

CIVIL DESIGN REPORT

UNIVERSITY OF SYDNEY FACILITY OF ARTS AND SOCIAL SCIENCES BUILDING

Prepared for:



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Prepared by:

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DOCUMENT DETAILS**REVISIONS**

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QUALITY ASSURANCE

On behalf of SCP Consulting Pty Ltd, I certify that this report has been reviewed and verified by the undersigned.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'L. Chiarot', written over a light blue horizontal line.

Livio Chiarot
FIE Aust
Principal Consultant
SCP CONSULTING PTY LTD

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1. INTRODUCTION

Consent is being sought for a State Significant Development for a new Faculty of Arts and Social Sciences building (FASS).

The proposed FASS Building falls within the 'Life Sciences Precinct' (Precinct E) and is located near the Ross St entrance to the Camperdown Campus of the University of Sydney adjacent to Parramatta Road. The site is currently elevated above Parramatta Road to the north and Science Road to the south and the new FASS Building will share the site with the existing R. D. Watt Building.

2. SCOPE

CIVIL WORKS

The proposed civil works will include the documentation for:

- Vehicle driveway to forecourt level
- Site works;
- Erosion and sediment control;
- Demolition;
- Drainage works for the site and connection to Science road drainage near Ross St.
- Vehicle pavement design.

DA SUBMISSION

The following drawings are included in this submission for DA

- Stormwater Drainage Concept Plan. Refer to Appendix A (drawing No FASS-C-3000DA)
- Erosion and Sediment Control Plan. Refer to Appendix B (drawing No FASS-C-6000DA)

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

- WMA water - University of Sydney Flood Risk Management Stage 1 – Campus Flood Study Review dated December 2013
- WMA water - University of Sydney Camperdown Campus Flood Mitigation Master Plan dated October 2015.
- Warren Smith and Partners - Camperdown Campus Stormwater Concept Design Report Document Ref: "4596001_University of Sydney - Stormwater Concept Design Report_Rev D"

3. DESIGN CRITERIA

BASIS OF DESIGN

The basis for the design of the civil works has been;

- Architect layout of the site and building by Architectus
- Landscape Design by Oculus Pty Ltd
- Survey by RPS and Draincorp
- University of Sydney Campus Infrastructure & Services Standards

- Secretary's Environmental Assessment Requirements (SEARs) for SSD 7081
- The University of Sydney Combined Services Upgrade works by Warren Smith and Partners
- The stormwater design has taken into account flood levels as reported by WMA Water and Warren Smith and Partners, for setting of tailwater levels.

The following services by others have also been taken into consideration for coordination;

- Building hydraulic stormwater and infrastructure services
- Electrical and communication services.
- Initial Geotechnical Site Assessment report by Coffey Geosciences Pty Ltd
- Landscape Plan by Oculus Pty Ltd
- Traffic advice and vehicle tracking provided by GTA Traffic Consultants

DESIGN CRITERIA AND STANDARDS

The design criteria and standards for the civil works include:

- Stormwater design in accordance with Australian Rainfall and Runoff
- City of Sydney guidelines including:
 - Sydney Street Technical Specifications, Version 2: 22.3.2013
 - Sydney DCP 2012
 - Interim Floodplain Management Policy, May 2014
- Soil and Water Management, Landcom's Soil and Construction Manual (Blue Book)
- Australian Standards
- Sydney Water stormwater drainage design requirements
- Austroads Pavement design
- University of Sydney Campus Infrastructure & Services Standards
- Warren Smith and Partners - Camperdown Campus Stormwater Concept Design Report Document Ref: "4596001_University of Sydney - Stormwater Concept Design Report_Rev D"
- WMA water - University of Sydney Flood Risk Management Stage 1 – Campus Flood Study Review dated December 2013
- WMA water - University of Sydney Camperdown Campus Flood Mitigation Master Plan dated October 2015.
- The SEARS (SSD-7081) requirements
 - The WMA water and Warren Smith and Partners reports have been prepared with the procedures and requirements of the NSW Floodplain Development Manual (2005).
 - The reports reference climate change (which includes sea level rise and increase in rainfall intensity) as stated in the objectives of the Council Interim Flood Plain Management Policy objectives and as such SCP has relied on these reports accordingly.

4. EXISTING SERVICES

All existing services located adjacent to, or within the proposed location of the FASS Building, that may be affected by the development are to be:

- Capped, sealed and removed, if redundant; or
- Isolated and re-routed 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 and shall be co-ordinated with University of Sydney Combined Services Upgrade works which have been designed by Warren Smith and Partners P/L in accordance with The Infrastructure Management Plan.

5. STORMWATER

EXISTING DRAINAGE

The site is has a small embankment area that falls towards Parramatta Road, but the predominant site area falls to the west and south west. These catchments are identified and described by the following City of Sydney reports:

- "Johnstons Creek Catchment Floodplain Risk Management Study and Plan, Draft Report", September 2014, WMA Water

The site discharges to the Johnston's Creek Catchment which also includes the majority of the University's Camperdown Campus.

FLOODING

SCP has relied upon the design of Warren Smith and Partners (WSP) and the campus stormwater augmentation works proposed as part of the Campus Improvement Program (CIP) which will reduce the extent of flooding levels in the campus. The FASS Building site is located close to the detention storage which is proposed on University Oval No. 2. The flood levels for both the existing and proposed development scenarios have been studied and reported by WMA water and Warren Smith and Partners in their reports listed below:

- WMA water - University of Sydney Flood Risk Management Stage 1 – Campus Flood Study Review dated December 2013.
- WMA water - University of Sydney Camperdown Campus Flood Mitigation Master Plan dated October 2015.
- Warren Smith and Partners - Camperdown Campus Stormwater Concept Design Report Document Ref: "4596001_University of Sydney - Stormwater Concept Design Report_Rev D"

The reported increase in Flood Levels at University Oval No. 2 at the Grandstand is 0.18 m in a 1% AEP event, to RL21.68 and 0.24 m in a PMF event, to RL21.74.

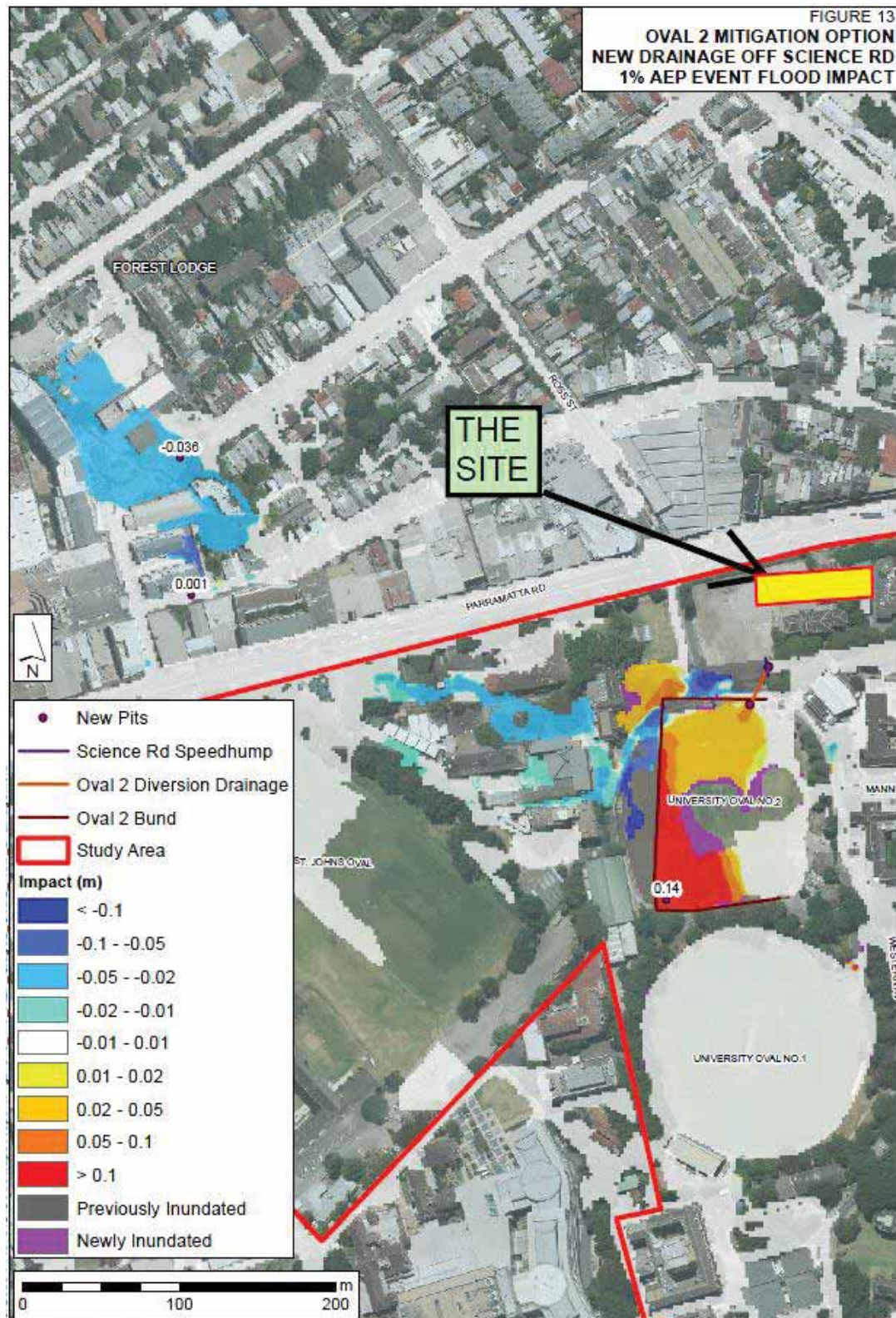


The estimated flood level at the site entry off Science St in a 1 % AEP event is RL 26.0 m AHD. The PMF event shows a flood level in Science Road to be about the same as the existing 1% AEP event as shown below at the FASS Building site entry.



Once the stormwater upgrade works are completed as reported in the Warren Smith and Partners (WSP) Stormwater Concept Design Report the flooding will be ameliorated resulting in a reduction in flood levels near the FASS Building site.

This is shown in the following figure taken from the WSP report:



Should the FASS Building be completed prior to the campus stormwater works being constructed, the site surface grading has been designed with the PMF flood levels considered in the design such that the FASS Building achieves the required flood immunity required by Council.



The levels in the FASS Building forecourt areas, generally fall away from the building façade. A long trench grated drain enables relatively constant cross falls from the building perimeter at level 1 (ground floor) to the low point formed by the trench grate in the forecourt areas.

The grated trench drain in the lower forecourt has sufficient capacity to drain the 100-year storm without ponding. So the 100-year water surface level resides below grade in the trench. This approach provides at least 300 freeboard from flooding in the 100-year storm. The trench grate itself is 300 wide nominally and therefore caters for blockage during extreme storm events. A series of trench grated drains and surface inlets pits drain the upper forecourt area with the levels graded to facilitate an overflow to the lower forecourt area during extreme storm events.

The pipe capacity is in excess of the 1 in 100-year storm flow, however the basis of design is that flood mitigation works proposed in the Warren Smith and Partners Camperdown Campus Stormwater Concept Design Report Document Ref: "4596001_University of Sydney - Stormwater Concept Design Report_Rev D" are being implemented.

The PMF for the site area is also capable of being collected by the trench drain and surcharged at corner of Ross St and Science Road via an existing grated gully pit and new kerb lintel pit.

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 design criteria include:

- Minor drainage system AEP = 5%
- Minimum pipe grade = 1%
- Minimum pipe diameter 225mm
- Minimum fall through pit of 20mm
- Pipe material to be steel reinforced concrete pipe (SRCP)

Refer to Appendix A Stormwater Drainage Concept Plan (drawing No FASS-C-3000DA)

ON SITE DETENTION (OSD)

OSD is not required for this site as the Flood Mitigation Work Program incorporates OSD off-site at other locations within the University Campus. A letter from Sydney Water confirming this requirement is contained in Appendix C.

WATER QUALITY (WSUD)

The Warren Smith and Partners "Camperdown Campus Stormwater Concept Design Report" proposes Gross Pollutant Traps (GPT) as part of the Campus Improvement Program (CIP) downstream of the FASS Building site to comply with City of Sydney WSUD treatment for stormwater runoff from the campus including runoff from the FASS Building site. Therefore, no water quality measures are required for the FASS Building site in this contract.

SUBSOIL DRAINAGE

Sub-soil drainage system will be provided behind the retaining walls in accordance with the structural engineer's requirements. This sub-soil water will discharge into the stormwater drainage system.

6. PAVEMENTS

Pavements have been designed in accordance with:

- Coffey Geoscience Geotechnical Site Investigation and subsequent estimated CBRS
- University of Sydney Design Standards "Landscape"
- GTA Consultants estimated traffic volumes
- Design standards
 - Austroads part 2: Pavement Structural Design 2012
 - Roads and Maritime Services Guide (2015) Austroads Guide to
 - Pavement Technology part 2: Pavement Structural Design
- Design Life:
 - Flexible pavement = 20 year
 - Rigid pavement = 40 year

7. EROSION AND SEDIMENT CONTROL

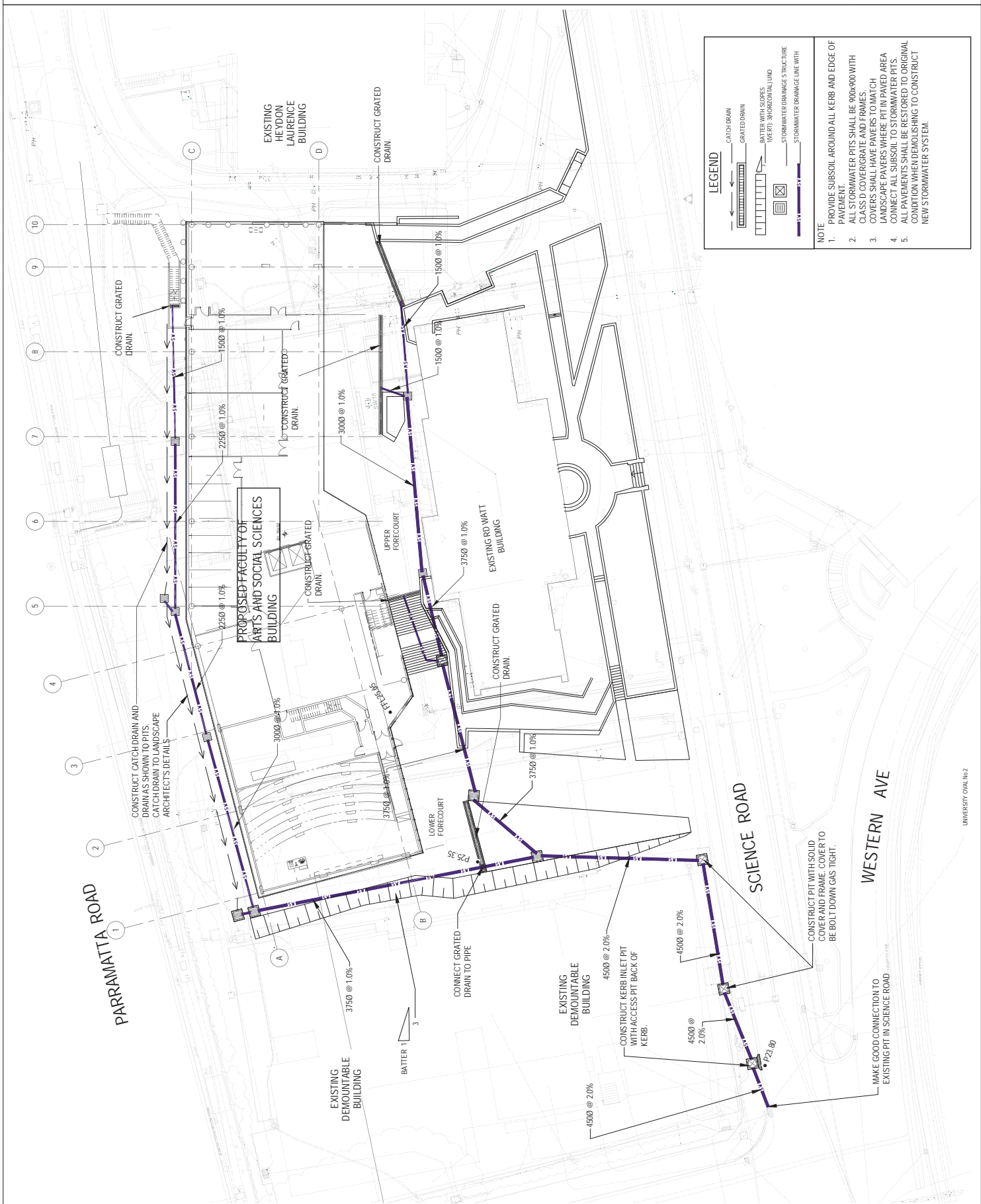
An erosion and sediment control plan has been prepared in accordance with Landcom's Soil and Construction manual (commonly known as the Blue Book), Volume 1, March 2004. The site area is approx. 3100 m² and in accordance with Table 2.1 of the Blue Book, an erosion and sediment control plan is required as the area to be disturbed is greater than 2,500 m². The erosion and sediment control measures have been designed to meet the requirements of the Blue Book, and the Contractor will be responsible for confirming the design and phasing the installation of the measures to suit the construction staging. A stormwater sump and pump will be required during the basement excavation and construction to capture and discharge trapped stormwater.

Refer to Appendix B Erosion and Sediment Control Plan (drawing No FASS-C-6000DA)

8. APPENDICIES

APPENDIX A

STORMWATER DRAINAGE CONCEPT PLAN



APPENDIX B

EROSION AND SEDIMENT CONTROL PLAN