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ENGINEERING AND TECHNOLOGY PRECINCT

STAGE 1 REDEVELOPMENT

Civil Design Report

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Reviewer: Stephen Naughton

Report no: K33–BON–CIV–REP–001 A For SSDA **Date:** 1 DEC 2017

Report Amendment Register

Rev. No.	Section & Page No.	Issue/Amendment	Author/Initials	Reviewer/Initials	Date
A		Issue for SSDA	AV	SN	1/12/17

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1 INTRODUCTION

The proposed building works consist of the redevelopment of the existing J03 (Electrical Engineering) building within the Sydney University Engineering Precinct. The Precinct is bounded by Cleveland Street to the North, Shepard Street to the East, and Maze Crescent to the West. The site is currently flood affected.

The proposed building works include partial demolition and construction of the existing Electrical Engineering Building, the demolition and clearing of the existing Electrical Engineering Carpark and construction of a landscaped flood storage basin, construction of a new dangerous goods facility and associated works. The works are Stage 1 of the Engineering and Technology Precinct redevelopment.

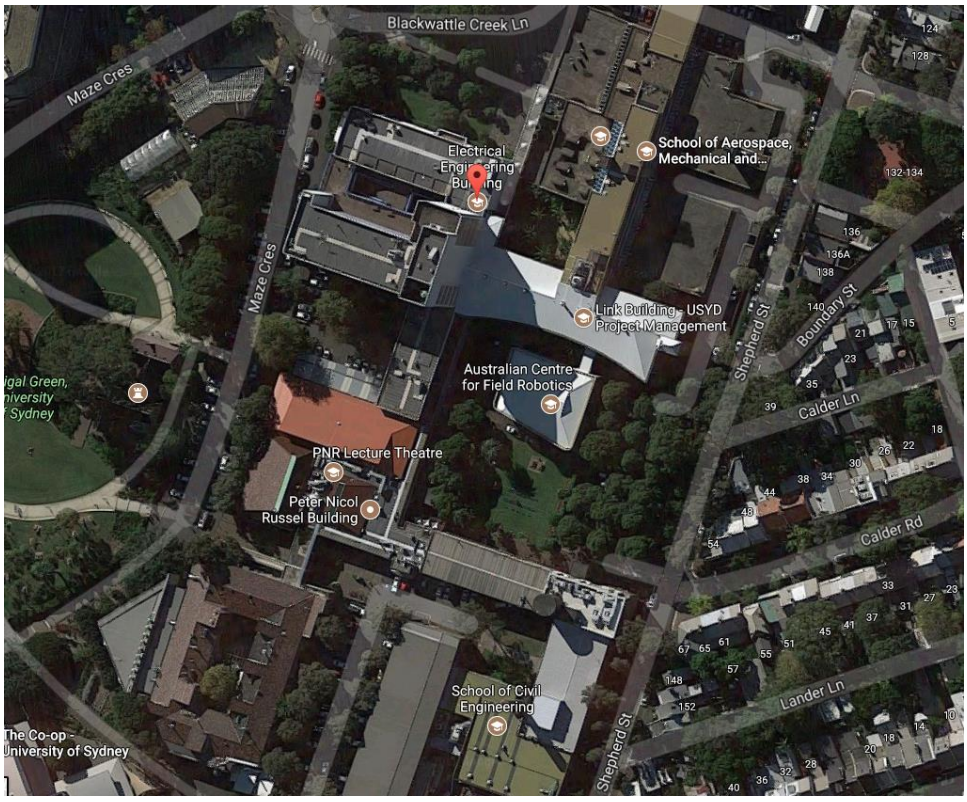


Figure 1.1: Site Locality Map (Source: Google Maps, 2017)

2 SCOPE

2.1 CIVIL WORKS

The proposed civil works will include documentation for:

- Demolition of existing infrastructure,
- Proposed Flood Storage basin,
- Drainage works for the newly constructed buildings, (including any diversion of existing stormwater assets), and
- Erosion and sediment control.

2.2 REFERENCES

This report relies on the following reports (which have been reviewed and accepted as a basis of design in relation to flood assessment)

- WMA Water – University of Sydney Flood Risk Management Stage 1 – Campus Flood Study Review (September 2013),
- WMA Water – University of Sydney Engineering Precinct Flood Mitigation Plan (Draft),
- TTW Civil/Flood Study University of Sydney Engineering Precinct Civil/Flood Study (Draft), Dec 2015, and
- The University of Sydney Engineering and Technology Precinct Redevelopment – Volume 7.23: Stormwater and Flooding Design Requirements (Revision B, 25 Spetember 2017)

3 DESIGN CRITERIA

3.1 BASIS OF DESIGN

The design of the civil works has been based on:

- Architectural Layout of the building and site prepared by COX
- Landscape concept plans prepared by TCL
- Survey by Monteith & Powys
- University of Sydney Campus Infrastructure & Services Standards

3.2 DESIGN CRITERIA AND STANDARDS

The design criteria and standards for the civil works include:

- Stormwater design in accordance with Australian Rainfall & Runoff
- City of Sydney guidelines including
    - Sydney DCP 2012
    - Interim Floodplain Management Policy (2014)
- Australian Standards
- Sydney Water policies and requirements
- Landcom's Publication - Managing Urban Stormwater: Soils and Construction (the "Blue Book")
- University of Sydney Campus Infrastructure & Services Standards
- SEARs (SSD 7974)

4 EXISTING SERVICES

All existing services located adjacent to, or within the proposed location of the Stage 1 of the Engineering and Technology Precinct that may be affected by the development are to be:

- Capped, sealed and removed, if redundant or
- Isolated and diverted if being retained

All works associated with capping, diverting or connecting to Sydney University infrastructure shall be coordinated with Campus Infrastructure Services (CIS) prior to any works being carried out. These works are to be coordinated with any enabling works.

5 STORMWATER

5.1 EXISTING DRAINAGE

The existing site generally falls from Maze Cres (north-west) to Shepherd St (south-east). There is existing stormwater infrastructure originating from multiple external catchments and multiple defined overland flow paths traversing the proposed works site. These drain Cadigal Green, Maze Cres, Electrical Engineering building (subject works site), PNR Lecture Theatre, and other sites further afield. The existing Electrical Engineering Carpark serves as an ill-defined minor flood storage basin.

There is an overland flow path that conveys stormwater through the existing Electrical Engineering Carpark from the north-west (Cadigal Green and Maze Cres). There exists a 900 diametre Sydney Water Stormwater Main that traverses the carpark site. Triple 600 diametre pipes convey the overland water flow from the existing carpark, under the existing Tyree Labs and Engineering Walk and towards Shepherd St.

5.2 CONCEPT STORMWATER DESIGN

The concept stormwater drainage design has been provided in accordance with the requirements of the City of Sydney, Sydney Water and Australian Standard 3500.3 Plumbing and Drainage. The key drainage criteria include:

- Minor drainage system capturing and conveying the 5% AEP,
- Minimum pipe grade of 1%,
- Minimum pipe diameter of 375mm,
- Minimum fall through a pit of 20mm, and
- Pipe material to be steel reinforced concrete pipe.

The stormwater strategy for the new building incorporates water quality train, water reuse provisions and a stormwater and floodwater detention strategy.

Refer to Appendix A Stormwater Drainage Concept Plan (Drawing 2021876 01C – C020).

5.3 ON SITE DETENTION (OSD) AND FLOOD STORAGE

The WMA Water – University of Sydney Engineering Precinct, Draft Flood Mitigation Plan has identified a methodology to facilitate the redevelopment of Sydney University land. This methodology has been accepted by Sydney Water and involves mitigating the effects of development via a campus-wide strategy.

A new flood storage basin (Basin D) was identified in the WMA report. The proposed basin location is the existing electrical engineering carpark, a current low point and overland flow path. As part of the current development, the newly constructed basin will provide approximately 610m^3 of flood storage. The volume is below the University of Sydney Engineering and

Technology Precinct Redevelopment – Volume 7.23: Stormwater and Flooding Design Requirements (Revision B, 25 Spetember 2017) which requires for a flood storage capacity of 1300m^3. Staged future works (not part of this development) will provide the additional flood storage required to meet this requirement.

5.4 WATER QUALITY

The proposed new building stormwater strategy incorporates Water Sensitive Urban Design principles by allowing for infiltration opportunities where possible (through the use of deep landscaping elements on podium) and site roof runoff being captured and reused for irrigation from a central rainwater tank. Water quality improvement device(s) will be specified and modelled using MUSIC (Version 6.2), demonstrating compliance with the water quality targets set in the Sydney City Council Development Control Plans (2012).

Within the proposed new flood storage basin (Basin D), a gross pollutant trap (GPT) is proposed.

5.5 SUBSOIL DRAINAGE

Sub-soil drainage will be provided to retaining walls, sub-floor space and podium planting/landscaping in accordance with structural engineer and landscape architect's requirements.. The sub-soil drainage will discharge into the stormwater drainage system.

6 SITEWORKS

Siteworks will consist of:

- The proposed redevelopment involves demolition of the northern portion of the existing electrical engineering building, and construction of a new 10 storey building, linking it to the retained existing Electrical Engineering building and all associated works,
- Construction of a new roof structure over a new Dangerous Goods Store,
- Construction of a new awning structure to the east,
- New landscaped area adjacent to Blackwattle Creek Lane,
- New landscaped area over the newly constructed Dangerous Goods store, and
- Construction of a new landscaped floodwater detention basin consisting of an existing 900dia pipe and a spillway consisting triple 600dia pipes, new GPT and maintenance hardstand.

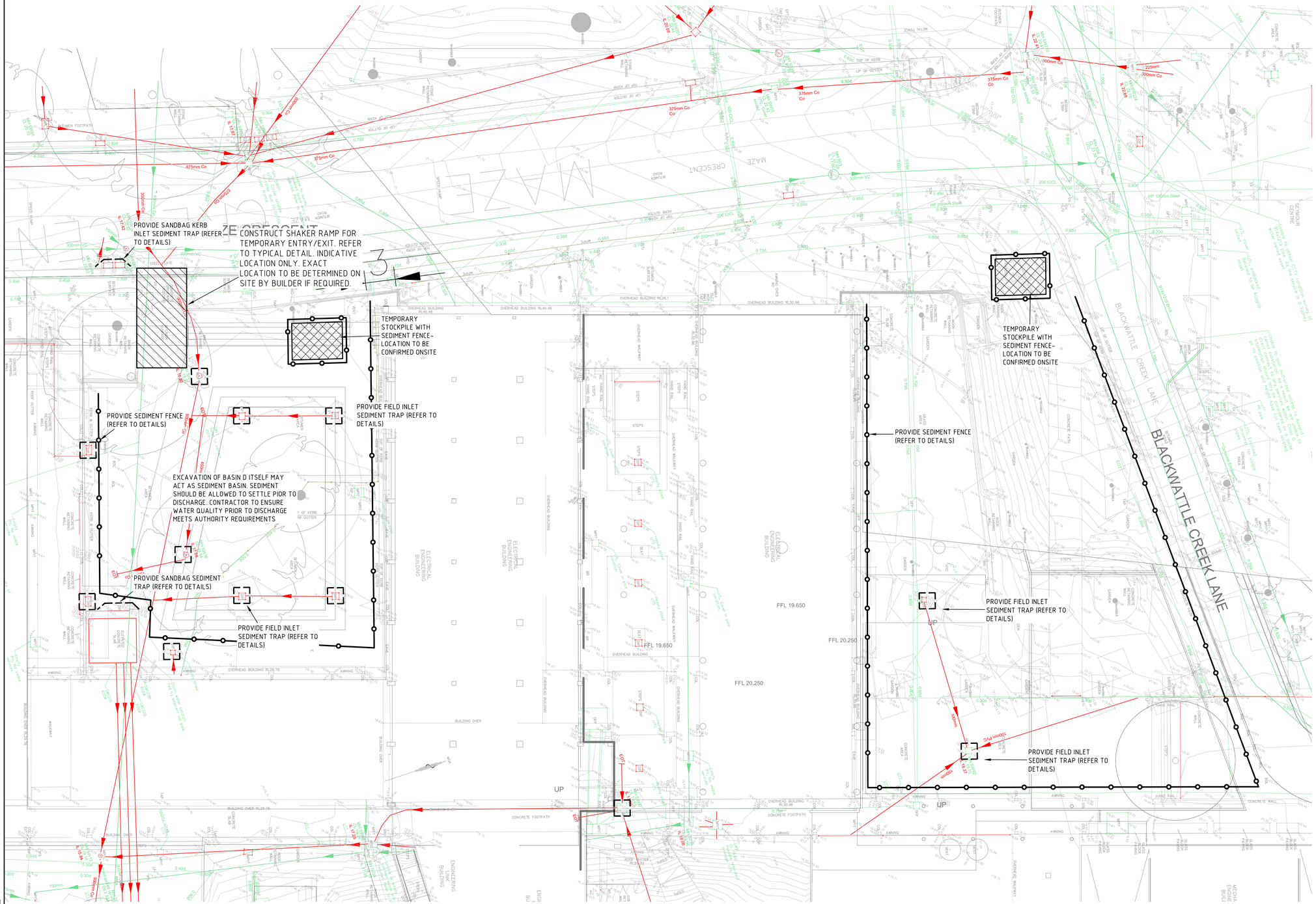
7 EROSION AND SEDIMENT CONTROL

A sediment and erosion control plan has been prepared in accordance with Landcoms *Managing Urban Stormwater: Soils and Construction Volume 1* (the "Blue Book").

The erosion and sediment control measures have been designed to meet the requirements of the Blue Book – the Contractor will be responsible for confirming the design and phasing the installation of the measures to suit the construction staging.

Refer to Appendix B Sediment and Erosion Control Plan (Drawings K33-BON-CIV-SKT-C005-P1 and K33-BON-CIV-SKT-C006-P1).

Appendix A – Sediment and Erosion Control Plan



SOIL AND WATER MANAGEMENT LEGEND

- SEDIMENT FENCE
- TEMPORARY 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

SOIL AND WATER MANAGEMENT NOTES

1. IT HAS BEEN ASSUMED THAT SEDIMENT FENCING WILL BE PROVIDED TO THE STAGE BOUNDARY SUFFICIENT TO PREVENT SEDIMENT RUNOFF FROM LEAVING SITE (EXCEPT IN THE CASE OF ENTRY/EXIT LOCATIONS WHERE TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TRAP ARE PROVIDED). IF THIS IS NOT THE CASE, PROVIDE SEDIMENT FENCE TO STANDARD DETAIL BELOW AS REQUIRED TO PREVENT SEDIMENT FROM LEAVING SITE, DIRECT RUNOFF TO SEDIMENT BASIN.
2. ALL SEDIMENT CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH LANDCOM MANAGING URBAN STORMWATER "BLUE BOOK".
3. MINIMISE CLEARING OUTSIDE BASEMENT EXTENT.
4. SEDIMENT CONTROL FOR LANDSCAPED WORKS DOWNSTREAM OF THE BUILDING TO INCLUDE A SILTFENCE AND SANDBAGS AS REQUIRED. TO BE MANAGED AT A RATE OF 50L/S BY THE CONTRACTOR ON SITE. INSTALL CATCH DRAIN TO DIVERT UPSTREAM CATCHMENT AWAY FROM DISTURBED SOIL AREA.

SEDIMENT CONTROL CONDITIONS

1. SEDIMENT FENCES WILL BE INSTALLED AS SHOWN AND ELSEWHERE AT THE DISCRETION OF THE SITE MANAGER TO CONTAIN COARSER SEDIMENT FRACTIONS (INCLUDING AGGREGATED FINES) AS NEAR AS POSSIBLE TO THEIR SOURCE.
2. SEDIMENT REMOVED FROM ANY TRAPPING DEVICE WILL BE RELOCATED WHERE FURTHER POLLUTION TO DOWNSLOPE LANDS & WATERWAYS CANNOT OCCUR.
3. STOCKPILES WILL BE PLACED WHERE SHOWN ON DRAWING OR ELSEWHERE AT THE DISCRETION OF THE SITE MANAGER AND NOT WITHIN 5m OF HAZARD AREAS INCLUDING LIKELY AREAS OF HIGH VELOCITY FLOWS SUCH AS WATERWAYS, PAVED AREAS & DRIVEWAYS.
4. WATER WILL BE PREVENTED FROM DIRECTLY ENTERING THE PERMANENT DRAINAGE SYSTEM WITH INLET FILTERS (SEE DETAILS) UNLESS IT IS SEDIMENT FREE.
5. TEMPORARY SEDIMENT TRAPS WILL BE RETAINED UNTIL AFTER THE LANDS THEY ARE PROTECTING ARE COMPLETELY REHABILITATED.
6. CONTRACTOR TO DESIGN/SIZE/CONSTRUCT TEMPORARY SEDIMENT BASIN, WATER SHOULD BE ALLOWED TO SETTLE BEFORE DISCHARGE. CONTRACTOR MUST VERIFY THAT WATER QUALITY MEETS AUTHORITIES REQUIREMENTS PRIOR TO DISCHARGE . ACCUMULATED SEDIMENT SHOULD THEN BE REMOVED & DISPOSED OF IN ACCORDANCE WITH ENVIRONMENTAL MANAGEMENT PROCEDURES.

Rev	Description	Date	By	App
P1	ISSUED FOR INFORMATION	15.11.17	JH	-

Rev	Description	Date	By	App

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Project Name: THE UNIVERSITY OF SYDNEY ENGINEERING AND TECHNOLOGY PRECINCT (ETP) - STAGE 1

Drawing Title: SOIL AND WATER MANAGEMENT PLAN

PRELIMINARY

Designed	AV
Drawn	JH
Scale	1:200
Date	NOV 17
Sheet	A1

Project Director Approved | Date | North

Project Ref: 20 10518 01 | Drawing No: C005 | Rev: P1

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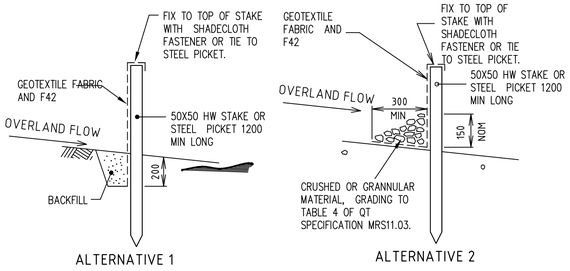
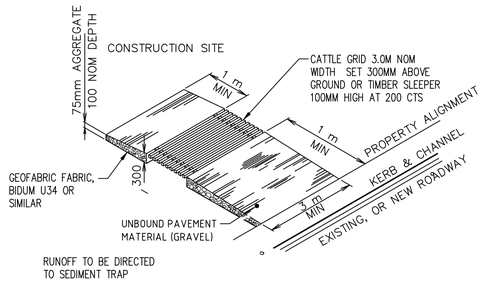
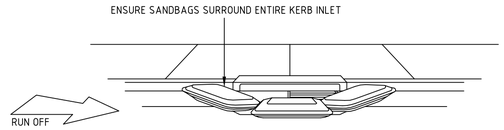




TEMPORARY CONSTRUCTION VEHICLE ENTRY/EXIT SEDIMENT TRAP

NOT TO SCALE



SANDBAG KERB INLET SEDIMENT TRAP

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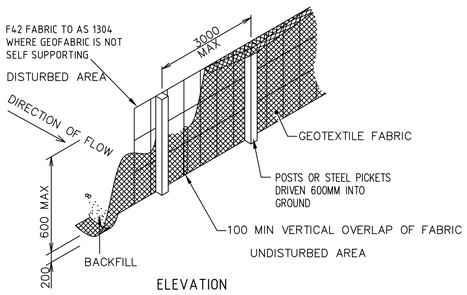

SEDIMENT FENCE

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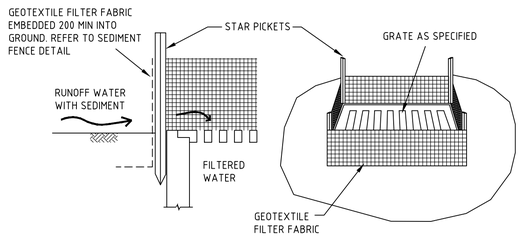

GEOTEXTILE PIT FILTER 1

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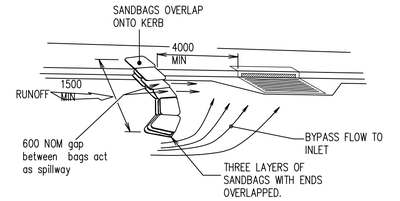
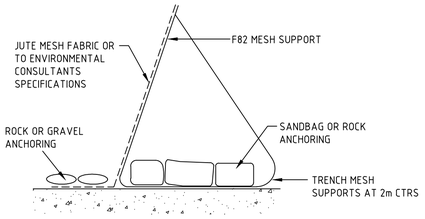


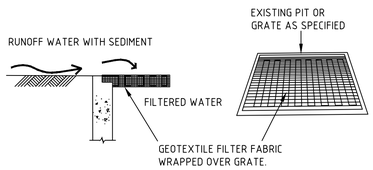
ON GRADE KERB INLET SEDIMENT TRAP

NOT TO SCALE



ALTERNATIVE SEDIMENT FENCE

NOT TO SCALE



GEOTEXTILE PIT FILTER 2

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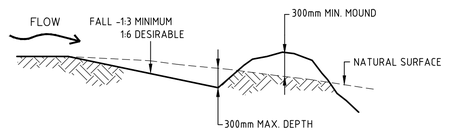

CATCH DRAIN

NOT TO SCALE

ALTERNATIVE SEDIMENT FENCE NOTES

1. INSTALL THIS TYPE OF SEDIMENT FENCE WHEN USE OF SUPPORT POSTS IS NOT DESIRABLE OR NOT POSSIBLE. SUCH CONDITIONS MIGHT APPLY, FOR EXAMPLE, WHERE APPROVAL IS GRANTED FROM THE APPROPRIATE AUTHORITIES TO PLACE THESE FENCES IN HIGHLY SENSITIVE ESTUARINE AREAS.
2. USE BENT TRENCH MESH TO SUPPORT THE F82 WELDED MESH FACING AS SHOWN ON THE DRAWING ABOVE. ATTACH THE JUTE MESH TO THE WELDED MESH FACING USING UV-RESISTANT CABLE TIES.
3. STABILISE THE WHOLE STRUCTURE WITH SANDBAG OR ROCK ANCHORING OVER THE TRENCH MESH AND THE LEADING EDGE OF THE JUTE MESH. THE ANCHORING SHOULD BE SUFFICIENTLY LARGE TO ENSURE STABILITY OF THE STRUCTURE IN THE DESIGN STORM EVENT, USUALLY THE 10 YEAR EVENT.

SEDIMENT AND EROSION CONTROL DETAILS

Rev	Description	Date	By	App
P1	ISSUE FOR INFORMATION	15.11.17	JH	-

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Project Name: THE UNIVERSITY OF SYDNEY ENGINEERING AND TECHNOLOGY PRECINCT (ETP) - STAGE 1

Drawing Title: SOIL AND WATER MANAGEMENT PLAN DETAILS

DEVELOPMENT APPLICATION

Designed	AV
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Date	NOV 17
Sheet	A1

Project Director Approved | Date | North

Project Ref: 20 10518 01 | Drawing No: C006 | Rev: P1

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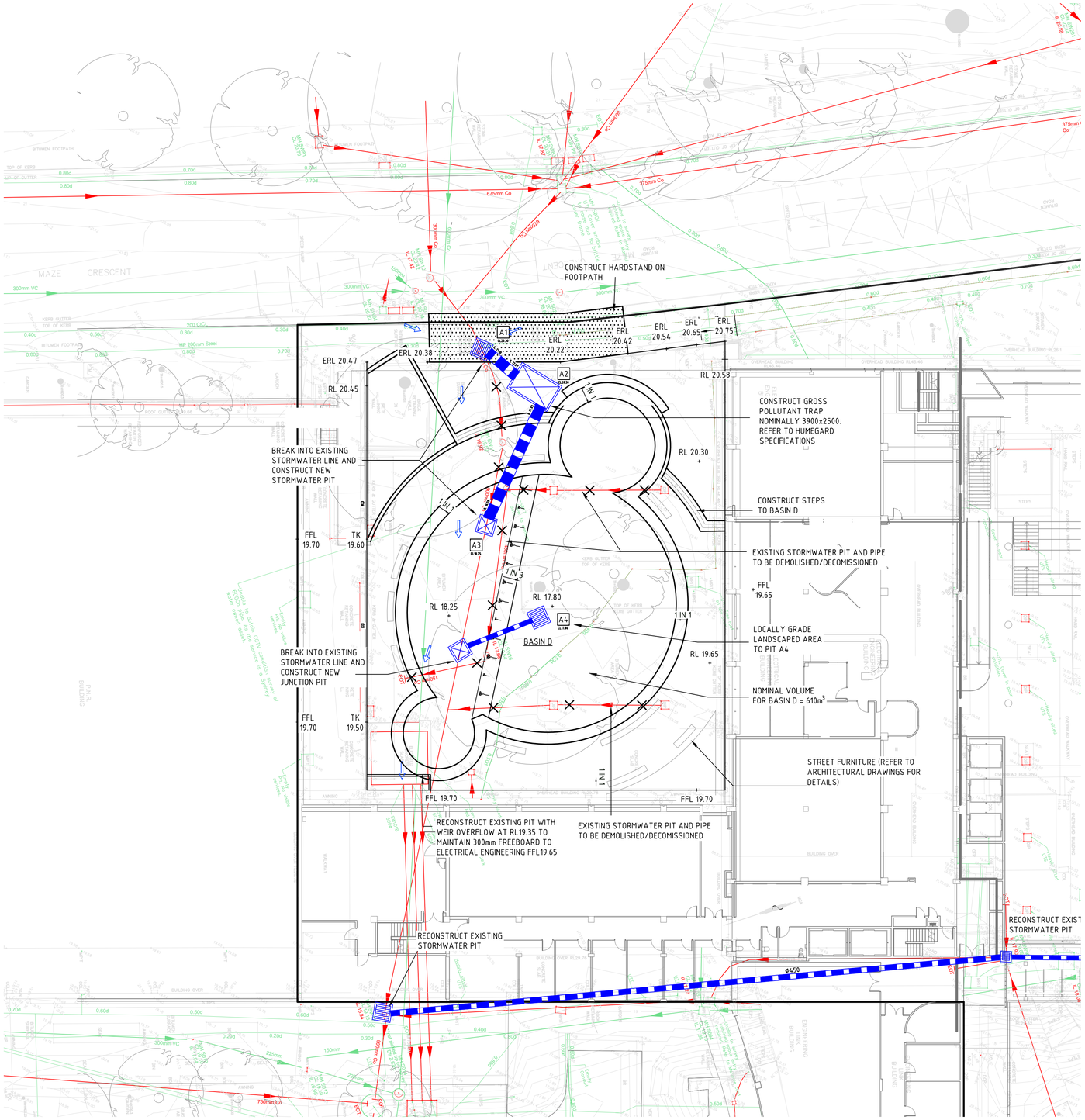
Appendix B – Stormwater Concept Plans



SITEWORKS LEGEND

IK 7.25	INVERT OF KERB LEVEL	ERL 7.25	EXISTING SURFACE LEVEL
TK 7.25	TOP OF KERB LEVEL	RL 7.25	FINISHED SURFACE LEVEL
		KO	KERB ONLY
RW	RETAINING WALL		STORMWATER LINE.
	EMERGENCY OVERLAND FLOW		STORMWATER GRATED PIT
			JUNCTION PIT/GPT
		IL 4.725	PIPE INVERT LEVEL.
		G6 SL 4.9.15	PIT NO. SURFACE LEVEL

NOTE:

NOMINALLY 610m³ OF STORAGE PROVIDED IN BASIN D.
TOTAL OF 1300m³ TO BE MADE AVAILABLE VIA EXTENSION OF THE BASIN DURING STAGE 2 ONCE EXISTING TYREE LAB HAS BEEN DEMOLISHED.

Rev	Description	Date	By	App
P2	ISSUE FOR SSDA	01.12.17	JH	-
P1	ISSUE FOR INFORMATION	15.11.17	JH	-

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Project Name: THE UNIVERSITY OF SYDNEY ENGINEERING AND TECHNOLOGY PRECINCT (ETP) - STAGE 1

Drawing Title: SITEWORKS AND STORMWATER DRAINAGE PLAN - SHEET 1

PRELIMINARY

Designed	AV
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Scale	1:200
Date	NOV 17
Sheet	A1

Project Director Approved | Date | North

Project Ref: 20 10518 01 | Drawing No: C031 | Rev: P2

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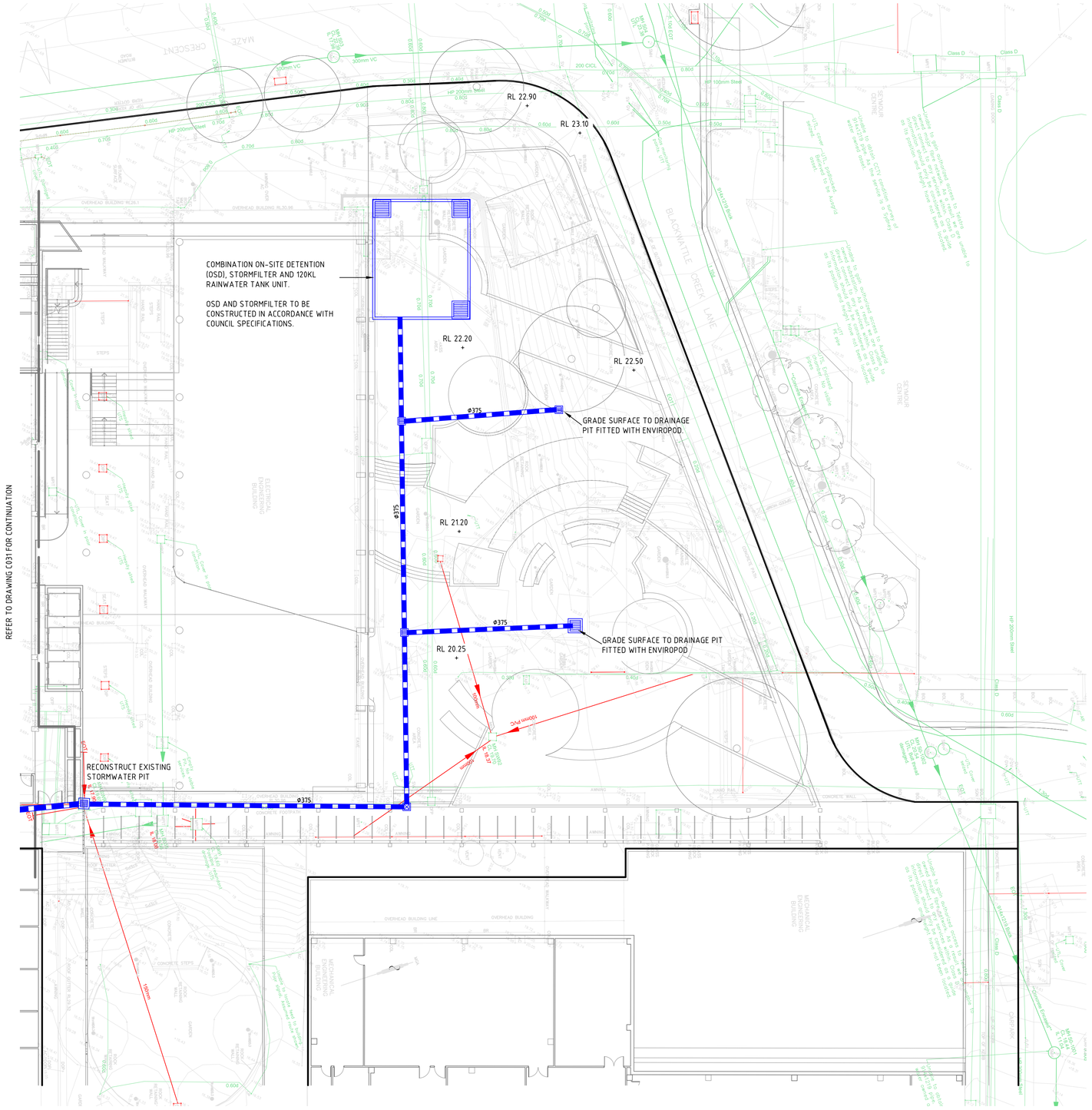

SITEWORKS LEGEND

IK 7.25	INVERT OF KERB LEVEL	ERL 7.25	EXISTING SURFACE LEVEL
TK 7.25	TOP OF KERB LEVEL	RL 7.25	FINISHED SURFACE LEVEL
		KO	KERB ONLY
RW	RETAINING WALL		STORMWATER LINE.
	EMERGENCY OVERLAND FLOW		STORMWATER GRATED PIT
			JUNCTION PIT/GPT
		IL 7.25	PIPE INVERT LEVEL.
		G6 SL 49.15	PIT NO. SURFACE LEVEL

Rev	Description	Date	By	App
P2	ISSUE FOR SSDA	01.12.17	JH	-
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Project Name: THE UNIVERSITY OF SYDNEY ENGINEERING AND TECHNOLOGY PRECINCT (ETP) - STAGE 1

Drawing Title: SITEWORKS AND STORMWATER DRAINAGE PLAN - SHEET 2

PRELIMINARY

Designed	AV
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Sheet	A1

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