Construction Environmental Management Plan (CEMP)

Midtown Macquarie Park Primary School

10 Mahogany Avenue

Macquarie Park NSW 2113

E-PLAN-03 (March 2024) | Approved by Andrew Andreou
Uncontrolled copy once printed.

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1. Introduction

1.1 Project Information Table

Project information table		
Project name	**Midtown Macquarie Park Primary School**	
Location	**10 Mahogany Avenue, Macquarie Park NSW 2113**	
Client	**The Crown in right of The State of New South Wales through the NSW Department of Education.**	
Duration of contract	**Contract Award – 08/08/24** **Contract Practical Completion Date – 17/06/25**	
Taylor contacts information		
Company name	Taylor Construction Group Pty Ltd	
ABN	25 067 428 344	
Address	Level 16, 100 Pacific Highway, North Sydney 2060	
Telephone and fax	Ph.: 02 8736 9000 Fax: 02 8736 9090	
Position	**Contact name**	**Phone numbers**
Chief Executive Officer	George Bardas	(02) 8736 9000
General Manager – Major Projects	Phil Bermingham	(02) 8736 9000
Project Director	Dean Fondas	0415 161 350
Senior Site Manager	***Damian Fisher**	**0421 239 997**
The Head Of WHS&E	Andrew Andreou	0404 492 614
WHSE Senior Advisor	Frank Fotakis	0412 107 373
Safety Advisor	Farhad Sharifi	0481 210 191
Quality & Compliance Manager	James Drury	0428 097 199
Contract Manager	Joe Cavallaro	0414 686 438
Contract Administrator	Blake Vassallo	0401 177 562
Project Engineer	Matt Ellis	0457 333 397
Site Engineer	TBC	
Cadet	Jade Biazarro	0413 064 350
Senior Design Manager	Katherine Barrionuevo	0428 972 865
Design Manager	Mike O Neil	0428 895 840
Senior Services Design Manager	Paul Leamore	0406 752 176
Site Supervisor	TBC	

Document control	Name	Position	Signature	Date
Prepared by	**Matt Ellis**	**Project Engineer**	MEllis	19/12/24
Prepared by				
Reviewed by	**Dean Fondas**	**Project Director**		19/12/24
Reviewed by	**Damian Fisher**	**Snr Site Manager**	D Fisher	19/12/24
Revised by:	**Revision #**	**Date**	**Changes made**	
Matt Ellis	4	19/12/24	Signatures added	
Matt Ellis	5	29/01/25	DPHI Comments	

*** Afterhours Contact Person**

1.2 Project Description

The Midtown Macquarie Park new primary school (MPPS) is a major investment being undertaken by Schools Infrastructure which will deliver an urban (vertical) primary school with a 750-student capacity (from Kindergarten to Year 6). The new school is set to be delivered within the Frasers Property Australia (FPA) mixed used Midtown Estate Development; with the school site amongst a number of high-density residential towers currently being constructed and in planning. The new school is required to meet the increasing student enrolment demand within the Ryde Secondary School Community Group (SCG).

The new primary school will be designed to meet the latest Education Facilities Standards Guidelines (EFSG) and Urban School Guidelines (USG) for a Core 28 school and achieve a 5-Star Green Star Rating. The site provides an opportunity to enhance community connection and facilities, with the inclusion of:

- A hall and school garden to be shared with the community (outside of school operational hours).
- Services infrastructure connection works
- Construction of new 6 storey teaching facility comprising of
    - Thirty-three (33) General Learning Spaces,
    - Nine (9) Common Learning Areas,
    - Administration and staff facilities,
    - Canteen,
    - Multi-purpose hall,
    - Library,
    - Covered outdoor learning area (COLA),
    - Outdoor play areas at ground level, on each floor of the building and rooftop,
    - Landscaped outdoor learning areas and
    - Eight (8) on-site car parking spaces
    - Chamber substation
    - Driveway – and associate alignment works for existing kerb
    - Pedestrian pathway connecting school to existing Wilga Park pathway
- Design and Construct of Level 5 ‘Roof Netting’ System

1.3 Purpose of the Construction Environmental Management Plan

Taylor Construction Group Pty Ltd has a documented Quality, Health, Safety and Environmental (QSE) Management System. While the management systems are integrated, key documents such as the Construction Environmental Management Plan (CEMP), the Project Safety Plan (WHSP) and the Project Management Plan (PMP, overarching plan with Quality provisions) are developed as separate documents to give each area a strong individual focus. The 'hierarchy of system documents' diagram below provides an overview of where the CEMP fits in the management system hierarchy.

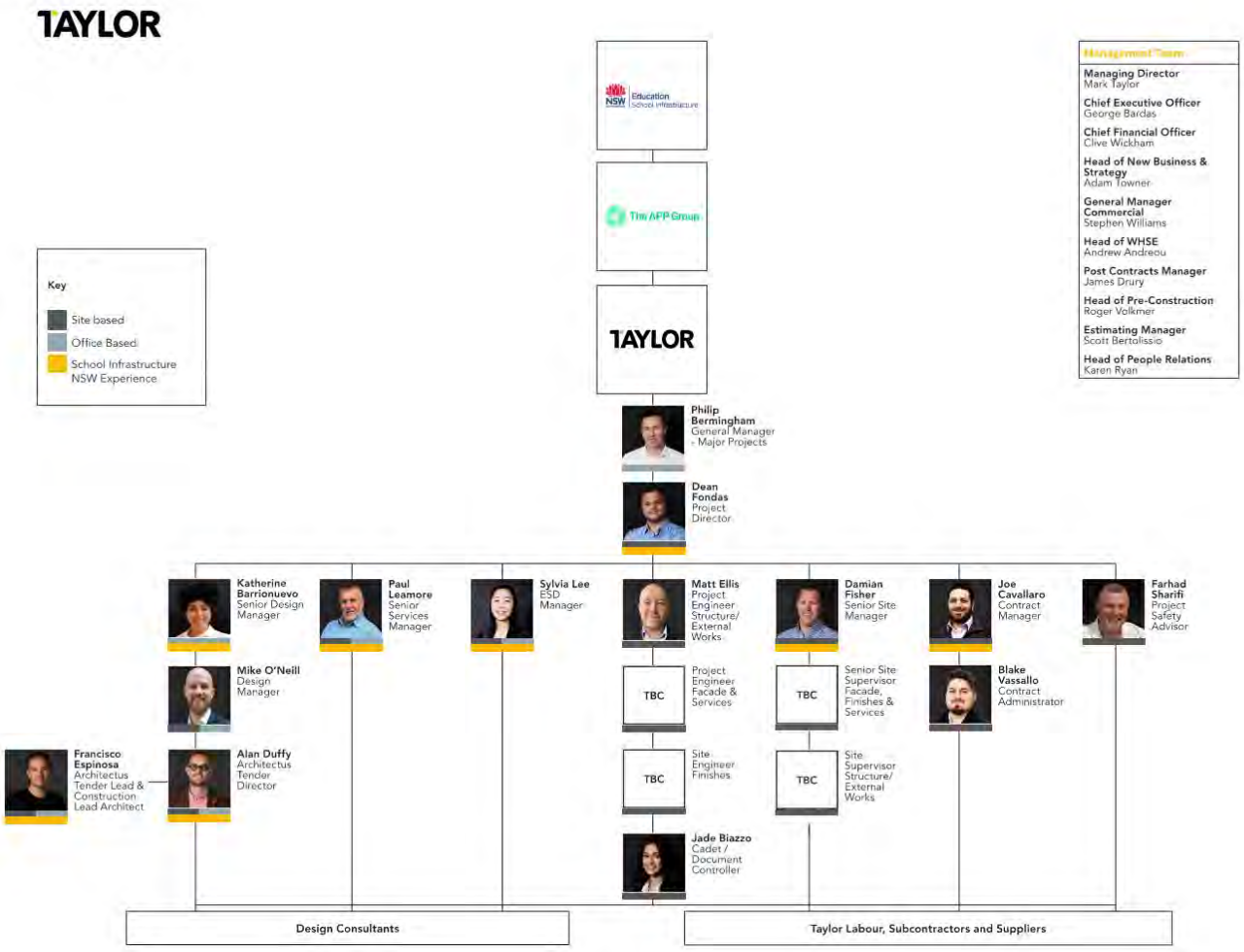
This document is a key component of the integrated QSE Management System and sets out the environmental management strategy to be adopted on site by Taylor Construction Group Pty Ltd as the principal contractor for works undertaken on this project. The purpose of this document is to provide guidance on the essential environmental requirements on a project level and reference to other important management system processes and procedures. A Construction Environmental Management Plan must be prepared for each project managed by Taylor Construction Group.The project-specific Environmental Management Plan is to be read in accordance with Taylor Construction Management Manual, Site Management Plan and Site Safety Plan.

The Construction Environment Management Plan Satisfy the Consent Condition B13 and B14. Below table shows the location of each item to satisfy condition 14 within this Management Plan.

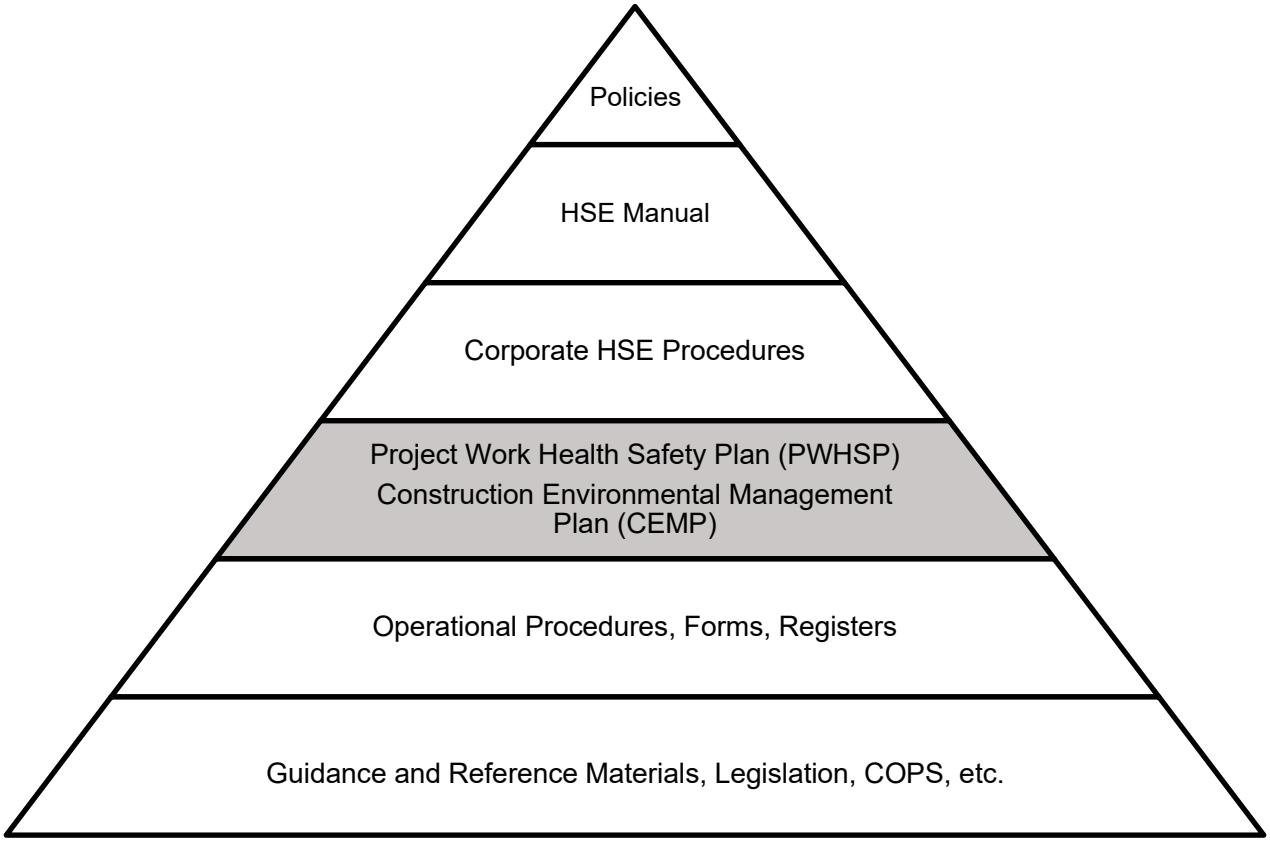
Consent Condition	Location/Section
(a)(i) Hours of Work	3.3 Development Consent Conditions (Page 12)
(a)(ii) 24-hour contact details of site manager	3.3 Development Consent Conditions (Page 12) & Page 3 Contact Information
(a) (iii) consultation strategy for liaison with surrounding stakeholders, including other developments under construction, and a complaint handling procedure	10.3.12 Community Communication (Page 38)
(a)(iv) traffic management	Appendix 8
(a)(v) noise and vibration management, prepared by a suitably qualified person	Appendix 9
(a)(vi) management of dust and odour to protect the amenity of the neighborhood	3.1 Environmental Factors (Page 10 & 11)
(a)(vii) stormwater control and discharge, including measures to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving site	10.3.2 Soil and Water Management / Sedimentation and Erosion Control
(a)(viii) contamination management, including any unexpected contamination finds protocol	Appendix 14
(a)(ix) waste management	3.1 Environmental Factors (Page 10 & 11)
(a)(x)Site security, including fencing or hoarding;	10.3.14 Site Security (Page 39)
(a)(xi) external lighting in compliance with applicable Australian Standards	3.1 Environmental Factors (Page 10 & 11)
(a)(xi) archaeological site induction	7.0 Induction (Page 30)
(a)(xiii) flora and fauna management, including tree protection measures recommended in the Arboricultural Impact Assessment, prepared by Truth About Trees, dated 7 July 2023	7.0 Induction (Page 30), Appendix 4 – Site Environmental Emergency Response Plan (Page 48),10.3.35 Tree Protection Measures (Page 39)
(a)(xiv) a flood emergency response plan to communication potential flood risks	Appendix 13

(b) Construction Traffic and Pedestrian Management Sub-Plan	Appendix 8
(c) Construction Noise and Vibration Management Sub-Plan	Appendix 9
(d) Construction Waste Management Sub-Plan	Appendix 10
(e) Construction Soil and Water Sub-Plan	Appendix 11
(f) A Geotechnical Monitoring Sub-Plan	Appendix 12
(g) an unexpected finds protocol for contamination and associated communications procedure	Appendix 14
(h) an unexpected finds protocol for Aboriginal and non-Aboriginal heritage and associated communications procedure	10.3.13 Archaeology and Heritage Management (Page 38)
(i) waste classification (for materials to be removed) and validation (for materials to remain) to be undertaken to confirm the contamination status in these areas of the site	10.3.4 Waste Management and Resource Recovery (Page 34)

1.4 Project Organisational Structure



2. Hierarchy of HSE System



QSE System documents can be found on SharePoint under the Taylor Management System (TMS), within the 'Quality' and 'HSE' folders.

The management system structure:

- Corporate
- QSE manual
- Corporate policies
- Corporate (system) procedures
- Forms and templates
- Registers and matrices
- Objectives and targets
- Organisational charts
- Certificates/ accreditations
- Training material.

HammerTech is a cloud-based software platform will used to enable teams to manage their processes effectively and maintain uniformly across all projects. This includes the collating and storing of:

- Onboarding and inductions
- Safety plans / SWMS / risk assessment
- Permits
- Pre-start and toolbox talks
- Equipment and maintenance records / schedules
- Personnel training records / competencies / licences

- WHS&E inspections / audits
- Accident and incident
- Attendance (site diaries).

HammerTech can also be used to send out news bulletins and updates to individuals advising of alerts, meetings, industry news and updates to site rules and procedures.

Environmental Policy

Taylor has an Environmental Policy outlining our commitment to the protection of the environment. This policy can be found in Appendix 2 of this document. A copy of the Environmental Policy is to be posted on the walls or notice board at the project site.

3. Legal and Other Requirements

The processes for identifying and keeping up to date with legal and other requirements are outlined in the **Legal and Other Requirements Procedure SE-P-01**.

An **Environmental Legal and Other Requirements Register E-R-01** has been prepared and is periodically updated to ensure that it reflects current legal requirements. This register identifies the key relevant legislation and guidelines and should be attached to this plan in Appendix 7.

3.1 Environmental Factors

Factor	Objectives	Requirements
Noise Management*		
Noise/ vibration	Protect the amenity of nearby residents from noise/ vibration impacts resulting from activities associated with the proposed or existing development by ensuring that noise/ vibration levels meet statutory requirements and acceptable standards.	– Identification of sources of noise/ vibration and estimates of project-wide noise. – Ensure that noise and vibration levels meet acceptable standards and that an adequate level of service, safety and public amenity is maintained. – Propose measures to manage and/ or mitigate impacts.
Water Management*		
Surface water quality	Maintain or improve the quality of surface water to ensure that existing and potential uses, including ecosystem maintenance, are protected.	– Details of site drainage, hydrocarbon use, disposal of plant site waste (including sewage), dewatering, and fate of water used/ pumped. – Incorporate measures and/ or operating procedures to ensure that storm water run-off from the site reflects patterns, volumes and quality that exist prior to development, as far as reasonably practicable. – Drainage lines are to be naturalised as much as possible and should enhance the ecological values and recreational opportunities. – Propose measures to manage and/ or mitigate impacts.
Groundwater quality	Maintain or improve the quality of groundwater to ensure that existing and potential uses, including ecosystem maintenance, are protected.	– Describe water requirements for any on-site processing. – Incorporate measures and/ or operating procedures that will minimise the demand of the development on potable water supplies. – Ensure that no contaminated water, including those containing sediments, leaves the site. – Propose measures to manage and/ or mitigate impacts.
Air management		
Air	Ensure that potential air pollutants are contained and that activities do not impact on the natural environment.	– Identify sources of air pollution. – Propose measures to manage and/ or mitigate impacts.
Particulates/ dust	Ensure that particulate/ dust emissions, both individually and cumulatively, meet	– Identification of sources of particulates/ dust and estimates of project-wide emissions.

	appropriate criteria and do not cause an environmental or human health problem.	– Propose measures to manage and/ or mitigate impacts.
Odour	Ensure that operations do not generate odour that causes environmental nuisance.	– Identification of sources of odour and estimates of project-wide emissions. – Propose measures to manage and/ or mitigate impacts.
Waste Management		
Solid/ liquid waste	Ensure that wastes are contained and isolated from land, ground and surface water surrounds and treatment or collection does not result in long-term impacts on the natural environment.	– Identify sources of solid and liquid waste and estimate the proposed amount generated. – Propose measures to manage and/ or mitigate impacts.
Contaminated Land and Water		
Land	Ensure that existing or proposed activities do not discharge to land.	– Identify activities that have the potential to discharge to land. – Propose measures to manage and/ or mitigate impacts. – external lighting in compliance with AS 4282-2019 Control of the obtrusive effects of outdoor lighting
Surface water	Ensure that existing or proposed activities do not discharge to surface waters.	– Identify activities that have the potential to discharge to surface waters. – Propose measures to manage and/ or mitigate impacts.
Groundwater	Ensure that existing or proposed activities do not discharge to groundwater.	– Identify activities that have the potential to discharge to groundwater. – Propose measures to manage and/ or mitigate impacts.
Hazardous Materials Management		
Scheduled wastes	Ensure scheduled wastes are specially treated for their destruction.	– Identify scheduled wastes and describe the treatment of their destruction. – Propose measures to manage and/ or mitigate impacts.
Resource storage	Ensure that chemicals and other potentially harmful resources used in the manufacturing process are stored and disposed of correctly.	– Describe the use and management of chemicals and other potentially harmful resources. – Propose measures to manage and/ or mitigate impacts.
Compressed/ liquid gas	Ensure the suitable storage of compressed/ liquid gas.	– Describe the use and management of compressed/ liquid gas. – Propose measures to manage and/ or mitigate impacts.

3.2 Specific Undertaking from Formal Environmental Impact Assessment

- Ivanhoe Estate Stage 3 - Environmental Impact Statement – May 2023
- Construction Environmental Management Plan – Midtown Macquarie Park Primary School – December 2024
- Construction Waste Management Plan - Midtown Macquarie Park Primary School – November 2024
- Construction Noise and Vibration Plan - Midtown Macquarie Park Primary School – October 2024
- Geotechnical Monitoring Plan - Midtown Macquarie Park Primary School – November 2024
- Construction Soil and Waste Management Plan - Midtown Macquarie Park Primary School – December 2024
- Construction Traffic and Pedestrian Management Plan - Midtown Macquarie Park Primary School - November 2024
- Construction Flood Management Plan - Midtown Macquarie Park Primary School – November 2024
- Unexpected Finds Protocol - Midtown Macquarie Park Primary School – December 2024

3.3 Development Consent Conditions

Consent working hours are:

Day	Start Time	Finish Time
Monday to Friday	7:00 am	7:00 pm
Saturday	8:00am	4:00pm
Sunday and Public Holidays	No Work	

NOTE: The Afterhours Contact is Damian Fisher, Senior Site Manager, Phone number: 0421 239 997

Please refer to Section 1.3 of this Construction Environmental Management Plan for relevant consent condition.

3.4 Environmental Protection License or Other Approvals

Include any Environmental Protection License details below.

- N/A

References:

- NSW Environmental Management System Guidelines 2015.
- Legal and Other Requirements Procedure SE-P-01.
- Environmental Legal and Other Requirements Register E-R-01.
- Environmental Management Plan Guideline Guideline for Infrastructure Projects (April 2020-DPIE)

4. Environmental Risk Identification and Assessment

Standard ISO 14001 requires that environmental aspects relating to the organisation's activities, products and services are identified and those aspects that can have a significant impact on the environment, determined. At Taylor, the environmental aspects relating to general construction activities have been identified through a risk assessment workshop attended by key project and site managers and an environmental consultant. The aspects, impacts, risk assessment outcomes and generic controls are documented in the **HSE Risk Register HSE-R-01**. Detailed requirements for risk assessments (environmental and OHS) are described in **Risk Assessment Procedure SE-OP-03.**

4.1 Environmental Risk Assessment

The methodology for risk assessments is based on the requirements described AS/NZS 4360 (Risk Assessment) and HB203 (Environmental Risk Assessment).

Taylor's procedure requires an initial Project Risk Assessment to be undertaken at the commencement of each project. The risk assessment is to be conducted in the form of a workshop and is to include the Project / Site Manager, HSE Manager, key members of the project team and, to the extent required, key subcontractors, and is to be recorded on form **HSE-R-01 HSE Risk Register**.

The HSE Risk Register is to be developed to address both legal and other requirements covered in this plan and is to be referenced to implement systems and work practices that will eliminate or minimise the likelihood of injury, illness or incident occurring.

When developing the project HSE Risk Register, members of the workshop will take into consideration available information which is relevant to the works and is contained in any published copies of the below documents:

- HSE acts.
- WHS regulation.
- Australian / National Standards.
- Codes of practice.
- Available internal and external industry bulletins/alerts.
- Industry reports.

This will ensure members of the workshop identify and document any known or foreseeable hazards associated with that task.

The completed Environmental Risk Assessment can be found in Appendix 13 of the project HSE Plan (**WHS-PLAN-02**).

References:

- SE-P-03 Risk Assessment Procedure.

5. Objective and Targets

Objectives and targets are set at a corporate level. They are monitored and measured to ensure that Taylor continually improves our environmental performance. To ensure that we meet our corporate objectives and targets, key performance indicators (KPIs) are set at a project level and reported to management monthly.

Objectives	Targets
Effective site environmental controls.	– Achieve alignment with Taylors and Client expectations in relation to best practice control measures. – Fulfil environmental obligations.
Increase amount of waste being recycled, reduce waste cost.	– Eighty-five per cent (85%) of waste to be recycled.
Environmental performance.	– Zero major environmental incidents and no breaches. – Zero infringement notices. – All environmental spills to be reported to Taylor Construction within 2 hours of occurrence. – Environmental inspection competed weekly and documented in **SE-F-02 HSE Inspection Checklist** (more often if required).
Reduce the amount of environmental impact our operations have on the environment.	– Environmental issues identified and controlled prior to causing negative impacts on the project or on the environment.
Effective implementation of the environmental system.	– Eighty per cent (80%) or better internal audit results. – Full compliance with planning approval requirements.
Community issues carefully handled.	– Zero valid complaints. All complaints reported to Taylor's representative.

6. Roles and Responsibilities

All persons working for and on behalf of Taylor have responsibilities in relation to ensuring that environmental issues are appropriately managed. Generic WHS and environmental responsibilities are outlined in the **Roles, Responsibilities and Authorities Procedure QSE-P-06.**

Subcontractors

The subcontractor shall be required to comply with all applicable work health, safety and environmental legislation, including any additional Taylor's requirements, whilst engaged on a Taylor-managed project. The subcontractor shall be responsible to communicate any relevant environmental information to their personnel (workers) who are engaged in carrying out the work or providing material to the job site, including any secondary subcontractors or sole traders engaged by them and approved by Taylor.

Subcontractor's minimal environmental requirements:

- Has the subcontractor identified in the SWMS environmental hazards and controls in relation to the work task (where required), i.e. refuelling plant and equipment on site, nuisance dust controls, nuisance noise, waste management (off-cuts), rubbish, concrete wash-out?
- Have hazardous substances or dangerous goods to be used on site by the subcontractor been identified?

  Note: the subcontractor will need to provide copies of relevant Safety Data Sheets (SDS) for all materials and/ or hazardous substances or dangerous goods to be used on site and note reference to training of employees in the SDS prior to first use and controls listed in the SWMS.

Taylor Construction Personnel

For this project, the key roles and specific responsibilities of our managers, supervisors, and site personnel regarding environmental management on site are outlined below. Project-related management and staff are required to sign off that they have read and understood their responsibilities.

6.1 Directors

Directors are responsible for:

- Defining Taylor Construction workplace WHS&E policies and setting their objectives.
- Acquiring and keeping up to date with knowledge of environmental matters relevant to the organisation.
- Gaining an understanding of the nature of the operation of the business or undertaking and general environmental issues associated with those operations.
- Providing leadership that promotes and maintains Taylor's determination to continually improve its performance in workplace health safety and the environment.
- Demonstrating genuine interest in workplace health and safety and the environment; supporting all project teams to encourage incident prevention.
- Ensuring that there is available for use and used by those engaged in the business or undertaking, appropriate resources and processes to eliminate or minimise risks to the environment and non-compliance with licences during the conduct of the business or undertaking.
- Ensuring that people engaged in the business or undertaking have appropriate processes for receiving and considering information regarding environmental incidents, hazards, and risks, and respond in a timely way to that information.
- Ensuring that those engaged in the business or undertaking have in place and implement processes for complying with any duty or obligation of the organisation under the Act, including complying with licence conditions and notices served.

6.2 Chief Executive Officer

The Chief Executive Officer's responsibilities include:

- Informing the board of all events within, or which reasonably should be within, his/her knowledge or awareness, which may or do have a material impact on the organisation's activities or well-being.
- Monitoring and interpreting the external environment in order to continually position the organisation in its markets to best advantage.
- Maintaining awareness of political, governmental, business, and industry components of the external environment, on a local, national, and international level.
- Reviewing environmental objectives and targets to ensure compliance with our environmental commitments and achieve continuous improvement in our environmental performance.
- Working proactively with our clients, regulators, and other community stakeholders to enable environmental issues to be addressed at an early stage of development.
- Monitoring the activities which are undertaken by employees and subcontractors are done so in a manner that is consistent with the principles of ecologically sustainable development.
- Overseeing the implementation of company procedures and policies that will prevent pollution and reduce adverse environmental impacts of our activities on the natural, built, and cultural environment.
- Setting realistic environmental objectives and targets at all relevant levels within the company and continually monitoring performance.
- Promote the efficient use of natural resources and reduce waste using the waste hierarchy – avoid, reduce, re-use, recycle and finally dispose of.
- Identifying alternative, financially viable, and sustainable courses of action to minimise environmental impacts.
- Defining Taylor Construction WHS&E policies and setting their objectives.

6.3 General Manager

General Manager is responsible for:

- Demonstrating genuine interest in workplace health, safety, and environment; supporting all project and site managers to encourage incident prevention and compliance.
- Assessing and allocating appropriate resources and equipment within the company for the effective implementation of the workplace health, safety, and environmental management systems and the management of WHS&E-related hazards/ risks relevant to the construction projects.
- Being fully briefed on the WHS&E performance and compliance of all current Taylor projects.
- Assisting in the development and implementation of continuous improvement processes for workplace environmental management
- Defining Taylor Construction WHS&E policies and setting their objectives.

Specific roles:

- Ensuring project teams' compliance with any licence, permit notice or order from the EPA. For example, failure to have a monitoring program at a licensed site is a breach of your licence.
- Ensure the implementation and overall effectiveness of the Taylor environmental, health, and safety programs.
- Provide visible commitment to a safe and healthy work environment by ensuring regular reviews are undertaken. Participate in WHS&E meetings and consultations regarding workplace health safety and environmental matters.
- Consider workplace health safety and environment matters with other senior members of the organisation as part of normal business practice and incorporate WHS&E into meeting agendas.
- Allow appropriate budget allocations for WHS&E management and improvement.
- Encourage and promote safety within the company by participating and openly consulting with employees with respect to their health and safety.
- Follow up with the WHS&E Manager and site teams on any compliance breaches or external authority notices issued to projects and or subcontractors.
- Report on critical incidents which then embed lessons learned and system improvement will demonstrate the board's commitment to environmental responsibility.
- Participate in periodic compliance inspections/audits to review the effectiveness of management structures and risk controls for environmental performance that are appropriate and remain effective.

Name:	Philip Bermingham
Signed:	
Date:	19 dec 2024

6.4 Construction Manager

The Construction Manager is responsible for:

- Demonstrating genuine interest in workplace health and safety; supporting all the project/ site managers to encourage environmental incident prevention.
- Confirm that legislative obligations are met, and that Taylor's Environmental Policy is effectively implemented throughout all company construction projects under their control.

Specific roles:

- Provide leadership in the development of project teams to ensure the fostering of the business culture and approach to doing business with our clients, consultants, and subcontractors.
- Attend sites on a regular basis to ensure compliance with workplace environmental and programming requirements of both the head contract and the company's systems.
- Provide visible commitment to a safe and healthy work environment by ensuring regular reviews are undertaken, and by participating in safety and health meetings and consultation regarding WHS&E matters.
- Ensure that the Project / Site Manager has developed and implemented systems, which will ensure subcontractors/ suppliers engaged by the company comply with the health safety management and environmental systems and the relevant HSE legislation.
- Consider workplace health safety and environmental matters with other senior members of the organisation as part of normal business practice and incorporate WHS&E into meeting agendas.
- Support the Head of WHSE in ensuring Project / Site Managers have developed and implemented systems that will ensure subcontractors and suppliers engaged by the company comply with the WHS&E management systems and the relevant legislation.
- Respond to non-conformance by any member of the company who fails to discharge their duties as set by the Responsibility Statement and actively participate in dispute resolution where required.
- Participating in periodic compliance inspections/audits to review the effectiveness of management structures and risk controls for environmental performance are appropriate and remain effective.
- Where events or non-compliance occurs, all reasonable and appropriate precautions are reviewed and as necessary, ensure new controls are designed and implemented.

Name:	N/A
Signed:	
Date	

**** If no construction manager has been allocated to the project these roles and responsibilities will be shared by the project manager and the site manager.

6.5 Project Director

The Project Director is responsible for:

- Ensuring that environmental, health and safety obligations are carried out by everyone working in their operations.
- Communicating to employees, workers, and visitors that health and safety and concern for the environment are top priorities on Taylor projects and that everyone shares in the obligation to perform work in a safe, healthful, environmentally protective manner.
- Analysing work procedures to identify hazards; ensuring measures are implemented to eliminate or control those hazards.
- Ensuring the PCBU has implemented processes for complying with any legal duty or obligation.
- Curtail or stop work being carried out under their authority if they reasonably believe that continuation of the work poses an imminent danger to health or safety. Upon directing that work be curtailed or stopped, if the situation cannot be corrected immediately, the Manager must notify the WHS&E Manager
- Ensuring that self-assessment inspections are performed regularly, that records are retained and that deficiencies identified in any inspection (self-assessment or HSE inspections) are addressed.
- Consulting with Taylor's Construction Manager and HSE Manager to ensure enough resources are allocated to the project to comply with legislative and Taylor's WHS&E requirements.
- Ensuring compliance with safety legislation, regulations, licensing conditions, and authorities' requirements relevant to all construction work.
- Ensuring Taylor's site supervision is maintained throughout all hours of operation and those assigned with supervisory roles are competent and authorised to do so (e.g., PM, SM, or Site Supervisor).
- Ensuring incidents are investigated and appropriate action taken as required by Taylor's site safety plan requirements in consultation with the WHS&E Manager.
- Providing a visible commitment to a safe and healthy work environment by ensuring regular reviews are undertaken, and by participating in health and safety meetings and consultation regarding WHS&E matters.
- Ensure safety notices issued and/ or visits made to the project by industrial representatives and/ or SafeWork NSW are reported to both the General Manager and the head of WHSE.
- Selecting appropriate subcontractors, giving due regard to their ability to comply with legislative and Taylor's WHS&E requirements.
- Owning and understanding the key project environmental issues involved.
- Participating in at least one formal site HSE inspection per month on a project under their control.
- Reporting back to Taylor's senior managers on project HSE incidents, any external authority visits, and/ or Notices issued by external authorities.
- Overseeing the development and implementation of site evacuation and emergency procedures and overseeing at least one spontaneous evacuation drill every six months and assessing the results of that drill.
- Supporting the Site Manager in the management of employee, subcontractor, and supplier performance in complying with Taylor's environmental plan and the site-specific rules for the project.
- Be familiar with the emergency plan, the emergency assembly area, and emergency coordinators for their project and participate in emergency drills.
- Promoting and overseeing procurement standards for goods and services that help minimise environmental hazards.
- Where required, engaging with the local community to understand their environmental concerns and impacts linked to the organisation's operations.
- Ensuring compliance with Taylor's accredited QSE systems is maintained and implemented across all Taylor-managed projects under their control.

Name:	Dean Fondas
Signed:	
Date:	19/12/24

6.6 The Head Of WHS&E

The Head Of WHS&E is responsible for:

- Overseeing the development and implementation of Taylor policies and procedures related to environmental health and safety that provide additional support for the environment.
- Developing and maintaining electronic systems and technology solutions related to environmental health and safety.
- Disseminating information and providing guidance regarding compliance with federal, state, and local regulations and Taylor policies and procedures.
- Providing guidance, direction, and oversight to help ensure adherence to federal, state, and local regulations and Taylor policies and procedures instituted to protect the health and safety of employees, workers, visitors, and the environment.
- Overseeing the implementation of Taylor's health, safety, and environmental management systems throughout all Taylor activities.
- Ensuring that a systematic internal reporting system exists to guarantee that information about environmental hazards and unsafe practices is promptly conveyed to senior management and acted on.
- Maintaining a good relationship with external regulatory authorities.
- Setting targets and allocating priorities within the framework of the QSE System.
- Safeguarding compliance and maintenance of the company's third-party accreditations.
- Planning and delivering training in environmental management and/ or arranging for the appropriate internal or external trainers/ facilitators to conduct the training.
- Researching, developing, and implementing new procedures and forms, and updating the manual as required.
- Reviewing, analysing, and reporting on safety and environment project performance to Taylor's managing director, sector managers, and any party as arranged by the managing director.
- Ensuring compliance with environmental legislation, regulations, licensing conditions, and authorities' requirements.
- Ensuring Taylor's workplace health safety and environmental performance are reviewed on a regular basis (i.e., arranging for internal and external audits).
- Ensuring that periodic audits of the effectiveness of management structures and risk controls for environmental performance are conducted.
- Review internal and external (independent) audit reports and, in consultation with the directors and the project manager, develop appropriate action plans if necessary.
- Identifying environmental hazards, assessing risks, and in consultation with project teams selecting risk control measures for site-specific situations.
- When required, acting as the lead investigator in workplace incidents/ accidents, liaise with external authorities in managing them and report back to the managing director and/ or sector managers on outcomes of investigations.
- Ensuring WHS&E policies and procedures are implemented on all projects and that a specific site environmental plan is prepared and implemented for all projects.

Name:	Andrew Andreou
Signed:	
Date:	19/12/24

6.7 WHSE Senior Advisor

The WHSE Senior Advisor is responsible for:

- During site visits monitor that personnel are adequately skilled and trained for the tasks they are required to undertake
- Bring to the attention of site teams any safety or potential safety hazards that have been observed that may require investigation and recommend corrective action
- Participate in any workplace consultative meetings relating to Work Health and Safety
- Participate in randomly selected project HSE weekly HSE inspections.
- Be present in all scheduled authority or client orientated. HSE inspections or audits
- Conduct project audits and ensure actions and non-conformance resulting from an audit are closed out within agreed timeframes.
- Take reasonable care for your health and safety and take reasonable care not to adversely affect the psychological and physical health and safety of others
- Comply with reasonable WHSE instructions from line managers and comply with the Taylor-accredited WHSE
- Management System, Policies and Procedures, and the Project Management Plan that sets out in detail the
- health, safety, and environmental responsibilities of your role on each project
- Lead by example, displaying a genuine interest, and playing an active role in safety, that provides immediate, positive, proactive WHSE leadership and support for everybody's effort to together keep safety at the forefront of what we do
- Ensure all projects have been developed and signed off on all project specific QSE plans, and these have been signed off and are accessible to employees and subcontractors if requested.
- Work with the site team to ensure emergency control equipment is suitable, compliant and effective, onsite to maintain company uniformity across all projects. (Nurse calls, evacuation sirens, fire extinguishers, first aid kits and equipment)
- Champion Hammertech and ensure all projects are on board, and those required to use Hammertech have been provided with the training and possess the knowledge required to navigate through the system
- Provide leadership to Project Teams on WHS&E procedures policies, legal requirements, and governance
- Contribute to the WHSE component of the Corporate Induction Program and ensure new Taylor staff are inducted appropriately
- Assist teams to prepare for OFSC accreditation guidelines and ISO 9001 and 45001 certifications
- Monitor compliance of project audits and ensure actions and non-conformance resulting from an audit are closed out within timelines.
- Monitor incident/accident investigations are managed (investigated) and closed out promptly. All incidents are to be immediately reported to the Head of WHSE
- Actively promote a Zero Lost Time Injuries through "Zero Harm" attitude in the workplace (whilst actively participating in rehabilitation of injured workers).

Name:	N/A
Signed:	
Date:	

6.8 Project Safety Advisor

The Project Safety Advisor is responsible for:

- Providing a visible commitment to a safe and healthy work environment by ensuring regular reviews are undertaken, and by participating in safety and health meetings and consultation regarding WHS&E matters.
- Ensuring workplace hazards and environmental, health, and safety-related policies and procedures are communicated to employees, workers, and visitors.
- Assisting the WHS&E manager and project teams in implementing Taylor's health, safety, and environmental procedures, policies, and project systems in line with best practices and the relevant statutory legislation.
- Reporting any serious environmental incident or near miss and unexpected finds immediately to the WHS&E manager.
- Safeguarding compliance and maintenance of the company's third-party accreditations.
- Assisting project teams and subcontractors in meeting their workplace health safety and environmental obligations.
- Ensuring compliance with this project's environmental plan.
- Monitoring subcontractor's compliance with the site environmental plan, and subcontractor compliance to their Safe Work Method Statements by conducting regular task observation/ audits.
- Undertaking regular workplace inspections to identify hazards and unsafe/ unhealthy workplace conditions and practices.
- Being familiar with the emergency plan, the emergency assembly area, and emergency coordinators for the project and participating in emergency drills.
- Assisting the Site Manager / Site Supervisor in the supervision of subcontractors.
- Ensuring WHS&E items identified by safety inspections and or audits are rectified within specified timelines in consultation with the Site Manager, and subcontractors.
- Reporting incidents and/ or identified environmental hazards and appropriate risk control measures to line managers.
- Ensuring all workplace health and safety and environment documents are maintained and filed in accordance with Taylor's filing requirements.
- Coordinating or conducting site toolbox talks and ensuring subcontractors regularly consult with their employees on matters relating to environmental issues.
- Liaising with the Project / Site Manager to implement controls on hazards identified.
- Completing Safe Work Method Statement checklists for the site (task observation).
- Collating completed contractor required forms, authority to work permits, and checklists.
- Acting site safety representative for the site (unless another person has been elected to perform this role as per the consultation statement S-F-04 WHS Consultation Statement).
- Other HSE and/ or CW's issues or activities that may require their attention.

If no safety advisor is allocated to the project, the roles and responsibilities mentioned above are to be allocated to alternative Taylor Construction persons engaged in the project who are competent or have been suitably trained to fulfill these duties.

Name:	Farhad Sharifi
Signed:	F Sharifi
Date:	19/12/24

6.9 Site Manager

The Site Managers are responsible for:

- Providing a visible commitment to a safe and healthy work environment by ensuring regular reviews are undertaken, and by participating in safety and health meetings and consultation regarding WHS&E matters.
- Facilitating the process to ensure the project team and the WHS&E manager are consulted and participate in the development of the project specific WHS&E risk assessment. This is to be done prior to such activities commencing.
- Ensuring that prior to the works commencing a formal assessment of the emergency control equipment requirements has been completed and that these remain effective throughout the duration of the project. (e.g., first aid, nurse call, emergency warning alarms, fire extinguishers, spill kits, lighting, and signage)
- Ensuring workplace hazards and environmental, health, and safety-related policies and procedures are communicated to employees, workers, and visitors.
- Ensuring individuals working in their operations have the proper safety equipment and personal protective equipment to perform their work safely.
- Leading or participating in formal site safety inspections weekly and record results using **SE-F-02 HSE Inspection Checklist**. Daily informal inspections should be noted in the site diary.
- **Unexpected finds** – ensure all unexpected finds are treated, reported, and managed in accordance with Taylor's unexpected finds procedure.
- **Environmental controls** – ensure all environmental controls (sediment and erosion, noise, hours of operation, etc) as mentioned by permits or building approvals are adhered to and workers are advised of these requirements during the site induction process.
- **Emergency Response and Training Plan** – contribute to the development of the ERP, ensure that all employees, workers, and others know about the plan, and communicate the importance of participating in drills and otherwise following procedures set out in the plan.
- **Groundwater protection Program** – report any hazardous materials or other pollutants spilled to or discovered in soil or groundwater to EH&S for appropriate emergency or non-emergency clean-up.
- **Hazardous material and waste management** – inform employees and workers that hazardous materials and hazardous waste, except as expressly authorized by regulations, licenses, or permits, may not be disposed of via the sewer system, or other unsafe or environmentally damaging routes; and to stress the importance of proper hazardous material/waste management.
- **Training** – ensuring that everyone working in their operations is appropriately trained to identify and mitigate potential hazards. Ensure that work requiring training is performed only by persons who have received the proper training.
- **3**– upon request, provide assistance in hazardous material spill clean-up, prepare written reports about reportable releases, and notify appropriate persons about reportable spills.
- **Noise monitoring and hearing conservation** – conduct noise surveys to determine exposure levels.
- **Environmental procedures/permits** – ensure activities requiring an internal and or external permit or approvals do not commence until a permit or approval has been formally granted the user has the responsibility for providing relevant information to obtain permits, meeting permit conditions, and any responsibility. Taylor site management shares in the responsibility to advise those performing the works of Taylors' procedure and permit requirements.
- Ensuring WHS&E items identified by safety inspections and or audits are rectified within specified timelines in consultation with the Project Manager, Project Safety Advisor, and subcontractors.
- Ensuring that all plant and equipment used on Taylor sites are environmentally safe, and correctly maintained and that the operator is appropriately licensed or qualified to operate and or use that equipment.
- Utilising experience and judgment to shut down and/ or evacuate any part of the site if a major health and safety and environmental risk occur.
- Reviewing, coordinating, and implementing emergency evacuation procedures and participating in drills at specified intervals (quarterly).

Name:	Damian Fisher
Signed:	D Fisher
Date:	19/12/24

6.10 Site Supervisor

The Site Supervisor is responsible for:

- Implementing, through consultation with the Project Manager, the site environmental plan and procedures in accordance with WHS&E legislation, regulations, codes of practice, Australian Standards, and/ or other statutory requirements.
- Ensuring no work is undertaken on site until the relevant SWMS has been reviewed and signed off in accordance with form **SE-F-14 Safe Work Method Statement Review Form**.
- Monitoring subcontractors' compliance with the site environmental plan and subcontractors' compliance to their Safe Work Method Statements by conducting regular task observation /audits.
- Ensuring all workers and, if required, visitors, are site-inducted and aware of any environmental compliance obligations.
- Assisting with implementing and undertaking formal and proactive consultation measures between the project team and subcontractors.
- Ensuring items identified by environmental or system audits findings are rectified and closed out within specified timelines in consultation with the project manager, site manager, site safety advisor and subcontractors.
- Consulting with all persons on environmental issues, including changes to the workplace layouts and access egress points, and encourage the involvement of all personnel in achieving a safe and healthy site.
- First response in managing site-specific workplace environmental issues in the first instance, and discussing these with the project manager, site manager and/ or site safety advisor as required.
- Assisting the site manager with developing, planning, implementing, and reviewing site-specific emergency and evacuation procedures.
- Identifying any environmental hazards and assessing any risks on site and implementing risk control measures.
- Leading or participating in formal site safety inspections weekly using form **SE-F-02 HSE Inspection Checklist**. Note: informal inspections should be noted in the site diary.
- In consultation with the Project Manager and Senior Site Manager, and utilising experience and judgment, shut down and/ or evacuate any part of the site if a major environmental risk or situation occurs.
- When requested by the Site Manager participate in any environmental incident and assist with the investigating, recording, and reporting,
- Be familiar with the emergency plan, the emergency assembly area, and emergency coordinators for the project and participate in emergency drills.
- Monitoring the use of personal protective equipment (PPE) by site personnel.
- Where requested by the Site Manager, assist with monitoring of environmental issues (e.g., dust, noise, air quality)
- Assist the Site Manager with reviewing, coordinating, and implementing emergency evacuation procedures and participating in drills at specified intervals, minimum every six months.
- Ensuring that all plant and equipment used on Taylor sites are environmentally safe to use, and appropriately maintained and that the operator is correctly licensed or qualified for operating that equipment.

Name:	TBC
Signed:	
Date:	

6.11 Contract Administrator

The Contract Administrator responsibilities are to:

- Support the Project Manager and Site Manager in the management of employee, subcontractor, and suppliers' performance in complying with Taylor WHS&E and the site-specific rules for the project.
- Assist the project/ site manager to ensure the site environmental plans and associated documentation, including standard forms, procedures, and templates, remain current and up to date.
- Where required, assist the project and site manager with site inductions.
- Include in the subcontract agreement the requirement for subcontractors to carry out their works in accordance with the company's or subcontractor's approved QSE plans.
- Forward to subcontractors a copy of HSE subcontractor requirement, **Contractor's HSE Requirements QSE-F-15.23** (letter template), ensuring this is completed and returned by subcontractor prior to commencing.
- Discuss with the subcontractors, at the tender interview stage, their obligation for managing HSE requirements by issuing to the relevant sections of the tender interview form and ensuring this is completed by the subcontractor prior to commencing on site.
- Request and obtain from the subcontractor prior to their arrival to the site copies of their Worker's Compensation and Public Liability Certificates of Currency, environmental and or council licences and or required permits ensuring they are current and that copies are available on site.
- Ensure that all completed copies of form **Contractor's HSE Requirements QSE-F-15.23** (letter template) are returned and filed in the project files.
- Ensure that the latest copies of project plans and WHS&E risk assessments are uploaded onto the project centre, or preferred data control system used, and engaged subcontractors have access to these.
- Ensure all external complaints/ incidents are recorded on **SE-F-21 Incident Report Form** and filed in the external complaints register or HammerTech.
- Assist the Project Manager and Site Manager in the general administration of WHS&E where requested.
- Be familiar with the emergency plan, the emergency assembly area, and emergency coordinators for the project and participate in emergency drills.

Name:	Blake Vassallo
Signed:	B Vassallo
Date:	19/12/24

Name:	
Signed:	
Date:	

6.12 Project / Site Engineer

The Project / Site Engineer's responsibilities are:

- Take reasonable care for your own physical and psychological work health and safety and ensure your actions or lack of action does not harm others.
- Collaborate with the project team to identify and document high risk activities and hazards on the project in advance of the commencement of works. Procure, review, and obtain approvals for Safe Work Method Statements (SWMS's) for high risk works from Subcontractors and Suppliers.
- Coordinate and engage in High-Risk Workshop planning sessions with all key stakeholders involved in critical site activities.
- Ensure compliance with SWMSs through site inspections and task observations at a frequency set by the Project Director/Manager.
- Ensure that all temporary works, structures, and equipment are engineered, installed, maintained, and operated in accordance required standards and procedures.
- Assist project management to develop and implement a site safety plan with particular focus on identifying WHSE hazards.
- Identify any hazards and assessing any risks at the work site and implementing the necessary risk control measures.
- Ensure the implementation of all Company Quality, Environmental and other policies, systems, and procedures applicable to the project
- Assist the Project Manager/Quality Assurance & Compliance Manager in conducting project audits to report on quality assurance matters and in the maintenance of quality records
- In conjunction with the project team, promote and ensure subcontractor compliance to satisfactorily complete Subcontractor audits and performance reviews with legislative requirements and the contract documentation with suitable recording of same.
- Assist with the selection, control, and management of subcontractors to achieve project outcomes which are safe, on time and to a high-quality standard.
- Satisfy PMP mandatory responsibilities and input requirements, and contribution to PMP reviews
- Provide support to the Site Manager to develop the construction methodology, sequence and materials handling strategy for the approval of the Project Manager and manage all pre-construction planning sessions prior to commencement of works on site

Name:	**Matt Ellis**
Signed:	
Date:	19/12/24

Name:	**TBC**
Signed:	
Date:	

6.13 Building Cadet

The Building Cadet's health, safety, and environmental responsibilities are to:

- Provide general assistance to management on an assigned project.
- Provide administrative assistance in managing site safety, quality assurance, and environmental management systems.
- Maintain project registers and records up to date.
- Where requested, assist with site contract administration and tendering.
- Manage project document control and provide design management assistance.
- Assist the Project / Site Manager to ensure the site QSE plans and associated documentation, including standard forms, procedures, and templates, remain current and up to date.
- Fulfil responsibilities as outlined in the 'Taylor Cadet Program Guidelines, including undertaking an approved course of study at an Australian University.
- Assist the Project Manager and Site Manager in the general administration of HSE where requested.
- Monitor the use of personal protective equipment (PPE) by site personnel.
- Complete site diaries as per project administration requirements.

Name:	Jade Biazzo
Signed:	J Biazzo
Date:	19/12/24

6.14 First Aid Officers

It is the job of the trained first aider to provide initial treatment to injured or ill employees, which is consistent with first aider's level of training and competency. Where the treatment required is beyond a first aider's level of competency, they should recommend that the employee seek immediate medical assistance.

The nominated site first aid officers shall possess the required level of competency (Senior First Aid Certificate or Occupational First Aid Certificate) and they shall be responsible for:

- Providing first aid assistance to persons ill or injured on site.
- Recording all such assistance provided.
- Liaising with the site manager and/ or site supervisor to achieve first aid obligations.

First Aid Officer Records

The nominated first aider shall be relied upon to exercise a common sense approach in determining what type of injuries require a first aid report to be completed. First aid/ incident reports shall only be completed for injuries or illnesses for which first aid assistance was sorted **immediately** following an event. Employees, including subcontractors, is, seeking to report an injury or incident for which first aid assistance was not initially sort **shall not** be provided with a copy of the report unless this has been authorised by the Site / Project Manager and/ or Taylor's WHS&E Manager.

Some typical injuries that may require reporting are:

- All injuries requiring off-site medical treatment.
- Impact injuries.
- Head injuries.
- Musculoskeletal injuries.
- Open wounds (cuts).
- Eye injuries.

The first aid officers shall also be responsible for the regular maintenance and replenishment of the first aid kits and equipment. At all times during normal operations there shall be a minimum of one (1) trained first aider on site for every 25 workers.

Name:	Damian Fisher
Signed:	D Fisher
Date:	19/12/24

Name:	Matt Ellis
Signed:	
Date:	19/12/24

Name:	TBC
Signed:	
Date:	

6.15 PCBU and Workers

PCBU and Workers are responsible for:

- Attending Taylor's site-specific induction prior to commencing work on site.
- Taking reasonable care for their individual health and safety and that of others on site, including members of the public.
- Familiarising themselves and adhering to Taylor Construction corporate policies.
- Performing only those works in which they possess the required competencies for or have been suitably trained to perform.
- Taking corrective actions to eliminate hazards within the workplace and /or reporting those hazards they cannot correct.
- Reporting all injuries to a first aid officer or supervisor.
- Cooperating with Taylor management in all requirements imposed in the interest of health, safety the environment, and wellbeing.
- Never intentionally or recklessly interfere, misusing, or remove any items and/ or equipment provided in the interest of health and safety.
- Complying with all site safety instructions and abiding by the procedures and work practices identified in the Workplace Heath Safety Project Plans and/ or as directed or informed by the Site Manager / Site Supervisor.
- Complying with all relevant workplace health and safety legislation, standards, and codes of practice.
- Reporting promptly to a Site Manager / Site Supervisor any unsafe conditions, practices or defects discovered in any control measures, including personal protective equipment.
- Maintaining safe work practices when working with, or near, hazardous substances, so that their own health and safety, and the health and safety of those around them, is maintained.
- Using personal protective equipment (PPE) as required. The equipment should be kept clean and maintained in an appropriate manner.
- Practicing high-standard personal hygiene in and around all amenity areas such as lunch, change and toilet facilities by washing thoroughly and removing all protective clothing before eating, drinking, and smoking.
- Do not perform any activity or act that endangers or impacts the environment.

References:

- Roles, Responsibilities, and Authorities Procedure QSE-P-06.

7. Induction

Taylor employees, including those workers engaged by or working on behalf of the subcontractors, are required to be site-inducted prior to commencing work on the site. General environmental awareness and specific environmental requirements of this CEMP must be incorporated into the site-specific induction as required.

As a minimum, inductions must include the following environmental information:

- Community issues.
- Hours of operation.
- Noise and vibration.
- Dust management.
- Traffic access.
- Washing requirements for construction plant and equipment.
- Storage and handling of fuels, oils, and other chemicals.
- Waste management: recycling, disposal, litter.
- Soil and water issues: controls, tracking of mud off-site.

Where there are significant environmental issues identified for the project, these must be incorporated into the site-specific induction. These may include but shall not be limited to (where required):

- Environmentally sensitive areas of the site (specify details in this section).
- Contaminated or Acid Sulphate soils.
- Endangered flora and fauna.
- Environmental controls and management.
- Noise emissions.
- Plant emissions.
- Archaeology and heritage management.

7.1 Archaeological Site Induction

The site specific induction presentation, runs through the below items to address Archaeological finds -

Indigenous heritage – all Aboriginal and Torres Strait Islander, regardless of significance, are protected under law. Should any deposit, artefact or material evidence (including skeletal remains) of Aboriginal and Torres Strait Islander origin be found, Taylor and subcontractors shall cease all construction works that might disturb or damage the deposit, artefact or material. The Project Manager will notify the client immediately, who will then consult the relevant government department (i.e., DECCW - National Parks and Wildlife Services). Examples of Aboriginal and Torres Strait Islander objects include stone tool artefacts, shell middens, axe grinding groves, pigment or engraved rock art, burials, and scarred trees.

Historic heritage – historic (non-Aboriginal) heritage items may include archaeological ‘relics and other historical items such as works, structures, buildings or moving objects. Should any item which is suspected to be of historical heritage value be encountered, Taylor and subcontractors shall cease all construction works that might disturb or damage the item. The Project Manager will notify the client immediately, who will arrange for an officer from the relevant government heritage department to be consulted. A ‘relic’ is ‘any deposit, artefact, object or material evidence that relates to the settlement of the area, not being Aboriginal and Torres Strait Islander settlement; and is of State or local heritage significance’. It can include bottles, remnants of clothing, pottery, building materials and general refuse.

References:

- SE-F-11 Site Induction Form and Mandatory Safety Requirements.
- SE-F-11a Induction Register.

8. Training and Competency

All persons undertaking work on the project (employees and subcontractors) must be trained and competent to carry out their work. This includes undertaking tasks in an environmentally sound manner.

Subcontractors shall be responsible to ensure that Taylor's environmental risk management, as prescribed in Section 10.3 of this plan, are adopted and controls, as contained in Taylor's **HSE-R-01 HSE Risk Register,** are implemented when developing their systems of work.

The subcontractor shall be responsible to consult and train workers under their management in the agreed environmental system. Evidence of appropriate training shall be made available by the subcontractor to Taylor upon request by a Taylor-nominated representative.

The Project / Site Manager, along with relevant members of the project team, must be made aware of the requirements of the Taylor environmental management system and shall be required to attend Environmental Awareness and Due Diligence training sessions when organised by the company.

References:

- QSE-P-19 Training, Competency, and Awareness Procedure.
- WHS-PLAN-02 Project Workplace Health and Safety Plan (PWHSP).

9. Communication

The requirements for internal and external communication are outlined in the QSE Management System Manual. The following provides essential information in relation to environmental communication on projects.

9.1 Internal Communications

Essential information relating to project environmental management will be communicated through toolbox talks and inductions.

Environmental alerts will be periodically prepared and sent to sites for posting on notice boards.

Key changes to environmental legislation will be sent by email to all project managers and site managers.

9.2 External Communications – Community

Community complaints must be reported as environmental incidents and all correspondence relating to the complaint must be retained and filed on site, including information on how the complaint was resolved.

9.3 Regulator Site Visits and Written Communications

If an authorised officer *(*Council or DECCW representative*)* visits your site, you should contact the HSE Manager or Construction Manager for assistance and advice. While you can request that a higher level of management assists you, you cannot refuse to answer questions. An authorised officer must show their identification on request (ensure you ask for it) and has the right to ask any person on site questions relating to environmental issues. When being enquired, always be polite, discuss only the facts and do not elaborate or provide opinions.

Any Penalty Infringement Notices or official warnings from regulators are to be treated as 'incidents' and reported in the Incident Report Form, investigated and corrective actions assigned and completed to address the root cause of the infringement.

Any communication from a regulator must be notified to the HSE manager. Records of all communications must be retained and appropriately filed.

10. Environmental Risks

10.1 Standard Operating Procedures

Several standard operating procedures have been developed as part of the HSE management system to provide detailed information on the management of site issues in relation to environmental and safety risks. The following procedures have been developed to date and are available on SharePoint:

- SE-OP-01 Hazardous Substances and Dangerous Goods Procedure.
- E-OP-01 Erosion and Sedimentation Controls.
- E-OP-02 Waste and Resource Management.
- QSE-OP-02 Asbestos Management Procedure.
- SE-OP-04 Noise Management (OHS and Environmental).

10.2 Safe Work Method Statements (SWMS)

While SWMS are primarily used in WHS to manage high-risk activities, any relevant or foreseen environmental risk must also be considered in the preparation of the SWMS.

Taylor's site managers or their nominees are responsible for ensuring that subcontractors include environmental issues in their task-specific SWMS by using **SE-F-14**. If environmental issues are not appropriately addressed, the subcontractor should be advised of the requirements. It is recommended that subcontractors are assisted with identifying environmental issues, particularly during the early implementation of Taylor's environmental management system and CEMP.

References:

- SE-F-03 Taylor Construction Group Safe Work Method Statement.
- SE-F-14 Safe Work Method Statement Review Form.
- SE-F-14.1 Contractor's HSE Plan Review.

10.3 Environmental Risk Management and Control

This section provides an overview of environmental issues typically encountered on-site based on the generic issues identified in the master Environmental Risk Assessment. There is no environmental issues identified on site as per the Environmental Impact Assessment Report, therefore the risk associated with any environmental issue is very low.

In event of inclement weather, all the materials to be stored in storage units where required. The works to be carried out under covered area when and where practical. At the demolition and excavation phase, the stockpiles should be at the allocated area and be covered by plastic or fabric and the appropriate sediment measures to be placed where required.

10.3.1 Project Design – Environmental Considerations

During the planning phase of the project, consideration should be given to the following:

- How will design minimise energy use and allow for and use the natural environment?
- How will materials, products and systems be selected or designed to minimise adverse impacts and/ or benefit the environment?

These questions should be considered prior to commencement of the project and may require the input from the client.

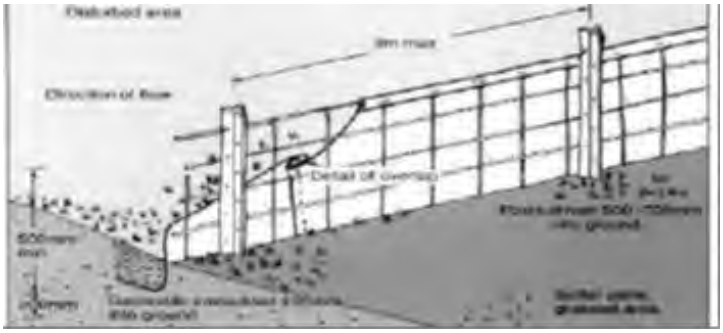
10.3.2 Soil and Water Management / Sedimentation and Erosion Control

Taylor and subcontractors shall plan and carry out works to avoid erosion and prevent sediment from leaving the site to the surrounding land, watercourses, water bodies, wetlands, and stormwater drainage systems. This includes the installation of erosion and sedimentation controls prior to commencing clearing works. Where possible, works should be staged to reduce the areas cleared at the same time to minimize soil disturbance. Where required, prepare erosion and sediment control plans (ESCP), install the controls in accordance with the plan, and maintain them regularly. For more detailed information, refer to the procedure and external guidelines listed below.

The following controls will be implemented within Taylor site boundaries to control erosion, sediment, and pollution within the site:

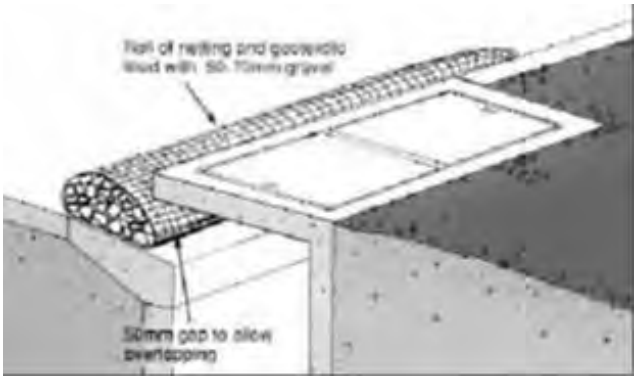
Sediment and erosion control devices – unnecessary disturbance of the site shall not occur, and all cuts are to be stabilised as soon as possible after the completion of site earthworks. Extra care will be taken to prevent sediment run-off into all neighbouring lots and stormwater. Any collected silt will be disposed of in accordance with all other relevant codes and standards.

Silt fences – are to be installed to site boundaries as required. Geotextile fabric will be fixed to the temporary construction fencing where 'downhill' boundaries exist. The fabric will be turned down under the existing ground line and secured at regular intervals not exceeding 3m, in accordance with the following diagram:



Vehicle access – will be controlled to prevent sediment being tracked. This will be done by maintaining an all-weather access/ driveway composed of an approved coarse aggregate surface. Moreover, if the need arises, a shaker grid will be installed to the main access by Taylor during the construction works. Any sediment that is tracked onto the surrounding roads will be cleaned off in a timely manner.

Storm water inlets – all storm water inlets are to be covered with geotextile fabric in a roll or other format to ensure that no sediment enters the storm water system. This will be the responsibility of the site manager to enforce. The rolls will not only be placed directly at the inlets as shown below, but also at regular intervals in the gutters 'upstream' from the inlets, creating multiple barriers.



Stockpiles – if appropriate topsoil is to be stockpiled on site, then the following measures will be put in place:

- Stockpiles shall be stored at least 2 metres away from drainage lines, natural watercourse and established trees.
- Stockpiles will have temporary silt fences around it to create an enclosure and, if necessary, they will be covered with shade cloth or tarpaulin to retain the materials inside it. The location of stockpiles will be determined on site.

Monitoring – to maintain the various erosion and sediment control devices, regular inspections, repairs and cleaning will be carried out on the silt fences to the boundaries, stockpiles, waste enclosures and to the stockpile covers.

References:

- E-OP-01 Erosion and Sedimentation Controls Procedure.
- Managing urban stormwater: soils and construction, Volume 1, 4th edition, 2004.

10.3.3 Vegetation Management

Taylor and subcontractors shall plan the works to preserve existing trees, plants and other vegetation, that are to remain within or adjacent to the works. Areas of the site that contain vegetation that must be preserved should be fenced-off, marked or otherwise isolated to ensure they are not inadvertently damaged. If there are any endangered species on site, specific management techniques may be required; these should be addressed in an Environmental Impact Assessment.

On completion of the works, all areas disturbed by construction activities shall be restored to the contract specifications. Where required and practical, efforts will be made to mulch and re-use vegetation on site or send it to a green waste recycling facility.

10.3.4 Waste Management and Resource Recovery

Taylor and subcontractors shall adopt the hierarchy of waste (avoid, reduce, reuse, recycle/ reprocess), dispose to maximise resource recovery and minimise disposal wherever possible and practical. The importance of appropriate waste management practices is to be included in the site induction.

Sites are to be provided with suitable bins and skips for appropriate collection and separation of waste and recyclables, and these are to be collected with appropriately qualified and licensed (where required) waste contractors.

Prior to disposal, waste must be classified in accordance with the DECCW Waste Classification Guidelines (latest version 2014) prior to transporting waste off-site. Excerpts from the waste classification guidelines are contained within appendix B of the **Waste and Resource Management Procedure E-OP-02**. Waste receipts must be kept for legal requirements; details of waste separated and disposed of is to be documented in the **Waste and Recycling Register QSE-R-16**. The information from the register is to be used to complete the waste management section of the KPI Monthly Report Form and forwarded to the HSE manager for tracking of Taylor environmental targets.

References:

- E-OP-02 Waste and Resource Management Procedure.
- SE-F-23 KPI Monthly Report Form.
- QSE-R-16 Waste and Recycling Register.

10.3.5 Noise Management

From an environmental viewpoint, noise can create a nuisance to neighbours and members of the public and is subject to legal requirements. Taylor and subcontractors shall make all practical efforts to comply with statutory requirements for noise management and minimise nuisance to neighbours. Protection of the Environment Operations Act 1997 (sections 139 and 140) and the Department of Environment and Climate Change NSW 'Interim Construction Noise Guideline' risk controls for noise must be incorporated in relevant SWMS, including nuisance to neighbours. Where required by development consent conditions, environmental noise monitoring will be undertaken as per the conditions. Further information on noise management from a WHS and environmental viewpoint is contained within the Noise Management Procedure.

References:

- SE-OP-04 Noise Management Procedure.

10.3.6 Water Quality Management

Taylor and subcontractors shall comply with the requirements of section 120 of the Protection of The Environment Operations Act 1997 (Prohibition of Pollution of Waters). The act prohibits all forms of water pollution unless specifically authorised through an environment protection license (EPL). On most projects undertaken by Taylor, an EPL will not be required.

There are substantial penalties for individuals and the company and controls must be in place to ensure that site activities do not cause water pollution.

Potentially hazardous activities, including washing out of concrete delivery vehicles and washing down of construction plant, are not permitted on site except in specially constructed bays that retain high PH water. Washing out of concrete delivery vehicles off-site is only permitted at locations approved for that purpose by the appropriate authority. Drains will be labeled to reduce the likelihood of misuse.

Washing of paint brushes must be undertaken to avoid any paint wash-water entering drains or waterways. Wash water must be removed from the site and appropriately treated and/ or disposed of. The chemicals, acids, or residue from any 'wet trades' such as brick cleaning must also be prevented from entering drains and waterways.

All liquids and materials that could cause water pollution must be stored in areas with secondary containment. Also refer to the section on hazardous substances, chemicals, oils, and other contaminants and the related procedure.

Pumping of stormwater – if a sediment basin is required and stormwater is required to be pumped out of the site, the pump intake is to be located no more than one metre (1m) below the surface of the collected water to reduce the amount of settled silt being pumped out for further treatment.

Stormwater treatment – there are two treatment options for stormwater collected on-site, flocculation and/ or filtration. For each option, the applicable procedures in their entirety are to be followed.

References:

- SE-OP-01 Hazardous Substances and Dangerous Goods Procedure.
- Storing and Handling Liquids - Environmental Protection (DECCW).

10.3.7 Air Quality Management

Taylor and subcontractors shall comply with all statutory requirements governing air quality management, i.e. Protection of The Environment Operations (POEO) Act 1997, section 124, and the POEO Clean Air Regulation 2010.

The Project / Site Manager will ensure that all construction facilities erected at the site are designed and operated to minimise the emission of smoke, dust, cement dust, plant and vehicle exhausts, and other substances into the atmosphere.

Taylor and subcontractors shall employ construction methods that will keep the air pollution to a minimum and apply measures such as those listed below to ensure that airborne pollutants do not cause pollution and nuisance near the works:

- The spraying of disturbed soil and roads with water whilst under construction as required.
- The removal of mud from the wheels and bodies of plant and vehicles before it enters public roads or other sealed pavements. This could be rumble grids, dry brushing, wheel wash, etc., depending on the nature of the site.
- The removal of mud or dirt spilled by construction equipment onto public roads or other sealed pavements.
- The provision of coverings or stabilisation of topsoil stockpiles.
- Covering all loads leaving the site.
- Stabilisation of ground likely to be exposed for significant time periods (e.g., using sterile seed).
- Fitting power tools with dust collection devices where practical.
- Keeping all plant and equipment well maintained and not leaving them idling while not being used.
- Reporting excess air emissions from plant and arranging for a service to fix the problem.

On-site burning of any materials is not permitted on Taylor sites.

Dust Including Crystalline Silica Dust

Dust containing respirable crystalline silica particles is commonly called silica dust. Activities such as cutting, grinding, sanding, drilling, loading or demolishing products that contain silica can generate respirable particles of crystalline silica dust that are small enough to breathe into your lungs. Crystalline silica dust can be harmful when it is inhaled into your lungs over a long period of time at low to moderate levels, or short periods at high levels.

From the **1st of July 2020** in NSW dry cutting will be an offence and for those who choose to ignore the law and put their employees a risk, SafeWork inspectors will issue tough new fines for noncompliance.

All subcontractors working on a Taylor project that is using, drilling, cutting, sanding or grinding products that are known to contain silica will need to have a system in place that will allow their workers to either wet cut or drill, or will be required to use dust extraction systems on portable tools, or adopt other methods that eliminate or minimise the generation of silica dust.

10.3.8 Hazardous Substances, Chemicals, Oils, and Other Contaminants

Prior to commencing work on site, an assessment of the quantities and locations of hazardous substances, chemicals, etc. likely to be held on-site must be undertaken. The location of hazardous substances and other contaminants must be marked on a site map (refer to appendix 5). The Site Manager will use the assessment when planning the works to minimise the potential for pollution. This includes providing appropriate storage, separation of incompatible materials and bunding, and ensuring that all activities that use or handle these substances are undertaken in an area that will not cause water pollution or land contamination.

Spill kits will be provided wherever substances that could potentially cause pollution are stored and handled. Relevant site personnel will be trained in spill response and will be familiar with the contents and function of the spill kit materials on site. All spills, no matter how small, must be cleaned up immediately and be 0reported as an environmental incident.

Refuelling or maintenance of plant and equipment, or any other activity which may result in the spillage of a chemical, fuel or lubricant on the site, is not permitted without appropriate temporary control measures.

The use and storage of any hazardous substances or other chemicals will be made strictly in accordance with the manufacturer's instructions and the relevant materials safety data sheets (MSDS).

References:

- SE-OP-01 Hazardous Substances and Dangerous Goods Procedure.
- Storing and Handling Liquids - Environmental Protection (DECCW).

Spill Response

Major spillages must be notified immediately, and all efforts made to contain the spill and prevent escape into stormwater drains and waterways, provided it is safe to do so. If the spill is beyond the capacity of the site personnel to contain and clean up, specialist services must be employed.

Minor spillages must be cleaned up immediately. If soil or ground is contaminated, the soil is to be removed and placed into a bag or designated waste drum and disposed of appropriately.

If the spill enters drains or waterways, the incident may be required to be reported to the appropriate regulatory authority (local council) as soon as practicable, in accordance with the duty to report under the POEO Act. The decision to report must be discussed with the HSE Manager or a Director prior to making the report.

Spill response procedures for this project are:

- Provide site map showing the location of all hazardous substances, chemicals, fuels, oils, spill kits, stormwater drains, and natural waterways (Appendix 5).
- Spill Response Procedure flow chart (Appendix 3).
- Call emergency services (fire, hazmat): call 000.
- Local council phone number: 02 9806 5050
- MSDSS are located at: Site Office & Hammertech

10.3.9 Pesticide Use and Storage

If pesticides are used at the site, they must be stored appropriately as per 'hazardous substances' section (11.3.8 above) and used in accordance with the manufacturer's requirements and the NSW Pesticides Management Act and Regulations. The act and regulations have strict record-keeping requirements for the use of more than 20 litres of product.

Taylor Construction Group's general policy on the use of pesticides is that they should only be applied by suitably qualified pest control contractors.

10.3.10 Contaminated Land

Prior to commencing project work, checks should be made on the potential for the site to be contaminated. This should generally be identified by the client and addressed in an Environmental Impact Assessment. If the site is found to be contaminated, the recommendations for the management of the contaminated soils from the assessment and other reports should be incorporated into this CEMP below.

Should contamination be suspected once working on the site (e.g., unusual odours, visual indications of soil or water pollution, etc.) work should cease immediately and Taylor's project/ site manager contacted. Where relevant, the client should be notified by Taylor's project manager, and investigations undertaken into the nature of the contamination. Work should not recommence until the nature and extent of the contamination is established and can be safely managed without environmental risk.

Taylor and subcontractors shall comply with relevant statutory requirements of the Contaminated Land Management Act and the POEO Act (NSW) in relation to the disturbance or treatment of potentially contaminated ground.

The company shall install any control measures needed to divert surface run-off away from the contaminated ground and to treat any surface run-off contaminated by exposure to contaminated ground. Contaminated material removed from the site must be recorded on the **Waste and Recycling Register QSE-R-16**.

References:

- Waste and Recycling Register QSE-R-16.

10.3.11 Acid Sulphate Soils (ASS)

Acid sulphate soils are naturally occurring soils generally found in estuarine areas. When exposed to air, they can oxidise and cause run-off of highly acid water. Acid sulphate soils require specialist management techniques.

The client should be aware of any potential for encountering acid sulphate soils and, if there is a potential, it should be addressed in the Environmental Impact Assessment undertaken for the project.

10.3.12 Community Communication

School Infrastructure NSW manages the community engagement and all community communications for the project. If, during construction, direct community complaints are received on site, they should be treated as incidents. Complaints must be reported to the SINSW Community Engagement manager and Project Director for logging to the CRM system immediately as well as to the HSE Manager for investigation and reporting on SharePoint. Reference to complaints must also be documented and included in site diary entries.

The project manager and site manager should work closely with SINSW to resolve the issue within 10 days, where practicable. Where complaints are unable to be resolved within this timeframe the complainant should be provided with regular updates regarding the complaint resolution process. Please refer to the Community Communication Strategy for further information.

References:

- Community Communication Strategy
- SE-F-21 Incident Report Form.
- SE-F-22 Incident Investigation Form (report on SharePoint – forms are back-up only).
- SE-F-23 KPI Monthly Report (as above).

10.3.13 Archaeology and Heritage Management

If any unexpected heritage item is discovered during maintenance and construction works, the following must be taken into consideration:

Indigenous heritage – all Aboriginal and Torres Strait Islander, regardless of significance, are protected under law. Should any deposit, artefact or material evidence (including skeletal remains) of Aboriginal and Torres Strait Islander origin be found, Taylor and subcontractors shall cease all construction works that might disturb or damage the deposit, artefact or material. The Project Manager will notify the client immediately, who will then consult the relevant government department (i.e., DECCW - National Parks and Wildlife Services). Examples of Aboriginal and Torres Strait Islander objects include stone tool artefacts, shell middens, axe grinding groves, pigment or engraved rock art, burials, and scarred trees.

Historic heritage – historic (non-Aboriginal) heritage items may include archaeological ‘relics and other historical items such as works, structures, buildings or moving objects. Should any item which is suspected to be of historical heritage value be encountered, Taylor and subcontractors shall cease all construction works that might disturb or damage the item. The Project Manager will notify the client immediately, who will arrange for an officer from the relevant government heritage department to be consulted. A ‘relic’ is ‘any deposit, artefact, object or material evidence that relates to the settlement of the area, not being Aboriginal and Torres Strait Islander settlement; and is of State or local heritage significance’. It can include bottles, remnants of clothing, pottery, building materials and general refuse.

References:

- Heritage Act 1977.
- National Park and Wildlife Act 1974.
- Unexpected Heritage Items Procedure – Roads and Maritime Services, 2022.

10.3.14 Site Security

The site has been established with chain wire fencing and A Class Hoarding to the perimeter of the project. A personnel access gate and turnstyle will be installed, to control access the site and restricted to only inducted personal, located at the North West End of the project.A vehicle gate will be located to the north West end of the project, to allow deliveries and waste collection. A second vehicle gate will be located to the south west end of the project, accessing a hardstand compound for pumping of concrete. This will also be used be used for deliveries and waste collection, if required. Gates will be manned by Traffic Controllers when in use.

B Class Hoarding will be installed on the South elevation of the project boundary, to facilitate crane movements over the footpath, to access the Primary Loading Zone.

Refer to Appendix 17 – Fencing and Hoarding Plan.

10.3.15 Tree Protection Measures

Tree protection Measures are required to be established for the following trees, as per the below:

Trees 1, 2, 3, 30, 40, 41, 42

- TPZ Enroachment
- General physical TPM's
- Restricted activities within the TPZ
- Supervision of any and all works with the TPZ by project aborist
- Expploratory excavation
- Certification required in accordance with specified hold points & TPM
- Tree sensitive construction methods

Tree 6

- General physical TPM's
- Certification required in accordance with specified hold points & TPM

Refer to Appendix 18 – Arboricultural Impact Assessment for details of the above.

10.3.16 Additional Environmental Issues

Nil at this point.

11. Incident and Emergency Management

11.1 Emergency Response

The Emergency Response Plan for this site has been developed based on a template provided in the **SE-P-07 Project Emergency Control Management Plan**. Additional information for the management and control of emergency situations can be found in the Project Safety Plan (**WHS-PLAN-02**) but a Spill Response Procedure Flow Chart is contained in appendix 3 of this plan. For additional information on response to a spill, refer to section 10.3.8.

Emergency response posters and flow charts are to be posted in the site and induction office, WHS notice boards, in crib rooms and other areas of the site as required.

References:

- SE-P-07 Project Emergency Control Management Plan.
- QSE-F-10.1 Pre-Start Site QSE Checklist.
- SE-F-31 Emergency Evacuation Rehearsal Register.
- SE-F-05 Site Layout Evacuation Plan.
- SE-F-06 On-Site Emergency Control Plan.

11.2 Incident Reporting and Investigation Reporting

Site environmental incidents must be reported to the Project / Site Manager as soon as practically possible. In addition, any major environmental incidents must also be reported to the HSE Manager in accordance with the **Incident Reporting and Investigation Procedure QSE-OP-05**. The priority is to ensure that the situation is controlled as soon as possible and to avoid further pollution or other adverse environmental consequences. Reporting of the incident should not delay any immediate responses to the incident.

Incident Reports must be completed and forwarded to the HSE manager within 24 hours and must be kept for a minimum of five (5) years.

Environmental incidents that cause, or threaten to cause, material environmental harm must be reported to the Appropriate Regulatory Authority (ARA, the local council in which the project is located) as soon as practicable following the incident. This would include any spillage or leak of substances that cause water or land pollution. Material environmental harm generally means that the harm is not trivial and/ or costs more than $10,000 to clean up. The phone number of the ARA should be included in the Emergency Response Plan.

If the Site Manager believes that the incident may be reportable to the ARA, contact the WHS Manager for further advice prior to making an investigation report.

All environmental incidents that cause, or could potentially result, in an environmental harm are to be investigated, and corrective actions implemented following the investigation. Depending on the seriousness of the incident, key site personnel, the HSE Manager, witnesses, etc. should be consulted on the investigation and in determining appropriate corrective or preventive actions.

References:

QSE-OP-05 Incident Reporting and Investigation Procedure.

SE-F-21 Incident Report Form (report on SharePoint – forms are back-up only).

SE-F-22 Incident Investigation Form (as above).

12. Environmental Monitoring and Inspections

12.1 Site Environmental Inspections

Site environmental inspections are to be undertaken weekly using **SE-F-02 HSE Inspection Checklist** to ensure that environmental hazards are recognised and can be promptly rectified. Additional environmental issues may be added to the site HSE inspection form as required.

12.2 Physical Monitoring

For many projects undertaken by Taylor, physical environmental monitoring is not typically required (e.g., dust, water quality, noise levels and air quality). Should the Environmental Impact Assessment specify that environmental monitoring is required, the project manager will arrange for appropriately qualified consultants to undertake that monitoring. All equipment used to measure environmental parameters will be calibrated in accordance with manufacturer's instructions.

12.3 Monitoring of Project Environmental Targets

Objectives and targets for the project are specified under 'Objectives and Targets' section of the CEMP. Data relating to these targets will be documented daily using site diaries, reviewed by Project / Site Managers monthly and forwarded to the HSE Manager for reporting to senior management.

The KPI monthly report captures information on lag and lead indicators. The current indicators are:

Lag indicators:

- Number of environmental incidents.
- Number of penalty infringement notices (pins) or clean-up notices.
- Number of community complaints.

Lead indicators:

- Number of toolbox talks (combined with WHS and environmental issues);
- Number of environmental inspections undertaken.
- Waste and recycling volumes (initially to set benchmark, then track improvement)

Add any additional KPIs that may be set from Environmental Impact Assessments, conditions of consent and client requirements, etc.

13. Non-Conformity, Corrective and Preventive Actions

Taylor has a non-conformance and corrective action process in place to address all non-conformities across the business, regardless of the source. The process is defined in the **Reporting Non-Conformance, Corrective and Preventive Actions Procedure QSE-OP-29**. Typically, environmental non-conformances would result from audits, inspections and from observations by the site manager of poor environmental practices, including incorrect waste disposal/ recycling (liquid waste, poor storage of hazardous substances, oils, chemicals and damage to existing environmental controls such as sediment fencing, etc.). Non-conformances may be issued for serious breaches or repeated minor breaches.

References:

- QSE-OP-29 Reporting Non-Conformance, Corrective and Preventive Actions Procedure.
- Notices (electronic) raising of non-conformances (internal).
- Notices (printable) for raising NCRS on subcontractors.

14. Purchasing / Procurement

Purchasing and procurement includes the purchase of goods and the supply of services of contractors. When purchasing goods, the following environmental considerations should be considered:

- Is there a less toxic, less harmful alternative (e.g., chemicals, paints, solvents, etc.)?
- How much do we need? Will anything be wasted? Precise ordering will minimise wastage of resources and money.
- Can the product be purchased locally to reduce transport impacts?
- Are there any opportunities to use 'green' products in construction to improve the efficiency of the building in terms of energy and water usage (design issue – may need client input)?
- S-F-18.1 Pre-Hire Purchasing Assessment Form

When engaging contractors, the following should be taken into consideration:

- Has the environmental capability been assessed and signed-off through contract administration?
- Has the contractor attended a pre-award interview and assessed Taylor Construction Group environmental requirements?
- Has **Subcontractor Tender Interview and Assessment Form QSE-F-15.6** been completed?

References:

- QSE-OP-15 Subcontracting, Purchasing and Hiring Procedure
- QSE-F-15.6 Subcontractor Tender Interview and Assessment Form.

15. Contractor Management

Taylor, as the principal contractor, will ensure that contractors performing work on site are aware of the environmental requirements and enforce compliance to requirements.

Prior to commencing on site, contractors are to be inducted to the site as part of the HSE requirements. Inductions will include an environmental component to ensure all contractors are aware of the environmental risks on the project.

Contractors are required to submit Safe Work Method Statements (SWMS*)* prior to commencement of work as part of the WHS requirements. SWMS also address the environmental risks for the tasks and will be reviewed and checked-off on **SE-F-14 Safe Work Method Statement Review Form** by the site manager to ensure that all environmental risks are appropriately identified, and controls documented.

Environmental inspections will be undertaken at least once monthly. This will include an inspection of the contractor's work area and checking that all environmental controls are in place. Serious breaches or repeated minor breaches will result in the issue of a Non-Conformance Report, and the issue must be resolved within designated time frames.

16. Environmental Audit

Audits of the Environmental Management System will be conducted regularly to ensure the system is appropriately in place and implemented. As part of the audit program, audits will also be undertaken on project sites for compliance to the requirements of the Construction Environmental Management Plans. Audits should be undertaken by suitably experienced auditors.

Projects that have duration of more than six months will have at least one audit against the CEMP and, after the six months, will be audited at least once per year. This will generally be undertaken as an integrated audit in conjunction with the Project Safety Plan and Project Management Plan (Quality). Projects with high-risk activities or that performed poorly at the initial audit may be audited at a higher frequency. The HSE Manager is responsible for coordinating project audits.

17. Review of This Plan

This Environmental Management Plan must be reviewed by the project manager in consultation with the project team and HSE manager whenever any major change occurs on the site that may have an impact on the environment, or at least twice (every six months) during construction.

Appendix 1 – Global Mark Accreditation

Certificate of Approval

This certificate confirms that the company below complies with the following standard:

Company Name	**Taylor Construction Group**
Company Other Name	
Client ID	**101009**
Scheme	**Environmental Management Systems Scheme**
Certification Standard	**AS/NZS ISO 14001-2016: Environmental management systems - Requirements with guidance for use**
Scope of Certification	**Design, construction, project management and property development services**
Type of Certification	**Management System**

CERTIFICATE DATES:

Original / Initial	**19/11/2009**	*Last Certificate update*	**6/05/2024**
Certification / Re Certification	**26/04/2024**	*Expiry*	**7/05/2027**
Last Certification Decision	**5/05/2024**		

APPROVED COMPANY/SITE ADDRESS(ES):

Level 16, 100 Pacific Highway North Sydney NSW 2060 Australia

The use of the Accreditation Mark indicates accreditation by the Joint Accreditation System of Australia and New Zealand in respect to those activities covered by JAS-ANZ accreditation. Refer to www.jasanz.org/register for verification.

This certification remains valid until the above mentioned expiry date and subject to the organisation's continued compliance with the certification standard, and Global-Mark's Terms and Conditions.

This Certificate of Approval remains the property of Global-Mark Pty Ltd, Company Number: ACN.108-087-654

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Certification Manager

Unique Certificate Code: A8052C2D488982D1CA258B0E001BEE1A

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Appendix 2 – Environmental Policy

Environmental Policy Statement

Taylor is committed to protecting the environment, the health and safety of our employees, and the community in which we conduct our business. It is our policy to seek continual improvement throughout our business operations to lessen our impact on the environment by conserving energy, water, and other natural resources, reducing waste generation and recycling, and reducing our use of hazardous materials.

Our Commitment

We are committed to environmental excellence and pollution prevention, meeting or exceeding all environmental regulatory requirements, and identifying products that have greater recycled content with lower toxicity and packaging, that reduce the use of natural resources.

We will comply with relevant legislation governing the protection of the environment. Our environmental management systems will address all aspects of the International Standard, ISO 14001:2016: 'Environmental Management Systems – Requirements with guidance for use'.

Objectives

To develop and operate an environmental management system to minimise pollution, preserve resources, and fulfill compliance obligations.

Measures

We expect all employees and subcontractors to adhere to this policy and help reach our goals by:

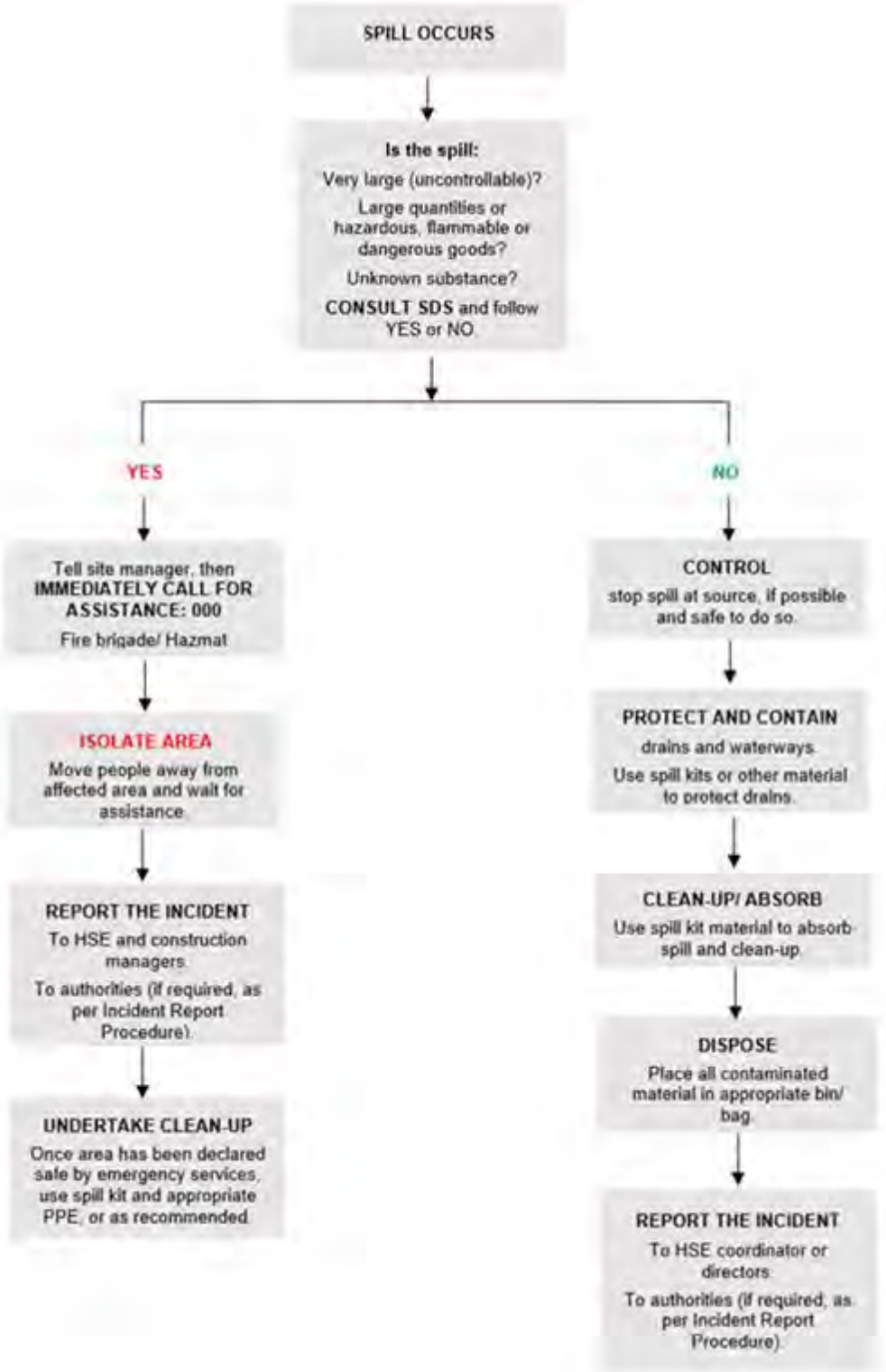
- Working proactively with our clients, regulators, and other community stakeholders to enable environmental issues to be addressed at an early stage of development.
- Considering local community views and ensure that we inform, listen to, and respond to reasonable concerns relating to our projects.
- Complying with, and where possible, surpassing the standards required by the applicable environmental regulations.
- Fulfilling all environmental requirements prescribed by the Company.
- Promoting sound environmental policies and practices
- Promoting environmental awareness among all employees and subcontractors to achieve our environmental objectives.
- Conserving resources and maximising energy efficiency.
- Promoting the efficient use of natural resources and reduce waste using the waste hierarchy – avoid, reduce, re-use, recycle, and finally dispose.
- Setting realistic environmental objectives and targets at all relevant levels within the company and continually monitor performance.
- Reusing or recycling waste where appropriate and regulating the treatment and disposal of residual waste.
- Reducing and preventing pollution where possible.
- Minimising vehicular and mobile plant emission of pollutants.
- Advocating good environmental practices on both company and individual levels; and continually and effectively improving our environmental performance.
- Continually improve our environmental performance through periodic review and evaluation of our policy and management systems to ensure they remain suitable, adequate, and effective
- Encouraging a sense of personal responsibility for environmental issues amongst employees and subcontractors through effective communication, training, and positive organisational culture.

This policy will be reviewed in January 2025

George Bardas
Chief Executive Officer

Appendix 3 – Taylor's Construction Spill Reponse Procedure Flow Chart

Taylor's Construction Spill Response Procedure Flow Chart



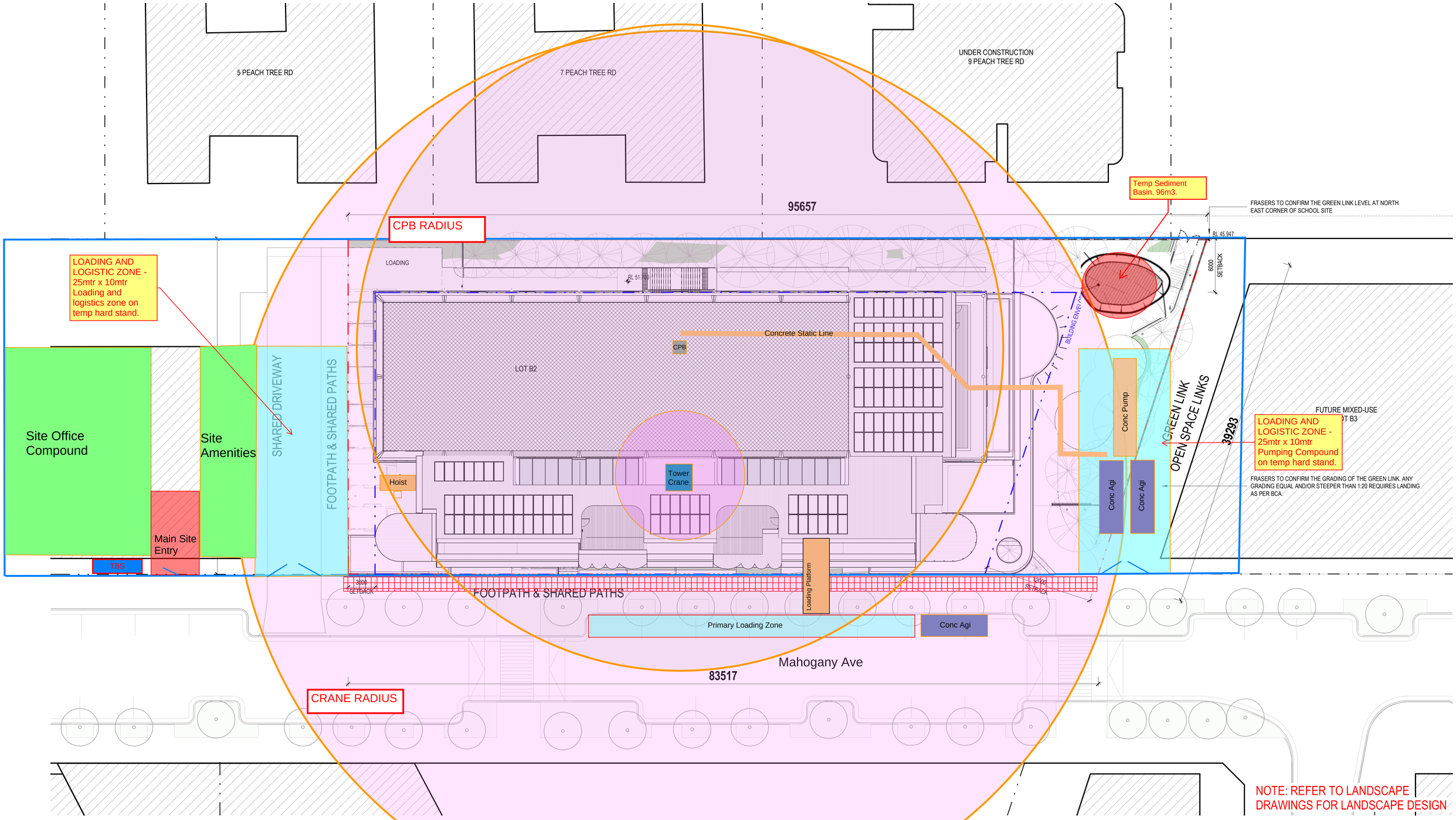
Appendix 4 – Site Environmental Emergency Response Plans

Site Environmental Emergency Response Plans

Potential emergency	What to do?	Relevant authorities and persons
Injury caused by: – Fire – Explosion – Machinery accidents – Minor injuries	– For serious injuries, call an ambulance. You should also have the contact details of the nearest doctor, medical centre and hospital. – Immediately inform the site first aid officer. – Follow the procedures as detailed in the Site Safety Plan. – For major injuries, contact the site manager or project manager.	– Emergency services – Nearest doctor – Medical centre – Site Manager – Project Manager
Fire **Fire at the diesel tank** **Fire at any of the machineries** **Fire caused by vandalism**	– Evacuate all personnel to a safe area immediately. – Call the fire brigade (emergency services). – If the fire is likely to damage neighbouring property, inform the adjacent residents. – Follow the procedures as detailed in the Site Safety Plan. – For major fire emergencies, contact the site manager or project manager. – Inform terminal security. **Note:** fire extinguishers are located throughout the site as detailed in the Emergency Evacuation Map.	– Emergency services – Site Manager – Project Manager – Adjacent residents
Spills management and contaminated soils. **Major spills:** – Spill or release of diesel fuel or oil – Spill or release of other hazardous chemicals or material.	For major spills (defined as a spill that is likely to have direct environmental consequences): – Immediately call the Fire Brigade and notify the project manager. – Identify the source of the spill. – Refer to the Material Safety Data Sheet (MSDS) and evaluate the hazards of the material.	– Emergency services (fire brigade) – HSE Manager – Site Manager and Project Manager – EPA
Minor site spills **Acid sulphate soils**	– If the material is dangerous, evacuate the site immediately and notify all neighbours. – If it is safe to do so, halt the source of the spill immediately. – Contain the spill and control its flow. – Block storm water drains downstream of the spill. – EPA and local council must be notified about any spills that are likely to threaten the environment. – Minor spills (defined as spills which can be contained and rectified correctly without the need of external services), shall be contained and rectified with the site spill kit and disposed of correctly. Superintendent to be notified via incident report. – Reported to the Site Manager.	– Emergency services (fire brigade) – HSE Manager – Site Manager and Project Manager – EPA

Potential emergency	What to do?	Relevant authorities and persons
	– Where acid sulphate soils are discovered, the spoil shall not be removed from site; subsequent notification and testing will follow.	
Heavy rainstorm and flood beyond the capacity of the sediment and erosion controls on-site or failure of the sedimentation control measures.	– Contain/ minimise the flow. – Contact council immediately. – Investigate reasons for failure and prepare an incident report. – Contact the Project Manager.	– Council – Site manager – Project manager
Discovery of items of conservation value (e.g., flora and fauna, heritage).	Fence-off the area as 'no go' zone and contact the site manager or project manager immediately for further action.	– Site Manager – Project Manager
Discovery of contaminated material on site (e.g., underground fuel storage tanks).	Fence-off the area as 'no go' zone and contact the site manager or project manager immediately for further action.	– Site Manager – Project Manager

Appendix 5 – Site Map: Environmental Requirements



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Nominated Architect
Ray Brown, NSWARB 6359

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Do not scale drawings. Verify all dimensions on site

revision	purpose of issue	checked	date
A	FOR INFORMATION		06-04-23
B	50% DESIGN DEVELOPMENT ISSUE		28-04-23
C	FOR INFORMATION		29-06-23
D	90% DETAILED DESIGN - ISSUE FOR TENDER		21-07-23

NSW GOVERNMENT Education School Infrastructure

Consultants

Project Manager APP	Landscape Architect OCULUS	BCA Engineer MBC
Structural + Civil Engineer TTW	Cost Planner ALTUS GROUP	Acoustic Engineer PWNA
Building Services Engineer ERBAS	Fire Engineer WSP	Traffic Consultant Stantec

LEGEND

- SITE BOUNDARY
- SETBACK
- EASEMENT

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Brisbane
Melbourne
Perth
Sydney

approved	scale
FE+JP	As indicated @A1
prepared	project no
SL	220350

project
Midtown Macquarie Park New Primary School

drawing
Site Plan

drawing no. **MPS-ARC-ZZ-ZZ-DR-A-0012** revision **D**

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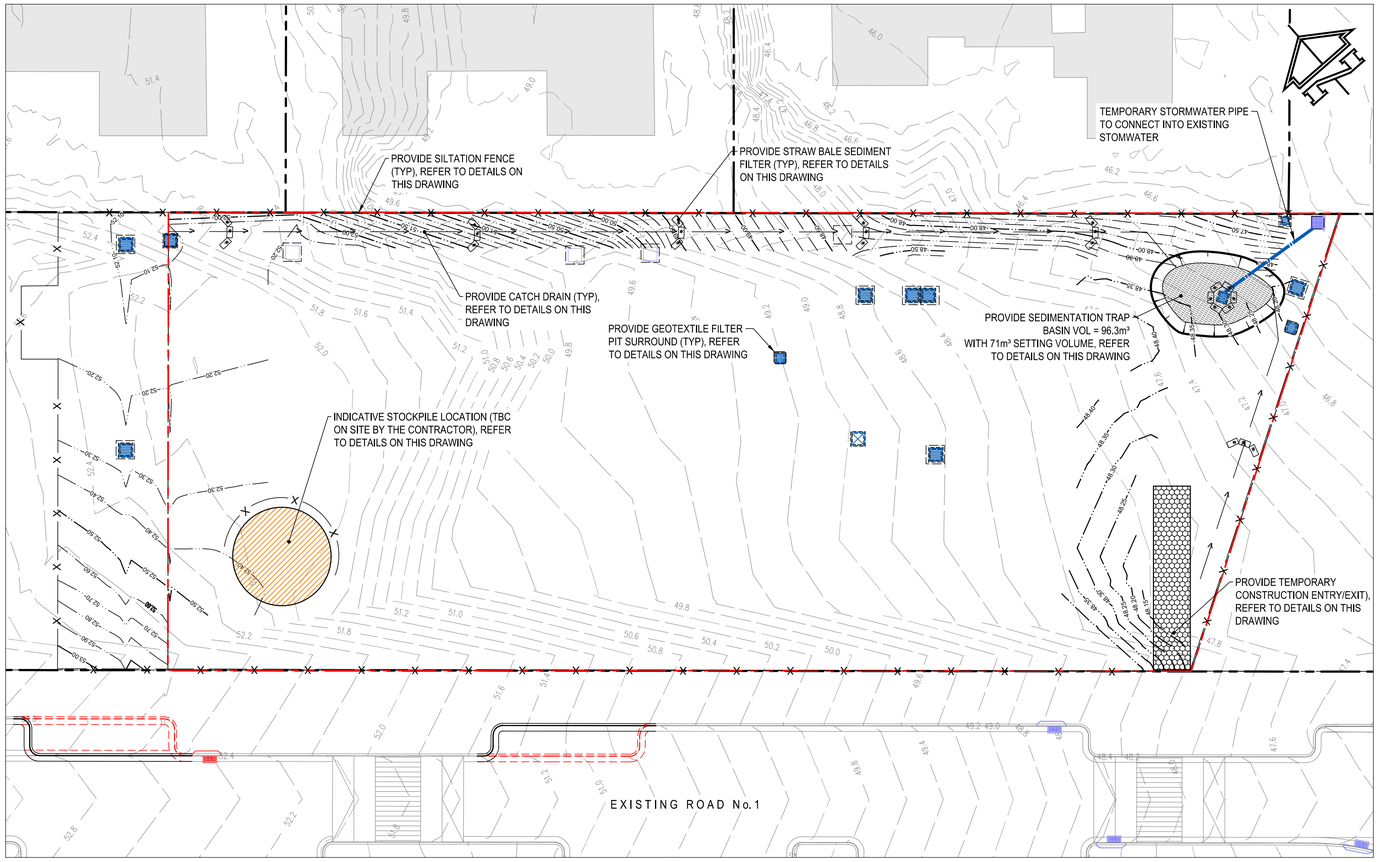
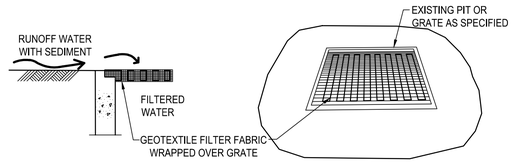
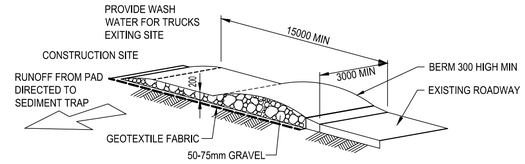
Appendix 6 – Sediment Control Plan

Updated (21 July 2025) version provided`





GEOTEXTILE PIT FILTER
NTS



TEMPORARY CONSTRUCTION EXIT
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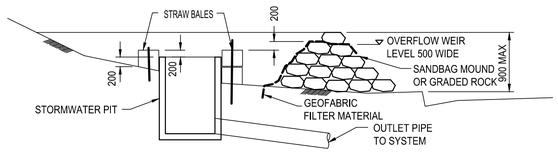

SEDIMENTATION TRAP
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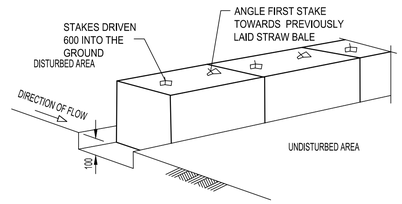

STRAW BALE SEDIMENT FILTER
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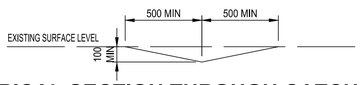
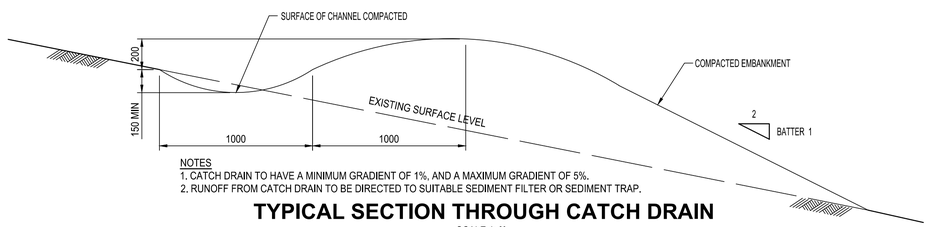
NOTE: STAKE TO BE EITHER TAR COATED STAR OR 50 x 50 HARDWOOD



TYPICAL SECTION THROUGH CATCH DRAIN
SCALE 1: 20



NOTES
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2. RUNOFF FROM CATCH DRAIN TO BE DIRECTED TO SUITABLE SEDIMENT FILTER OR SEDIMENT TRAP.

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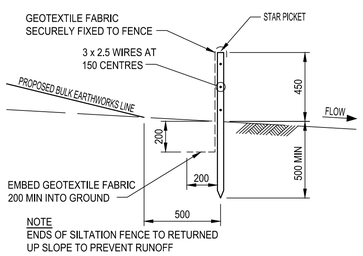
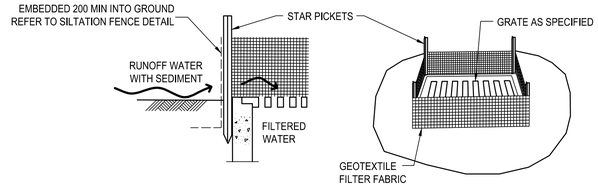
SCALE 1: 20

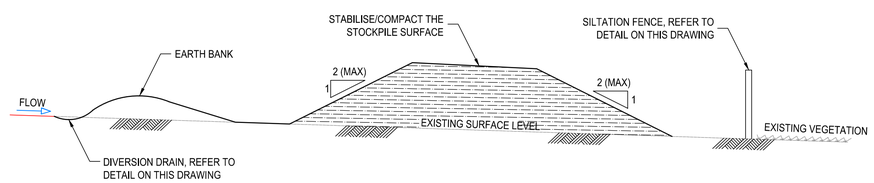


NOTE
ENDS OF SILTATION FENCE TO RETURNED UP SLOPE TO PREVENT RUNOFF

SILTATION FENCE DETAIL
SCALE 1: 20



GEOTEXTILE FILTER PIT SURROUND
NTS



STOCKPILE DETAIL
NTS

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EROSION AND SEDIMENT CONTROL NOTES

1. All work shall be generally carried out in accordance with
   (A) Local authority requirements,
   (B) EPA - Pollution control manual for urban stormwater,
   (C) LANDCOM NSW - Managing Urban Stormwater: Soils and Construction ("Blue Book").
2. Erosion and sediment control drawings and notes are provided for the whole of the works. Should the Contractor stage these works then the design may be required to be modified. Variation to these details may require approval by the relevant authorities.
   The erosion and sediment control plan shall be implemented and adapted to meet the varying situations as work on site progresses.
3. Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
4. When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
5. Minimise the area of site being disturbed at any one time.
6. Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
7. All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site conditions.
8. Control water from upstream of the site such that it does not enter the disturbed site.
9. All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
10. All vehicles leaving the site shall be cleaned and inspected before leaving.
11. Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
12. Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

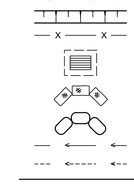
1. Prior to commencement of excavation the following soil management devices must be installed.
1.1. Construct silt fences below the site and across all potential runoff sites.
1.2. Construct temporary construction entry/exit and divert runoff to suitable control systems.
1.3. Construct measures to divert upstream flows into existing stormwater system.
1.4. Construct sedimentation traps/basin including outlet control and overflow.
1.5. Construct turf lined swales.
1.6. Provide sandbag sediment traps upstream of existing pits.
2. Construct geotextile filter pit surround around all proposed pits as they are constructed.
3. On completion of pavement provide sand bag kerb inlet sediment traps around pits.
4. Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

WATER QUALITY TESTING REQUIREMENTS

Prior to discharge of site stormwater, groundwater and seepage water
into council's stormwater system, contractors must undertake water quality tests in conjunction with a suitably qualified environment consultant outlining the following:

- Compliance with the criteria of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)
- If required subject to the environmental consultants advice, provide remedial measures to improve the quality of water that is to be discharged into Councils storm water drainage system.This should include comments from a suitably qualified environmental consultant confirming the suitability of these remedial measures to manage the water discharged from the site into Councils storm water drainage system. Outlining the proposed, ongoing monitoring, contingency plans and validation program that will be in place to continually monitor the quality of water discharged from this site. This should outline the frequency of water quality testing that will be undertaken by a suitably qualified environmental consultant.

EROSION AND SEDIMENT CONTROL LEGEND



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FOR CONSTRUCTION CERTIFICATE

REV	DESCRIPTION	CHK	DR	DATE
P.06	90% DETAILED DESIGN - ISSUE FOR TENDER	NB	LA	27.07.23
P.05	ISSUED FOR APPROVAL	NB	LA	25.07.23
P.04	ISSUED FOR APPROVAL	NB	LA	21.07.23
P.03	ISSUED FOR INFORMATION	NB	LA	29.06.23
P.02	ISSUED FOR 90% TENDER	NB	LA	26.06.23
P.01	ISSUED FOR 50% DD	NB	LA	09.05.23
P.08	ISSUED FOR CONSTRUCTION CERTIFICATE	CR	ES	18.12.24
P.07	ISSUED FOR CONSTRUCTION CERTIFICATE	CR	LA	23.09.24

ARCHITECT: architectus™

ENGINEER: TTW Structural Civil Traffic Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

PROJECT: **MIDTOWN MACQUARIE PARK NEW PUBLIC SCHOOL**

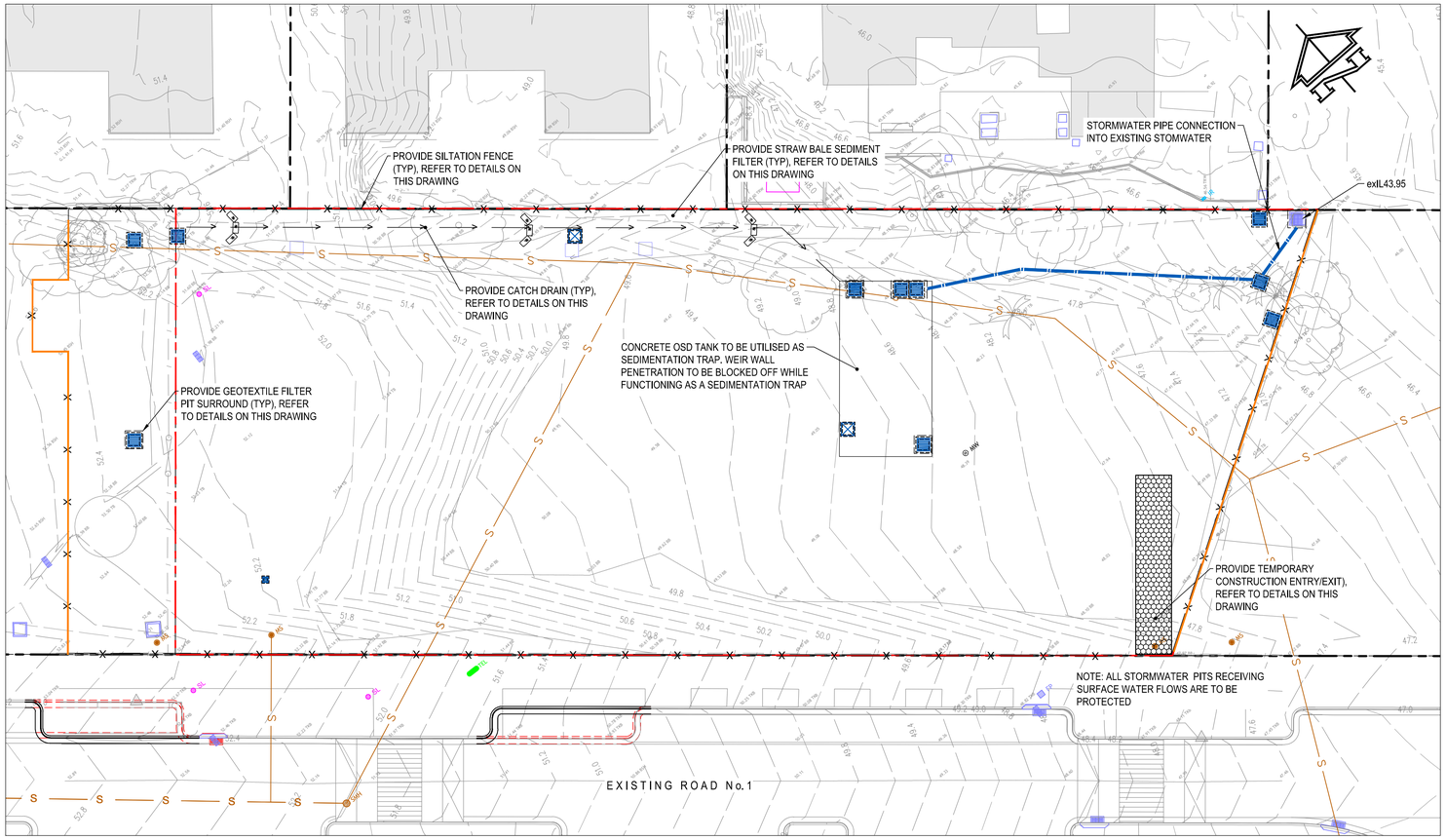
PROJECT NUMBER: **221684**

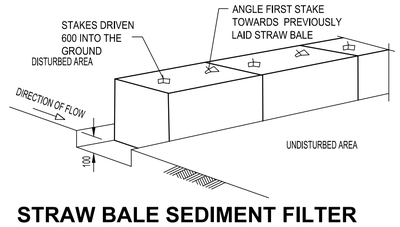
DRAWING NAME: SEDIMENT AND EROSION CONTROL PLAN AND DETAILS

SCALE : A1 **1:250** | DRAWN BY **LA** | AUTHORISED BY CR

DRAWING No **MPS-TTW-ZZ-XX-DR-C-0002** | REVISION **P.08**

Plot File Created: Dec 18, 2024 - 5:46pm





STRAW BALE SEDIMENT FILTER
NTS

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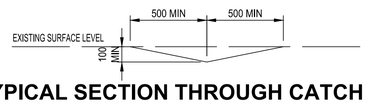
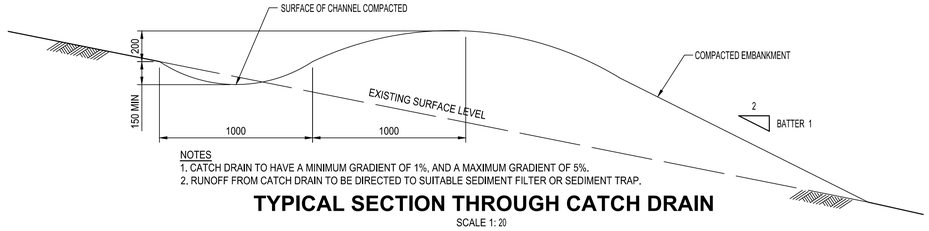


TYPICAL SECTION THROUGH CATCH DRAIN
SCALE 1: 20



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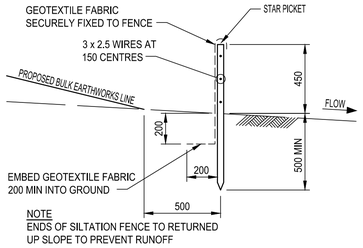

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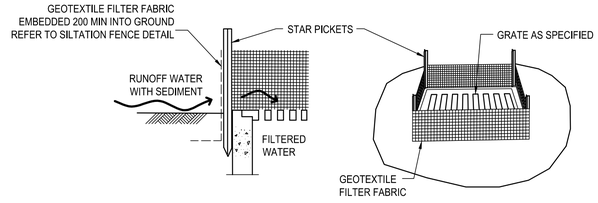
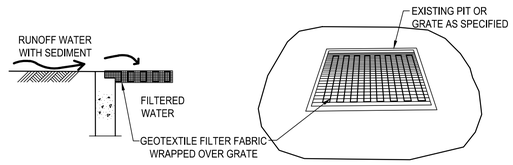


GEOTEXTILE FILTER PIT SURROUND
NTS



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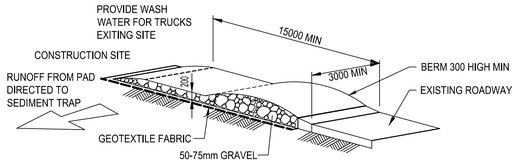

TEMPORARY CONSTRUCTION EXIT
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EROSION AND SEDIMENT CONTROL LEGEND

- Batter
- Siltation fence
- Stormwater pit with Geotextile filter surround
- Hay bale barriers
- Sandbag sediment trap
- Catch drain
- Overland flow path

0 2.5 5 7.5 10 12.5 15 17.5 20m

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THIS DRAWING HAS BEEN PREPARED USING COLOUR

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ISSUE FOR CONSTRUCTION

REV	DESCRIPTION	CHK	DR	DATE
03	ISSUED FOR CONSTRUCTION	CR	LA	21.07.25
02	ISSUED FOR CONSTRUCTION	CR	LA	17.07.25
01	ISSUED FOR CONSTRUCTION	CR	LA	21.03.25

ARCHITECT: architectus™

ENGINEER: TTW Structural Civil Traffic Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

PROJECT: **MIDTOWN MACQUARIE PARK NEW PUBLIC SCHOOL**

PROJECT NUMBER: **221684**

DRAWING NAME: SEDIMENT AND EROSION CONTROL PLAN AND DETAILS

SCALE : A1 **1:250** | DRAWN BY **LA** | AUTHORISED BY CR

DRAWING No **MPS-TTW-ZZ-XX-DR-C-0002** | REVISION **03**

Plot File Created: Jul 21, 2025 - 1:58pm

Appendix 7 – Environmental Legal and Other Requirements Register

TAYLOR

Project : 2405 – Midtown Maquarie Park Primary School **Date: 08/08/2024**

ENVIRONMENTAL -LEGAL -REGISTER -01

Environmental Legal Register

Legislation	*Key Requirements*	*Relevance to Taylor Construction Group*	*Mechanism for Evaluating Compliance*	*Link to legislation and relevant web sites*
Protection of the Environment Operations Act 1997 (POEO Act)	The POEO Act is the key piece of environment protection legislation, and is administered by the Department of Environment and Climate Change (DECC) – formerly EPA. The objective of the Act is to protect restore and enhance the quality of the environment in NSW with a need to maintain ecologically sustainable development. Schedule 1 of the POEO Act lists activities that are subject to environmental licensing. Where an environmental Protection Licence is required, the DECC is the Appropriate Regulatory Authority (ARA). In most other cases, the local council is the ARA.	Environmental Protection Licences may be required for large projects by TPG. (Refer to Schedule 1) Therefore, in most cases, the local council is the Appropriate Regulatory Authority . Environmental protection offences and penalties, and a duty to notify of environmental harm, apply to all personnel working on the project. Managers, supervisors, workers and contractors need to comply with all requirements of the Act, with particular emphasis on duty to notify, and prevention of pollution (see key sections in adjacent column to the left)	**Environmental inspections** **Compliance checks / audits against Environmental Management Plan**	www.austlii.edu.au/au/legis/nsw/consol_act/poteoa1997455/ http://www.environment.nsw.gov.au/licensing/
	The POEO Act imposes severe penalties for causing environmental harm, polluting water, not operating equipment in an efficient manner and inappropriate handling and disposal of waste. Penalties also exist for failure to notify pollution incidents.	The company and individuals can be prosecuted in criminal proceedings under this Act.	**Environmental inspections** **Plant pre-start inspections and plant maintenance** **Compliance checks / audits against Environmental Management Plan**	
	The following is a summary of key sections of the Act that must be complied with: ▪ S 120 – Prohibition of Water pollution ▪ S 124 - 125 Air pollution - failing to maintain and operate plant, or carry out maintenance work on plant, in a proper and efficient manner.		Environmental inspections Plant pre-start inspections and plant maintenance Compliance checks / audits against Project Environmental Management Plan	http://www.environment.nsw.gov.au/water/polltreatment.htm http://www.environment.nsw.gov.au/air/

TAYLOR		
Project :	**2405 – Midtown Maquarie Park Primary School**	**Date: 08/08/2024**
	ENVIRONMENTAL -LEGAL -REGISTER -01	
	Environmental Legal Register	

Legislation	*Key Requirements*	*Relevance to Taylor Construction Group*	*Mechanism for Evaluating Compliance*	*Link to legislation and relevant web sites*
	▪ S 128 Standard of air impurities not to be exceeded (air pollution) ▪ S 139 – Noise Pollution – operation of plant S 142 A-E – Land Pollution (offence if cause or permit land to be polluted S 143 – Land Pollution (unlawful transport of waste) S 144 – Land Pollution – permitting land to be used as unlawful waste facility	**Waste must be transported by an appropriately licenced transporter to a facility that is licenced to accept waste**		http://www.environment.nsw.gov.au/noise/
	S 148 – Duty to Notify S 152 Offences for failure to notify of pollution incident **Penalties** **Most Serious Offences Causing Harm to the Environment and Involving Wilfulness or Negligence** Maximum penalty: Corporations $5,000,000 (wilful) or $2,000,000 (negligence): Individuals $1,000,000 or 7 years' imprisonment, or both, (wilful) or $500,000 or 4 years' imprisonment, or both (negligence) **Tier 2 (strict liability)** Corporations: $1,000,000 and up to $120,000 for each day the offence continues. Individuals: Up to $250,000 and up to $60,000 each day the offence continues.	**Licenced disposal authority to provide receipts for all waste received , receipt is to include date, time and amount of waste disposed , ALL receipts MUST be provided to Taylors site management on their return to site or when requested** Damage to corporate reputation / image **Possible exclusion from tendering for future environmental sensitive projects** **Financial Cost to company and project stake holders**	**Environmental incident reports (indicating if notification was required). Reviewed at Management Review.** **Environmental inspections** **Plant pre-start inspections and plant maintenance** **Compliance checks / audits against Environmental Management Plan** **Monitor compliance with DA consent**	

TAYLOR		
Project :	**2405 – Midtown Maquarie Park Primary School**	**Date: 08/08/2024**
	ENVIRONMENTAL -LEGAL -REGISTER -01	
	Environmental Legal Register	

Legislation	*Key Requirements*	*Relevance to Taylor Construction Group*	*Mechanism for Evaluating Compliance*	*Link to legislation and relevant web sites*
	Tier 3 (penalty notice – on the spot fine) $1500 for corporation $750 for individuals **Failure to Notify a Pollution Incident** Maximum penalty: corporations $1,000,000; individuals $250,000			
POEO (General) Regulation 2009	The Regulation (among other things): • sets out fees for environment protection notices and noise control notices; • sets out matters to be included by the EPA in its statement of reasons for the grant or refusal of a licence application; • makes it an offence to provide false or misleading information in relation to a licence application; • requires licensees to retain records used to calculate licence fees; • prescribes certain matters when placed into water to be water pollution, and the methodology for testing matter in waters; • exempts certain water pollution from the water pollution offence under the *POEO Act 1997* ; • allows the EPA to prohibit or regulate certain activities that threaten the safety of drinking water that is part of a public water supply; declares certain bodies to be the ARA in relation to certain activities for the purposes of the *POEO Act 1997* ;	Projects may require environmental protection licences. (Refer to Schedule 1 of the POEO Act)	**Planning - requirement for Licence set out in PEMP (if required)** **Audits against PEMP**	https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiQq5ew4rzYAhWHE7wKHXjTDUUQFggnMAA&url=http%3A%2F%2Fwww.austlii.edu.au%2Fau%2Flegis%2Fnsw%2Fconsol_reg%2Fpoteor2009601%2F&usg=AOvVaw1RKZIXEv0dxWGfFhkVRVb3

TAYLOR

Project : 2405 – Midtown Maquarie Park Primary School **Date: 08/08/2024**

ENVIRONMENTAL -LEGAL -REGISTER -01

Environmental Legal Register

Legislation	Key Requirements	Relevance to Taylor Construction Group	Mechanism for Evaluating Compliance	Link to legislation and relevant web sites
POEO (Clean Air) Regulation 2010	**This Regulation replaces the** *Clean Air (Domestic Solid Fuel Heaters) Regulation 1997, Clean Air (Motor Vehicles and Motor Vehicle Fuels) Regulation 1997, Clean Air (Plant and Equipment) Regulation 1997* and the *Protection of the Environment Operations (Control of Burning) Regulation 2000POEO (Clean Air) Regulation 2002*			http://www.austlii.edu.au/au/legis/nsw/consol_reg/poteoar2002601/
	In relation to motor vehicles, the regulation deals with the emission of air impurities, including excessive smoke from motor vehicles. In relation to Plant and Equipment, the regulation sets maximum limits on emissions from activities and plant for a number of substances, including chlorine, dioxins furans, smoke, solid particles and sulphur. In relation to the control of burning, the regulation controls burning in the open or in incinerators in local government areas, prohibits the burning of certain articles (including tyres, paint and solvent containers, and certain treated timbers), and imposes a general duty on persons to prevent or minimise air pollution when burning in the open or in an incinerator	Keep vehicles maintained to minimise air pollution and avoid a "smoky vehicle" fine. Maintain plant and equipment to minimise air pollution General Policy at Taylor Construction Group is no burning off at site.	Environmental Inspection checklist Pre-start checks on plant	http://www.legislation.nsw.gov.au/fragview/inforce/subordleg+428+2010+whole+0+N?tocnav=y
POEO (Noise Control) Regulation 2008	This Regulation repeals and remakes, with minor amendments, the provisions of the Protection of the Environment Operations (Noise Control) Regulation 2000: • the sounding of sirens and similar devices and the use of sound systems on vessels, • the emission of noise from the engines or exhausts of motor vehicles and vessels, • the maintenance of noise control equipment on motor vehicles and vessels, • the issue of defective vehicle notices and defective vessel notices,	**Noise emissions from machinery and activities.**	**Environmental Inspection checklist** **Pre-start checks on plant**	www.austlii.edu.au/au/legis/nsw/consol_reg/poteocr2008693/ http://www.environment.nsw.gov.au/noise/

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Legislation	*Key Requirements*	*Relevance to Taylor Construction Group*	*Mechanism for Evaluating Compliance*	*Link to legislation and relevant web sites*
	• the times during which it is not permissible to use certain articles if they emit noise that can be heard in any residential premises, • the inspection and testing procedures for the purpose of determining noise emission levels of certain motor vehicles, motor vehicle accessories, vessels, articles or equipment			
POEO (Penalty Notices) Regulation 2004	This Regulation: • sets out the offences under the *Protection of the Environment Operations Act 1997* and related Acts and regulations for which penalty notices may be issued, and the amount of such fines; • specifies the organisations authorised to issue penalty notices for particular offences; and • authorises the service of a penalty notice relating to an offence, applying to an owner of a motor vehicle or vessel, on the owner without naming the address of the owner and by leaving the penalty notice on that vehicle or vessel.	Environmental protection offences and penalties, and a duty to notify of environmental harm, apply to all personnel working on projects.		www.austlii.edu.au/au/legis/nsw/consol_reg/poteonr2004710/
POEO (Waste) Regulation 2005	Schedule 1 of the regulation sets out the types of waste to which waste tracking requirements apply.	Certain chemicals used or generated may be subject to tracking requirements in this regulation. If waste tracking requirements apply, waste dockets and other records must be kept	**Periodic (monthly) review of project waste dockets and records to ensure compliance with tracking requirements.**	http://www.austlii.edu.au/au/legis/nsw/consol_reg/poteor2005609/ www.environment.nsw.gov.au/waste
Protection of the Environment Operations Amendment (Scheduled Activities and Waste) Regulation 2008 (Note – part of 2005 Regulation)	**This framework uses a mix of legislative, policy, educative and economic tools to encourage waste avoidance and the further recovery of resources. This new framework includes:**	Altered definitions of waste categories and disposal requirements (since April 2008). If using recovered resources (eg recycled asphalt, etc), ensure material meets threshold contaminant requirements (obtain from supplier prior to use)		www.austlii.edu.au/au/legis/nsw/consol_reg/poteor2005609/

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Legislation	*Key Requirements*	*Relevance to Taylor Construction Group*	*Mechanism for Evaluating Compliance*	*Link to legislation and relevant web sites*
	• **Fewer and simpler licensing categories for waste;** • A streamlined waste classification system; • **New resource recovery licensing categories and resource recovery exemptions; and** • **Clearer requirements for managing asbestos and clinical waste.** **The waste regulatory framework is administered under the principal legislation of the Protection of the Environment Operations Act 1997 and the Waste Avoidance and Resource Recovery Act 2001.**	includes 2011 amendment		http://www.environment.nsw.gov.au/waste/classification.htm http://www.environment.nsw.gov.au/waste/RRecoveryExemptions.htm http://www.legislation.nsw.gov.au/sessionalview/sessional/subordleg/2011-151.pdf
Protection of the Environment Operations (Underground Petroleum Storage Systems Regulation 2008)	Regulation requires that underground petroleum storage tanks must not be commissioned unless it has been properly designed, installed and equiped, and integrity test performed. A storage system must not be used unless groundwater monitoring wells are installed on the storage site and these are not to be installed unless properly designed. The storage system must not be used unless an environment protection plan is in place and must be used in accordance with that plan. (for detail, of plan requirements refer to clause 19) Note - this requirement will apply to old tanks from June 2009. Groundwater monitoring requirements on old storage tanks will come be required from June 2011 (Clause 21) Loss detection procedures must be in place and acted upon if any loss is detected (clause 22) Records must be kept for at least 7 years	The regulation generally will only apply to TPG if it owns or operates sites with Underground Petroleum Storage Systems (UPSSs). When working on sites with UPSTs, ensure location is known, and that client can provide details on locations of groundwater monitoring wells, and other required information	If UPSSs are owned or operated by TCG, extensive monitoring would be required in accordance with an Environmental Protection Plan specifically relating to the tank. Periodic evaluations would be conducted agains the Plan.	www.austlii.edu.au/au/legis/nsw/consol_reg/poteopssr2008983/ http://www.environment.nsw.gov.au/clm/upss.htm

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Legislation	Key Requirements	Relevance to Taylor Construction Group	Mechanism for Evaluating Compliance	Link to legislation and relevant web sites
Contaminated Land Management Act 1997 *Contaminated Land Management Amendment Act 2008*	The main objective of this Act is to establish a process for investigating and remediating land areas where contamination presents a significant risk of harm to human health or some other aspect of the environment. The amendment Act strengthens EPA/DECC powers in relation to contaminated land. Under this act DECC has the power to: • Declare an investigation site and order and investigation • Declare a remediation site and order remediation to take place • Agree to a voluntary proposal to investigate or remediate a site	Environmental Hygienist may be engaged to provide advice , reports and monitor activities when undertaking work on contaminated sites is required .	**If contaminated land is likely to be encountered, measures for testing, handling and disposing of contaminated spoil are in the Project Environmental Management Plan. Testing is undertaken to ensure compliance.**	http://www.austlii.edu.au/au/legis/nsw/consol_act/clma1997238/ http://www.austlii.edu.au/au/legis/nsw/consol_act/clmaa2008318/sch1.html http://www.environment.nsw.gov.au/clm/
Contaminated Land Management Regulation 2008	This Regulation prescribes a number of matters for the purposes of the *Contaminated Land Management Act 1997* , including: • the content of site auditors' annual returns; • the form to be used when reporting contamination; and • the amount which the EPA may recover for its costs incurred in relation to investigation and remediation orders.	Minimal relevance.	N/A	http://www.austlii.edu.au/au/legis/nsw/consol_reg/clmr2008329/
Environmentally Hazardous Chemicals Act 1985	The purpose of this Act is to control chemicals that are environmentally hazardous. DECC may make chemical control orders (CCOs) with respect to assessed chemicals or declared chemical wastes. The CCOs may regulate the manufacture, processing, conveying, buying, selling or disposal of chemical or declared waste. A CCO may prohibit activities in relation to declared chemical wastes, except under the authority of a licence issued by DECC.	Certain chemicals used or generated may be subject to handling and disposal requirements in this Act. Chemicals subject to this Act include Dioxin wastes, Asbestos wastes, PCBs, and organochlorine pesticide wastes. It is unlikely that Taylor Construction Group activities would generate hazardous wastes covered by a CCO	**Measures for identification, handling, disposal of hazardous wastes are in the Project Environmental Management Plan.**	http://www.austlii.edu.au/au/legis/nsw/consol_act/ehca1985373/
Environmentally	This Regulation:	No relevance.		

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Legislation	*Key Requirements*	*Relevance to Taylor Construction Group*	*Mechanism for Evaluating Compliance*	*Link to legislation and relevant web sites*
Hazardous Chemicals Regulation 2008	• sets various fees in relation to assessments of technology and prescribed activities by the EPA and in relation to licences to carry on prescribed activities; • specifies the matters to be included in applications for assessment of prescribed activities, in EPA notices about assessments of chemicals, and in EPA notices about applications for licences and transfers of licences; • prescribes the information to be included in registers under the Act.			
Pesticides Act 1999	This Act promotes the protection of human health, environment, property and trade in relation to the use of pesticides. It is an offence under the Act to: • Use a pesticide that harms or damages a person or property, a non-target animal or plant; • Use a pesticide that harms a threatened species or protected animal; • Possess or use an unregistered pesticide without a permit, or contrary to the approved label; • Fail to comply with the label or permit while using a pesticide; • Keep a registered pesticide in a container without a label; • Possess or use a restricted pesticide without authorisation. DECC may make pesticide control orders which prohibit use or possession of restricted pesticides	Generally pest control would be undertaken by specialist contractors. If pesticides are applied by TPG personnel, stringent storage, handling and record keeping requirements apply. Refer to the full Act and Regulations	**If pesticides are used, the requirements would be documented in the Project Environmental Management Plan for the project. Regular audits would be undertaken against the Plan, and pesticide records would be reviewed once monthly by the project manager.**	www.austlii.edu.au/au/legis/nsw/consol_act/pa1999120/ http://www.environment.nsw.gov.au/pesticides/

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Legislation	*Key Requirements*	*Relevance to Taylor Construction Group*	*Mechanism for Evaluating Compliance*	*Link to legislation and relevant web sites*
Pesticides Regulation 1995	This regulation requires that any person or organisation applying a chemical in a public place must apply this chemical as described in their Notification Plan for Pesticide Use in Public Places. The regulation makes it compulsory for all people who use pesticides for commercial or occupational purposes to make a record of their pesticide use.	As above	As above	www.austlii.edu.au/au/legis/nsw/consol_reg/pr1995211/
Environmental Planning and Assessment Act 1979 **(EP&A Act)**	The main objective of the EP&A Act is to ensure that proper management and development of land is undertaken incorporating the ecologically sustainable development principles. To achieve this the EP&A Act: • Ensures that development consent is obtained prior to construction; • Ensures compliance with planning consents and conditions associated with the consent; • Ensures environmental assessment is undertaken prior to development consent; • Has provision for penalties to be issued should development conditions be breached. Also has Planning instruments such as Local Environmental Plans (LEPs)	Development Approval / Consent required prior to construction as per EP&A Act and as detailed in LEPs. Need to comply with Conditions of Consent once granted	**Compliance audits / checks against development consent conditions (likely to be done by client)**	www.austlii.edu.au/au/legis/nsw/consol_act/epaaa1979389/
Waste Avoidance and Resource Recovery Act 2001	This Act promotes waste avoidance and resource recovery by: • Encouraging efficient use of resources in accord with ecologically sustainable principles; • Promoting the "Avoid, reuse, recycle, dispose" hierarchy; • Ensuring industry has a responsibility for reducing and dealing with waste; • Providing penalties for breaches of this Act.	Waste is generated during construction. The principles of the Act are applied to all aspects of construction to reduce impacts from waste. A Waste Management Plan may be required to be prepared as part of conditions of consent.	**Regular environmental inspections using standard checklist** **Audit against Waste Management Plan (if applicable) or against Project Environmental Management Plan**	www.austlii.edu.au/au/legis/nsw/consol_act/waarra2001364/ http://www.environment.nsw.gov.au/waste/

TAYLOR Project : 2405 – Midtown Macquarie Park Primary School Date: 08/08/2024 ENVIRONMENTAL -LEGAL -REGISTER -01 Environmental Legal Register				
Legislation	***Key Requirements***	***Relevance to Taylor Construction Group***	***Mechanism for Evaluating Compliance***	***Link to legislation and relevant web sites***
Threatened Species Conservation Act 1995	This Act outlines the protection of threatened species, communities and critical habitat. An independent Scientific Committee determines which species, populations and ecological communities should to be listed as endangered, vulnerable or extinct, and also determines key threatening processes. Any animal, plant or habitat that is listed as endangered, vulnerable or threatened must not be harmed or damaged, unless planning approvals or licences from DECC have been granted.	Construction activities may be undertaken in areas where threatened species, communities and critical habitat exit. The presence of these should be identified by the Environmental Impact Assessment process prior to construction – usually identified by the client	**If threatened species have been identified in the Environmental Impact Assessment (usually by client), the requirements would be documented in the Project Environmental Management Plan for the project. Regular audits would be undertaken against the Plan.**	www.austlii.edu.au/au/legis/nsw/consol_act/tsca1995323/ http://www.environment.nsw.gov.au/threatenedspecies/
Native Vegetation Act 2003	This Act regulates the clearing of native vegetation on all land in NSW except for National Parks, State Forests and reserves and urban areas. Native vegetation is any species of vegetation that existed in	Approval is generally required for clearing native vegetation, although some exceptions apply.		www.austlii.edu.au/au/legis/nsw/consol_act/nva2003194/ http://www.environment.nsw.gov.au/vegetation/
Noxious Weeds Act 1993	This Act requires occupiers of land to control noxious weeds required under control categories specified in relation to the weeds concerned. There are five classes of noxious weeds: Class 1 – State Prohibited Weeds: must not be introduced/become established in NSW; Class 2 – Regionally Prohibited Weeds: must not be introduced or become established in parts of NSW; Class 3 – Regionally Controlled Weeds: area that these weeds occupy must be reduced; Class 4 – Locally Controlled Weeds: impact on economy, community, environment must be minimised; Class 5 – Restricted Plants: must not be introduced or allowed to spread from current areas. Notices ordering the eradication of a classified weed may be served.	Classified weeds that are present on project sites or establish themselves during construction must be eradicated.	**If noxious weeds are present, regular inspections should be carried out as part of the environmental inspection process**	www.austlii.edu.au/au/legis/nsw/consol_act/nwa1993182/ http://www.environment.nsw.gov.au/pestsweeds/

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Legislation	*Key Requirements*	*Relevance to Taylor Construction Group*	*Mechanism for Evaluating Compliance*	*Link to legislation and relevant web sites*
National Parks and Wildlife Act 1974	Under this Act, NPWS is responsible for the care, control and management of all national parks, historic sites, nature reserves, reserves, Aboriginal areas and state game reserves. The Act governs various activities including: • Protection of flora and fauna; • Protection of Aboriginal heritage; • Licences and approvals to modify or destroy flora, fauna or Aboriginal heritage; • Penalties for breaches of the Act.	Relates to any Aboriginal heritage or relics, and protection of flora and fauna.	**If works are undertaken in areas with potential Aboriginal Heritage, These should be identified in the Environmental Impact Assessment and related documents, and incorporated into the PEMP. Regular inspections and audits would be undertaken to ensure compliance.**	www.austlii.edu.au/au/legis/nsw/consol_act/npawa1974247/ http://www.environment.nsw.gov.au/licences/
	An Aboriginal Heritage Impact Permit (AHIP) is required for any activity likely to have an impact on Aboriginal objects or places.			http://www.environment.nsw.gov.au/nswcultureheritage/dec_consultation_080103_ReviewInterimRequirementsForAHIP.htm
National Parks and Wildlife Regulation 2002	This regulation governs various activities under the *National Parks and Wildlife Act 1974* , including: • the regulation of the use of national parks and other areas administered by the NPWS (Part 2) • the preservation of public health in Kosciuszko National Park (Part 3) • licences and certificates (Part 4) • the protection of fauna (Part 5) The regulation replaces the former NPW (Land Management) Regulation 1995, the NPW (Administration) Regulation 1995 and the NPW (Fauna Protection) Regulation 2001.	Minimal relevance. Relates to any Aboriginal heritage or relics, and protection of flora and fauna.	If works are undertaken in areas with potential Aboriginal Heritage, These should be identified in the Environmental Impact Assessment and related documents, and incorporated into the PEMP. Regular inspections and audits would be undertaken to ensure compliance.	www.austlii.edu.au/au/legis/nsw/consol_reg/npawr2002338/

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Legislation	*Key Requirements*	*Relevance to Taylor Construction Group*	*Mechanism for Evaluating Compliance*	*Link to legislation and relevant web sites*
Heritage Act 1977	The Heritage Act protects NSW's natural and cultural heritage including archaeological remains. If a site or place is of great significance, the Heritage Council can list it on the State Heritage Register. Items listed on the State Heritage Register are subject to the provisions of the *Heritage Act 1977* , which protects items of State heritage significance. Items 50 years or older are also considered heritage items and need to be managed as such. The Act prohibits the demolition, damage or development of or around any heritage item without approval from the Heritage Office.	Minimal relevance. Requirements will be triggered if there are natural or culturally significant sites or places. These should be identified through the Environmental Impact Assessment (EIA) process (eg – EIA, REF)	**If works are undertaken in areas with potential European Heritage, these should be identified in the Environmental Impact Assessment and related documents, and incorporated into the PEMP. Regular inspections and audits would be undertaken to ensure compliance.**	http://www.austlii.edu.au/au/legis/nsw/consol_act/ha197786/
Heritage Regulations 2005	The Heritage Regulation 2005: • restates the minimum standards for the maintenance and repair of items on the State Heritage Register set in the previous regulation; and • provides for equitable and adequate funding for heritage protection through cost recovery for statutory processing..	Minimal relevance.		
Water Act 1912	An Act consolidating water rights, water and drainage and artesian wells. Provisions include: • To obtain a licence to sink or alter an artesian bore; • Not to waste water taken from dams, lakes, artesian wells and bores; • Not to unlawfully interfere with sub-surface water or obstruct its flow.	Minimal relevance.	N/A	
Water Management Act 2000 and Water Management (General) Regulation 2004	The *Water Management Act 2000* is the main piece of water legislation in NSW and governs: • Extraction of water from waterways and bores • The construction of water storage and supply structures	Approvals may be required to undertake water supply works, drainage works or floodplain works	**If water is extracted from waterways, this would be addressed in the EIA and PEMP. Audits of the PEMP would be undertaken to determine compliance**	

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Legislation	Key Requirements	Relevance to Taylor Construction Group	Mechanism for Evaluating Compliance	Link to legislation and relevant web sites
	• Development or building within the proximity of waterways • A licensing system established under the *Water Management Act 2000* allows for regulated usage of water resources The WMA Act consolidates the Water Act 1912 and the Rivers and Foreshores Improvement Act 1948.			http://www.austlii.edu.au/au/legis/nsw/consol_act/wma2000166/
Rivers & Foreshore Improvement Act 1948	*This Act has been repealed and is replaced by the Water Management Act 2000*	Nil - repealed	N/A	
Commonwealth Legal Requirements				
Environment Protection and Biodiversity Conservation Act 1999 ***(Commonwealth Act)*** (EPBC Act)	This Act aims to protect the environment, particularly matters of National Environmental Significance. Approval is required for actions that are likely to have a significant impact on: □ a matter of national environmental significance; □ environment of Commonwealth land (even if taken outside Commonwealth land); □ environment anywhere in the world if the action is undertaken by the Commonwealth. Permits are required under the EPBC Act for: □ certain activities in Commonwealth reserves; □ activities that affect listed species or communities in Commonwealth areas; cetaceans in Commonwealth waters and outside Australian waters; □ the import and export of wildlife.	Approvals may be required when working in areas that may have matters with national significance. Examples may include: * Work on Commonwealth land that may have a significant impact on the environment Working in areas that are listed as: *World Heritage property * National Heritage places * Listed wetlands (Ramsar) * Threatened species or communities * Migratory species * Nuclear actions * Marine Environments	**Specific requirements for complianceshould be addressed in Environmental Impact assessments and Project Environmental Management Plans. Audits and inspections would be undertaken against the stated requirements.**	http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/

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Legislation	*Key Requirements*	*Relevance to Taylor Construction Group*	*Mechanism for Evaluating Compliance*	*Link to legislation and relevant web sites*
	The Act contains compliance and enforcement mechanisms such as court injunctions, required environmental audits, strict civil and criminal penalties, remediation of environmental damage, liability of executive officers, and publicising contraventions.			
Other Requirements				
NSW Environmental Management System Guidelines Edition 2, 2007	The guidelines are published by the NSW Government to provide a framework for managing evnironmental issues on construction sites	Taylor Construction Group is seeking to gain accreditation to the NSW EMS Guidelines. The Integrated HSE management system and the Project Environmental Management Plan templates have been designed and prepared to meet these requirements		

** Note: This Legal Register provides guidance on the applicability of certain Environmental Acts and Regulations at Taylor Construction Group and should not be seen as legal advice. Should legal advice be required, appropriate legal firms should be engaged.*

Appendix 8 – Construction Traffic and Pedestrian Management Plan

Midtown Macquarie Park New Primary School

Construction Traffic and Pedestrian Management Plan

PREPARED FOR TAYLOR CONSTRUCTION | 13 DECEMBER 2024 | 300305728

We design with community in mind

Stantec

Revision

Revision	Date	Comment	Prepared By	Approved By
A	5 December 2024	For submission	Helen Aberra	Dave Salangsang
B	6 December 2024	Final	Marko Rimac	Dave Salangsang
C	11 December 2024	Final – minor update	Marko Rimac	Dave Salangsang
D	13 December 2024	Final – minor update	Marko Rimac	Dave Salangsang
E	28 January 2025	Minor update	Dave Salangsang	-

_____

Dave Salangsang

For and on behalf of

Stantec Australia Pty Ltd

L9, The Forum, 203 Pacific Highway, St Leonards NSW 2065

Acknowledgment of Country

In the spirit of reconciliation, Stantec acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their Elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

Limitations

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Appendix C. Tower Crane Arrangement

Appendix D. Site Hoarding Plan

1. Introduction

1.1 Background

Stantec has been engaged by Taylor to prepare a Construction Traffic and Pedestrian Management Plan (CTPMP) in relation to the proposed development known as Midtown Macquarie Park Primary School (MMPPS) in Macquarie Park, NSW.

The CTPMP examines the impacts of construction works on the surrounding road network and details the proposed construction traffic and pedestrian measures.

Specifically, this document has been drafted to address Condition B37 of the development consent. The condition is outlined in Table 1.1.

Table 1.1: Consent condition requirements

Condition	Detail		Report Section
B37	**Construction traffic and pedestrian management sub-plan**		
	Prior to the commencement of works, the Applicant must submit to the Certifier a final Construction Traffic and Pedestrian Management Sub-Plan (CTPMP) for the Development with measures to reduce environmental impacts and harm during construction of the Development arising from construction traffic, including, at a minimum, the following information:	a) location of proposed work zone(s);	Section 3.6
		b) construction vehicle access and parking arrangements, haulage routes and heavy vehicle routes;	Section 3.5 and 3.8
		c) evidence that sufficient off-street parking has been provided for heavy vehicles, to ensure that construction traffic associated with the development does not utilise on-street parking or public parking facilities;	Section 3.4
		d) details of crane arrangements including location of any crane(s);	Section 3.5 – Figure 3-3
		e) predicted number and timing of construction vehicle movements and vehicle types;	Section 3.7
		f) identification of potential conflicts between vehicle movements required for construction and general traffic, cyclists, pedestrians, bus services within the vicinity of the site from construction vehicles;	Section 4.2
		g) cumulative construction impacts of projects including developments within the Ivanhoe Estate. Existing CPTMPs for developments within or around the development site should be referenced in the CPTMP to ensure that coordination of work activities are managed to minimise impacts on the surrounding road network;	Section 4.6
		h) measures to minimise movement delays, i.e. vehicle movements are to be minimised during peak network demand periods;	Section 3.7
		i) proposed mitigation measures, should any impacts be identified, the duration of the impacts and measures proposed to mitigate any associated general traffic, public transport, pedestrian and cyclist impacts should be clearly identified and included in the CPTMP.	Section 4

This CTPMP has been prepared in accordance with the Transport for NSW's (TfNSW) Traffic Control at Work Sites Technical Manual and appointed contractor proposes to undertake all works in accordance with this CTPMP. The requirements are attached in Appendix A.

The overall principles of traffic management during the construction activity include:

- provide an appropriate and convenient environment for pedestrians
- minimise the impact on pedestrian movements
- minimise the impact on cyclists
- maintain appropriate capacity for pedestrians at all times on footpaths around the site
- maintain appropriate public transport access

- minimise the loss of parking
- maintain access to/ from adjacent buildings
- restrict construction vehicle movements to designated routes to/ from the site
- manage and control construction vehicle activity in the vicinity of the site
- carry out construction activity in accordance with Council's approved hours of works.

This report has been prepared by engineers who holds the SafeWork NSW Traffic Control Work accreditation. Details of the accredited engineers are provided below:

- Dave Salangsang – Card No. TCT1055006.

1.2 References

In preparing this report, reference has been made to the following:

- an inspection of the site and its surrounds
- Traffic Control at Work Sites Technical Manual, Transport for NSW, February 2022
- Australian Standard AS1742.3:2019 'Manual of Uniform Traffic Control Devices – Traffic control for works on roads'
- Austroads Guide to Temporary Traffic Management series (2021).

2. Existing Conditions

2.1 Subject Site

The subject site is located at 10 Mahogany Avenue, Macquarie Park. The site of approximately 3,346sq.m has a frontage of 83.5m to Mahogany Avenue. The site has a land use classification as MU1 – Mixed Use and is currently unoccupied. The surrounding properties are also of mixed use and residential uses to the north and south of the site.

The location of the subject site and its surrounding environs is shown in Figure 2-1.

Figure 2-1: Subject Site and Its Environs

Base image source: Nearmap

2.2 Road Network

2.2.1 Adjoining Roads

Mahogany Road

Mahogany Road is classified as a local road and in the vicinity of the site is aligned in an east-west direction. It is a two-way road configured with one lane in each direction, set within 6.5m wide road carriageway. Indented spaces adjacent to the carriageway provide some parking on-street.

Epping Road

Epping Road is classified State Road and in the vicinity of the site is aligned in an east-west direction. It is a two-way road configured with generally three lanes in each direction, set within 30m wide road separated carriageway. Kerbside parking is not permitted on this road.

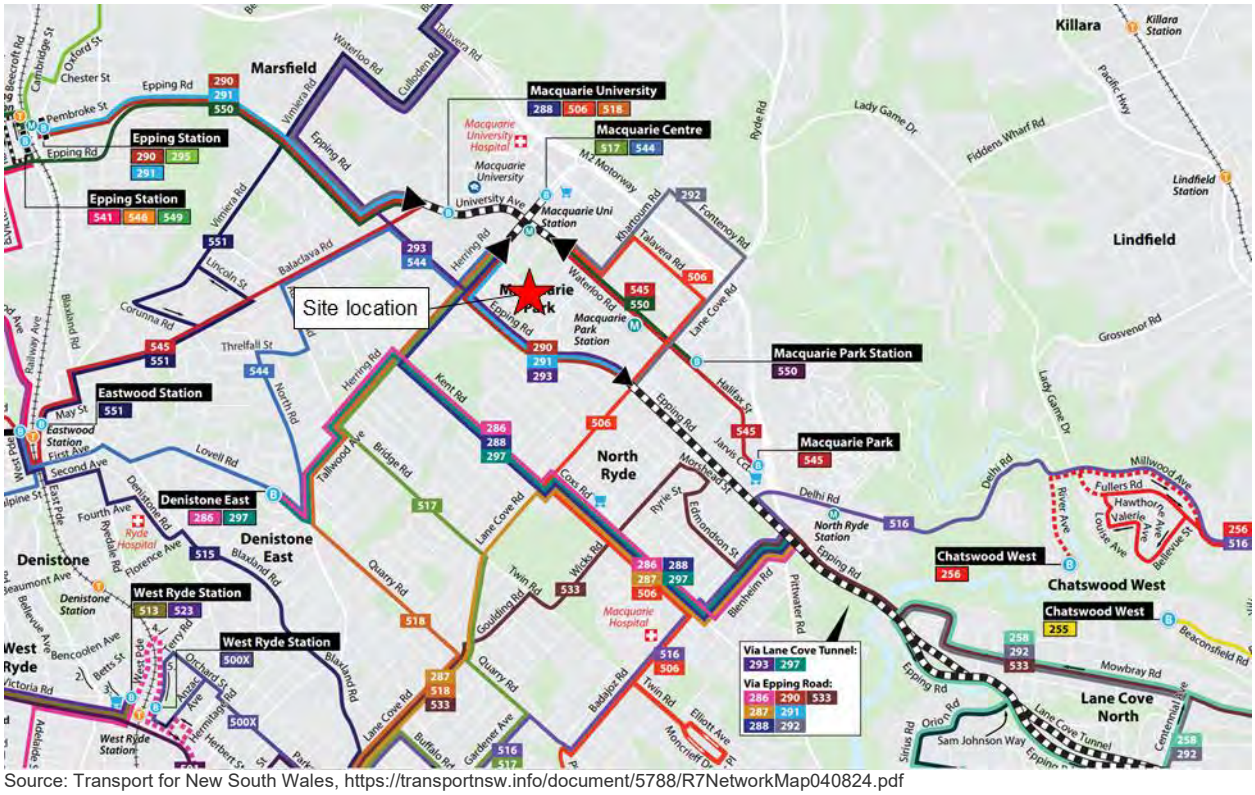
2.3 Public Transport

The site has good transport connectivity with a bus stop located within 400 metres walking distance to Epping Road. Buses on Epping Road provide connectivity to Sydney CBD and North Sydney with frequent services. The metro is also within close proximity to the site with Macquarie University metro station located 700 metres north-east of the site. A review of the public transport available in the vicinity of the site is summarised in Table 2.1.

Table 2.1: Public Transport Provision

Service	Route #	Route Description	Location of Stop	Distance to Nearest Stop	Frequency On/Off Peak
Bus	290	Epping to City Erskine Street via North Sydney	Epping Road	400m	Every 20-30 minutes between the hours midnight and 6am
	291	Epping to McMahons Point via North Sydney			15 mins/ 60 mins
	293	Marsfield to City Wynard via Lane Cove Tunnel			Every 10 mins morning and afternoon period only
Metro	M1	Tallawong to Sydenham	Macquarie University	700m	Every 4-10 mins
			Macquarie Park	1.4km	

Figure 2-2: Transport Network Map

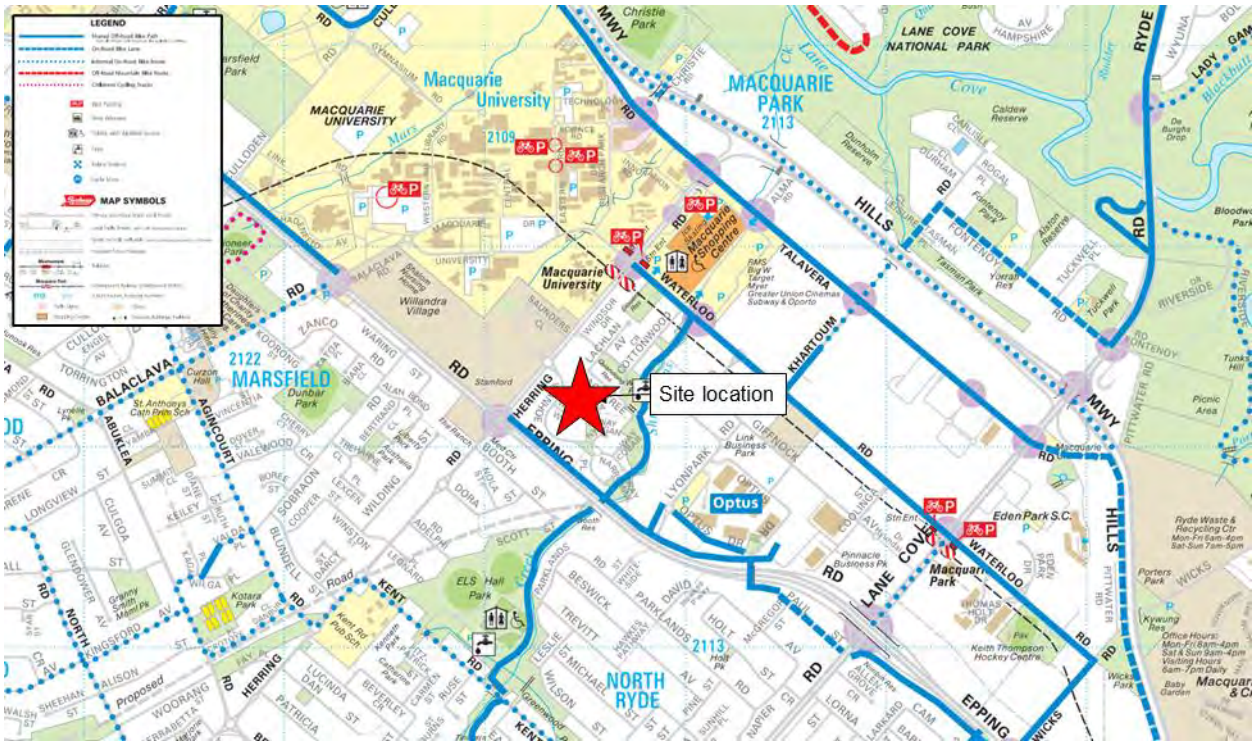


Source: Transport for New South Wales, https://transportnsw.info/document/5788/R7NetworkMap040824.pdf

2.4 Pedestrian and Cycle Infrastructure

The site has good pedestrian connectivity with footpaths provided on Mahogany Lane and Herring Road within the vicinity of the site. The site also has good cycling connectivity with shared paths provided on Epping Road and Lane Cove Road. The cycle network is shown figuratively in Figure 2-3.

Figure 2-3: Surrounding Cycle Network



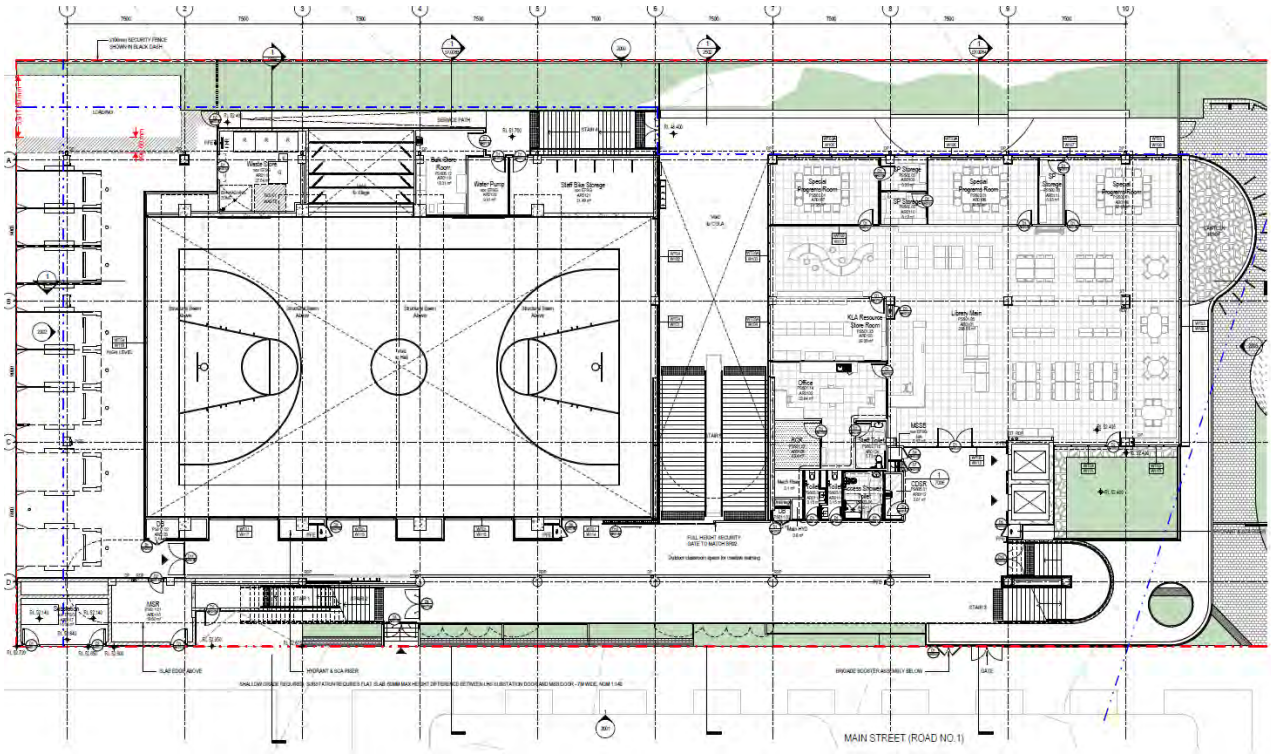
Source: City of Ryde Council Bike Map

3. Overview of Construction Activities

3.1 Development Proposal

The proposed works include the construction of an urban (vertical) primary public school to cater for 750 students (from Kindergarten to Year 6). The proposed upgrades to the site will include a six-storey built form, including flexible learning areas, library, outdoor play areas, multipurpose hall and more. The ground floor plan is shown indicatively below in Figure 3-1.

Figure 3-1: GA Plan, Level 1



Base image source: GA Plan Level 1, Rev H, Drawing no. MPS-ARC-ZZ-ZZ-DR-A-1001, Dated 15 July 2024

3.2 Description of Construction Activities

The proposal includes the construction of a new six storey teaching facility comparison of the following:

- 33 general learning spaces
- Nine common learning area
- Administration and common learning areas
- Canteen
- Multi-purpose hall
- Library
- Outdoor learning areas.

The construction of the school will occur in eight main stages with site establishment (phase 1) set to begin in January 2025 and handover of the site (phase 8) scheduled to occur in April 2024. The key milestones for the project are shown in Table 3.1.

Table 3.1: Stages of the project

Stage	Start date	End date	Duration
Earthworks	January 2025	May 2025	5 months
Structure	April 2025	September 2025	6 months
Fit-out	August 2025	March 2026	8 months

Stage	Start date	End date	Duration
Public Domain	December 2025	April 2026	8 months
External works	December 2025	April 2026	8 months

3.3 Work Hours

The construction hours will comply with Condition C3 stipulated within the Development Consent. In this regard, construction work associated with the development will be carried out between the following hours:

- Monday to Friday 7:00am and 7:00pm
- Saturday 8:00am and 4:00pm
- Sunday/ public holiday no work.

The contractor will be responsible for instructing and controlling all subcontractors regarding the hours of work. Any work outside the approved construction hours would be subject to specific prior approval from Council.

3.4 Construction Workforce and Parking

The workers on site will vary depending on the stage of construction with the maximum number workers on site expected to be 100 people during the fit-out stage between August 2025 and March 2026. A summary of the expected number of construction workers is provided below in Table 3.2 broken down into the average and peak numbers for each stage.

Table 3.2: Expected number of construction workers for each stage

Stage	Number of construction workers	
	Average	Peak
Earthworks	15	25
Structure	40	60
Fit-out	80	100
External works	40	60

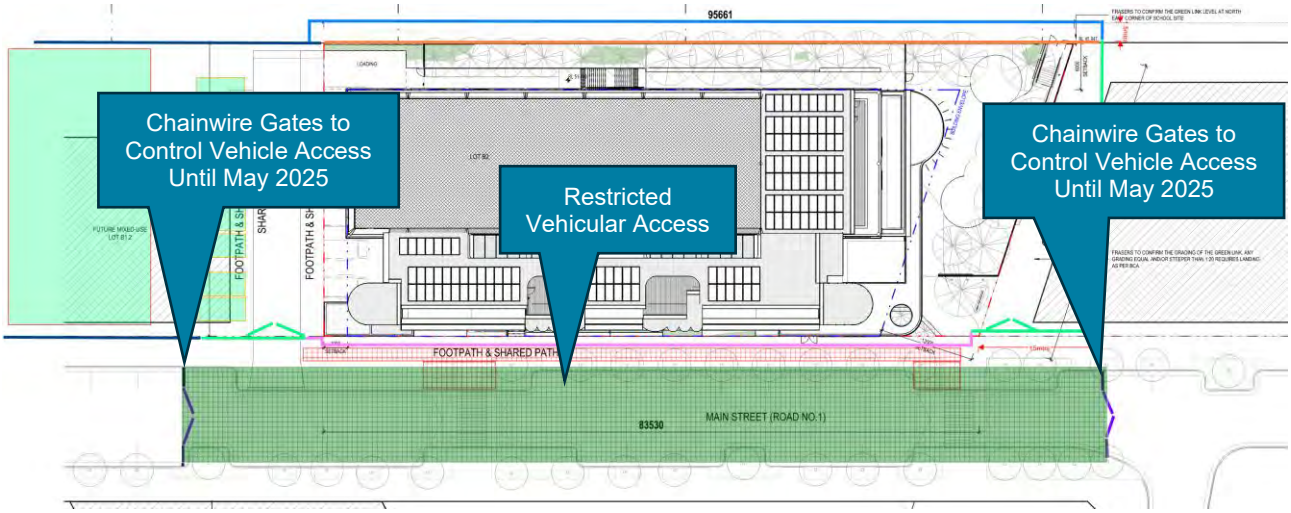
Due to the size of the site, no construction worker vehicles can be accommodated on site. However, the Contractor may choose to use one of the two site compound areas available and nominate some areas for car parking. Given the site's proximity to high frequency and wide-ranging public transport services including the Sydney Metro, workers will be encouraged to use public transport to access the site where practical. During site induction, workers will be informed of the existing bus network servicing the site. Appropriate arrangements will be made for any equipment/ tool storage and drop-off requirements.

Any construction worker arrivals and departures by vehicle would be outside of road network peak hours and as such is unlikely to impact the surrounding road network.

3.5 Construction Site Access

It is noted that while the footpath and site frontage remain open to the general public, vehicular access to the street fronting the site along Mahogany Avenue is restricted to construction vehicles only.

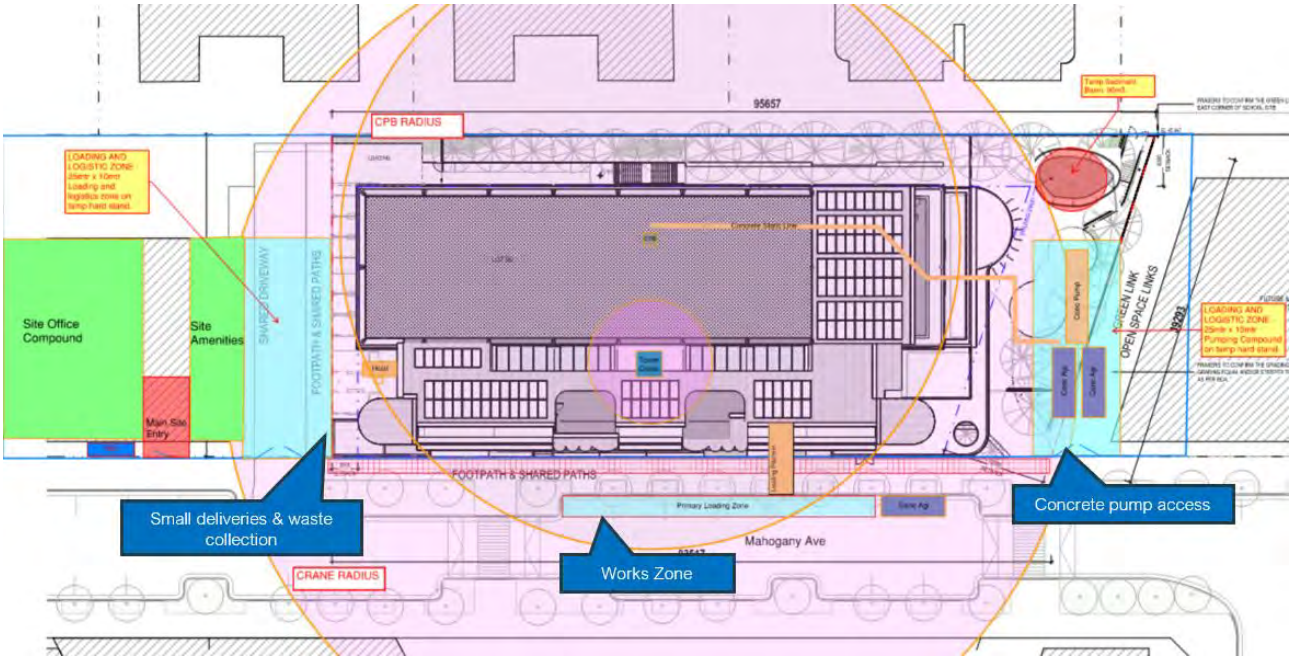
Figure 3-2: Controlled Vehicular Access Fronting the Site



Base image source: Site Plan, Rev E, Drawing no. MPS-ARC-ZZ-ZZ-DR-A-0012, Dated 15 July 2024

The site will be accessed via two gates, one will be located west of the site to allow for small deliveries and bin collection while a second vehicle access will be located at the east end of the site accessing a hardstand compound for pumping concrete. Large vehicles will be positioned in a construction zone on Mahogany Avene and will be unloaded with the site Tower Crane. The site accesses are shown below in Figure 3-3, with the location of the crane shown below in below in blue and the extend of its reach circled in purple. This crane arrangement is included in this report as Appendix C.

Figure 3-3: Site Plan



Base image source: Site Plan, Rev D, Drawing no. MPS-ARC-ZZ-ZZ-DR-A-0012, Dated 21 July 2023

Construction vehicles into the site will be limited to 20-metre-long Articulated Vehicles (AV). It is expected that the majority of construction vehicles would be HRV's and semi-trailers.

Accredited traffic controllers will be positioned at the site access gate to manage pedestrian movements and stop traffic if required when construction vehicles are entering/ exiting the site.

Swept path analysis demonstrating the movement of the typical construction vehicles to access the site is included in this report as Appendix B.

3.6 On-Street Works Zone

It is proposed to provide on-street work zones along Mahogany Avenue, as shown in Figure 3-3.

The work zone on location is proposed to cover a length of approximately 15 to 20 metres to accommodate a tower crane that will allow for loading and unloading activities. It is noted that the works zone is within Frasers property and not within the public domain. Additionally, as discussed in Section 3.5, the street fronting the site will be restricted to construction vehicle access only, and thus will be under the control of the contractor. Nevertheless, construction vehicle arrivals and departures will be restricted within the approved work hours.

3.7 Construction Vehicle Volumes

The site will have various construction vehicles accessing the site. A summary of the vehicles accessing the site at each stage is provided below in Table 3.3.

It is expected peak construction vehicle activity and will result in up to 4-5 trucks per day (9-10 two-way movements) in and out of the site per day.

Table 3.3: Expected number of vehicles for each stage

Stage	Vehicle Type	Frequency	Time
Earthworks	Truck and dog	1 veh/hour	7am-3pm
Structure	Medium and heavy rigid	4 veh/day	7am-1pm
	Semi-trailer	3 veh/week	7am
Fit-out	Medium and Heavy Rigid	6 veh/day	7am-3pm
	Semi-trailer	5 veh/week	7am

As seen in the table above, construction vehicle volumes are low and as such is not anticipated to impact the surrounding road network.

Due to the low volume of construction vehicle movements, it is not anticipated that queueing will occur as sufficient room is available on site and on Mahogany Avenue to accommodate vehicle movements.

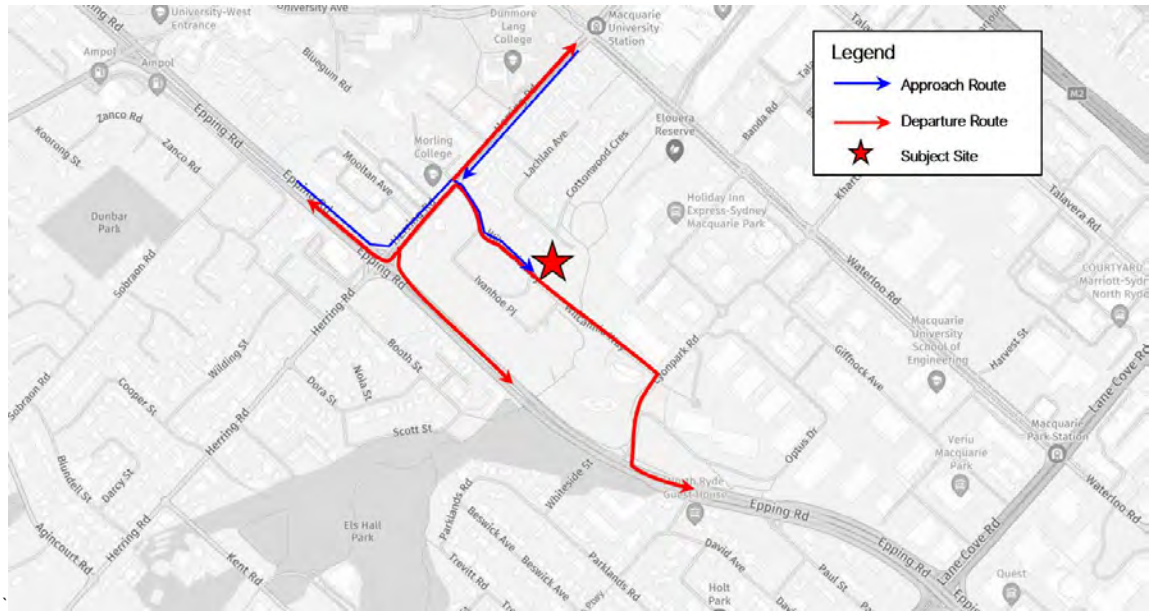
3.8 Construction Vehicle Routes

Generally, construction vehicles will have origins and destinations from a wide variety of locations throughout Sydney. However, all construction vehicles will be restricted to the State and Regional Road network where practicable. Broadly speaking, vehicles would approach the site from either Epping Road, Herring Road or Lyon Park Road. The construction vehicle routes are detailed below and shown in Figure 3-4. No queuing or marshalling of construction vehicle will be permitted on public roads.

Approach/ Departure route:

- North: Mahogany Avenue and Herring Road.
- South: Mahogany Avenue, Herring Road and Epping Road
- East: Mahogany Avenue, Lyonpark Road and Epping Road.
- West: Mahogany Avenue, Herring Road and Epping Road.

Figure 3-4: Construction vehicle approach and departure routes



Base image source: Nearmap

4. Construction Traffic Management

4.1 Traffic Guidance Scheme

Detailed information for work site operations is contained in the Traffic Control at Work Sites Technical Manual (TfNSW, 2022). The control of traffic at work sites must be undertaken with reference to SafeWork requirements and any other Workplace Health and Safety manuals.

Overview Traffic Guidance Schemes (formerly known as Traffic Control Plans), provided in Appendix A, includes the following considerations:

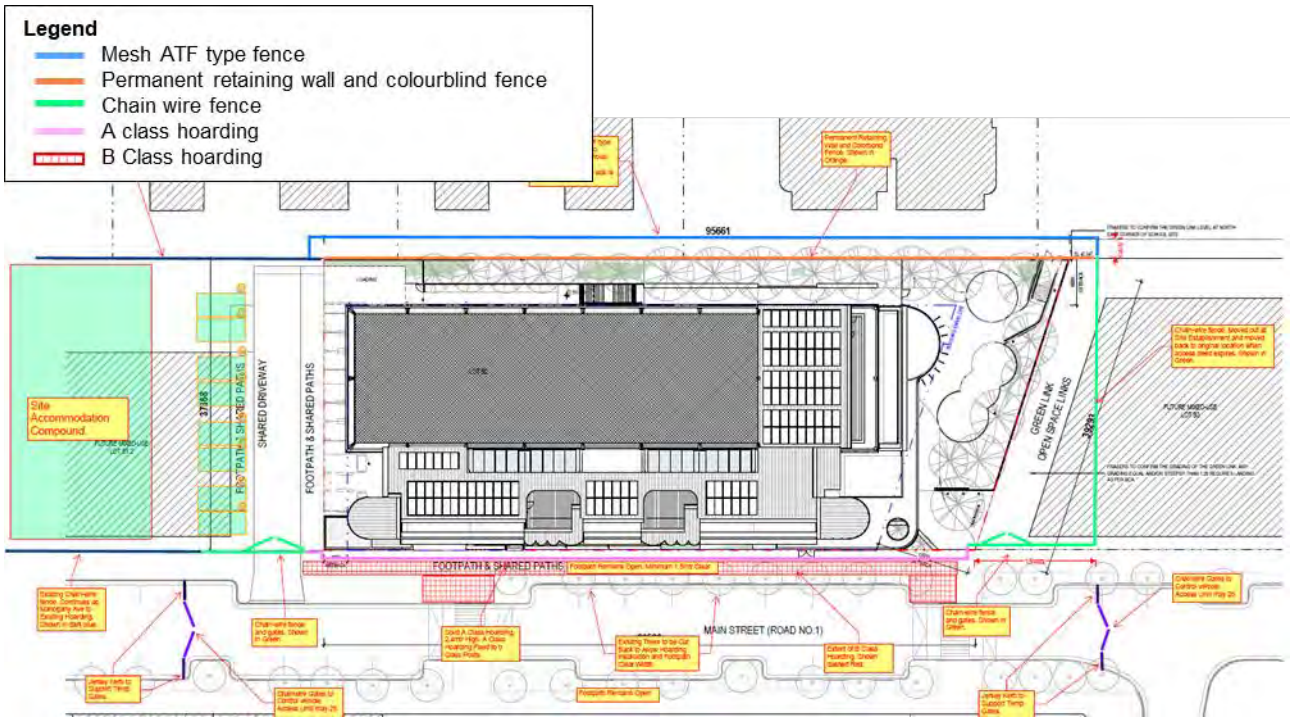
- Construction vehicle activity, including the loading/ unloading of trucks to be conducted within the work site.
- Pedestrians and all passing vehicles will maintain priority.
- Clear definition of the work site boundary to be provided by erection of A and B Class hoardings around the site boundaries.
- All signage will be clean, clearly visible and not obscured.
- All construction vehicle activity will be minimised during peak periods, where possible.

4.2 Pedestrian Management

Pedestrian movements will be maintained through the provision of a mixture of Class A and Class B hoardings along the perimeter of the site. Pedestrian and cyclist movements are not expected to be impacted along the site frontage.

The proposed location of each type of hoarding is shown in Figure 4-1, also included in this report as Appendix D.

Figure 4-1: Hoarding location



Base image source: Site Plan, Rev E, Drawing no. MPS-ARC-ZZ-ZZ-DR-A-0012, Dated 15 July 2024

While pedestrian movements will remain to have priority over vehicle movements, pedestrian approaching the site frontage while a truck is manoeuvring will be held by traffic controllers on Mahogany Street. This will ensure pedestrian safety along the site frontage.

4.3 Construction Vehicle Access

4.3.1 Concrete Pump and Concrete Agitator

A dedicated concrete pumping zone is located on the eastern end of the site, this will allow concrete trucks to unload within the site. On concrete pour days, a concrete pump arrives at site early in the morning to park at the hardstand facing the northern boundary of the site. Concrete agitators will then arrive throughout the day to deliver concrete mixes and reverse back into the concrete pump. The hardstand is able to accommodate up to three (3) MRV's, which includes one concrete pump truck, and up to two concrete agitators.

Swept paths demonstrate that there is sufficient room on site to facilitate this arrangement.

4.3.2 Semi-Trailers (AV)

As previously established, the street fronting the site is controlled by the contractor and restricts access to construction vehicles only. This includes construction vehicles for the construction site across the street. The constructed kerbside indented parking will be used as a delivery / unloading / works zone, noting that the street frontage is currently a private road, and will remain as such throughout the construction duration.

Semi-trailers (up to 20-metre AVs) will approach the site from the west (from Herring Road), enter the construction site, and pull into the works zone. Upon completion of delivery / pick up, the AV will then continue east and exit the site via a secondary gate at the eastern end. The truck will then continue along Mahogany Avenue and onto Lyonpark Road, and out onto Epping Road.

4.3.3 All other trucks

All trucks with the exception of concrete pumps / agitators and semi-trailers, will utilise the general loading area / hardstand at the western end of the site.

Both the eastern and western end hardstands in the site have restricted access to the project's construction vehicles, by vehicular gates. These gates are controlled and stationed by gate / traffic controllers to guide truck movements and ensure pedestrian priority and safety is maintained. The overall swept path analysis of the construction vehicle movements described above are included in this report as Appendix B.

4.4 Public Transport

The construction activities are not expected to impact existing public transport services near the site.

4.5 Emergency Vehicle Access

Access to the subject site and adjacent buildings by emergency vehicles would not be affected by the works as road and footpath frontages would be unaffected. Emergency protocols on the site would include a requirement for suitably accredited site personnel to assist with emergency access from the street.

Consequently, any potential impacts on emergency access would be effectively managed throughout the works.

Liaison would be maintained with the police and emergency services agencies throughout the construction period and a 24-hour contact would be made available for 'out-of-hours' emergencies and access.

4.6 Cumulative Construction Impact within the Ivanhoe Estate

Apart from the Midtown Macquarie Park Primary School, there are a number of developments within the estate. This includes residential flat buildings comprising of private, social, and affordable housing, aged care facilities, schools, childcare centres, minor retail and community uses. These developments are being developed in stages; however, some construction sites may occur simultaneously. This arrangement has been established within the preliminary CTMP for the overall Ivanhoe Estate development prepared by Ason Group dated February 2018. A high level CTMP study has also been undertaken and reported within the Transport and Accessibility Impact Assessment prepared by Ason Group dated May 2023, the Transport Management and Accessibility Plan Addendum prepared by Ason Group dated September 2018, and the Midtown Macquarie Park New Primary School School Transport Plan prepared by Stantec dated May 2023.

As the entire estate is under the management of Frasers Property, regular fortnightly coordination meetings are held between all contractors and developers to manage influx of construction vehicles by way of scheduling and working around each other's timeframe. This coordination between construction sites and project managers mitigates the risk of having a noticeable impact on the surrounding road network and distributes the vehicle volumes throughout the days, weeks, or months.

This also ensures the amenities for the residents of the newly populated developments within the precinct are maintained, while also maintaining the safety of the general public as the estate-wide development is progressively delivered.

4.7 Site Inspections and Record Keeping

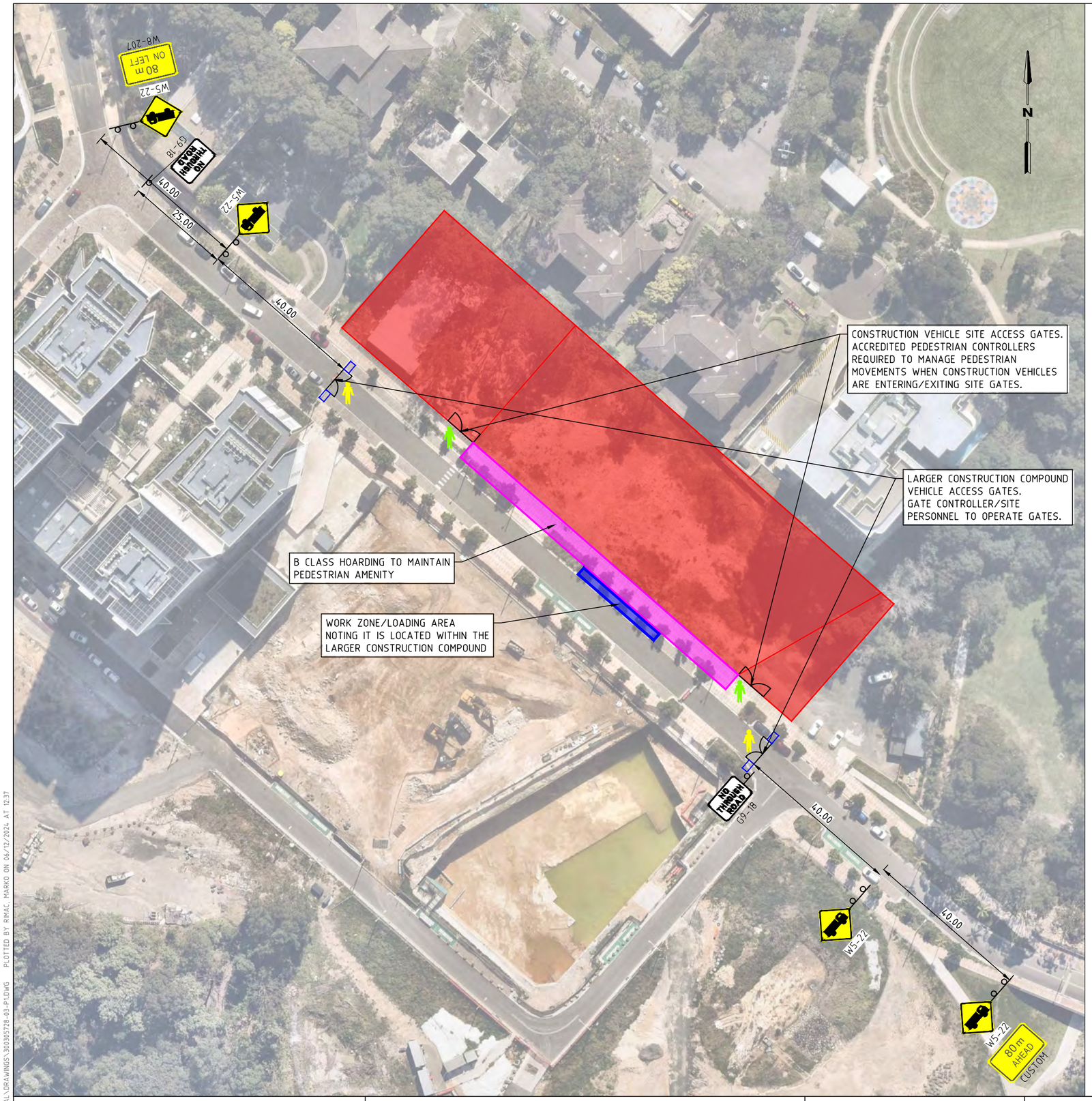
The construction work would be monitored to ensure that it proceeds as set out in the Construction Management Plan provided by the appointed contractor. A daily inspection before the start of the construction activity should take place to ensure that conditions accord with those stipulated in the plan and there are no potential hazards. Any possible adverse impacts would be recorded and dealt with if they arise.

4.8 Site Induction

All staff employed on the site by appointed contractor (including sub-contractors) would be required to undergo a site induction.

The induction would include permitted access routes to and from the construction site for site staff and delivery vehicles, limited parking arrangements, as well as standard environmental, workplace health and safety, driver protocols and emergency procedures. The approved work hours must be included as part of this induction.

Appendix A. Traffic Guidance Scheme



NOTES:

1. NOT ALL DIMENSIONS SHOWN ARE TO SCALE.
2. LOCATION OF SIGNS ARE TO BE CONFIRMED ON-SITE TO ENSURE APPROPRIATE VISIBILITY.
3. ALL SIGNS TO BE MINIMUM SIZE A.
4. ALL SIGNS TO BE CLASS 1 RETROREFLECTIVE.
5. ALL TRAFFIC GUIDANCE SCHEMES ARE TO BE IMPLEMENTED IN ACCORDANCE WITH THE TfNSW "TRAFFIC CONTROL AT WORK SITES" MANUAL, VER 6.1 (TfNSW 2022) AND AUSTRALIAN STANDARDS AS1742.3:2019 MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, PART 3: TRAFFIC CONTROL DEVICES FOR WORKS ON ROADS.
6. THIS TRAFFIC GUIDANCE SCHEME MUST BE SET UP BY A PERSON HOLDING AN "IMPLEMENT TRAFFIC MANAGEMENT PLANS" TICKET AND THE TfNSW TRAFFIC CONTROL AT WORK SITES CHECKLIST SHALL BE COMPLETED PRIOR TO IMPLEMENTATION.
7. THE ACCREDITED PERSONNEL SHALL IMPLEMENT THE APPROVED TGS BEFORE ANY PHYSICAL WORK COMMENCES AND ENSURE A COPY OF THE TGS IS KEPT ON-SITE. THE ACCREDITED PERSONNEL SHALL ALSO DRIVE THROUGH THE SITE BEFORE WORKS BEGIN TO ENSURE THAT THE TGS HAS BEEN IMPLEMENTED CORRECTLY AND THAT IT WILL WARN, INSTRUCT AND GUIDE ROAD USERS AS DESIGNED. ANY VARIATIONS MADE TO THE PLAN MUST BE MARKED ON THE PLAN AND INITIALLED BY THE ACCREDITED PERSONNEL.
8. IT IS THE RESPONSIBILITY OF AN ACCREDITED PERSON WITH A 'PREPARE WORK ZONE TRAFFIC MANAGEMENT PLAN' TICKET TO ENSURE THE FOLLOWING:
   - THE INTEGRITY OF ALL TRAFFIC CONTROL MEASURES THROUGH TO THE FINAL REMOVAL. THIS INCLUDES DAILY CHECKS OF ALL SIGNS AND DEVICES. THE CORRESPONDING RECORDS OF CHECKS SHALL BE KEPT ON FILE FOR AUDITING PURPOSES.
   - VEHICULAR ACCESS AND SERVICING REQUIREMENTS ARE TO BE MAINTAINED AT ALL TIMES TO ADJACENT PROPERTIES AFFECTED BY TRAFFIC CONTROL MEASURES.
   - AT ALL TIMES AN UP-TO-DATE COPY OF "TRAFFIC CONTROL AT WORK SITES" SHOULD BE AVAILABLE FOR REFERENCE AND IMPLEMENTATION AS REQUIRED ON-SITE.
9. ALL WORKERS WILL BE CONFINED TO THE DEDICATED WORKS AREA SHOWN ON THE PLAN.
10. IF THE WORKSITE IS LEFT UNATTENDED IT IS THE CONTRACTOR'S DUTY TO ENSURE THAT THE APPROPRIATE MEASURES ARE TAKEN TO PROVIDE A SAFE ENVIRONMENT FOR VEHICLES AND PEDESTRIANS TO RELEVANT AUSTRALIAN STANDARDS.
11. TRAFFIC CONTROLLERS ARE NOT REQUIRED AT THE ACCESS FULL TIME, SHOULD CONDITIONS BE MODIFIED AND TRAFFIC CONTROLLERS REQUIRED, THEY ARE TO BE SUITABLY ACCREDITED TO AUSTRALIAN STANDARDS AND TfNSW ACCREDITATION AS REQUIRED. WHEN REQUIRED T1-34 AND T1-10 SIGNS ARE TO BE SET UP IN ACCORDANCE TO AUSTRALIAN STANDARDS AND TfNSW REQUIREMENTS.
12. ALL SIGNAGE IS TO BE CLEAN, CLEARLY VISIBLE AND NOT OBSCURED.
13. ALL SIGNS TO BE COVERED OR REMOVED WHEN WORKERS ARE NOT ON SITE.
14. ALL WORKERS MUST ADHERE TO THE APPLICABLE SAFE WORK DISTANCE AS DESCRIBED IN AS1742.3:2019.
15. ALL DISTANCES BETWEEN SIGNS ARE TO BE IN ACCORDANCE WITH SECTION 4.3.2 OF AS1742.3:2019. HOWEVER, MODIFICATIONS CAN BE MADE TO SUIT SITE CONDITIONS.

LEGEND

- WORK SITE
- WORK ZONE/LOADING AREA
- B CLASS HOARDING
- WATER FILLED BARRIERS
- PEDESTRIAN CONTROLLER
- GATE CONTROLLER/SITE PERSONNEL
- CONSTRUCTION ACCESS GATE
- SIGN POST

NEARMAP AERIAL IMAGE
DATED 14.09.2024

CERTIFICATION

THE UNDERSIGNED HAS COMPLETED AND OBTAINED:
- PREPARE A WORK ZONE TRAFFIC MANAGEMENT PLAN

AND IS SUITABLY EXPERIENCED TO DESIGN, SELECT AND MODIFY TRAFFIC CONTROL PLANS

CERTIFICATE NO: TCT1055006
PREPARE A WORK ZONE TMP CARD
DAVE SALANGSANG

Stantec

nearmap.com

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED	M.RIMAC
DESIGN CHECK	D.SALANGSANG
APPROVED BY	D.SALANGSANG
DATE ISSUED	6 DECEMBER 2024
SCALE	A3 — 0 5 10 20 — 1:1000
CAD FILE NO.	300305728-03-P1.DWG

MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

TRAFFIC GUIDANCE SCHEME

DRAWING NO. 300305728-03-01 SHEET 01 OF 01 ISSUE P1

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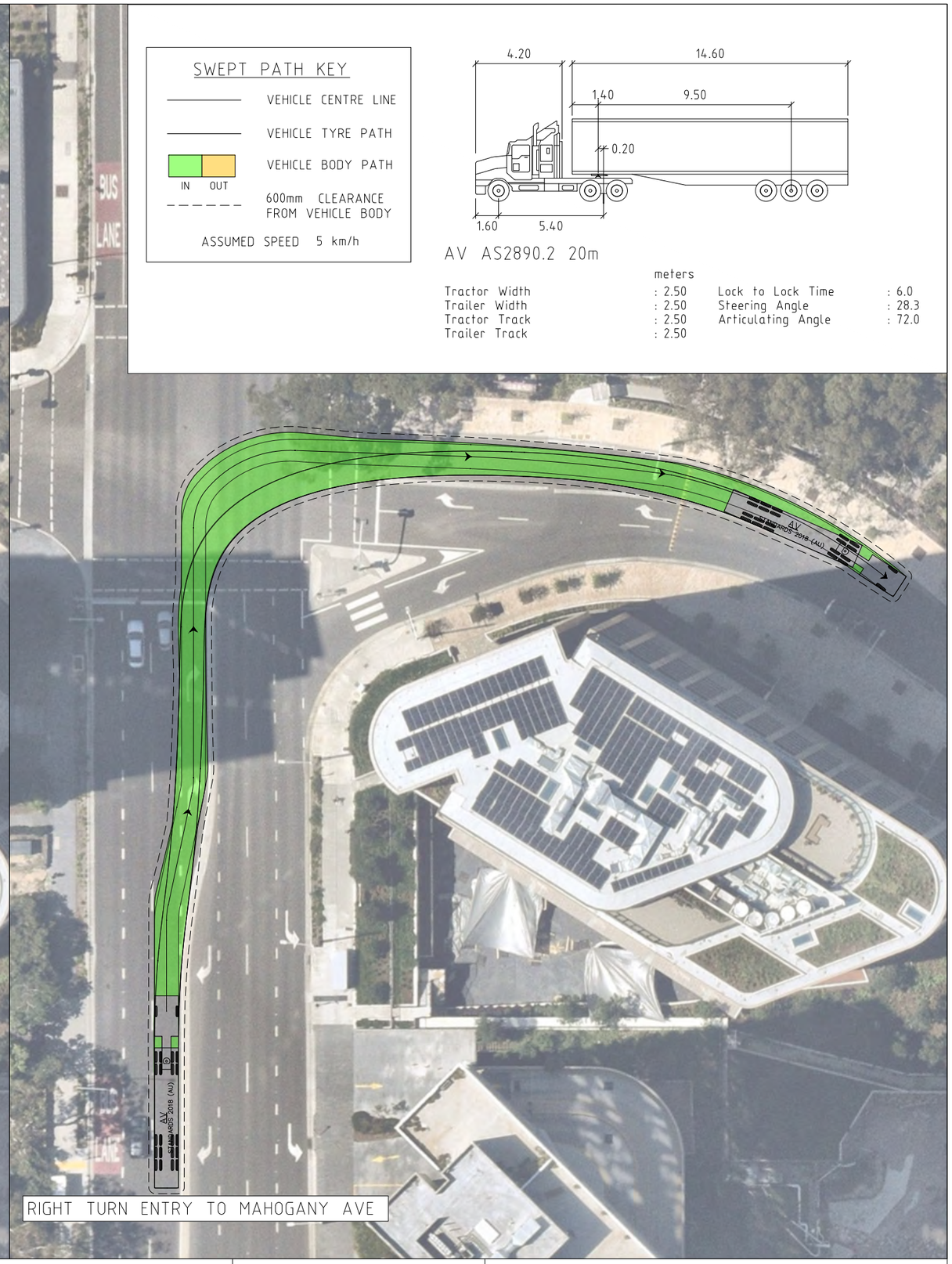
Appendix B. Construction Vehicle Swept Path Assessment

LEFT TURN ENTRY TO MAHOGANY AVE



RIGHT TURN ENTRY TO MAHOGANY AVE

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH (IN / OUT)
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5 km/h

AV AS2890.2 20m

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

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DESIGNED S.CANO	DESIGN CHECK D.SALANGSANG
APPROVED BY D.SALANGSANG	DATE ISSUED 25 NOVEMBER 2024

SCALE A3 0 2.5 5 10 1:500

CAD FILE NO. 300305728-02-P1.DWG

MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

CONSTRUCTION SWEPT PATH ASSESSMENTS

DRAWING NO. 300305728-02-01 SHEET 01 OF 12 ISSUE P1

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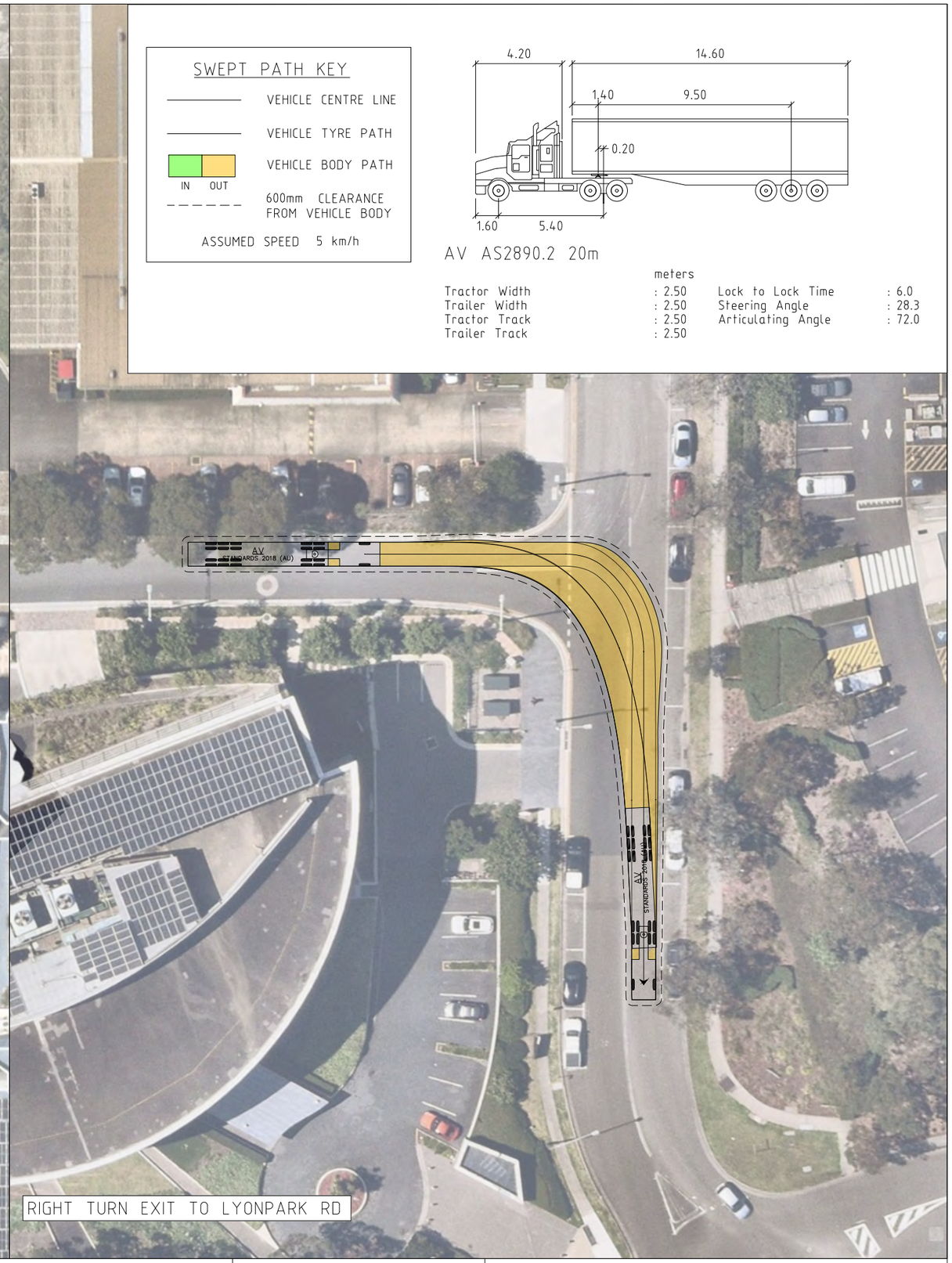
LEFT TURN ENTRY



RIGHT TURN EXIT TO LYONPARK RD

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH (IN / OUT)
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5 km/h

AV AS2890.2 20m

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

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DESIGNED	S.CANO
DESIGN CHECK	D.SALANGSANG
APPROVED BY	D.SALANGSANG
DATE ISSUED	25 NOVEMBER 2024
SCALE	A3 0 2.5 5 10 1:500
CAD FILE NO.	300305728-02-P1.DWG

MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

CONSTRUCTION SWEPT PATH ASSESSMENTS

DRAWING NO. 300305728-02-02 SHEET 02 OF 12 ISSUE P1

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SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH (IN / OUT)
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5 km/h

AV AS2890.2 20m

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

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WARNING

BEWARE OF UNDERGROUND SERVICES

THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED S.CANO	DESIGN CHECK D.SALANGSANG
APPROVED BY D.SALANGSANG	DATE ISSUED 25 NOVEMBER 2024

SCALE A3 0 1.25 2.5 5 1:250

CAD FILE NO. 300305728-02-P1.DWG

MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

CONSTRUCTION SWEPT PATH ASSESSMENTS

DRAWING NO. 300305728-02-03 SHEET 03 OF 12 ISSUE P1

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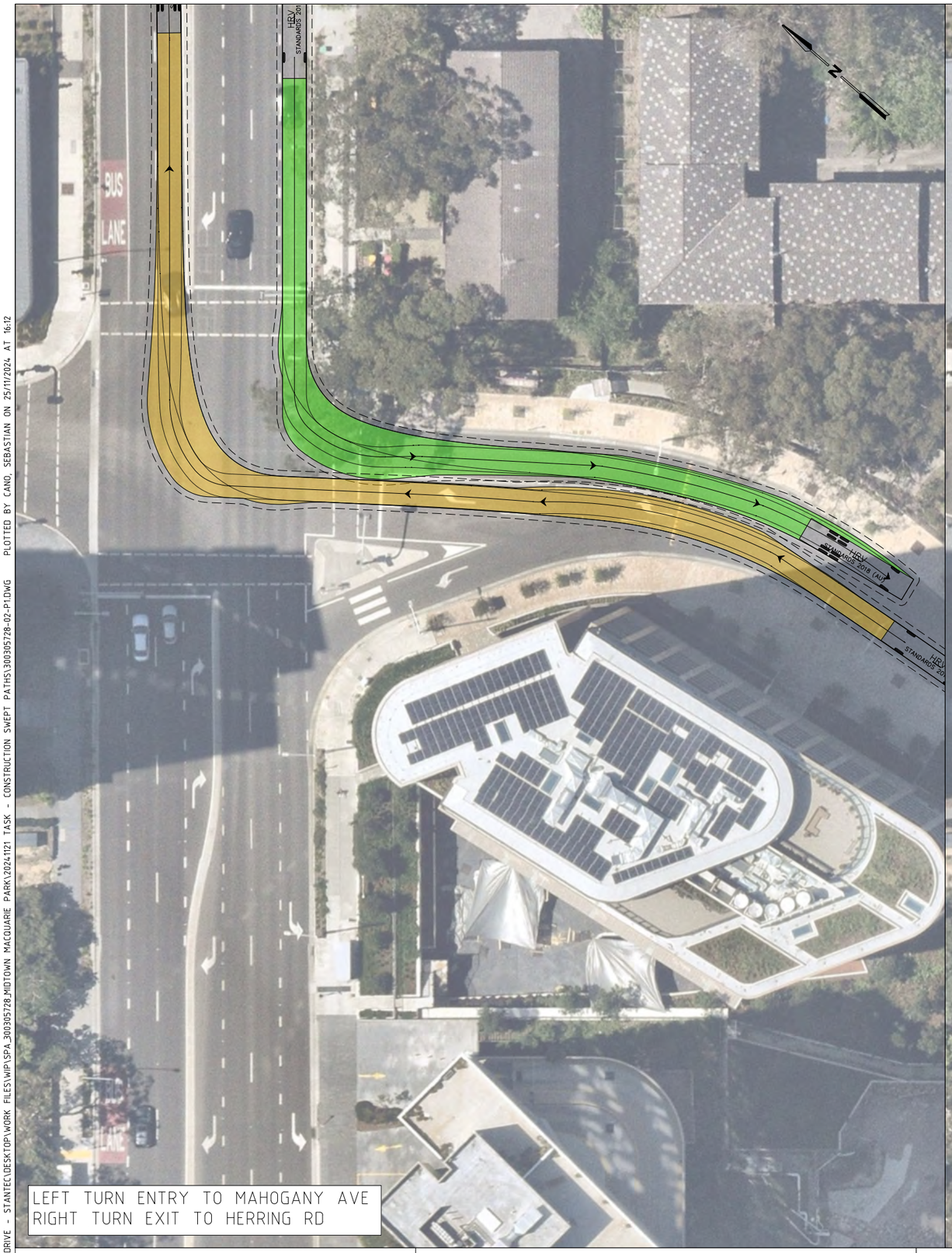
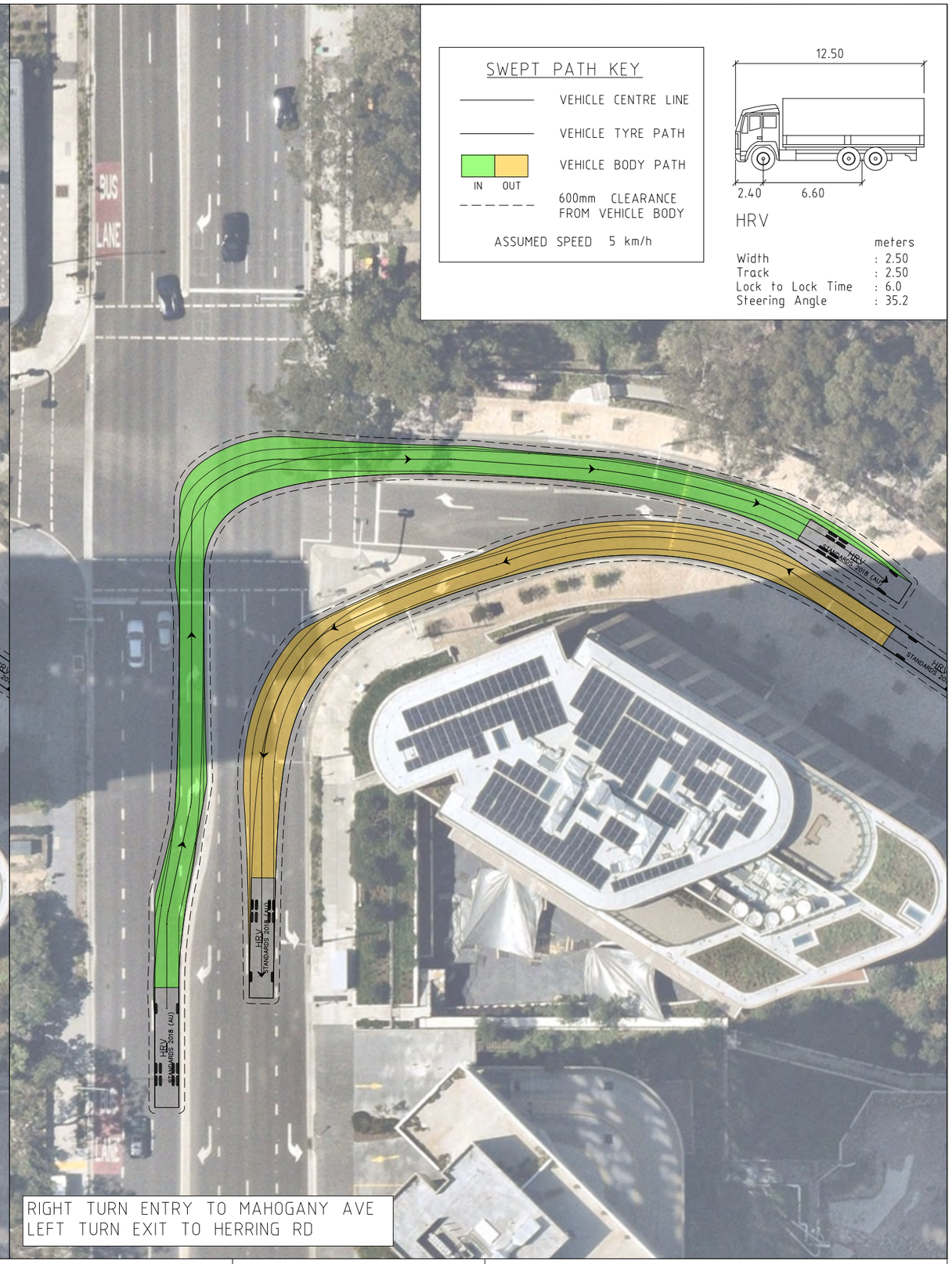


LEFT TURN ENTRY TO MAHOGANY AVE
RIGHT TURN EXIT TO HERRING RD



RIGHT TURN ENTRY TO MAHOGANY AVE
LEFT TURN EXIT TO HERRING RD

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH (IN / OUT)
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5 km/h

HRV

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 35.2

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WARNING
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APPROVED BY D.SALANGSANG	DATE ISSUED 25 NOVEMBER 2024

SCALE A3 0 2.5 5 10 1:500

CAD FILE NO. 300305728-02-P1.DWG

MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

CONSTRUCTION SWEPT PATH ASSESSMENTS

DRAWING NO. 300305728-02-04 SHEET 04 OF 12 ISSUE P1

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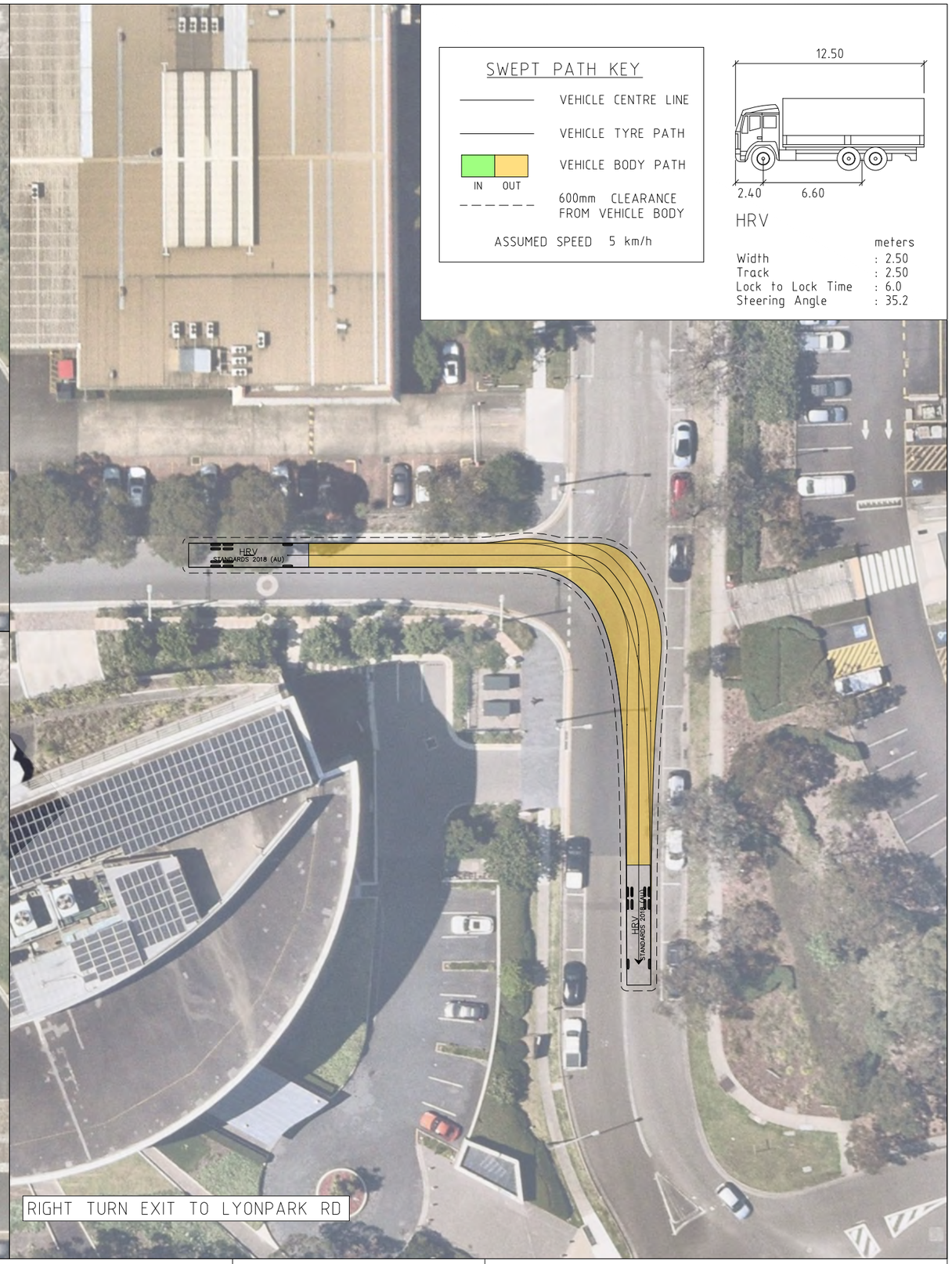
LEFT TURN ENTRY



RIGHT TURN EXIT TO LYONPARK RD

RIGHT TURN EXIT

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH (IN / OUT)
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5 km/h

HRV

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 35.2

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APPROVED BY D.SALANGSANG	DATE ISSUED 25 NOVEMBER 2024

SCALE A3 0 2.5 5 10 1:500

CAD FILE NO. 300305728-02-P1.DWG

MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

CONSTRUCTION SWEPT PATH ASSESSMENTS

DRAWING NO. 300305728-02-05 SHEET 05 OF 12 ISSUE P1

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SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH (IN / OUT)
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5 km/h

HRV

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 35.2

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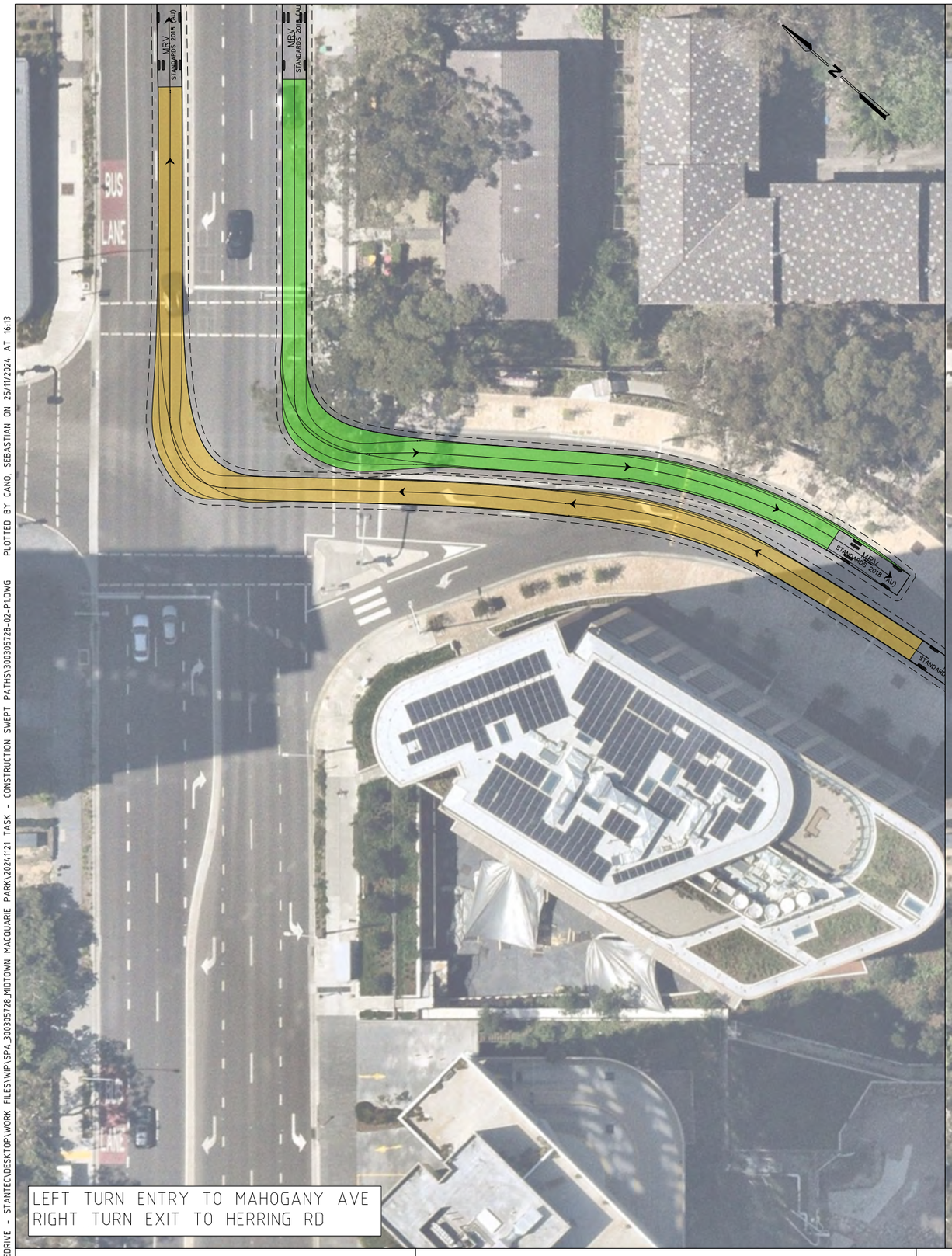
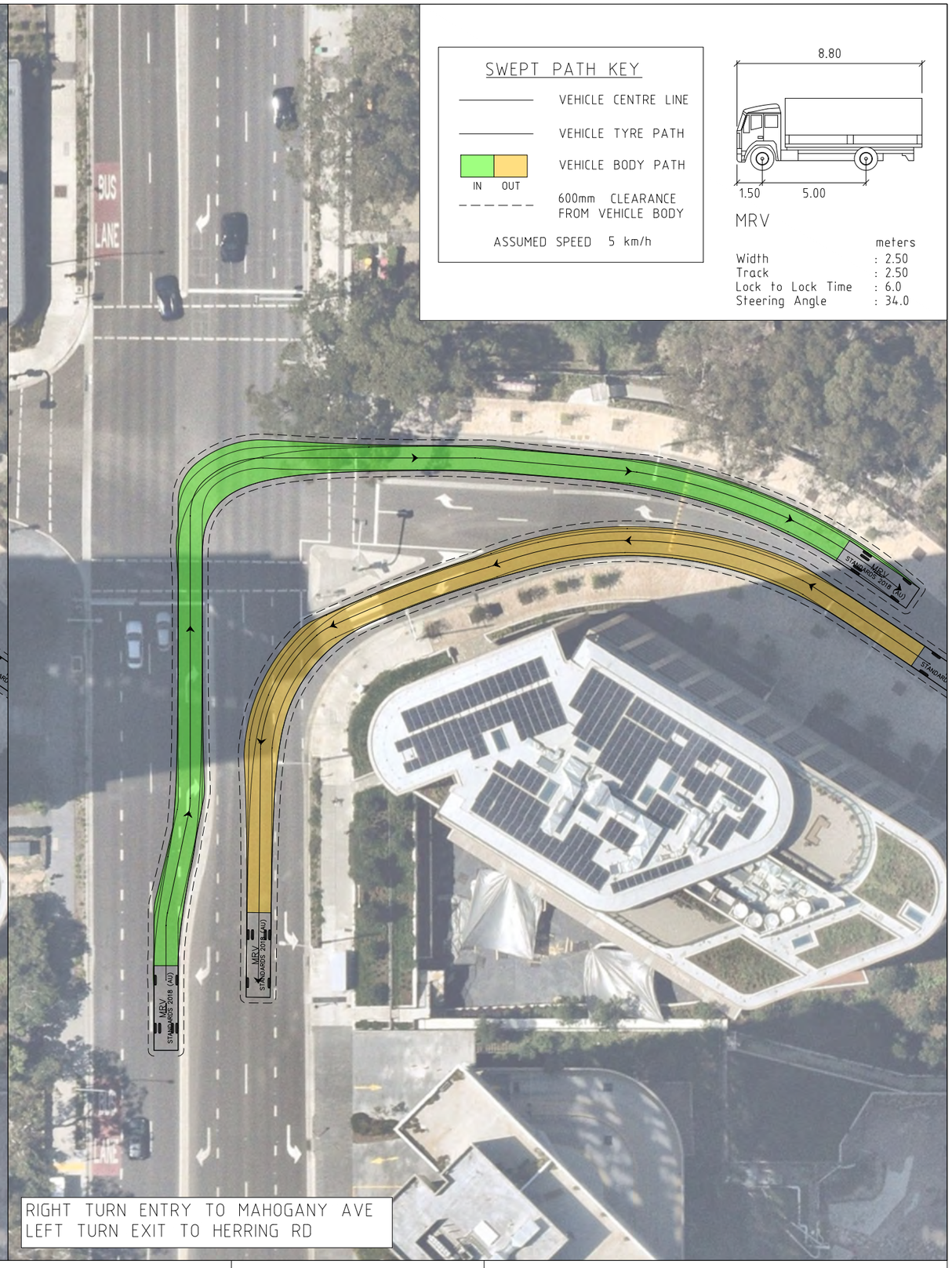
MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

CONSTRUCTION SWEPT PATH ASSESSMENTS

DRAWING NO. 300305728-02-06 SHEET 06 OF 12 ISSUE P1



LEFT TURN ENTRY TO MAHOGANY AVE
RIGHT TURN EXIT TO HERRING RD



RIGHT TURN ENTRY TO MAHOGANY AVE
LEFT TURN EXIT TO HERRING RD

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH (IN / OUT)
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5 km/h

MRV

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

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APPROVED BY	D.SALANGSANG
DATE ISSUED	25 NOVEMBER 2024
SCALE	A3 — 0 2.5 5 10 — 1:500
CAD FILE NO.	300305728-02-P1.DWG

MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

CONSTRUCTION SWEPT PATH ASSESSMENTS

DRAWING NO. 300305728-02-07 SHEET 07 OF 12 ISSUE P1

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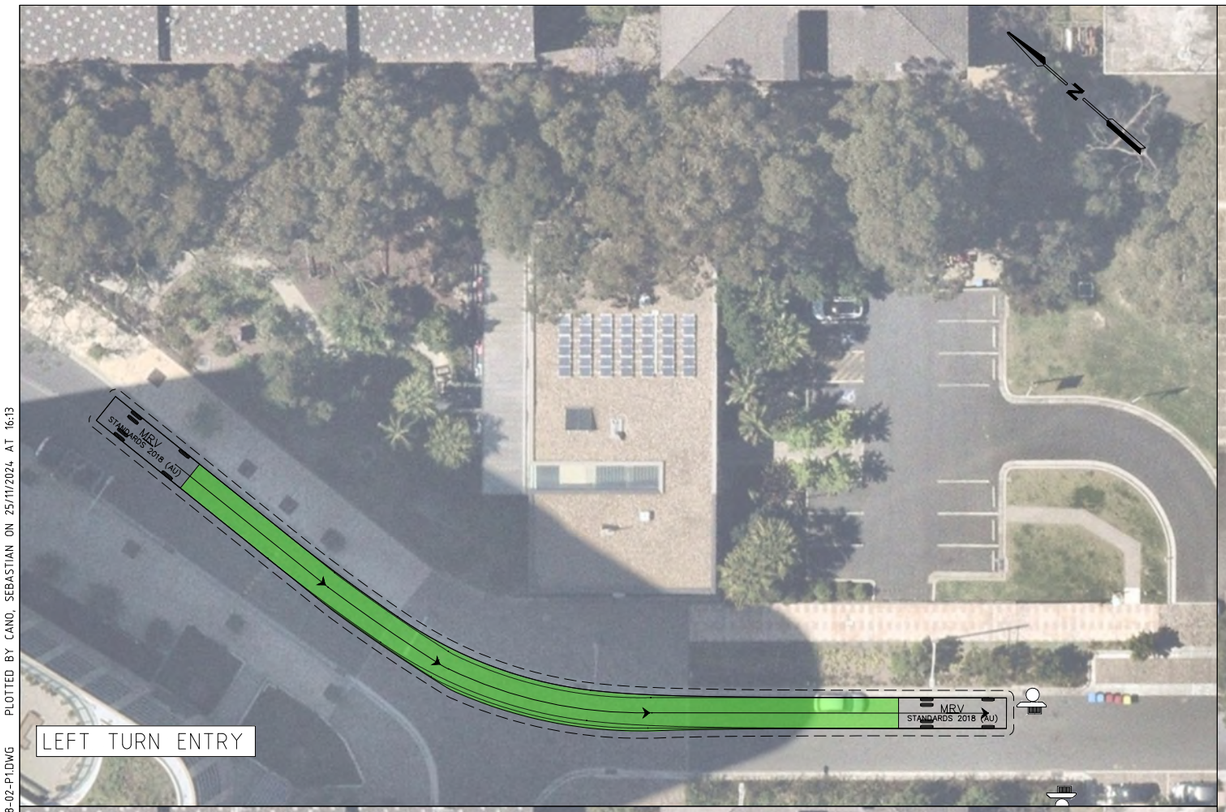
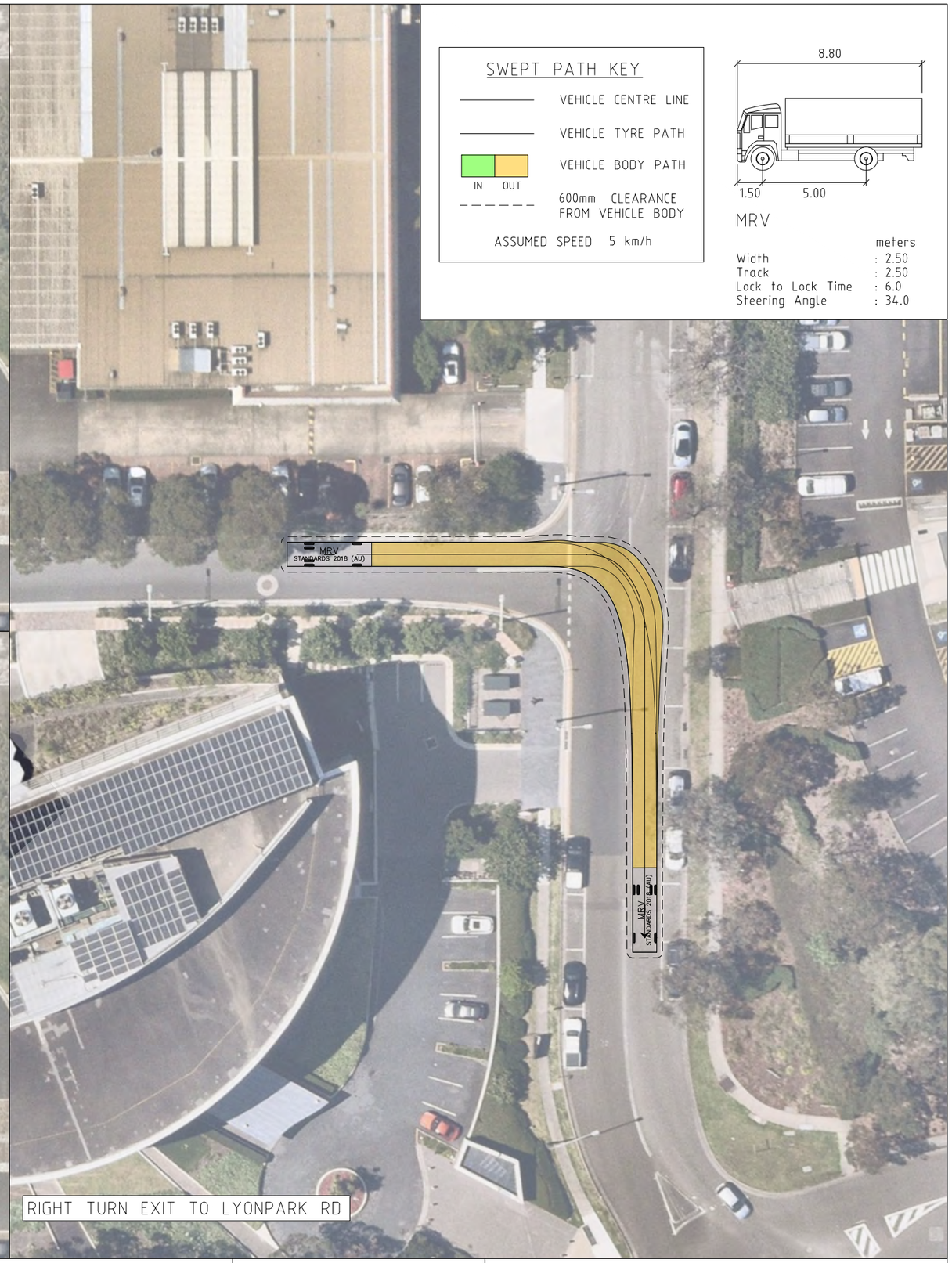


LEFT TURN ENTRY

RIGHT TURN EXIT



RIGHT TURN EXIT TO LYONPARK RD

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH (IN / OUT)
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5 km/h

MRV

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

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APPROVED BY D.SALANGSANG	DATE ISSUED 25 NOVEMBER 2024

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MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

CONSTRUCTION SWEPT PATH ASSESSMENTS

DRAWING NO. 300305728-02-08 SHEET 08 OF 12 ISSUE P1

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH (IN / OUT)
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5 km/h

MRV

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

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MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

CONSTRUCTION SWEPT PATH ASSESSMENTS

DRAWING NO. 300305728-02-09 SHEET 09 OF 12 ISSUE P1

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SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH (IN / OUT)
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5 km/h

AV AS2890.2 20m

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

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MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

CONSTRUCTION SWEPT PATH ASSESSMENTS

DRAWING NO. 300305728-02-10 SHEET 10 OF 12 ISSUE P1

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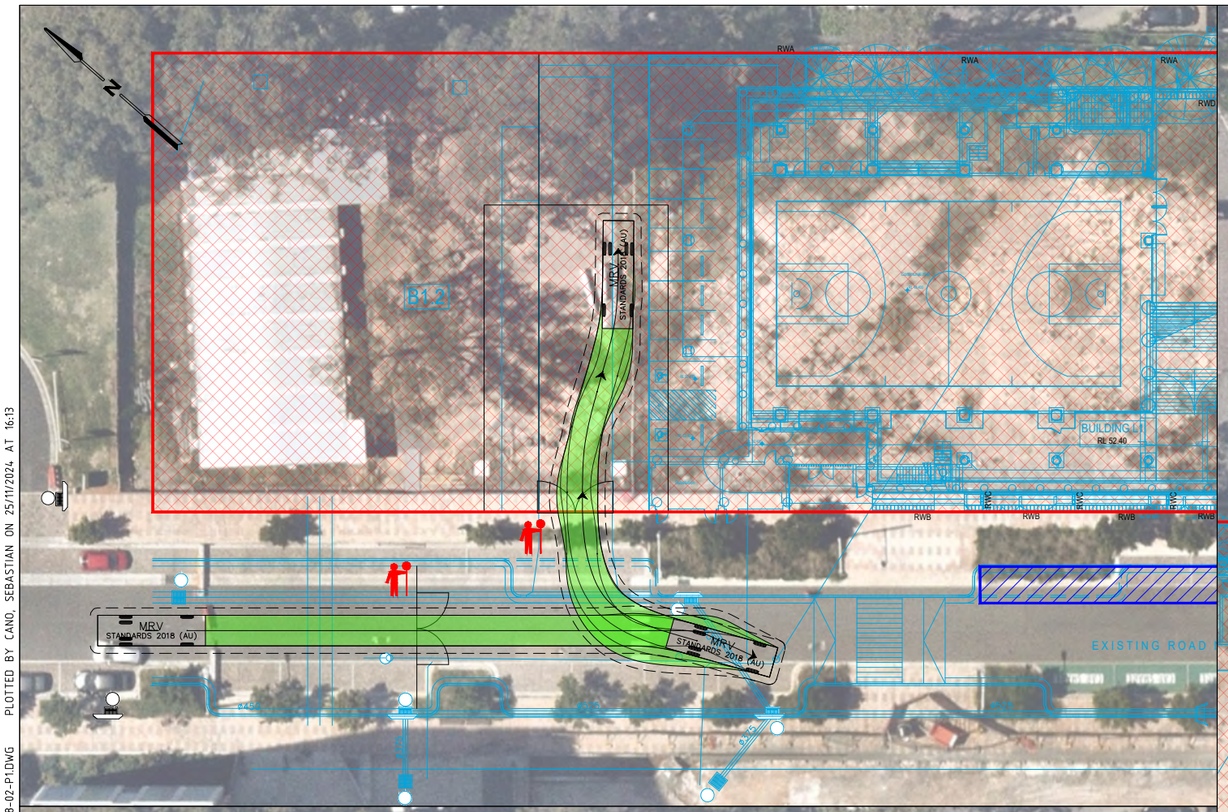

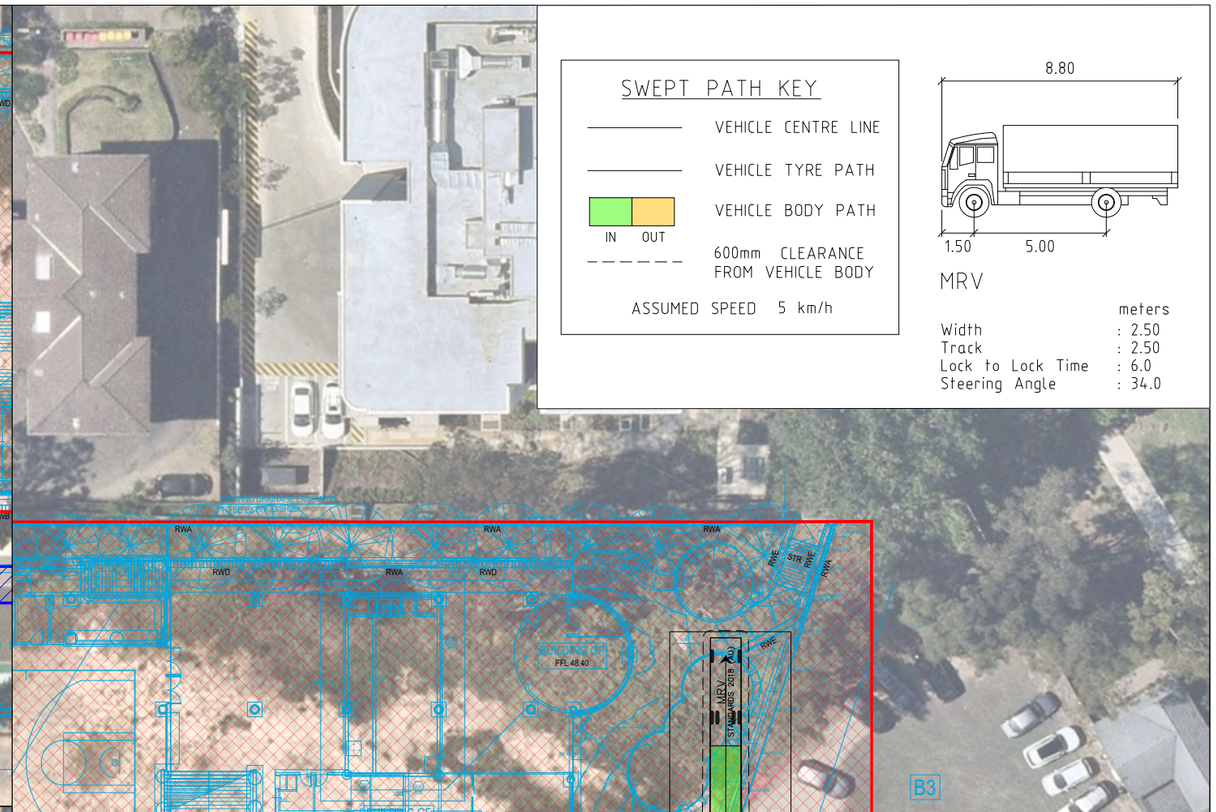

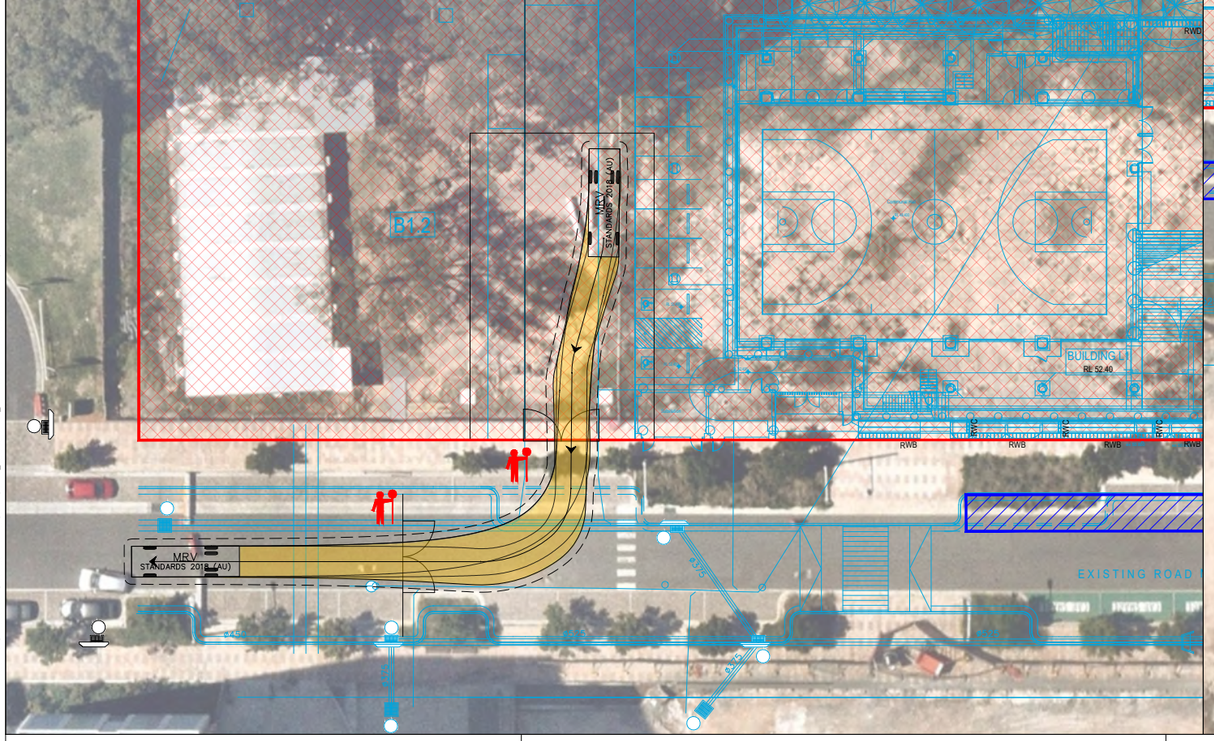

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH (IN / OUT)
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5 km/h

MRV

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

ARCHITECTURAL BASE IN BLUE
DRAWING
MPS-TTW-ZZ-GF-DR-C-0010
REVISION P.11
BY ARCHITECTUS
DATED 05.11.2024

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MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

CONSTRUCTION SWEPT PATH ASSESSMENTS

DRAWING NO. 300305728-02-11 SHEET 11 OF 12 ISSUE P1

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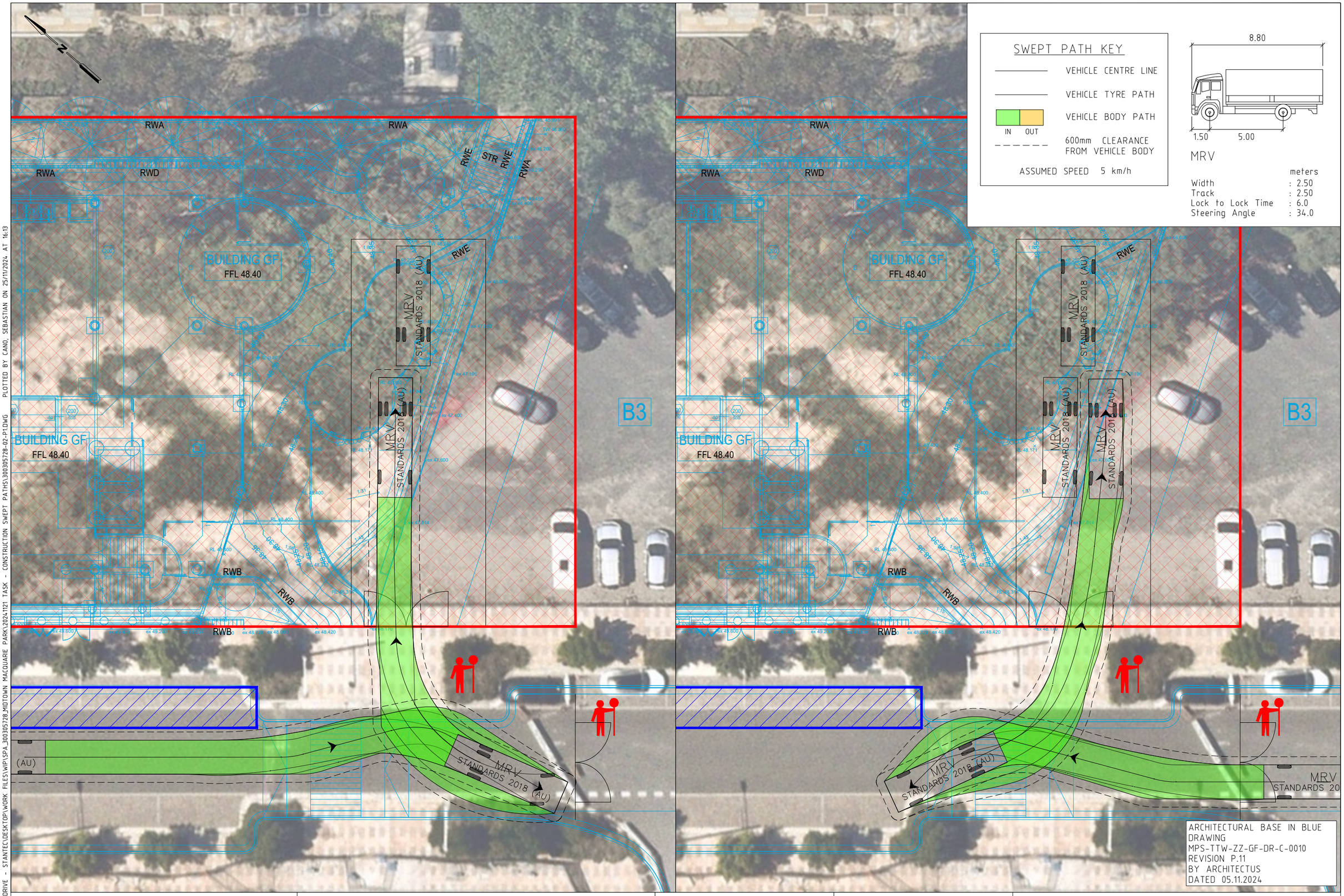

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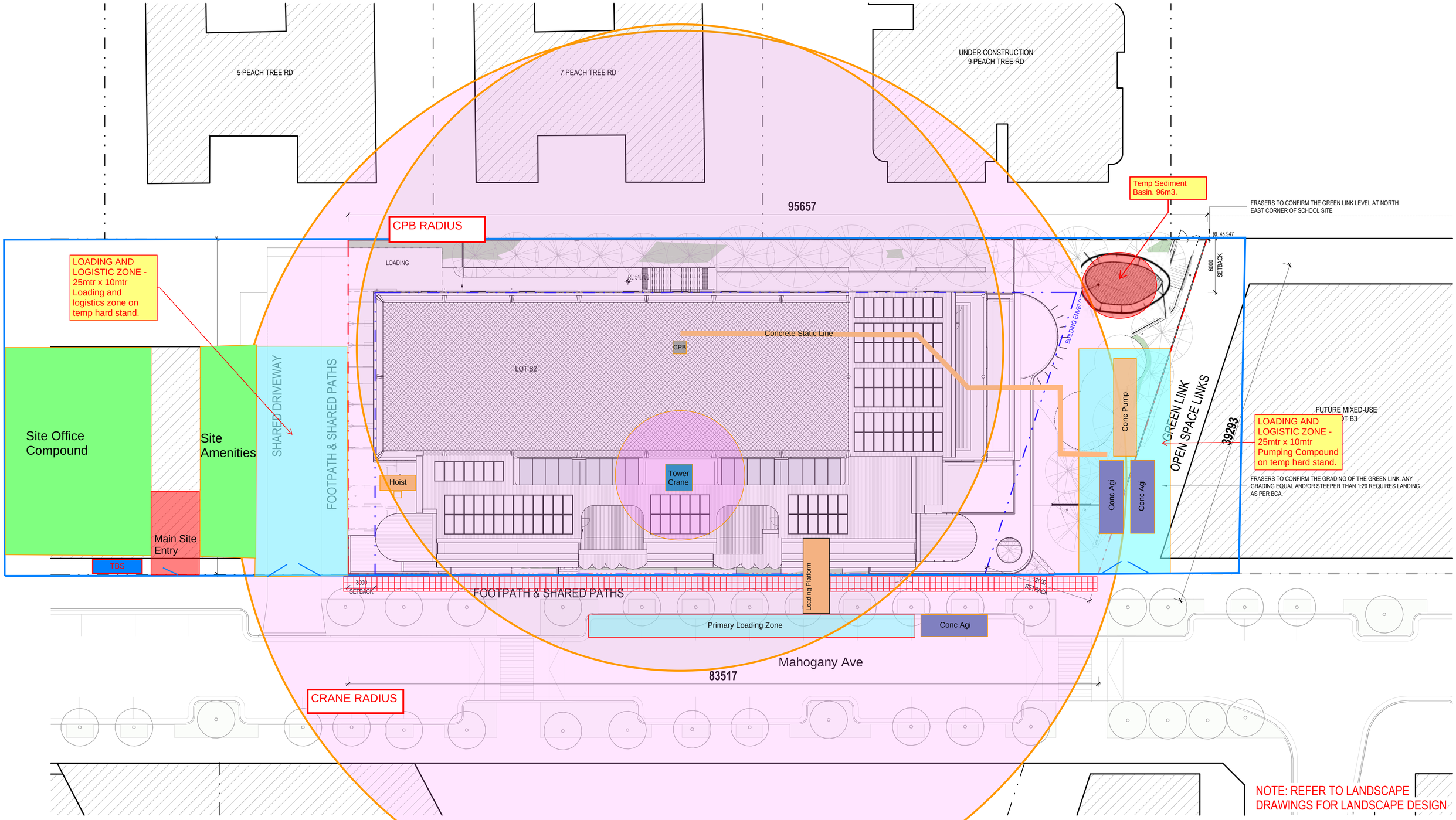
MIDTOWN MACQUARIE PARK
NEW PUBLIC SCHOOL

CONSTRUCTION SWEPT PATH ASSESSMENTS

DRAWING NO. 300305728-02-12 SHEET 12 OF 12 ISSUE P1

Appendix C. Tower Crane Arrangement



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Nominated Architect
Ray Brown, NSWARB 6359

0 2 4 6 10 m

Do not scale drawings. Verify all dimensions on site

revision	purpose of issue	checked	date
A	FOR INFORMATION		06-04-23
B	50% DESIGN DEVELOPMENT ISSUE		28-04-23
C	FOR INFORMATION		29-06-23
D	90% DETAILED DESIGN - ISSUE FOR TENDER		21-07-23

NSW GOVERNMENT Education School Infrastructure

Consultants

Project Manager APP	Landscape Architect OCULUS	BCA Engineer MBC
Structural + Civil Engineer TTW	Cost Planner ALTUS GROUP	Acoustic Engineer PWNA
Building Services Engineer ERBAS	Fire Engineer WSP	Traffic Consultant Stantec

LEGEND

- SITE BOUNDARY
- SETBACK
- EASEMENT

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Architectus Sydney
Level 18
25 Martin Place
Sydney NSW 2000
T (61 2) 8252 8400
F (61 2) 8252 8600
sydney@architectus.com.au
ABN 90 131 245 684

Adelaide
Brisbane
Melbourne
Perth
Sydney

approved	scale
FE+JP	As indicated @A1
prepared	project no
SL	220350

project
Midtown Macquarie Park New Primary School

drawing
Site Plan

drawing no. **MPS-ARC-ZZ-ZZ-DR-A-0012** revision **D**

20/07/2023 10:51:37 PM

Appendix D. Site Hoarding Plan

Taylor Site Hoarding
Mark Up.
23-10-24

5 PEACH TREE RD

7 PEACH TREE RD

UNDER CONSTRUCTION
9 PEACH TREE RD

Existing timber boundary fence (Behind existing hoarding) to remain in place and is not affected. Shown in dark blue.

Temporary mesh ATF type fence installed prior to existing hoarding removal and removed when permanent Retaining wall is constructed.

Permanent Retaining Wall and Colorbond Fence. Shown in Orange.

95661

FRASERS TO CONFIRM THE GREEN LINK LEVEL AT NORTH EAST CORNER OF SCHOOL SITE

1.5mtrs

RL 45.947

6000 SETBACK

Male Ablution

Female Ablution

Female Change/ Ablution

Male Ablution

LOADING

RL 51.700

LOT B2

BUILDING ENVELOPE

Change Room

Lunch Room

Lunch Room

Lunch Room

Lunch Room

37368

SHARED DRIVEWAY

FOOTPATH & SHARED PATHS

FOOTPATH & SHARED PATHS

Site Office and Accommodation Compound.

FUTURE MIXED-USE LOT B1.2

First Aid

Site Entry

GREEN LINK
OPEN SPACE LINKS

39293

Chain-wire fence. Moved out at SIte Establishment and moved back to original location when access deed expires. Shown in Green.

FUTURE MIXED-USE LOT B3

FRASERS TO CONFIRM THE GRADING OF THE GREEN LINK. ANY GRADING EQUAL AND/OR STEEPER THAN 1:20 REQUIRES LANDING AS PER BCA.

3000 SETBACK

FOOTPATH & SHARED PATHS

Footpath Remains Open. Minimum 1.5mtr Clear

1200m SETBACK

15mtrs

Existing Chain-wire fence. Continues up Mahogany Ave to Existing Hoarding. Shown in dark blue.

Chain-wire fence and gates. Shown in Green.

Solid A Class Hoarding. 2.4mtr High. A Class Hoarding Fixed to b Class Posts.

83530

MAIN STREET (ROAD NO.1)

Extent of B Class Hoarding. Shown dashed Red.

Chain-wire fence and gates. Shown in Green.

Chainwire Gates to Control vehicle Access Until may 25.

Jersey Kerb to Support Temp Gates.

Chainwire Gates to Control vehicle Access Until may 25.

Footpath Remains Open

Jersey Kerb to Support Temp Gates.

NOTE: REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN

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Nominated Architect
Ray Brown, NSWARB 6359

0 2 4 6 10 m

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revision	purpose of issue	checked	date
A	FOR INFORMATION		06-04-23
B	50% DESIGN DEVELOPMENT ISSUE		28-04-23
C	FOR INFORMATION		29-06-23
D	90% DETAILED DESIGN - ISSUE FOR TENDER		21-07-23
E	100% DD DRAWINGS FOR TENDER		15-07-24

NSW GOVERNMENT Education School Infrastructure

Consultants

Project Manager APP	Landscape Architect OCULUS	BCA Engineer MBC
Structural + Civil Engineer TTW	Cost Planner ALTUS GROUP	Acoustic Engineer PWNA
Building Services Engineer ERBAS	Fire Engineer WSP	Traffic Consultant Stantec

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ABN 90 131 245 684

Adelaide
Brisbane
Melbourne
Perth
Sydney

approved FE+JP
prepared SL
scale As indicated @A1
project no 220350

project
Midtown Macquarie Park New Primary School

drawing
Site Plan

drawing no. MPS-ARC-ZZ-ZZ-DR-A-0012
revision E

12/07/2024 10:01:33 PM

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Appendix 9 – Construction Noise and Vibration Management Plan

Midtown Macquarie Park Public School (MMPPS) – SSD-56124984

Construction Noise and Vibration Management Sub Plan (CNVMSP)

Taylor Construction Group
Level 16, 100 Pacific Highway,
North Sydney NSW 2060

Report Reference: 240550 – Midtown Macquarie Park Public School (MMPPS) – CNVMSP – R6

Date: 29 January 2025

Revision: R6

Project Number: 240550

PULSE WHITE NOISE ACOUSTICS Suite 601, L6, 32 Walker St, North Sydney NSW 2060
P 1800 4 PULSE (1800 478 573) **E** info@pwna.com.au **pwna.com.au** ABN 95 642 886 306

DOCUMENT CONTROL

Project Name:	Midtown Macquarie Park Public School (MMPPS) – SSD
Project Number:	240550
Report Reference:	240550 – Midtown Macquarie Park Public School (MMPPS) – CNVMSP – R6
Client:	Taylor Construction Group

Revision	Description	Reference	Date	Prepared	Checked	Authorised
0	DRAFT – For Review	240550 – Midtown Macquarie Park Public School (MMPPS) – CNVMSP – R0	03/10/24	Matthew Furlong	Matthew Furlong	Ben White
1	DRAFT – For Review	240550 – Midtown Macquarie Park Public School (MMPPS) – CNVMSP – R1	11/10/24	Matthew Furlong	Matthew Furlong	Ben White
2	DRAFT – For Review	240550 – Midtown Macquarie Park Public School (MMPPS) – CNVMSP – R2	06/12/24	Matthew Furlong	Matthew Furlong	Ben White
3	DRAFT – For Review	240550 – Midtown Macquarie Park Public School (MMPPS) – CNVMSP – R3	08/12/24	Matthew Furlong	Matthew Furlong	Ben White
4	DRAFT – For Review	240550 – Midtown Macquarie Park Public School (MMPPS) – CNVMSP – R4	16/12/24	Matthew Furlong	Matthew Furlong	Ben White
5	Final	240550 – Midtown Macquarie Park Public School (MMPPS) – CNVMSP – R5	17/12/24	Matthew Furlong	Matthew Furlong	Ben White
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This report has been prepared by Pulse White Noise Acoustics Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Taylor Construction Group.

Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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1 INTRODUCTION

Pulse White Noise Acoustics (PWNA) has been engaged by Taylor Construction Group (TCG) to prepare a site-specific Construction Noise and Vibration Management Sub-Plan (CNVMSP) for the construction of the new Midtown Macquarie Park Public School (MMPPS) to be constructed at Lot 24 in the staged subdivision of parent allotment Lot 100 DP 1262209 and is currently legally known as Lot 13 DP 1271599.

This CNVMSP has been prepared to satisfy the requirements of Conditions B38, of the consent conditions presented to this office given in the Notice of Determination – Approval issued for Development Application No. SSD-56124984, dated 13th December 2024.

Onsite unattended noise levels have previously been determined for the project by Pulse White Noise Acoustics in the sites *Noise and Vibration Impact Assessment* submitted for as part of the SSD Application, report reference: *220612 – MMPNPS – SSDA NVIA Assessment – R8.* These will be adopted for the purpose of establishing residential Noise Management Levels (NMLs).

A glossary of acoustic terminology used throughout this report is included in Appendix A.

1.1 Condition Satisfaction

In addressing the requirements of condition B38.

Table 1 Condition Satisfaction Table

CEMP Condition Satisfaction Table		
Condition	Condition Requirements	Document/Sub-Plan Reference
B38	*Prior to the commencement of any work, the Applicant must submit to the Certifier a Construction Noise and Vibration Management Sub-Plan (CNVMP) for the Development prepared by a Professional Engineer with measures to minimise environmental impacts and harm during construction of the Development arising from construction noise and vibration, including, at a minimum, the following information:*	Author Qualifications: Refer to Appendix C.
	a) identification of noise sources and Sensitive Receivers;	Refer to Section 1.5.
	b) quantification of the rating background noise level (RBL) for Sensitive Receivers;	Refer to Section 2.
	c) describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009) (ICNG) (as may be updated or replaced from time to time);	Refer to Section 3.2.1.
	d) prediction and assessment of potential noise, ground-borne noise (as relevant) and vibration levels from the proposed construction methods expected at Sensitive Receiver premises against the objectives identified in the ICNG, EPA's Assessing Vibration: Technical Guideline and relevant standards;	Refer to Section 4.1, Section
	e) noise mitigation measures that can be implemented to reduce construction noise and vibration impacts, including: *i. installation of acoustic barriers/enclosures;* *ii. alternative excavation methods;*	Refer to Section 5.1, 5.2, 5.3, 5.4, 5.5 and 5.7.

	f) describe the measures to be implemented to manage high noise generating works (such as piling and rock breaking) or activities that may be particularly annoying (as defined in the ICNG), in close proximity to sensitive receivers;	Refer to Section 5.2.1.
	g) measures to identify non-conformances with the requirements of the CNVMP, and procedures to implement corrective and preventative action and to respond to complaints;	Refer to Section 5.5.
	h) procedures for notifying sensitive receivers of construction activities that are likely to affect their noise and vibration amenity	Refer to Section 5.4.
	i) include strategies that have been developed in consultation with the directly adjoining properties for managing vibration such as any alternative construction methods with lower source vibration levels and provision for respite periods;	Refer to Section 5.4.5.
	j) include a complaints management system that would be implemented for the duration of the development.	Refer to Section 5.4.

1.2 Development Overview

Midtown Macquarie Park Public School will provide for 750 students from Kindergarten to Year 6 within a five/six-storey built form, including:

- Flexible learning areas;
- Administration and staff facilities;
- Canteen;
- Multi-purpose hall and covered outdoor learning area;
- Library;
- Outdoor play areas at ground level, on each floor of the building and rooftop;
- Landscaped outdoor learning areas; and
- Car parking.

1.3 Project Construction

To ensure the successful delivery of the project in line with the needs of the community for a school it is proposed that the project is constructed in one (1) stage, not multiple.

1.4 Site Layout

The project site is known as site 'B2' in the current concept approval for the redevelopment of Ivanhoe Estate, Macquarie Park (SSD-8707).

The project site is contained within Proposed Lot 24 in the staged subdivision of parent allotment Lot 100 DP 1262209 approved under Stage 1 of the concept approval (SSD-8903) and is currently legally known as Lot 13 DP 1271599. The project site has an area of 3,346m2 and a frontage to Main Street of 83.517m.

The project also includes the construction and use of a driveway on a future adjoining site, known as site 'B1.2' in the concept approval, proposed lot 23 in the Stage 1 subdivision, and currently legally known as Lot 13 DP 1271599.

Figure below outlines the concept approval area, the project site and the driveway.

Figure 1 Precinct Plan (Sourced NearMap)

1.5 Surrounding Receivers

The nearest sensitive receivers to the site are identified below.

Receiver 1: Multi-storey residential buildings along the northern boundary of the site outside the Ivanhoe Estate situated along Peach Tree Road. Receivers are located along the southern side of Peach Tree Road (No. 3, 5, 7 & 9). Receiver one will be known as *Peach Tree Receivers* in this report.

Receiver 2: Future residential apartment building to the east of the site within the Ivanhoe Estate located on site B3 which PWNA understand is proposing a building form up to 20-storeys. Currently an EIS for the site is being prepared as per (SSD-30530150). Receiver two will be known as *Ivanhoe B3 Receiver* in this report.

Receiver 3: Future residential apartment building to the southeast of the site within the Ivanhoe Estate located on site C3 which PWNA understand is proposing a building form up to 16-storeys. Currently an EIS for the site is being prepared as per (SSD-15822622). Receiver three will be known as *Ivanhoe C3 Receiver* in this report.

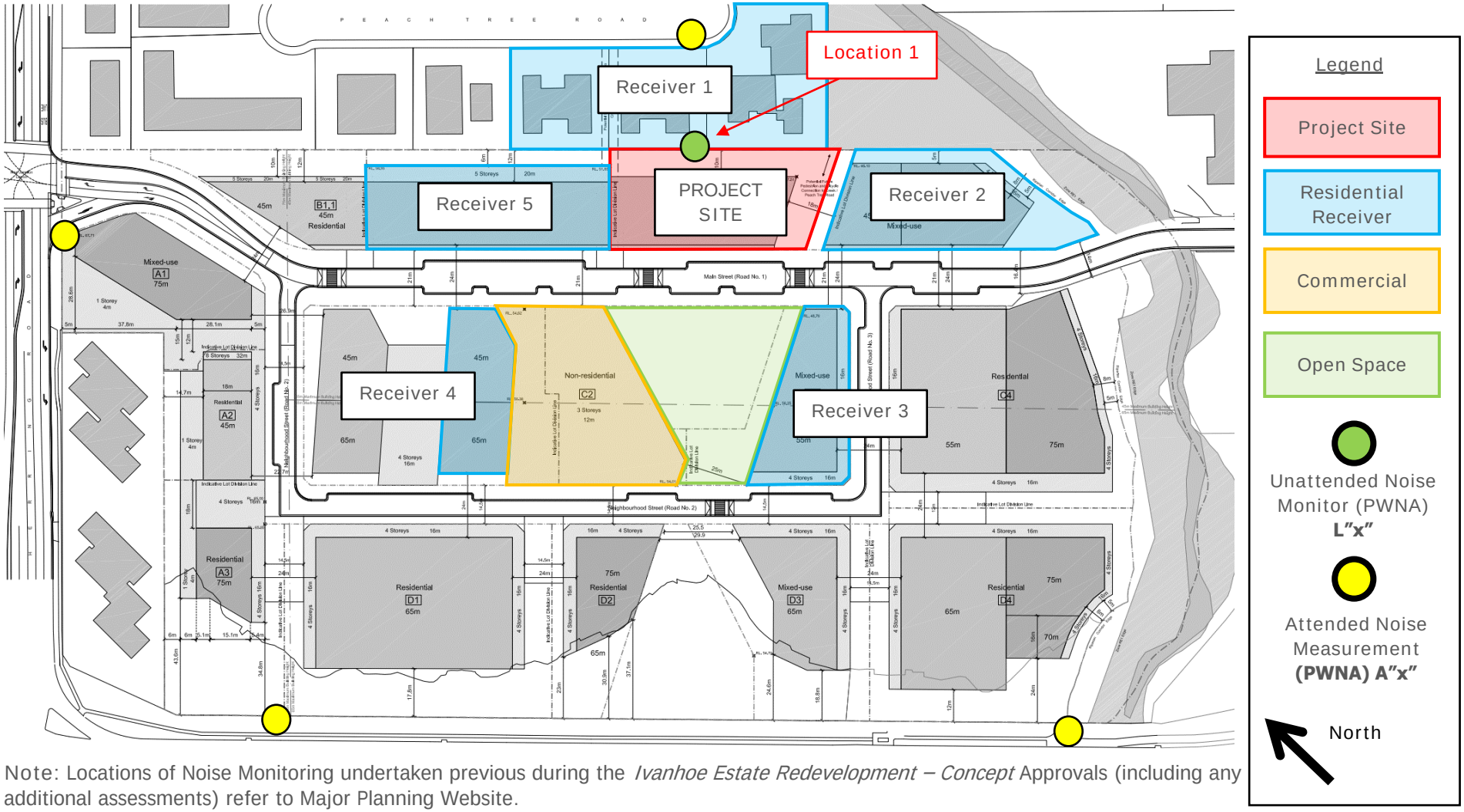
Receiver 4: Future residential apartment buildings currently under construction to the southwest of the site within the Ivanhoe Estate located on site C1 which PWNA understand is proposing a building form up to 14 and 20-storeys. An approval for the construction of these buildings has been provided as per SSD-8903. Receiver four will be known as *Ivanhoe C1 Receiver* in this report.

Receiver 5: Future residential apartment building to the west of the site within the Ivanhoe Estate located on site B1.2 which PWNA understand is proposing a building form up to 11 and 13-storeys. No further information is known about receiver 5. Receiver five will be known as *Ivanhoe B1.2 Receiver* in this report.

Based on the topography of the site, receivers located to the northwest of the site are situated higher than the receivers located to the southeast level than the project site.

A map showing the site location as well as nearest receivers is provided in Figure 2 below. This figure also shows the location of onsite unattended measurements which were conducted as part of this assessment.

Figure 2 Site Map, Measurement Locations (PWNA) and Surrounding Receivers



Note: Locations of Noise Monitoring undertaken previous during the *Ivanhoe Estate Redevelopment – Concept* Approvals (including any additional assessments) refer to Major Planning Website.

2 EXISTING ACOUSTIC ENVIRONMENT

Table 4 from Section 3.2.1 of the PWNA *Noise & Vibration Impact Assessment* submitted as part of the SSDA outlined the relevant project Rating Background Noise Levels (RBL) applicable to the surrounding receivers, see below.

Figure 3 Extract of PWNA Acoustic Report – Planning Submission

Resulting background noise levels assumed for this project are:

Table 4 Assumed Rating Background Noise Level

Measurement Location	Daytime[1] 7:00 am to 6:00 pm	Evening[1] 6:00 pm to 10:00 pm	Night-time[1] 10:00 pm to 7:00 am
	L_{A90}[2] (dBA)	L_{A90}[2] (dBA)	L_{A90}[2] (dBA)
Receiver 1 (Based on the data from Acoustic Logic Location 4, January 2020)	45	43	37
Receiver 2, 3, 4 & 5 (Based on the data from Acoustic Logic Location 5, January 2020)	43	41	39

Note 1: For Monday to Saturday, Daytime 7:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 7:00 am. On Sundays and Public Holidays, Daytime 8:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 8:00 am

Note 2: The L_{A90} noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.

3 NOISE AND VIBRATION CRITERIA

Relevant noise and vibration criteria for construction activities are detailed below.

3.1 SSD Approval (SSD-56124984) Planning Conditions

Relevant conditions of the consent require the following in relation to construction noise and vibration impacts from the site.

Condition B38 – Construction Noise and Vibration Management Plan

Prior to the commencement of any work, the Applicant must submit to the Certifier a Construction Noise and Vibration Management Sub-Plan (CNVMP) for the Development prepared by a Professional Engineer with measures to minimise environmental impacts and harm during construction of the Development arising from construction noise and vibration, including, at a minimum, the following information:

(a) identification of noise sources and Sensitive Receivers;

(b) quantification of the rating background noise level (RBL) for Sensitive Receivers;

(c) describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009) (ICNG) (as may be updated or replaced from time to time);

(d) prediction and assessment of potential noise, ground-borne noise (as relevant) and vibration levels from the proposed construction methods expected at Sensitive Receiver premises against the objectives identified in the ICNG, EPA's Assessing Vibration: Technical Guideline and relevant standards;

(e) noise mitigation measures that can be implemented to reduce construction noise and vibration impacts, including:

(i) installation of acoustic barriers/enclosures;

(ii) alternative excavation methods;

(f) describe the measures to be implemented to manage high noise generating works (such as piling and rock breaking) or activities that may be particularly annoying (as defined in the ICNG), in close proximity to sensitive receivers;

(g) measures to identify non-conformances with the requirements of the CNVMP, and procedures to implement corrective and preventative action and to respond to complaints;

(h) procedures for notifying sensitive receivers of construction activities that are likely to affect their noise and vibration amenity;

(i) include strategies that have been developed in consultation with the directly adjoining properties for managing vibration such as any alternative construction methods with lower source vibration levels and provision for respite periods;

(j) include a complaints management system that would be implemented for the duration of the development.

Condition C3 – Hours of Construction

Construction, including the delivery of materials or machinery to and from the site, may only be carried outbetween the following hours:

(a) between 7:00am and 7:00pm, Mondays to Fridays inclusive; and

(b) between 8:00am and 4:00pm, Saturdays.

Condition C4 – Hours of Construction

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

Condition C5 – Hours of Construction

Activities may be undertaken outside of these hours if required:

(a) by the Police or a public authority for the delivery of vehicles, plant or materials to and from the site; or

(b) in an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or

(c) where the works are inaudible at the nearest sensitive receivers; or

(d) (d) for the delivery, set-up and removal of construction cranes, where notice of the crane related works is provided to the Planning Secretary and affected residents at least seven days prior to the works; or

(e) by the relevant roads authority or utilities service provider in order to minimise disruption to the roadway or essential services, where related works have been provided to the Planning Secretary and affected residents at least seven days prior to the works; or

(f) where a variation is approved in advance in writing by the Planning Secretary if appropriate justification is provided for the works.

Condition C6 – Hours of Construction

Notification of activities undertaken in the circumstances in Condition C5 must be given to affected residents before undertaking the activities or as soon as is practical afterwards.

Condition C7 – Hours of Construction

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.

Condition C11 – Construction Noise Limits

The development must be constructed to achieve the construction noise management levels detailed in the Interim Construction Noise Guideline (DECC, 2009). All feasible and reasonable noise mitigation measures must be implemented and any activities that could exceed the construction noise management levels must be identified and managed in accordance with the management and mitigation measures identified in the approved Construction Noise and Vibration Management Plan (Condition B38).

Condition C12 – Construction Noise Limits

The Applicant must ensure construction vehicles (including concrete agitator trucks) do not arrive at the subject site or surrounding residential precincts outside of the construction hours of work outlined under this consent.

Condition C13 – Construction Noise Limits

The Applicant must implement, where practicable and without compromising the safety of construction staff or members of the public, audible movement alarms of a type that would minimise noise impacts on surrounding Sensitive Receivers.

Condition C14 – Construction Noise Limits

The Applicant must ensure that any work generating high noise impact (i.e. work exceeding a NML of L_{Aeq} 75dBA) as measured at any Sensitive Receiver is only undertaken in continuous blocks of no more than 3 hours, with at least a 1-hour respite between each block of work generating high noise impact, where the location of the work is likely to impact the same receivers. For the purposes of this condition 'continuous' includes any period during which there is less than 1 hour respite between ceasing and recommencing any of the work the subject of this condition.

Condition C15 – Vibration Criteria

Vibration at any residence or structure outside the site caused by construction must be limited to:

(a) for structural damage, the latest version of DIN 4150-3 (1992-02) Structural vibration - Effects of vibration on structures (German Institute for Standardisation, 1999);

(b) for human exposure to vibration, the evaluation criteria set out in the Environmental Noise Management Assessing Vibration: a Technical Guideline (Department of Environment and Conservation, 2006) (as may be updated or replaced from time to time).

Condition C16 – Vibration Criteria

If vibration compactors are used within 30 metres of residential or heritage buildings, vibration monitoring is to be implemented and vibration limited in accordance with Condition C15. These limits apply unless otherwise outlined in the project specific CNVMP required by this consent.

3.2 Construction Noise Criteria

3.2.1 NSW EPA Interim Construction Noise Guideline (ICNG) – DECC 2009

Noise criteria for construction and demolition activities are discussed in the Interim Construction Noise Guideline (ICNG). The ICNG also recommends procedures to address potential impacts of construction noise on residences and other sensitive land uses. The main objectives of the ICNG are summarised as follows:

- Promote a clear understanding of ways to identify and minimise noise from construction works;
- Focus on applying all "feasible" and "reasonable" work practices to minimise construction noise impacts;
- Encourage construction to be undertaken only during the recommended standard hours unless approval is given for works that cannot be undertaken during these hours;
- Streamline the assessment and approval stages and reduce time spent dealing with complaints at the project implementation stage; and

- Provide flexibility in selecting site-specific feasible and reasonable work practices in order to minimise noise impacts.

The ICNG contains a quantitative assessment method which is applicable to this project. Guidance levels are given for airborne noise at residences and other sensitive land uses.

The quantitative assessment method involves predicting noise levels at sensitive receivers and comparing them with the Noise Management Levels (NMLs). The NML affectation categories for residential receivers have been reproduced from the guideline and are listed in the table below.

Table 2 NMLs for quantitative assessment at residences

Time of Day	Noise Management Level $L_{Aeq(15minute)}$ [1,2]	How to Apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	"Noise Affected Level" RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq(15minute)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	"Highly Noise Affected Level" 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences. 2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected. RBL + 5 dB	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5 dB above the noise affected level, the proponent should negotiate with the community.

Note 1 Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Note 2 The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the NSW Noise Policy for Industry (EPA 2017).

Note 3 Requirements listed in the table above are in accordance with the Construction Hours listed in Condition C3, C4, C5, C6 and C7.

Construction noise levels at other noise receivers are outlined below:

- Construction noise levels at offices, retail outlets is not to exceed 70dB $L_{Aeq,15minute}$, when measured externally.
- Community centres is to not exceed the maximum noise level of AS2107:2016, i.e. 45dBA $L_{Aeq,15minute}$, when measured internally.

Based on the measured background noise levels summarised in section 2, and the NMLs outlined above the construction noise criteria to be used in this assessment are listed above.

Table 3 NMLs as basis for the acoustic assessment

Receiver Types		NML, dB $L_{Aeq(15minute)}$	
		Standard Hours Monday to Friday: 7:00am to 6:00pm Saturday: 8:00am to 1:00pm	Non-Standard Hours Monday to Friday: 6:00pm to 7:00pm Saturday: 1:00pm to 4:00pm
Residences (Measured externally)	Receiver 1	NAFL: 55 + HNAL: 75	NAFL: 48
	Receiver 2	NAFL: 53 + HNAL: 75	NAFL: 46
	Receiver 3	NAFL: 53 + HNAL: 75	NAFL: 46
	Receiver 4	NAFL: 53 + HNAL: 75	NAFL: 46
	Receiver 5	NAFL: 53 + HNAL: 75	NAFL: 46
Community Centre (Measured Internally, windows/doors closed)	Receiver 6	45	45

3.2.2 Construction Traffic Noise Criteria

For existing residences and other sensitive land uses affected by additional traffic on existing roads, the NSW Road Noise Policy (RNP) states that for noise associated with increased road traffic generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB during both day and night-time periods. An increase of 2 dB represents a minor impact that is considered barely perceptible to the average person.

3.3 Vibration Criteria

Effects of ground borne vibration on buildings may be segregated into the following three categories:

- Human comfort – vibration in which the occupants or users of the building are inconvenienced or possibly disturbed. Refer to further discussion in Section 3.3.1.
- Effects on building contents – where vibration can cause damage to fixtures, fittings and other non-building related objects. Refer to further discussion in Section 3.3.2.

- Effects on building structures – where vibration can compromise the integrity of the building or structure itself. Refer to further discussion in Section 3.3.2.

3.3.1 Vibration Criteria – Human Comfort

Vibration effects relating specifically to the human comfort aspects of the project are taken from the guideline titled "Assessing Vibration – A Technical Guideline". (AVTG) This type of impact can be further categorised and assessed using the appropriate criterion as follows:

- Continuous vibration – from uninterrupted sources (refer to Table 4).
- Impulsive vibration – up to three instances of sudden impact e.g. dropping heavy items, per monitoring period (refer to Table 5).
- Intermittent vibration – such as from drilling, compacting or activities that would result in continuous vibration if operated continuously (refer to Table 6)

Table 4 Continuous vibration acceleration criteria (m/s2) 1 Hz-80 Hz

Location	Assessment period	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day or night-time	0.020	0.014	0.040	0.028
		0.04	0.029	0.080	0.058

Table 5 Impulsive vibration acceleration criteria (m/s2) 1 Hz-80 Hz

Location	Assessment period	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and places of worship	Day or night-time	0.64	0.46	1.28	0.92

Table 6 Intermittent vibration impacts criteria (m/s1.75) 1 Hz-80 Hz

Location	Daytime		Night-time	
	Preferred Values	Maximum Values	Preferred Values	Maximum Values
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80

3.3.2 Vibration Criteria – Building Contents and Structure

The vibration effects on the building itself are assessed against international standards as follows:

- For transient vibration: British Standard BS 7385: Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration" (BSI 1993); and
- For continuous or repetitive vibration: German DIN 4150: Part 3 – 1999 "Effects of Vibration on Structure" (DIN 1999).

3.3.2.1 Standard BS 7385 Part 2 - 1993

For transient vibration, as discussed in standard BS 7385 Part 2-1993, the criteria are based on peak particle velocity (mm/s) which is to be measured at the base of the building. These are summarised in Table 7 and illustrated in Figure 4.

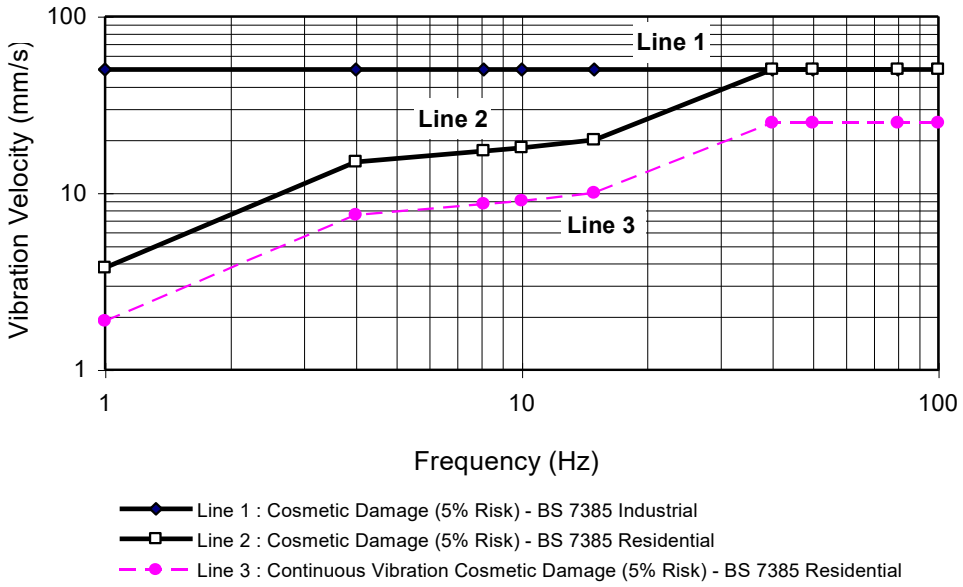
Table 7 Transient vibration criteria as per standard BS 7385 Part 2 - 1993

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

Standard BS 7385 Part 2 – 1993 states that the values in Table 7 relate to transient vibration which does not cause resonant responses in buildings.

Where the dynamic loading caused by continuous vibration events is such as that results in dynamic magnification due to resonance (especially at the lower frequencies where lower guide values apply), then the values in Table 7 may need to be reduced by up to 50% (refer to Line 3 in Figure 4).

Figure 4 BS 7385 Part 2 – 1993, graph of transient vibration values for cosmetic damage



In the lower frequency region where strains associated with a given vibration velocity magnitude are higher, the recommended values corresponding to Line 2 are reduced. Below a frequency of 4 Hz where a high displacement is associated with the relatively low peak component particle velocity value, a maximum displacement of 0.6 mm (zero to peak) is recommended. This displacement is equivalent to a vibration velocity of 3.7 mm/s at 1 Hz.

The standard also states that minor damage is possible at vibration magnitudes which are greater than twice those given in Table 7, and major damage to a building structure may occur at values greater than four times the tabulated values.

Fatigue considerations are also addressed in the standard and it is concluded that unless calculation indicates that the magnitude and number of load reversals is significant (in respect of the fatigue life of building materials) then the values in Table 7 should not be reduced for fatigue considerations.

3.3.2.2 Standard DIN 4150 Part 3 - 1999

For continuous or repetitive vibration, standard DIN 4150 Part 3-1999 provides criteria based on values for peak particle velocity (mm/s) measured at the foundation of the building; these are summarised in Table 8. The criteria are frequency dependent and specific to particular categories of structures.

Table 8 Structural damage criteria as per standard DIN 4150 Part 3 - 1999

Type of Structure	Peak Component Particle Velocity, mm/s			
	Vibration at the foundation at a frequency of			Vibration of horizontal plane of highest floor at all frequencies
	1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz1	
Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40

Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
Structures that, because of their sensitivity to vibration, do not correspond to those listed in lines 1 and 2 and are of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

Note 1 For frequencies above 100Hz, at least the values specified in this column shall be applied.

3.4 Ground-Borne Noise Criteria

According to the NSW EPA Interim Construction Noise Guideline (ICNG) 2009, the criteria for ground-borne noise at residences is defined as follows:

- Maximum internal noise levels of 40 dB $L_{Aeq(15mins)}$ between 6:00pm and 10:00pm.

4 NOISE AND VIBRATION ASSESSMENT

4.1 Construction Noise Assessment

Sound power levels have been predicted for the construction tasks identified in the project program. The equipment anticipated for use in each task is based on previous project experience. The sound power levels for the equipment likely to be used for each of the listed tasks are provided in Table 9 below.

Table 9 Summary of predicted sound power levels

Tasks	Equipment	Sound Power Levels (dBA re 1pW)	Aggregate Sound Power Level per Task (dBA re 1pW)
Site Establishment Works	Mobile crane	110	113
	Power hand tools	109	
	Semi Rigid Vehicle [1]	105	
Ground Works	Excavator	112	120
	Hydraulic Hammer	118	
	Piling Rig	110	
	Handheld jack hammer [1]	111	
	Dump truck [1]	104	
	Concrete saw [1]	114	
	Skid steer	110	
	Power hand tools	109	
Structure	Handheld jack hammer [1]	106	117
	Concrete saw [1]	114	
	Power hand tools	109	
	Welder	101	
	Concrete pump truck	110	
	Concrete agitator truck	108	
Internal Works	Power hand tools	109	109
Common and External Works	Concrete agitator truck	108	114
	Saw cutter [1]	104	
	Dump truck [1]	104	
	Concrete saw [1]	114	
	Power hand tools	109	

Note 1 An assumed time correction has been applied, this being 5 minutes of operation in any 15-minute interval.

Table 10 Receiver 1 – Summary of preliminary predicted construction noise levels

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted Individual Noise Level at Receiver dBA $L_{Aeq\ 15\ minutes}$	Predicted Combined Noise Level at Receiver dBA $L_{Aeq\ 15\ minutes}$	Criteria dBA $L_{Aeq\ 15\ minutes}$	Summary of Result
Site Establishment Works	Mobile crane	113	64 to 78	67 to 82	Monday to Friday 07.00-18.00 45 + 10 = 55 HNAL: 75 18.00-19.00 43 + 5 = 48 Saturday 08.00-13.00 45 + 10 = 55 HNAL: 75 13.00-16.00 43 + 5 = 48	Works indicatively predicted to have the potential to exceed the BG+10 dBA and could have the potential to be above the Highly Noise Affected Level when working near a receiver. Additionally, no noisy works should not be undertaken during the non-standard hours of 18.00-19.00 Monday to Friday and 13.00-16.00 on Saturday.
	Power hand tools		63 to 77			
	Semi Rigid Vehicle		59 to 74			
Ground Works	Excavator	119	66 to 80	72 to 87		
	Handheld jack hammer		60 to 75			
	Dump truck		58 to 73			
	Concrete saw		68 to 83			
	Skid steer		64 to 78			
	Power hand tools		63 to 77			
Structure	Handheld jack hammer	117	60 to 75	71 to 86		
	Concrete saw		68 to 83			
	Power hand tools		63 to 77			
	Welder		55 to 69			
	Concrete pump truck		64 to 78			
	Concrete agitator truck		62 to 76			
Internal Works	Power hand tools	109	63 to 77	63 to 77		
Common and External Works	Concrete agitator truck	117	62 to 76	71 to 85		
	Saw cutter		58 to 73			
	Dump truck		58 to 73			
	Concrete saw		68 to 83			
	Power hand tools		63 to 77			

Table 11 Receiver 2 – Summary of predicted construction noise levels

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted Individual Noise Level at Receiver dBA $L_{Aeq\ 15\ minutes}$	Predicted Combined Noise Level at Receiver dBA $L_{Aeq\ 15\ minutes}$	Criteria dBA $L_{Aeq\ 15\ minutes}$	Summary of Result
Site Establishment Works	Mobile crane	113	35 to 51	39 to 54	Monday to Friday 07.00-18.00 = 45 18.00-19.00 = 45 Saturday 08.00-13.00 = 45 13.00-16.00 = 45	Works indicatively predicted to have the potential to exceed the Noise Management Level when working near a receiver.
	Power hand tools		34 to 50			
	Semi Rigid Vehicle		31 to 46			
Ground Works	Excavator	119	37 to 53	44 to 59		
	Handheld jack hammer		32 to 47			
	Dump truck		30 to 45			
	Concrete saw		40 to 55			
	Skid steer		35 to 51			
	Power hand tools		34 to 50			
Structure	Handheld jack hammer	117	32 to 47	43 to 58		
	Concrete saw		40 to 55			
	Power hand tools		34 to 50			
	Welder		26 to 42			
	Concrete pump truck		35 to 51			
	Concrete agitator truck		33 to 49			
Internal Works	Power hand tools	109	34 to 50	34 to 50		
Common and External Works	Concrete agitator truck	117	33 to 49	42 to 58		
	Saw cutter		30 to 45			
	Dump truck		30 to 45			
	Concrete saw		40 to 55			
	Power hand tools		34 to 50			

Table 12 Receiver 3 - Summary of predicted construction noise levels

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted Individual Noise Level at Receiver dBA $L_{Aeq\ 15\ minutes}$	Predicted Combined Noise Level at Receiver dBA $L_{Aeq\ 15\ minutes}$	Criteria dBA $L_{Aeq\ 15\ minutes}$	Summary of Result
Site Establishment Works	Mobile crane	113	60 to 74	64 to 77	Monday to Friday 07.00-18.00 45 + 10 = 53 HNAL: 75 18.00-19.00 43 + 5 = 46 Saturday 08.00-13.00 45 + 10 = 53 HNAL: 75 13.00-16.00 43 + 5 = 46	Works indicatively predicted to have the potential to exceed the BG+10 dBA and could have the potential to be above the Highly Noise Affected Level when working near a receiver. Additionally, no noisy works should not be undertaken during the non-standard hours of 18.00-19.00 Monday to Friday and 13.00-16.00 on Saturday.
	Power hand tools		59 to 73			
	Semi Rigid Vehicle		56 to 69			
Ground Works	Excavator	119	62 to 76	69 to 82		
	Handheld jack hammer		57 to 70			
	Dump truck		55 to 68			
	Concrete saw		65 to 78			
	Skid steer		60 to 74			
	Power hand tools		59 to 73			
Structure	Handheld jack hammer	117	57 to 70	68 to 82		
	Concrete saw		65 to 78			
	Power hand tools		59 to 73			
	Welder		51 to 65			
	Concrete pump truck		60 to 74			
	Concrete agitator truck		58 to 72			
Internal Works	Power hand tools	109	59 to 73	59 to 73		
Common and External Works	Concrete agitator truck	117	58 to 72	67 to 81		
	Saw cutter		55 to 68			
	Dump truck		55 to 68			
	Concrete saw		65 to 78			
	Power hand tools		59 to 73			

Table 13 Receiver 4 - Summary of predicted construction noise levels

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted Individual Noise Level at Receiver dBA $L_{Aeq\ 15\ minutes}$	Predicted Combined Noise Level at Receiver dBA $L_{Aeq\ 15\ minutes}$	Criteria dBA $L_{Aeq\ 15\ minutes}$	Summary of Result
Site Establishment Works	Mobile crane	113	59 to 70	62 to 73	Monday to Friday 07.00-18.00 45 + 10 = 53 HNAL: 75 18.00-19.00 43 + 5 = 46 Saturday 08.00-13.00 45 + 10 = 53 HNAL: 75 13.00-16.00 43 + 5 = 46	Works indicatively predicted to have the potential to exceed the BG+10 dBA and could have the potential to be above the Highly Noise Affected Level when working near a receiver. Additionally, no noisy works should not be undertaken during the non-standard hours of 18.00-19.00 Monday to Friday and 13.00-16.00 on Saturday.
	Power hand tools		58 to 69			
	Semi Rigid Vehicle		54 to 65			
Ground Works	Excavator	119	61 to 72	67 to 78		
	Handheld jack hammer		55 to 66			
	Dump truck		53 to 64			
	Concrete saw		63 to 74			
	Skid steer		59 to 70			
	Power hand tools		58 to 69			
Structure	Handheld jack hammer	117	55 to 66	67 to 77		
	Concrete saw		63 to 74			
	Power hand tools		58 to 69			
	Welder		50 to 61			
	Concrete pump truck		59 to 70			
	Concrete agitator truck		57 to 68			
Internal Works	Power hand tools	109	58 to 69	58 to 69		
Common and External Works	Concrete agitator truck	117	57 to 68	66 to 77		
	Saw cutter		53 to 64			
	Dump truck		53 to 64			
	Concrete saw		63 to 74			
	Power hand tools		58 to 69			

Table 14 Receiver 5 - Summary of predicted construction noise levels

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted Individual Noise Level at Receiver dBA $L_{Aeq\ 15\ minutes}$	Predicted Combined Noise Level at Receiver dBA $L_{Aeq\ 15\ minutes}$	Criteria dBA $L_{Aeq\ 15\ minutes}$	Summary of Result
Site Establishment Works	Mobile crane	113	60 to 78	64 to 82	Monday to Friday 07.00-18.00 45 + 10 = 53 HNAL: 75 18.00-19.00 43 + 5 = 46 Saturday 08.00-13.00 45 + 10 = 53 HNAL: 75 13.00-16.00 43 + 5 = 46	Works indicatively predicted to have the potential to exceed the BG+10 dBA and could have the potential to be above the Highly Noise Affected Level when working near a receiver. Additionally, no noisy works should not be undertaken during the non-standard hours of 18.00-19.00 Monday to Friday and 13.00-16.00 on Saturday.
	Power hand tools		59 to 77			
	Semi Rigid Vehicle		56 to 74			
Ground Works	Excavator	119	62 to 80	69 to 87		
	Handheld jack hammer		57 to 75			
	Dump truck		55 to 73			
	Concrete saw		65 to 83			
	Skid steer		60 to 78			
	Power hand tools		59 to 77			
Structure	Handheld jack hammer	117	57 to 75	68 to 86		
	Concrete saw		65 to 83			
	Power hand tools		59 to 77			
	Welder		51 to 69			
	Concrete pump truck		60 to 78			
	Concrete agitator truck		58 to 76			
Internal Works	Power hand tools	109	59 to 77	59 to 77		
Common and External Works	Concrete agitator truck	117	58 to 76	67 to 85		
	Saw cutter		55 to 73			
	Dump truck		55 to 73			
	Concrete saw		65 to 83			
	Power hand tools		59 to 77			

4.2 Ground Borne Noise

In accordance with Condition C3 the approved construction hours are limited to:

(a) between 7:00am and 7:00pm, Mondays to Fridays inclusive; and

(b) between 8:00am and 4:00pm, Saturdays.

In accordance with Condition C7 the rock breaking, rock hammering, sheet piling, pile driving and similar activities are limited to:

(a) 9am to 12pm, Monday to Friday;

(b) 2pm to 5pm Monday to Friday; and

(c) 9am to 12pm, Saturday.

As the consent condition do not permit noisy works to be undertaken when ground borne noise requirements apply (after 6:00pm and before 7:00am). No further assessment is required as general non-noisy works will not create ground borne noise issues.

4.3 Vibration Assessment

In order to maintain compliance with the human comfort vibration criteria discussed in Section 3.3, it is recommended that the indicative safe distances listed in Table 15 should be maintained. These indicative safe distances should be validated at the start of construction works by undertaking measurements of vibration levels generated by construction and demolition equipment to be used on site.

If applicable, the criteria for scientific or medical equipment (should any of these exist close to the site) can be more stringent than those required for human comfort. Vibration validating measurements should be conducted at each site to determine the vibration level and potential impact to this sensitive equipment.

Additionally, any vibration levels should be assessed in accordance with the criteria discussed in Section 3.3. This information should also be included as part of the CNVMSP.

Table 15 Recommended indicative safe working distances for vibration intensive plant

Plant	Rating / Description	Safe Working Distances (m)	
		Cosmetic Damage (BS 7385: Part 2 DIN 4150: Part 3)	Human Comfort (AVTG)
Vibratory roller	< 50 kN (Typically 1 – 2 tonnes)	5	15 – 20
	< 100 kN (Typically 2 – 4 tonnes)	6	20
	< 200 kN (Typically 4 – 6 tonnes)	12	40
	< 300 kN (Typically 7 – 13 tonnes)	15	100
	> 300 kN (Typically more than 13 tonnes)	20	100
Small hydraulic hammer	300 kg, typically 5 – 12 tonnes excavator	2	7
Medium hydraulic hammer	900 kg, typically 12 – 18 tonnes excavator	7	23
Large hydraulic hammer	1600 kg, typically 18 – 34 tonnes excavator	22	73

Plant	Rating / Description	Safe Working Distances (m)	
		Cosmetic Damage (BS 7385: Part 2 DIN 4150: Part 3)	Human Comfort (AVTG)
Vibratory pile driver	Sheet piles	2 – 20	20
Jackhammer	Hand held	1	Avoid contact with structure and steel reinforcements

5 NOISE AND VIBRATION MANAGEMENT PLAN

5.1 Acoustic Management Procedures

5.1.1 Summary of Management Procedures

Table 16 below summarises the management procedures recommended for airborne noise and vibration impacts. These procedures are also further discussed in the report. Hence, where applicable, links to further references are provided in Table 16.

Table 16 Summary of mitigation procedures

Procedure	Abbreviation	Description	Further Reference
General Management Measures	GMM	Introduce best-practice general mitigation measures in the workplace which are aimed at reducing the acoustic impact onto the nearest affected receivers.	Refer to Section 5.7 For noise impact, also refer to Section 5.2 For vibration impact, also refer to Section 5.3
Project Notification	PN	Issue project updates to stakeholders, discussing overviews of current and upcoming works. Advanced warning of potential disruptions can be included. Content and length to be determined on a project-by-project basis.	Refer to Section 5.4.
Verification Monitoring	V	Monitoring to comprise attended or unattended acoustic surveys. The purpose of the monitoring is to confirm measured levels are consistent with the predictions in the acoustic assessment, and to verify that the mitigation procedures are appropriate for the affected receivers. If the measured levels are higher than those predicted, then the measures will need to be reviewed and the management plan will need to be amended.	For noise impact, refer to Section 5.2.3 and Section 5.2.4. For vibration impact, refer to Section 5.3.2
Complaints Management System	CMS	Refer to SINSW Complaint Management System	Refer to Section 5.4.
Specific Notification	SN	Refer to SINSW Complaint Management System	Refer to Section 5.4.
Respite Offer	RO	Offer provided to stakeholders subjected to an ongoing impact.	Refer to Section 5.2.1
Alternative Construction Methodology	AC	Contractor to consider alternative construction options that achieve compliance with relevant criteria. Alternative option to be determined on a case-by-case basis. It is recommended that the selection of the alternative option should also be determined by considering the assessment of on-site measurements (refer to Verification Monitoring above).	Refer to Section 5.7.1 and 5.7.2

The application of these procedures is in relation to the exceedances over the relevant criteria. For airborne noise, the criteria are based on NMLs. The allocation of these procedures is discussed in Section 5.1.2

For vibration, the criteria either correspond to human comfort, building damage or scientific and medical equipment. The application of these procedures is discussed in Section 5.1.3.

5.1.2 Allocation of Noise Management Procedures

For residences, the management procedures have been allocated based on noise level exceedances at the affected properties, which occur over the designated NMLs (refer to Section 3). The allocation of these procedures is summarised in Table 17 below.

Table 17 Allocation of noise management procedures – residential receivers

Construction Hours	Exceedance over NML (dB)	Management Procedures (see definition above)
Standard Hours Mon – Fri: 7:00 am to 6:00 pm Sat: 8:00 am – 1:00 pm	0 - 3	GMM
	4 - 10	GMM, PN, V 1, CMS, AC
	> 10	GMM, PN, V, CMS, SN, AC
	≥ 75dBA	GMM, PN, V, CMS, SN, AC, RO
Note 1 Verification monitoring to be undertaken upon complaints received from affected receivers		

Please note the following regarding the allocation of these procedures:

- The exceedances have been estimated as part of the acoustic assessment, and these are summarised in Section 4.1
- The allocation of procedures is based on the assumptions used for noise level predictions (refer to Section 4.1). Consequently, these allocations can be further refined once onsite works are undertaken and further development of the construction program.
- For non-residential receivers (such as educational), management measures are provided in Section 5.2.4.

5.1.3 Allocation of Vibration Management Procedures

Table 18 below summarises the vibration management procedures to be adopted based on exceedance scenarios (i.e., whether the exceedance occurs over human comfort criteria, building damage criteria, or criteria for scientific and medical equipment). Please note these management procedures apply for any type of affected receiver (i.e., for residences as well as non-residential receivers).

Table 18 Allocation of vibration management procedures

Construction Hours	Exceedance Scenario	Management Procedures
Standard Hours Mon – Fri: 7:00 am to 6:00 pm Sat: 8:00 am – 1:00 pm	Over human comfort criteria (refer to Section 3)	GMM, PN, V, RO
	Over building damage criteria (refer to Section 3)	GMM, V, AC, RO

5.2 Site Specific Noise Mitigation Measures

5.2.1 Respite Periods

Predicted noise levels outlined in Section 4.1 indicate that in some cases when works are being undertaken within proximity of receiver boundaries, exceedances above the Noise Management Levels (NMLs) may occur. In addition, in accordance with Condition B38 respite periods are recommended for noisy activities. As such the following respite conditions are recommended in accordance with C7 or when works extended periods of noisy works are affecting a surrounding receiver above the HNAL of 75dBA. See below.

Table 19 Recommended Respite Periods

Monday to Friday	Saturday
7:00am to 9:00am – No rock breaking, rock hammering, sheet piling, pile driving and similar activities. (Respite Period)	8:00am to 9:00am – No rock breaking, rock hammering, sheet piling, pile driving and similar activities. (Respite Period)
9:30am to 12:00pm – Works	9:00am to 12:00pm – Works
12:00pm to 2:00pm – No rock breaking, rock hammering, sheet piling, pile driving and similar activities. (Respite Period)	12:00pm to 1:00pm – No rock breaking, rock hammering, sheet piling, pile driving and similar activities. (Respite Period)
2:00pm to 5:00pm – Works	
5:00pm to 6:00pm – No rock breaking, rock hammering, sheet piling, pile driving and similar activities. (Respite Period)	

Note: Recommended respite periods for noisy works has been formulated in accordance with Condition C7 from the Notice of Determination – Approval.

5.2.2 General Comments

The contractor will, where reasonable and feasible, apply best practice noise mitigation measures. These measures shall include the following:

- Maximising the offset distance between plant items and nearby noise sensitive receivers.
- Preventing noisy plant working simultaneously and adjacent to sensitive receivers.
- Minimising consecutive works in the same site area.
- Orienting equipment away from noise sensitive areas.
- Carrying out loading and unloading away from noise sensitive areas.

In order to minimise noise impacts during the works, the contractor will take all reasonable and feasible measures to mitigate noise effects.

The contractor will also take reasonable steps to control noise from all plant and equipment. Examples of appropriate noise control include efficient silencers and low noise mufflers.

The contractor should apply all feasible and reasonable work practices to meet the NMLs and inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels, duration of noise generating construction works, and the contact details for the proposal.

5.2.3 Noise Monitoring

It is recommended that during the earthworks and structure phases of the project, onsite noise monitoring is undertaken to provide real time feedback to the construction team regarding their acoustic impact.

The survey methodology and equipment will comply with the monitoring requirements as discussed in Australian Standard AS 1055.1-1997.

All onsite measurements will be undertaken to investigate compliance against the noise management levels (NML's) which are formulated in section 3 above (i.e., Project Approval and NSW EPA ICNG).

The location of the monitors will be determined by the location and type of works being undertaken on each site, and will be reviewed monthly, or as work location and type progresses (whichever is first). Due to the extent of works area and the complex nature of the project sequencing, several monitors may be required throughout the duration of the project.

Monthly reporting is recommended to be undertaken which should include the following noise descriptors: LA90, LA10, LA1 and LAeq.

In the case of an exceedance, the unattended automated system will alert the project team, who will be able to begin an immediate investigation by use the project's "Noise and Vibration Investigation Checklist" (see Appendix A). This checklist will be used by the project team to determine the appropriate course of action which may or may not include involvement from the project's Acoustic Consultant. A summary of the available alternate mitigation measures will be provided as part of the monthly report. However, we do note in some cases alternate methodologies may not be available or cannot be implemented due to other project constraints.

5.2.4 Noise Mitigation Measures for Non-Residential Receivers

Where exceedances have been identified in Section 4, the following mitigation measures are recommended:

- Undertake general mitigation measures as discussed in Section 5.7.
- Issue project updates to tenants in affected premises. The updates can include overview of current and upcoming works, as well as advanced warning of potential disruptions.
- Signage to be posted in order to provide stakeholders information regarding project details, emergency contacts and enquiry contact information.

5.2.5 Alternate Equipment or Process

Exceedance of the site's NMLs should result in an investigation as to whether alternate equipment could be used, or a difference process could be undertaken.

In some cases, the investigation may conclude that the use of other equipment is not possible, however, a different process could be undertaken.

5.2.6 Acoustic Enclosures/Screening

Typically, on a construction site there are three different types of plant that will be used: mobile plant (i.e., excavators, skid steers, etc.), semi mobile plant (i.e., hand tools generally) or static plant (i.e., diesel generators).

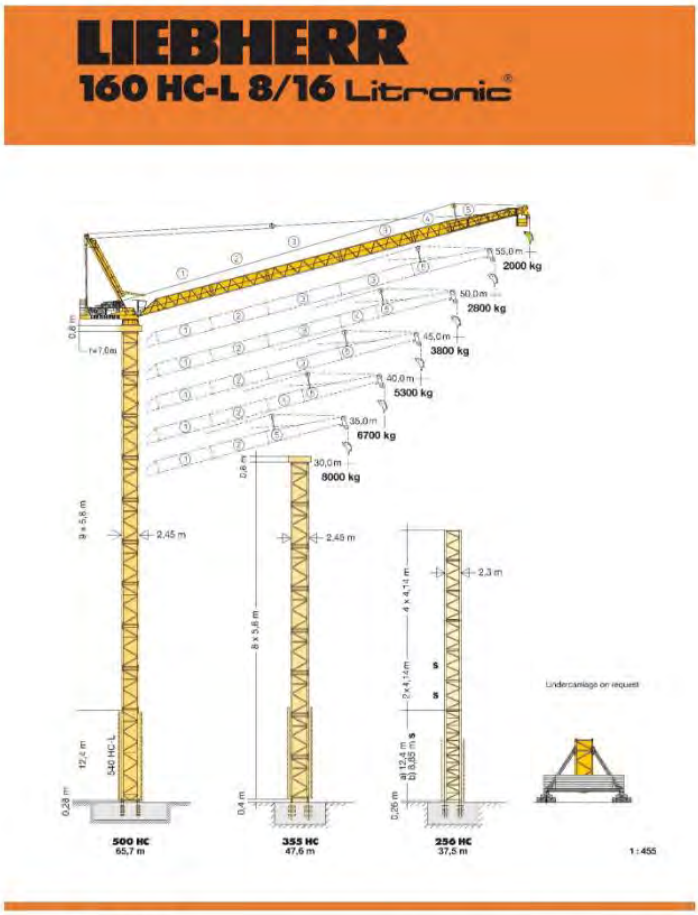
For plant items which are static it is recommended that, in the event exceedances are being measured due to operation of the plant item, an acoustic enclosure/screen is constructed to reduce impacts. These systems can be constructed from Fibre Cement (FC) sheeting or, if airflow is required, acoustic attenuators or louvres.

For semi mobile plant, relocation of plant should be investigated to either be operated in an enclosed space or at locations away from a receiver.

With mobile plant it is generally not possible to treat these sources. However, investigations into the machine itself may result in a reduction of noise (i.e., mufflers/attenuators etc).

5.2.7 Tower Cranes

A review of the proposed crane to be installed has been undertaken. We have been advised the proposal crane is a Leibherr 160 HC-L crane with a 50m boom is proposed. This is an electric crane and will be acoustically acceptable to work during Standard Construction hours in accordance with the NSW EPA ICNG. If the crane requires diesel power generators these should be reviewed to ensure compliance with any acoustic treatments possible.



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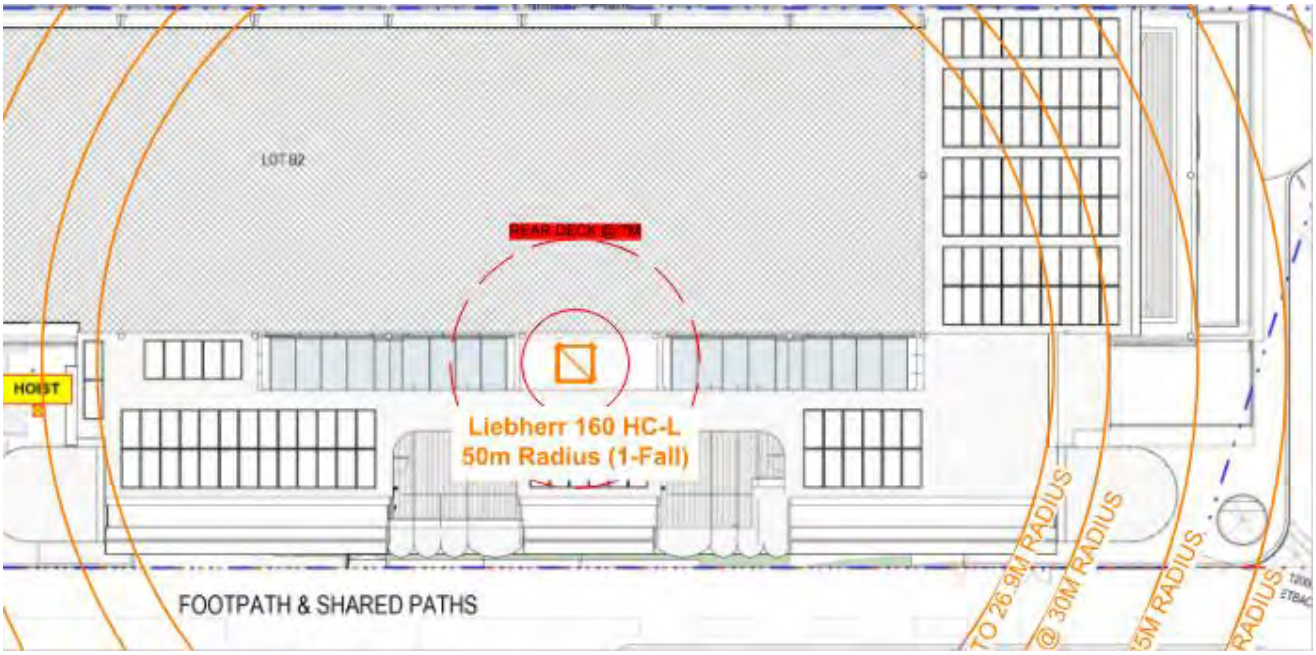
ABN: 50 095 255 628 ACN: 095 255 628



5.3 Vibration Mitigation Measures

5.3.1 General Comments

As part of the CNVMSP, the following vibration mitigation measures should be implemented:

- Any vibration generating plant and equipment is to be in areas within the site in order to lower the vibration impacts.
- Investigate the feasibility of rescheduling the hours of operation of major vibration generating plant and equipment.
- Use lower vibration generating items of construction plant and equipment; that is, smaller capacity plant, where feasible
- Minimise conducting vibration generating works consecutively in the same area (if applicable).
- Schedule a minimum respite period in accordance with Condition 7.
- Use only dampened rock breakers and/or "city" rock breakers to minimise the impacts associated with rock breaking works.

5.3.2 Vibration Monitoring

Upon receive of complaint, vibration monitoring to be undertaken to investigate complaint.

Vibration monitoring will target civil and vibratory works. In addition, attended vibration measurements may be undertaken from time to time to supplement the unattended monitoring.

The vibration monitoring results will also be accessible by the project team via an online portal and monitored by the project acoustic consultant.

All vibration measurements are to be undertaken in accordance with the methodologies outlined in British Standard 7385-1:1990 Evaluation and measurement for vibration in buildings, DIN V 4150-1 Vibrations in Building; Influence On Persons In Buildings and DIN 4150-1 Effects On Structures.

The monitoring locations would be on a stiff part of the structure (at the foundation) on the side of the structure adjacent to the subject demolition and construction works, or in a suitable location at the site boundary.

Unattended monitoring systems will be configured to record the peak vibration levels and to trigger an alarm when predetermined vibration thresholds are exceeded. The thresholds correspond to an "Operator Warning Level" and an "Operator Halt Level", where the Warning Level is 75% of the Halt Level. The Halt Level should be determined based on the vibration criteria for building contents and structure (refer to Section 2).

Exceedance of the "Operator Warning Level" would not require excavation or demolition work to cease, but rather, alerts the site manager to proceed with caution at a reduced force or load.

An exceedance of the "Operator Halt Level" would require the contractor to implement an alternative excavation technique pending further analysis of the vibration frequency content in order to determine any potential exceedance of the criteria.

The location of the monitors will be determined by the location and type of works being undertaken on each site, and will be reviewed monthly, or as work location and type progresses (whichever is first). Due to the extent of works and the complex nature of the project sequence, several monitors will be required throughout the duration of the project.

If an exceedance above the management criteria is identified, an alert will be issued to the project team, who will assess whether it is at a 'Warning' or a 'Halt' level. If it is a 'Halt' level exceedance, the project team will complete a Noise and Vibration Investigation Checklist (see Appendix B) to determine the appropriate course of action. A summary of the available alternate mitigation measures is to be provided as part of the monthly report. However, we do note in some cases alternate methodologies may not be available or cannot be implemented due to other project constraints.

5.4 SINSW Complaints management process as outlined in the Community Communication Strategy (CCS)

5.4.1 Enquiries and complaints management

SINSW manages enquiries (called interactions in our CRM, Darzin), and complaints in a timely and responsive manner.

Prior to project delivery, a complaint could be related to lack of community consultation, design of the project, lack of project progress, etc.

During project delivery, a complaint is defined as in regard to construction impacts – such as – safety, dust, noise, traffic, congestion, loss of parking, contamination, loss of amenity, hours of work, property damage, property access, service disruption, conduct or behaviour of construction workers, other environmental impacts, unplanned or uncommunicated disruption to the school.

As per our planning approval conditions, a complaints register is updated monthly and is publicly available on the project's website page on the SINSW website. The complaints register will record the number of complaints received, the nature of the complaints and how the complaint was resolved.

5.4.2 Complaints management process

If SINSW receives a complaint about the project during construction, it must be logged in our CRM system, actively managed, closed out and resolved by SINSW within 24-48 hours of receipt by the SINSW Community Engagement Manager, as outlined in Table 6 below. If this is not possible, the complaint must be escalated internally as required and resolved within 7 business days.

Complaints received via the following channels will be directed to the SINSW Community Engagement Manager for resolution:

- Phone: 1300 482 651 (24 hour toll free number)
- Email: schoolinfrastructure@det.nsw.edu.au
- Postal address: GPO Box 33, Sydney, NSW 2001
- Face to face
- School executive
- Project team

If the complainant is not satisfied with the SINSW response, and they approach SINSW for rectification, the process will involve a secondary review of their complaint as per the outlined process.

Complaints will be escalated when:

- An activity generates three complaints within a 24-hour period (separate complainants).
- Any construction site receives three different complaints within a 24-hour period.
- A single complainant reports three or more complaints within a three day period.
- A complainant threatens to escalate their issue to the media or government representative.
- The complaint was avoidable.
- The complaint relates to a compliance matter.

Complaints will be first escalated to the Senior Manager, Community and Engagement or Director of Communications for SINSW as the designated complaints handling management representatives for our projects. Further escalation will be made to the Executive Director, Office of the Chief Executive to mediate if required.

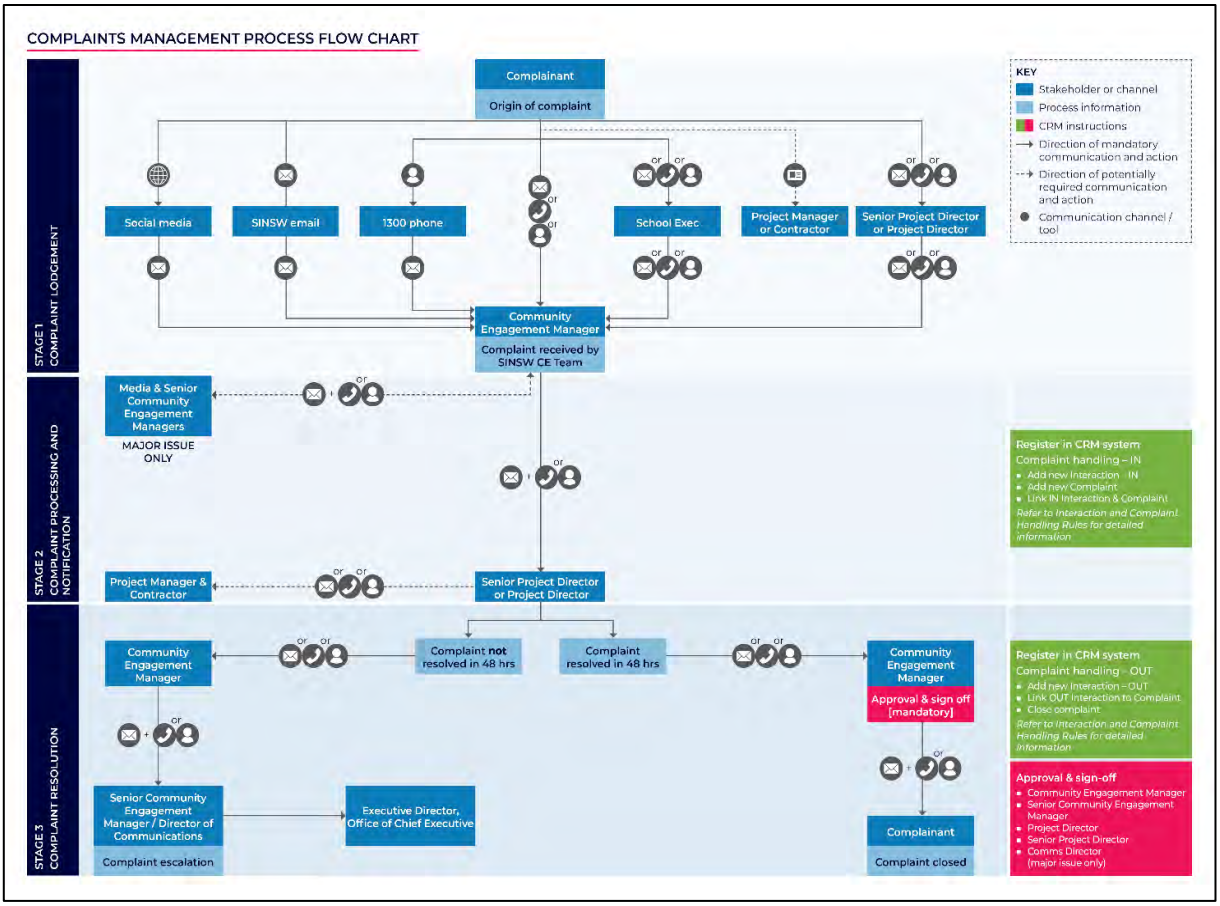
- If a complaint still cannot be resolved by SINSW to the satisfaction of the complainant, we will advise them to contact the NSW Ombudsman - https://www.ombo.nsw.gov.au/complaints.

The below table summarises timeframes for responding to enquiries and complaints, through each correspondence method:

Table 20 Recommended Respite Periods

Complaint	Acknowledgement times	Response time
Phone call during business hours	At time of call – and agree with caller estimated timeframe for resolution.	Complaint to be closed out within 48 hours. If not possible, continue contact, escalate as required and resolve within 7 business days.
Phone call after hours*	Within two (2) hours of receiving message upon returning to office.	Following acknowledgement, complaint to be closed out within 48 hours. If not possible, continue contact, escalate as required and resolve within 7 business days.
Email during business hours	At time of email (automatic response)	Complaint to be closed out within 48 hours. If not possible, continue contact, escalate internally as required and resolve within 7 business days.
Email outside of business hours	At time of email (automatic response)	Complaint to be closed out within 48 hours (once return to business hours). If not possible, continue contact, escalate internally as required and resolve within 7 business days.
Letter	NA	Complaint to be closed out within 48 hours following receipt. If phone or email contact details are not provided a written response to be sent within 48 hours following receipt. If not possible, continue contact, escalate internally as required and resolve within 7 business days.
Interaction/ Enquiry		
Phone call during business hours	At time of call – and agree with caller estimated timeframe for response.	Interaction to be logged and closed out within 7 business days.
Phone call after hours	Within two (2) hours of receiving message upon returning to office.	Interaction to be logged and closed out within 7 business days.
Email during business hours	At time of email (automatic response)	Interaction to be logged and closed out within 7 business days.
Email outside of business hours	At time of email (automatic response)	Interaction to be logged and closed out within 7 business days.
Letter	N/A	Interaction to be logged and closed out within 10 business days following receipt.

The below diagram outlines our internal process for managing complaints.



5.4.3 Complaints in common community languages

Complaints can be made in common community languages using the Translating and Interpreting Service (TIS), managed by the Department of Home Affairs. Community members can be connected to an interpreter by calling TIS on 131 450. TIS contact details are included on all project communications. Once TIS has the interpreter on the line, the interpreter and community member are connected to School Infrastructure and phone interpretation can begin. School Infrastructure NSW receives the complaint via the translator and begins the complaints management process as outlined above.

5.4.4 Community Notifications

Prior to the works onsite being undertaken, it is recommended that community consultation with the neighbouring affected parties be undertaken. These include:

Receiver 1: 3, 5, 7 and 9 Peach Tree Road Macquarie Park.

Receiver 2: Ivanhoe Estate, site B3.

Receiver 3: Ivanhoe Estate, site C3.

Receiver 4: Ivanhoe Estate, site C1.

Receiver 5: Ivanhoe Estate, site B1.2.

The communication, however, should not be limited to the beginning of the onsite works but throughout, providing the community with constant updates on the progress and upcoming works. In our experience these could include:

- Project website.
- Email notifications; and
- Letterbox drops.

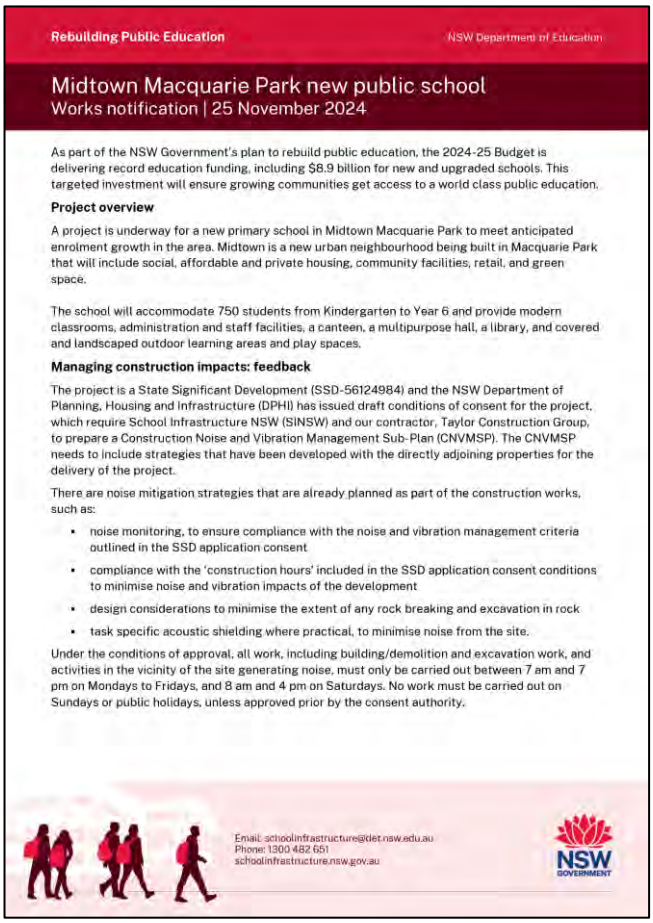
5.4.5 Community Engagement (Condition *B38*(i))

In addressing the requirement for the community consultation when formulating onsite noise and vibration mitigation measures in accordance with Condition B38(i) we note the following:

- Condition B38(i) reads:

  > *Condition* B38(i) – "*include strategies that have been developed in consultation with the directly adjoining properties for managing vibration such as any alternative construction methods with lower source vibration levels and provision for respite periods.*"

- SINSW prepared and issued the following letter which was distributed to nearby/adjacent residential properties around the site via a letter box drop. This letter (see below) was distributed on the 25th November 2024.



Rebuilding Public Education — NSW Department of Education

Midtown Macquarie Park new public school
Works notification | 25 November 2024

As part of the NSW Government's plan to rebuild public education, the 2024-25 Budget is delivering record education funding, including $8.9 billion for new and upgraded schools. This targeted investment will ensure growing communities get access to a world class public education.

Project overview

A project is underway for a new primary school in Midtown Macquarie Park to meet anticipated enrolment growth in the area. Midtown is a new urban neighbourhood being built in Macquarie Park that will include social, affordable and private housing, community facilities, retail, and green space.

The school will accommodate 750 students from Kindergarten to Year 6 and provide modern classrooms, administration and staff facilities, a canteen, a multipurpose hall, a library, and covered and landscaped outdoor learning areas and play spaces.

Managing construction impacts: feedback

The project is a State Significant Development (SSD-56124984) and the NSW Department of Planning, Housing and Infrastructure (DPHI) has issued draft conditions of consent for the project, which require School Infrastructure NSW (SINSW) and our contractor, Taylor Construction Group, to prepare a Construction Noise and Vibration Management Sub-Plan (CNVMSP). The CNVMSP needs to include strategies that have been developed with the directly adjoining properties for the delivery of the project.

There are noise mitigation strategies that are already planned as part of the construction works, such as:

- noise monitoring, to ensure compliance with the noise and vibration management criteria outlined in the SSD application consent
- compliance with the 'construction hours' included in the SSD application consent conditions to minimise noise and vibration impacts of the development
- design considerations to minimise the extent of any rock breaking and excavation in rock
- task specific acoustic shielding where practical, to minimise noise from the site.

Under the conditions of approval, all work, including building/demolition and excavation work, and activities in the vicinity of the site generating noise, must only be carried out between 7 am and 7 pm on Mondays to Fridays, and 8 am and 4 pm on Saturdays. No work must be carried out on Sundays or public holidays, unless approved prior by the consent authority.

Email: schoolinfrastructure@det.nsw.edu.au
Phone: 1300 482 651
schoolinfrastructure.nsw.gov.au

NSW GOVERNMENT

Rebuilding Public Education — NSW Department of Education

The conditions also provide construction noise limits such as restricting construction vehicles arrival times to site to within work hours only and limitations on the extent of continuous high noise impact works which can be undertaken across a day.

If you would like to contribute any recommendations or strategies that you feel would be beneficial and feasible for the project to implement, please contact us on the below contact information by Monday 9 December 2024.

Email: schoolinfrastructure@det.nsw.edu.au
Phone: 1300 482 651

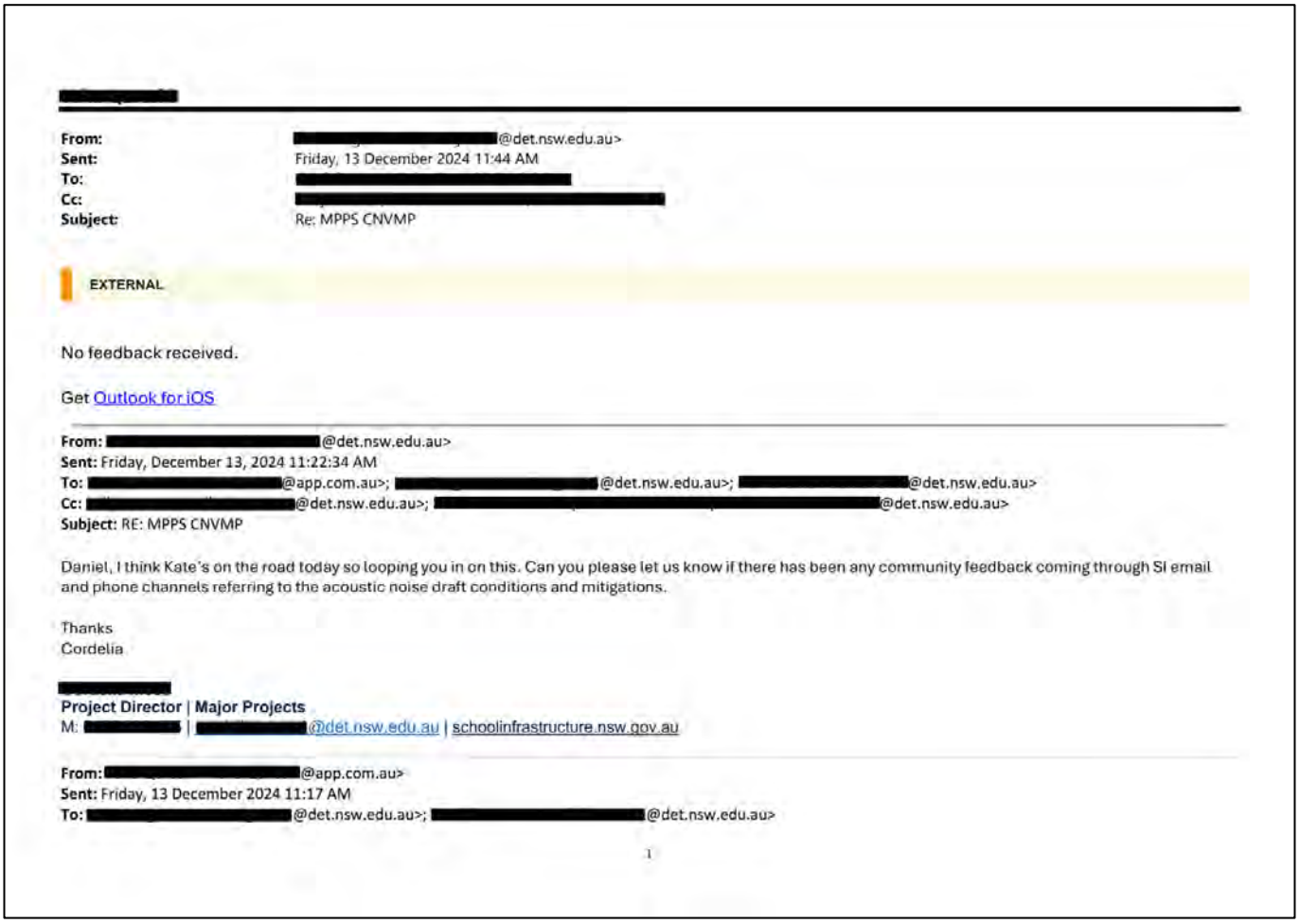
More information

You can find more information about the project at edu.nsw.link/MacquarieParkNPS or by scanning the QR code.

Email: schoolinfrastructure@det.nsw.edu.au
Phone: 1300 482 651
schoolinfrastructure.nsw.gov.au

NSW GOVERNMENT

- No community responses were received in response to the letter box drop. See below.



[redacted]

From: [redacted]@det.nsw.edu.au>
Sent: Friday, 13 December 2024 11:44 AM
To: [redacted]
Cc: [redacted]
Subject: Re: MPPS CNVMP

EXTERNAL

No feedback received.

Get Outlook for iOS

From: [redacted]@det.nsw.edu.au>
Sent: Friday, December 13, 2024 11:22:34 AM
To: [redacted]@app.com.au>; [redacted]@det.nsw.edu.au>; [redacted]@det.nsw.edu.au>
Cc: [redacted]@det.nsw.edu.au>; [redacted]@det.nsw.edu.au>
Subject: RE: MPPS CNVMP

Daniel, I think Kate's on the road today so looping you in on this. Can you please let us know if there has been any community feedback coming through SI email and phone channels referring to the acoustic noise draft conditions and mitigations.

Thanks
Cordelia

[redacted]
Project Director | Major Projects
M: [redacted] | [redacted]@det.nsw.edu.au | schoolinfrastructure.nsw.gov.au

From: [redacted]@app.com.au>
Sent: Friday, 13 December 2024 11:17 AM
To: [redacted]@det.nsw.edu.au>; [redacted]@det.nsw.edu.au>

1

- Based on no responses been received, no further additional mitigation measures were development with the Community.
- Notwithstanding above, Condition B38(i) is satisfied.

5.5 Compliance with the CNVMSP

In accordance with Condition B38(g) the following procedures are required to be implemented to ensure all works onsite are being undertaken in accordance with the acoustic mitigation measures as detailed in this plan (i.e. CNVMSP):

- Contractor's site management team are to ensure all respite periods are being followed in accordance with the consent. Any non-compliances are to be documented and fully investigated.
- Regular site walks by contractors team are to be undertaken to ensure all possible acoustic mitigation measures are implemented (i.e. acoustic barriers, noise suppressors, etc).
- Results from any noise and vibration monitoring are to be reviewed by the project Acoustic Consultant to verify if any additional acoustic mitigation measures are to be implemented.

- All results from any investigations undertaken as a result of a received noise and or vibration compliant are to be documented and provided to project team.

5.6 Contingency Plans

Contingency plans are required to address noise or vibration problems if excessive levels are measured at surrounding sensitive receivers and/or if justified complaints occur. Such plans include:

- Stop the onsite works.
- Identify the source of the main equipment within specific areas of the site which is producing the most construction noise and vibration at the sensitive receivers; and
- Review the identified equipment and determine if an alternate piece of equipment can be used or the process can be altered.
- In the event an alternate piece of equipment or process can be used, works can re-commence.
- In the event an alternate piece of equipment or process cannot be determined implement a construction assessment to be performed by a suitably qualified acoustic consultant.

The Superintendent shall have access to view the Contractor's noise measurement records on request. The Superintendent may undertake noise monitoring if and when required.

5.7 General Mitigation Measures (Australia Standard 2436-2010)

As well as the above project specific noise mitigation controls, AS 2436-2010 "Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites" sets out numerous practical recommendations to assist in mitigating construction noise emissions. Examples of strategies that could be implemented on the subject project are listed below, including the typical noise reduction achieved, where applicable.

5.7.1 Adoption of Universal Work Practices

- Regular reinforcement (such as at toolbox talks) of the need to minimise noise and vibration.
- Regular identification of noisy activities and adoption of improvement techniques.
- Avoiding the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon nearby sensitive receivers.
- Where possible, avoiding the use of equipment that generates impulsive noise.
- Minimising the need for vehicle reversing for example (particularly at night), by arranging for one-way site traffic routes.
- Use of broadband audible alarms on vehicles and elevating work platforms used on site.
- Minimising the movement of materials and plant and unnecessary metal-on-metal contact.
- Minimising truck movements.

5.7.2 Plant and Equipment

- Choosing quieter plant and equipment based on the optimal power and size to most efficiently perform the required tasks.
- Selecting plant and equipment with low vibration generation characteristics, where feasible.
- Operating plant and equipment in the quietest and most efficient manner.

5.7.3 On Site Noise Mitigation

- Maximising the distance between noise activities and noise sensitive land uses.
- Installing purpose-built noise barriers, acoustic sheds and enclosures around static plant.

5.7.4 Work Scheduling

- Providing respite periods which could include restricting very noisy activities to time periods that least affect the nearby noise sensitive locations, restricting the number of nights that after-hours work is conducted near residences or by determining any specific requirements.
- Scheduling work to coincide with non-sensitive periods.
- Planning deliveries and access to the site to occur quietly and efficiently and organising parking only within designated areas located away from the sensitive receivers.
- Optimising the number of deliveries to the site by amalgamating loads where possible and scheduling arrivals within designated hours.
- Including contract conditions that include penalties for non-compliance with reasonable instructions by the principal to minimise noise or arrange suitable scheduling.

5.7.5 Source Noise Control Strategies

Some ways of controlling noise at the source are:

- Where reasonably practical, noisy plant or processes should be replaced by less noisy alternatives.
- Modify existing equipment: Engines and exhausts are typically the dominant noise sources on mobile plant such as cranes, graders, excavators, trucks, etc. In order to minimise noise emissions, residential grade mufflers should be fitted on all mobile plant utilised on site.
- Siting of equipment: locating noisy equipment behind structures that act as barriers, or at the greatest distance from the noise-sensitive area; or orienting the equipment so that noise emissions are directed away from any sensitive areas, to achieve the maximum attenuation of noise.
- Regular and effective maintenance.

5.7.6 Miscellaneous Comments

- Deliveries should be undertaken, where possible, during standard construction hours.

- Maximise hammer penetration (and reduce blows) by using sharp hammer tips. Keep stocks of sharp profiles at site and monitor the profiles in use.

- The use of "quackers" could be used to ensure noise impacts on surrounding noise sensitive receivers are minimised. This will not be implemented where it is deemed the use of quackers (as opposed to standard vehicle notification devices) would compromise the safety of construction staff or members of the public.

- No public address system should be used on site (except for emergency purposes).

6 CONCLUSION

Pulse White Noise Acoustics (PWNA) has been engaged by Taylor Construction Group (TCG) to prepare a site-specific Construction Noise and Vibration Management Sub-Plan (CNVMSP) for the construction of the new Midtown Macquarie Park Public School (MMPPS) to be constructed at Lot 24 in the staged subdivision of parent allotment Lot 100 DP 1262209 and is currently legally known as Lot 13 DP 1271599.

This CNVMSP has been prepared to satisfy the requirements of Condition B38 of the Consent given in the Notice of Determination – Approval issued for Development Application No. SSD 56124984, dated 12th December 2024.

An assessment of noise and vibration impacts from the required processes to be undertaken during the construction period of the project (including excavation and construction) has been undertaken and suitable treatments, management controls, perioding measurements and community engagement has been detailed in this report.

Providing the recommendations in this report are included in the construction of the site, compliance with the relevant EPA's Interim Construction Noise Guideline Objectives and condition B38 of the projects *Conditions of Consent* can be achieved.

For any additional information please do not hesitate to contact the person below.

Regards

Matthew Furlong
Principal Acoustic Engineer
Pulse White Noise Acoustics
AAS Member and AAAC Member Firm

APPENDIX A. APPENDIX A. ACOUSTIC TERMINOLOGY

The following is a brief description of the acoustic terminology used in this report:

Ambient Sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Audible Range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.
Character, acoustic	The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. The following are examples of the decibel readings of every day sounds; 0dB the faintest sound we can hear 30dB a quiet library or in a quiet location in the country 45dB typical office space. Ambience in the city at night 60dB Martin Place at lunch time 70dB the sound of a car passing on the street 80dB loud music played at home 90dB the sound of a truck passing on the street 100dB the sound of a rock band 115dB limit of sound permitted in industry 120dB deafening
dB(A)	*A-weighted decibels* The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.
Frequency	Frequency is synonymous to *pitch*. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on
LMax	The maximum sound pressure level measured over a given period.
LMin	The minimum sound pressure level measured over a given period.
L1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L10	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L90	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L_{90} noise level expressed in units of dB(A).
Leq	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
dB (A)	'A' Weighted overall sound pressure level
Sound Pressure Level, LP dB	A measurement obtained directly using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the rms sound pressure to the reference sound pressure of 20 micro Pascals.

Sound Power Level, Lw dB	Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power levels is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picoWatt

APPENDIX B. NOISE AND VIBRATION INVESTIGATION CHECKLIST

Midtown Macquarie Park Public School – Noise & Vibration Investigation Checklist

Pulse White Noise Acoustics (PWNA) and Taylor Construction Group (TCG) have prepared the following noise and vibration investigation checklist to assist the onsite construction team in investigation any received noise and vibration complaint or identifying an exceedance over the management levels. Th is checklist should be completed in conjunction with the *Midtown Macquarie Park Public School – Construction Noise Vibration Management Sub-Plan* prepared by PWNA.

Should any noise and vibration complaint be received, TCG must complete the following steps:

Exceedance/Complaint Information

Complaint reference number:..... .....

Date Received: .....

Location of Complaint: .....

Complainant Contact Details:.....

Step	Task	Completed Response
1	Pause onsite works	
2	Identify the main source(s) construction noise and/or vibration within specific areas of the site which is impacting the most at the sensitive receiver.	
3	Review the identified equipment and determine if an alternate piece of equipment can be used or the process can be altered. ***(If no, skip to step 5)***	
4	In the event an alternate piece of equipment or process can be used, works can re-commence incorporating possible and practical mitigation measures.	
5	In the event an alternate piece of equipment or process cannot be determined implement a construction assessment to be performed by a suitably qualified acoustic consultant. This may include additional respite periods.	

APPENDIX C. AUTHOR CURRICLULUM VITAE (CV)

MATTHEW FURLONG

Principal Acoustic Engineer

Qualifications

Bachelor of Creative Technology (Audio Engineering and Sound Production)

Member of the Australian Acoustical Society (AAS)

Matthew Furlong has 10 years' experience in delivering acoustic design on architectural, environmental and infrastructure projects, including conceptual, detailed design, construction, and post-construction stages.

He has consulted for mixed use of education, health commercial and residential developments, developing in-principal recommendations for the client, and managing contractor providing detailed design advice as well as full construction services.

Selected Project Experience

Commercial

- Development Application, Acoustic Design and Construction Services Winston Hills Mall Enabling Works.
- Development Application and Acoustic Design 210-220 George Street Sydney.
- Acoustic Design and Construction Services 151 Clarence Street, Sydney.
- Development Application for 390-396 Pitt Street, Haymarket.
- Acoustic Design and Construction Services Chifley Plaza Internal Works.
- Development Application 371-375 Pitt Street, Sydney.
- Construction Services Fitout of the Department of Premier and Cabinets.
- Noise Investigations for Transport NSW (Chatswood and Burwood).
- Schematic Design for Western Sydney Airport – Nancy Warbird (WSA).
- Schematic Design, Detailed Design, Tender, IFC, Construction Johnson Winter Slattery (JWS) Sydney Office Fitout.
- Schematic Design, Detailed Design, Tender, IFC, Construction UHY Haines Norton Sydney Office Fitout.

Residential

- Acoustic Design for Crown Casino Sydney.
- Acoustic Design and Construction Services 130 Elizabeth Street, Sydney (One30Hyde).
- Acoustic Design and Construction Services Trinity Terraces Rosebery.
- Construction Services 1a Coulson Street, Erskinville.
- Construction Services for the Erko Apartments Erskinville.
- Construction Services for the Eve Apartments Erskinville.
- Acoustic Design 54-56 Riley Street and 1 Crown Lane, Darlinghurst.
- Development Application, Acoustic Design and Construction Services New Life Darling Harbour, 495 Harris Street, Ultimo.

PULSE WHITE NOISE ACOUSTICS Level 5, 73 Miller Street, North Sydney NSW 2060
P 1800 4 PULSE (1800 478 573) **E** info@pwna.com.au **pwna.com.au** ABN 95 642 886 306

- Development Application, Acoustic Design and Construction Services Meriton Developments (Mascot, Rosebery, Epping, Parramatta, Pagewood, Bondi, Dee Why, Zetland, Waterloo, North Sydney, Sydney, Macquarie Park).
- Development Application, Acoustic Design and Construction Services Summer Hill Flourmill Stages 1, 2, 3 and 4.
- Acoustic Design and Construction Services Macquarie Park Village.
- Acoustic Design and Construction Services Ryde Gardens.
- Acoustic Design and Construction Services Tempo Apartments Victoria Road Drummoyne.
- Development Application, Acoustic Design and Construction Services Winston Hills Mall Residential.
- Construction Services Presbyterian Aged Care Paddington.
- Acoustic Design and Construction Services Wahroonga Nursing Home.
- Acoustic Design and Construction Anglicare Castle Hill (ARV).
- Acoustic Design and Construction Cardinal Freeman Village, Ashfield.

Education

- Schematic, SSDA, Detailed Design, IFC, Construction Carlingford West Public School
- Masterplan, Concept, Schematic and SSDA Tallawong Station Public School.
- Masterplan, Concept, Schematic and SSDA Tallawong Public School.
- Schematic and SSDA Macquarie Park Public School.
- Detailed Design Neutral Bay Public School.
- SSDA, Acoustic Design, Construction and Commissioning Meadowbank Education Precinct (School + TAFE – certain elements)
- Schematic, SSDA, Detailed Design, IFC, Construction and Commissioning New Primary School in Murrumbateman
- Schematic, SSDA, Detailed Design, IFC, Construction and Commissioning New Primary School in Googong.
- Design Finalisation, IFC, Construction and Commissioning Chatswood High School.
- Design Finalisation, IFC, Construction and Commissioning Chatswood Public School.
- Schematic, Planning Pathway Hurlstone Agricultural High School.
- Schematic, Planning Pathway Yanco Agricultural High School.
- CNVMP and Construction Services Anzac Park Public School.
- CNVMP and Construction Services Alexandria Park Public School.
- Planning Pathway, Detailed Design, Tender, Design Finalisation, Commissioning Aspect Autism Schools Australia.
    - Cardiff Heights School.
    - The Gables School.
    - Corrimal School.
    - Central Coast Primary School.
    - Central Coast Secondary School.
    - Vern Barnett School.

Health Facilities

- Master Planning, Feasibility, Schematic, SSDA, Detailed Design and IFC for Sydney Children's Hospital Stage 1 & Children's Comprehensive Cancer Centre (SCH1/CCCC), Randwick.
- Formulation of the new Victorian Health Engineering Guidelines (Acoustics).
- Construction Services for Wagga Wagga Base Hospital Stage 2.
- SSDA and Acoustic Design for Concord Repatriation General Hospital.
- SSDA and Acoustic Design Nepean Public Hospital.
- CNVMP, Design Finalisation, IFC, Construction Campbelltown Hospital Redevelopment Works

Licensed Premises

- Development Application for The Cauliflower Hotel, Waterloo
- Development Application for Christopher Hanna Salon and Bar, 13-15a Bridge Street, Sydney
- Development Application for the Tilbury Hotel Woolloomooloo.
- Development Application for the Exchange Hotel, Balmain.
- Development Application for the Town Hall Hotel, Balmain.
- Development Application for the Exchange Hotel, Darlinghurst.
- Development Application for 388 George Street, Sydney.
- Development Application for 88 Pitt Street, Sydney.
- Development Application for 92 Pitt Street, Sydney.
- Development Application for Pilu Freshwater.
- Development Applications for the Redevelopment of Ibis Hotels:
    - Enfield NSW.
    - Liverpool NSW.
    - Wentworthville NSW.
    - Sydney Airport NSW.
    - St Peters NSW.
    - Olympic Park NSW.
    - Thornleigh NSW.

Industrial

- Acoustic design Erskine Park Industrial Area.
- CNVMP, Acoustic Design, IFC and Construction Snackbrands Orchard Hills.
- CNVMP, Acoustic Design, IFC and Construction Logos Moorebank (Warehouse 6 & 7).

Appendix 10 – Construction Waste Management Plan

Waste Audit GFA Consulting Group Pty Ltd
Level 21/133 Castlereagh Street Sydney, NSW 2000
Telephone (02) 9199 4521
www.wasteaudit.com.au

Midtown Macquarie Park Primary School

Construction Waste Management Sub-Plan

January 2025

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1. Introduction

This Construction Waste Management Sub-Plan (CWMSP) has been prepared by Waste Audit GFA Consulting Group Pty Ltd ('Waste Audit') on behalf of Taylor Construction Group Pty Ltd (the applicant) in support of a State Significant Development Application (SSDA) for Midtown Macquarie Park New Public School.

This Construction Waste Management Sub-Plan is intended to provide guidance on management of general waste and recyclable materials that will be generated during the demolition and construction phases of the project, and addresses current legislation, standards, guidelines and best practices and the approved SSD Conditions.

All waste management provisions, including internal bins, central storage areas, management and handling protocols, and contractor requirements, have been designed to ensure safe and sustainable management of all materials.

Storage areas have been designed to achieve compliance with general best practice requirements as regards design, sizing, and location, and will, as designed, be adequate to manage the expected types and volumes of materials that will be generated.

2. The Site

The site is legally described as Lot 13 DP 1271599:

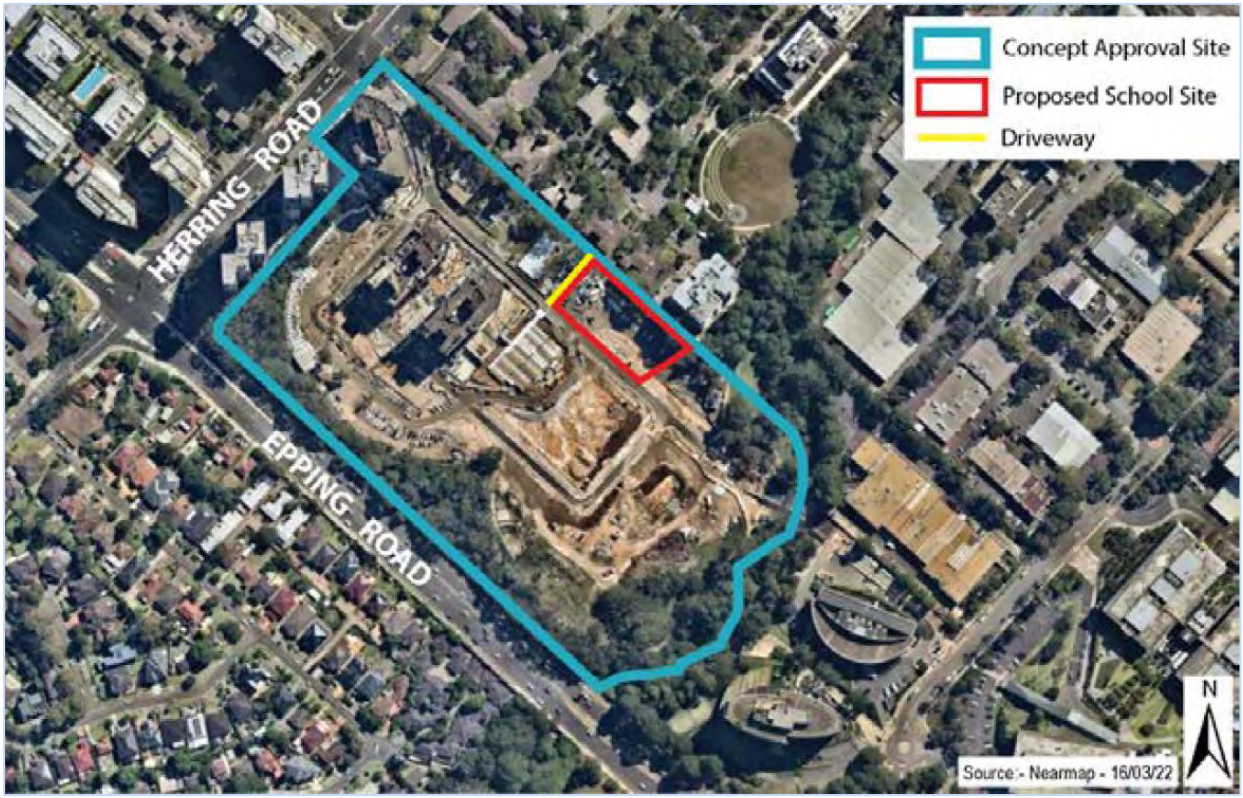

Figure 01: Site plan

3. Project Background & Objectives

3.1 Background

The school site is within Fraser's Midtown at Mac Park development (formerly Ivanhoe Estate) and is subject to a concept development approval under SSD-8707. SSD-8707 includes stamped approved plans that identify the site of the proposed development for use as a school. The development approval includes high-density residential towers, retail, community facilities and green spaces that are currently in design, planning and construction phases, including delivering a multipurpose hall and school garden for community use.
The site is currently legally known as Lot 13 DP 1271599, and is located at 10 Mahogany Ave, Macquarie Park, New South Wales, in the City of Ryde LGA.

3.2 Objectives

Midtown Macquarie Park New Public School will be a new Core 28 urban school located in the Frasers Property Australia (Frasers) 'Midtown at Mac Park' development.
The project is designed to maximise the accommodation of large teaching spaces and provide a learning hub for students in more flexible, collaborative, and larger scale spaces.
Key features of the project include:

- 33 Permanent Learning Spaces for up to 750 students
- Administration and staff facilities
- Library and Canteen
- Multi-purpose hall and covered outdoor learning area
- Outdoor play areas at ground level, on each floor of the building and rooftop
- Landscaped outdoor learning areas
- Eight (8) on-site car parking spaces
- Chamber substation
- Shared driveway
- Temporary pedestrian pathway connecting school to existing Wilga Park pathway

4. Conditions and Requirements

The preparation of this plan has been undertaken with reference to the following NSW Department of Planning, Housing and Infrastructure's SSD 56124984 conditions – B39:

Table 1. Department of Planning, Housing and Infrastructure – Conditions B39

Requirements	Report Section
(a) require that all waste generated during the project is assessed, classified and managed in accordance with the EPA's "Waste Classification Guidelines Part 1: Classifying Waste".	Appendix 1.0
(b) demonstrate that an appropriate area will be provided for the storage of bins and recycling containers and all waste and recyclable material generated by the works.	Appendix 2.0
(c) procedures for minimising the movement of waste material around the site and double handling.	Section 8.0 Section 9.0
(d) waste (including litter, debris or other matter) is not caused or permitted to enter any waterways.	Section 9.2
(e) any vehicle used to transport waste or excavation spoil from the site is covered before leaving the premises.	Section 9.2
(f) the wheels of any vehicle, trailer or mobilised plant leaving the site and cleaned of debris prior to leaving the premises.	Section 9.2

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(g) details in relation to the transport of waste material around the site (on-site) and from the site, including (at a minimum): i a traffic plan showing transport routes within the site; ii commitment to retain waste transport details for the project life to demonstrate compliance with the Protection of the Environment Operations Act 1997; and iii the name and address of each licensed facility that will receive waste from the site.	Section 9.4 Section 9.5 Appendix 2.0

5. Legislation, Standards & Guidelines

The following guidelines and standards have been used as references in compiling this Waste Management Plan:

- *Protection of the Environment Operations Act 1997*
- *Protection of the Environment Operations (Waste) Regulation 2014, Part 11*
- *Protection of the Environment (General) Operations Act 1998*
- *Waste Avoidance and Resource Recovery Act 2001*
- NSW EPA *Waste Classification Guidelines* 2014
- NSW Department of Planning and Environment, *Secretary's Environmental Assessment Requirements* (SEARs)

6. Risk Management

Current legislation determines that the generator of waste is the owner of the waste until the material crosses a weighbridge into a licensed processing or disposal facility. Waste contractors including construction contractors will be the primary transporters of waste off-site; accordingly, contractors will be required to provide monthly reports on waste reused, reprocessed or recycled, thus diverted from landfill or waste sent to landfill.

The WMP will be implemented on site throughout demolition and construction. All entries in the Waste Data File will include:

- Time and date of material removed
- Description and size of waste
- Waste facility used
- Vehicle registration and waste contractor's company details

The Waste Data File will be available for inspection to any authorized Council Officer at any time during site works. At the conclusion of site works, the designated person will retain all waste documentation and make this validating documentation available for inspection.

7. Objectives & Targets

The project's waste management objectives include:

- Meeting all waste management standards while ensuring the health and safety of the workers on the project
- Maximising the quantities of materials diverted from landfill by reusing, recycling and reprocessing off-site
- Disposal of no more than 20% of residual waste materials to a licensed landfill in accordance with both regulatory and legal requirements

Management strategies and parties responsible for ensuring these objectives are achieved are detailed in Sections 8 & 9.

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8. Site Management, Strategies & Responsibilities

The following waste management strategies for the project will operate over the design, procurement, and construction (including fit out) stages of the project.

Table 3. Roles and Responsibilities

Management Strategies	Responsibilities
Design: Use of modular components in design Use of prefabricated components in design Design for materials to standard sizes Design for operational waste minimisation	 Architect & Engineer Architect, Builder, Subcontractors Architect, Subcontractors Architect & Builder
Procurement: Select recycled and reprocessed materials Select components that can be reused after deconstruction	Architect, Engineer, Builder, Subcontractors Architect, Engineer & Builder
Pre-construction: Waste management plan to be reviewed and approved prior to construction	Builder
Construction on-site: Use the waste hierarchy principles of avoidance, reuse, reduction, and recycling Minimisation of recurring packaging materials Returning packaging to the supplier Separation and recycling of materials off site Audit and monitor the correct usage of bins Audit and monitor the Waste Contractor	Builder & Waste Contractor Sub-contractors Builder & Sub-contractor Waste Contractor Builder & Waste Contractor Builder

8.1 Site Contamination

A separate Detailed Site Investigation (Contamination) Report was prepared for Schools Infrastructure NSW by Douglas Partners Geotechnical in July 2023.

The detailed site investigation comprised a review of a previous PSI report, and intrusive soil investigation to assess the suitability of the site for the proposed Primary School development and whether further investigation and / or management of contamination is required. The analysed contaminant concentrations or arithmetic means of all soil samples tested were within the adopted SAC. Asbestos was not detected within the soil samples analysed. The fill soils in the areas of proposed works are preliminary classified as GSW (non-putrescible) with reference to NSW EPA (2014), whilst the natural soils are preliminary classified as VENM.

9. Management Practices

9.1 General Principles

The following standard waste management hierarchy principles have been used to guide this waste management plan:

Avoid: Use sound work practices during the demolition and construction processes that avoid the creation of waste products in the first place (e.g., the Design for Manufacture and Assembly (DfMA) process that combines the manufacture of building components, such as wall systems and facades, in a safe, clean and efficient factory environment, with on-site construction assembly. For details of this process please go to:

https://www.Schoolsinfrastructure.nsw.gov.au/content/infrastructure/www/what-we-do/we-build-Schools/modern-construction-methods.html

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Reduce: Reduce the use of materials during demolition that require treatment or disposal

Reuse: Ensure that wherever possible, materials are reused either on site or offsite:

- Identify and put systems in place to separate and store materials for onsite reuse
- Identify the potential applications for reuse offsite and facilitate this process

Recycle and Recover: Identify all recyclable waste products to be produced on site:

- Provide systems, bins, and signage for separating and stockpiling of recyclables
- Process the material for recycling either onsite or offsite

Treat and Dispose: Waste products which cannot be reused or recycled will be removed and treated/disposed of at appropriately licensed facilities. To minimise vehicle movements and transportation costs, bins should be monitored for fullness and collected on an efficient schedule.

9.2 Liquid Waste, Runoff and Vehicle Management

- Ensure water is used in moderation and no taps are left continuously running
- Use any grey water produced on site for irrigation or for dust suppression
- Only discharge clean water into storm water
- Manage all wastewater and runoff in accordance with Sydney Water requirements

Measures put in place to prevent unintended matter from contaminating the surrounding areas or entering the waterways through runoff in accordance with Sydney Water requirements, such as;

- Containers and bins are maintained on a regular basis to prevent any leakage
- All open backed waste vehicles leaving site with waste or spoil must be covered
- No waste is handled in the open hard stand area
- A Road sweeper sweeps all hardstand areas and accessible roads daily
- All waste tipping is conducted inside a specified and protected area
- Vehicles, including trailers and mobile plants, to have their wheels thoroughly monitored and cleaned of debris, before leaving site

9.3 Hazardous Materials Management

Should any materials be suspected of being (or containing), asbestos, the following process will be followed:

i. Treat the material as asbestos unless proven otherwise
ii. Do not disturb the material (i.e., shift or place into a container)
iii. Seek advice from a suitably qualified laboratory to test the material(s) to determine if it is or is not asbestos
iv. If determined not to be asbestos, then it can be managed as an inert waste
v. If determined to be asbestos then it must be managed by a licenced contractor for packaging, removal and disposal
vi. If the material has accidently been uncovered, then the area should be cleared, barriers erected to prevent access, NSW WorkCover and EPA notified, and if the material is broken, it should be covered with a fine spray/mist of water.
vii. Vehicle decontamination and load monitoring will be a strict requirement for vehicles entering and exiting the project site.

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For what has been conclusively identified as asbestos-containing materials (including soils), a specialist/licensed asbestos contractor will be used. As required, only workers trained in asbestos removal techniques will be allowed to manage the removal of asbestos-contaminated soil and any material contained in the buildings.
In regard to disposal of asbestos containing materials, there are regulatory requirements under Clause 42 of the *Protection of the Environment Operations (Waste) Regulation 2005* that apply to the management of asbestos waste.

9.4 Waste Reporting

On at least a quarterly basis the project applicant must be informed of:

a. Cumulative waste report generated from the monthly waste reports provided by the waste contractor over the entire duration of construction works, based upon both;
    - Waste Generated by the contractor
    - Waste Diverted by the contractor
b. The processes being used to monitor the re-use/ recycling of construction and demolition waste;
c. The quantities achieved for re-used and recycled waste.

Records will be required to be kept of all wastes and recyclables generated and either re-used on site or transported off-site – for the life of the project.

It will be a condition of appointment that all contractors provide these records and that they also contain details of the facilities that the materials are transported to. Recording and monitoring processes are further outlined below:

1. Clear separation/ tracking system for waste from site to processing facility.

    Prior to depositing materials at the site, trucks enter over the weighbridge, the truck number is registered along with *Gross, Tare and Net weights* (as the truck departs). As loads are deposited, a staff member visually analyses the load(s) and records the estimated volumes per material type. Data is reviewed that validates the process of incoming and outgoing loads for the types of accepted materials.
    The Facility has a system to record all loads entering or exiting the site.
    As materials from individual projects are recorded as to where generated and then recycled, the facility can accurately measure the percentage that is recycled. This is then generated in a report provided to the clients.

2. Certified weighbridge and operational procedures.

    A weighbridge should demonstrate that they can quantify and provide an auditable trail for weights of inbound waste as well as weights of outbound recyclables and residuals and that they can prepare accurate reports and account for all inbound waste received and all outbound waste diverted from and to landfill.
    The operating system should ensure the following information is captured:

    - Date and time are recorded for all loads arriving and departing the site.
    - Details of generating site recorded.
    - Details of facility for departing loads recorded along with tonnage.

3. Source and fate of inbound and outbound waste.

    - Documents record all details for inbound and outbound loads.
    - Reports are provided to clients detailing the volume of materials accepted, disposal and percentages recycled.

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4. Calculating Waste.

Waste will be measured in kilograms. To calculate the amount of waste diverted from landfill, the project team is required to report the total amount of waste generated and the total amount of waste diverted from landfill, and report on the proportion diverted as a percentage.

Volume to weight conversion: Waste contractors are often required to determine the weight of waste material streams from visual inspections of a load's volume for the purpose of reporting the estimated weights of material types removed from site (e.g., timber, steel, plasterboard, concrete, carpet).

Special waste and excavation waste are excluded from this requirement. However, soil generated from site clean-up works must be included in the waste-to-landfill calculations, as it forms part of the building site's general waste profile.

- Excavation waste: Includes unwanted material resulting from excavation activities such as a reduced level dig and site preparation and levelling, and the excavation of foundations, basements, tunnels, and service trenches typically consisting of soil and stones.
- Special waste: Includes asbestos waste and asbestos containing material, or other hazardous waste and restricted solid waste as defined by the NSW Environment Protection Authority Environmental Guidelines and Policies.
- Soil generated from site clean-up works: Which incorporates soil leaving the site mixed with general construction and demolition waste.

9.5 Processing Facilities

Specific disposal/recycling facilities have not yet been selected, as a waste removal contractor has not yet been appointed for the project. All contractors and sub-contractors, once appointed, will be required to detail all intended and actual disposal facilities used.

The DPHI would be notified once waste collection contractors have been approved.

Waste contractors and waste processing facilities that provide waste management and reporting services to Green Star projects must achieve independent verification of their compliance with the reporting criteria. Such verification of compliance is a prerequisite for the recognition and acceptance of the waste reports that are provided within Green Star 'Construction and Demolition Waste' credit submissions.

Table 4 – Resource recovery and disposal facilities in proximity to Macquarie Park

Facility	Location	Material Streams
Porters ECoMRF Construction Waste Recycling	162 Wicks Road, Macquarie Park	Disposal of construction materials such as concrete and asphalt. Processed recycled materials such as crushed asphalt and crushed concrete (10mm and 20mm agg).
Cleanaway Ryde Resource Recovery Centre	145 Wicks Road, Ryde	Accepts a range of solid waste from commercial, industrial, domestic customers - including wet and mixed material, tree trunks, large branches, untreated timber, and specific volumes of expanded plastics. Further, offers special recycling for pre-sorted loads of selected material such as paper and cardboard, steel and aluminium cans and scrap metals.
ECORR (ECO Resource Recovery)	155 Newton Road, Wethrill Park	ECORR recycles construction waste to create performance engineered circular construction materials and solutions for projects such as mine and quarry rehabilitation, legacy landfill redevelopment and contaminated site management with classification, handling, treatment and disposal options.

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10. Demolition Phase

The site is essentially clear, although there may be some remnant vegetation and debris that require removal before construction begins. Estimated demolition quantities in m^3 to be generated are included in the below table.

11. Construction Phase

The table below shows expected volumes of waste arising from the construction process, including materials generated from deliveries of materials, including pallets, pallet wrap, cardboard packaging, and general waste and recyclable containers disposed of by construction contractor staff.

Table 5. Construction Waste - Expected Materials Streams

Materials on Site		Destination		
Type of Material	Volume (m^3)/ Tonne	Onsite (Reuse or recycle)	Offsite (Reuse or recycle)	Disposal (Landfill)
Excavation Materials	7,500 m3	Yet to be classified as VENM. No on-site reuse or recycling	Collected by contractor and disposed of at recycling facility	No disposal to landfill
Used Pallets	15 m^3	Reused on site for storage where possible	Collected by contractor and disposed of at recycling facility	No disposal to landfill
Paper/Cardboard Recycling	10 m^3	Reuse cardboard boxes for storage where possible	Collected by contractor and taken to concrete recycling facility	No disposal to landfill
Soft Plastics (Pallet Wrap etc.)	10 m^3	Reused on site for storage where possible	Collected by contractor and disposed of at recycling facility	No disposal to landfill
Concrete (Excess)	16 m^3	No on-site reuse or recycling	Collected by contractor and taken to concrete recycling facility	No disposal to landfill
Misc. General Waste	20 m3	No on-site reuse or recycling	Collected by the waste contractor for disposal	Disposal to landfill
Timber Offcuts	10 m^3	Reuse for formwork where possible	Untreated recyclable timber will be collected and recycled at appropriate timber yard. Unrecyclable (treated) timber will be disposed of at landfill	Material that cannot be recycled will be disposed of at landfill facility
Plasterboard Offcuts	5 m3	No on-site reuse	Material to be collected by the waste contractor for recycling for use as soil improver with gypsum etc. removed by recycler	Material that cannot be recycled will be disposed of at landfill facility
Glass (Excess)	4 m^3	No on-site reuse	Recyclers consulted as to potential for recycling	No disposal to landfill
Floor Coverings	4 m^3	No on-site reuse	Collected in designated bin and sent for recycling if of required quality; otherwise sent to landfill	Material that cannot be recycled will be disposed of at landfill facility
Metal Offcuts, Roof Sheeting, Wiring, etc.	2 m^3	No on-site reuse	Collected by specialist metal subcontractor for separation into different metal types for recycling	No disposal to landfill

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Materials on Site		Destination		
Type of Material	Volume (m^3)/ Tonne	Onsite (Reuse or recycle)	Offsite (Reuse or recycle)	Disposal (Landfill)
Mixed Recyclables	10 m^3	No on-site reuse or recycling	Collected by contractor and taken to concrete recycling facility	No disposal to landfill
TOTAL VOLUME OF MATERIALS	106 m^3	In total, the development's construction phase, *not including excavation materials*, will produce around 106 cubic metres of waste materials, of which over 81% can potentially be diverted from landfill disposal, either by being reused on or off site, or recycled off-site at a specialised facility.		
POTENTIAL RECOVERY	>81%			

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Appendix 1. Classifying Waste

The EPA's Waste Classification Guidelines Part 1: Classifying Waste, classifies building and demolition waste as general solid, non-putrescible waste.

The specific waste stream in the above Table 5 is cross referenced to the waste classification guidelines, below;

EPA's Waste Classification Guidelines Part 1: Classifying Waste	
Waste Type	Classification
General solid waste (other than special waste) • glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal	General solid waste (non-putrescible) *Page 4, Waste Classification Guidelines*
The demolition, erection, construction, refurbishment or alteration of buildings; • bricks, concrete, paper, plastics, glass and metal	General solid waste (non-putrescible) *Page 5, Waste Classification Guidelines*
The demolition, erection, construction, refurbishment or alteration of buildings; • timber, including unsegregated timber, that may contain timber treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP)	General solid waste (non-putrescible) *Page 5, Waste Classification Guidelines*

This categorisation does not include excavated soil (for example, soil excavated to level off a site prior to construction or to enable foundations to be laid or infrastructure to be constructed).

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Appendix 2. Construction Site

Below are both the Site Plan and short description of the site features;

- Waste and materials are to be stored onsite.
- Storage locations will be centred behind the site office compound with access to hardstand and supporting the use of HRV.
- Vehicle access is available from several locations;
  - Lyonpark Rd via a new access bridge
  - Herring Rd to Main Street
- Both roads support heavy vehicle (HRV) access, and further, the Neighbourhood Street indicated in pink, forms a loop road to effectively enable a U-turn facility for vehicles.
- Blue shaded zones marked as ‘Loading and Logistic Zones’ are the transport routes within the site.

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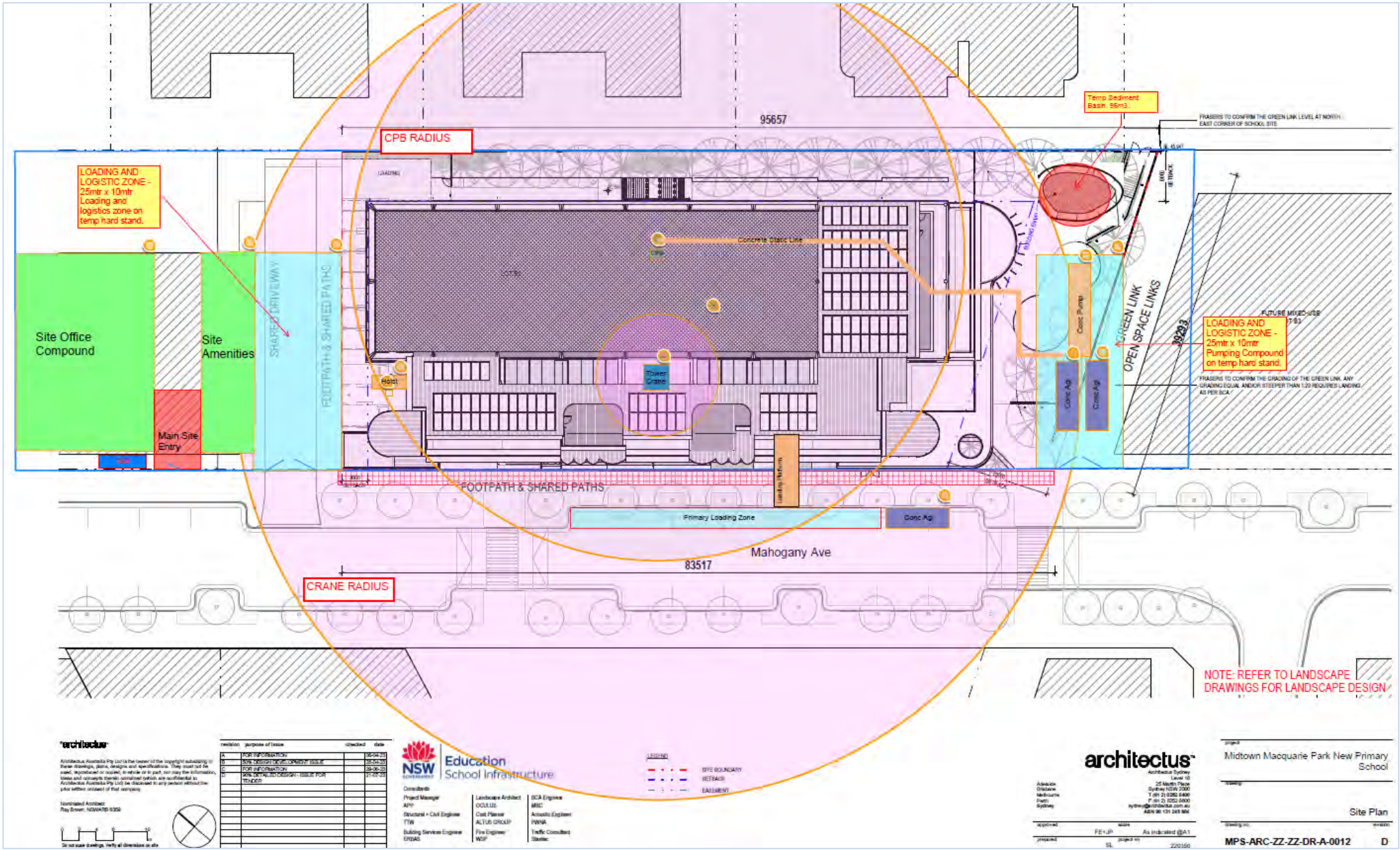
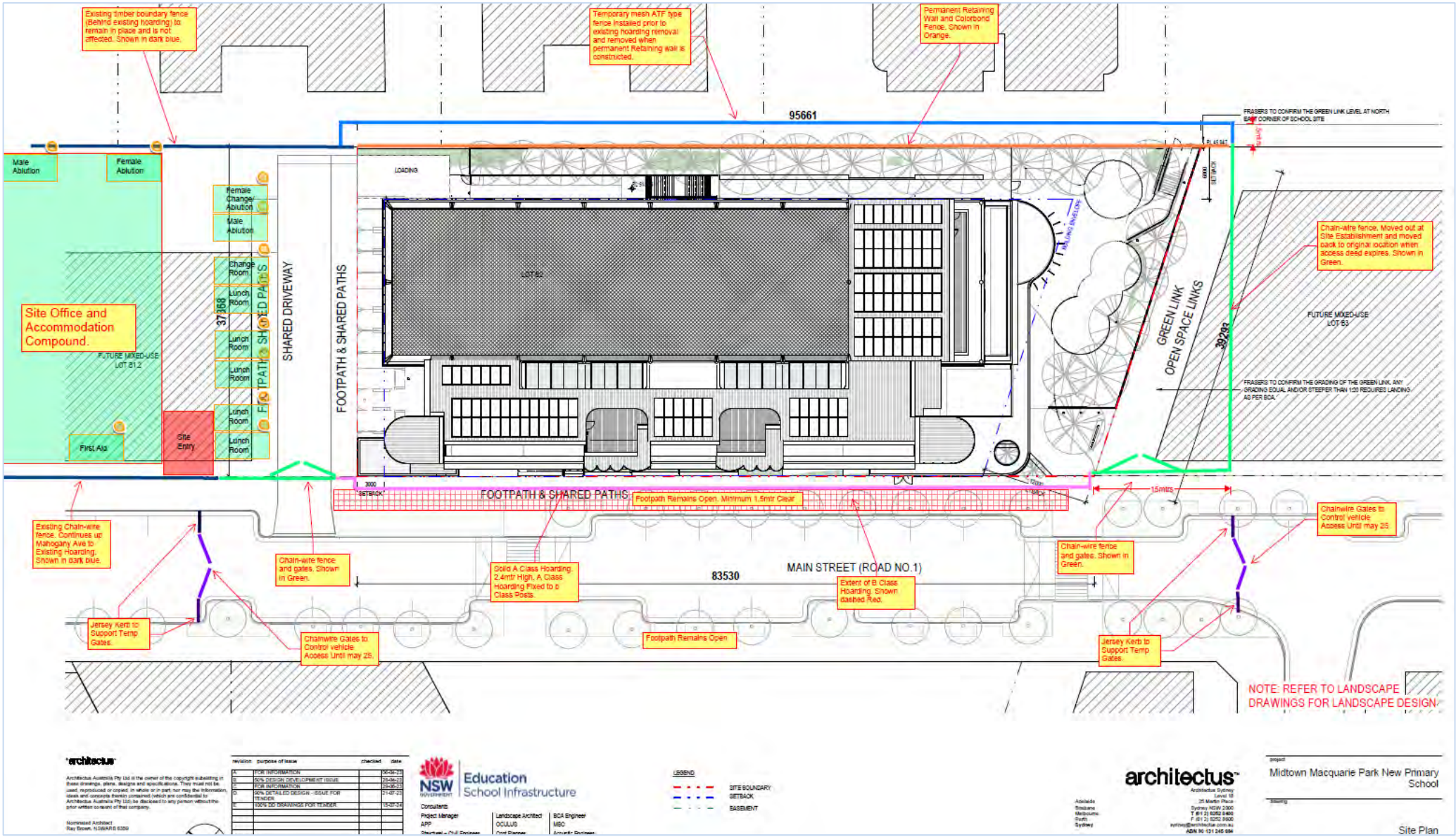

CPB RADIUS
LOADING AND LOGISTIC ZONE - 25mtr x 10mtr Loading and logistics zone on temp hard stand.
Site Office Compound
Site Amenities
Main Site Entry
SHARED DRIVEWAY
FOOTPATH & SHARED PATHS
95657
Concrete Static Line
Tower Crane
Hoist
Temp Sediment Basin. 95m3.
FRASERS TO CONFIRM THE GREEN LINK LEVEL AT NORTH EAST CORNER OF SCHOOL SITE
OPEN SPACE LINKS
GREEN LINK
LOADING AND LOGISTIC ZONE - 25mtr x 10mtr Pumping Compound on temp hard stand.
FUTURE MIXED-USE
FRASERS TO CONFIRM THE GRADING OF THE GREEN LINK. ANY GRADING EQUAL AND/OR STEEPER THAN 1:20 REQUIRES LANDING AS PER BCA
Conc Pumps
Conc Agi
FOOTPATH & SHARED PATHS
Primary Loading Zone
Mahogany Ave
83517
CRANE RADIUS
NOTE: REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN
architectus
Education
School Infrastructure
Midtown Macquarie Park New Primary School
Site Plan
MPS-ARC-ZZ-ZZ-DR-A-0012
D


Existing timber boundary fence (Behind existing hoarding) to remain in place and is not affected. Shown in dark blue.
Temporary mesh ATF type fence installed prior to existing hoarding removal and removed when permanent Retaining wall is constructed.
Permanent Retaining Wall and Colorbond Fence. Shown in Orange.
95661
FRASERS TO CONFIRM THE GREEN LINK LEVEL AT NORTH EAST CORNER OF SCHOOL SITE
Male Ablution
Female Ablution
Female Change/ Ablution
Male Ablution
Change Room
Lunch Room
Lunch Room
Lunch Room
Lunch Room
Lunch Room
Site Office and Accommodation Compound.
FUTURE MIXED-USE LOT 81,2
First Aid
Site Entry
37366
FOOTPATH & SHARED PATHS
SHARED DRIVEWAY
FOOTPATH & SHARED PATHS
LOADING
LOT 62
BUILDING ENVELOPE
GREEN LINK
OPEN SPACE LINKS
39293
FUTURE MIXED-USE LOT 63
Chain-wire fence. Moved out at Site Establishment and moved back to original location when access deed expires. Shown in Green.
FRASERS TO CONFIRM THE GRADING OF THE GREEN LINK. ANY GRADING EQUAL AND/OR STEEPER THAN 1:20 REQUIRES LANDING AS PER BCA.
3000 SETBACK
FOOTPATH & SHARED PATHS
Footpath Remains Open. Minimum 1.5mtr Clear
1.5mtrs
Existing Chain-wire fence. Continues up Mahogany Ave to Existing Hoarding. Shown in dark blue.
Chain-wire fence and gates. Shown in Green.
Solid A Class Hoarding. 2.4mtr High, A Class Hoarding Fixed to p Class Posts.
83530
MAIN STREET (ROAD NO.1)
Extent of B Class Hoarding. Shown dashed Red.
Chain-wire fence and gates. Shown in Green.
Chainwire Gates to Control vehicle Access Until may 25
Jersey Kerb to Support Temp Gates.
Chainwire Gates to Control vehicle Access Until may 25
Footpath Remains Open
Jersey Kerb to Support Temp Gates.
NOTE: REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN.
architectus
Education
School Infrastructure
LEGEND
SITE BOUNDARY
SETBACK
EASEMENT
architectus
Midtown Macquarie Park New Primary School
Site Plan

Appendix 11 – Construction Soil and Waste Management Plan

Construction Soil and Water Management Sub-Plan

SINSW Midtown Macquarie Park New Primary School

Prepared for Taylor Construction / 29 January 2025

221684 CBAB

Taylor Thomson Whitting (NSW) Pty Ltd (ACN 113 578 377)
as trustee for the Taylor Thomson Whitting NSW Trust
(ABN 59 514 956 558) I Consulting Engineers
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Your Partner in Engineering

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1.0 Background

This Construction Soil and Water Management Sub-Plan (CSWMSP) has been prepared to support a State Significant Development Application (SSDA 56124984) for the Midtown Macquarie Park Primary School (MMPPS). The associated works proposed as part of the SSDA will consist of the following:

- Construction of a six-storey educational facility including general learning spaces, common learning areas, administration and staff facilities, canteen, multi-purpose hall, library, covered outdoor learning area (COLA),
- Construction of new outdoor play areas and landscaped outdoor learning areas,
- Access to a new shared driveway outside the new school property boundary along the north-west boundary which includes access to on-site car parking spaces,
- Pedestrian pathway connecting school to existing Wilga Park
- Services infrastructure connection works.

This report has been prepared to satisfy the Planning Approval Conditions as shown in Table 1 below:

Table 1: Consent Conditions

Consent Condition Item	Document Reference
B40. Prior to the commencement of any work, the Applicant must submit to the Certifier a Construction Soil and Water Management Sub-Plan (**CSWMSP**) for the Development. The CSWMSP must be prepared by a suitably qualified expert, in Consultation with Council and include, at a minimum, the following information:	Refer to Curriculum Vitae (CV) provided in **Appendix A** and the Council consultation in **Appendix B**, pending Council's response.
a. Describe all erosion and sediment controls to be implemented during construction;	Refer to Section 6.0 and Sediment and Erosion Control Plan (SECP) in **Appendix C** for details.
b. Provide a plan of how all construction works will be managed in a wet-weather event (i.e. storage of equipment, stabilisation of the site);	Refer to Sections 4.0, 5.0, 6.0 and SECP in **Appendix C** for details.
c. Detail all off-site flows from the site during construction; and	Refer to Section 5.0 and SECP in **Appendix C** for details.
d. Describe the measures that must be implemented to manage stormwater and flood flows for small and large sized events, including, but not limited to 1 in 1-year ARI, 1 in 5-year ARI and 1 in 100-year ARI.	Refer to Section 5.0 and SECP in **Appendix C** for details.

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1.1 Reference Documents

The following documents have been reviewed and referenced in preparation of this CSWMSP:

- City of Ryde Development Control Plan (DCP) 2014.
- Blue Book – Managing Urban Stormwater Soils and Construction (4th Edition, Landcom NSW) 2004.
- Flood Statement prepared by Martens dated 18 July 2023.
- Flood Impact Assessment Report prepared by Martens dated 16 June 2023.
- Construction Environmental Management Plan (CEMP) prepared by Taylor.
- Construction Site Project Management Plan (CSMP) prepared by Taylor.
- Development Consent Conditions SSD 56124984 for Ivanhoe Estate, Macquarie Park.

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2.0 Extent of Works

MMPPS is located at 10 Mahogany Ave in Macquarie Park within the City of Ryde Council and is legally defined as Lot 29 in DP1294659.

The site is part of a wider precinct development to subdivide the lot that is approximately 8.2 hectares. Those works are being conducted concurrently and are not part of the scope of this report.

An aerial photo of the proposed school site within the context of the wider subdivision is shown below in **Figure 1**.

Figure 1 – Site Location (Source: Taylor Construction)

The extent of works is as shown in the site plan in **Appendix D**. The works will be constructed as a single stage.

3.0 Access Locations and Traffic Movements within the Worksite

Access to the site for the construction works is anticipated to be from the following:

1. The north-west end of the site for personnel access gate,
2. The north-west compound for small deliveries and bin collection,
3. The south-west end of the site for pumping of concrete, and
4. The construction zone on Mahogany Ave for large vehicles to be unloaded with the site Tower Crane.

Refer to the CSMP prepared by Taylor for further details. All vehicles will enter and exit the site in a forward direction, with direction of travel shown on the CEMP prepared by Taylor.

4.0 Site Storage and Stockpile Location

Material storage areas are located within the site as shown on the attached site plan and hoarding plan prepared by Taylor in **Appendix D**.

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Refer to Sediment and Erosion Control plan attached in **Appendix C** for indicative location of stockpile location.

5.0 Stormwater and Flooding Flows

The location of off-site stormwater flow control devices is detailed within the SECP in **Appendix C**. Connections are to be temporary and implemented during the construction stage of the works for conveyance of construction stormwater runoff.

The proposed development works area is located outside of the major flood paths for the 1 in 1-year ARI, 1 in 5-year ARI, 1 in 100-year ARI as well as the Probable Maximum Flood (PMF) floods of the Shrimptons Creek catchment as outlined in the Flood Impact Assessment Report prepared by Martens (dated 16 June 2023). Localised overland flows would be expected to be contained within the public road reserve.

6.0 Sediment and Erosion Control

A sediment and erosion control plan has been prepared for the site to prevent sediment laden stormwater from flowing into adjoining properties or receiving water bodies. Stormwater controls are detailed in the attached SECP provided in **Appendix C**. These have been prepared with reference to City of Ryde Council's Development Control Plan and Landcom NSW's Managing Urban Stormwater, Soils and Construction (Blue Book).

A sedimentation basin volume has been assessed in accordance with Landcom NSW's Managing Urban Stormwater, Soils and Construction (Blue Book) as detailed in **Appendix C**. The basin design meets the 5-day 85th percentile rainfall volume. Storm events in excess of the design event may overtop the sediment basin and will be treated by the sediment fence on the downstream side. Additional measures to be implemented to manage stormwater during construction include catch drains, hay bale sediment filters, geotextile pit filters, silt fences and sandbag sediment traps.

During wet weather events, equipment is to be moved into storage located within the site to be kept dry during the duration of the event. Equipment (including heavy machinery) are to be maintained as per their guidelines/manuals. Loose earthworks are to be stockpiled in allocated stockpile location in accordance with Taylor. This is indicatively shown in the SECP.

For site stabilisation, sediment and erosion control measures are to be kept in place as per SECP by TTW (**refer to Appendix C**).

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Prepared by
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JEMA LOPEZ
Engineer

Authorised By
TTW (NSW) PTY LTD

COLIN ROPE
Associate Director

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Appendix A

Curriculum Vitae

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Experience

2024 – Current
Associate Director, Civil, TTW

2013 – 2024
Senior Associate, Robert Bird Group

2012 – 2013
Associate Engineer, OPUS

2003 – 2012
Senior Engineer, Mott MacDonald, UK

Colin has over 20 years of experience in the delivery and management of civil engineering design projects in the UK and in Australia. Colin has a diverse portfolio of experience and is well versed in the design of stormwater infrastructure, Water Sensitive Urban Design, pavements, flooding assessment, roads and earthworks for both private and public sector civil engineering projects.

Education

Oran Park Public School Expansion
Gregory Hills Public School
Sydney University – Ross Street Teaching Hub
University of Wollongong – Molecular Horizons building
Oran Park Public School
Gosford Public School, Henry Kendal High School, Gosford

Health

Tweed Valley Hospital
Blacktown Hospital Stages 1 and 2
Mount Druitt Hospital Stage 2
Maitland Hospital
Port Macquarie Base Hospital Mental Health Expansion

Transport

Circular Quay Renewal
Sydney Metro – Site establishment and Ancillary Works
Sydney Metro (CTP) – Eastern Creek Precast Facility
Gordon Station Commuter Car Park and Interchange
Parramatta Light Rail
Sydney Light Rail
Museum Station Easy Access Upgrade
Pendle Hill Station Easy Access Upgrade
Commuter Car Parks at Kiama, Moss Vale, Gordon Oak Flats
Level Crossing Upgrades at Berry and Dapto
Cotter Road and Streeton Drive Intersection

Mixed Development

Morling College, Macquarie Park
Surry Hills Shopping Village and Residential Redevelopment
Compass Centre, Bankstown
6-12 O'Riodan Street, Green Square
Lachlan's Line, Macquarie Park
6 Hassall Street, Parramatta

Retail

Westfield Tuggerah Retail and Cinema Expansions
Westfield Kotara
Warringah Mall bus station

Residential

6-8 Phillip Street, Parramatta

Infrastructure

Wyalong Solar Farm
White Rock Wind Farm
Snowy Hydro 2.0 – Quarry Trail
HumeLink Transmission Line

Appendix B

Council Correspondence

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Jema Lopez

From: Jema Lopez
Sent: Wednesday, 29 January 2025 3:33 PM
To: Sanju Reddy
Cc: Colin Rope; Mike O'Neill; Dean Fondas; Damian Fisher; Matt Ellis
Subject: RE: Draft Construction Soil and Water Management Sub-Plan for the Proposed Midtown Macquarie Park Primary School
Attachments: MPS-TTW-ZZ-XX-DR-C-0002-P.08_250129_JL.pdf; Appendix F-Sediment Basin Calculation.pdf

Hi Sanju,

Attached is the marked-up version of the sediment and erosion control plan (SECP).
Could you kindly confirm that it addresses Council's comments as also explained in our responses below in blue?

Thank you,
Jema

From: Sanju Reddy <SanjuR@ryde.nsw.gov.au>
Sent: Wednesday, 29 January 2025 1:02 PM
To: Jema Lopez <jema.lopez@ttw.com.au>
Cc: Colin Rope <colin.rope@ttw.com.au>; Mike O'Neill <mikeo@taylorau.com.au>; Dean Fondas <deanf@taylorau.com.au>; Damian Fisher <damianf@taylorau.com.au>; Matt Ellis <matte@taylorau.com.au>; Sanju Reddy <SanjuR@ryde.nsw.gov.au>
Subject: RE: Draft Construction Soil and Water Management Sub-Plan for the Proposed Midtown Macquarie Park Primary School

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Hi Jema

The following comments is provided by Council.

There is no objection to the proposed arrangement however the amendments should include the following detail;

- *The levels of the inlet pit located inside the basin are not detailed and should obviously be elevated such that the top water level of the pit flows into the drainage system (allowing for settlement of sediment). It would be warranted to depict this detail in cross section view. The "Sedimentation Trap" detail on the plans may be appropriate. Please find attached mark-up of the SECP showing the levels in a cross-sectional detail view of the sedimentation trap.*

- *The overflow should have measures implemented on the downstream side of the basin to prevent erosion (it will have a spillway effect in an extreme storm event) as noted on the "Sedimentation Trap" and this measure should be included on the plan view for consistency. The attached mark-up shows the sandbag mound/graded rock battering at east, and consistent with the sedimentation trap detail.*

No assessment has been made as to whether the basin volume is adequate with respect to the degree of runoff and the required settlement time period. I trust this component would be addressed by the expertise of the consultant in this field and their certification on this matter. Please find attached sediment basin calculation in accordance with Landcom NSW's Managing Urban Stormwater, Soils and Construction (Blue Book).

Thank you

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From: Jema Lopez <jema.lopez@ttw.com.au>
Sent: Wednesday, 29 January 2025 9:26 AM
To: Sanju Reddy <SanjuR@ryde.nsw.gov.au>; Emily Lu <EmilyL@ryde.nsw.gov.au>
Cc: Colin Rope <colin.rope@ttw.com.au>; Mike O'Neill <mikeo@taylorau.com.au>; Dean Fondas <deanf@taylorau.com.au>; Damian Fisher <damianf@taylorau.com.au>; Matt Ellis <matte@taylorau.com.au>
Subject: RE: Draft Construction Soil and Water Management Sub-Plan for the Proposed Midtown Macquarie Park Primary School

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Good day Emily, Sanju,

I hope you're both doing well.
I wanted to follow up on the below query and kindly ask if you could provide an update or confirmation on this.

Thank you and regards,
Jema

TTW
Jema Lopez | Civil Engineer
+61 2 9439 7288 | +61 2 9067 5017 | jema.lopez@ttw.com.au
TTW Engineers | Sydney

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From: Sanju Reddy <SanjuR@ryde.nsw.gov.au>
Sent: Wednesday, 18 December 2024 1:12 PM
To: Matt Ellis <matte@taylorau.com.au>; Jema Lopez <jema.lopez@ttw.com.au>
Cc: Colin Rope <colin.rope@ttw.com.au>; Mike O'Neill <mikeo@taylorau.com.au>; Dean Fondas <deanf@taylorau.com.au>; Damian Fisher <damianf@taylorau.com.au>; Emily Lu <EmilyL@ryde.nsw.gov.au>
Subject: RE: Draft Construction Soil and Water Management Sub-Plan for the Proposed Midtown Macquarie Park Primary School

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Matt

Emily will follow up on this matter on Monday when our Senior Development Engineer returns from leave.
I have copied Emily in this email.
Thank you

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From: Matt Ellis <matte@taylorau.com.au>
Sent: Wednesday, 18 December 2024 11:13 AM
To: Sanju Reddy <SanjuR@ryde.nsw.gov.au>; Jema Lopez <jema.lopez@ttw.com.au>
Cc: Colin Rope <colin.rope@ttw.com.au>; Mike O'Neill <mikeo@taylorau.com.au>; Dean Fondas <deanf@taylorau.com.au>; Damian Fisher <damianf@taylorau.com.au>
Subject: RE: Draft Construction Soil and Water Management Sub-Plan for the Proposed Midtown Macquarie Park Primary School

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Hi Sanju,

This management plan is being finalised today, so if there is any further input, we need to know.

Regards,
Matt

Kind Regards,

Matt Ellis
Project Engineer

TAYLOR

Level 16, 100 Pacific Highway North Sydney NSW 2060
P +61 2 8736 9000 M +61 457 333 397 W **taylorau.com.au**

We acknowledge the traditional Aboriginal and Torres Strait Islander custodians of this land. We pay our respects to Elders past, present and emerging.

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From: Sanju Reddy <SanjuR@ryde.nsw.gov.au>
Sent: Wednesday, 18 December 2024 11:07 AM
To: Jema Lopez <jema.lopez@ttw.com.au>
Cc: Colin Rope <colin.rope@ttw.com.au>; Matt Ellis <matte@taylorau.com.au>; Mike O'Neill <mikeo@taylorau.com.au>
Subject: RE: Draft Construction Soil and Water Management Sub-Plan for the Proposed Midtown Macquarie Park Primary School

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Hi Jema
I am following up on this matter.
Thanks

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Acting Manager Development Advisory Service

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From: Jema Lopez <jema.lopez@ttw.com.au>
Sent: Wednesday, 18 December 2024 9:53 AM
To: Sanju Reddy <SanjuR@ryde.nsw.gov.au>
Cc: Colin Rope <colin.rope@ttw.com.au>; Matt Ellis <matte@taylorau.com.au>; Mike O'Neill <mikeo@taylorau.com.au>
Subject: RE: Draft Construction Soil and Water Management Sub-Plan for the Proposed Midtown Macquarie Park Primary School

Good day Sanju,

I hope you're having a great week.
I just wanted to check in on my earlier query and kindly ask if you or the drainage engineer could provide an update to this please.

Thank you and regards,
Jema

TTW

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+61 2 9439 7288 | +61 2 9067 5017 | jema.lopez@ttw.com.au
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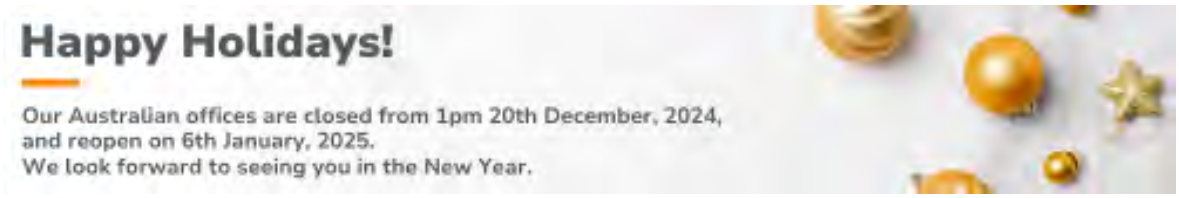

From: Jema Lopez <jema.lopez@ttw.com.au>
Sent: Friday, 13 December 2024 10:28 AM
To: Sanju Reddy <SanjuR@ryde.nsw.gov.au>
Cc: Colin Rope <colin.rope@ttw.com.au>
Subject: RE: Draft Construction Soil and Water Management Sub-Plan for the Proposed Midtown Macquarie Park Primary School

Good day Sanju,

I hope you are well and thank you for your comments. Please see below our responses in blue. Could we kindly also get a confirmation from the drainage engineer if there are any further comments on the draft CSWMSP before we make any further changes?

Very best regards,
Jema

From: Sanju Reddy <SanjuR@ryde.nsw.gov.au>
Sent: Saturday, 7 December 2024 10:50 PM
To: Jema Lopez <jema.lopez@ttw.com.au>
Cc: Colin Rope <colin.rope@ttw.com.au>; Sanju Reddy <SanjuR@ryde.nsw.gov.au>
Subject: RE: Draft Construction Soil and Water Management Sub-Plan for the Proposed Midtown Macquarie Park Primary School

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Hi Jema

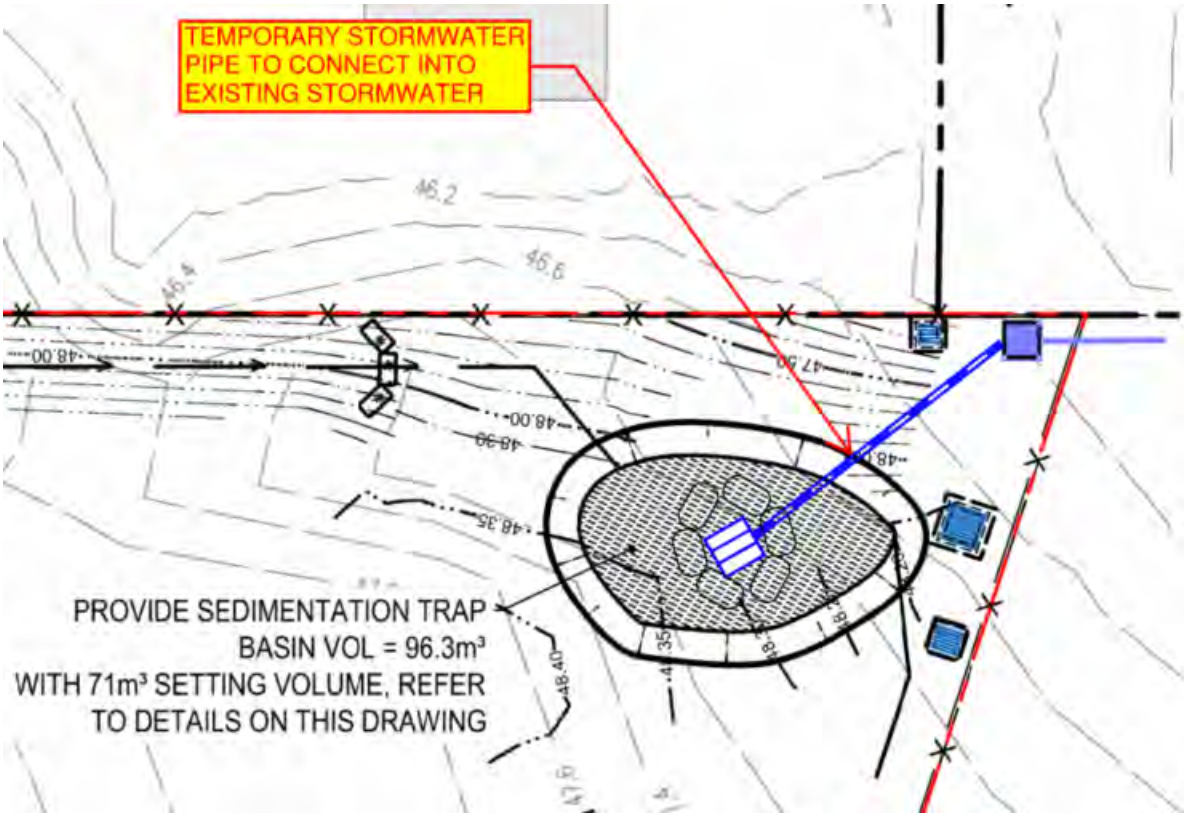
The following additional details are required;

- The condition specifies that runoff be considered for specific extreme storm events (condition B47(d)) yet there is no information in the report which specifically covers it. It is noted that Section 6.0 makes a pretty sweeping statement that additional measures will be implemented but does not go into detail in the report or the plan.

TTW Response: *The sedimentation basin has been designed in accordance with Landcom NSW's Managing Urban Stormwater, Soils and Construction (Blue Book), which meets the 5-day 85th percentile rainfall volume. Storm events in excess of the design event may overtop the sediment basin and will be treated by the sediment fence on the downstream side. Additionally, as noted in Section 5.0, the extent of works is located outside of the major flood paths for both the 1% AEP and PMF floods of the Shrimptons Creek catchment as outlined in the "Flood Impact Assessment Report" prepared by Martens (dated 16 June 2023). Localised overland flows would be expected to be contained within the public road reserve.*

- The soil erosion / sediment control plan nominates a basin however there is no further detail where the basin is to discharge to or whether there is any further treatment required following that.

TTW Response: *A pit and pipe system will be installed as depicted below, connecting to the existing stormwater network at the eastern corner (lowest point) of the site. In events where rainfall exceeds the design capacity, overflow from the sediment basin will be managed by the downstream sediment fence.*



Could you please provide the additional details. Also please note that our Drainage Engineer is coming back from leave on Monday (9 Dec). Should anything further be identified you will be informed next week.

Thank you

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From: Jema Lopez <jema.lopez@ttw.com.au>
Sent: Tuesday, 3 December 2024 2:08 PM
To: City of Ryde <CityofRyde@ryde.nsw.gov.au>
Cc: Colin Rope <colin.rope@ttw.com.au>

Subject: RE: Draft Construction Soil and Water Management Sub-Plan for the Proposed Midtown Macquarie Park Primary School

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Good afternoon Council officer,
I hope you're doing well. I just wanted to follow up on my query below and hope you can get back to me on this.
Thank you.
Very best regards,
Jema

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TTW Engineers | Sydney
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From: Jema Lopez
Sent: Monday, 11 November 2024 4:45 PM
To: cityofryde@ryde.nsw.gov.au
Subject: Draft Construction Soil and Water Management Sub-Plan for the Proposed Midtown Macquarie Park Primary School

Good afternoon Council officer,
I am in the process of preparing a Construction Soil and Water Management Sub-Plan (CSWMP) for the Midtown Macquarie Park Primary School (MMPPS) to meet the requirements of consent condition B47 for the project. I would appreciate your input and would like to consult with you for any comments or feedback. Attached is a draft of the CSWMP for your review.

CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN SUB-PLAN

B47. Prior to the commencement of any work, the Applicant must submit to the Certifier a Construction Soil and Water Management Sub-Plan (**CSWMP**) for the Development. The CSWMP must be prepared by a suitably qualified expert, in Consultation with Council and include, at a minimum, the following information:

(a) describe all erosion and sediment controls to be implemented during construction

(b) provide a plan of how all construction works will be managed in a wet-weather event (i.e. storage of equipment, stabilisation of the site);

(c) detail all off-site flows from the site during construction; and

(d) describe the measures that must be implemented to manage stormwater and flood flows for small and large sized events, including, but not limited to 1 in 1-year ARI, 1 in 5-year ARI and 1 in 100-year ARI.

If you have any concerns or would like to discuss this further, please don't hesitate to contact me.
Thank you and regards,
Jema

Appendix C

Sediment and Erosion Control Plan

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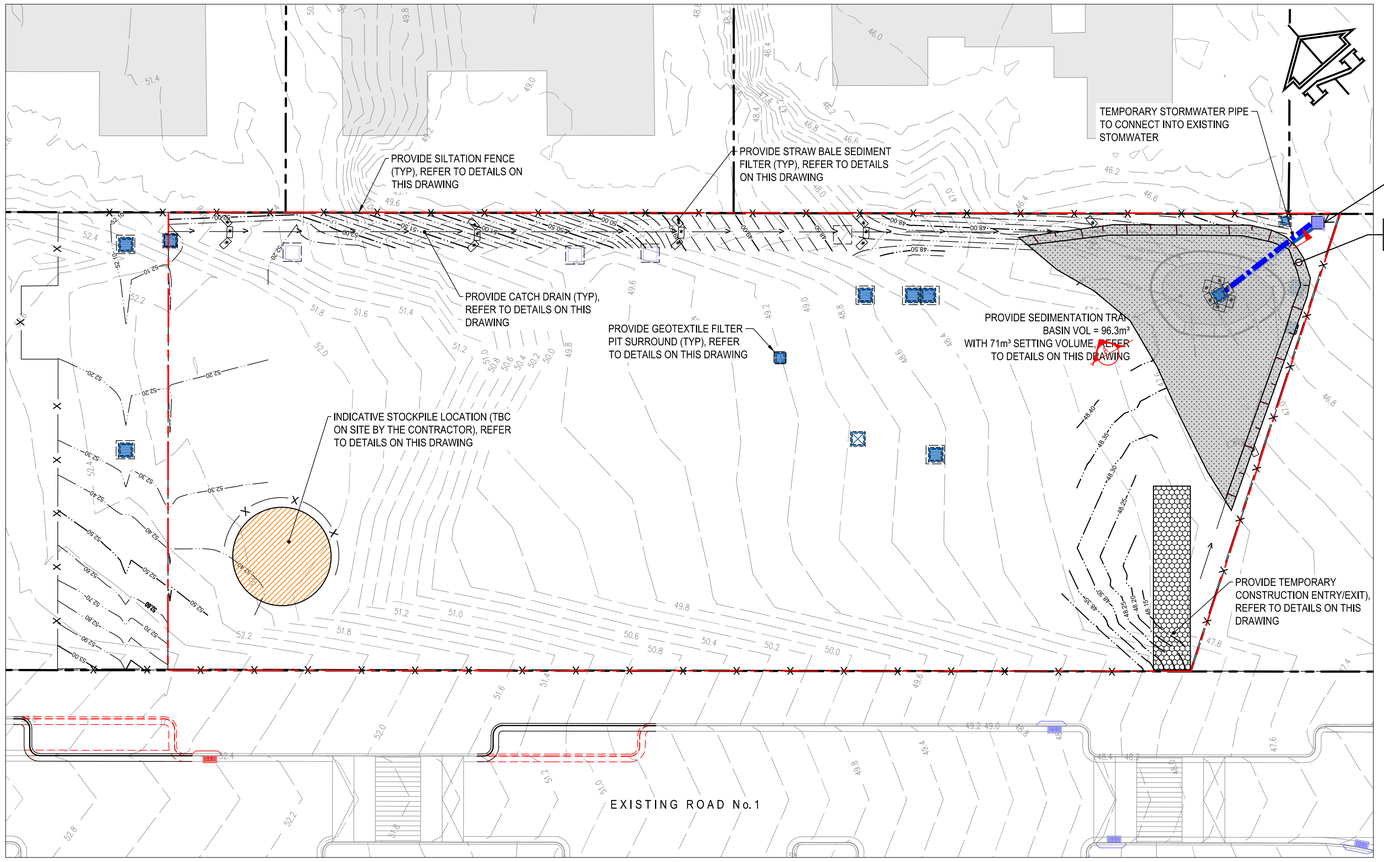
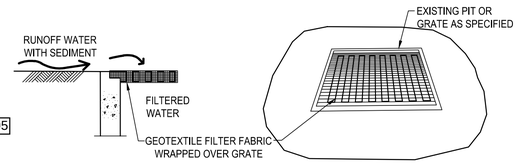
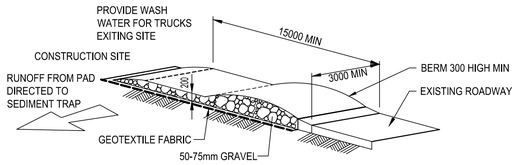
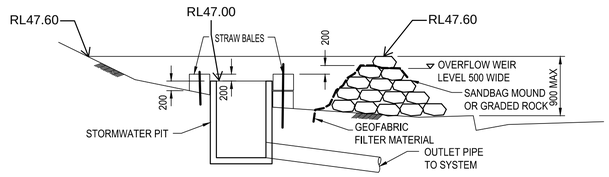




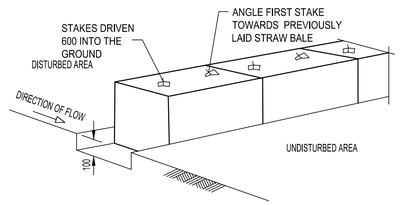
GEOTEXTILE PIT FILTER
NTS



TEMPORARY CONSTRUCTION EXIT
NTS

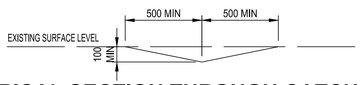


SEDIMENTATION TRAP
SECTION A NTS

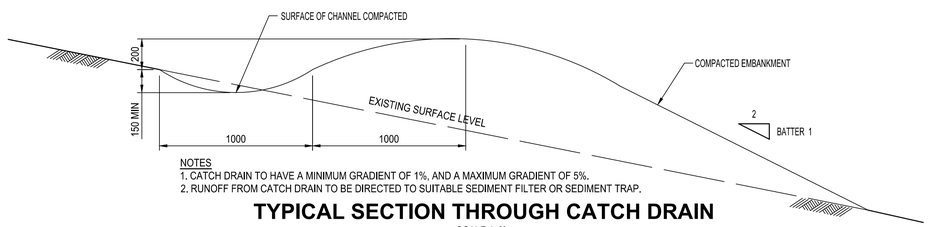


STRAW BALE SEDIMENT FILTER
NTS

NOTE: STAKE TO BE EITHER TAR COATED STAR OR 50 x 50 HARDWOOD

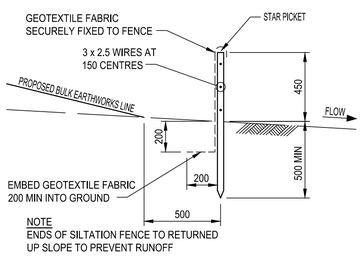


TYPICAL SECTION THROUGH CATCH DRAIN
SCALE 1: 20



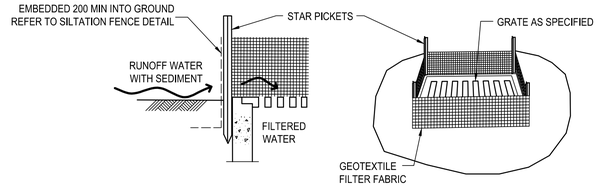
NOTES
1. CATCH DRAIN TO HAVE A MINIMUM GRADIENT OF 1%, AND A MAXIMUM GRADIENT OF 5%.
2. RUNOFF FROM CATCH DRAIN TO BE DIRECTED TO SUITABLE SEDIMENT FILTER OR SEDIMENT TRAP.

TYPICAL SECTION THROUGH CATCH DRAIN
SCALE 1: 20

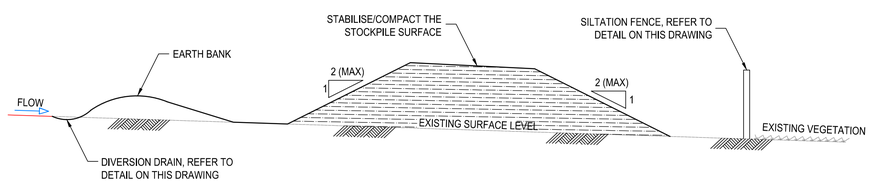


NOTE
ENDS OF SILTATION FENCE TO RETURNED UP SLOPE TO PREVENT RUNOFF

SILTATION FENCE DETAIL
SCALE 1: 20



GEOTEXTILE FILTER PIT SURROUND
NTS



STOCKPILE DETAIL
NTS

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EROSION AND SEDIMENT CONTROL NOTES

1. All work shall be generally carried out in accordance with
   (A) Local authority requirements,
   (B) EPA - Pollution control manual for urban stormwater,
   (C) LANDCOM NSW - Managing Urban Stormwater: Soils and Construction ("Blue Book").
2. Erosion and sediment control drawings and notes are provided for the whole of the works. Should the Contractor stage these works then the design may be required to be modified. Variation to these details may require approval by the relevant authorities.
   The erosion and sediment control plan shall be implemented and adapted to meet the varying situations as work on site progresses.
3. Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
4. When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
5. Minimise the area of site being disturbed at any one time.
6. Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
7. All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site conditions.
8. Control water from upstream of the site such that it does not enter the disturbed site.
9. All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
10. All vehicles leaving the site shall be cleaned and inspected before leaving.
11. Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
12. Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

1. Prior to commencement of excavation the following soil management devices must be installed.
1.1. Construct silt fences below the site and across all potential runoff sites.
1.2. Construct temporary construction entry/exit and divert runoff to suitable control systems.
1.3. Construct measures to divert upstream flows into existing stormwater system.
1.4. Construct sedimentation traps/basin including outlet control and overflow.
1.5. Construct turf lined swales.
1.6. Provide sandbag sediment traps upstream of existing pits.
2. Construct geotextile filter pit surround around all proposed pits as they are constructed.
3. On completion of pavement provide sand bag kerb inlet sediment traps around pits.
4. Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

WATER QUALITY TESTING REQUIREMENTS

Prior to discharge of site stormwater, groundwater and seepage water into council's stormwater system, contractors must undertake water quality tests in conjunction with a suitably qualified environment consultant outlining the following:

- Compliance with the criteria of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)
- If required subject to the environmental consultants advice, provide remedial measures to improve the quality of water that is to be discharged into Councils storm water drainage system.This should include comments from a suitably qualified environmental consultant confirming the suitability of these remedial measures to manage the water discharged from the site into Councils storm water drainage system. Outlining the proposed, ongoing monitoring, contingency plans and validation program that will be in place to continually monitor the quality of water discharged from this site. This should outline the frequency of water quality testing that will be undertaken by a suitably qualified environmental consultant.

EROSION AND SEDIMENT CONTROL LEGEND

- Batter
- Siltation fence
- Stormwater pit with Geotextile filter surround
- Hay bale barriers
- Sandbag sediment trap
- Catch drain
- Overland flow path

0 2.5 5 7.5 10 12.5 15 17.5 20m

1:250 A1 1:500 A3

FILENAME: Z:\jobs\22\221684\cvl\MPS-TTW-ZZ-XX-DR-C-0002.dwg - USER: jamal - Plot File Created: Dec 18, 2024 - 5:46pm

FOR CONSTRUCTION CERTIFICATE

REV	DESCRIPTION	CHK	DR	DATE
P.06	90% DETAILED DESIGN - ISSUE FOR TENDER	NB	LA	27.07.23
P.05	ISSUED FOR APPROVAL	NB	LA	25.07.23
P.04	ISSUED FOR APPROVAL	NB	LA	21.07.23
P.03	ISSUED FOR INFORMATION	NB	LA	29.06.23
P.02	ISSUED FOR 90% TENDER	NB	LA	26.06.23
P.01	ISSUED FOR 50% DD	NB	LA	09.05.23
P.08	ISSUED FOR CONSTRUCTION CERTIFICATE	CR	ES	18.12.24
P.07	ISSUED FOR CONSTRUCTION CERTIFICATE	CR	LA	23.09.24

ARCHITECT: architectus™

ENGINEER: TTW Structural Civil Traffic Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

PROJECT: **MIDTOWN MACQUARIE PARK NEW PUBLIC SCHOOL**

PROJECT NUMBER: **221684**

DRAWING NAME: SEDIMENT AND EROSION CONTROL PLAN AND DETAILS

SCALE : A1 **1:250** | DRAWN BY **LA** | AUTHORISED BY CR

DRAWING No **MPS-TTW-ZZ-XX-DR-C-0002** | REVISION **P.08**

Plot File Created: Dec 18, 2024 - 5:46pm

1. Erosion Hazard and Sediment Basins

Site Name: Midtown Macquarie Park Primary School

Site Location: 10 Mahogany Ave, Macquarie Park NSW 2113

Precinct/Stage:

Other Details:

Site area	Sub-catchment or Name of Structure						Notes
Total catchment area (ha)	0.335						
Disturbed catchment area (ha)	0.335						

Soil analysis (enter sediment type if known, or laboratory particle size data)

Sediment Type (C, F or D) if known:	D						From Appendix C (if known)
% sand (fraction 0.02 to 2.00 mm)							Enter the percentage of each soil fraction. E.g. enter 10 for 10%
% silt (fraction 0.002 to 0.02 mm)							
% clay (fraction finer than 0.002 mm)							
Dispersion percentage							E.g. enter 10 for dispersion of 10%
% of whole soil dispersible							See Section 6.3.3(e). Auto-calculated
Soil Texture Group	D						Automatic calculation from above

Rainfall data

Design rainfall depth (no of days)	5						See Section 6.3.4 and, particularly, Table 6.3 on pages 6-24 and 6-25.
Design rainfall depth (percentile)	85						
x-day, y-percentile rainfall event (mm)	33.1						
Rainfall R-factor (if known)	3500						Only need to enter one or the other here
IFD: 2-year, 6-hour storm (if known)							

RUSLE Factors

Rainfall erosivity (*R*-factor)	3500						Auto-filled from above
Soil erodibility (*K*-factor)	0.075						RUSLE LS factor calculated for a high rill/interrill ratio.
Slope length (m)	103						
Slope gradient (%)	6						
Length/gradient (*LS*-factor)	1.71						
Erosion control practice (*P*-factor)	1.3	1.3	1.3	1.3	1.3	1.3	
Ground cover (*C*-factor)	1	1	1	1	1	1	

Sediment Basin Design Criteria (for Type D/F basins only. Leave blank for Type C basins)

Storage (soil) zone design (no of months)	2	2	2	2	2	2	Minimum is generally 2 months
Cv (Volumetric runoff coefficient)	0.64						See Table F2, page F-4 in Appendix F

Calculations and Type D/F Sediment Basin Volumes

Soil loss (t/ha/yr)	584						
Soil Loss Class	5						See Table 4.2, page 4-13
Soil loss (m^3/ha/yr)	449						Conversion to cubic metres
Sediment basin storage (soil) volume (m^3)	25						See Sections 6.3.4(i) for calculations
Sediment basin settling (water) volume (m^3)	71						See Sections 6.3.4(i) for calculations
Sediment basin total volume (m^3)	96						

Appendix D

Site Plan and Hoarding Plan

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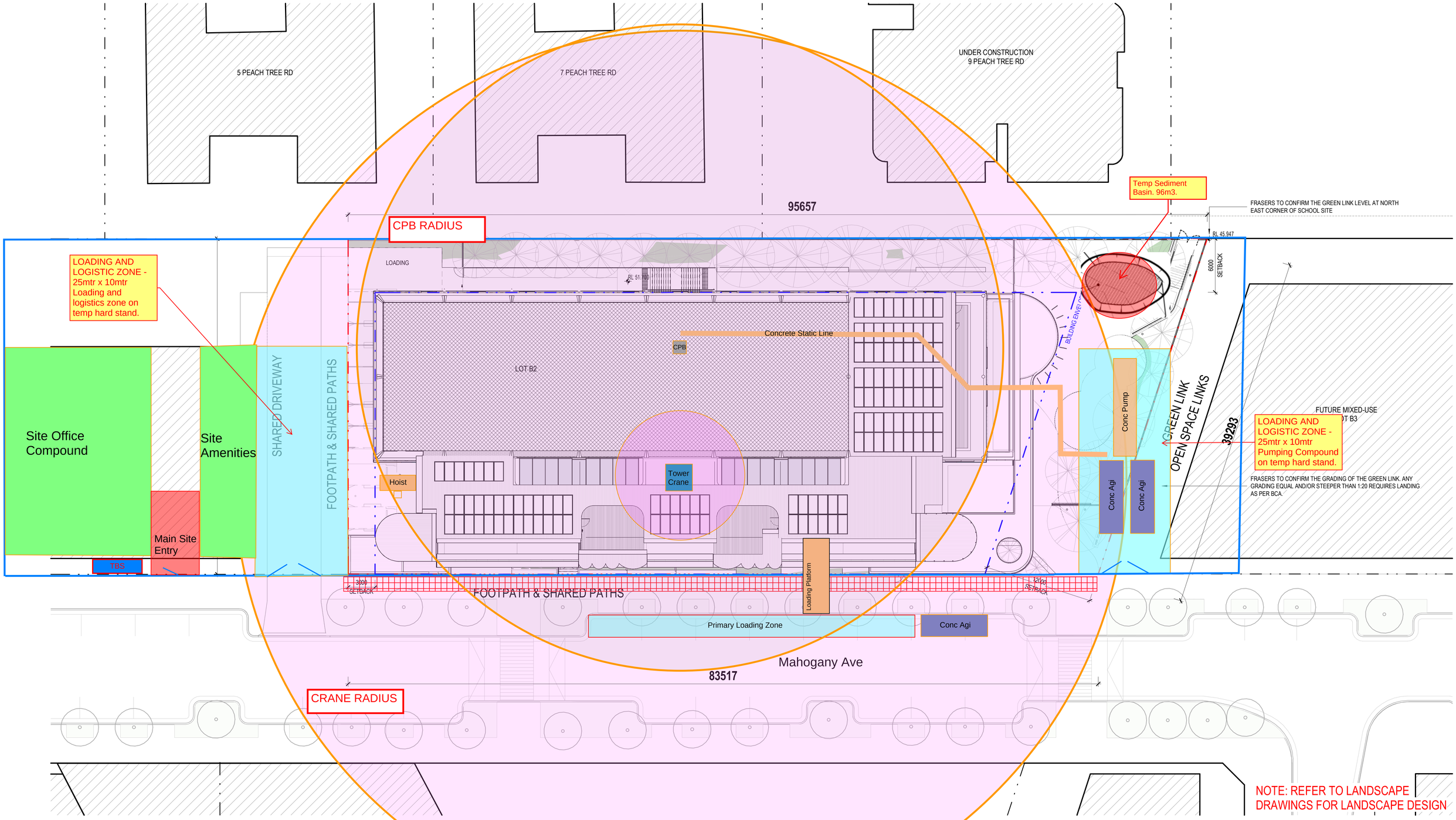

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Nominated Architect
Ray Brown, NSWARB 6359

0 2 4 6 10 m

Do not scale drawings. Verify all dimensions on site

revision	purpose of issue	checked	date
A	FOR INFORMATION		06-04-23
B	50% DESIGN DEVELOPMENT ISSUE		28-04-23
C	FOR INFORMATION		29-06-23
D	90% DETAILED DESIGN - ISSUE FOR TENDER		21-07-23

NSW GOVERNMENT Education School Infrastructure

Consultants

Project Manager APP	Landscape Architect OCULUS	BCA Engineer MBC
Structural + Civil Engineer TTW	Cost Planner ALTUS GROUP	Acoustic Engineer PWNA
Building Services Engineer ERBAS	Fire Engineer WSP	Traffic Consultant Stantec

LEGEND

- SITE BOUNDARY
- SETBACK
- EASEMENT

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Brisbane
Melbourne
Perth
Sydney

approved	scale
FE+JP	As indicated @A1
prepared	project no
SL	220350

project
Midtown Macquarie Park New Primary School

drawing
Site Plan

drawing no. **MPS-ARC-ZZ-ZZ-DR-A-0012** revision **D**

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Taylor Site Hoarding
Mark Up.
23-10-24

5 PEACH TREE RD

7 PEACH TREE RD

UNDER CONSTRUCTION
9 PEACH TREE RD

Existing timber boundary fence (Behind existing hoarding) to remain in place and is not affected. Shown in dark blue.

Temporary mesh ATF type fence installed prior to existing hoarding removal and removed when permanent Retaining wall is constructed.

Permanent Retaining Wall and Colorbond Fence. Shown in Orange.

95661

FRASERS TO CONFIRM THE GREEN LINK LEVEL AT NORTH EAST CORNER OF SCHOOL SITE

1.5mtrs

RL 45.947

6000 SETBACK

Male Ablution

Female Ablution

Female Change/ Ablution

Male Ablution

LOADING

RL 51.700

LOT B2

BUILDING ENVELOPE

Change Room

Lunch Room

Lunch Room

Lunch Room

Lunch Room

37368

FOOTPATH & SHARED PATHS

SHARED DRIVEWAY

FOOTPATH & SHARED PATHS

GREEN LINK
OPEN SPACE LINKS

39293

Chain-wire fence. Moved out at SIte Establishment and moved back to original location when access deed expires. Shown in Green.

FUTURE MIXED-USE
LOT B3

Site Office and Accommodation Compound.

FUTURE MIXED-USE
LOT B1.2

First Aid

Site Entry

FRASERS TO CONFIRM THE GRADING OF THE GREEN LINK. ANY GRADING EQUAL AND/OR STEEPER THAN 1:20 REQUIRES LANDING AS PER BCA.

3000 SETBACK

FOOTPATH & SHARED PATHS

Footpath Remains Open. Minimum 1.5mtr Clear

1200m SETBACK

15mtrs

Existing Chain-wire fence. Continues up Mahogany Ave to Existing Hoarding. Shown in dark blue.

Chain-wire fence and gates. Shown in Green.

Solid A Class Hoarding. 2.4mtr High. A Class Hoarding Fixed to b Class Posts.

83530

MAIN STREET (ROAD NO.1)

Extent of B Class Hoarding. Shown dashed Red.

Chain-wire fence and gates. Shown in Green.

Chainwire Gates to Control vehicle Access Until may 25.

Jersey Kerb to Support Temp Gates.

Chainwire Gates to Control vehicle Access Until may 25.

Footpath Remains Open

Jersey Kerb to Support Temp Gates.

NOTE: REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN

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Nominated Architect
Ray Brown, NSWARB 6359

0 2 4 6 10 m

Do not scale drawings. Verify all dimensions on site

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A	FOR INFORMATION		06-04-23
B	50% DESIGN DEVELOPMENT ISSUE		28-04-23
C	FOR INFORMATION		29-06-23
D	90% DETAILED DESIGN - ISSUE FOR TENDER		21-07-23
E	100% DD DRAWINGS FOR TENDER		15-07-24

NSW GOVERNMENT Education School Infrastructure

Consultants

Project Manager APP	Landscape Architect OCULUS	BCA Engineer MBC
Structural + Civil Engineer TTW	Cost Planner ALTUS GROUP	Acoustic Engineer PWNA
Building Services Engineer ERBAS	Fire Engineer WSP	Traffic Consultant Stantec

LEGEND

SITE BOUNDARY
SETBACK
EASEMENT

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Adelaide
Brisbane
Melbourne
Perth
Sydney

approved FE+JP
prepared SL
scale As indicated @A1
project no 220350

project
Midtown Macquarie Park New Primary School

drawing
Site Plan

drawing no. MPS-ARC-ZZ-ZZ-DR-A-0012
revision E

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Appendix 12 – Geotechnical Monitoring Plan

Douglas PARTNERS

GROUNDED EXPERTISE

Geotechnical Monitoring Plan

Midtown Macquarie Park new Primary School

Ivanhoe Estate, Macquarie Park, NSW

Prepared for Taylor Construction Group Pty Ltd

Project 216254.04

19 December 2024

Douglas Partners Pty Ltd
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Document History

Details

Project No.	216254.04
Document Title	Geotechnical Monitoring Plan
Site Address	Ivanhoe Estate, Macquarie Park, NSW
Report Prepared For	Taylor Construction Group Pty Ltd
Filename	216254.04.R.002.Rev1

Status and Review

Status	Prepared by	Reviewed by	Date issued
Draft A	Matthew Bennett	Bruce McPherson	29 November 2024
Revision 0	Matthew Bennett	Scott Easton	11 December 2024
Revision 1	Matthew Bennett	Scott Easton	19 December 2024

Distribution of Copies

Status	Issued to
Draft A	Mike O'Neill, Taylor Construction Group Pty Ltd
Revision 0	Mike O'Neill, Taylor Construction Group Pty Ltd
Revision 1	Mike O'Neill, Taylor Construction Group Pty Ltd

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

Signature		Date
Author		19 December 2024
Reviewer		19 December 2024

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

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Appendix A: About This Report

Appendix B: Drawings

Geotechnical Monitoring Plan
Midtown Macquarie Park new Primary School
Ivanhoe Estate, Macquarie Park, NSW

1. Introduction

This report prepared by Douglas Partners Pty Ltd (Douglas) outlines the geotechnical monitoring plan (GMP) for the Midtown Macquarie Park new Primary School at Ivanhoe Estate, Macquarie Park, NSW (the site). The work was commissioned by email, dated 22 November 2024 from Mike O'Neill of Taylor Construction Group Pty Ltd.

It is understood that the proposed development of the site includes the construction of a six-storey school building with a partial basement ground level, as well as construction of an on-grade car park area and landscaping. The site plan is shown on Drawing 1, Appendix B.

The proposed bulk excavation level (BEL) is RL 48.15 m AHD, which will require a maximum cut depth of about 4 m below ground level on the western portion of the site, which reduces to no cut and some areas of fill on the eastern portion of the site.

It is understood that the excavation on the western portion of the site will be supported by soldier piles with shotcrete infill panels. Temporary batters are proposed in areas with shallow cuts in the eastern portion of the site.

The GMP is based on the results of a geotechnical investigation undertaken by Douglas at the site in August 2022 (ref: 216254.00.R.001, Rev. 3, dated 30 June 2023). The investigation included four rock-cored boreholes to depths of between 6 m and 10 m, five test pits to depths of 1.5 m and the installation of four groundwater monitoring wells. An interpreted geotechnical cross-section, based on the investigation results, is shown on Drawing 2, Appendix B.

This GMP has been prepared to address Development Consent Condition B41(b) in **SSD-56124984**, as summarised in Table 1.

Table 1: Summary of Development Consent Conditions Address in this Report

Condition Number	Development Consent Condition	Relevant Section of Report
B41(b)	A Geotechnical Monitoring Sub-Plan (GMP) to be implemented during construction that:	Entire Report
	(i) is based on a geotechnical investigation of the site and subsurface conditions, including groundwater;	Entire Report
	(ii) details the location and type of monitoring systems to be utilised including those that will detect the deflection of all shoring structures, settlement and excavation induced ground vibrations to the relevant Australian Standard;	Sections 3, 4 & 5

Condition Number	Development Consent Condition		Relevant Section of Report
B41(b)	(iii)	details the recommended hold points and trigger levels of any monitoring systems, to allow for the inspection and certification of geotechnical and hydro-geological measures by the professional engineer; and	Sections 3, 4 & 5
	(iv)	details an action plan and contingency for the principal building contractor in the event these trigger levels are exceeded.	Sections 3, 4 & 5

The proposed basement footprint is located within the Ivanhoe Estate. The site is bounded by Mahogany Avenue to the south, grassed and paved areas to the east and west, and multi-storey residential apartment buildings to the north. The development to the north at 9 Peach Tree Road is understood to have a basement to an unknown depth and a multi-storey residential development has been completed to the west of the site (Ivanhoe Estate site 'C1') understood to have a basement to down to approximately RL 47 m AHD. Sites 'C2' and 'C3' to the south of the site are currently under construction with basements.

Note that this monitoring plan is a live document and may require updating as the works progress. Also note that Principal Contractor and Builder are used interchangeably and essentially mean the same entity. The term geotechnical engineer means a suitably experienced geotechnical engineer or engineering geologist.

2. Objectives

The objectives of the GMP are to provide a sequence for geotechnical and hydrogeological monitoring activities expected during excavation and construction, showing the responsible parties, as well as hold points to manage the geotechnical aspects of the construction processes.

The plan has been separated into the following three sections:

- **Geotechnical** – movement or settlement of temporary and permanent works and structures, excavation support, and adequacy of foundation materials;
- **Hydrogeological** – potential changes of the groundwater; and
- **Vibration** – vibration generated by excavation works.

The Principal Contractor for the proposed development is responsible for implementing the measures outlined in this plan. The contractor shall engage the services of suitably qualified and experienced professionals for the required monitoring activities.

3. Geotechnical Monitoring

3.1 General

The key geotechnical aspects which require monitoring on this project are as follows:

- stability of excavations;
- groundwater;
- stability of adjacent existing buildings; and
- adequacy of the foundation materials to provide support to footings.

The impact of the excavation of any adjacent structures is dependent on the stability of the proposed basement excavation. At this site, the nearest heavily loaded structures to the proposed excavation are the apartment buildings at 5 and 7 Peach Tree Road to the north, which are approximately 10 m from the proposed excavation footprint. Lightly loaded structures are located adjacent to the site, including the concrete footpath and pavement at Mahogany Avenue to the south, and paved driveways to the north at 5 and 7 Peach Tree Road.

For monitoring the stability of the excavation, survey monitoring by a registered surveyor and visual inspections by a suitably qualified and experienced geotechnical engineer will be carried out at regular intervals, as construction progresses. Following the inspections and/or review of the survey data, additional excavation support measures may be necessary.

The geotechnical engineer is to inspect the drilling of foundation piles and the excavated base of footings to confirm the bearing capacity of the rock.

3.2 Geotechnical Monitoring Procedure

The steps shown in Table 2 are recommended, with Hold Points identified where information should be provided to the structural or geotechnical engineers prior to continuing with the works.

Table 2: Summary of Geotechnical Monitoring Activities

Step	Description	Hold Point
G1. Prior to Commencement of Works		
G1.1	The Principal Contractor and any relevant subcontractors should familiarise themselves with the structural engineer's drawings, the geotechnical reports and this monitoring plan.	
G1.2	Installation of survey monitoring targets by a registered surveyor at 10 m centres at the top of the shoring walls or along the top of the perimeter of the excavation along each elevation. Baseline survey of monitoring targets before commencement of any bulk excavation works.	Hold Point
G2. During Excavation		
G2.1	Inspection of the drilling and installation of 20% (distributed evenly around site) of the shoring piles by a geotechnical engineer to check ground conditions are as per design assumptions and installation as per design.	Hold Point
G2.2	Builder to carry out daily visual inspections of the excavation crest and faces to check for any signs of ground movement/instability/loose material.	
G2.3	Survey of the monitoring targets by a registered surveyor as excavation progresses at 1.5 m depth intervals.	Hold Point
G3. After Excavation		
G3.1	Inspection of the base of the excavation at bulk level by the geotechnical engineer to assess the ground conditions prior to detailed excavation.	Hold Point

Step	Description	Hold Point
G3.2	Survey of the monitoring targets by a registered surveyor once excavation is at bulk excavation level, once basement slabs have been constructed, and one month following completion of the basement structure or after three consecutive measurements not less than a week apart showing no further movement, whichever is the later.	Hold Point
G3.3	Inspection of all foundation piles and footing excavations by a geotechnical engineer to confirm that the bearing capacity meets the requirements of the design.	Hold Point

3.3 Trigger Levels/Contingency Plans

The movement trigger levels for the shoring wall are based on an estimated wall deflection of up to 8 mm along the west elevation. The threshold levels adopted are provided in Table 3.

Table 3: Movement Trigger Levels for Shoring Wall

Threshold Level	% of Agreed Limit	Magnitude of Deflection	Required Action
Alert Level	Up to 80%	Up to 6 mm	No action. Excavation can continue
Action Level	81% to 100%	6 mm to 8 mm	Review monitoring data and increase monitoring frequency to an agreed level. Excavation can continue
Alarm Level	Over 100%	>8 mm	Excavation to stop and agreed contingency measures to be implemented

If the subsurface conditions encountered during the excavation are different to those indicated in the geotechnical report, both the geotechnical and structural engineers must be immediately informed. The geotechnical and structural engineers should then inspect the site and re-design the excavation support (i.e. shoring), foundations or another feature, as required.

Contingency measures for adverse movement at the excavation crest will depend on the nature and extent of the movement. Measures could include backfilling against the shoring wall face, installation of anchors, and installation of internal props/bracing.

4. Hydrogeological Monitoring

4.1 General

Reference should be made to the Dewatering Management Plan (Douglas Report 216254.04.R.001) for background on groundwater at the site, expected inflow and monitoring requirements.

Based on the available information, the pre-excavation level of the permanent groundwater table at the site reduces from approximately RL 49 m AHD up-slope to approximately RL 45 m AHD

downslope. Subsequent site observations and monitoring suggests that these levels may be impacted by more recent nearby basement dewatering, and it is possible that groundwater will not be encountered at the bulk excavation level of RL 48.15 m AHD. Table 4 shows the recommended monitoring steps, with Hold Points identified, where information should be provided to the structural or geotechnical engineer prior to continuing with the works.

Note that as part of the soldier pile and shotcrete support, vertical strip drains should be installed behind the shoring to collect all seepage that may occur and to direct the seepage to the subfloor drainage system, from where it can be removed using sump-and-pump or gravity drainage methods.

Table 4: Summary of Hydrogeological (Groundwater) Monitoring Activities

Step	Description	Hold Point	Ref
H1. Prior to Excavation			
H1.1	Inspection of shoring piles by a geotechnical engineer to observed groundwater inflows into the pile holes. If water levels observed in the pile holes suggests that groundwater will not be intersected by the excavation, then excavation work may proceed. Otherwise, refer to the monitoring and reporting requirements in the DMP.	Hold Point	DMP
H2. Excavation below RL 49 m AHD to Bulk and Detailed Level			
H2.1	Builder to carry out daily inspection of excavation area and notify the geotechnical engineer if water inflow is observed.		
H2.2	Inspection of the base of the excavation at bulk level by the geotechnical engineer to assess the hydrogeological conditions prior to detailed excavation. If water inflow is observed, then the monitoring and reporting requirements in the DMP will need to be implemented prior to continuing excavation/construction.	Hold Point	DMP
H3. Following Completion of Excavation and Commencement of Building Construction			
H3.1	Evaluation of information obtained from Steps H1 and H2 by the geotechnical engineer, to determine ongoing frequency of monitoring and reporting given in H1 and H2, if required.	Hold Point	DMP
H4. Prior to Handover/OCC			
H4.1	Re-evaluation by geotechnical engineer of predicted long-term groundwater inflows to basement, based on ongoing records during construction.	Hold Point	DMP
H4.2	Builder to prepare documentation confirming their compliance with the monitoring and reporting requirements required by this GMP.	Hold Point	
H4.3	Builder to confirm that the as-built groundwater management system includes suitable measures to allow for the long-term groundwater treatment, quality evaluation and volume discharge requirements of the permanent groundwater management system.	Hold Point	DMP

4.2 Trigger Levels/Contingency Plans

4.2.1 General

If groundwater is encountered in the excavation, trigger levels and contingency plans described in the following sections will need to be considered.

4.2.2 Water Quality

If the results of groundwater quality measurements indicate an impact on existing groundwater conditions, or on disposal requirements for the pumped water, a plan must be developed to mitigate any impacts on existing groundwater conditions, and to provide treatment to meet the appropriate groundwater disposal requirements.

4.2.3 Water Level Outside the Basement

Previous groundwater monitoring in the area indicates a natural groundwater fluctuation of approximately 1 m. Groundwater levels surrounding the site that fall by more than 1 m below initial levels (as measured shortly prior to dewatering and taking fluctuation into account, as well as surrounding drained basements or excavations) should trigger an assessment of the records of pumped groundwater volumes, records of pumped groundwater/seepage volumes and weather/climatic factors. A plan may need to be developed to reduce groundwater take if the drawdown is determined to be due to the excavation. This may include localised grouting/sealing such as polymer-based emulsion grout etc.).

4.2.4 Groundwater Inflow

If groundwater inflow is assessed as excessive relative to the predicted inflow (refer DMP Report 216254.04.R.001), reanalysis and reassessment may be needed and additional measures to reduce groundwater inflow may be necessary. This may include localised grouting/sealing such as polymer-based emulsion grout etc.), as above.

5. Vibration Monitoring

5.1 General

Based on the report on geotechnical investigation for the site (ref: 216254.00.R.001, Rev. 3, dated 30 June 2023), an allowable vibration limit of 5 mm/s Vector Sum Peak Particle Velocity (VSPPV) at the foundation level of nearby buildings is suggested. The proposed allowable vibration limit at the foundation level of adjacent buildings is also adequate to reduce the risk of structural damage to buildings and road assets on the adjacent properties, including buried services. However, vibration sensitivity of the services should be confirmed with the asset owners prior to excavation. The limit may need to be adjusted to reflect the asset requirements, response of neighbouring structures during excavation and vibration dosage once the neighbouring building is occupied.

The proposed limit takes into account both structural damage and human comfort criteria given in relevant Standards (e.g., ISOAS 2670, EPA guidelines, German DIN4150 Standard and Australian Standard AS 2187-2 (2006)).

A vibration trial may be required to size equipment at the commencement of excavation into rock. The trial may indicate that minimum offset distances are required for the preferred plant, or that alternative excavation methods are required.

5.2 Monitoring Procedures

For this site, due to the limited excavation proposed, it is suggested that vibration monitoring be limited to carrying out an initial trial of excavation equipment. If the trial indicates that the vibration limits could be exceeded, then the contractor is to install a permanent monitoring system which will allow 'self-management' of vibration.

If required, geophones should be installed on or near the base of the walls of the neighbouring buildings. The geophones should be firmly attached to the building's structure or footings and should be connected to a data monitor, which is capable of measuring vibrations to 0.5 mm/sec PPVi or less. The monitor shall be set up to record all vibrations which exceed 5 mm/sec. A warning light or sound signal shall be attached to the monitor, which is configured with an alarm threshold of 5 mm/sec PPVi to warn the excavation contractor of vibration exceedances. The system should also automatically send a text message to the site superintendent should an exceedance occur, for the superintendent to investigate.

Table 5 shows the steps recommended, with Hold Points identified, where information should be provided to the structural or geotechnical engineer prior to continuing with the works.

Table 5: Summary of Vibration Monitoring Activities

Step	Description	Hold Point
V1. Prior to Commencement of Bulk Excavation Works		
V1.1	When excavation encounters medium strength rock, undertake a vibration trial using the largest machine of each equipment category (e.g., rock breaker, bulldozer with ripping tyne, rock saw) to be used in order to determine the minimum buffer distances to neighbouring structures for each equipment type. Geotechnical engineer to advise on whether proposed equipment is likely to exceed allowable vibration levels and whether continuous monitoring is required.	Hold Point
V1.2	If the vibration trial indicates that vibration limits may be exceeded by the proposed works, then geophones and monitors are to be installed and configured to undertake continuous unattended monitoring of vibration. Install geophone at the base of the neighbouring structure closest to the excavation works. Connect geophone to data monitor and install a flashing light or sound warning signal and enable automatic text messaging to the site superintendent. Set warning light to trigger at 5 mm/s VSPPV.	Hold Point
V2. During Excavation		
V2.1	If continuous monitoring is required (see Step 1 above) – data from the monitor is to be uploaded weekly, with direct feedback to site personnel of the number of recorded events exceeding the Allowed Limit. Reports should include a tabulation of times and levels of any events exceeding a recording threshold of 5 mm/s VSPPV, for correlation with site activity records. The weekly vibration monitoring reports should be forwarded to the geotechnical engineer for review.	

Step	Description	Hold Point
V2.2	If the number of exceedances on any day is more than 10 then the respective excavation works shall stop, and the geotechnical engineer shall be notified. The geotechnical engineer will investigate the causes of the exceedances and provide advice on measures to avoid further vibration exceedances.	Hold Point

5.3 Trigger Levels/Contingency Plans

If the vibration trials indicate that continuous monitoring is required, then the monitor shall be configured such that either an SMS message is sent automatically to nominated mobile phones (including the monitoring entity and the site superintendent), or a flashing light or sound signal is triggered when the vibration at the base of the neighbouring structure exceed 5 mm/s VSPPV. If the SMS message is sent or the warning signal is triggered, then the machinery operator should reduce the force generated by his equipment or move further away from the neighbouring structure.

Occasional exceedances may be allowed, however, if a sustained exceedance occurs, an inspection by the structural and geotechnical engineers should be made of the potentially affected building and excavation should only resume if no vibration-induced damage can be seen.

If the warning light is being triggered frequently (e.g., >10 times/day), excavation works are to stop, the geotechnical engineer is to be notified, and a site visit carried out by the geotechnical engineer to investigate the cause of the exceedances. A change in excavation method may be recommended as a result of the inspection, or on the basis of recorded vibration data.

6. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report for the proposed Midtown Macquarie Park new Primary School at Ivanhoe Estate, Macquarie Park, NSW in line with Douglas' proposal dated 28/08/23 and acceptance received from Mike O'Neill of Taylor Construction Group Pty Ltd dated 22 November 2024. The work was carried out under Douglas' Engagement Terms. This report is provided for the exclusive use of Taylor Construction Group Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after Douglas' field testing has been completed.

Douglas' advice is based upon the conditions encountered during the previous geotechnical investigation at the site (ref: 216254.00.R.001, Rev. 3, dated 30 June 2023). The accuracy of the

advice provided by Douglas in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical and groundwater components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. Douglas cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by Douglas. This is because this report has been written as advice and opinion rather than instructions for construction.

Appendix A

About this Report

About this Report

October 2024

Introduction

These notes have been provided to amplify Douglas' report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

Douglas' reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Engagement Terms for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, Douglas will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, Douglas cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, Douglas will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, Douglas requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. Douglas would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

intentionally blank

Appendix B

Drawings

Legend

- Approx. building footprint
- Approx. site boundary
- Test pit location
- Borehole with groundwater well
- Borehole location
- Proposed Driveway

Drawing adapted from aerial imagery from Metro Map. Site boundary traced from provided DWG architectural plans file

Test locations acquired using DGPS accurate to approximately 100 mm vertical/horizontal

0 15 30 45 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: School Infrastructure NSW		
OFFICE: Sydney	DRAWN BY: CL	
SCALE: 1:600	DATE: 16.June.2023	

TITLE: **Test Location Plan**
Midtown Macquarie Park New Primary School
Macquarie Park, NSW

N

Project:	216254.00
DRAWING No:	1
REVISION:	0

DP.QGIS.A3LandScapeDrawingLayout.DftA

A

A'

ELEVATION (AHD)

56
54
52
50
48
46
44
42
40
38

TP309
Offset 7.6m
BH304
Offset - 6.7m

APPROXIMATE SURFACE LEVEL

BH303
Offset - 11.9m

TP308
Offset - 10.4m

BH302
Offset 4.3m

TP307
Offset 5.7m

TP305
Offset - 10.8m

BH301
Offset 0.0m

TP306
Offset 8.9m

BASEMENT EXTENT AND FLOOR LEVEL AT RL 48.4m
(INDICATIVE ONLY AND SUBJECT TO DESIGN)

FILL
RESIDUAL CLAY
CLASS V SANDSTONE
CLASS IV SANDSTONE
CLASS III SANDSTONE
CLASS II SANDSTONE

N = 18
refusal
Bottom Depth 1.7 m
L
M
L
H
Bottom Depth 6 m

N = 19
refusal
Bottom Depth 1.5 m
M
L
M-H
M
Bottom Depth 6 m

N = 16
refusal
Bottom Depth 1.5 m
L
M
H
M
Bottom Depth 10 m

FILL
Bottom Depth 1.5 m

N = 12
refusal
RESIDUAL CLAY
Bottom Depth 1.5 m
M
CLASS IV SANDSTONE
H
CLASS III SANDSTONE
H
CLASS II SANDSTONE
Bottom Depth 6 m

Bottom Depth 1.5 m

-20
0
20
40
60
80
100
120

DISTANCE ALONG PROFILE (m)

LEGEND

- Core Loss
- Clay
- Filling
- Roadbase
- Sandstone
- Sandy Clay
- Silty Clay

NOTES:
1. Subsurface conditions are accurate at the borehole locations only.
   Variations in subsurface conditions may occur between borehole locations.
   Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

ROCK STRENGTH
EL - Extremely Low
VL - Very Low
L - Low
M - Medium
H - High
VH- Very High

TESTS / OTHER
N - Standard penetration test value
— ? — - Interpreted geotechnical boundary
- Water level
— — — - Approximate Groundwater Table Level

0 8
Horizontal Scale (metres)
Vertical Exaggeration = 4.0

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: School Infrastructure NSW		TITLE: **Interpreted Geotchnical Cross-Section A-A'**	PROJECT No: 216254.00
OFFICE: Sydney	DRAWN BY: JV/MG	**Midtown Macquarie Park New Primary School**	DRAWING No: 2
SCALE: 1:400 (H) 1:100 (V) @ A3	DATE: 23.08.2022	**Macquarie Park, NSW**	REVISION: 0

Appendix 13 – Construction Flood Emergency Management Plan

Flood Emergency Response Plan (FERP) Construction Stage

Midtown Macquarie Park New Primary School

Final Report

P2209247JR02V01

December 2024

Prepared for Schools Infrastructure New South Wales

environmental science & engineering

Project Details

Report Title	Flood Emergency Response Plan (FERP) Construction Stage: Midtown Macquarie Park New Primary School
Client	Schools Infrastructure New South Wales
Document	P2209247JR02V01
Director	Daniel Martens
Manager	Stanley Leung
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Document History

Issue	Issue Date	Status	Description / Comment	Author	Reviewer	Approved
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Executive Summary

Martens & Associates Pty Ltd (**MA**) have prepared this Construction Stage Flood Emergency Response Plan (**FERP**) in support of the Construction Certificate submission for an approved State Significant Development Application (**SSD 56124984**) for the proposed Midtown Macquarie Park New Primary School at 10 Mahogany Avenue, Macquarie Park (Lot 29, DP1294659).

Review of MA flood modelling results found that:

1. The site is materially flood free up to and including the probable maximum flood (**PMF**) event.
2. Mahogany road adjacent to the site experiences hazardous flooding during the PMF, with flood waters reaching H5, based on ARR hazard definitions.
3. The proposed development area is not subject to any flood hazard or risk and the flood extents from Shrimpton Creek are well outside of the development footprint.
4. The proposed development's lowest ground level lies at 48.4 mAHD, which provides freeboard in excess of 2.0 m to the PMF level of 46.14 mAHD, more than the 0.5 m required by Section 2.1 of the City of Ryde Council's Stormwater and Floodplain Management.

This site specific FERP has been prepared to ensure that the construction site can operate safely in the floodplain environment. Whilst the site is materially flood free up to and including the PMF, hazardous flows do occur in Mahogany Avenue adjacent to the site during a PMF event. A range of straightforward mitigation measures can be implemented to reduce the flood risks to occupants. In summary:

1. Subscription to a number of warning systems will significantly reduce the likelihood of persons on site during a major flood event.
2. In the unlikely scenario that persons are on-site during an unanticipated major flood event, risk to persons is managed through a shelter-in-place strategy. Evacuation can also be carried out if advised by NSW SES.
3. With the implementation of the FERP procedures, the risk to life is reduced to acceptable levels.

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Glossary of Terms

AEP	Annual exceedance probability: the probability of a flood event occurring within a year. A 1% AEP flood has a 1% chance of occurring in any given year.
ARR	Australian Rainfall & Runoff
BoM	Bureau of Meteorology
Council	City of Ryde Council (CRC)
FERP	Flood emergency response plan
FPL	Flood planning level
MA	Martens & Associates Pty Ltd
PMF	Probable maximum flood: the most extreme flood event possible for a certain location, with an approximate AEP of 100,000 to 10,000,000 years
SIP	Shelter-in-place
SSDA	State Significant Development Application

1 Introduction

1.1 Overview

Martens & Associates Pty Ltd (**MA**) have prepared this Construction Stage Flood Emergency Response Plan (**FERP**) in support of the Construction Certificate submission for an approved State Significant Development Application (**SSD 56124984**) for the proposed Midtown Macquarie Park New Primary School at 10 Mahogany Avenue, Macquarie Park (Lot 29, DP1294659).

This report should be read in conjunction with the site-specific flood assessment reports prepared by MA:

- Flood Impact and Risk Assessment: Midtown Macquarie Park New Primary School (2023, REF: P2209427JR01V01).
- Additional Flood Assessment : Midtown Macquarie Park New Primary School (2024, REF: P2209427JC02V04), hereafter referred to as the 'MA Flood Assessment'.

1.2 Project Scope and Objectives

Project scope and objectives are:

1. Summarise local flood characteristics from the MA flood assessment.
2. Prepare a flood emergency response plan (**FERP**) for the construction phase of the proposed Midtown Macquarie Park New Primary School.
3. Recommend engineering controls to improve safety in case of the site flooding.

1.3 Relevant Guidelines

This report and the MA flood assessment have been prepared in accordance with the following guidelines and policies:

1. City of Ryde (2014), Ryde *Local Environmental Plan (LEP).*
2. City of Ryde (2014), City of Ryde *Development Control Plan (DCP).*
3. Commonwealth of Australia (2019), Australian Rainfall and Runoff – A Guide to Flood Estimation.
4. NSW Department of Planning and Environment (2023), Flood Risk Management Manual.
5. NSW State Emergency Services (2022), Ryde Hunters Hill Flood Emergency Sub Plan.

6. State of NSW and Office of Environment and Heritage, Floodplain Risk Management Guide (2019).

1.4 Proposed Development

MA understand that the proposed development is the construction of a five-storey primary school which will include:

1. 33 general learning spaces with 1 learning common area and multipurpose room for approximately every 4 learning spaces.
2. Library and associated office and storerooms.
3. Multi-purpose school hall, gym, performance space.
4. Rooftop outdoor learning area.
5. Canteen and student amenities.
6. Administration offices and meeting rooms.
7. Staff room and facilities.

Refer to Appendix A for proposed site layout. MA expect the construction to take 2- 5 years.

2 Site Flooding Characteristics

The proposed school site is located within the Ivanhoe Estate located in the Shrimpton Creek catchment in Macquarie Park. Flood maps have been previously prepared for the site based on the MA flood assessment for the 1% annual exceedance probability (**AEP**) and probable maximum flood (**PMF**) events, relevant maps have been reproduced in Appendix B of this report.

Based on the BMT WBM flood modelling results, we note the following:

1. The site is materially flood free in the 1% AEP and PMF events.

2. The site is situated in the middle northern portion of the Ivanhoe Estate, approximately 120m west of Shrimpton Creek along the south-eastern boundary of the estate.

3. The site is not subject to any flood hazard or risk, and it will not cause any offsite flood impacts as the flood extent from Shrimpton Creek does not encroach on the existing site or the proposed development footprint, and the floodwaters are entirely contained within the corridor of the creek.

4. Table 1 summarises the peak flood levels within Shrimpton Creek adjacent to the school site for each modelled design event. The lowest proposed school building level is 48.4 mAHD. A freeboard in excess of 0.5 m has been achieved for all events up to and including the PMF event, in accordance with the freeboard requirements defined in Section 2.1 of the City of Ryde Council's Stormwater and Floodplain Management.

   Table 1: Summary of the peak flood levels south-east of the site. The levels have been extracted from the Midtown Stage 2 Flood Impact Assessment by BMT WBM which derives its levels for Lot C4 within the Ivanhoe Estate Redevelopment Area.

Flood Event	Peak Flood Level (m AHD)
1% AEP	44.48
PMF	46.14

   Notes
   1. The levels listed are conservative for the site as they are extracted at a nearby lot which is beside Shrimpton Creek, upstream from the site, that experiences greater peak flood levels.

5. Based on the review of the local topography, the site is only affected by local stormwater runoff generated within the estate itself. Theses flows are generally low depth and low velocity and are considered as 'Local Drainage' in accordance with the Floodplain Development Manual (2005).

6. Mahogany Avenue adjacent to the site is materially flood free in the 1 % AEP event, but flood waters in the PMF average depths around 0.15 meters with velocities ranging between 2 – 3 meters per second. These conditions result in hazards reaching up to H5, based on ARR hazard definitions (refer to Figure 1 and Appendix B, Map 6).

7.

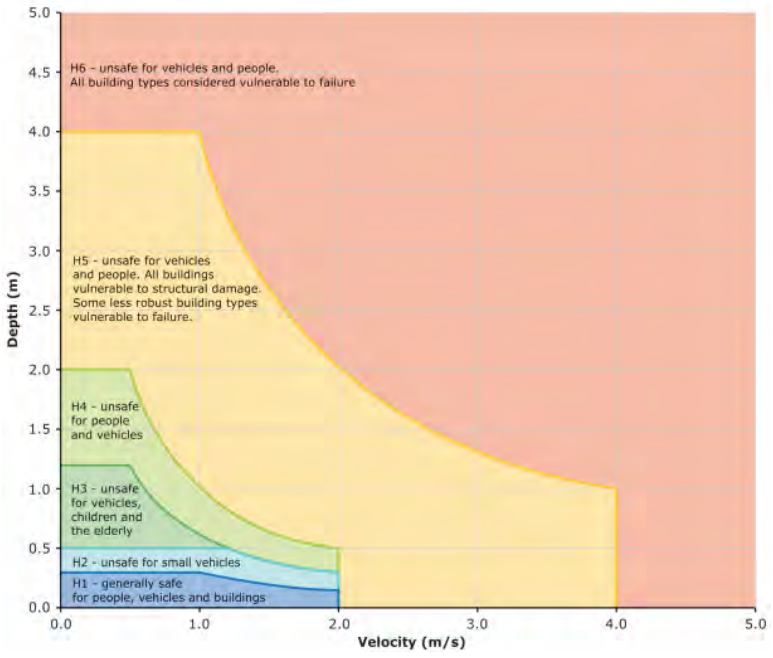

Figure 1: Flood Hazard Curves (Geoscience Australia, 2019).

3 Construction Stage Flood Emergency Response Plan

3.1 Overview

This FERP makes recommendations to ensure that in the event of a flood at the site during the construction stage, risk to personal safety and the environment is appropriately managed. It should be noted that it is highly unlikely that a major flood event will occur while the site is occupied during the construction stage, which we assume will take 2-5 years, in particular because it is typical for construction sites to cease works when heavy rainfall is anticipated.

The site is materially flood free in events up to and including the PMF, and therefore the primary response is to shelter-in-place (**SIP**) inside any temporary structures, or within the school buildings under construction. The secondary response would be to evacuate the site if ordered to do so by NSW SES.

3.2 Flood Warning Mechanisms

Monitoring weather forecasts and conditions near the site will help to manage the flood risk. A number of methods to monitor the risk of flooding are detailed in the following sections.

3.2.1 Bureau of Meteorology

The Bureau of Meteorology (**BoM**) generates a number of information sources useful for monitoring the weather forecast and conditions near the site:

1. Rainfall maps (http://www.bom.gov.au/jsp/watl/rainfall/pme.jsp) can be used to estimate the daily rainfall expected to occur over the next 24, 48, 72, and 96 hours as well as the total rainfall for the next 4 and 8 days.

2. Occasionally BoM issues Weather Warnings for NSW via their website (http://www.bom.gov.au/nsw/warnings/). These warnings provide both general warnings across NSW, and warnings for more specific locations. There are two types of warnings that may indicate that flooding is imminent on the site: Severe Weather Warnings and Severe Thunderstorm Warnings. Specifically, these warnings should be monitored for references to flash flooding in the Northern Sydney or Sydney areas. Warnings are generally issued with up to 60 minutes notice however for very large events (i.e. east coast lows), warnings may be issued with 24 hours notice or more.

3. The radar service operated by BoM shows current rainfall location and intensity for the Sydney area (http://www.bom.gov.au/products/IDR713.loop.shtml).

3.2.2 Other Warnings

Site management may also be alerted to flood warnings via the following mechanisms:

- NSW SES emergency alert telephone warning system.
- Media warnings (TV, radio, internet etc.).
- Police and / or SES door knocking.
- Weather apps (e.g. 'Early Warning Network').
- Visual observation of flood waters in the depression along the south-eastern site boundary.

If site management or occupants receive a flood warning via any of the mechanisms described above, they should undertake the SIP procedure immediately as described in Section 3.5, or evacuate the site if instructed to do so, as described in Section 3.6.

3.3 Roles and Responsibilities

3.3.1 Site Management

The managers of the site have the responsibility to implement and maintain the requirements of this FERP. Specifically, they are to ensure that:

- A suitable number of flood kits are kept on the premises which are to include a first aid kit, portable radio and spare batteries, megaphone, torch and spare batteries, hi-vis vests and hi-vis raincoats.
- A Chief Flood Warden is appointed.
- The Chief Flood Warden and all other Flood Wardens are trained in the application of the FERP and the interpretation of rainfall and weather warning information published by BoM and CRC.
- All staff are to be trained in their respective roles and responsibilities in relation to this FERP.
- The FERP is kept up to date.
- The site is cleaned and checked following a flood event.
- In the event of a flood at the site, all loose materials within the PMF extents are to be moved to higher ground if adequate time to do so safely.
- Sufficient financial resources are provided for the above.

Site management, at its discretion may delegate some of the above tasks to the Chief Flood Warden or others. Site Management will however remain responsible to ensure that these tasks are occurring.

3.3.2 Chief Flood Warden

The Chief Flood Warden will report to site management. It is anticipated that the Site Manager or similar will be the Chief Flood Warden. The Chief Flood Warden will:

- Familiarise themselves with the FERP procedures.
- Appoint Flood Wardens such that the Chief Flood Warden or a Flood Warden is always on duty.
- Organise training for themselves and the Flood Wardens in the implementation of the procedures detailed in this FERP.
- Monitor weather forecasts and flood warnings daily.
- Ensure any alerts received from the BoM, Early Warning Network app, or otherwise are issued directly to the Flood Warden via phone call or text message to all site occupants.
- Ensure the flood response kits are equipped with all required equipment.
- Keep hard copies of the FERP on site and accessible to all staff.
- Implement the procedures in this FERP in the event of a flood, including evacuating and closing the site if instructed to do so.
- Liaise with emergency services in the event of a flood.
- Review the FERP following flood events which trigger an emergency response.

3.3.3 Flood Wardens

The Flood Wardens will:

- Familiarise themselves with this FERP and the procedures within it.
- Follow the procedures within this FERP in the event of a flood.
- Follow the directions of the Chief Flood Warden.
- Fulfil the role of the Chief Flood Warden in their absence.
- Monitor weather forecasts and flood levels on site during operational hours in the absence of the Chief Flood Warden.

3.3.4 Workers & Visitors

Occupants and visitors of the premises are to follow the directions of site management, the Chief and/or Flood Wardens and signage related to flooding during a flood event on site.

3.4 Flood Response Phases and Triggers

3.4.1 Overview

There are four flood response phases for flooding on the site:

- **Prepared** – will apply at all times when the other phases do not apply.

- **Alert** – this is triggered when heavy rainfall is forecast or a severe weather warning is issued indicating potential flooding at the site.
- **Respond** – this occurs when a flood response is triggered by one of several means indicating a flood is occurring or is likely to occur at the premises.
- **Recover** – this occurs following a flood response operation of any scale and lasts until operations have returned to normal, after which the 'Prepare' phase applies.

Refer to Appendix C for the Flood Actions Checklist which details the four phases, actions and responsibilities.

3.4.2 Prepare

During the prepare phase, weather forecasts and warnings are checked daily and the flood emergency response plan arrangements are maintained.

3.4.3 Alert

The alert phase is triggered by any of the following:

- Heavy rainfall forecast is (≥ 50 mm in the next 24 hours).

In the alert phase, the rain forecast, warnings are monitored every 2 hours until BoM advise that heavy rainfall has passed.

3.4.4 Respond

The respond phase is triggered by the following:

- BoM issues a severe weather warning for the Macquarie Park or Sydney areas with a chance of flash flooding at the site.
- NSW SES issues a flood alert covering the site.
- NSW SES issues an evacuation order which covers the site.

In the respond phase, the Chief flood warden or Flood Warden will:

- Keep the site closed if not yet open.
- Relocate all loose or hazardous materials to sheltered or higher ground if safe to do so.
- Ensure that anyone on the site is notified to shelter-in-place on the fill pad inside any temporary structures.
- Evacuate and lockdown the site if instructed to by NSW SES.
- Determine how many occupants are currently on site.
- Notify the NSW SES and site management that there are occupants sheltering-in-place.

- Evacuate and lockdown the site if instructed by NSW SES.

If site occupants have sheltered-in-place, once emergency services advise that the flood has receded, occupants will evacuate and the site will be locked down until cleaning and any repairs can be made.

3.4.5 Recover

The recovery phase occurs once the flood situation has ended. If flood waters reached the vicinity of the site, the site should be thoroughly cleaned and repaired if necessary.

In any flood event affecting the site, a debrief should be held with site management and all Flood Wardens, and the FERP should be reviewed.

3.5 Shelter-in-Place Details

The primary and preferred emergency response strategy is for pre-emptive site closure in the lead up to an extreme flood event. However, if the site is open, SIP can safely be undertaken by all occupants as the site is materially flood free during the PMF.

The SIP duration would be around 2-3 hours, as the site is flood free and local roads are not expected to experience long periods of inundation, which is considered an acceptable duration to SIP.

The following is to be provided to enable safe shelter-in-place:

1. All Flood Wardens on duty will remain with anyone who is sheltering on site.
2. An emergency kit including torch with spare batteries, portable radio with spare batteries, first aid kit, high visibility vest, high visibility rain coat, drinking water, non-slip footwear and megaphone, is to be kept in public areas with proper signage.
3. Any persons sheltering-in-place will not leave the site until NSW SES or the Flood Wardens instructs them to do so.

3.6 Evacuation Details

The MA flood assessment demonstrates that Herring Road to the north of the site is located outside the PMF extents. Therefore, the evacuation route is to travel north from the site via Mahogany Avenue, onto Herring Road. From there, evacuees can proceed to their own homes if advised by NSW SES to be safe. The evacuation route can be accessed within minutes, and is shown in Figure 2.

However, as the MA flood assessment does not extend further north, it is uncertain whether the roads beyond Herring Road are affected by hazardous flood waters. Therefore, evacuation during a flood event should only be undertaken if advised by NSW SES.

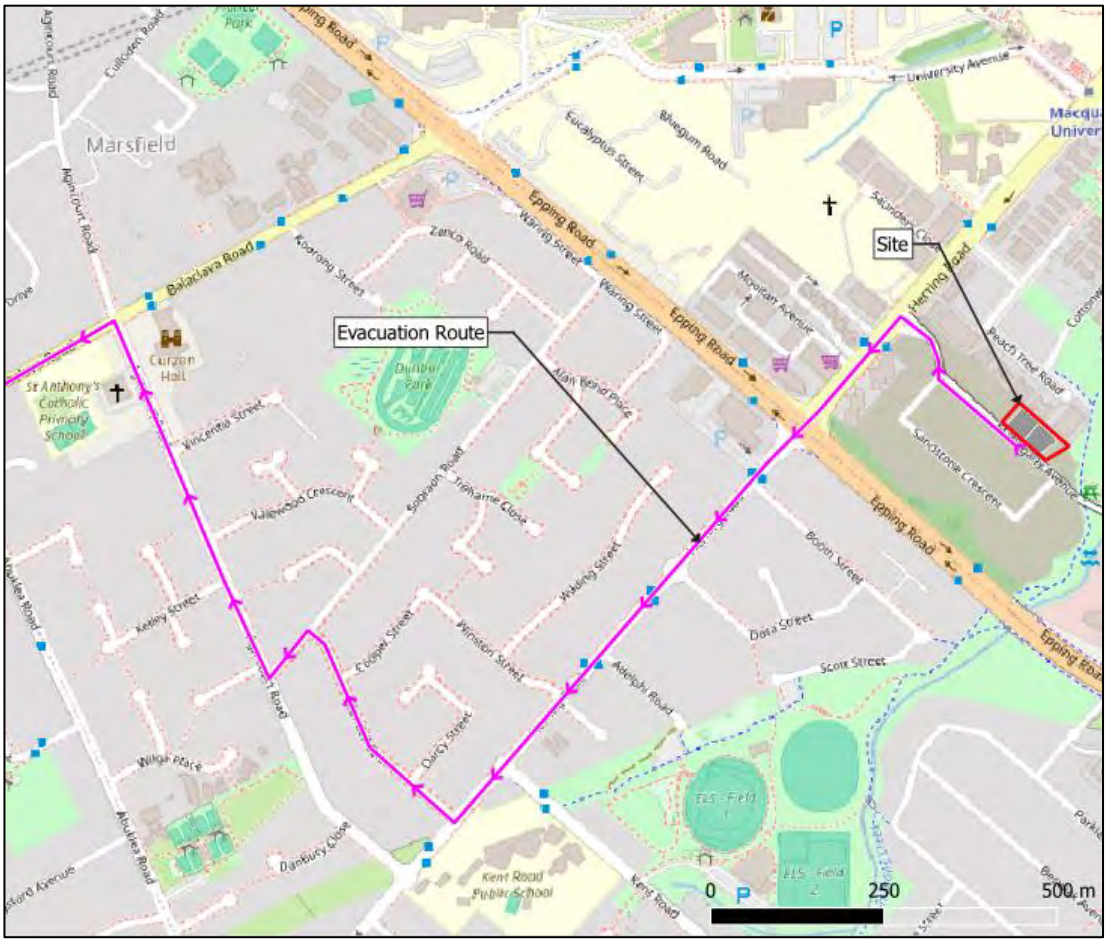

Figure 2: Adopted evacuation route (background aerial from Open Street Maps (2024)).

3.7 Flood Warning Times

Site flood model results show the site is unaffected by flooding in the 1% AEP and PMF events respectively, with only local stormwater affectation in the road in front of the site. As the road catchment is relatively small, it will likely only be affected by flash flood events, characterised by short, intense bursts of rain which may affect the trafficability of roads for short periods of time.

The warning mechanisms described in Section 3.2, will allow sufficient time for site occupants to follow this FERP and shelter-in-place or evacuate the site if advised by NSW SES to do so.

3.8 Flood Awareness Training

Flood awareness training should be provided to employees, contractors, site users and visitors to understand site flood behaviour, which will help to prepare site occupants and reduce flooding risks. Training with respect to site flood hazards and emergency procedures should be provided for all staff as part of the site induction process, and yearly flood awareness training is to be provided for all staff.

3.9 Emergency Contact List

NSW SES can be contacted during a flood emergency if required on 132 500. In a life-threating situation it is advised to call triple zero (000) for assistance from police, ambulance or the fire brigade.

The following are the key points that need to be followed after logging a call with NSW SES in case of an emergency:

1. Keeping phones nearby so that it is easy for NSW SES to make contact after assistance request call.
2. Stay away from power lines and fallen trees during the storm period.
3. Follow directions given by NSW SES staff.
4. NSW SES attends to requests for assistance in a priority-based order. Therefore, it is necessary to outline the priority of the call.
5. Cancel the call request if help is not needed anymore stating the reference number given prior.

See Appendix D for full details of emergency contact list for NSW SES and other emergency services during flooding.

4 Summary

This site specific FERP has been prepared to ensure that the site can operate safely in the floodplain environment. Whilst the proposed fill pad and buildings are not directly affected by flooding, part of the site is inundated and likely experiences high flood hazards during the PMF event. In summary:

1. Subscription to a number of warning systems will significantly reduce the likelihood of persons on site during a major flood event.
2. The site is generally unaffected by PMF waters, with shallow depths observed in Mahogany Avenue, outside the site.
3. In the unlikely scenario that persons are on-site during an unanticipated major flood event, risk to persons is managed through a SIP strategy.
4. With the implementation of the FERP procedures the risk to life is reduced to acceptable levels.

5 References

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City of Ryde (2014), City of Ryde *Development Control Plan (DCP).*

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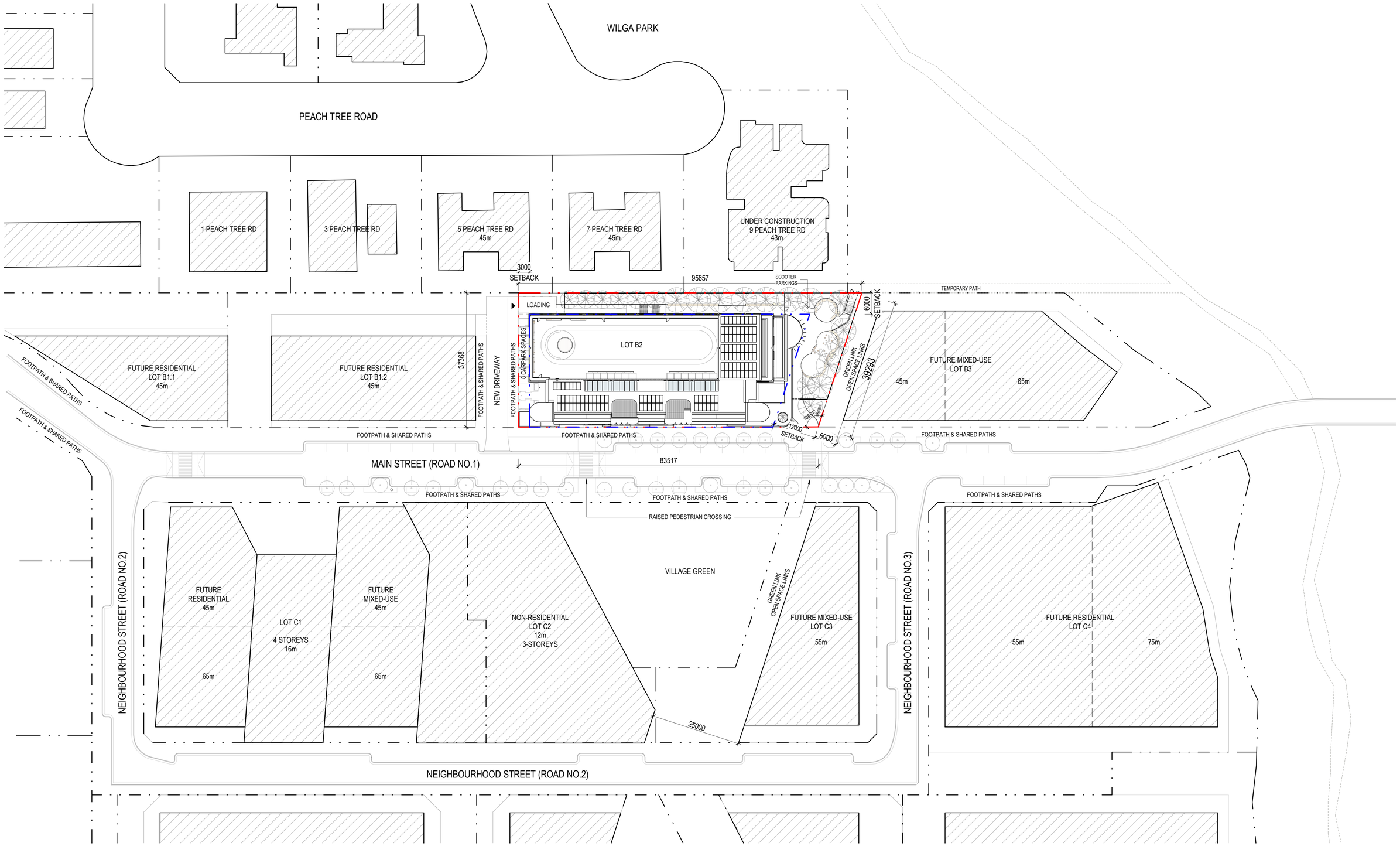
Martens and Associates (February 2024), *Additional Flood Assessment: Midtown Macquarie Park New Primary School (P2209247JC02V04).*

NSW Department of Planning and Environment (2023), *Flood Risk Management Manual.*

NSW State Emergency Services (2022), *Ryde Hunters Hill Flood Emergency Sub Plan.*

State of NSW and Office of Environment and Heritage, *Floodplain Risk Management Guide* (2019).

Appendix A – Proposed Site Layout



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Nominated Architect
Ray Brown, NSWARB 6359

0 5 10 15 25 m

Do not scale drawings. Verify all dimensions on site

revision	purpose of issue	checked	date
A	SSDA Draft Submission		03-05-23
B	FOR INFORMATION		09-06-23
C	SSDA Draft Submission		05-07-23
D	SSDA SUBMISSION		21-07-23

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prepared	project no
PD	220350

project
Midtown Macquarie Park New Primary School

drawing
Site Plan

drawing no. **DA0004**

revision **D**

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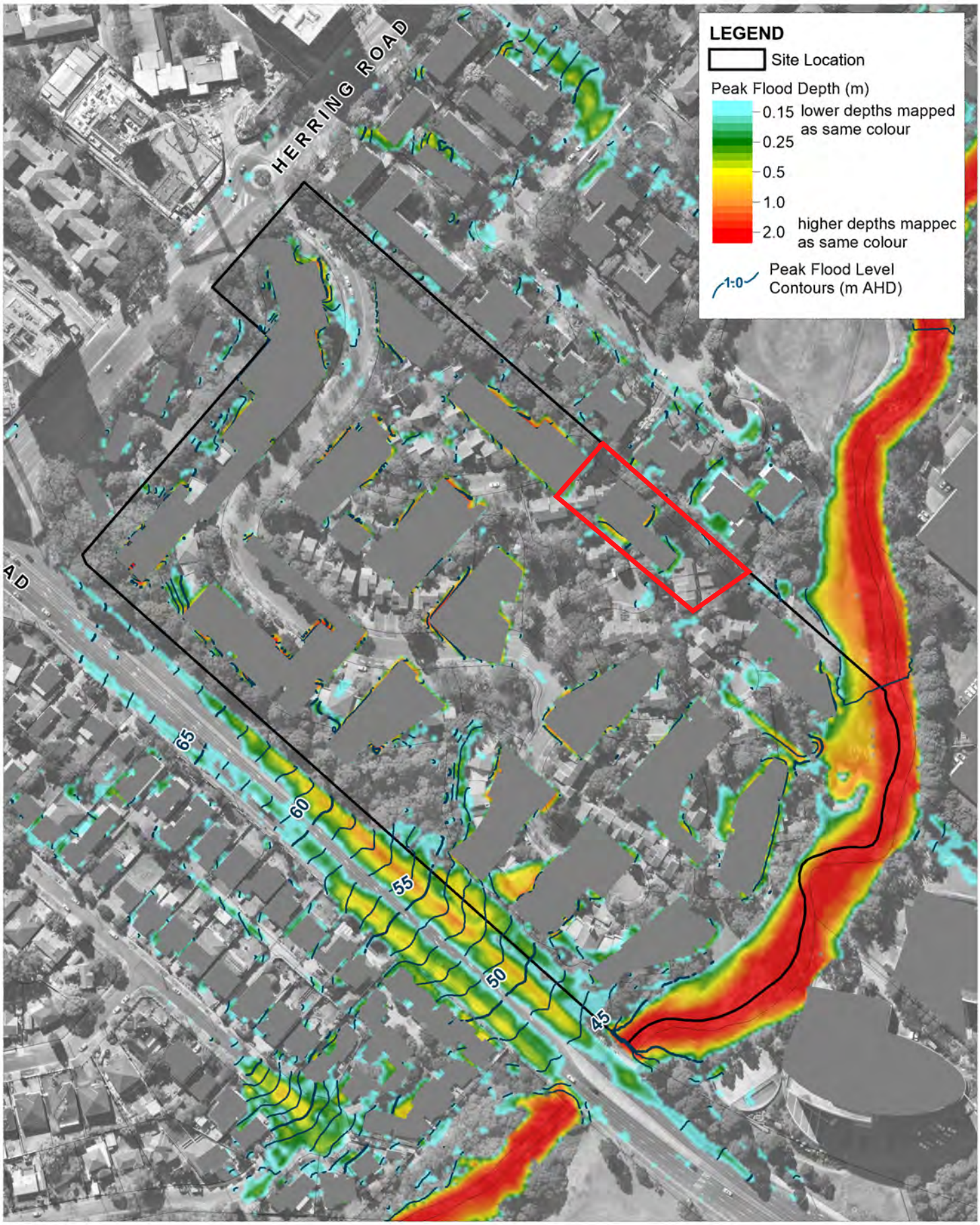
Appendix B – Flood Maps



Title:

Peak Flood Depth - Developed Scenario 100 yr ARI

Figure: C-2

Rev: -

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Approx. Scale

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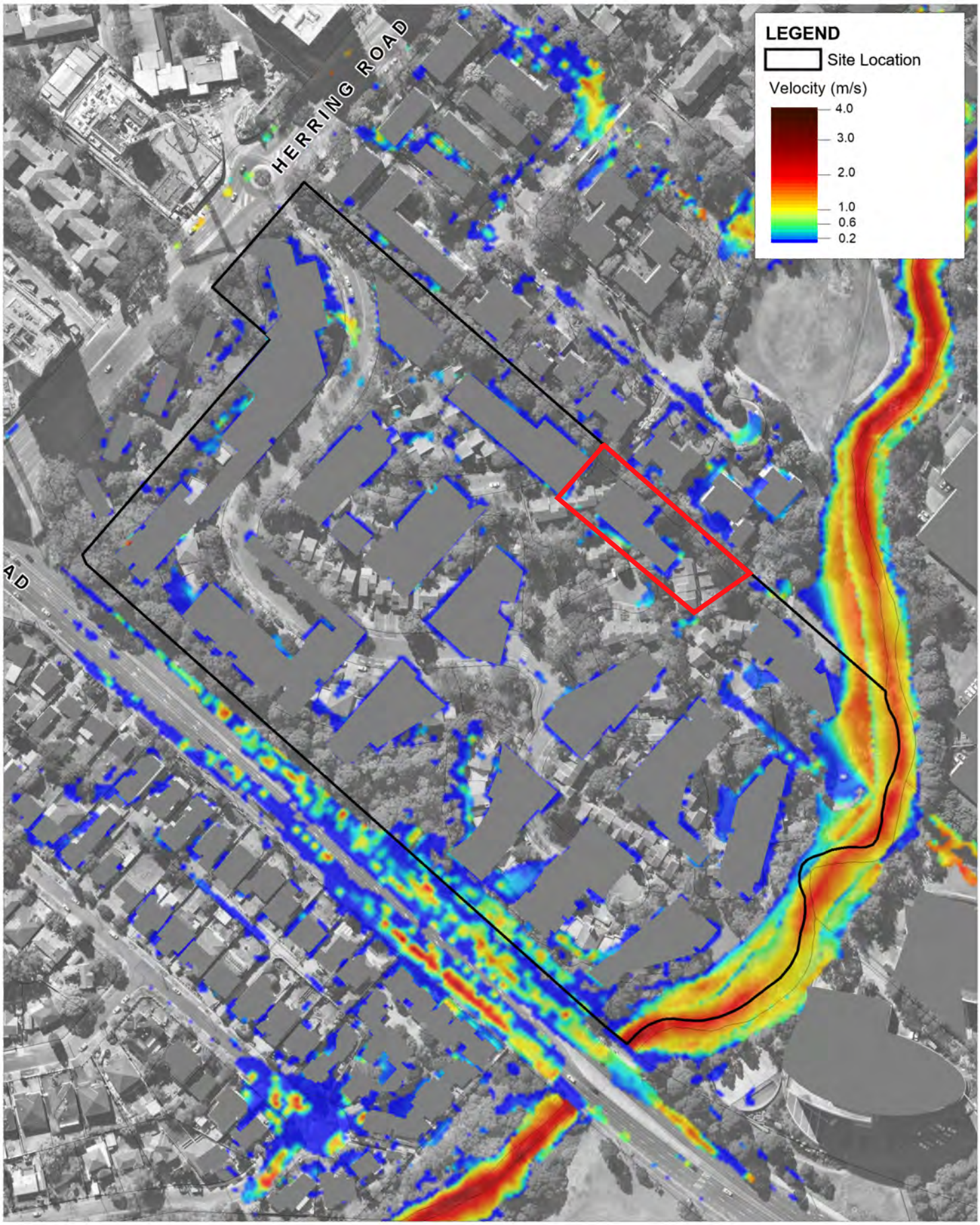

Title:

Peak Flood Velocity - Developed Scenario 100 yr ARI

Figure: C-5

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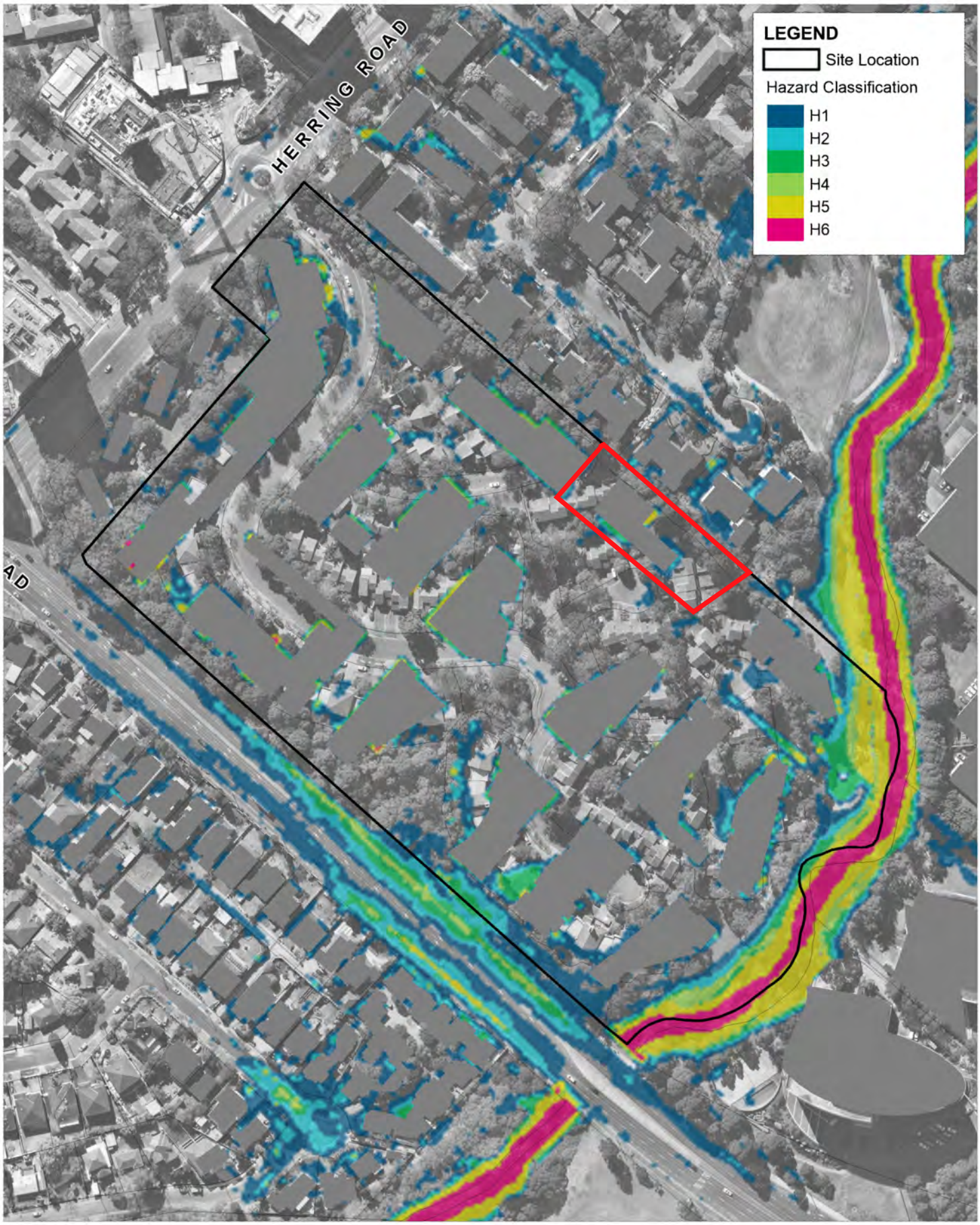

Title:

Flood Hazard Classification - Developed Scenario 100 yr ARI

Figure: C-10

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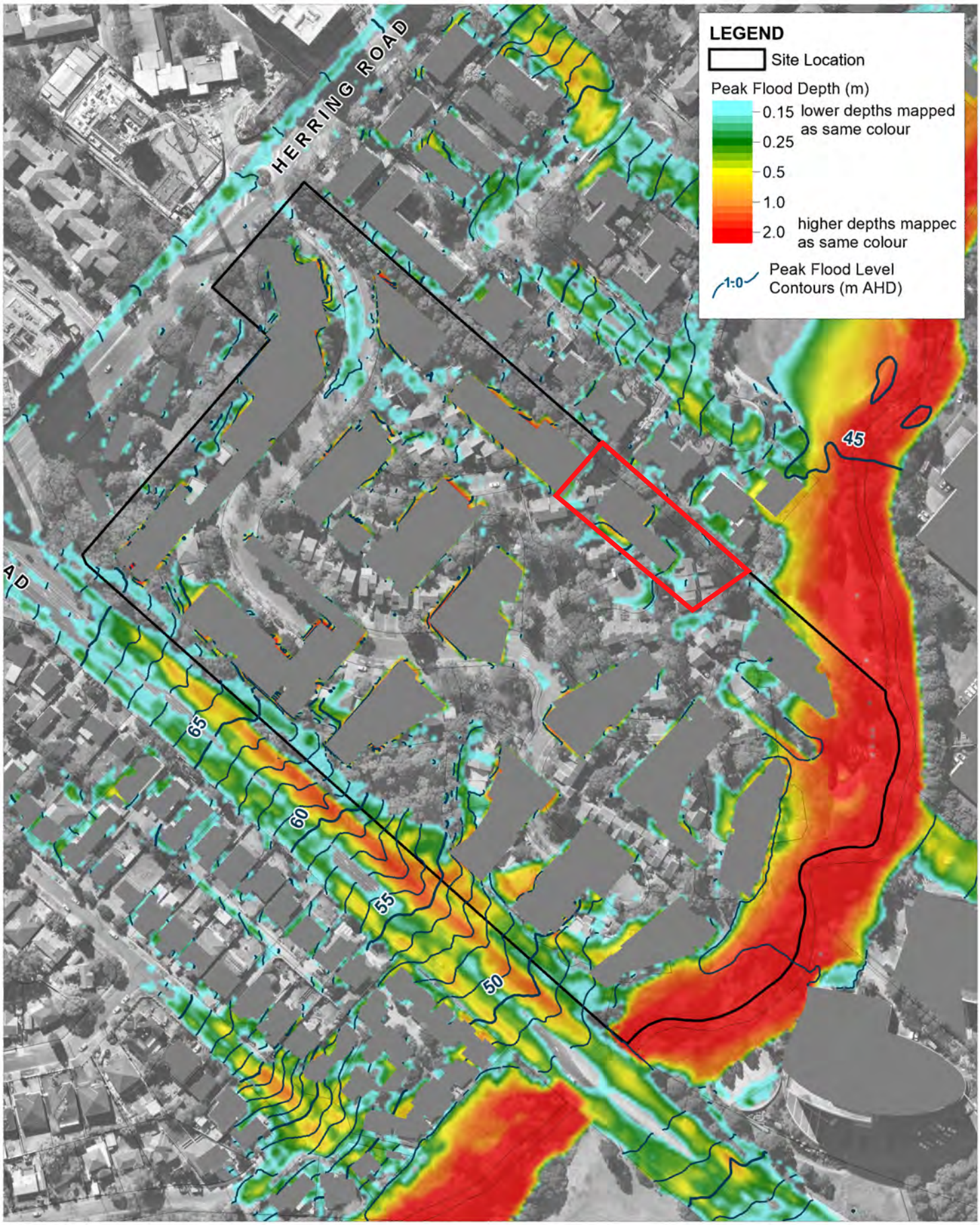

Title:

Peak Flood Depth - Developed Scenario Probable Maximum Flood (PMF)

Figure: C-3

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Approx. Scale

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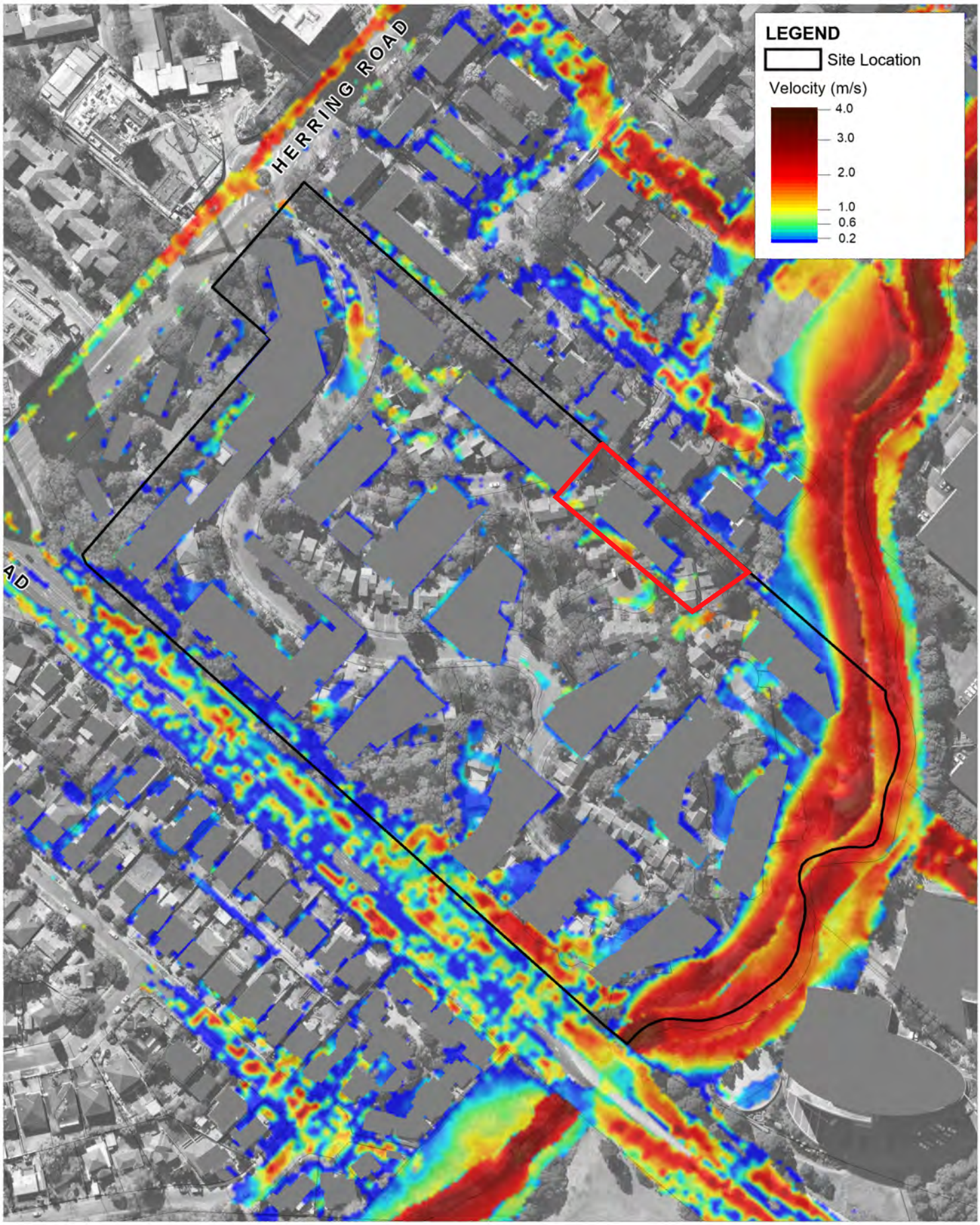

Title:

Peak Flood Velocity - Developed Scenario
Probable Maximum Flood (PMF)

Figure: C-6

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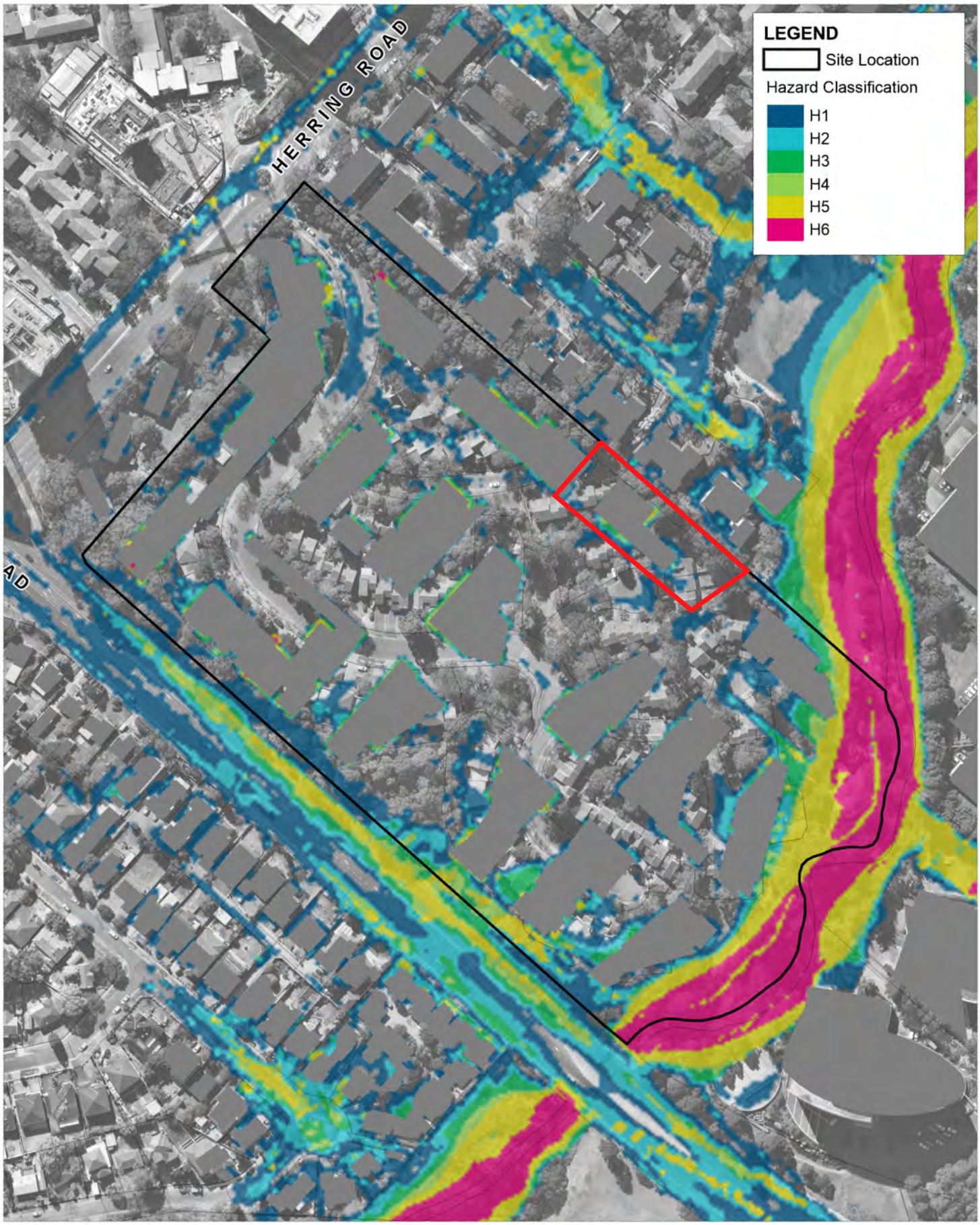

Title:

Flood Hazard Classification - Developed Scenario Probable Maximum Flood (PMF)

Figure: C-11

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Appendix C – Flood Actions Checklist

Prepare – Before A Flood			
Trigger	**Action**	**Responsibility**	**Requirements**
Always	Appoint a Chief Flood Warden and ensure that there is always someone in this role.	Site Management	FERP
	Subscribe Chief Flood Warden and the Flood Wardens to a warning alert service so that they receive BOM severe weather warnings direct to their mobile phone.	Site Management	FERP, subscription to service, mobile device, access to BOM website
	Supply and maintain all of the equipment necessary to implement the FERP.	Site Management	Flood response kits including first aid kits, portable radio and megaphone, sufficient torches and hi-vis vests and raincoats for all Flood Wardens, spare batteries for all the above
	Ensure the Chief Flood Warden and Flood Wardens are trained in the implementation of the FERP and interpretation of the rainfall, flood information and warning information published by BoM.	Site Management	FERP, training resources
	Keep this FERP up to date and review it following a flood emergency.	Site Management	FERP
	Appoint sufficient Flood Wardens such that there will be a Flood Warden on duty (not necessarily on site) at all times, and on site during opening hours.	Chief Flood Warden	FERP
	Appoint sufficient Flood Wardens for the implementation of the FERP in any event.	Chief Flood Warden	FERP
	Monitor BoM weather forecasts and flood warnings daily.	Chief or Flood Warden	Mobile or computer with internet connection
	A database of Site Management, Chief Flood Warden, and Warden mobile phone numbers will be maintained and kept up to date.	Site Management	Phone Numbers
	A list of emergency contacts will be maintained which will include emergency services and utility providers.	Chief Flood Warden	Emergency contact list
	This FERP and the list of contacts will be kept on site in electronic and hard copy.	Chief Flood Warden	Electronic and hard copy of FERP

Alert – When a Flood is Possible			
Trigger	**Action**	**Responsibility**	**Requirements**
-BoM forecasts heavy rainfall (50 mm or more in the next 24 hours). - BoM issues a severe weather warning for the Macquarie Park or Sydney area with a chance of flash flooding.	Check BoM severe weather warnings for flash flooding in the Macquarie Park or Sydney area and BoM radar service every 2 hours while the site is open, and 2 hours before opening.	All Flood Wardens	Mobile or computer with internet connection

Respond – During a Flood Event			
Trigger	**Action**	**Responsibility**	**Requirements**
Either of the following: - BoM issues a severe weather warning for the Macquarie Park or Sydney areas with a chance of flash flooding at the site. - The NSW SES issues an a flood alert for the site.	If the site is closed:		
	Visit the site, if safe to do so, ensure no one is on site, ensure gates are locked and place a sign on the gates advising premises are closed until further notice due to risk of flooding.	Chief Flood Warden or delegate	Informative signs
	Cancel any upcoming deliveries.	Chief Flood Warden or delegate	FERP
	If the site is open:		
	Order all site personnel to move to shelter-in-place inside any temporary structures, or on the buildings ground floor if constructed.	All Flood Wardens	Flood response kits including first aid kits, portable radio and megaphone, sufficient torches and hi-vis vests and rain coats for all Flood Wardens, spare batteries for all of the above
	Relocate all loose materials within the PMF extents to higher ground if safe to do so.	Site Management	FERP
	Sweep site to ensure everyone is in the nominated assembly area.	Flood Wardens	Torches, megaphone, informative signs
	Explain why sheltering, the sheltering arrangements and the likely duration.	All Flood Wardens	This FERP, megaphone
	Contact site management and advise that there are people sheltering on site.	All Flood Wardens	Telephone and emergency contact list

	Contact the NSW SES (131 500) advise that there are people sheltering on site.	All Flood Wardens	Telephone and emergency contact list
Respond – During a Flood Event			
Trigger	**Action**	**Responsibility**	**Requirements**
Any of the following: - The NSW SES issues an evacuation order which covers the site.	Order an immediate site evacuation.	All Flood Wardens	Flood response kits including first aid kits, portable radio and megaphone, sufficient torches and hi-vis vests and raincoats for all Flood Wardens, spare batteries for all of the above
	Advise site management that the site is being evacuated.	Chief Flood Warden, or Warden (whoever has called the evacuation)	Telephone, emergency contact list
	Sweep the site to ensure everyone has left the site before locking the gates and placing a sign on the gates advising premises are closed until further notice due to risk of flooding.	Chief Flood Warden, or Warden in charge	Torches, megaphone, informative signs
	Cancel any upcoming deliveries, and/or interrupt any ongoing deliveries and instruct vehicles to leave site.	Chief Flood Warden or delegate	FERP
Any of the following: - NSW SES or BoM advises that flood peak has passed. - Flood water recedes or no visible sign of flood water along south eastern boundary	Check the condition of the evacuation route.	Chief Flood Warden	Torches, hi-vis vests
	If safe to do so, direct remaining people on site to evacuate via roads which are clear of flooding.	Chief Flood Warden	Megaphone
	If not safe to do so, contact NSW SES (131 500) and await further instructions.	Chief Flood Warden	Telephone and emergency contact list
	Advise site management of status.	Chief Flood Warden	Telephone and emergency contact list

Recover – After a Flood			
Trigger	**Action**	**Responsibility**	**Requirements**
All clear given by NSW SES, BoM, or Chief Flood Warden	No one will be allowed to return to the site while flooding is still occurring or has recently occurred.	Site Management and Chief Flood Warden	Informative signs
	Site access roads will need to be cleared of debris before the site is accessed. This should only be undertaken under the direction of the NSW SES or Council, due to risks from electricity, gas, debris and venomous animals.	Site Management and Chief Flood Warden	Telephone and emergency contact list
	Normal site usage should be able to resume once the site has been checked to ensure that utilities are restored and no structural damage has occurred. These checks need to be undertaken by professionals qualified to do so. Although landscaping areas would need cleaning that would not prevent use of the premises if the building is in working order.	Site Management and Chief Flood Warden	Contact details for structural engineer, electricians and plumbers
	Before any cleaning or repair work is undertaken on site, a hazard assessment will be undertaken, safe work methods statements (SWMS) prepared and personal protective equipment supplied consistent with the known hazards which can be associated with floods: - Slips, trips and falls - Sharp debris - Venomous animals - Contaminated water and sediments	Site Management and Chief Flood Warden	Correct SWMS and PPE
	A debrief will be held and may involve emergency services. The flood event and response, including the use of this FERP and any emergency procedures will be reviewed.	Site Management, Chief Warden and other wardens who were involved in response	FERP, a log of actions taken during the event. This check list can be used for that purpose with times and notes recorded against each action.
	Changes may be made to the FERP and the requirements for future emergency response should the review identify any improvements which may be made.	Site Management and Chief Flood Warden	FERP

Appendix D – Emergency Contact List

When to call the NSW SES

NSW STATE EMERGENCY SERVICE

132 500

For emergency help in flood, storm and tsunami

IN LIFE-THREATENING EMERGENCIES

CALL TRIPLE ZERO (000)

Due to flood or storm is anyone trapped or injured?

YES — Call **Triple Zero (000)**.

NO

Has a fallen tree blocked access? (i.e. front door/driveway/road)

OR

Is a tree threatening to fall on your property or driveway?

OR

Is your property flooded or in danger of flooding?

OR

Is your roof damaged or leaking?

OR

Is there damage to your property that you cannot fix yourself?

NO

Contact your insurance company or a private contractor to assess and complete the job, or repair it yourself if safe to do so.

YES

Call the NSW SES on 132 500

Your request for assistance will be logged by our operations centre who will give you a reference number. Your request will then be forwarded onto the nearest SES unit for action.

NSW SES Volunteers undertake temporary emergency measures to make your home and the situation safe. It is important that you contact either your insurance company or a private contractor to make permanent repairs to damage resulting from a flood or storm or to remove any remaining debris.

When to call the NSW SES

NSW STATE EMERGENCY SERVICE

132 500

For emergency help in flood, storm and tsunami

IN LIFE-THREATENING EMERGENCIES

CALL TRIPLE ZERO (000)

The ***NSW SES*** experiences many calls during floods and storms.

Assisting people in our communities who are overwhelmed by damage and impacts of natural disasters as quickly as possible is important to all ***NSW SES*** volunteers.

What to do after logging a call with us:

- Make sure you keep your phone close by so we can easily contact you about your request for assistance.
- Stay away from any fallen trees and/or power lines that may have been brought down in the storm.
- Follow any safety recommendations you are given by the ***NSW SES***.
- ***NSW SES*** attends to request for assistance in a priority based order. A life threatening emergency will always be given immediate priority.
- If you no longer require emergency assistance, call us on **132 500** quoting your reference number to cancel the request. This helps free up our emergency crews if you no longer need us.

For great tips on how you can Get Ready this Storm Season, or to find out more information about the *NSW SES*, head to our website at www.ses.nsw.gov.au

NSW Emergency Contact Numbers

NORTHERN SETTLEMENT SERVICES LIMITED

Services	Disaster	Service Name	Telephone Number	Details	Social Media	App	Website
000 EMERGENCY	All Emergencies	Emergency	TRIPLE ZERO (000)	All life threatening emergencies			www.triplezero.gov.au
	All Emergencies	NSW Police Force	TRIPLE ZERO (000)	Police Assistance Line - 131 444, Crime Stoppers - 1800 333 000 **Report crimes that are not in progress**		–	www.police.nsw.gov.au
		NSW Fire & Rescue	TRIPLE ZERO (000)	Helps the community during building fires, car accidents, rescues & accidents involving hazardous material			www.fire.nsw.gov.au
		NSW Rural Fire Service - RFS	TRIPLE ZERO (000)	Info Line - 1800 679 737 Help the community during bush, grass & building fires, as well as car accidents			www.rfs.nsw.gov.au
SES NSW STATE EMERGENCY SERVICE		NSW Emergency Service - SES	132 500	For general help in a flood or storm			www.ses.nsw.gov.au
TIS TRANSLATING AND INTERPRETING SERVICE	–	Translating Interpreting Service - TIS	13 14 50	If you do not speak English well, you can call TIS (not an emergency service)	–	–	www.tisnational.gov.au

Updates During and After an Emergency

	All Emergencies	Emergency NSW	–	Alerts and Updates	–	–	www.emergency.nsw.gov.au
ABC Local Radio Your Emergency Broadcaster Be prepared. Stay informed.	All Emergencies	ABC Local Radio ABC Emergency	–	Emergency Broadcasts Updates			www.abc.net.au/news/emergency/
NSW Emergency New South Wales	All Disasters	State Disaster Welfare Services	1800 018 444	Disaster Relief Grants	–	–	www.emergency.nsw.gov.au

Developed by Northern Settlement Services Ltd. Natural Disaster Awareness Program in partnership with NSW State Emergency Service and NSW Rural Fire Service. Project funded by the Commonwealth and NSW Governments under the Community Resilience Innovation Program. Resource funded by Westpac Natural Disaster Recovery Fund. **www.nsservices.com.au**

Appendix 14 – Unexpected Finds Protocol

Douglas PARTNERS

GROUNDED EXPERTISE

Unexpected Finds Protocol

Midtown Macquarie Park New Primary School

Ivanhoe Estate, Macquarie Park, NSW

Prepared for Taylor Construction Group Pty Ltd

Project 216254.04

19 December 2024

Douglas Partners Pty Ltd
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Document History

Details

Project No.	216254.04
Document Title	Unexpected Finds Protocol
Site Address	Midtown Macquarie Park, New Primary School, Ivanhoe Estate, Macquarie Park, NSW
Report Prepared For	Taylor Construction Group Pty Ltd
Filename	216254.04.R.003.Rev1 - UFP

Status and Review

Status	Prepared by	Reviewed by	Date issued
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Revision 0	Divyansh Kumar / David Walker	Nizam Ahamed	12 December 2024
Revision 1	Divyansh Kumar / David Walker	Nizam Ahamed	19 December 2024

Distribution of Copies

Status	Issued to
Draft A	Mike O'Neill, Taylor Construction Group Pty Ltd
Revision 0	Mike O'Neill, Taylor Construction Group Pty Ltd
Revision 1	Mike O'Neill, Taylor Construction Group Pty Ltd

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

Signature		Date
Author	pp	19 December 2024
Reviewer		19 December 2024

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

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Attachments

Appendix A: Notes About This Report

Appendix B: Drawing 1

Appendix C: Tables 1 and 2: Summary of Laboratory Analytical Results (Douglas, 2023)

Appendix D: Unexpected Finds Form

Appendix E: Site Assessment Criteria

Unexpected Finds Protocol
Midtown Macquarie Park New Primary School
Ivanhoe Estate, Macquarie Park, NSW

1. Introduction

Douglas Partners Pty Ltd (Douglas) has been engaged by Taylor Construction Group Pty Ltd (Taylor) to prepare this Unexpected Finds Protocol (UFP) for Lot 29 in Deposited Plan (D.P.) 1294659 and part of Lot 132 in D.P. 1297655 which represent the 'B2' site within the Ivanhoe Estate concept approval (SSD-8707) (hereafter referred to as the 'site', as indicated in Figure 1). The purpose of the UFP is to provide a formal contingency protocol to be followed in the event of an unexpected find (UF) with respect to potential site contamination encountered during bulk earthworks. It is understood that the UFP has been prepared to address a requirement for a construction certificate and for the state significant development application (SSDA).

It is understood that the proposed school development includes the construction of a six-storey school building with a partial basement ground level, as well as construction of an on-grade car park area and landscaping. Driveway access from Mahoganey Avenue will be at the north-western part of the site.

The site is located at Mahogany Avenue, Macquarie Park within the Ivanhoe Estate Development and covers an area of approximately 3346 m^2. At the time of preparing this UFP, the site was vacant.

The site is bounded by Mahogany Avenue to the south, grassed and paved areas to the east and west, and existing residential apartment buildings to the north. The "Midtown MacPark" development area is located to the west, south and east of the site. The site and surroundings are shown in Figure 1.

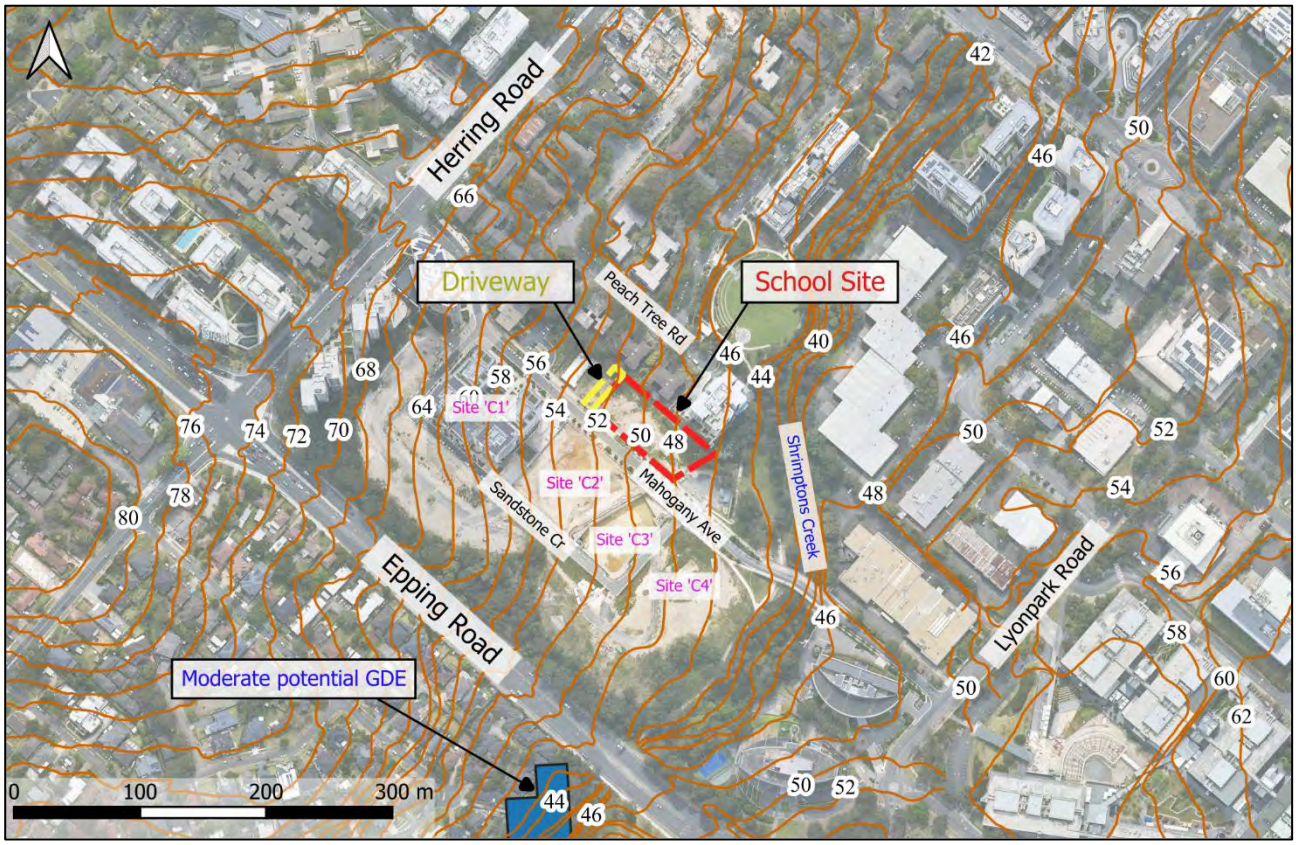

Figure 1: Aerial image of site overlain by 2 m surface contours to AHD and nearby features

2. Previous intrusive investigation reports

2.1 Douglas (2023)

The scope of works for Douglas (2023) included laboratory analysis of soil samples collected from four geotechnical boreholes (BH301 to 304) and five test pits (TP305 to 309), and laboratory analysis of groundwater samples collected from three groundwater wells (BH301, BH302 and BH304) which were installed for geotechnical purposes. Sample locations are shown on Drawing 1, Appendix A.

The report provided a summary of the sub-surface conditions as follows:

- **Fill** – Fill was encountered within all boreholes and test pits to depths of between 0.8 m and 1.5 m. The fill appeared variably compacted and typically consisted of a 0.2 to 0.3 m thick layer of either silty / sandy topsoil or road base gravel overlying low plasticity, dark brown silty clay, and gravelly clay, with varying proportions of subangular polylithic (sandstone, basalt, and concrete) gravel, and trace quantities of glass fragments, concrete cobbles, steel wire, terracotta fragments and moist decomposed roots / organic matter.
- **Residual CLAY**– Medium plasticity silty clay, grading to low plasticity, sandy clay logged as extremely weathered material. The consistency of the residual clay generally ranged from very stiff to hard. Residual soil was typically encountered to depths of 2 to 3 m below ground level (bgl).

- **Sandstone** – Very low to low strength, highly weathered sandstone overlying predominantly medium to high strength, slightly weathered sandstone was encountered in deep boreholes (BH301 toBH304) from depths of between 1.9 m and 2.68 m.

Selected soil samples were analysed for metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), organochlorine pesticides (OCP), organophosphorus pesticides (OPP), polychlorinated biphenyls (PCB), total phenols, asbestos and perfluoroalkyl and polyfluoroalkyl substances (PFAS). Contaminant concentrations or the 95% upper confidence limit (UCL) of the arithmetic mean (using USEPA ProUCL) of soil samples tested were within the adopted site assessment criteria (SAC). Asbestos was not detected in the analysed soil samples.

No free groundwater was observed during excavation of test pits or drilling of boreholes. Measurement of standing water levels, after allowing the wells to stabilise following purging, indicated groundwater at a depth of approximately:

- 3.8 m bgl (RL 45.1 m AHD) within downgradient well BH301;
- 5.7 m bgl (RL 44.2 m AHD) within downgradient well BH302; and
- 2.8 m bgl (RL 49.2 m AHD) at within up-gradient well BH304.

It should be noted that groundwater levels are subject to seasonal and temporal variations.

For tested groundwater samples:

- Concentrations of PAH, phenols, TRH, BTEX, PCB, OCP and OPP in all samples were below their respective laboratory detection limits; and
- Concentrations of copper (in all wells), lead (in BH301 only), nickel (in BH301 and BH302) and zinc (in all wells) were above the adopted assessment criteria. However, these exceedances were attributed to the background concentrations that would be associated with the mineralogy of the clay / sandstone and were therefore not considered to present a risk to the nearest receptor (receiving waterbody i.e. Shrimptons Creek).

Analytical results for soil and groundwater samples are summarised in Tables 1 and 2, Appendix C.

2.2 Douglas (2024)

The scope of works for Douglas (2024) included soil sampling from 13 test pits (TP1 to TP13) and laboratory analysis of soil samples for metals, TRH, BTEX, PAH, OCP, OPP, PCB, phenols and asbestos.

The report provided a summary of the sub-surface conditions as follows:

- **Fill / pavers** – Pavers in TP12 and TP13 to depths of 0.1 m bgl.
- **Fill** – Fill generally comprising sandy clay and / or silty clay with trace fragments of brick, PVC, twigs, ceramic and concrete in all test locations to depths of between 0.3 m and 1.3 m bgl.
- **Clay** - Clay in all test locations. All test pits terminated in this clay (maximum depth 1.5 m bgl) with the exception of TP8 which was terminated at 1.2 m bgl due to a potential underground service.

The screening of 10 L samples of fill soils did not identify any potential asbestos containing material (ACM). No free groundwater was observed during excavation of test pits.

Analytical results for all contaminants tested in all samples were below the SAC.

It was considered that the site is suitable for the primary school development. It was recommended that, with all construction projects, an UFP should be prepared and implemented during site works to address any unexpected potential contamination finds.

Analytical results are summarised in Table G2, Appendix C. Sample locations are shown on Drawing 1, Appendix A.

3. Implementation of the unexpected finds protocol

3.1 Overview

This UFP is a precautionary measure (to be implemented during any civil or construction works at the site) to ensure that unexpected finds of contamination, if any, are appropriately managed. Unexpected finds of potential contamination may be identified by visual (appearance or staining) and / or olfactory (odour) evidence during site works.

3.2 Responsibilities

Relevant personnel for the project and UFP (at the time of preparing this UFP) are as follows:

- Site Manager: Damian Fisher (Taylor);
- Project Engineer: Matt Ellis (Taylor) (alternative contact if Site Manager is not available); and
- Principal's Representative: Taha Qureshi (The APP Group).

The Site Manager is responsible for providing advice and a copy of the UFP to all excavation and construction personnel prior to commencing work and for ensuring that the plan is implemented by contractors during works undertaken at the site.

All site workers must be inducted to the UFP prior to commencement of any works. The induction can be undertaken at the time of a general site induction and toolbox meetings. Induction into the UFP must be performed by a suitably qualified person.

The UFP is to be implemented by contractors during any stage of the project (including during site preparation, excavation and construction works) if / when unexpected contamination finds are identified during any stage of the development. Prior to the commencement of site works, a pre-start meeting should be convened between all relevant parties to discuss the requirements of the UFP and to assign roles and responsibilities.

3.3 Timing

This UFP should be implemented over the period of construction and earthworks being carried out at the site. The management of long-term contamination issues (if encountered) is outside the purview of this UFP.

4. Contingency plan

In order to assist in the early identification of unexpected finds and to minimise the potential for unexpected finds to be damaged and / or spread across the site during earthworks and / or development works, a site walkover following excavation works to visually identify areas of uncontrolled filling should be undertaken by a competent person or a suitably qualified environmental consultant. Should any unexpected contamination find be encountered during the site walkover, the management procedure and relevant procedure for the specific find (detailed below) should be implemented.

4.1 Unexpected finds protocol – general

If unexpected conditions with respect to contamination are encountered by a contractor during the works (such as buried structures or unexpected contaminated soil), the following general approach should be adopted:

- Upon discovery of an UF, works should cease in that area. The Site Manager should be notified, and the affected area closed off by the use of barrier tape;
- The location of the UF should be surveyed using dGPS with sub-metre accuracy;
- The Site Manager is to contact the Principal's Representative, and then the Principal's Representative or Site Manager is to notify the Environmental Consultant;
- The Environmental Consultant will inspect the area and make an assessment of the significance of the find in terms of the potential impact to human health and the environment with reference to NSW EPA endorsed guidelines. (Site assessment criteria for assessing analytical results are included in Appendix E for reference);
- The Environmental Consultant is to provide advice to the Principal's Representative regarding the recommended course of action;
- The Environmental Consultant will prepare a report detailing their assessment, including the extent and methods of remediation and a validation plan, as required. Where the contamination is considered to be substantial or extensive (i.e. not localised or highly contaminated), a remediation action plan (RAP) should be prepared. The RAP should be reviewed and endorsed by a Site Auditor;
- The assessment results together with a suitable remediation / management plan may be provided to Council / consent authority (as required) prior to the removal or treatment of such contamination;
- The agreed management / remedial strategy shall be implemented;
- All movements of soil within the site and off-site are to be tracked ('from cradle to grave') with records of the movements to be kept by the Site Manager. Records are to be provided to the Environmental Consultant, as required;
- Any soils to be disposed off-site as a result of the remedial works are to be classified by the Environmental Consultant in accordance with NSW EPA (2014) and disposed to a licensed facility / landfill in accordance with the *Protection of the Environment Operations Act 1997* (POEO Act). NSW EPA (2022) is to be referred to for adopting sampling densities for waste classification;
- Any soils, aggregate etc imported for remediation works should be assessed by the Environmental Consultant (see Section 5.2);

- Details of the incident are to be recorded in the site record system; and
- The remediation and validation works undertaken is to be reported by the Environmental Consultant in a validation report. The report is to provide an assessment of the findings and results, and comment on the suitability of the site for the proposed use.

4.2 **Unexpected finds protocol – asbestos**

In the event that the UF relates to the identification of asbestos, the following protocol will also apply:

- Upon discovery of suspected asbestos, the Site Manager should be notified and the affected area closed off by the use of barrier tape and warning signs. Warning signs shall be specific to Asbestos Hazards and shall comply with the Australian Standard 1319-1994 *Safety Signs for the Occupational Environment*;
- The location of the UF should be surveyed using dGPS with sub-metre accuracy;
- The Site Manager is to contact the Principal's Representative, and the Principal's Representative is to notify an appropriately qualified Environmental Consultant or Occupational Hygienist;
- The Environmental Consultant or Occupational Hygienist is to confirm the presence of asbestos and assess the extent of remediation works to be undertaken. An assessment report detailing this information will be compiled by the Environmental Consultant or Occupational Hygienist and provided to the Principal's Representative. The Environmental Consultant should also prepare a report detailing the methods of management / remediation and an associated validation plan, as required. Where the contamination is considered to be extensive, a RAP should be prepared. The RAP should be reviewed and endorsed by a Site Auditor;
- The assessment results, together with a suitable management plan, may be provided to Council / consent authority (as required) prior to the removal or treatment of the asbestos;
- An asbestos removal control plan (ARCP), as described in SafeWork NSW (2022b), for the asbestos removal work is to be prepared for the asbestos removal work by the licensed asbestos removal contractor. SafeWork NSW is to be notified in writing at least five days before the licensed asbestos removal work commences;
- The agreed management / remedial strategy shall be implemented. All work associated with asbestos in soil will be undertaken by an appropriately licenced contractor;
- All movements of soil within the site and off-site are to be tracked ('from cradle to grave') with records of the movements to be kept by the Site Manager. Records are to be provided to the Environmental Consultant, as required;
- In dry and windy conditions, any stockpiles or other areas of the site found to contain asbestos should be lightly wetted and covered with plastic sheeting whilst awaiting remediation / disposal;
- Monitoring for airborne asbestos fibres is to be carried out during the soil excavation and remediation (if undertaken);

- Any soils to be disposed off-site as a result of the remedial works are to be classified by the Environmental Consultant in accordance with NSW EPA (2014) and disposed to a licensed facility / landfill in accordance with the POEO Act. NSW EPA (2022) is to be referred to for adopting sampling densities for waste classification. The NSW EPA's online Integrated Waste Tracking Solution (IWTS) is to be used for tracking the transport of asbestos waste;
- Any soils, aggregate etc imported for remediation works should be assessed by the Environmental Consultant (see Section 5.2);
- Documentary evidence (weighbridge dockets) of correct disposal is to be provided to the Site Manager and / or Principal's Representative (as appropriate);
- At the completion of the excavation, a clearance inspection is to be carried out and written confirmation is to be provided by the Environmental Consultant or Occupational Hygienist that the area is safe to be accessed and worked. Validation should include appropriate soil sampling and testing; and
- Details of the UF and the remedial action employed should be recorded in the site record system.

4.3 Unexpected finds protocol – buried structures

In the event that buried structures, such as underground storage tanks (USTs), are encountered during site works, in addition to the procedure outlined in Section 4.1 above, the structure(s) and any associated pipework should generally be managed / removed as follows:

- Upon discovery of the structure, the Site Manager is to be notified and the area barricaded;
- The area will be inspected by a qualified environmental consultant including visual identification of the structure and associated pipework;
- Under the supervision of a competent person or environmental consultant:
  - Remove and dispose of the structure and associated pipework by a qualified contractor. In the case of an UST, the tank must be removed in accordance with Australian Standard AS 4976 - 2008 *The Removal and Disposal of Petroleum Underground Storage Tanks*; and
  - Excavate and stockpile impacted materials (based on field observations) for waste classification by the Environmental Consultant.
- Validation of the remedial pit is to be undertaken by the Environmental Consultant through inspection, and sample collection and analysis for the contaminants of concern at the following minimum sampling densities (adopted from NSW EPA, 2023):
  - Base of tank pit excavation: one sample for tank length <4 m, two samples (one at each end) for tanks >4 m long or, for larger excavations, one sample per 25 m^2 with a minimum of two samples;
  - Side of tank pit excavation: one sample per wall for tank length <4 m, two samples per wall for tank length 4-10 m, or three samples per wall for tank length >10 m (i.e. at least one sample per 5 m length of wall);
  - Fuel feed lines / pipe-work: one sample per 5 linear metres; and
  - Quality assurance / quality control (QA / QC) replicate sampling and analysis at a rate of at least 10% of the samples collected.

(Site assessment criteria for the assessment of results for validation samples have been included in Appendix E for reference);

- If required, 'chase out' all of the material in the remediation pit identified to be impacted by petroleum hydrocarbons, and undertake further validation sampling and analysis as required to assess appropriate removal of impacted materials (using the sample densities given above);
- Any soils to be disposed off-site as a result of the remedial works are to be classified by the Environmental Consultant in accordance with NSW EPA (2014) and disposed to a licensed facility / landfill in accordance with the POEO Act. NSW EPA (2022) is to be referred to for adopting sampling densities for waste classification;
- Based on the extent of impacts, the need for a groundwater investigation should be considered by the environmental consultant;
- All movements of soil within the site and off-site are to be tracked ('from cradle to grave') with records of the movements to be kept by the Site Manager. Records are to be provided to the Environmental Consultant, as required;
- Any soils, aggregate etc, imported for remediation works should be assessed by the Environmental Consultant (see Section 5.2); and
- Inclusion of validation, waste classification and disposal documents (including landfill dockets and, in the case of USTs, tank and pipe work destruction certificates) in a validation report for the site.

4.4 **Unexpected finds protocol – groundwater**

Previous investigations have encountered groundwater at depths of between RL 44.2 and 49.2 m AHD (near bulk excavation levels) and the results of the groundwater monitoring did not indicate a high risk of groundwater contamination. Notwithstanding if potentially contaminated groundwater (i.e. odorous or stained) is encountered during the proposed development, then:

- Upon discovery of contaminated groundwater, the Site Manager is to be notified, works in the area halted and the area barricaded;
- The area / impacts should be inspected by a qualified environmental consultant with a view to investigating the nature and extent of the contamination if any. As necessary, the delineation exercise may involve a detailed groundwater investigation. (Site assessment criteria for the assessment of results for groundwater samples have been included in Appendix E for reference); and
- Based on the results, the environmental consultant will provide a report to the Site Manager / Principal's Representative regarding the nature of the contamination, the need for additional investigations and / or the proposed management strategy. In this regard, it is noted that management of contaminated groundwater can be a complex matter and therefore, the type of management strategies will be dependent on the nature and extent of the identified contamination, if any. Where groundwater remediation is required, a RAP should need be prepared and then reviewed and endorsed by a Site Auditor.

4.5 Documentation

An unexpected find form is attached at the end of this UFP and should be completed by the Site Manager in the event of encountering an UF. The form should be sent to the Principal's Representative and Environmental Consultant, or Occupational Hygienist, in the event of encountering a UF.

A validation report(s) is to be prepared by the Environmental Consultant where remediation has been undertaken to address contamination associated with an UF.

5. General site management plan

This section provides a general site management plan for the remediation of an UF with the aim of minimising potentially adverse impacts on the environment, and worker and public health. The information presented herein may be incorporated into a construction environmental management plan (CEMP) (or similar) for the project.

5.1 Stockpiling

Contaminated material shall be excavated and stockpiled at a suitably segregated location(s) away from sensitive areas (e.g. water bodies, drainage lines, stormwater pits, etc.) and ongoing excavations, and in a manner that will not cause nuisance to the neighbouring properties. Contaminated soil stockpiles are to be managed as follows:

- An impermeable membrane such as plastic sheeting should be placed at the ground surface prior to stockpiling. Plastic sheeting should be taped at joins, as necessary;
- All stockpiles of contaminated material shall be surrounded by star pickets and marking tape or other suitable material to clearly delineate their boundaries;
- Stockpiles shall be lightly conditioned by a sprinkler system or covered by geotextile or similar cover to prevent dust generation;
- Stockpiles impacted, or potentially impacted, with asbestos must be covered by geotextile;
- Measures should be taken to prevent the migration of stockpiled materials (i.e. perimeter bunds, silt fences, etc); and
- A site record of stockpile locations (stockpile register), dimensions, descriptions, environmental controls, etc. should be maintained.

Imported material shall be stockpiled at a suitably segregated location(s) away from sensitive areas (e.g. water bodies, drainage lines, stormwater pits, etc.) and ongoing excavations, and in a manner that will not cause nuisance to the neighbouring properties. Soil stockpiles are to be managed as follows:

- Imported material should not be stockpiled within un-remediated areas of the site. If this is unavoidable an impermeable membrane such as plastic sheeting should be placed at the surface prior to stockpiling. Plastic sheeting should be taped at joins, as necessary;
- Stockpiles shall be lightly conditioned by sprinkler or covered by geotextile or similar cover to prevent dust generation; and

- A site record of stockpile locations (stockpile register), dimensions, descriptions, etc. should be maintained

5.2 Imported material assessment

Imported materials will only be accepted for use at the site if:

- It can legally be accepted onto the site (e.g. classified as virgin excavated natural material (VENM) or under a NSW EPA Resource Recovery Order and associated Resource Recovery Exemption, accompanied by a report / certificate prepared by a qualified environmental consultant);
- Visual inspection of the imported soil confirms that the soil has no signs of concern and is consistent with those described in the supporting classification documentation;
- Have no aesthetic issues of concern; and
- The materials are validated (by inspection / sampling) by the Environmental Consultant as being suitable for use at the site. The need for and densities of check-sampling is to be determined by the Environmental Consultant depending on the source of the material, adequacy of the supporting documentation provided and inspection(s) of material. (Site assessment criteria have been included in Appendix E for reference). Quarried material / VENM may need little or no check sampling. Any recycled materials proposed for importation must be sampled at a frequency of one sample per 25 m^3, with a minimum of three samples per load.

5.3 Transport of material off-site and on to site

Transport of contaminated material from the site and imported material to the site shall be via a clearly delineated haul route(s) and this route shall be used exclusively for entry and egress of vehicles used to transport contaminated materials within and away from the site, and onto and within the site.

All haulage routes for trucks transporting soil, materials, equipment or machinery to and from the site should be selected to meet the following objectives:

- Comply with all road traffic rules;
- Minimise noise, vibration and dust to adjacent premises; and
- Use State roads and minimise use of local roads as far as practicable.

The remediation work will be conducted such that all vehicles:

- Conduct deliveries of soil, materials, equipment or machinery only during the specified hours of remediation;
- Have securely covered loads to prevent any dust or odour emissions during transportation; and
- Exit the site in a forward direction.

In addition, measures will be implemented to ensure no contaminated material is spilled onto public roadways or tracked off-site on vehicle wheels. Roadways will be kept clean throughout the remediation works and will be broomed, if necessary, to achieve a clean environment.

All loads will be securely covered and may be lightly wetted, if required, to ensure that no materials or dust are dropped or deposited outside or within the site. Any soil spilled onto surrounding streets will be cleaned by mechanical or hand methods, on a daily basis.

Removal of waste materials from the site shall only be carried out by contractors holding the appropriate license(s), consent or approvals to dispose the waste materials according to the waste classification and with the appropriate approvals obtained from the EPA, were required.

Materials imported onto the site shall only be carried out by contractors holding the appropriate license(s), consent or approvals to transport the materials with the appropriate approvals obtained from the EPA, where required.

5.4 **Odour control**

No odours should be detected at any boundary of the site during remediation works by an authorised Council Officer relying solely on sense of smell. The following example procedures could be employed to comply with this requirement as necessary:

- Use of appropriate covering techniques such as plastic sheeting, polythene or geotextile membranes to cover excavation faces or stockpiles;
- Fine spray of water and / or hydrocarbon mitigating agent on impacted areas / stockpiles or loads to lightly condition the material;
- If required, restrict uncovered stockpiles to appropriate sizes to minimise odour generation;
- Ceasing works during periods of inclement weather such as high winds or heavy rain;
- Regular checking of the fugitive dust and odour issues to ensure compliance. Undertake immediate remediation measures to rectify any cases of excessive dust or odour (e.g. use of misting sprays or odour masking agent); and
- Adequate maintenance of equipment and machinery to minimise exhaust emissions.

5.5 **Water management**

Stormwater must be managed during remediation works such that potential adverse impacts from surface runoff (e.g. cross contamination, mobilisation of contaminants in soil particles, etc.) are appropriately mitigated. These may include:

- Construction, where necessary, of stormwater diversion channels, bunding and linear drainage sumps with catch pits in and around the remediation areas to divert stormwater from the contaminated areas;
- Provision of appropriately located sediment traps including geotextiles; and
- Discharge of excess water in excavations / low points on a regular basis to minimise the potential for flooding.

Any runoff or seepage water accumulated in site excavations that requires removal must initially be sampled and tested for suspended solids, pH and any contaminants of potential concern (CoPC) as identified by the Environmental Consultant. The options for management of excavation pump-out water, dependent upon the test results, are for disposal of the water as follows:

- Discharge to stormwater with prior approval from Council. Provided the test results comply with relevant ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018), or any other compliance requirements stipulated by Council. The Environmental Consultant must consider the most appropriate criteria to be used; or
- Discharge to sewer, as industrial trade wastewater, with prior approval from Sydney Water. This option would require the analysis of a larger list of analytes, and compliance with the Sydney Water acceptance standards; or
- Pumping by a licensed liquid waste contractor for removal of the water off-site to a licensed facility, in accordance with regulatory requirements.

5.6 **Work health and safety**

All site work must be undertaken in a controlled and safe manner with due regard to potential hazards, training and safe work practices. Contractors undertaking the remedial work are to have SWMS (safe work method statements) which comply with policies specified in the *Work Health and Safety Regulation 2011*. All appropriate permits, licences and notifications required for the remediation activities must be obtained prior to the commencement of remediation works.

Appropriate fencing and signage must be installed around and within the site to prevent unauthorised access and restrict access to remediation areas and / or deep excavations. Any existing pits or unstable areas on site that may generate potential safety, or operational risk should be demarcated and taped off, with appropriate rectification action undertaken (e.g. backfilling of pits).

Personnel will endeavour, wherever possible, to avoid direct contact with potentially contaminated material. Appropriate personal protective equipment (PPE) must be used to mitigate potential exposure risks. As a minimum, all personnel on site will be required to wear the following PPE:

- Steel-capped boots (mandatory);
- High visibility clothing / vest (mandatory);
- Safety glasses or safety goggles with side shields requirements (as necessary);
- Hard hat (as necessary);
- Appropriate respiratory and protective equipment for any works involving asbestos (as necessary); and
- Hearing protection when working in the vicinity of machinery or plant equipment if noise levels exceed exposure standards (as necessary).

Each item of PPE should meet the corresponding relevant Australian Standard(s).

Specific safe work practices will be adopted when working with asbestos, in accordance with (but not limited to) the following codes of practice:

- SafeWork NSW Code of Practice, *How to Manage and Control Asbestos in the Workplace* (SafeWork NSW, 2022a);
- SafeWork NSW Code of Practice, *How to Safely Remove Asbestos* (SafeWork NSW, 2022b);
- WorkCover NSW, *Managing Asbestos in or on Soil* (WorkCover NSW, 2014); and
- NOHSC, *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Ed* (NOHSC, 2005).

6. Concluding statements

This UFP has been prepared to outline appropriate management procedures and reporting protocols that should be implemented in the event that unexpected contamination is encountered during the proposed development.

It is possible that indications of contamination not specifically covered in this UFP may be encountered at the site. In such a scenario, a precautionary principle will be applied and the general unexpected finds protocol (Section 4.1) should be applied in all circumstances.

7. References

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NSW EPA. (2014). *Waste Classification Guidelines - Part 1: Classification of waste.* Sydney: NSW Environment Protection Authority (EPA).

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land.* Contaminated Land Guidelines: NSW Environment Protection Authority.

NSW EPA. (2022). *Sampling Design, Part 1: Application; Part 2: Interpretation.* NSW Environment Protection Authority.

NSW EPA. (2023). *Contamination assessment of service station sites.*

SafeWork NSW. (2022a). *Code of Practice, How to Manage and Control Asbestos in the Workplace.* August 2022.

SafeWork NSW. (2022b). *Code of Practice, How to Safely Remove Asbestos.* August 2022: SafeWork NSW, NSW Government.

WorkCover NSW. (2014). *Managing Asbestos in or on Soil.* March 2014: WorkCover NSW, NSW Government.

8. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report for this project at Ivanhoe Estate, Macquarie Park, NSW in accordance with Douglas' proposal dated 28 August 2024. The work was carried out under Douglas' Engagement Terms. This report is provided for the exclusive use of Taylor Construction Group Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and / or their agents.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. Douglas cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by Douglas. This is because this report has been written as advice and opinion rather than instructions for construction.

Appendix A

Notes About This Report

About this Report

November 2023

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

continued next page

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

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Appendix B

Drawing 1

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	216254.04.R.001.Rev0	10.12.2024	ZAK

0 5 10 15 20 25 30 m

1:500 @ A3

Douglas PARTNERS
OFFICE: Wollongong
1 Luso Drive, Unanderra NSW
(02) 4271 1836

CLIENT:
NSW GOVERNMENT Education School Infrastructure
Schools Infrastructure NSW

NOTE:
1: Basemap from Metromap.com (Dated 22.09.2024)

COORDINATE REFERENCE SYSTEM: GDA2020, MGA ZONE 56

Midtown Macquarie Public Park Public School

Ivanhoe Estate, Macquarie Park, NSW

DRAWING TITLE:
Test Location Plan

PROJECT NO:	216254.04
DRAWING NO:	1
REVISION:	0

Appendix C

Tables 1 and 2: Summary of Laboratory Analytical Results (Douglas, 2023)

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Table 1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, Phenol, OCP, OPP, PCB, Asbestos

				Metals								TRH						BTEX				PAH				Phenol
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 (C6-C10)-BTEX	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs	Phenol
			PQL	4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	0.1	0.05	0.5	0.05	5
Sample ID	Depth	Soil Matrix	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BH301	0.4 - 0.5 m	FILL	03/08/2022	**4**	<0.4	**16**	**13**	**12**	<0.1	**7**	**25**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -	100 -
BH301	1.9 - 2 m	NATURAL	03/08/2022	**5**	<0.4	**20**	**3**	**12**	<0.1	**2**	**6**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.2	<0.05	<0.5	**0.2**	-
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	90 180	NL -	- 1300	- 5600	1 65	NL 105	NL 125	310 45	NL 170	- 0.7	3 -	300 -	100 -
BH302	0.4 - 0.5 m	FILL	03/08/2022	<4	<0.4	**19**	**29**	**9**	<0.1	**6**	**20**	<25	<50	<25	<50	**110**	**100**	<0.2	<0.5	<1	<1	<0.1	**0.08**	<0.5	**0.4**	<5
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -	100 -
BH303	0.1 - 0.2 m	FILL	03/08/2022	**5**	<0.4	**15**	**10**	**15**	<0.1	**8**	**22**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	**0.07**	<0.5	**0.07**	<5
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -	100 -
BH303	0.9 - 1 m	NATURAL	03/08/2022	**8**	<0.4	**18**	**11**	**17**	<0.1	**8**	**25**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	-
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -	100 -
BH304	0.4 - 0.5 m	FILL	03/08/2022	**5**	<0.4	**15**	**8**	**13**	<0.1	**3**	**15**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -	100 -
TP305	0.1 - 0.2 m	FILL	03/08/2022	<4	<0.4	**5**	**39**	**4**	<0.1	**9**	**24**	<25	53	<25	53	**290**	**390**	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -
TP306	0.1 - 0.2 m	FILL	03/08/2022	<4	<0.4	**12**	**30**	**24**	<0.1	**9**	**77**	<25	<50	<25	<50	**340**	**310**	<0.2	<0.5	<1	<1	<0.1	**0.09**	<0.5	**0.09**	<5
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -
BD01	0.1 - 0.2 m	FILL	03/08/2022	**6**	<0.4	**11**	**20**	**25**	<0.1	**8**	**37**	-	-	-	-	-	-	-	-	-	-	<0.1	**0.06**	<0.5	**0.06**	-
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -
TP306	0.5 - 0.6 m	FILL	03/08/2022	<4	<0.4	**11**	**10**	**17**	<0.1	**6**	**23**	<25	<50	<25	<50	**140**	**200**	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	-
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -
TP307	0.5 - 0.6 m	FILL	03/08/2022	<4	<0.4	**11**	**16**	**11**	<0.1	**14**	**28**	<25	<50	<25	<50	**130**	**120**	<0.2	<0.5	<1	<1	<0.1	**0.2**	<0.5	**0.78**	<5
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -	100 -
TP308	0.1 - 0.2 m	FILL	03/08/2022	<4	<0.4	**9**	**6**	**10**	<0.1	**7**	**29**	<25	<50	<25	<50	**100**	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -	100 -
TP308	0.5 - 0.6 m	FILL	03/08/2022	<4	<0.4	**9**	**18**	**10**	<0.1	**7**	**25**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	**0.1**	<0.5	**0.71**	-
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -	100 -
TP309	0.1 - 0.2 m	FILL	03/08/2022	<4	<0.4	**8**	**11**	**9**	<0.1	**5**	**17**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	-
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -
TP309	1 - 1.1 m	FILL	03/08/2022	**6**	<0.4	**13**	**13**	**19**	<0.1	**2**	**25**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	<5
				100 100	20 -	100 590	6000 75	300 1100	40 -	400 140	7400 230	- -	- 120	70 180	240 -	- 300	- 2800	0.5 50	220 85	NL 70	60 105	NL 170	- 0.7	3 -	300 -	100 -

Lab result

HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab, refer to the lab report **Blue** = DC exceedance HSL 0-<1 Exceedance

Bold = Lab detections - = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable NL = Non limiting AD = Asbestos detected NAD = No Asbestos detected

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level ML = Management Limit DC = Direct Contact HSL

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Reported naphthalene laboratory result obtained from BTEXN suite

c Criteria applies to DDT only

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

SAC based on generic land use thresholds for Residential A with garden/accessible soil

HIL A	Residential / Low - High Density (NEPC, 2013)
HSL A/B	Residential / Low - High Density (vapour intrusion) (NEPC, 2013)
DC HSL A	Direct contact HSL A Residential (Low density) (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

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Table 1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, Phenol, OCP, OPP, PCB, Asbestos

			OCP											OPP	PCB									PFAS			Asbestos		
			DDD	DDT+DDE+DDD [c]	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene [b]	Methoxychlor	Chlorpyriphos	Aroclor 1016	Total PCB	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	PFOA	PFOS+PFHxS (Calculated)	PFOS	Asbestos ID in soil >0.1g/kg	Trace Analysis	Total Asbestos
			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1				
Sample ID	Depth	Soil Matrix	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	-	-	-
BH301	0.4 - 0.5 m	FILL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	NAD	NAD	NAD
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
BH301	1.9 - 2 m	NATURAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
BH302	0.4 - 0.5 m	FILL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	NAD	NAD	NAD
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
BH303	0.1 - 0.2 m	FILL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	NAD	NAD	NAD
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
BH303	0.9 - 1 m	NATURAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
BH304	0.4 - 0.5 m	FILL	<0.1	0.2	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	NAD	NAD	NAD
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
TP305	0.1 - 0.2 m	FILL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	NAD	NAD	NAD
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
TP306	0.1 - 0.2 m	FILL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
BD01	0.1 - 0.2 m	FILL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
TP306	0.5 - 0.6 m	FILL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
TP307	0.5 - 0.6 m	FILL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.1**	**0.6**	**0.6**	NAD	NAD	NAD
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
TP308	0.1 - 0.2 m	FILL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	NAD	NAD	NAD
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
TP308	0.5 - 0.6 m	FILL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
TP309	0.1 - 0.2 m	FILL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			
TP309	1 - 1.1 m	FILL	0.3	1.2	**1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.2**	**0.2**	NAD	NAD	NAD
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	100 10000	10 -	- 1000			

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab, refer to the lab report **Blue** = DC exceedance HSL 0-<1 Exceedance

Bold = Lab detections - = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable NL = Non limiting AD = Asbestos detected NAD = No Asbestos detected

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level ML = Management Limit DC = Direct Contact HSL

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Reported naphthalene laboratory result obtained from BTEXN suite

c Criteria applies to DDT only

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

SAC based on generic land use thresholds for Residential A with garden/accessible soil

HIL A	Residential / Low - High Density (NEPC, 2013)
HSL A/B	Residential / Low - High Density (vapour intrusion) (NEPC, 2013)
DC HSL A	Direct contact HSL A Residential (Low density) (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

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Table 2: Summary of Groundwater Analytical Results - Site Assessment Criteria (All results in µg/L unless otherwise stated)

Sample ID	Heavy Metals								PAH and Phenols							TRH								BTEX				PCB									
	As	Cd	Cr[1]	Cu	Pb	Hg	Ni	Zn	Napthalene	Anthracene	Phenanthrene	Fluoranthene	Benzo(a)pyrene	Total +ve PAH	Total Phenolics (as Phenol)	C6-C10 less BTEX (F1)	C10-C14	C15-C28	C29-C36	TRH>C10-C16 less Naphthalene (F2)	TRH>C16-C34	TRH>C34-C40	Benzene	Toulene	Ethyl-benzene	Total Xylenes	Total PCB	4,4-DDE	a-BHC	Aldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD
PQL	1	0.1	1	1	1	0.05	1	1	0.2	0.1	0.1	0.1	0.1	0.1	0.05	10	50	100	100	50	100	100	1	1	1	3	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
BH301	**1**	<0.1	**2**	**18**	**11**	<0.05	**20**	**140**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<10	<50	<100	<100	<50	<100	<100	<1	<1	<1	<3	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH302	<1	<0.1	<1	**18**	<1	<0.05	**12**	**76**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<10	<50	<100	<100	<50	<100	<100	<1	<1	<1	<3	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH304	**5**	<0.1	<1	**7**	<1	<0.05	**8**	**190**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<10	<50	<100	<100	<50	<100	<100	<1	<1	<1	<3	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BD01	<1	<0.1	<1	**17**	<1	<0.05	**13**	**77**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD01-01	<1	<0.1	<1	**23**	<1	<0.1	**13**	**74**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<50	<100	<50	<100	<100	<100	-	-	-	-	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Groundwater Investigation Levels (GIL)[3]																																			
Fresh water[4]	13.0	0.2	1.0	1.4	3.4	0.60	11	8	16	0.4*	2.0*	1.4*	0.2*	-	320	-	-	-	-	-	-	-	950	180*	80*	625*	-	-	-	-	-	0.08		-	-
HSL-A, 2m<4m/4m<8m, clay	-	-	-	-	-	-	-	-	NL	-	-	-	-	-	-	NL	-	-	-	NL	-	-	5000	NL	NL	NL	-	-	-	-	-	-	-	-	-

Notes:

1	Assumed as Cr(III) oxidation state
2	Only those compounds for which GILs have been determined are included in the list
3	NEPC (2013) and ANZG (2018) Australian and New Zealand Guidelines for Fresh & Marine Water Quality
4	Fresh water trigger values for slightly to moderately disturbed ecosystems - 95% species protection
*	Insufficient data for reliable trigger value. Interim working value or low reliability value used for screening purposes
**	No positive PAHs detected by the laboratory
-	Not defined/ not analysed/ not applicable
	Exceeds GIL
BOLD	Exceeds PQL
NL	Not limiting
PQL	Practical Quantification Limit of Laboratory

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Table 2: Summary of Groundwater Analytical Results - Site Assessment Criteria (All results in µg/L unless otherwise stated)

Sample ID	OCP										OPP				
	DDT	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	g-BHC (Lindane)	HCB	Heptachlor	Methoxychlor	Chlorpyriphos	Diazinon	Dimethoate	Fenitrothion	Ethion
PQL	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.002	0.001	0.009	0.01	0.15	0.2	0.2
BH301	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.009	<0.01	<0.15	<0.2	<0.2
BH302	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.009	<0.01	<0.15	<0.2	<0.2
BH304	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.009	<0.01	<0.15	<0.2	<0.2
BD01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD01-01	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5
Fresh water [4]	0.01	-	0.2		-	0.02	-	-	0.09	-	0.01	0.01	0.15	0.2	-
HSL-A, 2m<4m/4m<8m, clay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1	Assumed as Cr(III) oxidation state
2	Only those compounds for which GILs have been determined are included in the list
3	NEPC (2013) and ANZG (2018) Australian and New Zealand Guidelines for Fresh & Marine Water Quality
4	Fresh water trigger values for slightly to moderately disturbed ecosystems - 95% species protection
*	Insufficient data for reliable trigger value. Interim working value or low reliability value used for screening purposes
**	No positive PAHs detected by the laboratory
-	Not defined/ not analysed/ not applicable
	Exceeds GIL
BOLD	Exceeds PQL
NL	Not limiting
PQL	Practical Quantification Limit of Laboratory

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Table G1: Summary of Laboratory Results – Priority metals, Priority PAH, PAH, Priority TRH, TRH, BTEX, Priority phenols, Priority OCP, OCP, Priority OPP, OPP, PCB, Asbestos (FA/AF), Asbestos, Other, Additional PhysChem

			Priority metals								Priority PAH				Priority TRH					BTEX				Priority phenol	Priority OCP												Priority OPP	PCB	Asbestos (FA/AF)				Asbestos, Other				
			Total Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ (BaP TEQ)	Total PAH	TRH C6 - C10	TRH >C10-C16	F1 [(C6-C10) BTEX]	F2 [>C10-C16 less Naphthalene]	F3 [>C16-C34]	F4 [>C34-C40]	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total Phenolics	DDT+DDE+DDD [c]	Aldrin + Dieldrin	Total Chlordane	Total Endosulfan	Endrin	Heptachlor	Hexachlorobenzene	Methoxychlor	Mirex	Chlorpyrifos	Total PCB	Asb_Sample_mass	ACM >7mm Estimation	FA and AF Estimation	FA and AF Estimation	Asbestos ID in soil >0.1g/kg	Asbestos ID in soil <0.1g/kg	Trace Analysis (NEPC)	Total Asbestos#	Asbestos Summary
		PQL	4	0.4	1	1	1	0.1	1	1	1	0.05	0.5	0.05	25	50	25	50	100	100	0.2	0.5	1	1	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1				0.001				0.1	0.1
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	g	g	g	%(w/w)	-	-	-	g/kg	
Site Assessment Criteria - Residential A Land Use																																												
Health Investigation Levels / Health Screening Levels A			100	20	100	6000	300	40	400	7400			3	300			50	280			0.5	160	55	40	100	240	6	50	270	10	6	10	300		160	1	Asbestos Detected								
Ecological Investigation Level / Ecological Screening Level (0-<0.1m, clay soil)			100		590	75	1100		140	140	170	0.7					180	120	300	2800	50	85	70	105																				
Management Limit																	700	1000	2500	10000																								
Direct Contact HSL- Residential A											1400						4400	3300	4500	6300	100	14000	4500	12000																				
Direct Contact - HSL - Intrusive Maintenance Worker											29000						82000	62000	85000	120000	1100	120000	85000	130000																				
TP1	0 - 0.2 m	14/02/24	<4	<0.4	**9**	**13**	**11**	<0.1	**13**	**20**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<5	**0.2**	<0.1	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**911.18**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
BD1/20240214	0 m	14/02/24	<4	<0.4	**11**	**16**	**12**	<0.1	**15**	**23**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP1	0.8 - 1 m	14/02/24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**634.24**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP2	0 - 0.2 m	14/02/24	<4	<0.4	**9**	**23**	**18**	<0.1	**10**	**43**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	**170**	<100	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**803.22**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP2	1 - 1.2 m	14/02/24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**721.95**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP3	0 - 0.2 m	14/02/24	**6**	<0.4	**15**	**15**	**27**	<0.1	**2**	**28**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<5	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**786.86**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP3	1 - 1.2 m	14/02/24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**709.4**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP4	0 - 0.2 m	14/02/24	**7**	<0.4	**22**	**10**	**10**	<0.1	**10**	**9**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<5	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**771.92**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP4	0.9 - 1.1 m	14/02/24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**588.54**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP5	0 - 0.2 m	14/02/24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**902.29**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP5	0.5 - 0.7 m	14/02/24	**5**	<0.4	**15**	**18**	**16**	<0.1	**17**	**22**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<5	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**810.13**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP6	0 - 0.2 m	14/02/24	**7**	<0.4	**18**	**15**	**20**	<0.1	**2**	**19**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<5	**0.4**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**710.52**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP6	0.6 - 0.8 m	14/02/24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**710.29**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP7	0 - 0.2 m	14/02/24	**5**	<0.4	**12**	**13**	**15**	<0.1	**10**	**29**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**738.31**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP7	0.9 - 1.1 m	14/02/24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**827.28**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP8	0 - 0.2 m	14/02/24	**5**	<0.4	**13**	**9**	**13**	<0.1	**6**	**27**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**720.25**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP8	1 - 1.2 m	14/02/24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**822.2**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP9	0 - 0.2 m	14/02/24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**740.21**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP9	0.8 - 1 m	14/02/24	**7**	<0.4	**17**	**13**	**29**	<0.1	**2**	**21**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<5	**0.9**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**622.84**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP10	0 - 0.2 m	14/02/24	**10**	<0.4	**15**	**11**	**23**	<0.1	**3**	**19**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<5	**0.5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**897.08**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP11	0 - 0.2 m	14/02/24	**6**	<0.4	**14**	**10**	**10**	<0.1	**5**	**9**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<5	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**748.43**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP12	0.1 - 0.3 m	14/02/24	<4	<0.4	**8**	**40**	**1**	<0.1	**66**	**27**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**896.05**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP13	0.1 - 0.3 m	14/02/24	<4	<0.4	**21**	**48**	**3**	<0.1	**95**	**40**	<1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**821.19**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP13	0.6 - 0.8 m	14/02/24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**735.09**	NAD	NAD	<0.001	NAD	NAD	NAD	<0.1	NAD
TP1 - [TRIPLICATE]	0 - 0.2 m	14/02/24	**5**	<0.4	**15**	**17**	**14**	<0.1	**16**	**25**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Lab result

HIL/HSL value EIL/ESL/EGV value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab, refer to the lab report **Blue** = DC exceedance **Red** = EGV-indirect exceedance HSL 0-<1 Exceedance

Bold = Lab detections - = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable NL = Not limiting NAD = No Asbestos detected

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level EGV = Environmental Guideline Value ML = Management Limit DC = Direct Contact HSL

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Naphthalene reported as highest detection from the BTEXN or PAH suite, or if both results <PQL as lowest PQL

c EIL criteria applies to DDT only

Site Assessment Criteria (SAC):

SAC based on generic land use thresholds for Residential A with garden/accessible soil

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

HIL	HIL-A (NEPC, 2013 or HEPA, 2020 (PFAS only))	EGV	EGV, all land uses, direct exposure (HEPA, 2020)
HSL (vapour intrusion)	HSL-A/B (NEPC, 2013)	ESL	Areas of Ecological Significance (NEPC, 2013)

Appendix D

Unexpected Finds Form

Unexpected Find Form

Unexpected Find No.:

Date:

Location:

Actions

Item	Action Taken	Action Taken By
Unexpected find encountered	Affected area closed off by barrier tape	
	Notify the Principal's Representative	
	Notify Environmental Consultant / Occupational Hygienist	

Information for the Environmental Consultant to be completed by the Site Manager

Description of the Unexpected Find	
Does the Unexpected Find potentially involve asbestos	Yes No

Appendix E

Site Assessment Criteria

1. Introduction

The following key guidelines were consulted for deriving the site assessment criteria (SAC):

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater* (CRC CARE, 2011).
- HEPA *PFAS National Environmental Management Plan (NEMP)* (HEPA, 2020).
- ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018).
- NHMRC *Guidelines for Managing Risks In Recreational Water* (NHMRC, 2008).
- NHMRC, NRMMC *Australian Drinking Water Guidelines 6 2011, Version 3.2* (NHMRC, NRMMC, 2022).
- ANZECC *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000).

The following inputs are relevant to the selection and / or derivation of the SAC:

- Land use: public school.
    - Corresponding to land use category 'A', residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry)), also includes children's day care centres, preschools and primary schools.
- Soil type: sand / clay.

2. Soils

2.1 Health investigation and screening levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. HIL and HSL for vapour intrusion, sourced from NEPC (2013), are listed in Table 1 and Table 2.

Table 1: Health investigation levels (mg/kg)

Contaminant	HIL-A
Metals	
Arsenic	100
Cadmium	20
Chromium (VI)	100
Copper	6000

Contaminant	HIL-A
Lead	300
Mercury (inorganic)	40
Nickel	400
Zinc	7400
PAH	
B(a)P TEQ	3
Total PAH	300
Phenols	
Phenol	3000
Pentachlorophenol	100
OCP	
DDT+DDE+DDD	240
Aldrin and dieldrin	6
Chlordane	50
Endosulfan	270
Endrin	10
Heptachlor	6
HCB	10
Methoxychlor	300
Mirex	10
OPP	
Chlorpyrifos	160
PCB	
PCB	1

Table 2: Health screening levels for vapour intrusion (mg/kg)

Contaminant	HSL-A&B	HSL-A&B
SAND	**0 m to <1 m**	**1 m to <2 m**
Benzene	0.5	0.5
Toluene	160	220
Ethylbenzene	55	NL
Xylenes	40	60
Naphthalene	3	NL

Contaminant	HSL-A&B	HSL-A&B
TRH F1	45	70
TRH F2	110	240
CLAY	**0 m to <1 m**	**1 m to <2 m**
Benzene	0.7	1
Toluene	480	NL
Ethylbenzene	NL	NL
Xylenes	110	310
Naphthalene	5	NL
TRH F1	50	90
TRH F2	280	NL

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} minus naphthalene
The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

The HSL for direct contact derived from CRC CARE (2011) are in Table 3.

Table 3: Health screening levels for direct contact (mg/kg)

Contaminant	HSL-A	HSL-IMW
Benzene	100	1100
Toluene	14 000	120 000
Ethylbenzene	4500	85 000
Xylenes	12 000	130 000
Naphthalene	1400	29 000
TRH F1	4400	82 000
TRH F2	3300	62 000
TRH F3	4500	85 000
TRH F4	6300	120 000

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} minus naphthalene
IMW intrusive maintenance worker

2.2 Asbestos in soil

The health screening levels for asbestos in soil are based on likely exposure levels for different scenarios published in NEPC (2013) for the following forms of asbestos:

- Bonded asbestos containing material (ACM); and
- Fibrous asbestos and asbestos fines (FA and AF).

The health screening levels are in Table 4.

Table 4: Health screening levels for asbestos

Form of asbestos	HSL-A
ACM	0.01%
FA and AF	0.001%
FA and AF and ACM	No visible asbestos for surface soil *

Notes: Surface soils defined as top 10 cm.
* Based on site observations at the sampling points and the analytical results of surface samples.

2.3 Health investigation levels for per- and poly-fluoroalkyl substances in soil

The HIL for PFAS, derived from Table 2 of HEPA (2020), are listed in Table 5.

Table 5: Health investigation levels (mg/kg)

Contaminant	HIL-A
PFOS and PFHxS *	0.01
PFOA	0.1

Notes: * Includes PFOS only, PFHxS only and the sum of the two.

2.4 Ecological investigation levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table 7, with inputs into their derivation shown in Table 6.

Table 6: Inputs to the derivation of the ecological investigation levels

Variable	Input	Rationale
Age of contaminants	"Aged" (>2 years)	Site history
pH	4.3	Adopted from Douglas (2023)
CEC	9 $cmol_c/kg$	Adopted from Douglas (2023)
Clay content	30%	Adopted from Douglas (2023)
Traffic volumes	High	Main road near site
State / Territory	NSW	

Table 7: Ecological investigation levels (mg/kg)

Contaminant	EIL - urban residential and public open space
Metals	
Arsenic	100
Copper	75
Nickel	140
Chromium III	590
Lead	1100
Zinc	140
PAH	
Naphthalene	170
OCP	
DDT	180

2.5 Ecological screening levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. ESL are listed in Table 8.

Table 8: Ecological screening levels (mg/kg)

Contaminant	Soil type	ESL - urban residential and public open space
Benzene	Coarse	50
Toluene	Coarse	85
Ethylbenzene	Coarse	70
Xylenes	Coarse	105
TRH F1	Coarse/ Fine	180*
TRH F2	Coarse/ Fine	120*
TRH F3	Coarse	300
TRH F4	Coarse	2800
Benzo(a)pyrene	Coarse	0.7

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

2.6 Ecological soil guideline values

The interim ecological soil guideline values (EGV) derived from Table 3 of HEPA (2020) are listed in Table 9.

Table 9: Ecological soil guideline values (mg/kg) – all land uses

Contaminant	Direct exposure	Indirect exposure
PFOS	1	0.01
PFOA	10	NC
PFHxS	NC	NC

Notes: NC no criterion

2.7 Management limits

In addition to appropriate consideration and application of the HSL and ESL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards; and
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services.

The adopted management limits are in Table 10.

Table 10: Management limits (mg/kg)

Contaminant	Soil type	ML - residential, parkland and public open space
TRH F1	Coarse	700
TRH F2	Coarse	1000
TRH F3	Coarse	2500
TRH F4	Coarse	10 000

Notes: TRH F1 is TRH C_6-C_{10} including BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

3. Groundwater

3.1 Default guideline values for aquatic ecosystems

For the protection of aquatic ecosystems, default guideline values (DGV) from ANZG (2018) are listed in Table 11.

Table 11: Default guideline values for protection of aquatic ecosystems (µg/L)

Contaminant	Freshwater DGV 95% LOP	Notes
Metals / metalloids		
Arsenic	24 / 13	Levels provided for As III / As IV respectively. Moderate reliability.
Cadmium	0.2	Very high reliability.

Contaminant	Freshwater DGV 95% LOP	Notes
Chromium (VI)	1	Chromium VI levels adopted as initial screen for total chromium. Very high reliability.
Copper	1.4	Very high reliability.
Lead	3.4	Moderate reliability.
Mercury (inorganic)	0.06	99% LOP adopted as recommended due to potential for bioaccumulation. Moderate reliability.
Nickel	11	Low reliability.
Zinc	8	Very high reliability.
BTEX		
Benzene	950	Moderate reliability.
Ethylbenzene	80	Unknown reliability.
m-Xylene	75	Unknown reliability.
o-xylene	350	Low reliability.
p-Xylene	200	Low reliability.
Toluene	180	Unknown reliability.
PAH		
Anthracene	0.01	99% LOP adopted as recommended due to potential for bioaccumulation. Unknown reliability.
Benzo(a)pyrene	0.1	99% LOP adopted as recommended due to potential for bioaccumulation. Unknown reliability.
Fluoranthene	1	99% LOP adopted as recommended due to potential for bioaccumulation. Unknown reliability.
Naphthalene	16	Low reliability.
Phenanthrene	0.6	99% LOP adopted as recommended due to potential for bioaccumulation. Unknown reliability.
Phenols		
Phenol	320	Moderate reliability.
Pentachlorophenol	3.6	99% LOP adopted as recommended due to potential for bioaccumulation. Moderate reliability.
2,4,6-Trichlorophenol	3	99% LOP adopted as recommended due to potential for bioaccumulation. Moderate reliability.
OCP		
Aldrin	0.001	Unknown reliability and LOP.
Chlordane	0.03	99% LOP adopted as recommended due to potential for bioaccumulation. Moderate reliability.

Contaminant	Freshwater DGV 95% LOP	Notes
DDT	0.006	99% LOP adopted as recommended due to potential for bioaccumulation. Moderate reliability.
Dieldrin	0.01	Unknown reliability and LOP.
Endosulfan	0.03	99% LOP adopted as recommended due to potential for bioaccumulation. Moderate reliability.
Endrin	0.01	99% LOP adopted as recommended due to potential for bioaccumulation. Moderate reliability.
Heptachlor	0.01	99% LOP adopted as recommended due to potential for bioaccumulation. Moderate reliability.
Methoxychlor	0.005	Unknown reliability and LOP.
OPP		
Chlorpyrifos	0.01	Moderate reliability.
Diazinon	0.01	Moderate reliability.
Dimethoate	0.15	Low reliability.
Fenitrothion	0.2	Moderate reliability.
Malathion	0.05	Moderate reliability.
Parathion	0.004	Moderate reliability.
PCB		
Aroclor 1242	0.3	99% LOP adopted as recommended due to potential for bioaccumulation. Low reliability.
Aroclor 1254	0.01	99% LOP adopted as recommended due to potential for bioaccumulation. Moderate reliability.

Notes: 95% LOP for non-bioaccumulative contaminants
99% LOP for bioaccumulative contaminants

The DGV for the protection of aquatic ecosystems derived from HEPA (2020) are in Table 12.

Table 12: Default guideline values for protection of aquatic ecosystems (µg/L)

Contaminant / LOP	Freshwater DGV
PFOS 99% LOP	0.00023
PFOA 99% LOP	19

3.2 Health screening levels for vapour intrusion

The HSL to evaluate potential vapour intrusion risks derived from NEPC (2013) are listed in Table 13. Site specific assessment will be required where groundwater is within 2 m of the ground floor or basement level.

Table 13: Groundwater health screening levels for vapour intrusion (µg/L)

Contaminant	HSL-A&B	HSL-A&B
SAND	**2 m to <4 m**	**4 m to <8 m**
Benzene	800	800
Toluene	NL	NL
Ethylbenzene	NL	NL
Xylenes	NL	NL
Naphthalene	NL	NL
TRH F1	1000	1000
TRH F2	1000	1000
SILT	**2 m to <4 m**	**4 m to <8 m**
Benzene	4000	5000
Toluene	NL	NL
Ethylbenzene	NL	NL
Xylenes	NL	NL
Naphthalene	NL	NL
TRH F1	6000	6000
TRH F2	NL	NL
CLAY	**2 m to <4 m**	**4 m to <8 m**
Benzene	5000	5000
Toluene	NL	NL
Ethylbenzene	NL	NL
Xylenes	NL	NL
Naphthalene	NL	NL
TRH F1	NL	NL
TRH F2	NL	NL

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} minus naphthalene
The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour that is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

4. References

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NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

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Appendix 15 – EMP preparation checklist

EMP preparation checklist

Use the checklist below to help develop an EMP that contains all the required information. The checklist should be completed and supplied to the Department with the EMP. One checklist should be submitted for each EMP.

Requirement	Plan reference	Yes/No/Not applicable
Document preparation and endorsement		
Has the EMP been prepared in consultation with all relevant stakeholders as per the requirements of the conditions of consent? (Section 4.1)	Page 3 &4	Yes
Have the views of the relevant stakeholders been taken into consideration? Have appropriate amendments been made to the EMP and does the EMP clearly identify the location of any changes? (Section 4.1)	Section 17 (Page 42) and reviewed undertaken recorded on Page 4	Yes
Has the EMP been internally approved by an authorised representative of the proponent or contractor? (Section 4.2)	Page 3 &4	Yes
Version and content		
Does the EMP describe the proponent's Environmental Management System (EMS) (if any), and identify how the EMP relates to other documents required by the conditions of consent? (Section 3.5.1)	Page 5 & 6 Section 1.3 has been	Yes
Does the EMP include the required general content and version control information? (Section 3.1)	Page 3 &4	Yes
Does the EMP have an introduction that describes the project, scope of works, site location and any staging or timing considerations? (Section 3.2)	Page 4 Section 1.2 project description	Yes
Does the EMP reference the project description? (Section 3.3)	Page 4, 5 & 6 Section 1.2 &1.3	Yes
Does the EMP reference a Community and Stakeholder Engagement Plan (or similar) or include community and stakeholder engagement actions (if required)? (Section 3.4)	Section 10.3.12 Community Connection (Page 38)	Yes
Have all other relevant approvals been identified? Has appropriate information been provided regarding how each approval is relevant? (Section 4)	Section 3 & Appendix 7	Yes
Has the environmental management structure and responsibilities been included? (Section 3.5.2)	Section 6 & Section 2	Yes
Does the EMP include processes for training of project personnel and identify how training and awareness needs will be identified? (Section 3.5.3)	Section 6 & Section 8	Yes
Does the EMP clearly identify the relevant legal and compliance requirements that relate to the EMP? (Section 3.5.3)	Section 3 & Appendix 7	Yes
Does the EMP include all the conditions of consent to be addressed by the EMP and identify where in the EMP each requirement has been addressed? (Section 3.5.13)	Page 5. Section 1.3	Yes
Have all relevant guidelines, policies and standards been identified, including details of how they are relevant? (Section 3.5)	Section 3 & Appendix 7	Yes
Is the process that will be adopted to identify and analyse the environmental risks included? (Section 3.5.5)	Section 4 &10	Yes

Have all the environmental management measures in the EIA been directly reproduced into the EMP? (Section 3.5.7)	Section 4 & 10, Appendix 7	Yes
Have any additional environmental management measures been included in the EMP? (Section 3.5.7)	Section 2, Section 5 & Section 12,	Yes
Have environmental management measures been written in committed language? (Section 3.5.7)	Section 4 & Appendix 7	Yes
Have project environmental management measures, including hold points, been identified and included? (Section 3.5.6)	Section 15, 16	Yes
Are relevant details of environmental monitoring that will be carried out included? (Section 3.5.8)	Section 12	Yes
Have the components of any environmental monitoring programs been incorporated? (Section 3.5.8)	Section 12	Yes
Are environmental inspections included? (Section 3.5.9)	Section 12, 15	Yes
Does the EMP document all relevant compliance monitoring and reporting requirements for the project? (Section 3.5.12 and 3.5.13)	Section 4,12 & 15	Yes
Does the EMP describe the types of plans or maps (such as environmental control maps) that will be used to assist with the management of environmental matters on site? (Section 3.5.10)	Appendix, 4-11	Yes
Does the EMP list environmental management documents? (Section 3.5.11)	Section 3 & 4 and Appendix 7	Yes
Is an auditing program referenced? (Section 3.5.13)	Section 16	Yes
Does the EMP include the incident notification and reporting protocols that comply with the relevant conditions of consent? (Section 3.5.15)	Section 9 & 13	Yse
Does the EMP identify the project role/position that is responsible for deciding whether an occurrence is an incident? (Section 3.5.15)	Section 6 & Section 2	Yes
Does the EMP describe a corrective and preventative action process that addresses the requirements? (Section 3.5.16)	Section 13	Yes
Does the EMP include details of a review and revision process that complies with the requirements? (Section 3.6)	Section 17	Yes

Appendix 16 – Environmental Risk Register

Taylor Construction Group
E-R-02
Environmental Risk Assessment

			Inherent / initial risk				Residual Risk				
Activity	**Environmental Aspect**	**Environmental Impact**	Consequence	Likelihood	**Score & Risk Level**	**Controls**	Consequence	Likelihood	**Score & RL**	**Legal Reqt?**	**Additional Controls or Actions**
Obtaining environmental approvals (licences, approvals, DA's, tree preservation etc)	Approvals not obtained	**Delayed start of project - client dissatisfaction, additional costs, contractor management issues**	1	5	5	**Identify required approvals early** **Plan approvals at earliest possible stage and monitor progress**	1	1	1	Yes EP&A Act Fisheries Act Water Mgmtt Act EPBC (C'Wth) Act Local Govt Act LEPs or SEPPs	Having a proactive approach and provide all the required reports prior to receiving SSDA based on the conditions received from similar project.
Site Establishment and clearing works: - site compounds, fencing, amenities, storage, storage of fuel, oils, chemicals etc	Removal or disturbance of vegetation from the land,	**Loss of biodiversity, disturbance / destruction of endangered or protected species or habitats** **Potential fines for not obtaining or non-compliance with approvals**	3	1	3	*** Where possible, retain vegetation on site (will depend on client reqts)** *** Where endangered or protected species identified, relocate using qualified ecologist (refer to EIA, EMP, conditions of consent or conditions of EPBC referral/approval etc).**	3	1	3	Yes Native Veg. Act TSC Act EPBC (C'Wth) Act	Please refer to the arboriculture impact assessment and landscape design. Through comprehensive design, the team has eliminated any negative effect on the native
	Disturbance of soil	**Erosion / soil loss / land degradation**	2	3	6	*** Minimise soil disturbance and stage development where possible** *** Strip topsoil and stockpile for site restoration** *** Install appropriate silt controls** *** Stabilise soil where practical (eg seeding, mulching, etc)**	2	1	2	Yes POEO s 120	The team have developed a comprehensive sediment control plan as well as soil water management plan and flood emergency plan to
	Disposal of vegetation	**Use of landfill space** **Methane generation in landfill**	0	0	0	**Mulch vegetation and re-use on site where possible or feasible** **Separate vegetation - divert to green waste recycling plant**	0	0	0	No	Not Applicable to the project
	Dust generation	**Local Nuisance (neighbours, community)**	3	2	6	**Minimise area cleared** **Spray dust affected areas with water,** **Stabilise soil with spray grass, seeds, spray mulch etc** **Cover or fence stockpiles** **Restrict vehicle access to stabilised areas**	3	1	3	Yes POEO s 126, 136-141 POEO (Clean Air) Regulation 2002	developed a comprehensive Dust control management plan to eliminate the risk. And have additional measures in place such as water cart to reduce
	Run-off of pollutants	**Water pollution - kill aquatic life (fish, plants etc)** **Potential fines and prosecution**	0	0	0	**Retain water on site (sediment ponds, diversion) where possible** **Water treatment, flocculation on site** **Re-use waste water on site (dust suppression etc) where clean enough** **Pump out polluted water (from bunds etc) - take to liquid waste depot using licensed contractors**	0	0	0	Yes POEO S 116, 120	The project is not near the water.

			Inherent / initial risk				Residual Risk				
Activity	**Environmental Aspect**	**Environmental Impact**	Consequence	Likelihood	**Score & Risk Level**	**Controls**	Consequence	Likelihood	**Score & RL**	**Legal Reqt?**	**Additional Controls or Actions**
	Spillage of oils, fuels, other pollutants	**Land pollution, soil contamination**	3	2	6	**Store all potentially polluting substances in contained areas (bunds, trays, chemicals cabinets etc)**	3	1	3	yes POEO S 116, 120 & 142	The team have dedicated storage location and have spill kit and procedure in place to avoid and limit the risk.
	Sediment run-off	**Stormwater/waterways pollution Increased nutrients in waterways leading to algal blooms Potential fines and prosecution**	3	1	3	**Install appropriate sediment and erosion controls & monitor Prepare Erosion and Sediment Control Plan (ESCP) or Soil and Water Management Plan (SWMP) and implement as required.**	3	1	3	Yes POEO s 120	Based on the program the OSD tank and stormwater connection will be completed as soon as possible. The team have developed a comprehensive sediment control plan as well as soil water management plan and flood emergency plan to
	Disturbing heritage items, aboriginal sacred sites, relics etc	**Destruction /damage of indigenous items / sacred sites Destruction / damage of European heritage items Potential negative media attention and community outrage**	0	0	0	**Obtain initial information from client, local council etc. If any heritage or Aboriginal aretfacts / relics are likely to occur on site, seek appropriate professional assistance. Document in EMP and implement requirements**	0	0	0	Yes National Parks & Wildlife Act	Not Applicable to the project based on the Heritage Assessment report
	Disturbing biological pathogens, plant diseases, exotic fauna (eg fire ants)	**Spread of plant diseases and other biological pests (eg Phytophtora, fire ants etc)**	0	0	0	**Survey of site - obtain information from client, councils, regulators etc Manage according to specific identified requirements**	0	0	0	No	not applicable to project refer to the arborist report.
	Weed disturbance	**Spread of noxious weeds leading to degradation of land, displacement of native species, loss of biodiversity**	0	0	0	**Specific controls in EMP where noxious weeds is an issue. Develop Vegetation Management Plan as required by regulatory authorities or clients.**	0	0	0	Noxious Weeds Act	not applicable to project refer to the arborist report.
Use and application of pesticides	Excess spraying Unlicensed use	**Kill non-targeted plants and animals Legal penalties for non-authorised use Contamination of waterways - death of fish and aquatic flora and fauna.**	4	0	0	**Use licensed contractors to apply pesticides (check authorisations) If using pesticides, must comply with Pesticides Act - requires records and competency. If using pesticides, document in EMP (also OHS risk)**	4	0	0	Pesticides Act 1999 Pesticides Regulation 1995	Not applicable to the project.

			Inherent / initial risk				Residual Risk				
Activity	**Environmental Aspect**	**Environmental Impact**	Consequence	Likelihood	**Score & Risk Level**	**Controls**	Consequence	Likelihood	**Score & RL**	**Legal Reqt?**	**Additional Controls or Actions**
Excavation / trenching "normal soils"	Sediment run-off	**Sediment run-off / water pollution**	3	0	0	**Retain water on site (sediment ponds, diversion) where possible** **Install sediment controls (silt fences, sand bags, straw bales etc)** **Water treatment, flocculation on site**	3	0	0	Yes POEO s 120	Based on the program the OSD tank and stormwater connection will be completed as soon as possible including filtration system. The team have developed a comprehensive sediment control plan as well as soil water management plan and flood emergency plan to eliminate the risk
	Damage water or sewer pipe	**Water pollution - sewage** **Land contamination**	4	0	0	**Call "dial before you dig" service prior to excavating** **Use "as built" site plans to locate services** **Use "Service locators"** **Hand excavate in areas with suspected services**	4	0	0	Yes POEO s 120 & 142	The authorities have been all contacted and full service location has been completed. The permit must be issued prior to any digging works and Taylor Procedure will be strictly followed prior to
	Dust generation	**Local air pollution and nuisance to neighbours / community**	4	1	4	**Water spraying,** **Avoid working in hot, windy conditions where possible** **Erect "wind break" fences in high dust risk areas**	4	1	4	Yes s 126, 127	The team have developed a comprehensive Dust control management plan to eliminate the risk. And have additional
"De-watering" of trenches	Sediment laden water runoff	**Sediment run-off / water pollution**	4	1	4	**Allow water to settle to reduce suspended sediment** **Test "turbidity levels" and pH prior to discharge** **If required, add flocculant / pH correction** **Discharge water onto vegetated areas, protected downstream by sediment controls**	2	1	2	Yes POEO s 120	The team has methodology in place and directed the subcontractor to fill the trench immediately after completion of works where possible. The team have developed a comprehensive sediment control plan as well as soil water management plan and flood emergency plan to eliminate the risk. In addition the dewatering pump has been purchased for the site to be used to dewater any trench works.

			Inherent / initial risk				Residual Risk				
Activity	**Environmental Aspect**	**Environmental Impact**	Consequence	Likelihood	**Score & Risk Level**	**Controls**	Consequence	Likelihood	**Score & RL**	**Legal Reqt?**	**Additional Controls or Actions**
Excavation / trenching and stockpiling "acid sulfate soils"	sediment and highly acid water run-off from oxidation process	**Water pollution - kill aquatic life (fish, plants etc)** **Potential fines and prosecution**	4	0	0	**Determine level of risk through Acid Sulfate Soil Risk Maps, or through client / council** **If in risk area, develop an Acid Sulfate Soils Management Plan or include in EMP and manage in accordance with requirements** **Main control is to minimise time kept out of water (oxidises when exposed to air) and prevent run-off from exposed sediments.** **Lime can be used to neutralise**	4	0	0	Yes POEO s 120	Not Applicable to the project as per the Geotechnical Report
Excavation / trenching in reclaimed land / potentially contaminated land	Mobilisation and run-off of contaminated sediments	**Water pollution - kill aquatic life (fish, plants etc)** **Potential fines and prosecution**	4	1	0	**Determine level of risk through search of previous land use - information available from councils, clients, DECC etc** **If in a risk area, develop a contaminated site management plan (get assistance from experts)** **Main control is to contain sediments on site**	4	0	0	Yes POEO s 120	The team have placed contamination management in place and due to the location of site the water pollution risk is minimal.
Stockpiling - normal soils	Sedimentation run-off Dust generation	**Sediment run-off / water pollution** **Dust nuisance - community**	4	1	4	**Install sediment controls downstream of stockpiles** **Locate stockpiles in areas that will not result in off-site escape of sediment.** **Where exposed, protect stockpiles with wind barriers.** **Keep stockpiles low in profile.** **Stabilise / cover / temp vegetate where retained for significant period.**	4	1	4	Yes POEO s 120	The team have developed a comprehensive Dust control management plan to eliminate the risk. And have additional measures in place such as water cart to reduce the risk.
Stockpiling- acid sulfate soils	Acid water run-off	**Kill aquatic organisms(fish, plants etc)**	5	0	0	**Prepare Acid sulfate soils management plan if working with Acid sulfate soils and get expert advice.** **Minimise stockpiling where possible** **Prevent any run-off**	5	0	0	Yes POEO s 120	Not Applicable to the project as per the Geotechnical Report no finding.
Use of vehicles and plant	Air emissions (exhaust)	**Air pollution (particulates, visible smoke)** **Potential smoky vehicle fines** **CO2 pollution - contribution to climate change**	5	1	5	**Maintain plant / vehicle appropriately** **Daily check of exhaust (visual)**	5	1	5	Yes POEO s 124-128 POEO (Clean Air) Regulation 2002	The maintained record is being checked every 3 month to make sure there is no pollution to the air.
	Use of fuel - diesel, petrol	**Depletion of natural resources (fossil fuels)**	5	1	5	**Use appropriate machinery for task** **Monitoring of fuel usage** **Minimise idling time (switch off when not in use)** **Driving technique - "drive green"** **Investigate alternative "bio" fuels**	5	1	5	No	the use of fuels such as adopting electric tower crane in lieu of fuel base one and generally use green fuels where possible.

			Inherent / initial risk				Residual Risk				
Activity	**Environmental Aspect**	**Environmental Impact**	Consequence	Likelihood	**Score & Risk Level**	**Controls**	Consequence	Likelihood	**Score & RL**	**Legal Reqt?**	**Additional Controls or Actions**
	Spillage of fuel when refuelling	**Land Contamination** **Water pollution**	5	1	5	**Refuel in designated bunded refuelling areas** **Mobile refuelling away from drains and waterways** **Spill kit on standby when refuelling** **Small containers used when mobile refuelling** **Use portable bunds**	5	1	5	yes POEO S 116, 120 & 142	The refuelling to be done outside the site where possible, and Taylor Procedure will be strictly followed. The spill kit and procedures are in place to avoid and limit the risk.
	Noise and vibration emissions	**Disturbance of community / neighbours / complaints**	3	2	6	**Maintain plant / vehicle appropriately** **Daily check of noise level (aural)** **Initial and periodic noise monitoring of plant**	3	1	3	yes POEO s 139-141 POEO (Noise Control) Reg 2008	The team have developed the Noise and vibration management plan. Please refer to the plan attached as part of CEMP
	Tracking mud onto roads	**Sediment run-off / water pollution** **Visual - potential for fines**	3	2	6	**Installation of rumble grids/ shake pads** **Stabilise truck routes with ballast,** **Install wheel wash on muddy sites** **Sweeping of public roads as required**	3	1	3	Yes POEO s 120	The wheels are being cleaned on site prior to going to the street. In the event of any mud on street, the muds will be brushed off.
	Uncovered loads	**Littering, dust, material on roads leading to land and water pollution. Potential prosecution.**	5	0	0	**Cover all loads whenever on public roads**	5	0	0	Yes POEO s 145	Not Applicable to the project as all the loadings are covered loads.
	Loss of fluids (hydraulic oil, coolant, fuel etc)	**Land contamination** **Stormwater/waterways pollution**	5	1	5	**Maintain and inspect hoses on vehicles** **Maintain vehicles and plant, report defects, repair ASAP**	1	0	0	Yes POEO s 120	The maintenance record is being checked every 3 month to make sure there is no pollution to the air.

			Inherent / initial risk				Residual Risk				
Activity	**Environmental Aspect**	**Environmental Impact**	Consequence	Likelihood	**Score & Risk Level**	**Controls**	Consequence	Likelihood	**Score & RL**	**Legal Reqt?**	**Additional Controls or Actions**
Storage and use of chemicals, hazardous substances	Spillage of chemicals, fuels, hazardous substances	**Land contamination Stormwater/waterways pollution vapourisation leading to air pollution**	5	0	5	**Store all hazardous substances in bunded / contained area, purpose built flammable goods cabinets etc Handle all hazardous substances in areas that do not drain to stormwater or waterways Supply and maintain spill kits in areas where substances handled or stored Keep containers (petrol, other volatile substances) closed Carry portable spill kits in vehicles and on plant Choose "environmentally friendly" spill kit materials Appropriate labelling and signage Provide MSDSs Emergency Response Procedures Provide appropriate security (keep locked) Contractor Management - control substances brought onto site by contractors Procedures - Follow Hazardous Substances Procedure (to be developed) Training and awareness / induction / toolbox talks Environmental / OHS inspections**	0	0	0	yes POEO S 116, 120 & S 142-145	Taylor Procedure will be Strictly followed. The spill kit and procedures are in place to avoid and limit the risk.
	Storage of incompatible chemicals together	**Chemical reaction - leading to explosion or toxic vapours**	5	0	0	**Separation of incompatible substances (use dangerous goods classifications) Appropriate labelling and signage Emergency Plan - identification of scenario and response plan Appropriate suppression systems and fire fighting equipment for substances held**	2	0	0	Yes OHS amendment (Dangerous Goods) Act	The items have designated storage.
	Build up of vapours in storage areas	**Explosion, fire leading to air and water pollution**	5	0	0	**Ventilation of storage areas**	2	0	0	Yes POEO s 120	ventilation is provided. No risk to the project.
	Storage of flammable substances near ignition sources	**Explosion, fire leading to air and water pollution**	5	0	0	**Do not store flammable substances near ignition sources (eg - generators, welding operations etc)**	2	0	0	AS 1940?	Not Applicable to the project as the flammable will be stored in appropriate storage unit and the extinguisher is available on site in near approximate.
Concrete pouring and use	Loss of cement and alkaline water during pour	**Pollution of waterways (concrete slurry, alkaline water) leading to killing of aquatic organisms**	5	0	0	**Appropriate preparation and planning for pour Retain potentially alkaline and sediment laded water on site**	2	0	0	Yes POEO s 120	Allocated wash bay for the concrete therefore not applicable to this project.

			Inherent / initial risk				Residual Risk				
Activity	**Environmental Aspect**	**Environmental Impact**	Consequence	Likelihood	**Score & Risk Level**	**Controls**	Consequence	Likelihood	**Score & RL**	**Legal Reqt?**	**Additional Controls or Actions**
	Unused concrete	**Waste product - depletion of natural resources** **Transport of concrete waste - depletion of resources** **Use space in landfill - depletion of natural resources**	5	1	0	**Accurate ordering of concrete** **Recycling / re-use of excess concrete on site.** **Unavoidable excess concrete taken to concrete recyclers**	1	0	0	No (but may be required as condition of consent)	There will be designated area to safely dispose any additional concrete.
	Use of curing compounds	**Can help minimise water usage (positive impact)**	n/A	n/A	n/A	**Use "environmentally friendly" curing compounds** **Use compounds to minimise water usage**	N/A	N/A	N/A	No	The Design for the concrete mix is improved by reducing cement percentage and use of Greenstar concrete has been adopted on this project.
	Usage of water	**Depletion / wastage of natural resources (water)**	n/A	n/A	n/A	**Water capture and re-use of wash water**	N/A	N/A	N/A	No	Water tank on site to reuse the water where possible. Also OSD tank and stormwater system will be installed early on to increase the reuse of water.
Concrete wash-out (of trucks)	Generation of alkaline water with concrete residue	**Water pollution - kill aquatic life (fish, plants etc)** **Potential fines and prosecution**	0	0	0	**Washout in dedicated area** **Water capture and re-use of water - treat if necessary (flocculate and pH correction)** **Truck wash-out activities off-site by supplier where possible**	0	0	0	Yes POEO s 120	Allocated wash bay for the concrete therefore not applicable to this project.
Concrete / bitumen saw cutting	Generation of sediment laden water	**Water pollution to stormwater and waterways**	0	0	0	**Vacuum excess water, sweep up residue when dry** **Install effective sediment controls around drains**	0	0	0	Yes POEO s 120	OSD tank and stormwater system will be installed early on to increase the reuse of water.
Demolition	Waste generation	**Use of landfill space** **Wastage of natural resources**	0	0	0	**Separate waste streams (steel, concrete, bricks, timber etc) - Provide appropriate bins** **Select contractors who can separate and recycle various waste streams.**	0	0	0	No	Multiple stockpile on site to separate the different waste where possible.
	Asbestos waste	**Community health and OHS impacts** **Illegal disposal - leading to prosecution**	2	3	6	**Engage licensed contractors to remove and take to landfill able to accept asbestos** **Asbestos must be double wrapped in specified grades of plastic and sealed prior to transport and disposal** **Keep records of disposal**	1	0	0	Yes POEO s 143 & 144 POEO (Waste) Regulation 2005	The team has developed comprehensive asbestos management plan as well as material management plan to complete the removal safely.

			Inherent / initial risk				Residual Risk				
Activity	**Environmental Aspect**	**Environmental Impact**	Consequence	Likelihood	**Score & Risk Level**	**Controls**	Consequence	Likelihood	**Score & RL**	**Legal Reqt?**	**Additional Controls or Actions**
	Dust generation	**Local Nuisance (neighbours, community)**	3	1	3	**Water spraying as required**	3	1	3	Yes POEO s 126, 127 POEO (Clean Air) Regulation 2002	Water Cart on site to make sure the dust will be minimal.
	Noise and vibration emissions	**Local Nuisance (neighbours, community)**	3	0	0	**Timing of noisy activities during specified working hours**	4	0	0	Yes POEO s 139-141 POEO (Noise Control) Reg 2008	Please refer to the Noise and vibration management plan for further detail.
Wet trades (brick laying, rendering, brick cleaning, painting, tiling, final clean etc)	Contaminated water run-off	**Water pollution (chemicals, suspended solids etc)**	3	0	0	**Retain water on site - capture and pump out or divert to sediment ponds** **Remove contaminated water for disposal where required**	3	0	0	Yes POEO s 120	the OSD tank and stormwater connection will be completed as soon as possible. The team have developed a
	Disposal of paints, thinners, used solvents, paint wash water, residues etc	**Water pollution, land contamination** **Fines for inappropriate disposal**	3	0	0	**Engage licensed contractors to remove and recycle solvent based products, dispose of wash water.** **Contractor Management - ensure painters remove all wastes and dispose of appropriately.** **Waste tracking - keep records of disposal.**	3	0	0	Yes POEO s 120, 143 & 144 POEO (Waste) Regulation 2005	The team have dedicated storage location and have spill kit and procedure in place to avoid and limit the risk.
	Emissions of Volatile Organic Compounds (VOCs) from paint	**Air pollution**	1	1	1	**Use low VOC paints where possible**	1	1	1	Yes POEO s 124 - 128 POEO (Clean Air) Regulation 2002	Low VOC paints are used.
	Spillage of paints, thinners etc	**Water pollution, land contamination** **Fines water pollution**	3	1	1	**Appropriate storage and use (see Hazardous substance section)** **Minimise quantities kept on site - contractors take off-site when not in use.**	3	1	1	Yes POEO s 120	The team have dedicated storage location and have spill kit and procedure in place to avoid and limit the risk.
Piling (bored and drilled) (dry land)	Noise and vibration Dust emissions	**Nuisance noise and vibration to neighbours** **Dust nuisance to neighbours**	**N/A**	**N/A**	**N/A**	**Maintain plant to ensure optimal operation** **Operate machinery only during designated operating hours** **Use dust suppression as required**	**N/A**	**N/A**	**N/A**	Yes POEO s 126, 127 139-141 POEO (Clean Air) Regulation 2002	Not Applicable to the project no Pilling
Piling (bored and drilled) (wetlands, waterways)	Noise and vibration	**Nuisance noise and vibration to neighbours**	**N/A**	**N/A**	**N/A**	**Maintain plant to ensure optimal operation** **Operate machinery only during designated operating hours**	**N/A**	**N/A**	**N/A**	Yes POEO s 139-141 POEO (Noise Control) Reg 2008	Not Applicable to the project no Pilling

			Inherent / initial risk				Residual Risk				
Activity	**Environmental Aspect**	**Environmental Impact**	Consequence	Likelihood	**Score & Risk Level**	**Controls**	Consequence	Likelihood	**Score & RL**	**Legal Reqt?**	**Additional Controls or Actions**
	Disturbance of sediments	**Water pollution**	**N/A**	**N/A**	**N/A**	**Employ techniques to allow working in dry environment (isolate working area from water, pump out ingress water etc). Methods should be detailed in EMP where applicable.**	**N/A**	**N/A**	**N/A**	Yes POEO s 120	Not Applicable to the project no Pilling
	Removal of riparian vegetation	**Destruction of riparian vegetation leading to instability of river banks**	**N/A**	**N/A**	**N/A**	**Minimise clearing of vegetation where possible Minimise disturbance of river banks Re-instate river banks to appropriate standards Detailed methodology should be documented in EMP.**	**N/A**	**N/A**	**N/A**	Yes Native Vegetation Act TSC Act	Not Applicable to the project no Pilling
	Contact with contaminated sediments (man induced or acid sulfate soils	**Water pollution Aquatic fauna death, Human Health impacts**	**N/A**	**N/A**	**N/A**	**If contaminated sediments or acid sulfate soils are likely to be encountered, seek expert assistance and work to a documented plan.**	**N/A**	**N/A**	**N/A**	Yes POEO s 120	Not Applicable to the project no Pilling
	Spillage of oils, fuels etc into water	**Water pollution**	**N/A**	**N/A**	**N/A**	**Maintain machinery to ensure no oil leaks (inspect daily) No refuelling over water except with robust controls in place**	**N/A**	**N/A**	**N/A**	Yes POEO s 120	Not Applicable to the project no Pilling
Use of site amenities (toilets, showers, lunch rooms etc)	Use of water Use of energy	**Depletion of natural resources (water, fossil fuels)**	0	0	0	**Purchase / Install energy efficient lighting and appliances Install water efficient taps, shower heads Zone lighting areas so that whole areas are not lit if not required Signage - turn off lights, limit shower time, save water etc Adjust thermostats on airconditioners/heaters to minimise energy usage Install solar / heat pump water heaters where feasible Training and awareness - why these things should be done**	0	0	0	No	Energy efficient lighting and appliances used where possible.
	Wastes to sewer Sewage pump-out Port-a-loos	**Water pollution**	0	0	0	**Appropriate connection to sewer If pump-out, inspections and regular pump-out Use appropriate port-a-loo contractors - regular servicing**	0	0	0	Yes POEO s 120	appropriate temporary hydraulic connections are in place to the amenities.

			Inherent / initial risk				Residual Risk				
Activity	**Environmental Aspect**	**Environmental Impact**	Consequence	Likelihood	**Score & Risk Level**	**Controls**	Consequence	Likelihood	**Score & RL**	**Legal Reqt?**	**Additional Controls or Actions**
	Emissions of Ozone Depleting substances	**Contributing to hole in ozone layer** **Fines / prosecution for inappropriate or unlicensed supply and handling**	0	0	0	**Use licensed air conditioning contractors, for servicing and re-gassing** **Do not use halon gas fire suppressionn systems**	0	0	0	Yes Ozone Protection Act 1989	all the required licences will be checked prior to starting on site.
	Domestic waste generation (packaging, beverage containers etc)	**Depletion of natural resources** **litter** **Use of landfill space**	1	3	3	**Provide water supply, not bottled water** **Provide recycling bins and separate** **Use contractors that separate waste and take to recycling facilities.**	0	0	0	Yes Waste Avoidance and Resource Recovery Act 2001	the waste will be in the bin and goes to the bin collection and waste management facilities.
Servicing of vehicles (on site)	Oil , fuel, coolant and other chemical spillage	**Water pollution** **Land / ground contamination**	5	1	5	**Do not refuel or service vehicles in the vicinity of drains, drainage lines, creeks etc** **Carry portable spill kits and keep nearby when servicing vehicles** **Use spill mats during servicing to prevent ground contamination** **If ground contamination occurs, clean-up immediately.**	1	1	1	Yes POEO s 120 & 142	The servicing should be done outside of site where possible. The pill kit is provided and Taylor procedures will be strictly followed.
Material delivery	Unwanted packaging Excess goods	**Depletion of Natural resources** **Use of landfill space if not recycled**	0	0	0	**Where possible, have suppliers take back the packaging as part of the contract.** **Purchase goods with minimal packaging wherever possible** **Reuse if possible** **Separate and recycle - avoid sending to landfill**	0	0	0	No	all the major packaging will be disposed and removed from site. The waste management will manage the reusable items.

			Inherent / initial risk				Residual Risk				
Activity	**Environmental Aspect**	**Environmental Impact**	Consequence	Likelihood	**Score & Risk Level**	**Controls**	Consequence	Likelihood	**Score & RL**	**Legal Reqt?**	**Additional Controls or Actions**
Waste management	Generation and disposal of waste Recycling of waste Re-use of waste materials	**Use of landfill space** **Depletion of Natural Resources** **Contamination of land (landfill)**	3	0	0	**Use hierarchy of waste - Avoid, reduce, recycle / re-process, dispose.** **Provide appropriate bins for separation of waste streams - ensure good signage in place**	2	0	0	Yes POEO s 143, 144 POEO (Waste) regulation 2005 Waste Avoidance and Resource Recovery Act 2001	The team have developed comprehensive waste management plan. Please refer to the plan for further information.

Appendix 17 – Fencing and Hoarding Plan

Taylor Site Hoarding
Mark Up.
23-10-24

5 PEACH TREE RD

7 PEACH TREE RD

UNDER CONSTRUCTION
9 PEACH TREE RD

Existing timber boundary fence (Behind existing hoarding) to remain in place and is not affected. Shown in dark blue.

Temporary mesh ATF type fence installed prior to existing hoarding removal and removed when permanent Retaining wall is constructed.

Permanent Retaining Wall and Colorbond Fence. Shown in Orange.

95661

FRASERS TO CONFIRM THE GREEN LINK LEVEL AT NORTH EAST CORNER OF SCHOOL SITE

1.5mtrs

RL 45.947

6000 SETBACK

Male Ablution

Female Ablution

Female Change/ Ablution

Male Ablution

LOADING

RL 51.700

LOT B2

BUILDING ENVELOPE

Change Room

Lunch Room

Lunch Room

Lunch Room

Lunch Room

37368

FOOTPATH & SHARED PATHS

SHARED DRIVEWAY

FOOTPATH & SHARED PATHS

GREEN LINK
OPEN SPACE LINKS

39293

Chain-wire fence. Moved out at SIte Establishment and moved back to original location when access deed expires. Shown in Green.

FUTURE MIXED-USE
LOT B3

Site Office and Accommodation Compound.

FUTURE MIXED-USE
LOT B1.2

First Aid

Site Entry

FRASERS TO CONFIRM THE GRADING OF THE GREEN LINK. ANY GRADING EQUAL AND/OR STEEPER THAN 1:20 REQUIRES LANDING AS PER BCA.

3000 SETBACK

FOOTPATH & SHARED PATHS

Footpath Remains Open. Minimum 1.5mtr Clear

1200m SETBACK

15mtrs

Existing Chain-wire fence. Continues up Mahogany Ave to Existing Hoarding. Shown in dark blue.

Chain-wire fence and gates. Shown in Green.

Solid A Class Hoarding. 2.4mtr High. A Class Hoarding Fixed to b Class Posts.

83530

MAIN STREET (ROAD NO.1)

Extent of B Class Hoarding. Shown dashed Red.

Chain-wire fence and gates. Shown in Green.

Chainwire Gates to Control vehicle Access Until may 25.

Jersey Kerb to Support Temp Gates.

Chainwire Gates to Control vehicle Access Until may 25.

Footpath Remains Open

Jersey Kerb to Support Temp Gates.

NOTE: REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN

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Nominated Architect
Ray Brown, NSWARB 6359

0 2 4 6 10 m

Do not scale drawings. Verify all dimensions on site

revision	purpose of issue	checked	date
A	FOR INFORMATION		06-04-23
B	50% DESIGN DEVELOPMENT ISSUE		28-04-23
C	FOR INFORMATION		29-06-23
D	90% DETAILED DESIGN - ISSUE FOR TENDER		21-07-23
E	100% DD DRAWINGS FOR TENDER		15-07-24

NSW GOVERNMENT Education School Infrastructure

Consultants

Project Manager APP	Landscape Architect OCULUS	BCA Engineer MBC
Structural + Civil Engineer TTW	Cost Planner ALTUS GROUP	Acoustic Engineer PWNA
Building Services Engineer ERBAS	Fire Engineer WSP	Traffic Consultant Stantec

LEGEND

SITE BOUNDARY
SETBACK
EASEMENT

architectus™
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Sydney NSW 2000
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sydney@architectus.com.au
ABN 90 131 245 684

Adelaide
Brisbane
Melbourne
Perth
Sydney

approved FE+JP
prepared SL
scale As indicated @A1
project no 220350

project
Midtown Macquarie Park New Primary School

drawing
Site Plan

drawing no. MPS-ARC-ZZ-ZZ-DR-A-0012
revision E

12/07/2024 10:01:33 PM

Appendix 18 – Arboricultural Impact Assessment

Truth About Trees Pty. Ltd.
PO Box 594
Gymea
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2227

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Arboricultural Impact Assessment

Midtown Macquarie Park-
Primary School.

10 Mahogany Avenue
Macquarie Park
NSW 2113

Prepared for:

Taylors Construction Pty Ltd

Prepared by:
Tom Hare | AQF Level 5 Consulting Arborist
Truth About Trees Pty Ltd
0414 369 660
tom@truthabouttrees.com.au

Date: 11/12/24
Version: Final

1 EXECUTIVE SUMMARY

Truth About Trees Pty. Ltd. have been engaged by School Infrastructure New South Wales (SINSW), to prepare an Arboricultural Impact Assessment report in accordance with the requirements of AS4970-2009: The Protection of Trees on Development Sites (Standards Australia, 2009).

This Arboricultural Impact Assessment accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), in respect of a State Significant Development Application (SSDA) for the construction and operation of Midtown Macquarie Park new primary school.

Macquarie Park new primary school will provide for 750 students from Kindergarten to Year 6 within a five/six-storey built form, including:

- Flexible learning areas;
- Administration and staff facilities;
- Canteen;
- Multi-purpose hall and covered outdoor learning area;
- Library;
- Outdoor play areas at ground level, on each floor of the building and rooftop;
- Landscaped outdoor learning areas; and
- Car parking.

Assessment of the trees was undertaken on 15/12/22 by Tom Hare and using the framework of the *Visual Tree Assessment procedure* (VTA) prescribed by Mattheck & Breloer (Claus Mattheck, 1994).

The project site is known as site 'B2' in the current concept approval for the redevelopment of Ivanhoe Estate, Macquarie Park (**SSD-8707**). The project site is contained within Proposed Lot 24 in the staged subdivision of parent allotment Lot 100 DP 1262209 approved under Stage 1 of the concept approval (**SSD-8903**) and is currently legally known as Lot 13 DP 1271599. The project site has an area of 3,346m^2 and a frontage to Main Street of 83.517m. The project also includes the construction and use of a driveway on a future adjoining site, known as site 'B1.2' in the concept approval, proposed lot 23 in the Stage 1 subdivision, and currently legally known as Lot 13 DP 1271599. The site is not subject to any bushfire constraints.

A small portion site is not mapped on the NSW Department of Planning & Environment Biodiversity Values Map, as an area of Biodiversity Value

The initial concept DA (SSD-8707) provided for the subdivision and development of the overall site highlighted a number of trees which would be removed during demolition and construction within the site, and also identified trees which could be retained for the purposes of the concept DA.

It should be noted that the data contained within the previous AIA by Eco Logical Australia and the surveys the report relied upon did not include some of the trees which have been captured within this AIA due to previous site conditions and restricted access. It is also likely that trees may not have been included within the previous report due to being below the required dimensions to meet the definition of a prescribed tree within the Ryde Council DCP. Some of these trees may now have grown to an extent where they are now considered to be a prescribed tree and have therefore been captured within this report.

This report includes additional tree assessment of the newly planted street trees in front of the development site, numbered 42.1-42.11 within the report.

Eight trees captured within this report but excluded from the previous AIA (Eco Logical 2020) are within the areas designated as demolition footprint (Orange) and development footprint (Yellow) shown in figure 3 (Section 5.1). It is clear therefore that these trees were all considered as being removed during demolition or development and therefore, should be considered as being approved under the concept DA. This relates to tree numbers 14*,17,18,22*,24*,25*,26*,27, five (5) of which are exempt specimens due to species or dimensions.

Seven (7) trees already approved for removal and shown as such within the previous AIA by Eco Logical Australia 2022, currently still exist within the site, along the Northern boundary, trees: 10,19,20,21,23,28,33.

- Based upon the current design, thirty-four (34) trees will require removal to facilitate this development- 4,5,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,31,32,33,34,35,36,37,38,39
- Based upon the mapping within the approved AIA from Eco Logical Australia (February 2020), the following fifteen (15) trees should be considered as being approved for removal under the concept DA:10,14,17,18,19,20,21,22,23,24,25,26,27,28,33.
- Dead trees 15,16,32 are allowed to be removed, however, they may still need to go through the application process with the consent authority.
- A total of sixteen (16) prescribed trees and three (3) dead trees will need to be removed and will require approval from the consent authority 4,5,7,8,9,11,12,15*,16*,13,29,31,32*,34,35,36,37,38,39.
- Trees 1,2,3,30,40,41 are to be retained and will require tree protection measures to be installed.
- Trees 1,2,3 are subject to TPZ encroachments of 10-15% so tree root mapping using non-destructive methods will be required prior to installation of the retaining wall.
- Trees 6,40 & 41 are to be retained with tree protection fencing and signage used to isolate the tree from construction activity.
- The driveway construction within the TPZs of trees 40 & 41must be constructed using sensitive construction methods. Grading is to be excluded from the TPZs and the driveway must be constructed using sensitive construction methodologies such as suspended slab and building on or above existing grade.
- Tree 30 is a tree is located within the neighbour's property. Grading is to be excluded from the TPZ and the car park and driveway must be constructed using sensitive construction methodologies such as suspended slab and building on or above existing grade.
- Trees 42.1 and 42.11 are within the footprint of the new driveway and will require removal.

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3 INTRODUCTION & AIM

Truth About Trees Pty. Ltd. have been engaged by School Infrastructure New South Wales (SINSW), to prepare an Arboricultural Impact Assessment report in accordance with the requirements of AS4970-2009: The Protection of Trees on Development Sites (Standards Australia, 2009).

This Arboricultural Impact Assessment accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), in respect of a State Significant Development Application (SSDA) for the construction and operation of Midtown Macquarie Park new primary school. This report addresses the relevant Secretary's Environmental Assessment Requirements (SEARs) issued for the project, notably:

Table 1 – Summary of Relevant SEARs and Response

SEAR	Requirement	Response	Report Section
7	*Assess the number, location, condition and significance of trees to be removed and retained and note any existing canopy coverage to be retained on-site.*	**29 trees to be removed. No existing canopy coverage to be retained within the site.**	**7,8,9.**

Figure 1 - Showing the approximate site boundary within the larger development site.

Macquarie Park new primary school will provide for 750 students from Kindergarten to Year 6 within a five/six-storey built form, including:

- Flexible learning areas;
- Administration and staff facilities;
- Canteen;
- Multi-purpose hall and covered outdoor learning area;
- Library;

- Outdoor play areas at ground level, on each floor of the building and rooftop;
- Landscaped outdoor learning areas; and
- Car parking.

This report includes additional tree assessment of the newly planted street trees in front of the development site, numbered 42.1-42.11 within the report.

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4 METHODOLOGY

Assessment of the trees was undertaken on 15/12/22 , 15/6/23 and subsequently on 15/11/24 by Tom Hare and using the framework of the *Visual Tree Assessment procedure* (VTA) as prescribed by Mattheck & Breloer (Claus Mattheck, 1994).

Trees within the survey area were tagged and geo-located with data collected using a TRIMBLE TDC600 data collector, with an external DA2 aerial capable of 1cm accuracy when used in optimal conditions.

Details provided for the trees are as follows:

a) Correct botanical identification and common name
b) Health assessment & rating
c) Basic structural assessment & rating
d) Dimensions: height, crown spread, DBH & DAB
e) TPZ & SRZ calculations
f) Age class
g) Landscape significance assessment & rating
h) Estimated Life Expectancy
i) Retention value in accordance with the STARS system

Tree Protection Zones (TPZ) and Structural Root Zones (SRZ) were calculated in accordance with Australian Standard *AS4970-2009: Protection of Trees on Development Sites* (Standards Australia, 2009).

Tree Retention Values were determined using the Institute of Australian Consulting Arborists (IACA) *'Significance of a Tree, Assessment Rating System'* (STARS) (IACA©, 2010).

A detailed Arboricultural assessment methodology can be found in Appendix 1 of this report.

4.1 LIMITATIONS OF THE REPORT:

- No internal diagnostic testing has been completed.
- No sub surface root testing or soil analysis has been completed.
- All observations were made from ground-level only and where access was reasonably available.
- Tree height, canopy spreads and trunk diameters have been estimated.
- This report has been compiled based only on the information provided by the client as detailed in Table 1 below, and from observations made at the time of the site inspection(s) only.
- Only trees located within or directly adjacent to the subject site(s) boundaries that had the potential to be impacted were captured, provided they satisfied the definition criteria of a 'tree' in accordance with Councils Development Control Plan (DCP).
- Assessment of tree health and condition has been included to guide assessment of tree retention aspects only and is based on a basic visual assessment using elements of the VTA method. Tree structure and defects may be discussed briefly within this report; however, this report is not designed to be, nor does it satisfy the requirements of a detailed Arboricultural Risk Assessment report.

4.2 DOCUMENT SCHEDULE

The documents listed below have been relied upon in the preparation of this report.

Ref. No.	Document / Drawing Title	Author	Date
SEPP_B&C 2021	State Environmental Planning Policy (SEPP) Biodiversity & Conservation – Chapter 2: Vegetation in non-rural areas	NSW DPE	1/3/2022
DCP 2014	City of Ryde Development Control Plan (DCP)	COR	2014
LEP 2014	City of Ryde Local Environmental Plan (LEP)	COR	2014
AS4970	Australian Standard AS4970-2009 'Protection of trees on development sites'	Standards Australia / SAI Global	2009
AS4373	Australian Standard AS4373-2007 'Pruning of amenity trees'	Standards Australia / SAI Global	2007
Documentation provided to Truth About Trees by the client and or representatives:			
N/A	Architectural PDF & DWG Package	Architectus	24/5/23
N/A	Civil Drawing Package	TTW	24/5/23
MPS-TTW-ZZ-GF-DR-C-0010	Siteworks Plan rev. 6	TTW	6/6/23
N/A	Landscape Drawings	Oculus	24/5/23
N/A	Mechanical Drawings	Erbas	24/5/23
N/A	Structural Drawings	TTW	24/5/23
N/A	Hydraulic Drawings	Erbas	24/5/23
N/A	Frasers SSD Mod Pack	Bates Smart	1/5/23
N/A	Frasers Property Site Wide AIA	Ecological	Feb 2020

Table 1 – Document Register

5 SITE DETAILS

The project site is known as site 'B2' in the current concept approval for the redevelopment of Ivanhoe Estate, Macquarie Park (**SSD-8707**).

The project site is contained within Proposed Lot 24 in the staged subdivision of parent allotment Lot 100 DP 1262209 approved under Stage 1 of the concept approval (**SSD-8903**) and is currently legally known as Lot 13 DP 1271599. The project site has an area of 3,346m^2 and a frontage to Main Street of 83.517m.

The project also includes the construction and use of a driveway on a future adjoining site, known as site 'B1.2' in the concept approval, proposed lot 23 in the Stage 1 subdivision, and currently legally known as Lot 13 DP 1271599.

The site is not subject to any bushfire constraints.

A small portion site is not mapped on the NSW Department of Planning & Environment Biodiversity Values Map, as an area of Biodiversity Value (Environment, Biodiversity Values Map, 2022).

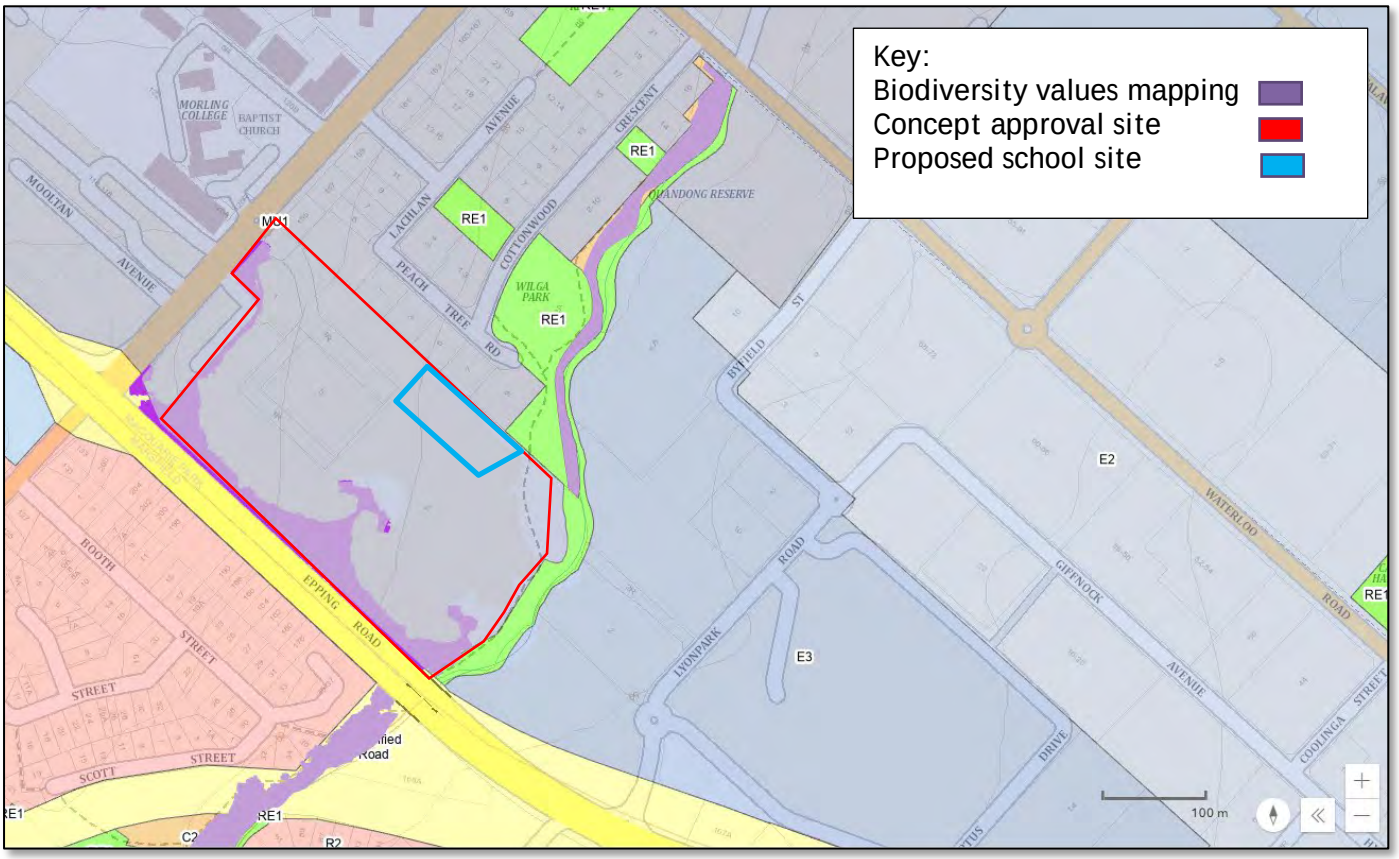

Figure 2 – Showing the approximate location of the subject site (blue) within the larger development boundaries (red) with zoning and biodiversity values overlays – Image (Environment, ePlanning Spatial Viewer, 2022)

5.1 CONCEPT DA

The initial concept DA (SSD-8707) provided for the subdivision and development of the overall site highlighted a number of trees which would be removed during demolition and construction within the site, and also identified trees which could be retained for the purposes of the concept DA.

It should be noted that the data contained within the previous AIA by Eco Logical Australia and the surveys the report relied upon did not include some of the trees which have been captured within this AIA due to previous site conditions and restricted access.

It is also likely that trees may not have been included within the previous report due to being below the required

dimensions to meet the definition of a prescribed tree within the Ryde Council DCP. Some of these trees may now have grown to an extent where they are now considered to be a prescribed tree and have therefore been captured within this report.

It is noted that the report from Eco Logical Australia did not capture dead trees within their AIA. Dead trees have been included within this report as the Ryde Council DCP framework requires a tree permit application for the removal of dead trees.

Certain weed species or exempt trees were also captured within this report to provide context of the existing trees and site conditions.

Eight trees captured within this report but excluded from the previous AIA (Eco Logical 2020) are within the areas designated as demolition footprint (Orange) and development footprint (Yellow) shown in figure 3 below. It is clear therefore that these trees were all considered as being removed during demolition or development and therefore, should be considered as being approved under the concept DA. This relates to tree numbers 14*,17,18,22*,24*,25*,26*,27, five (5) of which are exempt specimens due to species or dimensions.

Seven (7) trees already approved for removal and shown as such within the previous AIA by Eco Logical Australia 2022, currently still exist within the site, along the Northern boundary, trees: 10,19,20,21,23,28,33 as shown in figure 3 below.
Based upon the mapping within the approved AIA from Eco Logical Australia (February 2020), the following fifteen (15) trees should be considered as being approved for removal under the concept DA:
10,14,17,18,19,20,21,22,23,24,25,26,27,28,33.

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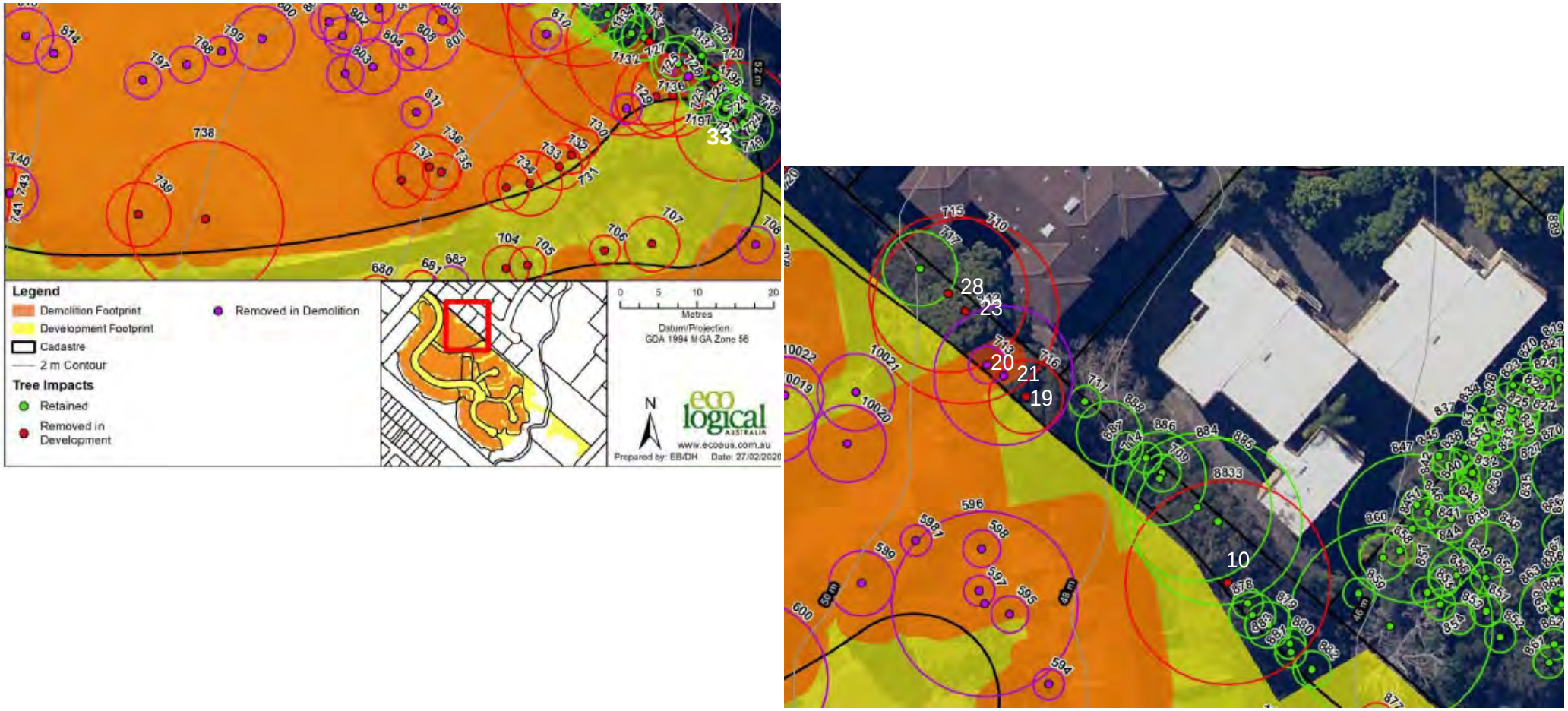

Figure 3- Drawings from the whole site AIA which was prepared for the concept DA with Truth About Trees numbering shown in white on trees approved for removal (red & purple). The trees shown in green were specified for retention within the AIA prepared by Eco Logical Australia dated February 2020.

6 THE PROPOSAL

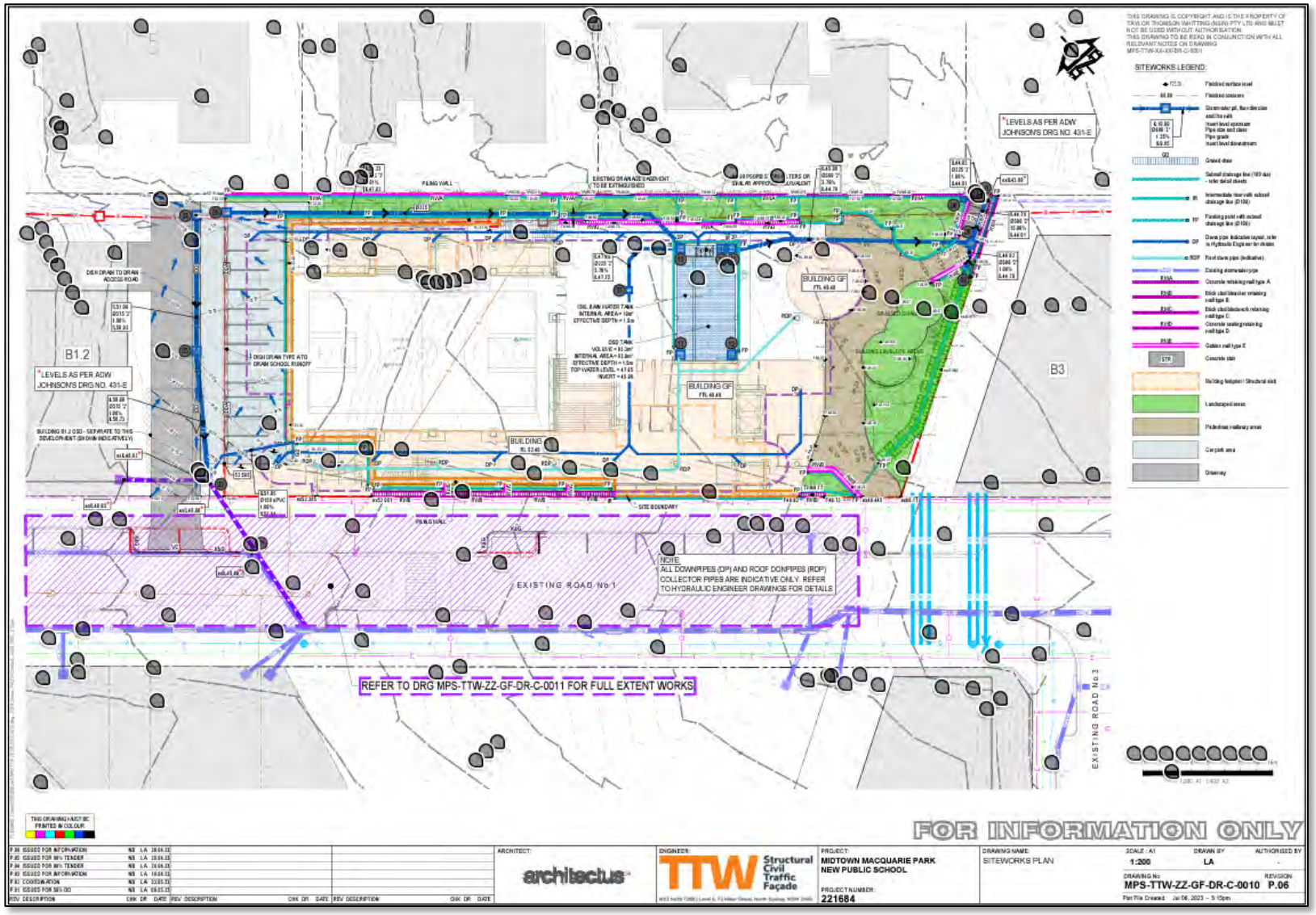

Figure 4 - Showing the proposed Site works Plan.

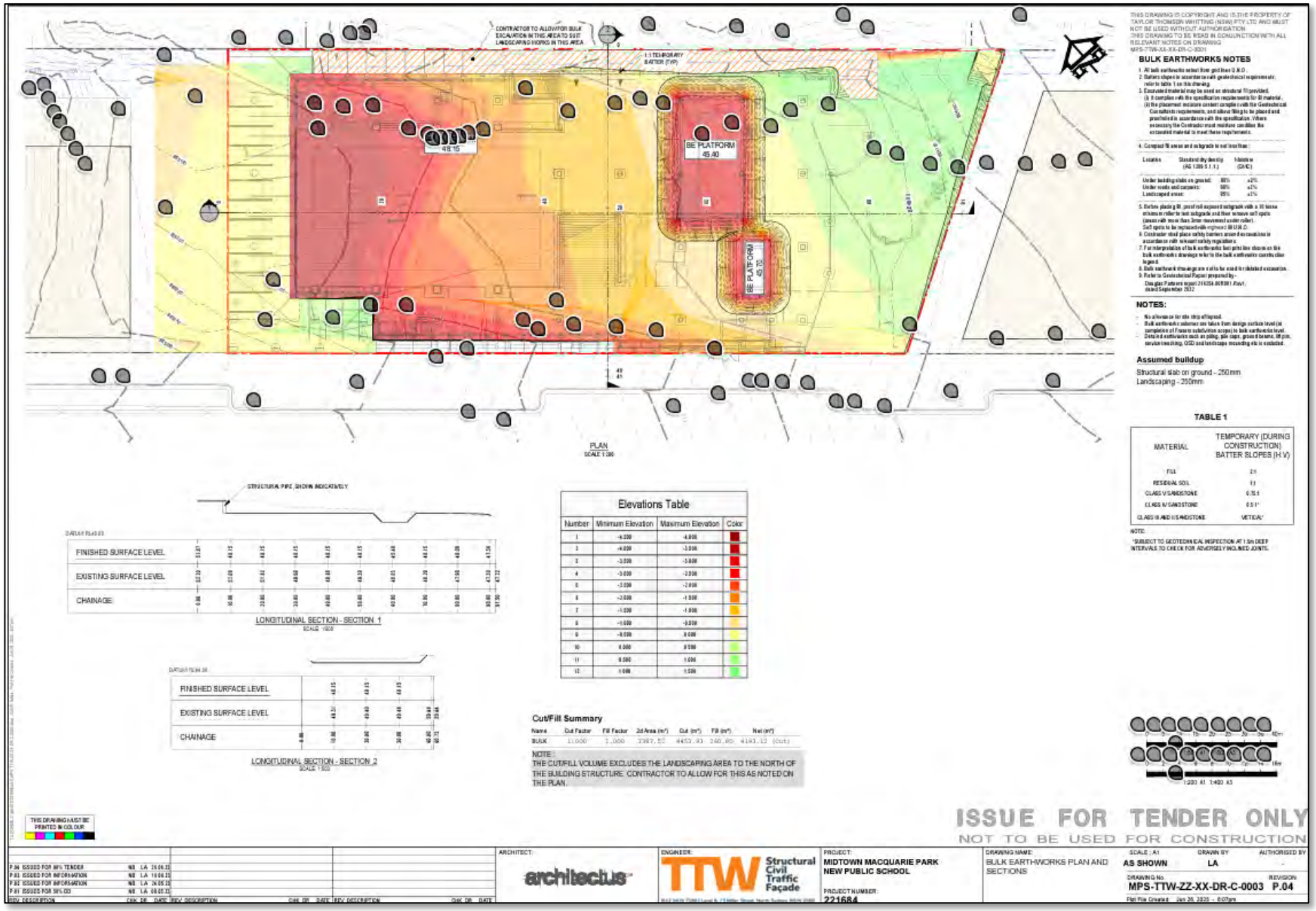

Figure 5- Cut and fill plan.

7 TREE SCHEDULE

Tree No	Species	Height	Spread	DBH mm	DAB mm	TPZ (mm)	SRZ (mm)	Health	Structure	Tree Defects	Landscape Significance	ELE	Retention Value
1	*Casuarina cunninghamiana* | River She-oak	18	8	320	400	3840	2252	Good	Poor	Deadwood 10cm plus diam.| Significant phototropic lean| Poor tree form| Previous failures	Medium	Medium	Medium
2	*Casuarina cunninghamiana* | River She-oak	20	8	380	460	4560	2388	Good	Fair		Medium	Medium	Medium
3	*Angophora costata* | Smooth-barked Apple Myrtle	11	5	290	340	3480	2104	Fair	Fair		Low	Medium	Low
4	*Angophora costata* | Smooth-barked Apple Myrtle	14	8	320	360	3840	2155	Fair	Fair		Medium	Medium	Medium
5	*Acacia binervia* | Coast Myall	5	4	260	300	3120	1996	Poor	Poor	Poor tree form| Wound(s)	Low	Short	Low
6	*Populus deltoides* | Cottonwood	20	13	540	660	6480	2779	Fair	Fair	Deadwood 10cm plus diam.| Cavity(s)|Decay| Dieback-tip| Epicormic growth. Couldn`t assess fully (neighbours' tree)	Medium	Medium	Medium
7	*Angophora costata* | Smooth-barked Apple Myrtle	7	3	220	290	2640	1968	Fair	Poor	Wound(s)	Low	Medium	Low
8	*Angophora costata* | Smooth-barked Apple Myrtle	10	6	270	385	3240	2216	Fair	Poor	Poor tree form| Wound(s)|Previous failures	Low	Short	Low
9	*Angophora costata* | Smooth-barked Apple Myrtle	5	3	140	270	2000	1910	Fair	Poor	Poor tree form| Wound(s)|Previous failures	Low	Short	Low
10	*Eucalyptus saligna* | Sydney Blue Gum	24	12	520	650	6240	2762	Poor	Poor	Deadwood 10cm plus diam.| Decay| Dieback-tip| Hanger(s)|Included bark| Poor tree form| Wound(s)|Excessive end weight| Previous failures| Weak unions.	High	Short	Low
11	*Eucalyptus saligna* | Sydney Blue Gum	25	9	460	600	5520	2670	Fair	Fair	Deadwood 10cm plus diam.| Cavity(s), Couldn`t assess fully due to access.	High	Medium	High
12	*Pittosporum undulatum* | Sweet Pittosporum	5	4	100	150	2000	1500	Fair	Fair	Couldn`t assess fully due to access.	Low	Medium	Low
13	*Eucalyptus saligna* | Sydney Blue Gum	25	12	440	500	5280	2474	Good	Fair	Deadwood 10cm plus diam.	High	Medium	High

Tree No	Species	Height	Spread	DBH mm	DAB mm	TPZ (mm)	SRZ (mm)	Health	Structure	Tree Defects	Landscape Significance	ELE	Retention Value
14	*Syagrus romanzoffiana* | Cocos Palm	5	4	250	280	3000	N/A	Good	Good		Low	Medium	Low
15	Dead Tree | Dead tree	13	12	460	550	5520	2575	Dead	Poor		Low	0	Low
16	Dead Tree | Dead tree	5	N/A	200	230	2400	1785	Dead	Poor	Stump	Low	0	Low
17	*Archontophoenix cunninghamiana* | Bangalow Palm	5	3	180	250	2500	N/A	Fair	Good		Low	Medium	Low
18	*Fraxinus oxycarpa* 'Raywood' | Claret Ash	10	6	325	365	3900	2167	Fair	Poor	Poor tree form| Previous failures, Bougainvillea in canopy	Low	Short	Low
19	*Acacia elata* | Cedar Wattle	9	5	210	280	2520	1939	Poor	Poor	Decay| Poor tree form, dead head	Low	Short	Low
20	*Eucalyptus microcorys* | Tallowwood	26	14	590	695	7080	2840	Good	Fair	Deadwood 10cm plus diam.	High	Medium	High
21	*Eucalyptus microcorys* | Tallowwood	26	14	460	555	5520	2584	Fair	Fair	Deadwood 10cm plus diam.| Borer/Termites	Medium	Medium	Medium
22	*Corymbia eximia* | Yellow Bloodwood	4	4	150	170	2000	1572	Good	Poor		Low	Medium	Low
23	*Eucalyptus microcorys* | Tallowwood	25	16	610	900	7320	3166	Good	Fair	Deadwood 10cm plus diam.| Included bark| Arboreal Termites	High	Medium	High
24	*Ligustrum sinense* | Small-leaved Privet	4	4	120	150	2000	1500	Good	Fair		Low	Short	Low
25	*Ligustrum sinense* | Small-leaved Privet	4	4	120	150	2000	1500	Poor	Fair		Low	Short	Low
26	*Eriobotrya japonica* | Loquat	5	5	140	185	2000	1629	Good	Fair	Poor tree form| Wound(s)	Low	Medium	Low
27	*Eucalyptus tereticornis* | Forest Red Gum	5	2	140	180	2000	1611	Poor	Poor		Low	Short	Low
28	*Eucalyptus microcorys* | Tallowwood	16	10	325	355	3900	2142	Fair	Poor	Deadwood 10cm plus diam.| Abnormal lean| Poor tree form| Excessive end weight	Low	Short	Low
29	*Eucalyptus acmenoides* | White Mahogany	21	15	455	550	5460	2575	Good	Fair	Co-dominant form, couldn`t assess fully due to Ivy.	Medium	Medium	Medium

Tree No	Species	Height	Spread	DBH mm	DAB mm	TPZ (mm)	SRZ (mm)	Health	Structure	Tree Defects	Landscape Significance	ELE	Retention Value
30	*Eucalyptus botryoides* | Southern Mahogany	9	8	330	400	3960	2252	Fair	Fair	Deadwood 5 – 10cm diam.| Suppressed – form phototropic	Low	Medium	Low
31	*Eucalyptus saligna* | Sydney Blue Gum	10	7	230	280	2760	1939	Fair	Fair	Deadwood <5cm diam.| Suppressed by T33	Low	Medium	Low
32	Dead Tree | Dead tree	6	2	200	230	2400	1785	Dead	Poor		Low	Short	Low
33	*Eucalyptus saligna* | Sydney Blue Gum	20	10	470	520	5640	2515	Good	Good		Medium	Medium	Medium
34	*Casuarina cunninghamiana* | River She-oak	5	2	180	200	2160	1683	Fair	Poor	Suppressed form	Low	Short	Low
35	*Corymbia maculata* | Spotted Gum	12	3	245	280	2940	1939	Fair	Poor	Suppressed form	Low	Short	Low
36	*Eucalyptus botryoides* | Southern Mahogany	6	3	230	300	2760	1996	Fair	Poor	Suppressed form	Low	Short	Low
37	*Corymbia maculata* | Spotted Gum	9	3	170	210	2040	1718	Fair	Poor	Poor specimen	Low	Short	Low
38	*Casuarina cunninghamiana* | River She-oak	5	3	135	165	2000	1553	Good	Fair		Low	Medium	Low
39	*Eucalyptus pilularis*| Blackbutt	14	5	300	350	3600	2129	Fair	Fair		Low	Medium	Low
40	*Casuarina cunninghamiana* | River She-oak	6	4	150	190	2000	1647	Good	Fair		Low	Medium	Low
41	*Eucalyptus saligna* | Sydney Blue Gum	23	14	460	600	5520	2670	Fair	Fair		Medium	Medium	Medium
AMENDED TREE SCHEDULE TO INCLUDE STREET TREE PLANTINGS BETWEEN JULY 2023 AND MARCH 2024													
42.1	*Ficus microcarpa var. hillii* | Hills Weeping Fig	4	2	120	175	2000	1592	Good	Fair	Tree located within footprint of driveway	Low	Long	Medium
42.2	*Ficus microcarpa var. hillii* | Hills Weeping Fig	5	3	155	205	2000	1701	Good	Fair		Low	Long	Medium
42.3	*Ficus microcarpa var. hillii* | Hills Weeping Fig	5	3	130	185	2000	1629	Good	Fair		Low	Long	Medium

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Tree No	Species	Height	Spread	DBH mm	DAB mm	TPZ (mm)	SRZ (mm)	Health	Structure	Tree Defects	Landscape Significance	ELE	Retention Value
42.4	*Ficus microcarpa var. hillii* | Hills Weeping Fig	5	3	120	170	2000	1572	Good	Fair		Low	Long	Medium
42.5	*Ficus microcarpa var. hillii* | Hills Weeping Fig	5	3	120	170	2000	1572	Good	Fair		Low	Long	Medium
42.6	*Ficus microcarpa var. hillii* | Hills Weeping Fig	5	3	120	170	2000	1572	Fair	Fair		Low	Long	Medium
42.7	*Ficus microcarpa var. hillii* | Hills Weeping Fig	5	3	120	170	2000	1572	Fair	Fair		Low	Long	Medium
42.8	*Ficus microcarpa var. hillii* | Hills Weeping Fig	5	3	145	185	2000	1629	Good	Fair		Low	Long	Medium
42.9	*Ficus microcarpa var. hillii* | Hills Weeping Fig	5	4	145	185	2000	1629	Good	Fair		Low	Long	Medium
42.10	*Ficus microcarpa var. hillii* | Hills Weeping Fig	5	3	145	185	2000	1629	Good	Fair		Low	Long	Medium
42.11	*Ficus microcarpa var. hillii* | Hills Weeping Fig	4	2	120	175	2000	1592	Good	Fair	Tree located within footprint of driveway	Low	Long	Medium

Table 2-Tree Schedule.

7.1 TREE RETENTION VALUES

Retention value	Tree numbers	Total
High	11, 13, 20, 23.	**4**
Medium	1, 2, 4, 6, 21, 29, 33, 41,42.1,42.2,42.3,42.4,42.5,42.6,42.7,42.8,42.9,42.10,42.11.	**19**
Low	3, 5, 7, 8, 9, 10, 12, 14, 15, 16, 17, 18, 19, 22, 24, 25, 26, 27, 28, 30, 31, 32, 34, 35, 36, 37, 38, 39, 40.	**29**
Very low	0	**0**

Table 3 - Showing tree retention values – colours showing the associated retention value colour.

7.2 TREE LOCATIONS PLAN

Figure 6- Tree location plan.

7.2.1 Additional Tree Locations And Impacts

Figure 7- Locations of additional trees in the streetscape and image of the approved driveway.

7.3 TREE ENCROACHMENT PLANS

Figure 8-Image showing ground floor encroachments.

7.4 AMENDED ENCROACHMENT PLAN FOLLOWING RECENT DESIGN CHANGE

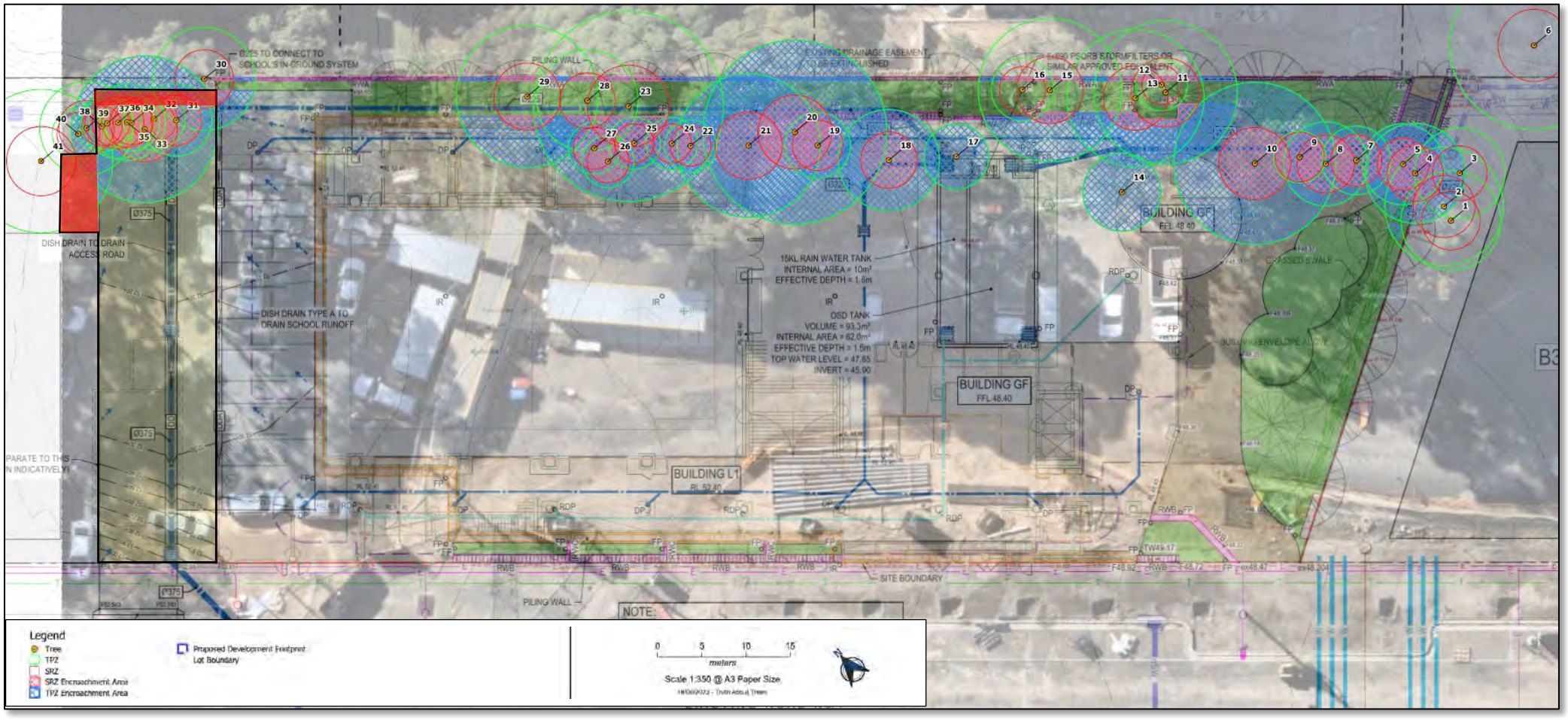

Figure 9 – Site Works Plan showing TPZ, SRZ & encroachments shown in blue & red hatching. New encroachment areas are highlighted in Red.

8 DISCUSSION

Based upon the current designs the following impacts are considered likely.

Tree number	Impacted by	Encroachment %	Potential mitigation options	Practical to retain YES/NO
1,2,3	Retaining wall & grading.	10%, 15%, 10%.	Exploratory excavation and tree root mapping.	YES
4,5	Retaining wall, stairs & grading,	46%, 69%	No suitable mitigation options under current design.	NO
6	Unaffected by the design.	0%	Tree protection fencing & signage.	YES
7,8,9,10	Stormwater and grading of school yard.	100%,100%, 100%, 87%	No suitable mitigation options under current design.	NO
11,12,13	Retaining wall, grading and building footprint	36%, 7%,38% Doesn`t include retaining wall.	No suitable mitigation options under current design.	NO
14	Within building footprint	100%	No suitable mitigation options under current design.	NO
15,16	Retaining wall and grading	31%, 8%	No suitable mitigation options under current design. Dead trees.	NO
17,18,19 20,21,22	Within building footprint	All 100%	No suitable mitigation options under current design.	NO
23	Stormwater, grading and building footprint	45%	No suitable mitigation options under current design.	NO
24,25,26 27	Within building footprint	All 100%	No suitable mitigation options under current design.	NO
28,29	Stormwater, retaining wall, grading and building footprint	34%, 35% Doesn`t include retaining wall.	No suitable mitigation options under current design.	NO
30	Retaining wall, stormwater, car park	28.9%	Tree sensitive construction methods must be used.	YES
31,32,33	Footprint of access road, major impacts from stormwater	All 100%	No suitable mitigation options under current design.	NO
34,35,36, 37,38	Within footprint of new driveway	All 100%	No suitable mitigation options under current design.	NO
39	New driveway	38%	No suitable mitigation options under current design.	NO
40,41	New driveway	8%,21.9%	Tree sensitive construction methods must be used.	YES
42.1, 42.11	New driveway footprint	100%	Trees will require removal	NO

Table 4-Impact schedule

Trees 1-3 are subject to encroachments of 10%- 15% from the proposed development and are suitable for retention in relation to this development, however, the trees will need to be removed for the future development of the adjacent block (B3). Tree root mapping will be required to confirm the location of any significant tree roots conflicting with the retaining wall design.

Tree six (6) is a neighbour's tree which is unaffected by the current design.

Tree thirty (30) is a neighbour's tree which is heavily impacted by the proposed works with TPZ encroachment of 28.9%. Grading is to be excluded from the TPZ and the car park and driveway must be constructed using sensitive construction methodologies such as suspended slab and building on or above existing grade.

Trees 40 & 41suffer encroachments of 8% and 21.9% respectively from the proposed driveway Grading is to be excluded from the TPZ and the driveway must be constructed using sensitive construction methodologies such as suspended slab and building on or above existing grade.

9 CONCLUSION

- A total of forty-one (41) trees were surveyed in December 2022 and June 2023.
- A further eleven (11) trees were surveyed on 15th November 2024.
- Four (4) trees were allocated a high retention value in accordance with the STARS system of assessment: 11,13,20,23.
- Nineteen (19) trees were allocated a medium retention value in accordance with the STARS system of assessment: 1,2,4,6,21,29,33,41,42.1,42.2,42.3,42.4,42.5,42.6,42.7,42.8,42.9,42.10,42.11. Trees with a medium retention value should be considered for retention where feasible and reasonable within the scope of the design and site limitations.
- Twenty-nine (29) trees were allocated a low retention value in accordance with the STARS system of assessment: 3,5,7,8,9,10,12,14,15,16,17,18,19,22,24,25,26,27,28,30,31,32,34,35,36,37,38,39,40.
- Trees with a low retention value are not considered to be a constraint upon development but may be retained if there is no impact to the trees from the proposed development. Tree seventeen (17) is a small Bangalow Palm, this is a native species and whilst the tree is of low retention value, this species of Palm can be reliably transplanted and should be considered for relocation.
- Based upon the current design, thirty-six (36) trees will require removal to facilitate this development- 4,5,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,31,32,33,34,35,36,37,38,39,42.1, 42.11.
- Based upon the mapping within the approved AIA from Eco Logical Australia (February 2020), the following fifteen (15) trees should be considered as being approved for removal under the concept DA:10,14,17,18,19,20,21,22,23,24,25,26,27,28,33.
- Dead trees 15,16,32 are allowed to be removed, however, they may still need to go through the application process with the consent authority.
- Additional trees 42.1 & 42.11 are recently planted trees within the driveway footprint. The trees are less than 5m in height, so they are not considered as prescribed trees within the DCP. As the roadway still belongs to Frasers, these trees are still private trees and may be removed without council permission.
- A total of sixteen (16) prescribed trees and three (3) dead trees will need to be removed and will require approval from the consent authority: 4,5,7,8,9,11,12,15*,16*,13,29,31,32*,34,35,36,37,38,39.
- Trees 1,2,3,30,40,41 are to be retained and will require tree protection measures to be installed.
- Trees 1,2,3 are subject to TPZ encroachments of 10-15% so tree root mapping using non-destructive methods will be required prior to installation of the retaining wall. Tree protection fencing and signage must be used to isolate the trees from construction activity.
- Trees 6,40 & 41, are to be retained with tree protection fencing and signage used to isolate the tree from construction activity. Trees 42.2,42.3,42.4,42.5,42.6,42.7,42.8,42.9,42.10 are going to be against the construction hoarding which should provide some level of protection from the development site, however, the road side of the trees will need to be protected. The installation of the hoarding is to be supervised by the project Arborist who at this time will also specify how the road side of the trees are to be protected.
- The driveway construction within the TPZs of trees 40 & 41must be constructed using sensitive construction methods. Grading is to be excluded from the TPZs and the driveway must be constructed using sensitive construction methodologies such as suspended slab and building on or above existing grade.
- Tree 30 is a tree is located within the neighbour's property. Grading is to be excluded from the TPZ and the car park and driveway must be constructed using sensitive construction methodologies such as suspended slab or building on or above existing grade. Tree protection fencing and signage must be used to isolate the tree from construction activity.

10 MITIGATION MEASURES

- Trees 1,2 & 3 suffer encroachments of 10-15% from the proposed development and will require tree protection fencing and signage in accordance with AS4970-2009. The tree protection zone lost to encroachment is to be compensated for with TPZ fencing extended contiguous with the TPZs. Non-destructive exploratory excavation under Arborist supervision will be required prior to the installation of the retaining wall to confirm the location of any significant tree roots and recommend alternate construction methods if required.
- Tree 6 is unaffected by the design and is located within the adjacent site. Tree protection fencing and signage is to be installed in accordance with AS4970-2009.
- Tree 30 is a neighbour's tree which is heavily impacted by the proposed works with TPZ encroachment of 28.9%. Grading is to be excluded from the TPZ and the car park and driveway must be constructed using sensitive construction methodologies such as suspended slab and building on or above existing grade.
- Trees 40 & 41 are subject to TPZ encroachment of 8% & 21.9% respectively from the proposed driveway. The driveway construction within the TPZs of trees 40 & 41must be constructed using sensitive construction methods. Grading is to be excluded from the TPZs and the driveway must be constructed using sensitive construction methodologies such as suspended slab and building on or above existing grade.
- These trees are to be retained and protected using tree protection fencing and signage to be installed in accordance with AS4970-2009.

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12 GLOSSARY OF TERMS & ABBREVIATIONS

Age class – Described as Juvenile, Semi-Mature, Mature, Over-Mature. These definitions are variable subject to species and growing environment.

- **Juvenile** - Trees that are generally a sapling, or a new planting, usually within the first two (2) years of their life.
- **Semi-mature** - Tree aged less than <20% of life expectancy, *in situ*
- **Mature** - Tree aged 20-80% of life expectancy, *in situ*.
- **Senescent/ Over Mature** - Tree aged greater than >80% of life expectancy, *in situ,* or *senescent* with or without reduced *vigour*, and declining gradually or rapidly but irreversibly to death

Arboriculture - The science and culture of the growth, planning, management, care and maintenance of trees primarily for amenity and utility purposes.

Arborist - An individual with competence to cultivate, care and maintain trees for *amenity* or utility purposes.

Australian Standard AS4970-2009 (AS4970) – Australian Standard AS4970-2009: 'Protection of trees on development sites' is the underpinning standard to which development-based Arboricultural works and guidance are based upon within Australia.

Australian Standard AS4373-2007 (AS4373) – Australian Standard AS4373-2007: 'Pruning of amenity trees' is the underpinning standard to which practical Arboricultural works are based upon within Australia.

Batter – The process of grading the land in a slope formation away from an excavation or built structure.

Benching - Relatively level strips of earth or rock in a broad step-like formation breaking the continuity of a slope usually for reasons of safety. Depending on soil and rock type a commonly used ratio for vertical to horizontal cutting is 2:1.

Building envelope - Total surface area of ground that is or will be covered by a building.

Building footprint - *See Building envelope*.

Deep soil - Soil to a depth of 1000 mm or more (Craul 1992, p. 32).

Defect - Any feature of a tree that is likely to make it less safe (in the case of a structural defect) or otherwise to reduce its health, longevity, landscape prominence or conservation value for any other reason.

Diameter at Base (DAB) – The diameter of the tree taken at ground level above the root buttress flare

Diameter at Breast Height (DBH) - Measurement of trunk width calculated at a given distance above ground from the base of the tree often measured at 1.4m.

Easement - Areas of land above or below ground, subject to statutory constraints being either public or private provided for access or the location of utilities.

Estimated Life Expectancy (ELE) - Assessed on trees of particular species in the urban environment, including health and structural conditions which may exist.

Footing - Of a building, the lowest part of a structural wall or *pier* (in any form), that rests upon or into the earth. See also *Foundation*.

Foundation - The point at the earth surface upon which a building *footing* rests. See also *Footing*.

Height over Diameter (H/D) - The height of the tree divided by the Diameter at Base (DAB) used to determine structural integrity of trees in relation to windthrow when trees have developed slender form due to competition.

Significance of a Tree Assessment Rating System (STARS) – A methodology produced by the Institute of Australian Consulting Arborists (IACA) for the use in determining tree retention value(s). (IACA©, 2010)

Structural Root Zone (SRZ) –

Tree Protection Zone (TPZ)

Vigour - Physical strength and health. A tree with good vigour has the ability to sustain life processes and is synonymous with good health.

Visual Tree Inspection (VTA) - Is a detailed visual inspection of a tree and surrounding site (Claus Mattheck, 1994)

13 DISCLAIMER

The information contained within this report is to be used solely for the purposes that were specified at the time of engagement.

All attempts have been made to ensure the legitimacy of any information which has been gathered in the process of compiling this report, however Truth About Trees Pty Ltd cannot be held liable for inaccurate or misguiding information which has been provided by others.

Any tree inspections or assessments which have been carried out for the purposes of this report are valid only at the time of inspection and are based on what could reasonably be seen or diagnosed from a visual inspection carried out from ground level.

All inspections, unless otherwise stated, are based upon Visual Tree Assessment (VTA) techniques, industry best practice and applied knowledge.

No internal diagnostic testing or below ground investigation has been carried out unless otherwise stated.

Trees are a dynamic living organism and as such they have a finite lifespan the end of which cannot always be predicted or understood, even apparently healthy trees can die suddenly or fall without warning. As such there is no warranty or guarantee provided, or implied, regarding the future risks associated with any tree.

Unless specifically stated within the scope and methodology sections of this report, this report does not constitute a detailed Arboricultural Risk Assessment if relating to construction and development related report types.

Assessment of tree health and condition has been included to guide assessment of tree retention aspects only and is based on a basic visual assessment using elements of the VTA method. Tree defects may be discussed briefly within this report; however, this report does not satisfy the requirements of a detailed Arboricultural Risk Assessment report.

It is noted that upon acceptance and completion of any development, that there may be trees that impose a risk of impacting a target that was not previously present prior to the development.

It is up to the client and the tree owner/manager to determine the risk threshold that they are willing to accept and undertake a suitably detailed Arboricultural risk assessment that identifies potential tree risk(s) and provides tree management recommendations in line with this threshold.

Please feel free to contact me either via telephone or email if you have any questions regarding this report.

14 APPENDIX 1: TREE ASSESSMENT METHODOLOGY

14.1 VISUAL TREE ASSESSMENT (VTA)

The VTA system is based on the theory of tree biology and physiology, as well as tree architecture and structure. This method is used by arborists to identify visible signs on trees that indicate good health, or potential problems. Symptoms of decay, growth patterns and defects are identified and assessed as to their potential to cause whole-tree, part-tree and/or branch failure. This system (represented by the image below) is based around methods discussed in `*The Body Language of Trees*'. (Claus Mattheck, 1994)

For the purpose of this report, elements of the VTA system will be used, along with industry standard literature, and other relevant studies that provide an insight into potential hazards in trees. This assessment is a snapshot of what could be reasonably seen or determined from a basic visual inspection. The VTA system is generally used as a means to identify hazardous trees; however, it is important to realize that for a tree to be hazardous there must be a target; a hazard poses no risk if there is no exposure to the hazard.

14.2 HEALTH & VIGOUR ASSESSMENT

The health and vigour of a tree are assessed by looking at the tree canopy and how it is performing. Certain indicators provide information on which to base the assessment. Abnormally small leaves, chlorosis (yellowing), sparse crown, wilting, and die-back can be signs of ill-health or decline but may also be related to a temporary imbalance due to drought or pest infestations. Epicormic growth can be a sign of stress and low energy reserves but can also be related to increased light levels through the removal or pruning of adjacent trees. Extension growth can be a good indicator of vigour, but this can vary greatly between species and under differing climatic conditions. For these reasons, each individual symptom or observation needs to be assessed with objectivity and consideration of all available information.

14.3 STRUCTURAL ASSESSMENT

The structural assessment of trees is carried out using the basic framework of Visual Tree Assessment. Signs and symptoms of defects are assessed to gauge the likelihood of failure, because not every defect constitutes a hazard e.g., *"…co-dominant stems are a structural defect. The severity of the defect is increased by included bark, large crowns and strong wind."* (Nelda P Matheny, 2009)

If trees were removed purely on the basis that there were defects present without assessing the likelihood of failure or whether practical mitigation measures are available, the urban forest would cease to exist. A basic visual tree assessment is undertaken from ground level, if defects are suspected further investigation may be required and recommended.

"*[When using] the Visual Tree Assessment (VTA) procedure for assessing trees, as the suspicion increases that defects are present, the examination becomes more thorough and searching."* (Claus Mattheck, 1994)

"Some defects, especially some forms of decay, do not give rise to external signs and therefore tend to escape detection in a purely visual survey. If there is no reason for suspecting a hidden defect to occur within a particular part of the tree, there is no reasonable basis for carrying out a detailed internal assessment. Although in theory an unsuspected defect might be detectable by the use of specialized diagnostic devices, this would be impracticable in the absence of some external sign to indicate the place which should be probed. Also, internal examination without good reason is undesirable, as it usually causes injury to the tree and is unreasonably time consuming and costly." (Lonsdale, 1999)

14.4 TREE PROTECTION ZONE (TPZ) & STRUCTURAL ROOT (SRZ) ZONE CALCULATIONS

In accordance with Australian Standard *AS4970-2009 Protection of trees on development sites* (Standards Australia, 2009), Tree Protection Zone (TPZ) radius is calculated using the following procedure. Diameter of the trunk is measured at approximately 1.4m above ground level; this measurement is referred to as DBH (Diameter at Breast Height). $R_{TPZ} = DBH \times 12$. For multi-stemmed trees the formula used is $R_{TPZ} = \sqrt{[(DBH1)^2 + (DBH2)^2 + (DBH3)^2]}$. The TPZ is measured radially from the centre of the stem and must be protected on all sides.

The Structural Root Zone (SRZ) radius is calculated by measuring the diameter of the stem close to ground level, just above the basal flare. This measurement is taken as ***D*** and then used in the following formula: $R_{SRZ} = (Dx50)^{0.42} \times 0.64$ and becomes the Structural Root Zone, measured radially from the centre of the stem.

It is important to realize that these calculations provide a notional figure only and tree dynamics, form and site conditions will greatly affect these zones, and it is the job of the arborist to interpret the information correctly.

For palms, cycads, tree ferns, and similar monocots, the TPZ is positioned at least 1m outside the crown projection. SRZs are not applicable to these plant types.

AS4970-2009 states "*a TPZ should not be less than 2m nor greater than 15m (except where crown protection is required*" and the minimum radius for an SRZ is 1.5m.

14.5 REFERENCE DIAGRAMS

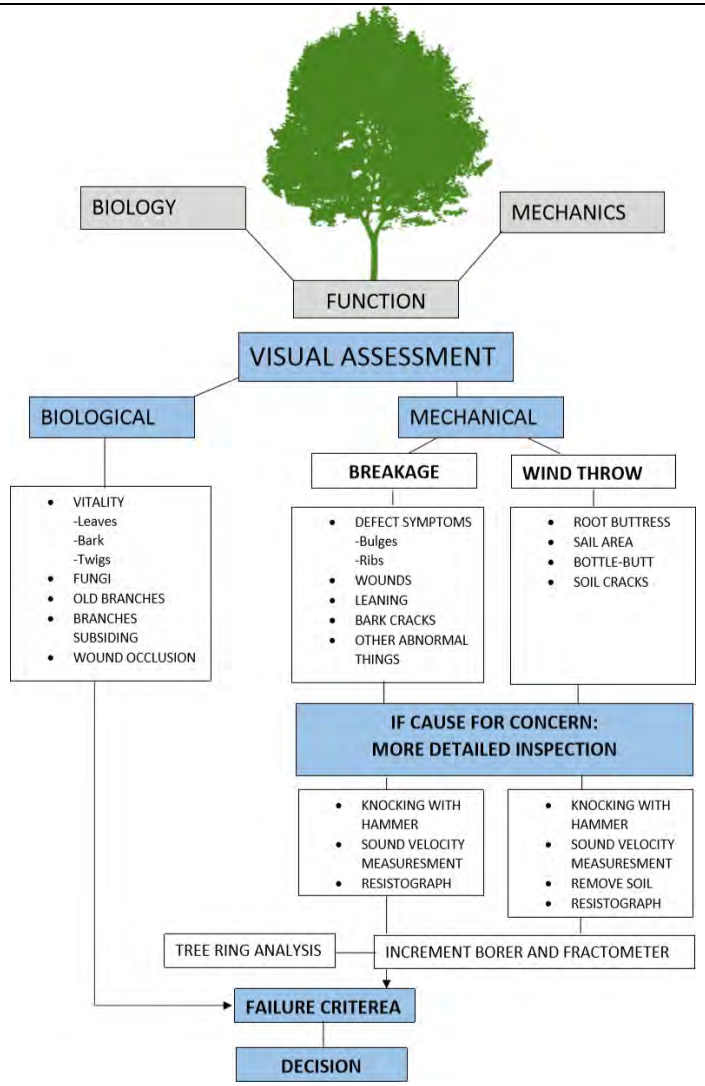

Figure 10 - VTA Procedure flowchart

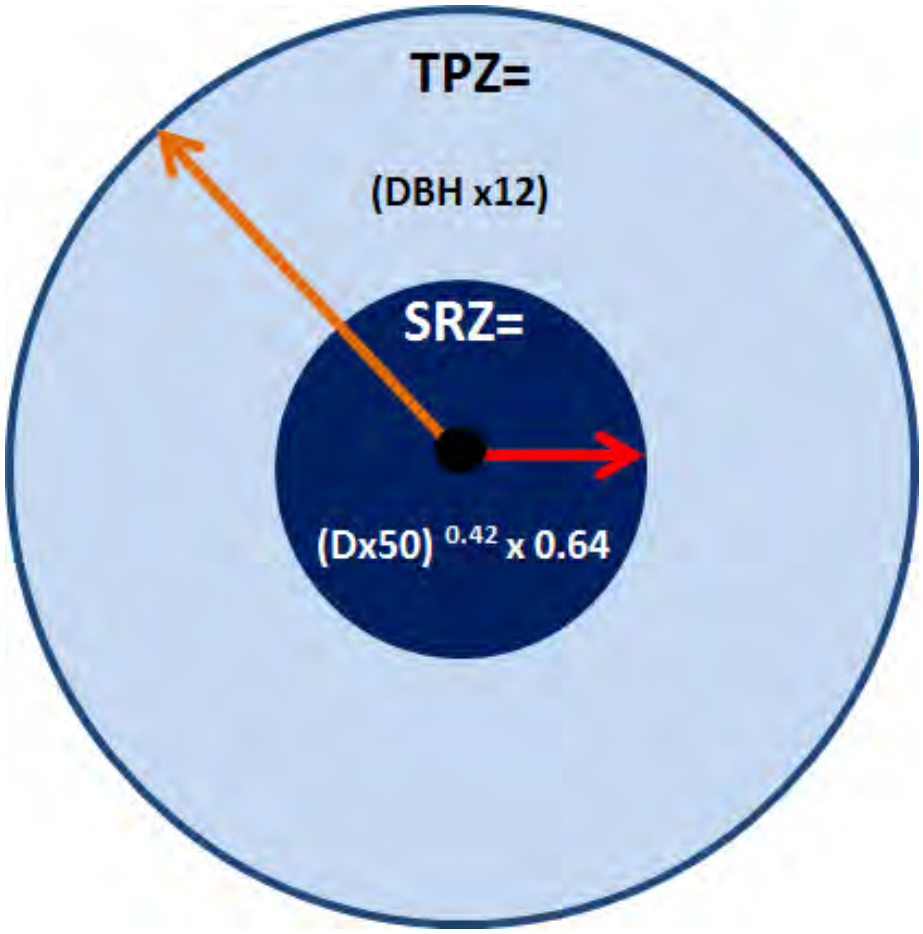

Figure 11 - A representation of TPZ & SRZ calculations

14.5.1 SIGNIFICANCE OF A TREE, ASSESSMENT RATING SYSTEM (STARS)

IACA Significance of a Tree, Assessment Rating System (STARS)© (IACA 2010)©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined. An example of its use in an Arboricultural report is shown as Appendix A.

Tree Significance - Assessment Criteria

1. High Significance in landscape

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa *in situ* - tree is appropriate to the site conditions.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

IACA 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, www.iaca.org.au

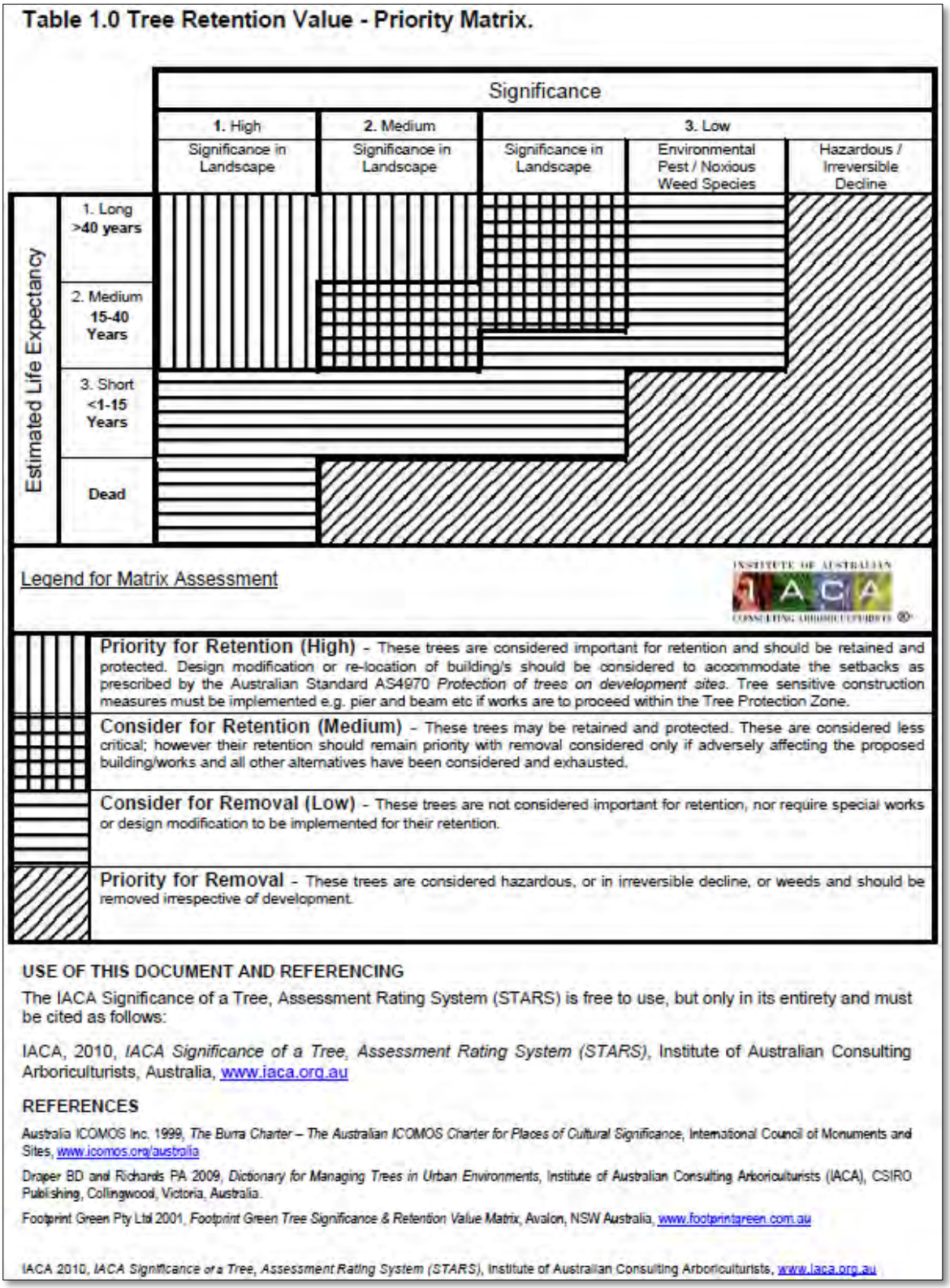

Figure 12- Significance of a Tree Assessment Rating System (STARS) – IACA

15 APPENDIX 2: TREE PROTECTION SPECIFICATION

15.1 INTRODUCTION

- Early identification & protection of important trees on development sites is essential from the outset & will minimise problems associated with retaining inappropriate trees, & in turn focus time, resources & budget on the retention & protection of the most valuable trees on site (Standards Australia, 2009).
- Tree protection will form an essential part of the success of the development & should be prioritised at the earliest stage of the project. Where trees are proposed for retention on site, proper tree protection & management procedures will be crucial in ensuring that the trees remain valuable assets over the long-term.
- The following specification has been developed to provide detailed guidance for tree protection measures & processes associated with the development project.

15.2 TREE PROTECTION ASSESSMENT SCHEDULE

Table 5 below has been provided to identify the key tree protection measures that are applicable to the individual trees, or groups of trees proposed for retention on site.

The heading number* provided in column three (3) of Table *5* below, correlates to the applicable section within the following specification.

It is important to note that the below table identifies the key tree protection measures for the individual tree(s) only, and not all that apply. Therefore, it is important that the specification is read in its entirety, and works are guided by the Project Arborist to ensure that all trees are protected in accordance with AS4970.

Tree #	Tree Protection Measure (TPM) Recommendations	Specification Heading Reference
1,2,3, 30,40, 41,42	• TPZ Encroachment • General physical TPM's i.e., fencing & signage apply, in accordance with AS4970-2009 & Appendix 2 • Restricted activities within the TPZ • Supervision of any & all works within TPZ by Project Arborist • Exploratory excavation • Certification required in accordance with specified hold points & TPM • Tree sensitive construction methods.	• 15.7.1.1,15.7.1.2 • 15.8 • 15.6.3 • 15.11.1 • 15.9.1,15.9.2,15.9.3 • 15.11,15.11.2 • 15.9
6	• General physical TPM's i.e., fencing & signage apply, in accordance with AS4970-2009 & Appendix 2 • Certification required in accordance with specified hold points & TPM	• 15.8 • 15.11,15.11.2
**Note - Select (Control + left-click-mouse-button) each heading number in column 3 to be taken to the applicable section of the specification*		

Table 5 - Tree Protection Assessment Schedule

15.2.1 APPLICABLE STANDARDS

15.2.1.1 Australian Standard AS4970-2009: Protection of trees on development sites (Standards Australia, 2009)

15.2.1.2 Australian Standard AS4373-2007: Pruning of amenity trees (Standards Australia, 2007)

- Australian Standards AS4373-2007 & AS4970-2009 are the underpinning documents that Arboricultural practice within Australia is based upon.
- The preparation of this specification has been prepared in accordance with & has been closely aligned with the foundations & principles of these standards.
- As such, this specification & any associated report(s) should be read in conjunction with AS4970 & AS4373.

15.2.2 APPROVAL FROM CONSENT AUTHORITY

- It is important to note that this specification & any associated report(s), do not count as approval for the recommendations contained within. It is vital that approval is obtained from the consent authority prior to following any recommendations provided by Truth About Trees as part of this specification or report.
- Upon approval from the consent authority, it is important that any variation between this specification & the Conditions of Consent (CoC) are identified, discussed & addressed with the Project Arborist, Project Manager & the consent authority to resolve any discrepancies.
- Unless otherwise advised by the consent authority, the CoC shall prevail.

15.3 PLANNING & DESIGN

- In addition to the commonly identified physical tree protection measures, tree protection is most effective when addressed through early-stage planning & design. Ideally this would mitigate the need to encroach on the tree(s) TPZ entirely resulting in only basic physical tree protection measures being required.
- The undertaking of a Preliminary Tree Assessment report is a key step in the process of tree protection. As through consultation between planners, the design team, project managers, the principal contractor & the project arborist; redesign, planning & detailed site management can achieve an outcome that both mitigates impacts to significant trees on site, & maintains the desired outcomes of the development.
- However, this may not always be feasible or have been considered early on in the development. Therefore, tree protection measures become paramount for the development to proceed successfully. At this point, the use of tree sensitive construction methods, combined with physical tree protection measures should be utilised for any part of the development that encroaches the TPZ of a tree proposed for retention.

15.3.1 TREE SENSITIVE CONSTRUCTION METHODS

- Tree sensitive construction methods are methods of construction that minimise the impact(s) to the tree(s) on site. Typically, in the form of minimising impacts associated with the below ground parts of the tree(s) root system.
- Examples of tree sensitive construction methods include, but are not limited to:
  - Pier & Beam style footings
  - Cantilevered Building Sections
  - Contiguous Piling
  - Suspended Slabs
  - Screw Piles
  - Directional under-boring

15.3.2 CONSTRUCTION MANAGEMENT PLAN

- A Construction Management Plan (CMP) should be compiled by the principal contractor in consultation with the Project Arborist in order to address any issues related to aspects such as the access & egress of vehicles and machinery & the storage of site materials.

15.3.3 ORDER OF WORKS

- It is important that works are undertaken with a methodical approach to mitigate conflict during the different stages of construction. When works are undertaken out of sequence, it can result in additional impacts to the tree(s) proposed for retention. ***(See Section 15.12)***
- One of the most effective ways to ensure that tree protection measures remain successful, is by ensuring compliance with AS4970 and this specification. ***(See Sections 15.4 & 15.5)***

15.4 COMPLIANCE

- Compliance with this specification is best managed through the appointment of a Project Arborist to ensure that works are undertaken in accordance with the recommendations & hold-points detailed within this specification. ***(See Section 15.12)***
- This specification should be clearly communicated with the Principal Contractor & Project Manager to ensure that all works are undertaken in accordance with this specification.
- Tree protection measures should form part of the site-specific induction process to ensure that all workers on site are familiar with the requirements set out within the specification.
- The Project Arborist & Project Manager are to be responsible for the monitoring & enforcement of all tree protection measures on site.

15.5 THE PROJECT ARBORIST

15.5.1 PROJECT ARBORIST APPOINTMENT & QUALIFICATIONS

- A Project Arborist (PA) with a minimum Australian Qualification Framework (AQF) Level-5 qualification in arboriculture should be appointed as the Consulting Arborist for the project.
- The PA is to have sufficient experience in managing trees on development sites & must be familiar with the required legislation & standards, & up to date on industry best practice methodologies.
- The PA is to be appointed prior to the start of any works on site, inclusive of tree pruning & removal works & prior to site establishment & occupation.

15.5.2 RESPONSIBILITIES OF THE PROJECT ARBORIST & RECORD KEEPING

- The PA is to be consulted at the design stage to ensure that impacts to valuable trees on site is either mitigated, or effectively managed throughout the project.
- The PA is to attend an on-site meeting with the Project Manager & Principal Contractor to discuss the requirements for tree protection measures for the project. This is to be conducted prior to any works on site & prior to site establishment & occupation.
- The PA is to be responsible for the compliance with the specification, AS4970 & any CoC placed upon the development by the consent authority.
- The PA is to guide all tree pruning & removal works in accordance with AS4970 & AS4373.
- Certification of the installation of tree protection measures and any additional relevant hold-points as detailed within ***Sections 15.11 & 15.12*** of this specification is to be undertaken by the PA in accordance with the relevant industry standards and reporting requirements.
- The PA is responsible for supervision of any & all works within the TPZ of any tree proposed for retention.
- Record keeping of all supervision works by the PA is to be completed via a statement of attendance, detailing what works were undertaken and certifying that they were undertaken in accordance with the relevant standards e.g., AS4970 & AS4373. ***(See Sections 15.11 & 15.12)***
- Whilst the above noted responsibilities are primarily that of the PA, it is the responsibility of the project manager/site manager to contact the PA prior to any works that require Arborist involvement and to assist with direct enforcement of all tree protection measures with all contractors.

15.6 TREE PROTECTION ZONE (TPZ)

15.6.1 TREE PROTECTION ZONE: DEFINITION & PURPOSE

- The Tree Protection Zone (TPZ) is defined within AS4970 as:

  ''A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.'' (Standards Australia, 2009)
- The TPZ is calculated in accordance with AS4970 by taking the Diameter at Breast Height (DBH) of the subject tree and multiplying it by twelve (12).
- It is important to note that this calculation provides a notional TPZ only, which is indicative of a generalised area that a tree may require to maintain tree health & structure. There are many aspects that contribute to the TPZ, and it is up to the PA to ensure that all aspects have been considered when determining the TPZ as this may differ from the notional TPZ calculation. ***(See section 15.7)***

15.6.2 STRUCTURAL ROOT ZONE: DEFINITION & PURPOSE

- The Structural Root Zone (SRZ) is defined within AS4970 as:

  'The area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area.'' (Standards Australia, 2009)

15.6.3 RESTRICTED ACTIVITIES

- It is important to restrict certain activities within the TPZ in order to mitigate any detrimental impacts to the tree(s) health and condition. Some activities may not appear to be of concern, however even indirect impacts can have a long-term and lasting effect on tree health and condition.

  Examples of restricted activities as detailed within AS4970 are listed below:

- machine excavation including trenching
- excavation for silt fencing
- cultivation
- storage
- preparation of any chemicals, including cement
- parking of vehicles and plant
- refuelling
- dumping of waste
- wash down and cleaning of equipment
- placement of fill
- lighting of fires
- soil level changes
- temporary or permanent installation of utilities
- physical damage to the tree

15.7 VARIATIONS TO THE TPZ

15.7.1 TPZ ENCROACHMENTS

- Encroachment to the TPZ may at times be a necessity due to site limitations and constraints & are generally decided upon during the planning & Development Application stages. It is imperative that any encroachment to the TPZ is only undertaken with prior approval from the Consent Authority & under the guidance of the PA.
- TPZ encroachments are considered to be items that have a longer-term effect on the TPZ e.g., excavation, trenching, building footings, installation of services etc.
- There are typically two (2) categories of TPZ encroachment which each have their own specific assessment & management processes as detailed below.

15.7.1.1 Minor TPZ Encroachments:

- Where an encroachment is <10% of the trees total TPZ area & provided it is outside of the SRZ, then it is considered to be a minor encroachment.
- A minor encroachment would not generally warrant further, or detailed root investigation.
- Where an encroachment occurs, the TPZ must be adapted to compensate for the loss of area due to the encroachment, the compensated area must be contiguous to the existing TPZ.

15.7.1.2 Major TPZ Encroachments:

- Where an encroachment is >10% of the trees total TPZ area, or if it encroaches the SRZ, then it is considered to be a major encroachment.
- A major encroachment will require assessment by the PA and may require exploratory root investigation works to demonstrate the viability of the tree over the long-term. ***(See Sections 15.9.1 & 15.9.2)***
- As with a minor encroachment, where an encroachment occurs, the TPZ must be adapted to compensate for the loss of area due to the encroachment, the compensated area must be contiguous to the existing TPZ.

15.7.2 CANOPY PROTECTION

- As well as the below-ground parts, the above-ground parts of the tree also require protection throughout development.
- On occasion, the notional TPZ calculation may be located within the tree canopy, therefore, the TPZ will require adjustment to 1m outside of the dripline to ensure that the tree canopy is properly protected.
- This will generally require the TPZ and associated fencing to be extended to a distance of 1m outside the perimeter of the tree canopy dripline as a minimum. ***(See section 15.8.1)***
- In some cases, site space & constraints may result in the requirement for tree branches to be pruned. In this instance, a pruning specification may be required & must be undertaken in accordance with the relevant standards & under the guidance of the PA. ***(See sections 15.2.1.2 & 15.10.1)***

15.7.3 ADDITIONAL CONSIDERATIONS

- Variations to the TPZ may also be required where the PA has demonstrated that one of the following (or other) aspects are impacting the likely TPZ requirement for the subject tree:
    - Existing or historical structures that are likely to have impacted the location of tree roots
    - The future growth requirements of the tree, including both above & below ground parts
    - Tree health
    - Tree structure
    - The characteristics of the individual tree species & its ability to tolerate development impacts
    - Site topography & soil type

15.8 PHYSICAL TREE PROTECTION MEASURES

15.8.1 TPZ FENCING & SIGNAGE

- TPZ fencing will be required for all trees proposed for retention, unless there is an existing structure that acts as physical barrier to access of the tree.
- Fencing must be erected in accordance with AS4970 & AS4687 & should be positioned to the perimeter of the TPZ.
- Where the notional TPZ is located within or below the tree canopy, the fencing should be extended to a minimum of 1m outside of the dripline.
- Access to, or relocation of the TPZ fencing must only be acted upon following guidance from the PA.
- Signage must be attached to the TPZ fencing in a position that is clearly visible from within the site.
- Signage must be a minimum of A4 paper size & must be weather-proofed (laminated) & securely attached to the fencing in a way that ensures it remains in place throughout the development.

  (See section 15.13)

15.8.2 TRUNK & BRANCH PROTECTION

- Trunk & branch protection may be required where there is likely to be an impact to the tree from the access & egress of vehicles & machinery on site & will be advised by the PA.
- Where trunk & branch protection is required, it should comply with AS4970 & consist of:
    - Wrapping a fabric layer (hessian/geotextile) around the tree trunk/branches,
    - Placing timber battens (90mm x 45mm) spaced at 150mm & to a height of 2m above-grade around the tree.
    - Timbers are not to be attached directly to the tree. ***(See section 15.13)***

15.8.3 GROUND PROTECTION

- Ground protection is to be utilised where temporary access & egress of vehicles & machinery is required into any part of the TPZ to prevent soil compaction & root damage.

  Unless otherwise specified, ground protection should consist of a layer of geotextile fabric, well composted native woodchip mulch to a depth of 75mm-100mm & timber rumble boards placed on top. ***(See section 15.13)***

15.9 CONSTRUCTION PROCESSES & TREE SENSITIVE METHODOLOGIES

15.9.1 Root Investigations

- Where a major encroachment occurs root investigation may be required in order to ensure that any impacts to significant roots are mitigated, and tree health & structure remains viable.
- This should be completed and documented prior to the start of any works on site.
- Root investigation can be conducted using a number of methods, each with their own benefits & constraints. Whilst all methods should be non-destructive, some methods are considered to be less invasive than others such as Ground Penetrating Radar (GPR).
- The investigation should be focused along the proposed line of construction.
- However, accuracy of the results can vary depending on characteristics of the individual site. As such, the PA will need to advise as to the most appropriate & effective method of investigation. Site constraints may impact upon the feasibility of a particular method & therefore site-specific recommendations will be required.
- Regardless of the method utilised, the following aspects should be assessed & documented as part of the investigation:
    - Method used
    - Date, time & location of works.
    - Individual tree identifying reference
    - Location, size, depth & direction of travel of all roots observed.
    - Summary of the estimated significance of the observed roots
    - Recommendations for construction processes to mitigate significant impacts to the roots (generally to be included as part of AIA reporting)

15.9.2 Exploratory Excavation

- Exploratory excavation is a method that can be utilised as part of a root investigation to guide design & construction. However, due to its invasive nature it is imperative that it is conducted in a way that minimises impacts to the tree.
- Exploratory excavation must be undertaken in accordance with the aspects detailed above in; ***section 15.9.1.***
- Exploratory excavation must be undertaken in accordance with the aspects detailed below in; ***section 15.9.3.***

15.9.3 Excavation Within the TPZ

- Any excavation within the TPZ must only be undertaken following approval from the consent authority & under the supervision & guidance of the PA.
- Works must be undertaken using non-destructive measures such as hand digging, AirSpade or a Dry Vac*

  *Note that a Dry Vac differs from a regular Hydro Vac. The Dry Vac uses air pressure to break up the soil profile, rather than a water jet, reducing the likelihood of tree roots being damaged by the high-pressure water jet.
- Works must be documented & certified by the PA ***(See section 15.11)***

15.9.3.1 Root Protection

- Where roots are likely to be exposed for an extended period of time, it is important that they are adequately protected to prevent them from drying out.
- This can be achieved by wrapping the roots in hessian & ensuring that they remain moist throughout the works.
- The hessian wrap must be removed & the area back-filled with a suitable material as soon as practicable upon completion of the works.

15.9.4 Root Pruning

- Root Pruning must only be undertaken under the guidance & supervision of the PA.
- Pruning cuts should be made using a fit-for-purpose & sharp tool to ensure that cuts are made cleanly and back to a suitable point in accordance with AS4373. ***(See Section 15.2.1.2)***
- No roots greater than 25mm in diameter are to be pruned unless demonstrated viable by the PA.

15.9.5 Grade Changes Within the TPZ

- Grade changes within the TPZ will require prior approval by the consent authority & the PA. They will generally consist of a raise in soil level only & not a reduction in grade.
- Where grade changes are permitted, they will generally be restricted to a maximum fill of 200mm above existing grade.
- The fill material must be a non-compacted material that is coarser than the existing soil & must be inspected & approved by the PA.

15.9.6 UNDERGROUND SERVICES

- Where feasible, all underground services should be located outside of the TPZ.
- In situations where site limitations dictate the location of service within the TPZ, then they would ideally be installed using directional under-boring to minimise disturbance to the TPZ. ***(See Section 15.9.7)***
- Should under-boring not be feasible, then the services must be installed in accordance with ***sections 15.9.1, 15.9.2 & 15.9.3*** of this specification.

15.9.7 DIRECTIONAL UNDER-BORING

- Directional under-boring is undertaken using specialist equipment that can bore below ground to avoid conflict with trees, structures & infrastructure. Whilst it is a highly beneficial method for minimising impacts with trees, there are certain aspects that must still be considered to successfully mitigate any significant impact with tree root systems.
- Entry/exit pits – The directional drilling equipment requires an entry & exit pit in order to start the drilling process, the size may vary depending on the make/model of equipment, but 2m² should be considered as a minimum requirement. It is important to ensure that the entry/exit pit is located outside of the TPZ where possible. Where the entry or exit pit must be within the TPZ of a tree, the PA is to assess the viability of the proposal and the entry/exit pit is to be excavated using non-destructive means.
- Drilling depth – different machines are capable of drilling to different depths, and different soil types or bedrock may guide the desired depth of the bore, but generally speaking most machines are capable of drilling to a depth that avoids conflict with the tree's root system. The PA is to provide guidance on the minimum depth required based on soil type, tree species and site conditions.

15.9.8 ABOVE-GROUND SERVICES & STRUCTURES

15.9.8.1 Scaffolding

- Should scaffolding be required within the TPZ, it should be designed to mitigate impacts with the tree canopy.
- Where there is no alternative but to place scaffolding within the TPZ, it should be constructed in a way that mitigates the requirement for tree pruning where feasible.
- Should pruning be required, it should be guided by the PA in accordance with AS4373 & the relevant DCP. Note that a pruning Specification may also be required. ***(See section 15.10.2)***
- Scaffolding within the TPZ will also require adequate ground protection to minimise soil compaction & damage to the tree roots. This can be achieved by utilising the methods detailed in ***section 15.8.3*****.**
- A layer of impervious black plastic or similar must be utilised instead of geotextile to assist in preventing chemical spills from entering the soil.
- Additionally, scaffold boards or similar can be utilised on top of the mulch.

15.9.8.2 Building Alignment

- Where feasible, building alignments should be positioned outside of the TPZ & must consider the future growth of the trees above & below ground parts. This should be considered at the design stage to avoid encroachment into the TPZ. ***(See Section 15.3)***
- Where the building alignment is to be positioned within the trees TPZ, it must be done so only after consultation & assessment with the PA and following approval from the consent authority. ***(See Sections 15.4 & 15.5)***
- Tree sensitive design & construction methods will need to be utilised to minimise impacts and the PA is to supervise all works within the TPZ. ***(See sections 15.3.1 & 15.5)***

15.9.8.3 Above-ground services – pruning spec

- Consideration needs to be given at the design stage to the location of above-ground services to minimise conflict with the trees canopy. ***(See Section 15.3)***
- Where services are to pass near to, or within the tree canopy, consultation with the PA will be required.
- A pruning specification may be required to guide the installation of the service(s) and the tree(s). ***(See Section 15.10.2)***

15.10 TREE REMOVAL & PRUNING WORKS

15.10.1 GENERAL

- No tree pruning or removal works should be undertaken without prior approval from the consent authority and without consultation with the PA.
- Tree pruning and removal works are to be undertaken by a suitably qualified, experienced and insured Arboricultural contractor with a minimum AQF level 3 qualification in Arboriculture.
  Works should be undertaken in accordance with the following:
  - (AS4373 – 2007) Pruning of Amenity Trees ***(See Section 15.2.1.2)***

- NSW Code of Practice for the Amenity Tree Industry 1998
- NSW Code of Practice for Work Near Overhead Power Lines 2006
- NSW Work Health & Safety Act & Regulations 2011
- Safe Work Guide to managing Risks of Tree Trimming and Removal Work 2016

15.10.2 PRUNING SPECIFICATION

- A pruning specification may be required where the proposed works exceed the allowances within the applicable DCP exemptions.
- The PA will advise when this is required, & the pruning specification must be compiled in accordance with AS4373 & AS4970. ***(See Section 15.2.1)***
- The pruning specification should clearly identify which branches require pruning & the suitable reduction point(s) that they should be pruned back to in order to ensure that tree health, form & condition are maintained.
- The pruning specification should be provided to the consent authority for approval as required & the document available on site during the pruning works.
- The PA should be advised by the Project Manager when pruning is to be undertaken, & consultation between the PA & the Arboricultural contractor that is undertaking the works, should occur prior to the works commencing.

15.11 MONITORING & CERTIFICATION

15.11.1 SUPERVISION

- This refers to the supervision of any works within the TPZ of a tree proposed for retention.
- Supervision should be undertaken by the PA or a suitably qualified & experienced AQF Lvl-5 Arborist.
- The primary purpose of supervision is to ensure that the PA is on site during works within the vicinity of the TPZ(s), to ensure that damage to the subject tree(s) is avoided by ensuring that works in these areas are undertaken in accordance with AS4970 & industry best practice.
- A secondary purpose of supervision is to ensure that the PA is present during works to provide guidance & advice should tree roots be encountered, or otherwise unforeseen tree related matters arise during the works.
- All supervision works should be documented & certified as detailed below.

15.11.2 HOLD POINTS & MONITORING

- Monitoring of the project is essential in order to ensure that tree protection measures remain in place & all tree protection & tree sensitive construction methods are undertaken in accordance with the specification & CoC.
- This can be achieved by ensuring compliance with the hold points detailed below in ***Section 15.12*.**
- All hold points will require certification by the PA.
- Certification is generally provided in a memo style certification letter, that will clearly identify & document the following items as a minimum:
  - Date, time & location of assessment/works & details of the person(s) and company(s) involved,
  - Applicable standards and or assessment methodology,
  - Detailed description of the works/assessment & detail of the involvement of the PA,
  - Description & location of trees subject to assessment,
  - Description of subject trees health & condition,
  - Photographic evidence that clearly shows examples of the works processes,
  - Items of non-compliance are clearly identified, documented & remediation recommendations provided.
  - Confirmation that any areas of non-compliance requiring remediation have been rectified (as required).
  - Signed acknowledgement of complying works and standards to which they have been assessed by.
- Certification will be provided to the client & will be the responsibility of the client to ensure that the certification is provided to the relevant consent authority & certifier as required.

15.12 HOLD-POINT INSPECTION SCHEDULE

Hold-Point	Description	Applicable Stage of Development	Required Actions
1	**Installation of tree protection measures**	Prior to site establishment & occupation & prior to any work activities commencing on site.	• Confirm that tree protection measures have been installed in accordance with the: ◦ Conditions of Consent ◦ Tree Protection Specification & Tree Protection Plan/Drawing ◦ AS4970-2009 • Ideally installed prior to tree pruning/removal to ensure TPZ's are not unnecessarily encroached by tree contractor vehicles & equipment
2	**Tree Protection Certification**	Following tree pruning & removal works & prior to site work activities commencing.	• Inspect and assess the installation of all tree protection measures • Confirm that have been installed in accordance with: ◦ Conditions of Consent ◦ Tree Protection Specification & Tree Protection Plan/Drawing ◦ AS4970-2009 • Provide letter of certification in accordance with *section 15.11* of this specification
3	**Tree Pruning & Removal**	Following the installation of all tree protection measures & prior to site establishment & occupation	• Confirm that tree pruning & removal works are undertaken in accordance with the: ◦ Conditions of Consent ◦ Tree Protection Specification & Tree Protection Plan/Drawing ◦ Pruning Specification (where applicable) ◦ AS4373-2007
4	**Construction & Landscaping Within the TPZ** Supervision of all access, demolition, construction & landscaping works within the TPZ Periodic site inspections to provide ongoing monitoring of the subject trees and compliance with tree protection measures	Following tree protection certification Periodically throughout demolition & construction. At any time that access or works are required within the TPZ, temporary or otherwise.	• Assess tree health & condition • Ensure that tree protection measures remain in situ • Ensure that all works are complying with: ◦ Conditions of Consent ◦ Tree Protection Specification & Tree Protection Plan/Drawing ◦ AS4970-2009 • Provide letter of certification in accordance with *section 15.11* of this specification
5	**Post Works Certification** Final inspection of the site & trees	Following project completion to assess tree health & condition post-development	• Confirm that all tree protection measures have been removed • Undertake an assessment of the health & condition of all trees and recommend remedial works if required • Provide letter of certification in accordance with *section 15.11* of this specification

Table 6 - Hold-point Inspection Schedule

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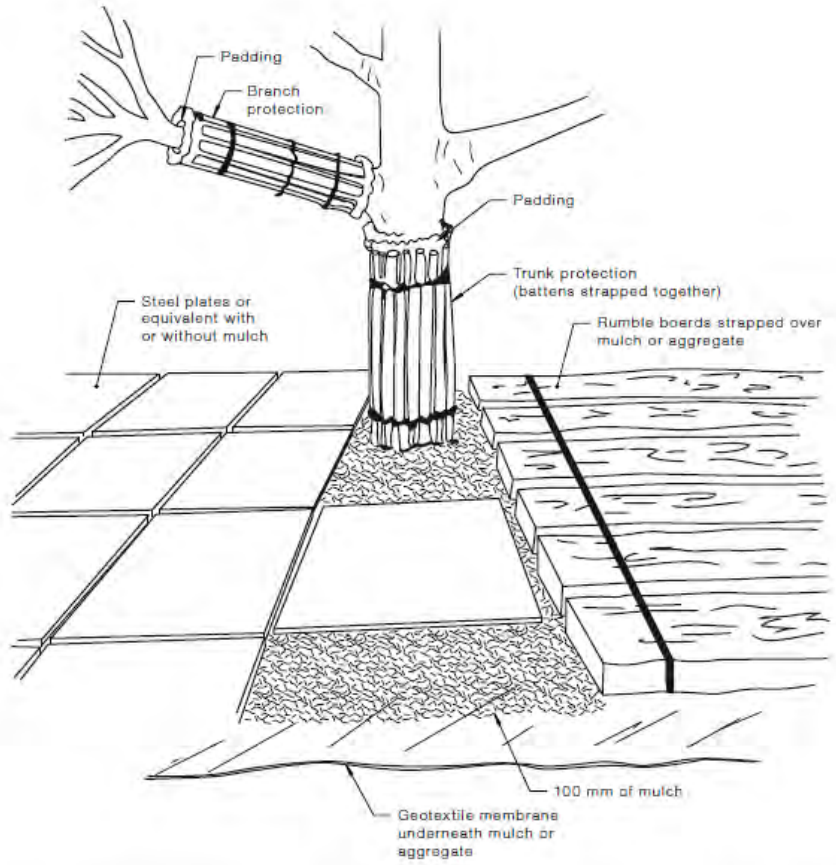
15.13 REFERENCE DIAGRAMS

Figure 13-TPZ Sign Example

LEGEND:

1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

Figure 14 - Tree protection fencing example - Image: (Standards Australia, 2009)



NOTES:

1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

Figure 15 - Trunk, branch & ground protection example - Image: (Standards Australia, 2009)

15.14 TREE PROTECTION DRAWING

Figure 16-Tree protection plan drawing.

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Thank you

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