

Engineering and Technology Precinct (ETP) – Stage 1

Soil and Water Management Plan

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Terms and Definitions

The following terms, abbreviations and definitions are used in this plan:

| Term | Description |
|------|--|
| ARI | Average Recurrence Interval |
| BTEX | Benzene, toluene, ethylbenzene and xylene |
| CEMP | Construction Environmental Management Plan |
| DPE | Department of Planning and Environment |
| DSI | Detailed site inspection |
| ENM | Excavated natural material |
| EPA | Environmental Protection Authority |
| ESCP | Erosion and Sediment Control Plan |
| ESL | Ecological screening level |
| ETP | Engineering and Technology Precinct |
| OCP | Organochloride pesticides |
| PAH | Polycyclic aromatic hydrocarbons |
| PCB | Polychlorinated biphenyls |
| PER | Project Environmental Representative |
| TRH | Total recoverable hydrocarbons |
| VENM | Virgin excavated natural material |

1. Introduction

This Soil and Water Management Plan (SWMP) has been developed as part of the Construction Environmental Management Plan (CEMP) to address the construction activities associated with the University's Engineering and Technology Precinct (ETP) Stage 1 project and mitigate the risk of impact to soil and water in accordance with the Project's legal, planning and contractual requirements. This SWMP has been prepared to fulfil the Conditions of Consent issued by the Department of Planning and Environment (DPE) for the Project, specifically Condition B22.

1.1 Project overview

The University of Sydney is transforming its ETP into an environment that fosters scholarship at the highest standard possible and delivers a positive experience to all of its staff, students and stakeholders. Therefore the ETP Stage 1 works involve delivering high-quality infrastructure that accommodates maximum research opportunities while being flexible enough to respond to new education pathways in the future.

A new Micro Engineering Building (Building J03) will incorporate 11,000m² of new space and 6,000m² of refurbished facilities. The building will include research and teaching laboratories, office areas and teaching spaces. The project also involves the associated demolition works and infrastructure upgrades, as well as staging and decanting works in adjacent buildings.

1.2 Scope

The proposed development involves demolition of the northern portion of the existing electrical engineering building, and construction of a new 10 storey building, demolition of the adjacent carpark to the south and constructing a flood mitigation storage basin, reconstruction of the public domain areas adjacent to Blackwattle Creek Lane to the north (Northern landscape) and demolition of the courtyard to the east and construction of new stores and loading dock.

Stormwater from the new building and loading dock will drain to the existing precinct stormwater network, while the new flood mitigation basin will drain to the existing Sydney Water stormwater main traversing the site.

1.3 Objective

The objective of this SWMP is to ensure that all risks associated with water quality and erosion and sedimentation are considered and managed effectively during construction. This SWMP seeks to ensure that best management practice controls and procedures are implemented during construction activities to avoid or minimise erosion/sedimentation impacts and potential impacts to water quality.

This SWMP aims to satisfy the following objectives:

- Address the requirements of the relevant environmental legislation as it applies to this project
- Summarise potential impacts on the environment from the proposed works
- Document environmental procedures to control potential environmental impacts.

1.4 Targets

The following soil and water management targets have been identified for the project:

- Ensure full compliance with the relevant legislative requirements.

- Ensure no adverse impacts to surrounding environment and waterways from sediment as a result of construction works on site.
- Meet water quality discharge parameters for any planned discharges.
- Prevent pollution of surface water through appropriate erosion and sediment control.
- Ensure all site staff and construction personnel are trained in erosion and sediment controls and water quality and discharge procedures.
- Ensure all controls and mitigation (including temporary measures) for a 1 in 100 ARI flood event is documented within this plan.

2. Legal and other requirements

The legislation and regulatory framework related to construction soil and water is outlined in Table 1.

Table 1 Legislation and Planning Instruments

| Act or regulation | Description | Relevance to the project |
|--|---|--|
| <i>Environmental Planning and Assessment Act 1979 (EP&A Act)</i> <i>Environmental Planning and Assessment Regulation 2000</i> | This Act and regulation establishes a system of environmental planning and assessment of development proposals for the State. This project has been assessed and approved under Section 89E of the <i>Environmental Planning and Assessment Act 1979</i> . | The approval conditions and obligations are incorporate into this SWMP. |
| <i>Protection of the Environment Operations Act 1997</i> | This Act includes all the controls necessary to regulate pollution and reduce degradation of the environment, provides for licensing of scheduled development work, scheduled activities and for offences and prosecution under this Act. | This Act is of high relevance to the Project as it provides for the issuing of environmental protection notices to control work and activities not covered by licences. Section 148 of the Act requires a pollution incident-causing or threatening material harm to the environment to be notified to the EPA and other authorities immediately. |
| <i>Contaminated Land Management Act 1997</i> | This Act provides for a process to investigate and remediate land that has been contaminated and presents a significant risk of harm to human health. Section 60 of the Act is a “Duty to Report Contamination”. This duty applied to owners of land and persons who become aware that their activities have contaminated the land. | The relevance of this Act will be in the event that suspected or potentially contaminated ground is found during construction activities. |
| <i>Commonwealth Environment Protection and Biodiversity Act 1999</i> | The main purpose of this Act is to provide for the protection of the environment especially those aspects that are of national environmental importance and to promote ecological sustainable development. The Act binds the Crown. Do not take, use, keep or interfere with “nationally significant” cultural and natural resources, protected wildlife and protected plants without approval. | This Act is of little relevance to this project as it has been determined not to trigger the provisions of the act. |
| <i>Soil Conservation Act 1938</i> | This Act makes for the provision for the conservation of soil resources, farm water resources and the mitigation of erosion. The Act is | This Act has low relevance as the site is not located within “protected land”. |

| Act or regulation | Description | Relevance to the project |
|---|--|---|
| | binding on the Crown; however, the Crown is not liable for prosecution. The Act provides for notification in the government gazette catchments where erosion is liable to cause degradation of rivers and lakes (i.e. protected land). | Further, such notification has not been given to the owner of the land. |
| <i>Water Management Act 2000</i> <i>Water Management (General) Regulation 2004</i> | This Act and Regulation provide for the protection, conservation and ecologically sustainable development of water sources of the State and in particular to protect, enhance and restore water sources and their associated ecosystems. | This Act has no direct relevance at this time to the construction work under this contract. The project approval does not trigger the provisions of this Act. |
| <i>Water Act 1912</i> | This Act provides for licences to extract water for construction purposes either from surface or artesian sources. Should construction water be extracted from surface (other than sedimentation ponds) or artesian sources, a licence will be required. | This Act has no relevance as it is not proposed that construction water will be obtained from surface (for example, creeks, lakes) or artesian sources. |

3. Existing Environment

3.1 Existing Soil Landscape

The *Sydney* 1:100,000 Soils Landscape Sheet indicates that the site is underlain by the residual soil landscape group. The Blacktown landscape occurs extensively across the Cumberland subregion, and is characterised by gently undulating rises with broad rounded crests and ridges on Wianamatta Group Shale. It consists of shallow to moderately deep soils (<150m) on crests, upper slopes and well-drained areas. Deep soils (150-300m) occur on lower slopes, drainage depressions and in localised, poorly drained areas. Topsoils reach a depth of up to 30cm, and contain significant sand and silt content overlying hard-setting clay subsoils.

3.1.1 Geotechnical report

Preliminary geotechnical investigations undertaken as part of the design indicate that typical subsurface layers found on the project site can be summarised as follows:

- Asphalt/roadbase to 0.05 m
- Topsoil – 100 mm to 300 mm of silty clay topsoils
- Filling – clay and crushed sandstone filling to depths between 0.5 m and 0.6 m
- Clay – stiff to hard clay to depths of 2.2 m
- Rock – extremely low strength and very low strength laminate grading to medium strength shale at depths between 7.3 m and 3.5 m

3.2 Geology

The *Sydney* 1:100,000 Geology of Sydney Geological Series Sheet indicates that the site is located on Ashfield Shale of Triassic age. The Ashfield Shale typically comprises black to dark-grey shale and laminite.

3.3 Hydrology

Historically, the upper reaches of several creeks running into Port Jackson have their headwaters within the university grounds. Blackwattle Creek, which runs to Blackwattle Bay began where the Darlington School now

stands. Another tributary began in Victoria Park and both of these ran northeast through Glebe, Chippindale and Ultimo. On the western side Orphan School Creek was present and located immediately west of the extant ovals.

3.4 Groundwater

The detailed site investigation (DSI) report states that there are no groundwater abstraction bores registered within a 500 m radial area of the site. There are approximately 49 groundwater abstraction bores registered within a 1 km radial search area of the site.

If groundwater is to be encountered throughout the duration of the works it will likely occur as seepage along the soil-rock interface and through joints and bedding planes in the rock, especially after wet weather.

It is likely that the regional groundwater flow would be to the north east towards Sydney Harbour (approximately 1.8 km to the north east of the site).

3.5 Salinity

The DSI found no evidence of soil salinity within the project area. As such, salinity related impacts on groundwater resources and hydrology are not expected.

3.6 Acid Sulphate Soils

The NSW National Resource Atlas *Acid Sulfate Soil Risk* Map indicates that the site is located in an area of no known occurrence of acid sulphate soil. The risk of encountering acid sulphate soils during excavation and construction activities is considered to be extremely low.

3.7 Surface Water

The site generally slopes from Cadigal Green (west) to Sheppard Street (east). The existing buildings drain to the campus stormwater network that ultimately discharges to Sydney Water and Council's stormwater pit and pipe network.

The nearest surface water receptor is a pond approximately 400 m to the north of the site in Victoria Park.

The direction of overland flow of surface water will generally be from Maze Crescent (north-west) to Shepherd Street (south-east). There is existing infrastructure originating from multiple catchments and multiple defined overland flow paths traversing the proposed works site. These drain Cadigal Green, Maze Crescent, the previous Electrical Engineering building (now the project site), PNR Lecture Theatre and other sites further afield. The Electrical Engineering Carpark also previously served as a minor flood storage basin.

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

3.8 Water Quality

Water courses within the Project site catchment are heavily urbanised, with stormwater collected by developed stormwater networks. In the existing urban stormwater system in which the project drains, pH will typically be between 6.5 to 8.5. Total suspended solids will generally average 25-50mg/L with peaks during wet weather events.

Currently the site does not have any stormwater quality treatment measures. For more information on the reuse and discharge of collected site water, please refer to section 5.3 – Surface Water Management.

3.9 Flooding

A Campus wide flood study “University of Sydney Engineering Precinct/Flood Study” produced by TTW Civil on behalf of the University of Sydney indicates that various locations within the engineering precinct are subject to flooding in significant storm events.

Specifically, in relation to the Engineering and Technology Precinct stage 1 (Part Lot 1 DP 790620), the identified overland flood path includes the southern landscape area (i.e. existing car park). The construction of this landscape area is not to commence until the latter stages, whereby the new 580m³ detention basin will be excavated and serve as a construction sediment detention basin before the completion of works. Whilst this area remains a hardstand throughout the majority of the construction, drainage via the existing pit and pipe system will continue to operate its intended function.

The anticipated 1 in 1 year ARI, 1 in 5 year ARI and 1 in 100 year ARI flood event to occur during construction has been taken into consideration whilst documenting the control and mitigation measures.

The Erosion and Sediment Control plan as identified in appendix 1, describes the measures that must be implemented to manage stormwater and flood flows for small and large sized events, including, but not limited to 1 in 1 year ARI, 1 in 5 year ARI and 1 in 100 year ARI. Outlining the necessary measures and controls below:

- Site Shed compounds located within the southern landscape is to be protected from major flood events.
- Hazardous material storage located away from flood zones.
- Existing pit and pipe systems used during construction to be protected as required.
- Limit the exposure of non-compacted soil required for external works.
- Maximise the diversion of water upstream of the project to the existing stormwater systems.
- Ensure temporary site drainage does not redirect flows resulting in flooding impacts.
- Internal sediment control measures to be designed in accordance with the criterion in the Blue Book.

3.10 Contamination

Prior to university land uses the site was mostly a residential area with some commercial operations possibly including manufacturers (bedstead, chemical, display fittings, woodware, sports goods, clock case, tennis and/or squash racquet press, sanitary fitting and hardware), sprayers, printers, and tobacco processors.

Given the length of time since the commercial operations on the site and the extensive redevelopment since then, residual contamination from former land uses is considered unlikely to be present.

Between 1965 and 1970 the site was redeveloped as part of the University of Sydney with the construction of a large building containing university facilities. The University of Sydney holds a licence or hazardous, industrial or Group A waste generation or storage. This indicates that hazardous storage may be located within or near to the site.

It has been confirmed that:

- The Electrical Engineering Building (J03) indicated a large high voltage research facility with a number of polychlorinated biphenyls (PCB) containing electrical equipment.
- The nearby Civil Engineering (J05) building contained large underground water tanks and systems which were used for fluid dynamics research and were previously contaminated with mercury.

The presence of PCB containing equipment would only pose a risk to the environment if leakage or spillage occurred into the surrounding substrate during operations or decommissioning. No records of such incidents have been reported.

Additional sources of contamination that have been identified include fibrous cement material in the original building, grease traps associated with the café in the engineering precinct and the use of lead paints in older buildings.

The preliminary site investigation report identifies the potential contamination sources and contaminants of concern to include:

- Contaminants associated with the former and current buildings including metals, total recoverable hydrocarbons (TRH); benzene, toluene, ethylbenzene and xylene (BTEX); polycyclic aromatic hydrocarbons (PAH), PCB, organochloride pesticides (OCP), phenols and asbestos.
- Storage of hazardous substances within or near to the site.
- Hazardous building materials (PCB and asbestos).

Laboratory results of soil samples collected from boreholes within the site indicated that levels of TRH, BTEX, PCB, OCP and phenols were below the laboratory detection limits. Metals and PAHs were found to be above laboratory detection levels, however when compared to levels of Schedule B1, *National Environmental Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013, the levels were all below conservative criteria for commercial/industrial land use with the exception of a benzo(a)pyrene which was above the ecological screening levels (ESLs) within one sample.

4. Aspects and Potential Impacts

The key aspects and potential impacts associated with the management of soil and water during the delivery works are listed in Table 2.

These potential impacts and opportunities have been taken into account in the development of this SWMP and site-specific procedures for the works.

Table 2 Aspects and Potential Impacts

| Aspects | Potential impacts/opportunities |
|---|--|
| Discharge of contaminated water from within site boundary during rainfall Concrete washout | <ul style="list-style-type: none"> • Contamination of downstream watercourses • Contamination of soils |
| Dust from the worksites or from vehicles | <ul style="list-style-type: none"> • Potential pollution of waterways and air |
| Earthworks / Embankment works/platform excavation works | <ul style="list-style-type: none"> • Potential spread of contamination into soils /surface or groundwater • Personnel exposure to contaminants • Sediment degrading surrounding environment • Change to flooding characteristics |
| Flooding of worksites | <ul style="list-style-type: none"> • Contamination of floodwaters by sewage, fuels and/or chemicals onsite |
| Leaks or spillages of fuels, oils and grease from construction plant and equipment and at compounds | <ul style="list-style-type: none"> • Contamination of soil • Contamination of stormwater systems, watercourses, riparian environment • Personnel exposure to contaminants |
| Sediment laden runoff during rainfall | <ul style="list-style-type: none"> • Runoff entering drainage lines causing pollution and impacting aquatic life downstream. |

| | |
|--|---|
| Sediment tracking onto public roads from vehicles leaving site | <ul style="list-style-type: none"> • Potential impact on traffic safety • Potential for sediment laden runoff during rainfall • Potential for generation of dust |
| Storage of hazardous substances | <ul style="list-style-type: none"> • Contamination as a result of a spill • Impact to stormwater systems and watercourses from pollution |
| Construction laydown spills | <ul style="list-style-type: none"> • Potential for pollutants to wash into the stormwater drainage system • Sediment laden/ contaminated runoff entering drainage system • Potential for contamination of floodwaters by sewerage, fuels and/or chemicals onsite |
| Inappropriate management (handling, stockpiling, transport and disposal) of identified contamination or contaminated materials encountered during construction works (e.g. excavation) | <ul style="list-style-type: none"> • Potential for spread of contamination (soil/water) • Personnel exposure to contaminants • Local media coverage • Fines and prosecution from Regulatory Authorities |

5. Soil and Water management

5.1 Erosion and Sediment Control

5.1.1 General Principles

Environmental protection during construction will involve the installation, use and maintenance of temporary erosion and sediment control measures as required in accordance with the following principles:

- Before undertaking any construction work (including earthmoving or vegetation removal works), implement all soil and water management works required to minimise pollution of waters.
- All erosion and sediment controls will be installed in accordance with best-practice guidelines such as NSW Blue Book Volumes 1 and 2D (Landcom, 2004 and DECC, 2008).
- Maintaining ground cover for as long as possible to prevent erosion and sedimentation.
- Diversion of 'clean' run-off from offsite around or through the worksite without it contacting exposed soils or mixing with 'dirty' onsite water and maintaining existing drainage infrastructure wherever possible.
- Minimisation of soil erosion and mobilisation of sediment during rain events.
- Use of suitable sediment retention structures and control measures to filter or retain mobilised sediment generated during rain events over surface disturbances.
- Maximum sediment capture through effective positioning of temporary erosion and sediment control structures.
- Progressive rehabilitation and/or stabilisation of completed areas to minimise erosion hazard, as soon as practicable.
- Regular inspection and maintenance of all erosion and sediment controls to ensure they are effective.
- Targeted training on ERSO principles for key staff.
- LOR to ensure that any road, footpath, shared path or cycleway which is open to the public is at all times kept free of mud, dirt, dust, deleterious material, debris, obstructions and trip hazards arising from LOR activities in accordance with the project approval.
- LOR to install, maintain and utilise appropriate site exit controls. This will include a rumble grid.

- Any spillage or build-up of such material or debris would be cleaned up prior to rainfall or the end of each shift.

5.1.2 Resources

Ultimate responsibility for erosion and sediment control will rest with the Construction Personnel within the Construction Team, led by Construction Managers, who will be responsible for the on-ground installation and maintenance of erosion and sediment controls. This would include (although is not limited to):

- Hard standing and deployment of spray-on soil stabilisers as required.
- Installation, cleaning and maintenance of controls such as sediment fences, gravel socks, inlet filters, straw bales, sandbags etc.
- Installation of temporary drain and channel liners (e.g. geofabric, jute matting etc.)
- All dewatering activities.

Relevant personnel will receive training and ongoing toolbox talks on installation and maintenance of erosion and sediment controls.

5.1.3 Sediment Basins

Based on the soil erodibility factor specified for the site soil landscape in the “Blue Book”, soil loss is expected to be less than 150m². As such, sediment basins are not required during the project works in accordance with the Blue Book.

5.1.4 Erosion and Sediment Control Plan

The Erosion and Sediment Control Plan (ESCP) for the Project area has been developed in accordance with requirements of the “Blue Book”. See Appendix 1 for Project’s ESCP map.

The ESCP includes the following key management measures:

Site Entry and Access Requirements

- Stabilised access points with rumble grids or wheel washes to prevent mud tracking on roads will be established.
- Access points to be clearly delineated.
- Use of street sweepers to remove accumulated sediment.
- Longer term and/or heavily used haul roads will generally be sealed. Sealed haul roads will be regularly cleaned.
- Unsealed haul roads to be regularly damped down with fixed or mobile sprinkler systems.
- Appropriate site speed limits will be imposed and signed on haul routes.
- Exclusion zones to be designated on construction sites to limit disturbance.

Soil Stripping and Stockpiling

- Stockpile areas are to be established within approved low-hazard areas clear of watercourses, stormwater drainage lines/culverts and not within the dripline of any retained trees where feasible and reasonable.
- Diversion drains/bunds are to be installed on the high side of stockpiles if run-off from upslope lands could impact on the stockpile.
- Any contaminated material stockpiles (i.e. asbestos, contaminated soil) will be covered on-site and short-term material stockpiles with potential to generate dust will be wetted down or covered to prevent fugitive dust emissions or run-off during wet weather. Long-term stockpiles (>30 days) will be stabilized and /or covered in accordance with “Blue Book” requirements.
- Topsoil stockpiles will be constructed to no more than 4m in height where possible.

- Stockpiles will be battered down to a maximum slope of 2:1 (H:V) where space permits.
- Material transport from site to surrounding pavement surfaces would be minimised.

Dust Control

- Dust suppression will be carried out whenever necessary to minimise sediments becoming air borne due to wind erosion.
- Wherever possible, water detained onsite will be re-used for dust control.

Stabilisation

- Undertake progressive stabilisation of ground surfaces as quickly as possible as they are completed rather than at the end of the works program.
- Progressively revegetate disturbed areas utilising appropriate species in those areas to be revegetated.
- Temporary ground covers such as hydraulic soil stabilisers or geotextile fabric will be used as much as possible to stabilise batters, stockpiles and large surface areas.
- Scour protection and energy dissipation would be used around discharge points at local points to reduce erosion where necessary.

Sediment Controls

- Sediment controls will be installed around stormwater inlet pits where appropriate and where they will not cause or exacerbate flooding. Traffic management and safety will need to be considered if installing such devices on or near live traffic.
- Turbid construction runoff will be diverted into sediment retention devices such as sediment sumps, sediment fences and other sediment traps where feasible to prevent surface run-off from leaving the site.
- Sediment removed from any trapping device will be relocated where further pollution to downslope lands and waterways cannot occur.
- Mulch bunds will not be used in concentrated flow areas or if they have the potential to result in tannin leachate into waterways.
- All erosion and sediment controls will be inspected at least weekly, before a site closure of two days or more, and after rainfall exceeding 20 mm in 24 hours. Maintenance will be carried out as required prior to the next forecast rainfall event. Details of inspection will be maintained via the Site Manager's weekly diary.
- Concrete washout will be confined to designated concrete washout locations or using a Concrete Waste Separation Unit (CWSU), which allows for recycling of concrete waste.
- Clean water diversions to be constructed and stabilised around work areas
- No stockpiles of materials or storage of fuels or chemicals would be located adjacent to the existing culverts.
- Stockpiles will not be placed within 2m of hazards areas including likely areas of high velocity flows such as paved areas and driveways.
- Temporary sediment traps will be retained until after revegetation/rehabilitation.

5.2 Imported Soil (Condition B26)

- Only virgin excavated natural material (VENM), excavated natural material (ENM), or other material approved in writing by the EPA is to be brought onto the site.
- Accurate records of the volume and type of fill to be used must be kept.
- The records must be made available to the DPE and Certifying Authority upon request.

5.3 Surface Water Management

5.3.1 Reuse

Where practicable, any water collected in excavations / work sites will be reused within the premises (e.g. dust suppression, watering retained vegetation). Approval must first be obtained from the Project's Environmental Representative (PER) prior to any discharge off the premises, or reuse within the premises, to ensure that water is suitable for reuse or discharge.

For reuse of water onsite, the following criteria must be met:

- pH – 6.5 to 8.5
- No visible oil and grease
- No potential for water to leave the premises
- No surface runoff will be generated from the reuse (reuse includes dust suppression, watering retained vegetation etc.)
- No potential for water to reach any watercourse

5.3.2 Offsite Discharge

No water is to be discharged off site until it is tested. Water is to be tested and treated as necessary to meet the following water quality criteria:

1. TSS: $\leq 50\text{mg/L}$ (~Turbidity 30NTU). If this cannot be achieved through natural settling, then the trapped sediment laden water is to be flocculated with gypsum applied at a rate of approx. 40kg/100m³.
2. pH: Between 6.5 and 8.5
3. No visible oil and grease

Prior approval from the University and the Environment Protection Authority are also required before any water can be discharged off-site.

5.3.3 Planning for Wet Weather and Flooding Events

The following measures will be implemented to mitigate the impacts of stormwater and flood flows during large rainfall events. These control measures have been designed to remain operational in the event of 1 in 100 year ARI, and in turn also provide adequate protection against less destructive rainfall events including 1 in 1 year ARI and 1 in 5 year ARI. Additional measures that will be implemented in potential flooding events are highlighted below.

- Ensure the erosion and sediment control plan for the site is implemented in advance of rainfall events.
- Stockpiling and storage of materials to occur outside potential flood areas.
- Temporary facilities and hazardous material storage to be above flood levels.
- Maintain overland flow paths.
- Monitoring of weather forecasts and during rainfall events.
- Construction equipment (or excess material) would be removed from prone areas where significant events are predicted.
- Site sheds and chemical stores will be protected from the anticipated flood events.
- Site inspections will be completed to ensure all erosion and sediment controls are place prior to the event.
- Where applicable, temporary levees or bunds would be strategically placed to contain potential flooding impacts resulting from any temporary works on the floodplain and minimise the risk to surrounding properties which might otherwise be affected.

- Stockpiles will be located away from areas subject to concentrated overland flow or provided with enhance erosion controls.
- In extreme flood events, such as 1 in 100 year ARI, temporary sandbags or diversions will be strategically placed to partially divert excessive floodwater flows away from the site and prevent overloading of stormwater drains and loss of large amounts of soil from site. Internal drainage systems will be inspected, reviewed and bolstered as necessary.
- In the event of an emergency the requirements set out in the Emergency Response Procedure (ERP) will be implemented.

5.4 Groundwater

Based on similar sites within the university, it is anticipated that any groundwater ingress can be controlled using sump and pumps during the construction phase, and discharged following the procedure outlined above in Section 5.3.2.

5.5 Refuelling, Chemicals and Spill Management

Hazardous substances and dangerous goods will be stored and used onsite in accordance with the following protocols:

- Hazardous substances will be stored onsite in lockable containers, in their original receptacles.
- Emergency spill kits would be kept on-site at all times. All staff would be made aware of the location of the spill kit and be trained in its use.
- All hazardous substances will be clearly labelled and will have Hazardous Chemicals and Safety Data Sheets (SDS) affixed or available nearby. The SDS will be used to determine compatibility of hazardous chemicals to be stored together, i.e. no flammables with corrosives, not all corrosives compatible with each other etc.
- A bund sized to 110% of the largest stored receptacle will be established around any storage area for hazardous substances.
- Storage and handling of flammable or combustible liquids will be in accordance with OEH guidelines for Bunding and Spill Management, as well as AS 1940-1993 – The Storage and Handling of Flammable and Combustible Liquids.
- An up-to-date register of hazardous substances will be kept onsite at all times.
- Hazardous substances will only be used onsite as required, in accordance with the manufacturer/supplier instructions.
- Any substances with the potential to impact water quality will be assessed by the PER to determine what environmental safeguards or procedures are required for that substance to minimise the risk of environmental harm.
- The use of any hazardous substance that could result in a spill will be undertaken away from drainage or stormwater lines and, wherever possible, within defined bunds.
- All spills or leakages will be immediately contained and absorbed. Routine inspections of all construction vehicles and equipment would be undertaken for evidence of fuel/oil leaks
- Vehicles and machinery would be properly maintained to minimise the risk of fuel/oil leaks
- In the event of a spill, the Spill Management Procedure will be implemented. As set out in the CEMP, the management of environmental incidents where material harm to the environment is caused or threatened will be managed in accordance with the Emergency Response Plan.
- Construction plant, vehicles and equipment would be refuelled off-site, or in designated re-fuelling areas located at a minimum distance of 50 metres from drainage lines or waterways, where possible

5.6 Contamination

Results of the initial DSI found no significant sources of contamination within the project site. If previously unidentified contamination is discovered the unexpected finds procedure as detailed in the CEMP is to be implemented. Briefly:

- Immediately cease all work in the area of concern.
- Isolate the area and prevent workers from entering.
- Report the area of concern to the Project Environmental Representative (PER) and Site Manager immediately.
- A suitable qualified contamination specialist will be consulted to inspect the site and carry out an initial assessment of the nature and extent of the contamination.
- The contamination specialist will prepare a report on the findings and advise what remediation actions are required.
- Works may only recommence upon receipt of clearance/validation report from the contamination specialist that the necessary remediation activities have been carried out.

Discovery of asbestos containing material on site would be managed in accordance with the Project specific Asbestos Works Management Plan.

5.7 Salinity

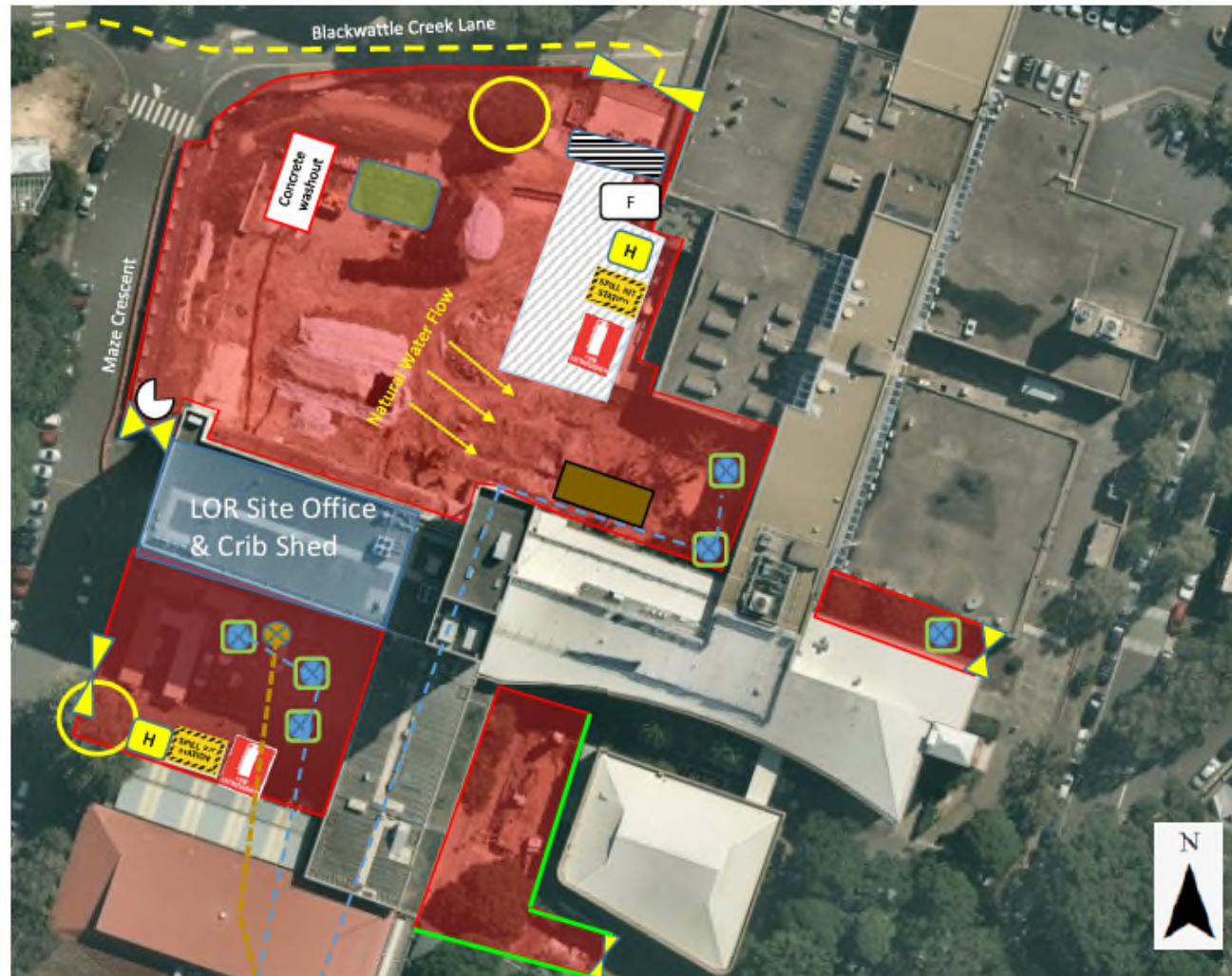
According to the EIS, the potential for salinity issues on the project site is low. Should salinity be identified during the project works further investigation is to occur, and measures would be put in place to protect building materials, vegetation and landscaping.

5.8 Acid Sulphate Soils

According to the EIS, the likelihood of encountering acid sulphate soils on the site is very low. Should acid sulphate soils be identified during the project works, the affected area will be quarantined and contingency controls and management procedures developed in accordance with Laing O'Rourke's Environmental Primary Standard – Acid Sulphate Materials.

APPENDIX 1 – ESCP Map

This is a progressive plan and will be regularly updated to reflect the current stage of the project.



Version 2
 Date: 01/04/19

USYD ETP Stage 1 Erosion and Sediment Control Map

Legend

| | | | |
|--|--|--|-------------------------------------|
| | Wheel Shaker / Wash | | Existing SW pits/line |
| | Refuelling Area | | Existing Sewer pits/line |
| | Hazardous Substance Storage Area | | Site Gates |
| | Loading and Unloading Zone | | Tree protection |
| | SW Pit Sediment Controls – Sed socks, geo fab and silt fence | | Sediment fencing |
| | Spill Kit | | Sediment basin 3m x 9m x 0.8m |
| | Fire Extinguisher | | Stockpile (Covered with Geo Fabric) |
| | Concrete Washout | | Heavy Vehicle Route |