

Civil Engineering Report

Alteration and Addition to Meriden School

Prepared for Meriden School / 01 July 2022

221208

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Rev	Date	Prepared By	Approved By	Remarks
A	01/07/22	DM	SB	For Approval
B	29/07/22	DM	SB	For Approval

1.0 Introduction

1.1 Executive Summary

Taylor Thomson Whitting Pty Ltd (TTW) has been engaged by CPTG on behalf of Meriden School to provide civil engineering consulting services for the proposed additions and alterations to the existing Meriden Senior School Campus.

This report supports a State Significant Development Application (SSDA) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

This proposed development is identified as a State Significant Development by way of Clause 15(2) of Schedule 1 under State Environmental Planning Policy (State and Regional Development) 2011 on the basis that the development is for the purpose of an existing school and has a Capital Investment Value of more than \$20 million.

1.2 Secretary's Environmental Assessment Requirements

Under SSDA number SSD-39005127, we have been provided with Secretary's Environmental Assessment Requirements (SEARs). This report provides a response (in part or full where relevant) to the following SEARs:

Key Issue	Assessment Requirements	Refer Section
13. Stormwater and Wastewater	<p>Provide an Integrated Water Management Plan for the development that:</p> <ul style="list-style-type: none"> ▪ Is prepared in consultation with the local Council and any other relevant drainage or water authority. ▪ Details the proposed drainage design for the site including any on-site treatment, reuse and detention facilities, water quality measures, and the nominated discharge points. ▪ Demonstrates compliance with the local council or other drainage or water authority requirements and avoids adverse impacts on any downstream properties. <p>Where drainage infrastructure works are required that would be handed over to the local council, or other drainage or water authority, provide full hydraulic details and detailed plans and specification of proposed works that have been prepared in consultation with, and comply with the relevant standards of, the local council or other drainage or water authority.</p>	Section 3.0
14. Flooding Risk	<p>Identify any flood risk on-site having regard to adopted flood studies, the potential effects of climate change, and any relevant provisions of the NSW Floodplain Development Manual.</p> <p>Assess the impacts of the development, including any changes to flood risk on-site or off-site, and detail design solutions and operational procedures to mitigate flood risk where required.</p>	Section 4.0

1.3 Relevant Documents

The following documents have been reviewed in preparing this document:

- Strathfield Council Stormwater Management Plan
- Strathfield Local Environment Plan 2013
- Strathfield Interim Flood Prone Land Policy 2012
- Strathfield Consolidated Development Control Plan 2005, Part M- Educational Establishments
- Strathfield Council WSUD Reference Guideline
- Managing Urban Stormwater: Soils and Construction (Landcom NSW)
- NSW Floodplain Development Manual 2005

2.0 Overview of Proposed Development

The site is located at 3 Margaret Street, Strathfield and is comprised of three campus areas including the Senior School, Junior School and Prep School campuses. The area of proposed works falls within the Senior School campus identified as Lot 101 DP 862040 as shown in **Figure 2.1** below. The development site is bounded to the north by Redmyre Road, south by Margaret Street, and to the east and west by residential housing. The site currently consists of multiple existing school buildings and sporting facilities. The site falls towards the north to Redmyre Road with Overland Flow being collected via grated surface pits and held via OSD located on site prior to discharge to Strathfield's Council drainage network beneath Redmyre Road.



Figure 2.1 – Site Location and Development Proposal

Development of the site will consist of the following:

- Demolition of the existing demountables to the northwest of the Senior School for the construction of a new Design and Creative Arts Building (DaCA). The DaCA building is 3 storeys tall and will comprise of two levels of basement. The basement will comprise a total of 53 staff carparks and off-street pick-up and drop-off area. The existing driveway along Redmyre Road is proposed to be modified to provide vehicle access into this new basement.
- Demolition of the existing DaCA building to the northeast of the Senior School for the construction of a new Social Science Building. The Social Science building is 3 storeys tall, comprising one basement level of general learning, staff areas, and a rooftop terrace.
- The existing Administration Building (the Ethel B. Wallis Memorial Administration Building) is proposed to be modified (including demolition of the 'Pottery Building' portion) to provide internal connection to the proposed science building.
- The removal of trees for the construction of the basement for the new DaCA building.
- Additional landscaping is proposed throughout the development area to integrate the proposed buildings with the existing school buildings.
- Increase the current senior school student cap to 1,224 students, plus the allowance for this capacity to exceed up to a maximum 20 additional students to allow for unanticipated enrolment fluctuations on a temporary basis. (Note: the current student cap for the senior school campus is 1,080 students + 20 for enrolment fluctuation – as approved under SSD 9692)



Figure 2.2 – Proposed DaCA Building (Architectus)

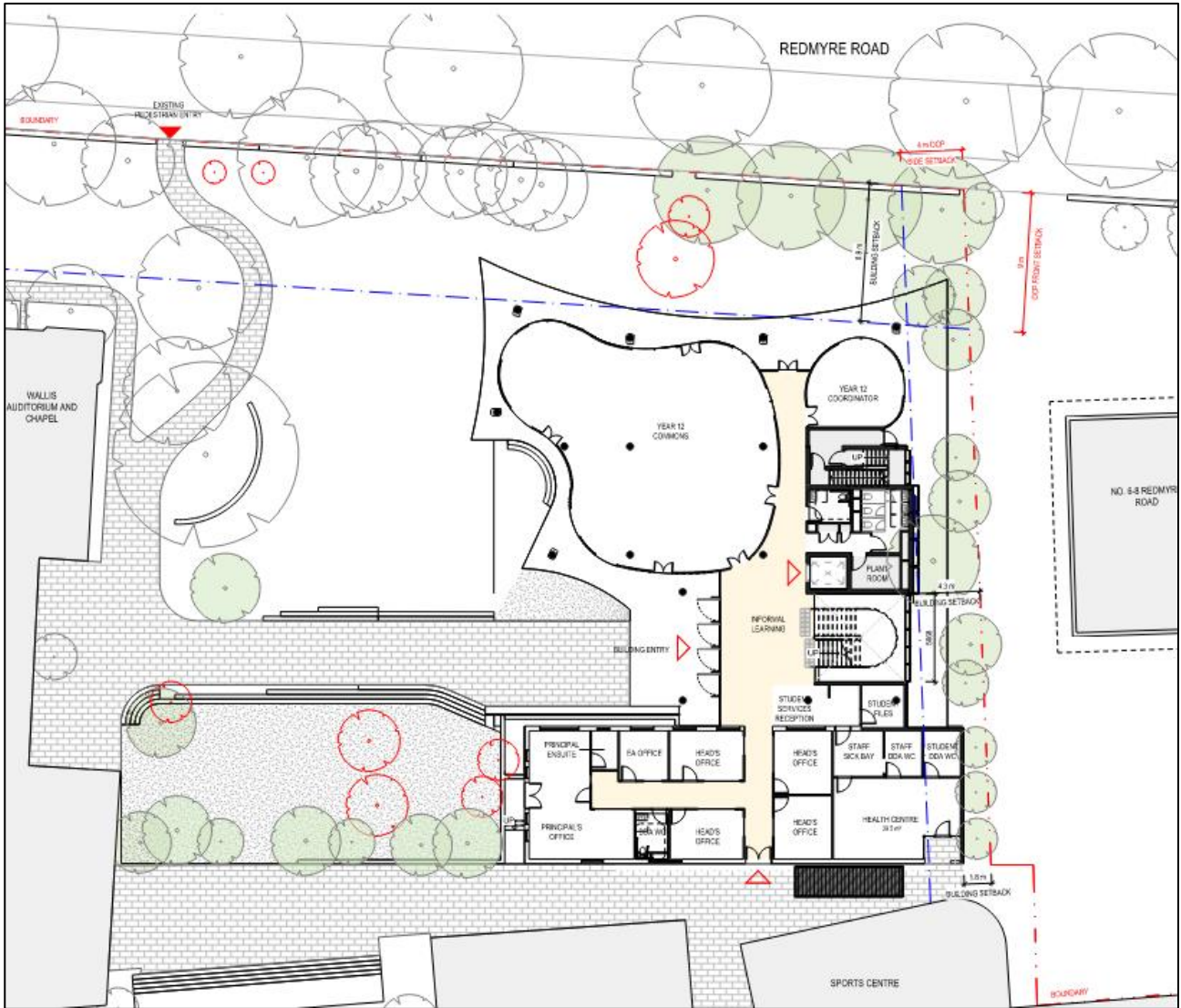


Figure 2.3 – Proposed Social Sciences Building (Architectus)

3.0 Stormwater Design

The purpose of this Section will be to address the following items highlighted for design within the SEAR's condition 13 – Stormwater and Wastewater outlined in **Section 1.2** of this report. This will include an Integrated Water Management Plan for the development that:

- Is prepared in consultation with the local Council and any other relevant drainage or water authority.
- Details the proposed drainage design for the site including any on-site treatment, reuse and detention facilities, water quality measures, and the nominated discharge points.
- Demonstrates compliance with the local council or other drainage or water authority requirements and avoids adverse impacts on any downstream properties.

Where drainage infrastructure works are required that would be handed over to the local council or other drainage or water authority, full hydraulic details and specifications of proposed works are to be provided.

3.1 Existing Site

Most of the proposed development site of Development Area 1 currently consists of landscaping with minimal roofing to the west boundary and paving to the north, whilst Area 2 primarily consists of hardstand and roof catchments surrounded by pervious and landscaped areas. Stormwater design of the existing site currently consists of a series of in-ground stormwater pipes and Onsite Stormwater Detention (OSD). Overland flow is conveyed around site via site grading to Surface Inlet Pits (SIP's) which are then conveyed to an existing OSD tank prior to discharge to Strathfield Council stormwater drainage network beneath Redmyre Road. Roof catchments are collected by roof and gutter and discharged to inground systems through downpipes and are collected within the OSD prior to discharge from site. The existing site currently consists of approximately 26.7% impervious area and 78.4% impervious area for Areas 1 and 2 respectively.



Figure 3.1 – Development Area of Existing Site

3.2 Stormwater Quantity

Stormwater Management for site is to be designed in line with requirements outlined in the Strathfield Council Stormwater Management Code 1994. Section 4.1 Adverse Impact and Controlling Site Runoff outlines that stormwater discharge of site is to be restricted to pre-development levels through the use of Onsite Stormwater Detention (OSD). Section 4.2 outlines the conditions of the development which warrants the requirement for OSD; it states that OSD is required where the proposed increase in impervious areas (paving & roofed) increases by 100sq.m

4.1 Adverse Impact and Controlling Site Runoff

Development / building work must not cause an adverse impact on adjoining or any other properties. This includes preserving surface flow paths and not increasing water levels. Site discharges will need to be restricted to pre- development discharges using On-site Stormwater Detention (OSD) storages where required. Protection is to be provided for all rainfall events through to 100 years ARI.

4.2 On-site Stormwater Detention (OSD) Storage

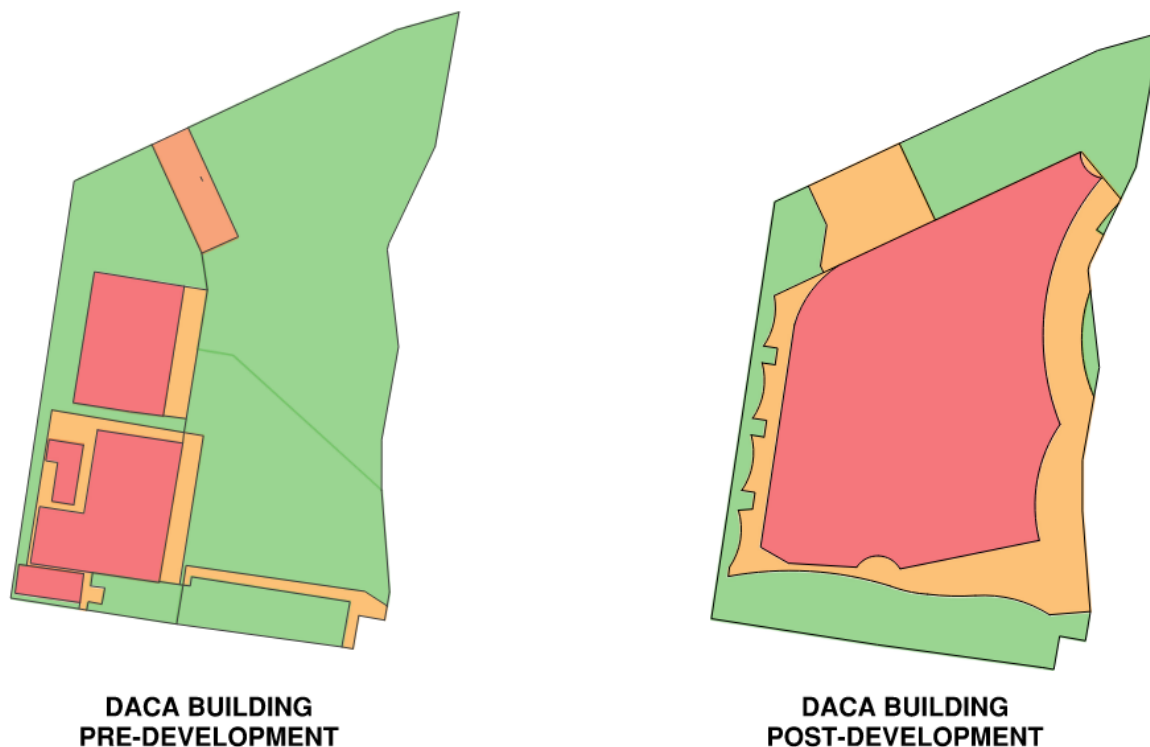
OSD is required to limit discharges from specified developments / building works to pre-development conditions. Council's OSD requirements have been formulated to ensure there is no increase in discharges adjacent to the site or elsewhere in the catchment for all rainfall events through to 100 years ARI.

Other than for single residential dwelling projects OSD will be required for all developments / building works where the proposed increased paved and/or roofed areas exceed 100m².

Figure 3.2 – Section 4.1 of the Stormwater Management Code outlining OSD Requirements for Site

3.2.1 DaCA Stormwater Quantity Design

A summary of post-development to pre-development catchment areas for development Area 1 has been provided in **Figure 3.3** below.



Comparison of Pre and Post Development Surfaces				
Area Description	Pre Development Site (2,130m ²)		Post Development Site (2,130m ²)	
	Area (m ²)	Percentage of total site area (%)	Area (m ²)	Percentage of total site area (%)
Roof Area	346	16%	1022	48%
Hardstand Area	216	10%	469	22%
Pervious Area	1568	74%	639	30%

Figure 3.3 – Area 1 Impervious vs Pervious Area for Pre-Development and Post-Development of DaCA Building

Since the proposed development is scheduled to have a total increase in impervious area exceeding 100sq.m, the DaCA development is required to comply with Council OSD requirements.

Supplement 2 of the Strathfield Stormwater Code requires that all roof and paved surfaces are to pass through the OSD system. The OSD and outlet control structure are to be designed for the 2, 10, and 100-year Average Rainfall Interval storms. A table outlining the required storage volumes and permissible discharge requirements using the Group 1 requirements outlined in the Strathfield Stormwater Code has been provided below.

Table 3.1 – Strathfield Council OSD Requirements for DaCA Development Site

Total DaCA Site Area = 2,130m ²				
ARI Storm	Minimum Storage Volume (m ³)		Permitted Discharge from Storage (L/s)	
	Per 1,000m ²	Required	Per 1,000m ²	Required
2	6	12.8	13	27.7
10	9	19.2	17	36.2
100	15	32.0	23	49.0

The stormwater network for the proposed development has been modelled in the virtual design program DRAINS to verify that stormwater discharge from site fall in line with Council requirements. An orifice plate of diameter 115mm will be required to meet discharge parameters set by Strathfield Council. Total volume of the OSD tank will equal 31m³ and the invert of the outlet will be at IL 13.25m AHD. A summary of site discharge is provided in **Table 3.2** below. A screenshot of the DRAINS model showing the 1% AEP storm event will also be provided as **Figure 3.4**.

Table 3.2 – DaCA Development OSD Volume and Discharge Rates

ARI Storm	OSD Storage Volume (m ³)	Design Discharge (L/s)
2	31	21.0
10	31	27.0
100	33	33.0

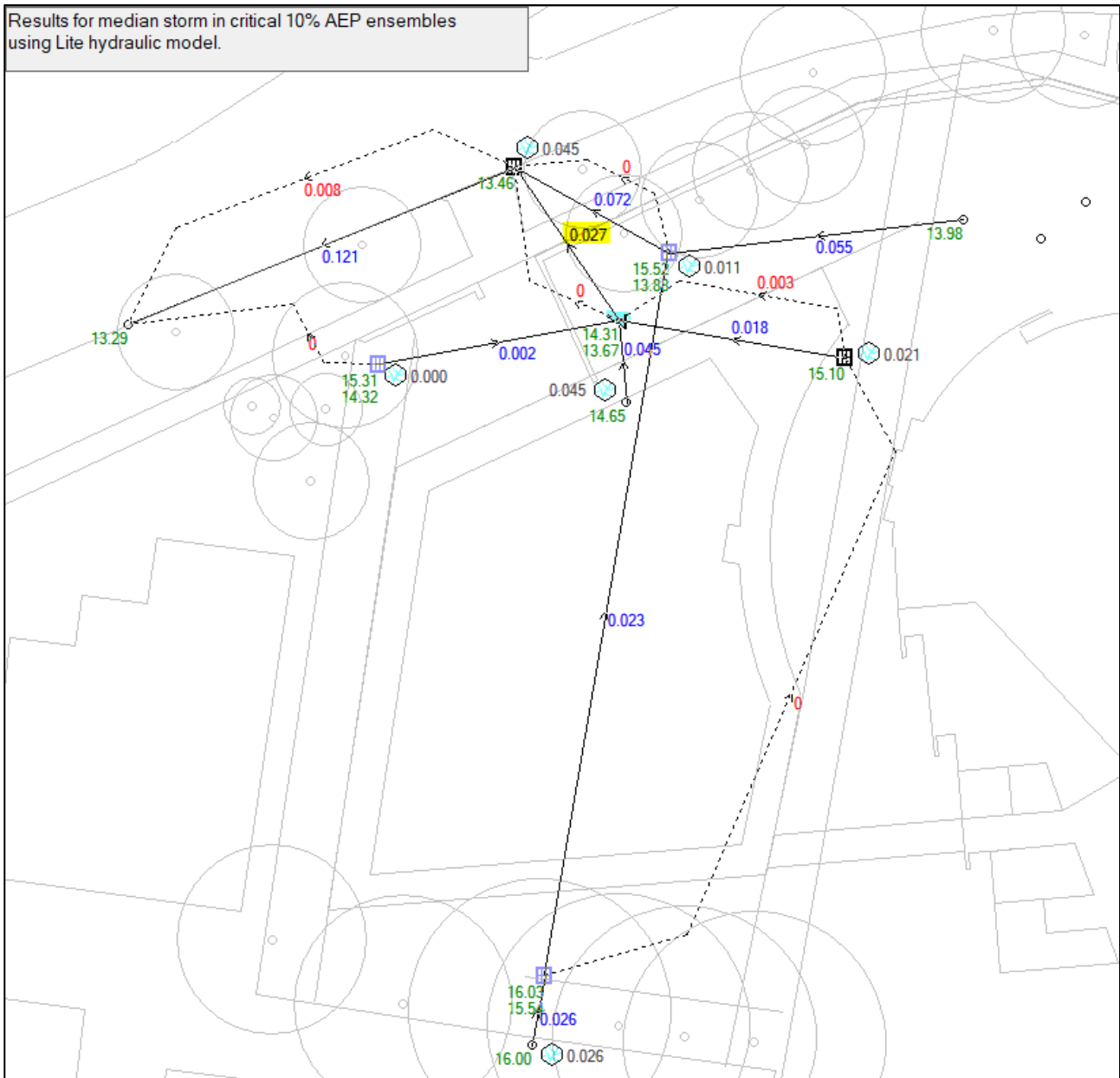


Figure 3.4 – DRAINS Model of DaCA Development Proposal – 10% AEP Results

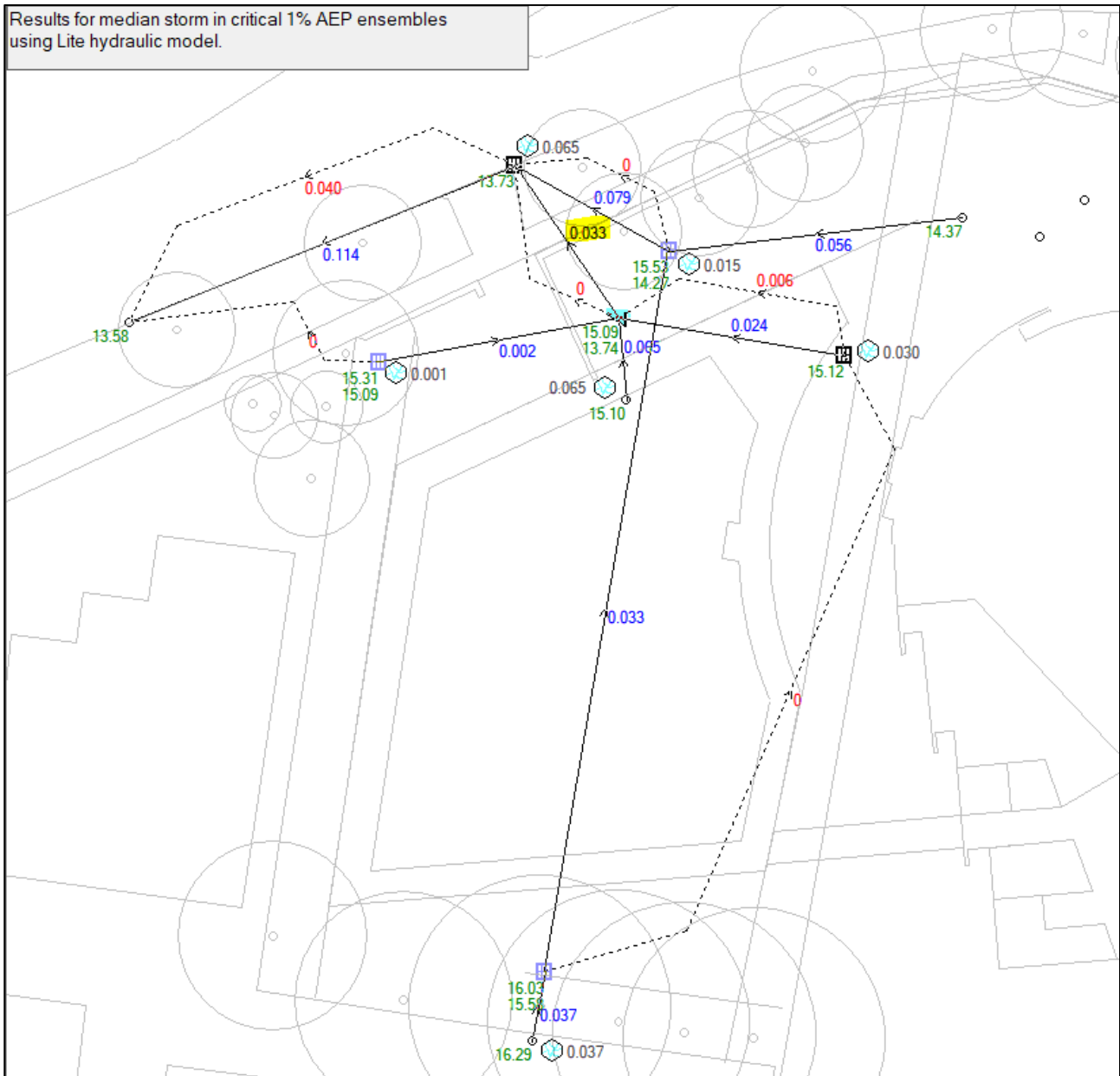
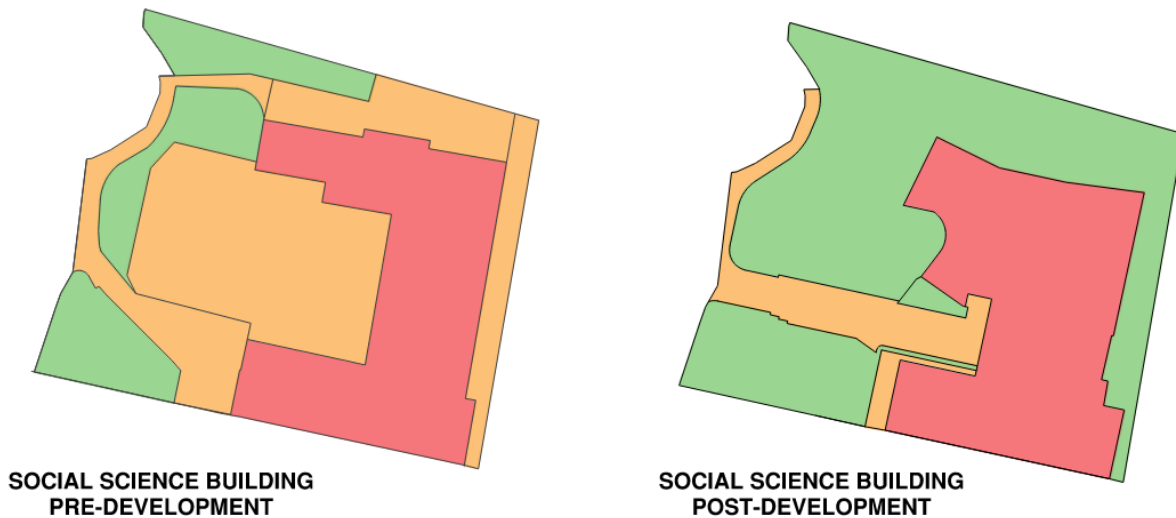


Figure 3.5 – DRAINS Model of DaCA Development Proposal – 1% AEP Results

3.2.2 Social Sciences Building OSD Requirements

A summary of post-development to pre-development catchment areas for development Area 1 has been provided in **Figure 3.6** below.



Comparison of Pre and Post Development Surfaces				
Area Description	Pre Development Site (2,353m ²)		Post Development Site (2,353m ²)	
	Area (m ²)	Percentage of total site area (%)	Area (m ²)	Percentage of total site area (%)
Roof Area	780	33%	830	35%
Hardstand Area	1124	48%	264	11%
Pervious Area	449	19%	1259	54%

Figure 3.6 – Area 1 Impervious vs Pervious Area for Pre-Development and Post-Development of Social Sciences Building

Since the proposed Social Sciences Building development is scheduled to have an overall reduction in impervious area, the development is exempt from Council's OSD requirements.

Discharge from site during the 2, 10, and 100-year ARI events has been modelled within DRAINS to demonstrate that post-development flows do not exceed pre-development rates and therefore will not require OSD. A summary of discharge rates for pre-development and post-development flows is provided in **Table 3.3** and a screenshot of the DRAINS model showing the 1% AEP is provided in **Figure 3.7**.

Table 3.3 – Social Sciences Building Pre-Development vs Post-Development Discharge Rates

ARI Storm	Pre-Development Discharge (L/s)	Post Development Discharge (L/s)
2	62	59
10	88	85
100	153	135

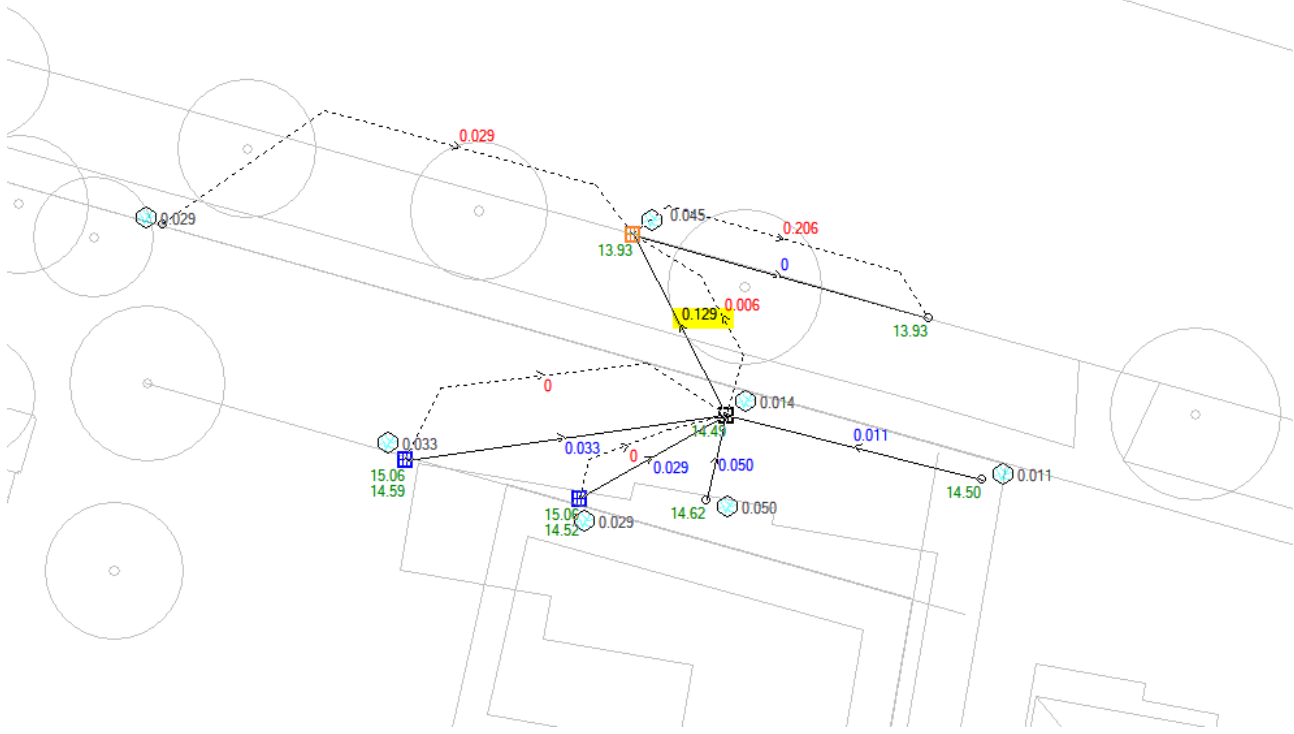


Figure 3.7 – DRAINS Model Social Sciences Building Development

3.3 Stormwater Quality

Water Sensitive Urban Design (WSUD) requirements for developments within Strathfield Council are outlined in Part N of the Strathfield Consolidated Development Control Plan 2005. Section 2.1 outlines that WSUD parameters will be required for “all alterations to existing commercial, retail, mixed use and industrial developments with a site area greater than 2,000m² which result in a building footprint or gross floor area of greater than 50%”. Although total site area for both development areas combined totals 4,450m², total roof area will not exceed 1,771m² and therefore satisfies this requirement. No WSUD requirements are therefore proposed for site in line with Council standards.

It is to be noted that the School has proposed to implement water quality measures to meet GBCA Green Star building requirements and thus WSUD has ultimately been proposed for design of site. Proposed measures include the implementation of stormwater harvesting and re-use for landscape irrigation to meet Category B pollutant load reduction targets. Pollutant load reduction targets are outlined in **Table 3.4**.

Table 3.4 – WSUD Pollutant Load Reduction Target Requirements

Pollutant	Greenstar Reduction Target
Total Suspended Solids (TSS)	80%
Total Phosphorus (TP)	60%
Total Nitrogen (TN)	45%
Gross Pollutants	90%
Total Petroleum Hydrocarbons	NA – No Vehicle Access
Free Oils	NA – No Vehicle Access

3.3.1 DaCA Stormwater Quality Design

A water quality model has been prepared using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) modelling program. Treatment for the DaCA development is to be provided through the application of:

- 2x Ocean Protect PSorb Stormfilter Cartridges or equivalent product located within the proposed OSD chamber.
- 2x Ocean Protect Oceanguard pit inserts or equivalent product.

An overview of the proposed treatment train is provided in **Figure 3.8** below, whilst the annual pollutant load reduction rate is provided in **Figure 3.9**.

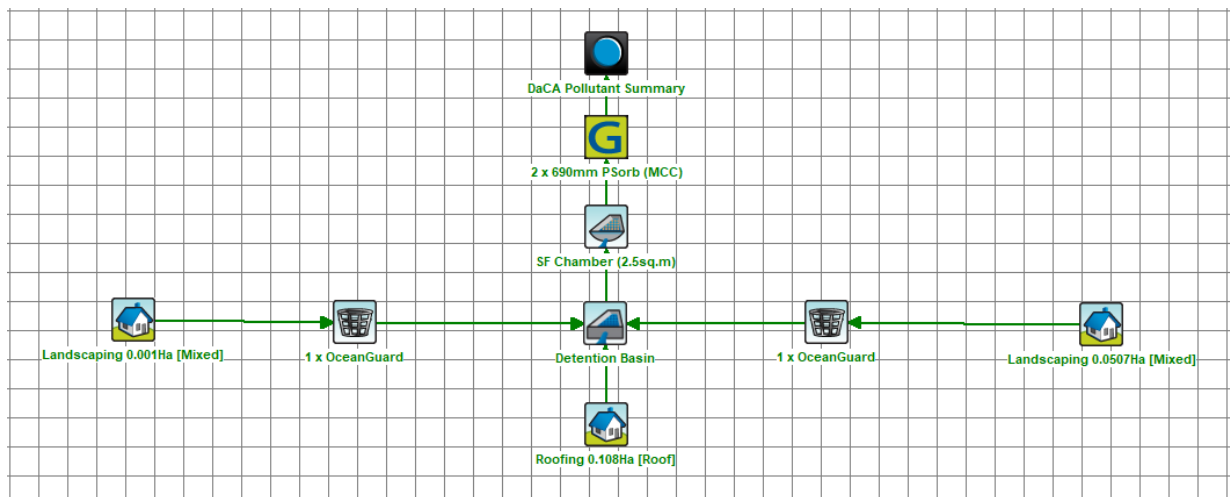


Figure 3.8 – Treatment Train of DaCA Building Modelled in MUSIC

	Sources	Residual Load	% Reduction
Flow (ML/yr)	1.54	1.34	12.8
Total Suspended Solids (kg/yr)	70.3	7.79	88.9
Total Phosphorus (kg/yr)	0.284	0.0608	78.6
Total Nitrogen (kg/yr)	3.48	1.33	61.9
Gross Pollutants (kg/yr)	33.1	0	100

Figure 3.9 – Pollutant Load Reduction Rates of Proposed Treatment Train - DaCA

3.3.2 Social Sciences Building Stormwater Quality Design

A water quality model has been prepared using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) modelling program. Treatment for the Social Sciences development is to be provided through the application of:

- 2x Ocean Protect PSorb Stormfilter Cartridges or equivalent product located within a treatment chamber.
- 1x Ocean Protect Oceanguard pit inserts or equivalent product.

An overview of the proposed treatment train is provided in **Figure 3.8** below, whilst the annual pollutant load reduction rate is provided in **Figure 3.9**.

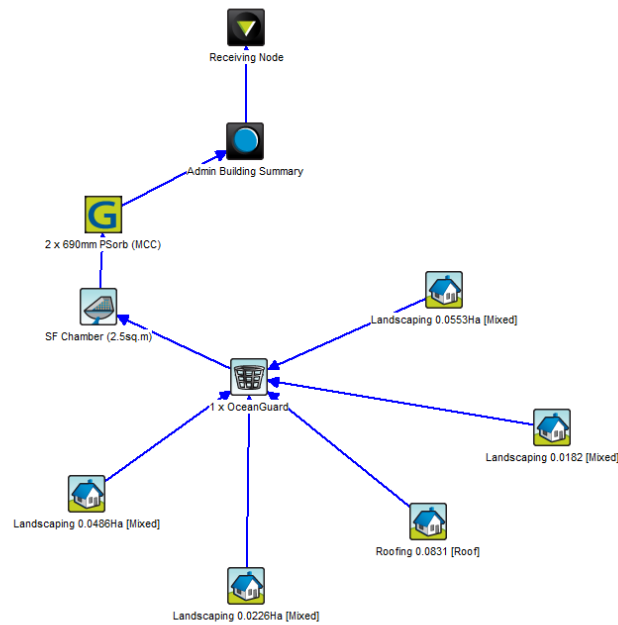


Figure 3.10 – Treatment Train of Social Sciences Building Modelled in MUSIC

	Sources	Residual Load	% Reduction
Flow (ML/yr)	2.07	2.07	0
Total Suspended Solids (kg/yr)	215	23.4	89.1
Total Phosphorus (kg/yr)	0.56	0.17	69.6
Total Nitrogen (kg/yr)	5.16	2.53	50.9
Gross Pollutants (kg/yr)	44.1	0	100

Figure 3.11 – Pollutant Load Reduction Rates of Proposed Treatment Train – Social Sciences

3.4 Erosion and Sediment Control

During the construction stage of the project, an erosion and sediment control plan is to be implemented to prevent sediment laden stormwater from flowing into adjoining properties, bushland, roadways or receiving water bodies. Stormwater controls onsite are detailed in erosion and sediment control plans which is in accordance with relevant regulatory authority guidelines including Landcom NSW's Managing Urban Stormwater, Soils and Construction ("Blue Book"). The proposed Erosion and Sediment Control Plans are included in Appendix A.

4.0 Flood Design

The purpose of this Section will be to address the following items highlighted for design within the SEAR's condition 14 – Flooding Risk outlined in **Section 1.2** of this report. This will consist of the following:

- Identification of flood risk on-site regarding adopted flood studies, potential effects of climate change, and any relevant provisions of the NSW Floodplain Development Manual.
- Assessment of any impacts resulting from the proposed development including changes to the flood-risk both on-site and off-site and detail design solutions and operational procedures to mitigate flood risks where required.

The site is located within the Powells Creek catchment area which has been the subject of a Flood Study performed by Strathfield Council. From the assessment of this flood study, the site was not identified as being subject to flooding due to its location upstream from the rivers originating point as outlined in **Figure 2.1**. The site is therefore not considered to be flood affected.

On site detention has been provided as outlined in Section 3.00 to reduce site discharge for storm events up to the 100 year ARI (1% AEP) which will reduce the risk of potential flood impacts to downstream developments. Adequate freeboard and overland flow paths have been scheduled as part of the development to reduce the risk of water ingress into surrounding buildings on-site for storm events up to the 100 year ARI (1% AEP). The above aspects have been tested in DRAINS modelling software to confirm no increased risk of flooding for on or off site developments.

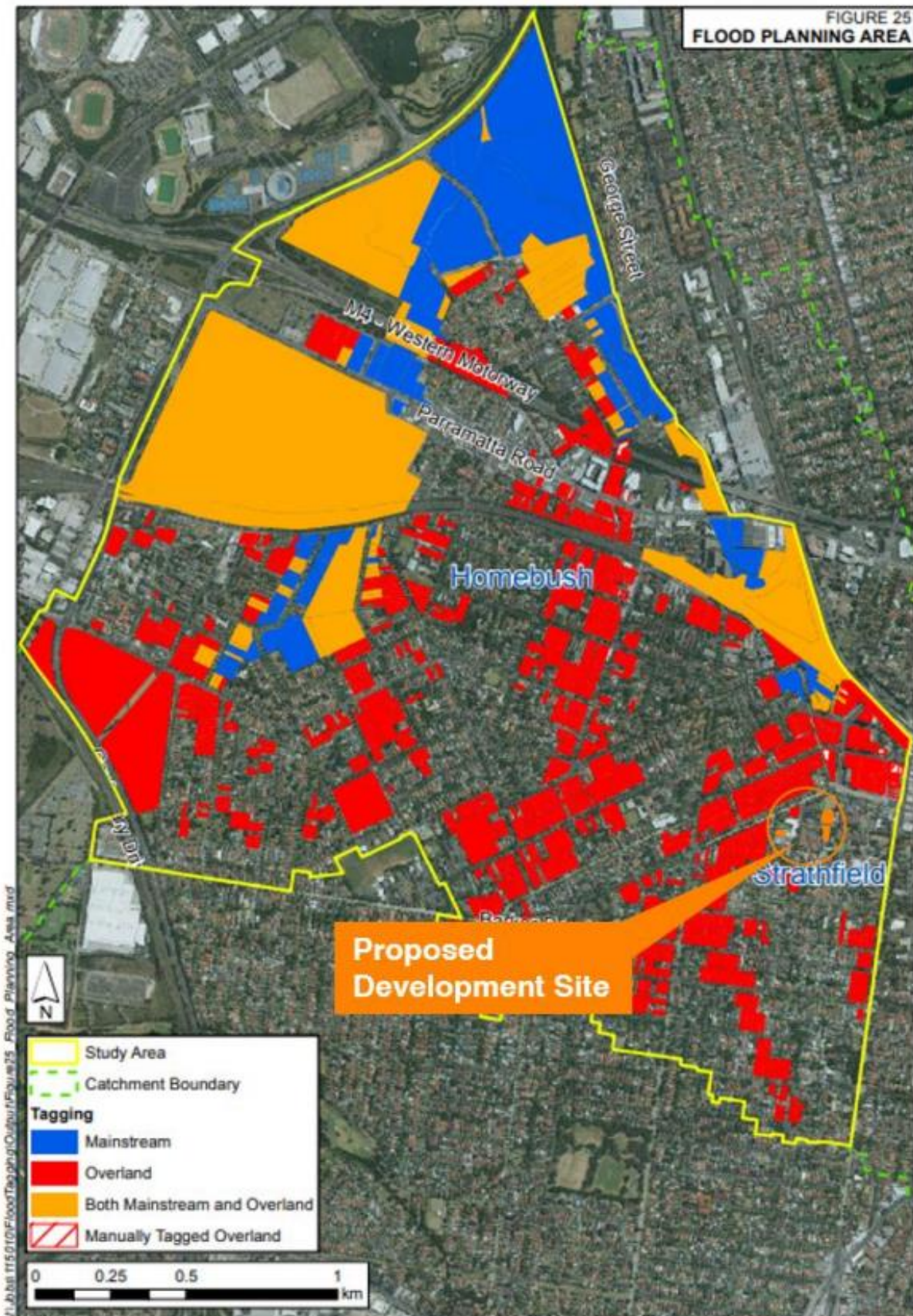


Figure 4.1 – Flood Study Map (Source: Powells Creek Flood Study)

5.0 Conclusion

To summarise the findings of this civil engineering statement, stormwater for the DaCA and Social Sciences development can be managed in accordance with Council requirements. The proposed development poses no adverse effects to existing Council stormwater management and no adverse flooding impacts to downstream developments. The implementation of water quality devices that meet reduction targets specified by GBCA will reduce the amount of common pollutants entering Council's receiving stormwater system.

Prepared by
TTW (NSW) PTY LTD



DUNCAN MARSHALL
Senior Civil Engineer

Authorised By
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STEPHEN BRAIN
Technical Director

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Appendix A

Civil Drawings

MERIDEN SENIOR SCHOOL

DESIGN & CREATIVE ARTS AND ADMINISTRATION BUILDING

3 MARGARET STREET, STRATHFIELD

GENERAL NOTES

- Contractor must verify all dimensions and existing levels on site prior to commencement of works. Any discrepancies to be reported to the Engineer.
- Strip all topsoil from the construction area. All stripped topsoil shall be disposed of off-site unless directed otherwise.
- Make smooth connection with all existing works.
- Compact subgrade under buildings and pavements to minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1.
- Compaction under buildings to extend 2m minimum beyond building footprint.
- All work on public property, property which is to become public property, or any work which is to come under the control of the Statutory Authority, the Contractor is to ensure that the drawings used for construction have been approved by all relevant authorities prior to commencement site.
- All work on public property, property which is to become public property, or any work which is to come under the control of the Statutory Authority is to be carried out in accordance with the requirements of the relevant Authority. The Contractor shall obtain these requirements from the Authority. Where the requirements of the Authority are different to the drawings and specifications, the requirements of the Authority shall be applicable.
- For all temporary batters refer to geotechnical recommendations.

REFERENCE DRAWINGS

- These drawings have been based from, and to be read in conjunction with the following Consultants drawings. Any conflict to the drawings must be notified immediately to the Engineer.

Consultant	Dwg Title	Dwg No	Rev	Date
ARCHITECTUS (ARCH)	DaCA GROUND FLOOR PLAN	DA-01-1002	D	27.06.22
ARCHITECTUS (ARCH)	S/S BUILDING LOWER GROUND FLOOR PLAN	DA-02-1002	B	10.06.22
CONTEXT (L-ARCH)	LANDSCAPE BASE PLAN	CTX_22517	-	24.06.22
SURVEY (LTS LOCKLEY)	PLAN OF DETAILS AND LEVELS	35598DT	-	01.04.22
DOUGLAS PARTNERS (GEOTECH)	GEOTECHNICAL INVESTIGATION	86568.00	0	16.11.18

SURVEY AND SERVICES INFORMATION

SURVEY

Origin of levels : SSM18117, RL18.652
 Datum of levels : A.H.D. AUSTRALIAN HEIGHT DATUM
 Coordinate system : MGA2020
 Survey prepared by : LTS LOCKLEY
 Setout Points : CONTACT THE SURVEYOR

Taylor Thomson Whitting does not guarantee that the survey information shown on these drawings is accurate and will accept no liability for any inaccuracies in the survey information provided to us from any cause whatsoever.

UNDERGROUND SERVICES - WARNING

The locations of underground services shown on Taylor Thomson Whittings drawings have been plotted from diagrams provided by service authorities. This information has been prepared solely for the authorities own use and may not necessarily be updated or accurate.

The position of services as recorded by the authority at the time of installation may not reflect changes in the physical environment subsequent to installation.

Taylor Thomson Whitting does not guarantee that the services information shown on these drawings shows more than the presence or absence of services, and will accept no liability for inaccuracies in the services information shown from any cause whatsoever.

The Contractor must confirm the exact location and extent of services prior to construction and notify any conflict with the drawings immediately to the Engineer/Superintendent.

The contractor is to get approval from the relevant state survey department, to remove/adjust any survey mark. This includes but is not limited to, State Survey Marks (SSM), Permanent Marks (PM), cadastral reference marks or any other survey mark which is to be removed or adjusted in any way.

Taylor Thomson Whitting plans do not indicate the presence of any survey mark. The contractor is to undertake their own search.

SAFETY IN DESIGN

Contractor to refer to Appendix B of the Civil Specification for the Civil Risk and Solutions Register.

EXISTING SERVICES

Contractor to be aware existing services are located within the site. Location of all services to be verified by the Contractor prior to commencing works. Contractor to confirm with relevant authority regarding measures to be taken to ensure services are protected or procedures are in place to demolish and/or relocate.

EXISTING STRUCTURES

Contractor to be aware existing structures may exist within the site. To prevent damage to existing structure(s) and/or personnel, site works to be carried out as far as practicable possible from existing structure(s).

EXISTING TREES

Contractor to be aware existing trees exist within the site which need to be protected. To prevent damage to trees and/or personnel, site works to be carried out as far as practicable possible from existing trees. Advice needs to be sought from Arborist and/or Landscape Architect on measures required to protect trees.

GROUNDWATER

Contractor to be aware ground water levels are close to existing surface level. Temporary de-watering may be required during construction works.

EXCAVATIONS

Deep excavations due to stormwater drainage works is required. Contractor to ensure safe working procedures are in place for works. All excavations to be fenced off and batters adequately supported to approval of Geotechnical Engineer.

GROUND CONDITIONS

Contractor to be aware of the site geotechnical conditions. Refer to geotechnical report by Douglas Partners for details.

HAZARDOUS MATERIALS

Existing asbestos products & contaminated material may be present on site. Contractor to ensure all hazardous materials are identified prior to commencing works. Safe working practices as per relevant authority to be adopted and appropriate PPE to be used when handling all hazardous materials. Refer to geotechnical/environmental report by Douglas Partners for details.

CONFINED SPACES

Contractor to be aware of potential hazards due to working in confined spaces such as stormwater pits, trenches and/or tanks. Contractor to provide safe working methods and use appropriate PPE when entering confined spaces.

MANUAL HANDLING

Contractor to be aware manual handling may be required during construction. Contractor to take appropriate measures to ensure manual handling procedures and assessments are in place prior to commencing works.

WATER POLLUTION

Contractor to ensure appropriate measures are taken to prevent pollutants from construction works contaminating the surrounding environment.

SITE ACCESS/EGRESS

Contractor to be aware site works occur in close proximity to footpaths and roadways. Contractor to erect appropriate barriers and signage to protect site personnel and public.

VEHICLE MOVEMENT

Contractor to supply and comply with traffic management plan and provide adequate site traffic control including a certified traffic marshal to supervise vehicle movements where necessary.

BOUNDARY AND EASEMENT NOTE

The property boundary and easement locations shown on Taylor Thomson Whitting drawing's have been based from information received from : LTS LOCKLEY

Taylor Thomson Whitting makes no guarantees that the boundary or easement information shown is correct. Taylor Thomson Whitting will accept no liabilities for boundary inaccuracies. The contractor/builder is advised to check/confirm all boundaries in relation to all proposed work prior to the commencement of construction. Boundary inaccuracies found are to be reported to the superintendent prior to construction starting.

STORMWATER DRAINAGE NOTES

1 Stormwater Design Criteria :
 (A) Average exceedance probability -
 1% AEP for roof drainage to first external pit
 5% AEP for paved and landscaped areas
 (B) Rainfall intensities -
 Time of concentration: 5 minutes
 1% AEP = 216 mm/hr
 5% AEP = 172 mm/hr
 (C) Rainfall losses -
 Impervious areas: IL = 1.5 mm, CL = 0 mm/hr
 Pervious areas: IL = 13.2 mm, CL = 2.5 mm/hr

2. Pipes 300 dia and larger to be reinforced concrete Class "2" approved spigot and socket with rubber ring joints U.N.O.
 3. Pipes up to 300 dia may be sewer grade uPVC with solvent welded joints, subject to approval by the engineer
 4. Equivalent strength VCP or FRP pipes may be used subject to approval.
 5. Precast pits may be used external to the building subject to approval by Civil Engineer
 6. Enlargers, connections and junctions to be manufactured fittings where pipes are less than 300 dia.
 7. Where subsol drains pass under floor slabs and vehicular pavements, unstopped uPVC sewer grade pipe is to be used.
 8. Grates and covers shall conform with AS 3996-2006, and AS 1428.1 for access requirements.
 9. Pipes are to be installed in accordance with AS 3725. All bedding to be type H2 U.N.O.
 10. Care is to be taken with invert levels of stormwater lines. Grades shown are not to be reduced without approval.
 11. All stormwater pipes to be 150 dia at 1.0% min fall U.N.O.
 12. Subsol drains to be slotted flexible uPVC U.N.O.
 13. Adopt invert levels for pipe installation (grades shown are only nominal).

RETAINING WALLS

1. Drainage shall be provided as shown on the drainage drawings.
 2. Backfilling shall be carried out after grout or concrete has reached a minimum strength of 0.85 f_c. Backfilling shall be approved granular material compacted in layers not exceeding 200mm to 95% Standard compaction unless noted otherwise.
 3. Provide waterproofing to back of walls as specified or noted.
 4. Where retaining walls rely on connecting structural elements for stability, do not backfill against the wall unless it is adequately propped or the elements have been constructed and have sufficient strength to withstand the loads.
 5. For all temporary batters obtain geotechnical engineers recommendations.

SITWORKS NOTES

1. All basecourse material to comply with RMS specification No 3051 and compacted to minimum 98% modified maximum dry density in accordance with AS 1289 5.2.1.
 2. All trench backfill material shall be compacted to the same density as the adjacent material.
 3. All service trenches under vehicular pavements shall be backfilled with an approved select material and compacted to a minimum 98% modified maximum dry density in accordance with AS 1289 5.2.1

CONCRETE NOTES

EXPOSURE CLASSIFICATION : External : B2

CONCRETE

Place concrete of the following characteristic compressive strength f_c as defined in AS 1379.

Location	AS 1379 f _c MPa at 28 days	Specified Slump	Nominal Agg. Size
Kerbs	S20	80	20
Retaining wall footing	S40	80	20
Stormwater pits	S40	80	20

1. Use Type 'GP' cement, unless otherwise specified.
 2. All concrete shall be subject to project assessment and testing to AS 1379.
 3. Consolidate by mechanical vibration. Cure all concrete surfaces as directed in the Specification.
 4. For all falls in slab, drip grooves, reglets, chamfers etc. refer to Architects drawings and specifications.
 5. Unless shown on the drawings, the location of all construction joints shall be submitted to Engineer for review.
 6. No holes or chases shall be made in the slab without the approval of the Engineer.
 7. Conduits and pipes are to be fixed to the underside of the top reinforcement layer.
 8. Slurry used to lubricate concrete pump lines is not to be used in any structural members.
 9. All slabs cast on ground require sand bedding with a Concrete Underlay

FORMWORK

1. The design, certification, construction and performance of the formwork, falsework and backpropping shall be the responsibility of the contractor. Proposed method of installation and removal of formwork is to be submitted to the superintendent for comment prior to work being carried out.

DBYD SERVICES NOTE

*Public Service Utility information shown on plan has been compiled from information received from Dial Before You Dig inquiry, reference Number 14788291, which was obtained on 21/08/2018. Unless specifically shown otherwise, this location and depth of services shown on this plan have not been verified.

The location of services shown on this drawing have been plotted as accurately as possible from diagrams provided by service authorities and should be confirmed by site inspection."

CONCRETE FINISHING NOTES

1. All exposed concrete pavements are to be broomed finished.
 2. All edges of the concrete pavement including keyed and dowelled joints are to be finished with an edging tool.
 3. Concrete pavements with grades greater than 10 % shall be heavily broomed finished.
 4. Carborundum to be added to all stair treads and ramped crossings U.N.O.

MASONRY NOTES

1. Temporary bracing shall be provided by the contractor to keep the masonry stable at all times.
 2. Masonry to be in accordance with AS 3700
 3. Masonry units shall comply with AS/NZS 4455 and as follows:

Type of masonry unit	Characteristic unconfined compressive strength (f _{cu})	Characteristic lateral modulus of rupture (F _{lt})
Clay & Calcium silicate	15 MPa	0.8 MPa
Concrete (used in non-loadbearing internal walls)	4.5 MPa (hollow units) 3.0 MPa (solid or cored units)	0.8 MPa
Concrete (used in unreinforced loadbearing walls, reinforced masonry and non-loadbearing external walls)	15 MPa (hollow units) 10 MPa (solid or cored units)	0.8 MPa

4. Mortar shall consist of the following:
 M3 for general applications
 1 part Type GP cement: 5 parts sand plus water thickener
 M4 for elements in interior environments subject to saline wetting and drying; below a damp-proof course or in contact with ground in aggressive soils; in severe marine environments; in saline or contaminated water including tidal splash zones; and within 1km of an industry producing chemical pollutants.
 1 part Type GP cement: 4 parts sand plus water thickener
 5. Provide vertical control joints in masonry over permanent floor joints and as per the architectural drawings.
 6. Masonry walls shown on the structural plans are load-bearing U.N.O. Non-loadbearing walls shall be separated from the concrete structure above with 20mm compressible filler. Masonry walls supporting slabs shall have a layer of mortar troweled smooth on top. Provide M.E.T. slipjoint to separate floor slabs and masonry. Provide Hercules HERCULIP COMPOSITE to separate roof slabs and masonry.
 7. Other than what is allowed in the specification no chasing or relieving may be made in masonry walls without written approval.
 8. The contractor shall provide records that demonstrate all masonry bed joint reinforcement, masonry ties and masonry wall stiffeners have been installed in accordance with the drawings and specification.
 9. All load bearing concrete masonry walls shall have all cores filled with grout U.N.O. Core filling grout shall be thoroughly compacted. Grout to be in accordance with AS3700 and as follows:

Location	f _{cg} MPa	Specified Slump	Maximum Agg. Size
Grout	20	230	10

10. All core filled blockwalls shall be constructed with "Double U" blocks
 11. In core filled blockwalls cleanup openings shall be provided at the bottom of each core and shall be cleaned of mortar protrusions before grouting.

12. All core filled block walls shall have all cores filled with grout U.N.O. Core filling grout to be in accordance with note 9.
 13. Cover to reinforcement to be 50mm to face of block U.N.O.

14. Provide bed joint reinforcement as follows
 M.E.T. galvanized masonry reo where M3 mortar is used (supplied by DUNSTONE MAZE in NSW)
 Ancon CCL stainless steel where M4 mortar is used and locate as follows
 - in 2 bed joints below and above head and sill flashings to openings
 - in 2 bed joints below and above openings
 - in third bed joint above bottom of wall
 - in second bed joint below top of wall

REINFORCEMENT NOTES

1. Fix reinforcement as shown on drawings. The type and grade is indicated by a symbol as shown below. On the drawings this is followed by a numeral which indicates the size in millimetres of the reinforcement.

N. Hot rolled ribbed bar grade D50N
 R. Plain round bar grade R250N
 SL. Square mesh grade 500L
 RL. Rectangular mesh grade 500L

2. Provide bar supports or spacers to give the following concrete cover to all reinforcement unless otherwise noted on drawings.

Footings - 50 top, 50 bottom, 50 sides.
 Walls - 30 generally.
 - 30 when cast in forms but later exposed to weather or ground.
 - .. when cast directly in contact with ground.

3. Cover to reinforcement ends to be 50 mm u.n.o.
 4. Provide N12-450 support bars to top reinforcement as required, Lap 500 U.N.O.
 5. Maintain cover to all pipes, conduits, reglets, drip grooves etc
 6. All cogs to be standard cogs unless noted otherwise.
 7. Fabric end and side laps are to be placed strictly in accordance with the manufacturers requirements to achieve a full tensile lap. Fabric shall be laid so that there is a maximum of 3 layers at any location.

FABRIC LAPS

25

8. Laps in reinforcement shall be made only where shown on the drawings unless otherwise approved. Lap lengths as per table below.

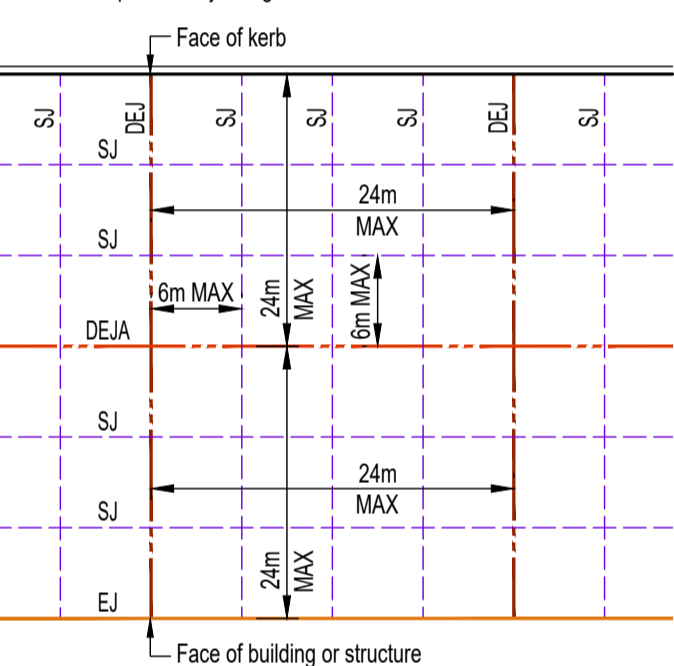
JOINTING NOTES

Vehicular Pavement Jointing

- All vehicular pavements to be jointed as shown on drawings.
- Dowelled expansion joints (DEJ) should generally be located at a maximum of 24.0m centres. Dowel bars to be plain round steel bars of Grade 250N, 450mm long and placed at 300mm spacing. Dowel diameter as specified below U.N.O

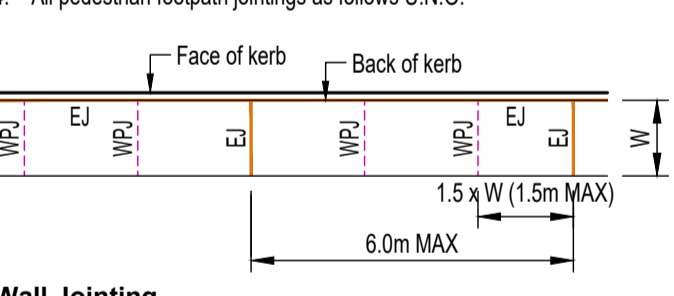
Design base thickness, D (mm)	Dowel diameter (mm)
150 < D ≤ 175	24
175 < D ≤ 200	28
200 < D ≤ 260	32
D > 260	36

3. Dowelled expansion joint type A (DEJA) should generally be located longitudinally and at a maximum of 24.0m centres. Refer to DEJA detail provided on detail sheets.
 4. Saw joints should generally be located at a maximum of 6.0m centres or 1.5 x the spacing of perpendicular saw joints
 5. Provide 10mm wide full depth expansion joints (EJ) between buildings/structures and all concrete or unit pavers.
 6. The timing of the saw cut is to be confirmed by the contractor on site. Site conditions will determine how many hours after the concrete pour before the saw cuts are commenced. Refer to the specification for weather conditions and temperatures required.
 7. Vehicular pavement jointing as follows.



Pedestrian Footpath Jointing

1. Expansion joints (EJ) are to be located where possible at tangent points of curves and elsewhere at max 6.0m centres.
 2. Weakened plane joints (WPJ) are to be located at a max 1.5 x width of the pavement.
 3. Where possible joints should be located to match kerbing and / or adjacent pavement joints.
 4. All pedestrian footpath jointings as follows U.N.O.



Wall Jointing

1. For concrete walls, weakened plane joints (WPJ) or control joints (CJ) to be located at a maximum of 8.0m centres. Expansion joints (EJ) to be located at a maximum of 30.0m centres U.N.O.
 2. For blockwork walls, dowelled control joints (CJ) to be located at maximum of 8.0m spacing U.N.O.

ABBREVIATIONS

TOK	TOP OF KERB	eRL	EXISTING SURFACE LEVEL
IOK	INVERT OF KERB	F	FINISHED SURFACE LEVEL
RCL	ROAD CENTRELINE	F'	FUTURE SURFACE LEVEL
BDY	BOUNDARY		
TOW	TOP OF WALL	FFL	FINISHED FLOOR LEVEL
BOW	BOTTOM OF WALL	SSL	STRUCTURAL SLAB LEVEL
CL	COVER LEVEL		
IL	INVERT LEVEL		
OL	OBVERT LEVEL		

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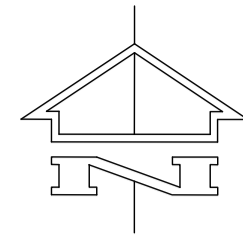
Project
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ADMINISTRATION BUILDING
 3 MARGARET STREET, STRATHFIELD

Sheet Subject
GENERAL NOTES SHEET

Scale : A1
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 Job No
221208
 Plot File Created: Jun 30, 2022 - 5:26pm

Drawn
 HA
 Drawing No
C001

Authorised
 Revision



EROSION AND SEDIMENT CONTROL NOTES

- All work shall be generally carried out in accordance with:
 (A) Local authority requirements,
 (B) EPA - Pollution control manual for urban stormwater,
 (C) LANDCOM NSW - Managing Urban Stormwater: Soils and Construction ("Blue Book").
- Erosion and sediment control drawings and notes are provided for the whole of the works. Should the Contractor stage these works then the design may be required to be modified. Variation to these details may require approval by the relevant authorities.
 The erosion and sediment control plan shall be implemented and adapted to meet the varying situations as work on site progresses.
- Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
- When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
- Minimise the area of site being disturbed at any one time.
- Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
- All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site conditions.
- Control water from upstream of the site such that it does not enter the disturbed site.
- All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
- All vehicles leaving the site shall be cleaned and inspected before leaving.
- Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
- Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

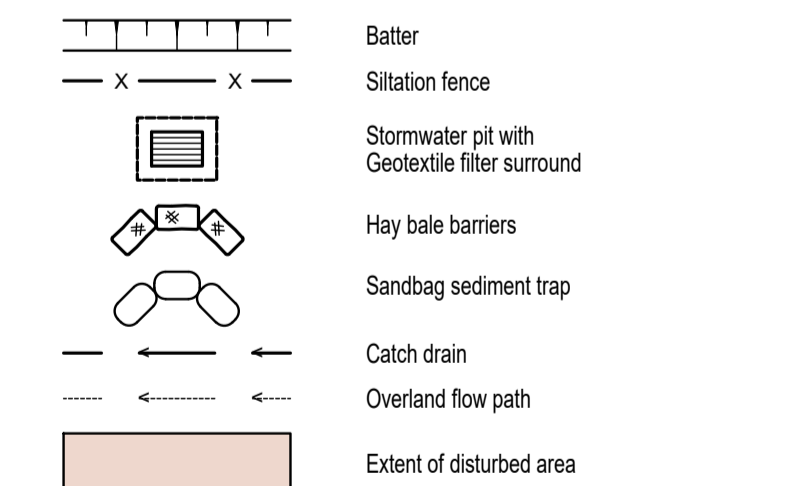
- Prior to commencement of excavation the following soil management devices must be installed.
 - Construct silt fences below the site and across all potential runoff sites.
 - Construct temporary construction entry/exit and divert runoff to suitable control systems.
 - Construct measures to divert upstream flows into existing stormwater system.
 - Construct sedimentation traps/basin including outlet control and overflow.
 - Construct turf lined swales.
 - Provide sandbag sediment traps upstream of existing pits.
- Construct geotextile filter pit surround all proposed pits as they are constructed.
- On completion of pavement provide sand bag kerb inlet sediment traps around pits.
- Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

WATER QUALITY TESTING REQUIREMENTS

Prior to discharge of site stormwater, groundwater and seepage water into council's stormwater system, contractors must undertake water quality tests in conjunction with a suitably qualified environmental consultant outlining the following:

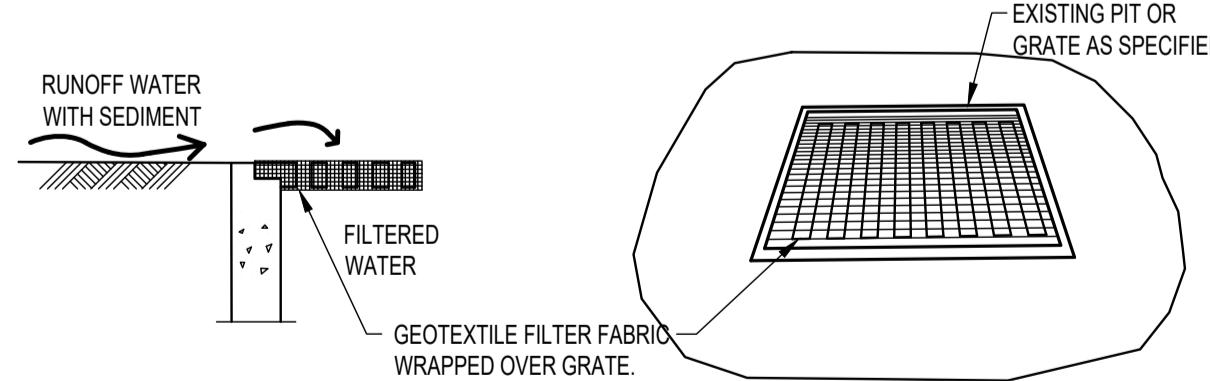
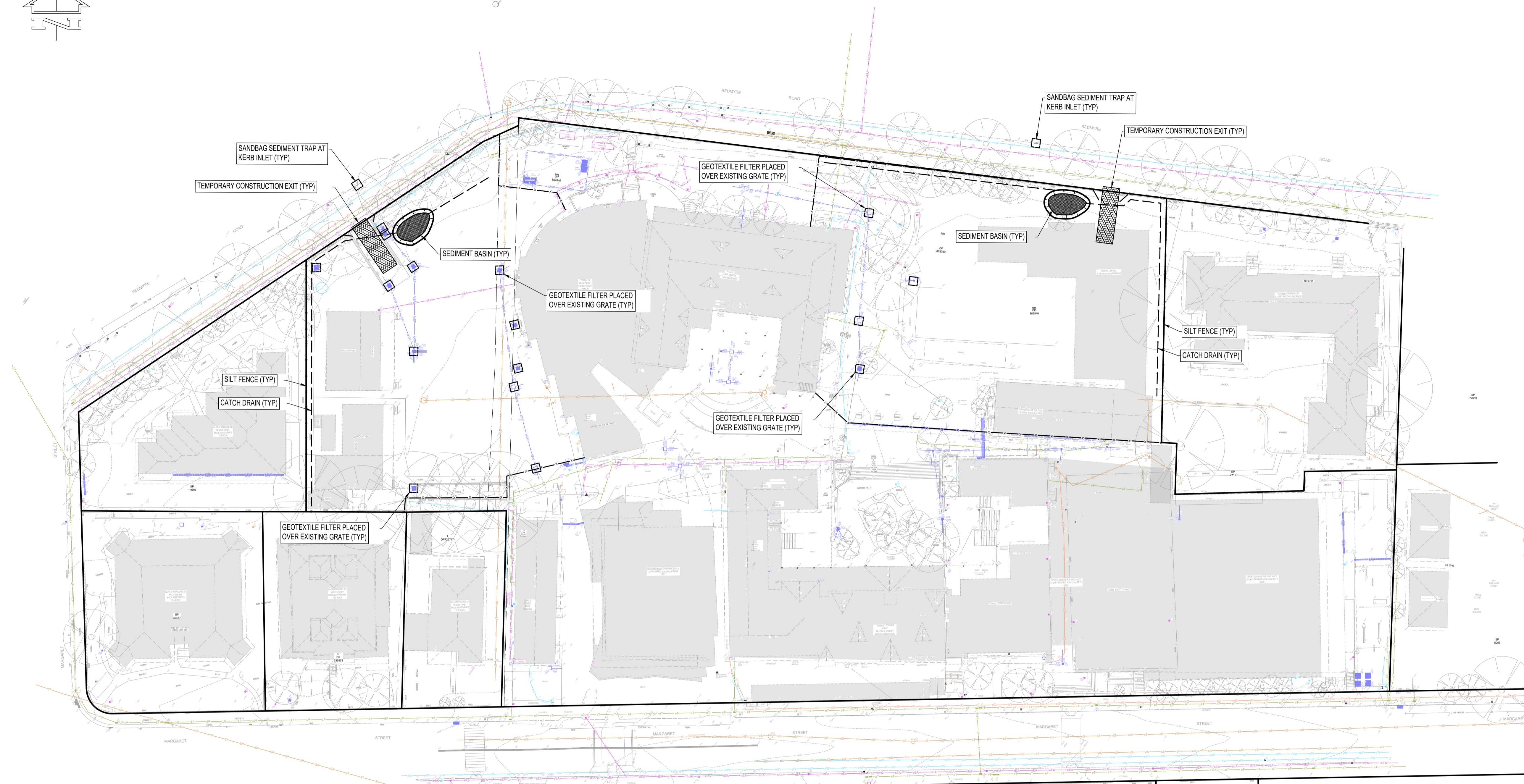
- Compliance with the criteria of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)
- If required subject to the environmental consultants advice, provide remedial measures to improve the quality of water that is to be discharged into Councils storm water drainage system. This should include comments from a suitably qualified environmental consultant confirming the suitability of these remedial measures to manage the water discharged from the site into Councils storm water drainage system. Outlining the proposed, ongoing monitoring, contingency plans and validation program that will be in place to continually monitor the quality of water discharged from this site. This should outline the frequency of water quality testing that will be undertaken by a suitably qualified environmental consultant.

EROSION AND SEDIMENT CONTROL LEGEND

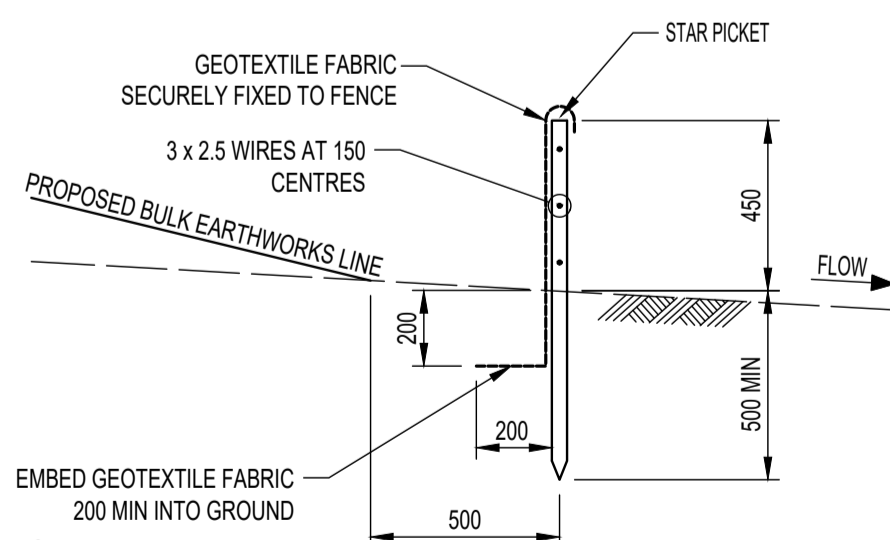


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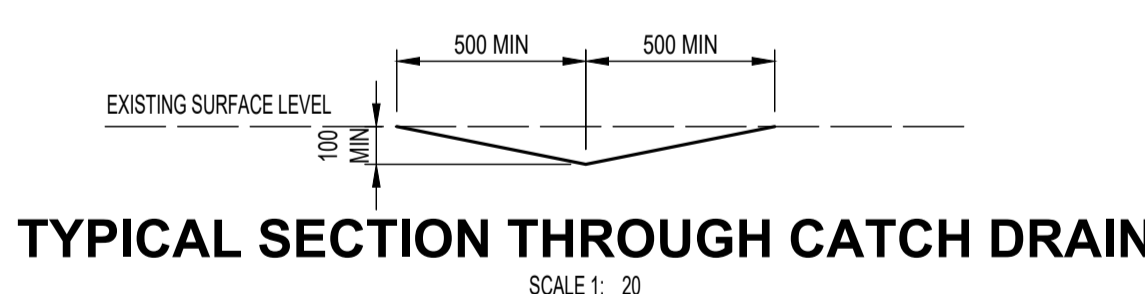
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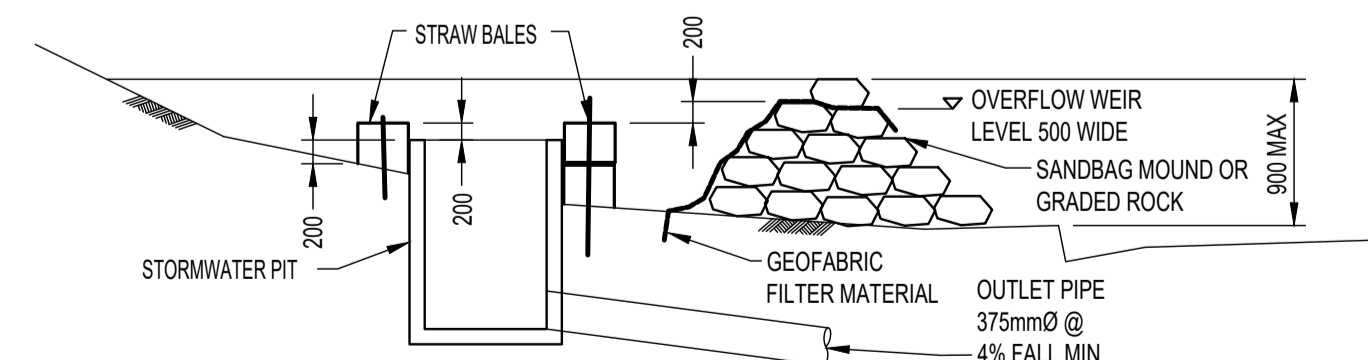
GEOTEXTILE PIT FILTER
 NTS



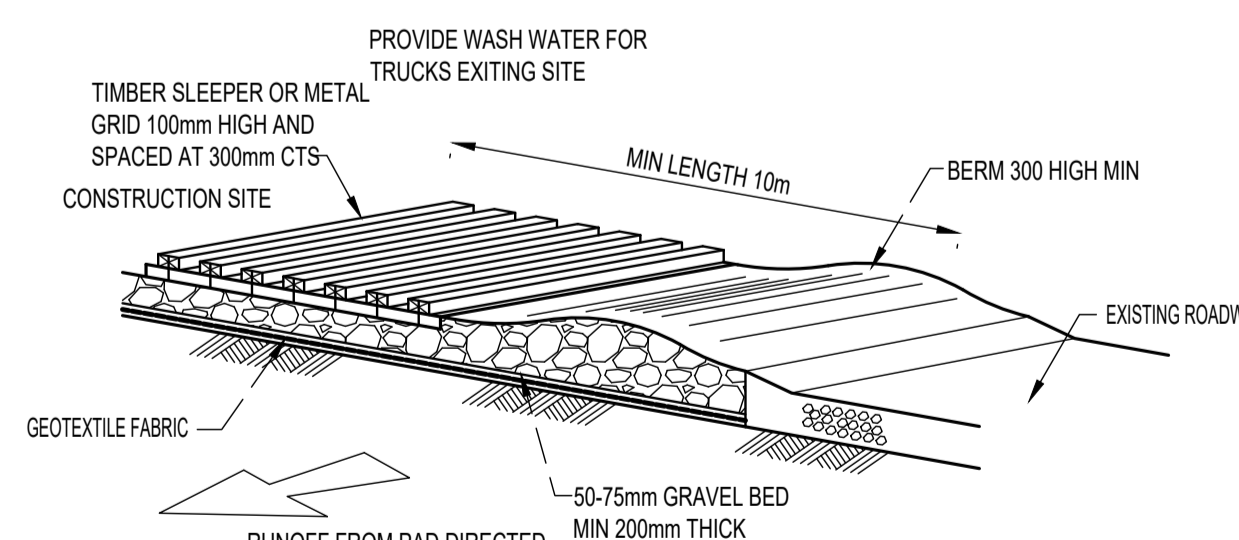
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TYPICAL SECTION THROUGH CATCH DRAIN
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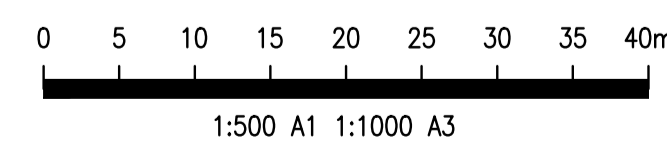


SEDIMENTATION TRAP
 NTS



TEMPORARY CONSTRUCTION VEHICLE EXIT
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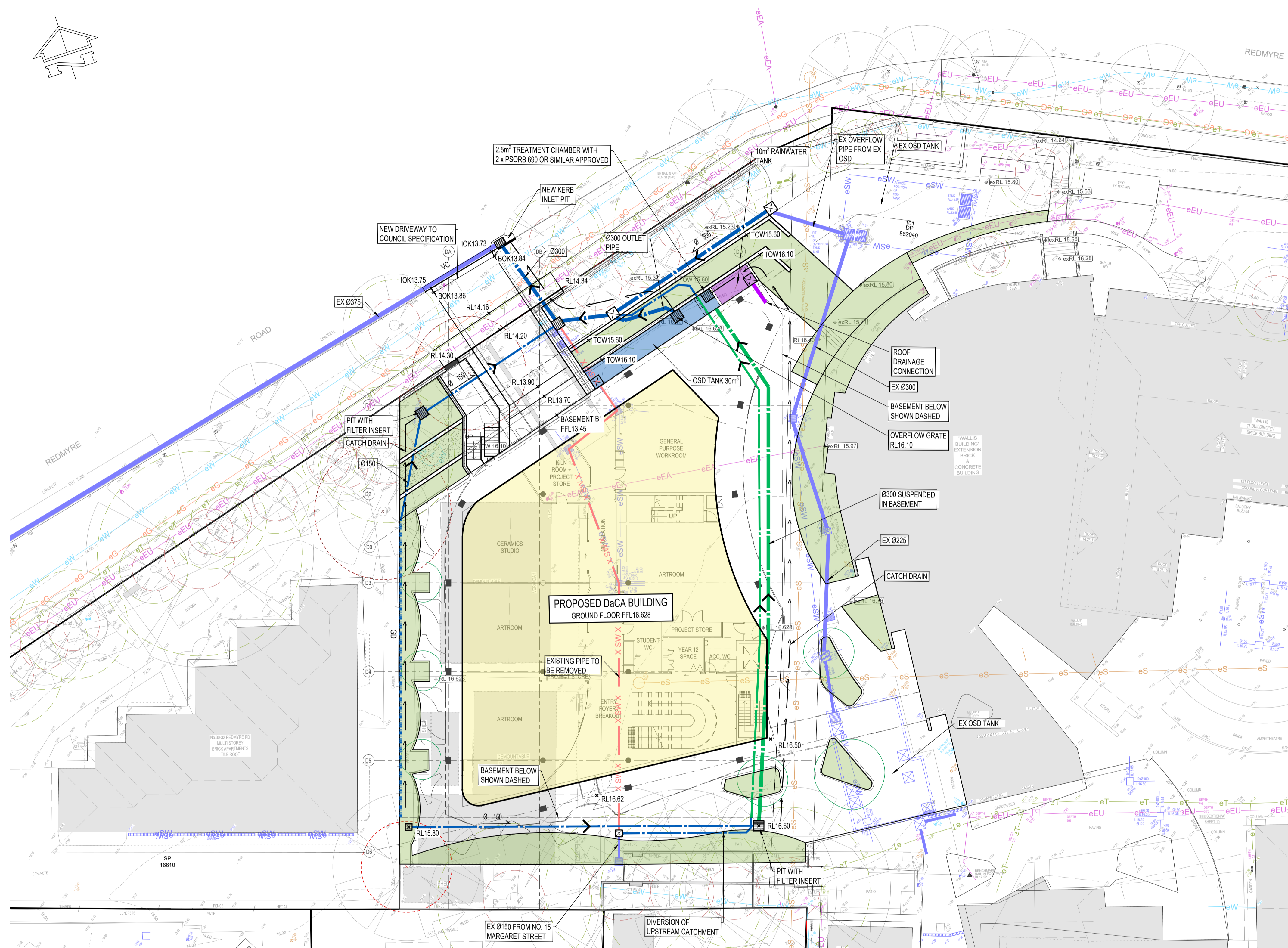
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 3 MARGARET STREET, STRATHFIELD

Sheet Subject
**SEDIMENT AND EROSION
 CONTROL PLAN**

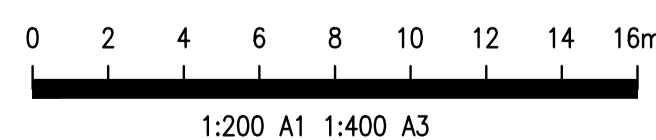
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LEGEND

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- 22.50 MAJOR FINISHED SURFACE CONTOUR 0.5m INTERVAL
- 22.10 MINOR FINISHED SURFACE CONTOUR 0.1m INTERVAL
- STORMWATER PIPE, FLOW DIRECTION
- PIPE FROM ROOF CATCHMENT, REFER HYDRAULIC ENGINEER'S DRAWINGS
- SUSPENDED STORMWATER PIPE
- ⊠ JUNCTION PIT
- ▣ GRATED INLET PIT
- ▬ ON-GRADE KERB INLET PIT
- ▭ HAUNCHED GRATED INLET PIT
- GRASS CATCH DRAIN
- TREE PROTECTION ZONE (TPZ)
- STRUCTURAL ROOT ZONE (SRZ)
- eEA EXISTING OVERHEAD ELECTRICAL
- eEU EXISTING UNDERGROUND ELECTRICAL
- eG EXISTING GAS
- eT EXISTING TELECOMMUNICATIONS
- eS EXISTING SEWER
- eW EXISTING WATER
- eSW EXISTING STORMWATER



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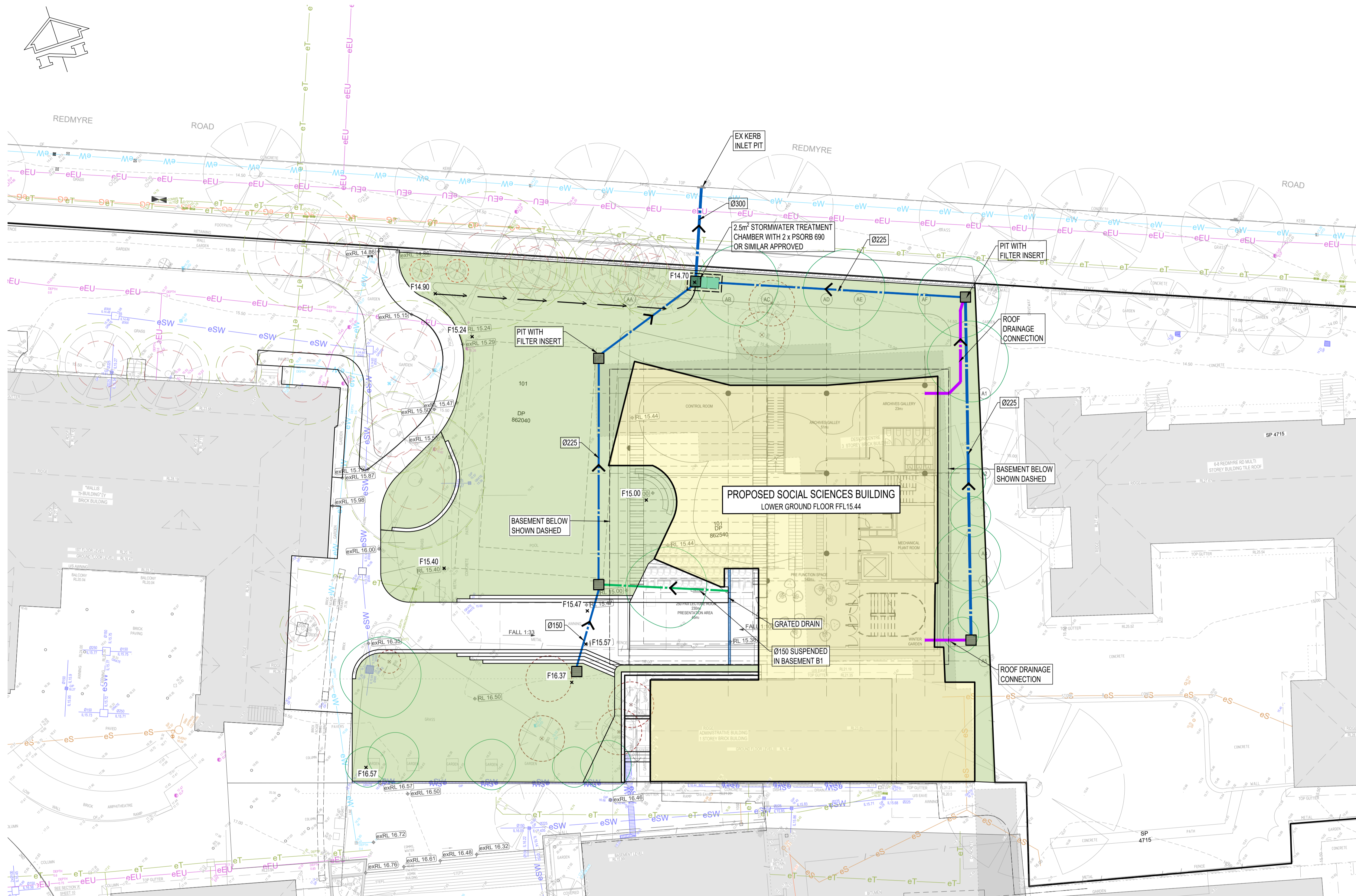
Project
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Sheet Subject
**SITWORKS AND
 STORMWATER PLAN
 SHEET 1**

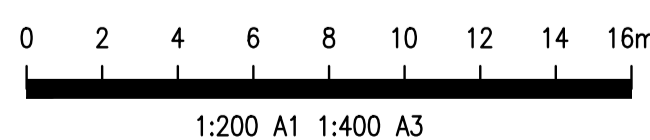
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LEGEND

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- 22.50 MAJOR FINISHED SURFACE CONTOUR 0.5m INTERVAL
- 22.10 MINOR FINISHED SURFACE CONTOUR 0.1m INTERVAL
- STORMWATER PIPE, FLOW DIRECTION
- PIPE FROM ROOF CATCHMENT, REFER HYDRAULIC ENGINEER'S DRAWINGS
- SUSPENDED STORMWATER PIPE
- ⊠ JUNCTION PIT
- ⊠ GRATED INLET PIT
- ⊠ ON-GRADE KERB INLET PIT
- ⊠ HAUNCHED GRATED INLET PIT
- GRASS CATCH DRAIN
- TREE PROTECTION ZONE (TPZ)
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- eEA EXISTING OVERHEAD ELECTRICAL
- eEU EXISTING UNDERGROUND ELECTRICAL
- eG EXISTING GAS
- eT EXISTING TELECOMMUNICATIONS
- eS EXISTING SEWER
- eW EXISTING WATER
- eSW EXISTING STORMWATER



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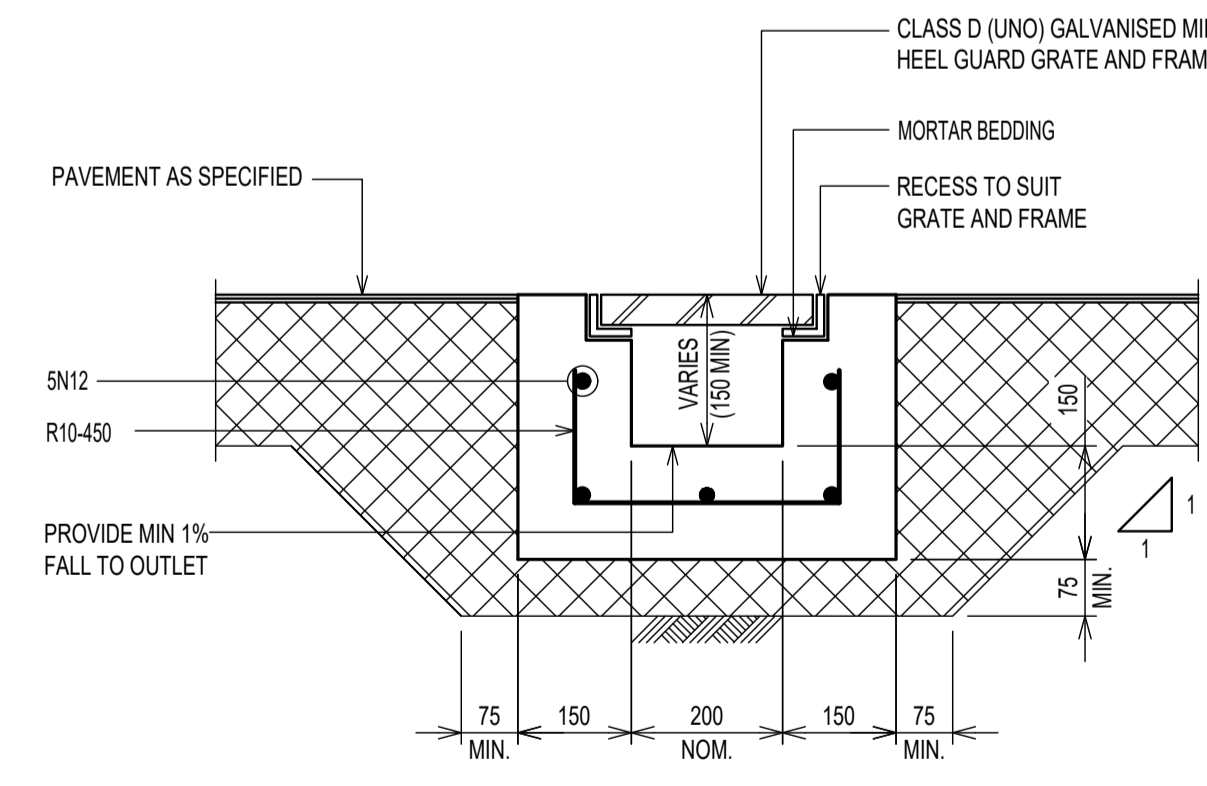
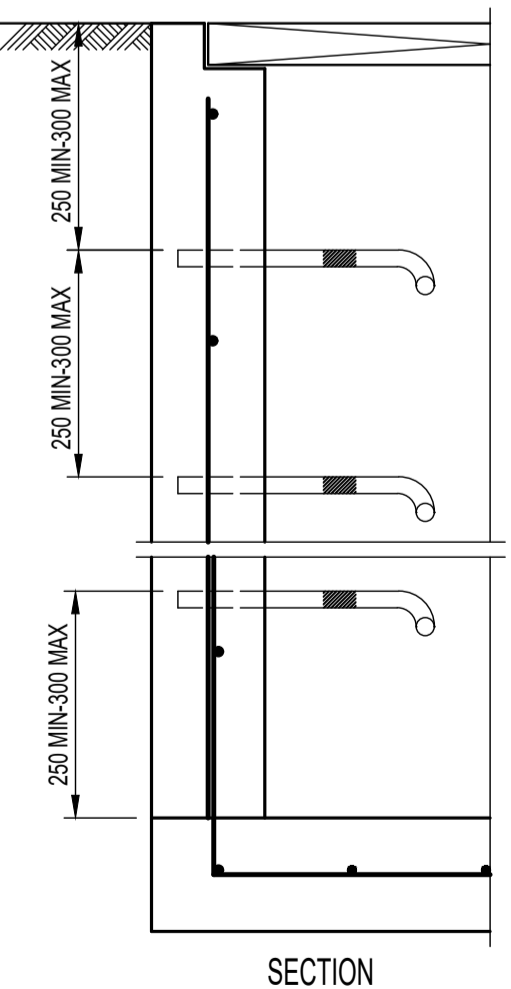
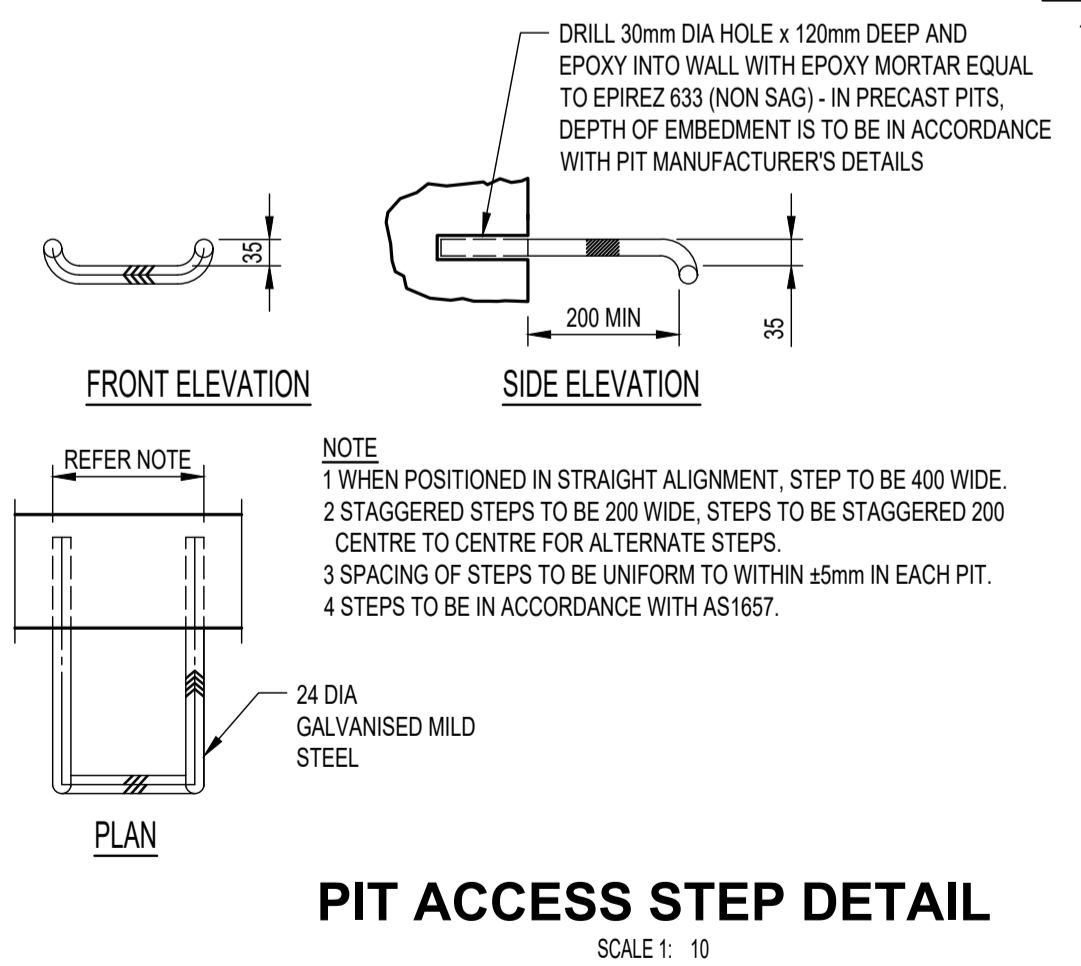
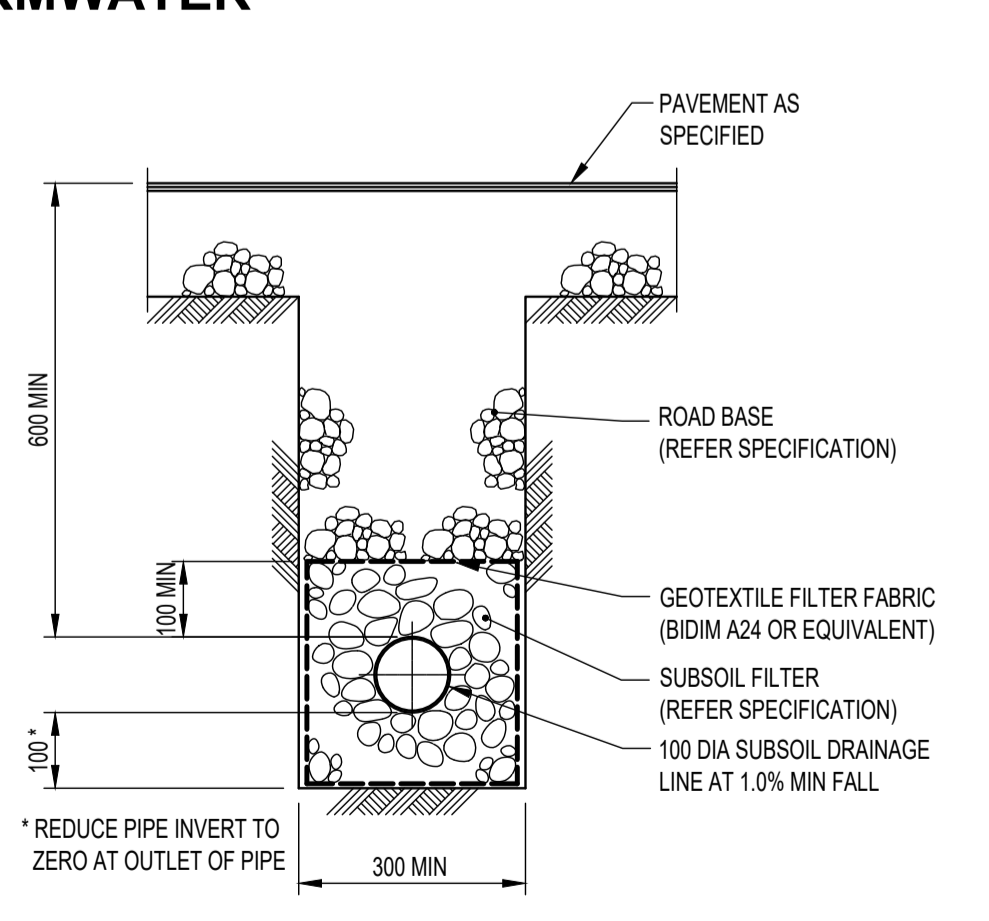
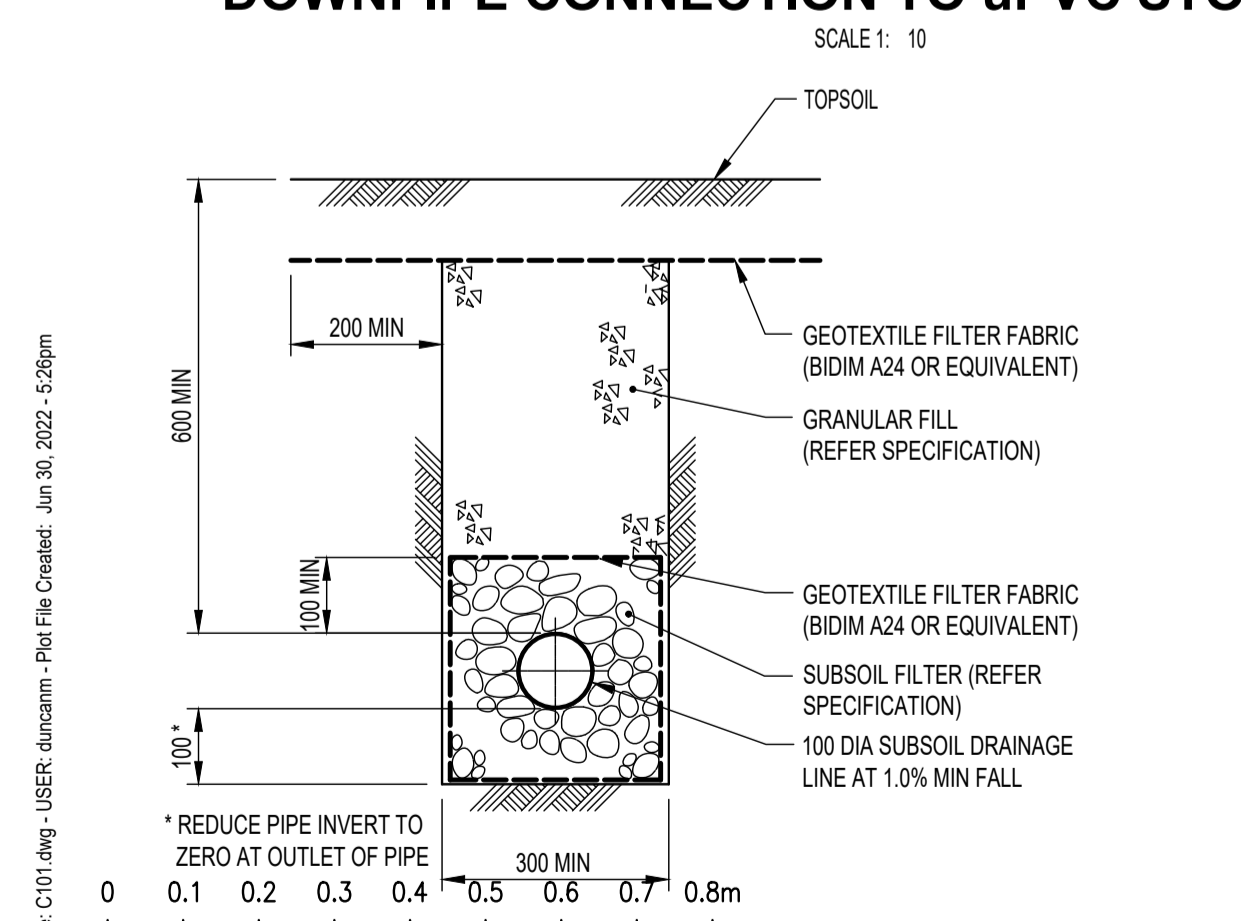
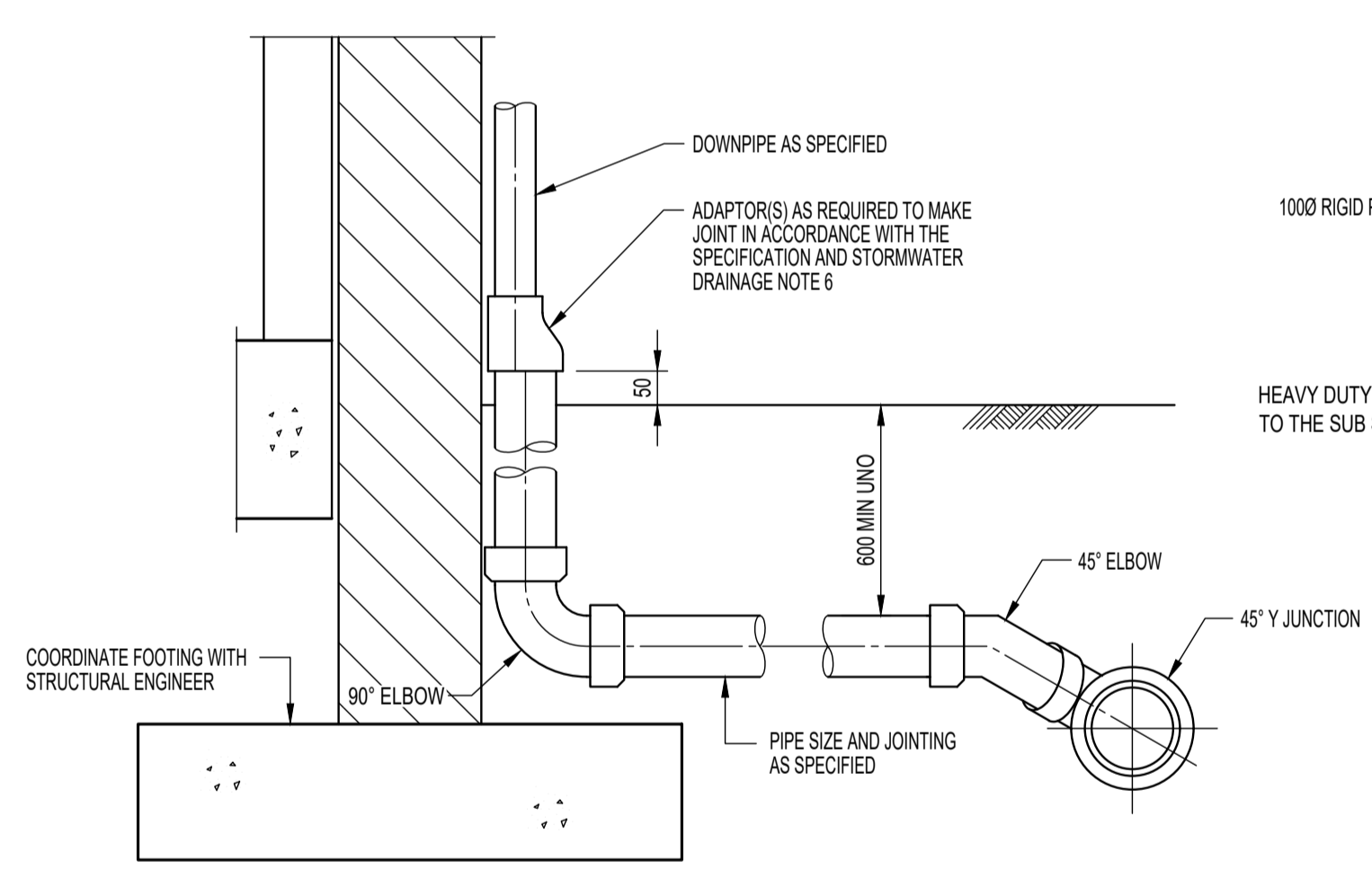
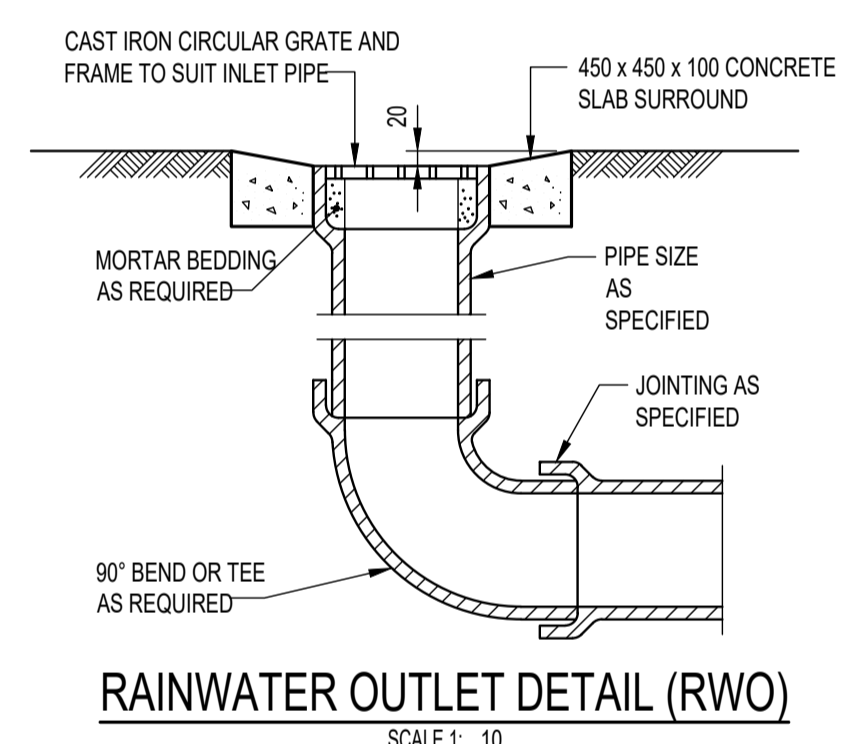
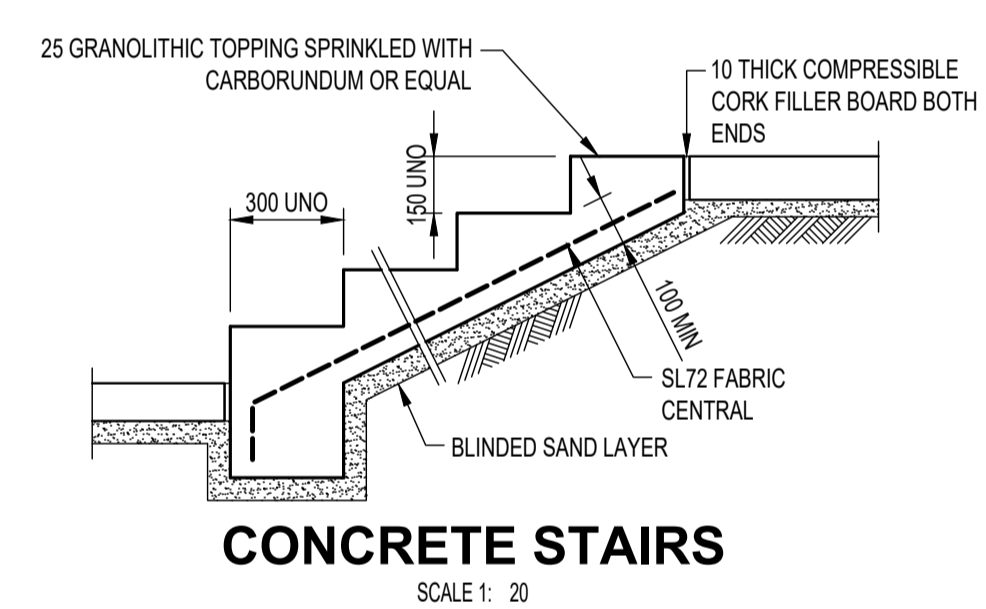
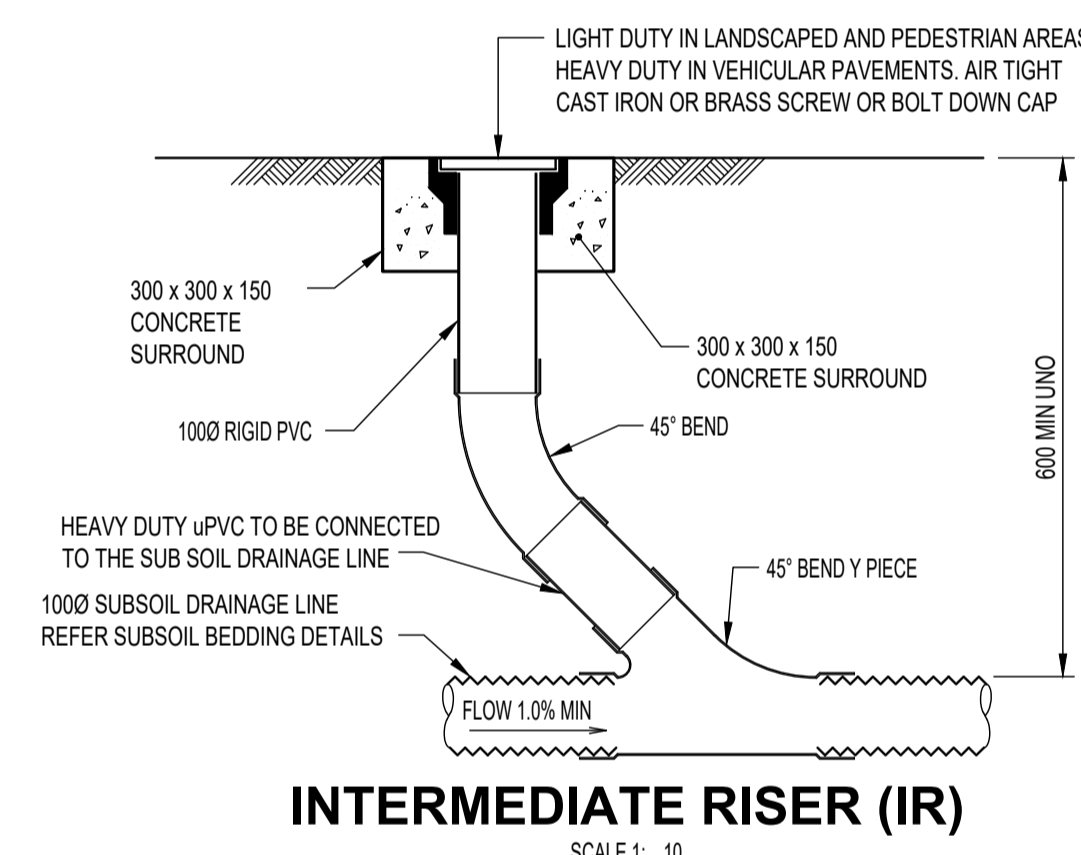
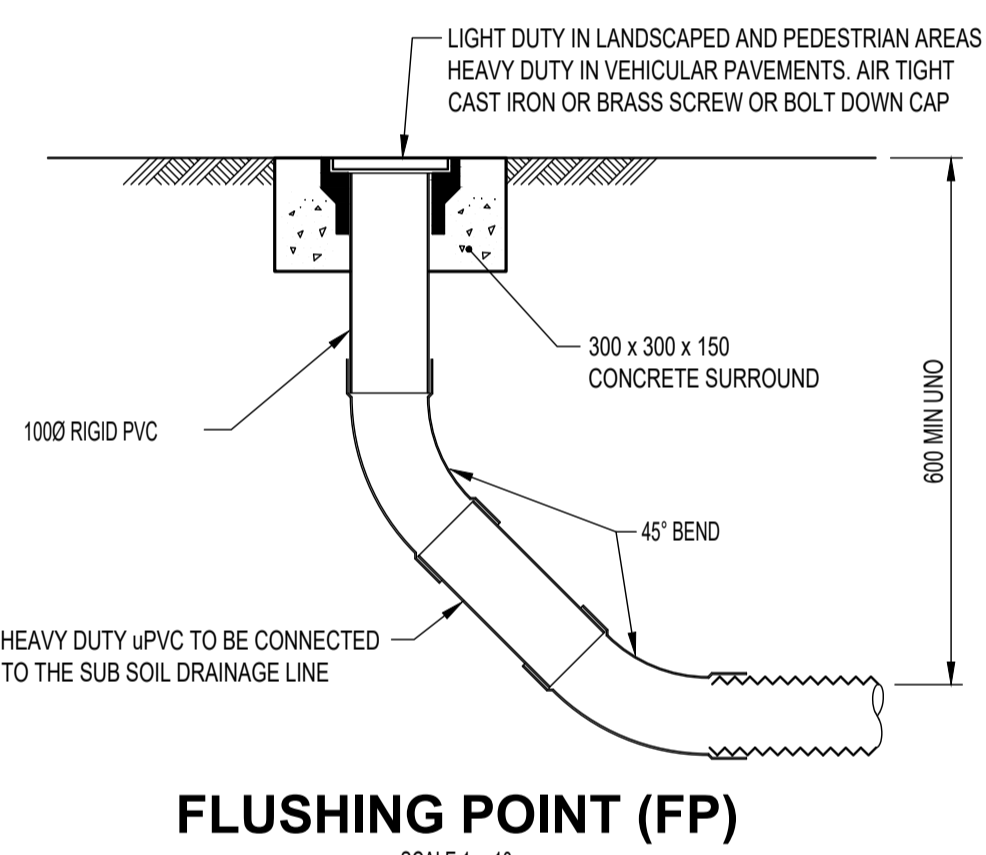
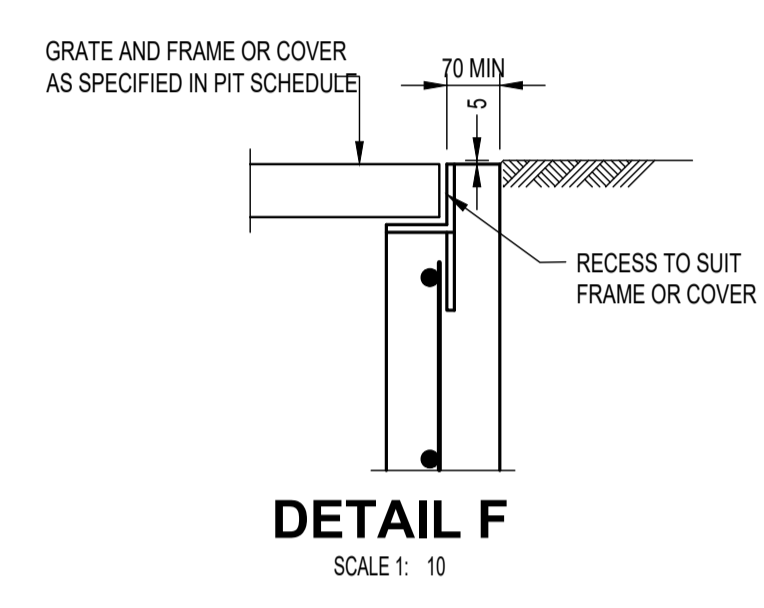
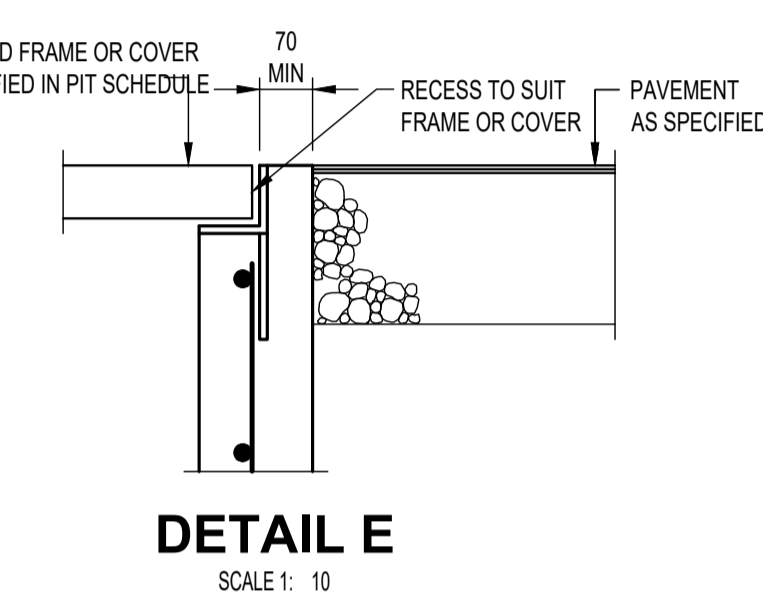
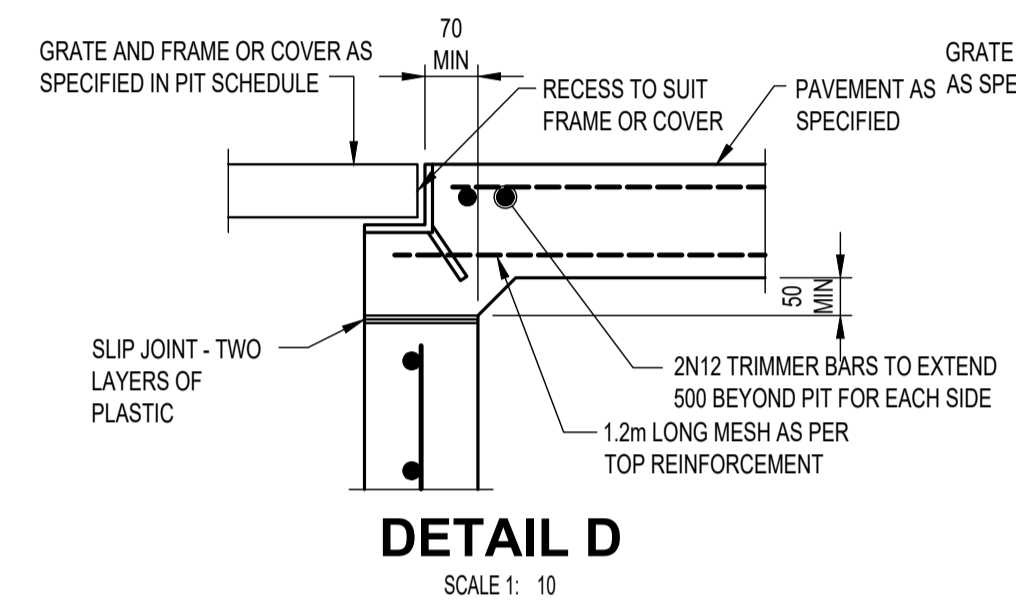
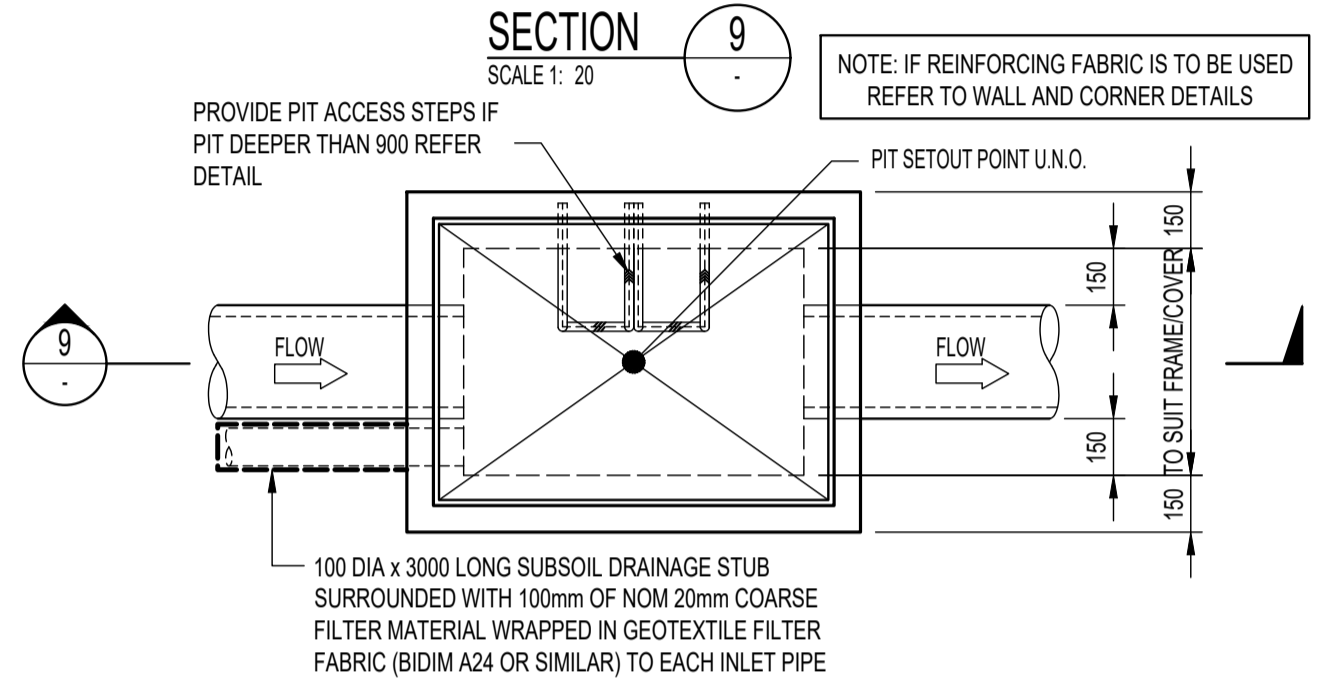
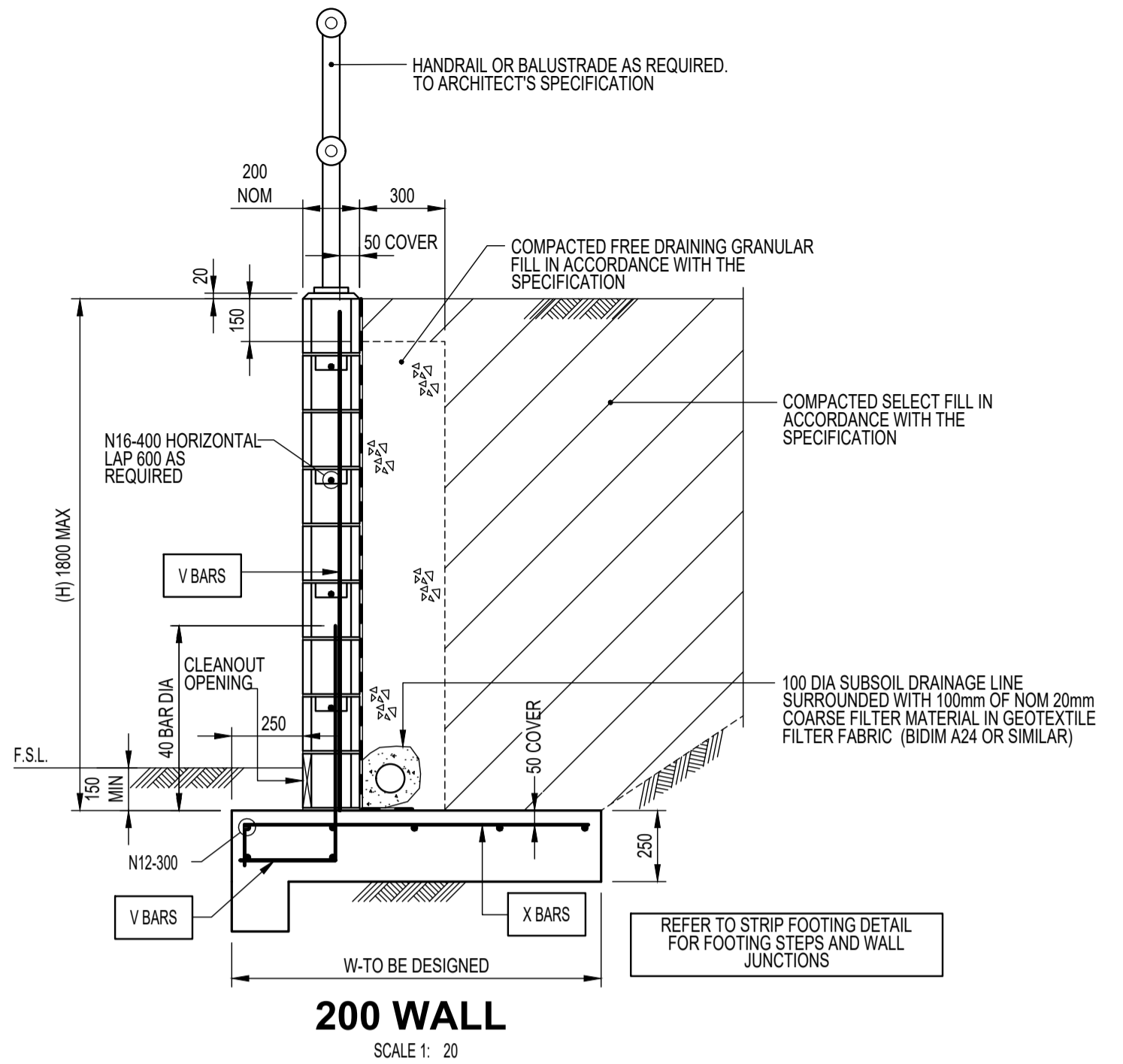
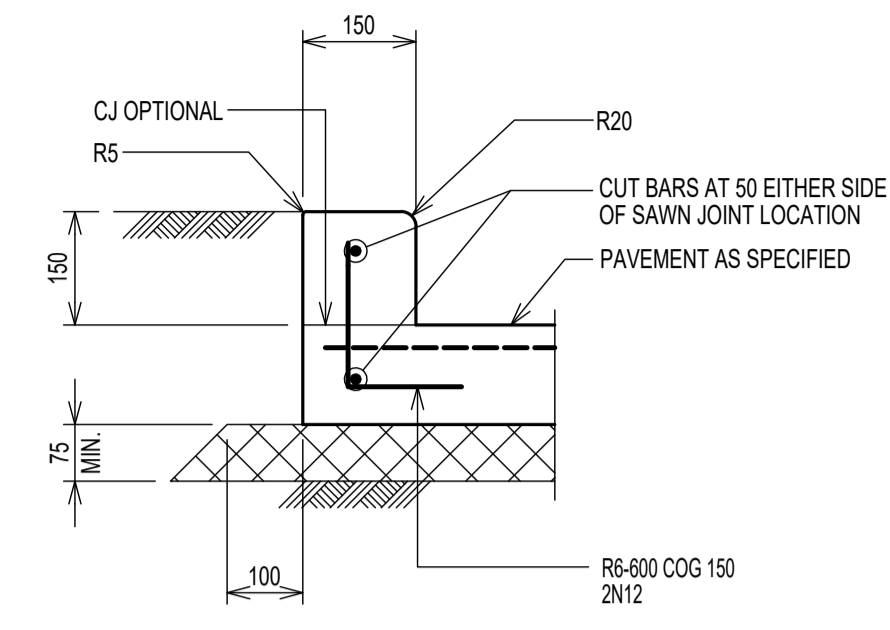
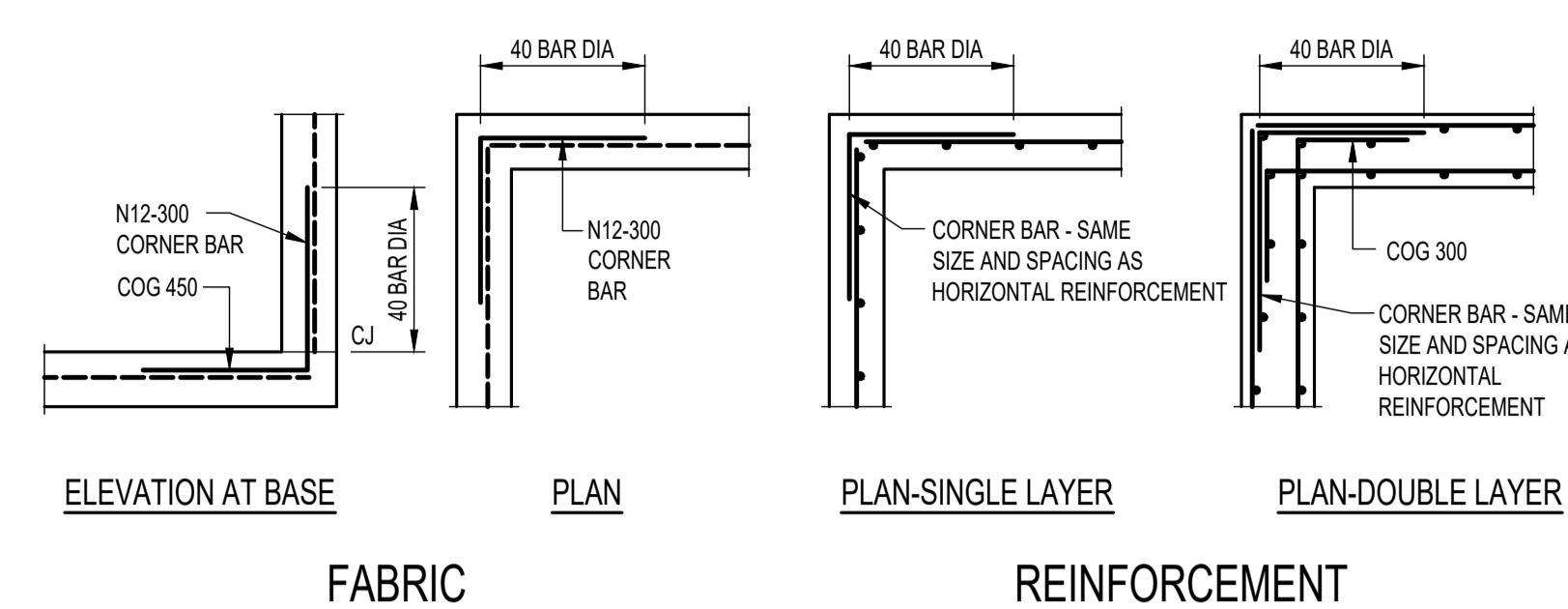
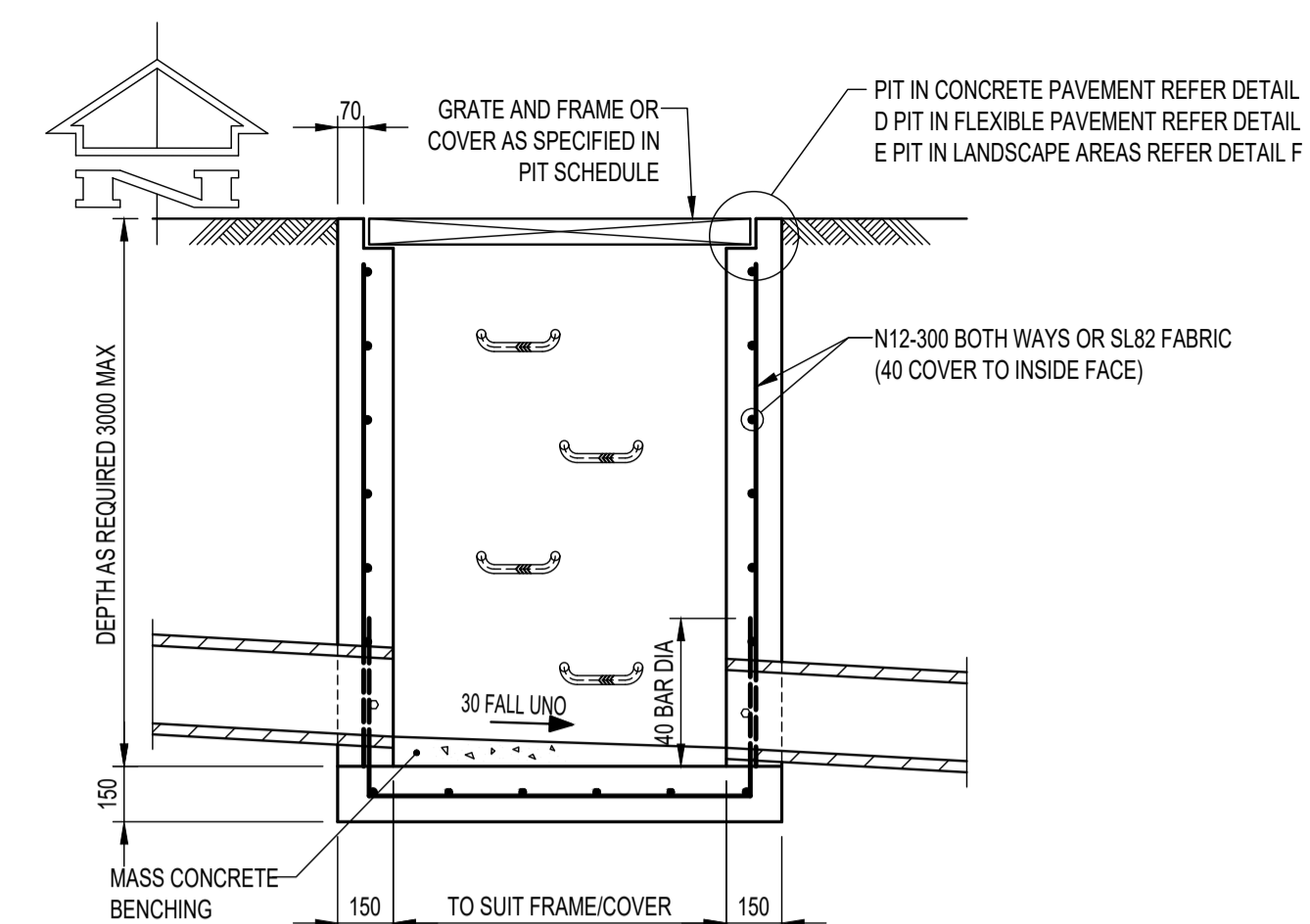
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Project
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Sheet Subject
**SITWORKS AND
 STORMWATER PLAN
 SHEET 2**

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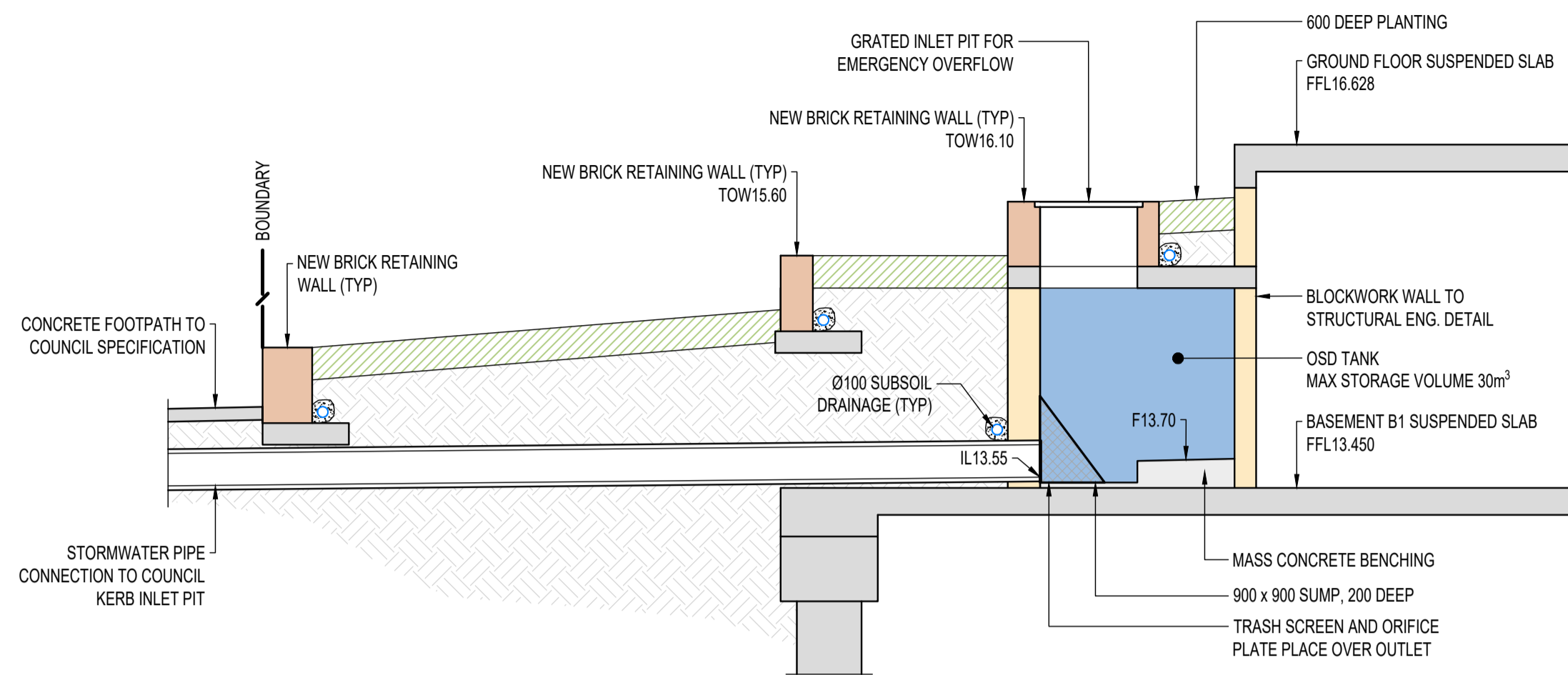
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 3 MARGARET STREET, STRATHFIELD

Sheet Subject
DETAILS SHEET 1

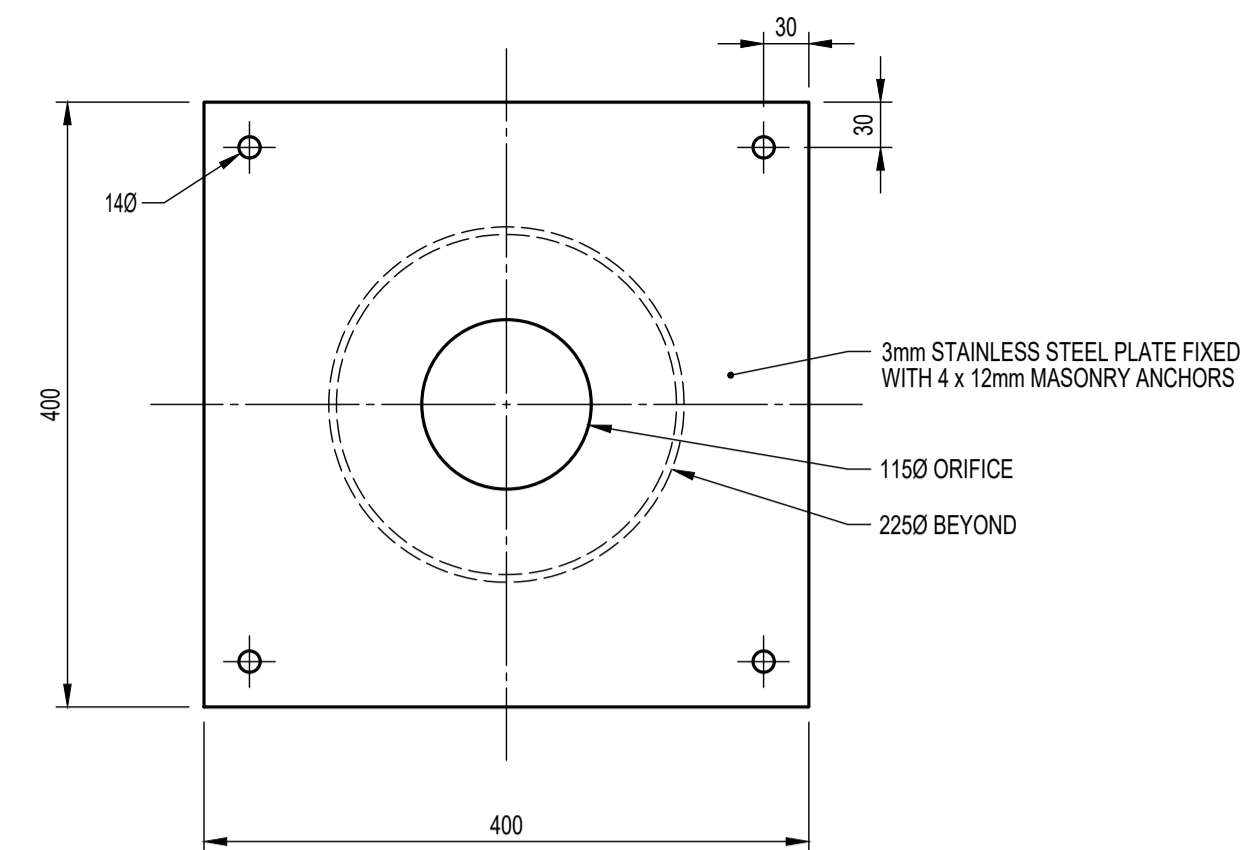
Scale: A1
 AS SHOWN

Drawn: 221208
 Authorised: C101

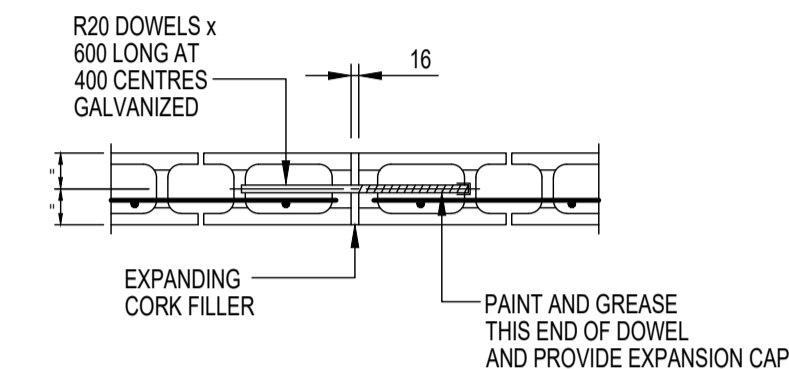
Job No: 221208
 Drawing No: C101
 Revision: Plot File Created: Jun 30, 2022 - 5:26pm



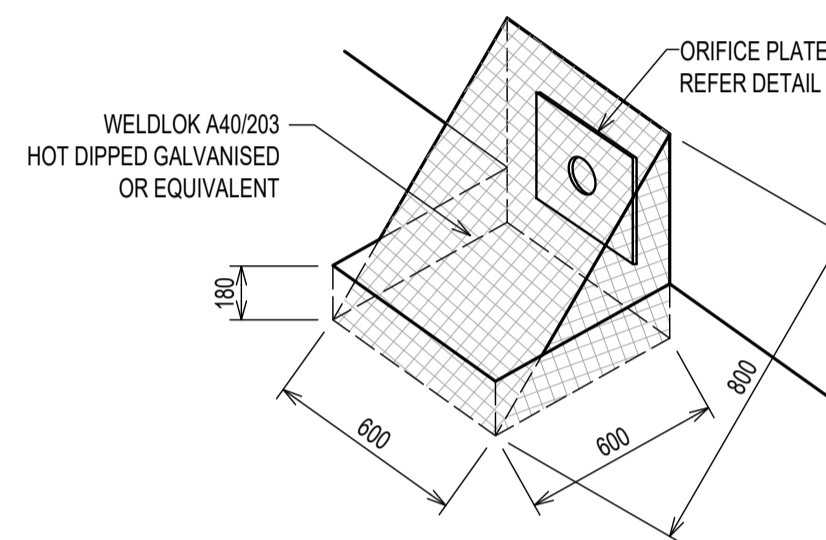
SECTION THROUGH OSD TANK
SCALE 1:50



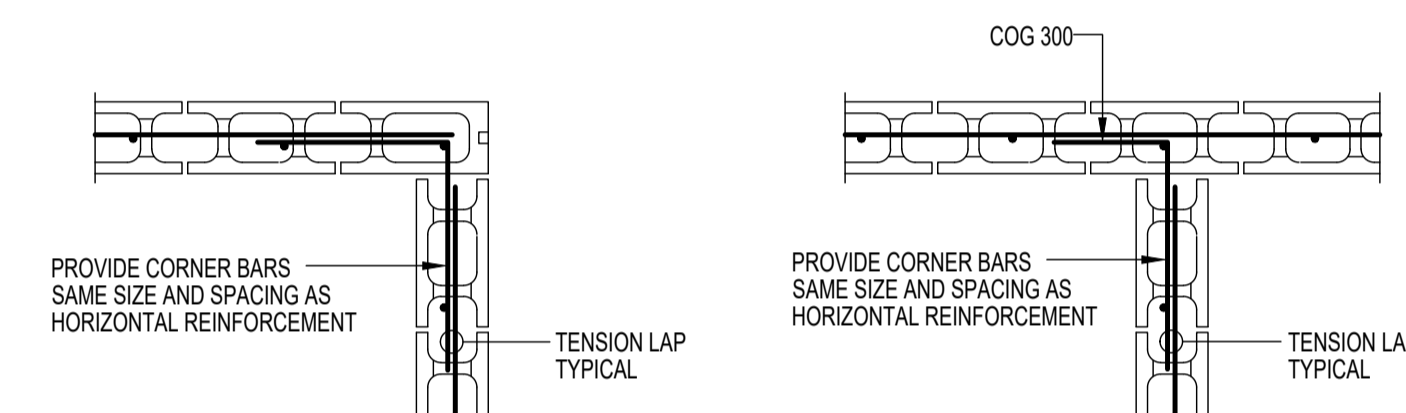
ORIFICE PLATE DETAIL
SCALE 1: 5



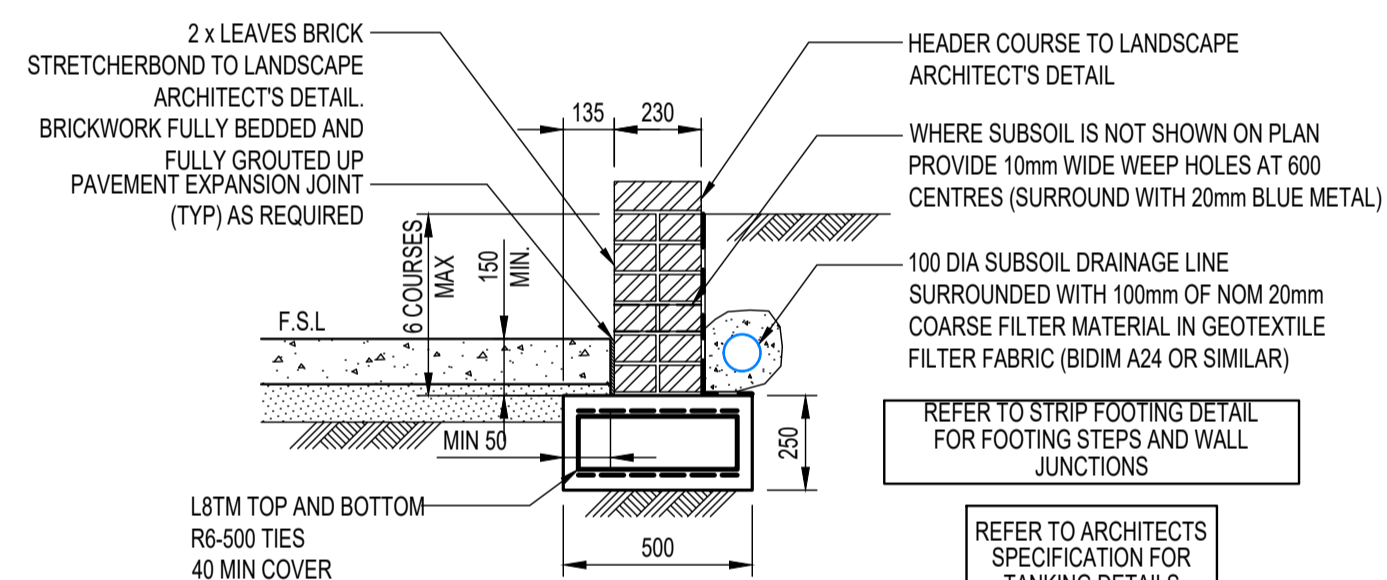
TYPICAL CONTROL JOINT DETAIL
(8000 MAX. CTS U.N.O.)



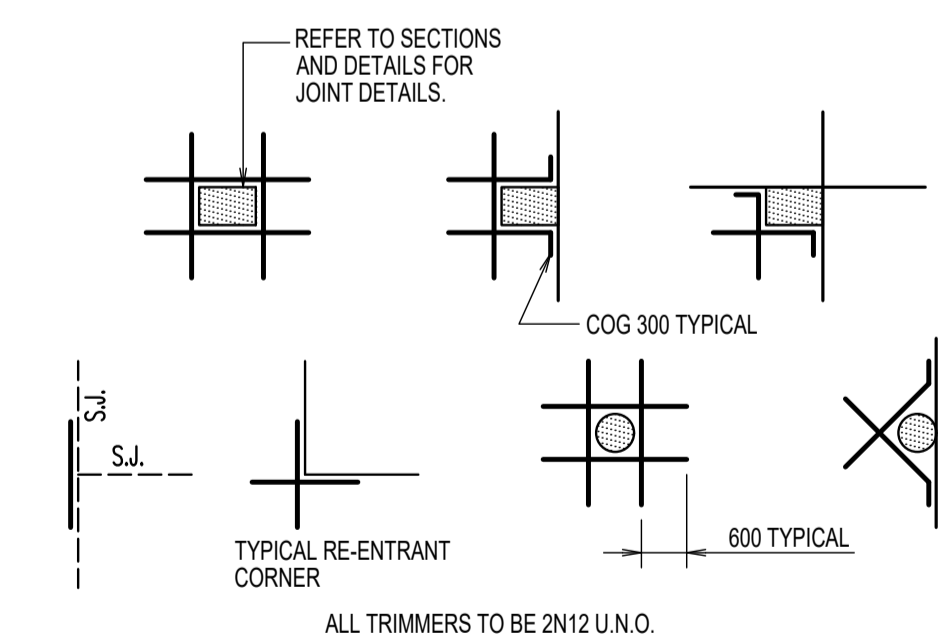
TRASH SCREEN DETAIL
NTS



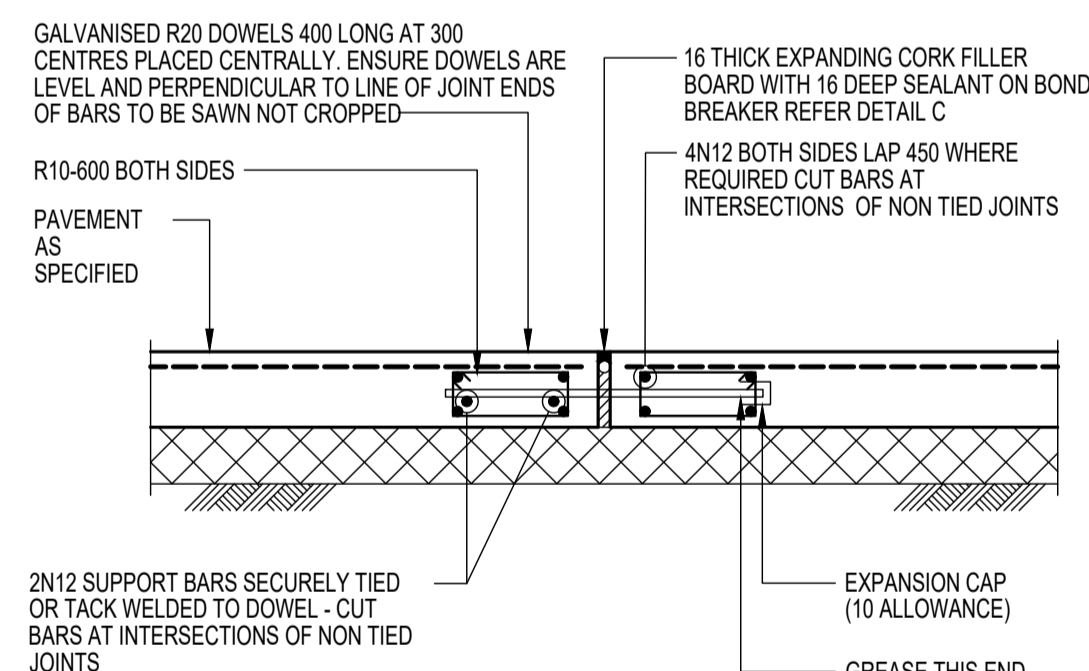
CORNER INTERSECTION
JUNCTION DETAILS



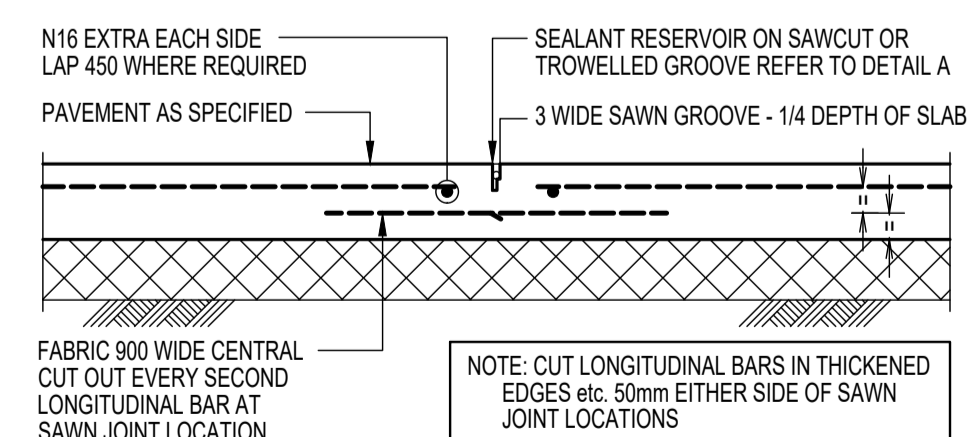
BRICK WALL UP TO MAX 0.6m HEIGHT (RWB)
SCALE 1:20



TYPICAL SLAB ON GROUND TRIMMER DETAILS
AT ALL COLUMNS, WALLS, PITS, FLOOR WASTES, ETC THAT CAUSE A PENETRATION THROUGH THE SLAB.

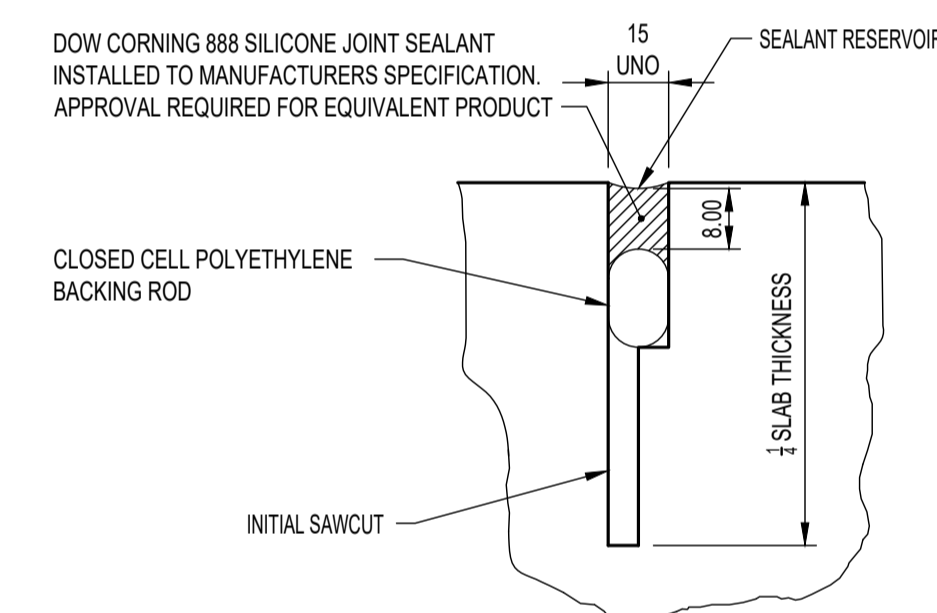


DOWELLED EXPANSION JOINT (DEJ)
SCALE 1: 20



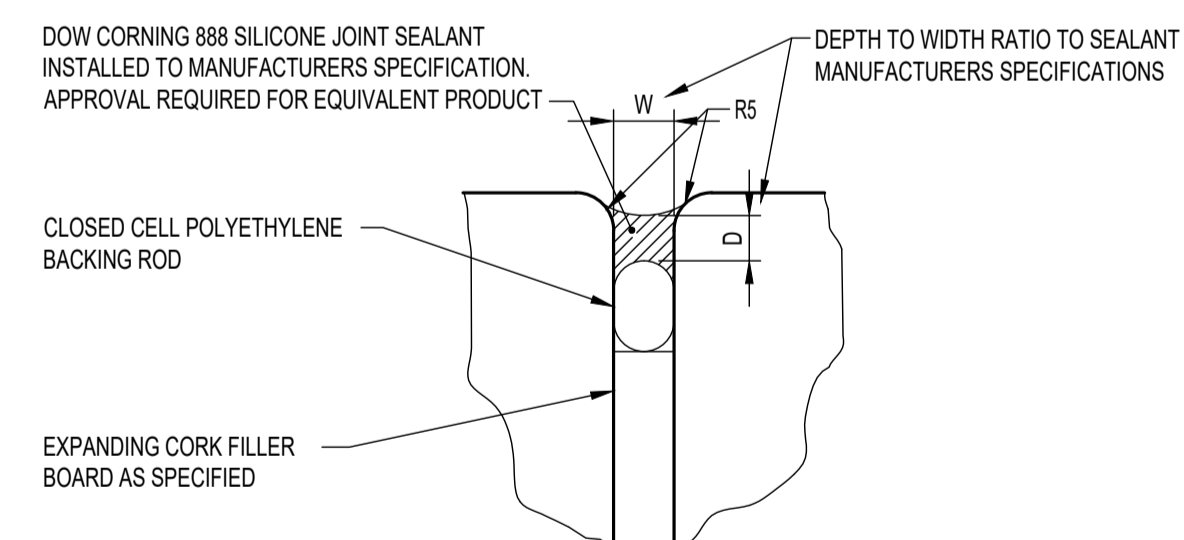
SAWN CONTROL JOINT (SJ)
SCALE 1: 20

NOTE: REFER TO JOINTING NOTES, POINT 5 FOR TIMING OF SAW CUTS.

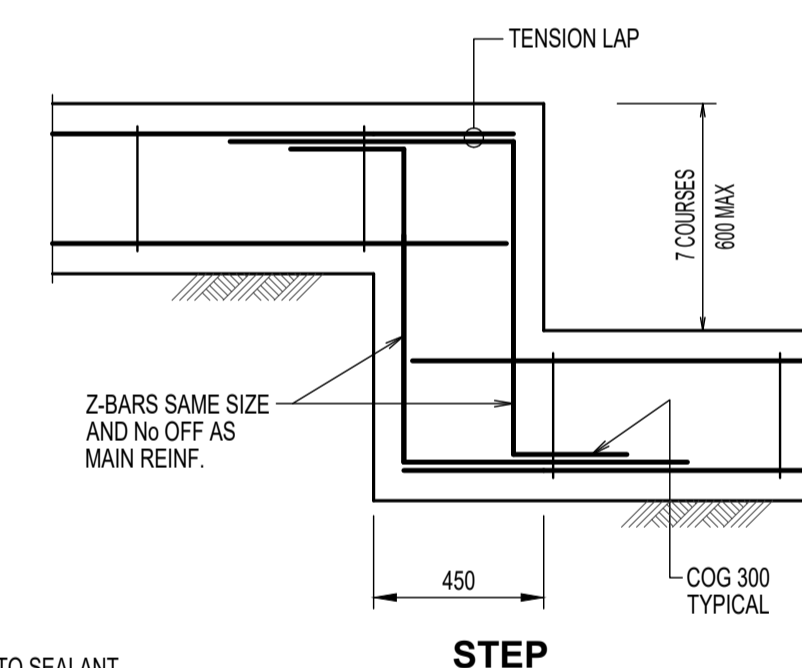


DETAIL A
NTS

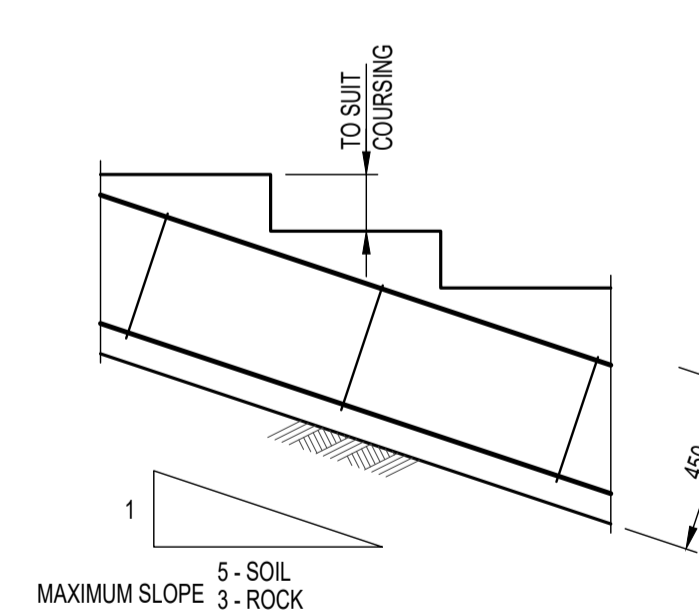
NOTE: REFER TO JOINTING NOTES, POINT 5 FOR TIMING OF SAW CUTS.



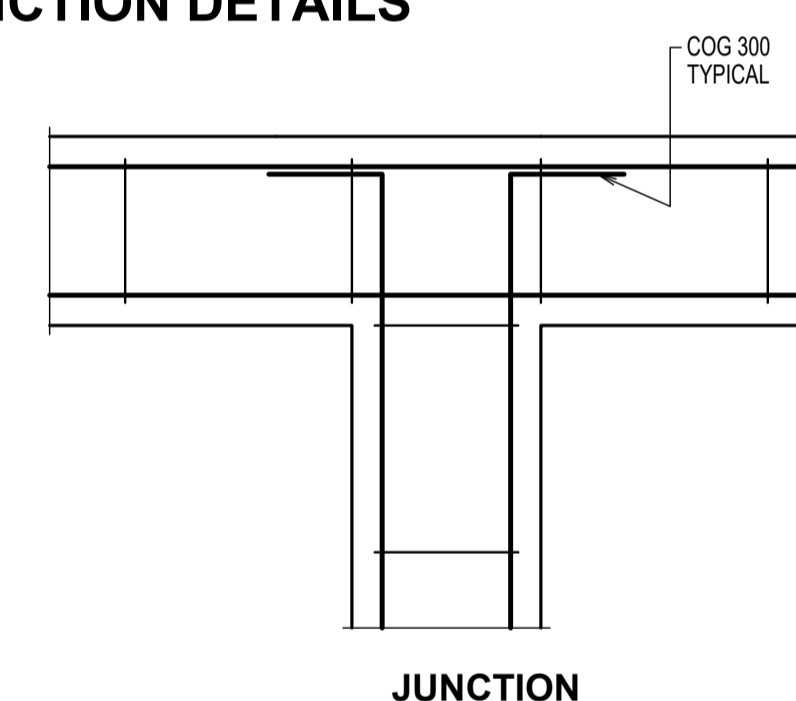
DETAIL C
NTS



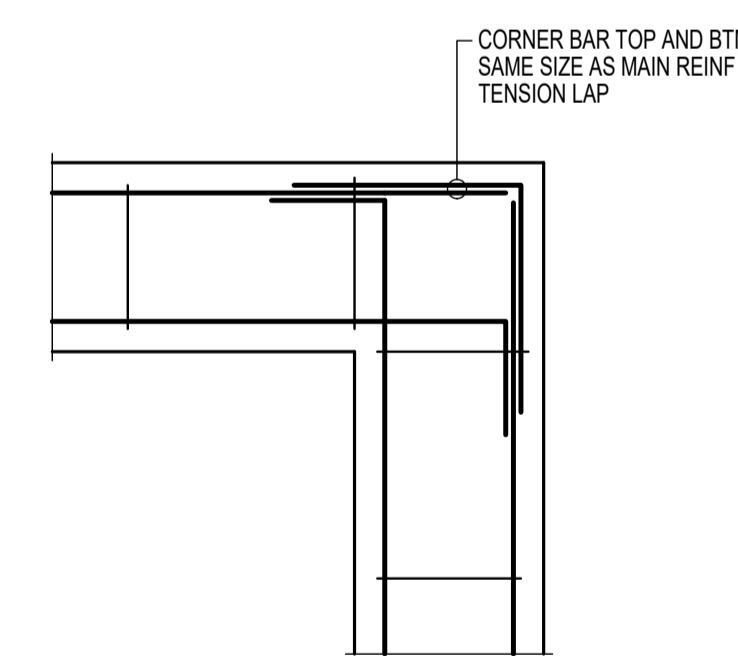
STEP



STEP - GENTLE SLOPES



JUNCTION



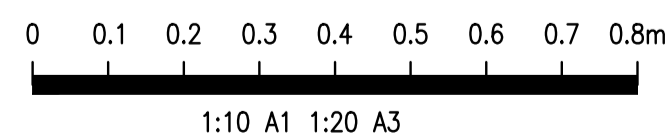
CORNER

STRIP FOOTING DETAILS

THIS DRAWING HAS BEEN PREPARED USING COLOUR

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

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Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date
P1	FOR REVIEW	DM	SH	27.06.22										

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 3 MARGARET STREET, STRATHFIELD

Sheet Subject
DETAILS SHEET 2 SHEET NAME

Scale : A1 Drawn Authorised
 AS SHOWN
 Job No 221208 Drawing No C102 Revision
 Plot File Created: Jun 30, 2022 - 5:26pm