



# **WATERLOO METRO QUARTER OVER STATION DEVELOPMENT**

## **Environmental Impact Statement Appendix BB – Civil Engineering Report and Plans**

### **SSD-10437 Southern Precinct**

Detailed State Significant Development  
Development Application

Prepared for **Waterloo Developer Pty Ltd**

30 September 2020

Reference	Description
Applicable SSD Applications	SSD-10437 Southern Precinct
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Document Number	WMQ-BLD3-WSP-CV-RPT-001
Status	Final
Version	D
Date of Issue	28 July 2020
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## 1. Glossary and abbreviations

Reference	Description
ACHAR	Aboriginal Cultural Heritage Assessment Report
ADG	Apartment Design Guide
AHD	Australian height datum
AQIA	Air Quality Impact Assessment
BC Act	Biodiversity Conservation Act 2016
BCA	Building Code of Australia
BC Reg	Biodiversity Conservation Regulation 2017
BDAR	Biodiversity Development Assessment Report
CEEC	critically endangered ecological community
CIV	capital investment value
CMP	Construction Management Plan
Concept DA	A concept DA is a staged application often referred to as a 'Stage 1' DA. The subject application constitutes a detailed subsequent stage application to an approved concept DA (SSD 9393) lodged under section 4.22 of the EP&A Act.
Council	City of Sydney Council
CPTED	Crime Prevention Through Environmental Design
CSSI approval	critical State significant infrastructure approval
CTMP	Construction Traffic Management Plan
DA	development application
DPIE	NSW Department of Planning, Industry and Environment
DRP	Design Review Panel
EP&A Act	Environmental Planning and Assessment Act 1979
EPA	NSW Environment Protection Authority
EPA Regulation	Environmental Planning and Assessment Regulation 2000
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ESC	Erosion Sediment Control

Reference	Description
ESCP	Erosion Sediment Control Plan
ESD	ecologically sustainable design
GANSW	NSW Government Architect's Office
GFA	gross floor area
HIA	Heritage Impact Assessment
IAP	Interchange Access Plan
LGA	Local Government Area
NCC	National Construction Code
OSD	over station development
PCA	Principal Certifying Authority
PIR	Preferred Infrastructure Report
POM	Plan of Management
PSI	Preliminary Site Investigation
RMS	Roads and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SEPP 55	State Environmental Planning Policy No 55—Remediation of Land
SEPP 65	State Environmental Planning Policy No. 65 – Design Quality of Residential Apartment Development
SRD SEPP	State Environmental Planning Policy (State and Regional Development) 2009
SREP Sydney Harbour	State Regional Environmental Plan (Sydney Harbour Catchment) 2005
SSD	State significant development
SSD DA	State significant development application
SLEP	Sydney Local Environmental Plan 2012
Transport for NSW	Transport for New South Wales
TIA	Traffic Impact Assessment

Reference	Description
The proposal	The proposed development which is the subject of the detailed SSD DA
The site	The site which is the subject of the detailed SSD DA
VIA	Visual Impact Assessment
WMQ	Waterloo Metro Quarter
WMP	Waste Management Plan
WSUD	water sensitive urban design

## 2. Executive summary

This Civil Engineering Report and Plans has been prepared by WSP to accompany a detailed State significant development (SSD) development application (DA) for the Southern Precinct over station development (OSD) at the Waterloo Metro Quarter site.

This report has been prepared to address the relevant conditions of the concept SSD DA (SSD 9393) and the Secretary's Environmental Assessment Requirements (SEARs) issued for the detailed SSD DA (SSD 10437).

This report addresses the potential impacts of the Civil Engineering design, which consists of pavement design and earthworks. The risks associated with the Civil Engineering design include non-compliance with City of Sydney pavement design requirements, accessibility problems associated with pavement grading and contamination of waterway systems due to construction earthworks. This report outlines the design decisions and measures taken to mitigate against these risks including designing pavements to comply with City of Sydney and Disability Discrimination Act requirements, and the production of an Erosion and Sediment Control Plan.

This report concludes that the proposed Southern Precinct OSD is suitable and warrants approval subject to the implementation of the design criteria contained in this report.



### 3. Introduction

This report has been prepared to accompany a detailed State significant development (SSD) development application (DA) for the Southern Precinct over station development (OSD) at the Waterloo Metro Quarter site. The detailed SSD DA is consistent with the concept approval (SSD 9393) granted for the maximum building envelope on the site, as proposed to be modified.

The Minister for Planning, or their delegate, is the consent authority for the SSD DA and this application is lodged with the NSW Department of Planning, Industry and Environment (DPIE) for assessment.

The detailed SSD DA seeks development consent for the design, construction and operation of:

#### Southern Precinct

- 25-storey residential building (Building 3) comprising student accommodation, to be delivered as a mixture of studio and twin apartments with approximate capacity of 474 students
- 9-storey residential building (Building 4) above the southern station box to accommodate 70 social housing dwellings
- ground level retail tenancies including Makerspace and gymnasium lobby, and loading facilities
- level 1 and level 2 gymnasium and student accommodation communal facilities
- landscaping and private and communal open space at podium and roof top levels to support the residential accommodation
- new public open space including the delivery of the Cope Street Plaza, including vehicle access to the site via a shared way from Cope Street, expanded footpaths on Botany and Wellington streets and public domain upgrades
- signage zone locations
- utilities and service provision
- stratum subdivision (staged).

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 8 April 2020 and issued for the detailed SSD DA. Consideration has been given to the SEARs requirements however there are no SEARs requirements of specific relevance to the civil design.

Item	Description of requirement	Section reference (this report)
	N/A	None relevant

**Table 1 - SEARs requirements**

This report has also been prepared in response to the following conditions of consent issued for the concept SSD DA (SSD 9393). There are no specific conditions of consent of relevance to the civil design.

Item	Description of requirement	Section reference (this report)
	N/A	None Relevant

***Table 2 - Conditions of Concept Approval***

This report has also been prepared in accordance with the guidelines outlined in the Waterloo Design and Amenity Guideline report.

Item	Description of requirement	Section reference (this report)
3D	Streets, lanes and footpaths	7.3

***Table 3 – Waterloo Design and Amenity Guidelines***

## 4. The site

The site is located within the City of Sydney Local Government Area (LGA). The site is situated about 3.3 kilometres south of Sydney CBD and eight kilometres northeast of Sydney International Airport within the suburb of Waterloo.

The Waterloo Metro Quarter site comprises land to the west of Cope Street, east of Botany Road, south of Raglan Street and north of Wellington Street (refer to Figure 1). The heritage-listed Waterloo Congregational Church at 103–105 Botany Road is within this street block but does not form a part of the Waterloo Metro Quarter site boundaries.

The Waterloo Metro Quarter site is a rectangular shaped allotment with an overall site area of approximately 1.287 hectares.

The Waterloo Metro Quarter site comprises the following allotments and legal description at the date of this report. Following consolidation by Sydney Metro (the Principal) the land will be set out in deposited plan DP1257150.

- 1368 Raglan Street (Lot 4 DP 215751)
- 59 Botany Road (Lot 5 DP 215751)
- 65 Botany Road (Lot 1 DP 814205)
- 67 Botany Road (Lot 1 DP 228641)
- 124-128 Cope Street (Lot 2 DP 228641)
- 69-83 Botany Road (Lot 1, DP 1084919)
- 130-134 Cope Street (Lot 12 DP 399757)
- 136-144 Cope Street (Lots A-E DP 108312)
- 85 Botany Road (Lot 1 DP 27454)
- 87 Botany Road (Lot 2 DP 27454)
- 89-91 Botany Road (Lot 1 DP 996765)
- 93-101 Botany Road (Lot 1 DP 433969 and Lot 1 DP 738891)
- 119 Botany Road (Lot 1 DP 205942 and Lot 1 DP 436831)
- 156-160 Cope Street (Lot 31 DP 805384)
- 107-117A Botany Road (Lot 32 DP 805384 and Lot A DP 408116)
- 170-174 Cope Street (Lot 2 DP 205942).

The detailed SSD DA applies to the Southern Precinct (the site) of the Waterloo Metro Quarter site. The site has an area of approximately 4830sqm. The subject site comprises the following allotments and legal description at the date of this report.

### Southern Precinct DA

- 130–134 Cope Street (Lot 12 DP 399757) (Part)
- 136–144 Cope Street (Lots A-E DP 108312) (Part)
- 93–101 Botany Road (Lot 1 DP 433969 and Lot 1 DP 738891) (Part)
- 156–160 Cope Street (Lot 31 DP 805384)
- 107–117A Botany Road (Lot 32 DP 805384 and Lot A DP 408116)



- 119 Botany Road (Lot 1 DP 205942 and Lot 1 DP 436831)
- 170–174 Cope Street (Lot 2 DP 205942).

The boundaries of the overall site are identified at Figure 1, and the subject site of the detailed SSD DA is identified at Figures 2 and 3. The site is reasonably flat with a slight fall to the south.

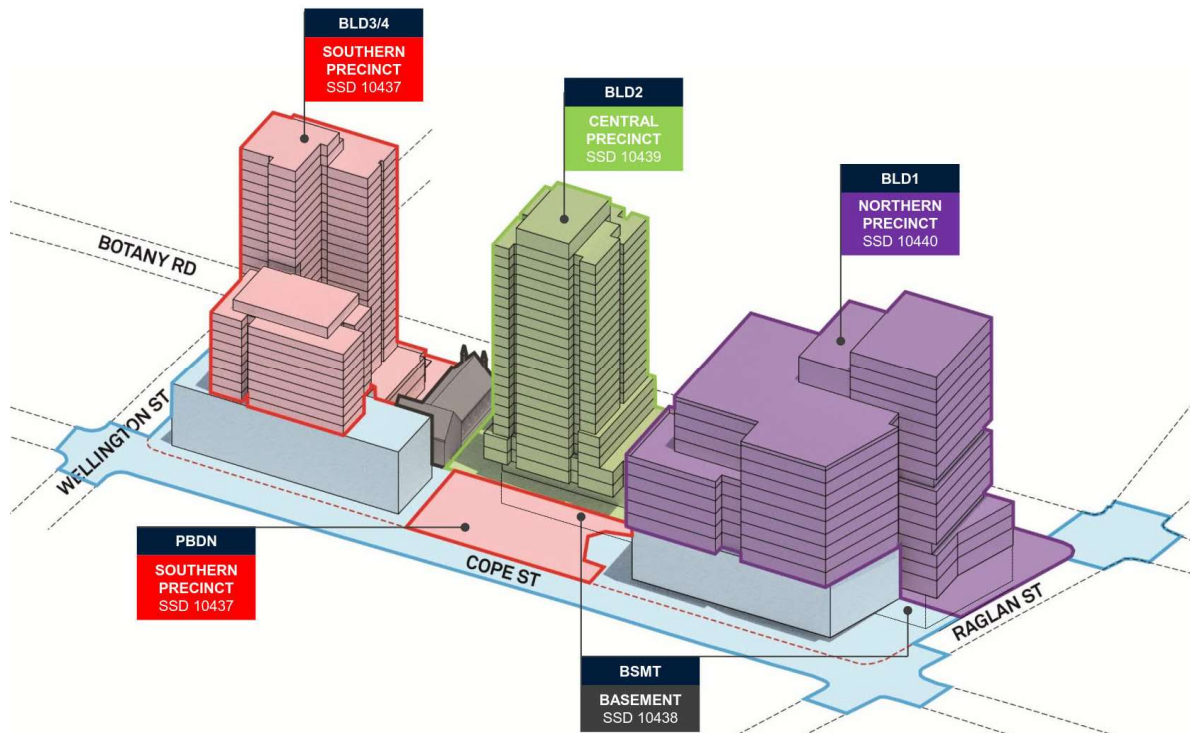
The site previously included three to five storey commercial, light industrial and shop top housing buildings. All previous structures except for an office building at the corner of Botany Road and Wellington Street have been demolished to facilitate construction of the new Sydney Metro Waterloo station. As such the existing site is predominately vacant and being used as a construction site. Construction of the Sydney metro is currently underway on site in accordance with critical State significant infrastructure approval (CSSI 7400).



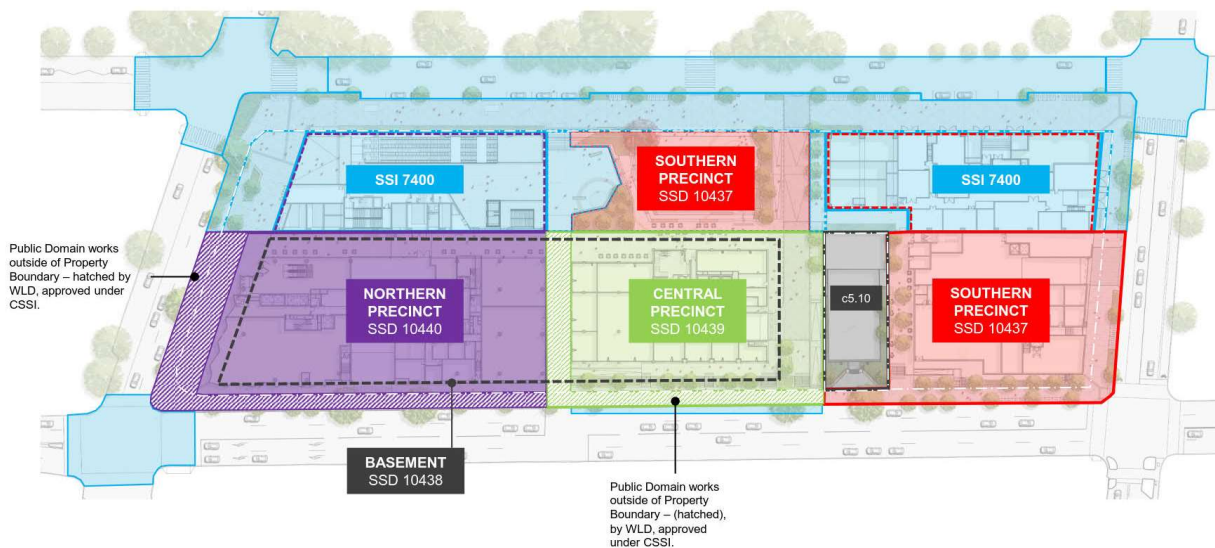
**Figure 1 - Aerial image of the site**  
Source: Urbis



The area surrounding the site consists of commercial premises to the north, light industrial and mixed-use development to the south, residential development to the east and predominantly commercial and light industry uses to the west.



**Figure 2 - Waterloo Metro Quarter site, with sub-precincts identified**  
Source: HASSELL



**Figure 3 - Waterloo Metro Quarter site, with sub-precincts identified**  
Source: Waterloo Developer Pty Ltd



## 5. Background

### 5.1 About Sydney Metro

Sydney Metro is Australia's biggest public transport project. Services started in May 2019 in the city's North West with a train every four minutes in the peak. A new standalone railway, this 21st century network will revolutionise the way Sydney travels.

There are four core components:

#### 5.1.1 Sydney Metro North West

This project is now complete and passenger services commenced in May 2019 between Rouse Hill and Chatswood, with a metro train every four minutes in the peak. The project was delivered on time and \$1 billion under budget.

#### 5.1.2 Sydney Metro City & Southwest

Sydney Metro City & Southwest project includes a new 30km metro line extending metro rail from the end of Metro Northwest at Chatswood, under Sydney Harbour, through new CBD stations and southwest to Bankstown. It is due to open in 2024 with the ultimate capacity to run a metro train every two minutes each way through the centre of Sydney.

Sydney Metro City & Southwest will deliver new metro stations at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street, Waterloo and new underground metro platforms at Central Station. In addition, it will upgrade and convert all 11 stations between Sydenham and Bankstown to metro standards.

#### 5.1.3 Sydney Metro West

Sydney Metro West is a new underground railway connecting Greater Parramatta and the Sydney CBD. This once-in-a-century infrastructure investment will transform Sydney for generations to come, doubling rail capacity between these two areas, linking new communities to rail services and supporting employment growth and housing supply between the two CBDs.

The locations of seven proposed metro stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays.

The NSW Government is assessing an optional station at Pyrmont and further planning is underway to determine the location of a new metro station in the Sydney CBD.

#### 5.1.4 Sydney Metro Greater West

Metro rail will also service Greater Western Sydney and the new Western Sydney International (Nancy Bird Walton) Airport. The new railway line will become the transport spine for the Western Parkland City's growth for generations to come, connecting communities and travellers with the rest of Sydney's public transport system with a fast, safe and easy metro service.

The Australian and NSW governments are equal partners in the delivery of this new railway.

The Sydney Metro project is illustrated below.

*Figure 4 - Sydney Metro alignment map  
Source: Sydney Metro*

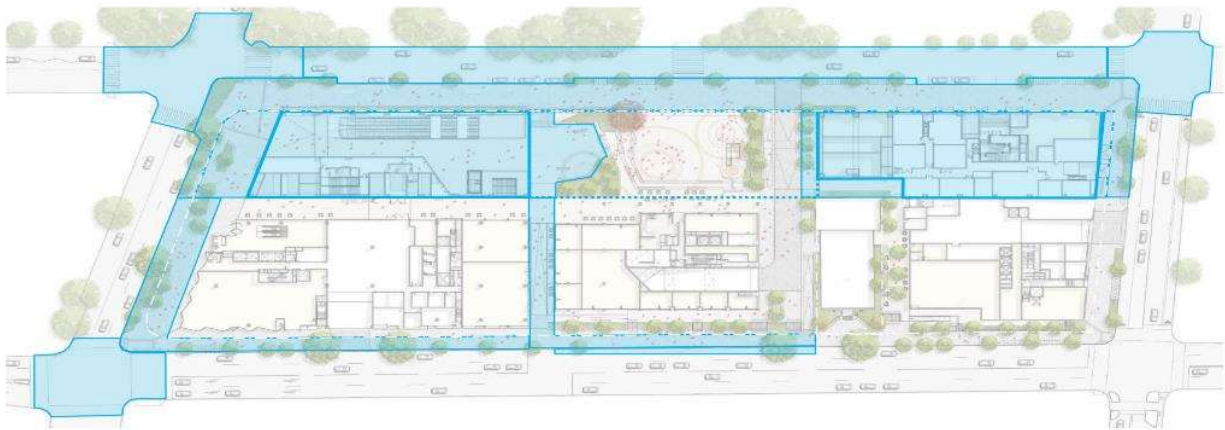
## 5.2 Sydney Metro CSSI Approval (SSI 7400)

On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham project as a critical State significant infrastructure (CSSI) project (reference SSI 7400) (CSSI approval). The terms of the CSSI approval includes all works required to construct the Sydney Metro Waterloo Station. The CSSI approval also includes the construction of below and above ground works within the metro station structure for appropriate integration with the OSD.

With regards to CSSI related works, any changes to the 'metro station box' envelope and public domain will be pursued in satisfaction of the CSSI conditions of approval and do not form part of the scope of the concept SSD DA or detailed SSD DA for the OSD.

Except to the extent described in the EIS or Preferred Infrastructure Report (PIR) submitted with the CSSI application, any OSD buildings and uses do not form part of the CSSI approval and will be subject to the relevant assessment pathway prescribed by the EP&A Act.

The delineation between the approved Sydney Metro works, generally described as within the two 'metro station boxes' and surrounding public domain works, and the OSD elements are illustrated in Figure 5.



**Figure 5 - CSSI Approval scope of works**  
**Source: WL Developer Pty Ltd**

### 5.3 Concept Approval (SSD 9393)

As per the requirements of clause 7.20 of the *Sydney Local Environmental Plan 2012* (SLEP), as the OSD exceeds a height of 25 metres above ground level (among other triggers), development consent is first required to be issued in a concept DA (formerly known as Stage 1 DA).

Development consent was granted on 10 December 2019 for the concept SSD DA (SSD 9393) for the Waterloo Metro Quarter OSD including:

- a maximum building envelope for podium, mid-rise and tower buildings
- a maximum gross floor area of 68,750sqm, excluding station floor space
- conceptual land use for non-residential and residential floor space
- minimum 12,000sqm of non-residential gross floor area including a minimum of 2,000sqm of community facilities
- minimum 5% residential gross floor area as affordable housing dwellings
- 70 social housing dwellings
- basement car parking, motorcycle parking, bicycle parking, and service vehicle spaces.

The detailed SSD DA seeks development consent for the OSD located within the Southern Precinct of the site, consistent with the parameters of this concept approval. Separate SSD DAs have been prepared and will be submitted for the Northern and Central Precincts and basement car park proposed across the Waterloo Metro Quarter site.

A concurrent amending concept SSD DA has been prepared and submitted to the DPIE which proposed to make modifications to the approved building envelopes at the northern precinct and central building. This amending concept SSD DA does not impact the proposed development within the southern precinct.



## 6. Proposed development

### 6.1 Waterloo Metro Quarter Development

The Waterloo Metro Quarter OSD comprises four separate buildings, a basement carpark and public domain works adjacent to the Waterloo Metro station.

Separate SSD DAs will be submitted concurrently for the design, construction and operation of each building in the precinct;

- Southern precinct SSD-10437,
- Basement Car Park SSD-10438,
- Central precinct SSD-10439, and
- Northern precinct-SSD-10440.

An overview of the Development is included below for context. This detailed SSD DA seeks development consent for the design, construction and operation of the Southern Precinct:

#### 6.1.1 Southern Precinct (Subject DA)

The Southern Precinct comprises:

- 25-storey residential building (Building 3) comprising student accommodation, to be delivered as a mixture of studio and twin apartments with approximate capacity of 474 students
- 9 storey residential building (Building 4) above the southern station box to accommodate 70 social housing dwellings
- ground level retail tenancies including Makerspace and gymnasium lobby, and loading facilities
- level 1 and level 2 gymnasium and student accommodation communal facilities
- landscaping and private and communal open space at podium and roof top levels to support the residential accommodation
- new public open space including the delivery of the Cope Street Plaza, including vehicle access to the site via a shared way from Cope Street, expanded footpaths on Botany and Wellington Streets and public domain upgrades
- signage zone locations
- utilities and service provision
- stratum subdivision (staged).

#### 6.1.2 Basement Car Park

The Basement Car Park comprises:

- 2-storey shared basement car park and associated excavation comprising
- Ground level structure
- Carparking for the Commercial Building 1, Residential Building 2, social housing Building 4, Waterloo Congregational Church and Sydney Metro
- Service vehicle bays
- commercial end of trip and bicycle storage facilities

- Retail end of trip and bicycle storage facilities
- residential storage facilities
- shared plant and services.

### 6.1.3 Central Precinct

The Central Precinct comprises:

- 24-storey residential building (Building 2) comprising approximately 126 market residential and 24 affordable housing apartments, to be delivered as a mixture of 1 bedroom, 2 bedroom and 3 bedroom apartments
- Ground level retail tenancies, community hub, precinct retail amenities and basement car park entry
- level 1 and level 2 community facilities (as defined in the SLEP) intended to be operated as a childcare centre
- landscaping and private and communal open space at roof top levels to support the residential accommodation
- new public open space including the delivery of the Church Square, including vehicle access to the basement via a shared way from Cope Street, expanded footpaths and public domain upgrades on Botany Road
- external licensed seating areas
- signage zone locations
- utilities and service provision
- stratum subdivision (staged).

### 6.1.4 Northern Precinct

The Northern Precinct comprises:

- 17-storey commercial building (Building 1) comprising Commercial floor space, with an approximate capacity of 4000 workers
- ground level retail tenancies, loading dock facilities serving the northern and central precinct including Waterloo metro station
- landscaping and private open space at podium and roof top levels to support the commercial tenants
- new public open space including the delivery of the Raglan Street Plaza, Raglan Walk and expanded footpaths on Raglan Street and Botany Road and public domain upgrades
- external licensed seating areas
- signage zone locations
- utilities and service provision
- stratum subdivision (staged).

## 7. Pavement

The pavement requirements included in the civil works package consist of ground level paved areas within the Southern Precinct including Building 3 frontages on Wellington Street and Botany Road, internal paving between Building 3 and the existing heritage-listed Waterloo Congregational Church, and Cope Street Plaza. Refer to the drawings in Appendix A for this report for the extent of works.

### 7.1 Pavement Type

The public domain footpath pavement on City of Sydney land (at the frontage of Building 3 on Wellington Street and Botany Road) will be concrete paving as per City of Sydney Council Standard Pavement Specifications. All service manhole covers will need to be reconstructed to the new footpath pavement levels. The service manhole covers will need to be paver infill type covers and aligned as per City of Sydney Council's public domain specification. All internal pavements types, extent and finishes are to refer to architectural documentation.

### 7.2 Pavement Levels and Crossfalls

Trafficable footpath pavement cross falls are expected to be no steeper than 1 in 40 in accordance with Disability Discrimination Act access requirements. Covered areas where water is expected due to wind driven rain shall be graded at 1 in 200 min. Exposed concrete area subject to rain shall be graded at 1 in 100 (minimum) and 1 in 80 (minimum) for paved areas. These requirements apply on site and Council's road reserve.

### 7.3 Waterloo Design and Amenity Guideline Requirements

Section 3D (Streets, lanes and footpaths) of the Waterloo Design and Amenity Guideline Requirements has the following objectives and design criteria which are relevant to pavement design.

- Objectives:  
Provide high quality materials and finishes in the public domain that respond to the character of the local area
- Design Criteria:  
Construct footpaths in accordance with the Sydney Streets Design Code. Design footpaths so that pedestrians, regardless of mobility impairments, are able to move comfortably and safely.

As stated in section 7.1 above, the pavement design is to be as per City of Sydney Council Standard Pavement Specifications, and will consequently be constructed in accordance with the Sydney Streets Design Code.

As stated in Section 7.2 above, all footpaths will be designed in accordance with DDA access requirements, and will therefore be accessible to all pedestrians, regardless of mobility impairments.

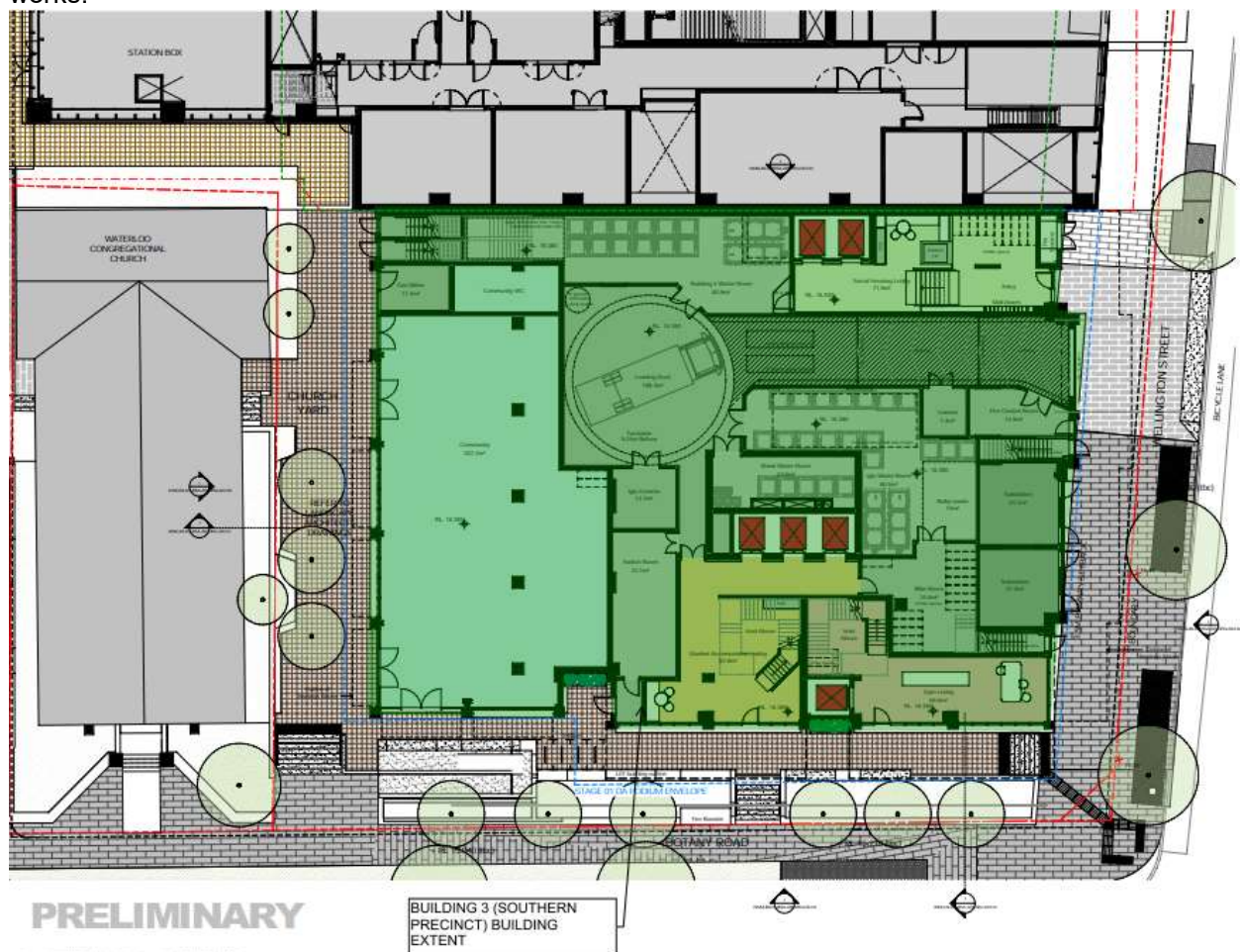
## 8. Earthworks

### 8.1 Bulk Earthworks

The Southern precinct consists of Buildings 3 and 4, and Cope Street Plaza. Building 4 and Cope Street Plaza are located above the Waterloo Station Metro Services Box, and will therefore not require any bulk excavation. A building pad will be required to be prepared for the construction of Building 3; a building pad is constructed by carrying out earthworks, excavation, laying and compaction of suitable material to the required levels.

The finished floor level of Building 3 is primarily R.L.16.38 and the resulting bulk excavation level is at R.L.15.88 (an allowance of 500mm for slab thickness).

The floor plan area is approximately 1260m<sup>2</sup>, refer to Figure 6 below for the extent of Building 3 works.



**Figure 6 – Building 3 extent**

The approximate site levels in the area are R.L.15.66, which means the site will be required to be built up to a level of R.L.15.88, a fill volume of approximately 276m<sup>3</sup>.

## 8.2 Soil and Erosion Control

The aim of an Erosion and Sediment Control Plan (ESCP) is to eliminate the potential risk of construction works polluting the receiving waterways downstream of the site. Pollution from construction sites is generally disturbed soil in the form of sediment runoff, clean or otherwise. An erosion control plan shall be formulated by the building contractor once the detailed design, staging and construction proposals have been completed.

Sediment controls during development will be adopted for the site as referenced in “Managing Urban Stormwater, Soils and Construction, 4th Edition March 2004, Landcom”.

### 8.2.1 Objectives

- To prevent land from being degraded by soil erosion or unsatisfactory land and water management practices,
- To protect streams and waterways from being degraded by sediment laden waters originating from construction sites, and
- To promote and protect biodiversity.

### 8.2.2 Works Description

The contractor will be responsible for formulating and implementing the appropriate erosion and sediment controls, being:

- The installation and maintenance of erosion and sediment management controls. These controls shall be modified on-site when required by construction schedules to ensure compliance with environmental and council legislation.
- Submitting details of erosion and sediment control management procedures for approval by the Principal Certifying Authority (PCA). The ESCP will include a schedule detailing the stages at which various management techniques will be in place.
- Submitting engineering drawings for each stage of the development.
- Protection of stockpiling to prevent them becoming a source of dust or sediment.
- The contractor will be responsible for the restoration of the site and any adjoining affected lands where sediment deposition has occurred as a result of construction activity associated with the development.

### 8.2.3 Temporary Site Drainage

Sandbags shall be used to divert stormwater run-off around or through the site as appropriate in a non-erosive manner and without impeding road and foot traffic in the adjacent road reserve. As works progress, clean water from external catchments will be diverted around any disturbed areas of the site. A temporary sedimentation basin may be constructed where sediment laden water will be allowed to deposit any sediment. Once settled, clean water would be pumped to Council’s stormwater pit and pipe system. Note, pumping to Council’s pit and pipe system requires prior Council approval.



#### 8.2.4 Sediment Control

Sediment controls are applied to prevent off-site damage. It is proposed that site controls will be implemented within the property boundaries to control sedimentation during construction. These controls generally include the following and appropriate measures should be taken in consideration of the specific site requirements:

Sediment Fence	A sediment fence to retain solids coarser than .02mm
Filter Strips	Strips of vegetation left or constructed downstream from earthworks to provide a simple method of trapping coarse sediment in most storm events other than large ones.
Stabilised Site Access	Reduces the likelihood of vehicles tracking soil materials onto public road and ensure all-weather entry/exit.
Stockpiles	Set aside in protected areas of reduced grade
Water Wetting	During dry weather water wetting should be utilised on dust areas to keep the dust from spreading.
Sedimentation Control Pit	Designed to intercept sediment-laden runoff and retain most sediment and other materials, thereby protecting downstream waterways from pollution.  The need for retention of runoff in sediment traps will be ascertained for each area of runoff depending upon the work methods and staging.
Filter Rolls / sandbags	Placed upstream of kerb inlet pits to prevent sediment from entering the stormwater system. To be maintained by a cleaning program.

**Table 4 – Sediment Control Measures**

#### 8.2.5 Pre-Construction Works

Demolition or Construction works will not be permitted until the erosion and sediment controls are installed and functional. Before the commencement of construction activities, the following measures will be implemented to ensure minimal disturbance to the site. Note measures should be chosen based on the particular site conditions:

- A single stabilised site entry/ exit point to be established, sign posted, and agreed with the PCA or Council (if required) for the site. Hoarding or barrier fencing will be used to restrict all vehicular movements to this point.
- The need for a Shaker Pad to remove excess spillage collected on construction vehicles is to be reviewed.
- Sediment/barrier fencing to be erected.
- Define the location of any construction vehicle compound, site office and vehicle servicing area.
- Establish diversion devices to divert runoff around potentially exposed areas and control site discharges.
- Educate site personnel to the importance of erosion and sediment control (ESC) measures and their maintenance.

- Approved bins for building waste, concrete and mortar slurries, paints, acid washings and litter will be provided and arrangements made for regular collection and disposal.

#### 8.2.6 During Construction

The Contractor is required to undertake a visual ESC monitoring and maintenance program for the site, to check that the ESC measures:

- Reflect this ESC Program (as approved by the PCA);
- Are maintained and fully operational at all times; and
- Are modified and/or supplemented as required to suit site conditions.

The nominated personnel should also obtain Bureau of Meteorology weather forecasts for the site and take appropriate action based on such forecasts.

A checklist for the monitoring and maintenance of the ESC program controls onsite is to be kept updated for the duration of works. The site supervisor, or a staff member chosen by the site supervisor, should undertake ESC inspections with the checklist on the following occasions during the works:

- At least weekly,
- Prior to forecast rain,
- At regular intervals not exceeding 14 hours during prolonged rainfall events, and
- Immediately after each rain event resulting in runoff from the site.

Should City of Sydney request additional erosion and sediment control measures be implemented during construction, these measures will be implemented in a timely fashion.

Lands adjacent to the site and on the footpath will not be disturbed during works except where essential. Where works are necessary, they will be undertaken in such a manner as to minimise the occurrence of soil erosion, even for short periods.

#### 8.2.7 Post Construction

Following the completion of construction works, permanent stormwater mitigation devices will be brought online as early as possible.

## 9. Conclusion

This Civil Engineering Report and Plans addresses the relevant conditions of the concept SSD DA (SSD 9393), the Secretary's Environmental Assessment Requirements issued for the detailed SSD DA and the Waterloo Design and Amenity Guidelines.

This report addresses the potential impacts of the Civil Engineering design, which consists of pavement design and earthworks. This report demonstrates the design decisions and measures taken to mitigate against Civil Engineering design risks including designing pavements to comply with City of Sydney and Disability Discrimination Act requirements, and the production of an Erosion and Sediment Control Plan.



## **10. Appendices**

### **10.1 Appendix 1 – Civil Engineering Works Drawings**

<b>WATERLOO METRO QUARTER DEVELOPMENT</b> SYDNEY METRO BUILDING 3 (SOUTHERN PRECINCT) PAVEMENT PLAN			
<b>STATUS: PRELIMINARY</b>		<b>SHEET 1 OF 1</b>	<b>©</b>
DRG No WYMQ-BLD3-WSP-CV-DRG-C8251			REV. C







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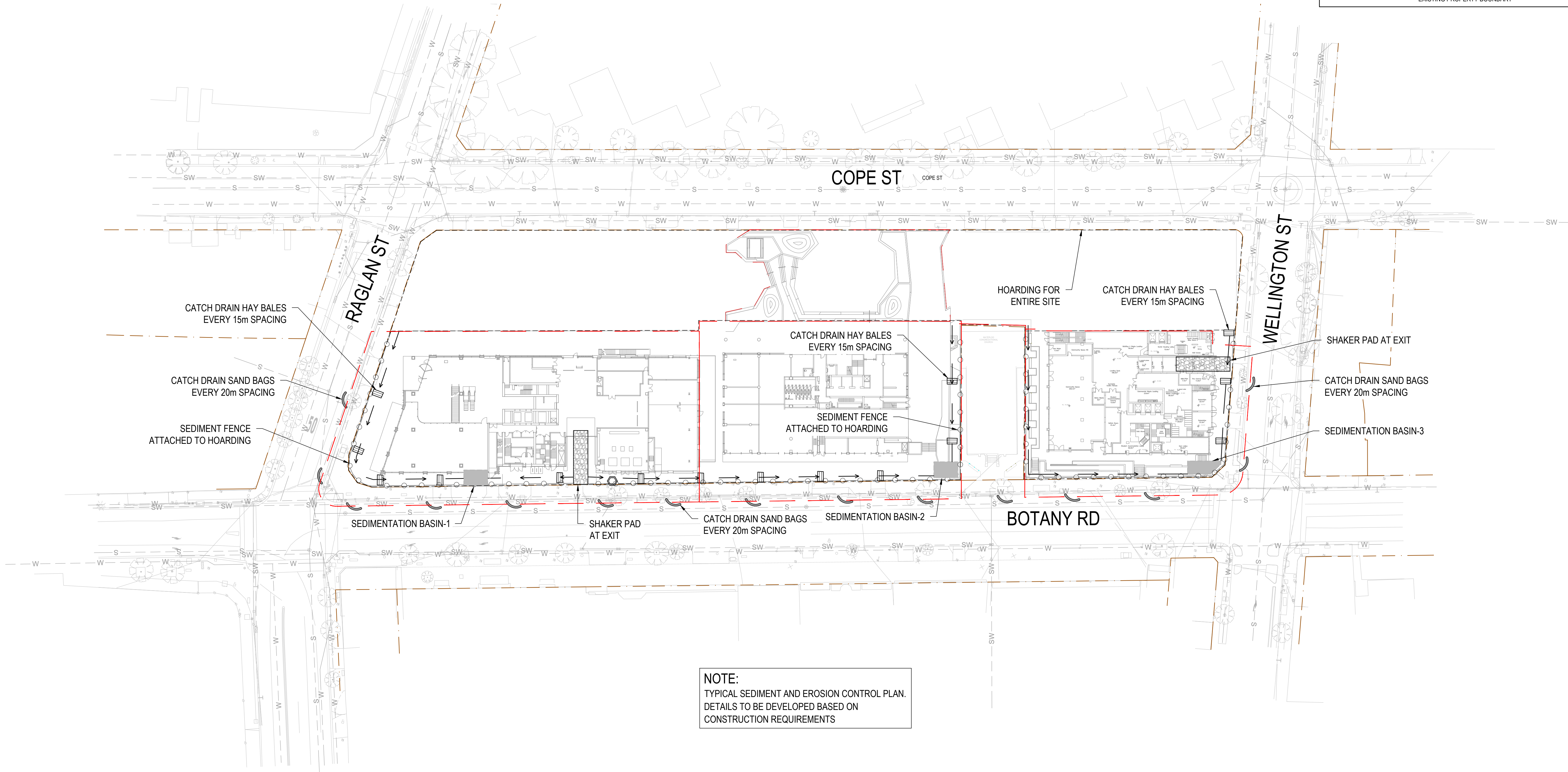
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100mm

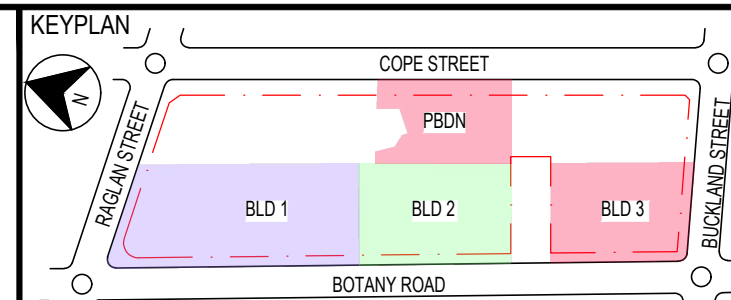
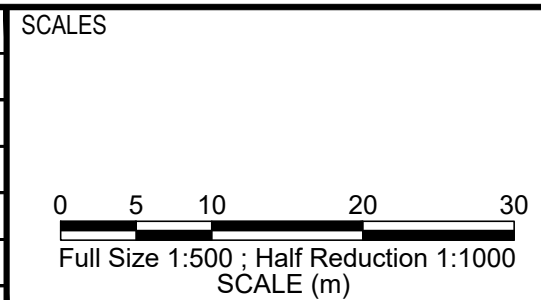
# SEDIMENT AND EROSION LEGEND

- PROPOSED SEDIMENT FENCE
- PROPOSED GEOTEXTILE INLET FILTER
- PROPOSED SANDBAG FILTER
- PROPOSED HAYBALE FILTER
- PROPOSED TEMPORARY DIVERSION CHANNEL/BUND
- PROPOSED STABILISED SITE ACCESS
- PROPOSED LIMIT OF WORKS
- EXISTING PROPERTY BOUNDARY



NOTE:  
TYPICAL SEDIMENT AND EROSION CONTROL PLAN.  
DETAILS TO BE DEVELOPED BASED ON  
CONSTRUCTION REQUIREMENTS

C	MR	28.07.20	RE-ISSUE FOR CONCEPT DESIGN	KS
B	MR	23.07.20	ISSUE FOR CONCEPT DESIGN	KS
A	MR	17.07.20	ISSUE FOR DA	KS
	BY	DATE	DESCRIPTION	APPD.
A1 Original	Co-ordinate System: MGA Zone 56		Height Datum: A.H.D.	This sheet may be prepre



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DESIGN CHECK\_ J.CONDON  
APPROVED\_ K.SWAN 28.07.20

WATERLOO METRO QUARTER DEVELOPMENT  
SYDNEY METRO  
BUILDING 3 (SOUTHERN PRECINCT)  
SEDIMENT AND EROSION CONTROL PLAN

STATUS: PRELIMINARY SHEET 1 OF 1 ©

DRG No WMQ-BLD3-WSP-CV-DRG-C8254 REV. C



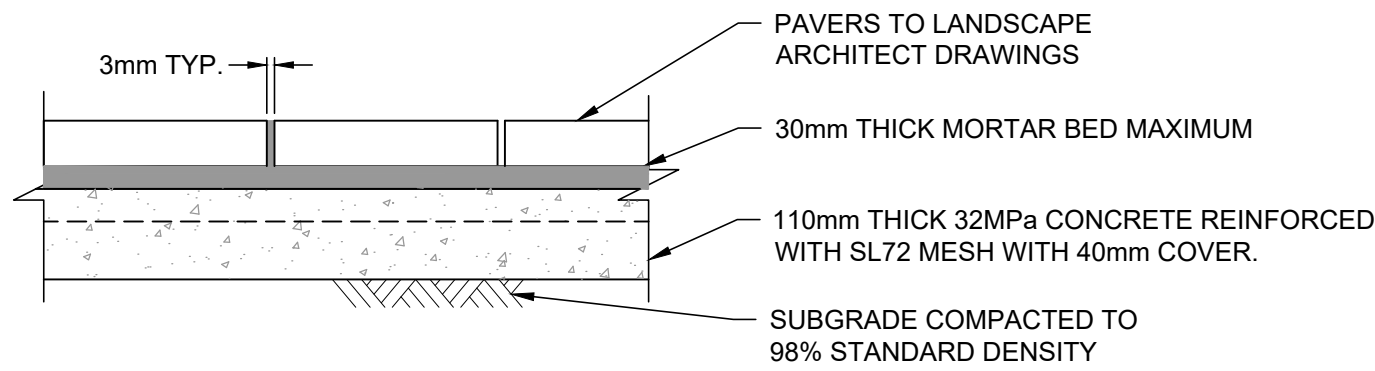


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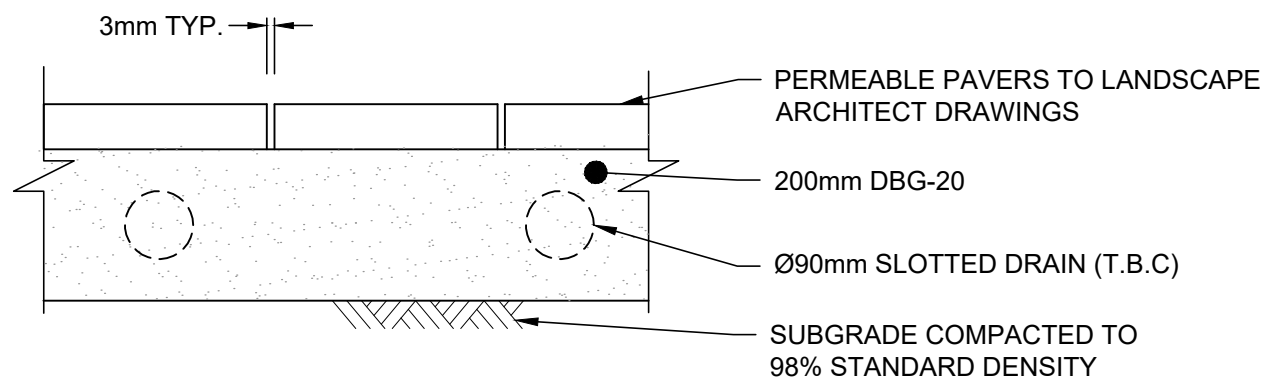
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100mm AT FULL SIZE

100mm



TYPICAL PAVING TYPE 1, 2, AND 3 DETAIL  
SCALE 1:10



TYPICAL PERMEABLE PAVING TYPE 6 DETAIL  
SCALE 1:10

B	MR	23.07.20	ISSUE FOR CONCEPT DESIGN	KS	
A	MR	17.07.20	ISSUE FOR DA	KS	
	BY	DATE	DESCRIPTION	APPD.	
A1 Original	Co-ordinate System: MGA Zone 56		Height Datum: A.H.D.	This sheet may be prepared using colour and may be incomplete if copied	

KEYPLAN

NOTE: Do not scale from this drawing.

ALT. DRG No. [Alt. Drg. No.]

A JOINT VENTURE PROJECT

CLIENT

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DESIGN CHECK\_ J.CONDON

APPROVED\_ K.SWAN

23.07.20

WATERLOO METRO QUARTER DEVELOPMENT

SYDNEY METRO  
BUILDING 3 (SOUTHERN PRECINCT)  
PAVEMENT DETAILS

STATUS: PRELIMINARY

SHEET 1 OF 1

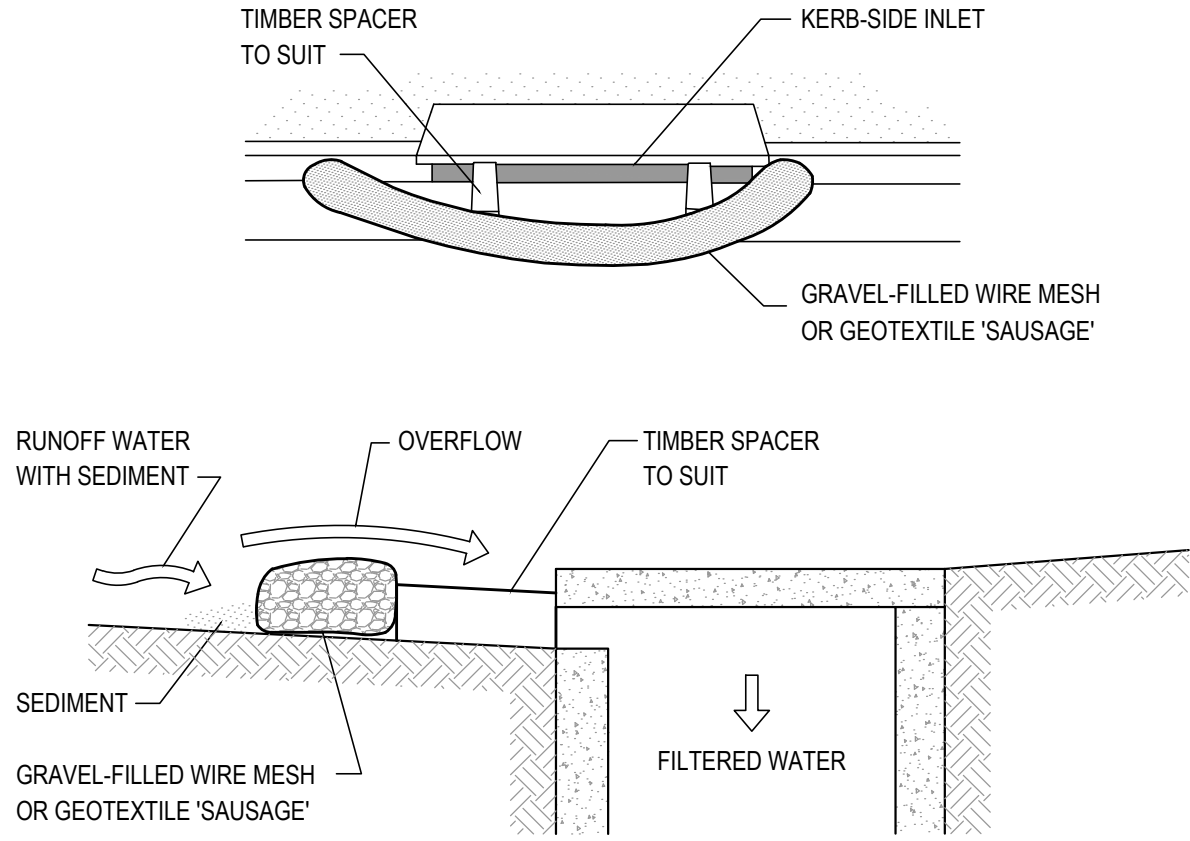
©

DRG No\WMQ-BLD3-WSP-CV-DRG-C8261

REV. B



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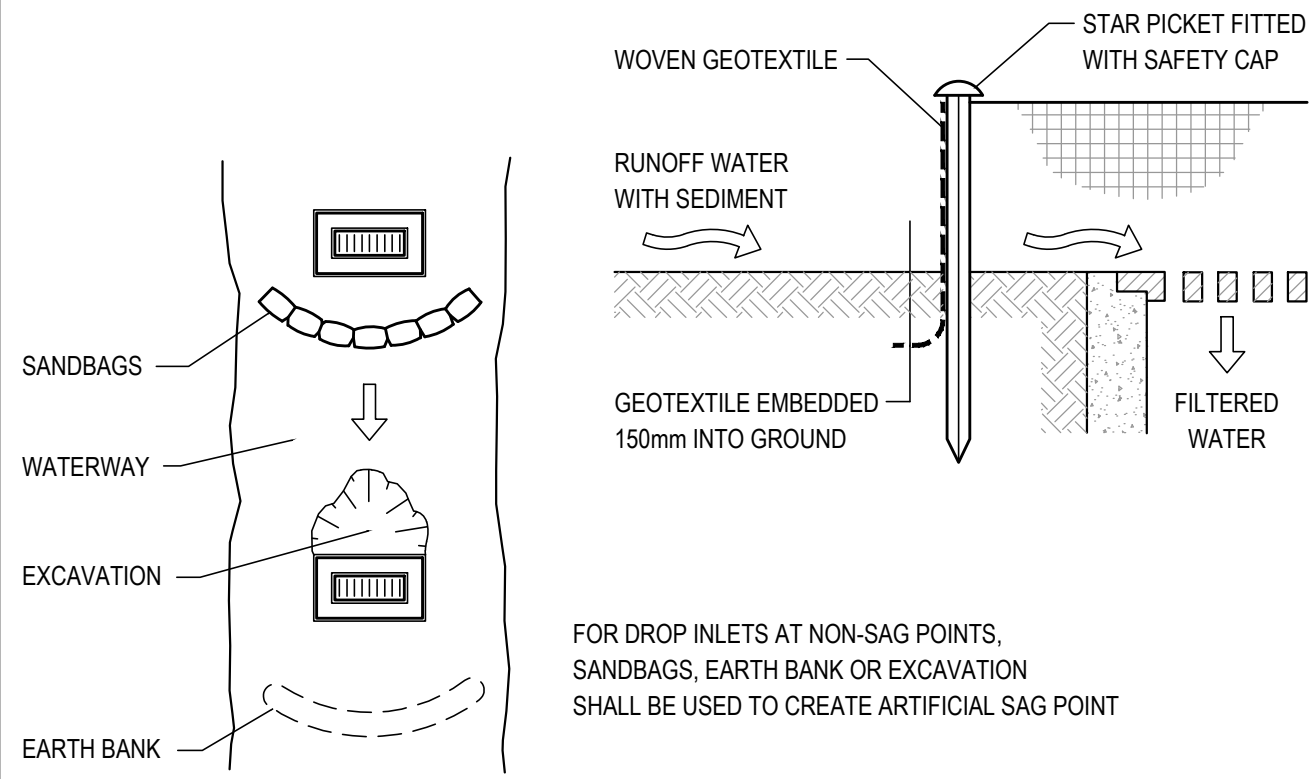
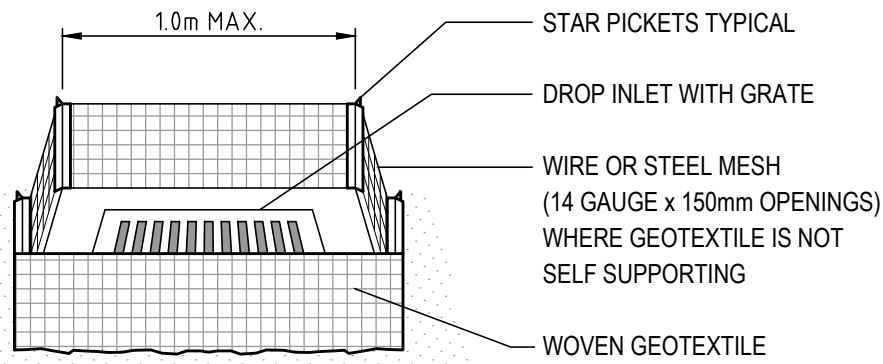


#### CONSTRUCTION NOTES:

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

#### MESH AND GRAVEL INLET FILTER DETAIL

NOT TO SCALE



FOR DROP INLETS AT NON-SAG POINTS, SANDBAGS, EARTH BANK OR EXCAVATION SHALL BE USED TO CREATE ARTIFICIAL SAG POINT

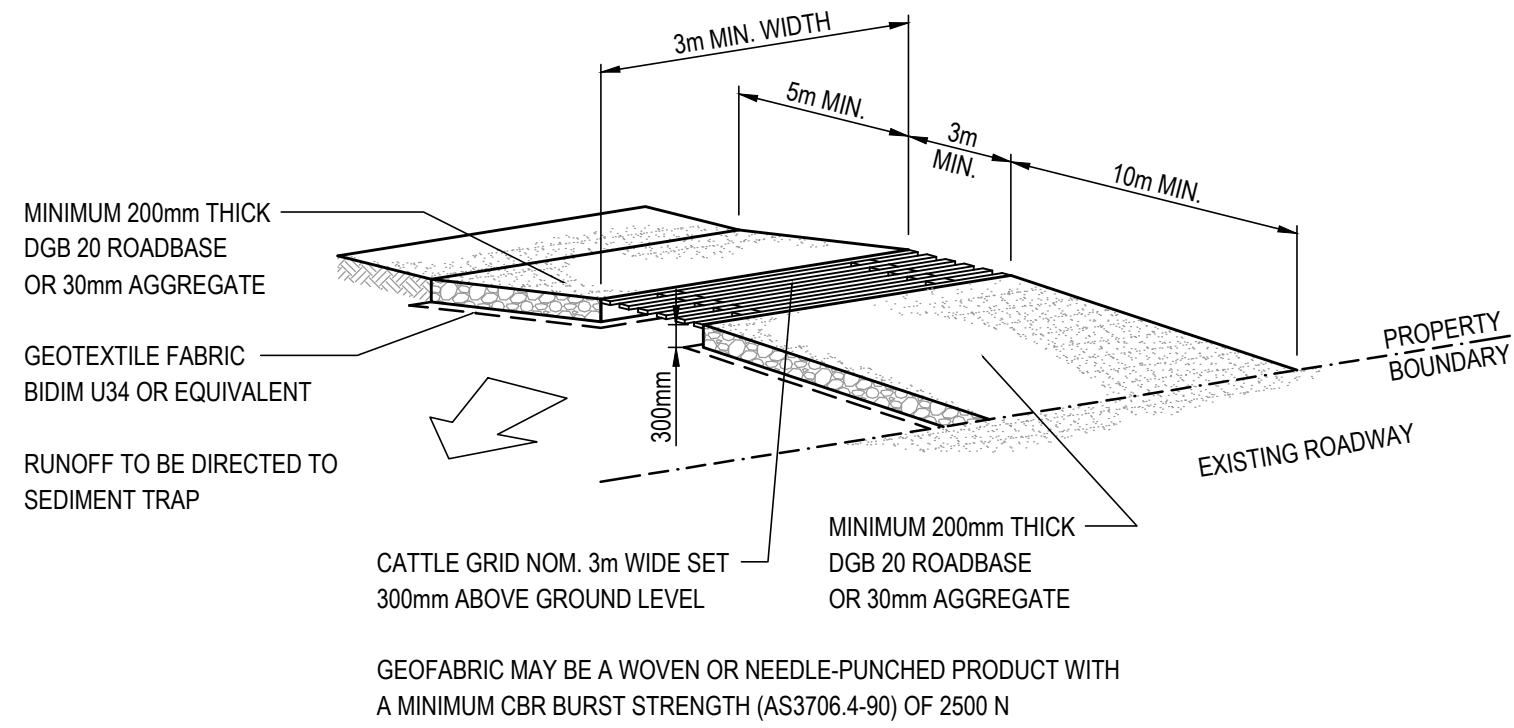
#### CONSTRUCTION NOTES:

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
3. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

#### GEOTEXTILE INLET FILTER DETAIL

FOR PITS WITHIN LANDSCAPED AREAS

NOT TO SCALE

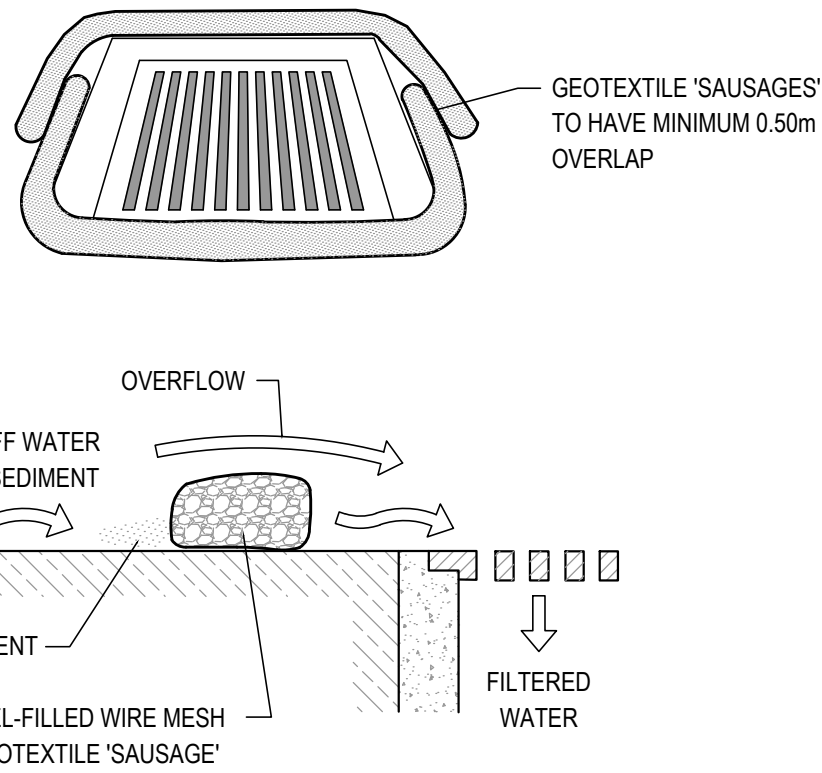


#### CONSTRUCTION NOTES:

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15m LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3m WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

#### STABILISED SITE ACCESS WITH SHAKER GRID DETAIL

NOT TO SCALE



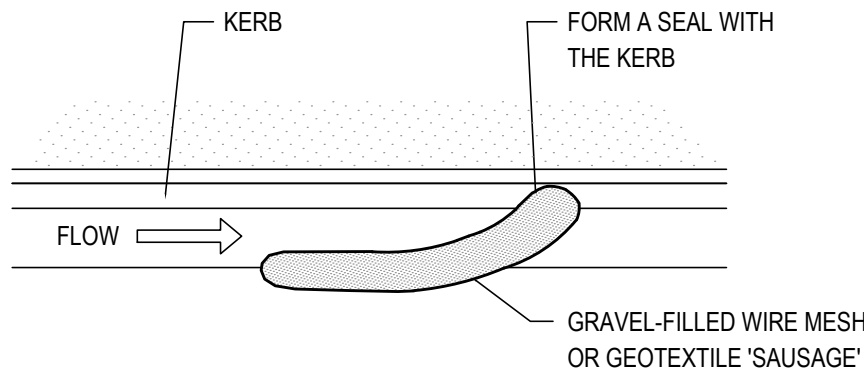
#### CONSTRUCTION NOTES:

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

#### GEOTEXTILE INLET FILTER DETAIL

FOR PITS WITHIN PAVEMENT AREAS

NOT TO SCALE

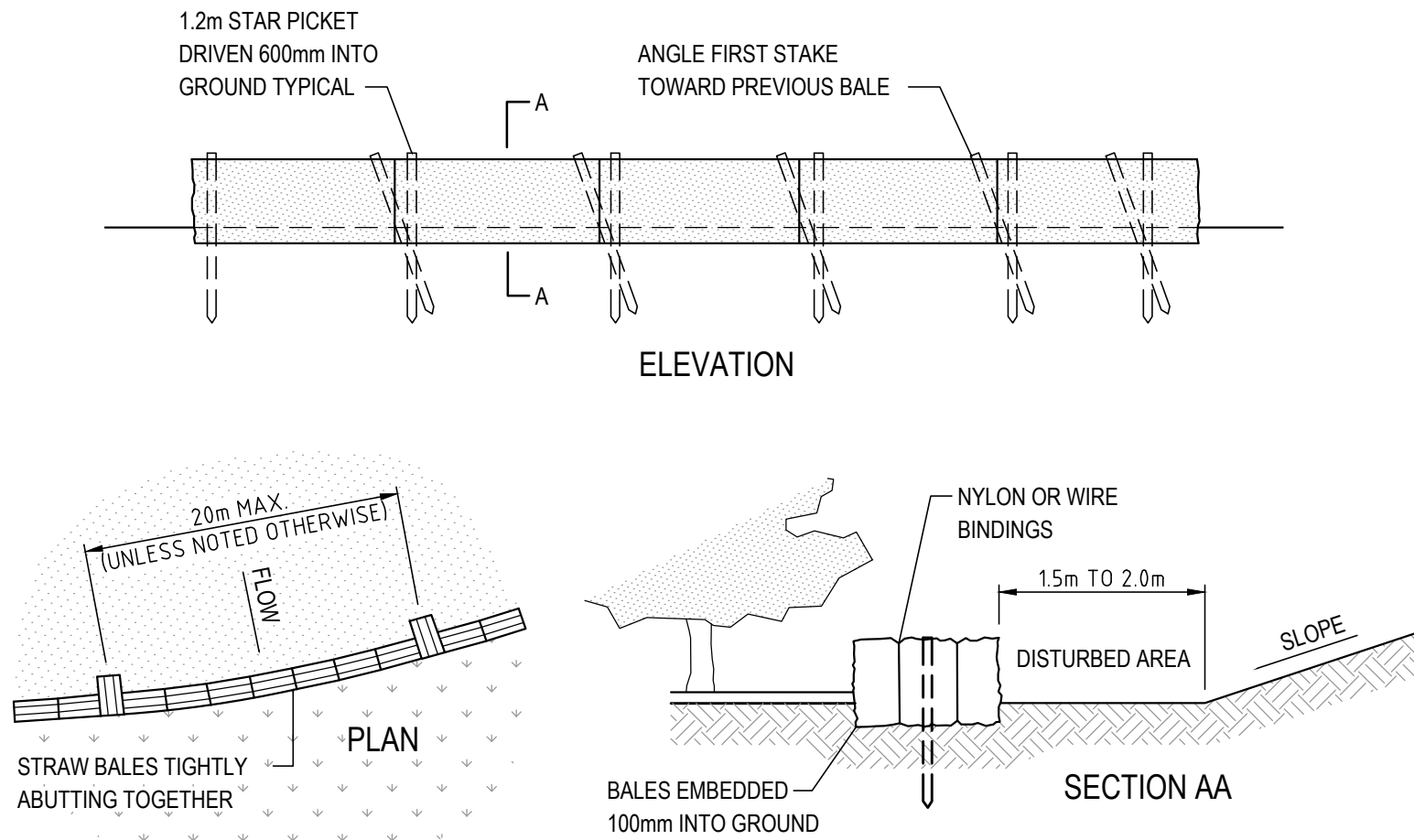


#### CONSTRUCTION NOTES:

1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH APPROXIMATELY 1.0m IN LENGTH AND FILL IT WITH 25mm TO 50mm GRAVEL.
2. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
3. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE KERB.
4. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

#### MESH AND GRAVEL KERB FILTER DETAIL

NOT TO SCALE

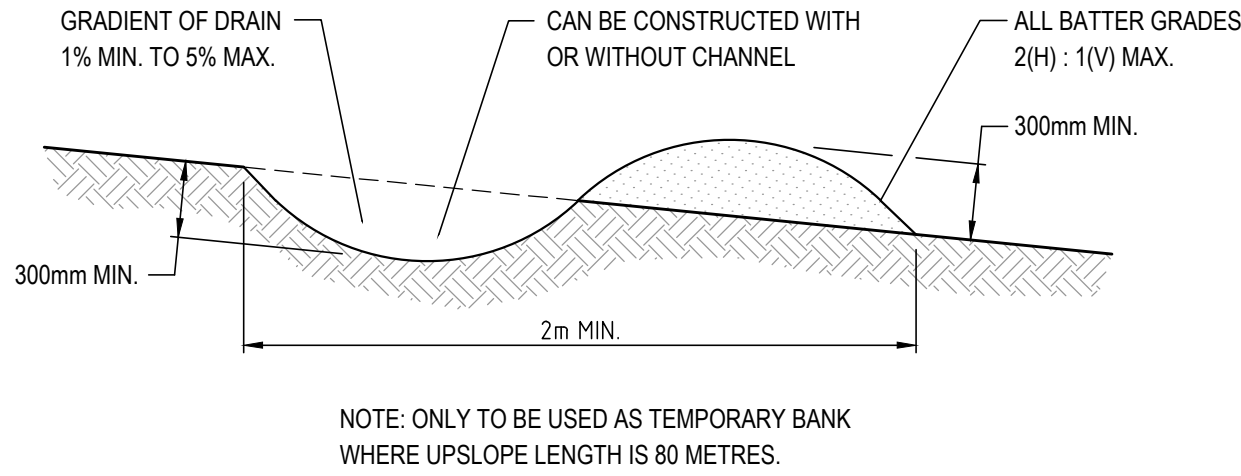


#### CONSTRUCTION NOTES:

1. CONSTRUCT THE STRAW BALE FILTER AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE.
2. PLACE BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE STRAW TO FILL ANY GAPS BETWEEN BALES. STRAWS ARE TO BE PLACED PARALLEL TO GROUND.
3. ENSURE THAT THE MAXIMUM HEIGHT OF THE FILTER IS ONE BALE.
4. EMBED EACH BALE IN THE GROUND 75mm TO 100mm AND ANCHOR WITH TWO 1.2m STAR PICKETS OR STAKES. ANGLE THE FIRST STAR PICKET OR STAKE IN EACH BALE TOWARDS THE PREVIOUSLY LAID BALE. DRIVE THEM 600mm INTO THE GROUND AND, IF POSSIBLE, FLUSH WITH THE TOP OF THE BALES. WHERE STAR PICKETS ARE USED AND THEY PROTRUDE ABOVE THE BALES, ENSURE THEY ARE FITTED WITH SAFETY CAPS.
5. WHERE STRAW BALE FILTER IS CONSTRUCTED DOWNSLOPE FROM A DISTURBED BATTER, ENSURE THE BALES ARE PLACED 1.0m TO 2.0m DOWNSLOPE FROM THE TOE.
6. ESTABLISH A MAINTENANCE PROGRAMME THAT ENSURES THE INTEGRITY OF THE BALES IS RETAINED - THEY COULD REQUIRE REPLACEMENT EACH TWO TO FOUR MONTHS.

#### STRAW BALE FILTER DETAIL

NOT TO SCALE

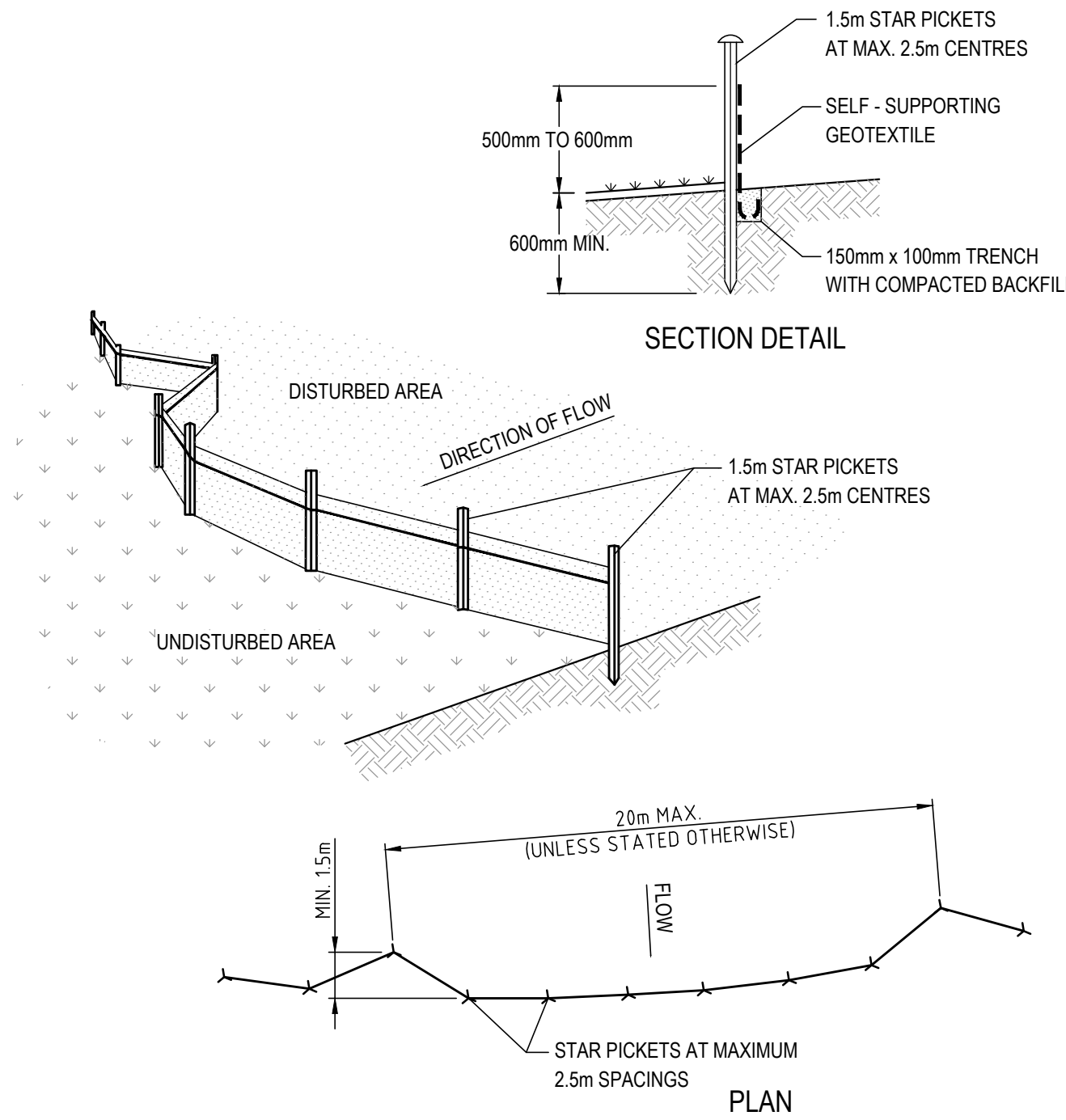


#### CONSTRUCTION NOTES:

1. BUILD WITH GRADIENTS BETWEEN 1% AND 5%.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPE.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

#### TEMPORARY DIVERSION CHANNEL (LOW FLOW)

NOT TO SCALE



#### CONSTRUCTION NOTES:

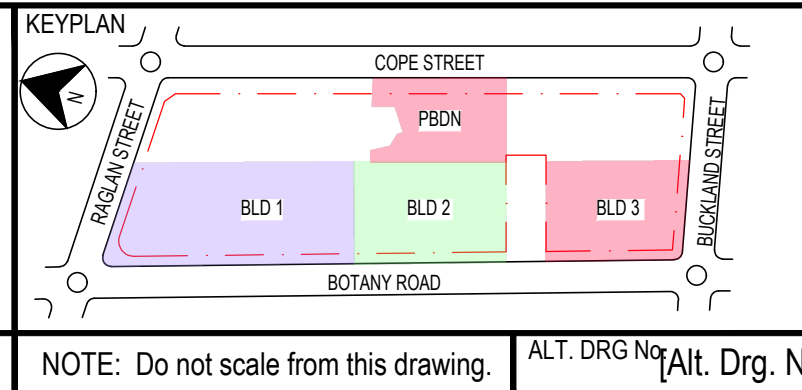
1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO THE GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150-mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

#### SEDIMENT FENCE DETAIL

NOT TO SCALE

B	MR	23.07.20	ISSUE FOR CONCEPT DESIGN	KS	
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SCALES	



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APPROVED	K.SWAN
Sydney, NSW, Australia	23.07.20
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WATERLOO METRO QUARTER DEVELOPMENT			
SYDNEY METRO			
BUILDING 3 (SOUTHERNPRECINCT)			
SEDIMENT AND EROSION CONTROL DETAILS			
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