

# Stormwater Management Plan Report

Residential Housing Development

35 Francis Street & 16-20 Sanita Street, Goulburn

Prepared for: Homes NSW

Issue no: C

Revision	Date	Purpose	Prepared By	Reviewed By
A	23/08/24	Issue for Part 5	N.Pearce	
B	26/08/24	Issue for Part 5	N.Pearce	
C	16/09/24	Reissue for Part 5	N.Pearce	

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## 1 Introduction

This Stormwater Management Plan (SWMP) report has been written to support the Part 5 submission for the residential housing development, which is located at 35 Francis Street & 16-20 Sanita Street, Goulburn

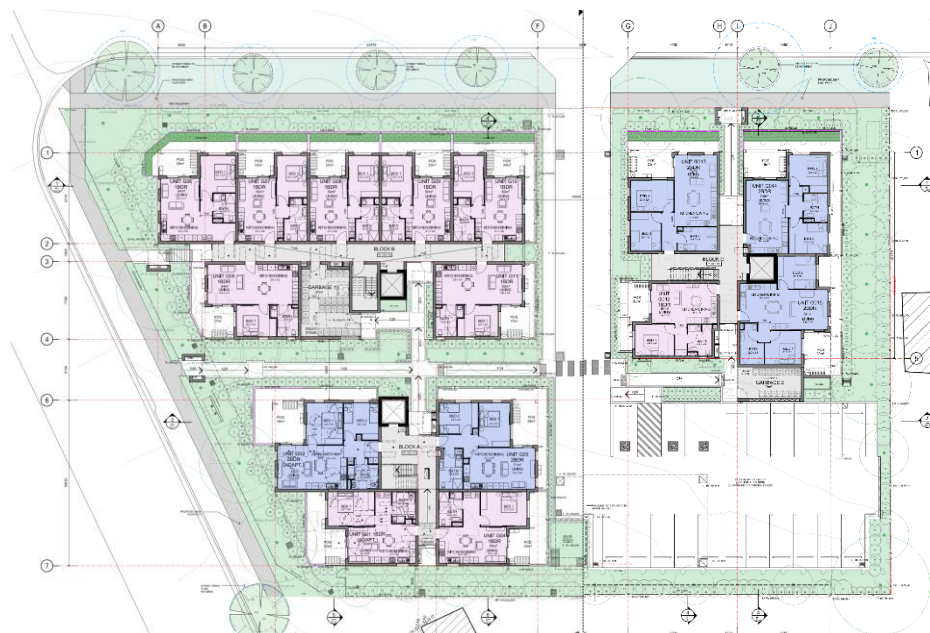
In the preparation of this report, the following reference information has been used:

- Architectural plans prepared by DEM Architects
- AS 3500.3 – Plumbing and Drainage – Stormwater Drainage
- Goulburn Mulwaree Development Control Plan 2009
  - Chapter 7 – Engineering Requirements
  - Design Specification
- Neutral or Beneficial Effect on Water Quality Assessment Guideline
- Water NSW Using MUSIC is Sydney Drinking Water Catchments

## 2 Site Description

The development is proposed to be located on 4 existing residential lots which are to be consolidated to allow for the construction of three new 2 storey residential buildings consisting of 29 units and an on-grade carpark.

The site area is approximately 3,519.23m<sup>2</sup> and falls 5.4% from northeast to west from the Sanita road frontage to the rear of the site. The proposed carpark is located in the southeast corner of the site and is accessed via a new driveway from Sanita Street



There is no existing Council in-ground stormwater drainage property frontage within either Sanita Street or Francis Street. The closest Council network is located south of the site at the intersection of Francis and Wyatt Street which is approximately 75m from the property boundary. The existing residential property roof downpipes seem to be directed in ground to the rear backyard and discharge to the kerb.



*Existing site aerial (Mosaic)*

### 3 Council Requirements

The proposed residential development is located in 35 Francis Street & 16-20 Sanita Street, Goulburn to be designed in accordance with Goulburn Mulwaree Council's DCP and Civil Works Specification for on-site detention and water-sensitive design requirements.

The Council DCP states that OSD will be required for the site to limit site discharge so as not to adversely impact downstream drainage system or adjacent properties. As such, the post-development discharge from the site should not be greater than the pre-development discharge for all storm events up to the 1 in 100-year ARI storm event.

Site drainage system must be designed to the major/minor system. The pit and pipe drainage system is to be designed for the 1 in 5-year ARI storm event, with larger storm events up to the 1% AEP to be conveyed as overland flows.

Water Sensitive Urban Design (WSUD) principles are to be implemented in accordance with WaterNSW standards. Goulburn Council is within the NSW Drinking Water catchment area and as such the development must comply with the 'neutral or beneficial effect on water quality' in accordance with Water NSW Using MUSIC is Sydney Drinking Water Catchments guidelines.



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## 5 Stormwater Quality and MUSIC Modelling

A MUSIC model has been undertaken to represent the water quality measures required to meet the Council and Water NSW NorBE reduction targets. All node parameters have been obtained from the Water NSW Using MUSIC is Sydney Drinking Water Catchments guidelines as stated above and have been used as the basis for the design model.

The MUSIC model, shown below, has been provided as part of the Part 5 submission for Councils review.

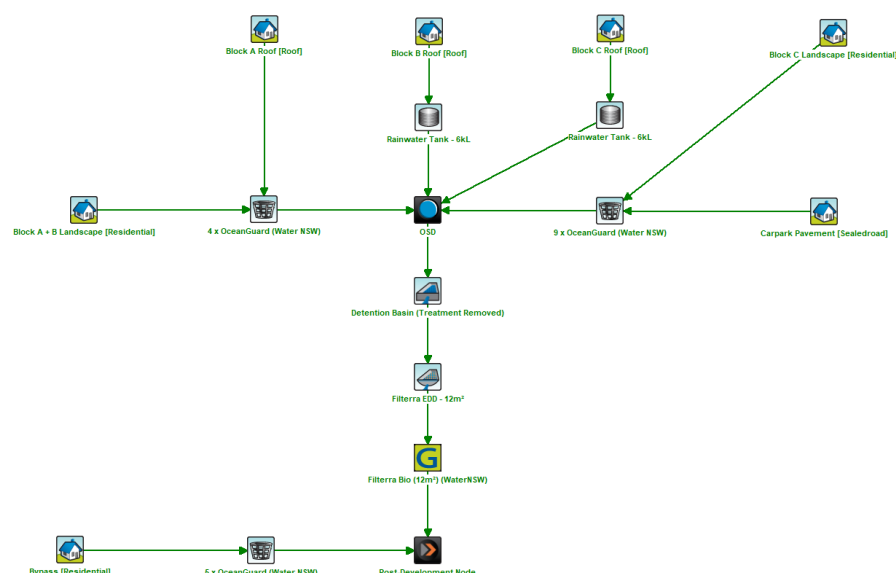
The proposed site has been split into seven (7) catchments to reflect the different source pollutant source nodes for MUSIC modelling purposes. These are represented below with the impervious areas nominated for each catchment.



Site Catchment Plan

It is proposed to use proprietary water treatment devices supplied by Ocean Protect to meet the NorBE requirements. These are proposed to be in the form of pit filter basket inserts, (OceanGuard) and rainwater tank (2x 6kL) and a bio-retention basin (Filterra). The Ocean Protect filter nodes are approved WaterNSW.

The pit filter basket inserts are proposed to be all surface inlet pits within the development with the Filterra bio-retention basin downstream of the OSD prior or to discharge to the Council kerb inlet pit.



## Site MUSIC Model

The results of the MUSIC model and the comparison to NORBE results are shown in the table below. Reduction targets are satisfied for all pollutants, including the 10% reduction from pre-development and as such are compliant with NORBE requirements. A copy of the MUSIC model has been provided as part of this submission.

	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
<b>Flow (ML/yr)</b>	0.873	1.59	0.873	1.28	0	19.5
<b>Total Suspended Solids (kg/yr)</b>	129	239	129	44.1	0	81.5
<b>Total Phosphorus (kg/yr)</b>	0.242	0.481	0.242	0.168	0	65.1
<b>Total Nitrogen (kg/yr)</b>	1.92	3.58	1.92	1.71	0	52.2
<b>Gross Pollutants (kg/yr)</b>	23	52.8	23	0	0	100

SITE INPUTS			
PRE-DEVELOPMENT	SOURCE	RESIDUAL	%
FLOW (ML/yr)	0.873	0.873	0
TOTAL SUSPENDED SOLIDS (kg/yr)	129	129	0
TOTAL PHOSPHORUS (kg/yr)	0.242	0.242	0
TOTAL NITROGEN (kg/yr)	1.92	1.92	0
GROSS POLLUTANTS (kg/yr)	23	23	0
POST-DEVELOPMENT	SOURCE	RESIDUAL	%
FLOW (ML/yr)	1.59	1.28	19.5
TOTAL SUSPENDED SOLIDS (kg/yr)	239	44.1	81.5
TOTAL PHOSPHORUS (kg/yr)	0.481	0.168	65.1
TOTAL NITROGEN (kg/yr)	3.58	1.71	52.2
GROSS POLLUTANTS (kg/yr)	52.8	0	100

NORBE - RESIDUAL LOAD COMPARISON			
NORBE	SOURCE	RESIDUAL	%
FLOW (ML/yr)	0.873	1.28	-46.6%
TOTAL SUSPENDED SOLIDS (kg/yr)	129	44.1	65.8%
TOTAL PHOSPHORUS (kg/yr)	0.242	0.168	30.6%
TOTAL NITROGEN (kg/yr)	1.92	1.71	10.9%
GROSS POLLUTANTS (kg/yr)	23	0	100.0%

## Site MUSIC Model Results

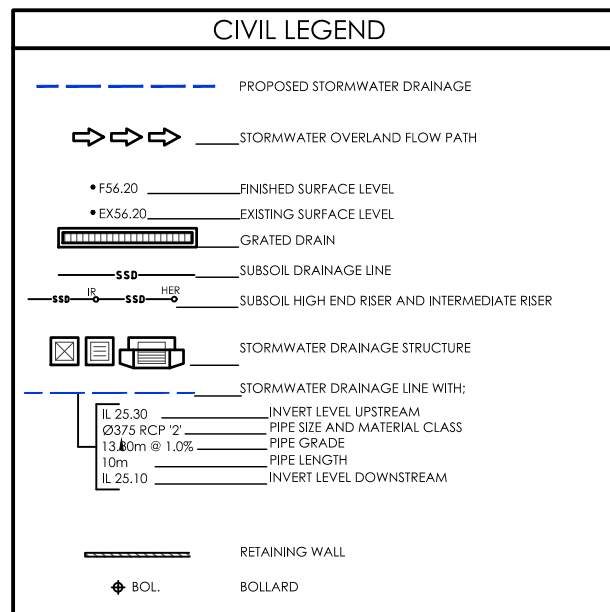


## Appendix A – Stormwater Management Plans

# GENERAL HOUSING - RFB (2-STOREY)

## 35 FRANCIS ST & 16-20 SANITA ST, GOULBURN

### STORMWATER MANAGEMENT PLAN



DRAWING SCHEDULE	
C100	COVER SHEET
C101	NOTES SHEET
C200	EXISTING SURVEY PLAN
C300	EROSION AND SEDIMENT CONTROL PLAN
C310	EROSION AND SEDIMENT CONTROL DETAILS
C400	STORMWATER MANAGEMENT PLAN
C410	CATCHMENT PLAN
C420	WSUD NORBE ANALYSIS
C421	WSUD STANDARD DETAILS
C430	OSD DRAINS ANALYSIS
C440	STORMWATER DETAILS SHEET

NOT FOR CONSTRUCTION

					CLIENT		 		ARCHITECT				CIVIL CONSULTANT		 		PROJECT				DRAWING TITLE	
																	GENERAL HOUSING		COVER SHEET			
					B		ISSUE FOR PART 5		23.08.24		NP		NP						DRAWN		DATE	
					A		ISSUE FOR DRAFT PART 5		26.07.24		NP		NP						JULY 24		NTS	
					ISSUE		AMENDMENT		DATE		DRAWN		APP						SCALE		A3	
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SITeworks NOTES

1. ORIGIN OF LEVELS :- AUSTRALIAN HEIGHT DATUM (A.H.D.)
2. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK.
3. ALL WORK IS TO BE UNDERTAKEN IN ACCORDANCE WITH THE DETAILS SHOWN ON THE DRAWINGS, THE SPECIFICATIONS AND THE DIRECTIONS OF THE PRINCIPAL'S REPRESENTATIVE.
4. EXISTING SERVICES HAVE BEEN PLOTTED FROM SUPPLIED DATA AND AS SUCH THEIR ACCURACY CANNOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE PRINCIPAL'S REPRESENTATIVE. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY.
5. WHERE NEW WORKS ABOUT EXISTING THE CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS OBTAINED.
6. THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR.
7. CARE IS TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATIONS ARE TO BE UNDERTAKEN OVER COMMUNICATIONS OR ELECTRICAL SERVICES. HAND EXCAVATE IN THESE AREAS.
8. ALL SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH AN APPROVED NON-NATURAL GRANULAR MATERIAL AND COMPACTED TO 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS.1289.5.1.1.
9. ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
10. ON COMPLETION OF PIPE INSTALLATION ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AND GRASSED AREAS AND ROAD PAVEMENTS.
11. PROVIDE 10mm WIDE EXPANDING CORK JOINTS BETWEEN CONCRETE PAVEMENTS AND ALL BUILDINGS , WALLS, FOOTINGS, COLUMNS, KERBS, DISH DRAINS, GRATED DRAINS, BOLLARD FOOTINGS ETC
12. CONTRACTOR TO OBTAIN ALL AUTHORITY APPROVALS.
13. ALL BATTERS TO BE GRASSED LINED WITH MINIMUM 100 TOPSOIL AND APPROVED COUCH LAID AS TURF.
14. MAKE SMOOTH TRANSITION TO EXISTING SERVICES AND MAKE GOOD.
15. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY DIVERSION DRAINS AND MOUNDS TO ENSURE THAT AT ALL TIMES EXPOSED SURFACES ARE FREE DRAINING AND WHERE NECESSARY EXCAVATE SUMPS AND PROVIDE PUMPING EQUIPMENT TO DRAIN EXPOSED AREAS.
16. THESE PLANS SHALL BE READ IN CONJUNCTION WITH APPROVED ARCHITECTURAL, STRUCTURAL, HYDRAULIC AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.
17. TRENCHES THROUGH EXISTING ROAD AND CONCRETE PAVEMENTS SHALL BE SAWCUT TO FULL DEPTH OF CONCRETE AND A MIN 50mm IN BITUMINOUS PAVING.
18. ALL BRANCH GAS AND WATER SERVICES UNDER DRIVEWAYS AND BRICK PAVING SHALL BE LOCATED IN Ø80 uPVC SEWER GRADE CONDUITS EXTENDING A MIN OF 500mm PAST PAVING.
19. ON COMPLETION OF WORKS ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL INCLUDING, BUT NOT LIMITED TO, KERBS, FOOTPATHS, CONCRETE AREAS, GRASS AND LANDSCAPED AREAS.

EROSION AND SEDIMENT CONTROL NOTES

- GENERAL INSTRUCTIONS
- E1. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING PLANS, AND ANY OTHER PLANS OR WRITTEN INSTRUCTIONS THAT MAY BE ISSUED AND RELATING TO DEVELOPMENT AT THE SUBJECT SITE.
- E2. THE PRINCIPAL'S REPRESENTATIVE WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE UNDERTAKEN AS INSTRUCTED IN THIS SPECIFICATION AND CONSTRUCTED FOLLOWING THE GUIDELINES OF "MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION", DEPT OF HOUSING, 2004 (BLUE BOOK).
- E3. ALL BUILDERS AND SUB-CONTRACTORS WILL BE INFORMED OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS.
- CONSTRUCTION SEQUENCE
- E4. THE SOIL EROSION POTENTIAL ON THIS SITE SHALL BE MINIMISED. HENCE WORKS SHALL BE UNDERTAKEN IN THE FOLLOWING SEQUENCE :
- a. INSTALL SEDIMENT FENCES, TEMPORARY CONSTRUCTION EXIT AND SANDBAG KERB INLET SEDIMENT TRAP.

b. UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. PHASE DEVELOPMENT SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.
- EROSION CONTROL
- E5. DURING WINDY CONDITIONS, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.
- E6. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 20 WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES.
- FENCING
- E7. STOCKPILES WILL NOT BE LOCATED WITHIN 2 METRES OF HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS. WHERE THEY ARE BETWEEN 2 AND 5 METRES FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE WATERS, E.G. THROUGH INSTALLATION OF SEDIMENT FENCING.
- E8. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) WILL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
- E9. WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE, I.E. THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.
- E10. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.
- OTHER MATTERS
- E11. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
- E12. RECEPTORS FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER ARE TO BE EMPTIED AS NECESSARY. DISPOSAL OF WASTE SHALL BE IN A MANNER APPROVED BY THE PRINCIPAL'S REPRESENTATIVE.
- SITE INSPECTION & MAINTENANCE
- E13. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AFTER RAINFALL EVENTS TO ENSURE THAT THEY OPERATE EFFECTIVELY. REPAIR AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED.

STORMWATER NOTES

1. ALL 375 DIA. DRAINAGE PIPES AND LARGER SHALL BE CLASS "2" APPROVED SPIGOT AND SOCKET FRC OR RCP PIPES WITH RUBBER RING JOINTS. (U.N.O.) ALL DOWNPIPE DRAINAGE LINES SHALL BE SEWER GRADE uPVC WITH SOLVENT WELD JOINTS. (U.N.O.)
2. EQUIVALENT STRENGTH REINFORCED CONCRETE PIPES MAY BE USED.
3. ALL PIPE JUNCTIONS UP TO AND INCLUDING 450 DIA. AND TAPERS SHALL BE VIA PURPOSE MADE FITTINGS.
4. MINIMUM GRADE TO STORMWATER LINES TO BE 1%. (U.N.O.)
5. CONTRACTOR TO SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTORS TO ENSURE PROPER CONNECTION BETWEEN DISSIMILAR PIPEWORK.
6. ALL CONNECTIONS TO EXISTING DRAINAGE PITS SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND THE INTERNAL WALL OF THE PIT AT THE POINT OF ENTRY SHALL BE CEMENT RENDERED TO ENSURE A SMOOTH FINISH.
7. PRECAST PITS SHALL NOT BE USED UNLESS WRITTEN APPROVAL IS OBTAINED FROM THE ENGINEER.
8. WHERE TRENCHES ARE IN ROCK, THE PIPE SHALL BE BEDDED ON A MIN. 50MM CONCRETE BED (OR 75MM THICK BED OF 12MM BLUE METAL) UNDER THE BARREL OF THE PIPE. THE PIPE COLLAR AT NO POINT SHALL BEAR ON THE ROCK. IN OTHER THAN ROCK, PIPES SHALL BE LAID ON A 75MM THICK SAND BED. IN ALL CASES BACKFILL THE TRENCH WITH SAND TO 200MM ABOVE THE PIPE. WHERE THE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH WITH SAND OR APPROVED GRANULAR BACKFILL COMPACTED IN 150MM LAYERS TO 98% STANDARD MAX. DRY DENSITY.
9. BEDDING SHALL BE (U.N.O.) TYPE HS2, IN ACCORDANCE WITH CURRENT RELEVANT AUSTRALIAN STANDARDS.
10. WHERE STORMWATER LINES PASS UNDER FLOOR SLABS SEWER GRADE RUBBER RING JOINTS ARE TO BE USED.
11. WHERE SUBSOIL DRAINAGE LINES PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS UNSLOTTED UPVC SEWER GRADE PIPE SHALL BE USED.
12. PROVIDE 3.0M LENGTH OF 100 DIA. SUBSOIL DRAINAGE PIPE WRAPPED IN FABRIC SOCK. AT UPSTREAM END OF EACH PIT.

EXISTING SERVICES AND FEATURES

1. THE CONTRACTOR SHALL ALLOW FOR THE CAPPING OFF, EXCAVATION, REMOVAL AND DISPOSAL IF REQUIRED OF ALL EXISTING SERVICES IN AREAS AFFECTED BY WORKS WITHIN THE CONTRACT AREA, AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE PRINCIPAL'S REPRESENTATIVE.
2. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED.
3. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL GAIN WRITTEN APPROVAL OF THEIR PROGRAMME FOR THE RELOCATION/CONSTRUCTION OF TEMPORARY SERVICES.
4. EXISTING BUILDINGS, EXTERNAL STRUCTURES, AND TREES SHOWN ON THESE DRAWINGS ARE FEATURES EXISTING PRIOR TO ANY DEMOLITION WORKS.
5. CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE PRINCIPAL'S REPRESENTATIVE. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE PRINCIPAL'S REPRESENTATIVE.
6. INTERRUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE TO THE PRINCIPAL. CONTRACTOR TO GAIN APPROVAL OF PRINCIPAL'S REPRESENTATIVE FOR TIME OF INTERRUPTION.

PART 5 - NORBE ASSESSMENT

1. THE MAJOR POTENTIAL POLLUTANTS OF CONCERN ARE SEDIMENTS FROM EROSION EFFECTS AS WELL AS STORMWATER POLLUTANT SUCH AS SUSPENDED SOLIDS, NITROGEN, PHOSPHORUS AND GROSS POLLUTANTS.
- SEDIMENTATION IS MOST LIKELY TO OCCUR DURING CONSTRUCTION WORKS FROM THE EROSION OF UNPROTECTED AND EXPOSED EARTHWORKS.
- STORMWATER POLLUTANTS ARE LIKELY TO OCCUR POST CONSTRUCTION AFTER BUILDING OCCUPATION AS THE PROPOSED DEVELOPMENT WILL INCREASE THE AMOUNT OF POLLUTION GENERATED FROM SITE.
2. SEDIMENT AND EROSION CONTROL MEASURES WILL BE IMPLEMENTED IN ACCORDANCE WITH THE 'BLUE BOOK' TO ENSURE ANY SEDIMENT GENERATED DURING CONSTRUCTION ARE CONTROLLED AND CONFINED TO THE SITE. THESE INCLUDE GEOTEXTILE PIT INLET FILTERS, SEDIMENT FENCES AND BASINS TO FILTER CONSTRUCTION SITE WATER PRIOR TO DISCHARGE TO COUNCIL DRAINAGE. REFER TO DRAWING C300 AND C310 FOR EROSION CONTROL PLAN AND DETAILS
- STORMWATER POLLUTANTS SUCH AS SUSPENDED SOLIDS, NITROGEN AND PHOSPHORUS WILL BE REDUCED TO BELOW PRE-DEVELOPED LEVELS BY THE USE OF PROPRIETARY WATER QUALITY TREATMENT DEVICES SUPPLIED BY OCEAN PROTECT. THESE INCLUDE AT SOURCE LITTER BASKET PIT INSERTS AND FILTERRA BIOSCAPE BIO-RETENTION BASIN. THE POLLUTANT REMOVAL HAS BEEN MODELLED USING INDUSTRY STANDARD PROGRAM MUSIC AND USES ENDORSED WATER NSW TREATMENT NODES. REFER TO MUSIC MODEL OPPOSITE AND DETAILS ON DRAWING C421 FOR FURTHER INFORMATION.
3. ALL WATER QUALITY TREATMENT DEVICES HAVE BEEN DESIGNED FOR APPROPRIATE STORM EVENTS TO PREVENT DAMAGE TO THE ENVIRONMENT.
- SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSPECTED AFTER RAINFALL EVENTS TO ENSURE THAT THEY CONTINUE TO OPERATE EFFECTIVELY. REPAIR AND OR MAINTENANCE MAY BE REQUIRED TO RECTIFY ANY DAMAGED FILTERS OR FENCES AFTER SIGNIFICANT RAIN.
- STORMWATER QUALITY DEVICES SUCH AS THE OCEANGAURD AND FILTERRA SHOULD BE MAINTAINED IN IN ACCORDANCE WITH OCEAN PROTECTS MAINTENANCE SCHEDULE. GENERALLY, DEVICES SHOULD BE INSPECTED TO REMOVE DEBRIS AFTER EACH LARGE RAINFALL EVENT OR EACH 6 MONTHS.
4. THE ABOVE DESCRIBED ONSITE TREATMENT MEASURES WILL ENSURE THAT POLLUTANTS ARE ADEQUATELY CONTAINED ON SITE AND PREVENT IMPACTS ON DOWNSTREAM STORMWATER DRAINAGE AND WATERWAYS.
5. A NORBE ASSESSMENT HAS BEEN UNDERTAKEN TO ENSURE THAT A BENEFICIAL EFFECT OF 10% POLLUTANT REDUCTION FROM PRE-DEVELOPED STATE OCCURS AS A RESULT OF THE WORKS. REFER TO DRAWING C420 FOR MUSIC AND NORBE RESULTS. A COPY OF THE MUSIC MODEL HAS BEEN PROVIDED AS PART OF THIS SUBMISSION.

B

ISSUE FOR PART 5

23.08.24

NP

NP

A

ISSUE FOR DRAFT PART 5

26.07.24

NP

NP

ISSUE

AMENDMENT

CLIENT



ARCHITECT



CIVIL CONSULTANT



PROJECT

GENERAL HOUSING  
35 FRANCIS ST & 16-20 SANITA ST  
GOULBURN 2058 NSW

NORTH POINT

DRAWING TITLE

NOTES SHEET

DRAWN

NP

DATE

JULY 24

SCALE

NTS

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QA CHECK

DATE

DESIGNED

NP

PROJECT NO.

230097

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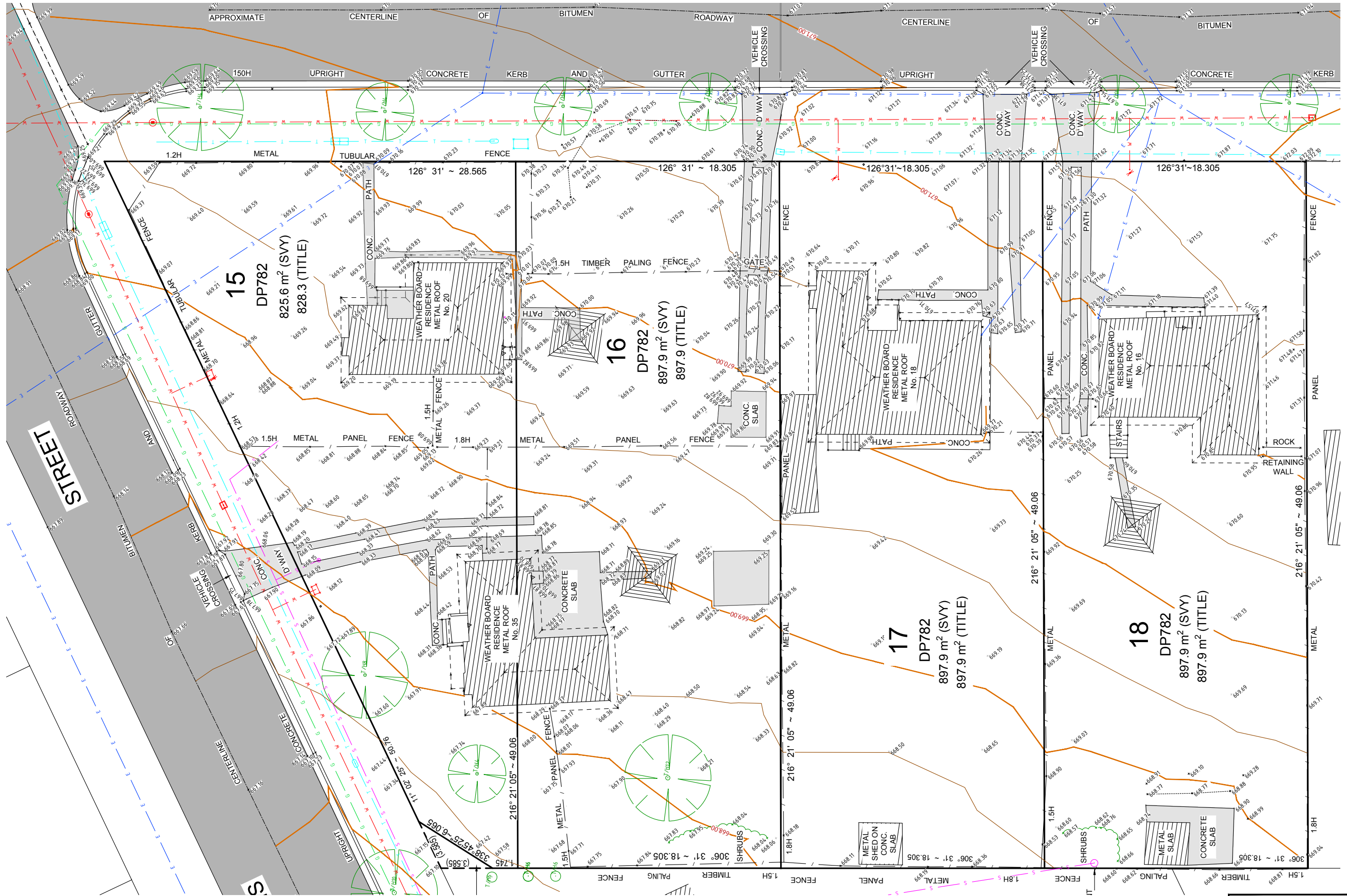
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ISSUE

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A	ISSUE FOR DRAFT PART 5	26.07.24	NP NP
ISSUE	AMENDMENT	DATE	DRAWN APP

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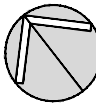
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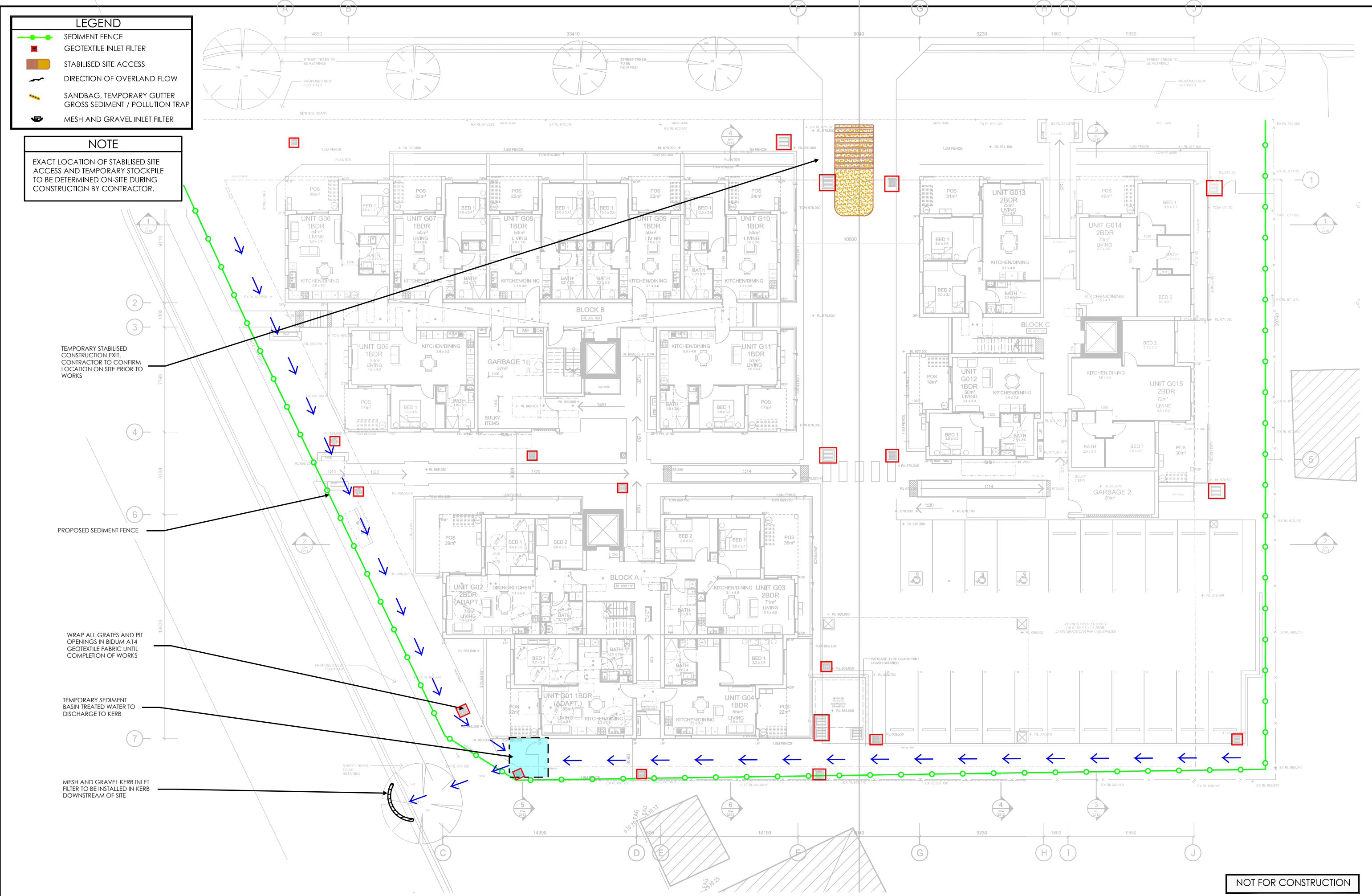
GENERAL HOUSING  
35 FRANCIS ST & 16-20 SANITA ST  
GOULBURN 2058 NSW

NORTH POINT





DRAWING TITLE EXISTING SURVEY PLAN			
DRAWN NP	DATE JULY 24	SCALE NTS	QA CHECK A3
DESIGNED NP	PROJECT NO. 230097	DRAWING NO. C200	ISSUE B






B	ISSUE FOR PART 5	23.08.24	NP	NP	
A	ISSUE FOR DRAFT PART 5	26.07.24	NP	NP	
ISSUE	AMENDMENT	DATE	DRAWN	APP	



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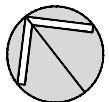
CIVIL CONSULTANT



PROJECT

GENERAL HOUSING  
35 FRANCIS ST & 16-20 SANITA ST  
GOULBURN 2058 NSW

NORTH POINT



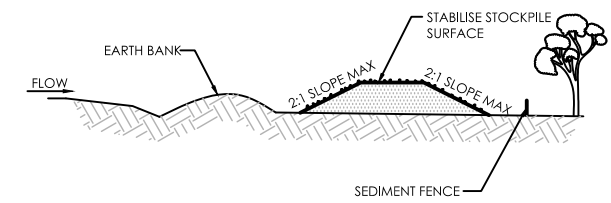
DRAWING TITLE

EROSION AND SEDIMENT CONTROL PLAN

DRAWN	DATE	SCALE	A3	QA CHECK	DATE
NP	JULY 24	1:250			
DESIGNED	PROJECT NO.	DRAWING NO.	ISSUE		
NP	230097	C300	B		

NOT FOR CONSTRUCTION

SOURCE: MANAGING URBAN STORMWATER  
SOILS AND CONSTRUCTION  
THIRD EDITION, AUGUST 1998  
PRODUCED BY THE DEPARTMENT OF  
HOUSING.

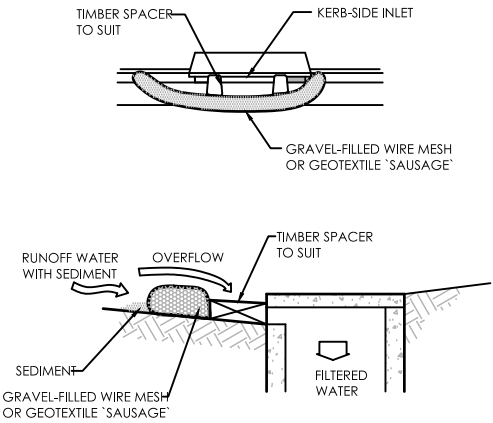


CONSTRUCTION NOTES:

1. LOCATE STOCKPILE AT LEAST 5 METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOWS, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS A LOW, FLAT, ELONGATED MOUND.
3. WHERE THERE IS SUFFICIENT AREA TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METERS IN HEIGHT.
4. REHABILITATE IN ACCORDANCE WITH THE SWMP/ESCP.
5. CONSTRUCT EARTH BANK (STANDARD DRAWING 5-2) ON THE UPSLOPE SIDE TO DIVERT RUN OFF AROUND THE STOCKPILE AND A SEDIMENT FENCE (STANDARD DRAWING 6-7) 1 TO 2 METRES DOWNSLOPE OF STOCKPILE.

STOCKPILES

SOURCE: MANAGING URBAN STORMWATER  
SOILS AND CONSTRUCTION  
THIRD EDITION, AUGUST 1998  
PRODUCED BY THE DEPARTMENT OF  
HOUSING.



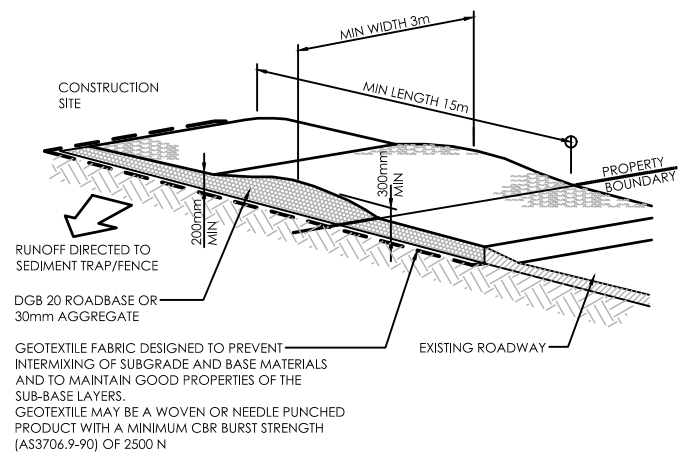
NOTE: THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN AN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES:

1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT.
2. FILL THE SLEEVE WITH 25MM TO 50MM GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150MM HIGH X 400MM WIDE.
4. PLACE THE FILTER AT THE OPENING OF THE KERB INLET LEAVING A 100MM GAP AT THE TOP TO ACT AS AN EMERGENCY SPILLWAY.
5. MAINTAIN THE OPENING WITH SPACER BLOCKS.
6. FORM A SEAL WITH THE KERBING AND PREVENT SEDIMENT BYPASSING THE FILTER.
7. FIT TO ALL KERB INLETS AT SAG POINTS.

MESH AND GRAVEL INLET FILTER

SOURCE: MANAGING URBAN STORMWATER  
SOILS AND CONSTRUCTION  
THIRD EDITION, AUGUST 1998  
PRODUCED BY THE DEPARTMENT OF  
HOUSING.

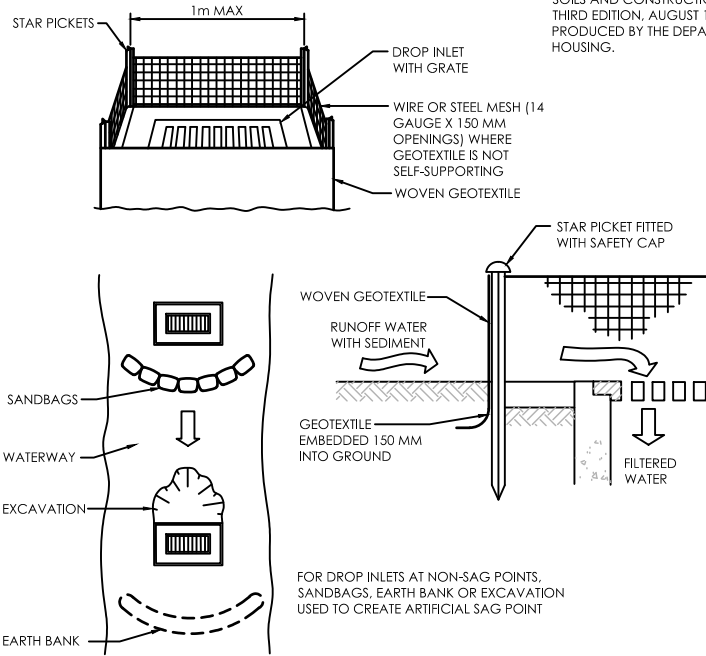


CONSTRUCTION NOTES:

1. STRIP TOPSOIL AND LEVEL SITE.
2. COMPACT SUBGRADE.
3. COVER AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
4. CONSTRUCT 200MM THICK PAD OVER GEOTEXTILE USING ROADBASE OR 30MM AGGREGATE. MINIMUM LENGTH 15M OR TO BUILDING ALIGNMENT. MINIMUM WIDTH 3 METRES.
5. CONSTRUCT HUMP IMMEDIATELY WITHIN BUOUNDARY TO DIVERT WATER TO A SEDIMENT FENCE OR OTHER SEDIMENT TRAP.

STABILISED SITE ACCESS

SOURCE: MANAGING URBAN STORMWATER  
SOILS AND CONSTRUCTION  
THIRD EDITION, AUGUST 1998  
PRODUCED BY THE DEPARTMENT OF  
HOUSING.

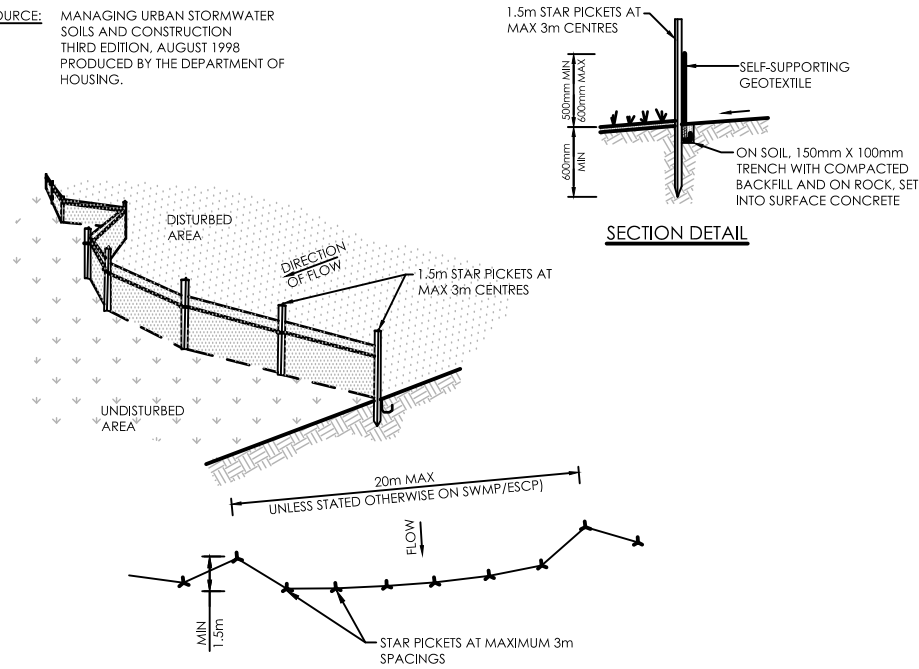


CONSTRUCTION NOTES:

1. FABRICATE A SEDIMENT BARRIER FROM GEOTEXTILE OR STRAW BALES.
2. SUPPORT GEOTEXTILE WITH MESH TIED TO POSTS AT 1 METRE CENTRES.
3. DO NOT COVER INLET WITH GEOTEXTILE.
4. CONSTRUCTION DETAILS ARE SIMILAR TO TYPICAL SEDIMENT FENCING DETAIL.

GEOTEXTILE INLET FILTER

SOURCE: MANAGING URBAN STORMWATER  
SOILS AND CONSTRUCTION  
THIRD EDITION, AUGUST 1998  
PRODUCED BY THE DEPARTMENT OF  
HOUSING.



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE.
2. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND, 3 METRES APART.
3. DIG A 150 MM DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
4. BACKFILL TRENCH OVER BASE OF FABRIC.
5. FIX SELF-SUPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
6. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150 MM OVERLAP.

SEDIMENT FENCE

NOT FOR CONSTRUCTION

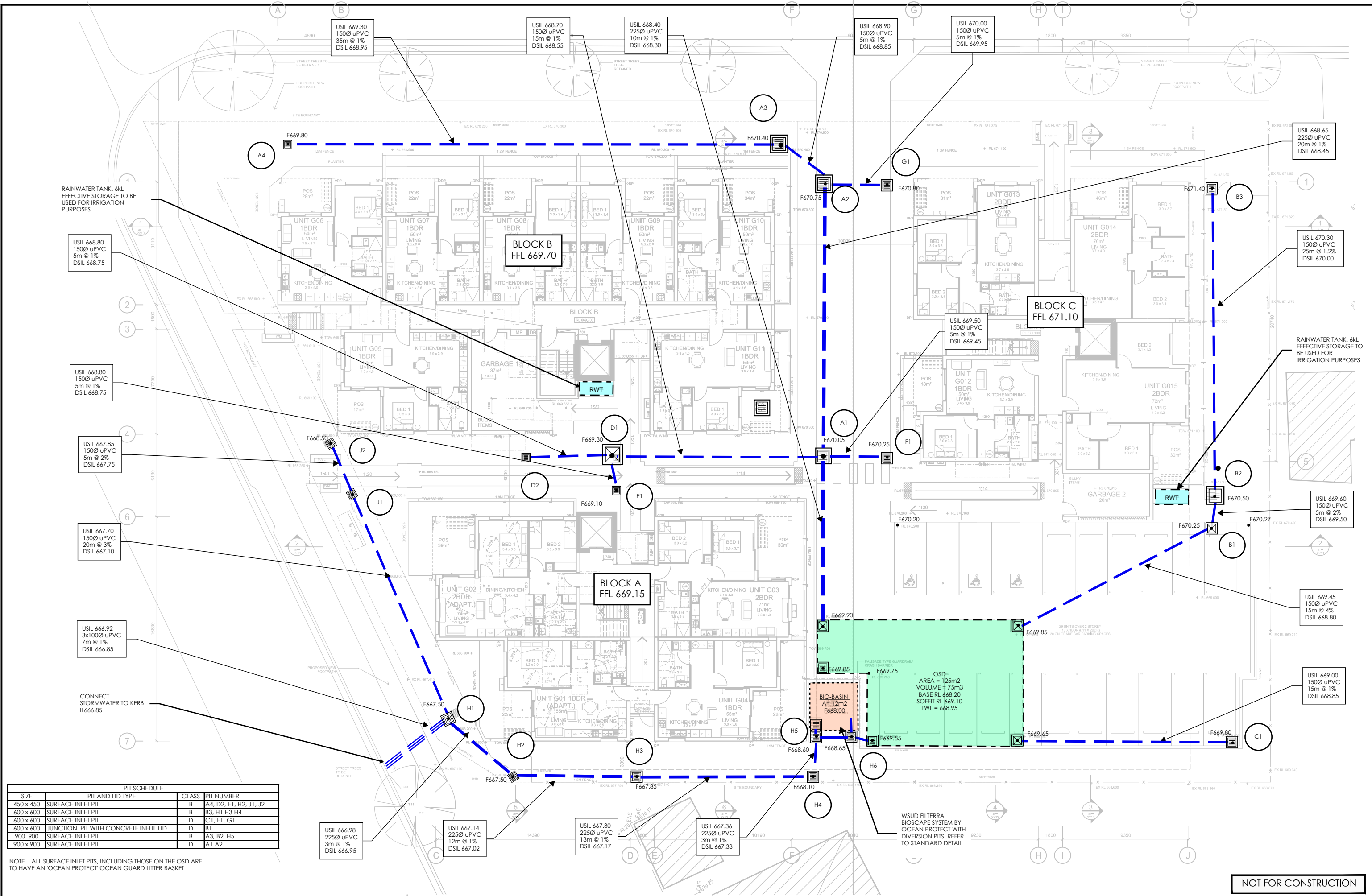
B	ISSUE FOR PART 5	23.08.24	NP	NP	
A	ISSUE FOR DRAFT PART 5	26.07.24	NP	NP	
ISSUE	AMENDMENT	DATE	DRAWN	APP	



PROJECT  
GENERAL HOUSING  
35 FRANCIS ST & 16-20 SANITA ST  
GOULBURN 2058 NSW

NORTH POINT


DRAWING TITLE EROSION AND SEDIMENT CONTROL DETAILS					
DRAWN NP	DATE JULY 24	SCALE NTS	A3	QA CHECK	DATE
DESIGNED NP	PROJECT NO. 230097	DRAWING NO. C310	ISSUE B		



PIT SCHEDULE			
SIZE	PIT AND LID TYPE	CLASS	PIT NUMBER
450 x 450	SURFACE INLET PIT	B	A4, D2, E1, H2, J1, J2
600 x 600	SURFACE INLET PIT	B	B3, H1 H3 H4
600 x 600	SURFACE INLET PIT	D	C1, F1, G1
600 x 600	JUNCTION PIT WITH CONCRETE INFLU LID	D	B1
900 x 900	SURFACE INLET PIT	B	A3, B2, H5
900 x 900	SURFACE INLET PIT	D	A1 A2

NOTE - ALL SURFACE INLET PITS, INCLUDING THOSE ON THE OSD ARE TO HAVE AN 'OCEAN PROTECT' OCEAN GUARD LITTER BASKET

ISSUE	AMENDMENT	DATE	DRAWN	APP
B	ISSUE FOR PART 5	23.08.24	NP	NP
A	ISSUE FOR DRAFT PART 5	26.07.24	NP	NP







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PROJECT

GENERAL HOUSING

35 FRANCIS ST & 16-20 SANITA ST

GOULBURN 2058 NSW

NORTH POINT



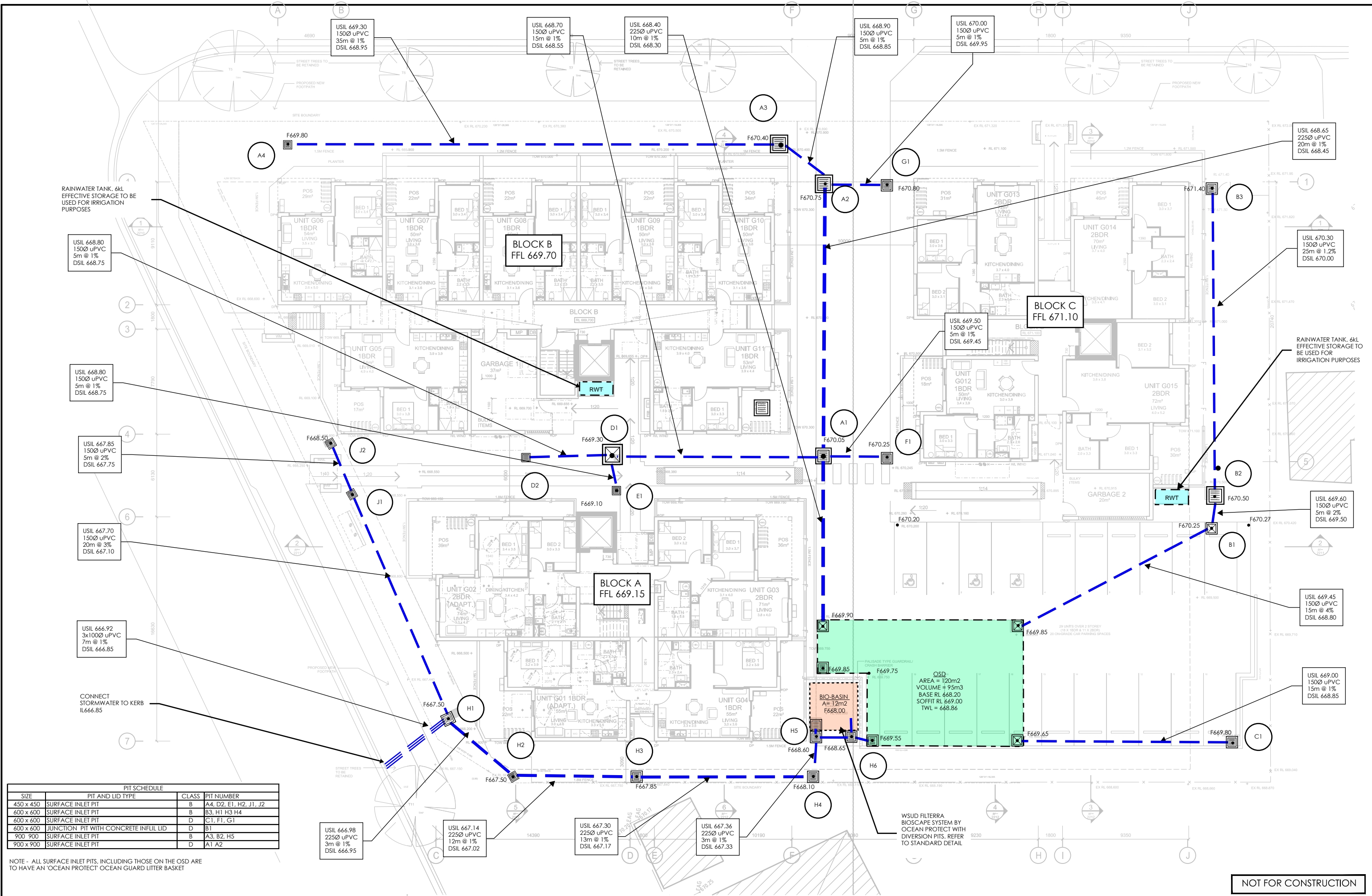
DRAWING TITLE

STORMWATER MANAGEMENT PLAN

DRAWN	DATE	SCALE	A3	QA CHECK	DATE
NP	JULY 24	1:250			
DESIGNED	PROJECT NO.	DRAWING NO.	C400	ISSUE	B
NP	230097				

NOT FOR CONSTRUCTION





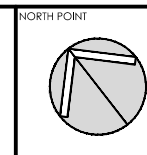
PIT SCHEDULE			
SIZE	PIT AND LID TYPE	CLASS	PIT NUMBER
450 x 450	SURFACE INLET PIT	B	A4, D2, E1, H2, J1, J2
600 x 600	SURFACE INLET PIT	B	B3, H1 H3 H4
600 x 600	SURFACE INLET PIT	D	C1, F1, G1
600 x 600	JUNCTION PIT WITH CONCRETE INFILL LID	D	B1
900 x 900	SURFACE INLET PIT	B	A3, B2, H5
900 x 900	SURFACE INLET PIT	D	A1 A2

NOTE - ALL SURFACE INLET PITS, INCLUDING THOSE ON THE OSD ARE TO HAVE AN 'OCEAN PROTECT' OCEAN GUARD LITTER BASKET

ISSUE	AMENDMENT	DATE	DRAWN	APP
C	REISSUE FOR PART 5	16.09.24	NP	NP
B	ISSUE FOR PART 5	23.08.24	NP	NP
A	ISSUE FOR DRAFT PART 5	26.07.24	NP	NP



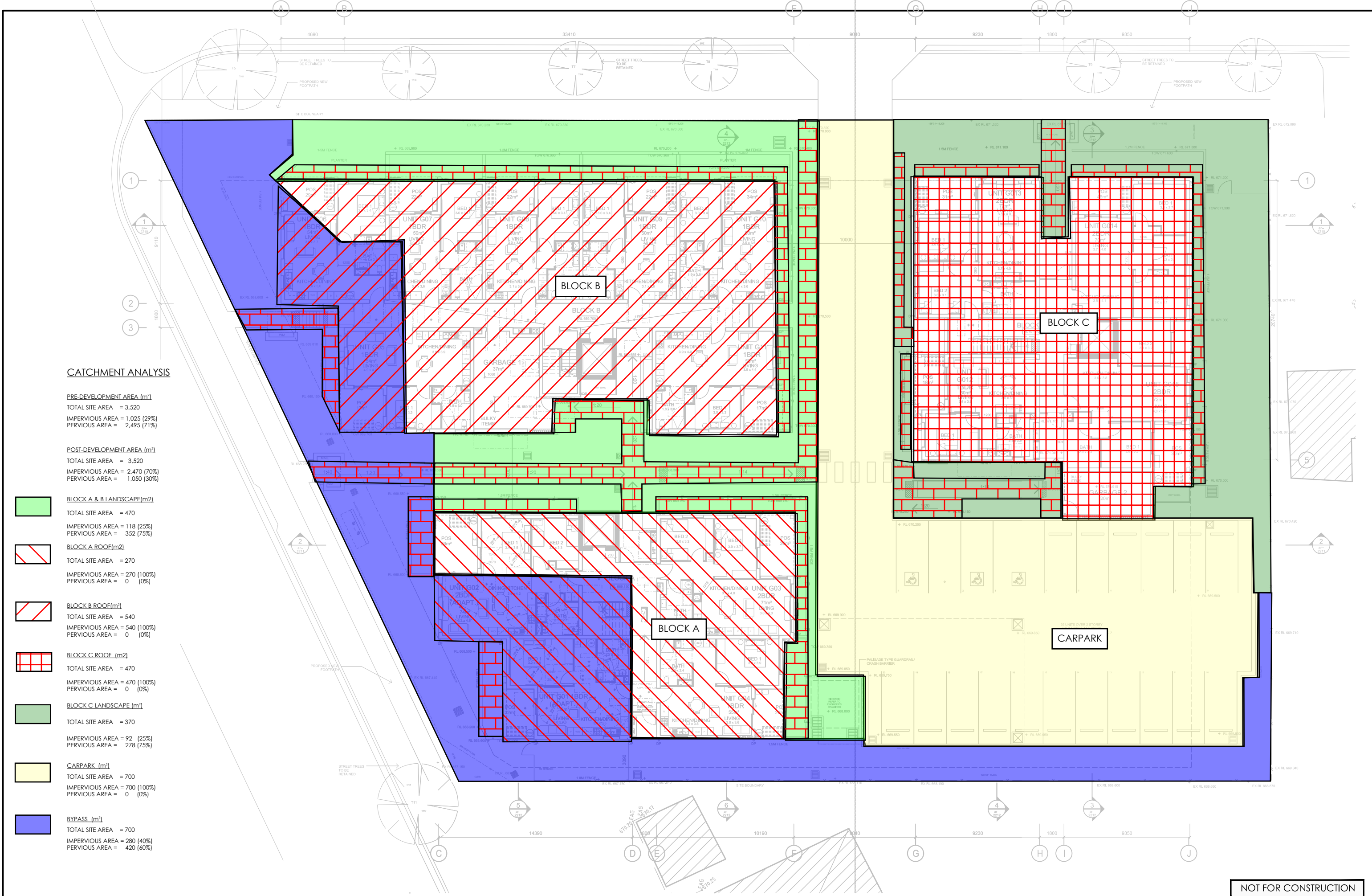
PROJECT  
GENERAL HOUSING  
35 FRANCIS ST & 16-20 SANITA ST  
GOULBURN 2058 NSW



DRAWING TITLE STORMWATER MANAGEMENT PLAN			
DRAWN NP	DATE JULY 24	SCALE 1:250	QA CHECK A3
DESIGNED NP	PROJECT NO. 230097	DRAWING NO. C400	ISSUE B

NOT FOR CONSTRUCTION








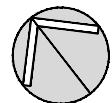
CATCHMENT ANALYSIS

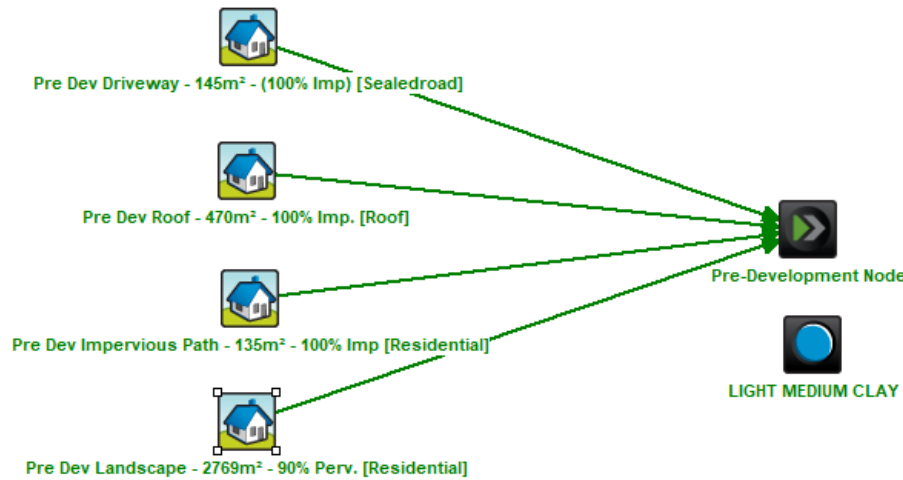
PRE-DEVELOPMENT AREA (m<sup>2</sup>)  
TOTAL SITE AREA = 3,520  
IMPERVIOUS AREA = 1,025 (29%)  
PERVIOUS AREA = 2,495 (71%)

POST-DEVELOPMENT AREA (m<sup>2</sup>)  
TOTAL SITE AREA = 3,520  
IMPERVIOUS AREA = 2,470 (70%)  
PERVIOUS AREA = 1,050 (30%)

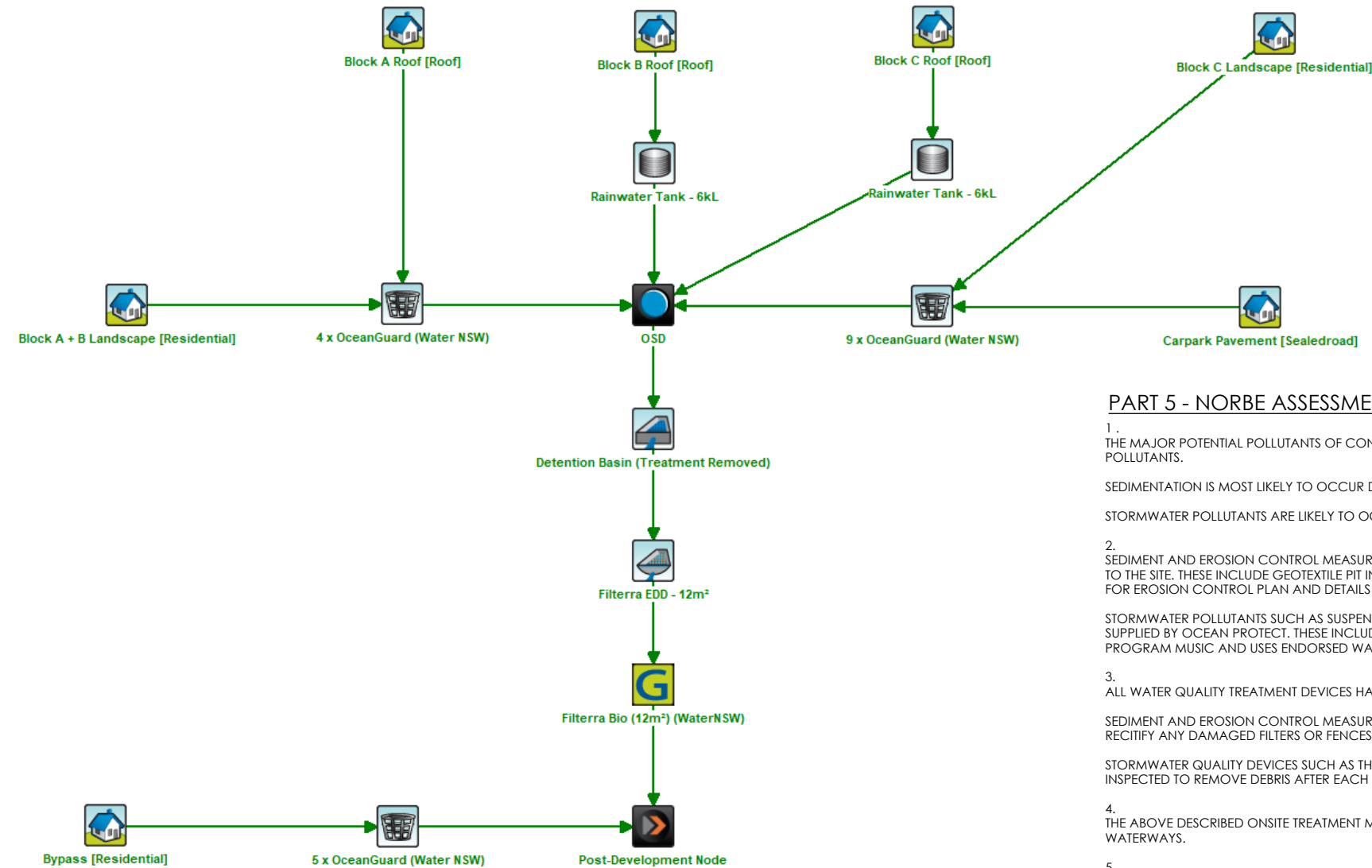
- BLOCK A & B LANDSCAPE(m<sup>2</sup>)**  
TOTAL SITE AREA = 470  
IMPERVIOUS AREA = 118 (25%)  
PERVIOUS AREA = 352 (75%)
- BLOCK A ROOF(m<sup>2</sup>)**  
TOTAL SITE AREA = 270  
IMPERVIOUS AREA = 270 (100%)  
PERVIOUS AREA = 0 (0%)
- BLOCK B ROOF(m<sup>2</sup>)**  
TOTAL SITE AREA = 540  
IMPERVIOUS AREA = 540 (100%)  
PERVIOUS AREA = 0 (0%)
- BLOCK C ROOF (m<sup>2</sup>)**  
TOTAL SITE AREA = 470  
IMPERVIOUS AREA = 470 (100%)  
PERVIOUS AREA = 0 (0%)
- BLOCK C LANDSCAPE (m<sup>2</sup>)**  
TOTAL SITE AREA = 370  
IMPERVIOUS AREA = 92 (25%)  
PERVIOUS AREA = 278 (75%)
- CARPARK (m<sup>2</sup>)**  
TOTAL SITE AREA = 700  
IMPERVIOUS AREA = 700 (100%)  
PERVIOUS AREA = 0 (0%)
- BYPASS (m<sup>2</sup>)**  
TOTAL SITE AREA = 700  
IMPERVIOUS AREA = 280 (40%)  
PERVIOUS AREA = 420 (60%)

NOT FOR CONSTRUCTION

<table><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td>B</td><td>ISSUE FOR PART 5</td><td>23.08.24</td><td>NP NP</td></tr><tr><td>A</td><td>ISSUE FOR DRAFT PART 5</td><td>26.07.24</td><td>NP NP</td></tr><tr><td>ISSUE</td><td>AMENDMENT</td><td>DATE</td><td>DRAWN APP</td></tr></table>																B	ISSUE FOR PART 5	23.08.24	NP NP	A	ISSUE FOR DRAFT PART 5	26.07.24	NP NP	ISSUE	AMENDMENT	DATE	DRAWN APP	<p>CUSTOMER</p> <div></div>		<p>ARCHITECT</p> <div></div>	<p>CIVIL CONSULTANT</p> <div></div>	<p>PROJECT</p> <p>GENERAL HOUSING</p> <p>35 FRANCIS ST &amp; 16-20 SANITA ST GOULBURN 2058 NSW</p>	<p>NORTH POINT</p> <div></div>	<p>DRAWING TITLE</p> <p>CATCHMENT PLAN</p> <table><tr><td>DRAWN</td><td>DATE</td><td>SCALE</td><td>A3</td><td>QA CHECK</td><td>DATE</td></tr><tr><td>NP</td><td>JULY 24</td><td>1:250</td><td></td><td></td><td></td></tr><tr><td>DESIGNED</td><td>PROJECT NO.</td><td>DRAWING NO.</td><td>ISSUE</td><td></td><td></td></tr><tr><td>NP</td><td>230097</td><td>C410</td><td>B</td><td></td><td></td></tr></table>	DRAWN	DATE	SCALE	A3	QA CHECK	DATE	NP	JULY 24	1:250				DESIGNED	PROJECT NO.	DRAWING NO.	ISSUE			NP	230097	C410	B		
B	ISSUE FOR PART 5	23.08.24	NP NP																																																							
A	ISSUE FOR DRAFT PART 5	26.07.24	NP NP																																																							
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DESIGNED	PROJECT NO.	DRAWING NO.	ISSUE																																																							
NP	230097	C410	B																																																							



MUSIC MODEL PRE-DEVELOPMENT



MUSIC MODEL POST-DEVELOPMENT

	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
Flow (ML/yr)	0.873	1.59	0.873	1.28	0	19.5
Total Suspended Solids (kg/yr)	129	239	129	44.1	0	81.5
Total Phosphorus (kg/yr)	0.242	0.481	0.242	0.168	0	65.1
Total Nitrogen (kg/yr)	1.92	3.58	1.92	1.71	0	52.2
Gross Pollutants (kg/yr)	23	52.8	23	0	0	100

MUSIC RESULTS

SITE INPUTS			
PRE-DEVELOPMENT	SOURCE	RESIDUAL	%
FLOW (ML/yr)	0.873	0.873	0
TOTAL SUSPENDED SOLIDS (kg/yr)	129	129	0
TOTAL PHOSPHORUS (kg/yr)	0.242	0.242	0
TOTAL NITROGEN (kg/yr)	1.92	1.92	0
GROSS POLLUTANTS (kg/yr)	23	23	0
POST-DEVELOPMENT	SOURCE	RESIDUAL	%
FLOW (ML/yr)	1.59	1.28	19.5
TOTAL SUSPENDED SOLIDS (kg/yr)	239	44.1	81.5
TOTAL PHOSPHORUS (kg/yr)	0.481	0.168	65.1
TOTAL NITROGEN (kg/yr)	3.58	1.71	52.2
GROSS POLLUTANTS (kg/yr)	52.8	0	100

NORBE - RESIDUAL LOAD COMPARISON			
NORBE	SOURCE	RESIDUAL	%
FLOW (ML/yr)	0.873	1.28	-46.6%
TOTAL SUSPENDED SOLIDS (kg/yr)	129	44.1	65.8%
TOTAL PHOSPHORUS (kg/yr)	0.242	0.168	30.6%
TOTAL NITROGEN (kg/yr)	1.92	1.71	10.9%
GROSS POLLUTANTS (kg/yr)	23	0	100.0%

NORBE RESULTS

PART 5 - NORBE ASSESSMENT

1.  
THE MAJOR POTENTIAL POLLUTANTS OF CONCERN ARE SEDIMENTS FROM EROSION EFFECTS AS WELL AS STORMWATER POLLUTANT SUCH AS SUSPENDED SOLIDS, NITROGEN, PHOSPHORUS AND GROSS POLLUTANTS.  
  
SEDIMENTATION IS MOST LIKELY TO OCCUR DURING CONSTRUCTION WORKS FROM THE EROSION OF UNPROTECTED AND EXPOSED EARTHWORKS.  
  
STORMWATER POLLUTANTS ARE LIKELY TO OCCUR POST CONSTRUCTION AFTER BUILDING OCCUPATION AS THE PROPOSED DEVELOPMENT WILL INCREASE THE AMOUNT OF POLLUTION GENERATED FROM SITE.
2.  
SEDIMENT AND EROSION CONTROL MEASURES WILL BE IMPLEMENTED IN ACCORDANCE WITH THE 'BLUE BOOK' TO ENSURE ANY SEDIMENT GENERATED DURING CONSTRUCTION ARE CONTROLLED AND CONFINED TO THE SITE. THESE INCLUDE GEOTEXTILE PIT INLET FILTERS, SEDIMENT FENCES AND BASINS TO FILTER CONSTRUCTION SITE WATER PRIOR TO DISCHARGE TO COUNCIL DRAINAGE. REFER TO DRAWING C300 AND C310 FOR EROSION CONTROL PLAN AND DETAILS  
  
STORMWATER POLLUTANTS SUCH AS SUSPENDED SOLIDS, NITROGEN AND PHOSPHORUS WILL BE REDUCED TO BELOW PRE-DEVELOPED LEVELS BY THE USE OF PROPRIETARY WATER QUALITY TREATMENT DEVICES SUPPLIED BY OCEAN PROTECT. THESE INCLUDE AT SOURCE LITTER BASKET PIT INSERTS AND FILTERRA BIOSCAPE BIO-RETENTION BASIN. THE POLLUTANT REMOVAL HAS BEEN MODELLED USING INDUSTRY STANDARD PROGRAM MUSIC AND USES ENDORSED WATER NSW TREATMENT NODES. REFER TO MUSIC MODEL OPPOSITE AND DETAILS ON DRAWING C421 FOR FURTHER INFORMATION.
3.  
ALL WATER QUALITY TREATMENT DEVICES HAVE BEEN DESIGNED FOR APPROPRIATE STORM EVENTS TO PREVENT DAMAGE TO THE ENVIRONMENT.  
  
SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSPECTED AFTER RAINFALL EVENTS TO ENSURE THAT THEY CONTINUE TO OPERATE EFFECTIVELY. REPAIR AND OR MAINTENANCE MAY BE REQUIRED TO RECTIFY ANY DAMAGED FILTERS OR FENCES AFTER SIGNIFICANT RAIN.  
  
STORMWATER QUALITY DEVICES SUCH AS THE OCEANGAURD AND FILTERRA SHOULD BE MAINTAINED IN ACCORDANCE WITH OCEAN PROTECTS MAINTENANCE SCHEDULE. GENERALLY, DEVICES SHOULD BE INSPECTED TO REMOVE DEBRIS AFTER EACH LARGE RAINFALL EVENT OR EACH 6 MONTHS.
4.  
THE ABOVE DESCRIBED ONSITE TREATMENT MEASURES WILL ENSURE THAT POLLUTANTS ARE ADEQUATELY CONTAINED ON SITE AND PREVENT IMPACTS ON DOWNSTREAM STORMWATER DRAINAGE AND WATERWAYS.
5.  
A NORBE ASSESSMENT HAS BEEN UNDERTAKEN TO ENSURE THAT A BENEFICIAL EFFECT OF 10% POLLUTANT REDUCTION FROM PRE-DEVELOPED STATE OCCURS AS A RESULT OF THE WORKS. REFER TO DRAWING C420 FOR MUSIC AND NORBE RESULTS. A COPY OF THE MUSIC MODEL HAS BEEN PROVIDED AS PART OF THIS SUBMISSION.

NOT FOR CONSTRUCTION

## SURFACE FLOW CONFIGURATION

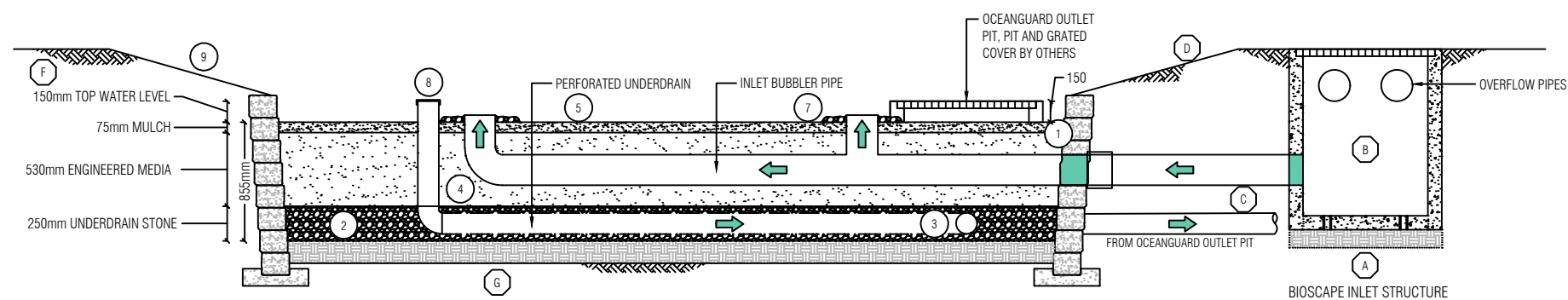
## PIPE FLOW CONFIGURATION

PLAN ID	MAXIMUM PIT PLAN DIMENSIONS
S	450mm x 450mm
M	600mm x 600mm
L	900mm x 900mm
XL	1200mm x 1200mm

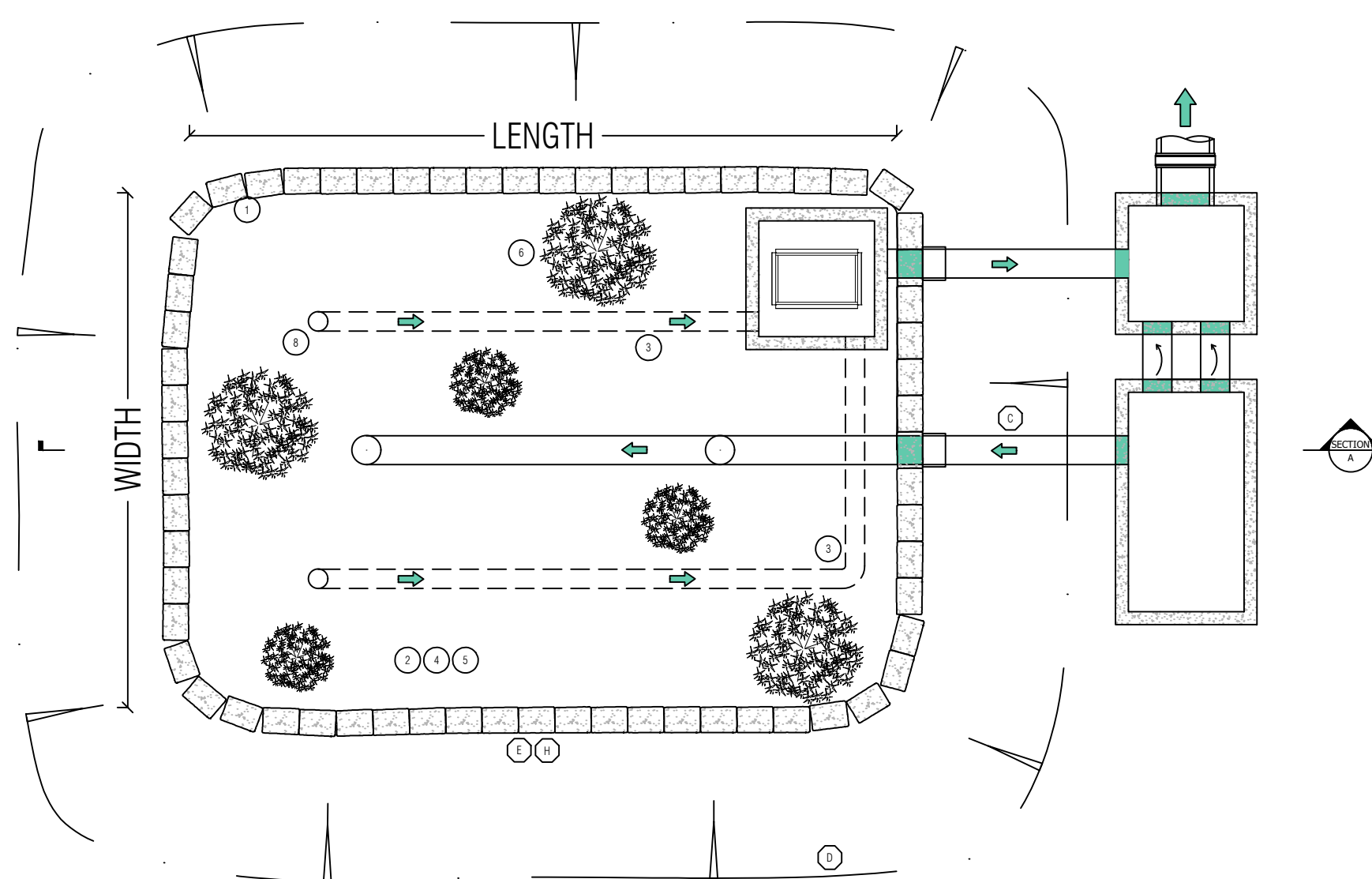
DEPTH ID	BAG DEPTH	OVERALL DEPTH
1	170	270
2	300	450
3	600	700

		DEPTH ID		
		1	2	3
PLAN ID	S	■		
	M	■	■	
	L	■	■	■
	XL	■	■	■

## OCEAN PROTECT OCEANGUARD STANDARD DETAILS



SECTION A-A



## PLAN

OCEAN PROTECT FILTERRA BIOSCAPE SYSTEM STANDARD DETAIL  
SITE SPECIFIC LAYOUT TO BE CONFIRMED DURING DETAIL DESIGN

NOT FOR CONSTRUCTION

B	ISSUE FOR PART 5	23.08.24	NP	NP
A	ISSUE FOR DRAFT PART 5	26.07.24	NP	NP
ISSUE	AMENDMENT	DATE	DRAWN	APP

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PROJECT	
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## GENERAL HOUSING

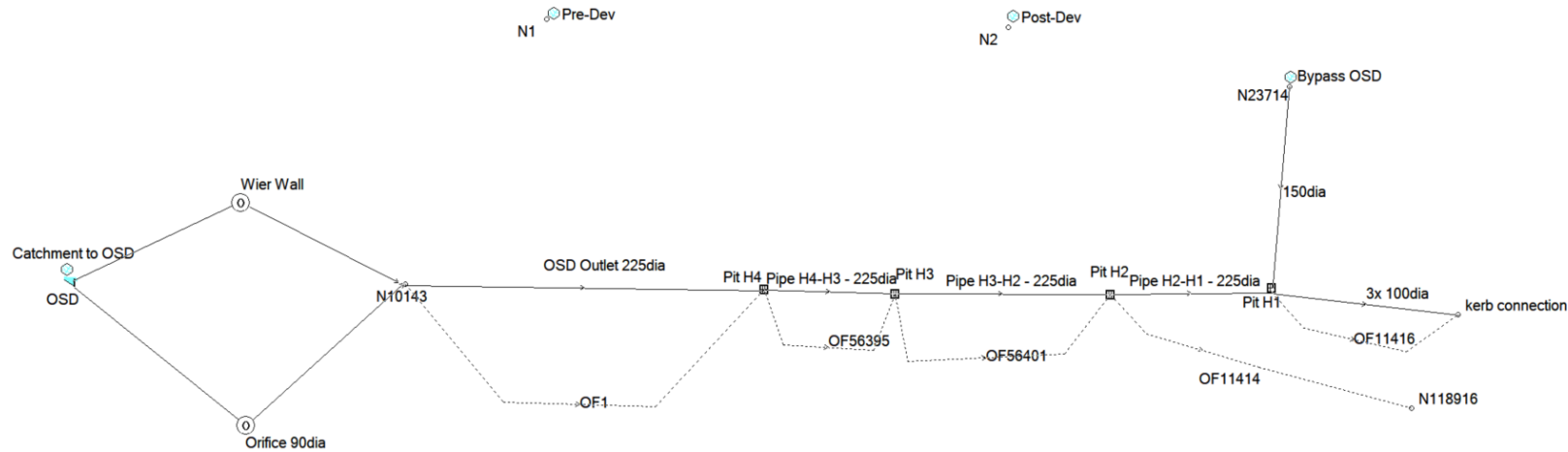
35 FRANCIS ST & 16-20 SANITA ST  
GOULBURN 2058 NSW

NORTH POINT

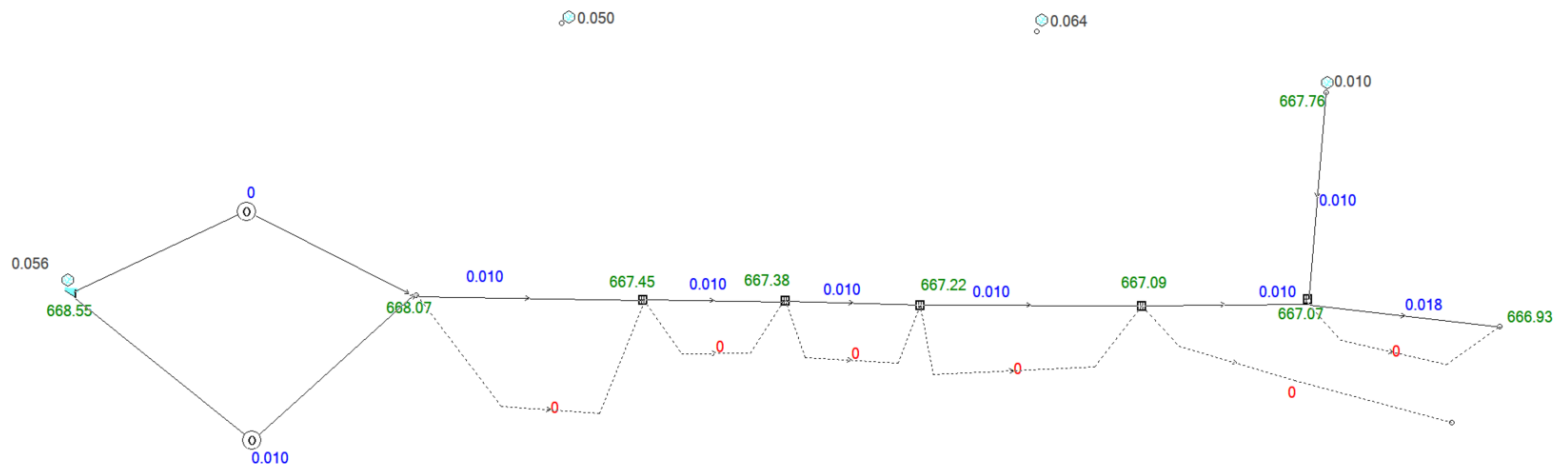
DRAWING TITLE

WSUD STANDARD DETAILS

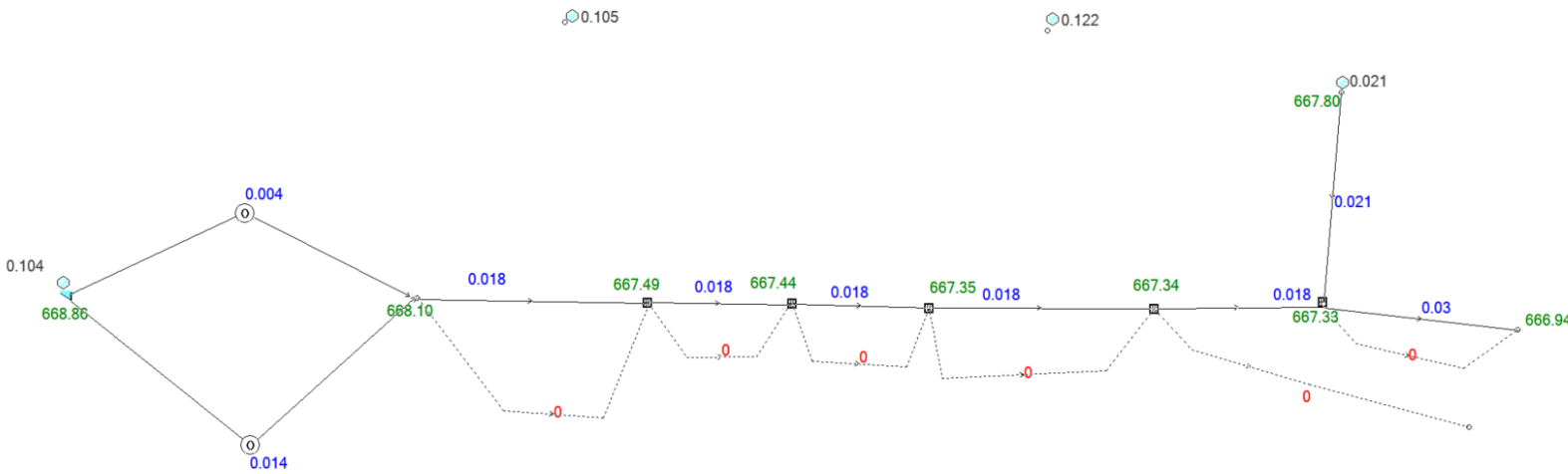
DRAWN NP	DATE JULY 24	SCALE NTS	A3	QA CHECK	DATE
DESIGNED NP	PROJECT NO. 230097		DRAWING NO. C421		ISSUE B



Drains Model



20% AEP Results



1% AEP Results

Catchment Analysis

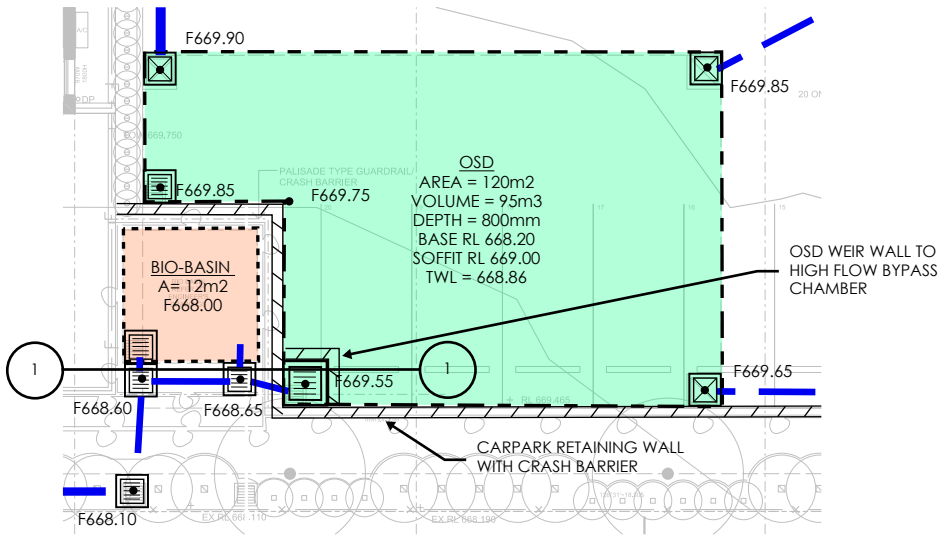
PRE-DEVELOPMENT AREA (m<sup>2</sup>)  
TOTAL SITE AREA = 3,520  
IMPERVIOUS AREA = 1,025 (29%)  
PERVIOUS AREA = 2,495 (71%)

POST-DEVELOPMENT AREA (m<sup>2</sup>)  
TOTAL SITE AREA = 3,520  
IMPERVIOUS AREA = 2,470 (70%)  
PERVIOUS AREA = 1,050 (30%)

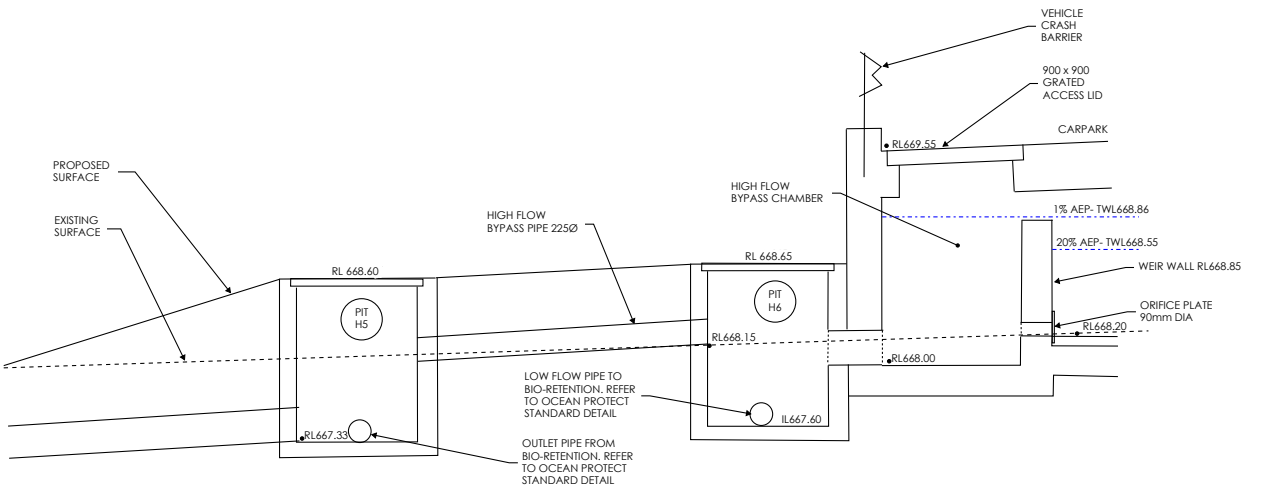
CATCHMENT TO OSD (m<sup>2</sup>)  
TOTAL SITE AREA = 2,820  
IMPERVIOUS AREA = 2,200 (78%)  
PERVIOUS AREA = 620 (22%)

CATCHMENT BYPASS OSD (m<sup>2</sup>)  
TOTAL SITE AREA = 700  
IMPERVIOUS AREA = 280 (40%)  
PERVIOUS AREA = 420 (60%)

Drains Results Summary	
Pre-Development	Flow (l/s)
Q <sub>5</sub> - 20% AEP	50
Q <sub>10</sub> - 10% AEP	64
Q <sub>20</sub> - 5% AEP	75
Q <sub>100</sub> - 1% AEP	105
Post-Development	Flow (l/s)
Q <sub>5</sub> - 20% AEP	18
Q <sub>10</sub> - 10% AEP	20
Q <sub>20</sub> - 5% AEP	21
Q <sub>100</sub> - 1% AEP	30



OSD Plan



Section 1 through OSD

NOT FOR CONSTRUCTION

ISSUE	AMENDMENT	DATE	DRAWN	APP
B	ISSUE FOR PART 5	23.08.24	NP	NP
A	ISSUE FOR DRAFT PART 5	26.07.24	NP	NP

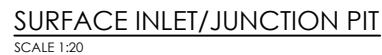


PROJECT  
GENERAL HOUSING  
35 FRANCIS ST & 16-20 SANITA ST  
GOULBURN 2058 NSW

NORTH POINT

DRAWING TITLE OSD DRAINS ANALYSIS					
DRAWN NP	DATE JULY 24	SCALE NTS	A3	QA CHECK	DATE
DESIGNED NP	PROJECT NO. 230097	DRAWING NO. C430	ISSUE B		

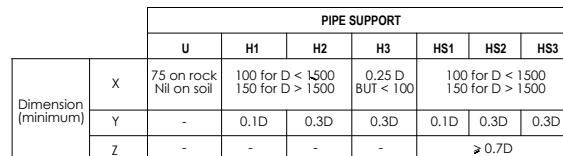
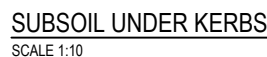




SCALE 1:20

- 
- 50 TYP.  
FROM EDGE OF  
PENETRATION
- 50 TYP.
- 600  
TYP.
- 600  
TYP.
- AT PITS, BOXES AND  
OTHER PENETRATIONS

### TYPICAL PIT CORNER DETAIL



D = External diameter of pipe

### TYPICAL EXPANSION JOINT - EJ

Diagram illustrating the termination of reinforcement mesh at the edge of a slab. The mesh is terminated before the edge of the slab, and a typical sealant type 'E' is applied at the edge of the slab.

SCALE 1:20



SCALE 1:20

SAWCUT WITHIN 24 HOUR PERIOD AFTER CONCRETE IS  
POURED UNLESS AGREED OTHERWISE BY ENGINEER



NOT FOR CONSTRUCTION

B	ISSUE FOR PART 5	23.08.24	NP	NP
A	ISSUE FOR DRAFT PART 5	26.07.24	NP	NP
ISSUE	AMENDMENT	DATE	DRAWN	APP

## CLIENT



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PROJECT

## GENERAL HOUSING

35 FRANCIS ST & 16-20 SANITA ST  
GOULBURN 2058 NSW

NORTH POINT

DRAWING TITLE

STORMWATER DETAILS SHEET

DRAWN NP	DATE JULY 24	SCALE NTS	A3	QA CHECK	DATE
DESIGNED NP	PROJECT NO. 230097			DRAWING NO. C440	ISSUE B

October 31, 2023 - 8:59pm

LEGEND

CUT & FILL DEPTH RANGE

LOWER VALUE (m)	UPPER VALUE (m)	
-1.5	-1.0	
-0.5	0	
0	0.5	
0.5	1.0	
1.0	1.5	

EARTHWORK QUANTITIES

TOTAL CUT = 260m³  
TOTAL FILL = 1,210m³  
BALANCE = 950m³ (IMPORTED FILL)

NOTES

1. EARTHWORK QUANTITIES ARE THEORETICAL AND INDICATIVE ONLY
2. VOLUMES HAVE BEEN CALCULATED BETWEEN THE EXISTING SURVEYED SURFACE AND DESIGN FINISHED SURFACE.
3. NO ALLOWANCE HAS BEEN MADE FOR STRIPPING OF TOPSOIL, BUILDING SLABS, PAVEMENTS OR LANDSCAPING DEPTHS.
3. VOLUMES ARE BASED ON INSITU MATERIAL AND DO NOT ACCOUNT FOR MATERIAL BULKING FACTORS OR COMPACTION REQUIREMENTS.
5. IT IS ASSUMED THAT THE EXCAVATED MATERIAL CAN BE REUSED ON SITE AS ENGINEERED FILL AND IS REFLECTED IN THE CUT AND FILL BALANCE CALCULATION.

B	ISSUE FOR PART 5	23.08.24	NP	NP	
A	ISSUE FOR DRAFT PART 5	26.07.24	NP	NP	
ISSUE	AMENDMENT	DATE	DRAWN	APP	

CLIENT



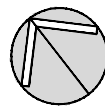
ARCHITECT



PROJECT

GENERAL HOUSING  
35 FRANCIS ST & 16-20 SANITA ST  
GOULBURN 2058 NSW

NORTH POINT



DRAWING TITLE  
CUT AND FILL PLAN

DRAWN NP	DATE JULY 24	SCALE 1:250	A3	QA CHECK	DATE
DESIGNED NP	PROJECT NO. 230097	DRAWING NO. C500		ISSUE B	



NOT FOR CONSTRUCTION