

Construction Environmental Management Plan

Project Details

Project Name: Macquarie University Central Courtyard Precinct

Project Number: 250075

Project Location: Gymnasium Rd, Macquarie Park

Principal: Macquarie University

Project Manager: Troy Thomas

Senior Project Manager: Simon Friend

Date work is to commence (approx.): May 2019

Estimated duration of work: Jan 2021

Name of principal contractor: FDC Construction (NSW) Pty Ltd

Company address: 22-24 Junction Street Forest Lodge 2037

ABN: 72 608 609 427

Approvals

Project Manager:	<u>Troy Thomas</u>	Signature:	<u></u>	Date:	<u>29/04/19</u>
Senior Project Manager:	<u>Simon Friend</u>	Signature:	<u></u>	Date:	<u>29/04/19</u>
Project Director:	<u>Damon Malek</u>	Signature:	<u></u>	Date:	<u>29/04/19</u>
General Manager:	<u>Sean Gibbeson</u>	Signature:	<u></u>	Date:	<u>29/04/19</u>
Divisional HSEQ Manager:	<u>Joe Abraham</u>	Signature:	<u></u>	Date:	<u>29/04/19</u>

Distribution: Principal, Project Manager, Site Manager, Subcontractors

**Management Plan
Revision:** Rev G

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1 Overview

1.1 Project Scope

The Macquarie University Central Courtyard Project (MUCCP) is an exciting project that will require careful consideration and interaction across various layers of project stakeholders to ensure successful delivery from commencement through to completion. The site is located within the University grounds and the proposed works involves the design and construction of the following stages:

- Stage 0 – Civil and landscaping works to Mars Creek, Mars Creek diversion works and flood mitigation to allow the substation to be located in Building R2 whilst meeting the 1 in 100 year flood zone requirements;
- Stage 2 – Renewal of the existing Public Domain (plaza) space to reflect the campus brand and identify/ connect the different precincts and spaces;
- Stage 4 – The refurbishment and conversion of the Ground Floor of the Lincoln Building (16 Wally's Walk) to seven food and beverage outlets (approximately 507m²), with office space for University Administration use on the upper two floors (approximately 2,500m²);
- Stage 5a - Construction of a new Learning and Teaching building (1CC), includes formal and informal teaching spaces (1st and 2nd level), food and beverage to 13 retail spaces (approximately 633m²) (ground level) which incorporates the University student bar (Ubar), Graduation hall and function space (basement level), which incorporates food and beverage back of house spaces (approximately 21,210m²);
- Stage 5b – Construction of 2 new student accommodation buildings providing 342 student beds, function spaces and ancillary spaces (approximately 11,500m²).

1.2 Site Location

*Macquarie University Central Courtyard Precinct
Gymnasium Rd, Macquarie Park*



1.3 Environmental Management Plan

- This Environmental Management Plan describes the environmental strategy, methods, controls, and requirements for the execution of the project. It stands alone as the master document for site environmental activities, and refers to company procedures.
- The Environmental Management Plan defines how the environmental aspects of the project will be run. It complements the Management System and in some cases may override it.
- This Environmental Management Plan should be read in conjunction with the Project Management Plan and the Site Safety Plan.

1.4 Purpose of the Environmental Management Plan

The purpose of this Environmental Management Plan is to:

- Identify the environmental issues (aspects and impacts) for this project;
- Establish, communicate and implement environmental operational controls to reduce any adverse impacts on the environment from the company's activities, products and services;
- Ensure compliance by FDC and its suppliers and subcontractors with all relevant environmental legislation, any applicable licence, approval and permit, regulatory requirements and this EMP;
- Ensure that works are managed to reduce adverse impacts on the environment;
- Action any outcomes from incidents or accidents, project audits or other identified non-conformances and to continually improve the Environmental Management System.

1.5 Key Project Personnel

1.5.1 Principals Personnel

Role	Organisation	Representative
Project Director	Macquarie University	Tony Carton
Lead Project Manager	Capital Insight	Elisabeth Wallace
Project Manager	Capital Insight	Michael Taylor
Assistant Project Manager	Capital Insight	Janbry Nibbelink

1.5.2 Principal Contractor Personnel

Role	Organisation	Representative	Email
Project Director	FDC Construction (NSW)	Damon Malek	damonm@fdcbuilding.com.au
Senior Project Manager	FDC Construction (NSW)	Simon Friend	simonf@fdcbuilding.com.au
Project Manager	FDC Construction (NSW)	Troy Thomas	troyt@fdcbuilding.com.au
Project Manager	FDC Construction (NSW)	Michael Badaoui	michaelb@fdcbuilding.com.au
Design Manager	FDC Construction (NSW)	David Saczko	david@fdcbuilding.com.au
Services Manager	FDC Construction (NSW)		
HSEQ Manager	FDC Construction (NSW)	Joe Abraham	joea@fdcbuilding.com.au
Communications & PQMR	FDC Construction (NSW)	TBC	
Commercial Manager	FDC Construction (NSW)	Jaryd Fulcher-Colin	jarydf@fdcbuilding.com.au
Site Operations Manager*	FDC Construction (NSW)	Anthony Hurst	anthonyh@fdcbuilding.com.au
Senior Site Manager	FDC Construction (NSW)	Neil Kirk	neilk@fdcbuilding.com.au

* 24 hour site contact - 0417 481 154

1.5.3 Principals Roles & Responsibilities

FDC understands that the following stakeholders will be involved in Project Communications. Communication with these stakeholders will be via the Principal unless otherwise directed by the Principal.

Team Member	Responsibilities
Capital Insight	Overall management accountability for all activities relating to the project. Liaison with principal stakeholders who will act on behalf of the University. Facilitates and attends stakeholder meetings and briefings. Responds to specific issues raised by stakeholders and incorporates into this plan

1.6 Environmental Objectives

The objectives for the project are:

Aspect	Objective
Waste	To minimise waste going to landfill
Sediment & Erosion Control	To prevent sediment from entering waterways or stormwater
Water Quality	To prevent contamination of water ways
Noise & Vibration	To minimise noise and vibration
Dust	To limit dust

1.7 Key Environmental Issues

The key environmental issues on the project are:

- Noise and vibration
- Water management
- Stormwater
- Erosion and sediment control
- Waste
- Green Star rating

1.8 Working Hours

1.8.1 Standard Work Hours

- 7.00am – 5.00pm Monday – Friday.
- 8.00am – 4.00pm Saturday.
- Site staff will be informed of the timing of standard working hours during the Project Induction. Working outside these hours will only be considered by the Project Manager where:
 - It is an emergency.
 - A situation that would create significant delays and/or hazardous conditions.
 - Plant breakdowns have delayed an activity that cannot be stopped (e.g. concrete pour).
 - The extended working hours will not have an impact.
- The Site Manager is responsible for control of works outside of normal working hours. If unplanned works are to continue after approved working hours, the Principal must be notified and approval granted.

1.8.2 Out of Hours Work

Prior to planned out of hours work can proceed, approval from the Principal will be required in writing. This will mainly be for connections to existing assets that can only be undertaken during non-peak demand times.

1.9 External Lighting

All external lighting will be in compliance with AS 4282-1997 Control of the obtrusive effects of outdoor lighting.

1.10 Environmental Rating Tools

1.10.1 Green Star

- Green Star rating system is a comprehensive, national, voluntary environmental rating scheme that evaluates the environmental design and achievements of buildings.
- Green Star is Australia's trusted mark of quality for the design and construction of sustainable buildings, fitouts and communities. Green Star rating tools help the property industry to reduce the environmental impact of buildings, improve occupant health and productivity and achieve real cost savings, while showcasing innovation in sustainable building practices.
- New Generation Green Star rating tools include: Green Star – Communities, Green Star – Design & As Built, Green Star – Interiors and Green Star – Performance.
- The Green Star rating for this project is: 5

2 Internal and External Communication

2.1 Project Organisational Chart

The Project Organisational Chart is detailed within the Project Management Plan.

2.2 Responsibilities & Authorities

Position descriptions and skills register of each member of the project team are included in the Appendices of the Project Management Plan.

2.3 Contact Details

Contact details of Key Personnel, Stakeholders and Environmental Agencies are included in the within the Project Management Plan, Communication & Stakeholders Management Plan and Section 1.5 of this document.

The 24 hour site contact will be Anthony Hurst (FDC Site Operations Manager). The 24 hour contact number is 0417 481 154.

3 Environmental Actions

3.1 Environmental Risks / Environmental Aspects

- Potential environmental obligations and risks associated with the project shall be identified prior to the start of the project by the Project Manager on the FDC Site Risk Assessment.
- The Environmental Risk Assessment will be provided to subcontractors and suppliers as part of the subcontract and supply contracts.
- Where risks are identified as medium to high in the matrix, the impacts associated with FDC's activities, products and services will be deemed as "significant" and require operational controls that shall be described on the Environmental Actions & Monitoring Table (Section 3.11) Significant aspects may impact on the environment positively (e.g. recycling) or negatively (e.g. pollution).

3.2 Environmental Impacts and Controls

3.2.1 Project Environmental Management Plans

- The Environmental Actions & Monitoring (Section 3.11) describes operational controls used to manage environmental issues.

- The Foreman will ensure that environmental controls are inspected in accordance with these plans.
- Information of hazardous materials, including each material's potential impact on the environment and measures to be taken in the event of accidental release will be managed via the Hazardous Substances Register.

3.2.2 Supplementary Environmental Plans

- Supplementary Plans required by the contract, Development Application or as deemed necessary by the Project Manager will be attached to this plan.
- Supplementary Plans required are:
 - Construction Traffic and Pedestrian Management Plan
 - Construction Noise and Vibration Management Plan
 - Construction Waste Management Plan
 - Construction Soil and Water Management Plan
 - Flood Emergency Response Plan
 - Communications and Stakeholder Management Plan
 - Environmental Policy
- Supplementary plans are found in Appendices.

3.2.3 Unexpected Contamination Procedure

In the event that a hazardous substance is discovered on site the following procedure will be implemented in order to ensure that material can be safely remediated:

- Stop work immediately
- Report to FDC Management for assessment and action
- Establish exclusion zone around suspected area
- Engage a hygienist to undertake verification of suspected hazardous material
- If a hazardous material is detected, the hygienist will prepare an appropriate remediation action plan in accordance with the requirements of the relevant legislation, code standards and guidelines. The appropriate remediation action plan is to include:
 - The method of containment, to avoid the emissions of hazardous materials into the air or the pollution of waterways which will include air monitoring to ensure that the levels of contaminated material leaving the site are below the required thresholds.
 - Prior to removal of material (if removal is required) we will submit testing results and seek approval from the Planning Secretary for the method of removal, including the location of the approved waste disposal facility.
 - The licensing requirements of the engaged contractor for the containment and removal of the hazardous material.
 - Workcover notification requirements and processes.
 - Procedure in place for if any contamination "leakage" occurs.
 - Requirements for any waste classification, validation reports and/or clearance certificate.
- Only after remediation has been completed to the area in accordance with the remediation action plan and the associated clearance certificates have been provided, can works recommence to the area.

3.2.4 Subcontractors and Suppliers

- Subcontractors, and suppliers shall meet the environmental management requirements specified in the EMP.
- Subcontractors shall be made aware of their responsibilities under the terms of the applicable environmental legislation, by being provided a copy of this Environmental Management Plans and by participating in site induction.
- Subcontractors will be requested to submit Safe Work Method Statements (SWMS), ITPs or environmental procedures with details of how they manage any environmental aspects and impacts associated with their activities.
- Consideration of normal and abnormal operations, along with emergency scenarios will be included in ITPs as required.
- Subcontractor performance will be monitored to ensure that contracts are being fulfilled and appropriate environmental management practices are being followed.

3.3 Legal & Other Requirements

3.3.1 Legislative Compliance

- Legislative requirements that apply to the project are detailed in the Construction Management Plan.
- Where Development Consents permits or approvals relate specifically to the project, these issues will also be deemed as “significant” and will be included in the Project Risk Assessment, Environmental Actions & Monitoring Table & environmental procedures.

3.3.2 Licences & Approvals

Licences and approvals required for the project are listed below:

Licence / Approval	Stage	Responsibility	Number
RMS	Prior to construction	FDC Construction	
Sewer Connection	Prior to commencement of sewer connection works	FDC Construction	
Crown Certificate	Prior to construction	FDC Construction	
Occupation Certificate	Prior to handover	FDC Construction	
Power Connection	Prior to commencement of power connection works	FDC Construction	
Trade Waste	Prior to occupation	Macquarie University	
Liquor Licence	Prior to operation	Macquarie University	

3.4 Contaminated Site Procedure

- Projects undertaken on contaminated sites will undergo a Contaminated Site Assessment (CSA). CSA reports shall be provided as part of planning approvals process of a proposed development.
- The CSA and associated approvals shall be reviewed by the Project Manager.
- All relevant CSA reports, documents and relevant approvals will be obtained and reviewed prior to site activities commencing. Operational controls will include any specific procedures described in the report or approvals.
- Where required, ITPs and/or SWMS will be developed to address requirements of CSAs and to ensure verification of the works being completed as described.
- The Site Manager will also ensure that the site workforce are made aware of potential contamination issues associated with the contaminated site development. Advice shall be provided should problems be identified.
- The Site Manager will maintain spoil disposal records.
- The Environmental Assessment Report dated 7th November, 2017 recommends that further inspections be undertaken beneath the student accommodation buildings to confirm the subsurface conditions. This will included visual inspections during the excavation and demolition works, and any contaminated material detected will be handled in line with the “Unexpected Contamination Procedure” outlined in Section 3.2.3 above.

3.5 Monitoring

- The Environmental Management Plan shall be monitored following implementation to ensure that:
 - Environmental operational controls are being effectively applied.
 - Project specific environmental monitoring targets specified in the Development Consent or other planning permits for air, water and noise are met.
 - Unpredicted impacts are identified and remedial action is taken; and
 - The project objectives listed above are being met.
- Monthly reports are provided to the General Manager for review. The performance of projects against company environmental objectives and targets is reviewed on a quarterly basis.

3.5.1 Weekly Site Inspections

- Site inspections shall be undertaken to monitor implementation of work practices and identify areas for improvements. These shall be conducted weekly, independent of consultation arrangements, with workers invited to attend. Actions arising from these inspections shall be communicated and addressed by FDC and subcontractors to ensure items are suitably addressed in a timely manner. Hazards identified shall be made safe where practical and details of rectification, or actions required recorded.
- The Site Supervisor Weekly Checklist can be used to assist in the implementation of the PMP and management system requirements.

3.5.2 Task Observations

- Task observations shall be completed at weekly intervals to verify high risk work activities are being performed in compliance with SWMS. The observation process shall aim to monitor compliance, identify hazards not documented and control measures that could be improved. At least one subcontractor performing high risk work shall be observed each week.
- Observations of activities not involving high risk work may be conducted at the team's discretion.
- Monthly reports are provided to the General Manager for review. The performance of projects against company environmental objectives and targets is reviewed on a quarterly basis.

3.6 Communication and Consultation

3.6.1 Training

- Prior to the commencement of project activities, all site personnel (including sub-contractors) will attend site induction.
- Site Induction shall include an outline of the requirements of this EMP and the responsibilities and accountabilities of all site personnel.
- The project environmental site rules will be included in the induction session.
- Training records will be kept to verify who has attended the training.

3.6.2 Community Consultation and Complaints Handling

(Refer to the Communication and Stakeholder Plan)

- The Principal will advise relevant residents of the nature and scope of works.
- Community complaint shall be recorded on a complaints register.
- Remedial action must be taken as soon as practical. Any action taken shall be recorded within the complaints register.

3.7 Emergency Planning & Response

Refer to the Critical Incident & Emergency Response Plan.

3.8 Incident Investigation & Reporting

3.8.1 Internal Requirements

- The Site Manager shall ensure that all incidents occurring in or around the site, involving company personnel, subcontractors, visitors or passers-by, are investigated and reported regardless of how minor they appear at the time of the occurrence.
- A Non-Conformance Report shall be completed for each incident that cannot be immediately rectified and has no ongoing environmental impact.
- The Principal will also be notified of any Incident occurring in or around the site.

3.8.2 Duty to Notify Office of Environment and Heritage (OEH) of Pollution Incident

FDC shall notify the OEH Pollution Line, 131 555, regarding pollution incidents that have occurred in the course of its activities, if the following apply:

- The actual or potential harm to the health or safety of human beings or ecosystems is not trivial.

- The actual or potential loss or property damage (including clean-up costs) associated with a pollution incident may exceed \$10,000.

3.9 Non Conformance

- In the event of breach in the requirements of the EMP, a Non Conformance Report will be completed and issued to the offending party.
- Non Conformances will be registered in the Non Conformance Report Register.
- A copy of the Non Conformance Notice will be forwarded to the Project Manager and the subcontractor, who will implement appropriate corrective action.

3.10 Audits

- Third Party Projects audits shall be scheduled by the National EHS Systems Manager and form part of the company's audit schedule. Refer Audit procedure Cor-8.2-001.
- Audits shall address the requirements of ISO9001, ISO4801, FDC's Management System and the various Management Plans.
- Monthly site audits shall be conducted and be attached to the Monthly Project Report and forwarded to the General Manager. The audit addresses the physical site as well reviewing the ongoing suitability of key documents including this PMP, Site Risk Assessment and Environmental Risk Assessment. If changes are required the updated documents will be distributed to key stakeholders.
- A full review of the attached sub-plans is to be conducted on a six monthly basis, as part of FDC's ongoing auditing schedule.

3.11 Environmental Actions and Monitoring Table

Environmental Aspect/Impact	Legal Requirements	Environmental Actions, Controls and Criteria	Operational Controls			Monitoring			Action
			Induction and/or toolbox	FDC	Subcont. SWMS & contracts	Type	Frequency	Responsibility	NCR/Refer PMP
Dust Generation Particulate Emissions (General)	NSW - POEO Act (Sections 124-126)	<ul style="list-style-type: none"> Install shade cloth on perimeter fencing and scaffold. Vehicle corridors will be clearly identified and restricted to control vehicle access onsite. Limit vehicle speed onsite to 10km/hr. Fixed and mobile (water tanker) water sprays. Reduce work activities /stop work during moderate to high wind velocity periods. Maintain equipment. Smokey plant to be stopped until repair works completed. Turn off vehicle engines whilst not in use (no long periods of idling). Conduct visual inspections of neighbouring buildings on a quarterly basis to confirm that dust control measures are effective. 	Y	Y	Y	Visual Inspection	Daily Weekly	Diary Site Inspection Checklist	As required
Dust Generation (Demolition)	NSW - POEO Act (Sections 124-126)	<ul style="list-style-type: none"> Breakers and crushing equipment to be fitted with dust filtration equipment or water sprays to control dust emissions. Conduct visual inspections of neighbouring buildings on a quarterly basis to confirm that dust control measures are effective. 	Y	Plant/ Machinery Register	Y	Visual Inspection	Daily Weekly	Diary Site Inspection Checklist	As required
Dust Generation (Construction)	NSW - POEO Act 1997 (s 124-126)	<ul style="list-style-type: none"> Minimise areas of site disturbed and stage works where possible. Dust suppression strategies to be used, i.e. water sprays, soil binders, hydromulching, controlled speed onsite, roadbase + shaker grids. Stockpiled topsoils and rubble will be restricted to 4m high. Stabilise if insitu for >4-6months. On site drilling or coring operations will be undertaken by equipment fitted with air filtration equipment. 	Y	Y	N	Visual Inspection	Daily Weekly	Diary Site Inspection Checklist	As required

Odour	NSW - (POEO Act 1997 s 142)	<ul style="list-style-type: none"> If odorous materials uncovered, recover immediately. Seek advice from consultant regarding soil /materials management. Install shade cloth to perimeter fencing and scaffold. Conduct visual inspections of neighbouring buildings on a quarterly basis to confirm that dust control measures are effective. 	N	Y	N	Visual	Daily	Diary	As required
Emissions to Air	NSW (POEO Act 1997, s 124-125)	<ul style="list-style-type: none"> Ensure machinery is maintained correctly. 	Y	Y	Y	Visual	Daily	Diary	As required
Stormwater (Discharge from sedimentation basins, flooding)	<p>NSW - POEO Act (Section 120)</p> <p>ANZECC Water Quality Guidelines</p> <p>NSW Department of Housing's Managing Urban Stormwater (2004)</p>	<ul style="list-style-type: none"> Water quality to meet ANZECC Water Quality Guidelines. → PH 6.5- 8.5, Turbidity <50NTU, No visible oil & grease. Obtain advice for use of flocculants to settle sediment from water. Sedimentation pond to be maintained at low levels to ensure capacity during rainfall event. DO NOT DISCHARGE IF CONTAMINANTS SUSPECTED. Obtain advice. 	Y	Stormwater & Sediment Control Plan	Y	Visual Inspection	Daily Weekly	Diary Site Inspection Checklist	As required
Adjoining waterways (dewatering, soil erosion & runoff)	<p>NSW - POEO Act 1997(s 120, 122)</p> <p>NSW - PEO (General) Regulation 1998,cl 55;</p> <p>NSW - Local Government Act 1993, s 638]</p> <p>NSW Department of Housing's Managing Urban Stormwater (2004)</p> <p>ANZECC Water Quality Guidelines</p>	<ul style="list-style-type: none"> Temporary drainage systems will be established to divert clean waters around the land development areas as appropriate. Erect silt fences, bunds and construct swale drains. Inspect at least weekly and after rainfall. Maintain and/or replace as required. Street sweepers will be employed on regular basis. Install erosion and sediment controls before work starts. Leave as much vegetation as possible. Install temporary fences to define 'no go' areas in those areas that are not to be disturbed. Include the area under the canopy of trees so that tree roots will not be damaged by soil compaction. Divert run-off from upslope away from the site, but ensure that you do not flood your neighbours. For example, dig drainage channels (catch drains sized to accommodate the upslope catchment). 	Y	Stormwater & Sediment Control Plan	Y	Visual Inspection	Daily Weekly	Diary Site Inspection Checklist	As required

		<ul style="list-style-type: none"> • Install sediment controls downslope of the site to catch sediment. • Check the erosion and sediment controls every day and keep them in good condition. • Leave or lay a kerbside turf strip (for example, the nature strip) to slow the speed of water flows and to trap sediment. • Limit vehicle entry and exit to one point, and lay geotextile and blue metal to stabilise it for all-weather access. • Install shaker grids to vehicle entry and exit points. • Allow for vehicle washdown during wet weather to ensure sediment is not tracked on roadways. This will be achieved by allowing for a hose connection where the shaker grids are location on exit from the site. • Clearly mark the access point and give an access map to all suppliers. • Protect all drains with a gravel sausage made from geotextile filled with blue metal. • Save the topsoil and stockpile it for use later in revegetation. Never place it around trees as this will kill them. • Store all stockpiles and building materials behind sediment fences. Cover them with plastic to prevent erosion by wind. • Get council approval before placing stockpiles or other materials on the nature strip or footpath. • Connect downpipes from the guttering to the stormwater drain as soon as the roof goes on. • Build a dam below the area used for cutting tiles, concrete and bricks. • Surround the wash-out area with a sediment fence that slows down the water flow. Site this area upslope of another sediment control. • Fill in all trenches immediately after services have been laid. • Spread the topsoil back when the work is finished and revegetate the site as soon as possible to control erosion. • Remove the sediment and erosion controls only after this is done. 							
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		<ul style="list-style-type: none"> Sweep the road and footpath every day. Washing down is unacceptable. Never place any materials in the gutter or on the road. You will be fined for this. Filter or settle-out all water pumped off the site. The water must be clear before it enters the stormwater system or creeks. Gypsum can be applied to muddy (turbid) water to help clay particles settle. Comply with the Erosion and Sediment Control measures outlined in the attached Construction Soil and Water Management Plan (Appendix 4.4). Complete quarterly visual inspections of neighbouring waterways to confirm effectiveness of the above strategies. 							
Sewer (Trade waste)	Comply with the conditions of the trade waste consent or permit, or the local council approval, including acceptance standards	<ul style="list-style-type: none"> No paints or other chemical to be poured down drains. If required, obtain trade waste licence for discharge or local council approval. 	Y	Stormwater & Sediment Control Plan	Y	Visual Inspection	Daily Weekly	Diary Site Inspection Checklist	As required
Land (Acid sulphate soils, contaminated soils, imported fill)	<p>NSW - Contaminated Land Management Act 1997, s 60;</p> <p>NSW - Contaminated Land Management Regulation 1998, cl 3</p> <p>Acid Sulfate Soils Management Advisory Committee</p>	<ul style="list-style-type: none"> Stop work if unexpected potentially contaminated soils are encountered. Refer to "Unexpected Contamination Procedure" outlined in Section 3.2.3 above. Obtain waste classification from consultant in accordance with OEH\EPACW\EPA guidelines Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-Liquid Wastes (June 2004) www.environment.nsw.gov.au/waste/envguidlms/index.htm. Where required a Remediation Action Plan will be developed and implemented. Sign off by Site Auditor may be required to validate cleanup. Any groundwater or ponded rainwater will be tested and classified by consultants prior to disposal. Check geotech requirements. Ensure soil classification suitable for land use i.e. Schools, residential, commercial etc. 	Y	Acid Sulphate Soils Management Plan	Y				As required

Land	NSW - Contaminated Land Management Act 1997, s 60 NSW - Contaminated Land Management Regulation 1998, cl 3	<ul style="list-style-type: none"> The requirements to import fill will be minimised by utilising on site cut material wherever possible. All analysis certificates shall be handed over as part of the completion documents to the Principal. Record all imported fill on Form F067 – Imported Fill Register. Mark up locations where fill compacted in site plan. Survey if required 		Y	Y				As required
Resources – water, materials, energy		<ul style="list-style-type: none"> For design and construct jobs, refer to the design specification for ESD requirements and product choices. Buy local wherever possible to reduce impacts of transport on environment. 		Y					As required
Noise	NSW - POEO Act (Sections 139, 140)	<ul style="list-style-type: none"> Refer to DA for noise restrictions and working hours. Use hoarding or acoustic mats as required. Situate generators and plant away from sensitive receivers. Turn off machinery. Maintain equipment and stop noisy plant until repaired. No early deliveries. 	Y	Noise Management Plan	Y	Visual Inspection	Daily Weekly	Diary Site Inspection Checklist	As required
Vibration		<ul style="list-style-type: none"> Conduct dilapidation report prior to work starting. Limit the use of vibratory rollers, rock breakers, impact piling etc. adjacent to buildings (>7m). Regenerated noise may also transfer through bedrock and building structures. Obtain advice if required. 	Y		Y				As required
Community Concerns		<ul style="list-style-type: none"> Provide information (e.g. Signage, letterbox drops) to community on programmed works. Provide contact name for inquiries. Keep a register of any complaints or inquiries made (to be updated on a monthly basis). Advice locals of “noisy” work. If required in noise sensitive areas and/or in response to complaints, engage consultants to undertake monitoring at nominated receivers. Vehicles will not be permitted to queue outside the site or in residential areas unless a defined area is 	Y	Y					As required

		established which does not adversely impact on neighbours.							
Flora	<p>NSW - State Environmental Planning Policy No 14 - Coastal Wetlands, s 7(1, 5), 7A;</p> <p>NSW - Native Vegetation Act 2003, s 12; Forestry Act 1916, s27(1);</p> <p>NSW - National Parks and Wildlife Act 1974, s 117(1), 118(1)]</p> <p>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth), s 12, 15B, 16, 18, 20, 21, 23</p>	<ul style="list-style-type: none"> Review planning documentation to determine the presence of any protected, threatened or significant flora. Obtain approvals as required. Engage arborist to develop tree management plan or refer DA and arborist reports. Education and training at site toolbox meetings and induction. Report all sightings to the Site Manager. Fence or barricade protected flora at the drip zone. Erect Keep Out signage. Do not stack materials under/against trees. The potential for reuse of vegetative wastes by mulching, chipping or on-site placement of trunks or limbs shall be reviewed for each project. 	Y	Y Consultant Report		Visual Inspection	Daily Weekly	Diary Site Inspection Checklist	As required
Fauna	<p>NSW Environmental Planning and Assessment Act 1979, s 5A, 78A(8)(b), 79B, 111 & 112-112E</p> <p>NSW - Threatened Species Conservation Act</p> <p>NSW - 1995; National Parks and Wildlife Act 1974, Part 8A</p> <p>Environment Protection and Biodiversity</p>	<ul style="list-style-type: none"> All native animals protected. Review planning documentation to determine the presence of any protected, threatened or significant fauna. Obtain approvals as required. Site rules/induction to include information regarding of the For injured animals, to relocate call WIRES. 	Y	Y Consultant Report		Visual Inspection	Daily Weekly	Diary Site Inspection Checklist	As required

	Conservation Act 1999 (Commonwealth), s 12, 15B, 16, 18, 20, 21, 23								
Waste Litter	<p>NSW - POEO Act (Section 116, 142),</p> <p>NSW - Waste Avoidance and Resource Recovery Act 2007</p> <p>NSW -PEOAAct 1997, s 143, 144-146</p> <p>NSW Crown Lands Act 1989, s 155</p> <p>NSW Management of Waters and Waterside Lands Regulations - N.S.W., cl 13;</p> <p>NSW - PEO (Waste) Regulation 2005, cl 49</p>	<ul style="list-style-type: none"> Hazardous materials surveys to be completed. Materials to be removed prior to demolition. Registers and waste disposal requirements as per WorkCover and OEHPACW/EPA requirements for removal, storage, transport and disposal. General site wastes –use one bin system and sort in contractors yard to produce quantities of material for recycling, reuse, disposal etc. Empty drums are to be taken off-site for disposal. Empty drums shall be crushed prior to recycling/disposal. Do not overfill skip bins. Provide plenty for use. Cover where potential for windblown litter. Comply with attached “Construction Waste Management Plan” included in Appendix 4.3. 	Y	Waste Management Plan	Y	Visual Inspection	Daily Weekly	Diary Site Inspection Checklist	As required
Landfilling	NSW - POEO Act (Section 116, 142)	<ul style="list-style-type: none"> Reduce, reuse and then dispose. Dispose of hard construction wastes for recycled gravels and sands. Do not send soil to landfill until alternatives for beneficial reuse have been explored as per consultants advice. Consideration should be given to chipping of the vegetation and reuse. Reuse packaging to protect works. 	Y	Y					As required
Chemicals	NSW - POEO Act (Section 116, 142,)	<ul style="list-style-type: none"> Chemicals to be stored in bunded areas (impervious + 110% of largest container) away from stormwater drains & pits. 	Y	Y	Y	Visual Inspection	Daily Weekly	Diary	As required

	NSW -Occupational Health and Safety Regulation 2001	<ul style="list-style-type: none"> Refer Workcover Code of Practice for Storage & Handling of Dangerous Goods, OEH/EPA/CWEPA Guidelines for Bunding & Spill Management. Appropriate chemicals storage is in conformance with: <ul style="list-style-type: none"> → AS 1940 The Storage and Handling of Flammable and Combustible Liquids → Storage and Handling of Dangerous Goods WorkCover Code of Practice 2005– refer p. 86 OEH/EPA requirements http://www.environment.nsw.gov.au/water/bundingspill.htm Ponded water within bunds will not be discharged to stormwater. Fuel and hydraulic leaks to be cleaned up immediately. Drilling muds to be contained within bunds and reused. Liquid paints NOT to be poured down drains. Spread on waste cardboard or similar and leave to dry. Paint brushes to be rinsed and paint solids allowed to settle. Container of paint solids to be disposed to liquid waste facility. Construct concrete washout pit for washout, away from stormwater drains. Send back to batch plant where possible. Concrete cuttings to be contained and wetvac to prevent runoff into stormwater drains. Storage of bulk fuels (>200L) on site is prohibited. All refueling shall be undertaken by a mobile facility with appropriate spill control and containment control equipment. MSDS's must be provided to the Foreman prior to a chemical being received on site and by subcontractors using chemicals/products. 						Site Inspection Checklist	
Traffic	Local Government Requirements	<ul style="list-style-type: none"> Develop and implement traffic management plans. Submit to local council as required. Signage and notices regarding disruptions. 	Y	Traffic Management Plan	Y	Visual Inspection	Daily Weekly	Diary	As required

		<ul style="list-style-type: none"> • Use crushed concrete, mulches etc. along site access roads. • Install shakers and wheel wash as required. • Organise regular street sweeping. • Haulage routes and rules will be provided to subcontractors prior to commencing on site. • All loads of soil, demolition wastes, general wastes etc. are to be tarped • Comply with attached "Construction Traffic and Pedestrian Management Plan" in Appendix 4.1. 						Site Inspection Checklist	
Hazardous Materials (Asbestos)	NSW - POEO Act (Section 142) NSW PEO (Waste) Regulation 2005, cl 42	<ul style="list-style-type: none"> • A licence subcontractor must be used to demolish, remove, repair or disturb asbestos. • A WorkCover asbestos licence is required to remove 10 square metres or more of bonded asbestos. • A Workcover licence is required to remove, repair or disturb friable asbestos. 	Y		Y				
Aboriginal heritage	National Parks and Wildlife Act 1974, s 90-91 NSW - Heritage Act 1977, s 146	<ul style="list-style-type: none"> • Education and training at site toolbox meetings and induction. • It is illegal to destroy heritage items. • Review local or regional environmental plans, or on the State Heritage Register is to be consulted prior to work starting onsite. • Obtain excavation permit issued by the Heritage Council of NSW if required. • Any heritage relics or sites discovered during construction shall be reported to the Office of Environment and Heritage. • Work in the subject area to cease until specialist advice is obtained. • The area will be fenced and signs erected to restrict access. • Heritage consultants may be required to provide advice on demolition/construction processes and finishes. • Comply with approved Aboriginal Cultural Heritage Management Plan. 	Y	Consultant Report	Y	Visual Inspection	Daily Weekly	Diary Site Inspection Checklist	As required

European heritage	NSW - Heritage Act 1977	<ul style="list-style-type: none"> • Education and training at site toolbox meetings and induction. • It is illegal to destroy heritage items. • Check the OE\EPAC\WEPA Aboriginal Heritage Information Management System (AHIMS). • Also check the register of the National Estate. • Obtain approval from NPWS (Section 90 consent). • Any evidence of Aboriginal relics discovered during construction shall be reported to the National Parks and Wildlife Service. • Local Land Council representatives may be required to monitor stripping/excavation. • Work in the subject area to cease until specialist advice is obtained. • The area will be fenced and signs erected to restrict access. 	Y	Consultant Report	Y	Visual Inspection	Daily Weekly	Diary Site Inspection Checklist	As required
Emergency Preparedness		<ul style="list-style-type: none"> • Spill kit onsite. • Refer to the MSDS for advice and procedures. • All spills must be reported to the Site Manager & cleaned up. Complete FDC Incident Report (F035). • Sediment pond pumped out regularly to maintain capacity in case of emergency. • Ensure you know where stormwater drains are and have materials to block them in case of a fire. 	Y	Y	Y	Inspection	Weekly	Site Inspection Checklist	As required

Appendix to the Environmental Monitoring Table: Indoor Air Quality During Construction



To minimise moisture and other contaminants to become potential long term problems during and after construction of the building(s), FDC has identified problems substances including :

- Construction dust
- Chemical fumes
- Off – gas materials
- Moisture
-

FDC is preventing that above problems are not introduced during construction, or, if they must be, eliminates or reduces their impact.

Areas of planning, including :

- Product substitution and material storage
- Safe installation
- Proper sequencing
- Regular monitoring
- Safe through cleanup

The overall project will be meeting 5stars under the Green star and GBCA banner. All contractors will need to provide information on their products in respect to their material properties and compliant to Green star relevant credits criteria such as building materials – Indoor pollutants (ie. Paints, sealants, adhesives, etc)

To prevent residual problems with indoor air quality in the completed building and protect workers on the site from undue health risks during construction the following trades will need to be especially careful (not limited):

- Flooring
- Roofing
- Painting
- Mechanical services
- Plaster boards & insulation
- Joinery
- Generally Clean up crew

Check list tasks:

- 1) Keep building material dry Building materials, especially those with moisture absorbing properties like wood, insulation, paper and fabric, to be kept dry to prevent the growth of mould and bacteria. If moisture is present allow to dry as much as possible as weather permits. Cover dry materials with plastic to prevent rain damage and if resting on the ground, use spacers to allow air to circulate between the ground and the materials.
- 2) Dry water damaged materials quickly. Water damaged materials should be dried within 24 hours. Due to the possibility of mould growth, materials that are damp or wet for more than 72 hours may need to be discarded.
- 3) Clean spills immediately. If solvents, cleaners, gasoline, or other odorous or potentially toxic liquids are spilled onto the floor, they should be cleaned up immediately. If a spill occurs on an easily replaced building material, it may be safest to discard it and replace it with new material.
- 4) Seal unnecessary openings. Seal all unnecessary openings in walls, floors and ceilings that separate conditioned space (heated or cooled) from unconditioned space. All penetrations in floors / walls to be sealed off to prevent indoor air quality problems such as air that is contaminated with mould, radon, moisture and pesticides ingress to rooms, leaving behind odours and allergens.
- 5) Temporarily seal duct-work. As duct-work is being installed, all return and supply air vents and any open duct-work should be temporarily sealed to prevent the duct-work and air handling units from being contaminated with construction debris or dust.
- 6) Reduce construction dust. Minimize the amount of dust in the air and on surfaces. Examples include use of vacuum assisted drywall sanding equipment and use of vacuums instead of brooms to clean construction dust from floors.
- 7) Reduce Indoor pollutants & product review; All paints, adhesives, sealants, carpets and engineered wood (i.e. Joinery) products used in the building must meet Green star requirements as mentioned within the specific criterion (GBCA rating tool) (ie. limitation of TVOC in g/L, formaldehyde emission limits). Safety data sheets (VOC test certificates to be provided accordingly).
- 8) Sanding for gypsum/ rock board assemblies to follow below mentioned measures:
 - Full isolation of space under finishing
 - Protection sheeting to be installed to provide air sealing during the sanding
 - Closure of all air system devices and ductwork
 - Sequencing of construction precludes the possibility of contamination of other spaces with gypsum dust
 - Worker protection is provided. Tool box safety meetings, signage and subcontractor agreements to communicate the goals of the construction indoor air quality plan.

4 Appendices

4.1 Construction Traffic and Pedestrian Management Plan

Costan Griziotis

From: Julien Quan <JQuan@ryde.nsw.gov.au>
Sent: Wednesday, 15 May 2019 3:00 PM
To: Costan Griziotis; 'Dave Salangsang'
Cc: Grant Taranto; 'Steve Wellman'; Damon Malek; Anthony Hurst; Troy Thomas; Simon Friend; Muddasir Ilyas
Subject: RE: Macquarie University FDC Construction SSD8755 CTPMSP
Attachments: 190430 - ptc. - Macquarie University Central Courtyard Project - CTMP (R....pdf

Hi Costan,

Council has reviewed the CTPMSP, Version R9 dated 30/4/19 and requesting an updated report addressing the following comments:

- **Peak Truck Movements** – the report stated that the daily truck movements will be 20 AV/Truck and Dogs per day during concrete pours/excavation stage plus 20 HRV and 20 MRV movements per day.
 - What is the peak hourly movement generation and when it is expected to happen? How long it is expected to happen (length of concrete pour/excavation)
 - The movements – are they two-way? i.e. 20 HRV movements per day means 20 ingress and 20 egress movements per day?
- **Truck Routes** - how will construction vehicles exit towards west? Will they utilise Herring Road? The route shown in the report needs to be elaborated.
- **Truck Swept Path** – the swept paths showed in the report are for HRV and Truck and Dogs only. Swept paths of 19m Articulated Vehicles should also be included.
- **Cumulative Construction Activity** – There are multiple active/soon to be active construction site located within Macquarie University. The cumulative construction impact should be address in the CTPMSP.

Regards,
Julien

Julien Quan
Traffic Engineer
TRAFFIC TRANSPORT AND DEVELOPMENT
P (02) 9952 8109
E JQuan@ryde.nsw.gov.au
W www.ryde.nsw.gov.au



Customer Service Centre 1 Pope Street, Ryde (Within Top Ryde City shopping centre)
North Ryde Office Binary Centre, Building 0, Level 1, 3 Richardson Place, North Ryde

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From: Costan Griziotis [mailto:costang@fdcbuilding.com.au]
Sent: Monday, 13 May 2019 3:02 PM
To: Dave Salangsang; City of Ryde; Muhammad Abdat
Cc: Grant Taranto; Steve Wellman; Damon Malek; Anthony Hurst; Troy Thomas; Simon Friend
Subject: RE: Macquarie University FDC Construction SSD8755 CTPMSP

Good Afternoon Muhammad,

Hope you had a good weekend! Can you please confirm a proposed time frame for the return of comments for the CTMP and the Construction Traffic and Pedestrian Management Sub-Plan included within this. I believe Council has had this for approximately 2 weeks.

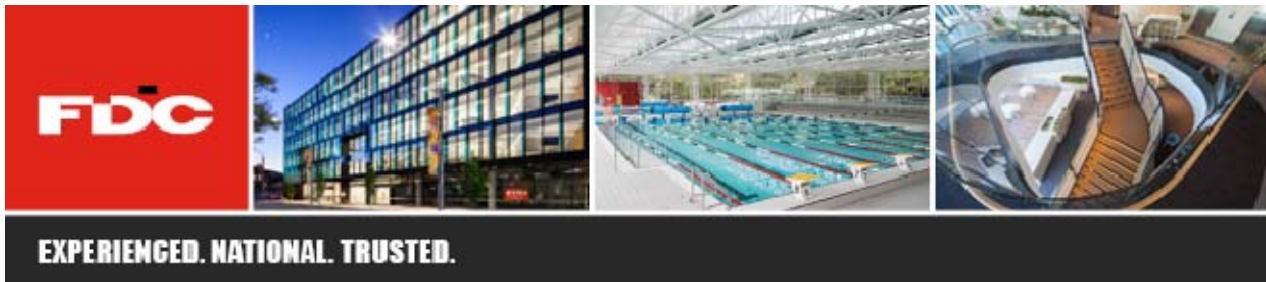
If you could please try and have something back to me by today or tomorrow that would be hugely appreciated as we are relying on the return of your comments for our Crown Certificate approval. Any feedback would be awesome.

As mentioned above, your help in moving this forward would be much appreciated from my end.

If you have any questions or issues, please don't hesitate to call me using the below contact details.

Thank you very much and have a good day!

Costan Griziotis | Cadet | FDC Construction (NSW) Pty Ltd
22 - 24 Junction Street Forest Lodge NSW 2037
Sydney | Canberra | Melbourne | Adelaide | Brisbane | Perth
T 61 2 8117 5211 | M 0433385588 | F 61 2 9566 2900 | www.fdcbuilding.com.au
Accreditations: QA | WHS | EMS | FSC | NSW Government



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From: Dave Salangsang [mailto:dave.salangsang@ptcconsultants.co]
Sent: Friday, 10 May 2019 3:16 PM
To: cityofryde@ryde.nsw.gov.au; mabdat@ryde.nsw.gov.au
Cc: Grant Taranto <grantt@fdcbuilding.com.au>; Steve Wellman <steve.wellman@ptcconsultants.co>; Damon Malek <damonm@fdcbuilding.com.au>; Anthony Hurst <anthonyh@fdcbuilding.com.au>; Troy Thomas <troyt@fdcbuilding.com.au>; Costan Griziotis <costang@fdcbuilding.com.au>
Subject: Re: Macquarie University FDC Construction SSD8755 CTPMSP

Hi Muhammad,

Good day! I hope you are doing well.

Just checking if there are any updates on our request from the email below?

Costan Griziotis

From: Development SCO <development.sco@transport.nsw.gov.au>
Sent: Thursday, 16 May 2019 9:32 AM
To: Costan Griziotis; 'Dave Salangsang'
Cc: Grant Taranto; 'Steve Wellman'; Damon Malek; Anthony Hurst; Troy Thomas; Simon Friend
Subject: RE: Macquarie University Development Consent SSD 8755

Hi Costan,

TfNSW endorses the CPTMP that have been provided.

TfNSW welcomes ongoing discussions on any issues that may arise during the development relating to traffic and transport.

Regards

Alex Karki
CBD Freight Policy & Planning Manager – Planning & Freight
Sydney Coordination Office
Transport for NSW

| M 0419 615 794 | O [02 8265 6649](tel:0282656649) W <http://mysydney.nsw.gov.au/>
Level 44, 680 George Street, Sydney, NSW 2002.



Transport
for NSW

From: Costan Griziotis [mailto:costang@fdcbuilding.com.au]
Sent: Wednesday, 15 May 2019 10:45 PM
To: Development SCO; 'Dave Salangsang'
Cc: Grant Taranto; 'Steve Wellman'; Damon Malek; Anthony Hurst; Troy Thomas; Simon Friend
Subject: RE: Macquarie University Development Consent SSD 8755

Hi Alex,

Just emailing in regards to CTMP comments for the Macquarie University job. Can you please confirm that you can have approval/comments across by 12pm on the 16/05.

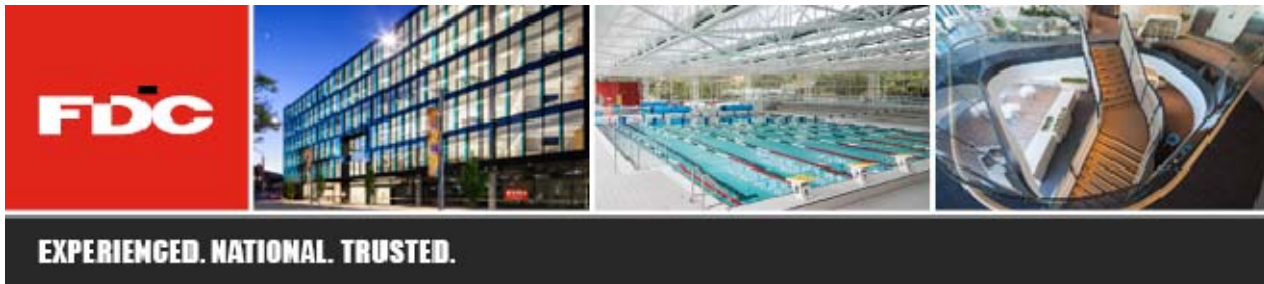
This has become extremely urgent as we are starting works on site very soon. Your help in pushing this through would be greatly appreciated.

Please do not hesitate to call if you have any queries.

Thank you very much,

Costan Griziotis | Cadet | FDC Construction (NSW) Pty Ltd
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From: Costan Griziotis

Sent: Monday, 13 May 2019 10:43 PM

To: 'Development SCO' <development.sco@transport.nsw.gov.au>; 'Dave Salangsang' <dave.salangsang@ptcconsultants.co>

Cc: Grant Taranto <grantt@fdcbuilding.com.au>; 'Steve Wellman' <steve.wellman@ptcconsultants.co>; Damon Malek <damonm@fdcbuilding.com.au>; Anthony Hurst <anthonyh@fdcbuilding.com.au>; Troy Thomas <troyt@fdcbuilding.com.au>; Simon Friend <simonf@fdcbuilding.com.au>

Subject: RE: Macquarie University Development Consent SSD 8755

Hi Alex,

As discussed this afternoon, can you please provide approval/comments/advice on the submitted CTMP prior to COB tomorrow. As mentioned over the phone and in the below email, this is vital to us obtaining our CC certificate for the commencement of works.

I appreciate your help on this matter!

Thank You,

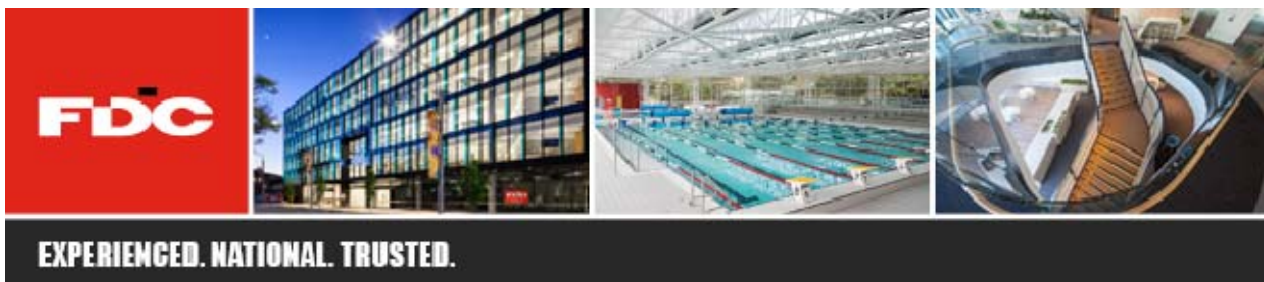
Costan Griziotis | Cadet | FDC Construction (NSW) Pty Ltd
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From: Costan Griziotis

Sent: Monday, 13 May 2019 11:52 AM

To: Development SCO <development.sco@transport.nsw.gov.au>; Dave Salangsang

<dave.salangsang@ptcconsultants.co>

Cc: Grant Taranto <grantt@fdcbuilding.com.au>; Steve Wellman <steve.wellman@ptcconsultants.co>; Damon Malek <damonm@fdcbuilding.com.au>; Anthony Hurst <anthonyh@fdcbuilding.com.au>; Troy Thomas <troyt@fdcbuilding.com.au>; Simon Friend <simonf@fdcbuilding.com.au>

Subject: RE: Macquarie University Development Consent SSD 8755

Good Morning Alex,

Hope you had a good weekend. Can you please confirm a proposed time frame for the return of comments for the CTMP and the Construction Traffic and Pedestrian Management Sub-Plan included within this. I believe Transport NSW has had this for approximately 2 weeks.

If you could please try and have something back to me by today or tomorrow that would be hugely appreciated as we are relying on the return of your comments for our Crown Certificate approval. Any feedback would be awesome.

As mentioned above, your help in moving this forward would be much appreciated from my end.

If you have any questions or issues, please don't hesitate to call me using the below contact details.

Thank you very much and have a good day!

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Accreditations: QA | WHS | EMS | FSC | NSW Government



Please consider the environment before printing this email

From: Development SCO [mailto:development.sco@transport.nsw.gov.au]

Sent: Friday, 10 May 2019 3:33 PM

To: Dave Salangsang <dave.salangsang@ptcconsultants.co>

Cc: Grant Taranto <grantt@fdcbuilding.com.au>; Steve Wellman <steve.wellman@ptcconsultants.co>; Damon Malek <damonm@fdcbuilding.com.au>; Anthony Hurst <anthonyh@fdcbuilding.com.au>; Troy Thomas <troyt@fdcbuilding.com.au>; Costan Griziotis <costang@fdcbuilding.com.au>

Subject: RE: Macquarie University Development Consent SSD 8755

Hi Dave

It usually takes 2 weeks to assess the CTMP. Your latest CTMP was circulated to our internal stakeholders last week.

I will get back to you next week.

Regards



CTPMSP;

**Macquarie University - Central
Courtyard Precinct**

For FDC Construction & Fitout

11 May 2020

**parking;
traffic;
civil design;
wayfinding;
ptc.**

Document Control

Macquarie University - Central Courtyard Precinct, CTPMSP

Issue	Date	Issue Details	Author	Reviewed	For the attention of
1	29/03/19	Draft Issue	SW	AM	Simon Friend
2	03/02/19	Second Draft Issue	SW	AM	Simon Friend
3	04/04/19	Final Report	SW	AM	Simon Friend
4	05/04/19	Revised Final Report	SW	AM	Simon Friend
5	08/04/19	Revised Final Report	SW	AM	Simon Friend
6	18/04/19	Updated Report	SW	AM	Simon Friend
7	18/04/19	Minor Adjustment	DS	SW	Simon Friend
8	24/04/19	Revised	DS	SW	Simon Friend
9	30/04/19	Revised	DS	SW	Simon Friend
10	16/05/19	Revised	DS	SW	Simon Friend
11	17/05/19	Added Attachment	DS	SW	Simon Friend
12	06/03/19	Revised	DS	SW	Simon Friend
13	05/12/19	Reviewed	DS	SW	Costan Gritziotis
14	06/12/19	Revised as per 6-month regular review	DS	SW	Costan Gritziotis
15	11/05/20	Revised as per 6-month regular review	DS	SW	Costan Gritziotis

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1. Introduction

1.1 Project Description

ptc. has been engaged by FDC Construction and Fitout to prepare a Construction Traffic Pedestrian Management Sub-Plan (CTPMSP) to the City of Ryde Council associated with the construction of the proposed development of Central Courtyard Precinct at Macquarie University.

The works involve:

- Construction of a new, multi-storey Student Hub (1 Central Courtyard) in place of existing Building C10A, with ancillary retail uses.
- Construction of two student accommodation buildings (Building R1 and R2) to provide approximately 340 student beds and integrated academic uses.
- Redevelopment of the landscaped Central Courtyard.
- Construction of a shared basement including plant, loading and waste management facilities, end of trip facilities and accessible parking.
- Installation of a new substation.
- Installation of utilities and services to accommodate the proposed development.
- Upgrade of the western extent of Science Road to accommodate fire brigade access.
- Tree removal and landscaping.

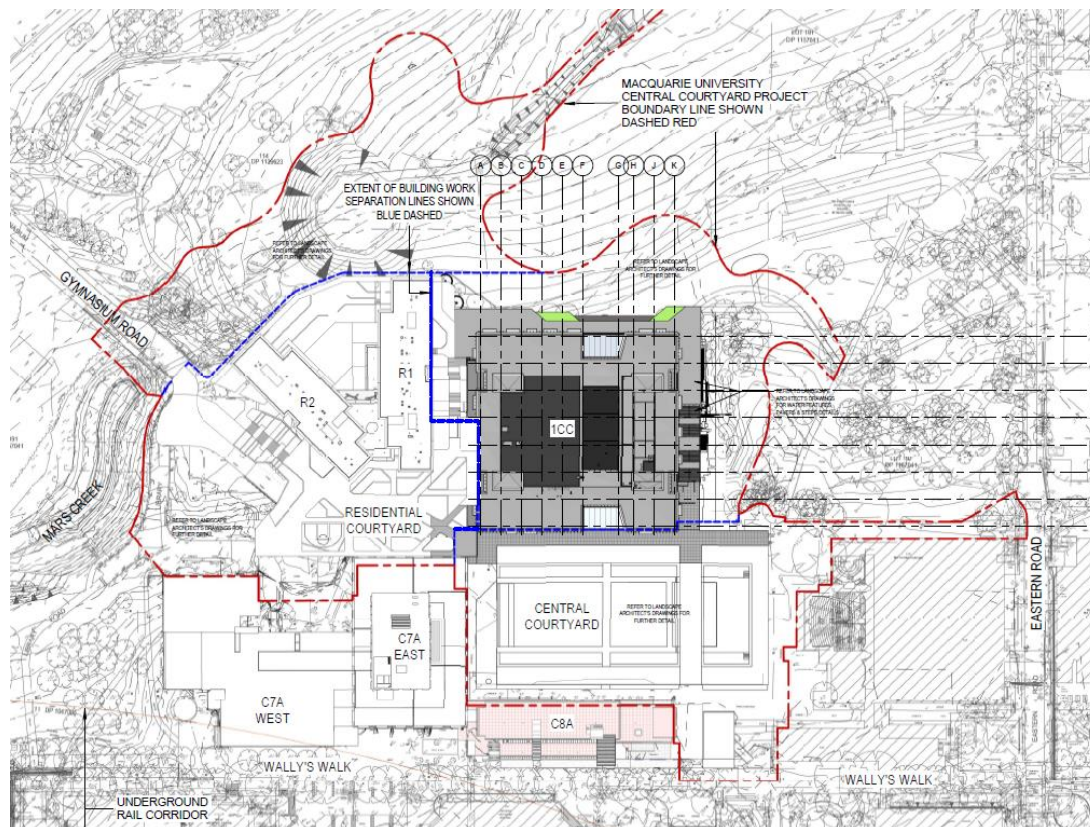


Figure 1 – Proposed Development

This report has been prepared as required by item 18 of the SEARs Report (SSD-8755) issued by the Department of Planning.

- *Traffic and transport impacts during construction, including:*
 - *How these impacts will be mitigated for any associated traffic, pedestrian, cyclists, parking and public transport;*
 - *The preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact;*
 - *Any cumulative impacts from construction activities for the Sydney Metro and associated Temporary Transport Plan;*
 - *An assessment of road safety at key intersections and locations subject to heavy vehicle construction traffic movements and high pedestrian activity; and*
 - *Construction programming detailing significant milestones and events during the construction process.*

The location of the site is shown in Figure 2.

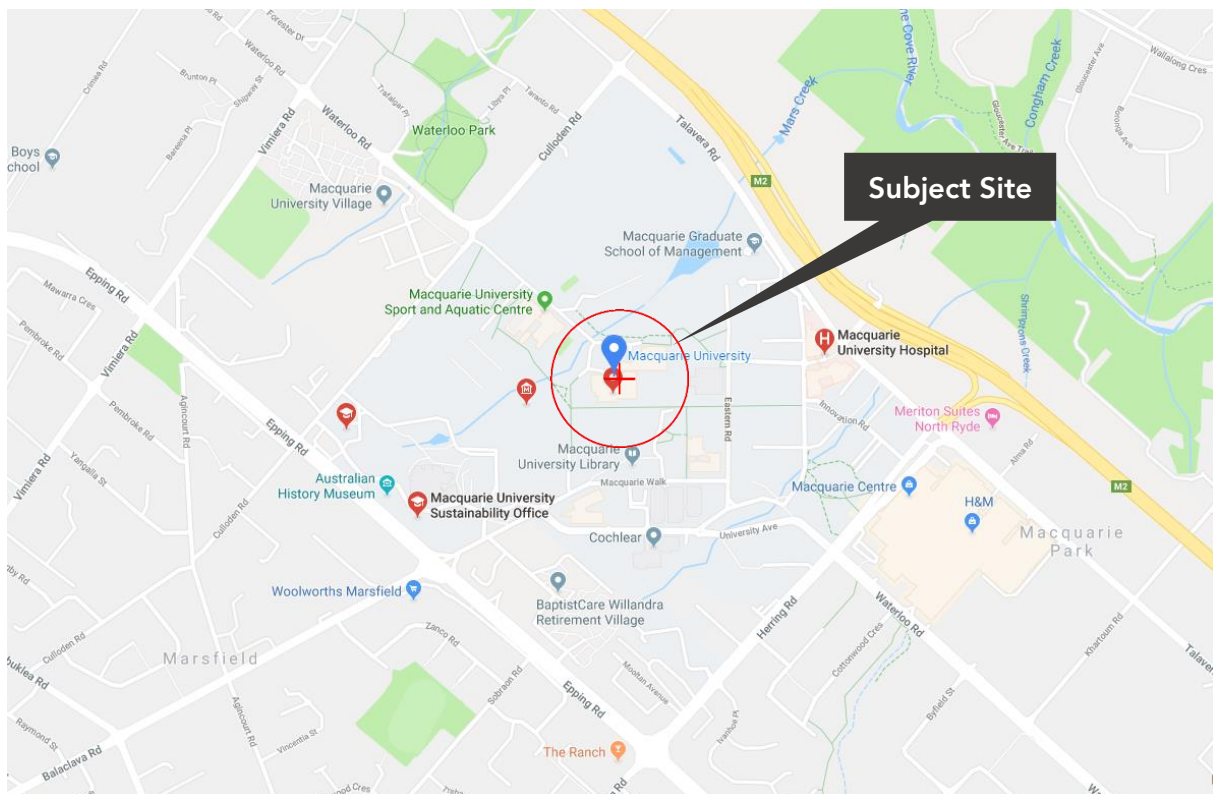


Figure 2 – Site Location

1.2 Purpose of this report

This report has been prepared to present the traffic and pedestrian management arrangements (including Traffic Control Plans) associated with the construction of the Clinical Education Building development.

This report presents the following considerations in relation to the construction traffic pedestrian management sub-plan:

- Section 2 - Background;
- Section 3 - A description of the project;
- Section 4 - A description of the road network serving the development site;
- Section 5 - Management of construction vehicles and non-site traffic; and
- Section 6 - Summary.

2. Background

The site is located on Lot 191, DP1157041, also known as 73 Talavera Road, Macquarie Park. The site lies within the grounds of Macquarie University.

The site has direct access from Gymnasium Road.

The site is classified as SP2-Infrastructure: Education Establishment, in accordance with the City of Ryde Local Environment Plan.

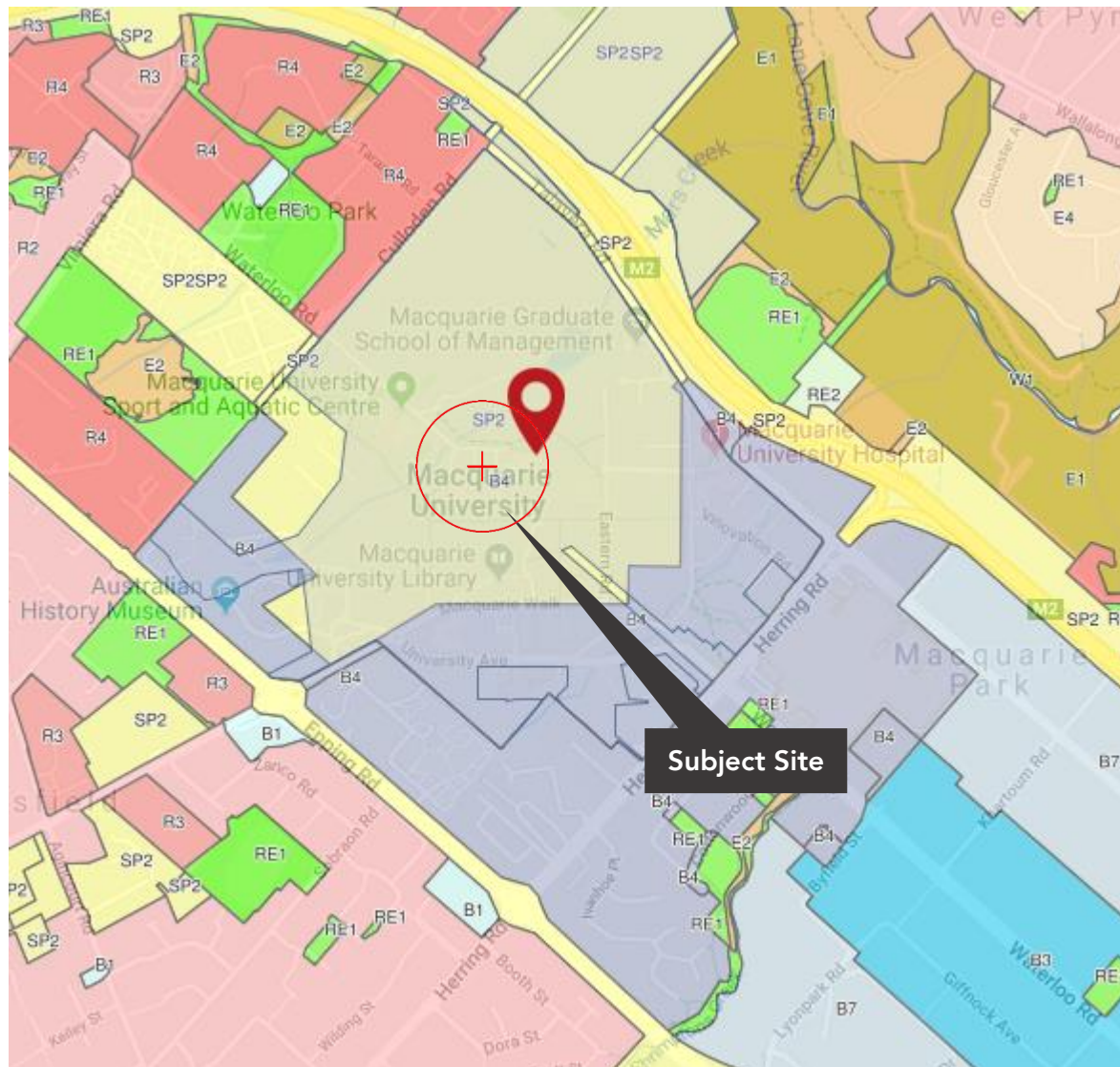


Figure 3 – Surrounding Land Use (Source: NSW Planning Portal)

The proposed development area is currently occupied by Buildings C9A and C10A (Student Hub), Buildings C8A, C7A and the landscaped Central Courtyard.

Figure 4 shows the location of the Central Courtyard Precinct in relation to the wider Macquarie University Precinct and Figure 5 shows the access to the site off Gymnasium Road.



Figure 4 – The Central Courtyard Precinct

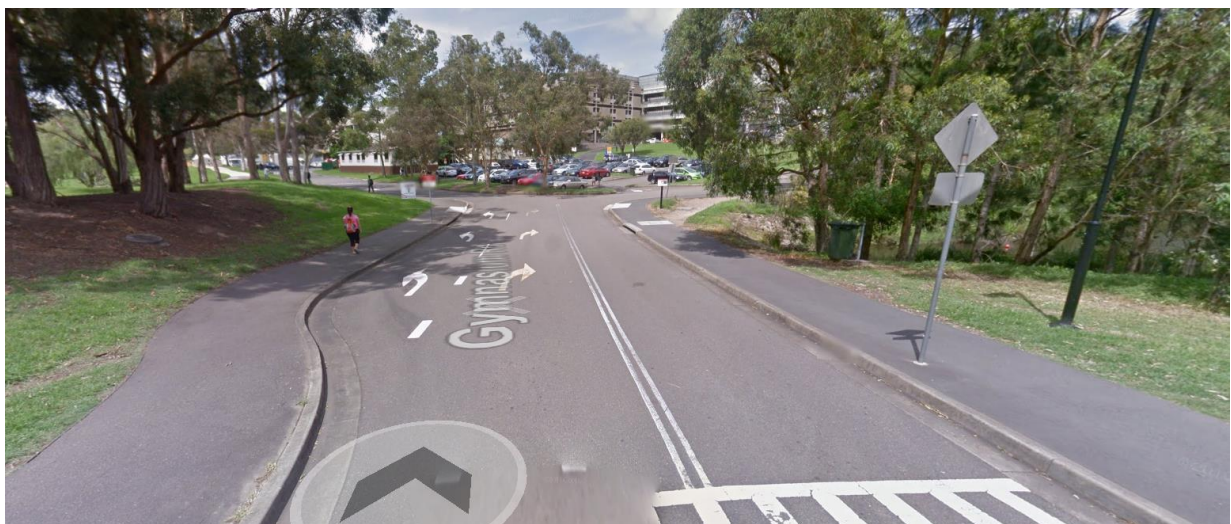


Figure 5 – Entry to the Site off Gymnasium Road

3. New Development

The proposed development involves the construction of:

- Construction of a new, multi-storey Student Hub (1 Central Courtyard) in place of existing Building C10A, with ancillary retail uses.
- Construction of two student accommodation buildings (Building R1 and R2) to provide approximately 340 student beds and integrated academic uses.
- Redevelopment of the landscaped Central Courtyard.
- Construction of a shared basement including plant, loading and waste management facilities, end of trip facilities and accessible parking.
- Installation of a new substation.
- Installation of utilities and services to accommodate the proposed development.
- Upgrade of the western extent of Science Road to accommodate fire brigade access.
- Tree removal and landscaping.

Figure 6 shows an overview of the proposed development.

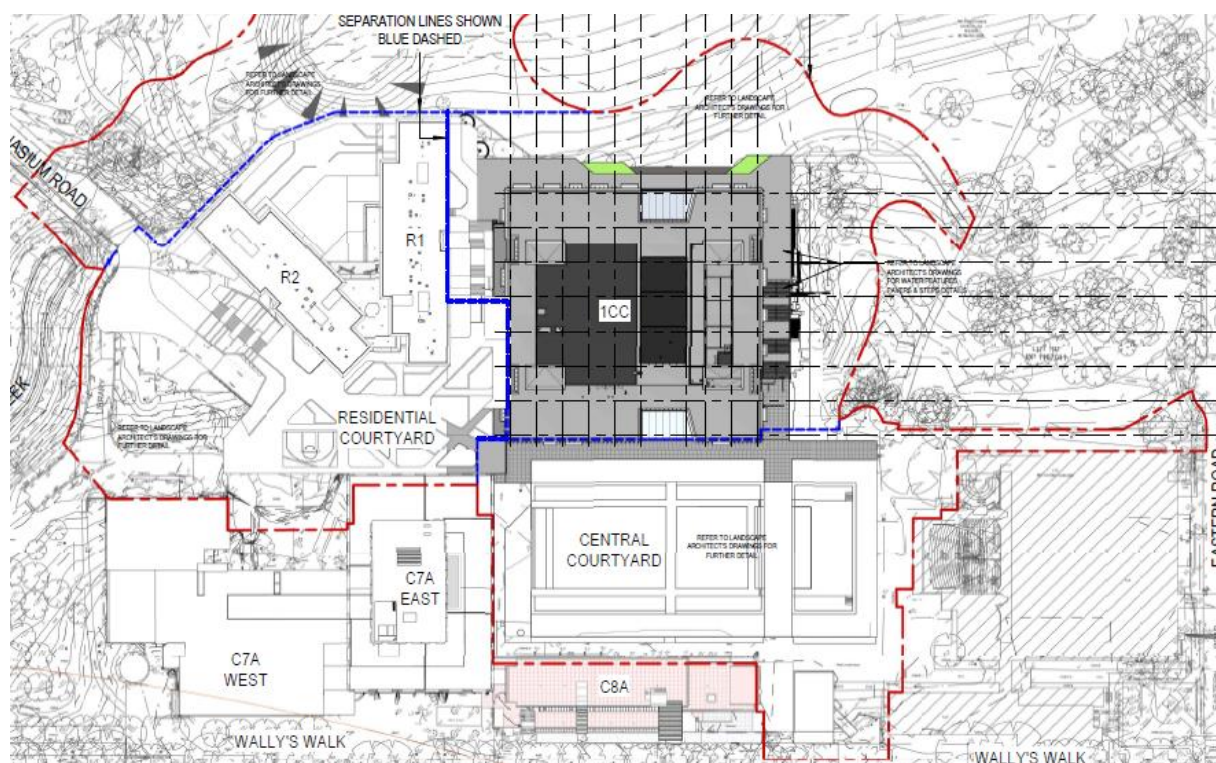


Figure 6 – New Development – Site Layout

4. Existing Transportation Facilities

4.1 Existing Road Network

The subject site is located in the suburb of Macquarie Park, approximately 350m south east of the intersection of Culloden Road and Gymnasium Road.

As shown in Figure 7, the site has good links to the local, regional and state road network, providing access to the local and greater Sydney road network.

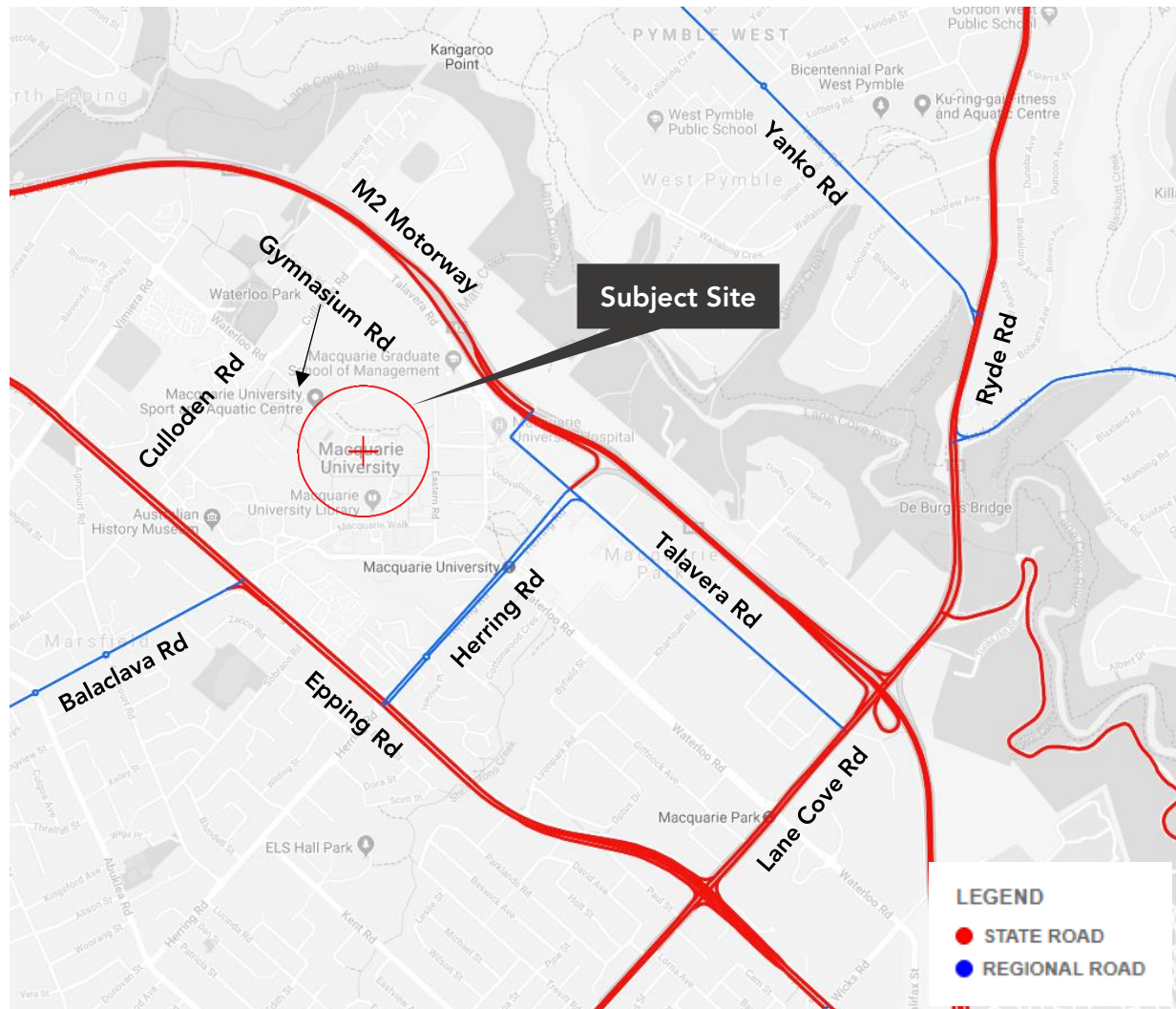


Figure 7 – Road Classification (Source: RMS State and Regional Roads Viewer)

The NSW administrative road hierarchy comprises the following road classifications, which align with the generic road hierarchy:

- State Roads: Freeways and Primary Arterials (RMS Managed);
- Regional Roads: Secondary or sub-arterials (Council Managed, Part funded by the State);
- Local Roads: Collector and local access roads (Council Managed).

Within the vicinity, the road network serving the site includes:

Epping Road	
Road Classification	State Road
Alignment	Northwest - Southeast
Number of Lanes	3 lanes in each direction, with additional bus and/or turning lanes on intersections
Carriageway Type	Divided
Carriageway Width	28 metres
Speed Limit	70 km/h
School Zone	No
Parking Controls	Clearway – 6am to 7pm Mon to Fri, 9am to 6pm Sat, Sun & Public Holiday
Forms Site Frontage	No



Figure 8 – Streetview of Epping Road, North-Westbound (Source: Google Maps)

Culloden Road	
Road Classification	Local Road
Alignment	Northeast – Southwest
Number of Lanes	1 lane in each direction
Carriageway Type	Un-divided
Carriageway Width	12 metres
Speed Limit	50 km/h
School Zone	No
Parking Controls	Un-restricted
Forms Site Frontage	No



Figure 9 – Streetview of Culloden Road, North-Eastbound (Source: Google Maps)

Gymnasium Road	
Road Classification	Local Road
Alignment	Northwest – Southeast
Number of Lanes	1 Lane in each direction
Carriageway Type	Un-divided
Carriageway Width	12 metres
Speed Limit	50 km/h
School Zone	No
Parking Controls	Un-restricted
Forms Site Frontage	No – site access road



Figure 10 – Streetview of Gymnasium Road, South-Eastbound (Source: Google Maps)

4.2 Key Intersections

The key intersections in the vicinity of the development site and their characteristics are listed below:

- Epping Road / Culloden Road: priority controlled, 4-arm intersection;
- Culloden Road / Waterloo Road / Gymnasium Road: 3-arm roundabout and priority controlled, 3-arm intersection and;
- Talavera Road / Culloden Road: 3-arm roundabout.

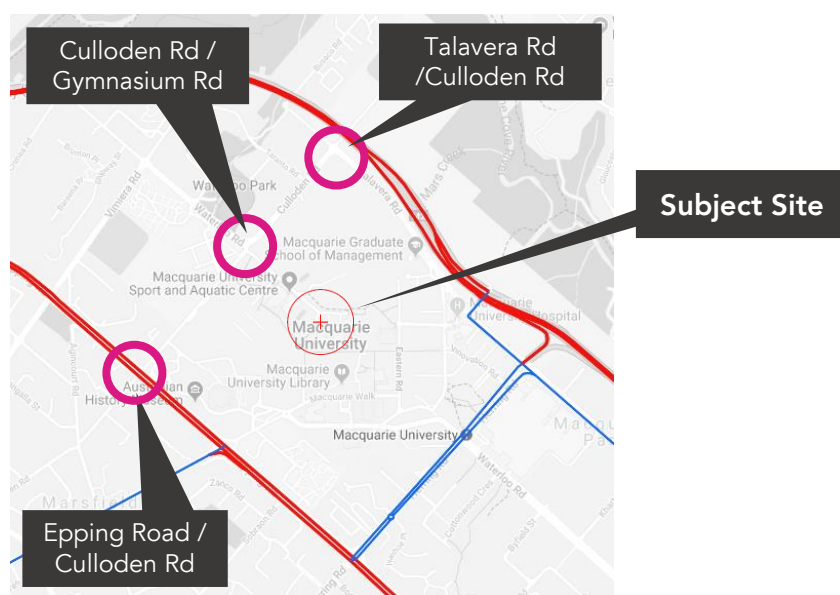


Figure 11 – Key Intersections

4.3.1 Train Services

The site is located at approximately 1000m (15 minute) walking distance from Macquarie University Metro Station as shown in Figure 12.

Macquarie University Metro Station services the M Line, which provides train services to and from Chatswood Interchange and North West Sydney approximately every 4 minutes during peak hours. The Sydney Train Network Map is illustrated in Figure 13 (Source: [transportnsw.info/sydney-rail-network-map](https://transport.nsw.info/sydney-rail-network-map))



Figure 13 - Sydney Train Network Map

4.3.2 Bus Services

As shown in Figure 12, the closest bus stops are located on Waterloo Rd and Culloden Rd, approximately 500m northwest of the site.

These stops service the following routes

Route 292	
Marsfield to the City (Erskine Street)	Mon to Fri - 6.30am to 12.30am, 30 min intervals, with additional services during peak times
	Sat – 8.00am to 1.00am, 30 min intervals
	Sun (& public holidays) – 8.30am to 11.30pm, 30 min intervals

Route 293	
Marsfield to the City (Wynyard)	To Marsfield: Mon to Fri – 4.40pm to 7.20pm, 20 min intervals
	To the City: Mon to Fri – 6.40am to 8.40am, 10 min intervals

Route 551	
Marsfield to Eastwood Station	To Eastwood Station: Mon to Fri – 7.23am, 7.55am and 8.55am
	To Marsfield: Mon to Fri – 3.39pm and 4.09pm

Route M41	
Hurstville to Macquarie Park	Mon-Fri - 5.15am to 11.50pm, 20 min intervals, with additional services during peak times
	Sat – 6.40am to 12.00am, 20 min intervals
	Sun (& public holidays) - 6.40am to 12.00am, 20 min intervals

There are also a number of other bus stops within reasonable walking distance and these bus stops service approximately 25 different bus routes operated by various bus operators as presented in Figure 14.

These routes provide access the greater reaches of the Sydney Metropolitan areas such as Hurstville, Castle Hill, Chatswood, and Strathfield.

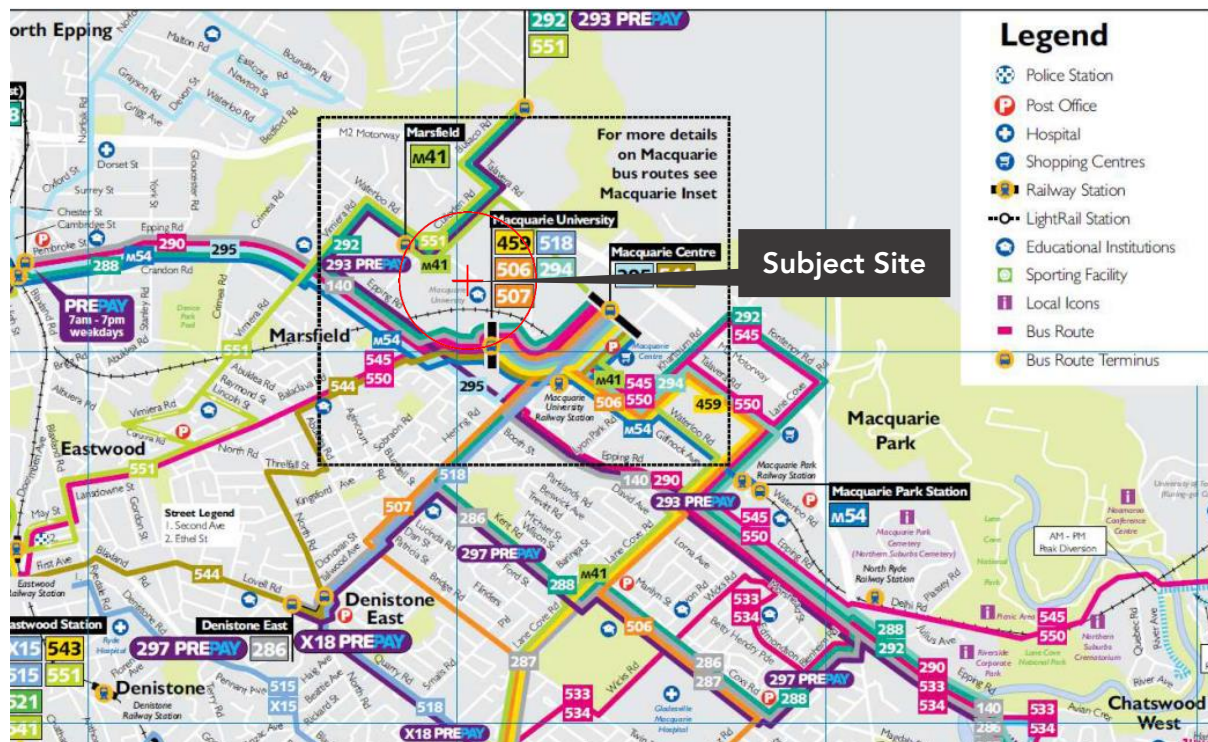


Figure 14 – Bus Service Map Servicing the Site and Surrounds

4.3.3 Summary

In light of the frequent train (or replacement bus services) and bus services which serve the locality, as well as the close proximity to Macquarie Park Station and nearby bus stops, the subject site is considered to be ideally located in terms of access to the public transport network.

4.4 Active Transport

4.4.1 Cycling Infrastructure

The City of Ryde encourages residents and visitors to cycle within the LGA. The Council has formed Bicycle Council advisory committees to assist with the adoption of the Community Strategic Plan and Delivery Plan. These plans identify a number of goals and strategies to provide improved connections and accessibility through the LGAs suburbs, centres, open spaces and places through improving public transport and car accessibility. In reviewing this strategic goal, a bicycle plan has been developed to illustrate existing on and off street cycling routes. For this development site, an informal on-road bike route is available on Lane Cove Road which provides access to the greater Sydney road network.

Figure 15 shows available cycle facilities adjacent to the development.

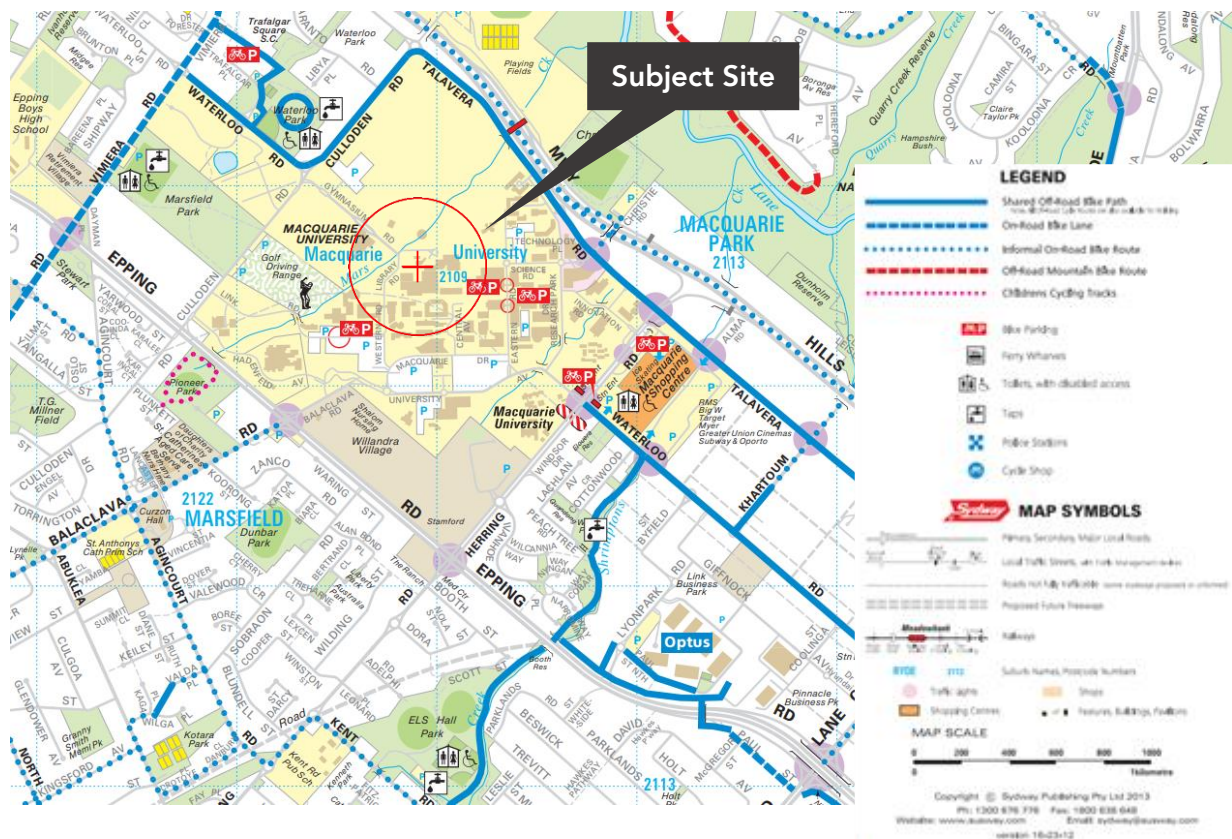


Figure 15 – Local Cycling Map (Source: Ryde Bike Map 2013)

4.4.2 Pedestrian Infrastructure

The Gymnasium Road provides the access to the site from Culloden Road and both roads have footpaths connections to and from key areas within the university (car parks and the accommodation precinct) and pedestrian crossings on the pedestrian desire lines.

Figure 16 shows an overview of the existing pedestrian infrastructure in the vicinity of the site.

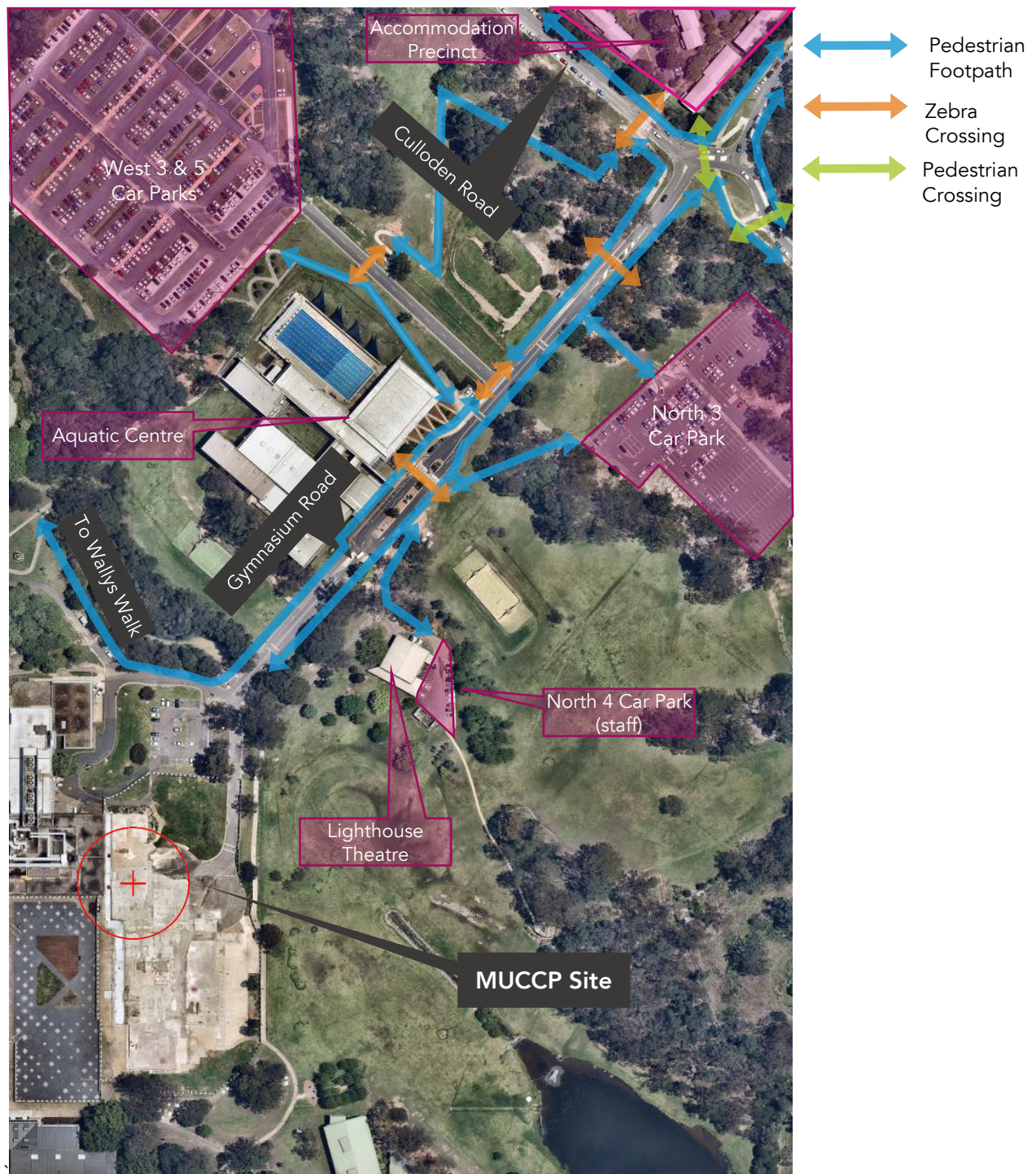


Figure 16 – Pedestrian Infrastructure

5. Traffic Management Plan

5.1 Objective

The traffic management plan associated with the construction activity aims to ensure the safety of all workers and road users within the vicinity of the construction site and the following are the primary objectives:

- To minimise the impact of the construction vehicle traffic on the overall operation of the road network;
- To ensure continuous, safe and efficient movement of traffic for both the general public and construction workers;
- Installation of appropriate advance warning signs to inform users of the changed traffic conditions;
- To provide a description of the construction vehicles and the volume of these construction vehicles accessing the construction site;
- To provide information regarding the changed access arrangement and also a description of the proposed external routes for vehicles including the construction vehicles accessing the site; and
- Establishment of a safe pedestrian environment in the vicinity of the site.

5.2 Hours of Work

All works, associated with the project will be restricted to the time periods by the Conditions of Consent, which details the following permitted working hours associated with the construction activity:

- Monday to Friday 7:00am to 7:00pm;
- Saturdays 8:00am to 4:00pm;

5.3 General Requirements

In accordance with Road and Maritime Services (RMS) requirements, all vehicles transporting loose materials will have the entire load covered and/or secured to prevent any large items, excess dust or dirt particles depositing onto the roadway during travel to and from the site. All subcontractors must be inducted by the lead contractor to ensure that the procedures are met for all vehicles entering and exiting the construction site. The lead contractors will monitor the roads leading to and from the site and take all necessary steps to rectify any road deposits caused by site vehicles.

Vehicles operating to, from and within the site shall do so in a manner, which does not create unreasonable or unnecessary noise or vibration. No tracked vehicles will be permitted or required on any paved roads. Public roads and access points will not be obstructed by any materials, vehicles, refuse skips or the like, under any circumstances.

The applicant/contractor is required to follow and abide by the any specific standard requirements for construction management as set out by the City of Ryde.

5.4 Construction Process

The works are anticipated to commence in May 2019 and last for approximately 21 months.

The site establishment plan is shown in Figure 17 and the following sections describe 2 distinctive stages of the project.

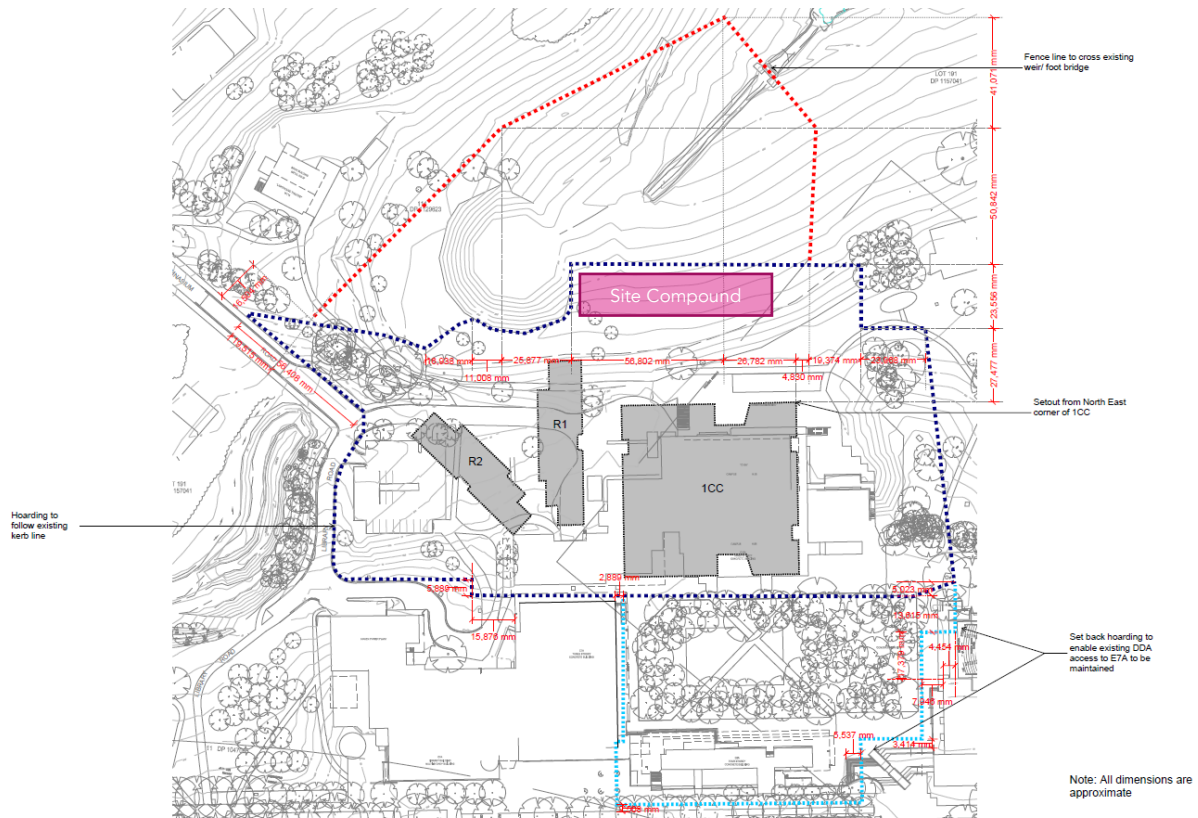


Figure 17 – Site Establishment Plan

5.4.1 Phase 1 – Demolition and Excavation

A summary of Phase 1 characteristics is shown in Table 1.

Table 1 – Phase 1 Summary

Item	Description
Works to be undertaken	Demolition of existing ground slab, site establishment, installation of piers, footings and completion of new ground floor slab
Commencement date	May 2019
Duration	3 months
Largest anticipated vehicle	19m Truck and Dog
Peak daily trucks / deliveries to the site	20 Truck and Dog (during excavation)

5.4.2 Phase 2 - Construction

A summary of Phase 2 characteristics is shown in Table 2.

Table 2 – Phase 2 Summary

Item	Description
Works to be undertaken	Above ground structure, cladding, roof, internal fit out and external works
Commencement date	August 2019
Duration	18 months
Largest anticipated vehicle	19m Semi Articulated
Peak daily trucks / deliveries to the site	20 concrete agitators (during concrete pours)

5.5 Construction Vehicle Types

As discussed in Section 3, the development involves the construction of three multi storey buildings, basement parking, servicing and plant area, sub-station and landscaping areas and will require removal of mixed materials, concrete delivery and the delivery of large materials to site.

It is expected that vehicle sizes will vary from car/vans to 19m Articulated / Truck and Dog vehicles will be used to remove and deliver materials to the site.

Any oversized vehicle that is required to travel to the project will be dealt with separately, with the submission of required permits to and subsequent approval by City of Ryde prior to any delivery.

5.6 Construction Traffic Activity

It is proposed that the construction work is to commence in Mid-2019 and is likely to be completed over the following 21 months.

The average daily construction vehicle movements are expected to be as follows:

- 19m Articulated Vehicles / Truck & Dog - 20 ingress and egress vehicles per day
- 12m Heavy Rigid Vehicles - 20 ingress and egress vehicles per day
- 8.8m Medium Rigid Vehicles - 20 ingress and egress vehicles per day
- Contractors vans/cars - 25 ingress and egress vehicles per day

During the peak period of construction, which is anticipated to be around July 2019, it is anticipated that there will be up to 30 Truck and Dogs, and 20 MRVs access and egress per day, distributed throughout the day. This equates to approximately 4 Truck and Dogs and 3 MRVs every hour.

It is not anticipated that the construction activity would cause a notable impact upon the network capacity or operation of the road network and this activity would fall within typical daily traffic variations.

5.7 Construction Vehicle Routes

The site is located in the suburb of Macquarie Park and the proposed construction vehicle routes have regard for the surrounding traffic arrangements within the vicinity of the site as illustrated in Figure 18.

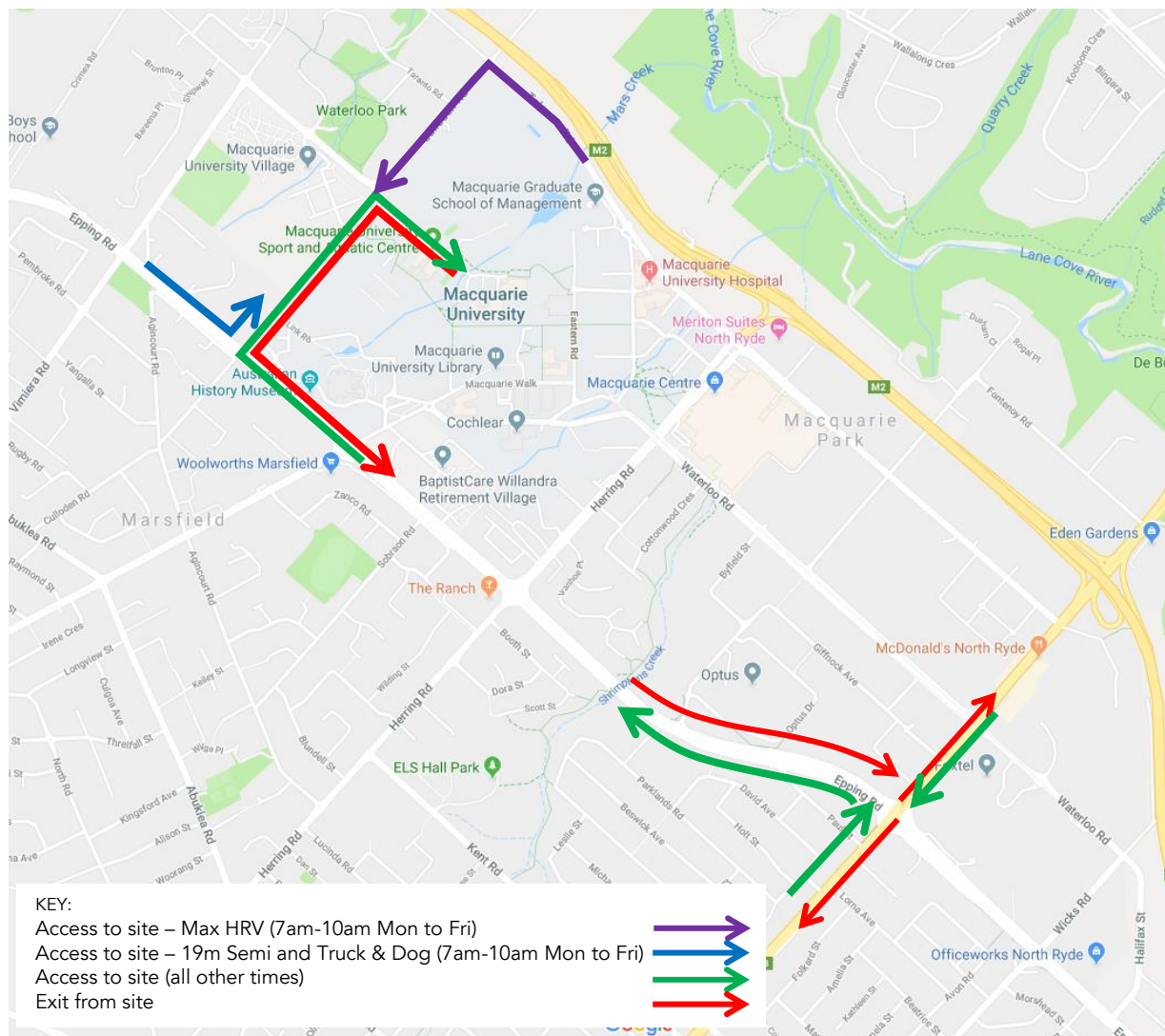


Figure 18 – Construction Vehicle Access and Egress Routes

The main access and egress to the site is proposed via Epping Road, Culloden Road and Gymnasium Road. However, due to a right turn restriction from Epping Road into Culloden Road between 6am and 10am Monday to Friday, two alternative access routes are proposed, between 7am and 10am, Monday to Friday.

- Vehicles up to Heavy Rigid Vehicle (12.5m) size will access the site from Talavera Road, Culloden Road and Gymnasium Road
- 19m semi articulated and Truck and Dogs will access the site southbound along Epping Road and turn left into Culloden Road.
- Construction vehicles exiting the site will travel west on Culloden Road, turn left into Epping Road, then travel south to either turn left or right into Lane Cove Road.

No queuing or marshalling of trucks is permitted on any public road.

All vehicle routes are constrained to existing public roads that have the physical geometry to accommodate the turning movements.

The key intersections (as outlined in Section 4.2) have been assessed in relation to the largest expected vehicles to access and egress the site.

Swept path analysis has been undertaken, utilising a 19m Truck and Dog or HRV on the three key intersections and, as shown in Figure 19, Figure 20 and Figure 22 (and Attachment 1) the intersections can accommodate the design vehicle with modifications to the median island at the Culloden Rd/Gymnasium Rd intersection.

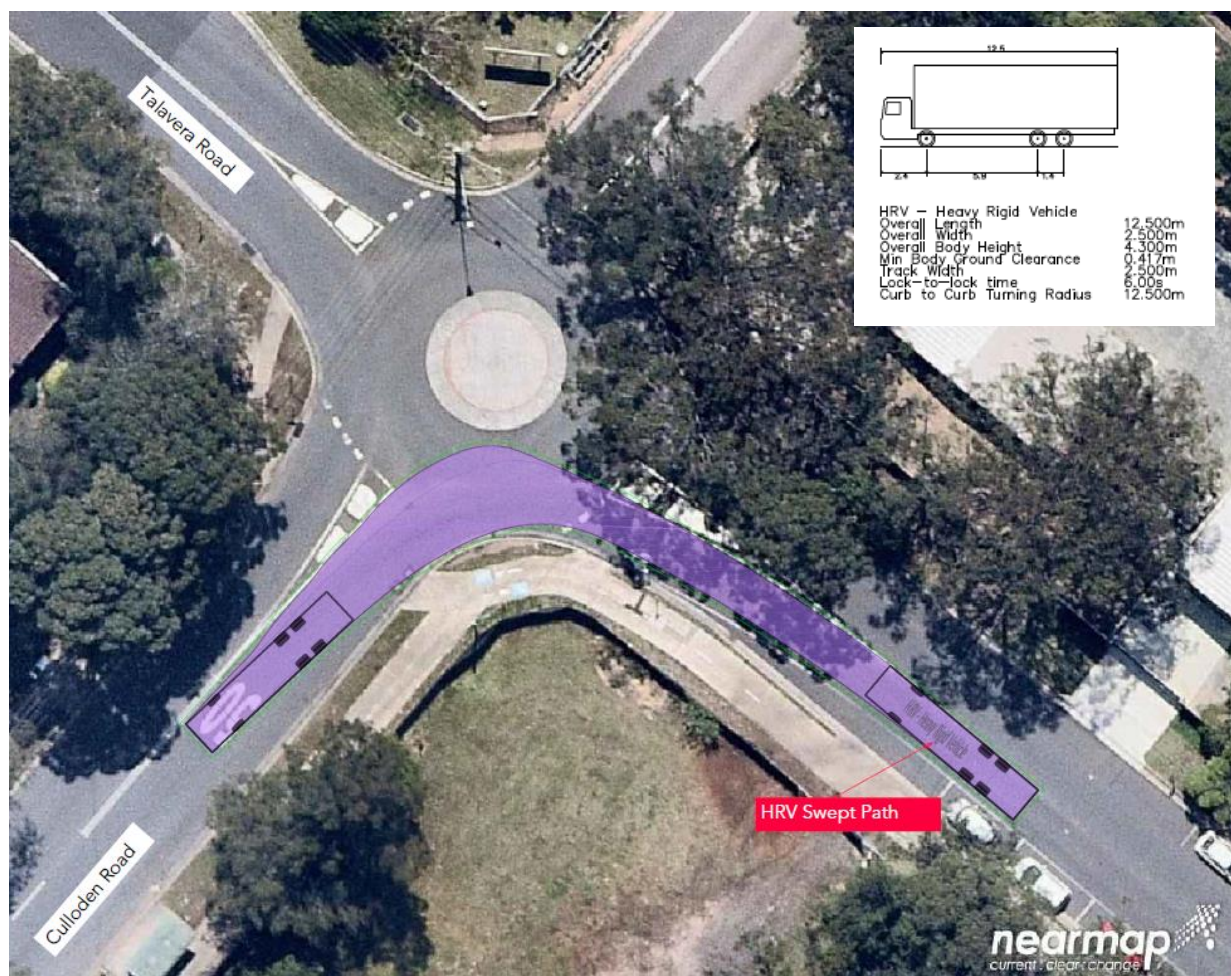


Figure 19 – Talavera Road and Culloden Road (CTMP-001)

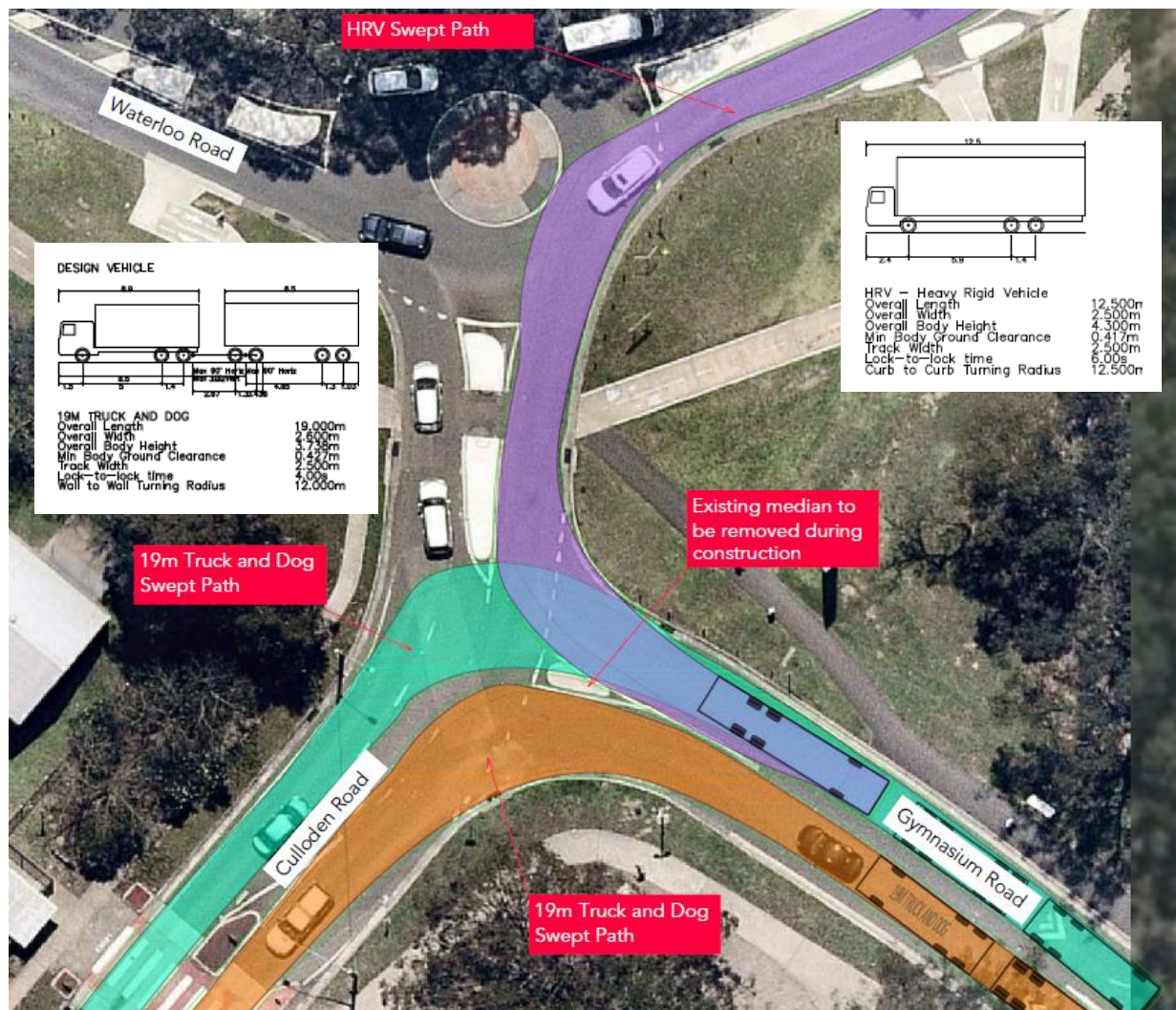


Figure 20 –Culloden Road, Waterloo Road and Gymnasium Road - T&D and HRV (CTMP-002)

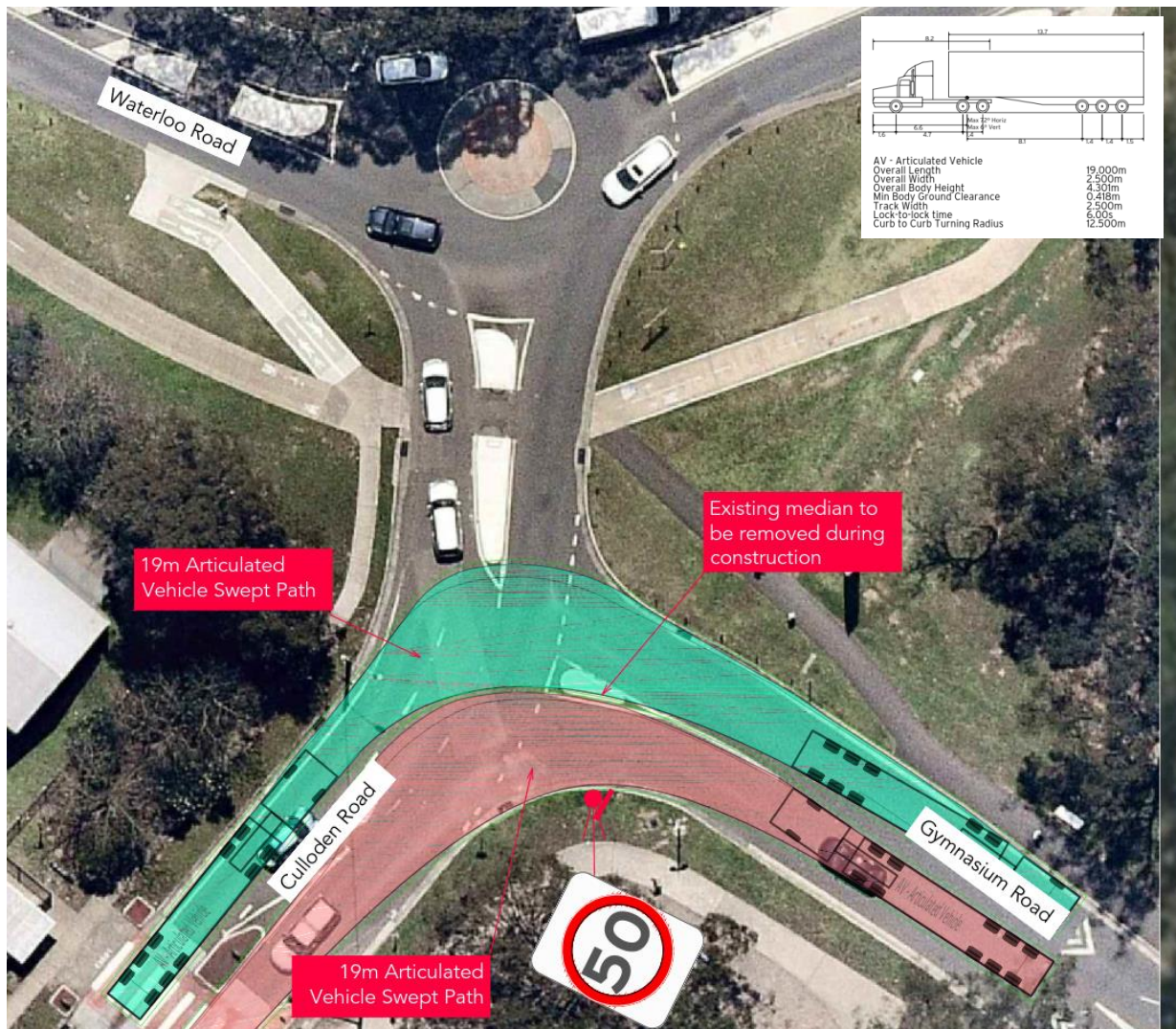


Figure 21 – Culloden Road, Waterloo Road and Gymnasium Road - AV (CTMP-002.1)

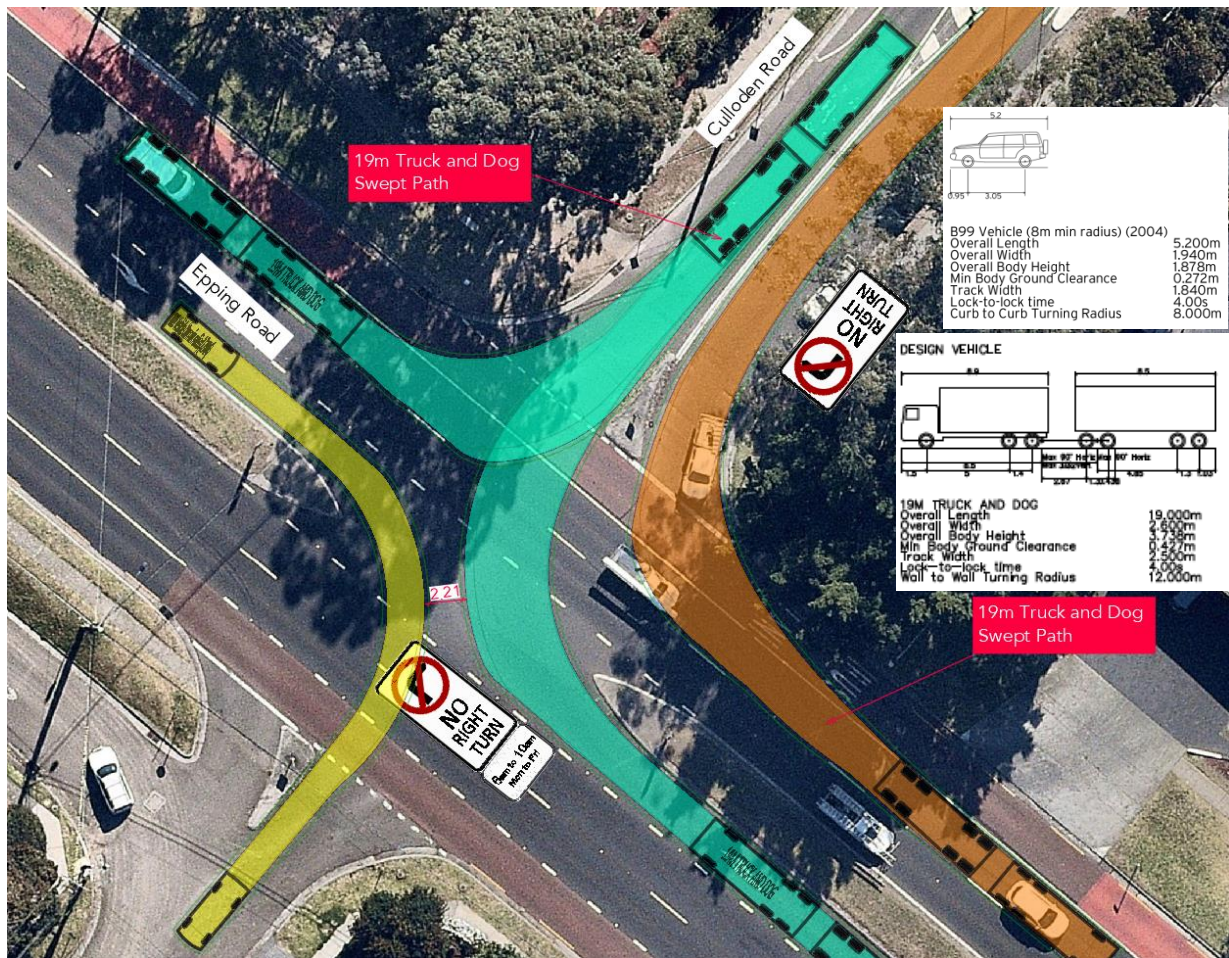


Figure 22 – Epping Road and Cullocden Road – T&D (CTMP-003)

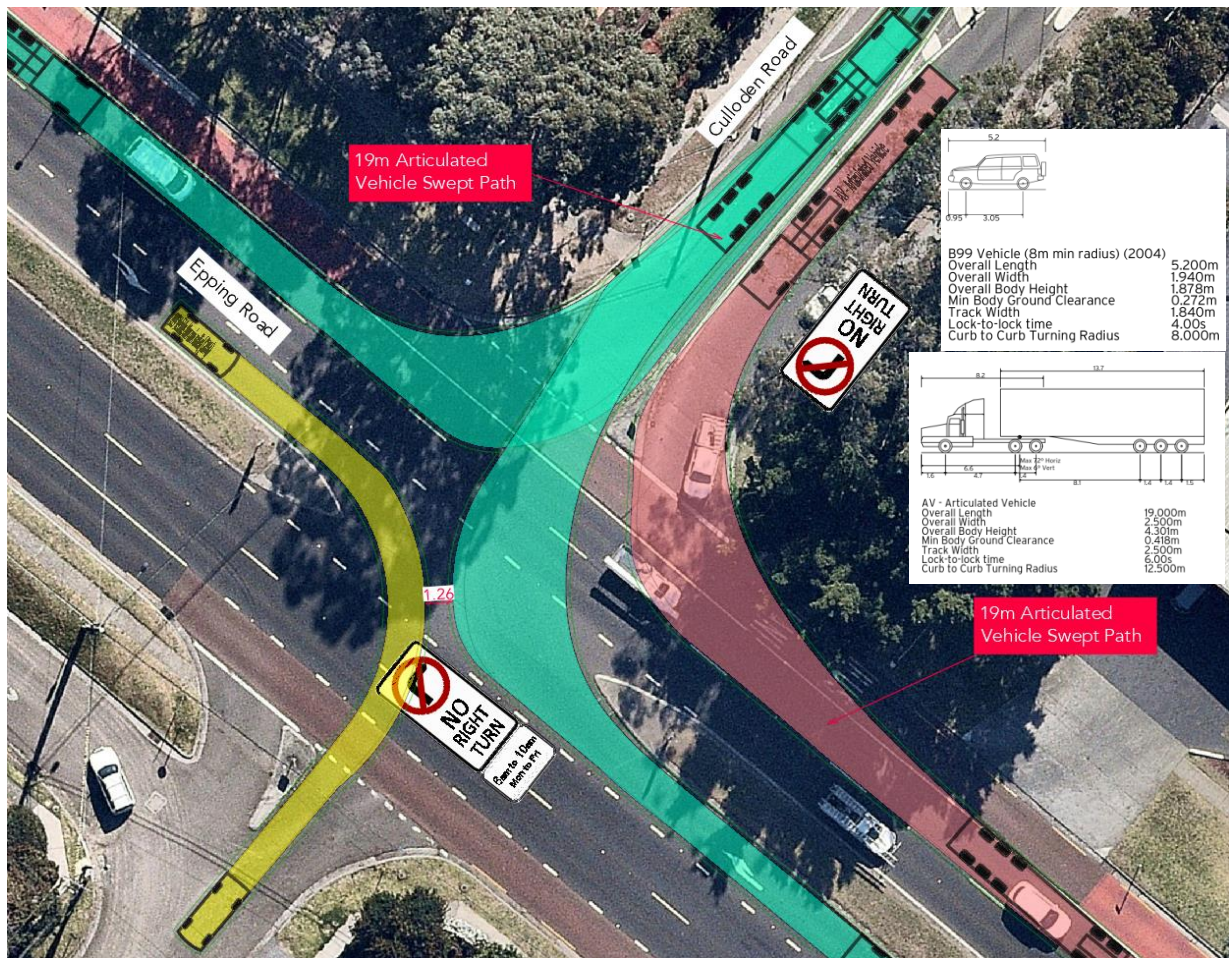


Figure 23 – Epping Road and Cullocden Road - AV (CTMP-003.1)

5.8 Construction Vehicle Access to the Site

Access to the site will be via Gymnasium Road and some modifications are proposed to the current infrastructure during the construction period.

- The existing boom gate and island to the south east of the Aquatic Centre will be temporarily removed and a temporary one way boom gate and associated pavement markings will be provided to the south, as shown in Figure 24.
- Access to the site will be via the construction access gate as shown in Figure 25.
- There are also proposed changes to the pedestrian access along Gymnasium Road and these are discussed further in Section 0

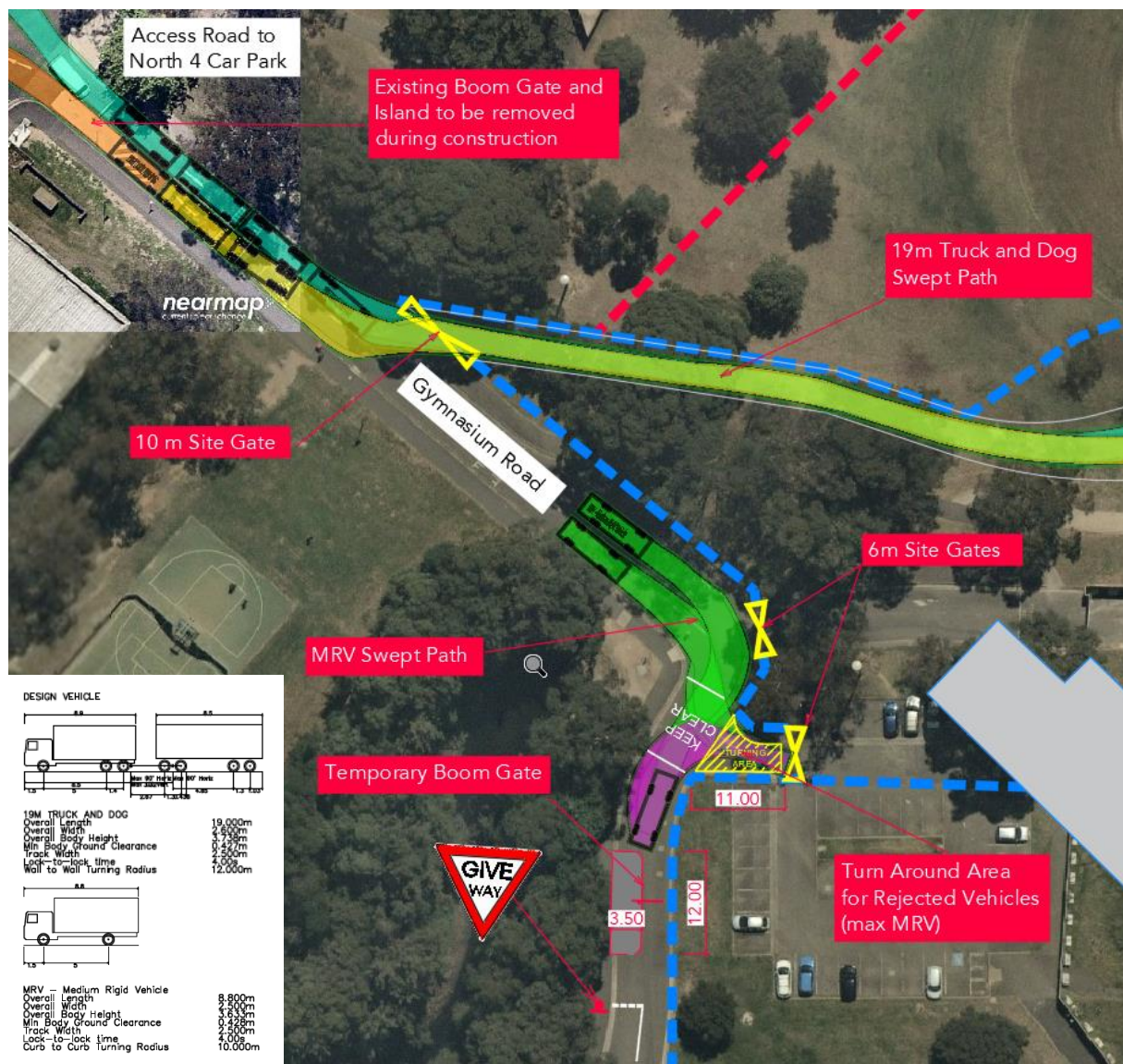


Figure 24 – Gymnasium Road (CTMP-004)

Access through the new boom gate will be for university staff vehicles accessing Building C7A Muse (18 Wallys Walk) only and access through the boom gate will be controlled by a swipe card.

5.9 Traffic Control Measures

The Traffic Control Plan (TCP) outlines the proposed traffic management to inform road users of the changed traffic conditions in the vicinity of the works site.

The TCPs have been set out in accordance with the RMS Traffic Control at Works Site.

Traffic controllers are not expected to be required for management of the traffic during the construction period, however, traffic signs will be erected to advise road users of the presence of construction vehicles and signage will be provided to advise road users of the alternative access to the West 3 and 5 Car Parks on Culloden Road.

Details of the proposed traffic management measures are shown in Figure 26, Figure 27, Figure 28, and Attachment 2.

Final Traffic Control Plans will be prepared by the traffic management contractor prior to commencement to works on site.

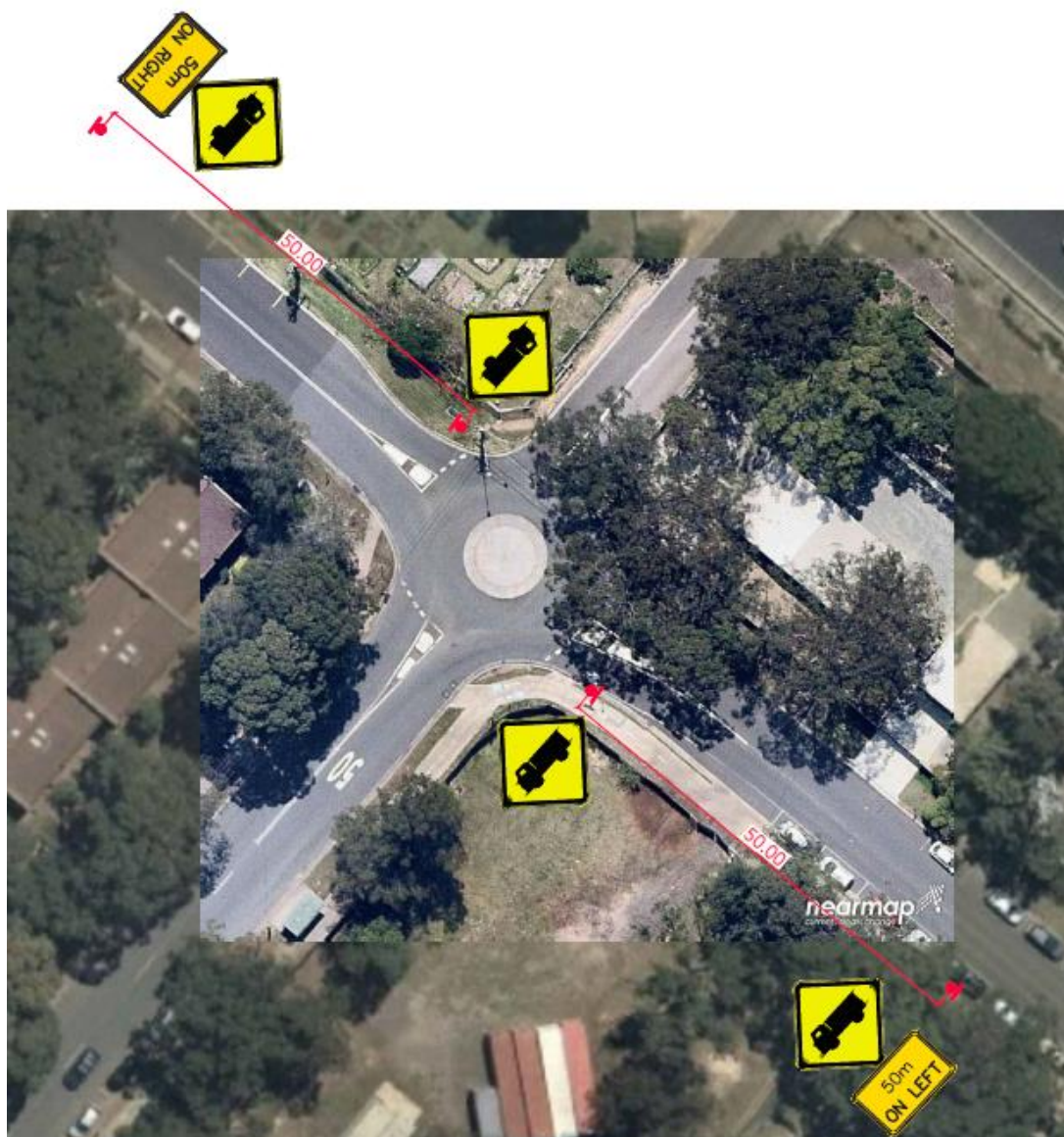


Figure 26 – Traffic Control Plan – Talavera Rd and Culloden Road (CTMP-006)



Figure 27 – Traffic Control Plan – Culloden Road and Gymnasium Road (CTMP-006)



Figure 28 – Traffic Control Plan – West 3 & 5 Car Park Access (CTMP-006)

5.10 Works Zone

No work zones are proposed as part of this development.

5.11 Pedestrian Management

Pedestrian access to and around the site is to be maintained at all times.

The entire site (and any remote work areas when applicable) will be physically separated from the University Campus via a combination of A-Class hoardings and temporary fencing as depicted on the Site Establishment Plan (Figure 17). The extents of fencing and hoarding will be modified during the works as required to suit the works occurring at each project stage.

As outlined in Section 4.4.2, pedestrian access is required from the car parks (off Gymnasium Road) and the accommodation precinct along Gymnasium Road to the main campus, via Wallys Walk.

To manage the pedestrians during the construction, process the following measures are to be put in place:

- Closure of the existing pedestrian crossing outside the aquatic centre.
- 1.8m high pedestrian containment fencing along the kerb lines on Gymnasium Road, with strategic gaps at pedestrian crossing points and vehicle gates for the emergency and service vehicle access points.
- The closure of the footway south east of the North 4 Staff Car Park and the diversion of pedestrians via the pedestrian crossing at the northern end of Gymnasium Road and the provision of a vehicle access gate to the car park.
- Provision of a temporary footpath (min width 1.2m) from the North 3 Car Park to Gymnasium Road.
- Signage to advise pedestrians of these changes.
- Speed reduction of Gymnasium Road to 20 km/h and signage to advise road users in conjunction with road narrow signs to further encourage speed reduction.

Details of the pedestrian management are shown in Figure 29 and Attachment 3.

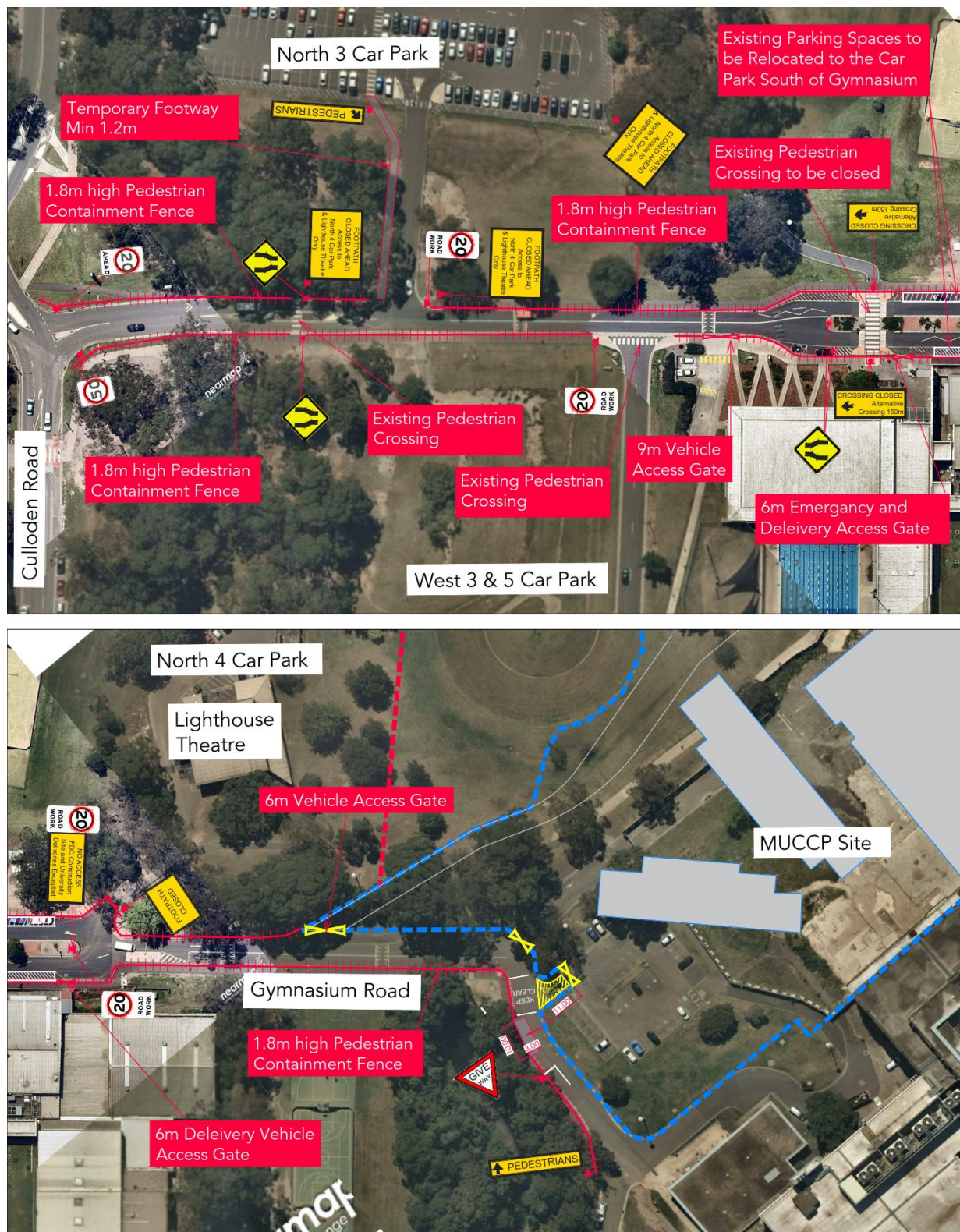


Figure 29 – Pedestrian Management (CTMP-007(2))

5.12 Cumulative Effect of Adjacent Developments

There are no major developments within 250m of the development site. However, the works will overlap with Metro works as outlined in Section 0, which results in closure of Macquarie University train Station until mid 2019. A temporary transport plan has been put in place, which provides replacement buses for these train services.

It is noted that a separate construction project within Macquarie University is being undertaken at the eastern corner of the site. However, the traffic movements and anticipated truck route of the development will be concentrated on Innovation Road, Waterloo Road, the eastern end of Herring Road, and ultimately onto the M2, which avoids, as far as practicable, the traffic movements of the subject site. It is anticipated, therefore, that there will be minimal cumulative impact on the road network.

It should also be noted, that sections of Herring Road are under construction as part of the 'Macquarie Park Bus Priority and Capacity Improvement Project', however these works are limited to the existing verge, turn lanes and central medians and should not affect the through traffic on Herring Road and therefore no effect on construction activity from the proposed development.

Construction traffic movements for the subject development are concentrated to the west of the site, accessible via Epping Road and Lane Cove Road (as discussed in Section 5.7), which avoiding further volume onto Herring Road.

5.13 Special Deliveries

Whilst not anticipated, any oversized vehicle that is required to travel to the site will be dealt with separately, with the submission of required permits to and subsequent approval by City of Ryde Council prior to any delivery. Requests shall be submitted 28 days prior to the scheduled date of use of an oversized vehicle.

5.14 Staff Parking

Macquarie University has confirmed to dedicate 50 car spaces within the campus for use of construction personnel for the duration of the project. Nevertheless, FDC will be discouraging travel to the project in private cars, or, if required, to car pool (wherever practicable).

The site is well serviced by public transport (refer to Section 4.3) and the contractor is to promote this aspect to all project participants, in particular subcontractor personnel. A shuttle service between Epping Station and the subject site shall be provided by FDC while the public train lines are out of operation. A public transport information pack is to be provided to all staff and contractors, advising them of the public transport options available.

5.15 Work Site Security

As discussed in Section 0, to provide security to the works site and protection to the general public, it is proposed that the entire site (and any remote work areas when applicable) will be physically separated from the University Campus via a combination of A-Class hoardings and temporary fencing as depicted on the Site Establishment Plan. The extents of fencing and hoarding will be modified during the works as required to suit the works occurring at each project stage.

Prior to commencement of works FDC will facilitate a Safety Workshop where The University and their stakeholders shall be invited to identify site specific safety and security initiatives.

All access points are to be securely locked when construction activities are not in progress. The exact location of this fence is to be agreed on site, prior to commencement of the works.

5.16 Staff Induction

All staff and subcontractors engaged on site will be required to undergo a site induction. The induction will include permitted access routes to and from the construction site for all vehicles, as well as standard environmental, OH&S, driver protocols and emergency procedures. Additionally, the lead contractor will discuss TMP requirements regularly as a part of toolbox talks and advise workers of public transport and car-pooling opportunities.

5.17 Emergency Vehicle Access

The proposed traffic control arrangements do not propose closure of any local roads. Any emergency vehicles requiring access to the project site will do so via the existing site access along Gymnasium Road.

5.18 Access to Adjoining Properties

Access to all adjoining properties will be maintained throughout the works.

5.19 Occupational Health and Safety

Any workers required to undertake works or traffic control within the public domain shall be suitably trained and will be covered by adequate and appropriate insurances. All traffic control personnel will be required to hold RMS accreditation in accordance with Section 8 of Traffic Control at Worksites.

5.20 Method of Communicating Traffic Changes

Traffic control plans in accordance with Australian Standards (AS 1742.3 – Traffic Control Devices for Works on Roads) and RMS Traffic Control at Worksites manual will advise motorists of upcoming changes in the road network.

During construction the contractor shall each morning, prior to work commencing, ensure all signage is erected in accordance with the TCP and clearly visible. Each evening, upon completion of work, the contractor is to ensure signage is either covered or removed as required. Sign size is to be size "A".

No deviation from the approved TCP shall be permitted, unless otherwise approved by Council and certified by an RMS accredited personnel.

The associated TCP road signage will inform drivers of works activities in the area including truck movements in operation.

Prior to commencement of works on site the contractor is to inform neighbouring properties of proposed works and provide site contact information by means of a letter box distribution.

5.21 Driver Code of Conduct

All heavy vehicle drivers are required to follow the ingress and egress routes in a "forward in, forward out" manner as specified in Section 5.8, whilst adhering to all road rules and regulations. This is essential to minimise the impacts of earthworks and construction on the local and regional road network. Should there be a Traffic Control Plan (TCP) required to manage construction activity, all construction vehicles entering or exiting from the site shall operate under the direction of an RMS accredited traffic controller at all times; this

will also minimise conflicts with other road users. Furthermore, construction traffic activity shall only occur within the permitted hours of work (see Section 5.2) to minimise road traffic noise.

This code of conduct will be advised to all drivers engaged on site at the staff induction, where all demolition and construction vehicles (excluding worker vehicles) are to be contained wholly within the site and must enter the site completely before stopping.

A Driver Code of Conduct leaflet has been prepared as part of this CTPMSP for distribution to truck drivers and operators. The Driver Code of Conduct is part of this document as Attachment 4.

5.22 Contact Details for On-Site Enquiries and Site Access

The principal contractor is FDC Construction & Fitout and all on-site enquiries can be addressed to Anthony Hurst (Site Manager) on 0417 481 154.

5.23 Maintenance of Roads and Footpaths

The roads and footpaths along the route of travel will be kept in a serviceable state at all times. Any damage arising as a result of the proposed truck movements will be treated / repaired by the principal contractor at no cost to Council.

5.24 Road Occupancy License (ROL)

All vehicle routes and access arrangements maintains a forward manoeuvre in and out of the site. Construction activities are to be contained wholly within the site, no queuing or marshalling of trucks is allowed on public roads, and no local or RMS roads are proposed to be occupied at any time. In this regard, Road Occupancy Licenses (ROLs) are not necessary. Should there be any special arrangements otherwise; ROLs shall be obtained by the principal contractor from the relevant road authority prior to any commencement of such works.

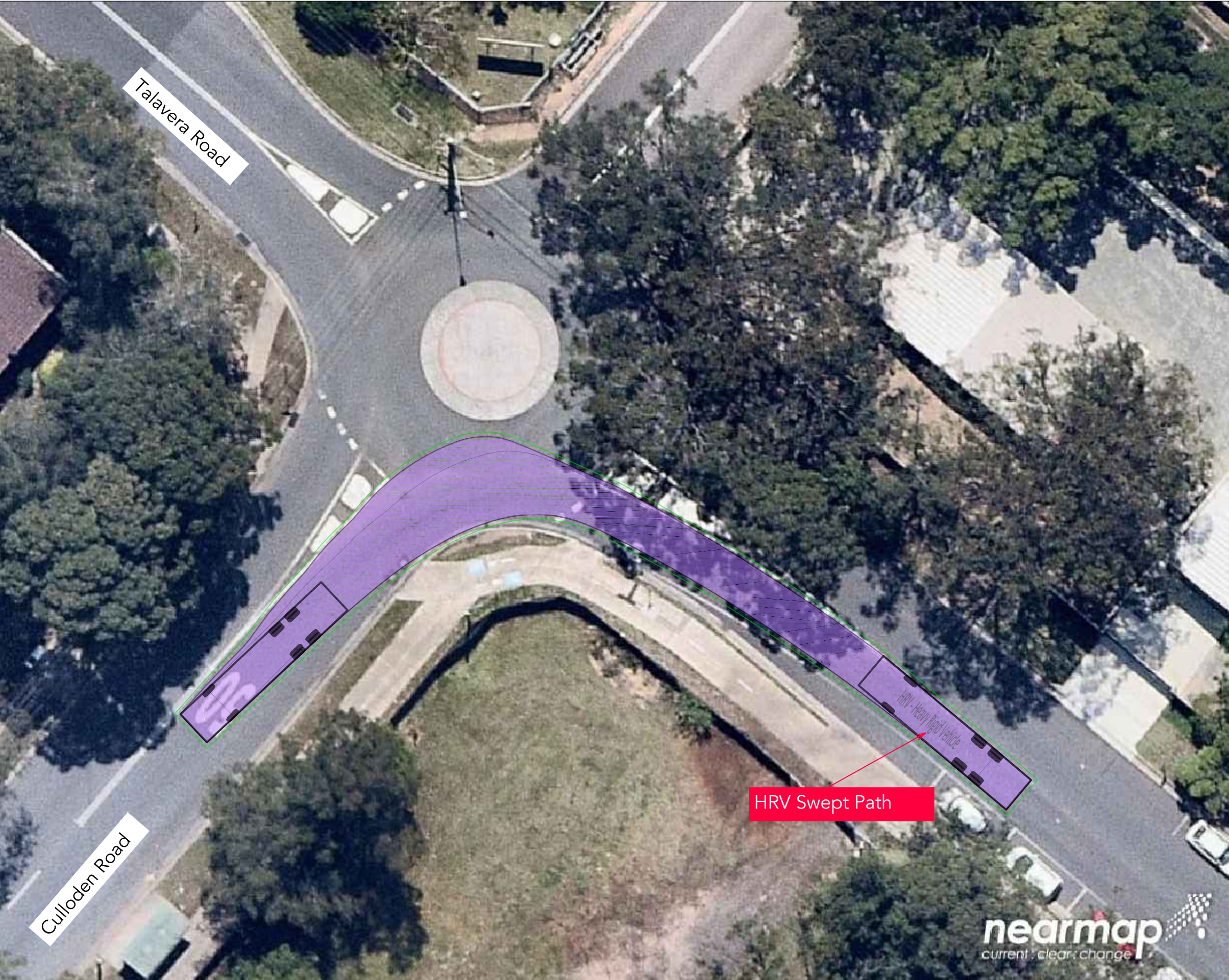
6. Summary

This CTPMSP has been prepared to outline the construction traffic measures to improve site safety to the public and workers and the construction process.

With the measures described in the CTPMSP in place, the construction activity is anticipated to have minimal disruption to the daily activities within the vicinity of the site.

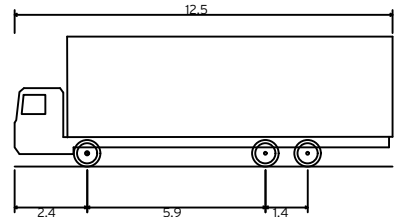
It is envisaged that this document will be continually reviewed and amended if required, due to changes in design, RMS, Councils or any other authority requirements.

Attachment 1 Swept Path Analysis



SITE NOTES:
S1. Maintain pedestrian access along formed pathway around the site.
S2. Work site to be fenced to prevent unauthorised access.

GENERAL NOTES:
G1. All signed to be clearly visible throughout the works and monitored. Signs can be mounted if required on posts to be visible above parked cars. Signs to be coordinated on site to ensure they are clearly visible.
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G4. Signs to be in accordance with RMS Traffic Control at Worksites (TCAWS) Manual and AS1742.3 Traffic Control for Works on roads.
G5. RMS/Council approvals to be obtained prior to implementation.
G6. This TCP is based on TCAWS Manual and is to be set up by qualified traffic controllers (Yellow card). Any alterations on site to this TCP is to be documented and rerecorded by qualified personnel with a Red/Orange card.



HRV - Heavy Rigid Vehicle	
Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

The turning paths illustrated in this drawing have been prepared using the Autotrack vehicle modelling software in conjunction with AutoCAD. The vehicle model was prepared by Analytico Pty Ltd based upon vehicle data provided by Austroads. While this modelling represents a conservative assessment of the vehicles ability, it is not possible to account for all vehicle types/characteristics or driver ability.

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REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
7	-	-	-	-					
6	-	-	-	-					
5	08/04/19	Revised Final Report	SW	AM					
4	05/04/19	Revised Final Report	SW	AM					
3	05/04/19	Final Report	SW	AM	10	16/05/19	Revised	DS	SW
2	03/04/19	Revised Swept Paths	SW	AM	9	30/04/19	Revised	DS	SW
1	28/03/19	Swept Paths	SW	AM	8	18/04/19	Revised Final Report	DS	



PROJECT:
Macquarie University
Central Courtyard Precint

DRAWING TITLE:
Construction Vehicle Swept Paths
Heavy Rigid Vehicle Access
Talavera Road & Culloden Road

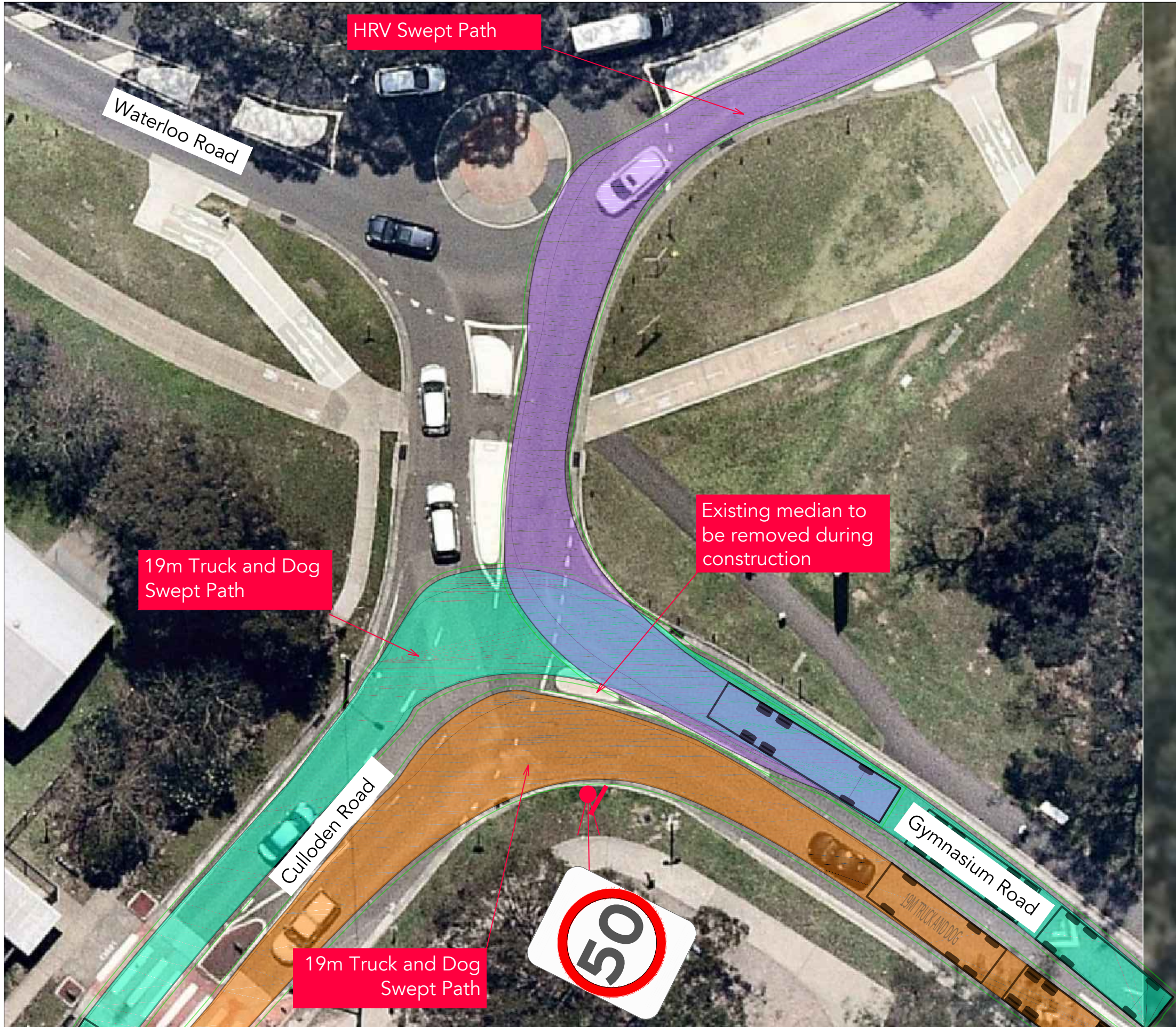
CLIENT: FDC Construction & Fitout

DRG. #: CTMP-001

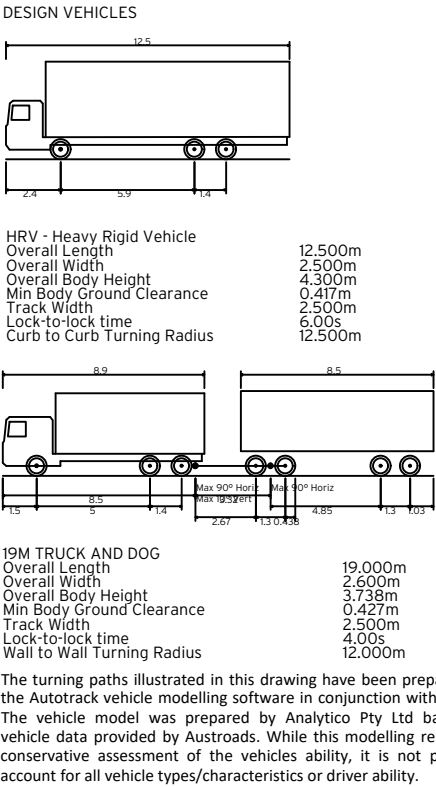
PROJECT #: 2592

SCALE: 1:250

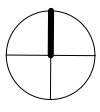
REV: 10



- SITE NOTES:**
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 - S2. Work site to be fenced to prevent unauthorised access.
- GENERAL NOTES:**
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REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
7	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-
5	08/04/19	Revised Final Report	SW	AM	-	-	-	-	-
4	05/04/19	Revised Final Report	SW	AM	-	-	-	-	-
3	05/04/19	Final Report	SW	AM	10	16/05/19	Revised	DS	SW
2	03/04/19	Revised Swept Paths	SW	AM	9	30/04/19	Revised	DS	SW
1	28/03/19	Swept Paths	SW	AM	8	18/04/19	Revised Final Report	DS	-



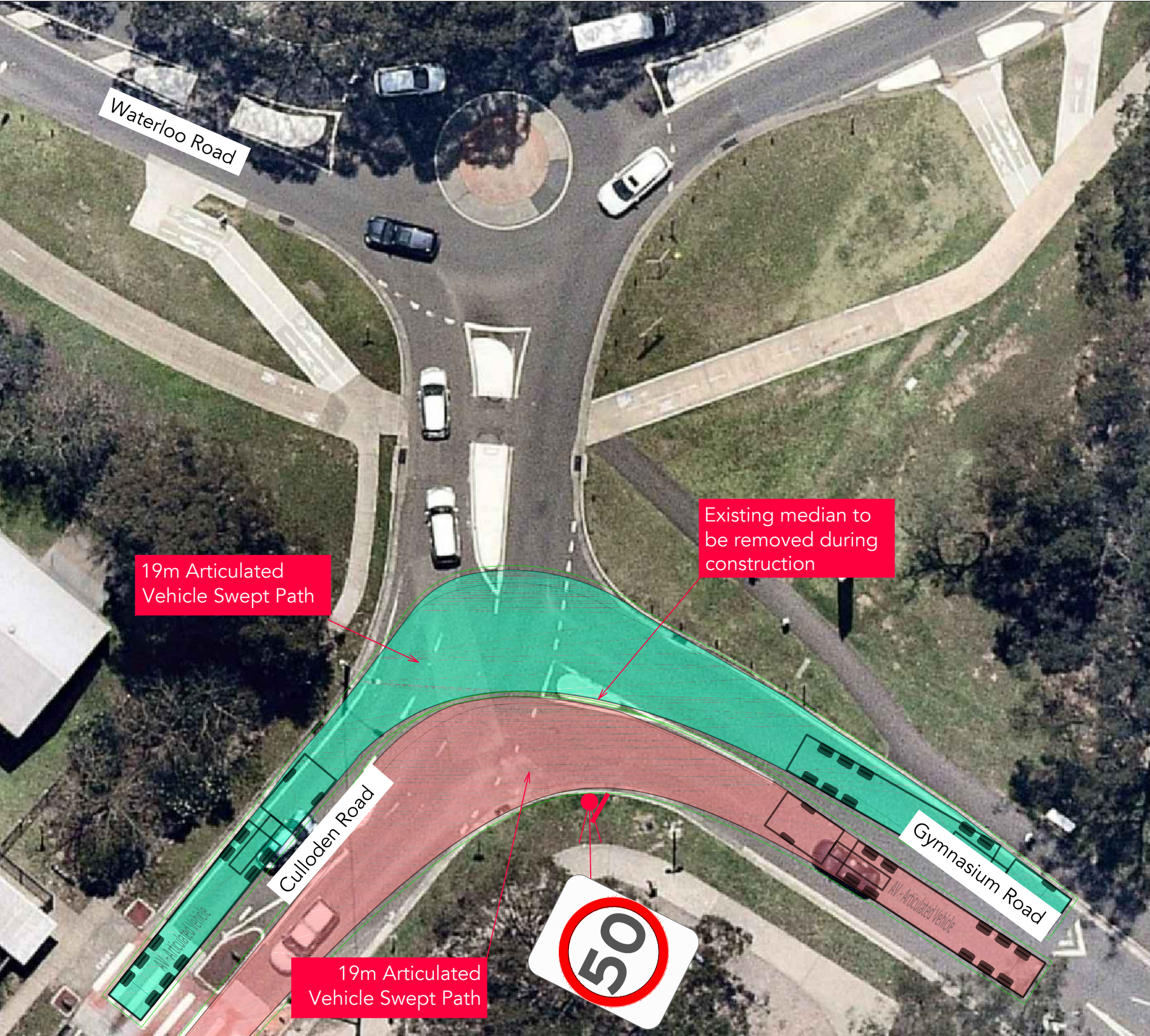
PROJECT:
Macquarie University
Central Courtyard Precinct

DRAWING TITLE:
Construction Vehicle Swept Paths
19m Truck & Dog

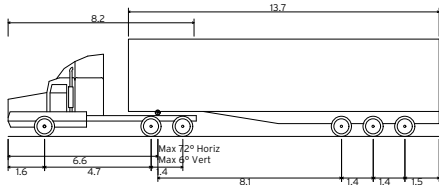
Culloden Rd/Waterloo Rd/Gymnasium Rd

CLIENT: FDC Construction & Fitout
DRG. #: CTMP-002
PROJECT #: 2592
SCALE: 1:250

REV: 10



- SITE NOTES:**
- S1. Maintain pedestrian access along formed pathway around the site.
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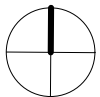
AV - Articulated Vehicle
Overall Length 19.000m
Overall Width 2.500m
Overall Body Height 4.301m
Min Body Ground Clearance 0.418m
Track Width 2.500m
Lock-to-lock time 6.00s
Curb to Curb Turning Radius 12.500m

The turning paths illustrated in this drawing have been prepared using the Autotrack vehicle modelling software in conjunction with AutoCAD. The vehicle model was prepared by Analytico Pty Ltd based upon vehicle data provided by Austroads. While this modelling represents a conservative assessment of the vehicles ability, it is not possible to account for all vehicle types/characteristics or driver ability.

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REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
7	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-
3	-	-	-	-	10	16/05/19	Revised	DS	SW
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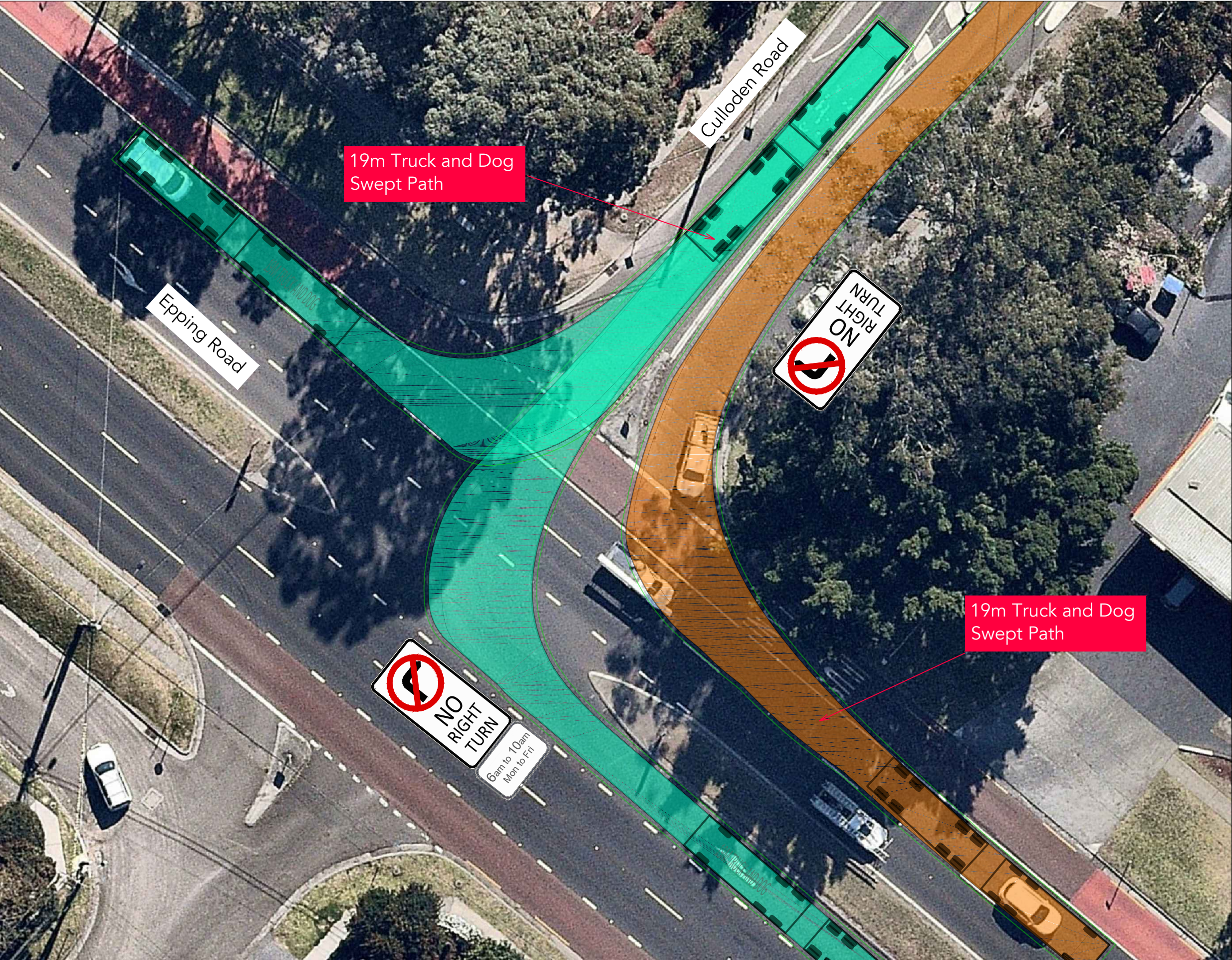
PROJECT:
Macquarie University
Central Courtyard Precint

DRAWING TITLE:
Construction Vehicle Swept Paths
19m Truck & Dog

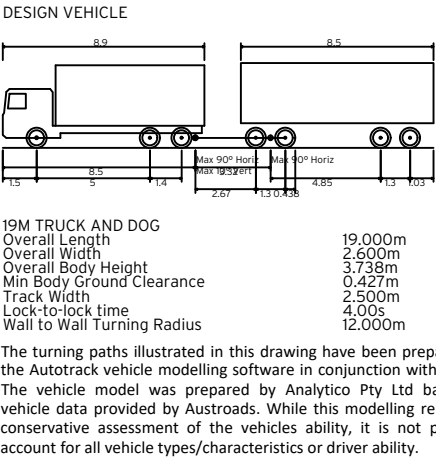
Culloden Rd/Waterloo Rd/Gymnasium Rd

CLIENT: FDC Construction & Fitout
DRG. #: CTMP-002.1
PROJECT #: 2592
SCALE: 1:250

REV: 10



- SITE NOTES:**
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- GENERAL NOTES:**
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7	-	-	-	-					
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4	05/04/19	Revised Final Report	SW	AM					
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2	03/04/19	Revised Swept Paths	SW	AM	9	30/04/19	Revised	DS	SW
1	28/03/19	Swept Paths	SW	AM	8	18/04/19	Revised Final Report	DS	



PROJECT:
Macquarie University
Central Courtyard Precinct

DRAWING TITLE:
Construction Vehicle Swept Paths
19m Truck & Dog
Epping Road and Culloden Road

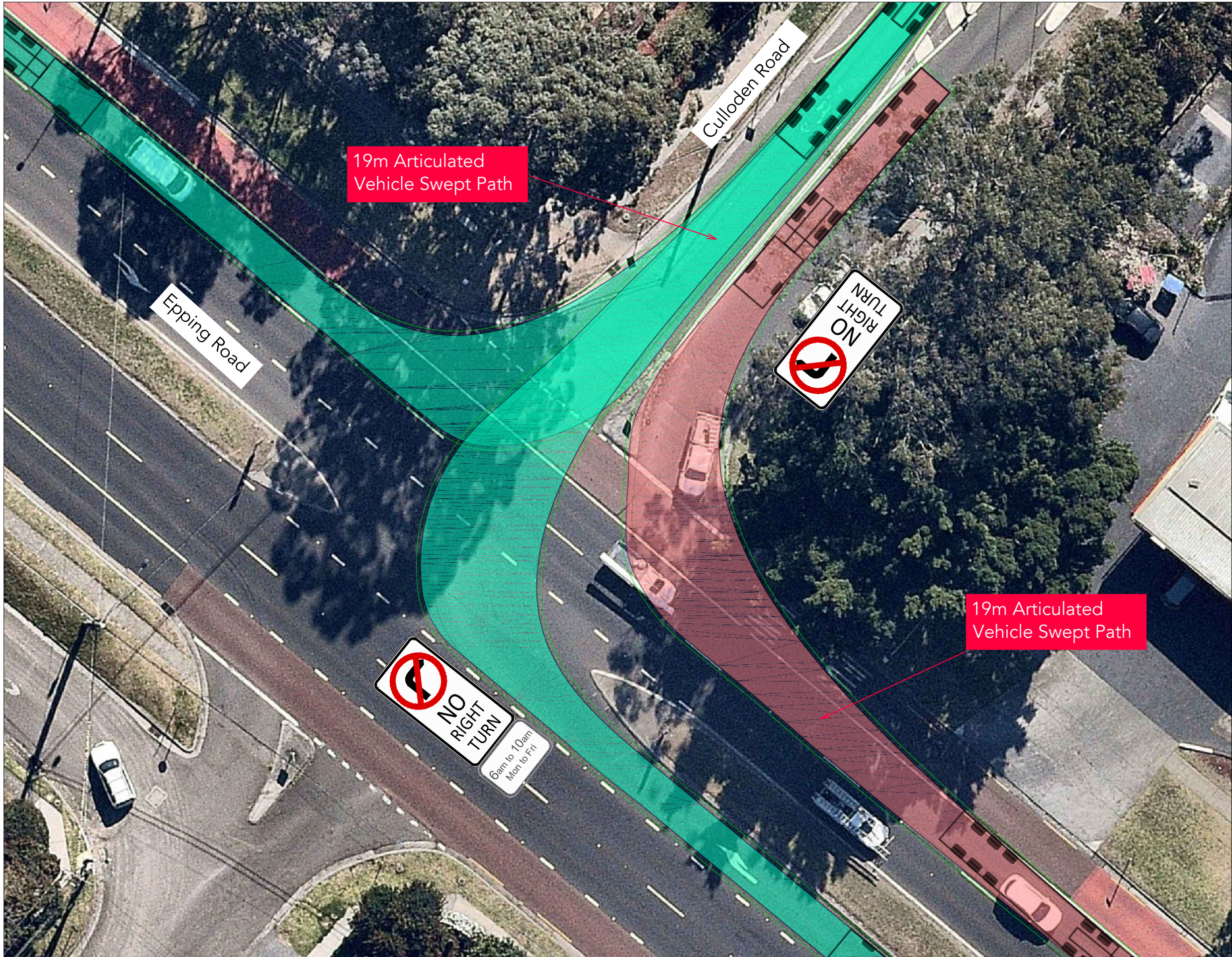
CLIENT: FDC Construction & Fitout

DRG. #: CTMP-003

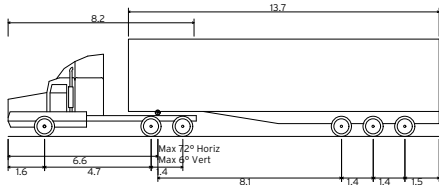
PROJECT #: 2592

SCALE: 1:250

REV: 10



- SITE NOTES:**
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AV - Articulated Vehicle
Overall Length 19.000m
Overall Width 2.500m
Overall Body Height 4.301m
Min Body Ground Clearance 0.418m
Track Width 2.500m
Lock-to-lock time 6.00s
Curb to Curb Turning Radius 12.500m

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6	-	-	-	-					
5	-	-	-	-					
4	-	-	-	-					
3	-	-	-	-	10	16/05/19	Revised	DS	SW
2	-	-	-	-	9	-	-	-	-
1	-	-	-	-	8	-	-	-	-



PROJECT:
Macquarie University
Central Courtyard Precint

DRAWING TITLE:
Construction Vehicle Swept Paths
19m Truck & Dog
Epping Road and Culloden Road

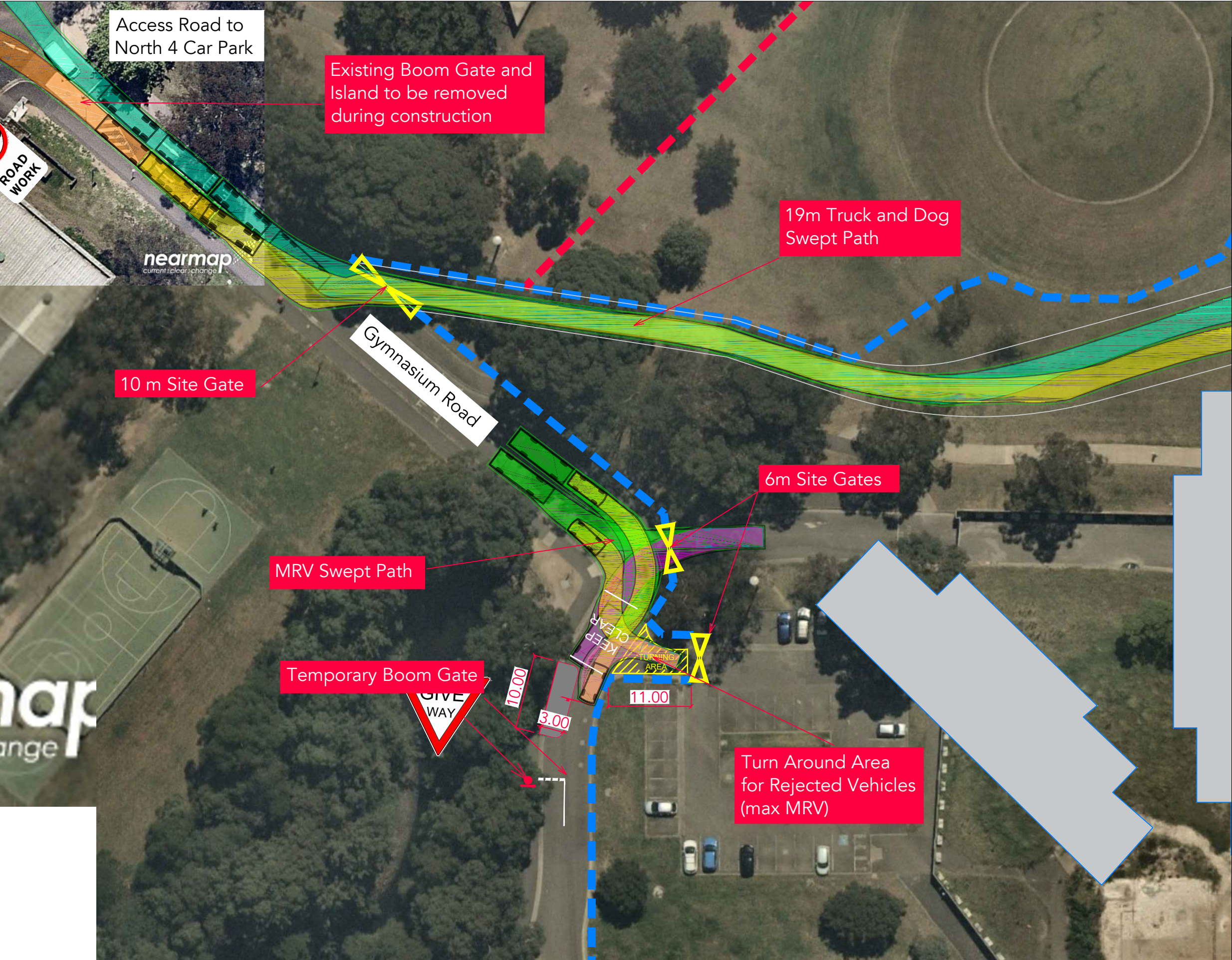
CLIENT: FDC Construction & Fitout

DRG. #: CTMP-003

PROJECT #: 2592

SCALE: 1:250

REV: 10



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DESIGN VEHICLE

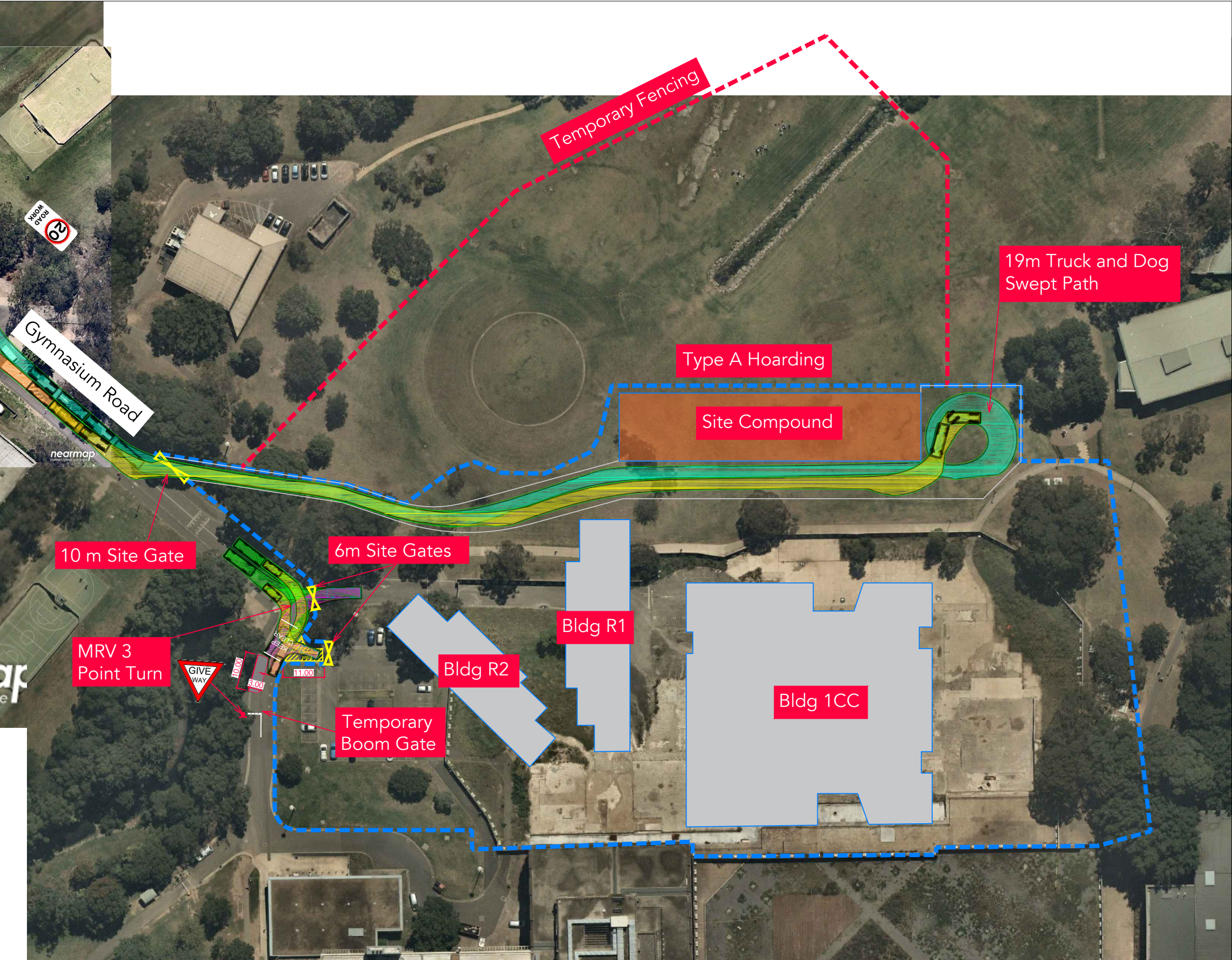
MRV - Medium Rigid Vehicle

Overall Length	8.800m
Overall Width	2.500m
Overall Body Height	3.633m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	10.000m

19M TRUCK AND DOG

Overall Length	19.000m
Overall Width	2.600m
Overall Body Height	3.738m
Min Body Ground Clearance	0.427m
Track Width	2.500m
Lock-to-lock time	4.00s
Wall to Wall Turning Radius	12.000m

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DESIGN VEHICLE

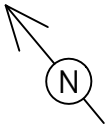
19M TRUCK AND DOG

Overall Length	19.000m
Overall Width	2.600m
Overall Body Height	3.738m
Min Body Ground Clearance	0.427m
Track Width	2.500m
Lock-to-lock time	4.00s
Wall to Wall Turning Radius	12.000m

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Attachment 2 Traffic Control Plans

Key Plan
not to scale



Culloden Road / Gymnasium Road
Scale 1:1250



SITE NOTES:

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Talavera Road /
Culloden Road

Culloden Road /
Gymnasium Road

West 3 & 5
Car Park Access

Talavera Road / Culloden Road
Scale 1:1000



West 3 & 5 Car Park Access
Scale 1:1000



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REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
7	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-
5	08/04/19	Revised Final Report	SW	AM	-	-	-	-	-
4	05/04/19	Revised Final Report	SW	AM	-	-	-	-	-
3	05/04/19	Final Report	SW	AM	10	16/05/19	Revised	DS	SW
2	03/04/19	Revised Swept Paths	SW	AM	9	30/04/19	Revised	DS	SW
1	19/03/19	Concept Swept Paths	SW	AM	8	18/04/19	Revised Final Report	DS	SW



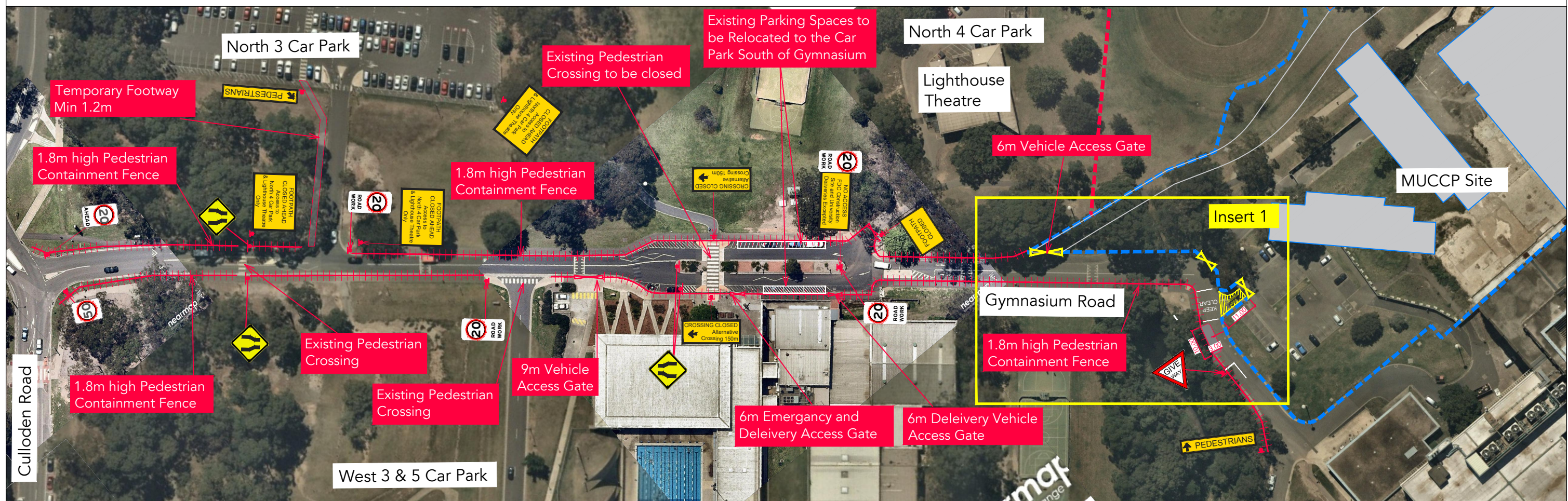
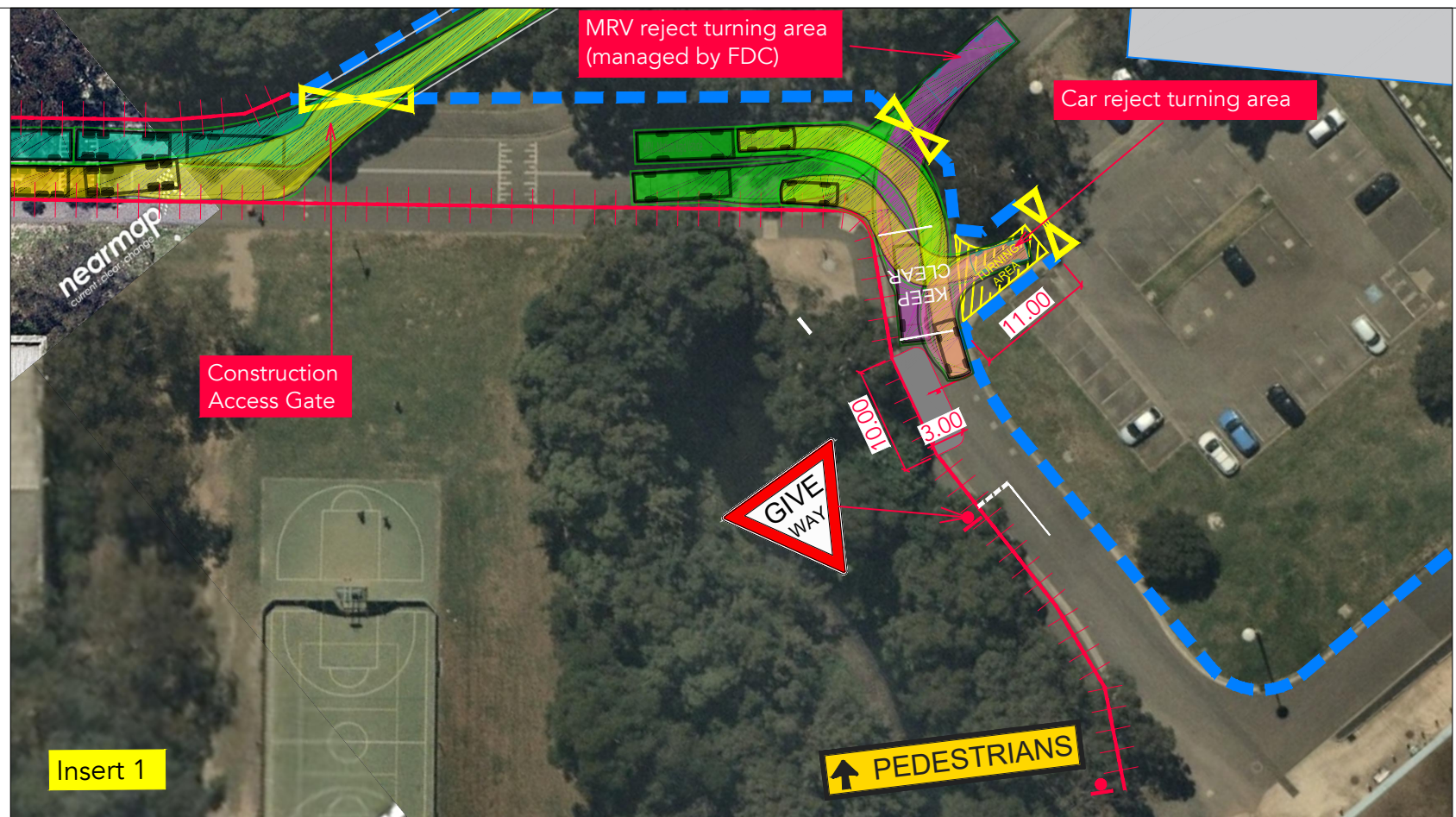
PROJECT:
Macquarie University
Central Courtyard Precinct

DRAWING TITLE:
Construction Vehicle Swept Paths
Traffic control Plans

CLIENT: FDC Construction & Fitout
DRG. #: CTMP-006
PROJECT #: 2592
SCALE: as shown

REV: 10

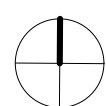
Attachment 3 Pedestrian Management



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ptcconsultants.co

REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
7	11/04/19	Updated layout	SW	AM					
6	08/04/19	Revised Final Report	SW	AM					
5	08/04/19	Revised Final Report	SW	AM					
4	05/04/19	Revised Final Report	SW	AM					
3		Not Used			10	16/05/19	Revised	DS	SW
2		Not Used			9	30/04/19	Revised	DS	SW
1		Not Used			8	17/04/19	Updated layout	DS	



PROJECT:
Macquarie University
Central Courtyard Precinct

DRAWING TITLE:
Construction Vehicle Swept Paths
Pedestrian Management - Overall Plan

CLIENT: FDC Construction & Fitout
DRG. #: CTMP-007 (2)
PROJECT #: 2592
SCALE: 1:1250/600

REV: 10

Attachment 4 Driver Code of Conduct Leaflet

Safety Initiatives

The construction site is within the Macquarie University Campus, where heavy pedestrian activity is anticipated. As such, care is to be taken around the vicinity of the site, keeping an eye on pedestrians.

Hours of Work

All work associated with the project will be restricted to the permitted working hours as defined in the CTPMSP:

Monday to Friday	7:00am to 7:00pm
Saturdays	8:00am to 4.00pm

Emergency Contact Numbers

RMS Transport Management Centre
131 700

Ryde City Council
9952 8222

FDC Site Manager (Anthony Hurst)
0417 481 154

FDC Construction & Fitout Sydney
02 8117 5000

NSW Ryde Police Station
02 9808 7401

All other Emergencies
000



Macquarie University Central Courtyard Precinct Construction Traffic and Pedestrian Management Sub Plan



Driver Code of Conduct

This Driver Code of Conduct applies to all personnel and any other person conducting business for the Macquarie University Central Courtyard Precinct, whether a direct employee of FDC Fitout and Construction or employed by some other organisation providing service or working with FDC.

General Requirements

- As a driver, you are required to know and comply with all the road rules pertaining to your vehicle;
- You are expected to hold a valid driver's license for the class of the vehicle you are operating;
- Undertake a site induction carried out by an approved member of the construction staff or suitably qualified person;
- Participate in regular toolbox meetings with appropriate and qualified person; and
- You are to operate the vehicle in a safe manner within and outside the construction site and comply with the direction of authorised site personnel while inside the site.

Truck Routes

Heavy vehicle drivers are to carefully plan their routes so that state and regional roads are given priority for route selection, keeping in mind the certain restrictions of during particular times of the day (i.e. No Right Turn from 7am to 10am, etc.) Local roads should only be used in an emergency situation.



Other Considerations

- Speed Limits – All heavy vehicle drivers are to observe the posted speed limits, within or outside of the construction site. Keep in mind that there are changes in traffic conditions and altered speed limits are posted on approach to the site;
- Driver Fatigue – Driver fatigue is a road safety hazard and one of the biggest causes of accidents especially for heavy vehicle drivers. All drivers have a duty to not drive a vehicle while impaired by fatigue.
- Covering Loads – RMS requires all loads covers to secure and contain all materials within the vehicle and trailer;
- Heavy Vehicle Interval – to increase road safety, heavy vehicles leaving the construction site should be separated, as far as practicable, a minimum of a 10-minute interval;
- Vehicle Breakdowns – in the case of a breakdown, the vehicle must be towed to the nearest breakdown point as soon as possible and reported to the RMS Transport Management Centre (131 700).

4.2 Construction Noise and Vibration Management Plan

CENTRAL COURTYARD MACQUARIE UNIVERSITY

CONSTRUCTION NOISE & VIBRATION MANAGEMENT PLAN

REPORT NO. 19160
VERSION E

MAY 2020

PREPARED FOR

FDC CONSTRUCTION (NSW) PTY LTD
22-24 JUNCTION STREET
FOREST LODGE NSW 2037

DOCUMENT CONTROL

Version	Status	Date	Prepared By	Reviewed By
A	Draft	2 May 2019	Jeff Robinson	Neil Gross
B	Draft	8 May 2019	Jeff Robinson	Neil Gross
C	Final	14 May 2019	Jeff Robinson	Neil Gross
D	6-month update	17 December 2019	Neil Gross	-
E	6-month update	11 May 2020	Neil Gross	-

Note

All materials specified by Wilkinson Murray Pty Limited have been selected solely on the basis of acoustic performance. Any other properties of these materials, such as fire rating, chemical properties etc. should be checked with the suppliers or other specialised bodies for fitness for a given purpose. The information contained in this document produced by Wilkinson Murray is solely for the use of the client identified on the front page of this report. Our client becomes the owner of this document upon full payment of our **Tax Invoice** for its provision. This document must not be used for any purposes other than those of the document's owner. Wilkinson Murray undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.

Quality Assurance

Wilkinson Murray operates a Quality Management System which complies with the requirements of AS/NZS ISO 9001:2015. This management system has been externally certified by SAI Global and Licence No. QEC 13457 has been issued.



AAAC

This firm is a member firm of the Association of Australasian Acoustical Consultants and the work here reported has been carried out in accordance with the terms of that membership.



Celebrating 50 Years in 2012

Wilkinson Murray is an independent firm established in 1962, originally as Carr & Wilkinson. In 1976 Barry Murray joined founding partner Roger Wilkinson and the firm adopted the name which remains today. From a successful operation in Australia, Wilkinson Murray expanded its reach into Asia by opening a Hong Kong office early in 2006. Today, with offices in Sydney, Newcastle, Wollongong, Orange, Queensland and Hong Kong, Wilkinson Murray services the entire Asia-Pacific region.



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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

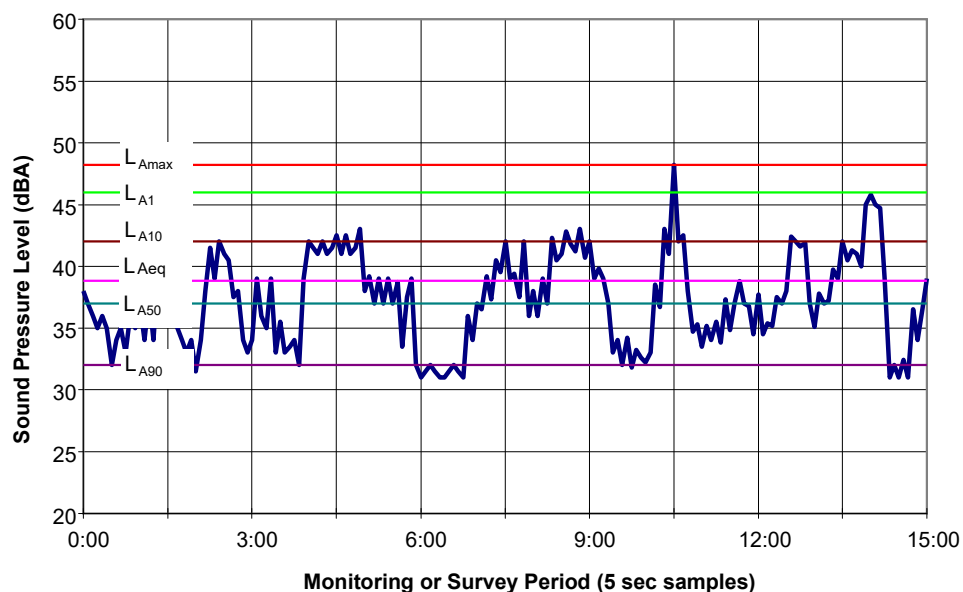
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

Wilkinson Murray Pty Limited (WMPL) has been commissioned by FDC Constructions to assess the potential for noise and vibration impacts and develop a Construction Noise & Vibration Management Plan (CNVMP) for the excavation and construction works associated with the 1 Central Courtyard project at Macquarie University. This plan is required to be updated on a six-monthly basis.

The assessment of noise and vibration from works at the site has been conducted to address condition B19 of the NSW Government Department of Planning and Environment (DP&E) conditions of development consent (ref: SSD 8755) which states the following regarding noise and vibration emissions from works.

B.19 *The Construction Noise and Vibration Management Sub-Plan must address, but not be limited to, the following:*

- (a) be prepared by a suitably qualified and experienced noise expert;*
- (b) describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009);*
- (c) describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;*
- (d) include strategies that have been developed with the community for managing high noise generating works;*
- (e) describe the community consultation undertaken to develop the strategies in condition B19(d); and*
- (f) include a complaints management system that would be implemented for the duration of the construction.*

Specific objectives of this CNVMP include:

- Identifying sensitive receivers to ensure appropriate environmental controls and procedures are implemented during construction activities;
- Implementation of "*feasible*" and "*reasonable*" noise mitigation measures with the aim of achieving the construction noise management levels detailed in the *Interim Construction Noise Guideline* (DECC, 2009); and
- Minimise complaints from the community and stakeholders and when complaints are made, they are dealt with promptly.

Reference has been made to the *Bulk Excavation Site Plan* for the project prepared by Architectus Sydney, dated 9 July 2018 (ref: 140423.00).

2 SITE DESCRIPTION & PROPOSED WORKS

2.1 Proposed Construction Works

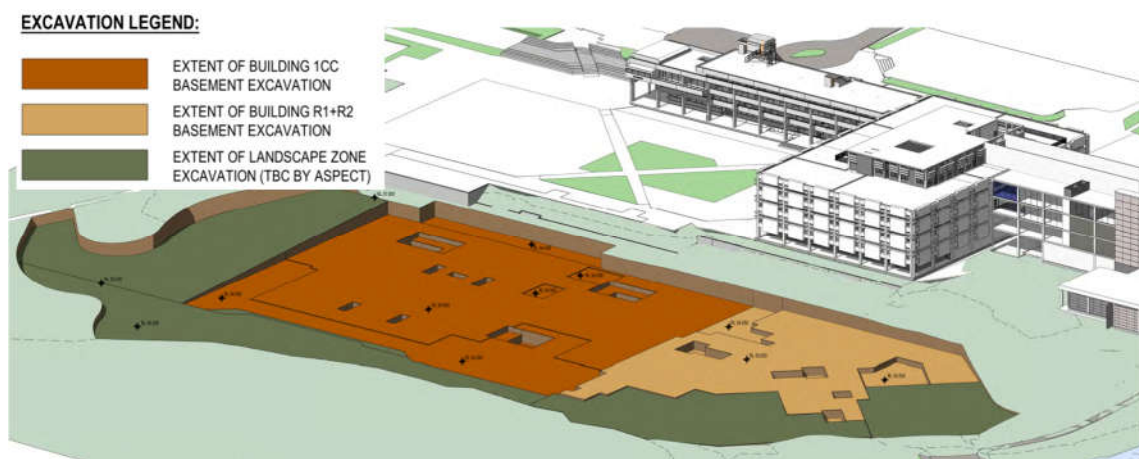
Consent has been issued for the redevelopment of the Macquarie University's Central Courtyard Precinct. The development includes the construction of three buildings to the north of the existing Central Courtyard.

The buildings include the *Central Courtyard Learning and Teaching Centre* (building 1CC) and two student accommodation buildings (Building R1 and R2).

Works at the site will include:

- Demolition works to remove existing concrete slab / car park; **(completed)**
- Bulk excavation of the earth across the whole site to a depth of up to 5m below current ground level; **(completed)**
- Detailed excavation (see Figure 2-1 below) to accommodate lift shafts / structural foundations, drainage / services etc; **(completed)**

Figure 2-1 Excavation Plan



- Construction of a 5-level building (building 1CC) to contain 25 formal teaching spaces, informal learning areas and a graduation hall in addition to a dual-tower student accommodation building (Buildings R1 and R2) to accommodate 345 beds;
- Interior fit-out works.

The bulk of the excavation works are to occur in the centre of the site as indicated in Figure 2-3 and Figure 2-1 with a maximum excavation depth of approximately 5m along the southern edge of the site adjacent to the Central Courtyard. Lighter excavation is proposed to be conducted at the northern end of the site adjacent to the E11A building.

Excavation is expected to be conducted with the following heavy earthwork equipment:

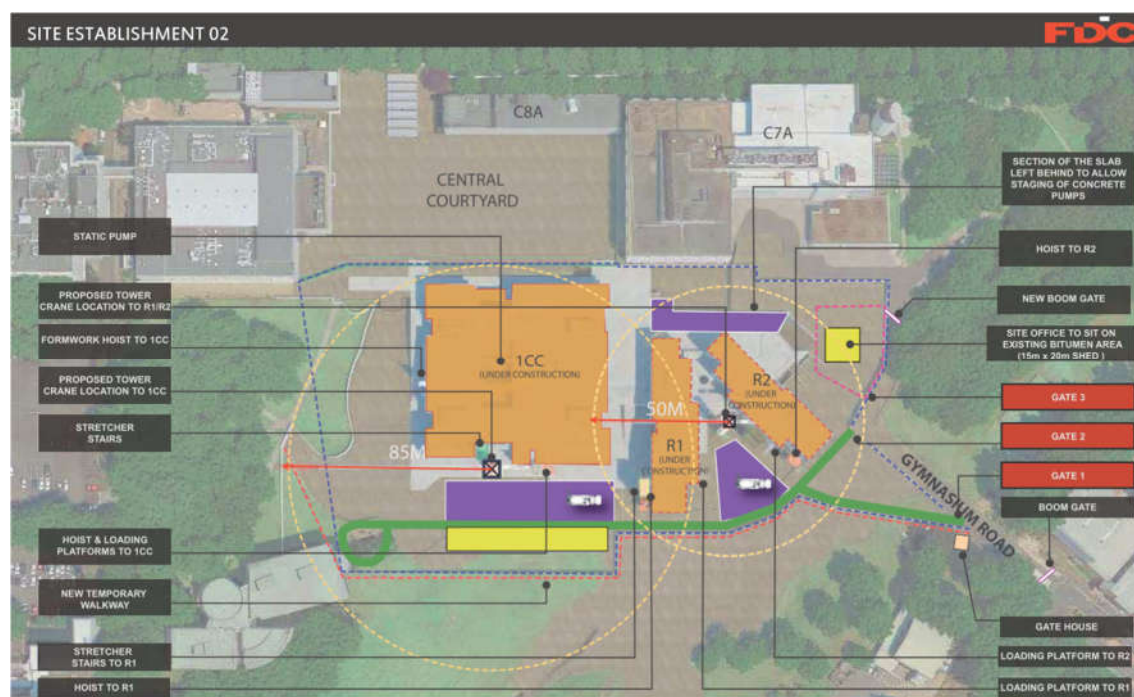
- 2 Piling Rigs (for shoring works along east and south site perimeter and for all building foundation piles);

- 1 excavator with hydraulic hammer attachment for demolition of existing concrete slab across the site.
- 4 excavators with bucket attachments (no hydraulic hammers expected to be required other than for demolition of existing concrete pavement) to operate across the site during bulk excavation works;
- Up to 20 trucks per day for removal of excavated material. Trucks to enter/exit site from Gymnasium Road to the north-west of the site.

Remaining activities during detailed excavation, groundworks and construction are expected to be conducted with the following:

- Concrete trucks and pumps to operate predominantly along the northern boundary of the site via site access routes;
- Delivery Trucks. Trucks to enter/exit site from Gymnasium Road to the north-west of the site;
- 2 electric tower cranes located centrally on the site in the locations shown below with 50m and 85m spans respectively;

Figure 2-2 Site Establishment Plan

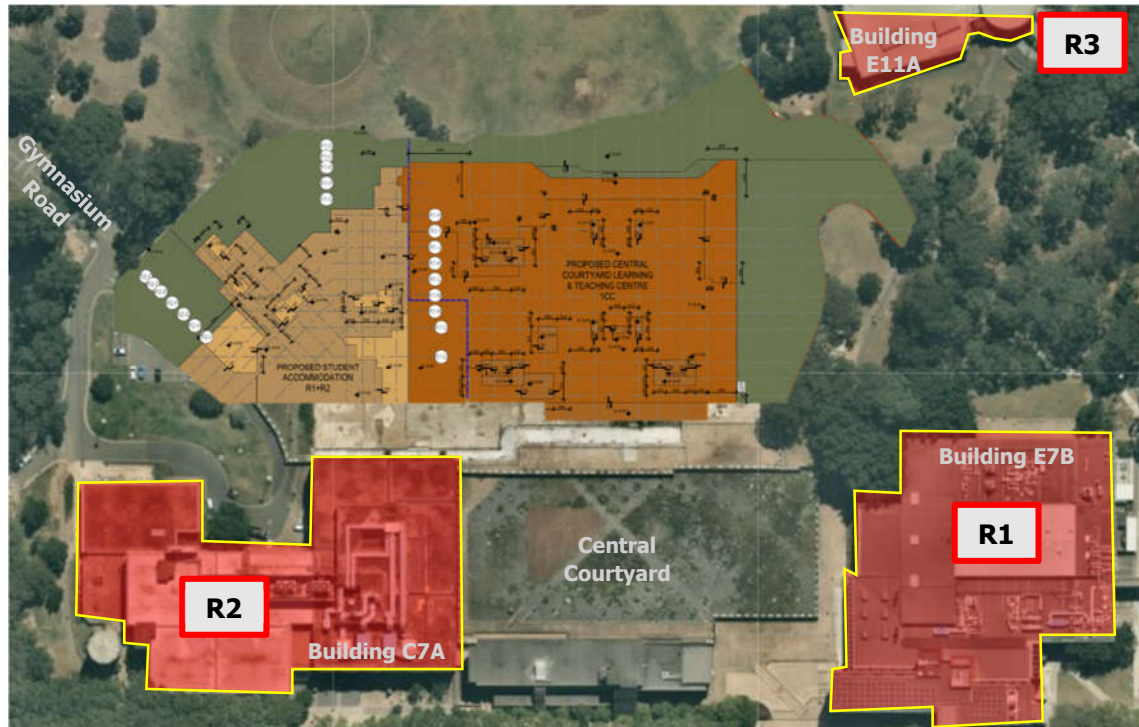


We note the proposed Class A (typically 2.7m in height) hoarding surrounding the site will provide an effective barrier to the lower levels of the nearest receivers. The hoarding will be particularly effective for the 2-story E11A Chancellery building. However, the hoarding will have less effect for higher buildings overlooking the site.

2.2 Project Site & Nearby Receivers

The site is located along the northern edge of the existing Macquarie University Central Courtyard at the western end of Gymnasium Drive as shown below.

Figure 2-3 Site Location & Surrounding Buildings



The nearest noise and vibration sensitive buildings in the vicinity of the demolition, excavation and construction works are associated with the university including the following:

- Receiver 1 (R1) – Building E7B – located approximately 36m to the southeast of the construction site boundary;
- Receiver 2 (R2) – Building C7A (Muse Building) located directly adjacent to the south boundary of the site and approximately 22m from the excavation / shoring line. We note demolition of the existing concrete slab will occur right up to the boundary of the C7A building, and;
- Receiver 3 (R3) – Building E11A (The Chancellery) located approximately 13m to the north-east of the site boundary.

We note the nearest development that is not related to the university is the Macquarie North Ryde Travelodge Hotel located approximately 250m to the east along Talavera Road. It would be expected that if noise levels to the nearest noise sensitive university buildings listed above can be appropriately managed, the noise impacts at the location of the commercial hotel will be minimal.

2.3 Construction Hours

Demolition, excavation and construction works will be conducted during the daytime period as specified in conditions of consent.

Conditions C5-C8 nominate the following with regard to allowable construction hours at the site.

C5 *Construction, including the delivery of materials to and from the site, may only be carried out between the following hours:*

- (a) between 7am and 7pm, Monday to Fridays inclusive; and*
- (b) between 8am and 4pm, Saturdays*

No work may be carried out on Sundays or public holidays.

C6 *Activities may be undertaken outside of the hours in condition C5 if required:*

- (a) by the Police or a public authority for the delivery of vehicles, plant or materials; or*
- (b) in an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or*
- (c) where works are inaudible at the nearest sensitive receivers; or*
- (d) where a variation is approved in advance in writing by the Planning Secretary or her nominee if appropriate justification is provided for the works.*

C7 *Notification of such activities must be given to affected residents before undertaking the activities or as soon as is practical afterwards.*

C8 *Rock breaking, rock hammering, sheet piling, pile driving and similar activities may only be carried out between the following hours:*

- (a) 9am to 12pm, Monday to Friday;*
- (b) 2pm to 5pm Monday to Friday; and*
- (c) 9am to 12pm, Saturday*

No works are expected to be conducted outside the approved hours.

3 NOISE EMISSION GUIDELINES

Condition B.19 of the consent nominates that noise emissions from the site should be in line with the requirements of the DECC (now EPA) ICNG. The provisions of the ICNG are discussed below with reference to the nearest noise sensitive education buildings of the Macquarie University.

3.1 EPA – Interim Construction Noise Guideline

Given the surrounding buildings nearest to the construction site are owned and occupied by Macquarie University, the noise management levels provided in table 3 of the ICNG should be used as a guideline to ensure the occupants of the buildings are not unduly disturbed.

The ICNG nominates an internal noise level of 45 dBA for *classrooms at schools and other educational institutions* which is appropriate for the use of the surrounding university buildings.

It would be expected that the nearest noise sensitive buildings associated with the university would achieve a minimum sound reduction of 25dBA across a closed façade (i.e. assuming all windows and doors are closed). Therefore, an external noise level incident at the façade of the nearest noise sensitive university buildings of 70dBA would be expected to comply with the internal noise management levels for the university teaching areas.

The ICNG also nominates an external noise level of 70dBA for commercial offices. This level would be applicable for any other university building used for administration purposes.

Table 3-1 Project Noise Management Levels – Surrounding Receivers

Receiver	Time Period	NML (L _{Aeq,15 min}) *
R1, R2, R3	Daytime (7.00am-6.00pm)	70dB

*External noise level at façade of receiving building to meet internal noise goal of 45dB assuming 25dB reduction through a closed façade. The acoustic performance of the closed façade should be confirmed once works at the site begin.

It is recommended in the ICNG that the proponent should consult with the nearest noise receiver (in this case Macquarie University) to ensure periods where noisier works are conducted will not conflict with particularly noise sensitive events occurring at the university (i.e. exam periods / live performances etc.). Details of management and community consultation techniques are discussed in the sections below.

4 VIBRATION EMISSION GUIDELINES

Impacts from vibration can be considered both in terms of both the effect on building occupants (human comfort) and the effects on the building structure (building damage). Of these considerations, the human comfort limits are the most stringent. Therefore, for occupied buildings, if compliance with human comfort limits is achieved, the building damage objectives will also be achieved.

4.1 Vibration Guidelines – Human Comfort

The EPA's '*Assessing Vibration: A Technical Guideline*' provides acceptable values for continuous and impulsive vibration in the range 1-80Hz. Both preferred and maximum vibration limits are defined for relevant receiver locations and are shown in Table 4-1 and Table 4-2.

Table 4-1 Preferred and Maximum Peak Particle Velocity (PPV) Values for Continuous Vibration, (mm/s)

Location	Assessment Period ¹	Preferred Values	Maximum Values
Residences	Daytime	0.28	0.56
	Night-time	0.20	0.40
Offices, schools, educational institutions and places of worship	Day or Night-time	0.56	1.1

Note 1: Daytime is 7.00am-10.00pm and night-time is 10.00pm-7.00am.

Table 4-2 Preferred and Maximum Peak Particle Velocity (PPV) Values for Impulsive Vibration, (mm/s)

Location	Assessment Period ¹	Preferred Values	Maximum Values
Residences	Daytime	8.6	17.0
	Night-time	2.8	5.6
Offices, schools, educational institutions and places of worship	Day or Night-time	18.0	36.0

Note 1: Daytime is 7.00am-10.00pm and night-time is 10.00pm-7.00am.

Values given for the most critical frequency range > 8Hz assuming sinusoidal motion.

4.2 Vibration Guidelines – Building Damage

For assessment of the potential for vibration to cause building damage, British Standard BS 7385 and German Standard DIN 4150-3 are used. The BS 7385 Part 2, 1993 limits (used by Transport for NSW projects and considered the more applicable) are summarised in Table 4-3.

Table 4-3 Transient Vibration Guide Values for Cosmetic Damage, (mm/s)

Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
	4-15Hz	15Hz and Above
Reinforced or framed structures	50mm/s at 4Hz and above	
Industrial and heavy commercial buildings		
Unreinforced or light framed structures	15mm/s at 4Hz increasing	20mm/s at 15Hz increasing
Residential or light commercial type buildings	to 20mm/s at 15Hz	to 50mm/s at 40Hz and above

5 PREDICTED NOISE & VIBRATION IMPACTS

5.1 Noise Impacts

The preliminary staging of the Project is outlined below in Table 5-1.

Table 5-1 Project Staging

Phase	Activity	Equipment
Site Establishment, Excavation & Ground Works (6 months)	Bulk and detailed excavation & construction of retaining walls etc.	- Excavator with hammer attachment (for removal of existing concrete pavement)
		- 4 x heavy excavators with bucket attachments
		- Trucks for removal of excavated material (enter/exit via Gymnasium Road)
		- Concrete trucks, - Concrete pumps
Construction (18 months)	Footings	- Excavator - Concrete pump
	Construction of base building structure incl. formwork	- Concrete trucks, - Concrete pump
		- Electric material hoist/lift
		- Electric tower cranes x 2
	Fit-out Works	- Power tools / hammers etc.

An assessment of noise emissions has been conducted based on the source noise levels presented below:

Table 5-2 Machinery Sound Power Levels

Phase	Plant / Machinery	Plant SWL	Combined SWL *
		L _{Aeq}	L _{Aeq, 15min}
Demolition of Slab	Excavator (Hammer Attachment)	117dB	110dB
	Excavators (Bucket Attachment)	110dB	
Landscape / Bulk Excavation	Piling Rig	111dB	
	Concrete Trucks	105dB	
	Concrete Pump	102dB	
	Truck (> 20 tonne)	105dB	

*Expected typical combined sound power level over 15-minute period accounting for multiple plant operating at any one time located across the site.

The expected noise emissions from the loudest typical activities to be conducted at the site have

been presented below. The intensity of noise at each receiver will be largely dependent on the location of the source noise of the site. The evaluation of noise emissions has been assessed with consideration of the proposed class A hoarding surrounding the site. Where a noise level range is shown, the higher noise emission level represents a scenario when the noise source is located within 5m of the construction site boundary closest to the receiver location and the lower level represents a noise level from the furthest position on the site from the receiver.

It is expected that the combined noise from multiple plant/machinery items operating at the same time may marginally increase the noise levels shown by 1-2dB for short periods depending on the number and location of items operating on site.

Table 5-3 Predicted Noise Emissions (Slab Demolition)

Activity / Phase	Receiver	Noise Level ($L_{Aeq,15\text{ min}}$)	Comment
Slab Demolition (Excavator with Hammer)	R1	61-75dB	Noise expected to exceed NML when works occurring near south eastern corner of site
	R2	67-90dB	Noise expected to exceed NML when hammering works occurring toward southern end of site
	R3	53-63dB	Noise expected to comply with NML

Table 5-4 Predicted Noise Emissions (Excavation Phase)

Activity / Phase	Receiver	Noise Level ($L_{Aeq,15\text{ min}}$)	Comment
Landscape Excavation (Excavator with Bucket)	R1	56-71dB	Noise expected to marginally exceed NML when works occurring at south eastern corner of site
	R2	58-68dB	Noise expected to comply with NML
	R3 (Level G)	48-67dB	Noise expected to comply with NML
	R3 (Level 1)	51-75dB	Noise expected to exceed NML when works occurring at north-eastern site boundary
Basement Excavation (Building 1CC) (Excavator with Bucket)	R1	57-68dB	Noise expected to comply with NML
	R2	60-75dB	Noise expected to exceed NML when works occurring at southern site boundary
	R3	58-70dB	Noise expected to generally comply with NML
Basement Excavation (Building R1/R2) (Excavator with Bucket)	R1	55-59dB	Noise expected to comply with NML
	R2	63-75dB	Noise expected to exceed NML when works occurring at southern site boundary
	R3	55-59dB	Noise expected to comply with NML

5.2 Vibration Impacts

The main bulk excavation works at the site are expected to be carried out with excavators with bucket attachments and bored pile rigs which are both relatively low vibration generating excavation methods. There is some sections of shale and sandstone to be removed during bulk excavation, but the use of a hydraulic rock breaker is not typically required for these areas.

An excavator with hydraulic hammer attachment is expected to be used during early demolition works at the site for removal of the existing concrete slab. Vibration levels are likely to exceed the *Human Comfort* guideline for vibration when demolition of the slab at the southern boundary is conducted. Works in close proximity to the surrounding buildings (primarily R2) may be required to be conducted in the early morning period before the building is fully occupied or on weekends when the building is expected to be unused.

Additional factors that may increase the risk of vibration in the structure (particularly at C7A building) is the level of connection between the slab to be removed and the building structure. Investigations of the structural connection is recommended prior to demolition works commencing. Any mechanical connection between the two, will need to be severed using saw cutting prior to hammering works.

It is expected that vibration from works will comply with the commercial building damage criteria (see Table 4-3), however, it is recommended that attended vibration testing is conducted prior to any full-scale concrete demolition works to gauge the level of vibration at the receiver and determine a safe working distance to ensure no damage to the structure.

Compliance with the vibration criteria for building damage and human comfort is expected to generally be achieved provided contact with the nearest vibration sensitive structures is avoided and precautionary compliance testing is conducted when slab demolition works are conducted at the southern boundary.

Table 5-5 Recommendations for Safe Working Distances for Vibration-Intensive Plant

Plant Item	Rating/Description	Safe Working Distance	
		Cosmetic Damage (BS 7385)	Human Response (EPA Vibration Guideline)
Excavator	20t	TBC based on on-site testing	TBC based on on-site testing
Excavator (Bucket Attachment)	20t	2m	Avoid contact with structure

5.3 Discussion of Noise and Vibration Impacts

5.3.1 Demolition of Existing Slab

The highest noise emission levels are expected to be recorded at the C7A (R2) building during demolition of the existing concrete slab. Demolition of the slab is expected to be conducted over a relatively short period of time. It is expected that the existing slab removal will take 2 weeks conducted in two stages (1 week each in duration) separated by a 3-week period with no concrete demolition.

Noise levels are expected to exceed the NML by approximately 20dBA at the C7A building when hammering is conducted close to the southern boundary of the site.

Coordination with the university is recommended prior to demolition works commencing, to confirm the periods of use and particular sensitive activities conducted in the C7A building. To reduce the impact on the occupants of building, hammering works at the southern boundary can be coordinated to be conducted outside typical hours of use for the building in the early morning period before the building is fully occupied, in lunch-break periods or on weekends when the building is expected to be largely unoccupied.

Increasing the height of the boundary hoarding along the southern boundary of the site, in line with the nearest noise sensitive building, will provide little to no benefit as building C7A largely overlooks the site. Management of noise emissions to the nearest receiver should be conducted in line with the recommendations in the following sections and as per the EPA ICNG guidelines.

5.3.2 Bulk Excavation

The results of noise predictions indicate that the highest noise levels impacting the nearest noise sensitive buildings will be recorded at the E11A Chancellery building (R3) to the north-east of the site. The highest noise levels expected at this receiver are up to 5dB over the NML at level 1 during the use of excavators for landscaping excavation at the north-east boundary in close proximity to the R3 building.

We note that the landscaping excavation works at this location are not expected to be conducted over a particularly long period and as such, noise levels of up to 75dB would be expected to be short in duration. Nevertheless, the noise mitigation methods discussed in the following sections can be employed at the site to reduce the impact on the receivers of the E11A building.

The bulk excavation of the basement areas of the three new buildings is expected to produce the most significant noise emission levels to the southern receivers (receivers R1 and R2). We note these buildings are particularly sensitive to noise intrusion as they are primarily used for teaching and student study. It is expected that noise emissions could be up to 5dB over the NML for extended periods at these locations when excavation along the southern boundary of the site is conducted. As such, activities on the site may be required to be managed to reduce the impact on these spaces as discussed in the following sections.

Noise levels during the construction phase are expected to be significantly less intrusive, when compared with periods of excavation due to the additional shielding of noise from the base building elements and relatively less intense noise generating activities.

On-going consultation with the university is recommended to determine the most noise sensitive periods where activities within the surrounding buildings may be particularly sensitive to noise intrusion, for example, in periods when exams are taking place.

6 CONSTRUCTION NOISE & VIBRATION MANAGEMENT PROCESSES

6.1 Community Consultation

Consultation with and the provision of information to the surrounding community is regarded as a major factor in controlling the negative reaction to the inevitable impacts associated with demolition, excavation and construction works.

In order for any construction noise management programme to work effectively, continuous communication is required between all parties which may be potentially impacted including the builder, excavation contractor and representatives from the nearest noise sensitive receivers, in this case, Macquarie University. This establishes a dynamic response process which allows for the adjustment of control methods and criteria for the benefit of all parties.

The objective in undertaking a consultation process is to:

- Inform and educate the groups about the project and the noise controls being implemented;
- Increase understanding of all acoustic issues related to the project and options available;
- Identify group concerns generated by the project, so that they can be addressed; and
- Ensure that concerned individuals or groups are aware of and have access to the Complaints Register which will be used to address any construction noise related problems should they arise.

To ensure that this process is effective, regular information regarding the proposed works and period when they will be required to be conducted should be provided to neighbouring receivers with a particular focus on the occupants of building E7B, C7A and E11A.

We note that FDC have committed to establishing a strong communication foundation with the university and other stakeholders with fortnightly progress meetings already in place in addition to employing a communications manager responsible for maintaining the line of communication with all affected parties.

6.2 Response to Complaints

FDC have advised that no complaints have been received by FCD relating to noise and vibration during the first six months.

Should ongoing complaints of excessive noise and vibration impacts occur measures shall be undertaken to investigate the complaint, the cause of the complaint identified and changes to work practices implemented. In the case of exceedances of the vibration limits, all work potentially producing vibration shall cease until the exceedance is investigated.

The effectiveness of any changes shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are not repeated.

If a noise and vibration complaint is received the complaint should be recorded. The complaint form should list:

- The name and location of the complainant (if provided);
- The time and date the complaint was received;

- The nature of the complaint and the time and date it occurred;
- The name of the employee who received the complaint;
- Actions taken to investigate the complaint, and a summary of the results of the investigation;
- Required remedial action, if required;
- Validation of the remedial action by a consultant or as detailed in this report; and
- Summary of feedback to the complainant.

A permanent register of complaints should be held. All complaints received should be fully investigated and reported to management. The complainant should also be notified of the results and actions arising from the investigation.

The investigation of a complaint shall involve where applicable:

- Measurements at the affected receiver;
- An investigation of the activities occurring at the time of the incident;
- Inspection of the activity; and
- Whether work practices were being carried out either within established guidelines or outside these guidelines.

6.3 Environmental Inductions

It is important that an induction is provided to all site personnel, contractors and sub-contractors with an emphasis on understanding and managing impacts. This should include the location of sensitive receivers, specific mitigation measures, site hours and complaints procedure.

6.4 Monitoring

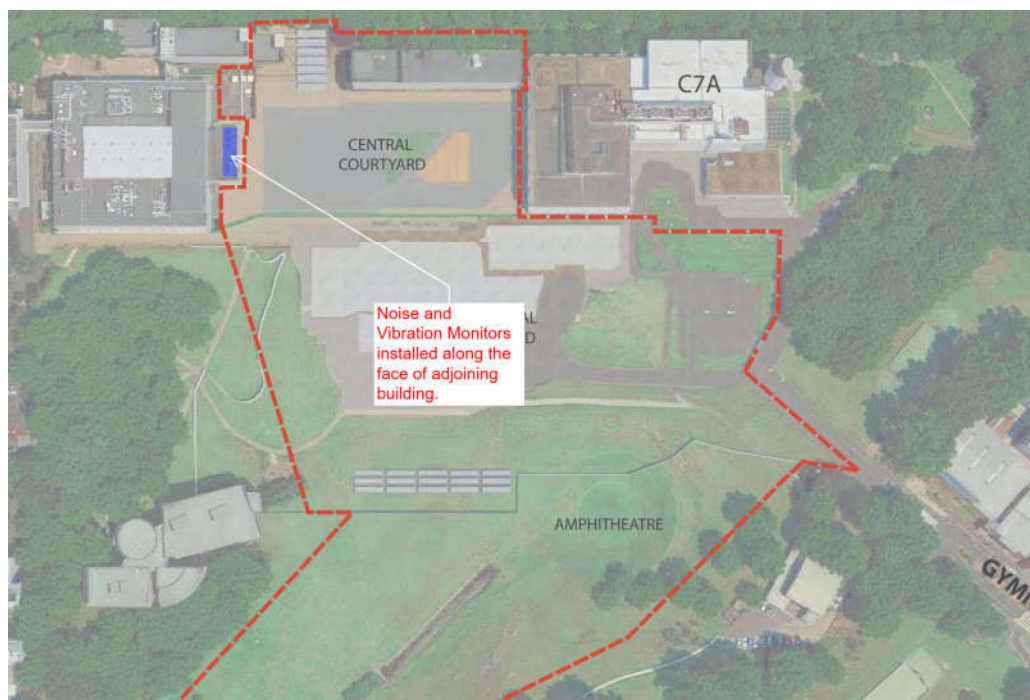
6.4.1 Construction Noise Monitoring

Noise monitors were installed at 3 locations surrounding the site during the excavation phase and early construction phase. The monitors were set to alert site management via email when noise levels exceed the NML at the surrounding receivers. The locations (refer Figure 2-3) included.

- C7A Roof level in North east corner overlooking site
- E7B On hoarding between site and building
- E11A Chancellery building On Statues nearby

For the remaining construction stages a permanent noise monitor is installed on the face of E7B as shown in Figure 6-1.

Figure 6-1 Current Monitoring Plan



A hand held device is available on site to undertake short term measurements on a regular basis (weekly) and in the event of complaints. The results of measurements will be documented along with any recommendations for mitigation. Any mitigation will be determined in consultation with the site manager.

Additional noise monitoring may be required in response to complaints from nearby identified receivers or during periods where the risk of noise-generating activities is high or in periods when particularly noise sensitive activities are conducted within the university (i.e. exam periods).

Ongoing review of the noise monitoring program should be conducted to confirm relevance of the monitoring location and recorded noise levels.

6.4.2 Construction Vibration Monitoring

Vibration monitors were installed 3 locations surrounding the site during the excavation phase. The monitors were set to alert site management via email when vibration levels exceed nominated limits at the surrounding receivers. The locations (refer Figure 2-3) included.

- C7A Ground level in North east corner overlooking site
- E7B Ground Level in north west corner plantroom
- E11A Chancellery building under stairs, western end

For the remaining construction stages a portable monitor is available on site to undertake short term measurements in the event of complaints. The results of measurements will be documented along with any recommendations for mitigation. Any mitigation will be determined in consultation with the site Project Manager.

The results of all vibration monitoring will be compared with established vibration goals in section 4 to determine appropriate actions.

Vibration monitors to be set up to alert site management when vibration exceeds a pre-determined trigger level corresponding to the relevant criteria nominated in section 4.

If consistent complaints regarding vibration emissions is received by site management, additional attended vibration measurements may be considered to isolate the main source of vibration impacting the nearest buildings and to determine appropriate mitigation.

It is expected that once bulk excavation works are completed at the site, monitoring of vibration at the nearest university buildings may no longer be required. The relevance of the monitors should be reviewed based on recorded levels from works on the site.

Confirmation should be received from all affected parties before monitors are removed from site.

6.4.3 Monitoring Locations and Protocols

Noise monitoring should be conducted as close as possible to the façade of the receiving buildings in line with the works being conducted on site. Any areas where monitors can be placed at the façade of the receiving building would be beneficial (i.e. on a balcony, or rooftop in line with the façade).

Additional attended noise measurements should be conducted once work at the site begins to determine the sound reduction across the façade of the surrounding buildings. An approximate internal noise level can then be estimated, based on the noise levels measured externally.

Vibration monitors should be placed as close as practicably possible to the foundation of the nearest university buildings at ground or basement level where access permits.

The location of the monitors on site should be reviewed based on the location of the works occurring and relocated if necessary, to record noise and vibration at the most effected buildings.

Ultimately, the specific location of the onsite noise and vibration monitoring units will be governed by factors such as ease of access and safety, however, following the general guidelines above will ensure relevant noise and vibration monitoring locations are found.

In the event the results of noise and/or vibration monitoring indicate an exceedance of the NML or vibration criteria, the following procedure is to be followed:

- 1) FDC to log exceeding event and note plant or activity occurring on site that is responsible for exceeding the limit.
- 2) Establish if there has been any impact on the occupants of the nearest noise effected university building where the excessive noise or vibration levels have been recorded via FDC communication liaison and/or via weekly stakeholder meetings.
- 3) If noise/vibration levels are found to significantly impact the occupants of the surrounding buildings, apply all reasonable and feasible noise mitigation methods as discussed in this report.
- 4) Review results of noise monitoring data or conduct additional attended noise measurements to confirm noise mitigation methods are effective at the affected building(s).

7 NOISE & VIBRATION CONTROL METHODS

The determination of appropriate noise and vibration control measures will be dependent on the particular activities and construction appliances used at the site. This section provides an outline of potential methods to reduce impacts at the nearest noise sensitive boundaries and will be investigated if the occupants are impacted by excessive noise and vibration.

7.1 Selection of Alternate Activity or Process

Where a particular activity or construction appliance is found to generate excessive noise levels, it may be possible to select an alternative approach or appliance. For example; the use of a hydraulic hammer on certain areas of the site may potentially generate high levels of noise. By carrying out this activity by use of pneumatic hammers, bulldozers ripping and/or milling machines lower levels of noise will result.

We note the proposed bulk excavation methodology does not require the use of hydraulic or pneumatic hammers which will significantly reduce noise emissions from the site. Hammering will be required for a relatively short period when demolition of the existing concrete pavement is conducted in the early stages of the works. These works are expected to be completed over a relatively short duration and discussed above in section 5.1.

7.2 Acoustic Barrier

Barriers or screens can be an effective means of reducing noise. Barriers can be located either at the source or receiver. The placement of barriers at the source is generally only effective for static plant. Noise from mobile equipment cannot be effectively attenuated by placing barriers at the source.

The degree of noise reduction provided by barriers is dependent on the amount by which line of sight can be blocked by the barrier. If the receiver is totally shielded from the noise source reductions of up to 15dBA can be affected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8dBA may be achieved. As barriers are used to provide shielding and do not act as an enclosure, the material they are constructed from should have a noise reduction performance that is approximately 10dBA greater than the maximum reduction provided by the barrier. In this case the use of a material such as 10mm or 15mm thick plywood would be acceptable for such barriers.

We note there is a proposed 2.7m Class A hoarding to be constructed surrounding the site, as discussed in section 2.1. Given the potential for higher noise levels during landscape excavation works at the north-east corner of the site, it might be considered to increase the height of the class-A hoarding in the vicinity of the E11A Chancellery Building (R3) to 3m – 3.5m in height subject to recorded noise emissions once works at the site begin. It would be expected that this will reduce noise levels by up to 5dB at the level 1 façade when works are occurring in close proximity to the E11A building. The benefit of additional hoarding height will reduce as works move further from the boundary.

For the E7B (R1) and C7A (R2) receivers, the proposed hoarding will provide little acoustic benefit as the buildings largely overlook the site.

7.3 Silencing Devices

Where construction activities or plant are found to be too noisy, the use of silencing devices may be possible. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

7.4 Location of Activities on Site

Where long periods of construction or excavation activities are found to consistently exceed the NML (to be determined with on-site noise monitoring) it may be required to relocate plant or machinery to an alternate area of the site to reduce the impact on the receivers closest to the works.

This may include, where practicable, planning excavation activities to be distributed across the site throughout the day-time period to reduce the amount of time impacting individual receivers. Limiting the amount of time exposed to higher noise levels can greatly reduce the impact on the occupant.

This technique may be particularly useful in periods when exams or other highly sensitive activities are conducted at the receiving buildings within the university.

8 CONCLUSION

This updated CNVMP outlines the assessment of the potential for noise and vibration impacts on the Macquarie University buildings surrounding the 1 Central Courtyard project.

The potential for impacts from the proposed works has been assessed against the relevant standards and guidelines detailed in sections 3 and 4.

Sections 6 and 7 of this report specifically outline measures to mitigate and manage noise and vibration impacts during the project.

4.3 Construction Waste Management Plan

Construction Waste Management Plan

Project Details

Project Name: Macquarie University Central Courtyard Precinct

Project Number: 250075

Project Location: Gymnasium Rd, Macquarie Park

Principal: Macquarie University

Name of principal contractor: FDC Construction (NSW) Pty Ltd

Company address: 22-24 Junction Street Forest Lodge 2037

ABN: 72 608 609 427

To be read and implemented in accordance with the Project Management Plan

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1 Overview

The purpose of this Waste Management Plan is to outline the proposed method to deal with construction waste throughout the entire construction phase of the building from demolition and excavation through to building, fit-out, landscaping and handover.

The method of dealing with construction waste is consistent throughout to ensure that our environmental obligations are being met.

The plan outlines how we propose to achieve the project requirements and shall be read and implemented in accordance with the Project Management Plan.

2 Recycling

Recycling is a vital means whereby Australia's natural resources are conserved and efficiently utilised. FDC aim to develop a waste management system based on resource recovery and recycling.

2.1 Option 1: On-site Recycling

- The efficiency of on-site recycling depends on the anticipated waste stream types and quantity along with space being available (and suitable) to house the bins required.
- The on-site separation of scrap metals such as aluminium, copper pipe and wire, lead and steel is viable. Bins will be identified clearly on sites to aid in the separation of materials. FDC will work together to reduce waste coming to site.
- Site conditions permitting separate on-site bins for cardboard and paper are also possible and FDC have committed to providing a paper bin for use on site for this purpose.
- FDC feel that off-site recycling is the more viable option for all other wastes.

2.2 Option 2: Off-site Recycling

- Off-site recycling is the most appropriate course of action for mixed waste streams and sites with minimum room or access difficulties.
- At the landfill and recycling facility, it is possible to sort and recycle wastes coming in. This sorting and recycling includes the recovery and production of the following materials:
 - Paper / Cardboard / Glass
 - Steel – OSI and Black Iron
 - Non-ferrous metals such as: lead, copper, electrical cable, brass and aluminium, all of which are sorted and sent to the appropriate processing plants.
 - Timber, such as formwork pallets, hardwood, oregon and the like are sorted for reuse with the remainder being processed to make woodchip.
 - Plasterboard and Gyprock are transformed into soil conditioners. Green waste is transformed into mulch.
 - Problem waste, such as tree stumps and plastics are all processed or recycled to avoid the potential problems that wastes such as these cause at landfills.
- All hard-core materials such as bricks, mortar, concrete, dirt, soil, sand, tiles and stone are either stacked for reuse or reprocessed into high quality raw materials such as road base, aggregates for drainage, fill sand, soil and turf underlay etc.

3 Environmental Management and Compliance

FDC offer a waste management service in accordance with the Protection of the Environment Operations Act 1997 and the Waste Minimisation and Management Act 1995.

Clients of FDC are secure in the knowledge that their waste is being disposed of according to environmental protection legislation and the principles of ecologically sustainable development. FDC has in place, as a major part of our business, a materials recovery and recycling program that exceeds the objectives of the waste minimisation and management legislation.

4 Legislation and Due Diligence

4.1 Legislation

The disposal of wastes is under the control of the local authorities and Environmental Protection Authority. The EPA administers the Protection of the Environment Operations Act and associated legislation and regulations.

4.2 Due Diligence

- Companies and individuals are required to act with due diligence in respect of the disposal of the waste they generate. Companies and individuals are exercising due diligence by using appropriate organisations to dispose of waste.
- Due diligence may be considered to be the legal opposite of negligence. If due diligence is not exercised, then negligence may be considered to have occurred. Due diligence applies to both a requirement to act and to a failure to act, thus commission and omission of action. Due diligence applies to companies, company Directors and employees. Due diligence means that companies and individuals have all the reasonable means to ensure that legal obligations have been met.
- For waste management, due diligence requires both the waste producer and the waste collector to mutually exercise:
 - Duty of care, and
 - Duty of disclosure

5 Definitions of Waste

5.1 Wastes

- Wastes are described by many different names and come in many different types, i.e. industrial, commercial, building and demolition, clinical, solid, domestic, putrescible, non-putrescible, hazardous, household, inert, municipal and trade waste. They are defined for regulatory purposes in the Protection of the Environment Operations Act.
- For practical purposes the following waste management hierarchy that prioritises ecological sustainable waste solutions:
 - Avoiding waste
 - Reusing materials
 - Recycling and reprocessing materials
 - Waste Disposal

6 Waste Management

Wastes need to be managed in order to comply with every aspect of the legislation covering wastes. The waste management service provided by FDC is a total waste management service. By engaging FDC to manage wastes, a waste generator has exercised complete due diligence. FDC assumes the responsibility and requirement for the correct collection, transport, storage and disposal of wastes.

The waste management service of FDC covers all aspects of all wastes and a complete and thorough service to assist industry; a significant service that is keeping Australia clean.

7 Removal of Hazardous Materials

7.1 General Procedure

FDC are responsible for ensuring that the appropriate measures are implemented to safely remediate any hazardous materials found on site, avoiding any contamination leaving the site. The following general procedures will be followed, where possible:

- Excavation and removal will be restricted to when the weather conditions are favourable (dry, low wind) to avoid any contamination leaving the site through surface water runoff or through dust particles in the air.
- Covering of any contaminated materials to avoid dust emissions, both when stockpiled on site, and during transport off site.
- Lightly wetting down of contaminated surfaces to reduce the amount of airborne dust particles.

7.2 Unexpected Finds Protocol

In the event that a hazardous substance is discovered on site the following procedure will be implemented in order to ensure that material can be safely remediated:

- Stop work immediately
- Report to FDC Management for assessment and action
- Establish exclusion zone around suspected area
- Engage a hygienist to undertake verification of suspected hazardous material
- If a hazardous material is detected, the hygienist will prepare an appropriate remediation action plan in accordance with the requirements of the relevant legislation, code standards and guidelines. The appropriate remediation action plan is to include:
 - The method of containment, to avoid the emissions of hazardous materials into the air or the pollution of waterways which will include air monitoring to ensure that the levels of contaminated material leaving the site are below the required thresholds.
 - Prior to removal of material (if removal is required) we will seek approval from the Planning Secretary for the method of removal, including the location of the approved waste disposal facility.
 - The licensing requirements of the engaged contractor for the containment and removal of the hazardous material.
 - Workcover notification requirements and processes.
 - Procedure in place for if any contamination "leakage" occurs.
 - Requirements for any waste classification, validation reports and/or clearance certificate.
- Only after remediation has been completed to the area in accordance with the remediation action plan and the associated clearance certificates have been provided, can works recommence to the area.

7.3 Site Specific Hazardous Materials

The Environmental Site Assessment (ESA) conducted by GeoLogix at the Central Courtyard Site location identified high levels of hydrocarbons in the collected soil samples. The observed hydrocarbon levels exceed the ecological protection criteria and as such, need to be remediated in order for the area to be suitable for redevelopment. The preferred method of remediation is off-site disposal. The proposed remediation method is as follows:

- Conduct a survey and mark out the area containing the hazardous substance
- Excavate the contaminated soil under the supervision of an environmental consultant
- Stockpile the material on hardstand or plastic sheeted area to prevent any cross contamination with surrounding soil
- Remove the soil off-site and dispose of at a landfill facility licenced by NSW EPA to accept such waste

8 Ecologically Sustainable Development

Ecologically sustainable development as the fundamental tenant of Australian business stems from the Intergovernmental Agreement of the Environment between the Australian Commonwealth, State, Territory and Local Governments on ecologically sustainable developments made in May 1992.

FDC endorses and is committed to the four principles which constitute ecologically sustainable development.

8.1 Principle 1: The Precautionary Principle

- For general hard wastes, there is a great deal of scientific certainty concerning their treatment, storage, transport and disposal.. For special wastes, FDC applies the measures and procedures for handling and disposal required by local legislation.
- These measures and procedures are designed to ensure the known and suspected effects of such materials are controlled.

8.2 Principle 2: Inter-generational Equity

- Resource recovery and recycling as carried out by FDC, together with corresponding savings in fossil fuel energy and more efficient use of landfill sites, are direct, positive and practical measures used to provide for inter-generational (future generations) and intra-generational (present generation) equity.

8.3 Principle 3: Conservation of Biological Diversity and Ecological Integrity

- Disposal of waste by FDC is at a designed licensed landfill site. The site has detailed rehabilitation plans to ensure the biological diversity and ecological integrity of the site and its environments.
- The recovery and recycling of resources conserves resources and consequently minimises the impact of the initial production of resources on the biological diversity and ecological integrity of land.

8.4 Principle 4: Improved Valuation and Pricing of Environmental Resources

- FDC applies control measures in the treatment, storage, transport and disposal of waste materials to minimise air, water and noise pollution. These control measures are the means whereby the valuation of the environmental resources of air quality, water quality and area amenity is enhanced.

9 Conclusion

FDC's clients can feel secure in the knowledge that their waste is being disposed of and recycled according to environmental protection legislation and the principles of ecologically sustainable development.

Recycling Reports are a key feature of FDC's waste management services and can be provided to clients at the end of each month, indicating the recycling results achieved by individual sites. This allows our clients the confidence of knowing they are achieving Government standards and meeting all reporting requirements.

10 Waste Estimates

Refer to the tables on the following page.

FDC CONSTRUCTION & FITOUT - WASTE MANAGEMENT PLAN
SECTION ONE - DEMOLITION STAGE

MATERIALS ON-SITE		DESTINATION		
		REUSE AND RECYCLING		DISPOSAL
Expected Waste Materials	Estimated Volume (m ³)	ON-SITE <ul style="list-style-type: none"> Specify proposed reuse or on-site recycling methods. 	OFF-SITE <ul style="list-style-type: none"> Specify contractor and recycling outlet. 	<ul style="list-style-type: none"> Specify contractor and landfill site.
Excavation Material (topsoil)	1,500m ³	Keep and reuse top soil for landscaping, Store on site where possible. Use some behind retaining walls	To recycling facility by Builder. To be offered for reuse as landscape supplies.	
Green Waste	200m ³	Where able replant to another location on site. Unwanted shrub material chipped and re-used on-site as mulch in landscaping.	Use off site for mulch and the like if possible	
Bricks / Blocks	500m ³	Quality bricks clean mortar and re-use where possible. Re-use others in fill.	Recycled via waste transfer depot through demolition / bin contractor for recycling	
Concrete	400m ³	Crush and use on-site in fill. Surplus concrete to be removed from site	To be crushed and recycled	
General Construction Waste	200m ³		Recycled via waste transfer depot through demolition / bin contractor for recycling	

Timber	0m3	Where able re-use as form work. Chip surplus and use in landscaping.	Recycled via waste transfer depot through bin contractor for recycling	
Metals	50m3	All existing metalwork to be removed from site.	Recycled via waste transfer depot through demolition / bin contractor for recycling	
Doors/Windows	50m3	Removed from site.	Recycled via waste transfer depot through demolition / bin contractor for recycling	
Glass	100m3	Collect on-site and stockpile.	Recycled via waste transfer depot through demolition / bin contractor for recycling	
Plasterboard	100m3	All existing plasterboard to be removed from site.	Nil	

FDC CONSTRUCTION & FITOUT - WASTE MANAGEMENT PLAN
SECTION TWO - EXCAVATION STAGE

MATERIALS ON-SITE		DESTINATION		
		REUSE AND RECYCLING		DISPOSAL
Type of Material	Estimated Volume (m ³)	ON-SITE <ul style="list-style-type: none"> Specify proposed reuse or on-site recycling methods. 	OFF-SITE <ul style="list-style-type: none"> Specify contractor and recycling outlet. 	<ul style="list-style-type: none"> Specify contractor and landfill site.
Excavation Material	20,000m ³	Excavation material will be re-used as fill on site where possible	Excess material to be exported from site and re-used as fill on another site	
Green Waste	0m ³	Refer to Demolition Stage.	Nil	
Bricks	50m ³	Nil	Surplus to Waste and Recycling Centre, by builder.	
Concrete	50m ³	Nil	Surplus to Waste and Recycling Centre, by builder.	
Glass	0m ³	Nil	Recycled via waste transfer depot Sims Metal Recycling (site rubbish skip bin service)	

SECTION ONE - CONSTRUCTION STAGE

MATERIALS ON-SITE		DESTINATION		
		REUSE AND RECYCLING		DISPOSAL
Expected Waste Materials	Estimated Volume (m ³)	ON-SITE <ul style="list-style-type: none"> Specify proposed reuse or on-site recycling methods. 	OFF-SITE <ul style="list-style-type: none"> Specify contractor and recycling outlet. 	<ul style="list-style-type: none"> Specify contractor and landfill site.
Bricks / Blocks	50m ³	Quality bricks clean mortar and re-use where possible. Re-use others in fill.	Recycled via waste transfer depot through bin contractor for recycling	
Concrete	500m ³	Crush and use on-site in fill. Surplus concrete to be removed from site	To be crushed and recycled	
General Construction Waste	2,000m ³		Recycled via waste transfer depot through bin contractor for recycling	
Timber	500m ³	Where able re-use as form work. Chip surplus and use in landscaping.	Recycled via waste transfer depot through bin contractor for recycling	
Metals	200m ³	All existing metalwork to be removed from site.	Recycled via waste transfer depot through bin contractor for recycling	

Glass	20m3	Collect on-site and stockpile.	Recycled via waste transfer depot through bin contractor for recycling	
Plasterboard	500m3	All existing plasterboard to be removed from site.	Nil	
Cardboards & Paper	1,000m3	Carboard/Paper bin dedicated to site	Recycled via waste transfer depot through bin contractor for recycling	

4.4 Construction Soil and Water Management Plan

Alexandra Ryan

From: Daniel Pearce <DPearse@ryde.nsw.gov.au>
Sent: Tuesday, 7 May 2019 11:26 AM
To: Simon Friend; City of Ryde
Cc: Michael Badaoui; Grant Taranto
Subject: RE: SSD 8755 Macquarie University, Central Courtyard Project - B21 Construction Soil & Water Management Plan

Hi Simon.

I note that the works are in proximity to a defined overland flowpath (Mars Creek) and the western area of the site is slightly effected by flooding.

I've reviewed the plan and note;

- All works are contained well within the confines of the site and unlikely to effect regions of public domain.
- The soil erosion plans referencing a sediment basin which callout note refers to separate detail. This is not in the plan.
- Sediment Basin 2 is in proximity to a defined flow path. It is suggested siting and refining dimensions of the basin well clear of this if possible given the ramifications of it being degraded (either by inundation or erosive action) by overland flow arising from extreme storm events.
- Condition B22 (Flood Emergency Response Sub-plan) addresses construction logistics during an extreme flood event.

Regards,
Daniel Pearce

Daniel Pearce

Senior Coordinator Development Engineering Services
DEVELOPMENT ASSESSMENT

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From: Simon Friend [mailto:simonf@fdcbuilding.com.au]
Sent: Tuesday, 7 May 2019 7:58 AM
To: Daniel Pearce; City of Ryde

Cc: Michael Badaoui; Grant Taranto

Subject: RE: SSD 8755 Macquarie University, Central Courtyard Project - B21 Construction Soil & Water Management Plan

Hi Daniel.

Just wondering if you have had a chance to review the below email as yet and if you have any comments on our proposed plan?

Regards,

Simon Friend | Senior Project Manager | FDC Construction (NSW) Pty Ltd
22 - 24 Junction Street Forest Lodge NSW 2037

Sydney | Canberra | Melbourne | Adelaide | Brisbane | Perth

T 61 2 8117 5033 | M 0411 045 248 | F 61 2 9566 2900 | www.fdcbuilding.com.au

Accreditations: QA | WHS | EMS | FSC | NSW Government

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Please consider the environment before printing this email

From: Simon Friend

Sent: Thursday, 2 May 2019 2:58 PM

To: 'dpearse@ryde.nsw.gov.au' <dpearse@ryde.nsw.gov.au>; 'cityofryde@ryde.nsw.gov.au' <cityofryde@ryde.nsw.gov.au>

Cc: Michael Badaoui <michaelb@fdcbuilding.com.au>; Grant Taranto <grantt@fdcbuilding.com.au>

Subject: SSD 8755 Macquarie University, Central Courtyard Project - B21 Construction Soil & Water Management Plan

Hi Daniel,

Thanks for returning my call. As discussed we are working on a development in Macquarie University (called the Central Courtyard Project) that is approved under an SSDA.

There is a condition of consent, condition B21, that requires us to prepare a Construction Soil & Water Management Plan in consultation with Council.

I have attached a copy of the plan that we have prepared along with a copy of the consent.

If you could please review and provide any feedback that you might have it would be much appreciated.

If you have any queries please don't hesitate to call.

Regards,

Construction Soil and Water Management Plan

Macquarie University

SCP Ref: 180122

Client FDC Construction and Fitout
Project Macquarie University Central Courtyard Project
Date 11 May 2020

Revision table

Revision #	Date	Issue description	Prepared by	Reviewed by	Issued by
A	24/04/2019	Draft for Review	JC	-	JC
B	02/05/2019	Issue for Consultation	JC	-	JC
C	08/05/2019	Final	JC	JB	JC
D	17/05/2019	Final- Revised	GK	-	GK
E	03/12/2019	Final – Re-issued	JC	-	JC
F	11/05/2020	Final – Re-issued	JC	-	JC

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1 Introduction

As part of the detailed design process for the civil and stormwater works associated with the Macquarie University Central Courtyard Redevelopment, SCP Consulting have been engaged to develop Construction Soil and Water Management Plan. This assessment is currently required under condition B24 of the State Significant Development Application Conditions of Consent (SSD-8755) and Landcom's "Managing Urban Stormwater" Volume 1, March 2004.

1.1 Purpose of Report

The purpose of this report is to:

- Describe how all erosion and sediment controls shall be implemented and maintained during construction.
- Provide a plan for how all construction works will be managed in a wet-weather event.
- Detail all off-site flows;
- Describe how measures will be implemented to manage `stormwater and flood flows for small and large events from 1 Exceedance per Year (EY) to 1% Annual Exceedance Probability (AEP).
- Provide evidence of consultation with Council to ensure Erosion and Sediment Controls are adequately provided.

1.2 Proposed Development

The site is located in Macquarie University between Gymnasium Road and Wally's Walk in Macquarie Park and within the City of Ryde local government area. The site is approximately 3.4 ha and the proposed development footprint covers the majority of the central courtyard precinct. Mars Creek flows from south west to north east along the western boundary of the proposed development. Figure 1 below presents the site location within the University.

The proposed development includes the construction of a new multi-function building, student accommodation, fitout of existing buildings along with upgrades to existing site infrastructure and landscaping. Rehabilitation of Mars Creek from Gymnasium Road to Macquarie Lake shall also be completed as part of these works.

Due to the size of the proposed development, rehabilitation of an active creek alignment and considerable impact it will have to the landscape of the site a robust site management plan must be implemented to ensure minimal impact to the environment and surrounding sites. It is pivotal that erosion, sediment and run-off are controlled throughout excavation and construction, until completion of the development.

This report details the measures to be taken on-site from the start of excavation until the completion of construction, in order to effectively manage all sediment, run-off and erosion, and to protect the surrounding properties and infrastructure.

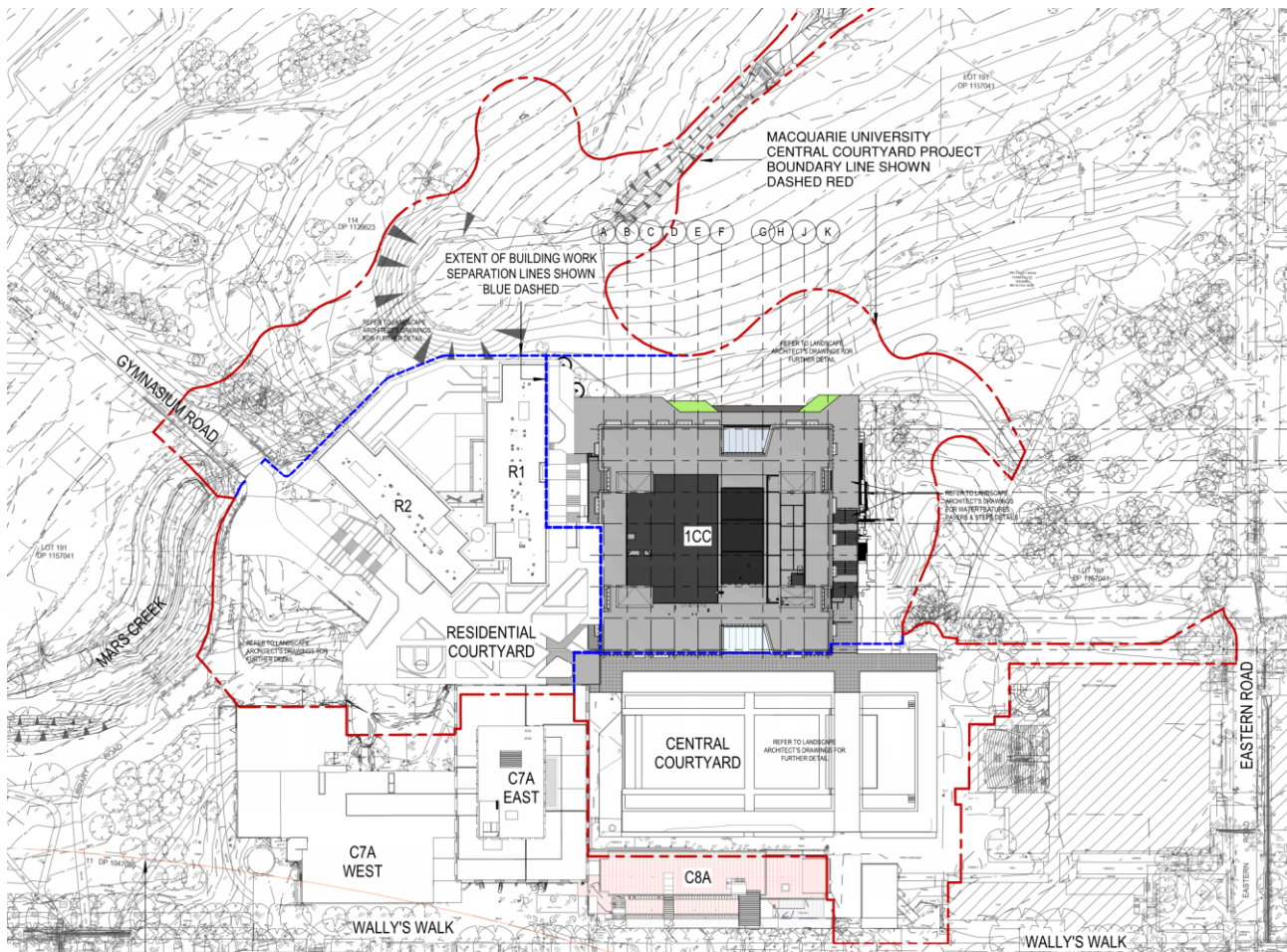


Figure 1 – Site Plan

1.3 Site Management

This Construction Soil and Water Management Plan (CSWMP) relates to the proposed Central Courtyard development at including Marts Creek rehabilitation and shall be read in conjunction with the drawings prepared by SCP Consulting (refer Appendix A), and the environmental and geotechnical investigations. The CSWMP is also to be read in conjunction with the architectural plans, engineering plans, and any other plans or written instructions that may be issued in relation to the development at the subject site.

This CSWMP has been prepared to outline how soil and water issues are to be identified, planned, managed and monitored during the construction period. The CSWMP addresses erosion, sedimentation, water pollution and flood management and outlines measures to minimise adverse impact on downstream waterways and floodplains. Particular effort must be made to protect and have minimal or no disturbance on the downstream areas. The measures should control all flow off site via sediment fencing, diversion banks and temporary sediment basins during construction, which will be specified within the erosion and sediment control plan.

In relation to DA approval Condition 21(d), stormwater flows from the Central Courtyard area will be diverted into a Sediment Control Basin located in the north-eastern corner of the site, refer to drawing S_0-CV-0016. The Basin will have storage volume of 320m³ and has been designed to accommodate flows resulting from the 1 in 1 ARI rainfall events, which is approximately 95% of all rainfall events. Sediment carried in the stormwater flow will settle in the basin and stormwater evaporate, and infiltrate in the most cases. In larger flows stormwater will

overflow from the basin and will be directed, along grassed Diversion Bank and Sediment Control Fence into Mars Creek. It is proposed to place Sandbag Sediment Traps or Straw Bale Sediment Filter across the creek as shown on drawing S_0-CV-0016, and details on drawing S_0-CV-0015.

Stormwater flows from the 1CC, R1 and R2 areas will be pumped and diverted into a Sediment Control Basin located in the northern corner of the site, refer to drawing S_0-CV-0016. The Basin will have storage volume of 820m³ and has been designed to accommodate flows resulting from the 1 in 1 ARI rainfall events, which is approximately 95% of all rainfall events. Sediment carried in the stormwater flow will settle in the basin and stormwater evaporate, and infiltrate in the most cases. In larger flows stormwater will overflow from the basin and will be directed into Mars Creek. It is proposed to place Sandbag Sediment Traps or Straw Bale Sediment Filter across the creek.

Particular attention shall be paid to the diversion of upstream catchments around the proposed works as these areas are large and need to be suitable managed to ensure potential flooding downstream of the development is mitigated during all stages of the construction.

Contractors shall ensure that all soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in Landcom's "Soils and Construction, Volume 1, 4th Edition (March 2004)".

The Contractor shall ensure that all subcontractors are informed of their responsibilities in minimising the potential for soil erosion and pollution to downslope and downstream areas. The plan shall be updated by the contractor during the construction works such that it is in accordance with this CSWMP and City of Ryde's guidelines and specifications.

2 Soil and Water Management

Soil and water management measures are to be in place to manage the impact of construction on the surrounding environment. The following measures are to be implemented as part of the site establishment works and prior to the commencement of any construction works and to remain installed until the completion of works. These measures cover all storms from small events (1 EY storm) through to large events (1% AEP storm). Following any storm event, inspection of all controls and maintenance as required shall occur for the implemented soil and water management controls, in accordance with the checklist and maintenance procedures in Section 3 of this report.

2.1 Soil and Water Management Implementation

Soil and water management measures shall be undertaken as follows:

- a. Input drainage and stormwater management systems to divert upstream stormwater catchments and run-off through or around site safely and without contamination of waterways.
- b. Any temporary sediment basins must be constructed and in service prior to the start of stripping and bulk excavation and earthworks, where disturbed earthworks area exceeds 2,500 m² at any one time. Multiple temporary storage basins are proposed to manage various catchments during the works. The total site area of 3.4 ha requires 1,160 m³ of storage and minimum 0.6m depth for the works. The erosion and sediment control plan and details present the volume and location of each sediment basin. Each basin is to remain until the disturbed area has commenced slab construction or stabilised disturbed areas. SCP Consulting can provide advice on most suitable location when final works schedule has been established.

- c. Install sediment fencing and diversion berms to meet the requirements of the erosion sediment management drawings prepared by SCP Consulting.
- d. Waste collection bins shall be installed adjacent to site office – yet not in a position which, in the case of overflowing or a spill, compromises the safety of waterways – for collection of all construction refuse. All waste materials must be disposed of off-site in a safe and legal manner, or stored safely, well clear of streambanks and flood-prone areas.
- e. Staff facilities to be located such that all effluent and waste water is easily contained and managed within the site management area.
- f. Construct stabilised site access in the location nominated on the erosion sediment management drawings prepared by SCP Consulting.
- g. Install sediment control protection measures such as geotextile filters or sandbags, at all natural and man-made drainage structures. Maintain until all the disturbed areas are stabilised.
- h. Clear and strip the work areas. Minimise the damage to grassed and low ground cover non-disturbed areas. At all times, minimise the area of the site being disturbed and stockpile all topsoil for reuse in rehabilitation works.
- i. Ensure that land disturbance is no further than 5 metres from the edge of construction activities, where possible.
- j. Vehicle and equipment maintenance to occur offsite, or, where appropriate, in a designated area onsite that is impervious and bunded or similarly confined to prevent contamination of waterways.
- k. All vehicles shall leave the site via the stabilised site access onto Gymnasium Road. It is proposed to construct Temporary Stabilised Construction Exit as shown on Drawing S_0-CV-0015. Vehicles shall have sediment removed from tyres and wheel guards prior to leaving the site. Wheels will be washed down during wet weather conditions when required.
- l. Do not use invasive species in rehabilitation.
- m. Do not use herbicides or other chemicals where they might pollute waterways.
- n. Works should not cause new seepage areas.
- o. Protect all stockpiles of materials from scour and erosion.
- p. Apply permanent stabilisation to site (landscaping) within 20 days of completion.
- q. Sediment fencing is to remain until construction is complete, and the site is fully stabilised.

2.2 Erosion and Sediment Control

All erosion and sedimentation control measures, where possible, are to be installed prior to the commencement of any excavation or construction works on-site. The erosion and sediment control plan within Appendix A nominates required measures. The devices are to be maintained throughout the entire excavation and construction process and must be maintained for a minimum of 3 months after the completion of works, where necessary or approved otherwise at completion.

The erosion and sedimentation control measures shall be undertaken as follows:

- a. Clearly visible barrier fencing shall be installed on the site to assist in controlling the movement of traffic within the site and prohibit unnecessary site disturbance.
- b. Vehicular access to the site shall be stabilised and limited to only that essential for construction work and shall enter the site only through the designated stabilised access points.
- c. Proprietary silt fencing shall be installed in accordance with the erosion and sediment management drawings prepared by SCP Consulting and elsewhere at the discretion of the site superintendent to contain coarser sediment fractions as near as possible to their source.
- d. Stockpiles shall be located in accordance with the erosion and sediment management drawings prepared by SCP Consulting. Where stockpiles are to be in place longer than 10 days they shall be stabilised by covering with matting or tarps. Use sediment fences and earth berms around stockpiles as required to manage erosion.
- e. Stockpile material may be removed and stored off-site to reduce the risk of further pollution of site runoff.
- f. Soil materials shall be replaced in the same layers they are removed from the ground i.e. all subsoils are to be buried and topsoil is to be respread on the surface at the completion of works.
- g. All disturbed areas are to be stabilised within 20 working days of the completion of site works. All disturbed areas are to be protected so that the land is permanently stabilised within three months. Topsoil shall be respread over the site as required to achieve a minimum depth of 75mm of hydromulchable soil (exact required depth to be confirmed by supplier). The site shall be stabilised and revegetated using a hydromulch mix (or equivalent) to be specified by the supplier, as appropriate for the site. Soil testing may be required to tailor the mix for the site.

If hydromulching is not suitable for site stabilisation, the below seed mix can be used for temporary stabilisation, assuming topsoil depths are sufficient.

SEASON	STABILISATION SEED MIX
Autumn/Winter	Oats at 40kg/ha and Japanese millet at 10 kg/ha
Spring/Summer	Oats at 20kg/ha and Japanese millet at 20 kg/ha

Table 1.1 – Stabilisation Seed Mix Table

The above seed mix will provide temporary protection for up to 6 months until such time as more permanent stabilisation measures can be implemented for permanent stabilisation of the site.

Any areas that remain exposed after disturbance, where no further works are to take place for a period of 12 weeks must be stabilised by the methods mentioned in this point (g) or an equivalent.

- h. All vehicles shall leave the site via the stabilised site access onto Gymnasium Road. **It is proposed to construct Temporary Stabilised Construction Exit as shown on Drawing S_0-CV-0015.** Vehicles shall have sediment removed from tyres and wheel guards prior to leaving the site. **Wheels will be washed down during wet weather conditions when required.**
- i. **In relation to DA Condition B21(c). When we are alerted to rainy weather in the area, workers will place protective sheets on scaffolding and remove loose items such as tools. Items will be stored in areas that are protected from stormwater flows. Also, structures will be tied down. These tasks will protect the site from project-delaying damage as well as injuries.**

2.3 Groundwater Protection

All erosion and sedimentation control measures also act as protection measures for groundwater during construction. The erosion and sediment control plan within Appendix A nominate required measures. The devices are to be maintained throughout the entire excavation and construction process and must be maintained for a minimum of 3 months after the completion of works, where necessary.

From geotechnical reporting, ground water was typically viewed well below existing surface level on site. A conservative estimation has been provided some 5 to 6m below the basement bulk excavation of the site. The excavation on site for building slabs on ground and stormwater infrastructure are above this level. **The proposed works will have no impact on the Groundwater Depths and flow regime.**

Materials storage and site accommodations shall be provided to ensure that any potential contamination sources are appropriately bunded and controlled from infiltrating into the subsurface. This will be through the provision of impervious surfaces, temporary bunding in re-fuelling areas and hazardous materials storage areas.

Geotechnical Report, Project 86354, Item 10.2.5 Groundwater, states:

Based on the depths at which groundwater was measured and the proposed depths of bulk excavation, it is considered unlikely that there will be groundwater seepage associated with a regional groundwater table into the basement excavations. Nevertheless, some perched groundwater seepage along the soil/rock interface and through defects in the rock mass may occur following periods of wet weather. As the groundwater level can fluctuate due to wet weather and climatic conditions, DP suggests a design groundwater level of RL 50 m AHD.

It is suggested that sub-floor drainage should be provided below the basement floors (and walls) for drained basements. This could comprise a minimum 100 mm thick, durable, open-graded, crushed rock layer with subsurface drains and sumps. It is normally necessary to incorporate provision for regular flushing and cleaning in the maintenance and design of the sub-floor drainage system.

3 Maintenance During Construction

A regular site maintenance program shall be established for the site based upon:

- Daily site walk-over by site foreman/manager to ensure adequate condition of erosion control measures;
- A weekly site audit of erosion control measures during periods of dry weather; and
- A site audit of all erosion control measures following a rainfall event.

The site maintenance program shall be conducted until site stabilisation measures have been established on site, and shall ensure (as a minimum) that the following activities are routinely conducted:

- a. Waste bins are to be emptied at least weekly and refuse is to be disposed of via an approved waste facility.
- b. All potential dust and air pollutants vulnerable to wind erosion must be controlled effectively. This includes waste bins, unsealed access tracks, and stockpiles etc.
- c. Ensure that all drains are operating effectively and make any necessary repairs.
- d. Remove any spilled material from areas subject to runoff or concentrated flow.
- e. Remove trapped sediment where the capacity of the trapping device falls below 60%. Sediment removed from any trapping device shall be relocated where further pollution to downslope lands and waterways cannot occur.
- f. Construct additional erosion or sediment control works as may be appropriate to ensure the protection of downslope lands and waterways.
- g. Maintain erosion and sediment control measures in a fully functioning condition at all times until the site is rehabilitated, making repairs to measures as necessary; always keeping all potential hazards of soil erosion and any potential pollutants to downslope areas to a minimum.
- h. A chemical flocculent (such as gypsum) may be dosed to aid settling of sediments in temporary basins within 24 hours of the conclusion of each rainfall event. The applied dosing rates should achieve the target quality within 36 to 72 hours of the conclusion of the rainfall event. pH testing of water shall be conducted prior to the release of any treated run-off into downstream waterways.
- i. Ensure rehabilitated lands have effectively reduced the erosion hazard and initiate upgrading or repair as appropriate.
- j. Ensure that the revegetation scheme is adhered to and that all grass covers are kept healthy, including watering and mowing. Excessive growth should be controlled as necessary.
- k. Remove temporary soil conservation structures as the last activity in the rehabilitation program.

For further and more detailed maintenance measures, refer to Chapter 8 of Landcom's *Soils & Construction - Managing Urban Stormwater*. Guidelines applicable to the inspection of erosion and sediment control measures have been appended to this report to inform an inspection checklist.

Reports covering a variety of anticipated environmental issues were prepared during the planning and design phase of this project. Contractors are to make themselves aware of these reports and the objectives and outcomes identified. The following reports should be read in conjunction with this Construction Soil and Water Management Plan:

- Geotechnical Report prepared by Douglas Partners Date June 2018 Ref: 86354.00.
- Detailed Site Assessment prepared by EIS Date: 7 November 2017
- Environmental Impact Statement prepared by Ethos Urban Date: June 2018 Ref: 17336
- Arborist Report and Tree Management Plan prepared by Australian Tree Consultants Date 27 November 2017 Ref: ATC 17-136
- Construction Management Report prepared by FDC. Date 29 April 2019 Ref: 250075
- Construction and Demolition Waste Management prepared by FDC Date April 2019, Ref: 250075
- Operational Waste Management Plan prepared by ARUP Date 3 November 2017, Ref: 251278-00
- Environmental Site Assessment Report, Delineation Assessment and Remediation Action Plan prepared by Geo-Logix Ref: 1901016Rpt01

4 Mars Creek Erosion Control

Due to part of the works being completed within the Mars Creek corridor the risk of flooding within some areas of the site has to be considered. Flood mapping prepared by ARUP during the planning and design phase of the project has been consulted in the development of the site establishment plan and erosion and sediment control plan. A Flood Emergency Response Sub-Plan has also been prepared and shall be implemented for the duration of the construction works.

Figure 2 below presents the existing 1% AEP flood conditions within the proposed development. The site establishment plan appended to this report locates the site accommodation and materials stockpile areas outside of the flood extents identified within Figure 2.

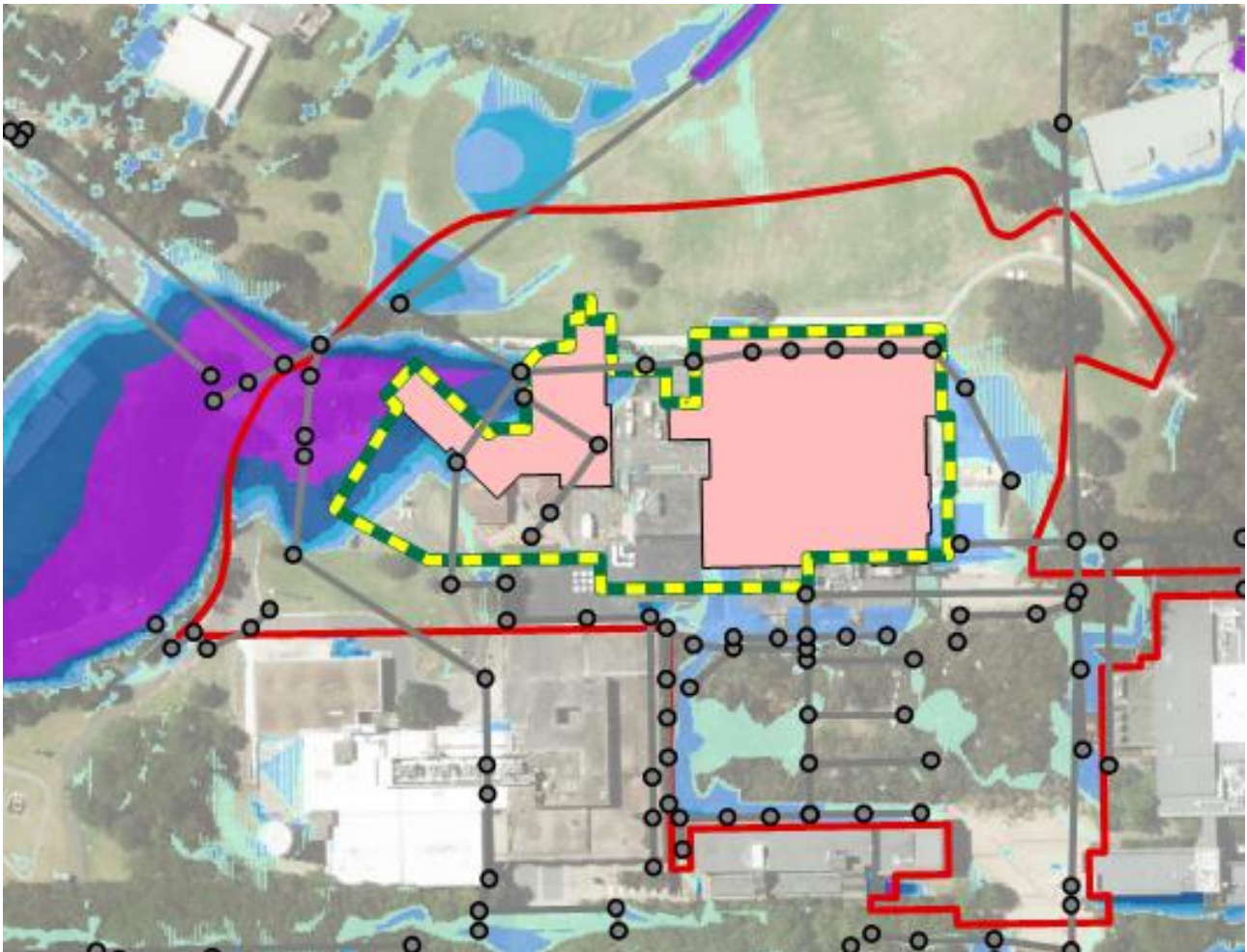


Figure 1 – Existing 1% AEP Flood extent (ARUP)

During small storm events up to an including the 0.2EY are retained with the Mars Creek corridor upstream of Gymnasium Road and are drained through the existing DN1800 culvert under Gymnasium Road directly to Macquarie Lake. The existing high capacity inlet will remain in operation throughout the duration of the construction works. All erosion and sediment controls shall be implemented within the Gymnasium Road corridor to not impede any stormwater flows into the upstream pit and pipe system within Mars Creek.

During large storm events up to and including the 1% AEP storm it is anticipated that stormwater flows will overtop Gymnasium Road and flow through the existing amphitheatre towards Macquarie Lake. Due to the severity of these events many media channels provide forewarning of extreme storm events including the Bureau of Meteorology website, SES bulletins, FM and AM radio channels and TV news outlets at least 24 hours prior to the event.

Should the weather forecast be predicting a large storm event sandbags and stabilised earth berms will be provided as required to convey flows along a controlled path through the Mars Creek corridor towards Macquarie Lake.

The large overland flows experienced during extreme storm events shall be restricted to a single corridor through the site to protect the remainder of the works and minimise the erosion and sediment introduced into the waterway. The erosion and sediment control plan indicates a zone through which the overland flows shall be directed which minimises the impact to both the proposed development and the Mars Creek corridor.

Further information on site management during flood events is provided within the Flood Emergency Response Sub-Plan.

5 Council Consultation

Ryde City Council was contacted during the development of the Erosion and Sediment Control Plans and Details and a Senior Co-ordinator in Development Engineering reviewed the plans and provided the following comments:

- All works are contained well within the confines of the site and unlikely to affect regions of public domain.
- The soil erosion plans referencing a sediment basin which callout note refers to separate detail. This is not in the plan.
- Sediment Basin 2 is in proximity to a defined flow path. It is suggested siting and refining dimensions of the basin well clear of this if possible, given the ramifications of it being degraded (either by inundation or erosive action) by overland flow arising from extreme storm events.
- Condition B22 (Flood Emergency Response Sub-plan) addresses construction logistics during an extreme flood event.

SCP have reviewed the comments and updated the the Erosion and Sediment Control Plans and Details to address these comments. Plans and Details have been appended to this report.

6 Conclusion

The following strategies have been documented and require implementation to ensure that the requirements of the SSD Condition of Consent is achieved:

- Erosion and Sediment Control measures, as per the details with Appendix A.
- Monitoring and maintaining the installed measures, as per details in Section 3.
- Following recommendations within the various reports listed within Section 3 is achieved.
- Ensure all storm events within hazardous areas are managed in accordance with details provided in Appendix A and Section 4.
- Confirm consultation has occurred with Council. Comments received have been provided in Section 5.

Throughout construction site conditions and construction methodologies can change. Therefore, it is recommended that soil and water management measures are reviewed regularly and amended as required, to ensure that the development has minimal to no impact on the local environment.



TEMPORARY DRAINAGE PIPE

CATCHMENT AREAS

06

1. EROSION AND SEDIMENT CONTROL HAVE BEEN DESIGNED TO MAINTAIN 1 IN 10 YEAR ARI STORM.
2. MARS CREEK MAJOR OUTFALL AND FLOW PATH HAS BEEN DESIGNED TO MAINTAIN 1 IN 10 YEAR ARI STORM.
3. WORKS SHALL BE SEQUENCED TO AVOID DOWNSTREAM AREAS BEING FLOODED BY INCOMPLETE WORKS UPSTREAM.
4. EROSION AND SEDIMENT CONTROL SHALL BE INSTALLED FROM COMPLETION TO UPSSTREAM AT THE COMMENCEMENT OF THE PROJECT AND NOT REMOVED UNTIL ALL LANDSCAPE FINISHES HAVE BEEN FINALIZED FOR THE AREA OF THE WORKS THE CONTROL PROTECTS.

A	ISSUE FOR TENDER	23.04.2019
Rev	Revision Description	Date

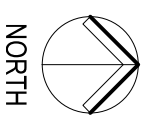


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Project
MACQUARIE UNI CENTRAL
COURTYARD PROJECT

Table SEDIMENT AND EROSION CONTROL PLAN



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4.5 Flood Emergency Response Plan

Flood Emergency Management Plan

Macquarie University

SCP Ref: 180122

Client FDC Construction and Fitout
Project Macquarie University Central Courtyard Project
Date 11 May 2020

Revision table

Revision #	Date	Issue description	Prepared by	Reviewed by	Issued by
A	24/04/2019	Draft for Review	JC	-	JC
B	09/05/2019	Final	JC	JB	JC
C	17/05/2019	Final-Revised	GK	-	GK
D	03/12/2019	Final – Re-issued	JC	-	JC
E	11/05/2020	Final – Re-issued	JC		JC

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1 Introduction

As part of the detailed design process for the civil and stormwater works associated with the Macquarie University Central Courtyard Redevelopment, SCP Consulting have been engaged to develop a Flood Emergency Response Sub-Plan (FERSP). This sub-plan is currently required under condition B25 of the State Significant Development Application Conditions of Consent (SSD-8755) and NSW Floodplain Risk Management Guidelines.

1.1 Purpose of Report

The purpose of this report is to:

- Describe the flood emergency response during the construction works;
- Outline predicted flood levels for large storm events;
- Identify flood warning times and flood notification procedures.
- Identify emergency assembly points and evacuation routes and protocols.
- Describe awareness training for employees and contractors involved with the construction works;

1.2 Proposed Development

The site is located in Macquarie University between Gymnasium Road and Wally's Walk in Macquarie Park and within the City of Ryde local government area. The site is approximately 3.4 ha and the proposed development footprint covers the majority of the central courtyard precinct. Mars Creek flows from south west to north east along the western boundary of the proposed development. Figure 1 below presents the site location within the University.

The proposed development includes the construction of a new multi-function building, student accommodation, fit out of existing buildings along with upgrades to existing site infrastructure and landscaping. Rehabilitation of Mars Creek from Gymnasium Road to Macquarie Lake shall also be completed as part of these works.

Due to the location of the proposed development and rehabilitation of an active creek alignment a robust site management plan must be implemented to ensure that flood emergency response is considered and communicated to all employees and contractors involved with the proposed development.

The proposed construction works are to be undertaken in a conventional construction sequence and are not proposed to be staged with the basement excavation and associated landscape earthworks being the commencement of the works followed by structure and fit out of the proposed buildings and landscaping of surrounding areas not impacted by the building works completed immediately after the completion of the earthworks.

This report details the triggers, responses and training required to appropriately manage flood risk on-site from the commencement of works until the completion of construction, in order to effectively manage all employees and contractors and to protect the surrounding properties and critical infrastructure from flooding.

Staff, students and visitors to the University which are not involved with the construction of the Central Courtyard project are not considered under this FERSP and should make themselves familiar with the appropriate response plans developed by the University for flood prone areas across their campus.

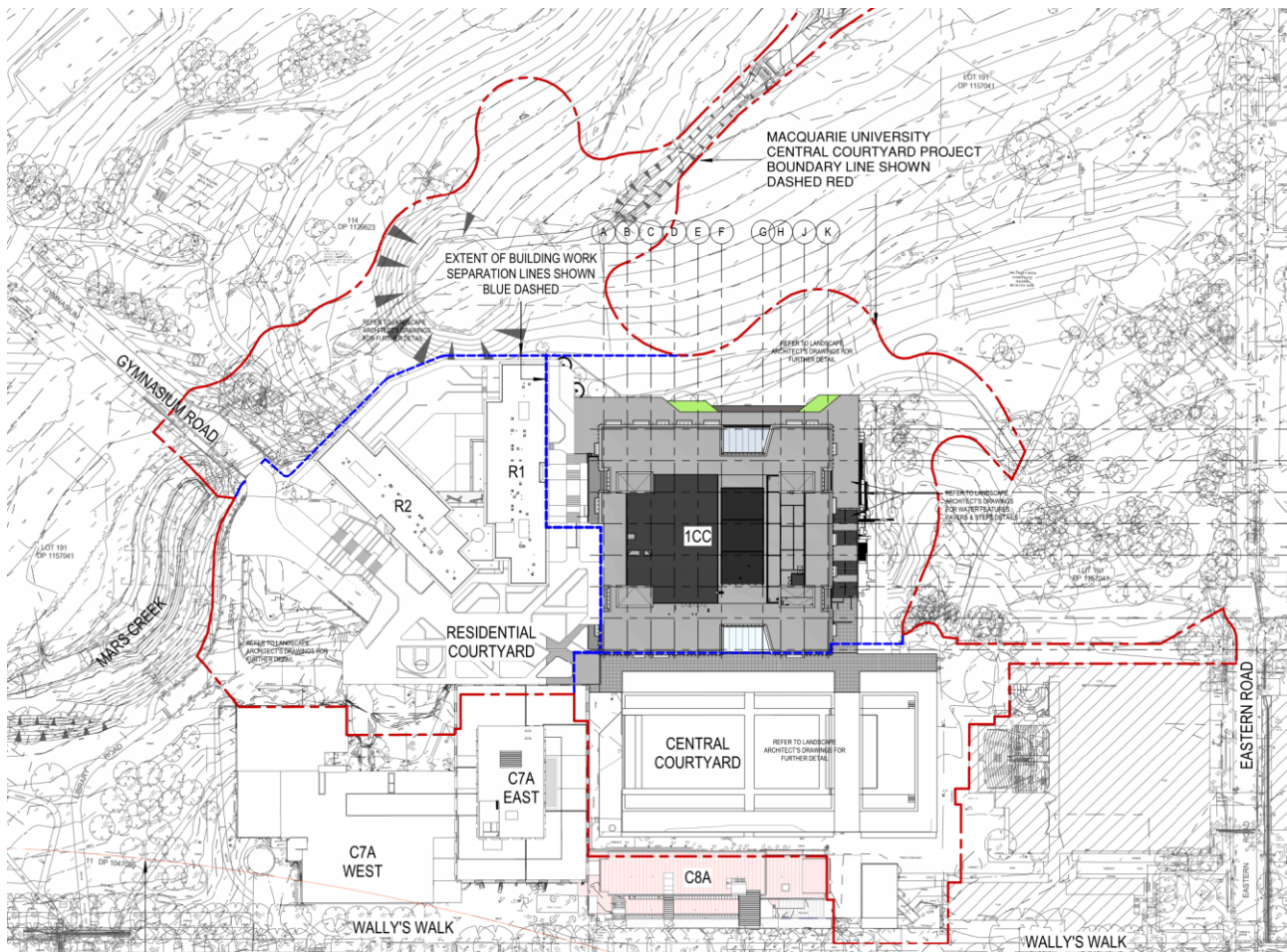


Figure 1 – Site Plan

2 Flooding

Flood mapping of Mars Creek adjacent the Central Courtyard redevelopment was initially completed as part of the Macquarie Park Floodplain Risk Management Plan by Bewsher on behalf of City of Ryde and was refined by ARUP during the planning phase of the project. The flood maps below prepared by ARUP present flood extent and flood depths across Macquarie University for the Mars Creek catchment and it's surrounds for the 20 Year and 100 Year ARI (Average Recurrence Interval) as presented in Figures 2 and 3 below.

From Figures 2 and 3 it is clear that the western edge of the site is impacted by flooding from Mars Creek during the 20 year and 100-year ARI storm event. The following flood levels have been estimated from the flood maps provided.

20 year flood level – RL 55.80

100 year flood level – RL 56.00

The ARUP flood modelling confirms that the 2-hour storm is the critical duration for the 100 year storm event. This critical duration shall be considered when developing flood warning times and evacuation notifications for the proposed construction works.

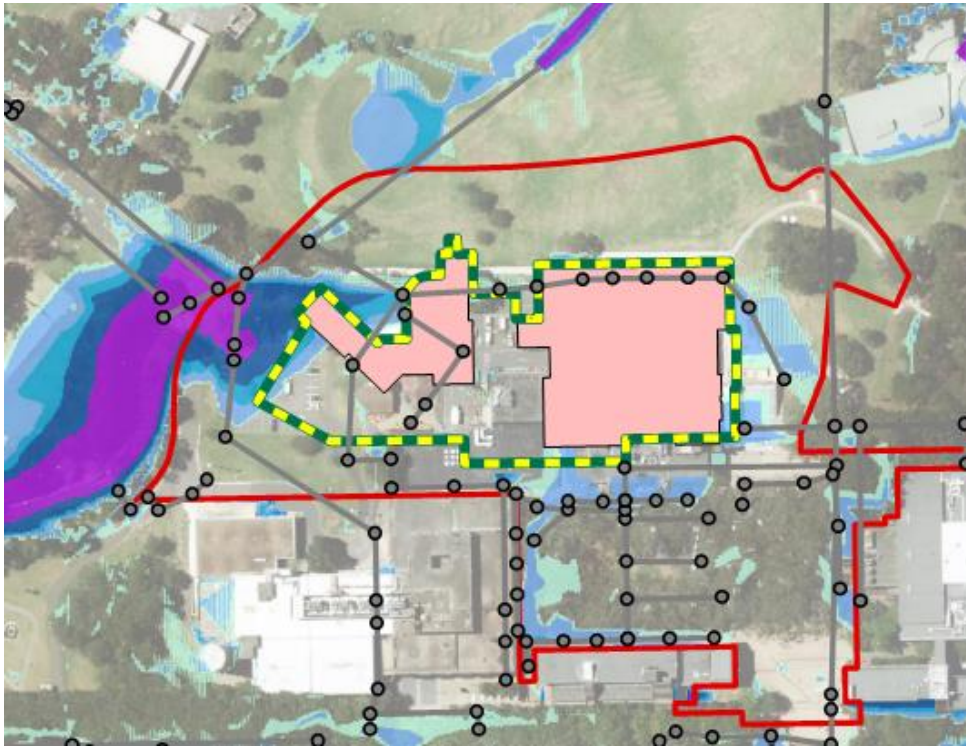


Figure 2 – Existing 20 Year ARI Peak Flood Depth (ARUP)

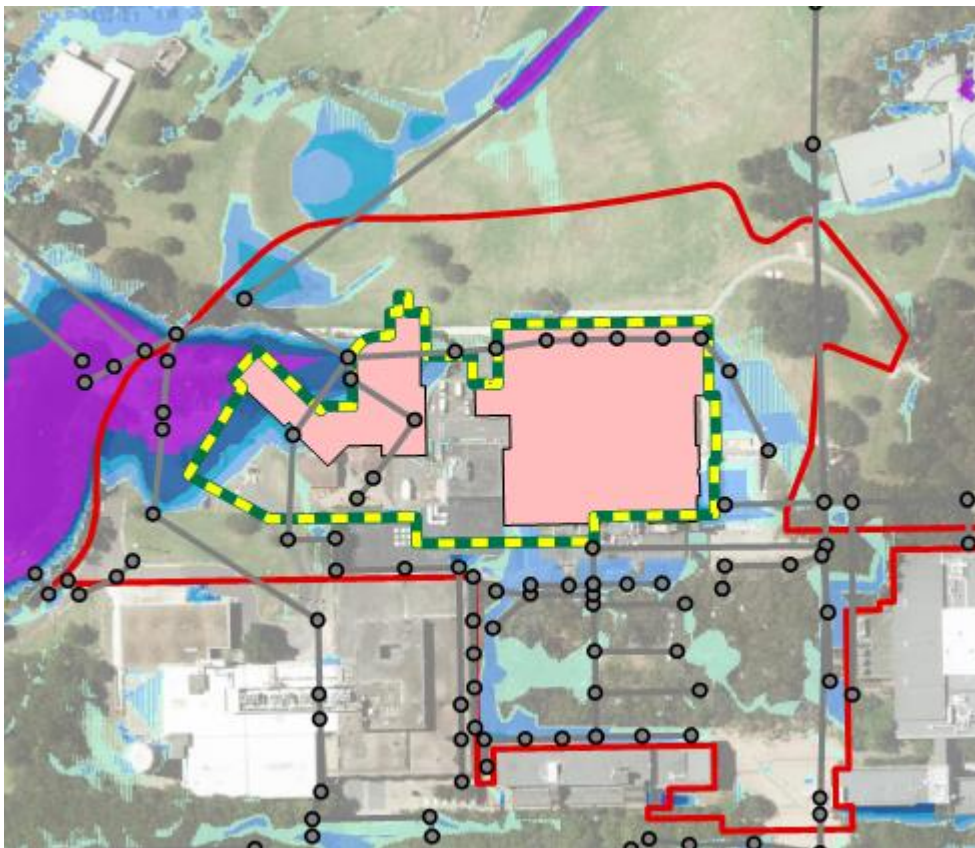


Figure 3 – Existing 100 Year ARI Peak Flood Depth (ARUP)

From Figures 2 and 3 above it can be seen that the extent of flooding within the site is isolated to the western side of the site. Site sheds and amenities, hazardous materials storage, stockpiles and crane bases have been located outside of the 100 year flood extent.

Given the limited extent of flooding within the site the following sections relate mostly to the flooding experienced within Mars Creek corridor as the main site area is not considered at risk of flooding from the provided flood maps.

3 Flood Warning

Flood warnings are provided through many communication channels when extreme storm events are forecast. Applications such as Weather-Zone, the Bureau of Meteorology, FM and AM radio stations and SES bulletins all provide notification of storm events which have the potential to cause flooding.

If Macquarie Park is forecast as having a storm or large amounts of rainfall during any day the site is operational this shall be communicated to all workers within the pre-start meeting and the site manager and supervisors tasked with regularly checking their preferred communication channel for updates on imminent heavy rainfall.

3.1 Warning Timeframe

The critical 100-year storm event duration has been identified as the 2-hour event. This does not mean that the peak flood level will occur exactly 2 hours after a heavy rainfall event commences but does provide an indication on how rapidly the water levels will rise within Mars Creek. It is recommended that a flood gauge be installed in a visible location upstream of Gymnasium Road to provide indication of the rate of rise in flood levels within Mars Creek for the duration of the construction works.

15 minutes after heavy rainfall commences all plant should be relocated to an area above the 100-year flood extent on the eastern side of the site. All work shall cease within the flood prone area and employees and contractors shall take shelter within the site amenities as located on the site establishment plan appended to this report.

Works should not recommence within any flood prone area until 1 hour after the water level upstream of Gymnasium Road has started to subside. At this time the site manager will issue the 'All Clear' and the exclusion zone removed.

3.2 Flood Warning Notification

Flood warning notifications are the first stage of the flood warning system implemented by the managing contractor. Flood warnings are triggered when flooding is likely to cut evacuation routes or inundate flood prone areas of the site.

During any rain event the site manager and/or supervisor shall review the flood gauge in the upstream reach of Mars Creek at the commencement of the rainfall, 5 minutes and 10 minutes after the rainfall event starts. If a significant rate of rise is observed (greater than 0.6m/hr) then the site manager or supervisor shall notify any workers within the flood extent to cease work immediately and relocate themselves, plant and any other loose items clear of the flood prone area.

A call shall be put over the site radio that a flood notification has been issued and the areas of the site within the 100 year flood extent shall be classified as an exclusion zone during the rainfall event. Given the location of the temporary site access road this includes the main entry/exit to the site. This is discussed further in Section 4.

3.3 Assembly Location and Refuge Protocol

In the event of a flood notification being issued all workers within the flood prone areas shall assemble at the site accommodation and where a check will be undertaken to ensure all employees and contractors present in the flood prone area during the notification are accounted for.

Should any employees or contractors be unaccounted for the following emergency steps will be followed:

1. A radio call be put out across the emergency site channel asking for the missing workers to identify themselves at the assembly point immediately. This call shall be put out three (3) times;
2. The site manager/supervisor that issued the flood notification shall inspect the flood prone area from an area outside of flood exclusion zone to see if the missing worker can be identified;
3. Contact with the missing worker shall be attempted using any means necessary including email, mobile phone call, office phone call, text message, etc.
4. Should a worker and/or plant become trapped in rising flood waters then the emergency services shall be called to conduct a flood rescue. **AT NO TIME SHALL ANY EMPLOYEES OR CONTRACTORS ENTER THE FLOOD EXCLUSION ZONE WHILST FLOOD WATER ARE STILL RISING**

Workers shall take refuge in the site accommodations until the flood risk has abated and the 'All Clear' has been provided by the site manager to return to work.

4 Flood Evacuation

Since the site is only partially flood prone and site accommodations have been located outside of the 100-year flood extent there is no foreseeable reason why the site would have to be fully evacuated due to a flood. Should an evacuation be required for any other reason then the Emergency Management Plan prepared by the managing contractor shall be implemented.

4.1 Site access during flooding

Given the main site access is from Gymnasium Road across Mars Creek there are no employees or contractors will be able to leave the site in a westerly direction during heavy rainfall as the main site access is located within the flood exclusion zone.

Should workers or contractor be required to leave site they shall notify the site manager and leave the site in a southerly or easterly direction along Wally's Walk or Eastern Avenue towards Macquarie Shopping Centre or Epping Road.

Only once the flood risk has abated and the site manager issued the 'All Clear' shall the main site access be open and egress to the west of the site be re-established.

5 Flood Awareness Training

Flood awareness training shall be provided as part of site-specific induction for all employees and contractors as part of the induction process.

The following items shall be covered as part of the flood awareness:

- Location of the flood exclusion zone and predicated flood levels in Mars Creek;
- Details of flood warning times and flood warning notifications;
- Assembly locations and refuge protocols;
- Changes to site access during heavy rainfall;

Workers involved in the civil and landscaping works within Mars Creek shall have pre-start meetings and Toolbox Talks focussed on the risks associated with working in flood prone areas including the rapid rising flood waters and entering flood waters.

6 Flood Emergency Response For Both Construction and Operational Phase

During proposed construction works all site employees and contractors will be informed about the University's site wide flood evacuation/emergency management plan requirements and guidelines.

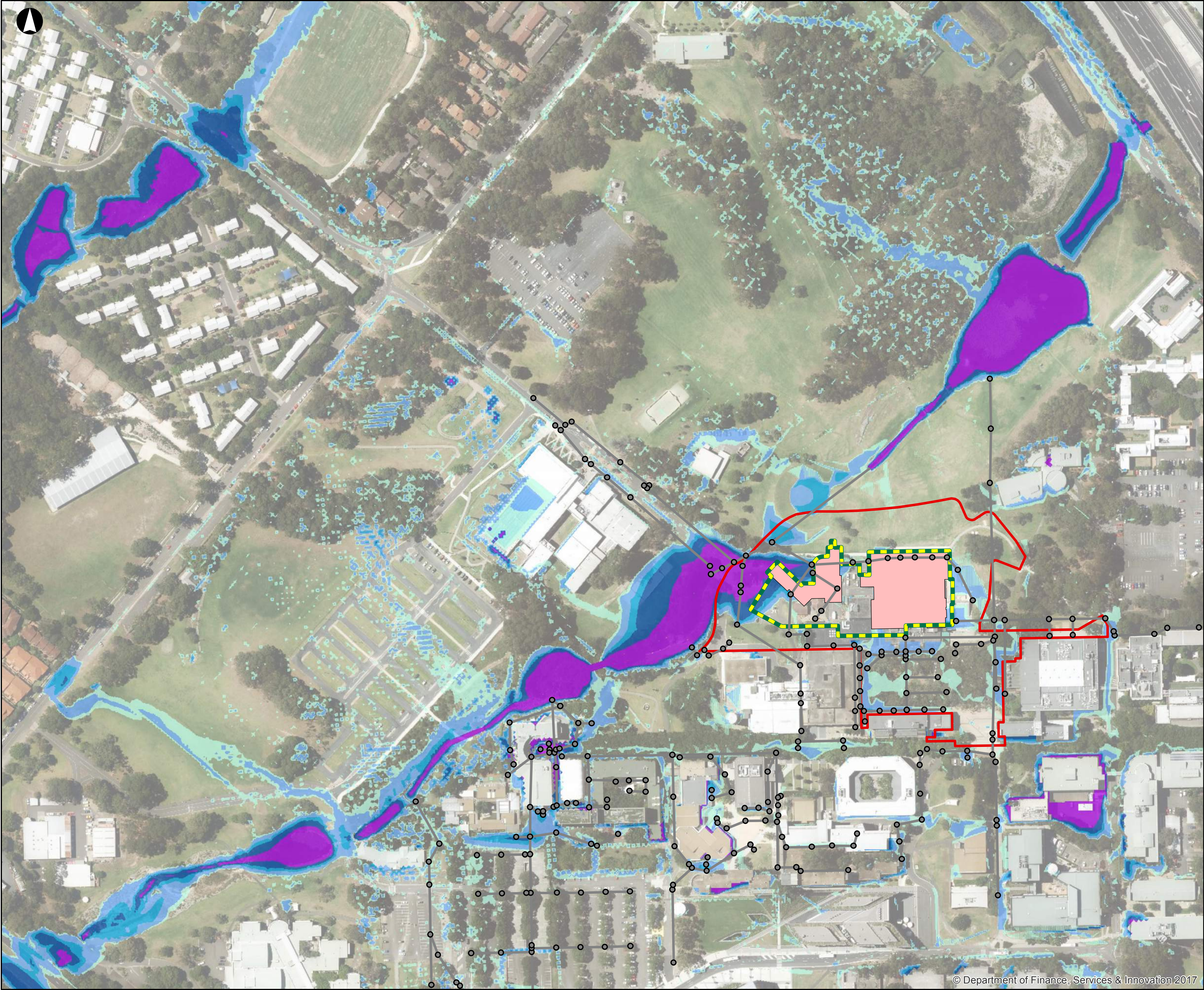
FDC Construction will work with the University prior to completion of works, to incorporate any changes required to this plan as a result of this development.

7 Conclusion

The following strategies have been documented and require implementation to ensure that the requirements of the SSD Condition of Consent is achieved:

- Predicated flood levels and extent of flooding on-site, as outlined in Section 2.
- Flood warning times and flood notification Monitoring, as per details in Section 3.
- Assembly points and refuge protocols as detailed in Section 3.
- Changes to site access as a result of flooding as detailed in Section 4.
- Ensuring employees and contractors are aware of the site-specific flood risk as outlined in Section 5.

Appendix A Flood Maps



Proposed Precinct Outline

SSDA Proposed Buildings

Combined Basement

Proposed Pits

Proposed Pipes

Existing Pits

Existing Pipes

Flood Depth (m)

0.05 - 0.1

0.1 - 0.3

0.3 - 0.5

0.5 - 1

> 1.0

B

2017-10-20

GK

MR

DC

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Date

By

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140

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Client

MACQUARIE
University
SYDNEY AUSTRALIA

Job Title

Macquarie University Central Courtyard

Precinct and Mars Creek Flood Assessment

Drawing Title

Existing Peak Flood Depth

100 year ARI

Scale at A3

1:3,000

Job No

251278-00

Drawing Status

Preliminary

Drawing No

S_0-INFRA-CV-IM-101

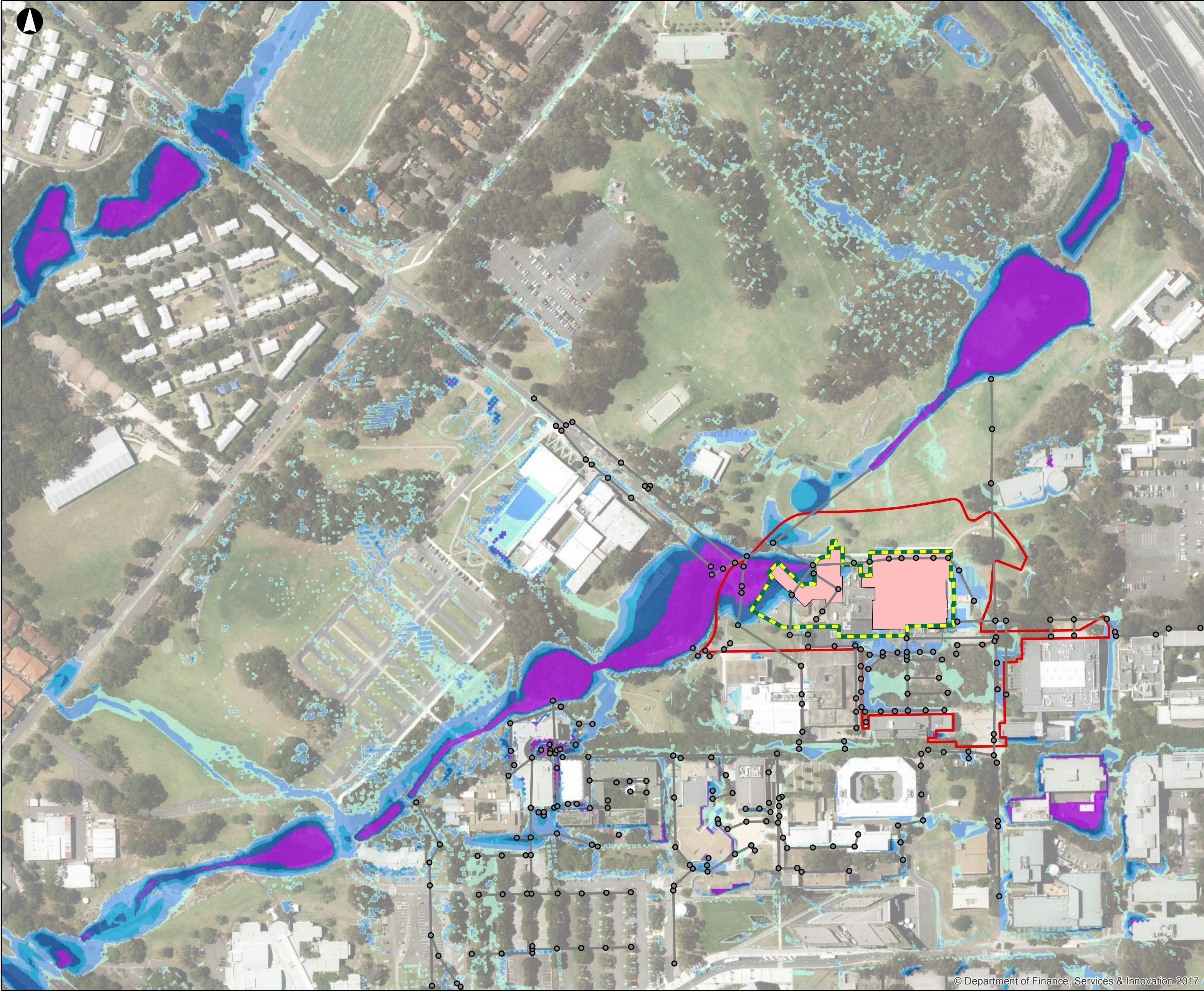
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Proposed Precinct Outline

SSDA Proposed Buildings

Combined Basement

Proposed Pits

Proposed Pipes

Existing Pits

Existing Pipes

Flood Depth (m)

0.05 - 0.1

0.1 - 0.3

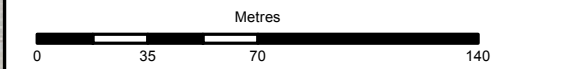
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Rev	Date	By	Chkd	Appd
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Client

MACQUARIE
University
SYDNEY AUSTRALIA

Job Title

**Macquarie University Central Courtyard
Precinct and Mars Creek Flood Assessment**

Drawing Title

**Existing Peak Flood Depth
100 year ARI + Climate Change**

Scale at A3

1:3,000

Job No

251278-00

Drawing Status

Preliminary

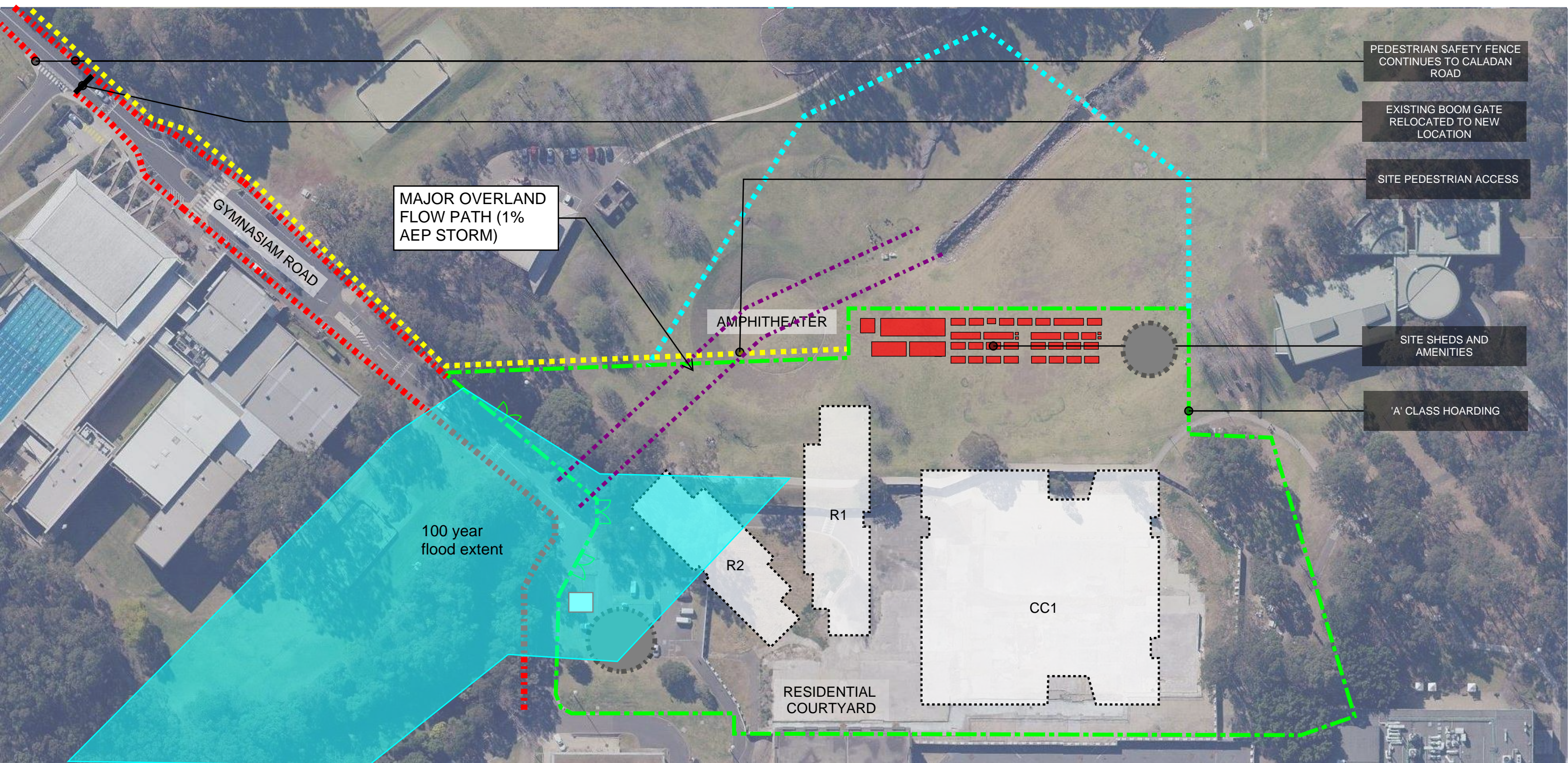
Drawing No

S_0-INFRA-CV-IM-102

Rev

A

Appendix B Site Establishment Plan



- 'A' CLASS HOARDING
- ATF FENCING
- MATERIAL STOCKPILE
- PEDESTRIAN SAFETY FENCE
- SITE ACCOMODATION
- SITE SMOKING AREA



4.6 Communication and Stakeholder Plan

Communication & Stakeholder Plan

Project Details

Project Name: Macquarie University Central Courtyard Precinct

Project Number: 250075

Project Location: Gymnasium Rd, Macquarie Park

Principal: Macquarie University

Name of principal contractor: FDC Construction (NSW) Pty Ltd

Company address: 22-24 Junction Street Forest Lodge 2037

ABN: 72 608 609 427

Prepared
Signature



Anthony Hurst
Site Manager

Approved
Signature



Simon Friend
Project Manager

Rev Date	Revision Description	PM's Initials (acceptance of changes)
27/03/19	Revision A – Project Start-Up	SF
	Revision B – CI Review	SF
17/04/19	Revision C – Updated to reflect CI comments	SF
16/05/19	Revision D – Updated to reflect to PCA comments	SF
26/11/19	Revision E – 6 Monthly Review	SF
07/07/20	Revision F - 6 Monthly Review	SF

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1. Overview

1.1 Purpose

This Communications strategy has been developed to provide a framework for action for communication activities to be associated with the construction of the new 1CC building, R1/R2 building and refurbishment of the existing Lincoln building including Central Courtyard works and Mars Creek upgrade..

The plan will define the communication requirements for the project and how information will be distributed between the key project stakeholders for the duration of the project.

The Communications Management Plan defines:

- Key Project Stakeholders
- What information will be communicated
- How the information will be communicated
- Who undertakes the communication
- Who receives the communication

1.2 Background

The latest iteration of the campus Master Plan places a clear emphasis on the quality of public realm and external spaces as the means of generating a memorable campus with a sense of place and identity.

Four key components were identified:

- the need to create an iconic entrance and campus identity at Herring Road;
- the need to create a distinct campus heart with a number of places with different characters and purposes that are activated at different times;
- a public realm that reflects the campus brand and identity and that connects the different precincts and spaces, maximising pedestrian accessibility and amenity; and
- the need to create a sense of space that meets the growing desire from students and staff to feel a part of something bigger and a sense of belonging to the organisation.

The Macquarie University Central Courtyard Project (MUCCP) is key to the University's objective in developing detailed strategies for research, administration and learning and teaching functions through creating communities, creating precincts, accommodating research, accommodation administration and accommodating Learn and Teaching functions.

The MUCCP shall reinvigorate and redefine the Central Courtyard as the 'Campus Heart', creating a public realm that reflects the campus' brand and maintains the existing design legacy, whilst maximising pedestrian accessibility and amenity and establishing a strong connection with new teaching and learning research space and a new student housing precinct.

1.3 Project Scope

The project comprises the following stages:

- Stage 0 – civil and landscaping works to Mars Creek, Mars Creek diversion works and flood mitigation to allow the substation located in R2 to above the 1 in 100 year flood zone;
- Stage 2 – renewal of the existing Public Domain (plaza) space to reflect the campus brand and identity and connect the different precincts and spaces;
- Stage 4 – the refurbishment and conversion of the Ground Floor of the Lincoln Building (16 Wally's Walk) to seven food and beverage outlets (approximately 507m2), with office

space for University Administration use equal to an A grade office facility on the upper two floors (approximately 2,500m²);

- Stage 5a - Construction of a new Learning and Teaching building (1CC), includes formal and informal teaching spaces (1st and 2nd level), food and beverage to 13 retail spaces (approximately 633m²) (ground level) which incorporates the University student bar (Ubar), Graduation hall and function space (basement level) which incorporates food and beverage (back of house spaces) approximately 21,210m²; and
- Stage 5b – construction of 2 new student accommodation providing 342 student beds, function spaces and ancillary spaces (approximately 11,500m²).

1.4 Project Stages

Milestone	Indicative Date/s
Separable Portion 2 - Completion of the Mars Creek works	06/05/2020
Separable Portion 3 - Construction, commissioning and defects free completion of the landscaping and infrastructure to the Central Courtyard (Stage 2 works), including any temporary lighting or security required to activate this space prior to these services being available from 1CC, in accordance with the Contract	21/04/2020
Separable Portion 4 - Construction, commissioning and defects free completion of 16 Wally's Walk (Stage 4 works) in accordance with the Contract, including provision of an Occupation Certificate for the entire area. This includes any temporary services connections until the shared services in 1CC are commissioned	25/05/2020
Separable Portion 5 - Access for retail fit out to the Lincoln Building	20/02/2020
Separable Portion 6 - Construction, commissioning and defects free completion of 1CC (Stage 5a works), including the connection of permanent services to Milestone 2 in accordance with the Contract, including provision of an Occupation Certificate for the entire area	07/01/2021
Separable Portion 7 - Access for retail tenants to 18 Wally's Walk to commence their fit out works	18/09/2020
Separable Portion 8 - Construction, commissioning and defects free completion of R1 and R2 (Stage 5b works), in accordance with the Contract, including provision of an Occupation Certificate for the entire area	15/12/2020
Separable Portion 9 - Relocation of users into Lincoln Building	23/06/2020
Separable Portion 10 - Landscape establishment for Separable Portions 2, 3 and 4	01/05/2021
Separable Portion 11 - Landscape establishment for Separable Portions 6 and 8	02/01/2022

1.5 Document Maintenance

- This document will be reviewed and updated as communication needs for the project change. When changes occur, the document's revision history log will reflect an updated version number as well as the date, the owner making the change, and change description will be recorded in the revision history log of the document.

2. Key Project Personnel

2.1 Principal's Personnel

Role	Organisation	Representative
Project Director	Macquarie University	Tony Carton
Lead Project Manager	Capital Insight	Elisabeth Wallace
Senior Project Manager	Capital Insight	Ilia Vidin
Assistant Project Manager	Capital Insight	Janbry Nibbelink

2.2 Principal Contractor's Key Personnel

Role	Organisation	Representative
Project Director	FDC Construction (NSW)	Damon Malek
Senior Project Manager	FDC Construction (NSW)	Simon Friend
Project Manager	FDC Construction (NSW)	Troy Thomas
Project Manager	FDC Construction (NSW)	Michael Badaoui
Design Manager	FDC Construction (NSW)	David Saczko
Services Manager	FDC Construction (NSW)	TBC
Builder – IMS Coordinator	FDC Construction (NSW)	Joe Abraham
Communications & PQMR	FDC Construction (NSW)	TBC
Commercial Manager	FDC Construction (NSW)	Richard Benn
Senior Site Manager	FDC Construction (NSW)	Anthony Hurst
Senior Site Manager	FDC Construction (NSW)	Mathew Hogan

2.3 Principal Contractor's Design Personnel

Role	Organisation	Representative
Architect (novated)	Architectus	Eric Lee
Structural Engineer	SCP	David Templeton
Civil Engineer	SCP	James Clare
BCA & PCA (novated)	BM+G	Dean Goldsmith
Fire Engineer (novated)	Arup	Dean Pramualphol

Access (novated)	Morris Golding	David Goding
Landscape Architect (novated)	Aspect	Natalie Bernuetz
Façade	Inhabit	Matthew Davidson
ESD Consultant	Northrop	Peter Young
Acoustic Engineer	Northrop	Peter Young
Geotechnical Engineer	TBA	TBA
Services Design FDC Peer Review	Northrop	TBA
Electrical D&C	TBA	TBA
Mechanical D&C	TBA	TBA
Hydraulic D&C	TBA	TBA

2.4 Principal Roles & Responsibilities

FDC understands that the following stakeholders will be involved in Project Communications. Communication with these stakeholders will be via the Principal unless otherwise directed by the Principal.

Team Member	Responsibilities
Capital Insight	<p>Overall management accountability for all activities relating to the project.</p> <p>Liaison with principal stakeholders who will act on behalf of the University.</p> <p>Facilitates and attends stakeholder meetings and briefings.</p> <p>Responds to specific issues raised by stakeholders and incorporates into this plan</p>

3. Meetings

The following meetings will be scheduled for the purpose of ongoing communication and coordination between the Principal, FDC and any other relevant stakeholders.

Meeting Type	Objectives	Frequency	Attendees	Deliverables
Interface Meeting	Review of project status and any interfaces with the University or other stakeholders	Weekly or as deemed necessary	FDC Project Team as required	Agenda Meeting minutes
Project Control Team (PCT)	Report on the status of the project including progress, costs and issues. Review requests for endorsement.	Monthly	PCT Group	PCG Report by FDC Meeting minutes
Precinct Meeting	Interface with Campus operations	Fortnightly	Representatives from Campus Life and MU Property, Capital Insight & FDC Team	Meeting Minutes Communications Strategy Disruption Notices
User Group Meetings	Seek approval of Design from Users	As required	Relevant Users, MU, CI, FDC team, Consultants	Meeting minutes Approved design
Design Meeting	Rationalise Project Design & coordination	Weekly or as deemed necessary	FDC Design Manager, FDC Project Team as required & Consultants	Agenda Meeting minutes
Services Coordination	Coordination of services	Weekly or as deemed necessary	FDC Design Manager, FDC Project Team as required & Consultants	Agenda Meeting minutes
Trade Specific	Trade specific design and documentation	Weekly or as deemed necessary	FDC Project Team as required	Agenda Meeting minutes
High Risk Workshops	Review upcoming high risk trades / activities	As required	FDC, CI	High risk workshop report

4. Project Correspondence

Correspondence is to be issued via Aconex.

All Aconex communications would be directed to suit the way that Aconex has been established by the University

4.1 Distribution

- Distribution of documentation is to be agreed prior to project commencement to establish lines of communication for various correspondence types.
- In the event that additional project personnel are included in correspondence by the originator of the correspondence, responses to the correspondence should also include those personnel.
- All controlled correspondence is to be distributed using *Aconex*

4.2 Documentation

- Documentation transmittals via Aconex platform

5. Key Communications About the Project

5.1 Internal Principal Communications

Ongoing regular communications will be required for FDC to notify University users and stakeholders of impacts of the works on the University environment.

Disruption Notices will be submitted for any works outside of FDC site boundary, or that will have an impact on the broader campus, with approval required prior to proceeding with the respective works Appendix 1.

5.2 Key Messages to the Community

The following key messages about the project are assumed and are to be reflected in project related communications:

- The University is committed to minimising construction impacts through implementation of appropriate mitigation measures and through consultation and communication about the project
- The University has an ongoing long-term relationship with the community and will continue to respect this role and be a good neighbour throughout the development process
- The University is committed to providing residents with an opportunity to be informed through regular updates in various forms of media
- The University will deliver the project sensitively and with the community needs in mind

5.3 Key Communication Strategies

5.3.1 Create communication links

- Establish communication links and protocols with key stakeholders, neighbours and other key agencies that may be a point of contact for the community.

5.3.2 Stakeholder database

- Establish a stakeholder database for distribution of emailed project updates. An online form will be prepared where people can register for further contact information for communication of any issues.

5.3.3 Complaints register

- Establish a register for complaints received and to record the management and follow up actions taken by the project team.

5.3.4 Monthly updates

- Provide monthly updates available for the University to circulate and/or posted on project signage. This could include display of the latest monthly aerial photograph.

5.3.5 Local media

- FDC would assist the Principal in preparing media releases if necessary for community events and project milestones as agreed.
- All communications with local media would be directed to the Principal.

5.3.6 Fact sheet

- Preparation of a fact sheet on general issues which may be of concern to the community in relation to the project including:
 - Parking arrangements during construction (are we changing anything?)
 - Removal of hazardous materials
 - Noise
 - Dust
 - Pedestrian and bicycle access changes
 - Traffic management and road safety
 - Trees and Vegetation
 - Other issues as identified

5.3.7 Project signs

- Project signs will be displayed around the site hoardings and will include information about the project start and completion dates and project contact information, contact phone numbers and project milestone information.

5.4 Communication Protocols

- FDC and its subcontractors will respond to all community enquiries / complaints and contacts in a professional manner. All community enquiries will be reported to the Principal for inclusion on the complaints register for follow up. An example Community Relations Register is included at *Appendix 2*.
- All media enquiries will be directed to the Principal for handling. Contractors are not to respond to media enquiries in relation to their work on the project.

6. Site Incidents

The procedures outlined below relate to the communication requirements for site incidents. In addition to the requirements of this communications plan, the procedures of the Project Management Plan must also be followed. For all emergency situations the procedures of the Emergency Management Plan must also be followed.

6.1 Site Incidents – Safety Related

- It is the responsibility of FDC to communicate and report all safety incidents within the site perimeter (hoarding and/or fence line) to the following:
 - Appropriate regulatory authority for reportable incidents only as outlined within Section 17 of the Site Safety Management plan.
 - FDC management including National EHS Systems Manager, FDC Project Director and FDC General Manager.
 - The Principal.
- For safety related incidents where the Principal is notified by a member of the public or member of their staff directly, the Principal's representative should notify FDC immediately so corrective action can be put in place. The notification to FDC should be made to both the Senior Project Manager and the Senior Site Manager.

6.2 Communication, Escalation & Reporting Charts

- There are a number of instances which will require communication between FDC and adjacent tenants / neighbours with regards to safety, complaints, disruptions and so forth.
- The Communication / Escalation and Reporting Flow Chart, contained within of the Communications Plan, sets out the manner in which communication is to take place between the stakeholders.
- A clear line of communication protocol is to be established and followed to ensure all matters concerning the Principal, FDC, the tenant concerned or associated representatives are resolved in an effective and efficient manner *Appendix 3*.

6.3 Acoustic Impacts

In the event the results of noise and/or vibration monitoring indicate an exceedance of the NML or vibration criteria, the following procedure is to be followed:

- FDC to log exceeding event and note plant or activity occurring on site that is responsible for exceeding the limit.
- Establish if there has been any impact on the occupants of the nearest noise effected university building where the excessive noise or vibration levels have been recorded via FDC communication liaison and/or via weekly stakeholder meetings.
- If noise/vibration levels are found to significantly impact the occupants of the surrounding buildings, apply all reasonable and feasible noise mitigation methods as discussed in this report.
- Review results of noise monitoring data or conduct additional attended noise measurements to confirm noise mitigation methods are effective at the affected building(s).

7. Appendices

Appendix 1 – Disruption Notices

Appendix 2 – Community Relations Register

Appendix 3 – Communication & Issue Resolution

4.7 Environmental Policy

ENVIRONMENTAL POLICY

The environmental elements within FDC's integrated management system manage the provision of project and construction management for residential, industrial and commercial building, including ground up construction refurbishment or additions and interior fitout to existing buildings.

FDC shall:

- "Reduce, re-use and recycle" wherever possible, be it on site or within the office environment;
- Promote environmentally friendly solutions;
- Ensure that environmental considerations form part of our business planning and decision-making processes;
- Promote a culture of responsible environmental management;
- Protect the natural environment and social surroundings, preserve biodiversity, prevent pollution and minimize waste;
- Comply with applicable environmental laws;
- Continually improve our environmental performance;
- Establish measurable objectives and targets; and
- Communicate with stakeholders on environmental matters.

FDC encourage, on a personal and corporate basis, sound environmental considerations for protection of our natural resources.

We discourage any practice or product selection that is knowingly detrimental to environmental protection. FDC Management and staff are committed to the implementation and maintenance of an environmental management system based on ISO14001.



Bentley Cottle
Managing Director