

Hydraulic Design

Including OSD Calculations-DRAINS,
Overland Flow Path Details,
Aboveground OSD/RWT Tanks Details,
Silt Arrestor Pit Details,
Elevation Details,

Roof Plan

and

Stormwater Systems

for

Proposed Single Residential Development at

Lot 7, DP 238331,
(H/No. 10) Courtley Road,
BEACON HILL

24 October 2022

Northern Beaches Council
Our Job Number: D3992

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- **OSD Calculation – DRAINS Modelling**

Hydraulic Details:

1. Notes, Calculations & Pit Details	1
2. Drainage Plan (1 in 200)	2
3. Elevation A & Roof Plan Details	3
4. OSD/RWT Tanks & Miscellaneous details	4

IMPORTANT NOTES:

The following hydraulic plans should be read in conjunction with:

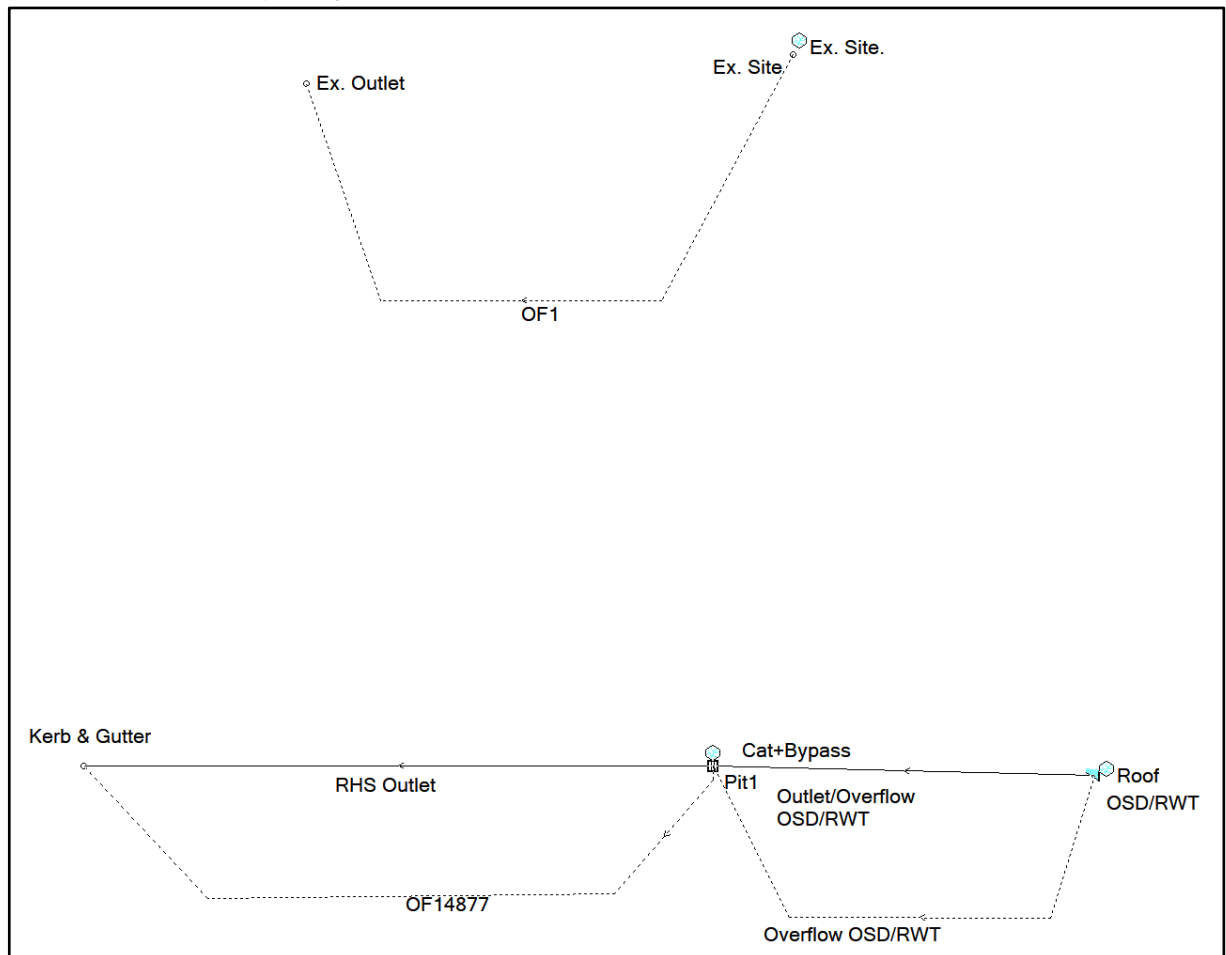
- 1. Architectural plans from Rawson Homes Pty. Ltd. Job No. A000350 Issue B dated 4 October 2022 (Phone: (02) 8765 5500).**
- 2. Northern Beaches Council's Policy on Stormwater Requirements for Residential Developments & BASIX Requirements.**

DRAINS ANALYSIS

Proposed Single Dwelling Residential Development at
LOT 7 (H/No. 10) Courtley Road, BEACON HILL
Council: Northern Beaches Council
Our Job Number: D3992
Date: 24 October 2022

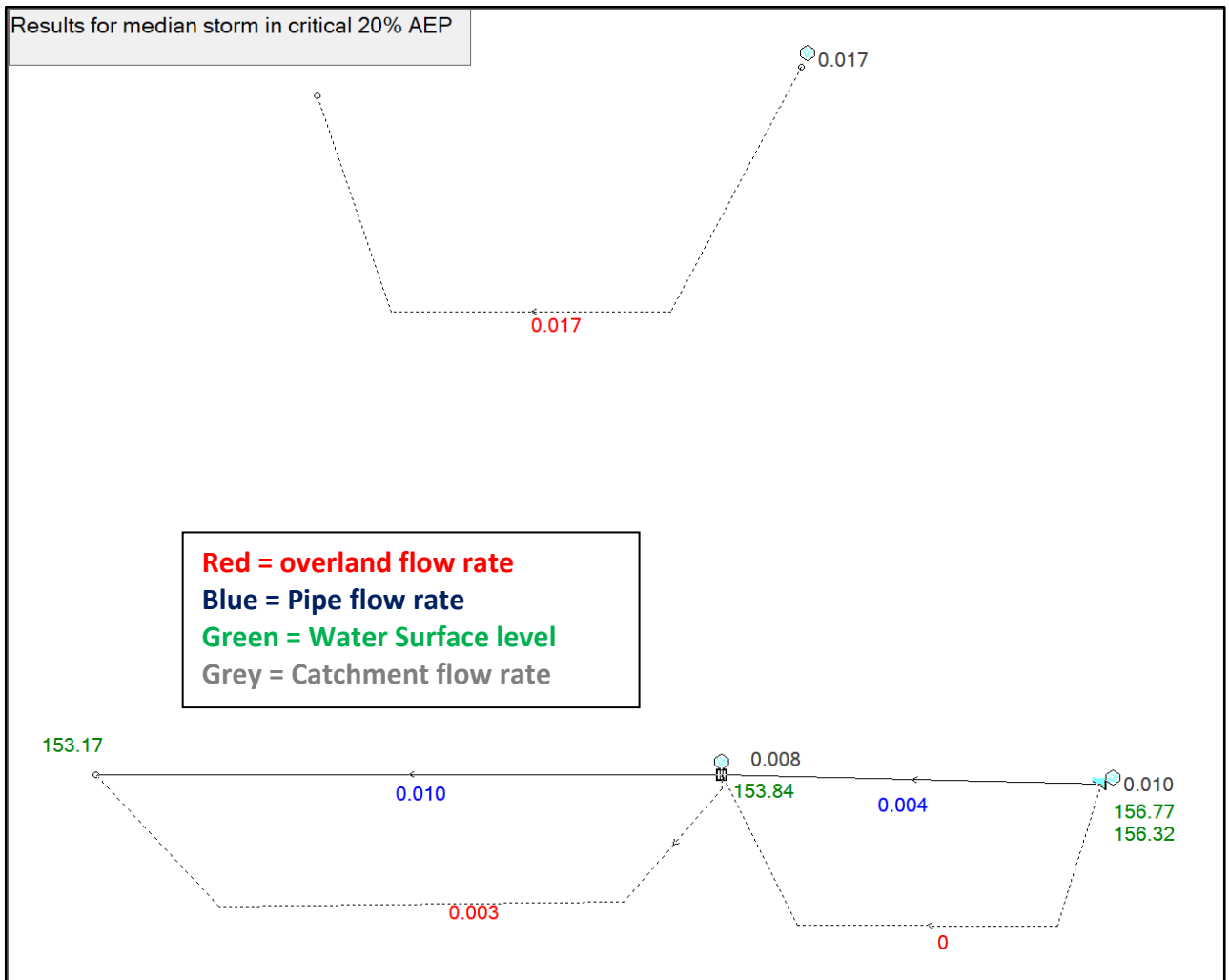
Objective of this report is to demonstrate that the OSD storage volume has been provided and the post development permissible site discharge (PSD) for the 20% AEP and 1% AEP storm events is restricted to the pre-development flows for the 20% AEP and 1% AEP storm events. DRAINS hydrological model was used with the ILSAX hydrological model. The model adopted ARR2019 procedures. IFD data was obtained from the Bureau of Meteorology and the temporal patterns were obtained from the ARR DataHub. These calculations should be read in conjunction with Warringah Council's OSD Technical Specification Section 4.30.

1. DRAINS Model input layout



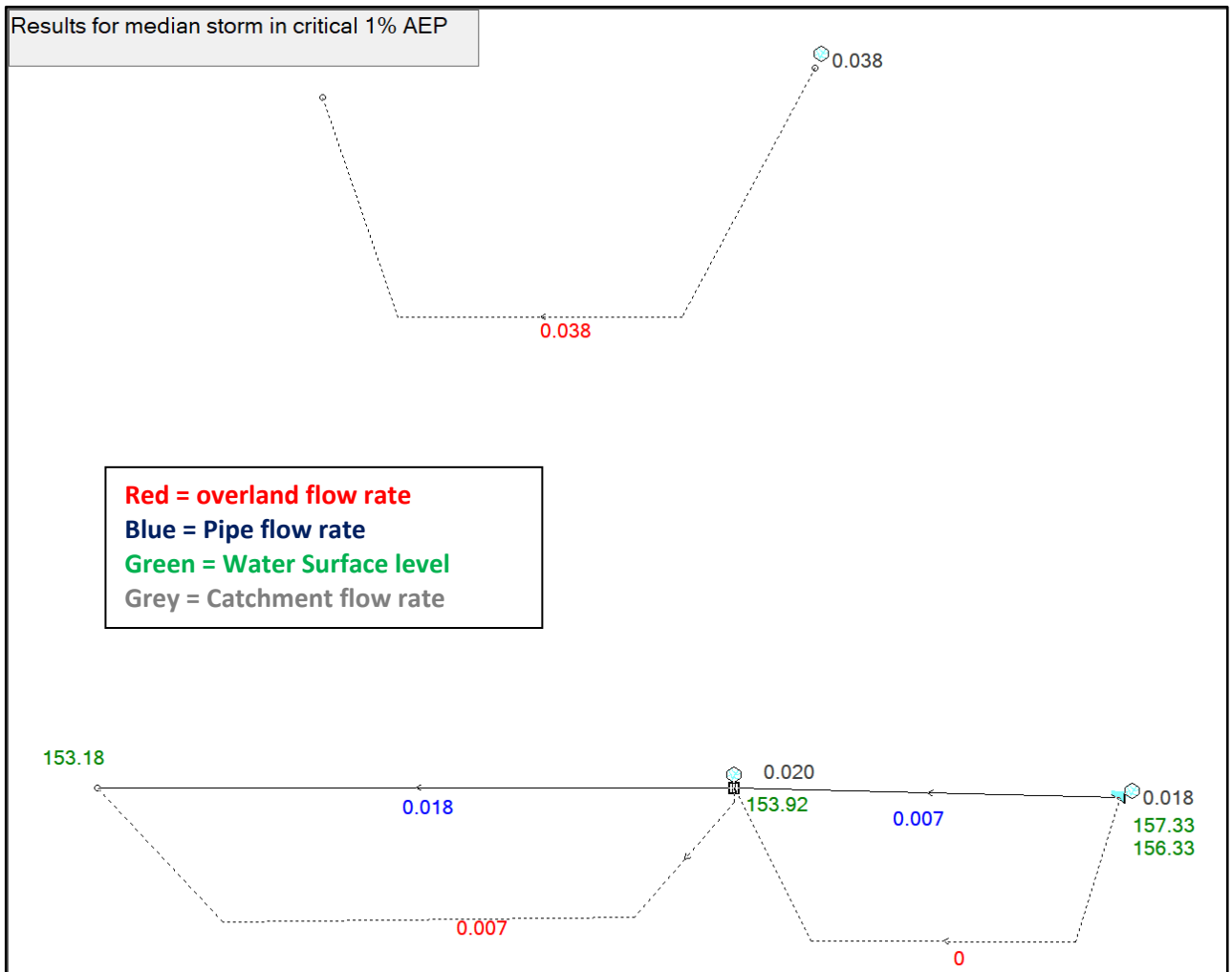
Consulting Engineers - Civil Hydraulic Structural

2. Drains Analysis for 20% AEP storm event



- Existing Site Discharged (20% AEP) = 17 l/s (Approx.)
- **Post Development Discharge (20% AEP) = (10 l/s Kerb Outlet + 3 l/s Overland runoff) = 13 l/s** (Approximate) < 17 l/s Existing Site Discharge (20% AEP)**OK**
- OSD/RWT Volume Required = 2.3 m³ (Approximate)
- Orifice OSD/RWT = 56 mm – Centre Orifice = 156.32 m AHD (Approximate)
- Max WL in OSD/RWT = 156.77 m (Approximate)

3. Drains Analysis for 1% AEP storm event



- Existing Site Discharged (1% AEP) = 38 l/s (Approx.)
- **Post Development Discharge (1% AEP) = (18 l/s Kerb Outlet + 7 l/s Overland runoff) = 25 l/s** (Approximate) < 38 l/s Existing Site Discharge (1% AEP)**OK**
- OSD/RWT Volume Required = 4.9 m³ (Approximate)
- Orifice OSD/RWT = 56 mm – Centre Orifice = 156.32 m AHD (Approximate)
- Max WL in OSD/RWT = 157.33 m (Approximate)

4. IFD Design Rainfall Depth (mm)

Duration	Annual Exceedance Probability (AEP)						
	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	2.51	2.80	3.75	4.41	5.07	5.96	6.66
2 min	4.22	4.67	6.10	7.09	8.07	9.43	10.5
3 min	5.82	6.46	8.49	9.90	11.3	13.2	14.8
4 min	7.27	8.09	10.7	12.5	14.3	16.8	18.7
5 min	8.57	9.56	12.7	14.9	17.1	20.1	22.4
10 min	13.5	15.1	20.3	24.0	27.6	32.5	36.3
15 min	16.9	18.9	25.5	30.0	34.6	40.7	45.5
20 min	19.4	21.8	29.3	34.5	39.7	46.7	52.2
25 min	21.5	24.0	32.2	38.0	43.7	51.3	57.3
30 min	23.2	25.9	34.7	40.8	46.9	55.1	61.5
45 min	27.1	30.3	40.3	47.2	54.1	63.6	71.0
1 hour	30.1	33.5	44.4	51.9	59.5	69.8	78.0
1.5 hour	34.7	38.5	50.6	59.1	67.7	79.5	88.8
2 hour	38.3	42.4	55.6	64.9	74.3	87.3	97.7
3 hour	44.1	48.7	63.7	74.5	85.5	101	113
4.5 hour	50.9	56.3	73.8	86.5	99.6	118	132
6 hour	56.7	62.6	82.5	97.0	112	133	150
9 hour	66.2	73.3	97.4	115	134	159	180
12 hour	74.0	82.3	110	131	152	182	206
18 hour	86.8	97.1	132	157	184	221	250
24 hour	97.1	109	149	179	210	252	286
30 hour	106	119	164	197	231	278	315
36 hour	113	127	176	212	249	300	340
48 hour	125	141	197	237	278	335	379
72 hour	141	161	225	270	317	379	427
96 hour	152	174	242	290	339	404	454
120 hour	160	183	254	303	353	418	468
144 hour	166	189	261	311	361	426	475
168 hour	171	194	266	316	365	429	477

(For more information and OSD/RWT details refer to the hydraulic design from Nasser Associates, Job no. D3992).

PIT / NODE DETAILS

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	Part Full Shock Loss	Inflow Hydrograph	Pit is	Internal Width (mm)	Inflow is Misaligned	Minor Safe Pond Depth (m)	Major Safe Pond Depth (m)
Ex. Site	Node					8		0		195.81	-271.503	921870		No					
Ex. Outlet	Node					153.3		0		195.768	-271.506	921874		No					
Pit1	OnGrade	GRATED PI	600sq		1.5	154.1		0	0	195.803	-271.565	No	1668533	1 x Ku	No	New			
Kerb & Gutter	Node					153.3		0		195.749	-271.565		1694423	No					

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length	id
OSD/RWT	156.27	4.6		Orifice		56	156.32			195.836	-271.565	No		1934393	
	156.29	4.6													
	157.33	4.6													
	157.44	4.6													

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%)	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor	Rainfall Multiplier
Ex. Site.	Ex. Site	0.0557	46	54	0	2	3	0											0			1
Roof	OSD/RWT	0.024	100	0	0	3	0	0											0			1
Cat+Bypass	Pit1	0.0317	20	80	0	2	3	0											0			1

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	RI (m)	Chg (m)	RL (m)	etc (m)
Outlet/Overfl	OSD/RWT	Pit1	16	156.29	153.8	15.56	uPVC, not t	100	105	0.012	NewFixed	1	OSD/RWT		0				
RHS Outlet	Pit1	Kerb & Gut	6	153.76	153.15	10.17	RHS SECTIC 0.2W x 0.1H			0.009	NewFixed	1	Pit1		0				

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of S Chg (m)	Bottom Elev (m)	Height of S Chg (m)	Bottom Elev (m)	Height of S etc (m)
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CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed
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OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Stori (m)	SafeDepth Minor Stor (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id	U/S IL	D/S IL	Length (m)
OF1	Ex. Site	Ex. Outlet	0.6				Dummy usi	0.2	0.05	0.6	0.1	0	921877	46	45.2	20
Overflow OSC	OSD/RWT	Pit1	0.1	157.33	0.11	1.7	Dummy usi	0.2	0.05	0.6	1	0	1934428	47.25	45.5	15
OF14877	Pit1	Kerb & Gut	0.3				Footpath	0.1	0.1	0.6	1	0	1668536	45.5	45.2	10

DRAINS results prepared from Version 2021.031

PIT / NODE DETAILS

		Version 8					
Name	Max HGL	Max Pond HGL	Max Surface Flow (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Pit1	153.84		0.013		0.26	0.003	Inlet Capacity
Kerb & Gutter	153.17		0.004				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Ex. Site.	0.017	0.011	0.006		2	3	0 20% AEP, 5 min burst, Storm 1
Roof	0.01	0.01	0		3	0	0 20% AEP, 5 min burst, Storm 1
Cat+Bypass	0.008	0.002	0.006		2	3	0 20% AEP, 20 min burst, Storm 8

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Outlet/Overflow	0.004	1.38	156.54	153.842	20% AEP, 20 min burst, Storm 4
RHS Outlet	0.01	2.35	153.825	153.172	20% AEP, 20 min burst, Storm 2

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm
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OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0.017	0.017	0.115	0.024	0	11.33	0.12	20% AEP, 5 min burst, Storm 1
Overflow OSD	0	0	0.362	0	0	0	0	
OF14877	0.003	0.003	0.169	0.008	0	2.8	0.11	20% AEP, 10 min burst, Storm 4

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD/RWT	156.77	2.3	0.004	0.004	0

Run Log for Courtley Rd 10 OSD Final 24.10.22.drn run at 11:41:28 on 24/10/2022 using version 2021.031

No water upwelling from any pit. Freeboard was adequate at all pits.

Flows were safe in all overflow routes.

DRAINS results prepared from Version 2021.031

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Version 8		Min Freeboard (m)	Overflow (cu.m/s)	Constraint
			Max Surface Flow (cu.m/s)	Max Pond Volume (cu.m)			
Pit1	153.92		0.026		0.18	0.007	Inlet Capacity
Kerb & Gutter	153.18		0.01				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Ex. Site.	0.038	0.019	0.019	2	3	3	0 1% AEP, 5 min burst, Storm 1
Roof	0.018	0.018	0	3	0	0	0 1% AEP, 5 min burst, Storm 1
Cat+Bypass	0.02	0.005	0.016	2	3	3	0 1% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Outlet/Overflow	0.007	0.77	157.059	153.919	1% AEP, 20 min burst, Storm 8
RHS Outlet	0.018	2.85	153.852	153.181	1% AEP, 5 min burst, Storm 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm
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OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0.038	0.038	3.451	0.032	0	14.48	0.15	1% AEP, 5 min burst, Storm 1
Overflow OSD	0	0	10.912	0	0	0	0	
OF14877	0.007	0.007	0.169	0.015	0	2.8	0.17	1% AEP, 5 min burst, Storm 1

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD/RWT	157.33	4.9	0.007	0.007	0

Run Log for Courtley Rd 10 OSD Final 24.10.22.drn run at 11:44:40 on 24/10/2022 using version 2021.031

No water upwelling from any pit. Freeboard was adequate at all pits.

Flows were safe in all overflow routes.

GENERAL NOTES:

- ALL HYDRAULIC WORKS TO BE IN ACCORDANCE WITH NORTHERN BEACHES COUNCIL'S STANDARD SPECIFICATIONS AND TO THE SUPERVISING ENGINEER'S SATISFACTION.
- THESE PLANS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL PLANS FROM RAWSON HOMES JOB No. A000350 ISSUE B DATED 4 OCTOBER 2022 (PHONE: (02) 8765 5500)
- ALL STORMWATER PIPES TO BE 100 DIA. UPVC UNLESS NOTED OTHERWISE. PIPES UNDER DRIVEWAY TO BE SEWER GRADE.
- DEPTH AND LOCATION OF SEWER & SERVICES TO BE CONFIRMED PRIOR TO COMMENCEMENT OF DRAINAGE WORKS.
- THE CONTRACTOR SHALL IMPLEMENT EROSION AND SEDIMENTATION CONTROL MEASURES AS NECESSARY AND TO THE SATISFACTION OF COUNCIL PRIOR TO COMMENCEMENT OF CONSTRUCTION AND DURING CONSTRUCTION.
- ENSURE FINISHED GROUND LEVELS ARE SLOPING AWAY FROM THE DEVELOPMENT & INTO PITS OR YARD SUMPS, AS SHOWN ON THE ATTACHED DRAINAGE PLAN.
- HYDRAULIC PLANS ARE SUBJECT TO COUNCIL APPROVAL.

OSD CALCULATIONS SUMMARY:

THESE CALCULATIONS SHOULD BE READ IN CONJUNCTION WITH NORTHERN BEACHES COUNCIL OSD TECHNICAL SPECIFICATION SECTION 4.30 – PRE AND POST DEVELOPMENT RUNOFF FOR FULL COMPUTATION METHOD. CALCULATION MUST BE SUBMITTED IN SUPPORT OF THE FLOW RATES AND STORAGE VOLUMES PROPOSED TO DEMONSTRATE THAT THE POST-DEVELOPMENT FLOWS FOR THE 20% AEP (5 YR ARI) AND 1% AEP (100 YEAR ARI) STORM EVENTS RESTRICTED TO THE PRE-DEVELOPMENT FLOWS FOR THE 20% AEP (5 YR ARI) AND 1% AEP (100 YEAR ARI) STORM EVENTS.

USING DRAINS SOFTWARE TO CALCULATE OSD VOLUME:

- EXISTING SITE DISCHARGE (20% AEP) = 17 l/s
 - PROPOSED SITE DISCHARGE (20% AEP) = 13 l/s
 - OSD VOLUME = 2.30 m³
 - EXISTING SITE DISCHARGE (1% AEP) = 38 l/s
 - PROPOSED SITE DISCHARGE (1% AEP) = 25 l/s
 - OSD VOLUME = 4.90 m³
 - ORIFICE = 56 mm
 - MAX WL IN OSD/RWT TANKS = 157.33 m (APPROX.)
- (REFER TO DRAINS ANALYSIS REPORT ATTACHED).

PROVIDED TWO ABOVEGROUND RAINWATER TANKS WITH TOTAL EFFECTIVE CAPACITY OF 7,900 LITRES (TOP 4,900 LITRES IS DETENTION & BOTTOM 3,000 LITRES IS RETENTION SYSTEM).

125x75x5.0 HOT DIP. GALV. RHS OUTLET TO STREET GUTTER AT 1% MIN. FALL (THE EXACT LOCATION TO BE DETERMINED DURING CONSTRUCTION).
INV. 153.76 (APPROX.)

SCREEN WITH GALVANISED GUIDE CHANNELS
MAXI-MESH RH 3030
(REFER TO DETAIL 4 ON SHEET NO. 4)

600 SQ. CONCRETE SILT ARRESTOR PIT (HINGED & LOCKED)

100 DIA SEWER GRADE FROM BOX DRAIN
INV. 153.80 (APPROX.)

100 DIA SEWER GRADE FROM PIT ⑤
INV. 153.80 (APPROX.)

100 DIA SEWER GRADE FROM PIT ②
INV. 153.80 (APPROX.)

REPLACABLE GEOTEXTILE FILTER FABRIC

4 x 100mm DIA. SEEPAGE HOLES FILLED WITH AGGREGATE

TWO 1/2 BRICK KEEPERS

GEOTEXTILE FILTER FABRIC SURROUNDING 14mm AGGREGATE

BTM PIT 153.50

DETAIL 1

SILT ARRESTOR PIT

SCALE 1:20

SITE CALCULATIONS:

TOTAL SITE AREA = 557.30 m²
TOTAL ROOF AREA IN RWT= 240.00 m²
TOTAL EXISTING IMPERVIOUS AREA = 255.0 m² (45.8%)
TOTAL PROPOSED IMPERVIOUS AREA = 293.70 m² (APPROX.)(52.7%)
(INCLUDING ROOF, DRIVEWAY & PATH/PAVED AREA)

BASIX REQUIREMENT (19.10.2022)

3,000 LITRES CAPACITY RAINWATER TANK FOR AT LEAST 60m² OF ROOF AREA. PROVIDED 3,000 LITRES OF RETENTION WITHIN 8,380 LITRES CAPACITY ABOVEGROUND OSD/RWT TANKS SYSTEM (7,900 TOTAL EFFECTIVE CAPACITY) FOR TOTAL ROOF AREA.

IMPORTANT NOTES:

- THESE HYDRAULIC DRAWINGS SHOULD BE READ IN CONJUNCTION WITH NORTHERN BEACHES COUNCIL'S STORMWATER MANAGEMENT CODE. ON-SITE DETENTION (OSD) & RETENTION (RWT) SYSTEMS ARE REQUIRED FOR THIS DEVELOPMENT (REFER TO DRAINS CALCULATIONS ATTACHED).
- TWO ABOVEGROUND OSD/RWT TANKS WITH TOTAL CAPACITY OF 8,380 LITRES (7,900 LITRES EFFECTIVE CAPACITY) HAVE BEEN PLACED ON NORTH-WESTERN SIDE OF THE GARAGE TO COLLECT TOTAL ROOF AREA. BOTTOM 3,000 LITRES CAPACITY OF THE OSD/RWT TANKS IS FOR RETENTION SYSTEM (RWT) FOR RE-USE OF WATER SUCH AS TOILET FLUSHING, LAUNDRY & IRRIGATION SYSTEMS. TOP 4,900 LITRES CAPACITY OF OSD/RWT TANK IS FOR DETENTION SYSTEM (OSD) – 100 DIA OVERFLOW/OUTLET FROM TOP OF OSD/RWT1 IS TO BE CONNECTED TO STORMWATER LINE AT 1% MIN. FALL (REFER TO SHEET No.2 FOR DETAILS).
- SURFACE WATER RUNOFF AROUND THE DWELLING INCLUDING DRIVEWAY AND OVERFLOW/OUTLET PIPE FROM TOP OF OSD/RWT1 IS TO BE DRAINED TO SILT ARRESTOR PIT ① IN FRONT, PRIOR TO DISCHARGING TO EXISTING STREET KERB & GUTTER VIA 125x75x5.0 HOP DIP. GALV. RHS AT 1% MIN. FALL (REFER TO SHEET No.2 FOR DETAILS).
- LEVELS ARE CRITICAL. PRIOR TO ANY CHANGES CONTACT ENGINEER.
- PRIOR TO BACKFILLING STORMWATER PIPES & RHS CONNECTION TO STREET GUTTER, CONTACT ENGINEER FOR AN INSPECTION.
- WORK-AS EXECUTED PLANS & COMPLIANCE CERTIFICATE WILL BE ISSUED AFTER COMPLETION OF ALL HYDRAULIC WORKS.

NASSERI ASSOCIATES

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J.NASSERI
BE, FIEAust.,
NER, CPEng.
DATE: 24/10/2022

SYMBOLS & NOTATIONS

--- STORMWATER LINES
○ DOWNPIPE
● 100 DIA YARD SUMP
--- 225x100 GRATED BOX DRAIN
INV INVERT LEVEL (PIPE / PIT)
SL FINISHED SURFACE LEVEL
FFL FINISHED FLOOR LEVEL
FPL FINISHED PLATFORM LEVEL
---X--- SEDIMENT CONTROL BARRIER
--- PROPOSED BOUNDARY
---S--- SEWER

ISSUE	AMENDMENTS				DATE
CLIENT: MS. OLIVIA BOYLE & MR. ANDREW IEMMA (RAWSON HOMES) LOT 7 (H/No. 10) COURTLEY ROAD, BEACON HILL					
DESIGNED	AS	DRAWN	AS	CHECKED	JN
SCALE		AS SHOWN			

HYDRAULIC DETAILS

NOTES, CALCULATIONS & PIT DETAILS

CAD REF. ENG/RAWSON JOB No. D3992 SHEET No. 1

LOT 7
557.30 m²

100 DIA SEWER GRADE TO PIT ①
AT 1% MIN. FALL (THE EXACT
LOCATION TO BE DETERMINED
DURING CONSTRUCTION)

100 DIA SEWER GRADE TO PIT ②
AT 1% MIN. FALL (THE EXACT
LOCATION TO BE DETERMINED
DURING CONSTRUCTION)

CREATE A SWALE OR EARTH
MOUND BEHIND THE RETAINING
WALL TO DIVERT SURFACE WATER
TO PIT ② & FRONT OF
PROPERTY (REFER TO DETAIL 2)

PLEASE NOTE:

1. THE EXACT LOCATION OF DOWNPIPES, STORMWATER LINE AND PITS MAY ALTER DURING CONSTRUCTION, TO SUIT THE SITE CONDITION.
2. ENSURE NO DAMAGE OCCURS TO EXISTING TREE ROOTS WHILE CONSTRUCTING THE STORMWATER SYSTEM.

100 DIA SEWER GRADE
TO TAKE ROOF WATER
TO TOP OF OSD/RWT1
(ALL DOWNPIPES TO BE
FULLY SEALED)

600 SQ. CONCRETE
SILT ARRESTOR PIT
SL. 154.10 (APPROX.)
INV. PIT 153.50
INV. OUTLET 153.76
(REFER TO DETAIL 1
ON SHEET No.1)

125x75x5.0 HOT DIP. GALV.
RHS OUTLET TO STREET
GUTTER AT 1% MIN. FALL
(THE EXACT LOCATION TO BE
DETERMINED DURING
CONSTRUCTION)

SL 153.30 (APPROX.)
INV. 153.15

EXISTING VEHICLE CROSSING
TO BE REMOVED & REPLACED
WITH CONCRETE KERB &
GUTTER & FOOTWAY AREA IN
ACCORDANCE WITH COUNCIL'S
SPECIFICATIONS

**NEW DRIVEWAY CROSSING IN
ACCORDANCE WITH COUNCIL'S
REQUIREMENTS**

225 x 100 GRATED BOX
DRAIN - 100 DIA SEWER
GRADE OUTLET TO BE
CONNECTED TO PIT ① AT
1% MIN. FALL
SL. 154.38 (APPROX.)
INV. 154.28

100 DIA SEWER GRADE TO PIT ①
AT 1% MIN. FALL (THE EXACT
LOCATION TO BE DETERMINED
DURING CONSTRUCTION)

www.dialbeforeyoudig.com.au



DRAINAGE PLAN

SCALE 1:200

450 SQ. CONCRETE
GRADED PIT
SL 155.55 (APPROX.)
INV. 155.10
(REFER TO DETAIL 6
ON SHEET No.4)

450 SQ. CONCRETE
GRADED PIT
SL 155.60 (APPROX.)
INV. 155.25
(REFER TO DETAIL 6
ON SHEET No.4)

100 DIA SEWER
GRADE CLEAN-OUT
PIPE TO PIT ③

100 DIA SEWER GRADE TO PIT ③
AT 1% MIN. FALL (THE EXACT
LOCATION TO BE DETERMINED
DURING CONSTRUCTION)

100 DIA YARD SUMP OR 250 SQUARE GRATED PIT (TYPICAL) STARTING POINT SL 155.60 (APPROX.) INV. 155.45
--

100 DIA SEWER GRADE
TO TAKE ROOF WATER
TO TOP OF OSD/RWT2
(ALL DOWNPIPES TO BE
FULLY SEALED)

100 DIA SEWER GRADE TO PIT ④
AT 1% MIN. FALL (THE EXACT
LOCATION TO BE DETERMINED
DURING CONSTRUCTION)

100 DIA SEWER
GRADE CLEAN-OUT
PIPE TO PIT ④

450 SQ. CONCRETE
GRADED PIT
SL 155.60 (APPROX.)
INV. 155.20
(REFER TO DETAIL 6
ON SHEET No.4)

CREATE A SWALE OR EARTH
MOUND BEHIND THE RETAINING
WALL TO DIVERT SURFACE WATER
TO PIT ⑤ & FRONT OF
PROPERTY (REFER TO DETAIL 2)

100 DIA SEWER GRADE TO PIT ⑤
AT 1% MIN. FALL (THE EXACT
LOCATION TO BE DETERMINED
DURING CONSTRUCTION)

450 SQ. CONCRETE
GRADED PIT
SL 155.55 (APPROX.)
INV. 155.10
(REFER TO DETAIL 6
ON SHEET No.4)

100 DIA SEWER GRADE
OVERFLOW/OUTLET PIPE
FROM TOP OF OSD/RWT1
TO BE CONNECTED TO
STORMWATER LINE AT 1%
MIN. FALL
SL 155.55 (APPROX.)
INV. 155.40

QSD/RWT
 (2x4,190) 8380 TOTAL LITRES CAPACITY
 *7,900 LITRES TOTAL EFFECTIVE CAPACITY
 (2,700L x 900W x 1,785H EACH)
 ABOVEGROUND OSD/RWT MODLINE TANKS
 (REFER TO ELEVATION A ON SHEET No.3)

Diagram of a beam with a parabolic profile. The total length is 500 OR 300. The height at the ends is 1, and the height at the center is 50 OR 30. The beam is supported by two triangular supports, each with a base of 5 and a height of 1.

DETAIL 2

500 OR 300mm WIDE EARTH MOUND OR DISH DRAIN

NTS

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J.NASSERI
BE, FIEAust.,
NER, CPEng.

DATE: 24/10/2022

SYMBOLS & NOTATIONS

— — —	STORMWATER LINES	SL	FINISHED SURFACE LEVEL
○	DOWNPIPE	FFL	FINISHED FLOOR LEVEL
	100 DIA YARD SUMP	FPL	FINISHED PLATFORM LEVEL
	225x100 GRATED BOX DRAIN	—X—	SEDIMENT CONTROL BARRIER
INV	INVERT LEVEL (PIPE / PIT)	— — —	PROPOSED BOUNDARY
		— S —	SEWER

ISSUE	AMENDMENTS		DATE
CLIENT: MS. OLIVIA BOYLE & MR. ANDREW IEMMA (RAWSON HOMES) LOT 7 (H/No. 10) COURTLEY ROAD, BEACON HILL			
DESIGNED	AS	DRAWN	AS
		CHECKED	JN
		SCALE	AS SHOWN

HYDRAULIC DETAILS

DRAINAGE PLAN

CAD REF. ENG/RAWSON

JOB No. D3992

SHEET No. 2

REFER TO DETAIL 3
ON SHEET No. 4
FOR MORE DETAILS

100 DIA SEWER GRADE
TO TAKE ROOF WATER
TO TOP OF OSD/RWT1
(ALL DOWNPIPES TO BE
FULLY SEALED)

100 DIA SEWER GRADE TO PIT ①
AT 1% MIN. FALL (THE EXACT
LOCATION TO BE DETERMINED
DURING CONSTRUCTION)

PLEASE NOTE:
BOTH TANKS MUST BE PLACED AT THE SAME
BASE LEVEL & MUST HAVE SAME HEIGHT.

100 DIA SEWER GRADE
OVERFLOW/OUTLET PIPE
FROM TOP OF OSD/RWT1
TO BE CONNECTED TO
STORMWATER LINE AT 1%
MIN. FALL
SL 155.55 (APPROX.)
INV. 155.40

450 SQ. CONCRETE
GRADED PIT
SL 155.55 (APPROX.)
INV. 155.10
(REFER TO DETAIL 6
ON SHEET No.4)

100 DIA SEWER GRADE
TO TAKE ROOF WATER
TO TOP OF OSD/RWT2
(ALL DOWNPIPES TO BE
FULLY SEALED)

100 DIA YARD SUMP
OR 250 SQUARE
GRADED PIT (TYPICAL)
STARTING POINT
SL 155.60 (APPROX.)
INV. 155.45

100 DIA SEWER GRADE TO PIT ④
AT 1% MIN. FALL (THE EXACT
LOCATION TO BE DETERMINED
DURING CONSTRUCTION)

450 SQ. CONCRETE
GRADED PIT
SL 155.60 (APPROX.)
INV. 155.20
(REFER TO DETAIL 6
ON SHEET No.4)

100 DIA SEWER
GRADE CLEAN-OUT
PIPE TO PIT ④

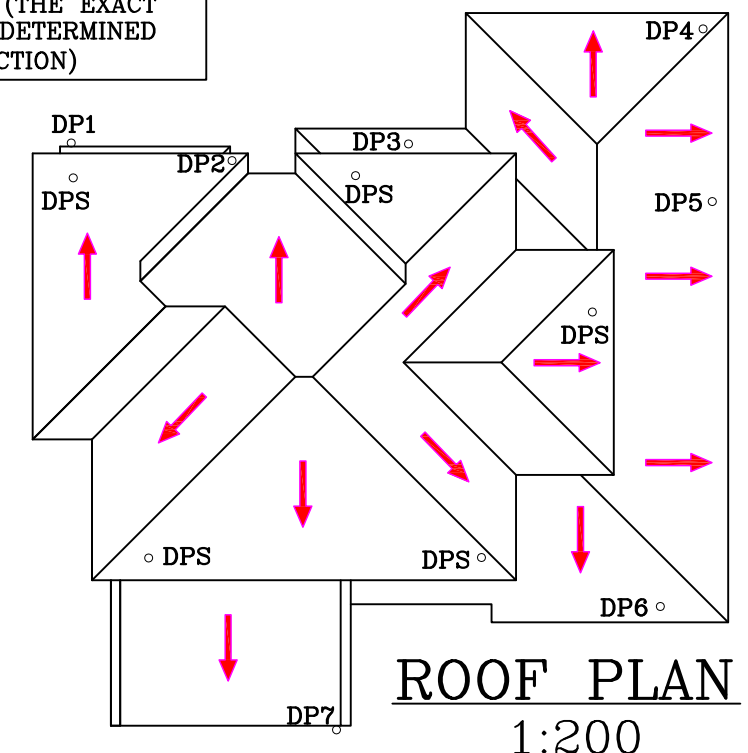
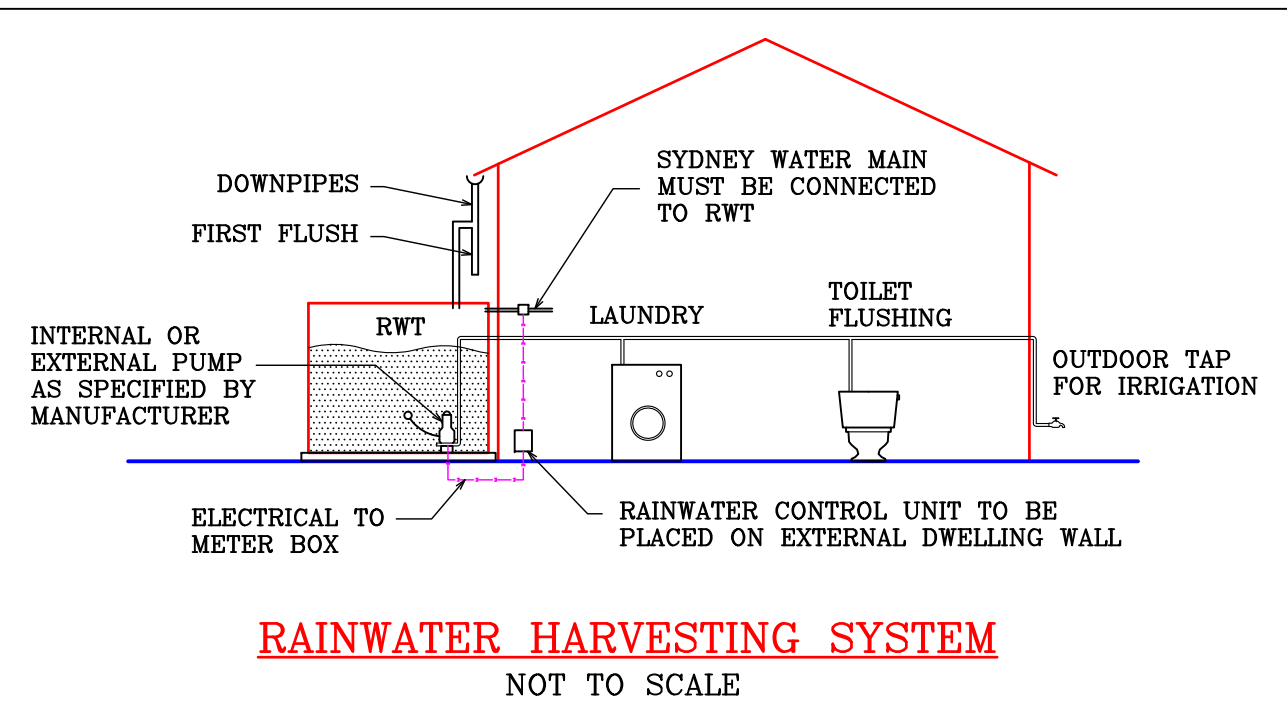
100 DIA SEWER GRADE TO PIT ⑤
AT 1% MIN. FALL (THE EXACT
LOCATION TO BE DETERMINED
DURING CONSTRUCTION)

OSD/RWT
(2x4,190) 8380 TOTAL LITRES CAPACITY
*7,900 LITRES TOTAL EFFECTIVE CAPACITY
(2,700L x 900W x 1,785H EACH)
ABOVEGROUND OSD/RWT MODLINE TANKS
(REFER TO SHEET No.4 FOR DETAILS)

ELEVATION A

SCALE 1:100

- IMPORTANT NOTES:**
1. RAINWATER TANKS ARE FROM KINGSPAN WATER OR SIMILAR. PH: 1300 736 562
 2. A FIRST FLUSH DEVICE IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS SHALL BE FITTED TO THE SYSTEM TO DIVERT THE FIRST 0.5mm OF RUN-OFF FROM THE AREA DRAINING AWAY FROM THE STORAGE TANK. (eg.0.5 l/m²)
 3. BOTH OSD/RWT1 & OSD/RWT2 MUST BE PLACED AT THE SAME BASE LEVEL & HAVE THE SAME HEIGHT.
 4. PLACE 50 DIA INTERCONNECTING PIPES AT THE BASE OF BOTH OSD/RWT1 AND OSD/RWT2.



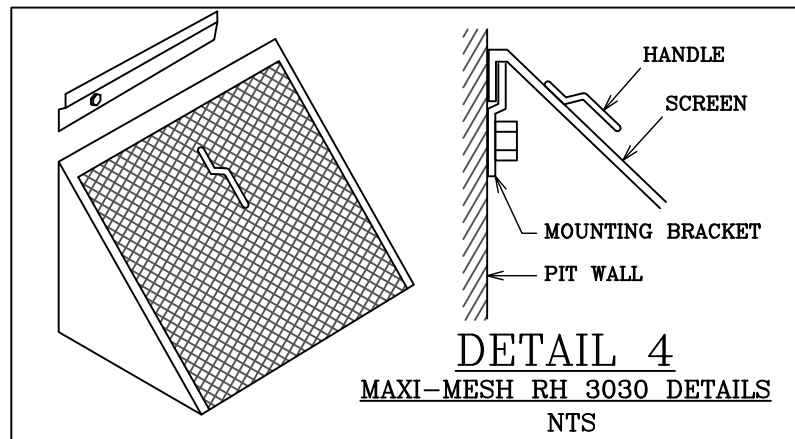
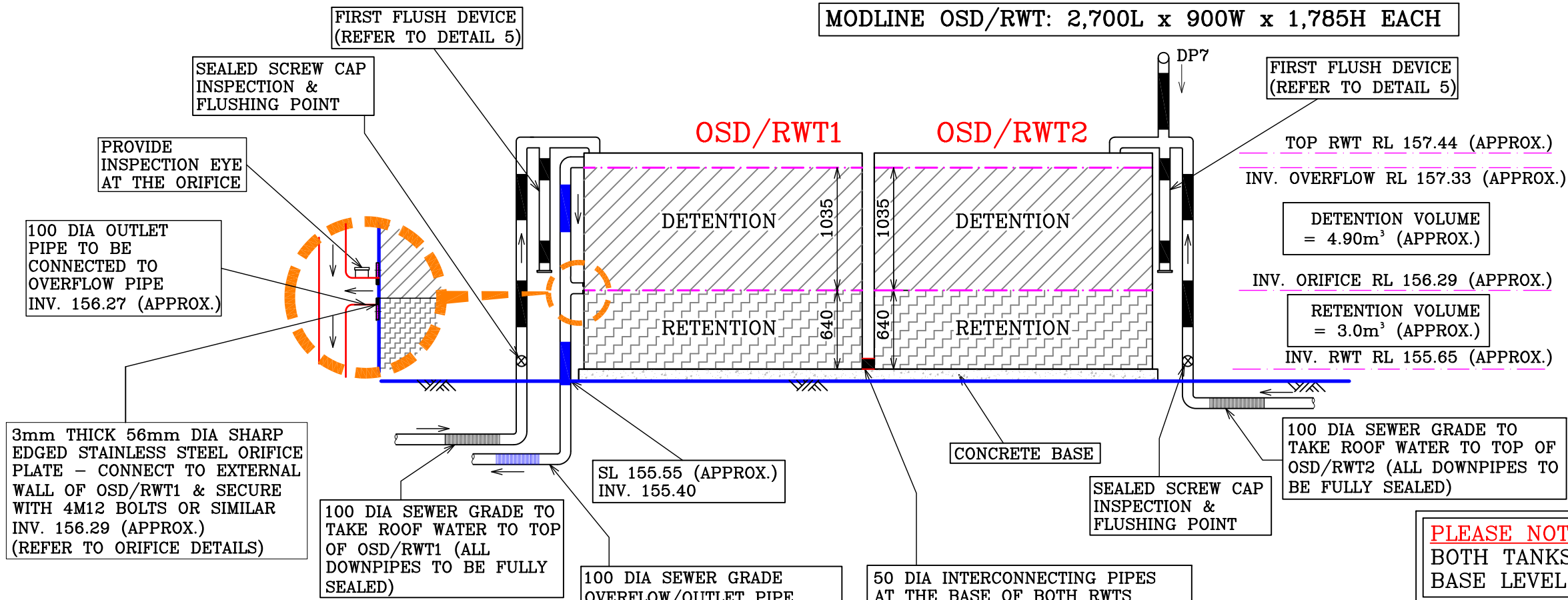
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SYMBOLS & NOTATIONS	
— STORMWATER LINES	SL FINISHED SURFACE LEVEL
○ DOWNPIPE	FFL FINISHED FLOOR LEVEL
100 DIA YARD SUMP	FPL FINISHED PLATFORM LEVEL
225x100 GRATED BOX DRAIN	—X— SEDIMENT CONTROL BARRIER
INV INVERT LEVEL (PIPE / PIT)	--- PROPOSED BOUNDARY
	—S— SEWER

ISSUE	AMENDMENTS					DATE
CLIENT: MS. OLIVIA BOYLE & MR. ANDREW IEMMA (RAWSON HOMES) LOT 7 (H/No. 10) COURTLEY ROAD, BEACON HILL						
DESIGNED	AS	DRAWN	AS	CHECKED	JN	SCALE AS SHOWN

HYDRAULIC DETAILS		
ELEVATION A & ROOF PLAN DETAILS		
CAD REF. ENG/RAWSON	JOB No. D3992	SHEET No. 3



100 DIA SEWER GRADE OVERFLOW/OUTLET PIPE FROM TOP OF OSD/RWT1 TO BE CONNECTED TO STORMWATER LINE AT 1% MIN. FALL

50 DIA INTERCONNECTING PIPES AT THE BASE OF BOTH RWTS INV. 155.65 (APPROX.) (BOTH RWTS MUST BE PLACED AT THE SAME BASE LEVEL)

100 DIA SEWER GRADE TO TAKE ROOF WATER TO TOP OF OSD/RWT2 (ALL DOWNPIPES TO BE FULLY SEALED)

PLEASE NOTE:
BOTH TANKS MUST BE PLACED AT THE SAME BASE LEVEL & MUST HAVE SAME HEIGHT.

DETAIL 3 OSD/RWT DETAILS N.T.S.

CALCULATIONS (OSD/RWT):

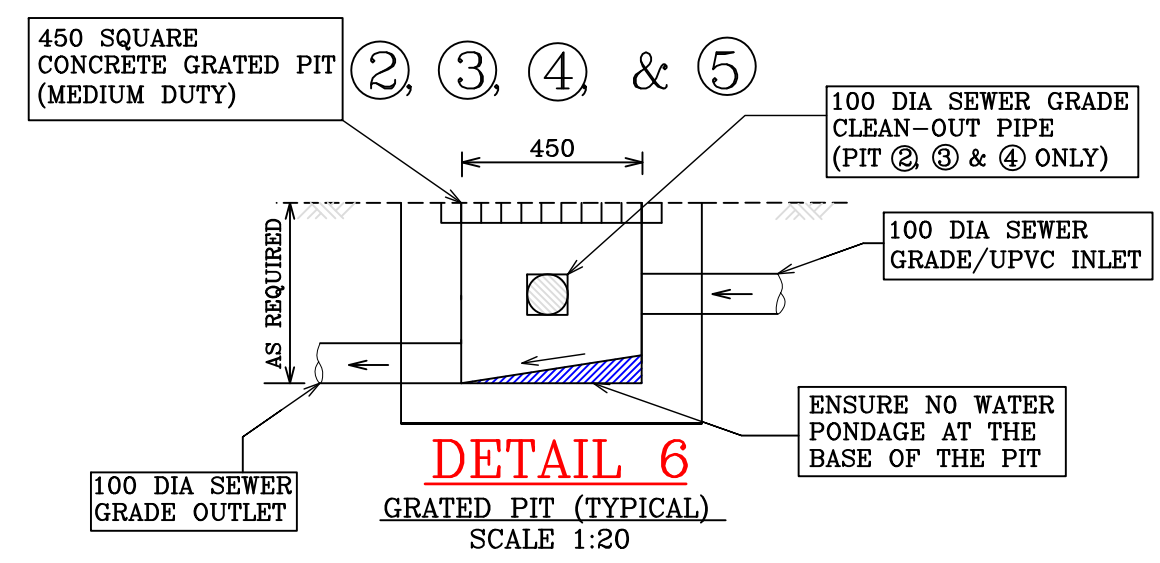
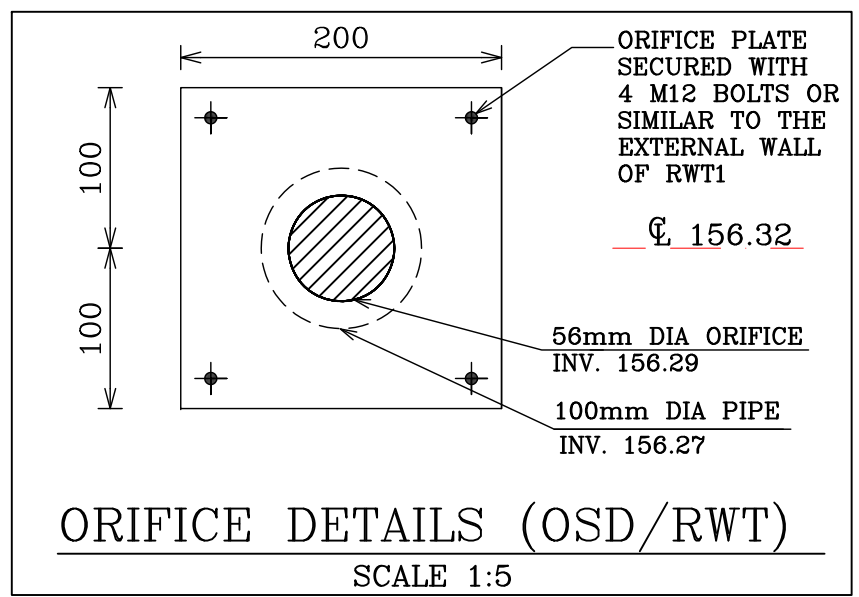
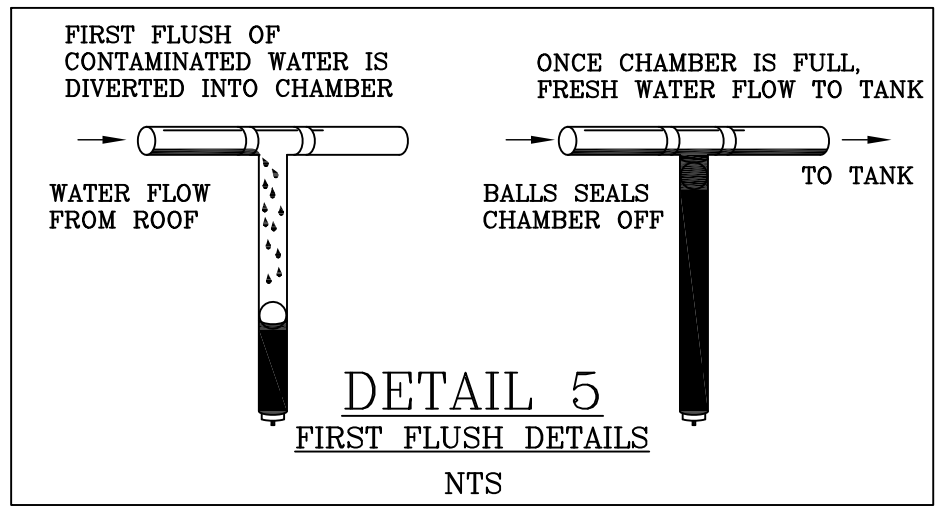
TOTAL TANKS VOLUME = 2 x 4,190 = 8,380 LITRES

EFFECTIVE VOLUME = (1.675/1.785)x8,390 = 7,900 LITRES (APPROX.)

RETENTION VOLUME = (0.640x7,900)/1.675 = 3,000 LITRES (APPROX.)

DETENTION VOLUME = (1.035x7,900)/1.675 = 4,900 LITRES (APPROX.)
= 4,900 REQUIRED

*ORIFICE = 56 mm



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SYMBOLS & NOTATIONS	
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ISSUE	AMENDMENTS				DATE
CLIENT: MS. OLIVIA BOYLE & MR. ANDREW IEMMA (RAWSON HOMES) LOT 7 (H/No. 10) COURTLEY ROAD, BEACON HILL					
DESIGNED	AS	DRAWN	AS	CHECKED	JN
		SCALE		AS SHOWN	

HYDRAULIC DETAILS		
OSD/RWT TANKS & MISCELLANEOUS DETAILS		
CAD REF. ENG/RAWSON	JOB No. D3992	SHEET No. 4