STORMWATER DRAINAGE PLAN

AT 54 BARDO ROAD, NEWPORT, NSW

NOTE RE. SERVICES

APPROXIMATE LOCATIONS OF EXISTING SERVICES SHOWN ON LONGITUDINAL SECTION.
EXACT LOCATIONS & DEPTHS TO BE ACURATELY LOCATED BY BUILDER CONTRACTOR BY CONTACTING THE RELEVANT AUTHORTIES BEFORE COMMENCEMENT OF ANY WORKS

DIAL 1100 BEFORE YOU DIG

GENERAL NOTES

1. ALL LINES ARE TO BE MIN. 100Ø UPVC @ MIN 1.0% GRADE UNLESS NOTED OTHERWISE.
2. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE & LEVEL ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY EARTHWORKS. ALL DESIGN LEVELS SHOWN ON PLAN SHALL BE VERIFIED ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORK.
3. ALL PIPES TO HAVE MIN 200mm COVER IF LOCATED WITHIN PROPERTY.
4. ALL PITS IN DRIVEWAYS BE HEAVY DUTY GRATES. DIRECT SURFACE FLOW TO ALL GRATED SURFACE INLET PITS.
5. ALL WORK DO BE DONE IN ACCORDANCE WITH COUNCIL'S DCP AND TO COUNCIL'S SATISFACTION.
6. LOCATION OF DOWNPIPES & FLOOR WASTES ARE INDICATIVE ONLY. DOWNPIPE & FLOOR WASTE SIZE, LOCATION & QUANTITY TO BE DETERMINED BY BUILDER & IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.
7. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ARCHITECTURAL, LANDSCAPE AND STRUCTURAL PLANS.
8. ANY DISCREPANCIES OR OMISSIONS SHALL BE REFERRED TO THE DESIGN ENGINEER AND COUNCIL ENGINEER FOR RESOLUTION.
9. ALL PITS OR GRATES IN TRAFFICABLE AREAS TO BE HEAVY DUTY.
10. ALL GUTTERS WILL BE FITTED WITH LEAF GUARDS AND SHOULD BE INSPECTED AND CLEANED TO ENSURE LEAF LITTER CANNOT ENTER THE DOWNPIPES
11. ALL PIT GRATES ON SITE MUST BE HINGED WITH J-BOLT LOCKDOWN SYSTEM.
12. PITS DEEPER THAN 1m REQUIRE STEP IRONS IN A STAGGERED MANNER. THE DEPTH OF ANY PIT IN EXCESS OF 2m SHALL BE STRUCTURALLY DESIGNED AND CERTIFIED BY A STRUCTURAL ENGINEER AND SUBMITTED TO COUNCIL FOR APPROVAL.
13. PROVIDE GRATED DRAIN IN ALL OPEN AREAS TO THE SKY INCLUDING STAIRS AND CONNECT TO NEAREST STORMWATER SYSTEM.
14. PROVIDE EMERGENCY SPITTERS TO ALL BALCONIES.
15. PROVIDE AGG PIPE IN ALL LANDSCAPE AREA AND CONNECT TO THE STORMWATER DRAINAGE SYSTEM.
16. PROVIDE AGG PIPE BEHIND THE RETAINING WALL AND CONNECT TO THE STORMWATER DRAINAGE SYSTEM.
17. TOP OF KERB AND INVERT OF GUTTER LEVELS & SERVICES ARE TO BE CHECKED ON SITE PRIOR ANY SITE WORK, INCLUDING CONSTRUCTION OF INTERNAL DRAINAGE SYSTEM. CONTACT ENGINEER IMMEDIATELY IF LEVEL VARIES FROM DESIGN DRAWING.
18. ALL RETAINING WALL FOR ABOVE GROUND OSD/BIORETENTION BASIN TO BE FULLY CONSTRUCTED WITHIN THE PROPERTY BOUNDARY.

1:100@A1 0 1 2 3 4 5

NOTE:
-ALL WALLS FORMING THE DETENTION BASIN SHALL BE CONSTRUCTED WHOLLY WITHIN THE PROPERTY BOUNDARIES OF THE SITE BEING DEVELOPED.

- LANDSCAPE AREAS WITHIN THE OSD STORAGE AREAS ARE MULCHED WITH DECORATIVE ROCK MULCH. (I.E. NON FLOATABLE)

SURFACE INLET PIT DIMENSION

DEPTH TO INVERT OF OUTLET	MINIMUM INTERNAL DIMENSIONS (mm)		
	RECTANGULAR		CIRCULAR
	WIDTH	LENGTH	DIAMETER
≤450	350	350	-
>450 ≤600	450	450	600
>600 ≤900	600	600	900
>900 ≤1200	600	900	1000
>1200	900	900	1000

ON-SITE DETENSION NOTE:

THE OSD BASIN/TANK IS TO BE BUILT TO THE CORRECT LEVEL & SIZE AS PER THIS DESIGN. ANY VARIATIONS ARE TO BE DONE UNDER CONSULTATION FROM OUR OFFICE ONLY. ANY AMENDMENTS WITHOUT OUR APPROVAL WOULD RESULT IN ADDITIONAL FEES FOR REDESIGN AT OC STAGE OR IF A SOLUTION CANNOT BE FOUND, RECONSTRUCTION IS REQUIRED UNDER THE CONTRACTOR'S EXPENSES.

NOTES: DRAINAGE LINES

DRAINAGE LINES SHOWN ------ TO COLLECT SURFACE WATER

DRAINAGE LINES SHOWN —— RWT —— TO COLLECT ROOF WATER ONLY TO RAINWATER TANK

DP : 100Ø DOWN PIPE U.N.O.
▬▬▬▬ : STORMWATER PIPE @1% MIN. U.N.O.
REFER TO AS.3500 PART 3 TABLE 7.2
P1 : 100Ø UPVC PIPE AT 1.0% MIN. GRADE
P2 : 150Ø UPVC PIPE AT 1.0% MIN. GRADE
P3 : 225Ø UPVC PIPE AT 0.5% MIN. GRADE
P4 : 300Ø UPVC PIPE AT 0.4% MIN. GRADE
P5 : 375Ø UPVC PIPE AT 0.4% MIN. GRADE
P6 : 450Ø RCP PIPE AT 0.4% MIN. GRADE

✳ NEW LEVEL
┼ EXISTING LEVEL

PROVIDE 150mm GAP UNDER THE FENCE AND IF BLOCK WALL PROVIDED, THEN PROVIDE OPENING FOR EMERGENCY OVERFLOW.

INSPECTION LIST:

THE STORMWATER DRAINAGE WORKS ARE TO BE INSPECTED DURING CONSTRUCTION, BY THE COUNCIL OR BY A SUITABLY QUALIFIED CIVIL ENGINEER. DOCUMENTARY EVIDENCE OF COMPLIANCE WITH COUNCIL'S SPECIFICATIONS SHALL BE OBTAINED PRIOR TO PROCEEDING TO THE SUBSEQUENT STAGES OF CONSTRUCTION, ENCOMPASSING NOT LESS THAN THE FOLLOWING KEY STAGES:

INSPECTION IS REQUIRED FOR THE BASEMENT BY STORMWATER ENGINEER PRIOR:
a) CONSTRUCTION OF PUMP WELL
b) BACKFILLING OF THE PITS AND PIPES.

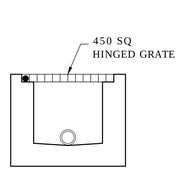
FOR THE GROUND FLOOR:

a) INITIAL INSPECTION TO DISCUSS CONCEPT AND SITE CONDITIONS / CONSTRAINTS PRIOR TO COMMENCEMENT OF CONSTRUCTION OF THE OSD.
b) PRIOR TO POURING OF THE ROOF OF THE DETENTION TANK.
c) AFTER COMPLETION OF STORAGE BUT PRIOR TO INSTALLATION OF FITTINGS (E.G. ORIFICE PLATES, SCREENS, FLAP VALVES ETC.)
d) FINAL INSPECTION

FOR THE SWALE DRAIN:
a) PRIOR TO LANDSCAPING OF SWALE DRAIN
b) FINAL INSPECTION

SYMBOLS

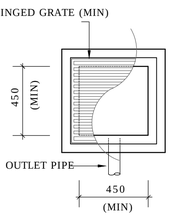
F.F.L.	FINISHED FLOOR LEVEL	▨	MASONRY RETAINING WALL
T.K.	TOP OF KERB	⊙ FW	FLOOR WASTE 300Ø
RL	PIT SURFACE LEVEL	⊙ RWO	RAINWATER OUTLET 150Ø
IL	INVERT LEVEL	⊙ DDO	DISH DRAIN OUTLET 100Ø
▬ ▬ ▬	STORMWATER DRAINAGE PIPE	▣	GRATED INLET PIT
—•—	DOWNPIPE TO RAINWATER TANK	▤	GRATED DRAIN
• DP	100Ø DOWN PIPE (U.N.O.)	⇦	OVERLAND FLOW PATH
• VD	VERTICAL DROP PIPE	▶SP	SPREADER
• VR	VERTICAL RISER	⋊ES	EMERGENCY SPITTER
• IO	INSPECTION OPENING		



PIT

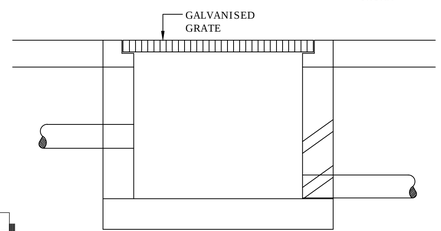
TYPICAL PIT SECTION

N.T.S.



STANDARD PIT

N.T.S.



TYPICAL PIT DETAIL

NTS

DRAWING SCHEDULE

DRAWING No.	DRAWING TITLE
D00	COVER SHEET, LEGEND & DRAWING SCHEDULE
D01	BASEMENT STORMWATER DRAINAGE PLAN
D02	BASEMENT STORMWATER DRAINAGE DETAILS
D03	GROUND FLOOR/SITE STORMWATER DRAINAGE PLAN
D04	GROUND FLOOR/SITE STORMWATER DRAINAGE DETAILS
D05	EROSION AND SEDIMENT CONTROL PLAN AND DETAILS
D06	FIRST FLOOR AND ROOF STORMWATER DRAINAGE PLAN AND DETAILS

ABBREVIATIONS

CL	CENTRELINE LEVEL	JP	JUNCTION PIT
CONV.	PIPE CONVERTER	KIP	KERB INLET PIT
D/S	DOWNSTREAM	LL	LOW LEVEL
DDO	DISH DRAIN OUTLET	O/F	OVERFLOW
DN	DIAMETER	OB	OBVERT LEVEL
DP	DOWNPIPE	OSD	ON-SITE DETENTION
EX.	EXISTING	PROP.	PROPOSED
FFL	FINISHED FLOOR LEVEL	PVC	POLYVINYLCHLORIDE
GL	GROUND LEVEL	RL	REDUCE LEVEL
GMS	GALVANISED MILD STEEL	RW	RETAINING WALL
GSIP	GROUND SURFACE INLET PIT	RWT	RAINWATER TANK
GTD	GRATED TRENCH DRAIN	S/S	STAINLESS STEEL
H.H	HEADHEIGHT	SL	SURFACE LEVEL
HL	HIGH LEVEL	STW	STORMWATER
IL	INVERT LEVEL	TK	TOP OF KERB
IO	INSPECTING OPENING	U/S	UPSTREAM

SITE OF WORK

LOCALITY SKETCH
NOT TO SCALE

N

No	AMENDMENT	ENG	DRAFT	DATE
D	FOR S4.55 (8)	A.S.	A.S.	08-03-22
C	FOR C.C. APPROVAL	A.S.	A.S.	09-12-21
B	FOR S4.55	L.Y.	L.L.	20-08-21
A	FOR D.A. APPROVAL	L.Y.	L.Y.	20-08-20

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Nominated Architects: Mark G Broadley [5823] Stuart D Hill [6459] Michael Aaron Vega [8004]

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PROJECT
PROPOSED SENIOR LIVING
54 BARDO ROAD,
NEWPORT, NSW

CONSENT AUTHORITY:
NORTHERN BEACHES–FORMER PITTWATER

SHEET SUBJECT
COVER SHEET, LEGEND AND DRAWING SCHEDULE

PROJECT 54 BARDO ROAD, NEWPORT			
DATE AUG 21	DRAWN A.S.	DESIGNED A.S.	CHECKED N.L.
SCALE @ A1 N.T.S.		JOB No 20NL103	
AUTHORISED NERMEIN LOKA		DWG No D00	REV D

INSPECTION LIST:

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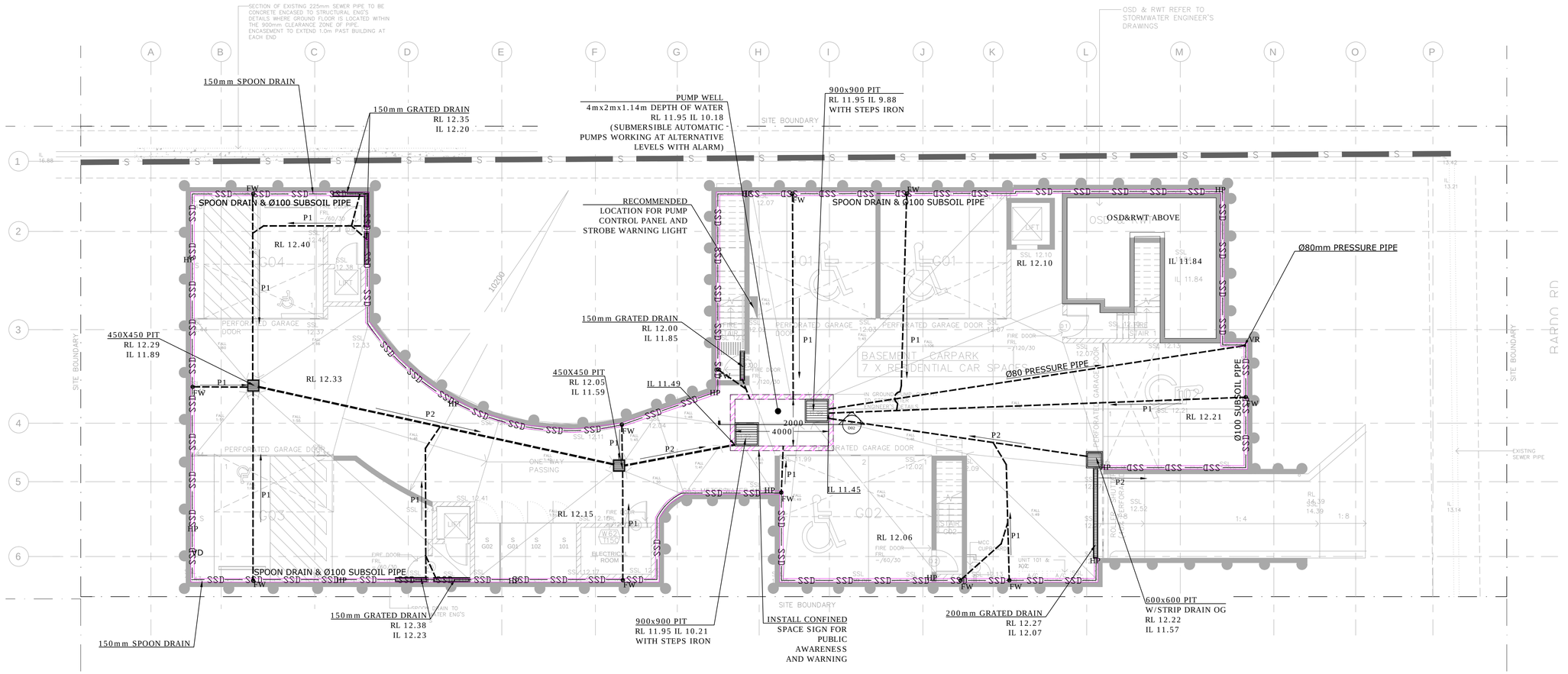
DIAL 1100 BEFORE YOU DIG



BASEMENT STORMWATER DRAINAGE PLAN

NOTES

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6. LOCATION OF DOWNPIPES & FLOOR WASTES ARE INDICATIVE ONLY. DOWNPIPE & FLOOR WASTE SIZE, LOCATION & QUANTITY TO BE DETERMINED BY BUILDER & IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.
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SYMBOLS

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T.K.	TOP OF KERB
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IL	INVERT LEVEL
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• VD	100Ø VERTICAL DROP (U.N.O.)
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• IO	INSPECTION OPENING
	MASONRY RETAINING WALL
⊗ FW	FLOOR WASTE 300Ø
⊗ DDO	DISH DRAIN OUTLET 100Ø
	GRATED INLET PIT
	GRATED DRAIN
	OVERLAND FLOW PATH
SP	SPREADER
ES	EMERGENCY SPITTER

VD : 100Ø VERTICAL DROP (U.N.O.)
▬▬▬▬▬ : STORMWATER PIPE @1% MIN. U.N.O.
REFER TO AS 3500 PART 3 TABLE 7.2
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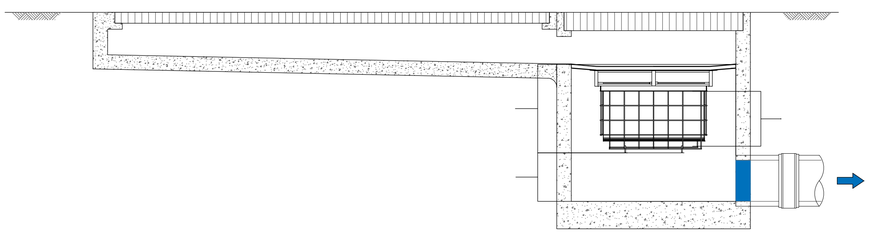
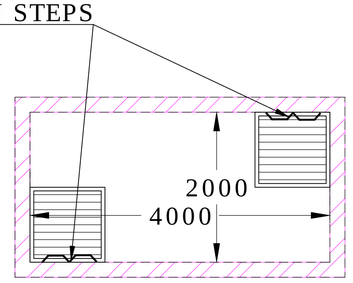
P3 : 225Ø UPVC PIPE AT 0.5% MIN. GRADE



PIT IN THE BASEMENT FOR DRIVEWAY DRAINAGE IS TO BE PROVIDED WITH A LITTER TRAP PRIOR CONNECTING INTO PUMP WELL.

IRON STEPS



STRIP DRAIN OCEANGUARD OR EQUIVALENT

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PUMP OUT WELL PLAN VIEW

NOTES: COUNCIL ISSUED FOOTWAY DESIGN LEVELS
COUNCIL'S ISSUED FOOTWAY DESIGN LEVELS TO BE INCORPORATED INTO THE FINISHED LEVELS ONCE ISSUED BY COUNCIL

NOTES: ROAD RESERVE & FOOTWAY DRAINAGE ELEMENTS
ALL STORMWATER DRAINAGE ELEMENTS PROPOSED WITHIN THE ROAD RESERVE AND FOOTWAY SHALL BE CONSTRUCTED UNDER THE SUPERVISION AND TO THE SATISFACTION OF COUNCIL'S ENGINEER.

No	AMENDMENT	ENG	DRAFT	DATE
F	FOR S4.55	L.Y.	L.L.	10-08-21
E	FOR S4.55	L.Y.	L.L.	03-08-21
D	FOR D.A. APPROVAL/ARCH UPDATES	L.Y.	L.Y.	06-04-21
C	FOR D.A. APPROVAL/ARCH UPDATES	L.Y.	L.Y.	17-03-21
B	FOR D.A. APPROVAL	L.Y.	L.Y.	01-09-20
A	FOR D.A. APPROVAL	L.Y.	L.Y.	26-08-20

No	AMENDMENT	ENG	DRAFT	DATE
J	FOR S4.55 (8)	A.S.	A.S.	08-03-22
I	FOR C.C APPROVAL	A.S.	A.S.	07-12-21
H	FOR S4.55	L.Y.	L.L.	08-10-21
G	FOR S4.55	L.Y.	L.L.	12-08-21

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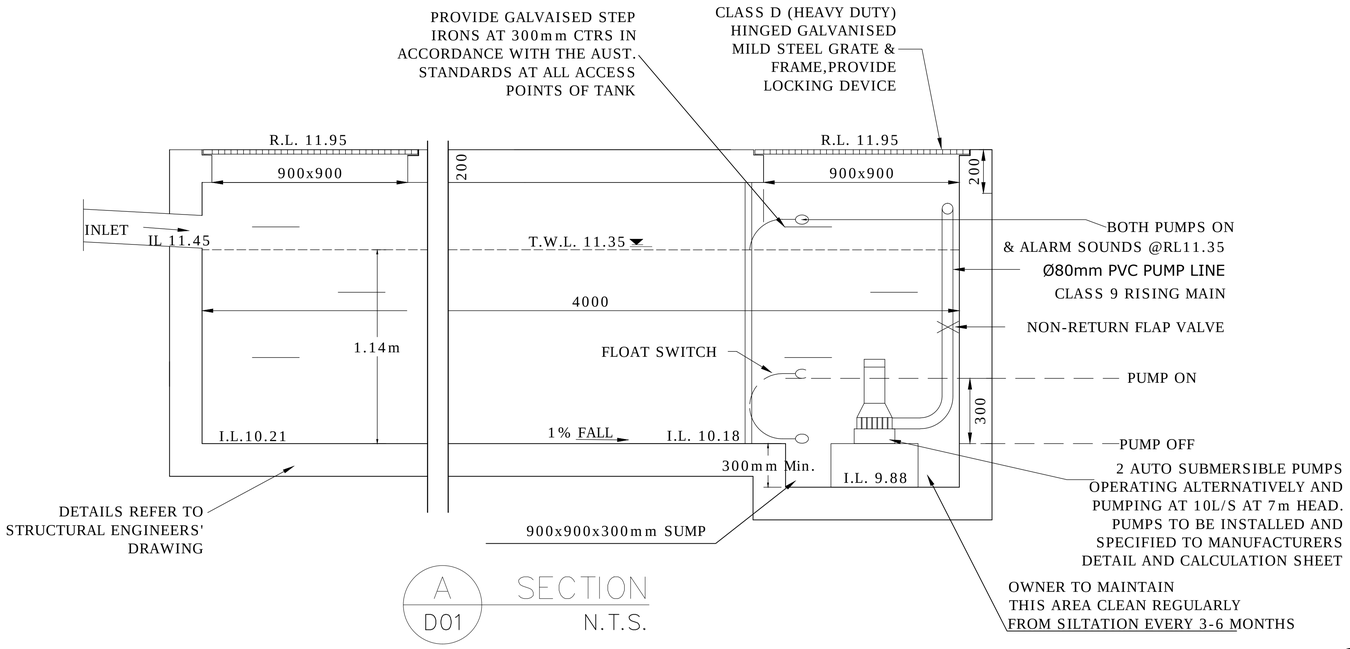
PROJECT
PROPOSED SENIOR LIVING
54 BARDO ROAD,
NEWPORT, NSW

CONSENT AUTHORITY:
NORTHERN BEACHES–FORMER PITTWATER

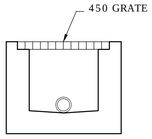
SHEET SUBJECT
BASEMENT STORMWATER DRAINAGE PLAN

PROJECT 54 BARDO ROAD, NEWPORT			
DATE OCT 21	DRAWN A.S.	DESIGNED A.S.	CHECKED N.L.
SCALE @ A1 1:100 U.N.O		JOB No 20NL103	
AUTHORISED NERMEIN LOKA		DWG No D01	REV J

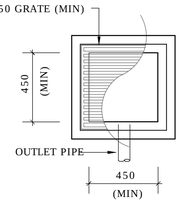


A SECTION
D01 N.T.S.

TYPICAL SECTION A THROUGH PUMP PIT
N.T.S.
PUMP WELL VOLUME 9.12cum

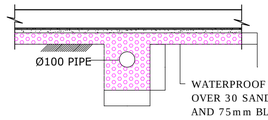


PIT



STANDARD PIT
N.T.S.

TYPICAL PIT SECTION
N.T.S.



TYPICAL SECTION THROUGH SUBSOIL HARD PIPE
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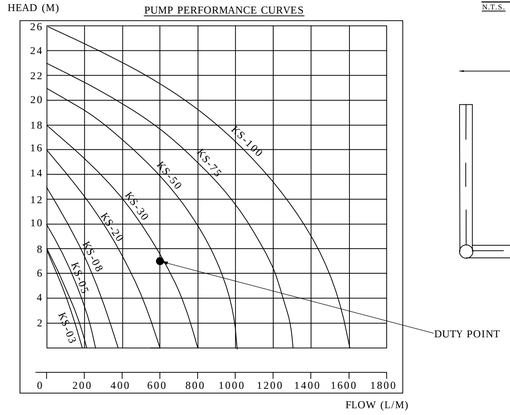
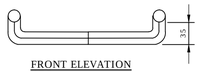


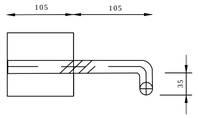
Type	Output		Outlet		Rated Head Capacity		Maximum Head	Maximum Capacity	Weigh	Dimension		
	HP	kW	mm	Inch	M	LPM	M	LPM	Kg	L(mm)	W(mm)	H(mm)
KS-03	1/3	0.25	40	1 1/2"	3	130	8	180	9	188	141	305
KS-04	1/2	0.4	50	2"	5	150	8	220	11	208	140	359
KS-05	1/2	0.4	50	2"	5	160	10	260	14	230	156	375
KS-08	1	0.75	50	2"	6	240	13	380	21	290	180	425
KS-20	2	1.5	80	3"	10	300	16	600	31	278	182	475
KS-30	3	2.2	80	3"	10	500	18	800	42	390	250	450
KS-50	5	3.7	100	4"	10	800	21	1100	48	450	240	530
KS-75	7 1/2	5.6	100	4"	15	800	23	1300	60	550	310	590
KS-100	10	7.5	150	6"	18	900	25	1600	70	550	310	610

RECOMMENDED PUMP

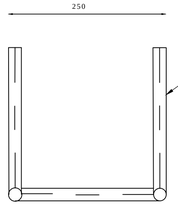
1:100@A1 0 1 2 3 4 5



FRONT ELEVATION
N.T.S.



SIDE ELEVATION
N.T.S.

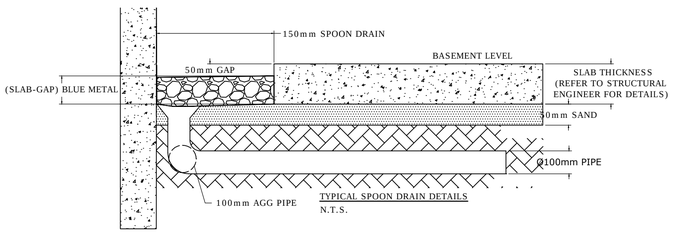


NOM 20mm-24mm DIA GALVANISED MILD STEEL RODS

PLAN
N.T.S.

STEP IRON DETAILS
N.T.S.

NOTE: INSTALL WHERE PITS ARE DEEPER THAN 1000mm



TYPICAL SPOON DRAIN DETAILS
N.T.S.

NOTE:
TO BE CONFIRMED BY STRUCTURAL ENGINEERS PRIOR CONSTRUCTION.

PUMP SPECIFICATIONS

STANDARD PUMP-OUT NOTES

THE PUMP-OUT SYSTEM IS DESIGNED TO WORK IN THE FOLLOWING MANNER -

1. THE PUMPS SHALL BE PROGRAMMED TO WORK ALTERNATELY SO AS TO ALLOW BOTH PUMPS TO HAVE EQUAL OPERATION LOAD & PUMP LIFE.
2. A LOW LEVEL FLOAT SHALL BE PROVIDED TO ENSURE THAT THE MINIMUM REQUIRED WATER LEVEL IS MAINTAINED WITHIN THE SUMP AREA OF THE BELOW GROUND TANK. IN THIS REGARD THIS FLOAT WILL FUNCTION AS AN OFF SWITCH FOR THE PUMPS.
3. A SECOND FLOAT SHALL BE PROVIDED AT A HIGHER LEVEL, APPROXIMATELY 300mm ABOVE THE MINIMUM WATER LEVEL, WHEREBY ONE OF THE PUMPS WILL OPERATE & DRAIN THE TANK TO THE LEVEL OF THE LOW LEVEL FLOAT.
4. A THIRD FLOAT SHALL BE PROVIDED AT A HIGH LEVEL, WHICH IS APPROXIMATELY THE ROOF LEVEL OF THE BELOW GROUND TANK. THIS FLOAT SHOULD START THE OTHER PUMP THAT IS NOT OPERATING & ACTIVATE THE ALARM.
5. AN ALARM SYSTEM SHALL BE PROVIDED WITH A FLASHING STROBE LIGHT & A PUMP FAILURE WARNING SIGN WHICH ARE TO BE LOCATED AT THE DRIVEWAY ENTRANCE TO THE BASEMENT LEVEL. THE ALARM SYSTEM SHALL BE PROVIDED WITH A BATTERY BACK-UP IN CASE OF POWER FAILURE.

PUMP WELL DETAILS

SUMP SIZE AND PUMP SIZE BASE ON 100 YEAR 2 HR STORM
INTENSITY IS 49.10mm/hr, AREA DRAINING TOWARDS SUMP IS 70.1m2
Q=CIA/3600 = 1.0x49.1x70.1/3600 =0.956L/ S
VOLUME REQUIRED IS 0.956x(2x60x60) =6884L
STORAGE PROVIDED 4000x2000x1140 = 9120L
THEREFORE ADEQUATE STORAGE PROVIDED
PUMP OUT RATE BASED ON 100YR 5MINS. STORM = 273mm/hr
Q=CIA/3600 = 1.0x273x70.1/3600 = 5.32L/s
USE KS 30 OR EQUIVALENT DUAL PUMPS TO BE INSTALLED IN SUMP AND CONNECTED TO CONTROL PANEL WHICH WILL ALLOW FOR THE PUMPS TO ACT ALTERNATIVELY AT 10L/s AT 7m HEAD

HEIGHT 150mm
WIDTH 200mm

COLOURS:

"DANGER" AND BACKGROUND	WHITE
ELLIPTICAL AREA	RED
RECTANGLE CONTAINING ELIPSE	BLACK
OTHER LETTERING AND BORDER	BLACK
MATERIALS	POLYPROPYLENE

CONFINED SPACE WARNING SIGN
N.T.S.

NOTE RE. SERVICES

APPROXIMATE LOCATIONS OF EXISTING SERVICES SHOWN ON LONGITUDINAL SECTION. EXACT LOCATIONS & DEPTHS TO BE ACCURATELY LOCATED BY BUILDER CONTRACTOR BY CONTACTING THE RELEVANT AUTHORTIES BEFORE COMMENCEMENT OF ANY WORKS

DIAL 1100 BEFORE YOU DIG

NOTES

1. ALL LINES ARE TO BE MIN. 100Ø UPVC @ MIN 1.0% GRADE UNLESS NOTED OTHERWISE.
2. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE & LEVEL ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY EARTHWORKS. ALL DESIGN LEVELS SHOWN ON PLAN SHALL BE VERIFIED ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORK.
3. ALL PIPES TO HAVE MIN 200mm COVER IF LOCATED WITHIN PROPERTY.
4. ALL PITS IN DRIVEWAYS BE HEAVY DUTY GRATES. DIRECT SURFACE FLOW TO ALL GRATED SURFACE INLET PITS.
5. ALL WORK DO BE DONE IN ACCORDANCE WITH AS/NZ 3500.3.2:1998 AND COUNCIL SPECIFICATIONS.
6. LOCATION OF DOWNPIPES & FLOOR WASTES ARE INDICATIVE ONLY. DOWNPIPE & FLOOR WASTE SIZE, LOCATION & QUANTITY TO BE DETERMINED BY BUILDER & IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.
7. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ARCHITECTURAL, LANDSCAPE AND STRUCTURAL PLANS.
8. ANY DISCREPANCIES OR OMISSIONS SHALL BE REFERRED TO THE DESIGN ENGINEER FOR RESOLUTION.
9. ALL PITS OR GRATES IN TRAFFICABLE AREAS TO BE HEAVY DUTY.
10. ALL GUTTERS WILL BE FITTED WITH LEAF GUARDS AND SHOULD BE INSPECTED AND CLEANED TO ENSURE LEAF LITTER CANNOT ENTER THE DOWNPIPES

WARNING

PUMP OUT SYSTEM FAILURE IN BASEMENT WHEN LIGHT IS FLASHING AND SIREN SOUNDING

BASEMENT PUMP OUT FAILURE WARNING SIGN

NOTE:-

1- SIGN SHALL BE PLACED IN A CLEAR AND VISIBLE LOCATION WHERE VEHICLES ENTER THE BASEMENT.

COLOURS :; -

WARNING - RED
BORDER AND OTHER COLOURING - BLACK

NOTE: A SUITABLE ALARM SYSTEM POSITIONED AT ENTRANCE OF BASEMENT CARPARK TO PROVIDE A FLOOD WARNING IN CASE OF PUMP FAILURE (TO COUNCILS SPEC). AS SHOWN ABOVE.

No	AMENDMENT	ENG	DRAFT	DATE	No	AMENDMENT	ENG	DRAFT	DATE
F	FOR C.C APPROVAL	A.S.	A.S.	07-12-21					
E	FOR S4.55	L.Y.	L.Y.	12-08-21					
D	FOR S4.55	L.Y.	L.Y.	10-08-21					
C	FOR S4.55	L.Y.	L.Y.	02-08-21					
B	FOR D.A. APPROVAL	L.Y.	L.Y.	01-09-20					
A	FOR D.A. APPROVAL	L.Y.	L.Y.	26-08-20	G	FOR S4.55 (8)	A.S.	A.S.	08-03-22

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PROJECT
PROPOSED SENIOR LIVING
54 BARDO ROAD,
NEWPORT, NSW

CONSENT AUTHORITY:
NORTHERN BEACHES–FORMER PITTWATER

SHEET SUBJECT
BASEMENT STORMWATER DRAINAGE DETAILS

PROJECT 54 BARDO ROAD, NEWPORT			
DATE AUG 21	DRAWN A.S.	DESIGNED A.S.	CHECKED N.L.
SCALE @ A1 N.T.S.		JOB No 20NL103	
AUTHORISED NERMEIN LOKA		DWG No D02	REV G

GROUND FLOOR/SITE STORMWATER DRAINAGE PLAN

SCALE 1:100

SYMBOLS

F.F.L.	FINISHED FLOOR LEVEL
T.K.	TOP OF KERB
RL	PIT SURFACE LEVEL
IL	INVERT LEVEL
— SSD —	SUBSOIL DRAINAGE PIPE
– – –	100Ø STORMWATER DRAINAGE PIPE (U.N.O.)
—–—	DOWNPIPE TO RAINWATER TANK
• DP	100Ø DOWN PIPE (U.N.O.)
• VD	VERTICAL DROP PIPE
• VR	VERTICAL RISER
• IO	INSPECTION OPENING
	MASONRY RETAINING WALL
⊗ FW	FLOOR WASTE 150Ø
⊗ DDO	DISH DRAIN OUTLET 100Ø
	GRATED INLET PIT
	GRATED DRAIN
⇦	OVERLAND FLOW PATH
▶SP	SPREADER
⋈ES	EMERGENCY SPITTER Ø65
• CO	CLEANING OPENING

DP : 100Ø DOWN PIPE U.N.O.

▬▬▬▬▬ : STORMWATER PIPE @1% MIN. U.N.O.

REFER TO AS.3500 PART 3 TABLE 7.2

P1 : 100Ø UPVC PIPE AT 1.0% MIN. GRADE

P2 : 150Ø UPVC PIPE AT 1.0% MIN. GRADE

P3 : 225Ø UPVC PIPE AT 0.5% MIN. GRADE

1:100@A1 0 1 2 3 4 5

SURFACE FLOW OCEANGUARD OR EQUIVALENT

WATER QUALITY:
SITE AREA <1500m²

FOR SURFACE INLET PIT NO. 1-4, 8, 10 & 11, LITTER TRAP/BASKET (PRIMARY TREATMENT DEVICES) TO BE PROVIDED. SIMILAR OR EQUIVALENT PRODUCT CAN BE INSTALLED.

ROOF GUTTER TO BE PROVIDED WITH LEAF SCREEN. ALL ROOF DOWN PIPES TO BE CONNECTED TO FIRST-FLUSH DEVICES PRIOR TO RAINWATER TANK. OSD OUTLET IS TO BE PROVIDED WITH MESH SCREEN

EMERGENCY SPITTERS TO BE PROVIDED WITH SPACE WHICH ALLOWS FOR WATER TO FLOW UNDER THE PLANTER BOXES FREELY

PROVIDE AGG PIPE FOR ALL PLANTER BOXES AND RETAINING WALLS TO CONNECT TO THE STORMWATER SYSTEM.

INSPECTION LIST:

THE STORMWATER DRAINAGE WORKS ARE TO BE INSPECTED DURING CONSTRUCTION, BY THE COUNCIL OR BY A SUITABLY QUALIFIED CIVIL ENGINEER. DOCUMENTARY EVIDENCE OF COMPLIANCE WITH COUNCIL'S SPECIFICATIONS SHALL BE OBTAINED PRIOR TO PROCEEDING TO THE SUBSEQUENT STAGES OF CONSTRUCTION, ENCOMPASSING NOT LESS THAN THE FOLLOWING KEY STAGES:

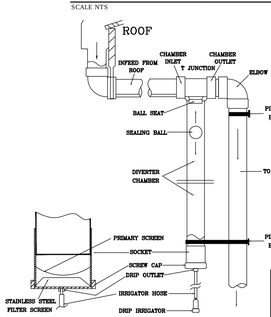
FOR THE GROUND FLOOR:

a) INITIAL INSPECTION TO DISCUSS CONCEPT AND SITE CONDITIONS / CONSTRAINTS PRIOR TO COMMENCEMENT OF CONSTRUCTION OF THE OSD.
b) PRIOR TO POURING OF THE ROOF OF THE DETENTION TANK.
c) AFTER COMPLETION OF STORAGE BUT PRIOR TO INSTALLATION OF FITTINGS (E.G. ORIFICE PLATES, SCREENS, FLAP VALVES ETC.)
d) FINAL INSPECTION

FOR THE SWALE DRAIN:
a) PRIOR TO LANDSCAPING OF SWALE DRAIN
b) FINAL INSPECTION

TYPICAL FLOOR WASTE 'FW' DETAIL

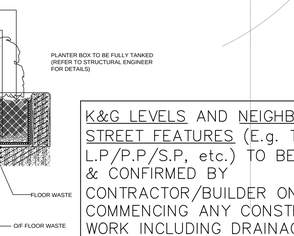
SCALE NTS



STANDARD FIRST FLUSH DEVICE KIT

TYPICAL LANDSCAPING AREA FLOOR WASTE DETAIL

N.T.S.

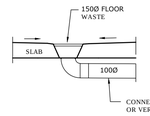


PLANTER BOX- DETAIL SECTION

SCALE NTS

NOTE - ALL PLANTING AREAS OVER BASEMENT TO HAVE ADEQUATE FLOOR WASTES INSTALLED

TYPICAL GROUND FLOOR WASTE DETAIL



K&G LEVELS AND NEIGHBOURING STREET FEATURES (E.g. TREES, V.C, L.P/P.P/S.P, etc.) TO BE CHECKED & CONFIRMED BY CONTRACTOR/BUILDER ON SITE PRIOR COMMENCING ANY CONSTRUCTION WORK INCLUDING DRAINAGE SYSTEM WITHIN THE SITE.
CONTACT ENGINEER IMMEDIATELY IF VARY.

NOTE RE. SERVICES

APPROXIMATE LOCATIONS OF EXISTING SERVICES SHOWN ON LONGITUDINAL SECTION. EXACT LOCATIONS & DEPTHS TO BE ACCURATELY LOCATED BY BUILDER CONTRACTOR BY CONTACTING THE RELEVANT AUTHORITIES BEFORE COMMENCEMENT OF ANY WORKS

DIAL 1100 BEFORE YOU DIG

NOTES: COUNCIL ISSUED FOOTWAY DESIGN LEVELS

COUNCIL'S ISSUED FOOTWAY DESIGN LEVELS TO BE INCORPORATED INTO THE FINISHED LEVELS ONCE ISSUED BY COUNCIL

NOTES: ROAD RESERVE & FOOTWAY DRAINAGE ELEMENTS

ALL STORMWATER DRAINAGE ELEMENTS PROPOSED WITHIN THE ROAD RESERVE AND FOOTWAY SHALL BE CONSTRUCTED UNDER THE SUPERVISION AND TO THE SATISFACTION OF COUNCIL'S ENGINEER.

No	AMENDMENT	ENG	DRAFT	DATE	No	AMENDMENT	ENG	DRAFT	DATE
I	FOR S4.55	L.Y.	L.L.	12-08-21	O	FOR S4.55 (8)	A.S.	A.S.	29-03-22
H	FOR S4.55	L.Y.	L.L.	12-08-21	N	FOR S4.55 (8)	A.S.	A.S.	08-03-22
G	FOR S4.55	L.Y.	L.L.	02-08-21	M	FOR C.C APPROVAL	A.S.	A.S.	08-12-21
F	FOR D.A. APPROVAL/COUNCIL COMM.	L.Y.	L.Y.	26-04-21	L	FOR S4.55	L.Y.	L.L.	08-10-21
E	FOR D.A. APPROVAL/COUNCIL COMM.	L.Y.	L.Y.	06-04-21	K	FOR S4.55	L.Y.	L.L.	27-09-21
D	FOR D.A. APPROVAL/COUNCIL COMM.	L.Y.	L.Y.	29-03-21	J	FOR S4.55	L.Y.	L.L.	20-09-21

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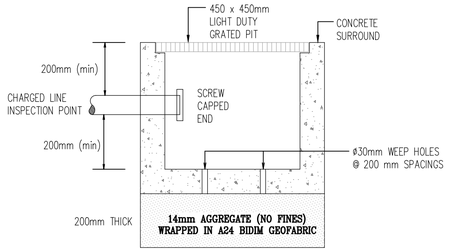
PROJECT
PROPOSED SENIOR LIVING
54 BARDO ROAD,
NEWPORT, NSW

CONSENT AUTHORITY:
NORTHERN BEACHES-FORMER PITTWATER

SHEET SUBJECT
GROUND FLOOR / SITE STORMWATER DRAINAGE PLAN

PROJECT 54 BARDO ROAD, NEWPORT			
DATE OCT 21	DRAWN A.S.	DESIGNED A.S.	CHECKED N.L.
SCALE @ A1 1:100 U.N.O		JOB No 20NL103	
AUTHORISED NERMEIN LOKA		DWG No D03	REV O

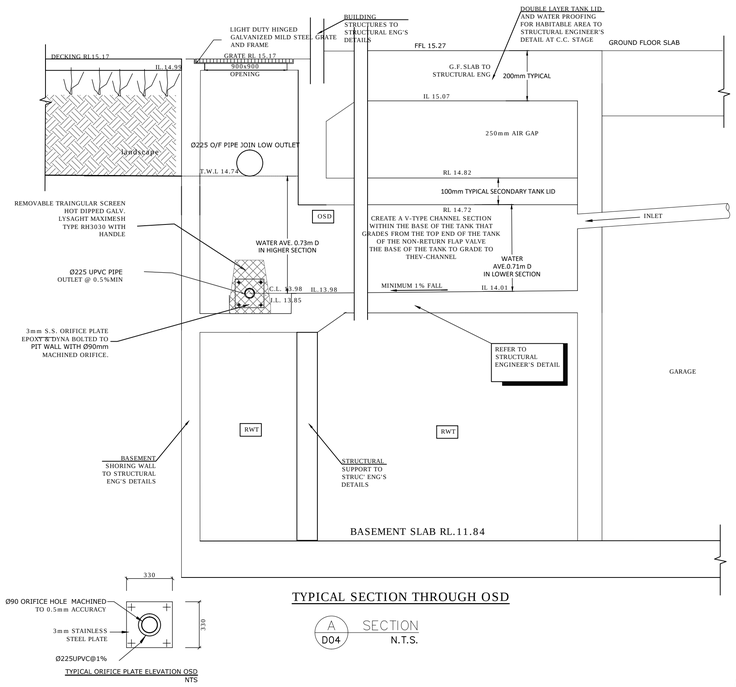


TYPICAL "CLEAN OUT" PIT FOR CHARGED LINES

NTS

Q	15 l/s
Q	0.015 m3/s
Cd	0.6
g	9.81
h	0.76
A	0.00647 m
D	0.09079 m
	90.7919 mm

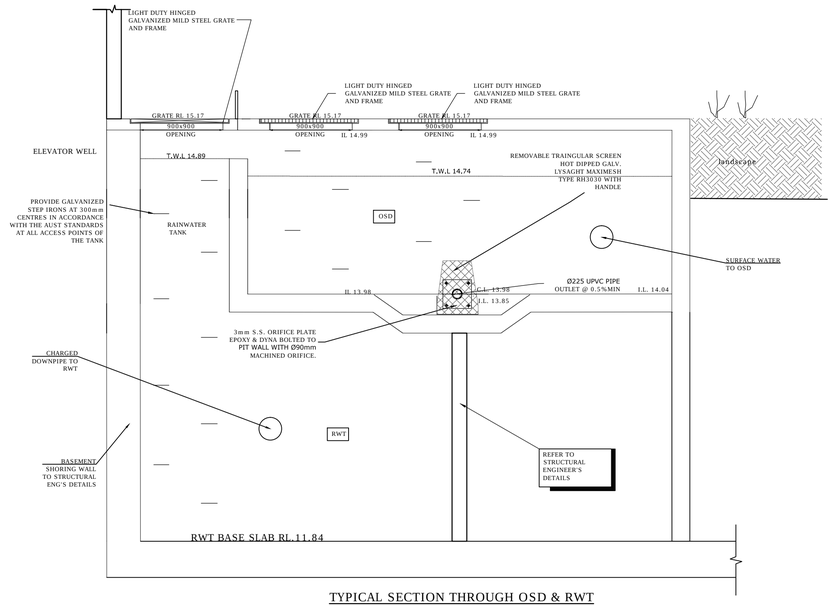
OSD ORIFICE CALCULATION



TYPICAL SECTION THROUGH OSD

A D04 SECTION N.T.S.

TYPICAL ORIFICE PLATE ELEVATION OSD
NTS



TYPICAL SECTION THROUGH OSD & RWT

B D04 SECTION N.T.S.

OSD SUMMARY:

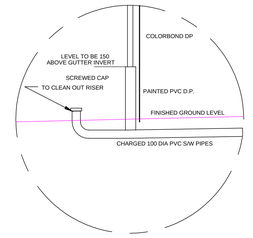
SITE AREA: 1226.3m²
EXISTING DEVELOPMENT: SINGLE DWELLING WITH SHED AT REAR
IMP. AREA: 400.48m² (32.66%)

PROPOSED DEVELOPMENT: SENIOR LIVING
IMP. AREA: 893.18m² (72.83%)

ADDITIONAL HARD AREA: 492.7m²
OSD SSR: 30kL
OSD PSD: 15L/s

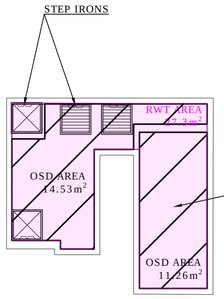
NO IMPERVIOUS AREA BYPASS OSD

OSD DISCHARGE:15L/s
ORIFICE: 90mm



STORMWATER CHARGED SYSTEM CLEAN OUT DETAIL

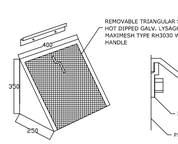
SCALE: NTS



OSD AREA
RWT AREA

LOW WATER DEPTH SECTION WITH DOUBLED TANK TOP STRUCTURE

OSD & RWT PLAN DETAIL



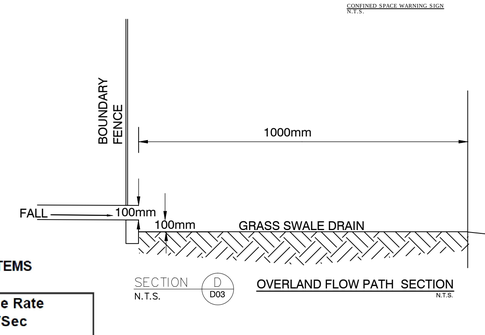
MULTI PURPOSE FILTER SCREEN
N.T.S.
PRODUCT CODE: MMMPS (MASCOT ENGINEERING)

COLOURS:	
"DANGER" AND BACKGROUND ELLIPTICAL AREA	WHITE
RECTANGLE CONTAINING ELIPSE	RED
OTHER LETTERING AND BORDER	BLACK
	BLACK

MATERIALS: POLYPROPYLENE

CONFINED SPACE WARNING SIGN
N.T.S.

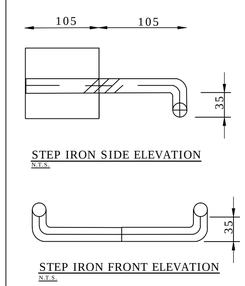
PROVIDE CONFINED SPACE ENTRY SIGN TO EACH ENTRANCE OF THE UNDERGROUND TANK IN ACCORDANCE WITH THE UPPER PARRAMATTA RIVER CATCHMENT TRUST REQUIREMENTS



SECTION N.T.S. D D03 OVERLAND FLOW PATH SECTION N.T.S.

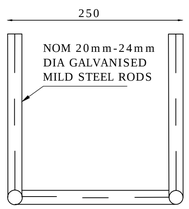
UPSTREAM CATCHMENT AREA	0.0737 ha
100 YR 6MIN STORM	273 mm/hr
Q100	50.3405 L/s
W	1 m
D	0.1 m
CROSS SECTION AREA	0.1 m2
CHANNEL SLOPE	0.01 m/m
WETTED PERIMETER	1.2 m
HYDRAULIC RADIUS	0.08333
ROUGHNESS PARAMETER	0.035
Q	54.5102 L/s

OVERLAND FLOW PATH CALCULATION



STEP IRON SIDE ELEVATION
N.T.S.

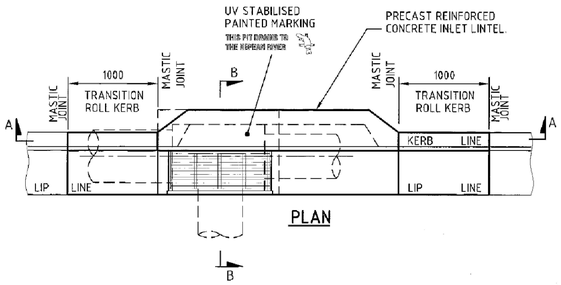
STEP IRON FRONT ELEVATION
N.T.S.

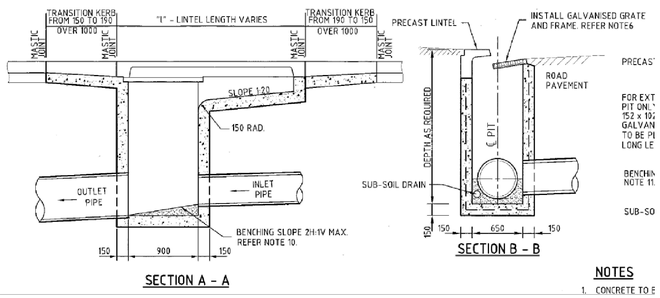


NOTE: INSTALL WHERE PITS ARE DEEPER THAN 1000mm

1:100@A1

STEP IRON PLAN
N.T.S.





TYPICAL STANDARD KERB INLET PIT SECTION

REQUIREMENTS FOR SIZE AND ALLOWABLE DISCHARGE FROM ON-SITE DETENTION SYSTEMS

Additional Hard (Impervious) Surface Area (square metres)	Minimum Capacity of On-Site Detention Tank (Litres)	Discharge Rate Litres/Sec
	OSD	
0 -50	Nil	Nil
>50 - 75	4,500	2
>75 - 100	6,000	3
>100 - 150	9,000	4
>150 - 200	12,000	6
>200 - 250	15,000	7
>250 - 300	18,000	9
>300 - 400	24,000	12
>400 - 500	30,000	15
>500 - 600	36,000	18
>600 - 700	42,000	21
>700 - 800	48,000	24
>800 - 900	54,000	27
>900 - 1,000	60,000	30
>1,000*	A minimum storage capacity of 60 litres per m2 of additional hard/impervious surface area, and a discharge rate which replicates the discharge from the site were it to be undeveloped.	

Rainwater tanks may be above or below ground and are required to have storage capacities in accordance with the following table:

RWT

Additional Hard (Impervious)Surface Area (square metres)	Minimum Rainwater Tank Storage Capacity
0 - 50	Nil
50 - 75	1,500 litres
75 - 100	2,000 litres
100 - 150	3,000 litres
150 - 200	4,000 litres
200 - 300	6,000 litres
300 - 400	8,000 litres
400 - 500	10,000 litres
500 - 600	12,000 litres
600 - 700	14,000 litres
700 - 800	16,000 litres
800 - 900	18,000 litres
900 - 1,000	20,000 litres
Above 1,000*	See note (1) below, minimum size 20,000 litres

No	AMENDMENT	ENG	DRAFT	DATE
F	FOR S4.55	L.Y.	L.L.	12-08-21
E	FOR S4.55	L.Y.	L.L.	02-08-21
D	FOR D.A. APPROVAL/COUNCIL COMM.	L.Y.	L.Y.	26-04-21
C	FOR D.A. APPROVAL/COUNCIL COMM.	L.Y.	L.Y.	29-03-21
B	FOR D.A. APPROVAL/ARCH UPDATES	L.Y.	L.Y.	17-03-21
A	FOR D.A. APPROVAL	L.Y.	L.Y.	26-08-20

No	AMENDMENT	ENG	DRAFT	DATE
K	FOR S4.55 (8)	L.Y.	A.S.	08-03-22
J	FOR C.C APPROVAL	L.Y.	A.S.	08-12-21
I	FOR S4.55	L.Y.	L.L.	20-10-21
H	FOR S4.55	L.Y.	L.L.	20-09-21
G	FOR S4.55	L.Y.	L.L.	19-08-21

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PROJECT
PROPOSED SENIOR LIVING
54 BARDO ROAD,
NEWPORT, NSW

CONSENT AUTHORITY:
NORTHERN BEACHES–FORMER PITTWATER

SHEET SUBJECT
SITE STORMWATER DRAINAGE DETAILS

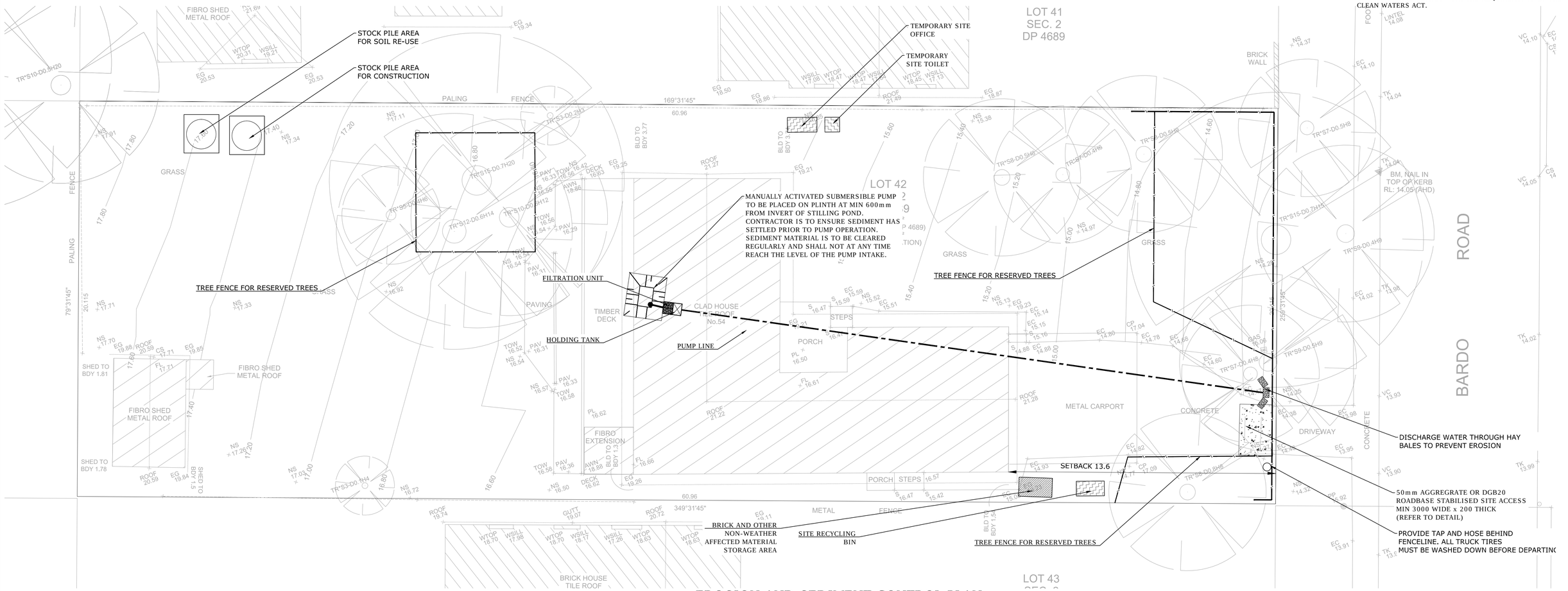
PROJECT 54 BARDO ROAD, NEWPORT			
DATE AUG 21	DRAWN A.S.	DESIGNED L.Y.	CHECKED N.L.
SCALE @ A1 N.T.S.		JOB No 20NL103	
AUTHORISED NERMEIN LOKA		DWG No D04	REV K

NOTE:
ALL EXISTING BUILDINGS TO BE DEMOLISHED ON SITE.

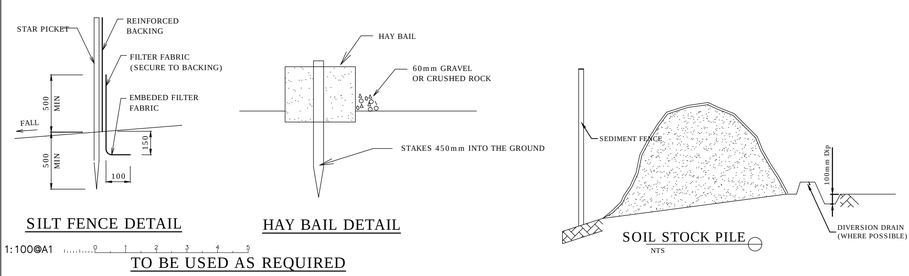
SYMBOLS
- EXISTING CONTOURS
- SILT FENCE
- WIRE MESH FENCE
- STABILISED SITE ACCESS
- Ø50 PUMP LINE

EROSION CONTROL NOTES

1. ALL EROSION & SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH 'MANAGING URBAN STORMWATER, 3RD EDITION' PRODUCED BY THE NSW DEPARTMENT OF HOUSING.
2. ALL EROSION AND SILTATION CONTROL DEVICES ARE TO BE PLACED PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION WORKS, AND ALL SILT TRAPS ARE TO HAVE DEPOSITED SILT REMOVED REGULARLY DURING CONSTRUCTION.
3. ALL TRESS ARE TO BE PRESERVED UNLESS INDICATED OTHERWISE ON THE ARCHITECT'S OR LANDSCAPE ARCHITECT'S DRAWINGS. EXISTING GRASS COVER SHALL BE MAINTAINED EXPECT IN AREAS CLEARED FOR BUILDINGS, PAVEMENTS, ETC.
4. STABILISE/REVEGATATE ALL DISTURBED AREAS PROGRESSIVELY WHERE PRACTICAL.
5. INSTALL TEMPORARY SEDIMENT BARRIERS TO ALL INLET PITS LIKELY TO COLLECT SILT LADEN WATER.
6. ADDITIONAL VEHICLES MUST PARK ON ROAD AND NOT FOOTPATH. PUBLIC FOOTPATH ADJACENT TO SITE MUST NOT BE OBSTRUCTED AND MUST BE SAFE FOR PEDESTRIAN ACCESS.
14. ENSURE FENCE IS KEYED AT BOTH ENDS INTO GROUND, WITH BASE TURNED UPSLOPE.
15. WHERE SEDIMENT FENCE IS NEAR STREET, ERECT FENCE WITHIN DEVELOPMENT SIDE OF TURF FILTER STRIPS AND PROPERTY BOUNDARY.
16. SEDIMENT FENCE FILTER CLOTH TO BE FASTENED SECURELY TO WIRE FENCE WITH TIES SPACED EVERY 600MM.OVERLAP ADJOINING FILTER CLOTH BY 150MM AND FOLDING OVER.
17. DIVERT UPSLOPE WATER AROUND WORK SITE AND STABILISE CHANNELS.
18. LAY KERB-SIDE TURF FILTER STRIP TO TRAP EXCESS SEDIMENT.
19. CONTAMINATED WATER WITH SEDIMENT FROM A SEDIMENT BASIN OR EXCAVATION PIT IS TO BE FLOCCULATED/ FILTERED TO LOWER SUSPENDED SOIL LOAD TO LESS THAN 50 MILLIGRAMS PER LITRE.
20. SOIL, SAND AND GRAVEL ARE NOT TO BE STOCKPILED ON ROADWAYS OR IN DRAINAGE AREAS.
21. WASH AREA MUST BE SLIGHTLY DEPRESSED TO COLLECT WASTE MATERIAL.
22. APPLY DUST CONTROL MEASURES TO REDUCE SURFACE AND AIRBORNE MOVEMENT OF SEDIMENT
23. NOT WITHSTANDING DETAILS SHOWN, IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO ENSURE THAT ALL SITE ACTIVITIES COMPLY WITH THE REQUIREMENTS OF THE CLEAN WATERS ACT.



EROSION AND SEDIMENT CONTROL PLAN



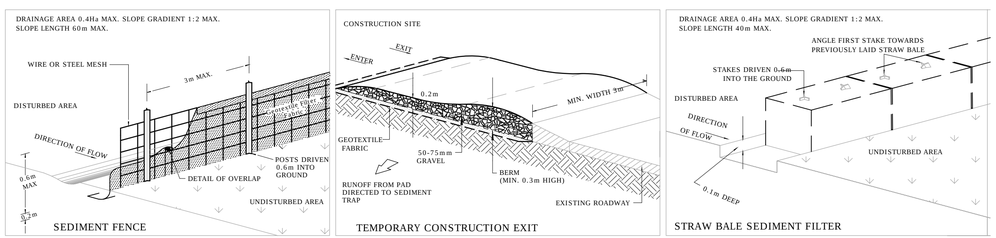
SILT FENCE DETAIL

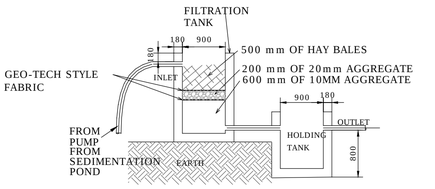
HAY BAIL DETAIL

1:100@A1

TO BE USED AS REQUIRED

SOIL STOCK PILE
NTS





TYPICAL DETAIL OF FILTRATION UNIT
NTS

NOTE: HAY TO BE CHANGED EVERY DAY
GEO-TECH, SAND, AND BLUE METAL, TO BE CHANGED WEEKLY

No	AMENDMENT	ENG	DRAFT	DATE
D	FOR S4.55 (8)	L.Y.	A.S.	08-03-22
C	FOR C.C APPROVAL	L.Y.	A.S.	12-08-21
B	FOR S4.55	L.Y.	L.Y.	02-08-21
A	FOR D.A. APPROVAL	L.Y.	L.Y.	04-06-20

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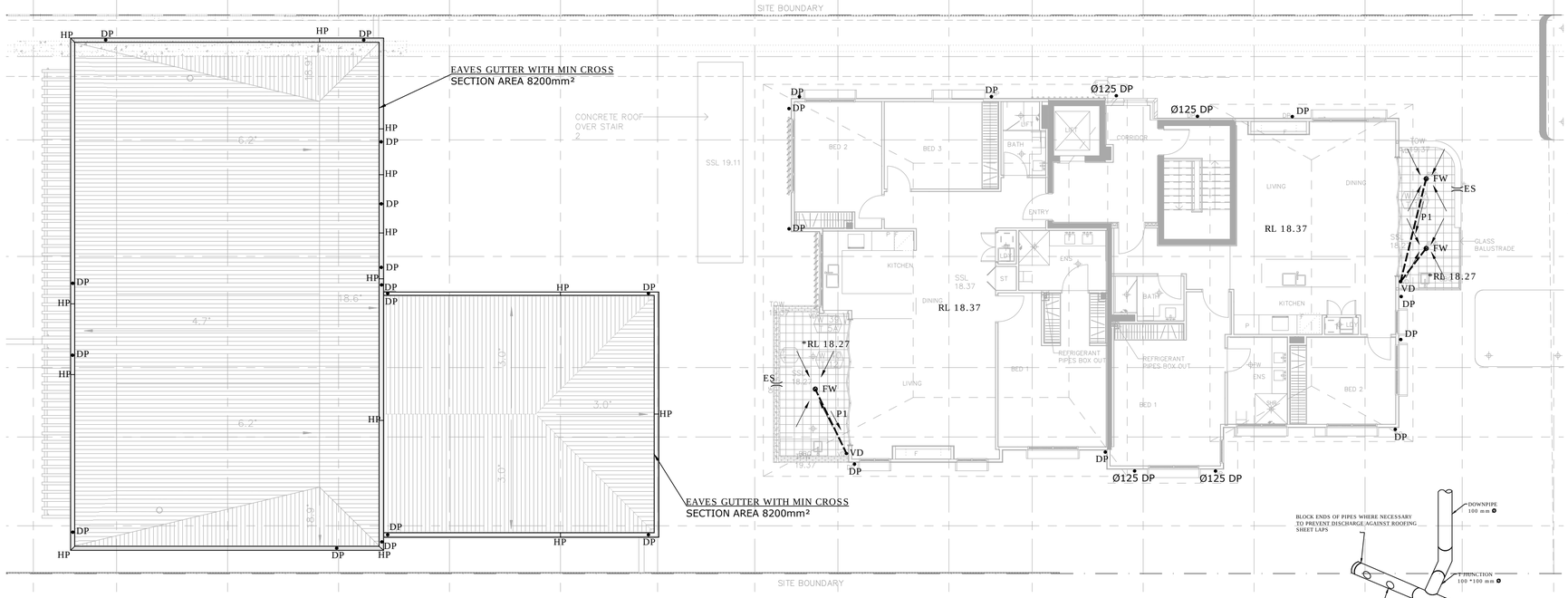
PROJECT
PROPOSED SENIOR LIVING
54 BARDO ROAD,
NEWPORT, NSW

CONSENT AUTHORITY:
NORTHERN BEACHES–FORMER PITTWATER

SHEET SUBJECT
EROSION AND SEDIMENT CONTROL PLAN AND DETAILS

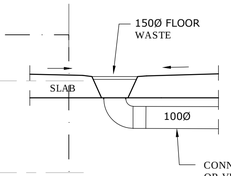
PROJECT 54 BARDO ROAD, NEWPORT			
DATE AUG 21	DRAWN A.S.	DESIGNED L.Y.	CHECKED N.L.
SCALE @ A1 1:100 U.N.O		JOB No 20NL103	
AUTHORISED NERMEIN LOKA		DWG No D05	REV D



FIRST FLOOR STORMWATER DRAINAGE PLAN

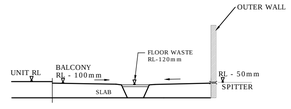
SCALE 1:100

TYPICAL SPREADER DETAIL



TYPICAL FLOOR WASTE 'FW' DETAIL

SCALE NTS



TYPICAL SPITTER DETAIL FOR BALCONIES

SCALE NTS

NOTE RE. SERVICES

APPROXIMATE LOCATIONS OF EXISTING SERVICES SHOWN ON LONGITUDINAL SECTION. EXACT LOCATIONS & DEPTHS TO BE ACCURATELY LOCATED BY BUILDER CONTRACTOR BY CONTACTING THE RELEVANT AUTHORITIES BEFORE COMMENCEMENT OF ANY WORKS

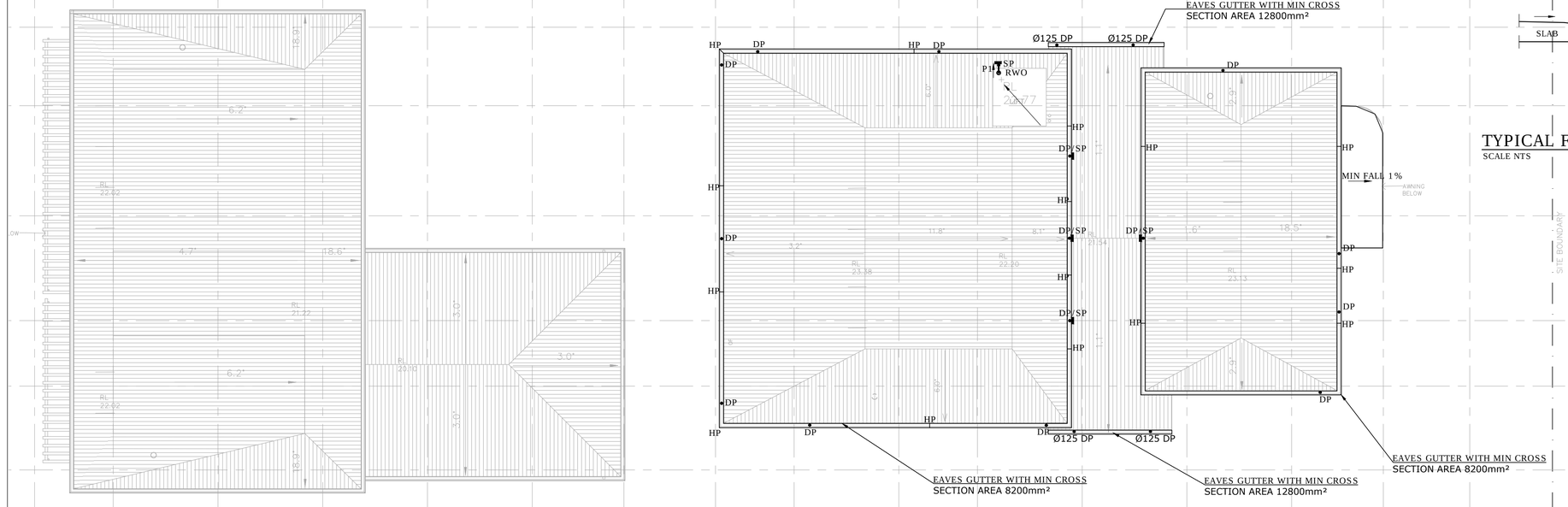
DIAL 1100 BEFORE YOU DIG

NOTES

1. ALL LINES ARE TO BE MIN. 100Ø UPVC @ MIN 1.0% GRADE UNLESS NOTED OTHERWISE.
2. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE & LEVEL ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY EARTHWORKS. ALL DESIGN LEVELS SHOWN ON PLAN SHALL BE VERIFIED ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORK.
3. ALL PIPES TO HAVE MIN 200mm COVER IF LOCATED WITHIN PROPERTY.
4. ALL PITS IN DRIVEWAYS BE HEAVY DUTY GRATES. DIRECT SURFACE FLOW TO ALL GRATED SURFACE INLET PITS.
5. ALL WORK DO BE DONE IN ACCORDANCE WITH AS/NZ 3500.3.2:2003 AND COUNCIL SPECIFICATIONS.
6. LOCATION OF DOWNPIPES & FLOOR WASTES ARE INDICATIVE ONLY. DOWNPIPE & FLOOR WASTE SIZE, LOCATION & QUANTITY TO BE DETERMINED BY BUILDER & IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.
7. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ARCHITECTURAL, LANDSCAPE AND STRUCTURAL PLANS.
8. ANY DISCREPANCIES OR OMISSIONS SHALL BE REFERRED TO THE DESIGN ENGINEER FOR RESOLUTION.
9. ALL PITS OR GRATES IN TRAFFICABLE AREAS TO BE HEAVY DUTY.
10. ALL GUTTERS WILL BE FITTED WITH LEAF GUARDS AND SHOULD BE INSPECTED AND CLEANED TO ENSURE LEAF LITTER CANNOT ENTER THE DOWNPIPES

SYMBOLS

F.F.L.	FINISHED FLOOR LEVEL
RL	SURFACE LEVEL
IL	INVERT LEVEL
– – –	STORMWATER DRAINAGE PIPE
	50Ø HDPE CASTING IN SLAB (U.N.O.)
	DOWNPIPE TO RAINWATER TANK
•DP	150Ø DOWN PIPE (U.N.O.)
• VD	100Ø VERTICAL DROP (U.N.O.)
• UDP	DOWN PIPE FROM UPPER LEVEL
• UVD	VERTICAL DROP FROM UPPER LEVEL
	MASONRY RETAINING WALL
⊗ FW	FLOOR WASTE 150Ø
⊗ DDO	DISH DRAIN OUTLET 100Ø
	GRATED INLET PIT
	GRATED DRAIN
	OVERLAND FLOW PATH
SP	SPREADER
ES	Ø65 EMERGENCY SPITTER
HP	HIGH POINT
⊗ RWO	RAINWATER OUTLET 300Ø



ROOF STORMWATER DRAINAGE PLAN

SCALE 1:100

1:100@A1 0 1 2 3 4 5

ALL GUTTERS AND DOWNPIPES ARE DESIGNED FOR STORM EVENT 1 IN 100 YEARS.

PROVIDE AGG PIPE FOR PLANT BOXES AND CONNECT TO THE NEAREST STORMWATER PIPE.

VD : 100Ø VERTICAL DROP (U.N.O.)
: STORMWATER PIPE @1% MIN. U.N.O.
REFER TO AS.3500 PART 3 TABLE 7.2
P1 : 100Ø UPVC PIPE AT 1.0% MIN. GRADE
P2 : 150Ø UPVC PIPE AT 1.0% MIN. GRADE
P3 : 225Ø UPVC PIPE AT 0.5% MIN. GRADE

NOTES: DRAINAGE LINES

DRAINAGE LINES SHOWN continuous – – – – –
TO COLLECT SURFACE WATER

DRAINAGE LINES SHOWN DASHED — RWT —
TO COLLECT ROOF WATER ONLY TO RAINWATER TANK

NOTES: COUNCIL ISSUED FOOTWAY DESIGN LEVELS

COUNCIL'S ISSUED FOOTWAY DESIGN LEVELS TO BE INCORPORATED INTO THE FINISHED LEVELS ONCE ISSUED BY COUNCIL

NOTES: ROAD RESERVE & FOOTWAY DRAINAGE ELEMENTS

ALL STORMWATER DRAINAGE ELEMENTS PROPOSED WITHIN THE ROAD RESERVE AND FOOTWAY SHALL BE CONSTRUCTED UNDER THE SUPERVISION AND TO THE SATISFACTION OF COUNCIL'S ENGINEER.

No	AMENDMENT	ENG	DRAFT	DATE
C	FOR S4.55 (8)	A.S.	A.S.	08-03-22
B	FOR C.C APPROVAL	A.S.	A.S.	07-12-21
A	FOR COORDINATION	N.L.	L.L.	02-08-21

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PROJECT
PROPOSED SENIOR LIVING
54 BARDO ROAD,
NEWPORT, NSW

CONSENT AUTHORITY:
NORTHERN BEACHES–FORMER PITTWATER

SHEET SUBJECT
FIRST FLOOR & ROOF STORMWATER DRAINAGE PLAN AND DETAILS

PROJECT	54 BARDO ROAD, NEWPORT		
DATE	DRAWN	DESIGNED	CHECKED
AUG 21	A.S.	A.S.	N.L.
SCALE @ A1		JOB No	
AS SHOWN		20NL103	
AUTHORISED		DWG No	REV
NERMEIN LOKA		D06	C