61 CRESSY ROAD, EAST RYDE
STORMWATER MANAGEMENT

GENERAL

1. ANY DEVIATIONS FROM LEVELS AND DETAILS SHOWN WITHIN THIS PACKAGE TO BE CONSULTED WITH THE ENGINEER CONSULTANT PRIOR TO ON-SITE CHANGES BEING MADE.
2. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH LOCAL COUNCIL ENGINEERING SPECIFICATIONS.
3. FINAL LOCATION OF NEW DOWNPIPES TO BE DETERMINED BY BUILDER/ARCHITECT AT TIME OF CONSTRUCTION.
4. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE ARCHITECTS AND OTHER CONSULTANT DRAWINGS. ANY DISCREPANCIES MUST BE REFEREED TO THE ENGINEER BEFORE PROCEEDING.
5. INSPECTIONS BY THE CERTIFIEING AUTHORITY SHALL BE CARRIED OUT FOR ALL THE CIVIL WORKS PRIOR TO RELEASE OF THE HOLD POINTS INCLUDING THE FOLLOWING STAGES:
   - 5.1. PRIOR TO INSTALLATION OF EROSION AND SEDIMENT CONTROL STRUCTURES
   - 5.2. FINAL INSPECTION AFTER ALL WORKS ARE COMPLETED AND 'WORK AS EXECUTED' PLANS HAVE BEEN SUBMITTED TO COUNCIL
6. MAKE SMOOTH JUNCTIONS WITH EXISTING WORKS.
7. NO WORK TO BE CARRIED OUT ON COUNCIL PROPERTY OR ADJOINING PROPERTIES WITHOUT THE WRITTEN PERMISSION FROM THE OWNER/S.
8. VEHICULAR ACCESS AND ALL SERVICES TO BE MAINTAINED AT ALL TIMES TO ADJOINING PROPERTIES AFFECTED BY CONSTRUCTION.
9. ALL RUBBISH, BUILDINGS, SHEDS AND FENCES TO BE REMOVED TO SATISFACTION OF COUNCIL'S ENGINEER.
10. THE CONTRACTOR SHALL OBTAIN ALL LEVELS FROM ESTABLISHED BENCH MARKS ONLY.

WARNING
BEWARE OF UNDERGROUND SERVICES
The locations of underground services are approximate only and their exact position should be proven on site.
No guarantee is given that all existing services are shown.
Locate all underground services before commencement of works
BEFORE YOU DIG
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TABLE 7.1
MINIMUM PIPE COVER
(from finished surface to top of pipe)

millimetres

Location	Cast iron, ductile iron, galvanized steel	Other authorized* products
	Minimum cover	
1 Not subject to vehicular loading:		
(a) without pavement—		
(i) for single dwellings	Nil	100
(ii) for other than Item (i)	Nil	300
(b) with pavement of brick or unreinforced concrete	Nil†	50†
2 Subject to vehicular loading:		
(a) other than roads—		
(i) without pavement	300	450
(ii) with pavement of—		
(A) reinforced concrete for heavy vehicular loading	Nil†‡	100†‡
(B) brick or unreinforced concrete for light vehicular loading	Nil†‡	75†‡
(b) roads—		
(i) sealed	300	500‡
(ii) unsealed	300	500‡
3 Subject to construction equipment loading or in embankment conditions	300	500‡

* Includes overlay above the top of the pipe of not less than 50 mm thick.
† Below the underside of the pavement.
‡ Subject to compliance with AS 1762, AS 2033, AS/NZS 2566.1, AS 3725 or AS 4060.

AS3500.3

EXISTING UNDERGROUND SERVICES NOTES

CONTRACTORS SHALL TAKE DUE CARE WHEN EXCAVATING ONSITE INCLUDING HAND EXCAVATION WHERE NECESSARY. CONTRACTORS ARE TO CONTACT THE RELEVANT SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF EXCAVATION WORKS. CONTRACTORS ARE TO UNDERTAKE A SERVICES SEARCH, PRIOR TO COMMENCEMENT OF WORKS ON SITE. SEARCH RESULTS ARE TO BE KEPT ON SITE AT ALL TIMES.

SITEWORKS NOTES

1. ORIGIN OF LEVELS:- REFER SURVEY NOTES.
2. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO CARDNO.
3. MAKE SMOOTH CONNECTION WITH EXISTING WORKS.
4. ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
5. BASE AND SUB-BASE LAYERS ARE TO BE INSPECTED AND TESTED BY AN INDEPENDENT GEOTECHNICAL TESTING AUTHORITY TO LEVEL 1 RESPONSIBILITY AS DEFINED IN AS3798.
6. ALL BASECOURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS FORM 3051, COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH AS 1289 5.2.1 FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m³ OF BASECOURSE MATERIAL PLACED.
7. ALL SUB-BASE COURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS FORM 3051, AND COMPACTED TO MINIMUM 95% MODIFIED DENSITY IN ACCORDANCE WITH A.S 1289 5.2.1 FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m³ OF SUB-BASE COURSE MATERIAL PLACED.
8. SHOULD THE CONTRACTOR WISH TO USE A RECYCLED PRODUCT THIS SHALL BE CLEARLY INDICATED IN THEIR TENDER AND THE PRICE DIFFERENCE BETWEEN AN IGNEOUS PRODUCT AND A RECYCLED PRODUCT SHALL BE CLEARLY INDICATED.
9. WHERE NOTED ON THE DRAWINGS THAT WORKS ARE TO BE CARRIED BY OTHERS, (eg. ADJUSTMENT OF SERVICES), THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CO-ORDINATION OF THESE WORKS.

MINIMUM GRADIENT OF SITE STORMWATER DRAINS

Nominal size	Minimum gradient		Nominal size	Minimum gradient	
DN	Aust.	NZ	DN	Aust.	NZ
90	1:100	1:90	225	1:200	1:350
100	1:100	1:120	300	1:250	1:350
150	1:100	1:200	375	1:300	1:350

AS3500.3

MINIMUM INTERNAL DIMENSIONS FOR STORMWATER AND INLET PITS

Depth to invert of outlet	Minimum internal dimensions mm		
	Rectangular		Circular
	Width	Length	Diameter
≤600	450	450	600
>600 ≤900	600	600	900
>900 ≤1200	600	900	1 000
> 1 200	900	900	1 000

AS3500.3

STORMWATER DRAINAGE NOTES

1. ALL PIPES ON DRAWINGS TO BE MIN 1% GRADE UNLESS NOTED OTHERWISE.
2. ALL DOWNPIPES TO BE 100Φ PVC UNLESS NOTED OTHERWISE.
3. PIPES 375 DIA. AND LARGER TO BE REINFORCED CONCRETE CLASS '2' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS. U.N.O.
4. PIPES 300 DIA AND LESS SHALL BE DWV GRADE (CLASS SN8) uPVC WITH SOLVENT WELDED JOINTS.
5. EQUIVALENT STRENGTH FRC PIPES MAY BE USED.
6. ALL PIPES ARE TO BE UNIFORMLY SUPPORTED ALONG THE LENGTH OF THE BARREL BY SUITABLE FILL MATERIAL. REFER TO BEDDING SUPPORT TYPE.
7. PIPES WITH SOCKETS SHALL BE LAID IN BEDDING WHERE SUITABLE RECESSES HAVE BEEN PROVIDED TO ENSURE PIPES DO NOT BEAR ON THEIR SOCKETS.
8. ALL STORMWATER DRAINAGE LINES UNDER PROPOSED BUILDING SLABS TO BE uPVC PRESSURE PIPE GRADE 6. ENSURE ALL VERTICALS AND DOWNPIPES ARE uPVC PRESSURE PIPE, GRADE 6 FOR A MIN OF 3.0m IN HEIGHT.
9. PIPES TO BE INSTALLED TO TYPE HS1 SUPPORT IN ACCORDANCE WITH AS 3725 (2007) IN ALL CASES BACKFILL TRENCH WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75).
10. REFER TO AS/NRS 3725:2007 TABLE B1 FOR REQUIRED FILL DEPTHS ABOVE PIPE BARREL PRIOR TO USE OF COMPACTION MACHINERY OR TRAVERSING OF PIPES BY GENERAL SITE EQUIPMENT.
11. WHERE WORKING METHODS REQUIRE HIGHER CLASS PIPE, THE CONTRACTOR SHALL REFER TO AS 3725 (2007) TO DETERMINE THE APPROPRIATE PIPE CLASS.
12. ALL INTERNAL WORKS WITHIN PROPERTY BOUNDARIES ARE TO COMPLY WITH THE REQUIREMENTS OF AS 3500 3.1 (2018) AND AS/NZS 3500 3.2 (2018).
13. ENLARGERS, CONNECTIONS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
14. WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED uPVC SEWER GRADE PIPE IS TO BE USED.
15. CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL.
16. GRATES AND COVERS SHALL CONFORM TO AS 3996.
17. ALL BOX CULVERTS SHALL BE STRUCTURALLY DESIGNED BY THE MANUFACTURER AND DELIVERED TO SITE AS FIT FOR PURPOSE.
18. AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS, ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS.
19. ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT/ENGINEER FOR FURTHER DIRECTIONS.

REV.	DESCRIPTION	BY.	APP.	DATE
A	ISSUED FOR DA	M.A.	M.A.	13.10.2022

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CLIENT FITZELL

PROJECT 61 CRESSY ROAD
EAST RYDE

TITLE COVER SHEET

DESIGN M.A.

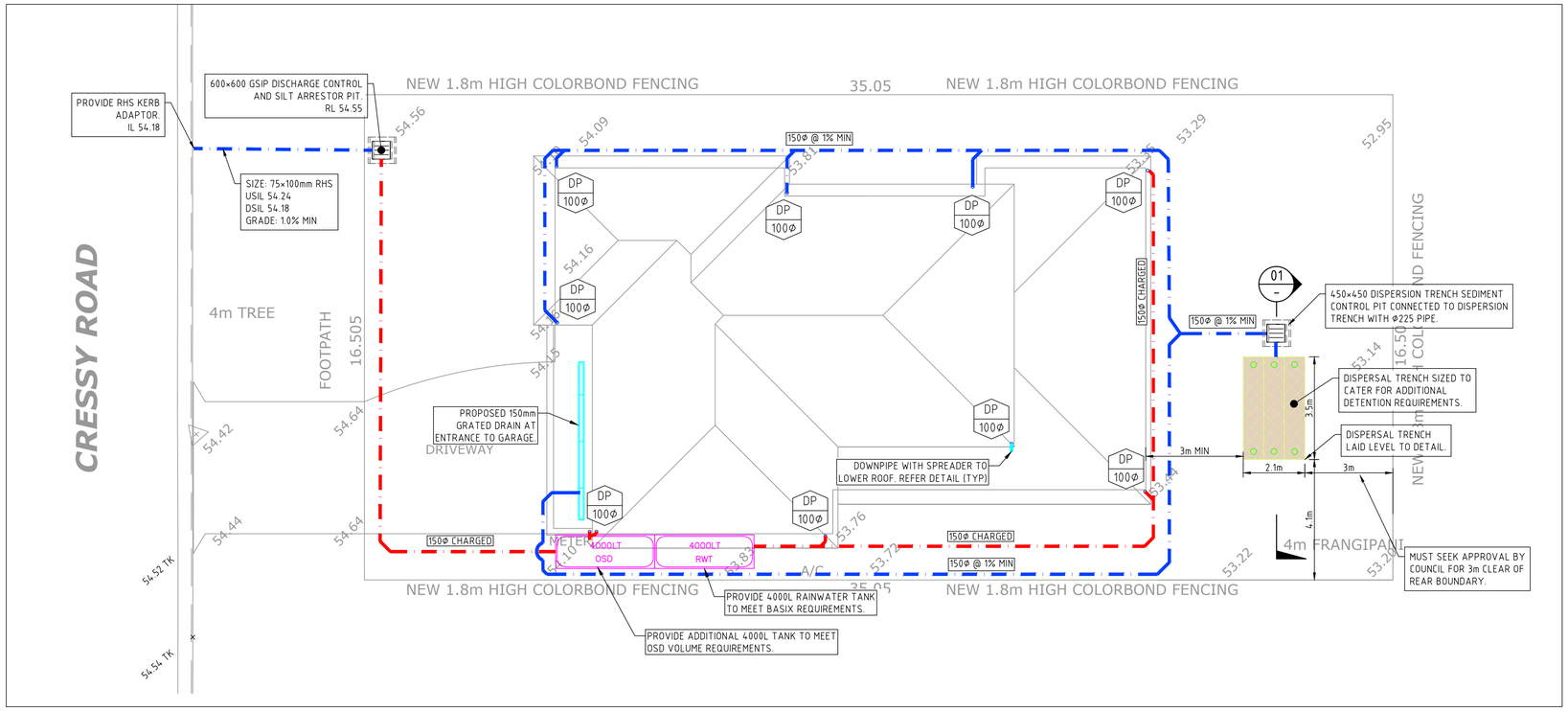
DRAWN M.A.

ISSUED FOR DA APPROVAL

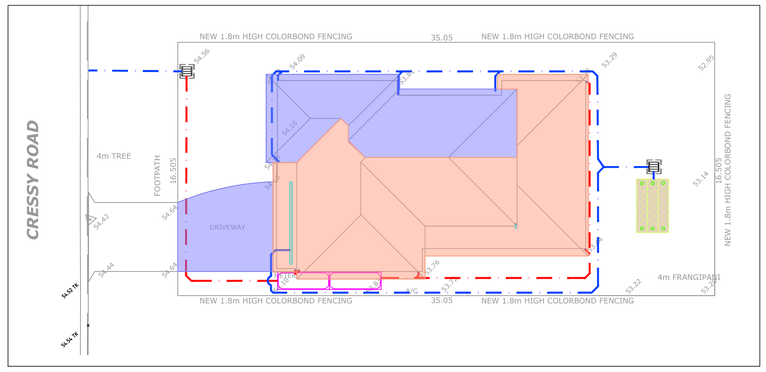
PROJECT NUMBER 22 H 490

DRAWING NO. SW00

A1 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



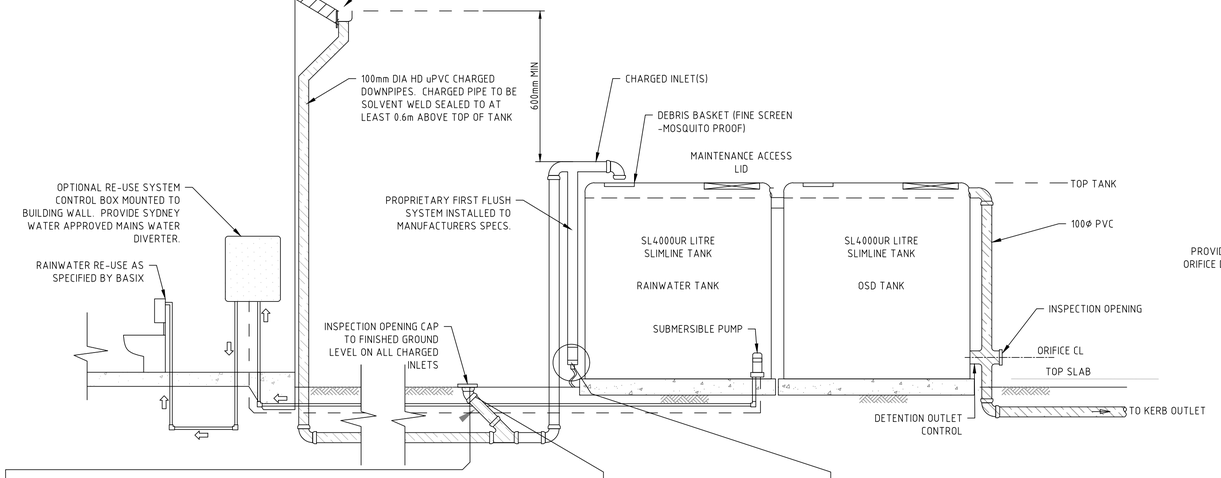
STORMWATER MANAGEMENT PLAN
SCALE 1:100

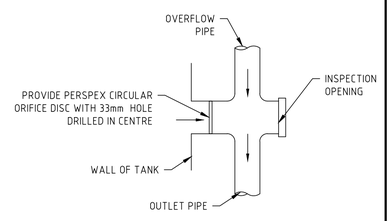


CATCHMENT PLAN
SCALE 1:200

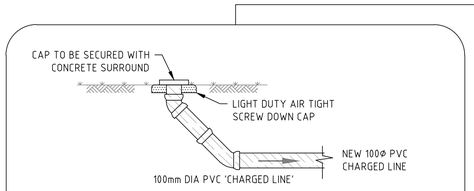
CATCHMENT 1
AREA TO ABSOPRTION TRENCH A=111m²

CATCHMENT 2
AREA TO RAINWATER TANKS A=177m²

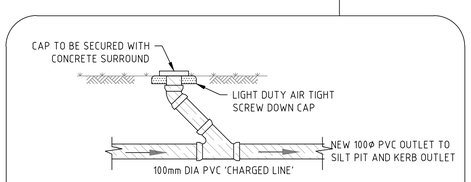




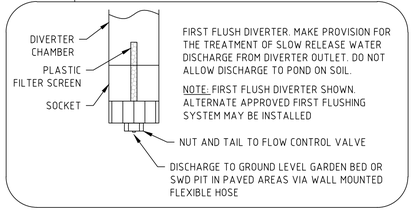
DETENTION OUTLET
NTS



INSPECTION RISER DETAIL 2



INSPECTION RISER DETAIL 1



RAINWATER RE-USE TANK - ABOVE GROUND
NTS

LEGEND

- CHARGED LINE (ROOF WATER)
- GRAVITY PIPE (TO BE Ø100 @ 1% MIN ONO)
- DOWNPIPE FROM ROOF ABOVE
- DP 100Ø — DOWNPIPE SIZE
- INSPECTION RISER

ON-SITE STORMWATER DETENTION (OSD) REQUIREMENTS

IN ACCORDANCE WITH RYDE CITY COUNCIL ON-SITE DETENTION CALCULATION SHEET, 4.87m³ OF DETENTION IS REQUIRED FOR THE SITE AREA DRAINAGE TO THE RAINWATER/OSD TANK. REFER SW02 FOR CALCULATION SHEET.

IN ACCORDANCE WITH RYDE CITY COUNCIL ABSORPTION SYSTEM CALCULATION SHEET, 3.26m³ IS REQUIRED FOR THE SITE AREA DRAINAGE TO THE ABSORPTION TRENCH. REFER SW02 FOR CALCULATION SHEET.

THEREFORE TOTAL REQUIRED DETENTION = 8.13m³

IN ACCORDANCE WITH CITY OF RYDE - STORMWATER AND FLOODPLAIN MANAGEMENT TECHNICAL MANUAL, SECTION 1.4.5 RAINWATER TANK OFFSETS, FOR SINGLE OCCUPANCY DEVELOPMENTS RAINWATER RE-USE CAN OFFSET THE ON-SITE DETENTION REQUIREMENTS BY AN EQUAL AMOUNT UP TO 5000L.

THEREFORE A 5m³ (5000L) RAINWATER TANK IS PROPOSED IN ADDITION TO BASIX FOR THE OFFSET OF THE 4.87m³ REQUIRED. A "KINGSPAN" DETENTION KIT WITH A 39mm ORIFICE IS TO BE PROVIDED.

10.5m OF ABSOPRTION TRENCH IS PROPOSED TO PROVIDE THE SUFFICIENT VOLUME IN ACCORDANCE WITH COUNCIL'S CALCULATION SHEET FOR ABSORPTION SYSTEMS.

TOTAL PROPOSED
RAINWATER TANK OFFSET = 5.0m³ > 4.87 REQUIRED
ABSORPTION TRENCH = 10.5m × 0.35m³ (EVERTRENCH JUMBO) = 3.67m³ > 3.26m³ REQUIRED

TOTAL PROPOSED DETENTION = 8.67m³

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CLIENT FITZELL

PROJECT 61 CRESSY ROAD
EAST RYDE

TITLE STORMWATER PLAN SHEET 1

DESIGN M.A. | DRAWN M.A.

ISSUED FOR DA APPROVAL

PROJECT NUMBER 22 H 490

DRAWING NO. SW01

A1 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

8.2 Appendix 2 - Absorption System Calculation Sheet

DEVELOPMENT TYPE: RESIDENTIAL

ADDRESS: 61 CRESSY RD EAST RYDE

Catchment Zone = (Zone 1) (Zone 2) (Eastwood)

1. Site Area =	575.4	m²		(A)
2. Roof Area =	254	m²		(B)
3. Driveway Area =	34	m²		(C)
4. Other Paved Area =	0	m²		(D)
5. Pervious Paving Area = m² x 0.25 = (E)	0		m²	
6. Total **Proposed** Impervious Area (B + C + D+ E) =	288	m²		(F)
7. Total Impervious Area **Draining** to Absorption Trench = (G) (As much of the impervious areas possible are to drain to the absorption system, with 100% of the roof area and driveway area to connect to the system)	111		m²	
8. Site impervious % = (F)/(A) x 100 = (must be less than 40%)	50	%		(H)
9. If (C) < 35% then go to step 10				

If (C) > 35% then onsite detention is required.

Impervious area over 35% = (((H) -35)/100) x (A) = _____ m² (I)

10. Rainwater Tank Volume to be provided = (I) x (0.2) = (J) _____ m³
11. Area available for dispersal = (K) _____ m²
12. Rainfall Intensity (mm/hr)
    For a 1 in 5 year 20min Storm: Zone 1 = 88.2
    Zone 2 and Eastwood = 82.7 — 88.2 mm/hr (L)
13. Volume of Runoff = (G) x (L) x (1/3) = L (M) — 3263
14. Storage Required = (M) /1000 = (N) — 3.26 m³
15. Absorption Trench Type = — Evertrench
16. Storage Capacity per lineal metre (from product guide) = — 0.175 m³/m (O)
17. Additional Storage Capacity in Gravel Trench with voids

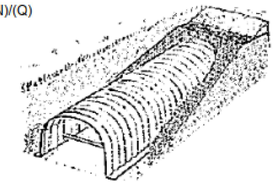
= (trench width (m) x trench height (m) – cross section area of absorption trench (m²)) x void space

0.175 m³/m (P)

18. Total Storage Capacity = (O) + (P) = 0.350 m³/m (Q)
19. Length of Trench Required = (N)/(Q)

Length = 9.3 m

10.5m Provided



8.3 Appendix 3 – Onsite Detention Calculation Sheet

RYDE CITY COUNCIL
ON-SITE DETENTION CALCULATION SHEET

DEVELOPMENT TYPE: RESIDENTIAL

ADDRESS: 61 CRESSY RD EAST RYDE

Catchment Zone	(Zone 1)	(Zone 2)	(Eastwood)		
Site Area		575.4		m²	(A)
65% Site Area		374.01		m²	
Total **Proposed** Impervious Area (roofs, driveways, hardstand etc)		288		m²	(B)
% of site Impervious		50%		%	
Impervious area draining to the Storage Facility		177		m²	(C)
Pervious area draining to the Storage Facility		0		m²	(D)
Total area draining to the Storage Facility (impervious and pervious areas)		177		m²	(E)
Pervious area bypassing the Storage Facility		287.4		m²	(F)
Impervious area bypassing the Storage Facility		0		m²	(G)
(C)+(G)/(C) =		0			(L)

must not be greater than 1.25.

Permitted Site Discharge (PSD) rate per m²
Catchments in Zones 1 & 2

If (G)=0 then PSD = 0.0265 l/sec/m²
If (G)≠0 then PSD = $0.0265 \times (L)^{-1.37}$ l/sec/m²

Eastwood Catchment

If (G)=0 then PSD = 0.0210 l/sec/m²
If (G)≠0 then PSD = $0.0210 \times (L)^{-1.37}$ l/sec/m²

0.0265 (J)

PERMITTED SITE DISCHARGE (E) x (J) 177 x 0.0265 = 4.69 l/s

Storage Volume per m²
(K) = 0.0275 m³/m² for zone 1 or
(K) = 0.0255 m³/m² for zone 2 or
(K) = 0.0300 m³/m² for Eastwood Catchment

0.0275 (K)

SITE STORAGE REQUIREMENT $((E) + (G)) \times (K) \times (1.2)^{Y}$ 177 + 0 x 0.0275 x (1.2) = 4.8675 m³

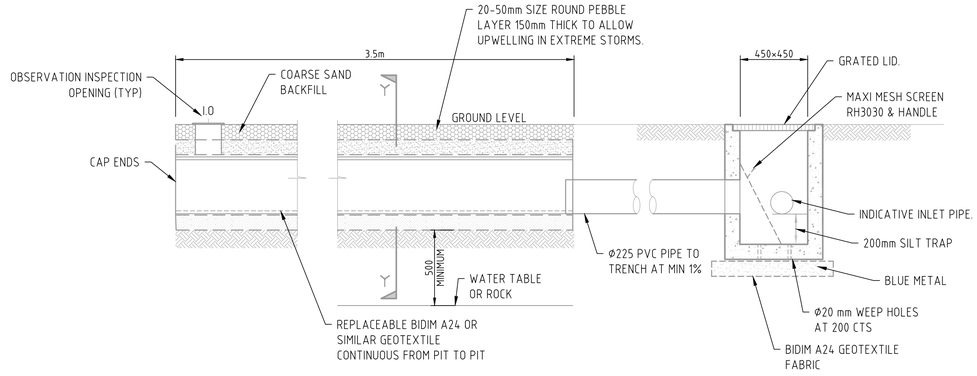
NOTE Y If OSD is provided in a landscaped surface basin the volume must be increased by 20%

OUTLET CONTROL - using a Sharp Edged Orifice Plate

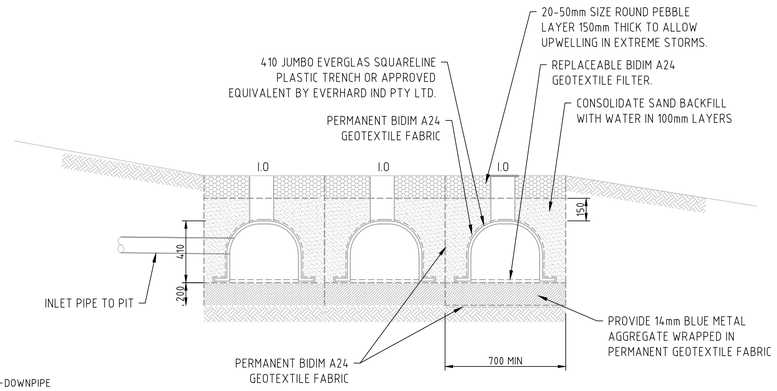
Height Difference between top water level and Centre of Orifice (m) 2m (H)

ORIFICE DIAMETER (mm) 39 mm $= 21.9 \sqrt{\frac{PSD}{\sqrt{(H)}}}$

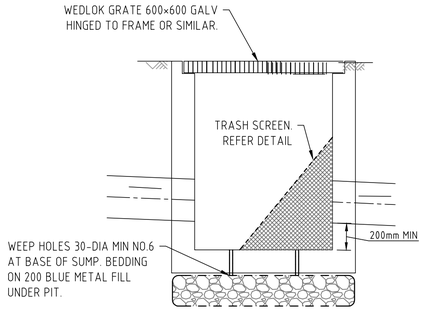
Should pipe and pit losses be used to control outflow, the calculations are to be attached.



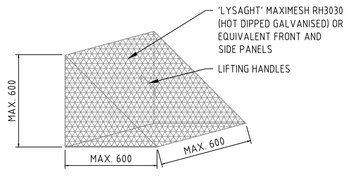
DISPERSAL TRENCH TYPICAL SECTION
NTS



SECTION Y-Y
NTS

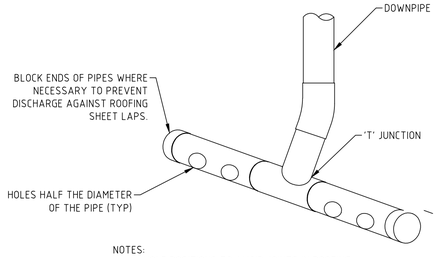


GSIP SILT ARRESTOR PIT DETAIL
NTS



TRASH SCREEN DETAIL
NTS

NOTES:
1. MAXIMESH SCREENS MUST BE PLACED SUCH THAT THE LONG AXIS OF THE OVAL SHAPED HOLES ARE ORIENTATED HORIZONTALLY WITH THE PORTRUDING LIP ANGLED UPWARDS AND FACING TOWARDS THE OUTLET.
2. THE SCREEN IS TO BE FORMED BY WELDING TWO TRIANGULAR MAXIMESH (OR EQUIVALENT) PANELS TO A RECTANGULAR FRONT MAXIMESH PANEL (OR EQUIVALENT)



NOTES:
- HOLE POSITIONS TO AVOID JOINTS IN ROOFING
- WHEN DOWNPIPE IS LOCATED IN A CORNER, SPREADER TO BE L-SHAPED.

DOWNPIPE LEVEL SPREADER
NTS

REV.	DESCRIPTION	BY.	APP.	DATE
A	ISSUED FOR DA	M.A.	M.A.	13.10.2022

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CLIENT FITZELL

PROJECT 61 CRESSY ROAD EAST RYDE

TITLE STORMWATER PLAN SHEET 2

DESIGN M.A. | DRAWN M.A.

ISSUED FOR DA APPROVAL

PROJECT NUMBER 22 H 490

DRAWING NO. SW02

A1 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150