

Civil Engineering Design Report

Dalmeny Public School Upgrade

Revision C

SINSW Group 2
Project Reference: 132563

March 2025

Prepared For:
Department of Education (DoE)

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C	Updates From Planning – Figures and Table	AN/AM/YC	YC	05.03.2025

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1 Introduction

1.1 Proponent

The Department of Education (DoE) is the proponent and determining authority pursuant to Section 5.1 of the *Environmental Planning and Assessment Act 1979* (the Act).

1.2 Landowner

The Minister for Education and Early Learning is the landowner.

This Stormwater Management Plan has been prepared to accompany a Review of Environmental Factors (REF) prepared for the Department of Education (DoE) relating to the Dalmeny Public School Upgrade (the activity) under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP TI).

This document has been prepared in accordance with the Guidelines for Division 5.1 assessments – Consideration of environmental health facilities and schools, Addendum October 2024 (the Guidelines) by the Department of Planning, Housing and Infrastructure.

This report examines and takes into account the relevant environmental factors in the Guidelines and Environmental Planning and Assessment Regulations 2021 under Section 170, Section 171 and Section 171A of the EP&A Regulation as outlined in Table A below. Refer to Appendix A for the relevant drawings for the Stormwater OSD and the Erosion Sediment Control Plan.

Regulation / Guideline Section	Requirement	Response	Report Section
Number	Insert Dot Point		
3a) Any environmental impact on a community	(a1) Impact during construction – such as noise, vibration, traffic, construction vehicle routes, access and parking, pollution/dust, water and stormwater flow, sediment and run-off, waste removal, servicing arrangements, bushfire, flooding, contamination, other construction occurring in the area.	The Contractor is to prepare a Construction management plan which include: <ul style="list-style-type: none"> • construction traffic management plan, and • construction and demolition waste management plan This plan should also highlight how overland stormwater flow will be managed to prevent any damage to the existing buildings as well as protect the constructed works during construction.	To be provided by the Contractor.
	(a2) impact post-construction (including from any development, activity, public-address systems and sirens, signage, events, hours of operation, or out of hours use of facilities, helicopter facilities, emergency facilities) which may include: <p>(i) water flow/water quality, downstream impacts</p>	<p>The new activity provides an underground Onsite Detention (OSD) Tank as well as an underground treatment chamber.</p> <p>The OSD provides storage for the generated stormwater run-off to mitigate the run-off to pre-developed flows.</p> <p>The treatment chamber house cartridges that filter out pollutants prior to discharging the collected stormwater run-off into the existing stormwater piped system to prevent pollution of the existing stormwater system and ultimately the council stormwater assets.</p>	Section 3.4 and Section 3.5 of this report.

Table A – Summary of Relevant Section of the Part 5 Guidelines and EP&A Regulation

The project site is located at 129 Dalmeny Drive, Prestons and is legally described as Lot 312 DP 882619.

Dalmeny Public School is located on the southern side of Dalmeny Drive and on the northern side of Umbria Street. The surrounding context of the site is predominantly low density residential.

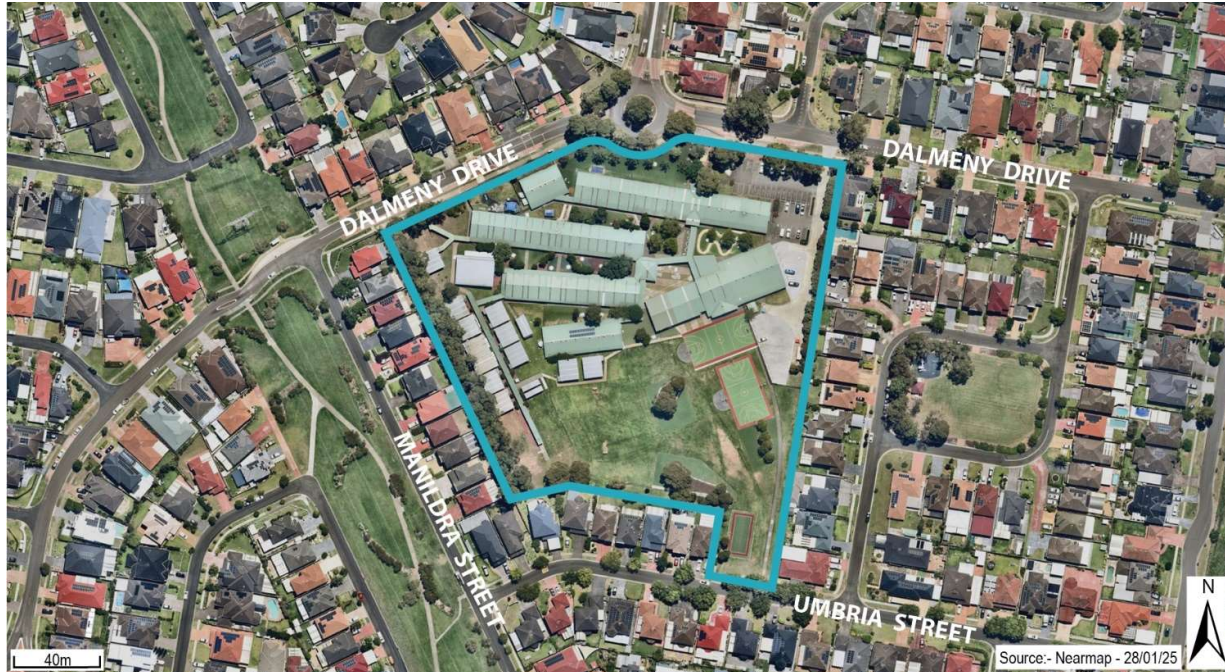


Figure 1: Aerial image of the site, outlined in blue (Source: NearMap, taken 28/01/2025)

2 Site Description

2.1 Existing Site Description

Dalmeny Public School is located approx. 45km south-west of the Sydney CBD and is within the Liverpool City Council Local Government Area (LGA). The proposed building site is situated in the south-western end of DPS and is surrounded by Dalmeny Drive to the North, Umbria St to the South, Manildra St to the West, and Romana Square to the East.

The site currently comprises an existing co-education primary (K-6) public school, interconnected covered walkways, play areas, on-grade parking, sports court and green spaces with mature trees.

2.2 Proposed Activity Description

The proposed activity for the Dalmeny Public School Upgrade includes the construction and occupation of a two-storey classroom building and associated covered walkways and landscaping.

Demolition

- Demolish part of existing fence on Dalmeny Drive;
- Remove two (2) trees; and
- Earthworks;

2.3 Existing Flooding Conditions

The proposed works activity at Dalmeny Public School lies outside the PMF, and outside the Flood Planning Area, and therefore no flood controls apply to the proposed site. Furthermore, the overland flow affecting the site has been demonstrated by the Flood Engineer to be small and can be controlled with relative ease.

Due to the increase in the impervious area of the proposed buildings an OSD Tank is required as well as quality treatment devices.

3 Proposed Development Activity

The civil works related to this activity will be discussed below.

3.1 Earthworks

The earthwork quantities associated with the proposed development activity are provided in the figures below:

- Cut – 422 m³
- Fill – 146 m³

The majority of the earthworks involve cut and will require export of approximately 276 m³ of cut material.

3.2 Legal Point of Discharge (LPoD)

The LPoD is identified as an existing internal stormwater pit as indicated on the Stormwater Layout Plan.

Refer to Appendix A for the Stormwater Layout for the proposed development activity.

3.3 Stormwater Drainage Strategy

In support of the proposed activity, additional stormwater drainage will be required to convey generated stormwater from the new impervious and adjoining pervious areas into the existing stormwater drainage network.

Meinhardt's preliminary recommendation is that detention storage of approx. 40 m³ be provided. This is to ensure peak discharge flows draining from the proposed activity can be managed by the downstream drainage systems from the developed site. A permissible site discharge will be determined using DRAINS modelling.

A summary of the schematic stormwater drainage design is presented in the image below.

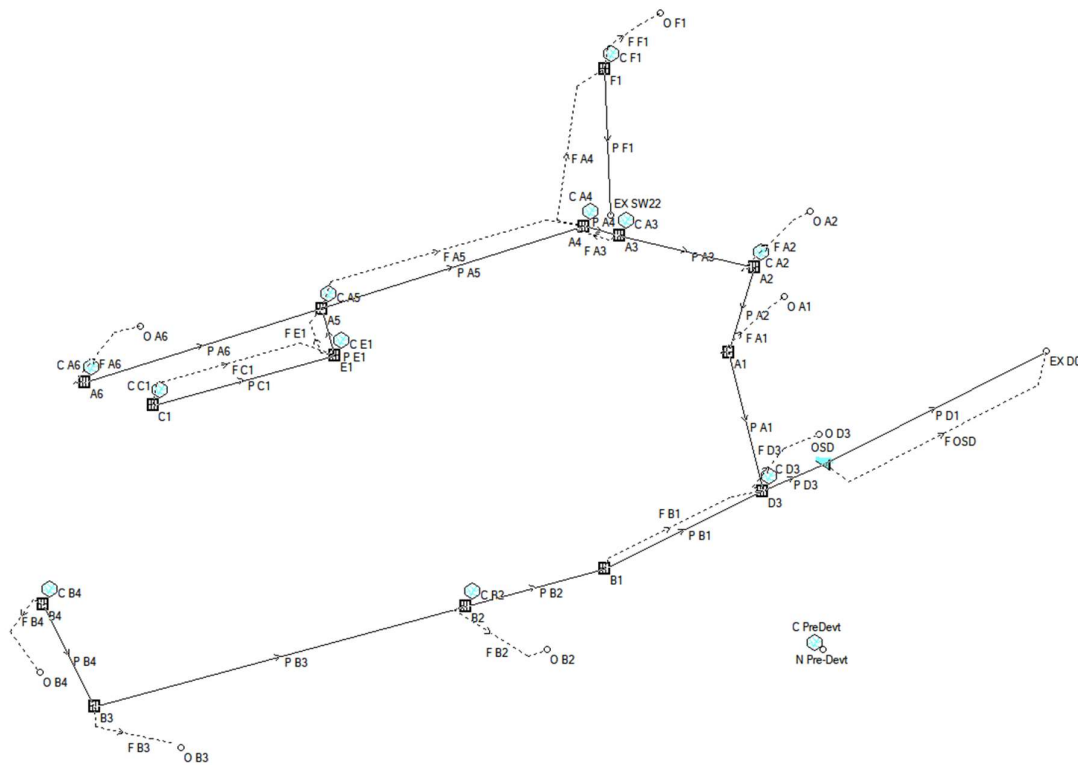


Figure 3: Site Preliminary DRAINS Layout

3.4 Stormwater Quantity Management

The stormwater quantity analysis of the existing and developed site conditions has been undertaken with reference to the requirements and procedure outlined by:

- On-Site Stormwater Detention Standard, Liverpool City Council
- Australian Rainfall and Run-off Volumes 1 & 2 (Aust R&R)

The following section of the report discusses the proposed activity's impact on peak stormwater run-off from the site and compares the existing site condition to ensure a no worsening effect to downstream properties.

The hydrological model adopted was the Extended Rational Method with hyetograph input as specified in Australian Rainfall and Run-off (AR&R) Volumes 1 and 2.

The following design parameters were used in the stormwater drainage calculations:

- Design storm is 1 in 10-year ARI as per Stormwater Drainage Design, Chapter D5.04.
- The Major storm considered is 1 in 100 ARI.
- Rainfall data is from BOM.
- Site area ± 0.2030 ha approximately 10% impervious

3.4.1 Existing Catchment

Catchment Area

The existing area where the proposed building will be constructed is an open space with 90% pervious percentage.

The existing area of approximately 0.2030 ha which is mostly draining towards east at an average grade of approximately 5% and has a pervious factor of 90%. Survey shows existing stormwater pits east and north east of the proposed development.

3.4.2 Stormwater Compliance

The developed site catchment is summarised below:

- Area – 0.2030 Ha
- Total time of concentration (t_c) – 5 and 7 minutes
- Percent Impervious – 85%

This site is governed by the following two documents:

- On-Site Stormwater Detention Standard, Liverpool City Council
- D5 Stormwater Drainage Design, January 2003

Tailwater level is set to the level of the downstream pit lid as stated in Stormwater Drainage Design, January 2003

Storm Event	Tailwater Level Assumptions
100yr	32.885
50yr	32.885
20yr	32.885
10yr	32.885
5yr	32.885
2yr	32.885

Table 1 – Assumed Tailwater Levels

3.4.3 DRAINS Configuration

The DRAINS Program was used in modelling the various stages of the project, i.e., pre-development, post-development and mitigated flows required not to impact surrounding areas with the proposed activity.

Please refer to the figure below for the DRAINS Configuration.

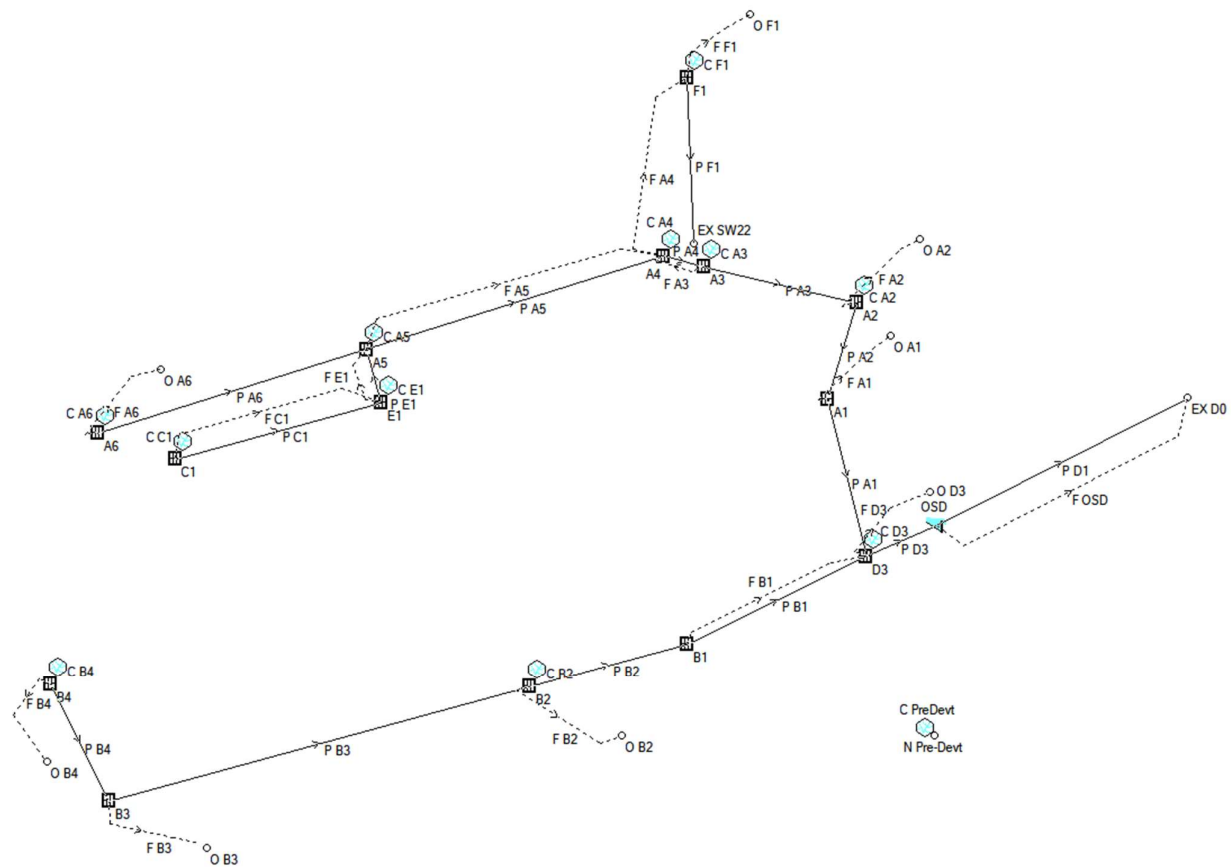


Figure 4: DRAINS Configuration - Developed Site

3.4.4 Stormwater Quantity Comparison

Peak flow rates from the developed site were determined by modelling various storm durations for each ARI storm. The Pre-Developed Site Discharge and Post-Developed flows are also provided are outlined in the table below:

ARI Storm Event	Pre-Developed Discharge Rate (L/s)	Mitigated Flow (L/s)
Q₅	30	30
Q₁₀	41	34
Q₂₀	50	38
Q₅₀	62	43
Q₁₀₀	71	49

Table 2 – Pre-Developed and Mitigated Flows

As shown in Table 4, the peak flow rate of stormwater run-off has decreased (if not maintained) through the formalised stormwater system and mitigation measures as discussed below.

3.4.5 Stormwater Detention

It is proposed to use an OSD Tank which will assist to mitigate the flows to meet the Permissible Site Discharge Rate. The OSD Tank will need to have a detention storage volume of about 40 cubic meters. This storage volume has now been confirmed by the DRAINS modelling process during schematic design and the larger initial volumes as per the council std for concept design stage is now superseded.

3.5 Stormwater Quality Management Strategy

3.5.1 Operational Phase

The stormwater quality management proposed for this portion of the development are required to achieve the following pollutant load reduction objectives:

The following Greenstar targets

- 80 % reduction in total suspended solids load (TSS)
- 60 % reduction in total phosphorus load (TP)
- 45 % reduction in total nitrogen load (TN)
- 90 % reduction in gross pollutant load

Liverpool City Council (Liverpool Development Control Plan Part 1) reduction targets

- 85 % reduction in total suspended solids load (TSS)
- 65 % reduction in total phosphorus load (TP)
- 45 % reduction in total nitrogen load (TN)
- 90 % reduction in gross pollutant load

Pollutants typically generated during the operational phase of the development activity include:

- Litter/gross pollutants
- Sediment
- Nutrients (N & P)
- Hydrocarbons (oils and grease); and
- Heavy metals.

In order to meet these pollutant reduction targets; stormwater treatment measures are required. These treatment measures (located on site as indicated in Figure 4 below) are detailed in the attached stormwater layout plan in Appendix A and are summarised as follows:

- a. Eleven (11) units of 690 PSorb Stormfilters or equivalent.

Stormwater modelling has been carried out using MUSIC modelling software to determine the required infrastructure needed to meet the Water Quality Objectives (WQOs) above.

3.5.2 MUSIC Model

MUSIC modelling for this development activity was carried out using the MUSIC program and data collected from Bureau of Meteorology. The developed site catchment details from the MUSIC model are outlined in Table below.

Catchment	Area (ha)	% Effective Impervious
Roof Area	0.1553	100 % Impervious
Footpath	0.0262	50% Impervious
Overall Area [ha]	0.1815	

Table 3 - Developed Site MUSIC Catchment Details

The layout for the music model, including the treatment train effectiveness is detailed in the figure below.



Figure 5: MUSIC Layout and Treatment Effectiveness for Developed Site

The results are presented below:

Treatment Train Effectiveness - Dalmeny PS			
	Sources	Residual Load	% Reduction
Flow (ML/yr)	2.33	2.32	0.2
Total Suspended Solids (kg/yr)	89.3	12.9	85.5
Total Phosphorus (kg/yr)	0.381	0.0785	79.4
Total Nitrogen (kg/yr)	4.98	2.41	51.7
Gross Pollutants (kg/yr)	56.5	0	100

Figure 6: MUSIC Results for Developed Activity

The developed site treatment train effectiveness is also outlined in the table below.

Pollutants	Reduction Targets (%)		Results (%)
	Green Star (B)	Liverpool City Council	Overall
Total Suspended Solids (kg/yr) TSS	80	85	85.5
Total Phosphorus (kg/yr) TP	60	65	79.4
Total Nitrogen (kg/yr) TN	45	45	51.7
Gross Pollutants (kg/yr)	90	90	100

Table 4 - Treatment train effectiveness

Based on the MUSIC modelling results in the table above, the proposed treatment train achieves the required pollutant load reduction objectives for all pollutants. The treatment train is considered adequate for the development activity including compliance with Greenstar (B) and Liverpool City Council.

3.6 Construction Phase

Pollutants typically generated during construction phase are described in Table 5 below.

Pollutant	Sources
Litter (Gross Pollutants)	Paper, construction packaging, food packaging, cement bags.
Sediment	Unprotected exposed soils and stockpiles during earthworks and building.
Hydrocarbons	Fuel and oil spills, leaks from construction equipment.
Toxic materials	Cement slurry, asphalt prime, solvents, cleaning agents, wash waters.
pH altering substances	Acid sulphate soils, cement slurry and wash waters.

Table 5 - Pollutants typically generated during the construction phase

4 Erosion and Sediment Control

Management of stormwater run-off during construction is necessary to avoid pollution of downstream waterways from sediment and gross pollutant loading.

Please refer to Appendix A for the initial Erosion and Sediment Control Plan. This plan will be used as a live document as construction progress on site by the contractor.

Impacts of inadequate erosion and sediment control downstream from the site include:

- traffic safety problems;
- blocked drains;
- local flooding problems;
- aesthetic pollution of drainage paths; and
- damage to local ecosystems.

Best practice erosion and sediment controls must be installed to minimise the discharge of sediment laden run-off during construction. Erosion and sediment control plans shall be developed during detailed design phase and must be continually maintained and amended as required to minimise environmental harm.

Erosion and sediment control plans are based on three sets of control measures:

- drainage control;
- erosion control; and
- sediment control.

These control measures must be maintained in an effective operational condition. Sediment disposal from site is to occur to the satisfaction of council. Defects in erosion and sediment control devices, such as sediment fences, are to be inspected and documented. Upon Inspection, the Contractor is to determine whether the device should be replaced or repaired. Documentation is to include how the damage was caused and what measures can be implemented to reduce the possibility of repeat occurrences. Any damage to either permanent or temporary water quality control structures or devices is to be immediately rectified at the contractor's expense.

Other measures include, but is not limited to the following:

- Temporary access to site with shaker pad
- An indicative stockpile area with sediment fence around it during construction.
- Geotextile inlet pit filters or sandbags to be placed around existing stormwater pits.

The design of these measures is to be in accordance with the Landcom "Blue Book".

The effectiveness of the erosion and sediment control devices can be monitored by visual audits. All ESC measures are to be inspected:

- at least daily (when work is occurring on site) or weekly (when work is not occurring on site);
- within 24 hours of expected rain; and
- within 18 hours of a rainfall event (i.e. an event of sufficient intensity and duration to mobilise sediment on site).

Drainage paths are to be inspected to ensure the sediment fences are not being bypassed as a result of soil erosion.

Sediment laden run-off shall be prevented from entering neighbouring properties. This shall be achieved by landscaping disturbed areas immediately after and prior to a rainfall event.

5 Maintenance and Monitoring Requirements

Periodic maintenance and monitoring of stormwater devices proposed in this report is crucial to ensure effective operation and design life.

Inspect field inlet grates, pits and underground pipes for blockage or damage at least 6 monthly or after significant rainfall event. The gross pollutant filter baskets within inlet pits and bioretention basin shall be inspected and maintained preferably by the manufacturer to avoid damage to units and to ensure adequate cleaning and record keeping. For the first 12 months routine inspections of treatment devices shall be carried out monthly with routine clean out at alternate months. Results of the initial 12 months maintenance program shall be used to determine future maintenance intervals. Refer to manufactures maintenance and monitoring methodology for specific details.

Maintenance of ESC measures must occur in accordance with Table 6 where applicable.

Table 6 - ESC Maintenance Requirements

ESC Measure	Maintenance Trigger	Timeframe for Completion of Maintenance
Sediment basins (where applicable)	When settled sediment exceeds the volume of the sediment storage zone	Within 7 days of the inspection.
Other ESC measures	The capacity of ESC measures falls below 75%.	By the end of the day.

Sediment accumulation on ESC devices is to be removed and disposed of to the satisfaction of Council.

6 Mitigation Measures

Mitigation measures are required for a Review of Environmental Factors (REF) and are actions or measures to avoid, minimise, rectify (by repairing, rehabilitating or restoring) and/or reduce or eliminate over time (by preservation and maintenance) the adverse environmental impacts of a Division 5.1 Activity under the EP&A Act.

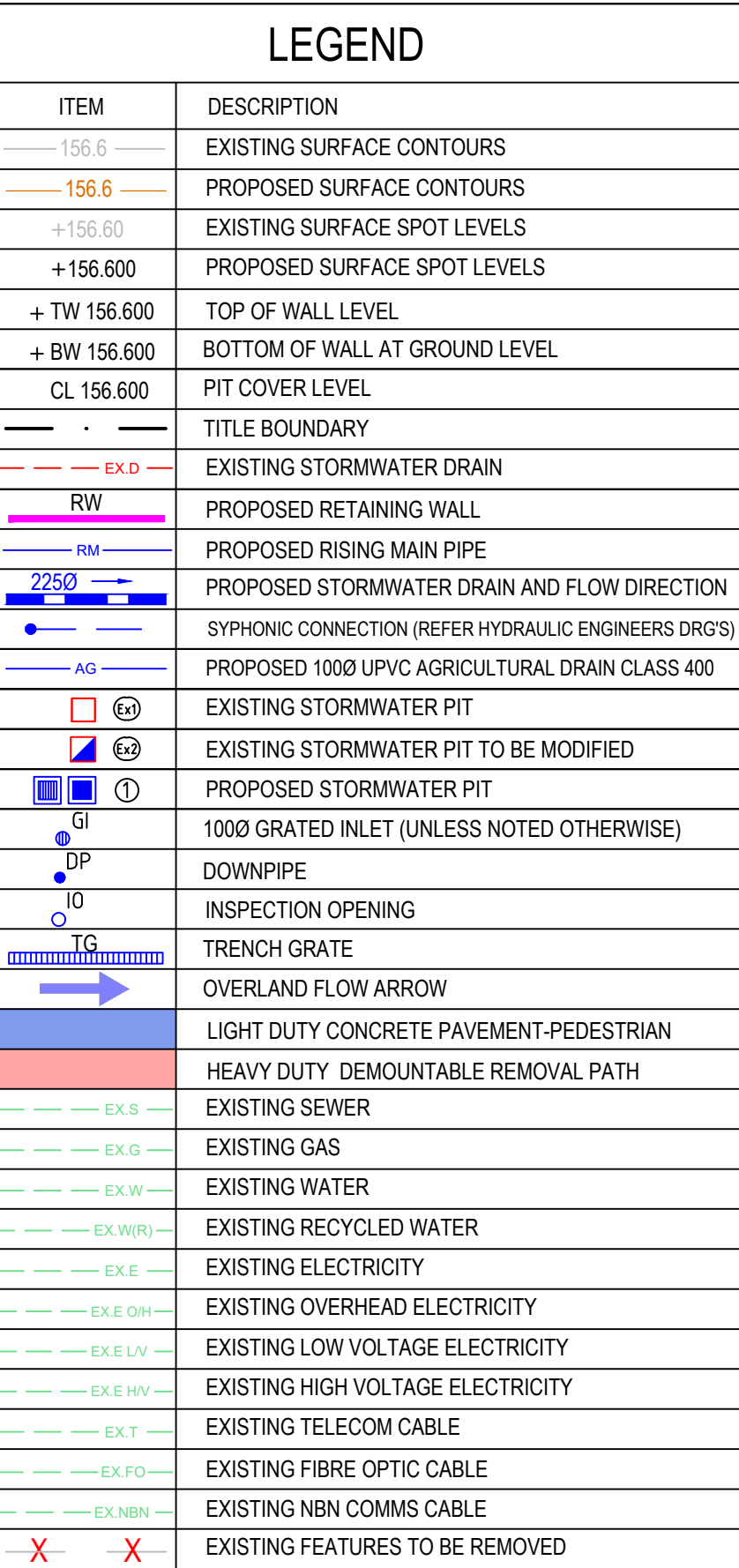
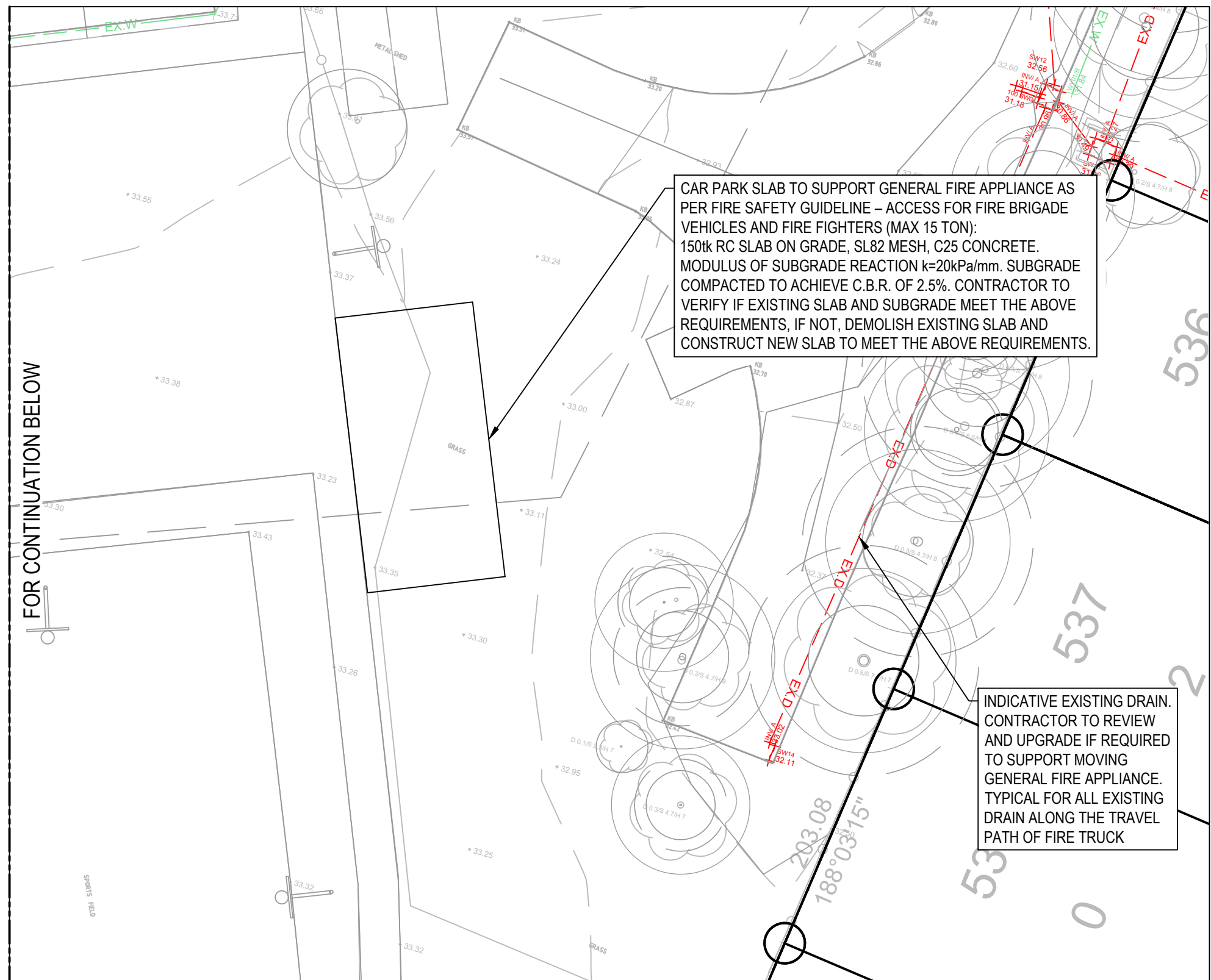
The following mitigation measures discussed throughout this report are summarised as follows:

Mitigation Number/Name	Aspect/Section	Mitigation Measure	Reason for Mitigation Measure
Stormwater Quality Management	Section 3.5	Stormwater runoffs generated by the proposed development activity will be collected thru the proposed drainage system and will then be treated in a chamber with 11 units of 690 PSorb Stormfilters or equivalent.	The proposed development activity generated an increased in pollutants, so it is required to reduce them to meet Greenstar B Pollutant Load reduction targets before the stormwater runoff leaves the property.
Stormwater Quantity Management	Section 3.4	The proposed development activity flow rate is mitigated thru implementing the use of On-site Detention Tank with a volume of 40m ³ .	The Parramatta Council requires a Permissible Site Discharge for new/additional developments, and it is specified in On-Site Stormwater Detention Handbook, Appendix Q. Therefore, the use of OSD is required to temporarily detain stormwater runoff and limit the discharge flow rate leaving the site.
Erosion and Sediment Control	Section 4	Construction pollutants will be mitigated by installing erosion and sediment control devices prior to commencement of construction such as hay bales, sediment fences and geotextile pit filters in compliance with the Erosion and Sediment Control Plan, refer to Appendix A. Ongoing monitoring and maintenance will be required on site.	It is necessary to manage stormwater runoff during construction to avoid pollution of downstream waterways from sediment and gross pollutant loading.
Overland Flow Management	Appendix A (Civil Siteworks) Stormwater Surface Flows	The whole site is assessed to identify the runoff flow directions during minor and major storm events. Stormwater runoff will be collected through a pit and pipe drainage system and will be mitigated by using OSD Tank. External catchment flows will be diverted by a diversion channel and will not be catered for by the proposed development activity's piped system.	The proposed development activity requires design and diversion of surface flows to keep water away from the building.

7 Evaluation of Environmental Impacts

The Civil Engineering impacts of this proposed activity can be adequately mitigated and minimised through the required mitigation measures such that the activity will not have a significant effect on the environment.

Appendix A:
Civil Siteworks Plan, and
Erosion and Sediment Control Plan



THESE DESIGN PLANS SHALL BE READ IN CONJUNCTION WITH
GEOTECHNICAL REPORT No. PS206292-SYD-GEO-REP-002-Rev01 DATED
17 NOVEMBER 2023 PREPARED BY WSP. THE PROVISIONS AND
RECOMMENDATIONS CONTAINED WITHIN THE REPORT ARE TO BE STRICTLY
COMPLIED WITH. ALL COMPACTION REQUIREMENT RESULTS SHALL BE
CARRIED OUT IN ACCORDANCE WITH GEOTECHNICAL REPORT
RECOMMENDATIONS.



WARNING
BEWARE OF UNDERGROUND SERVICES
 THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE
 ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO
 GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

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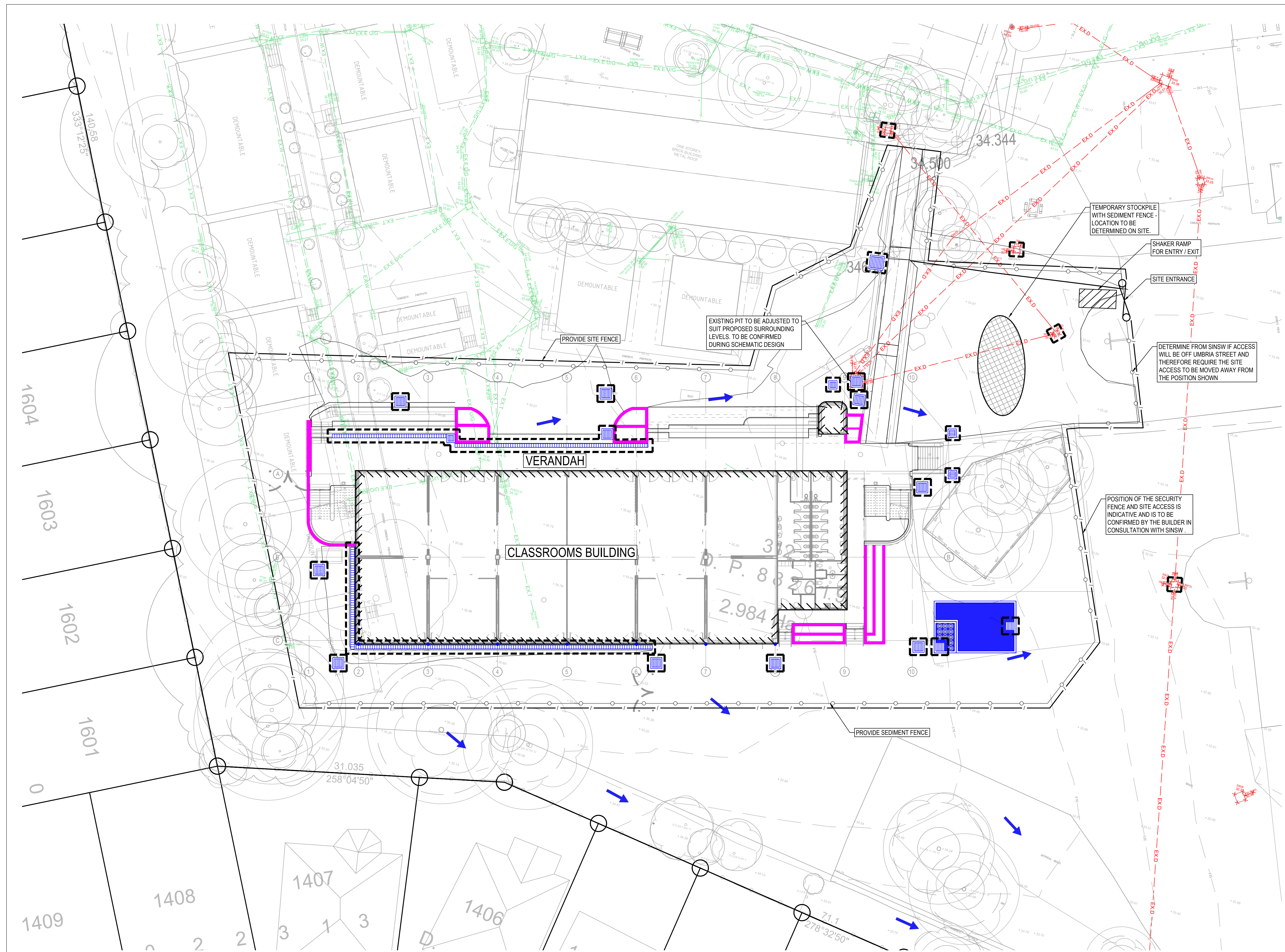
School Infrastructure NSW

CIVIL SITEWORKS PLAN

DALMENY PUBLIC SCHOOL
129 DALMENY DRIVE, PRESTONS, NSW 2170

TENDER ISSUE
NOT TO BE USED FOR CONSTRUCTION

DRAWN D.H	DESIGNED G.P	CHECKED Y.C	APPROVED	DATE -	SCALE @ 1:200
PROJECT No 132563		DRAWING No DAPS-MHT-00-00-DR-C-0101			REV T3



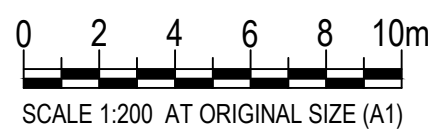
LEGEND	
ITEM	DESCRIPTION
	EXISTING SURFACE CONTOURS
	TITLE BOUNDARY
	EXISTING STORMWATER DRAIN
	EXISTING STORMWATER PIT
	EXISTING SEWER
	EXISTING GAS
	EXISTING WATER
	EXISTING RECYCLED WATER
	EXISTING ELECTRICITY
	EXISTING OVERHEAD ELECTRICITY
	EXISTING LOW VOLTAGE ELECTRICITY
	EXISTING HIGH VOLTAGE ELECTRICITY
	EXISTING TELECOM CABLE
	EXISTING FIBRE OPTIC CABLE
	EXISTING NBN COMMS CABLE
	EXISTING FEATURES TO BE REMOVED
	EXISTING TREE
	HOARDING/SECURITY FENCE
	SEDIMENT FENCE
	BUILDING OUTLINE
	SITE ACCESS GATE
	SHAKER RAMP FOR ENTRY/EXIT
	TEMPORARY STOCKPILE (LOCATION TBC ON-SITE)
	GEOTEXTILE PIT FILTER / FILTER SURROUND INSTALLED ON EXISTING PIT
	SANDBAGS INSTALLED ON EXISTING PIT
	OVERLAND FLOW ARROW



WARNING
PROPOSED SERVICES
THE LOCATION AND EXTENT OF PROPOSED SERVICES IS INDICATIVE ONLY AND ARE NOT TO BE USED FOR CONSTRUCTION. REFER TO AUTHORISED DOCUMENTATION BY RELEVANT AUTHORITY FOR CONSTRUCTION DETAILS

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REV	DESCRIPTION	BY	DES	CHKD	DATE
P1	50% SCHEMATIC DESIGN	D.H.	G.P.	Y.C.	22.11.24
P2	80% SCHEMATIC DESIGN	D.H.	G.P.	Y.C.	06.12.24
P3	80% SCHEMATIC DESIGN AS PER ARCHITECTURAL UPDATE	D.H.	G.P.	Y.C.	12.12.24
P4	100% SCHEMATIC DESIGN	D.H.	G.P.	Y.C.	10.01.25
P5	100% SCHEMATIC DESIGN	D.H.	G.P.	Y.C.	22.01.25
T1	TENDER ISSUE	D.H.	G.P.	Y.C.	14.02.25



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CLIENT



School Infrastructure NSW

TITLE
EROSION AND SEDIMENT
CONTROL PLAN

PROJECT

DALMENY PUBLIC SCHOOL
129 DALMENY DRIVE, PRESTONS, NSW 2170

STATUS

SCHEMATIC DESIGN
NOT TO BE USED FOR CONSTRUCTION

DRAWN	DESIGNED	CHECKED	APPROVED	DATE	SCALE @ A1
D.H.	G.P.	Y.C.	-	-	1:200
PROJECT No 132563		DRAWING No DAPS-MHT-00-00-DR-C-0060		REV T1	