NEW HIGH SCHOOL FOR GOOGONG

CIVIL ENGINEERING DESIGN REPORT

Prepared for: NSW Department of Education
By: **en**struct group pty ltd
January, 2025

NEW HIGH SCHOOL FOR GOOGONG

CIVIL ENGINEERING REVIEW OF ENVIRONMENTAL FACTORS DESIGN REPORT

ISSUE AUTHORISATION

PROJECT: NEW HIGH SCHOOL FOR GOOGONG

Project No: 140230

Rev	Date	Purpose of Issue / Nature of Revision	Prepared by	Reviewed by	Issue Authorised by
001	29/11/24	Issue for REF	RGU	RGU	RGU
002	21/01/25	Issue for REF	RGU	RGU	PAL
003	5/02/25	Issue for REF	RGU	RGU	PAL

Executive Summary

enstruct have been engaged by NSW Department of Education to provide civil engineering consultancy services and design development of the New High School for Googong.

This report relates to the civil engineering elements of the Review of Environmental Factors (REF) and will discuss items such as site composition, stormwater, flooding, and erosion and sediment control. This report supports the submitted development application documentation. The key items include:

- Onsite Stormwater Detention (OSD)
- Water Sensitive Urban Design (WSUD)
- Flooding
- Stormwater Overland Flow
- Erosion and Sediment control
- Design Integration

Contents

1 Introduction

This civil engineering review of environmental factors design report has been prepared by Enstruct on behalf of the NSW Department of Education (DoE) to inform a Review of Environment Factors (REF) for the proposed construction of a new high school for Googong (the activity) located at 200 Wellsvale Drive, Googong, NSW (the site).

The activity relates to the construction and operation of a new educational establishment to serve the needs of the growing Googong township by accommodating up to 700 students from years 7 – 12. Specifically, the activity includes the following:

- Building A, a three to four-storey building in the northern portion of the site, fronting Glenrock Drive, which will accommodate learning spaces and administrative functions of the school.
- Building B, a three-storey building in the north-west portion of the site, fronting Observer Street, which will accommodate learning spaces and administrative functions of the school.
- Building C, fronting Glenrock Drive, which will accommodate a school hall / gymnasium and canteen.
- Outdoor recreation areas, cricket nets, playing court and playing field.
- Main pedestrian entry established from Glenrock Drive.
- Car park and accessible pedestrian entry from Wellsvale Drive.
- Service entry from Observer Street.
- Associated civil works, earthworks, servicing and landscaping.
- Associated off-site works such as the construction of pedestrian crossings, drop off and pick up bays and a bus stop.
- School identification and wayfinding signage.

The REF describes the activity, documents the examination and consideration of all matters affecting, or are likely to affect, the environment, and details safeguards to be implemented to mitigate impacts.

The Department of Education is the determining authority for the project under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.1 Site Description

The site is identified in Figure 1 and the activity is shown in Figure 3.

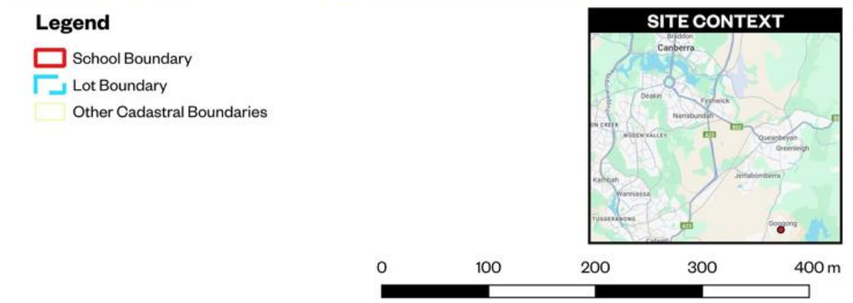


Figure 1– Site Location Plan

Source: Mecone

Figure 2: Site Masterplan (Source: NBRS)

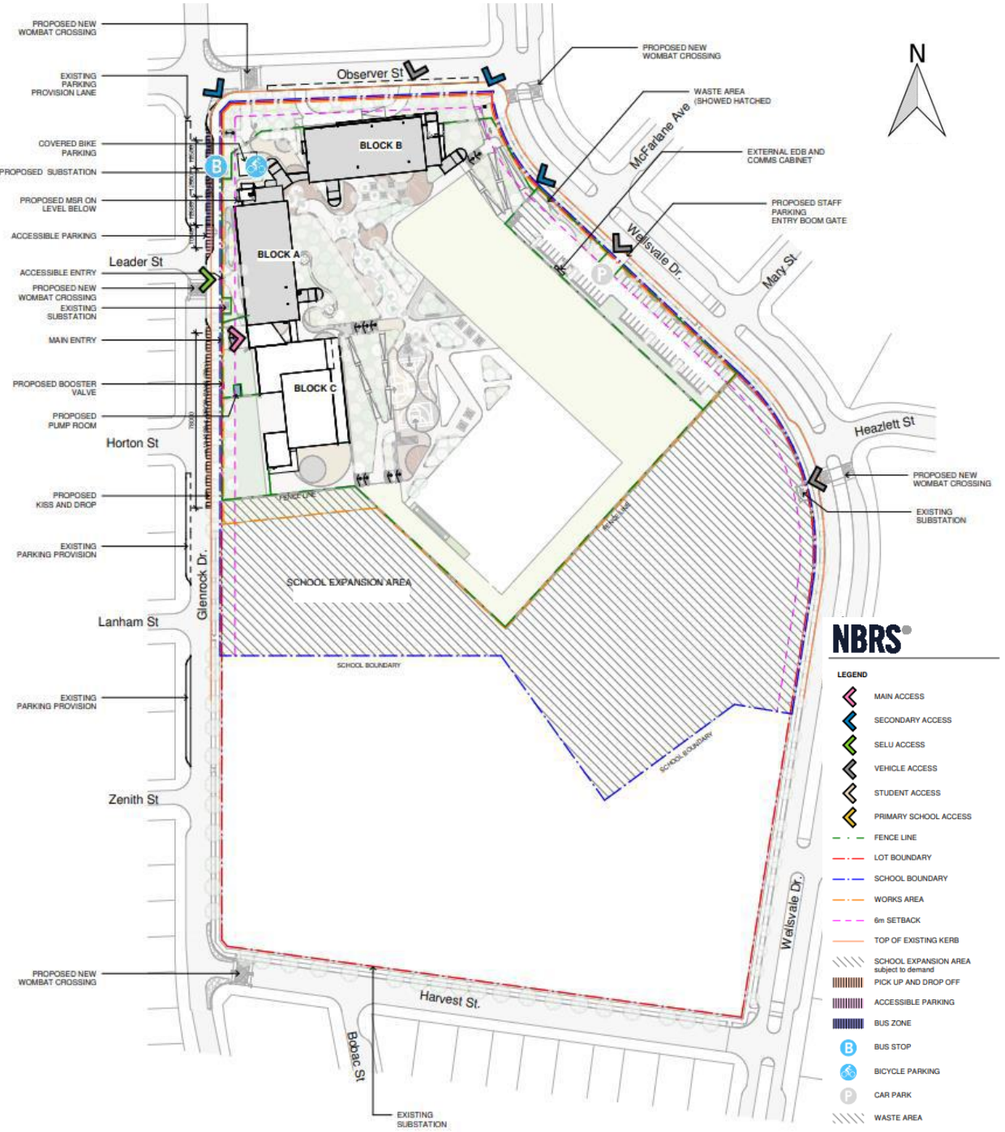


Figure 3 – Googong High School proposal – indicative only, subject to detailed design

Source: NBRS, 29/011/2024

Googong is a new release area within the Queanbeyan-Palerang Local Government Area (LGA), located approximately eight kilometres south of Queanbeyan and 17 kilometres southeast of the Canberra Central Business District (CBD). Googong Reservoir, a significant waterbody, is located approximately 3 kilometres east of the subject site. Canberra Airport is located approximately 12 kilometres north of the subject site.

The site is legally described as Lot 829 in Deposited Plan 1277372. The proposed new high school site within this Lot has an area of approximately 5.84 hectares.

The site is currently zoned as R1 General Residential in the Queanbeyan Palerang Local Environmental Plan (LEP) 2022 and is located within Neighbourhood 2 of the Googong Masterplan, within the Googong DCP 2010.

The site is surrounded by low-density residential development, recreational areas and a future local centre adjoining the site to the north.

The site is currently vacant with no existing structures and has been cleared of all trees and native vegetation. The site has an approximately 12 metre fall from the southwest corner of the site at RL ~763.550m Australian Height Datum AHD to the northeast at RL ~751.570m AHD.

1.2 Existing Stormwater

An investigation into the existing stormwater assets surrounding the site was undertaken through Dial Before You Dig (DBYD) and a level survey over the existing lots undertaken by CMS Surveyors Pty Ltd (Ref: 22727A dated 09/2023). Based on this survey and DBYD findings, it is understood that there are existing QPRC stormwater assets along all the streets surrounding the site: Glenrock Drive, Observer Street, Harvest Street and Wellsvale Drive, as seen in **Figure 4** below. It is noted that this existing council stormwater pits and pipe network extends further along Wellsvale Drive towards the northeast of the site.

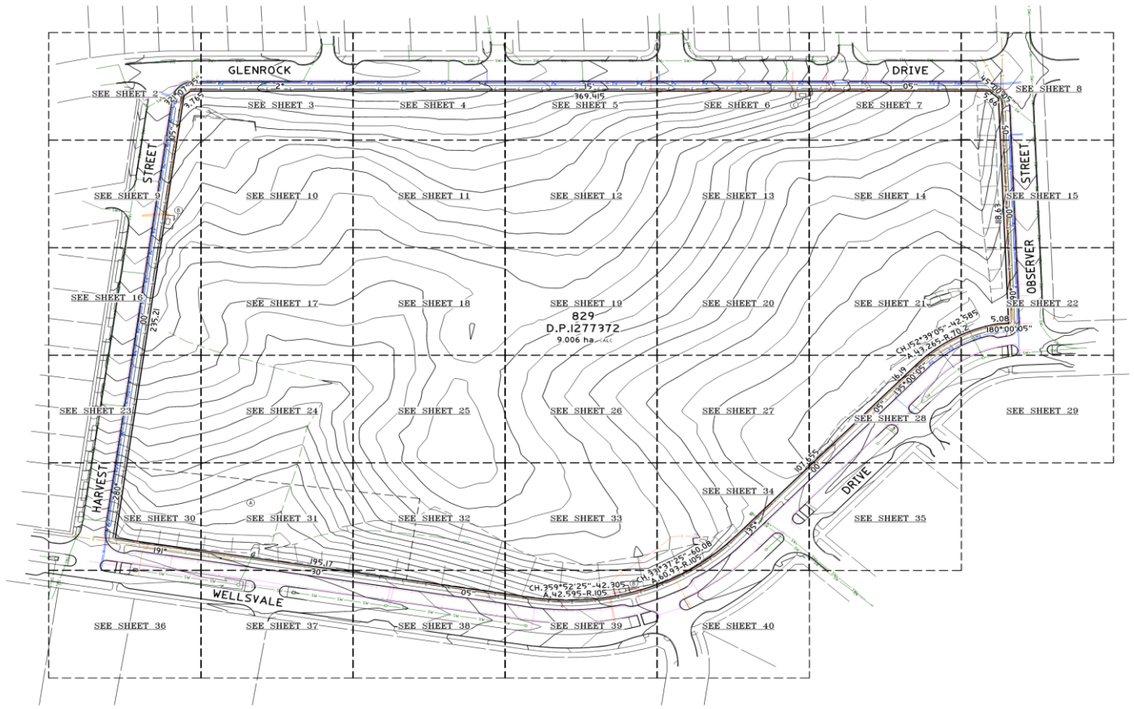


Figure 4: Existing Stormwater Assets (shown in green) at New high school for Googong (Source: Survey prepared by CMS Surveyors Pty Ltd (Ref: 22727A dated 09/2023).

1.3 Recommended Mitigation Measures

The mitigation measures for civil engineering-related environmental impacts, as required under Part 5 of the EP&A Act are outlined in the following chapters. A summary is provided in the table below.

Table 1: Mitigation measures related to civil engineering

Project Stage D – Design C – Constrction O - Operation	Mitigation Measures	Relevant section of the report
D/C	Erosion and Sediment control measures	Section 3
D/C/O	Stormwater Quantity Control measures (OSD)	Section 3.1 and 3.2
D/C/O	Stormwater Quality Control measures (WSUD)	Section 3.5 and 3.6
D/C/O	Flood analysis and planning measures	Section 3.3 and 3.4

In summary, after identifying potential impacts and assessing their nature and extent, it has been determined from a civil engineering perspective that:

- The proposed development will have minimal potential impacts, which are not expected to significantly affect the locality, community, or environment.
- All identified impacts can be effectively mitigated or managed to ensure no significant adverse effects on the environment or community.

2 Proposed Development

The key items proposed for the development of GHS are:

- Block A and B – multi-storey modular building containing classrooms, amenities, and administrative spaces
- Block C - Single storey hall.
- A sports field/Outdoor play space
- An accessible staff car park
- Landscaped areas.

2.1 Standards list

- Australian Rainfall & Runoff 2019
- Austroads: Guide to Pavement Technology
- AS1428.1 Design for Access & Mobility
- AS3500.3 Plumbing and Drainage: Stormwater Drainage
- Queanbeyan Local Environmental Plan 2022
- Queanbeyan Palerang Regional Council Development Design Specification D5 – Stormwater Drainage Design (2019),
- NSW MUSIC Modelling Guidelines 2015
- Queanbeyan Palerang Regional Council Public Domain Guidelines
- Googong Development Control Plan (2023)
- Queanbeyan Development Control Plan (2012)
- Queanbeyan Palerang Regional Council Development Design Specification D7 – Erosion Control and Stormwater Management (2018)
- AS 3500.3-1990 National Plumbing and Drainage Code - Stormwater drainage.
- Managing Urban Stormwater: Soils and Construction, “The Blue Book” – 4th edition 2004.
- Concrete Pipe Selection and Installation - Concrete Pipe Association 1990.

3 Stormwater Design

The stormwater design must be in accordance with Australian Standards, Googong Development Control Plan (2023), QPRC Development Design Specification D5 – Stormwater Drainage Design (2019), and Australian Rainfall and Runoff (2019).

According to EFSG 0224 - Stormwater Site Requirements, the drainage system must be designed to ensure that site facilities remain accessible for student use under all weather conditions, including up to a 100-Year Average Recurrence Interval (ARI).

Pipes and pits will need to be designed to satisfy the minimum provisions of AS 3500.3. They must be designed to convey, at least, the 5% Annual Exceedance Probability (AEP) flows as per ESFG guidelines. Where pipe capacity is exceeded i.e., greater than 5% AEP, stormwater will be conveyed as overland flow. Overland flow paths are to be designed to convey at the minimum 1% AEP stormwater flows with a Velocity x Depth to be less than 0.4m^2/s.

Class B, C and D pits are to be used in accordance with AS 3996.

3.1 Onsite Stormwater Detention (OSD) Mitigation Measures

Generally, QPRC requires OSD for all individual dwellings, multi-unit developments, commercial and industrial developments.

QPRC Development Design Specification D5 – Stormwater Drainage Design (2019) stipulates that the OSD system must be designed and constructed to control stormwater runoff from development sites such that, for all peak stormwater events up to and including 1%AEP discharges from the developed site do not exceed pre-development peak discharge rates.

OSD storage volume shall be provided such that the total OSD discharge and bypass flow from the site does not exceed the maximum permissible site discharge.

3.2 OSD Modelling

A preliminary OSD model has been developed using DRAINS to assess the ability of two OSD tanks to manage stormwater flows from the site to within pre-development site flows.

Preliminary calculations indicate that a 306m^3 OSD tank will be required to service the north and west of the site. Primarily Blocks A, B, &C. An additional 313.5 m^3 OSD tank will be required to manage stormwater flows from the south of the site. Primarily Blocks E and F.

In summary, a DRAINS model has been developed for the schematic design, incorporating a proposed OSD tank. The model calculations demonstrate that the OSD tank effectively collects stormwater from impervious and pervious areas, including the roof, footpath, and garden beds. The total stormwater runoff from the site including undeveloped area within the pre-development rate. For further details, refer to Appendix C for the DRAINS analysis outputs and Appendix B for the stormwater management plan.

3.3 Flooding

Based on the Queanbeyan Floodplain Risk Management Study and Plan (2019) which explores the flooding effects of the Queanbeyan and Molongo Rivers on surrounding local areas, it is understood that the proposed development is outside the council's flood planning area. This is supported by a flood planning Area and Floodway map in the QPRC DCP, as seen in **Figure 5** below. Therefore, it is understood that no flood planning controls are in place for this development.

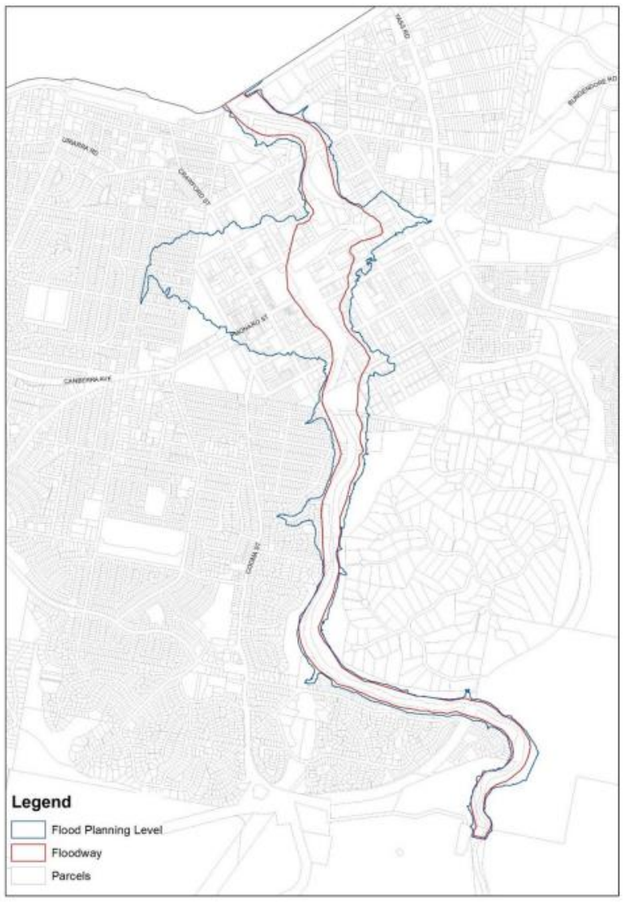


Figure 5: Queanbeyan Flood Planning Area Map (Source: QPRC DCP (2012))

3.4 Overland Flow Paths

If the piped in-ground stormwater system fails due to blockage or other obstruction, stormwater flows will be required to be conveyed as overland flow. The overland flow is to be directed away from buildings and towards the site's boundary.

Overland flow paths will be sized to accommodate the 1% AEP storm flows and not exceed safe Depth x Velocity products of 0.4m^2/s for pedestrians and vehicles.

3.5 Water Sensitive Urban Design (WSUD)

Water Sensitive Urban Design typically includes water reuse, pollutant removal via natural systems, and the minimisation of hard structures to control stormwater and improve aesthetic and recreational appeal.

Where possible, WSUD principles are incorporated into the stormwater design. Although, as standing water poses waterborne health risk, careful attention to the WSUD type and how it is incorporated has been undertaken.

3.6 Stormwater Quality Mitigation Measures

Part D7.21 of QPRC's Development Design Specification D7 – Erosion Control and Stormwater Management (2018) sets out the requirements for treatment of the stormwater prior to discharge into the Council system. The guidelines require all developments to achieve a minimum percentage reduction of the post development average annual load of pollutants. The targets for stormwater treatment are available in **Table 2**.

Table 2: Pollutant Reduction Targets Requirements as per QPRC Development Design Specification D7

Pollutant	Performance Requirements
Litter	100% retention of litter greater than 5mm for flows up to the 3-month ARI peak flow.
Suspended Solids (SS)	80% retention of average annual load.
Total Phosphorus (TP)	65% retention of average annual load.
Total Nitrogen (TN)	65% retention of average annual load.

The safety of the school population is to be considered when designing the stormwater treatment train. Consequently, mechanical (in lieu of natural removal) pollutant removal devices are incorporated to remove gross pollutants, suspended solids, reduce nutrient runoff including nitrogen and phosphorous.

The pollution control devices will require on-going maintenance. Pollutant removal devices will require at least a yearly inspection and maintenance.

It is proposed that a series of pollution control devices will need to be provided to remove contamination from stormwater runoff to the required level prior to discharge. It is expected that the devices will include, litter screens in all pits and an end of line treatment device to remove nitrogen & phosphorus contaminants etc., prior to discharge to the Authority's

stormwater system. This system is preferred as it will be able to achieve pollutant reductions required, is easily maintained, and does not require large open areas or pose safety risk to the school population.

3.7 *MUSIC Model*

A MUSIC Model has been developed for each stage of the development in accordance with the NSW WSUD Developer Handbook 2015 and QPRC's Development Design Specification D7 to indicate the suitability of the proposed WSUD measures on the site. The proposed water quality control devices for the site are:

- 9 OceanProtect OceanGuard pit inserts across the site,
- Twenty-Four AtlanFilter – Full Height cartridges within an 8.2m^2 stormfilter chamber within the 306m^3 OSD tank, and
- Twelve AtlanFilter – Full Height cartridges within a 3.8m^2 stormfilter chamber within the 313.5m^3 OSD tank.

The results of the MUSIC model confirmed the ability of the above devices to reduce the pollutants discharged from the site to below the requirements described by council. The results comparison is available in **Table 3** below.

Table 3: Pollutant Reduction MUSIC Results Comparison

Pollutant	Performance Requirement	Performance Result
Litter	100%	~99.9%
Suspended Solids (SS)	80%	89.1%
Total Phosphorus	65%	76.8%
Total Nitrogen	65%	67.8%

Further detail of the MUSIC models is available in **Appendix A**.

4 Erosion and Sediment Control Mitigation Measures

During construction and while the site is disturbed, erosion prevention and sediment control measures will be required. Erosion prevention generally involves managing stormwater by diverting overland flow around construction areas as well as collecting stormwater within the construction zone and directing to sediment control devices. Devices likely to be incorporated are silt removal fences, hay bales, catch drains, and water flow dissipation and discharge control devices such as sandbags, pollution mattresses, and sedimentation basins.

Erosion prevention and sediment removal strategies need to be inspected regularly during construction works, cleaned, and maintained after storm events, and modified to suit construction work progress, decanting and demolition.

Erosion and sediment controls are to be designed, constructed, and installed in accordance with Managing Urban Stormwater: Soils and construction - Volume 1 and maintained until the site is fully stabilised to prevent pollution of the receiving environment. An erosion and sediment control plan will be provided in the civil drawing set.

The current erosion and sediment control plan has been designed in accordance with *Managing Urban Stormwater* guidelines. It includes measures such as silt fences, catch drains, a silt fence around the existing pit, and a construction entry/exit with a shaker grid to manage and divert soil erosion during construction. These measures direct sediment into the proposed sediment basin, located at the site of the planned OSD tank, offering a cost-efficient solution by reducing excavation expenses. The final size of the sediment basin will be confirmed during the construction phase. With these controls in place, downstream impacts from construction are unlikely. An erosion and sediment control plan is included in the civil drawing set.

5 Civil Design

5.1 Pavements

Pavement design is to meet the requirements of the geotechnical investigation provided by Douglas Partners (ref: 224779.00. R.004.Rev 1 dated 15 February 2024). Pavement will also be designed to the requirements of ESFG and Austroads guidelines for vehicular pavements. The following items are applicable:

- All pavements to be designed for a 25-year life
- For other vehicular traffic areas design for 1.0 x 10^5 repetitions of a standard axle load, as defined by AUSTROADS.
- Allow for movements in the foundations caused by moisture variations and mine subsidence.
- Design rigid pavements so there is no vertical differential movement between panels at joints.
- For truck turning areas pavements shall be rigid in construction and finished with a reinforced concrete surface.
- For other areas pavements may be either flexible or rigid in construction. For flexible construction finish with a surface coat of asphaltic concrete.
- Breccia or dolerite is not to be used in road base or concrete mix.
- Non-skid finish for vehicular trafficked pavements
- Non-slip finish for pedestrian trafficked pavements, including carpark
- AC for roads and parking to be AC10 and have minimum thickness of 40mm or greater as the design requires.
- AC for games courts to be AC5 and have minimum thickness of 25mm levelling course plus 25mm surface course or greater as the design requires.
- Limit fly ash content to 20% of cementitious content of mix by weight.
- For roads and parking areas concrete shall have minimum 32 MPa characteristic compressive strength.
- For rigid method of construction finish with a reinforced concrete surface.
- Concrete pavements for vehicles shall be a minimum 150mm thick and reinforced with not less than SL92 mesh at top and 100 mm thick road base.
- Other concrete pavements shall be a minimum 100mm thick and reinforced with no less than SL72 mesh at top.
- Provide a thicker pavement and heavier mesh as the design requires and to meet durability requirements for minimum cover to reinforcement.
- For flexible construction finish with a surface coat of asphaltic concrete.
- Paving is to fall away from the buildings and covered areas.
- Finished vertical grades to be limited to < 1 in 10. Provide vertical curves where change of grade exceeds 3%. Provide cross-falls, as required.

Integration with all engineering and building systems, including services and traffic components, will continue to be coordinated through the upcoming phases. All stormwater drainage will be outside of the building extents and will require no structural penetrations.

6 *Conclusion*

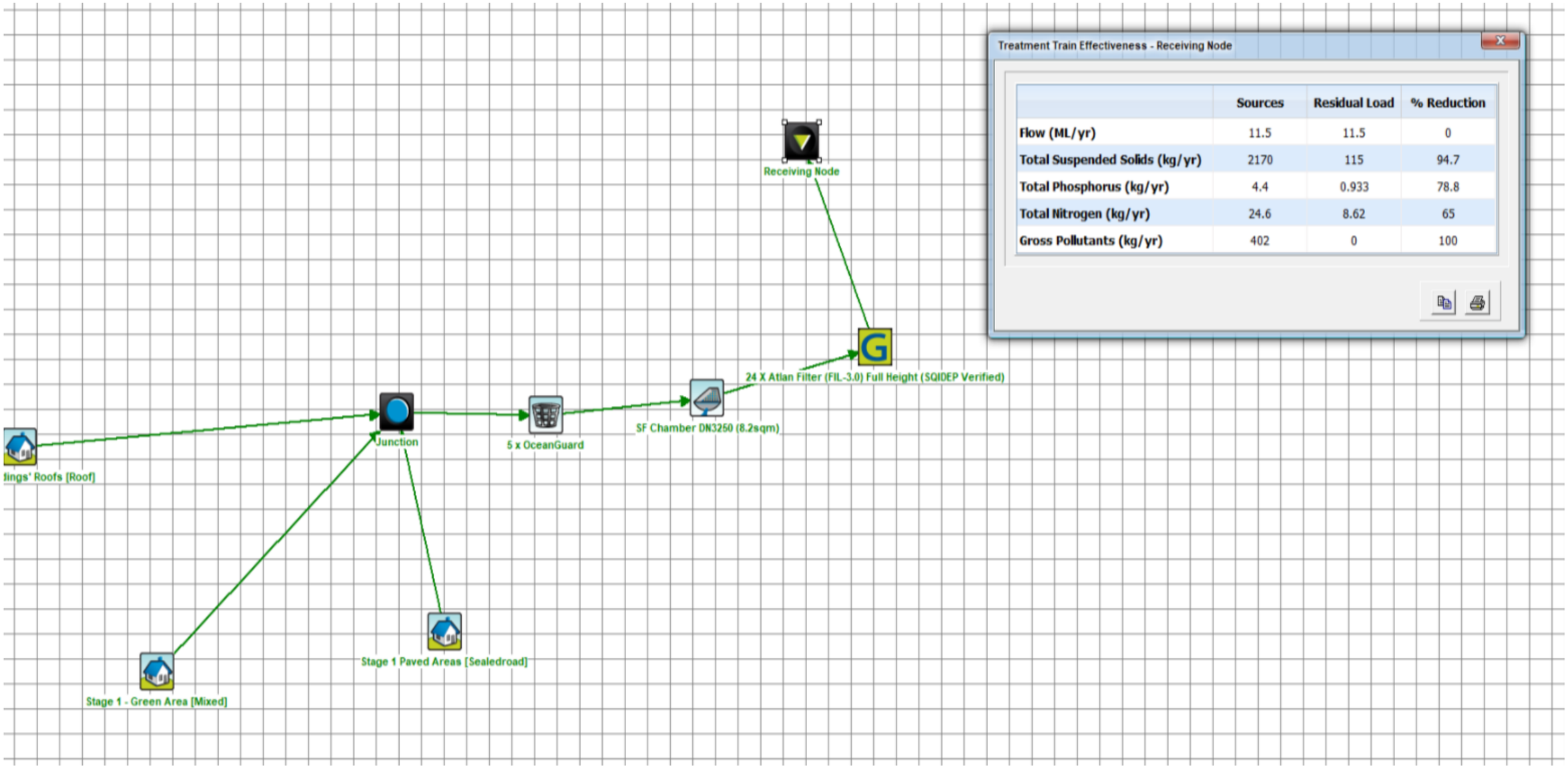
The civil works associated with the design of the new Googong High School has been carried out in accordance with normal engineering practice and will meet the requirements of relevant standards.

Erosion and sediment control measures are to be put in place during construction to prevent contamination of the downstream stormwater system and tracking of grit and sediment onto the driveway.

In conclusion, as discussed earlier in this report, the implementation of the recommended mitigation measures—including bulk earthworks, soil erosion control, and stormwater quantity and quality management—ensures that the proposed activity is unlikely to have a significant environmental impact related to stormwater, soil, or general civil matters.

APPENDIX A: MUSIC MODEL RESULTS

WATER QUALITY MUSIC MODEL AND RESULTS



Treatment Train Effectiveness - Receiving Node

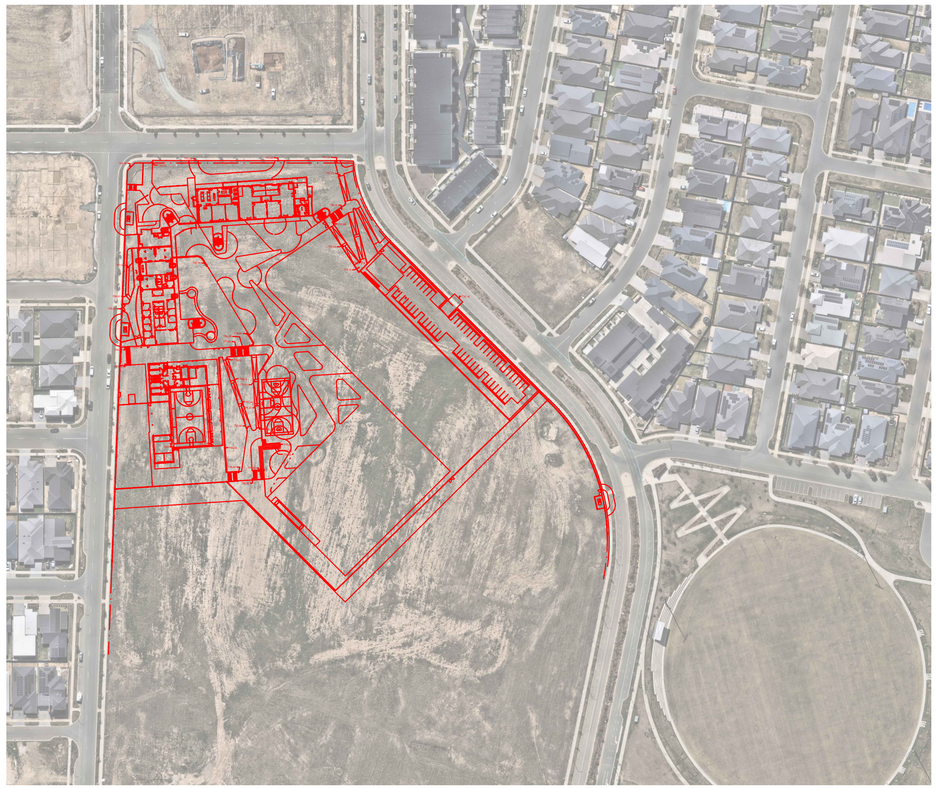
	Sources	Residual Load	% Reduction
Flow (ML/yr)	11.5	11.5	0
Total Suspended Solids (kg/yr)	2170	115	94.7
Total Phosphorus (kg/yr)	4.4	0.933	78.8
Total Nitrogen (kg/yr)	24.6	8.62	65
Gross Pollutants (kg/yr)	402	0	100

APPENDIX B: CIVIL DRAWINGS

enstruct
CIVIL ENGINEERING WORKS

GOOGONG HIGH SCHOOL

200 Wellsvale Drive, Googong NSW 2620



CIVIL ENGINEERING WORKS DRAWING LIST:

CV-0001	COVER SHEET
CV-1001	NOTES SHEET
CV-2001	EROSION AND SEDIMENT CONTROL PLAN AND DETAILS SHEET
CV-2100	BULK EARTHWORKS PLAN AND LONGITUDINAL SECTION
CV-3001	PAVEMENT AND SITE WORKS PLAN
CV-3100	PAVEMENT AND SITE WORKS DETAILS
CV-4101	STORMWATER DRAINAGE PLAN
CV4110	STORMWATER DRAINAGE DETAIL SHEET 1
CV4111	STORMWATER DRAINAGE DETAIL SHEET 2
CV4112	STORMWATER DRAINAGE DETAIL SHEET3

TO BE PRINTED IN FULL COLOUR

NOT FOR CONSTRUCTION

Date generated: 29/11/2024 9:09:51 AM \\CORP.PRWAN.NET\NZPROJECTS\AU\PS140XX\PS140230_SINSW\04172\BIDBOX\04_MIP\BIM\PROPERTY\CV_CIVIL\2D\CV-0001

rev	date	description	drn	ch'k
B	29/11/24	ISSUE FOR REF	RGU	RGU
A	15/11/24	ISSUE FOR TENDER	RGU	RGU

rev	date	description	drn	ch'k

NSW GOVERNMENT Education School Infrastructure

enstruct group pty ltd

Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia

Telephone (02) 8904 1444
Facsimile (02) 8904 1555
www.enstruct.com.au

enstruct

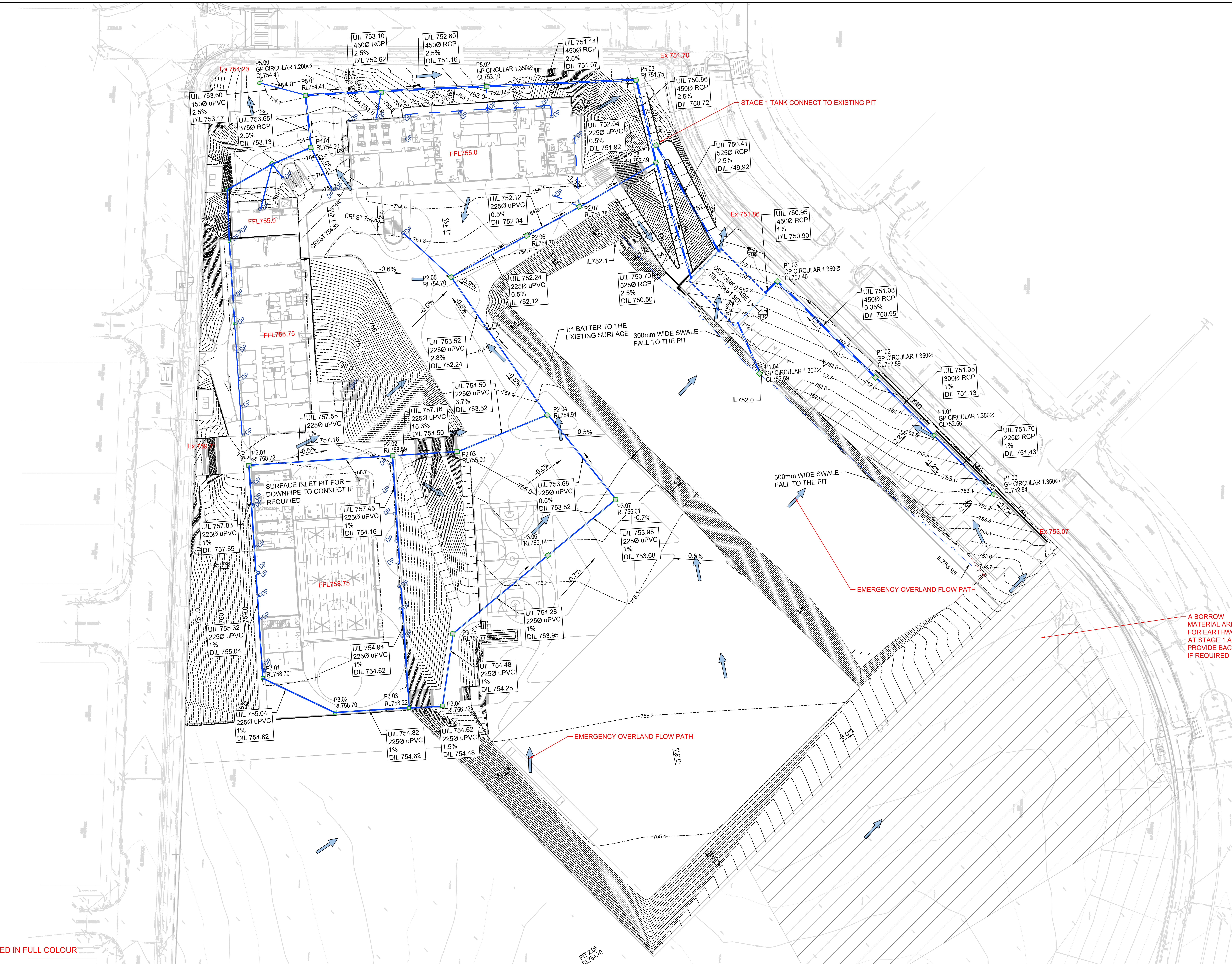
project: GOOGONG HIGH SCHOOL

drawing title: COVER SHEET

status: FOR REF

scale at A1	drawn	checked	approved
	RGU	RGU	PAL

project no.	sheet	rev.
PS140230	CV-0001	B



LEGEND

EX.D	EXISTING DRAINAGE
EX.W	EXISTING WATER
EX.E H/V	EXISTING ELECTRICAL HIGH VOLTAGE
EX.E O/H	EXISTING ELECTRICAL OVERHEAD
EX.G	EXISTING GAS
EX.COMM	EXISTING COMMUNICATIONS
EX.S	EXISTING SEWER
225Ø	STORMWATER DRAINAGE PIPE (PIPE TYPE - 150-300Ø uPVC, 375-450Ø RCP, 525Ø+ RCP UNO)
DP	DOWNPIPE
GP	STORMWATER PIT (900X900 UNO (ALL SURFACE INLET PITS TO BE FITTED WITH STORWATER 360 ENVIROPODS UNO)
JP	JUNCTION PIT
	TRENCH GRATE
19.00	EXISTING CONTOUR
>	PROPOSED SWALE
	HEADWALL & ROCK BEACHING

TO BE PRINTED IN FULL COLOUR

NOT FOR CONSTRUCTION

rev	date	description	drn	ch'k
E	29/11/24	ISSUE FOR REF	RGU	RGU
D	13/11/24	FOR TENDER	RGU	RGU
C	27/09/24	FOR INFORMATION	RGU	RGU
B	18/09/24	FOR INFORMATION	RGU	RGU
A	06/09/24	FOR INFORMATION	RGU	RGU

NSW GOVERNMENT Education School Infrastructure

enstruct group pty ltd
Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia

Telephone (02) 8904 1444
Facsimile (02) 8904 1555
www.enstruct.com.au
enstruct

project
NEW HIGH SCHOOL FOR GOOGONG

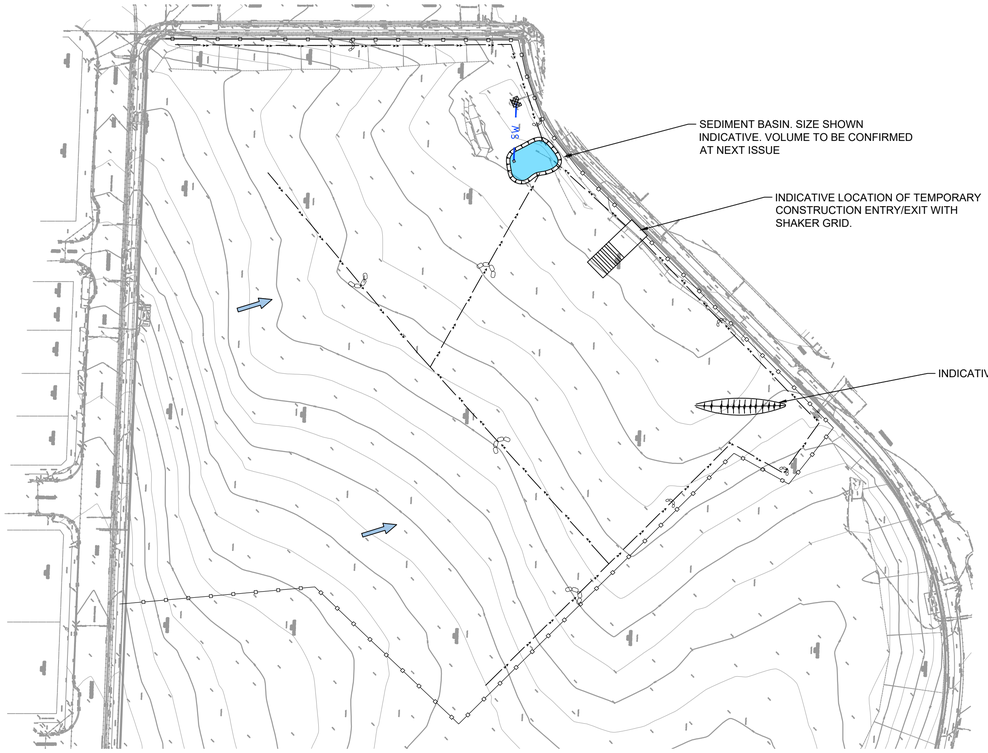
drawing title
STORMWATER DRAINAGE PLAN

status
TENDER ADDENDUM

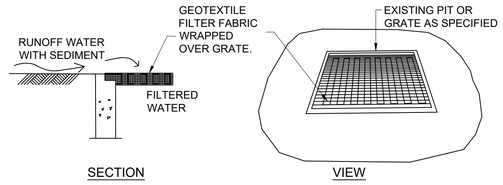
scale at A1	drawn	checked	approved
1:500	JAN	RGU	PAL

project no.	sheet	rev.
PS140230	CV-4101	E

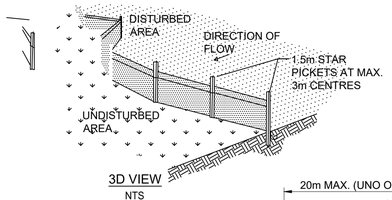
Date generated 5/02/2025 1:53:52 PM \\CORP.PBWAN.NET\ANZ\PROJECTS\AU\PS140XXX\PS140230_SINSWO547123B2BGO\4_WIP\BIM\PROPERTY\CV_CIVIL\2D\CV-4101



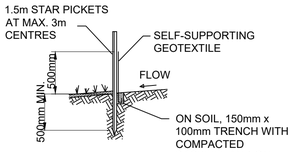
PLAN



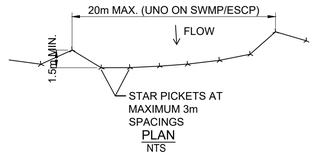
PIT GEOTEXTILE FILTER
NTS



3D VIEW
NTS



SECTION
SCALE 1:40

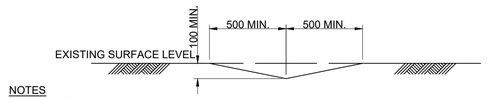


PLAN
NTS

SILTATION FENCE DETAIL

NOTES
1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE.
2. DRIVE 1.5m LONG STAR PICKETS INTO GROUND, 3 METRES APART.
3. DIG A 200mm 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 150mm OVERLAP.

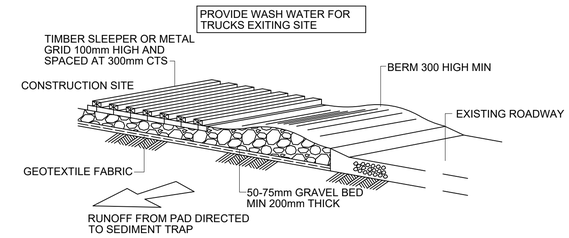
SANDBAG SEDIMENT TRAP
NTS



NOTES
1. CATCH DRAIN TO HAVE A LONGITUDINAL GRADIENT OF 1% MINIMUM, AND 5% MAXIMUM.
2. RUNOFF FROM CATCH DRAIN TO BE DIRECTED TO SUITABLE SEDIMENT FILTER OR SEDIMENT TRAP.

TYPICAL SECTION THROUGH CATCH DRAIN ON A FLAT TERRAIN

SCALE 1:20



TEMPORARY CONSTRUCTION VEHICLE EXIT

NTS

LEGEND

- Siltation Fence
- Sandbag Sediment Trap
- Overland Flow Path
- Catch Drain
- Stormwater pit, with Geotextile filter

EROSION AND SEDIMENT CONTROL NOTES

1. 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").
2. 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.
3. Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
4. When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
5. Minimise the area of site being disturbed at any one time.
6. Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
7. 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.
8. Control water from upstream of the site such that it does not enter the disturbed site.
9. All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
10. All vehicles leaving the site shall be cleaned and inspected before leaving.
11. Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
12. Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

1. Prior to commencement of excavation the following soil management devices must be installed.
1.1. Construct silt fences below the site and across all potential runoff sites.
1.2. Construct temporary construction entry/exit and divert runoff to suitable control systems.
1.3. Construct measures to divert upstream flows into existing stormwater system.
1.4. Construct turf lined swales.
1.5. Provide sandbag sediment traps upstream of existing pits.
2. Construct geotextile filter pit surround around all proposed pits as they are constructed.
3. On completion of pavement provide sand bag kerb inlet sediment traps around pits.

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 environment 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.

TO BE PRINTED IN FULL COLOUR

NOT FOR CONSTRUCTION

rev	date	description	drn	ch'k
C	29.11.24	ISSUE FOR REF	RGU	RGU
B	15.11.24	FOR TENDER	RGU	RGU
A	20.09.24	FOR INFORMATION	RGU	RGU

Education School Infrastructure

enstruct group pty ltd
Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia
Telephone (02) 8904 1444
Facsimile (02) 8904 1555
www.enstruct.com.au

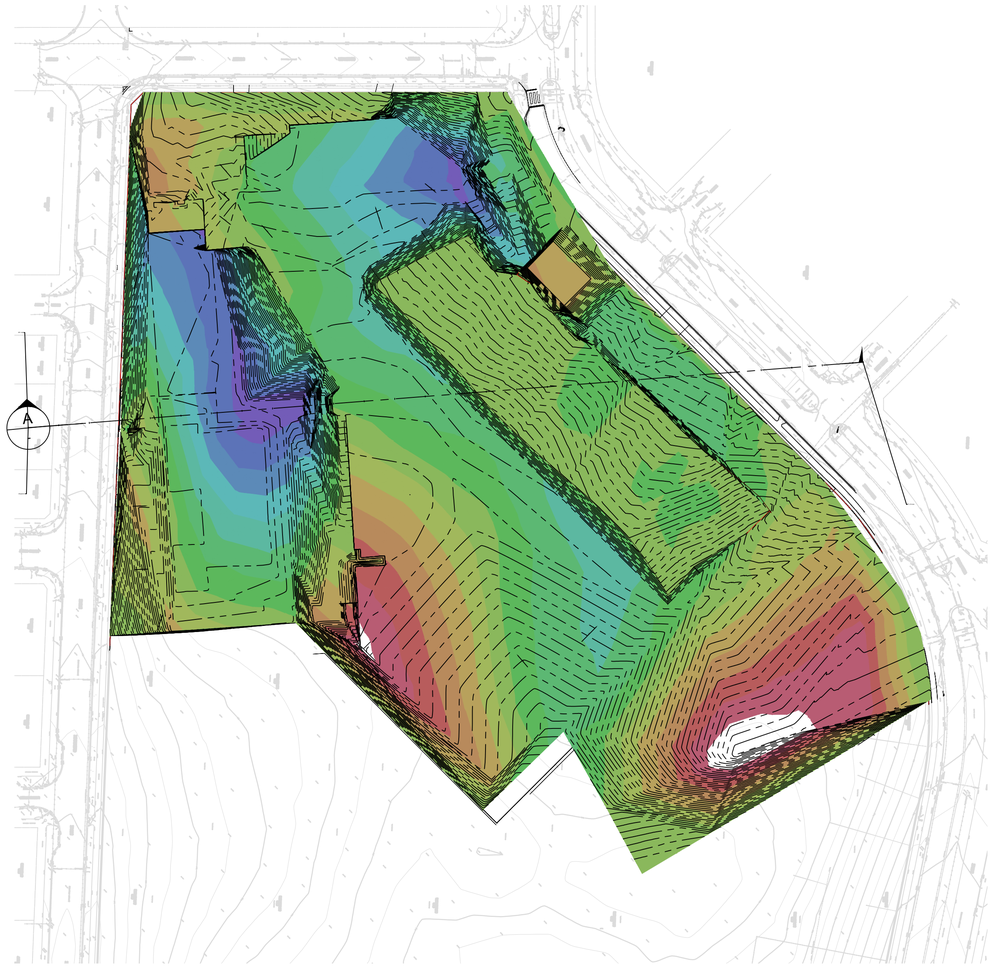
project: GOOGONG HIGH SCHOOL

drawing title: EROSION & SEDIMENT CONTROL PLAN STAGE

status: FOR REF

scale at A1	drawn	checked	approved
1:1000	RG	RG	PAL

project no.	sheet	rev.
PS140230	CV-2001	C



PLAN

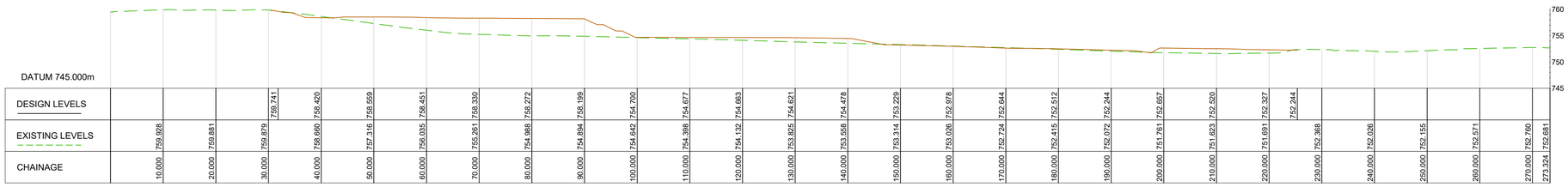
STAGE 1: ASSUMED BLOCK A , B SLAB THICKNESS IS 230mm. AND HALL THICKNESS 120mm

WORKS	VOLUME
PROPOSED STRUCTURES AND PAVEMENT. (-300mm) ESTIMATE #	24,838m³ (cut) 24,823m³ (fill) NET: 14.3m³ (cut)
STRIPPING (-200mm) ESTIMATE	8200m³ (CUT)

\# ADDITIONAL ALLOWANCE FOR PILING PAD IF REQUIRED.
ANY BULK FACTORS TO GEOTECHNICAL INVESTIGATION
VOLUME SUBJECT TO THE GEOTECHNICAL REPORT

NOTE: ANY IN-SITU OR REUSED FILL MATERIAL MUST BE EXCAVATED AND RECOMPACTED IN ACCORDANCE WITH THE CIVIL SPECIFICATION. THE VOLUME OF CUT/FILL MATERIAL SHOULD BE CONSIDERED WITH RESPECT TO THE GEOTECHNICAL CONDITIONS ON SITE AND MAY REQUIRE FURTHER GEOTECHNICAL INVESTIGATION.

Surface Analysis: Elevation Ranges			
Number	Color	Minimum Elevation (m)	Maximum Elevation (m)
1		-3.000	-2.500
2		-2.500	-2.000
3		-2.000	-1.500
4		-1.500	-1.000
5		-1.000	-0.500
6		-0.500	0.000
7		0.000	0.500
8		0.500	1.000
9		1.000	1.500
10		1.500	2.000
11		2.000	2.500
12		2.500	3.000
13		3.000	3.500
14		3.500	4.000



LONG SECTION

TO BE PRINTED IN FULL COLOUR

NOT FOR CONSTRUCTION

Date generated 5/02/2025 3:03:14 PM I:\CORP PROJECTS\NZ\PROJECTS\AU\PS140XX\PS140230_SINSW\05411239\BIM\PROPERTY\CV_CIVIL\2D\CV-2100

rev	date	description	drn	ch'k
F	15/11/24	ISSUE FOR TENDER	RGU	RGU
E	09/10/24	FOR INFORMATION	RGU	RGU
D	18/09/24	FOR INFORMATION	RGU	RGU
C	13/09/24	FOR INFORMATION	RGU	RGU
B	07/08/24	FOR INFORMATION	RGU	RGU
A	05/07/24	FOR INFORMATION	RGU	RGU

rev	date	description	drn	ch'k
G	29/11/24	ISSUE FOR REF	RGU	RGU

NSW GOVERNMENT Education School Infrastructure

enstruct group pty ltd

Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia

Telephone (02) 8904 1444
Facsimile (02) 8904 1555
www.enstruct.com.au

enstruct

project: NEW HIGH SCHOOL FOR GOOGONG

drawing title: BULK EARTHWORKS PLAN AND LONGITUDINAL SECTION

status: TENDER ADDENDUM

scale at A1	drawn	checked	approved
1:500	JAN	RGU	PAL

project no.	sheet	rev.
PS140230	CV-2100	G

PAVEMENT & SITE WORKS LEGEND

NOTES:

1. ASPHALTIC CONCREET SHALL CONFORM TO AS2150 AND THE SPECIFICATION

PAVEMENT TYPE 1
ASPHALTIC CARPARK
P1
BEL
ASSUMED CBR 3% min.

40MM THICKNESS ASPHALTIC CONCREET (AC10)
120MM COMPACETD THICKNESS FINE CRUSHED ROCK (DGB20)
220MM COMPACETD THICKNESS FINE CRUSHED ROCK (DGS40)

PAVEMENT TYPE 2
PEDESTRIAN FOOTPATH
P2
BE
ASSUMED CBR 3% min.

CONFIRM WITH LANDSCAPE ARCHIETCT FOR THE FINISHES
110MM THICKNESS CONCREET (F'C=25MPA) WITH EXPANSION JOINTS AT MAX 6.0M CENTRES AND WEAKENED PLANE JOINTS AT MAX 1.5M CENTRES
75MM COMPACETD THICKNESS FINE CRUSHED ROCK (DGB20)

PAVEMENT TYPE 3
OSD TANK CEILING SLAB
P3

REFER OSD TANK DETAIL FOR INFORMATION

PAVEMENT TYPE 4
LANDSCAPING AREA
P4

PAVEMENT TYPE 5
DRIVEWAY
P5
BE

125mm THICKNESS CONCREET (F'C=25MPA) WITH SL72 (40mm COVER MIN.)
75MM COMPACETD THICKNESS FINE CRUSHED ROCK (DGB20)

FK — FLUSH KERB

KG — KERB AND GUTTER

RW1 — RETAINING WALL 1 REFER TO DRAWING 3100 FOR DETAILS

RW2 — SANDSTONE RETAINING WALL REFER TO DRAWING 3100 FOR DETAILS

RW3 — RETAINING WALL 3 REFER TO STRUCTURAL ENGINEER'S DRAWING FOR DETAILS

WS — CROSS WHEEL STOP

TO BE PRINTED IN FULL COLOUR

NOT FOR CONSTRUCTION

Date generated: 5/02/2025 2:42:48 PM \\CORP.PBWAN.NET\ANZPROJECTS\AU\PS140XX\PS140230_SNSW\04712\BIM\BIGCH4_MPBIM\PROPERTY\CV_CIVIL\2D\CV-3001

rev	date	description	drn	ch'k
E	29/11/24	ISSUE FOR REF	RGU	RGU
D	13/11/24	FOR TENDER	RGU	RGU
C	27/09/24	FOR INFORMATION	RGU	RGU
B	18/09/24	FOR INFORMATION	RGU	RGU
A	06/09/24	FOR INFORMATION	RGU	RGU

rev	date	description	drn	ch'k

NSW GOVERNMENT Education School Infrastructure

enstruct group pty ltd
Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia
Telephone (02) 8904 1444
Facsimile (02) 8904 1555
www.enstruct.com.au
enstruct

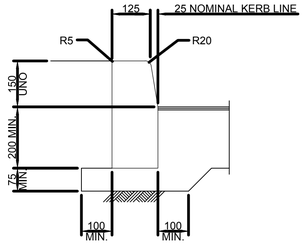
project: NEW HIGH SCHOOL FOR GOOGONG

drawing title: PAVEMENT AND SITEWORKS PLAN

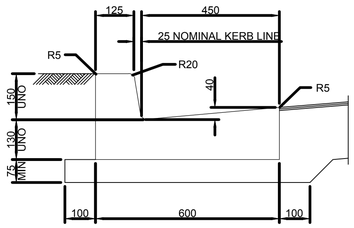
status: TENDER ADDENDUM

scale at A1	drawn	checked	approved
AS SHOWN	JAN	RGU	PAL

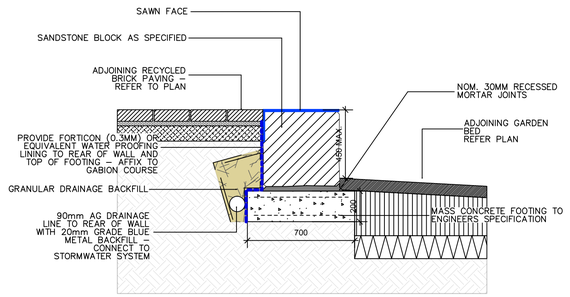
project no.	sheet	rev.
PS140230	CV-3001	E



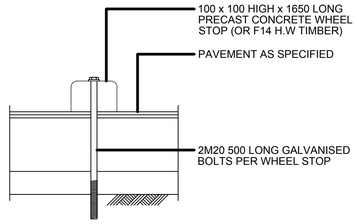
KERB ONLY (KO)
SCALE 1:10



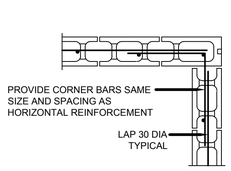
KERB AND GUTTER (K&G)
SCALE 1:10



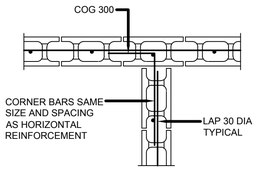
RETAINING WALL (RW2)
SCALE 1:20



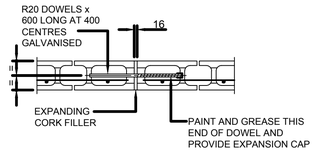
WHEEL STOP IN ASPHALT PAVEMENT
SCALE 1:10



CORNER

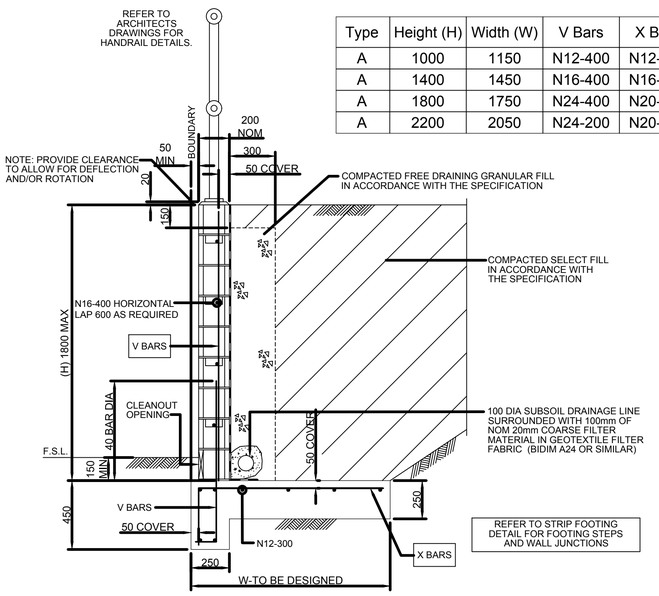


INTERSECTION



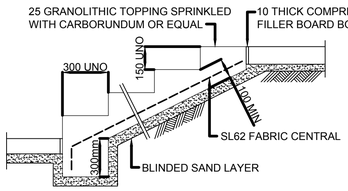
WALL JOINT DETAIL
(8000 MAX. CTS U.N.O.)

BLOCK WORK WALL JUNCTION DETAILS
SCALE 1:20

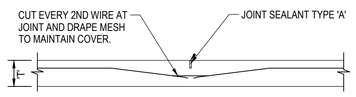


Type	Height (H)	Width (W)	V Bars	X Bars
A	1000	1150	N12-400	N12-400
A	1400	1450	N16-400	N16-400
A	1800	1750	N24-400	N20-400
A	2200	2050	N24-200	N20-400

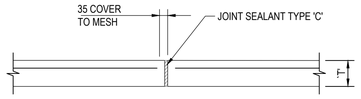
RETAINING WALL (RW1)
SCALE 1:20



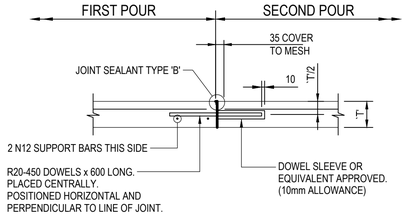
CONCRETE STAIRS WITH KEY
SCALE 1:20



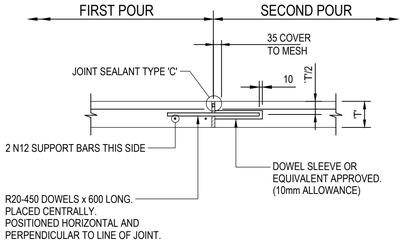
SAWCUT JOINT
DENOTED S.J. ON PLAN
(NTS)
SAWCUT WITHIN 4-12 HOURS



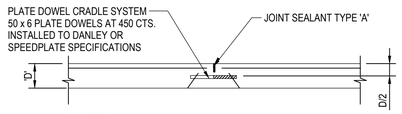
ISOLATION JOINT
DENOTED I.J. ON PLAN
(NTS)



DOWELLED JOINT
DENOTED D.J. ON PLAN
(NTS)

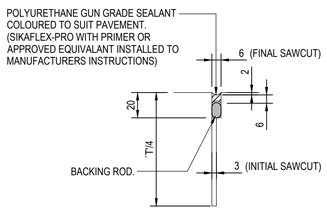


DOWELLED EXPANSION JOINT
DENOTED D.E.J. ON PLAN
(NTS)

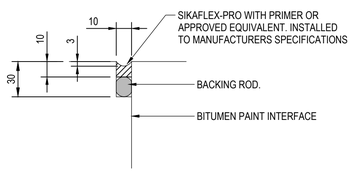


NOTES
1. SAWCUT WITHIN 12 - 18 HOUR PERIOD AFTER CONCRETE IS FINISHED, UNLESS AGREED OTHERWISE BY THE ENGINEER.
2. JOINT FILLING TO BE IN ACCORDANCE WITH CONCRETE SPECIFICATION. REFER JOINT FILLER DETAILS, BELOW.
3. NO SOFT CUTS PERMITTED.

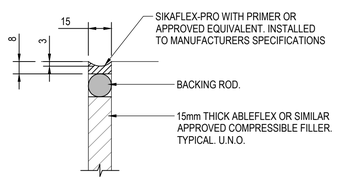
PLATE DOWELLED JOINT
DENOTED P.D.J. ON PLAN



TYPE 'A' (6mm)
(1:2)



TYPE 'B' (10mm)
(1:2)



TYPE 'C' (15mm)
(1:2)

TO BE PRINTED IN FULL COLOUR

NOT FOR CONSTRUCTION

rev	date	description	drn	ch'k
B	29/11/24	ISSUE FOR REF	RGU	RGU
A	15/11/24	FOR TENDER	RGU	RGU

NSW GOVERNMENT Education School Infrastructure

enstruct group pty ltd
Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia
Telephone (02) 8904 1444
Facsimile (02) 8904 1555
www.enstruct.com.au
enstruct

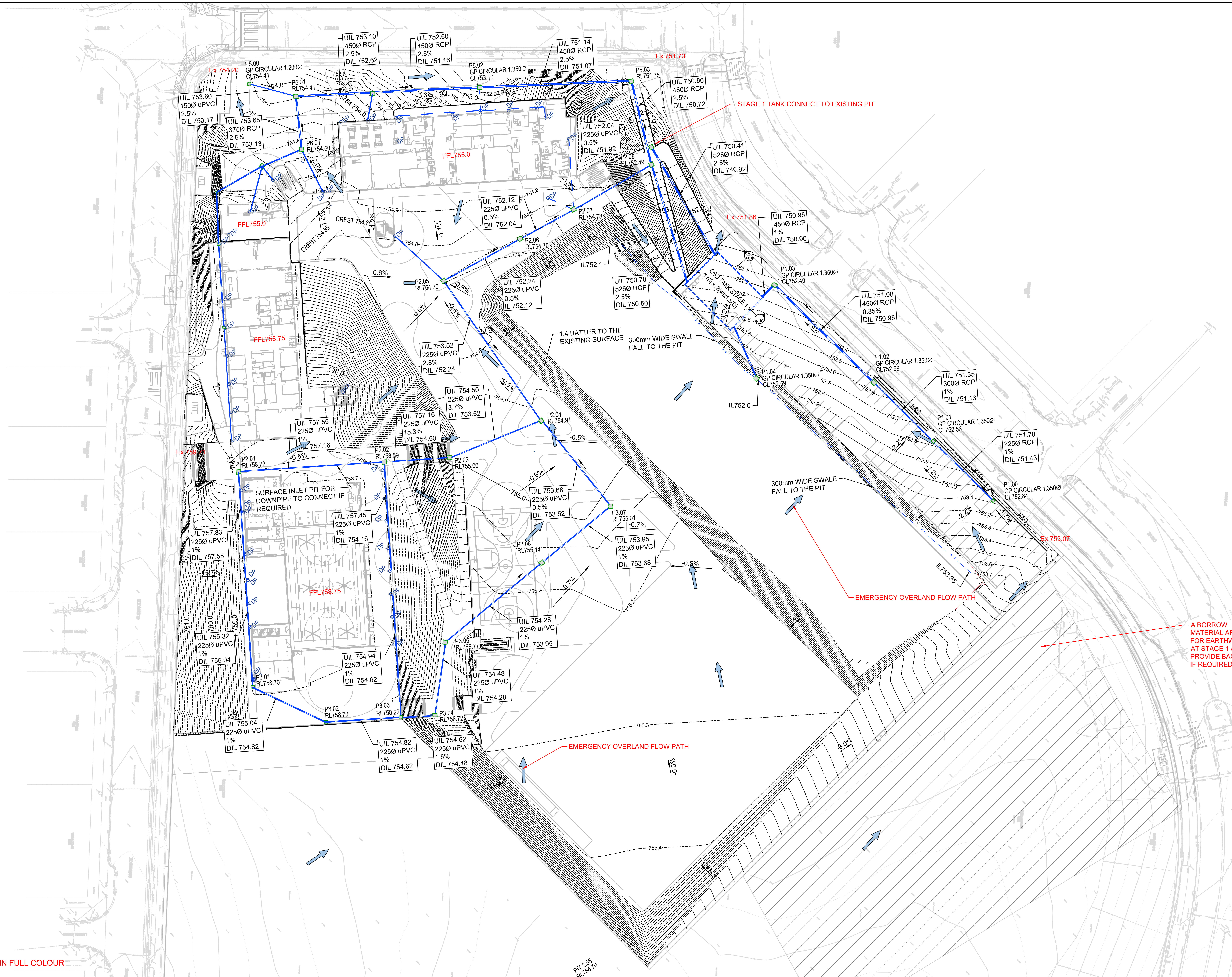
project: GOOGONG HIGH SCHOOL

drawing title: SITEWORKS DETAILS

status: FOR REF

scale at A1	drawn	checked	approved
1:500	RGU	RGU	PAL

project no.	sheet	rev.
PS140230	CV-3100	B



LEGEND

— — — EX.D —	EXISTING DRAINAGE
— — — EX.W —	EXISTING WATER
— — — EX.E H/V —	EXISTING ELECTRICAL HIGH VOLTAGE
— — — EX.E O/H —	EXISTING ELECTRICAL OVERHEAD
— — — EX.G —	EXISTING GAS
· — — EX.COMM ·	EXISTING COMMUNICATIONS
— — — EX.S —	EXISTING SEWER
← 225Ø	STORMWATER DRAINAGE PIPE (PIPE TYPE - 150-300Ø uPVC, 375-450Ø RCP, 525Ø+ RCP UNO)
DP	DOWNPIPE
GP ▥	STORMWATER PIT (900X900 UNO (ALL SURFACE INLET PITS TO BE FITTED WITH STORWATER 360 ENVIROPODS UNO)
JP ▣	JUNCTION PIT
▭▭▭▭	TRENCH GRATE
— — 19.00 —	EXISTING CONTOUR
—— > ——	PROPOSED SWALE
	HEADWALL & ROCK BEACHING

TO BE PRINTED IN FULL COLOUR

NOT FOR CONSTRUCTION

Date generated 5/02/2025 1:53:52 PM \\CORP.PBWAN.NET\ANZ\PROJECTS\AU\PS140XXX\PS140230_SINSWO547123B2BGO\4_WIP\BIM\PROPERTY\CV_CIVIL\2D\CV-4101

rev	date	description	drn	ch'k
E	29/11/24	ISSUE FOR REF	RGU	RGU
D	13/11/24	FOR TENDER	RGU	RGU
C	27/09/24	FOR INFORMATION	RGU	RGU
B	18/09/24	FOR INFORMATION	RGU	RGU
A	06/09/24	FOR INFORMATION	RGU	RGU

rev	date	description	drn	ch'k

NSW GOVERNMENT Education School Infrastructure

enstruct group pty ltd

Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia

Telephone (02) 8904 1444
Facsimile (02) 8904 1555
www.enstruct.com.au

enstruct

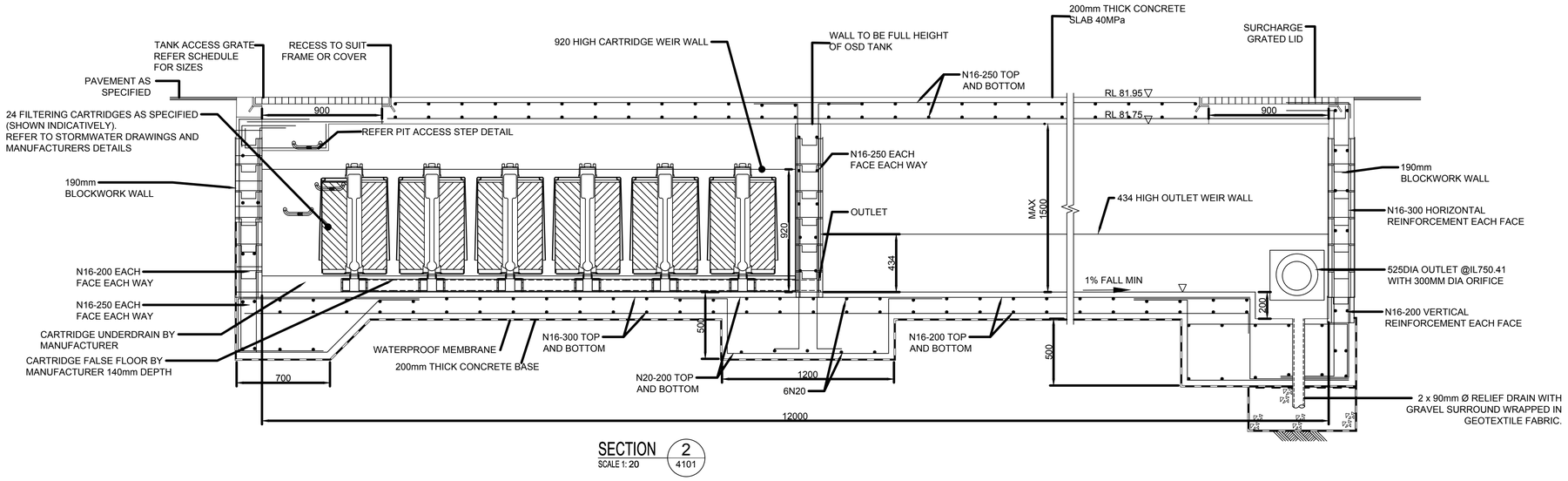
project
NEW HIGH SCHOOL FOR GOOGONG

drawing title
STORMWATER DRAINAGE PLAN

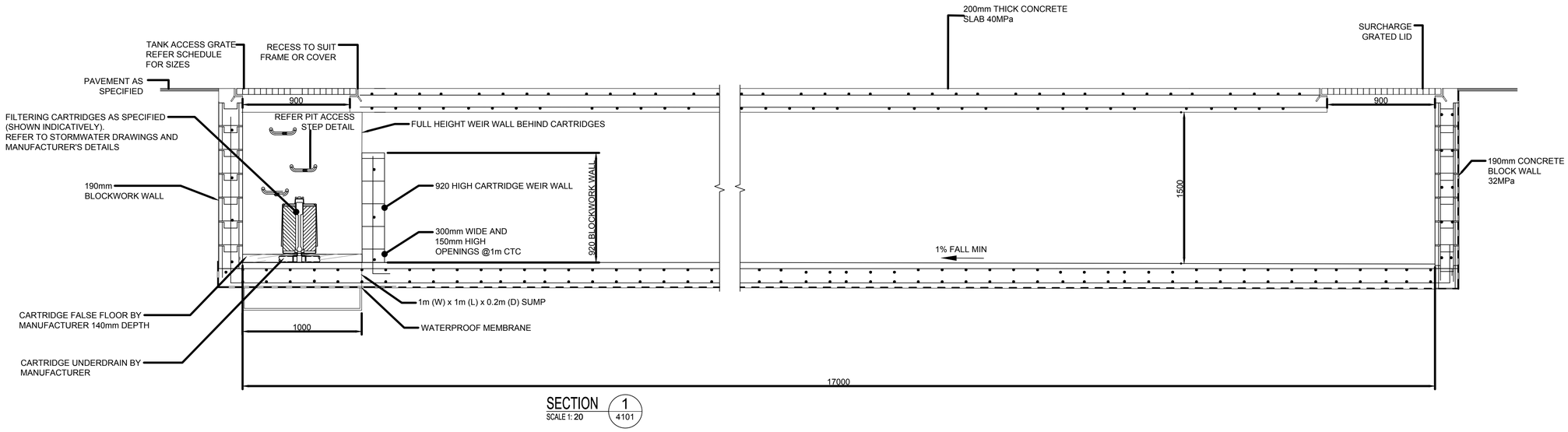
status
TENDER ADDENDUM

scale at A1	drawn	checked	approved
1:500	JAN	RGU	PAL

project no.	sheet	rev.
PS140230	CV-4101	E



SECTION 2
SCALE 1: 20
4101



SECTION 1
SCALE 1: 20
4101

TO BE PRINTED IN FULL COLOUR

NOT FOR CONSTRUCTION

rev	date	description	drn	ch'k
B	29/11/24	ISSUE FOR REF	RGU	RGU
A	15/11/24	FOR TENDER	RGU	RGU

rev	date	description	drn	ch'k

NSW GOVERNMENT Education School Infrastructure

enstruct group pty ltd

Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia

Telephone (02) 8904 1444
Facsimile (02) 8904 1555
www.enstruct.com.au

enstruct

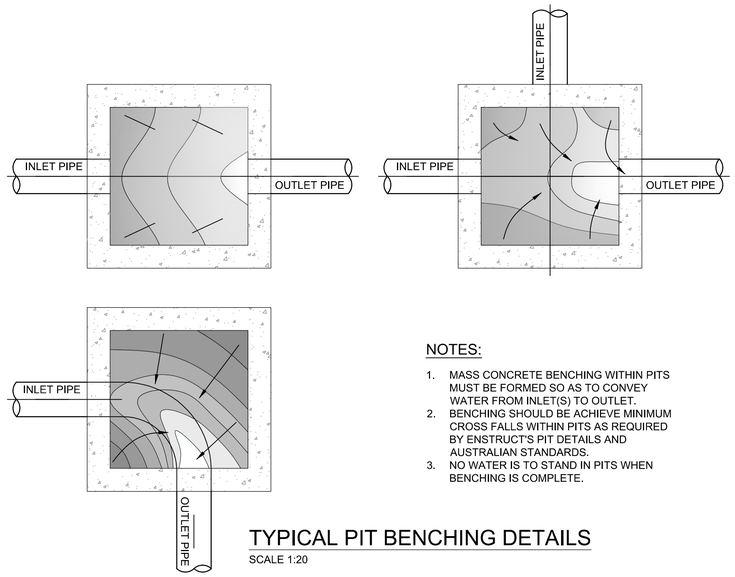
project: GOOGONG HIGH SCHOOL

drawing title: STORMWATER DRAINAGE DETAIL SHEET 1

status: FOR REF

scale at A1	drawn	checked	approved
1:500	RGU	RGU	PAL

project no.	sheet	rev.
PS140230	CV-4110	B

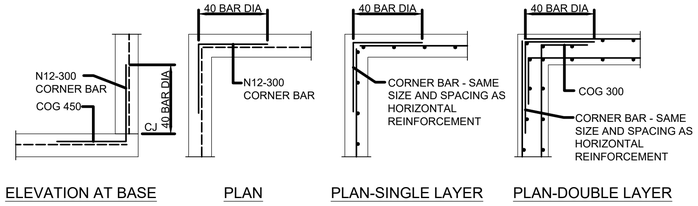


NOTES:

1. MASS CONCRETE BENCHING WITHIN PITS MUST BE FORMED SO AS TO CONVEY WATER FROM INLET(S) TO OUTLET.
2. BENCHING SHOULD BE ACHIEVE MINIMUM CROSS FALLS WITHIN PITS AS REQUIRED BY ENSTRUCT'S PIT DETAILS AND AUSTRALIAN STANDARDS.
3. NO WATER IS TO STAND IN PITS WHEN BENCHING IS COMPLETE.

TYPICAL PIT BENCHING DETAILS

SCALE 1:20

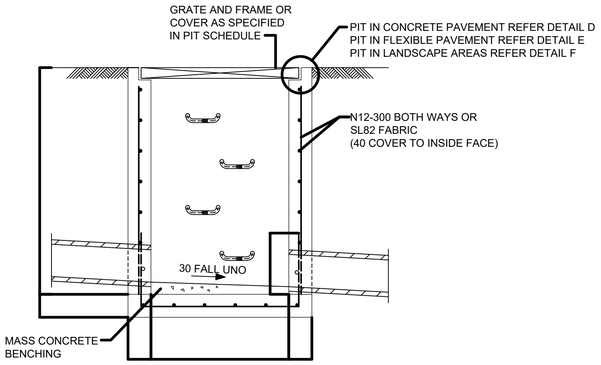


ELEVATION AT BASE | PLAN | PLAN-SINGLE LAYER | PLAN-DOUBLE LAYER

PIT CORNER DETAILS MESH REINFORCEMENT

SCALE 1:20

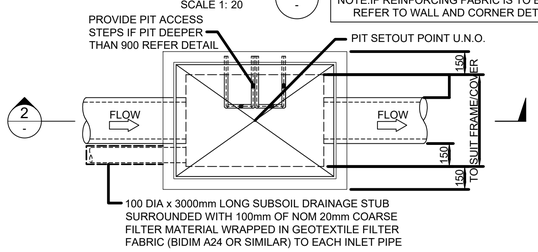
DESIGNER TO VERIFY EXTENT OF DETAILING



SECTION 2

SCALE 1: 20

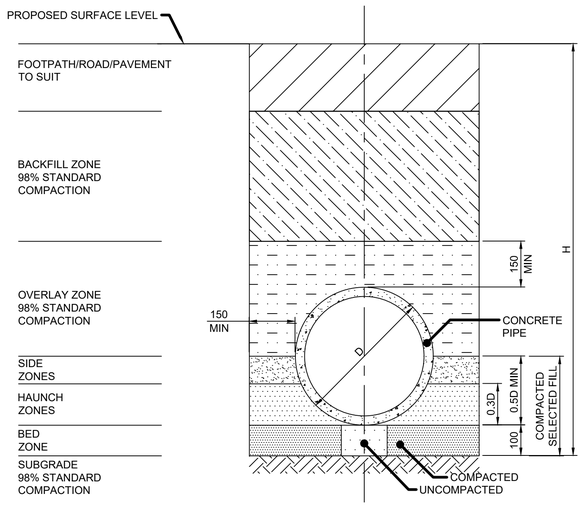
NOTE:IF REINFORCING FABRIC IS TO BE USED REFER TO WALL AND CORNER DETAILS



PLAN

SCALE 1:20

IN-SITU REGULAR PIT



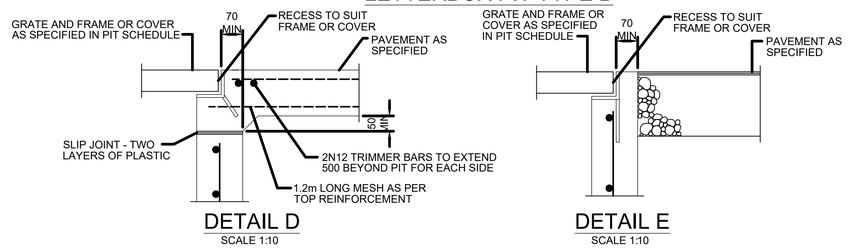
TYPICAL TRENCH 'HS' SUPPORT FOR CONCRETE PIPES

SCALE 1:10

NOTE:
1. TRENCHING AS PER AS3725
2. DRAINAGE PIPE TO BE MIN. 375Ø, MAX. SIZE 900Ø U.N.O. REINFORCED CONCRETE PIPE

SCALE 1:20

LETTERBOX PIT TYPE B

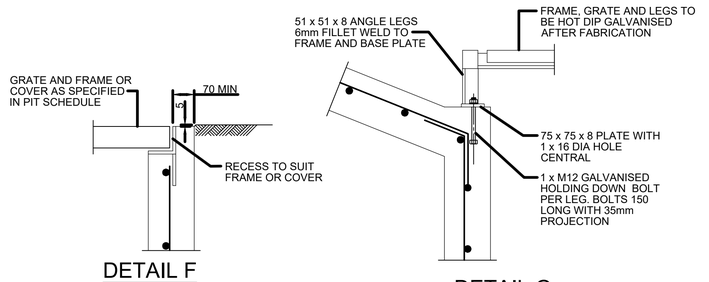


DETAIL D

SCALE 1:10

DETAIL E

SCALE 1:10



DETAIL F

SCALE 1:10

DETAIL G

SCALE 1:10

TO BE PRINTED IN FULL COLOUR

NOT FOR CONSTRUCTION

Date generated: 29/11/2024 7:55:29 AM \\CORP-PBWAN.NET\ANZ\PROJECTS\AUPS140XX\PS140230_SNSW\054712308\BIGCH4_WIP\BIM\PROPERTY\CV_CIVIL\2D\CV-4111

rev	date	description	drn	ch'k
B	29/11/24	ISSUE FOR REF	RGU	RGU
A	15/11/24	FOR TENDER	RGU	RGU

NSW GOVERNMENT Education School Infrastructure

enstruct group pty ltd

Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia

Telephone (02) 8904 1444
Facsimile (02) 8904 1555
www.enstruct.com.au

enstruct

project: GOOGONG HIGH SCHOOL

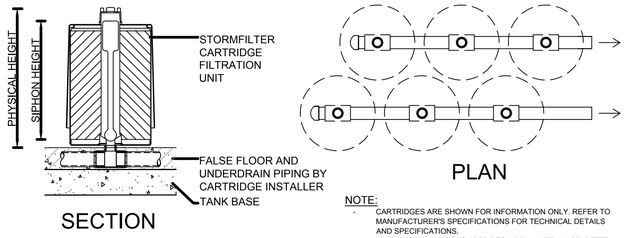
drawing title: STORMWATER DRAINAGE

DETAIL SHEET 2

status: FOR TENDER

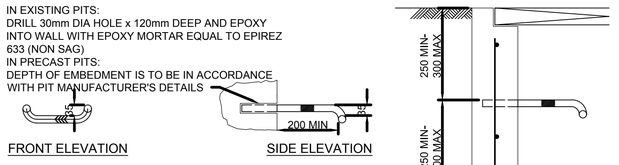
scale at A1	drawn	checked	approved
1:500	MB	JL	PAL

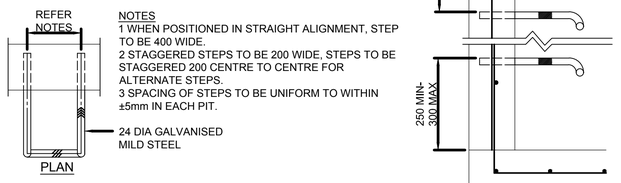
project no.	sheet	rev.
PS140230	CV-4111	B



NOTE:
- CARTRIDGES ARE SHOWN FOR INFORMATION ONLY. REFER TO MANUFACTURER'S SPECIFICATIONS FOR TECHNICAL DETAILS AND SPECIFICATIONS.
- ALL WATER QUALITY DEVICES REQUIRE MAINTENANCE. REFER TO MANUFACTURER'S MAINTENANCE SPECIFICATIONS AND SCHEDULES.

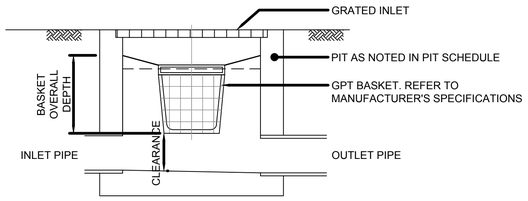
TYPICAL CARTRIDGE DETAIL
SCALE 1:50



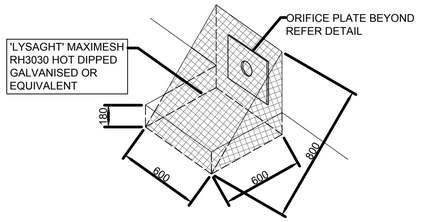


ACCESS STEP DETAIL (STEP 1)
SCALE 1:10

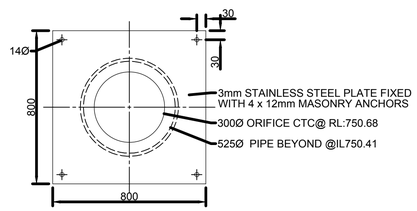
TO BE PROVIDED FOR PITS DEEPER THAN 900mm



GROSS POLLUTANT TRAP (GPT) PIT BASKET INSERT FOR SURFACE INLET PITS
SCALE: NTS



TRASH SCREEN DETAIL
NTS



ORIFICE PLATE DETAIL
SCALE NTS

TO BE PRINTED IN FULL COLOUR

NOT FOR CONSTRUCTION

rev	date	description	drn	ch'k
B	29/11/24	ISSUE FOR REF	RGU	RGU
A	15/11/24	FOR TENDER	RGU	RGU

rev	date	description	drn	ch'k

NSW GOVERNMENT Education School Infrastructure

enstruct group pty ltd

Level 4, 2 Glen Street
Milsons Point NSW 2061
Australia

Telephone (02) 8904 1444
Facsimile (02) 8904 1555
www.enstruct.com.au

enstruct

project: GOOGONG HIGH SCHOOL

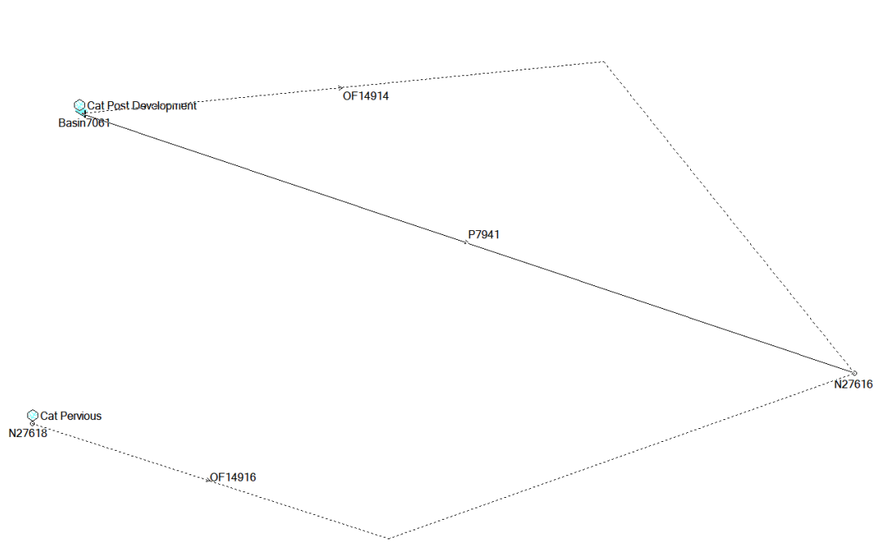
drawing title: STORMWATER DRAINAGE DETAIL DRAWING

status: FOR REF

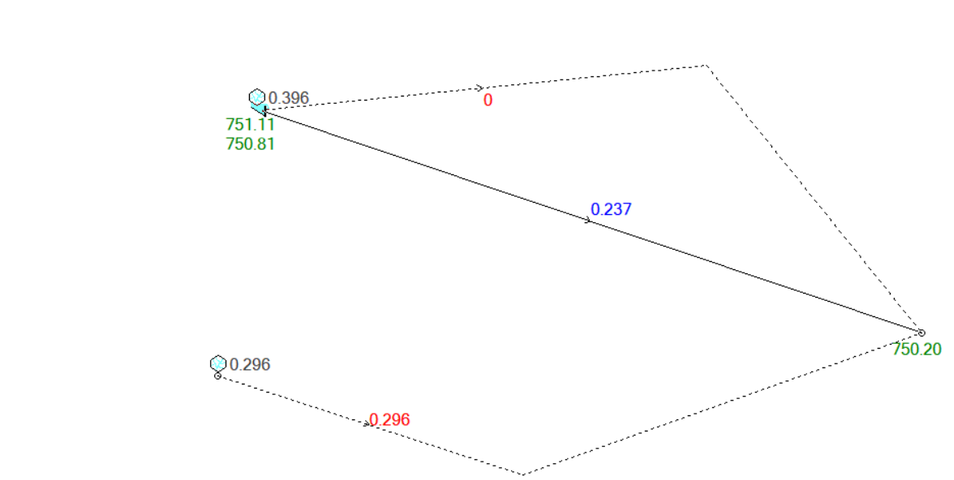
scale at A1	drawn	checked	approved
AS SHOWN	RGU	RGU	PAL

project no.	sheet	rev.
PS140230	CV-4112	B

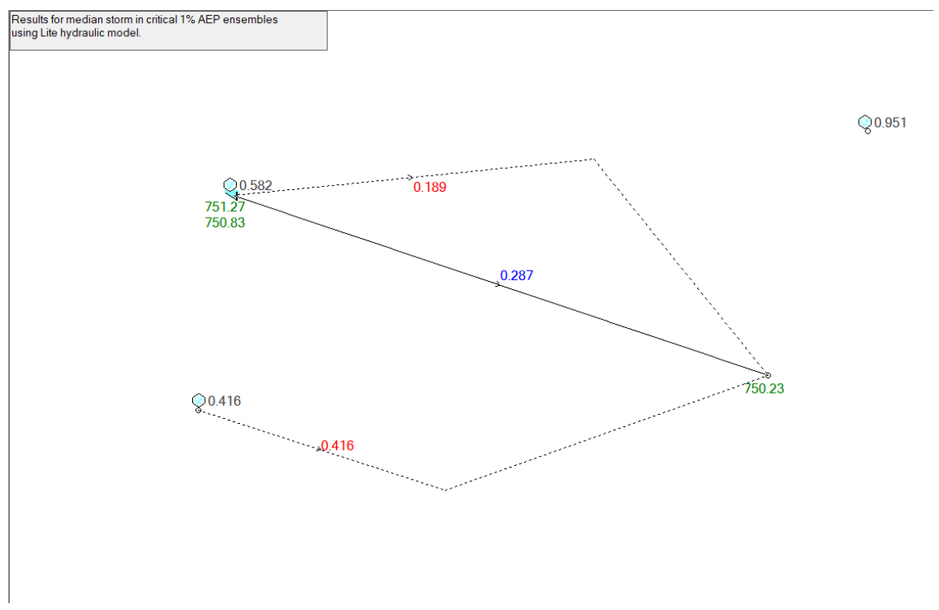
APPENDIX C: CIVIL DRAINS MODEL



Cat Pre Develo
N240



5% AEP



1% AEP

DRAINS MODEL