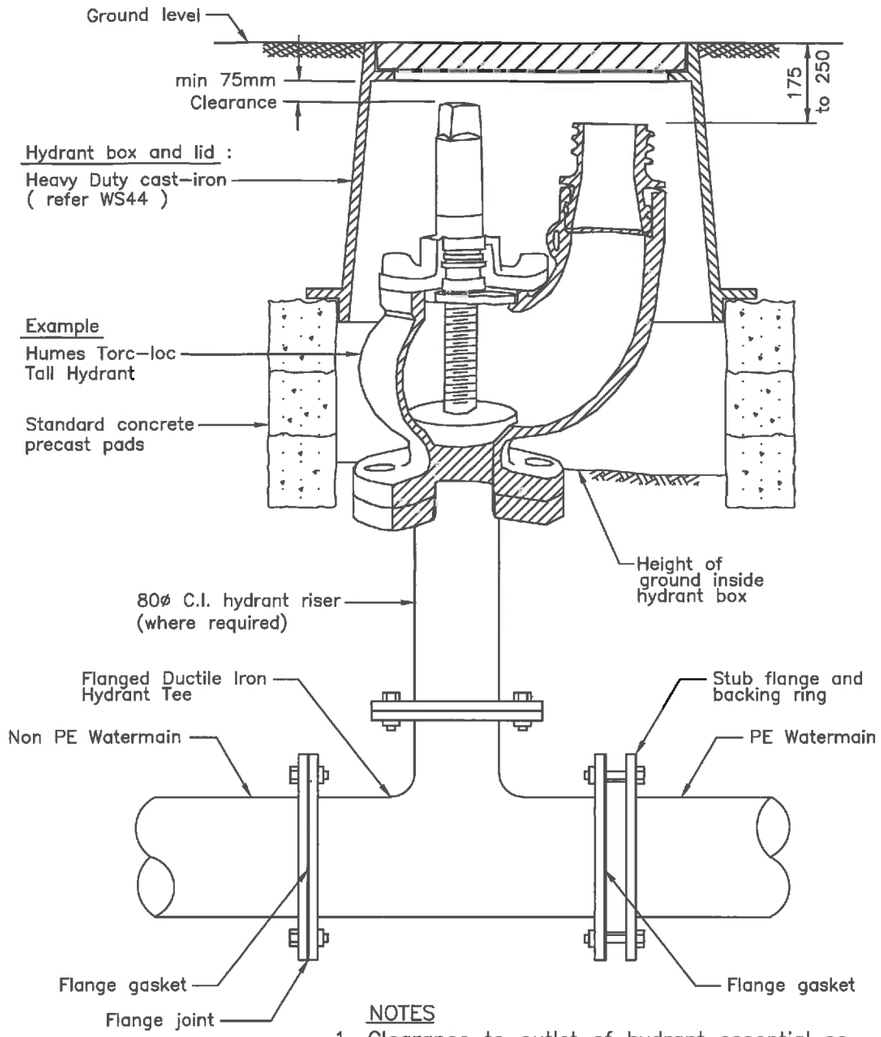
OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

WATERMAIN TYPICAL DETAIL PLAN SHEET 5 OF 7

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)
Job No: S3278-2A
Dwg No: 614
Rev: A



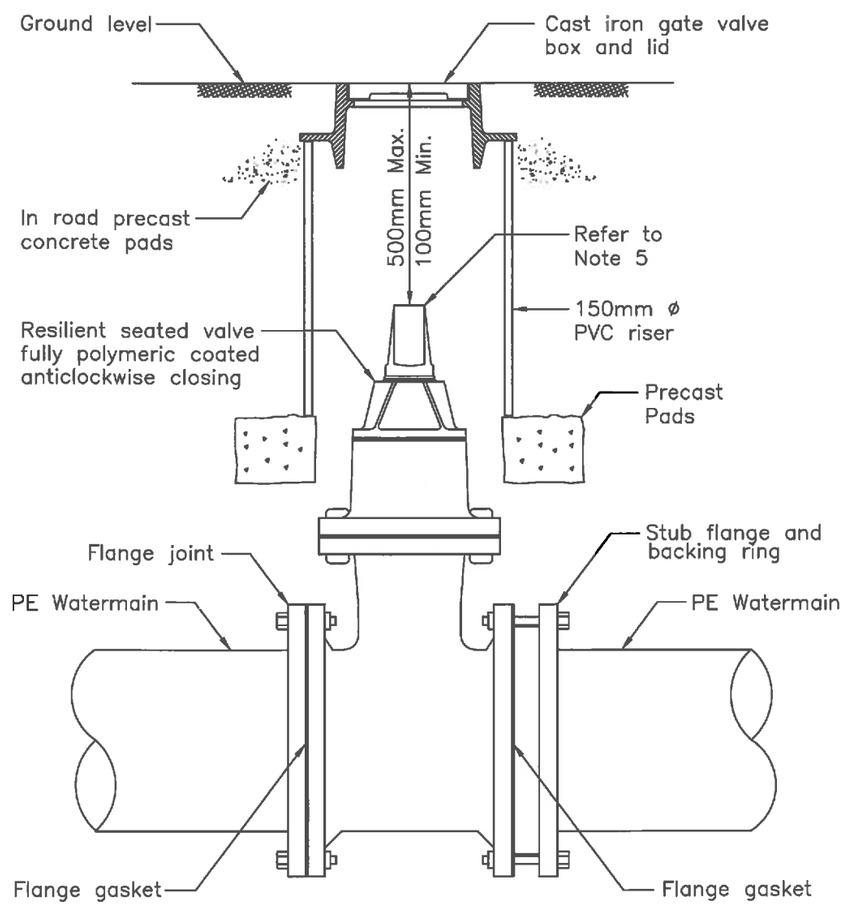
NOTES

1. Clearance to outlet of hydrant essential so that automatic pressure recorder can also be fitted.
2. Hydrant tee, riser, fire hydrant shall be fully polymeric coated.
3. All flanges and fittings shall be Denso wrapped and taped to manufacturers specifications.
4. All nuts & bolts to be Denso-Taped and Molybond coated and shall be grade 316 stainless steel.

L:\---\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010069.027 .DWG

HYDRANT DETAIL

SCALE:	N.T.S.
ISSUE DATE:	20-9-2013
DWG No.	2010069.027
REFERENCE No.	WS 29



NOTES

1. Plastic valve covers/boxes not permitted.
2. C.I. gate valve boxes to be used on existing valves only. Square C.I. valve boxes on all new mains.
3. Flanges are to be 'Greensleeved' Polyethylene or Denso wrapped and taped.
4. All nuts and bolts to be Denso-taped and Molybond coated and shall be grade 316 stainless steel.
5. An extension spindle shall be incorperated as required to ensure the top of the spindle is no more than 350mm below the finished surface level.

L:\---\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010069.029A .DWG

FLANGED SLUICE VALVE DETAIL

SCALE:	N.T.S.
ISSUE DATE:	25-11-2014
DWG No.	2010069.029A
REFERENCE No.	WS 31

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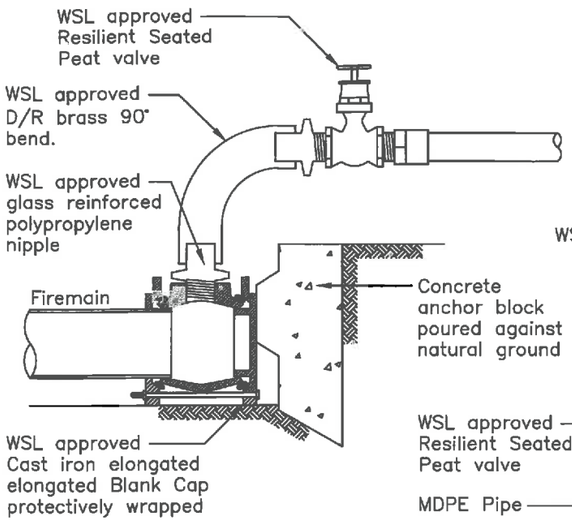
OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

WATERMAIN TYPICAL DETAIL PLAN SHEET 6 OF 7

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

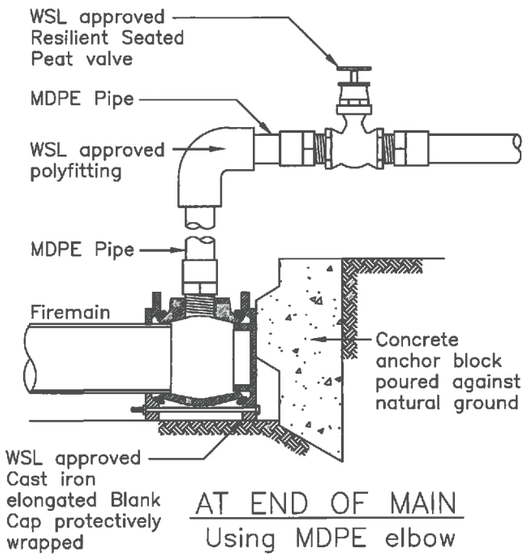
		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)
Job No: S3278-2A
Dwg No: 615
Rev: A

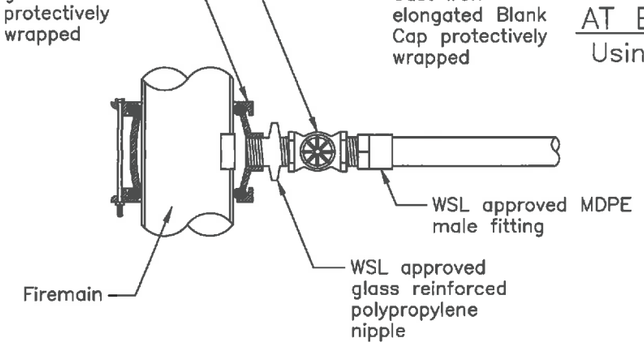


AT END OF MAIN
Using Brass 90° Bend

Notation
WSL = Watercare Services Ltd



AT END OF MAIN
Using MDPE elbow



AT TEE JUNCTION

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RIDER MAIN CONNECTION

SCALE:	N.T.S.
ISSUE DATE:	25–11–2014
DWG No.	2010069.036A
REFERENCE No.	WS 39

FOR CONSTRUCTION

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OREWA DEVELOPMENTS LTD
HALLS FARM STAGE 2A
264 WEST HOE HEIGHTS, OREWA

WATERMAIN TYPICAL DETAIL PLAN SHEET 7 OF 7

Issue	Description	Checked	Date
A	ISSUED FOR CONSTRUCTION	SJ	13.06.18

		Date
Designed:	SB	08.05.18
Drawn:	SB	08.05.18
Checked:	SJ	08.05.18

Scale: NTS (A3 Original)

Job No: S3278-2A | Dwg No: 616 | Rev: A

Planning | Surveying | Engineering | Environmental

Appendix B

SW Primary Network Calculations

12D MODEL - HYDRAULIC DESIGN SHEET

Project: Halls Farm S2A Design Drainage
Client: Orewa Developments Ltd
Project No.: S3278
Date: 10-06-2018

Pipe ID (-)			Pipe Type (-)			Pipe Length (m)	Pipe Size (mm)	Pipe Grade (%)	Pipe Grade (1 in)	Catch ID (-)	Total Time Tct (min)	Intensity I (mm/hr)	Runoff C (-)	Full-area Sum CA (ha)	Pipe Flow Q (L/s)	Capacity Flow Qcap (L/s)	Q/Qcap Ratio (-)	Full Pipe Vel Vf=Q/Af (m/s)	Norm Depth Vel Vn=Q/An (m/s)	Critical Depth Vel Vc=Q/An (m/s)	Capacity Vel Vcap=Qcap (m/s)
MH	1/02	to 1/01	RCRRJ	Class	4	22.67	1200	4.37	22.9	01-3(1P)	10.13	96.27	0.65	7.9013	1950.9	9669.8	0.2	1.72	6.67	2.55	8.55
MH	1/03	to 1/02	RCRRJ	Class	4	15.33	1200	4.44	22.5	01-3(1P)	10	96.6	0.65	7.7893	1930.3	9709.7	0.2	1.71	6.69	2.54	8.59
MH	1/04	to 1/03	RCRRJ	Class	2	7.83	825	5.07	19.7	01-8(1P)	11.24	93.43	0.65	6.1838	1535.3	3819.6	0.4	2.87	6.75	3.06	7.15
MH	1/05	to 1/04	RCRRJ	Class	2	25.14	825	13.55	7.4	01-8(1P)	11.03	93.97	0.65	5.846	1460.1	6248	0.23	2.73	9.53	2.96	11.69
MH	1/06	to 1/05	RCRRJ	Class	2	30.14	750	9.98	10	01-8(1P)	10.78	94.61	0.65	5.3783	1352.9	4157.9	0.33	3.06	8.41	3.18	9.41
MH	1/07	to 1/06	RCRRJ	Class	2	30.81	750	13.28	7.5	01-8(1P)	10.53	95.26	0.65	4.4279	1143	4796	0.24	2.59	8.9	2.81	10.86
MH	1/08	to 1/07	RCRRJ	Class	2	63.02	525	4.61	21.7	01-8(1P)	10	96.6	0.65	1.8855	493.7	1091.6	0.45	2.28	4.91	2.44	5.04
MH	1/09	to 1/08	RCRRJ	Class	2	68.47	525	4.85	20.6	01-9(1P)	10	96.6	0.65	1.6031	426.3	1119.3	0.38	1.97	4.82	2.21	5.17
MH	1/10	to 1/09	RCRRJ	Class	2	38.6	225	6.86	14.6	01-10(1P)	10	96.6	0.65	0.1011	27.1	139.1	0.19	0.68	2.71	1.07	3.5
MH	2/01	to 1/04	RCRRJ	Class	4	15.46	225	1	100	02-2(1P)	10.21	96.07	0.65	0.1307	34.6	53.1	0.65	0.87	1.42	1.18	1.34
MH	2/02	to 2/01	RCRRJ	Class	2	24.73	225	3.24	30.9	02-2(1P)	10	96.6	0.65	0.1307	34.8	95.6	0.36	0.88	2.21	1.18	2.4
MH	2/03	to 2/02	RCRRJ	Class	2	36.48	225	3.14	31.8	02-3(1P)	10	96.6	0.65	0.0769	20.6	94.1	0.22	0.52	1.9	0.97	2.37
MH	3/01	to 1/05	RCRRJ	Class	4	16.11	375	3.2	31.3	03-2(1P)	10.03	96.51	0.65	0.4677	121.5	370.8	0.33	1.1	3.01	1.51	3.36
MH	3/02	to 3/01	RCRRJ	Class	2	4.07	375	9.87	10.1	03-2(1P)	10	96.6	0.65	0.4677	121.6	651.3	0.19	1.1	4.51	1.51	5.9
MH	3/03	to 3/02	RCRRJ	Class	2	24.01	375	1	100	03-4(1P)	10.11	96.31	0.65	0.4318	112.9	207.3	0.54	1.02	1.92	1.46	1.88
MH	3/04	to 3/03	RCRRJ	Class	2	13.56	300	1	100	03-4(1P)	10	96.6	0.65	0.4318	113.2	114.3	0.99	1.6	1.84	1.75	1.62
MH	3/05	to 3/04	RCRRJ	Class	2	26.77	300	1	100	03-5(1P)	10	96.6	0.65	0.322	84.9	114.3	0.74	1.2	1.77	1.48	1.62
MH	3/06	to 3/05	RCRRJ	Class	2	22.34	300	7.42	13.5	03-7(1P)	10.14	96.25	0.65	0.2307	61.2	311.5	0.2	0.87	3.42	1.28	4.41
MH	3/07	to 3/06	RCRRJ	Class	2	16.6	225	8.5	11.8	03-7(1P)	10	96.6	0.65	0.193	51.4	154.8	0.33	1.29	3.5	1.45	3.89
MH	3/08	to 3/07	RCRRJ	Class	2	37.97	225	9	11.1	03-8(1P)	10	96.6	0.65	0.1292	34.7	159.3	0.22	0.87	3.2	1.18	4.01
MH	4/01	to 3/04	RCRRJ	Class	2	6.18	225	14.54	6.9	04-2(1P)	10.08	96.39	0.65	0.0692	18.4	202.4	0.09	0.46	3.16	0.93	5.09
MH	4/02	to 4/01	RCRRJ	Class	2	9.86	225	9.9	10.1	04-2(1P)	10	96.6	0.65	0.0692	18.4	167	0.11	0.46	2.76	0.93	4.2
MH	4/03	to 4/02	RCRRJ	Class	2	32.63	225	6.5	15.4	04-3(1P)	10	96.6	0.65	0.0376	10.1	135.3	0.07	0.25	2	0.77	3.4
MH	5/01	to 1/06	RCRRJ	Class	2	45.75	375	6.89	14.5	05-1(1P)	10	96.6	0.65	0.8945	227.4	544	0.42	2.06	4.7	2.16	4.93
MH	5/02	to 5/01	RCRRJ	Class	2	84.8	300	4.28	23.4	05-2(1P)	10	96.6	0.65	0.6466	167.6	236.4	0.71	2.37	3.63	2.4	3.34
MH	5/03	to 5/02	RCRRJ	Class	2	35.68	300	4.79	20.9	05-3(1P)	10	96.6	0.65	0.3944	103.1	250.2	0.41	1.46	3.37	1.65	3.54
MH	5/04	to 5/03	RCRRJ	Class	2	29.14	300	1	100	05-4(1P)	10	96.6	0.65	0.2878	75.7	114.3	0.66	1.07	1.73	1.4	1.62
MH	5/05	to 5/04	RCRRJ	Class	2	33.95	225	9.92	10.1	05-5(1P)	10	96.6	0.65	0.1743	46.2	167.2	0.28	1.16	3.59	1.36	4.2
MH	5/06	to 5/05	RCRRJ	Class	2	55.23	225	3.76	26.6	05-6(1P)	10	96.6	0.65	0.1377	36.9	103	0.36	0.93	2.38	1.21	2.59
MH	6/01	to 1/07	RCRRJ	Class	2	31.02	675	7.23	13.8	06-2(3P)	10.09	96.37	0.75	2.5424	675.2	2672.9	0.25	1.89	6.22	2.27	7.47
MH	6/02	to 6/01	RCRRJ	Class	4	10.93	600	2.5	40	06-2(3P)	10	96.6	0.75	2.2773	610.9	1147.8	0.53	2.16	4.12	2.4	4.06
MH	7/01	to 6/01	RCRRJ	Class	2	35.99	225	1.43	70.1	CP 13-1(2P)	10.03	96.52	0.9	0.1596	42.7	63.4	0.67	1.07	1.71	1.3	1.6
MH	8/01	to 1/08	RCRRJ	Class	2	31.38	225	6.2	16.1	CP 15-1(2P)	10.02	96.55	0.9	0.128	34.3	132.2	0.26	0.86	2.79	1.17	3.33
MH	9/01	to 1/09	RCRRJ	Class	2	28.56	525	6.26	16	09-2(3P)	10.1	96.33	0.75	1.3951	373.3	1272.5	0.29	1.72	5.11	2.04	5.88
MH	9/02	to 9/01	RCRRJ	Class	4	12.59	525	2.59	38.6	09-2(3P)	10	96.6	0.75	1.2173	326.6	818	0.4	1.51	3.57	1.91	3.78
MH	9/03	to 9/02	RCRRJ	Class	2	43.89	525	1.2	83.3									0	0	0	2.57
CP	5/01	to 5/01	RCRRJ	Class	4	5.74	225	2.73	36.7	CP 05-1(2P)	10	96.6	0.9	0.0694	18.6	87.7	0.21	0.47	1.75	0.93	2.2
CP	6/01	to 5/01	RCRRJ	Class	4	13.88	225	1.16	86.6	CP 06-1(2P)	10	96.6	0.9	0.0693	18.6	57.1	0.33	0.47	1.28	0.93	1.44
CP	7/01	to 5/02	RCRRJ	Class	4	5.92	225	1.14	87.7	CP 07-1(2P)	10	96.6	0.9	0.0651	17.5	56.7	0.31	0.44	1.26	0.91	1.43
CP	8/01	to 5/02	RCRRJ	Class	4	13.97	225	1	100	CP 08-1(2P)	10	96.6	0.9	0.0467	12.5	53.1	0.24	0.32	1.09	0.82	1.34
CP	9/01	to 3/06	RCRRJ	Class	4	20.88	225	1.1	90.6	CP 09-1(2P)	10	96.6	0.9	0.0377	10.1	55.8	0.18	0.25	1.06	0.77	1.4
CP	10/01	to 1/06	RCRRJ	Class	4	1.85	225	2.6	38.5	CP 10-1(2P)	10	96.6	0.9	0.056	15	85.5	0.18	0.38	1.62	0.87	2.15
CP	13/01	to 7/01	RCRRJ	Class	4	3.76	225	1	100	CP 13-1(2P)	10	96.6	0.9	0.0875	23.5	53.1	0.44	0.59	1.29	1.01	1.34
CP	14/01	to 7/01	RCRRJ	Class	4	10.8	225	1	100	CP 14-1(2P)	10	96.6	0.9	0.0721	19.3	53.1	0.36	0.49	1.23	0.94	1.34
CP	15/01	to 8/01	RCRRJ	Class	4	2.5	225	3.92	25.5	CP 15-1(2P)	10	96.6	0.9	0.0677	18.2	105.2	0.17	0.46	1.98	0.93	2.65
CP	16/01	to 8/01	RCRRJ	Class	4	10.53	225	1	100	CP 16-1(2P)	10	96.6	0.9	0.0602	16.2	53.1	0.3	0.41	1.17	0.89	1.34
CP	17/01	to 9/01	RCRRJ	Class	4	4.22	225	7.24	13.8	CP 17-1(2P)	10	96.6	0.9	0.0861	23.1	142.9	0.16	0.58	2.64	1	3.59
CP	18/01	to 9/01	RCRRJ	Class	4	11.44	225	1	100	CP 18-1(2P)	10	96.6	0.9	0.0917	24.6	53.1	0.46	0.62	1.31	1.03	1.34
DCP	1/01	to 1/03	RCRRJ	Class	4	5.04	300	7.93	12.6	DCP 01-1(2P)	10	96.6	0.9	0.083	22.3	322	0.07	0.31	2.61	0.91	4.56
DCP	2/01	to 1/02	RCRRJ	Class	4	2.05	300	9.75	10.3	DCP 02-1(2P)	10	96.6	0.9	0.112	30.1	357	0.08	0.43	3.07	1	5.05
DCP	3/01	to 1/04	RCRRJ	Class	4	1.86	225	4.86	20.6	DCP 03-1(2P)	10	96.6	0.9	0.0938	25.2	117.1	0.21	0.63	2.35	1.04	2.94
DCP	4/01	to 1/04	RCRRJ	Class	4	10.05	225	1	100	DCP 04-1(2P)	10	96.6	0.9	0.1133	30.4	53.1	0.57	0.76	1.38	1.11	1.34
DCP	11/01	to 6/01	RCRRJ	Class	4	2.5	300	1	100	DCP 11-1(2P)	10	96.6	0.9	0.1056	28.3	114.3	0.25	0.4	1.34	0.98	1.62
DCP	12/01	to 6/02	RCRRJ	Class	4	1.1	300	1	100	DCP 12-1(2P)	10	96.6	0.9	0.0945	25.4	114.3	0.22	0.36	1.3	0.94	1.62

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Appendix C

Wastewater Peak Flow Calculations

SEWER CAPACITY CALCULATION

Client: Orewa North-West Primary School
Site Address: Sunny Heights Road
Date: 11/01/2019
Rev: 1

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PROPOSED DEVELOPMENT SITE

type of development: Prop. Unit Development	USE	No. of Dwelling	Equivalent Population	No. of Persons (3 persons/Dwelling)	PWWF		ADWF	PDWF
					L/day	L/sec	L/sec	L/sec
Hall Farm Stage 1	Residential	49		147	220,500.00	2.552	0.306	0.919
Hall Farm Stage 2A	Residential	49		147	220,500.00	2.552	0.306	0.919
Orewa North-West Primary School	School	1		700	93,800.00	1.086	0.162	0.324
52 Sunnyheights Road	Residential	50		150	225,000.00	2.604	0.313	0.938
60 Sunnyheights Road	Residential	50		150	225,000.00	2.604	0.313	0.938
Total		**199**				**11.40**	**1.40**	**4.04**

EXISTING CATCHMENT

Existing Units *Contributing Catchment:*	USE	No. of Dwelling	Equivalent Population	No. of Persons	(Peak Flow)	
					L/day	L/sec
	Residential			0	-	-
Total						**0.000**

Design Parameters:

Residential flow

Average Dry Weather Flow (ADWF) =	180	l/p/d	
Peak Dry Weather Flow (PDWF) =	3.0	Peaking factor x ADWF	
Peak wet weather flow (PWWF) =	1,500	l/p/d	
Number of people per dwelling =	3		

School

Average Dry Weather Flow (ADWF) =	20	l/p/d	*Note: value increase from 15 l/d to 20 l/d to account for staff.*
Peak Dry Weather Flow (PDWF) =	2.0	Peaking factor x ADWF	
Peak wet weather flow (PWWF) =	134	l/p/d	
Number of people per dwelling =	700		

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Appendix D

Water Supply Peak Flow Calculations

WATER SUPPLY DEMAND CALCULATION

Client: Orewa North-West Primary School
Site Address: Sunny Heights Road
Date: 11/01/2019
Rev: 1

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PROPOSED DEVELOPMENT SITE (ADDITIONAL FLOW ONLY)

type of development:	USE	No. of Dwelling	Equivalent Population	No. of Persons	Average		Peak
Prop. Unit Development					L/day	L/sec	L/sec
Orewa North-West Primary School	School	1		700	17,500.00	0.20	0.41
Total		**1**				**0.20**	**0.41**

FUTURE CATCHMENT

Existing Units	USE	No. of Dwelling	Equivalent Population	No. of Persons	Average		Peak
Contributing Catchment:				(3 persons/Dwelling)	L/day		L/sec
				0	-		-
Hall Farm Stage 4	Residential	43		129	28,380.00	0.33	0.66
Total		**43**				**0.33**	**0.66**

Combined Totals = **0.53** **1.06**

Design Parameters:

Residential flow

Number of people/dwelling = 3
Daily consumption (L/p/d) = 220 l/p/d
Peaking factor = 2

School flow

Number of students = 700
Daily consumption (L/p/d) = 25 l/p/d *Note: value increase from 20 l/d to 25 l/d to account for staff.*
Peaking factor = 2