

Project Environmental Management Plan (PEMP)

**North Sydney Public
School
Bay Road North
Sydney NSW 2060**

E-PLAN-03 (October 2021) | Approved by Andrew Andreou
Uncontrolled copy once printed.

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1. Introduction

1.1 Project Information Table

Project information table				
Project name	North Sydney Public School			
Location	Bay Road North Sydney NSW 2060			
Client	NSW Government Education School Infrastructure			
Duration of contract	12 Months			
Taylor contacts information				
Company name	Taylor Construction Group Pty Ltd			
ABN	25 067 428 344			
Address	Level 13, 157 Walker Street, North Sydney 2060			
Telephone and fax	Ph.: 02 8736 9000 Fax: 02 8736 9090			
Position	Contact name	Phone numbers		
Chief Executive Officer	George Bardas			
General Manager – Refurbishment & Live Environment	Ben Folkard			
Operations Manager	Chris Bellemore			
Project Director	Dean Fondas			
Senior Project Manager	Michael Ettrick			
Site Manager	Andy Payne	0425 314 680		
The Head Of WHS&E	Andrew Andreou			
Quality & Compliance Manager	Stephen Player			
Contract Administrator	Daniel Wood			
Graduate Site Engineer	Tom Udovic			
Cadet	Sian Thomas			
<i>CADDET</i>	<i>EWAN BICOROLAS</i>			
Document control	Name	Position	Signature	Date
Prepared by	Michael Ettrick	Project Manager	<i>[Signature]</i>	18/01/22
Prepared by	Andy Payne	Site Manager	<i>[Signature]</i>	24/1/22
Reviewed by:	Andrew Andreou	Head of WHS&E	<i>[Signature]</i>	08/02/2022
Reviewed by:	Chris Bellemore	Operations Manager	<i>[Signature]</i>	08/02/2022
Reviewed by:	Ben Folkard	General Manager	<i>[Signature]</i>	04/02/2022



Revised by:	Revision #	Date	Changes made
ME	#02	15/3/22	Evan Bicopolous New Starter
Tom Udovcic	#03	09/06/22	Amendments as per SI comments

1.2 Project Description

Proposed works to be undertaken within the grounds of existing North Sydney Public School as defined under the contract include as follows:

- Site Establishment incl. perimeter hoardings, removal of heritage wall, establishment of loading zone and tower crane
- Demolition incl. removal of hazardous materials
- Excavation and Ground Works incl. in ground services, piling, footings
- Suspended Concrete Slabs
- Structural Steel and Roofing
- Façade & Windows
- Fitout
- External Works
- Testing & Commissioning

1.3 Purpose of the Project 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 Project Environmental Management Plan (PEMP), 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 PEMP 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 Project 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.

1.4 Satisfaction of SSDA Conditions within this Management Plan

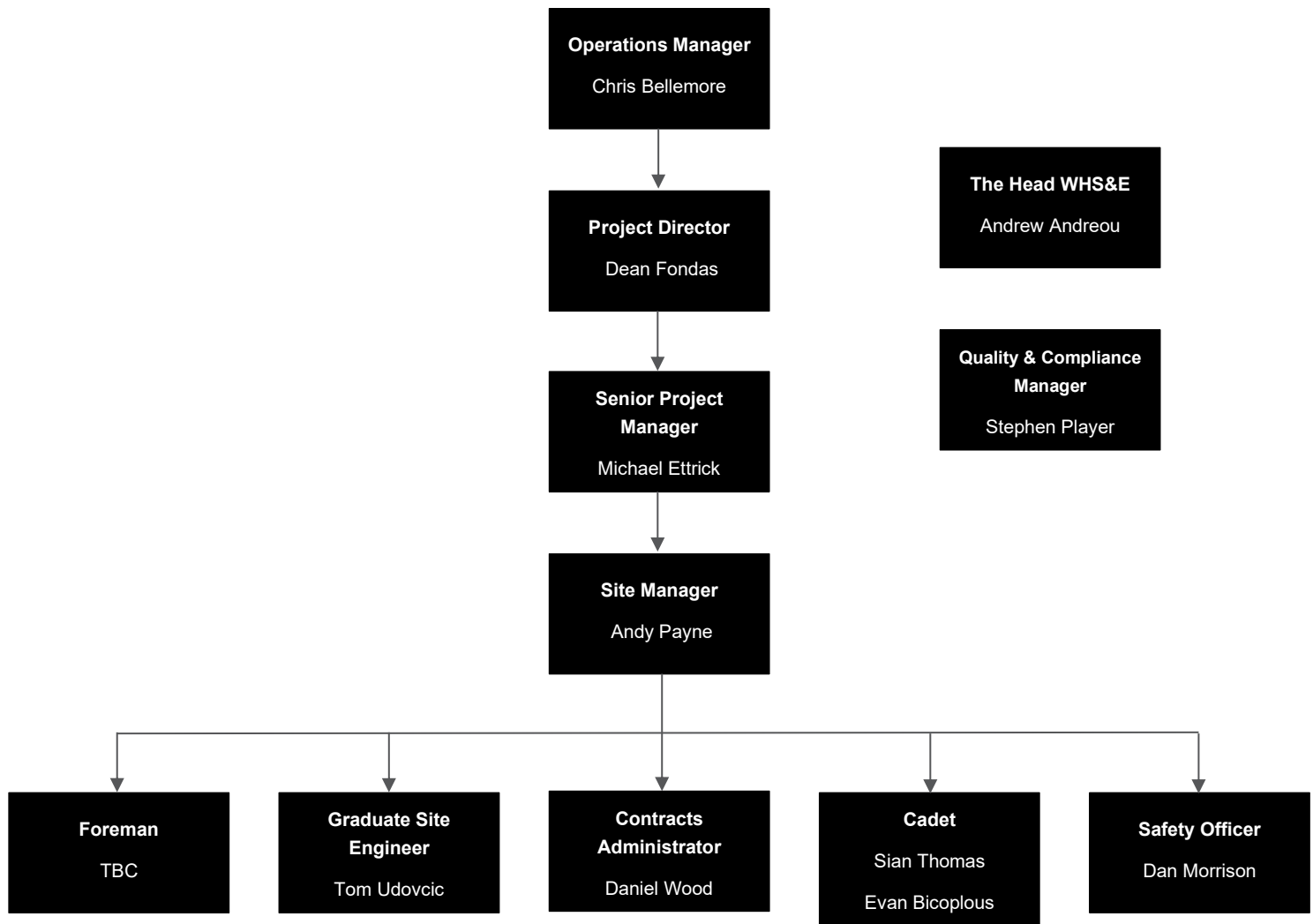
Condition Number	Condition Description	Section
B9	No later than 48 hours before the commencement of construction, a Community Communication Strategy must be submitted to the Planning Secretary for information. The Community Communication Strategy must provide mechanisms to facilitate communication between the Applicant, the relevant council, and the community (including adjoining affected landowners and businesses, and others directly impacted by the development), during the design and construction of the development for a minimum of 12 months following the completion of construction.	Appendix 7



B11	Prior to the commencement of lighting installation, evidence must be submitted to the satisfaction of the Certifier that all outdoor lighting to be installed within the site has been designed to comply with AS 1158.3.1:2005 Lighting for roads and public spaces – Pedestrian area (Category P) lighting – Performance and design requirements and AS 4282-2019 Control of obtrusive effects of outdoor lighting.	Appendix 6
B13	Management plans required under this consent must be prepared having regard to the relevant guidelines, including but not limited to the Environmental Management Plan Guideline: Guideline for Infrastructure Projects (DPIE April 2020)	Entire Document
B14 (a) (i)	Hours of work	3.3
B14 (a) (ii)	24-hour contact details of site manager	1.1
B14 (a) (iii)	Management of dust and odour to protect the amenity of the neighbourhood	3.1
B14 (a) (iv)	External lighting in compliance with AS 4282-2019. Control of the obtrusive effects of outdoor lighting	Appendix 6
B14 (a) (v)	Community consultation and complaints handling as set out in the Community Communication Strategy required by condition B9	Appendix 7
B14 (b)	An unexpected finds protocol for contaminated and associated communications procedure to ensure that potentially contaminated material is appropriately managed	12.4
B14 (c)	An unexpected finds protocol for Aboriginal and non-Aboriginal heritage and associated communications procedure	10.3.13
B14 (d)	Construction Traffic and Pedestrian Management Sub-Plan	Appendix 8
B14 (e)	Construction Noise and Vibration Management Sub-Plan	Appendix 9
B14 (f)	Construction Waste Management Sub-Plan	Appendix 10
B14 (g)	Construction Soil and Water Management Sub-Plan	Appendix 11
B15	Construction Traffic and Pedestrian Management Sub-Plan	Appendix 8
B16	Construction Noise and Vibration Management Sub-Plan	Appendix 9
B17	Construction Waste Management Sub-Plan	Appendix 10
B18	Construction Soil & Water Management Sub-Plan	Appendix 11
B19	Drive Code of Conduct	Appendix 8
B20	Unexpected Contamination Procedure	10.3.8
B21	Construction Worker Transportation Strategy	Appendix 8

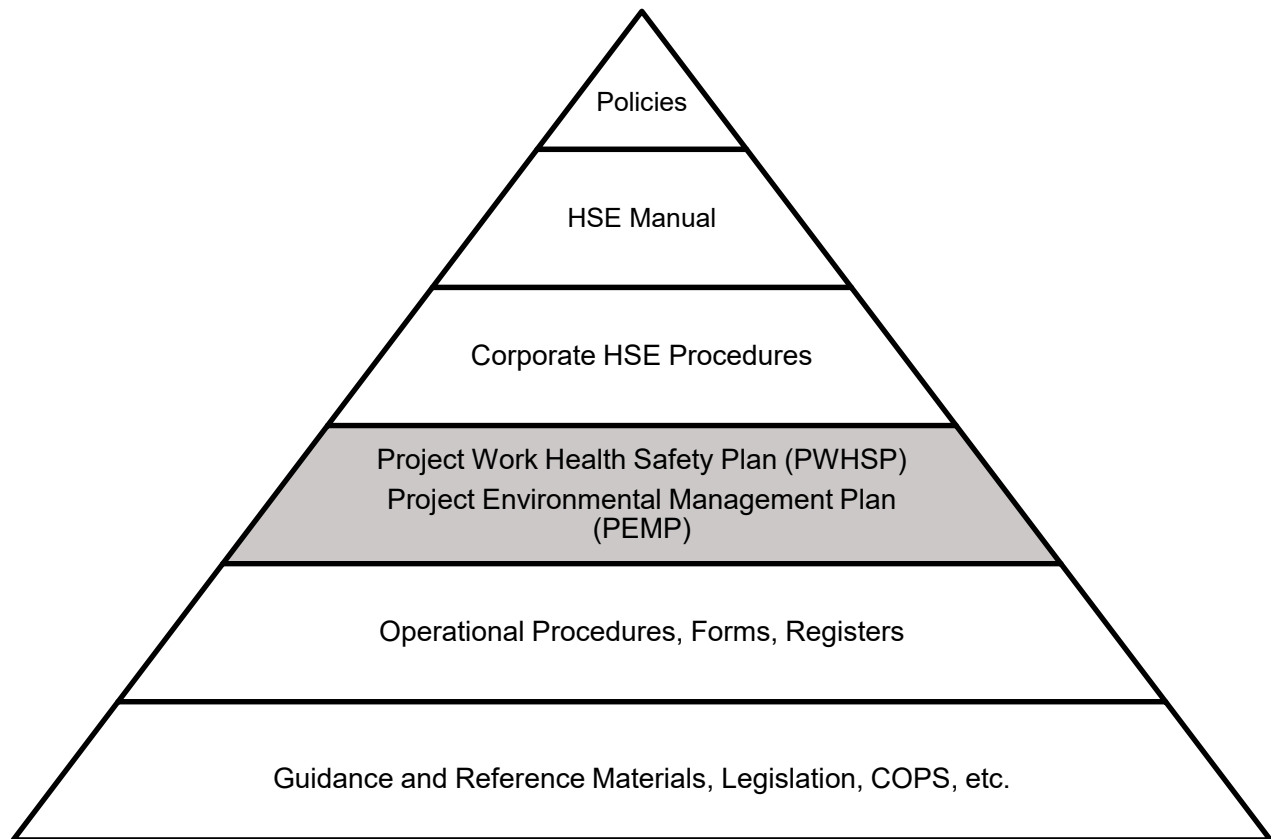


1.5 Project Organisational Structure





2. Hierarchy of HSE System Documents




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 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 **SE-P-01 Legal and Other Requirements Procedure** Appendix 7

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.	<ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> – 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	<ul style="list-style-type: none"> – Identification of sources of particulates/ dust and estimates of project-wide emissions. Ref 10.3.7



	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.	<ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> – Identify activities that have the potential to discharge to land. – Propose measures to manage and/ or mitigate impacts.
Surface water	Ensure that existing or proposed activities do not discharge to surface waters.	<ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> – Identify scheduled wastes and describe 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.	<ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> – 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

Nil

3.3 Development Consent Conditions

Consent working hours are:



Day	Start Time	Finish Time
Monday to Friday	7am	6pm
Saturday	8am	1pm
Sunday and Public Holidays	No works	

Obligation to Minimise Harm to the Environment

- A1. In addition to meeting the specific performance measures and criteria in this consent, all reasonable and feasible measures must be implemented to prevent, and, if prevention is not reasonable and feasible, minimise any material harm to the environment that may result from the construction and operation of the development.
- A22. Any condition of this consent that requires the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the EP&A Act. This includes conditions in respect of incident notification, reporting and response, non-compliance notification, Site audit report and independent auditing.
- Note: For the purposes of this condition, as set out in the EP&A Act, "monitoring" is monitoring of the development to provide data on compliance with the consent or on the environmental impact of the development, and an "environmental audit" is a periodic or particular documented evaluation of the development to provide information on compliance with the consent or the environmental management or impact of the development.*
- A23. At least 48 hours before the commencement of construction until the completion of all works under this consent, or such other time as agreed by the Planning Secretary, the Applicant must:
- (a) make the following information and documents (as they are obtained or approved) publicly available on its website:
 - (i) the documents referred to in condition A2 of this consent;
 - (ii) all current statutory approvals for the development;
 - (iii) all approved strategies, plans and programs required under the conditions of this consent;
 - (iv) regular reporting on the environmental performance of the development in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent;
- B13. Management plans required under this consent must be prepared having regard to the relevant guidelines, including but not limited to the *Environmental Management Plan Guideline: Guideline for Infrastructure Projects* (DPIE April 2020).
- AN11. The Applicant must consult with SafeWork NSW concerning the handling of any asbestos waste that may be encountered during construction. The requirements of the Protection of the Environment Operations (Waste) Regulation 2014 with particular reference to Part 7 – 'Transportation and management of asbestos waste' must also be complied with.

3.4 Environmental Protection License or Other Approvals

- 'Prune/Remove tree on private land' application
- 'Road occupancy' licence
- 'Public domain works' application

**References:**

- NSW Environmental Management System Guidelines 2015.
- Legal and Other Requirements Procedure SE-P-01.
- Environmental Legal and Other Requirements Register E-R-01.



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 12 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.	<ul style="list-style-type: none">– 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.	<ul style="list-style-type: none">– Eighty-five per cent (85%) of waste to be recycled.
Environmental performance.	<ul style="list-style-type: none">– 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 completed 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.	<ul style="list-style-type: none">– Environmental issues identified and controlled prior to causing negative impacts on the project or on the environment.
Effective implementation of the environmental system.	<ul style="list-style-type: none">– Eighty per cent (80%) or better internal audit results.– Full compliance with planning approval requirements.
Community issues carefully handled.	<ul style="list-style-type: none">– 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 monitor performance.
- Promote the efficient use of natural resources and reduce waste through the use of the waste hierarchy –avoid, reduce, re-use, recycle and finally dispose.
- Identifying alternative, financially viable and sustainable courses of action to minimise environmental impacts.




6.4 General Manager

The 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 hazard/ risks relevant to the construction projects.
- Being fully briefed of 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

Specific roles:

- 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 consultation 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 in 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 learnt 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 are appropriate and remain effective.

Name:	Ben Folkard
Signed:	
Date:	04/02/2022



6.3 Operations Manager

The Operations Manager is responsible for:

- Defining Taylor Construction WHS&E policies and setting their objectives.
- 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.
- Owning and understanding the key project environmental issues involved.
- Gaining an understanding of the operations of the business and the hazards and risks involved.
- Promoting and overseeing procurement standards for goods and services that help minimise environmental hazards.
- Ensuring information regarding incidents, hazards and risks is received responded to in a timely way.
- Ensuring the PCBU has implemented processes for complying with any legal duty or obligation.
- Being fully briefed of the safety status of all current Taylor Construction projects.
- Supporting and consulting employees and subcontractors on environmental performance.
- Setting targets and allocating priorities for workplace health and safety matters for all Taylor Construction staff.
- Leading by example in all matters concerning workplace health and safety.
- Conducting or participating in periodic environmental compliance inspections and or audits.
- Where required, engaging with the local community to understand their environmental concerns and impacts linked to the organisation's operations.
- Where events or non-compliance occurs, all reasonable and appropriate precautions are reviewed and as necessary, ensure new controls are designed and implemented.
- Examining whether risk management and other environmental compliance / systems requirements have been effectively reported to the general manager.
- Participating in periodic compliance inspections / audits to review the effectiveness of management structures and risk controls for environmental performance are appropriate and remain effective.

Name:	Chris Bellemore
Signed:	08/02/2022
Date:	




6.5 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.
- Assessing and allocating appropriate resources and equipment within the company for the effective implementation of the workplace health safety and environment management system and the management of WHS&E related hazard/ risks relevant to the construction projects.
- Confirming that legislative obligations are met, and that Taylor's Environmental Policy is effectively implemented throughout all company construction projects under their control.
- Ensuring compliance with Taylor's accredited QSE systems is maintained and implemented across all Taylor managed 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.
- Encourage and promote environmental compliance within the company by participating and openly consulting with employees in respect to their health and wellbeing.
- Ensure that Project / Site Manager have 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 WHS&E Manager in ensuring Project / Site Managers have developed and implemented systems which 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.
- Allow appropriate budget allocations for WHS&E management and improvement.
- Facilitate a systematic approach of workplace health, safety and environment identification, and assessment and facilitate control and monitoring of related risks that may arise through both normal and adverse operating conditions.


Name:	Dean Fondas
Signed:	
Date:	24-1-22



6.6 Project Manager

The Project Manager 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; ensure measures are implemented to eliminate or control those hazards.
- Ensuring safe operating procedures are in place and are observed.
- 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 foreman).
- 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 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 Managing Director and WHS&E Manager.
- Selecting appropriate subcontractors, giving due regard to their ability to comply with legislative and Taylor's WHS&E requirements.
- 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 a 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's 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.


Name:	Michael Etrick
Signed:	
Date:	24/1/22



6.7 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 and that provide additional support for environmental.
- 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 good relationship with government 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 environment performance is 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.
- Reviewing 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 select 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 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:	08/02/2022




6.8 Project Safety Advisor

The Project Safety Advisor is responsible for:

- Providing 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 practice 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 to this project 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 participate in emergency drills.
- Assisting the Site Manager / Foreman 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 ensure 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 on the project who are competent or have been suitably trained to fulfil these duties.

Name:	Dan Morrison
Signed:	
Date:	24-1-22



6.9 Site Manager

The Site Managers are responsible for:

- Providing 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 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.
- **Hazardous spill response** – upon request, provide assistance in hazardous material spill clean-up, preparing written reports about reportable releases and notifying appropriate persons about reportable spills.
- **Noise monitoring and hearing conservation** – conduct noise surveys to determine exposure levels.
- **Environmental procedures / permits** – ensure activities requiring internal and or external permit or approvals do not commence until 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, correctly maintained and that the operator is appropriately licensed or qualified to operate and or use that equipment.
- Utilising experience and judgement to shut down and/ or evacuate any part of the site if a major health and safety and environmental risk occurs.
- Reviewing, coordinating, and implementing emergency evacuation procedures and participating in drills at specified intervals (quarterly).

Name:	Andy Payne
Signed:	
Date:	24.9.22



6.10 Site Foreman

The Site Foreman 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 subcontractor's compliance with the site environmental plan and subcontractor's 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 site diary.
- In consultation with the Project Manager and Senior Site Manager, and utilising experience and judgement, 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, appropriately maintained and that the operator is correctly licensed or qualified for operating that equipment.

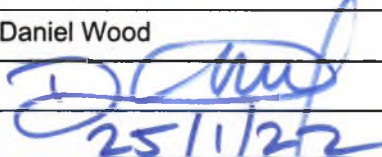
Name:	TBC
Signed:	
Date:	




6.11 Contract Administrator / Site Engineer

The Contract Administrator and Site Engineer's 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 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 them relevant sections of the tender interview form and ensuring this is completed by subcontractor prior to commencing on site.
- Request and obtain from the subcontractor prior to their arrival to site copies of their Workers 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 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:	Daniel Wood
Signed:	
Date:	25/1/22


Name:	Tom Udovic
Signed:	
Date:	7/2/22



6.12 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 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:	Sian Thomas
Signed:	
Date:	24.01.2022

6.12 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 Project Manager and Site Manger 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:	Sian Thomas / Evan Bicopolous
Signed:	
Date:	15/3/22

6.13 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 foreman to achieve first aid obligations.

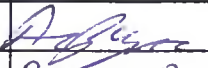
First Aid Officer Records

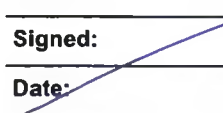
The nominated first aider shall be relied upon to exercise a common sense-approach in determining what type of injuries require a first aid report to be completed. First aid/ incident reports shall only be completed for injuries or illnesses for which first aid assistance was sorted **Immediately** following an event. Employees, including subcontractor 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.

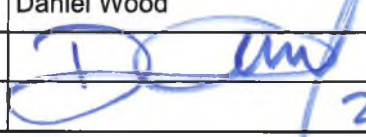
Some typical injuries that may require reporting are:


- 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:	Andy Payne
Signed:	
Date:	24.1.22

Name:	Michael Ettrick
Signed:	
Date:	

Name:	Daniel Wood
Signed:	
Date:	25/1/22

Name:	Tom Udovic
Signed:	
Date:	7/2/22



6.14 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 interfering with, misusing, or removing 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 Health Safety Project Plans and/ or as directed or informed by the Site Manager / Foreman.
- Complying with all relevant workplace health and safety legislation, standards, and codes of practice.
- Reporting promptly to a Site Manager / Foreman 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 a 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 on 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 PEMP 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.

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 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 Department of Planning & Environment 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 PEMP.

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. When preparing this document, the project manager should add any additional environmental issues that may have been identified through the environmental impact assessment, development consent/ approval, etc.

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.

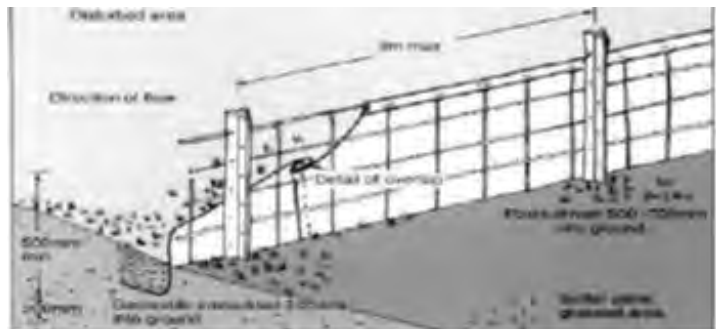
10.3.2 Soil and Water Management / Sedimentation and Erosion Control

Taylor and subcontractors shall plan and carry out works to avoid erosion and prevent sediment leaving the site to the surrounding land, watercourses, water bodies, wetlands and storm water 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:

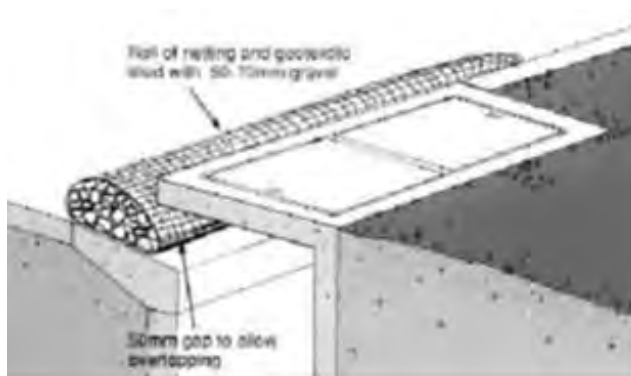
Sediment and erosion control devices – unnecessary disturbance of the site shall not occur, and all cuts are to be stabilised as soon as possible after the completion of site earthworks. Extra care will be taken to prevent sediment run-off into all neighbouring lots and storm water. Any collected silt 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 labelled to reduce 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 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 section on hazardous substances, chemicals, oils and other contaminants and the related procedure.

Pumping of storm water – if a sediment basin is required and storm water 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.

Storm water treatment – there are two treatment options for storm water 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 spilt 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 at risk, SafeWork inspectors will issue tough new fines for noncompliance.

All subcontractors working on a Taylor project that are 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 reported 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 controls 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 storm water 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 location of all hazardous substances, chemicals, fuels, oils, spill kits, storm water drains and natural waterways (Appendix 5).
- Spill Response Procedure flow chart (Appendix 3).
- Call emergency services (fire, hazmat): call 000.
- Local council phone number: 9936 8100
- MSDSS are located at Site Office

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 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 management of the contaminated soils from the assessment and other reports should be incorporated into this PEMP 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 the 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 Contaminated Land Management Act and the POEO Act (NSW) in relation to disturbance or treatment of potentially contaminated ground.

The company shall install any control measures needed to divert surface run-off away from contaminated ground and to treat any surface run-off contaminated by exposure to contaminated ground. Contaminated material removed from 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 Complaints

Community complaints should be treated as incidents. They must be reported to the HSE Manager, be thoroughly investigated and reported on SharePoint. Reference to these must also be documented and included in site diary entries. The project or site manager should try to resolve the issue with the community member in a conciliatory manner.

References:

- 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., Department of Planning & Environment - 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, 2015.

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 PEMP. 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.

12.4 Unexpected Finds Procedure

The Remediation Action Plan & Asbestos Management Procedure provide actions following the discover of unexpected contamination. This procedure is to be followed and contact the required stakeholders as detailed in the communication section of this plan.

Residual hazards that may exist at the site would generally be expected to be detectable through visual or olfactory means. At this site, these types of hazards may include suspected friable types of asbestos in soil, and odorous or stained hydrocarbon impacted soils.

The procedure to be followed in the event of an unexpected find is presented below:

1. In the event of an unexpected find, all work in the immediate vicinity should cease
2. The following parties should be contacted immediately:
 - a. Validation Consultant
 - b. Site Auditors
 - c. Turner & Townsend (Client Project Manager)
 - d. SINSW (Client Representative)

e. Planning Secretary

3. Temporary barricades should be erected to isolate the area from access to the public workers
4. In the event suspected friable asbestos material is encountered, a qualified occupational hygienist and/or asbestos consultant should be contacted.
5. An additional sampling and analytical rationale should be established by the validation consultant, the subsequently reviewed by the site auditor, and then implemented with reference to the relevant guideline documents
6. In the event remediation is required outside the purview of the RAP or the addendum RAP, and additional addendum RAP or Remedial Works Plan should be prepared and submitted to the Site Auditor, client and consent authority for approval; and
7. Appropriate validation sampling should be undertaken by the validation consultant and the result should be included within the validation report

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 must 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 Project 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 PEMP 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



global-mark®

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		

The control set source for controls applied in the Statement of Applicability (referenced above) does not imply these controls are certified by Global-Mark

CERTIFICATE DATES:

Original / Initial	19/11/2009	Last Certificate update	13/05/2021
Certification / Re Certification	4/05/2021	Expiry	7/05/2024
Last Certification Decision	13/05/2021		

APPROVED COMPANY / SITE ADDRESS(ES):

Level 13, 157 Walker Street 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.jas-anz.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



Certification Manager

Unique Certificate Code: E15D2CE263BF3E6CCA2586CF0001C4EF

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Appendix 2 – Environmental Policy

Environmental Policy

Taylor regards appropriate management of environmental issues as integral to our business. We are committed to the protection of the environment and ecologically sustainable practices in all aspects of our operations.

We will comply with all 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".

In managing our business, we make a commitment to:

- Work pro-actively with our clients, regulators, and other community stakeholders to enable environmental issues to be addressed at an early stage of development.
- Take local community views into consideration and ensure that we inform, listen to and respond to reasonable concerns relating to our projects.
- Undertake our activities in a manner that is consistent with the principles of ecologically sustainable development.
- Prevent pollution and reduce adverse environmental impacts of our activities on the natural, built and cultural environment.
- Promote the efficient use of natural resources and reduce waste through the use of the waste hierarchy – avoid, reduce, re-use, recycle and finally dispose.
- Set realistic environmental objectives and targets at all relevant levels within the company and continually monitor performance.
- Promote environmental awareness among all employees and subcontractors to achieve our environmental objectives.
- Continually improve our environmental performance through periodic review and evaluation of our policy and management systems to ensure they remain suitable, adequate and effective.
- Encourage 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 December 2021.

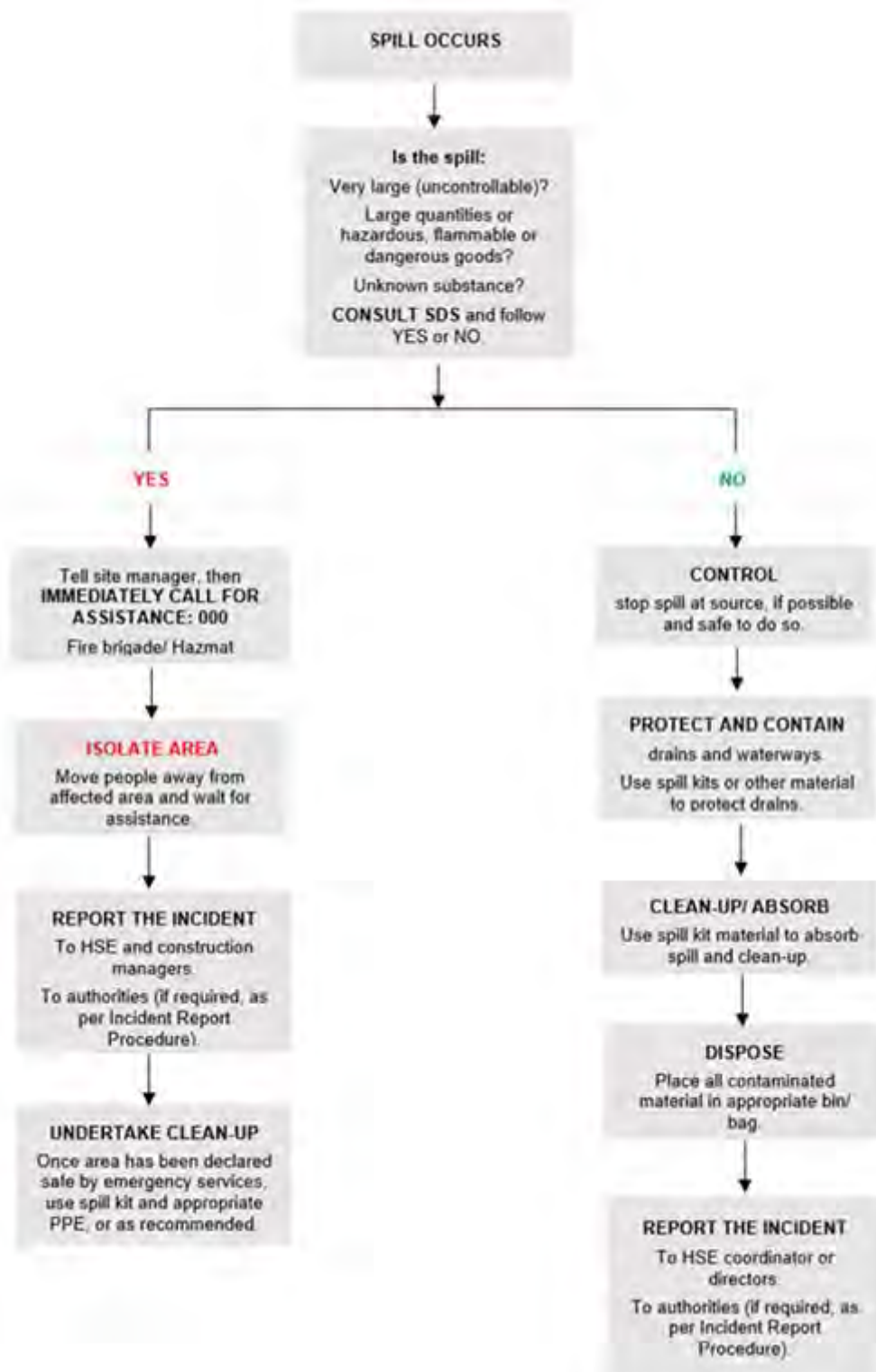


George Bardas
Chief Executive Officer



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

Taylor's Construction Spill Reponse Procedure Flow Chart



Appendix 4 – Site Environmental Emergency Reponse Plans



Site Environmental Emergency Response Plans

Potential emergency	What to do?	Relevant authorities and persons
Injury caused by: <ul style="list-style-type: none"> – Fire – Explosion – Machinery accidents – Minor injuries 	<ul style="list-style-type: none"> – 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. 	<ul style="list-style-type: none"> – 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	<ul style="list-style-type: none"> – 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. <p>Note: fire extinguishers are located throughout the site as detailed in the Emergency Evacuation Map.</p>	<ul style="list-style-type: none"> – Emergency services – Site Manager – Project Manager – Adjacent residents
Spills management and contaminated soils. Major spills: <ul style="list-style-type: none"> – Spill or release of diesel fuel or oil – Spill or release of other hazardous chemicals or material. 	<p>For major spills (defined as a spill that is likely to have direct environmental consequences):</p> <ul style="list-style-type: none"> – 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. 	<ul style="list-style-type: none"> – Emergency services (fire brigade) – HSE Manager – Site Manager and Project Manager – EPA
Minor site spills Acid sulphate soils	<ul style="list-style-type: none"> – 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. 	<ul style="list-style-type: none"> – Emergency services (fire brigade) – HSE Manager – Site Manager and Project Manager – EPA

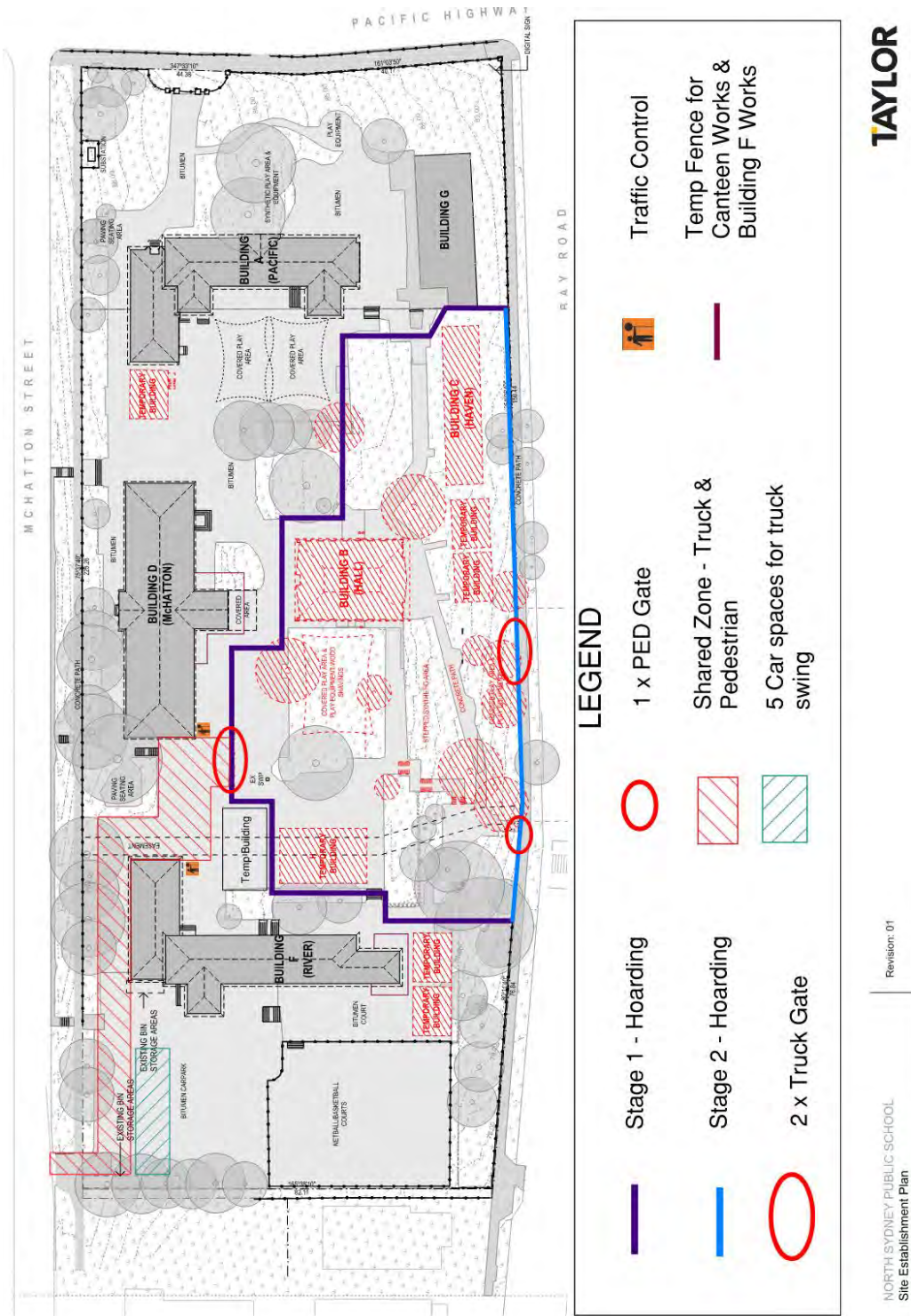


Potential emergency	What to do?	Relevant authorities and persons
	<ul style="list-style-type: none">– Where acid sulphate soils are discovered, the spoil shall not be removed from site; subsequent notification and testing will follow.	
Heavy rainstorm and flood beyond the capacity of the sediment and erosion controls on-site or failure of the sedimentation control measures.	<ul style="list-style-type: none">– Contain/ minimise the flow.– Contact council immediately.– Investigate reasons for failure and prepare an incident report.– Contact the Project Manager.	<ul style="list-style-type: none">– 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.	<ul style="list-style-type: none">– 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.	<ul style="list-style-type: none">– Site Manager– Project Manager

**Appendix 5 – Site Map: Environmental
Requirements incl. Sediment & Erosion Control +
Site Establishment Plan (for reference)**



SITE ESTABLISHMENT PLAN



Appendix 6 – External Lighting Compliance

Refer to [Condition 11] External Lighting Report

External Lighting Strategy

210557 NORTH SYDNEY PUBLIC SCHOOL UPGRADE

Client:
Department of Education

Revision:
P5

Date:
16/03/2022

REPORT INFORMATION

Project	North Sydney Public School Upgrade
Title	External Lighting Strategy
Client	Department of Education
Revision	P5
Revision Date	16/03/2022
Prepared By	LCI Consultants Sydney Level 5 73 Miller Street North Sydney 2060 Sydney
ABN/ACN	92 124 107 973 / 124 107 973
Author	Felicity Yu

REVISION SCHEDULE

Revision	Date	Issue Name	Author	Authorised
P1	16/08/2021	Draft for SSDA	FY	DDC
P2	17/08/2021	SSDA Submission	FY	DDC
P3	25/08/2021	Updated for SSDA Submission with inclusion of Signage requirements	FY	DDC
P4	10/03/2022	Final SSDA Submission	FY	DDC
P5	16/03/2022	Final SSDA Submission	FY	DDC

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2.2	<i>Design Criteria</i>	<i>5</i>
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1 Introduction

LCI has been engaged by Department of Education to prepare an external lighting strategy report for the proposed upgrades to North Sydney Public School.

This report intends to address condition B11 – Outdoor Lighting, for the State Significant Development Application (SSDA) 11869481.

1.1 Project Description

This SSDA seeks consent for alterations and additions to the existing North Sydney Public School. The proposal entails:

- Demolition of the existing hall (building B), Haven building (building C) and 6 temporary buildings;
- Construction of a three storey building comprising:
 - staff administration rooms;
 - 16 home bases
 - a new library;
 - hall;
 - out of school hours care facilities;
 - covered outdoor learning area;
 - bicycle parking and end of trip facilities for staff; and
 - services, amenities and access.
- New entry gate and forecourt from Bay Road;
- Internal refurbishment of building G ground floor from the existing library to 3 homebases;
- Capacity for an increase in student numbers from 869 to 1,012; and
- Associated tree removal, landscaping and excavation.

The proposal maintains:

- The gates and fence of former Crows Nest House including the entrance from Pacific Highway and Bay Road;
- Existing gate along McHatton Street;
- The outdoor play area to the east of Building A;
- Existing covered outdoor learning area adjacent to Building A;
- The basketball courts and staff carpark in the western portion of the site;
- The significant tree planting on all school boundaries;
- Buildings A, D and F noting minor internal refurbishments are being undertaken outside of the SSDA scope of work (exempt development) to improve student amenities and canteen; and
- Building G noting ground floor internal refurbishment is proposed in the SSDA.

2 External Lighting Strategy

2.1 General Approach

External lighting will be provided around the building entry and perimeter pathways to provide a safe environment for users of the facility after hours. This will include:

- Wall lighting in the entry blade walls to illuminate the proposed new gate entry
- Lighting in the entry awning roof structure to illuminate the entry stairs and landings
- Lighting to illuminate the entry ramps which are façade mounted
- Wall lighting along the face of the building to illuminate the service paths adjacent to Building J
- Awning or wall lighting for the external perimeter walkways along Building I

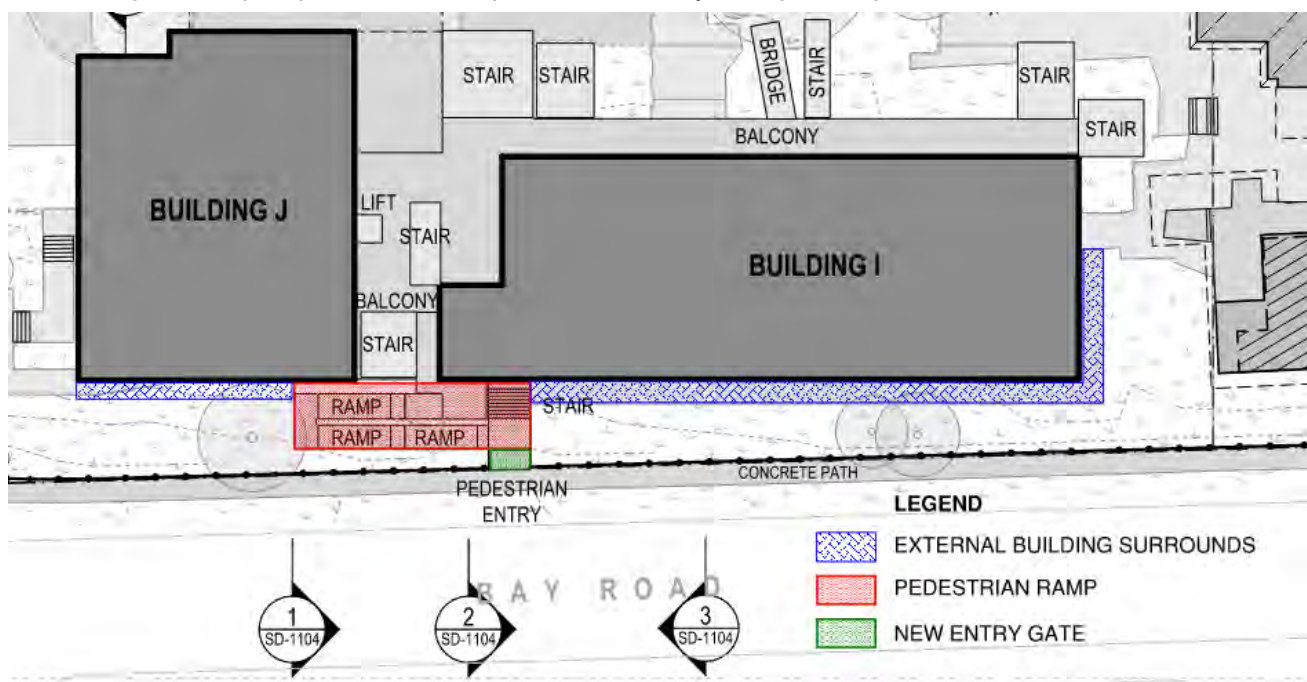


Figure 1 Propose external lighting zones

2.2 Design Criteria

In order to address SEARs item 4.2, the external lighting design will give due consideration to the following:

- safe movements of pedestrians
- integration with the architectural design intent and to compliment the overall aesthetics of the building and surrounds
- minimisation of obtrusive light spill and glare to surrounding properties
- security lighting

The operation of these lights will be managed through a timer system and will be limited to suit the school's operational requirements. External lighting will only be required after normal operational hours (typically 0700-1900) in the event the school is hosting a Community Event.

2.2.1 Standards

External lighting will be designed to comply with the following standards:

Standards	
AS/NZS 1158.3.1 - 2005	Lighting for roads and public spaces Pedestrian area (Category P) lighting – performance and design requirements
AS/NZS 4282 - 2019	Control of the obtrusive effects of outdoor lighting
AS/NZS 3000 - 2018	Electrical Installations “Wiring Rules”

2.2.2 Light Spill Minimisation

All new external lighting will comply with AS/NZS 4282 – Control of the obtrusive effects of outdoor lighting. External lighting will be designed with due consideration of lighting spillage to adjacent properties and sensitive receivers. A preliminary investigation into light spill has identified the following factors:

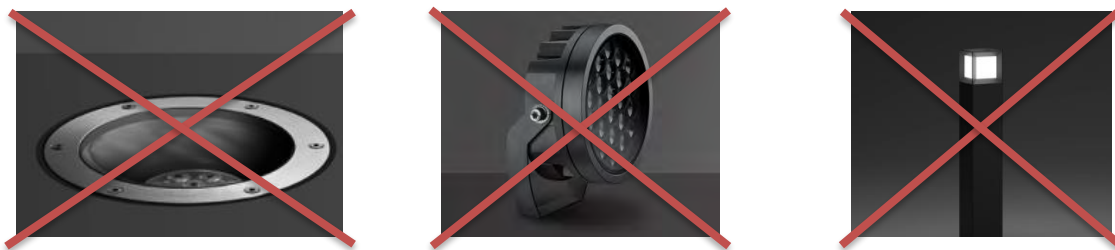
Effects on residential properties

There are residential properties along Bay road within close proximity to the development. Spill light from the new school entrance and buildings will be carefully designed to ensure limited obtrusive effect to the neighbouring properties.

2.2.3 Direction of Light

The aiming angle of the artificial light has a direct impact on the amount of obtrusive lighting. Reducing artificial skyglow can be achieved by ensuring that light shines below the horizontal plane.

Up lighting and bare floodlights will not be used in this project to ensure that the lighting will not interfere with the surrounding properties. Upward lighting will not be used unless it is intended to up light an undercover area.



2.2.4 Illuminated Signage

There are two illuminated signs proposed for the project which will need to be considered for obtrusive lighting effects:

- New digital sign located near the Pacific Hwy and Bay Road junction to replace an existing school sign
- Awning signage at the new building

The technical parameters of illuminated signage, including control strategy for dimming or switching off during curfew times will be specified by the signage provider and shall comply with relevant requirements from AS/NZS

4282 and the NSW Government SEPP 64 guidelines, and any additional requirements from the local council if applicable.

This includes compliance to AS/NZS 4282 tables 3.2, 3.3 and 3.5 for maximum values of lighting technical parameters for the luminaire within an environmental classification zone A3 or A4 (medium to high district brightness in suburban areas in towns and cities, or town and city centres and other commercial areas).

2.3 General Luminaire Types

Luminaires will be selected during detailed design. The light source will be high-quality, efficient LED type to minimise energy consumption. A warm white colour temperature (3000K) is proposed for external lighting in entrance and circulation areas to provide a warm, welcoming environment. To minimise light spill, luminaires will generally be low-cut off, aero screen style to minimise up light.

To provide the appropriate weatherproof and impact resistance, the outdoor luminaires are to have the following minimum ratings:

- IP65 and IK07 (if mounted at or above 2700mm AFFL)
- IP67 and IK08 (if mounted below 2700mm AFFL)

2.4 Entry Gate

Lighting to entry blade walls to wash light over the new gates will be provided. Further coordination with the architect will be required to refine the design and intent of this element of façade decorative lighting.

2.5 Under-awning Entrance

As the main entrance of the building, it is proposed that the area to be illuminated to a higher level to provide the hierarchy of lighting, being the most brightly lit area in the external lighting design.

Category	Classification
Type of road or pathway	Circulation
Basic operating characteristics	Pedestrian
Pedestrian/cycle activity	Medium
Fear of crime	Medium
Need to enhance amenity	Yes
Applicable lighting subcategory	PA3

The Under Awning Area will adopt the following lighting parameters:

Parameter	Value
Average horizontal illuminance	7 lux
Point horizontal illuminance	2 lux
Illuminance (horizontal) uniformity Cat. P	8
Point vertical illuminance	2 lux

2.6 Ramp & Stairs

Based on AS/NZS 1158.3.1, ramps and stairs are to be illuminated to PE2 category, which is to be equivalent to the highest lighting category adjacent to the area.

Therefore, values equivalent to the PA3 category are to be provided at the ramps and stairs.

Category	Classification
Type of road or pathway	Public Activity Areas
Basic operating characteristics	Pedestrian / Ramp & Stairs
Pedestrian/cycle activity	(equivalent to highest level adjacent)
Fear of crime	(equivalent to highest level adjacent)
Need to enhance amenity	Yes
Applicable lighting subcategory	PA3

The building entrance and Under Awning Area will adopt the following lighting parameters:

Parameter	Value
Average horizontal illuminance	7 lux
Point horizontal illuminance	2 lux
Illuminance (horizontal) uniformity Cat. P	8
Point vertical illuminance	2 lux

2.7 External Building Surrounds

The pedestrian footpaths and access pathways surrounding the external perimeter of the building are to be illuminated to PP3 category:

Parameter	Value
Average horizontal illuminance	3.5 lux
Point horizontal illuminance	0.5 lux
Illuminance (horizontal) uniformity Cat. P	5
Point vertical illuminance	0.1 lux

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Appendix 7 – Community Consultation & Complaints

Refer to [Condition 9] Community Communication Strategy

School Infrastructure NSW

Community Communication Strategy

North Sydney Public School upgrade

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Document Purpose

This Community Communication Strategy (CCS) has been developed by School Infrastructure NSW (SINSW) to:

- Successfully consider and manage stakeholder and community expectations as integral to the successful delivery of the project.
- Outline interfaces with other disciplines, including safety, construction, design and environment, to ensure all activities are co-ordinated and drive best practice project outcomes.
- Inform affected stakeholders, such as the local community or road users about construction activities.
- Provide a delivery strategy which enables the open and proactive management of issues and communications.
- Highlight supporting procedures and tools to enable the team to deliver this plan effectively.
- Provide support for the broader communications objectives of SINSW, including the promotion of the project and its benefits.

This CCS will be implemented through the design and construction phase of the project and for 12 months following construction completion.

Plan review

The CCS will be revised regularly to address any changes in the project management process, comments and feedback by relevant stakeholders, and any changes identified as a result of continuous improvement undertakings. This will be done in close consultation with the SINSW Senior Project Director, appointed Project Management Company and/or Contractor and SINSW Community Engagement Manager.

Approval

The CCS is reviewed and approved by the SINSW Senior Project Director, in close consultation with Schools Operations and Performance, with final endorsement from the SINSW Community Engagement Senior Manager before being submitted to the Planning Secretary for approval.

Table 1: List of SSD application consent conditions for communication and engagement and where they are addressed in this strategy

State Significant Developments B8	The community communications strategy addresses this in section
Identify people to be consulted during the design and construction phase	Section 4 Section 5
Set out procedures and mechanisms for the regular distribution of accessible information about or relevant to the development	Section 6 Section 7 Section 8.4
Provide for the formation of community-based forums, if required, that focus on key environmental management issues for the development	Section 4
Set out procedures and mechanisms:	
<ul style="list-style-type: none">• Through which the community can discuss or provide feedback to the Applicant	Section 4 Section 6 Section 8.5
<ul style="list-style-type: none">• Through which the Applicant will respond to enquiries or feedback from the community; and	Section 8.5

State Significant Developments B8	The community communications strategy addresses this in section
<ul style="list-style-type: none"> To resolve any issues and mediate any disputes that may arise in relation to construction and operation of the development, including disputes regarding rectification or compensation 	Section 8.5
Include any specific requirements around traffic, noise and vibration, amenity, flora and fauna, soil and water, contamination and heritage.	Section 3.3

1. Context

The NSW Government is investing \$7.9 billion over the next four years, continuing its program to deliver 215 new and upgraded schools to support communities across NSW. This is the largest investment in public education infrastructure in the history of NSW.

The NSW Department of Education is committed to delivering new and upgraded schools for communities across NSW. The delivery of these important projects is essential to the future learning needs of our students and supports growth in the local economy.

The upgrade of North Sydney Public School will provide students the latest educational facilities.

The project will deliver:

- 19 new flexible learning spaces
- New administration
- New library
- New hall
- New covered outdoor learning area
- Upgrade to canteen
- Upgrade to student amenities
- New entrance gate on Bay Road

The North Sydney Public School upgrade is classified as a State Significant Development (SSD), and has been assessed by the Department of Planning and Environment (DPE). Consent was provided on 21 February, 2022.

The project is available the DPE planning portal at www.planningportal.nsw.gov.au/major-projects/projects/upgrade-north-sydney-public-school.

2. Community Engagement Objectives

SINSW's mission is to provide school infrastructure solutions by working collaboratively with all our stakeholders to create learning environments across NSW that serve our future needs and make us all proud.

This CCS has been developed to achieve the following community engagement objectives:

- Promote the benefits of the project
- Build key school community stakeholder relationships and maintain goodwill with impacted communities
- Manage community expectations and build trust by delivering on our commitments
- Provide timely information to impacted stakeholders, schools and broader communities
- Address and correct misinformation in the public domain
- Reduce the risk of project delays caused by negative third-party intervention
- Leave a positive legacy in each community.

3. Key Messages

Through each phase of the project, the key messages and means of engagement will be regularly reviewed, refined and updated. Information that is currently in the public domain is outlined below.

3.1. High level messaging

The NSW Government is investing \$7.9 billion over the next four years, continuing its program to deliver 215 new and upgraded schools to support communities across NSW. This is the largest investment in public education infrastructure in the history of NSW.

The NSW Department of Education is committed to delivering new and upgraded schools for communities across NSW. The delivery of these important projects is essential to the future learning needs of our students and supports growth in the local economy.

3.2. Project messaging

The upgrade of North Sydney Public School will provide students the latest educational facilities.

The North Sydney Public High School upgrade project is classified as a State Significant Development.

3.2.1. Project status

The projects' State Significant Development application has been assessed by the DPE and consent to proceed was granted on 21 February, 2022.

3.2.2. Project benefits

The benefits of the project include:

- Responds to local demand for improved and expanded primary school educational facilities
- Delivers important public social infrastructure for the benefit of the local community
- Improves community access to site and its facilities; various community groups use the school out of school hours
- Provides improved landscaping and an expanded central courtyard play space
- Improves the school's street presence with new main entry gate on Bay Road
- Improves the school's environmental performance as the new buildings will be designed to a 5-star Green Star Design standard
- The project will help to stimulate the NSW economy as it is part of the NSW Government's Covid-19 economic recovery plan
- Provides permanent and state of the art teaching facilities for students. These include:
 - 19 new flexible learning spaces
 - One additional administration office and staff room
 - New library
 - Multipurpose space for use as a hall and gym
 - New outdoor areas and a rooftop play space
 - New canteen facilities.

3.2.3. High-quality learning environment

The project will provide flexible learning spaces which make use of the latest technology to enhance the learning experience for the next generation of students. Furthermore, the contemporary and sustainable facilities provide an outstanding working environment for school staff.

Flexible learning spaces are adaptable to accommodate small or large groups and facilitate students use of modern technology, while working independently and collaboratively.

3.2.4. Environmental benefits

The new facilities will be built in accordance with current sustainability principles as per 5-star Green Star Design Standards. SINSW is committed to environmentally conscious construction and maintenance practices.

3.3. Construction phase

3.3.1. Traffic management

The construction contractor has developed a Construction Traffic and Pedestrian Management Plan (CTPMP) to ensure vehicle movements are managed with minimal disruption to the local community.

3.3.2. Safety

SINSW is committed to ensuring the works are completed safely and efficiently and with minimal impact to the local community. This work will be carried out in accordance with regulatory requirements including the provisions of SafeWork NSW.

3.3.3. Noise, vibration and dust

Any activity that could exceed approved construction noise management levels will be managed in strict accordance with the Protection of the Environment Operations Act 1997. All works will be conducted in accordance with the Contractor's approved Construction Noise Management Plan. Vibration from works will be minimal and kept within acceptable levels as stated in the document 'Assessing Vibration: a technical guideline' which outlines vibration criteria for day time periods.

Mitigation measures will be in place to manage noise and dust levels, including hoarding to minimise the effects of noise and dust and hosing down as required to ensure the safety of the school and local community.

Construction works, including the delivery of materials to and from the site, will take place between 7:00am and 6:00pm Monday to Friday and between 8 am and 1 pm on Saturdays. No night work is scheduled for this project. In line with the NSW's Environmental Planning and Assessment (COVID-19 Development – Construction Work Days) Order 2020, SINSW construction sites may now operate on weekend and public holidays during the COVID-19 pandemic. Alignment to Order and any changes to it, will be monitored on an ongoing basis.

Notwithstanding the specified hours, provided noise levels do not exceed the existing background noise level plus 5dB, works may also be undertaken during the following hours:

- (a) between 6 pm and 7 pm, Mondays to Fridays inclusive; and
- (b) between 1 pm and 4 pm, Saturdays.

High noise generating activities such as rock hammering, sheet piling, pile driving and similar activities may only be carried out between the following hours:

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

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; 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) where a variation is approved in advance in writing by the Planning Secretary or his nominee if appropriate justification is provided for the works.

Notification of such construction activities must be given to affected residents before undertaking the activities or as soon as possible afterwards.

3.3.4. Disruptive works

Construction work for the North Sydney Public School upgrade is underway. The following activities are planned for the upcoming weeks (*works will be outlined*). You can contact us directly using the details below to discuss any aspect of this work.

3.3.5. Get involved

We are committed to working together with our school communities and other stakeholders to deliver the best possible learning facilities for students. Your feedback is important to us. For more information contact us via the details below.

- Email: schoolinfrastructure@det.nsw.edu.au

- Website: schoolinfrastructure.nsw.gov.au
- Phone: 1300 482 651

3.3.6. Fauna and vegetation

SINSW is committed to ensuring construction work has a minimal impact upon fauna and vegetation on site.

SINSW will comply with all Development Consent Conditions relating to the protection of fauna and vegetation, and will comply with all relevant mitigation measures listed in the Environmental Impact Statement (EIS).

Prior to construction, a Construction Environmental Management Plan (CEMP) will be prepared to govern the completion of all construction works. The CEMP will detail measures to be taken for the protection and management of fauna and vegetation, will be prepared in accordance with relevant guidelines and performance indicators, and will be submitted to the Certifier and DPE.

3.3.7. Soil and water

SINSW is committed to the appropriate management of soil and water on the construction site.

SINSW will comply with all Development Consent Conditions relating to soil and water management and will comply with all relevant mitigation measures listed in the EIS.

Prior to construction, a CEMP will be prepared to govern the completion of all construction works. The CEMP will detail measures for the management of soil and water, will be prepared in accordance with relevant guidelines and performance indicators, and will be submitted to the Certifier and DPE.

A suitably qualified and experienced consultant will prepare a Construction Soil and Water Management Sub-Plan (CSWMSP), which will form part of the CEMP. The CSWMSP will:

- describe erosion and sediment control measures to be implemented during construction
- provide a plan of how construction works will be managed in wet-weather events
- detail flows from the site to surrounding area
- describe the measures to be taken to manage stormwater and flood flows for small and large sized events

Erosion and sediment controls will be installed and maintained in accordance with the “Blue Book” – *Managing Urban Stormwater: Soils and Construction (4th edition)*. These controls will be implemented prior to the commencement of any other site disturbance works.

Only approved soil and fill types will be used onsite. Accurate records will be kept on the volume and type of fill used onsite.

3.3.8. Visual amenity

Prior to construction, a CEMP will be prepared to govern the completion of all construction works. The plan will detail measures to maintain visual amenity, will be prepared in accordance with relevant guidelines and performance indicators, and will be prepared to the satisfaction of the DPE.

The CEMP will include provisions for the management of outdoor lighting. The installation and operation of outdoor lighting will comply with both AS 4282-2019 – Control of the Obtrusive Effects of Outdoor Lighting and AS 1158.3.1-2005 – Lighting for Roads and Public Spaces – Part 3.1: Pedestrian Area (Category P) Lighting.

Visual amenity impacts will be limited during construction via the installation of appropriate site fencing and adherence to site housekeeping procedures.

3.3.9. Contamination

Prior to construction, a CEMP will be prepared to govern the completion of all construction works. The CEMP will detail contamination management measures, will be prepared in accordance with relevant guidelines and performance indicators, and will be prepared to the satisfaction of the DPE.

The project site has been tested for contamination and is considered to be safe and suitable for the school upgrade.

The CEMP will include protocols for the management of unexpected contamination discovered during the course of construction works.

3.3.10. Heritage

Prior to construction, a CEMP will be prepared to govern the completion of all construction works. The plan will detail measures to protect heritage matters, will be prepared in accordance with relevant guidelines and performance indicators, and will be prepared to the satisfaction of the DPE.

The CEMP will include unexpected finds protocols for objects of Aboriginal or Historic heritage.

In the event that relics of Aboriginal heritage are discovered, all works in the immediate area will cease immediately, and consultation will occur with a suitably qualified archaeologist, registered Aboriginal representatives and the relevant authorities to determine an appropriate management strategy.

In the event that relics of historic heritage are discovered, all works in the immediate area will cease immediately, and consultation will occur with the relevant authorities to determine an appropriate management strategy.

3.4. Handover phase

3.4.1. Traffic and access

Construction work on the North Sydney Public School upgrade has been completed. We are now in a position to confirm access provisions for the upgraded school, including pick-up and drop-off arrangements.

3.5. Official school opening

The upgrade works at North Sydney Public School have been completed. The school has the following new and delivered facilities:

- 19 new flexible learning spaces
- New administration
- New library
- New hall
- New covered outdoor learning area
- Upgrade to canteen
- Upgrade to student amenities
- New entrance gate on Bay Road

Thank you for your patience while we delivered this important School Infrastructure NSW project.

4. Project Governance

4.1. Project Reference Group

Engagement with school stakeholders and the community is a key goal for all Department led projects. To meet this objective, a Project Reference Group (PRG) is established with nominated representatives from the school community joining the SINSW project and community engagement teams, the works contractor, architects and architectural consultants.

The group meets a regular basis, usually monthly to exchange information. School representatives provide SINSW with information from an operational, educational, change and logistics perspective to inform the planning, design and construction phases of the project. This information is used to help minimise the effects of construction activities on school operations.

SINSW provides school representatives with progress updates to assist with communicating the project to school staff, parents/carers, stakeholders and the local community. This exchange of information assists to plan the operational and logistics changes at the school required to deliver the project.

As per all Department led delivery projects, the PRG acts as a consultative forum and not a decision-making forum for the planning and delivery of school infrastructure projects.

The PRG's role in a communication and engagement capacity:

- Provides a forum for the exchange of information relating to the planning and delivery of the project
- Identifies local issues and concerns to assist the project team with the development of mitigation strategies to minimise the effects of the construction on the school community, local residents and the environment
- Provides feedback to the community engagement team on key messages and communication and engagement strategies
- Provides advice on school engagement activities
- Assists to disseminate communication collateral to the school community and other stakeholders.

Figure 1: Project Reference Group (PRG)

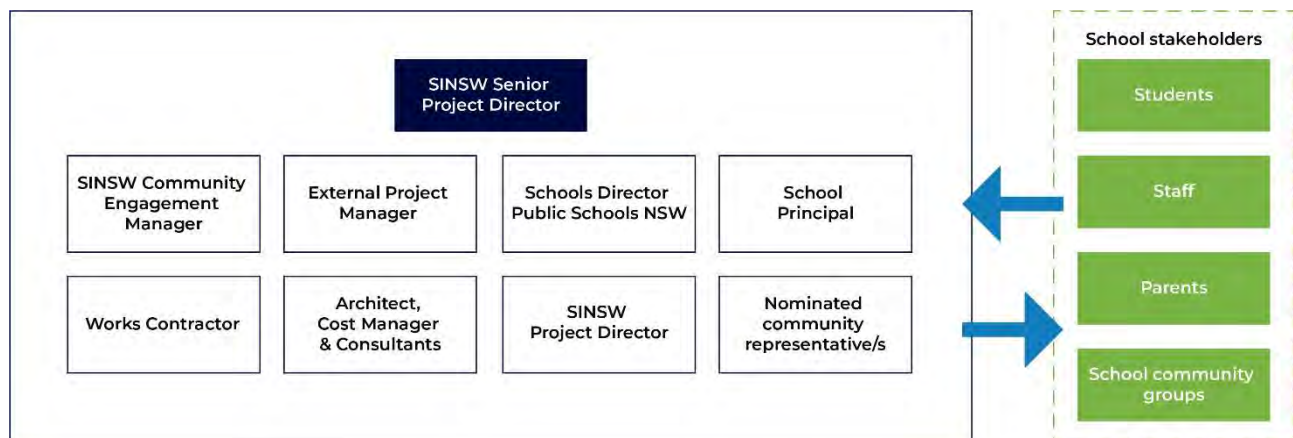
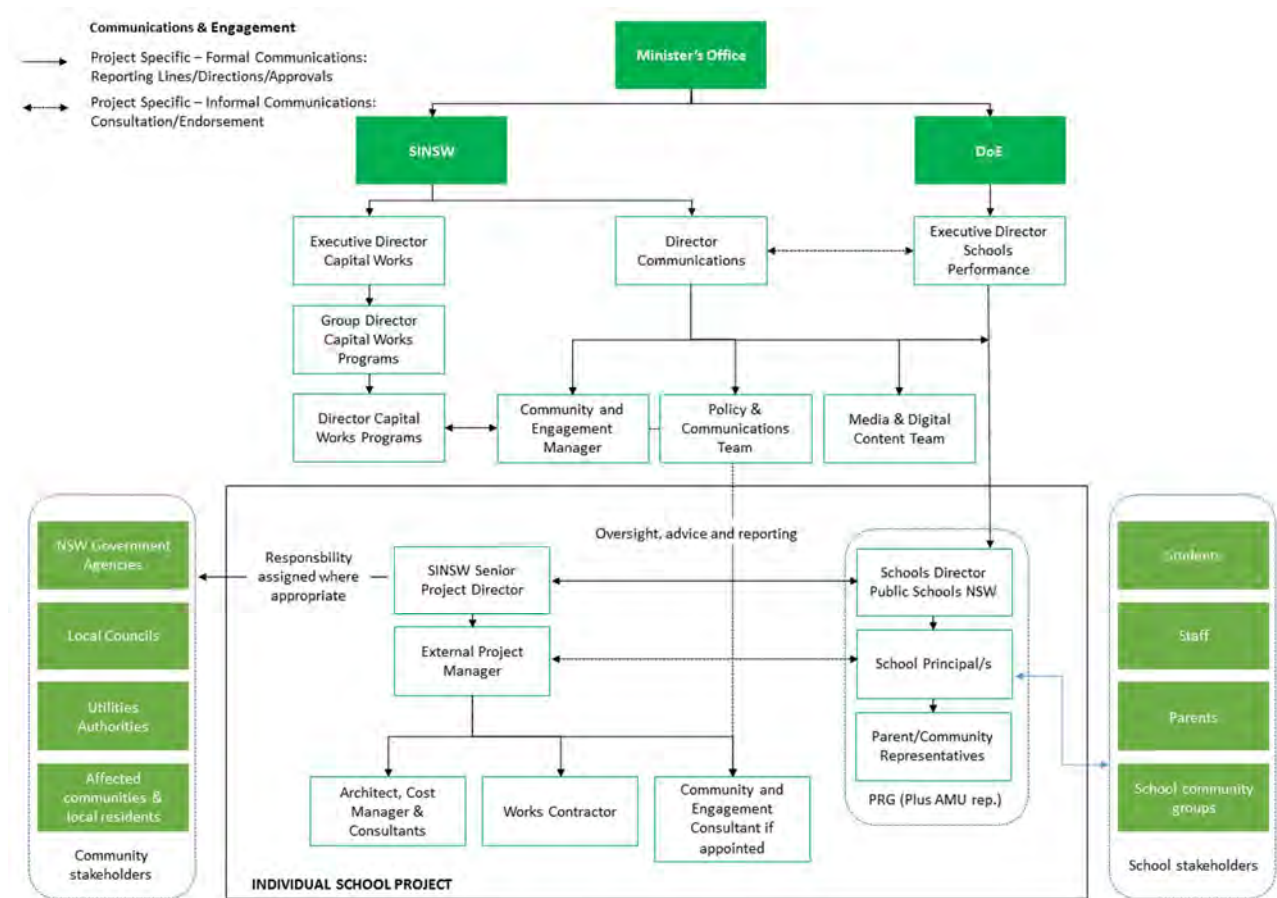


Figure 2: SINSW Project Governance

Figure 2 below maps how the Department and SINSW will communicate both internally and externally.



5. Stakeholders

The stakeholder list below summarises who will be consulted during the design and construction phase via ongoing face-to-face or virtual meetings, communication collateral and digital engagement methods.

Table 2: Stakeholders

Stakeholders	Interest and involvement
Local Members of Parliament: <ul style="list-style-type: none"> State Government Member for North Shore – Felicity Wilson MP Federal Government Member for North Sydney – Trent Zimmerman MP 	<ul style="list-style-type: none"> Meeting the economic, social and environmental objectives of state and federal governments Delivering increased public education capacity on time Delivering infrastructure which meets expectations Addressing local issues such as traffic, congestion and public transport solutions
Government agencies and peak bodies: <ul style="list-style-type: none"> Transport for NSW Roads and Maritime Services NSW Fire and Rescue NSW NSW Department of Education NSW Department of Planning and Environment NSW Environmental Protection Authority Sydney Water NSW Heritage Council NSW Office of Environment and Heritage NSW Department of Premier and Cabinet 	<ul style="list-style-type: none"> Traffic and congestion on the local road system Adequate public transport options and access Ensuring new infrastructure meets standard requirements for safety and fire evacuation Ensuring the development is compliant Ensuring the development does not impact heritage items Easing overcrowding in local schools
Local Council – North Sydney Council <ul style="list-style-type: none"> Mayor General Manager Councillors Bureaucrats 	<ul style="list-style-type: none"> Schedule for construction and opening of school Plans for enrolled students during the operation of the temporary school Impacts to the local community including noise, congestion and traffic Shared use of community spaces Providing amenities to meet increase population density
School community <ul style="list-style-type: none"> Principal Teachers Staff Parents and carers Students 	<ul style="list-style-type: none"> Safe pedestrian and traffic access to the temporary school during construction Construction impacts and how these will be minimised Quality of infrastructure and resources upon project completion How to access the new school once completed
Local community <ul style="list-style-type: none"> All residents and businesses surrounding the school including Bay Road, the Pacific Highway and 	<ul style="list-style-type: none"> Noise and truck movements during construction Increased traffic and congestion on nearby streets

Stakeholders	Interest and involvement
McHatton Street	<ul style="list-style-type: none"> Local traffic and pedestrian safety Changed traffic conditions during pick-up and drop-off Shared use of school facilities and amenities
Nearby public schools <ul style="list-style-type: none"> North Sydney Girls High School North Sydney Boys High School Cammeraygal High School Willoughby Girls High School Middle Harbour Public School Neutral Bay Public School Mosman Public School Beauty Point Public School 	<ul style="list-style-type: none"> Impact on school resources Impact on current students Implications for teaching staff Possible impacts on enrolments Opportunities to view the new facilities
Adjoining affected landowners and businesses <ul style="list-style-type: none"> Office/commercial/retail buildings along Pacific Highway and Bay Road including, but not limited to St Vincents Opportunity Shop, HHMS Global, A Dress for a Night, North Sydney General Practice, My Recruitment Plus and A2K Technologies. Adjacent residential owners on Bay Road and McHatton Street Nearby residential owners on Bay Road, McHatton Street and Pacific Highway St Nicholas School of Russian (operates Russian language classes from the school) KU Kids Care (within school grounds and also located nearby) 	<ul style="list-style-type: none"> Noise and truck movements during construction Increased traffic and congestion on nearby streets Local traffic and pedestrian safety Changed traffic conditions during pick-up and drop-off Shared use of school facilities and amenities Environmental impacts during construction
Community groups <ul style="list-style-type: none"> Committee for North Sydney (membership includes former Mayor of North Sydney, Genia McCaffery) North Sydney Chamber of Commerce North Sydney Community Centre Community members and groups which use the school's facilities out of hours: <ul style="list-style-type: none"> Professor Plums Science Kids up Front school holiday care Seido Karate Sport Little Kickers Sport Mandolin Orchestra Music Directions in Music 	<ul style="list-style-type: none"> Noise and truck movements during construction Increased traffic and congestion on nearby streets Local traffic and pedestrian safety Changed traffic conditions during pick-up and drop-off Shared use of school facilities and amenities

Stakeholders	Interest and involvement
<ul style="list-style-type: none"> • Guitars for All Music • Strings Music • VIP Music M • Piano Music • Simon Freeman Drama • Indian Dance • Ballroom Dance • Centre Stage Dance • Broadway Dance • Russian Language School • Portuguese Language • Chinese Datong Language School • Health & wellbeing • Homework Club • Sydney Academy of Chess • Just Art Australia • Unaccompanied Baggage 	

6. Engagement Approach

The way we communicate has temporarily changed due to social distancing requirements. Appendix A provides a detailed list of changed communication methods and tools. This particularly refers to face-to-face communication channels such as door knocks, information booths/sessions, face-to-face meetings and briefings.

The key consideration in delivering successful outcomes for this project is to make it as easy as possible for anyone with an interest to find out what is going on. In practice, the communication approach across all levels of engagement will involve:

- Using uncomplicated language
- Taking an energetic approach to engagement
- Encouraging and educating whenever necessary
- Engaging broadly including with individuals and groups that fall into harder to reach categories
- Providing a range of opportunities and methods for engagement
- Being transparent
- Explaining the objectives and outcomes of planning and engagement processes.

In addition to engagement with government departments, agencies and councils, two distinct streams of engagement will continue for the project:

- School community for existing schools being upgraded, or surrounding schools for new schools, and
- Broader local community.

This allows:

- School-centric involvement from school communities (including students, parents/caregivers, teachers, administration staff) unencumbered by broader community issues, and
- Broad community involvement unencumbered by school community wants and needs. Broad community stakeholders include local residents, neighbours and local community/action groups.

6.1. General community input

Members of the general public impacted by the construction phase are able to enquire and share feedback about environmental impacts via the following channels:

- Information booths and information sessions held at the school or local community meeting place, and advertised at least seven days before in local newspapers, on our website and via letterbox drops
- 1300 number that is published on all communication material
- School Infrastructure NSW email address that is published on all communication material
- Refer to Section 8.5 of this document for detail on our enquiries and complaints process.

A number of tools and techniques will be used to keep stakeholders and the local community involved as summarised in table three below.

For reference, project high level milestones during the delivery phase include:

- Site establishment/early works
- Start of main works construction
- Term prior to project completion
- Project completion
- First day of school following project completion
- Official opening

6.2 Construction works notification distribution methodology

Construction works notifications will be distributed to targeted properties in the vicinity of the project. These properties have been identified as part of the technical studies and plans submitted as part of the planning and assessment

approval pathway and post approval requirements. Specifically, the notification distribution map at Figure 1 below has been prepared through an analysis of the impacts and requirements identified in:

- the Acoustic Assessment Report submitted with the Environmental Impact Assessment
- the Transport and Accessibility Impact Assessment submitted with the Environmental Impact Statement
- the Construction Worker and Staff Transportation Strategy
- the Construction Environmental Management Plan
- the Construction Noise and Vibration Sub Plan
- the Construction Traffic and Pedestrian Management Sub Plan.

This methodology has been used to identify the anticipated construction impacts identified for this project. It does not include an arbitrary distribution area due to the robust impact analysis that has been carried out during planning and assessment phase of the project.

The distribution area may be altered:

- to address specific construction activities where the impact/s affect fewer or greater properties, depending on the nature of the work
- where ongoing monitoring shows more widespread impacts to that predicted in the EIS
- if complaints are received outside of the distribution area
- if there is an approved project modification in the future that results in more widespread impacts
- at the discretion of School Infrastructure NSW.

Additional project updates and notifications will also be distributed when communicating milestones and higher-level information to the wider community such as construction contract award and project completion. Such updates and notifications may not detail construction impacts and may be distributed to a greater number of addresses to widely publicise the project's achievements.

Figure 1: Map of construction works notification distribution area



Map of North Sydney Public School

Table 3: School Infrastructure NSW Communication Tools

Communications tool	Description of activity	Frequency
1300 community information line	The free call 1300 482 651 number is published on all communication materials and is manned by staff from SINSW during business hours.	Throughout the life of the project and accessible for 12

Communications tool	Description of activity	Frequency
	<p>All enquiries that are received are referred to the appointed C&E Manager and/or Senior Project Director as required and logged in our CRM.</p> <p>Once resolved, a summary of the conversation is updated in the CRM.</p>	months post completion
Call centre scripts	High level, project overview information provided to external organisations who may receive telephone calls enquiring about the project, most namely stakeholder councils.	Throughout the project when specific events occur or issues are raised by stakeholders
Community contact cards	<p>These are business card size with all the SINSW contact information.</p> <p>The project team/ contractors are instructed to hand out contact cards to stakeholders and community members enquiring about the project. Cards are offered to school administration offices as appropriate.</p> <p>The card directs all enquiries, comments and complaints through to our 1300 number and SINSW email address.</p>	Throughout the life of the project and available 12 months post completion
CRM database	<p>All projects are created in SINSW's Customer Relationship Management system Darzin at project inception.</p> <p>Interactions, decisions and feedback from stakeholders are captured, and monthly reports generated.</p> <p>Any enquiries and complaints are to be raised in the CRM and immediately notified to the Senior Project Director, Project Director and Community Engagement Manager.</p>	Throughout the life of the project and updated for 12 months post completion
Display boards	A0 size full colour information boards are displayed at information sessions or can be permanently displayed in appropriate places (a school administration office for example).	As required
Door knocks	<p>Provide timely notification to nearby residents of upcoming construction works, changes to pedestrian movements, temporary bus stops, expected impacts and proposed mitigation.</p> <p>Provide written information of construction activity and contact details.</p>	As required prior to periods of construction impacts
Face-to-face meetings/briefings	Activities include meeting, briefings and "walking the site" to engage directly with key stakeholders, directly impacted residents and business owners and the wider community.	As required
FAQs	Set of internally approved answers provided in response to frequently asked questions. Used as part of relevant stakeholder and community communication tools. These are updated as required, and included on the website if appropriate.	Throughout the life of the project
Information booths	<p>Information booths are held locally and staffed by a project team member to answer any questions, concerns or complaints on the project.</p> <p>Info booths are scheduled from the early stages of project delivery through to project completion.</p> <p>Information booths are to be held both at the school/neighbouring school, as well for the broad community:</p> <ul style="list-style-type: none"> School information booths are held at school locations at times 	At project milestones and as required

Communications tool	Description of activity	Frequency
	<p>that suit parents and caregivers, with frequency to be aligned with project milestones and as required.</p> <ul style="list-style-type: none"> Community information booths are usually held at local shopping centres, community centres and places that are easily accessed by the community. They are held at convenient times, such as out of work hours on weekdays and Saturday's. <p>Collateral to be provided include community contact cards, latest project notification or update, with internal FAQs prepared.</p> <p>All liaison to be summarised and loaded in the CRM.</p> <p>Notice of at least 7 days to be provided.</p>	
Information sessions (drop in)	<p>Information sessions are a bigger event than an information booth and are held at a key milestone or contentious period. These events feature detailed information on the project on display boards/ screens and an information pack handout which includes a project scope, planning approvals, any impacts on the school community or residents, a project timeline and a frequently asked questions section.</p> <p>Members from the project and communications team are available to answer questions about the project.</p> <p>These events occur after school hours on a week day (from 3pm – 7pm to cover working parents).</p> <p>All liaison summarised and loaded on the CRM.</p>	As required
Information pack	<p>This is a four-page A4 colour, fold out flyer which includes:</p> <ul style="list-style-type: none"> Project scope Project update FAQs Contact information Project timeline <p>Information packs are distributed at information sessions or at other bigger events/milestones in hard copy and also made available on the SINSW website.</p>	As required
Media releases/events	<p>Media releases are distributed at announce media milestones. They promote major project milestones and activities and generate broader community awareness.</p>	<p>Media milestones:</p> <ul style="list-style-type: none"> Project announcement Concept design completed Planning approval lodged Planning approval granted Construction contract tendered Construction

Communications tool	Description of activity	Frequency
		<p>contract awarded</p> <ul style="list-style-type: none"> ▪ SOD turning opportunity ▪ Handover ▪ Official opening
Notifications	<p>A4, single or double sided, printed in colour that can include frequently asked questions, if required.</p> <p>Notifications are distributed under varying templates with different headings to suit different purposes:</p> <ul style="list-style-type: none"> ▪ Works notification are used to communicate specific information/impacts about a project to a more targeted section of the community. This template doesn't have an image, so it can be more appropriately targeted for matters like hazardous material. ▪ Project update is used when communicating milestones and higher-level information to the wider community i.e. project announcement, concept design/DA lodgement, construction award or project completion. A project update always includes a project summary, information booths/sessions if scheduled, a progress summary and contact information. 	<p>As required according to the construction program.</p> <p>Distributed via letterbox drop to local residents and via the school community at least 5-7 days prior to construction activities or other milestones throughout the life of the project. Specific timings indicated in table 5 – Section 8.</p>
Photography, time-lapse photography and videography	<p>Captures progress of construction works and chronicles particular construction activities. The images are used in notifications, newsletters, reports, the SINSW website, social media channels, at information sessions and in presentations.</p> <p>Once the project is complete, SINSW will organise photography of external and internal spaces to be used for a range of communications purposes.</p>	<p>Project completion (actual photography and video of completed project)</p> <p>Prior to project completion - artist impressions, flythrough, site plans and construction progress images are used</p>
Presentations	Details project information for presentations to stakeholder and community groups.	As required
Priority correspondence	Ministerial (and other) correspondence that is subject to strict response timeframes. Includes correspondence to the Premier, Minister, SINSW and other key stakeholders. SINSW is responsible for drafting responses as requested within the required timeframes.	As required
Project Reference Group	SINSW facilitated Project Reference Group sessions providing information on the design solution, construction activities, project timeframes, key issues and communication and engagement strategies.	<p>Meets every month or as required</p> <p>More information on the PRG is detailed in Section 4</p>
Project signage	A0 sized, durable aluminium signage has been installed at the Mosman High School Upgrade.	Throughout the life of the project and installed for 12 months post completion

Communications tool	Description of activity	Frequency
	<p>Provides high level information including project scope, project image and SINSW contact information.</p> <p>Fixed to external fencing/entrances that are visible and are updated if any damage occurs.</p>	
Site visits	Demonstrate project works and progress and facilitate a maintained level of interest in the project. Includes media visits to promote the reporting of construction progress.	As required
School Infrastructure NSW email address	Provide stakeholders and the community a direct communication channel to the Community Engagement team. Email address (schoolinfrastructure@det.nsw.edu.au) is published on all communication materials.	Throughout the life of the project
School Infrastructure NSW website	<p>A dedicated project page for the North Sydney Public School Upgrade is located on the SINSW website:</p> <p>www.schoolinfrastructure.nsw.gov.au/projects/n/north-sydney-public-school-upgrade.html</p>	Updated at least monthly and is live for at least 12 months post completion of the project
Welcome pack/ thank you pack	<p>At project completion the following flyers are utilised:</p> <ul style="list-style-type: none"> ▪ Welcome pack – A two to four-page A4 flyer which is provided to the school community on the first day/week they return to school when new facilities are opening, or attending a new school. Includes project overview, map outlining access to the school and key locations, frequently asked questions and contact information. ▪ Thank you pack – A two to four-page A4 flyer tailored to local residents to thank them for their patience and support of the project. 	Project completion only

7. Engagement Delivery Timeline

The way SINSW communicates has temporarily changed during the COVID-19 pandemic due to social distancing requirements. Please refer to Appendix A for more details on changed methods and tools. The table below outlines both traditional and alternative methods to be used in line with the changes.

The following engagement delivery timeline maps tailored communications tools and activities by key milestone.

Table 4: Engagement timeline

Project Phase / milestone	Target audiences	Proposed communication tools / activities / purpose as per Table 3	Timing / implementation
Early works (fencing, relocation of existing demountable class rooms and upgrade work to internal existing amenities and canteen)	Local residents School community Adjoining affected landowners and businesses	Notifications Project updates Media release Website update SINSW email address and hotline Project signage	January 2022 to December 2022. Works to occur concurrently with main construction works
Main construction works, including, but not limited to: <ul style="list-style-type: none"> Demolition work Key impacts – noise, dust, traffic, vibration Construction milestone 	School community Local residents Adjoining affected landowners and businesses	Notification Project update Notifications Media release Website update Project Reference Group 1300 community information line Information booth/sessions/virtual room Information pack Project signage	March 2022 to Early-2023 (at key construction events as required, as per our notification process in Table 5)
Term prior to project completion	School community Local community Adjoining landowners Prospective parents and students Local schools	Project update Information booth / virtual room Information pack Website updates SINSW email address and hotline Site visits	Term Four
Handover and welcome to new school	School community Local community Adjoining affected landowners and businesses Nearby schools	Welcome pack Thank you pack Media release Website update SINSW email address and hotline	Early-2023

Project Phase / milestone	Target audiences	Proposed communication tools / activities / purpose as per Table 3	Timing / implementation
		Site visits Photography / videography	
Post-opening	All	Website remains live Project signage remains installed 1300 phone and email still active, and CRM still maintained for complaints and enquiries.	From Early-2023

8. Protocols

8.1. Media engagement

SINSW manages all media relations activities, and is responsible for:

- Responding to all media enquiries and instigating all proactive media contact.
- Media interviews and delegation to SINSW media spokespeople who are authorised to speak to the media on behalf of the project
- Informing the Minister's Office and SINSW project team members and communications representatives of all media relations activities in advance and providing the opportunity to participate in events where possible.

8.2. Site visits

SINSW in partnership with Schools Operations and Performance organises and hosts guided project site tours and media briefings as required by the Minister's Office. The Project Team will ensure the required visitor site inductions are undertaken and that all required Personal Protective Equipment (PPE) is worn.

For media site visits and events, SINSW creates, or contributes to, the production of an event pack. This will include an event brief, media release, speaking notes and Q&As.

8.3. Social, online and digital media

SINSW initiates and maintains all social and online media channels. These channels can include Facebook, Twitter, LinkedIn and the website. The SINSW Online Content Team upload to the SINSW website.

8.4. Notification process

Notifications (titled works notifications or project updates as per Table 3) are SINSW's primary mechanism to inform the community and key stakeholders about the impact of school construction on the local area. Notifications provide advance warning of activities and planned disruptions, allowing stakeholders and community members to plan for the impacts and make alternative arrangements where required. Depending on the work activity, notifications are distributed in person via door knocks, via letterbox drop, via the school and electronically via email.

Stakeholder engagement and community notification will:

- outline the reason that the work is required
- outline the location, nature, and duration of the proposed works
- outline work hours
- be written in plain English
- include a diagram that clearly indicates the location of the works, where required
- include a 1300 community contact number, project email address and website details.

Table 5: Notifications periods

Table 5 below outlines minimum notification periods for specific work activities that will be targeted for stakeholder and community notification. All notification periods prescribed within development approvals or by approving bodies will be adhered to. Regular project updates regarding the general work program will be also provided to nearby households and businesses throughout construction.

Works activity	Minimum community notification period
Notification to communities following major incident	Same day
Unplanned out of hours work (notification will be given to affected residents before undertaking the activities or as soon as is practical afterwards)	As soon as practical
Contamination management and notification	7 days
Upcoming works notification (minimum disruption)	7 days
Invitation/notification of community event (e.g. info booth)	7 days

Works activity	Minimum community notification period
Notifications regarding traffic changes, parking impacts, road closures, major detours	7 days
Pedestrian route changes and other impacts	7 days
Notifications regarding operational changes for the school community (school drop-off points, entry and exit points)	7 days
Major construction impacts (out of hours/ significant noise/ demolition)	7 days
Major impacts to school community e.g. relocation to temporary school	6 months

8.5. 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 regards 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.

If a phone call, email or face-to-face complaint is received during construction, it will be acknowledged within 2 working days and logged in our CRM, actively managed, closed out and resolved by SINSW within 2 to 5 working days, where practicable. Where complaints are unable to be resolved within this timeframe the complainant will be provided with regular updates regarding the complaint resolution process.

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.

If the complainant is not satisfied with 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: www.ombo.nsw.gov.au/complaints.

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

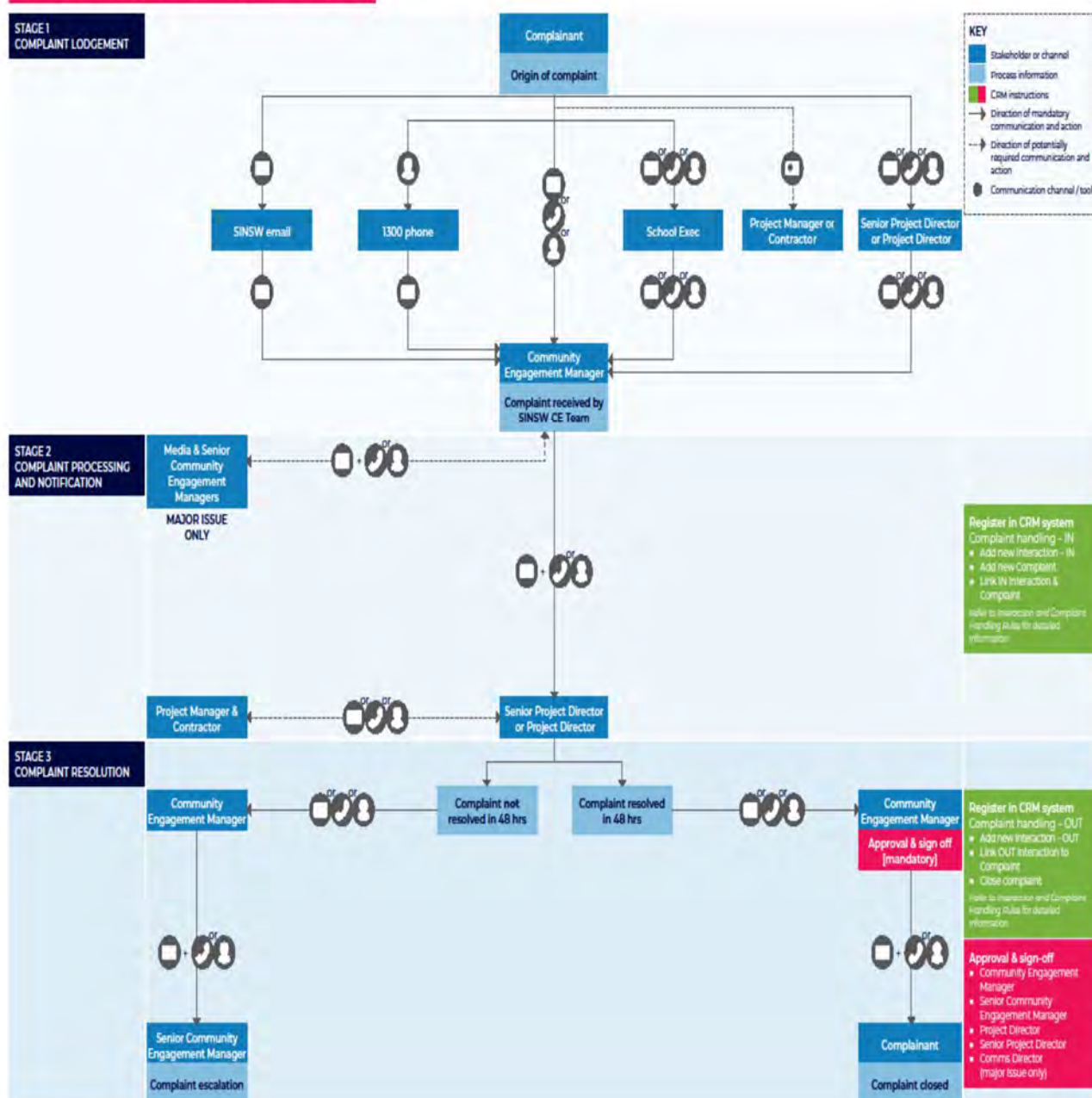
Table 6: Complaint and enquiry response time

Complaint	Acknowledgement times	Response times
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 seven business days, where practicable.
Phone call after hours*	Within two 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 seven business days, where practicable.
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 seven business days, where practicable.
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 seven business days, where practicable.
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 seven business days.
Phone call after hours	Within two hours of receiving message upon returning to office.	Interaction to be logged and closed out within seven business days.
Email during business hours	At time of email (automatic response)	Interaction to be logged and closed out within seven business days.
Email outside of business hours	At time of email (automatic response)	Interaction to be logged and closed out within seven 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.

Figure 3 - Internal Complaints Process

COMPLAINTS MANAGEMENT PROCESS FLOW CHART



8.5.1. Disputes involving compensation and rectification

SINSW is committed to working with the school and broader community to address concerns as they arise. Where disputes arise that involve compensation or rectification, the process for resolving community enquiries and complaints will be followed to investigate the dispute. Depending upon the results of the investigation, SINSW may seek legal advice before proceeding.

8.6. Incident management

An incident is an occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance. Material harm is harm that:

- involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial; or
- results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment).

8.6.1. Roles and responsibilities following an incident

In the event of an incident, once emergency services are contacted, the incident must be immediately reported to the SINSW Senior Project Director who will inform:

- SINSW Executive Director
- SINSW Community Engagement Manager
- SINSW Senior Manager, Community Engagement
- SINSW Director, Communications

SINSW Director, Communications will:

- Lead and manage all communications with the Minister's office in the event of an incident, with assistance as required
- Direct all communications with media to the SINSW Media Manager in the first instance for management
- Notify all other key project stakeholders of an incident.

The school and local community will be notified within 24 hours in the event of an incident, as per our notification timelines in Table 5.

The SINSW Senior Project Director will issue a written incident notification to Department of Planning and Environment and local council immediately following the incident to set out the location and nature of the incident.

This must be followed within seven days following the incident of a written notification to the Department of Planning, and Environment that:

- (a) identifies the development and application number;
- (b) provides details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
- (c) identifies how the incident was detected;
- (d) identifies when SINSW became aware of the incident;
- (e) identify any actual or potential non-compliance with conditions of consent;
- (f) describes what immediate steps were taken in relation to the incident;
- (g) identifies further action(s) that will be taken in relation to the incident; and
- (h) provides the contact information for further communication regarding the incident (the Senior Project Director).

Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Planning Secretary, SINSW will provide the Planning Secretary and any relevant public authorities (as determined by the Planning Secretary) with a detailed report on the incident addressing all requirements below:

- (a) a summary of the incident;
- (b) outcomes of an incident investigation, including identification of the cause of the incident;
- (c) details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and
- (d) details of any communication with other stakeholders regarding the incident.

8.7. Reporting process

Throughout the project, data will be recorded on participation levels both face-to-face and online, a record of engagement tools and activities carried out in addition to queries received and feedback against emerging themes.

Stakeholder and community sentiment will be evaluated throughout to ensure effectiveness of the engagement strategy and to inform future activities.

Reporting will include, but not be limited to:

- Stakeholder engagement reporting – numbers of forums, participation levels and a summary of the outcomes
- Community sentiment reporting – outputs of all community engagement activities, including numbers in attendance at events, participation levels and feedback received against broad themes

- Online activity – through the project website and via social media
- Media monitoring – as part of the proactive media campaign
- Engagement risk register – to be updated regularly.

Appendix A – Changing the way we communicate – community engagement alternative methods

Below are proposed alternatives to our standard mandatory requirements for community engagement effective as of 30 March 2020. These alternatives are proposed to ensure we continue to comply with SSD and DA conditions and that our communities can remain informed about our projects while adhering to social distancing requirements and NSW Health advice.

Our engagement principles for this period should continue to ensure our communications are:

- Simple
- Streamlined
- Accessible

Summary of mandatory requirements and alternatives:

Items in **bold** have alternate delivery options.

SSD CONDITION	ALTERNATIVE
1300 community information line	No change
Advertising (print)	Promote online information session / generic single advert
Call centre scripts	No change
Community contact cards	Contractors to hand out as required
CRM database	No change
Display boards	Digital version
Door knocks	Door knocks are replaced by letterbox drops
Face-to-face meetings/briefings	Phone call or teleconferencing
FAQs	No change
Information booths	Information booths are replaced by project updates Virtual information sessions
Information sessions (drop in)	Drop in information sessions are replaced by virtual information sessions
Information pack	Digital version
Media releases/events	No change to media releases, no events to be held

SSD CONDITION	ALTERNATIVE
Notifications	Distributed to school community via email from Principal Distributed to near neighbours via letterbox drop*
Photography, time-lapse photography and videography	Source photography if health advice permits Use images and time-lapse from similar projects if unable to photograph site
Presentations	Digital version for PRGs/stakeholder meetings
Priority correspondence (RML)	No change
Project Reference Group	Skype meetings / teleconferencing
Project signage	No change if production and installation still possible; A4 print out delivered
Site visits	Site visits via phone/video/photography
School Infrastructure NSW email	No change
School Infrastructure NSW website	No change (may publish updates more frequently)
Welcome pack/ thank you pack	Welcome pack: Do not issue until school resumes Thank you pack: Issued when project is entirely complete

**Alternative may change depending on distributor operations*

Appendix 8 – Construction Traffic & Pedestrian Management Sub-Plan

Refer to [Condition B15, B19 & B21] CTPMSP + Driver Code of Conduct

Construction & Pedestrian Traffic Management Plan

North Sydney Public School Upgrades

182 Pacific Highway, Waverton NSW 2060

8/04/2022

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03	08/04/2022	-	W. Zheng	W. Zheng

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APPENDICES

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Appendix C. Driver Code of Conduct
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1 Introduction

1.1 Introduction

Ason Group has been engaged by Taylor Construction (Taylor) to prepare a Construction & Pedestrian Traffic Management Plan (CPTMP) for the demolition and construction works at North Sydney Public School (the Site).

This CPTMP details the measures and strategies to be undertaken during construction to minimise the effects of work on the surrounding road network and to ensure the safety and efficiency of the community, all workers, and all road users.

This document addresses Conditions B15, B19 and B21 of SSD-11869481.

1.2 Project Representatives & Stakeholders

This report has been prepared by a consultant who holds a SafeWork NSW Work Health & Safety Traffic Control Work card, accredited for the 'Prepare a Work Zone Traffic Management Plan'. Details of the accredited consultant are provided below:

- Dora Choi Ticket No. TCT0021456
- Wendy Zheng Ticket No. TCT1015144

This Construction & Pedestrian Traffic Management Plan has been prepared to meet the requirements outlined in Appendix A and Appendix E, Section E.2 of the Transport for NSW Traffic Control at Work Sites Technical Manual (Issue No. 6.1, 2022).

Through the preparation of this CPTMP, the project representatives and stakeholders consulted in the development of the traffic management strategy are listed below:

TABLE 1: PROJECT REPRESENTATIVES AND STAKEHOLDERS

Organisation	Name	Role
Ason Group – Traffic & Transport Consultant	Dora Choi	Principal Lead Traffic Management & Operations
	Wendy Zheng	Senior Traffic & Design Engineer
School Infrastructure NSW - Project Principal	Jeremy Farrington	Senior Project Director – Major Projects
Turner & Townsend – Project Manager for Principal	Tarini Pathak	Project Manager
Taylor	Michael Etrick	Senior Project Manager
	Tom Udovcic	Site Engineer
	Cassandra Zughbi	Design Manager

1.3 Project Details

The project involves a series of alterations and additions to the existing North Sydney Public School. The proposal entails:

- Demolition of the existing hall (building B), haven building (building C) and 6 temporary buildings;
- Construction of a three-storey building comprising:
 - staff administration rooms;
 - 16 home bases
 - a new library;
 - hall;
 - out of school hours care facilities;
 - covered outdoor learning area;
 - 63 bicycle parking spaces;
 - End of trip facilities for staff; and
 - services, amenities and access.
 - New entry gate and forecourt from Bay Road;
- Internal refurbishment of building G ground floor from the existing library to 3 home bases; and
- Associated tree removal, landscaping and excavation.

1.3.1 Proposed Construction Activity / Works

The proposed construction activities detailed in the Staging information below show the construction staging and associated description from Taylors.

TABLE 2: PROJECT STAGING, DURATION AND WORKS DESCRIPTION

Stage	Sub-Stage	Duration	Description	Worker Number
1	Site Establishment	Mid-March to April 2022	Installation of temporary demountables Installation of site amenities Installation of fencing and class A hoarding Temporary removal of the heritage wall section	10 – 12 people
2	Demolition & Excavation	End March to July 2022	Protection of Bay Road heritage elements Demolition of Building C and temporary buildings Excavation and levelling of the site in preparation for asbestos management and removal	20 – 25 people
3	Crane Installation	May 2022	Installation of crane	25 – 30 people
4	Main Works	July 2022 to January 2023	Construction of Building I and Building J.	80 – 85 people

5	External Works	October to December 2022	Completion of external hardstand, entry to the south and all soft landscaping.	80 – 85 people
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1.3.2 Site Location

The site, Lot 1 in DP 183591 and Lot 1 in DP 184559, is located at 182 Pacific Highway, North Sydney NSW 2060. The site is bounded by the Pacific Highway to the east, McHatton Street to the north, low-density residential land to the west and Bay Road to the south, is essentially rectangular in shape and has an approximate area of 1.93 hectares.

The McHatton Street frontage has been used as the main access associated with car-based trips to / from the school. There is a significant level difference between the kerbside parking that consists of a mix of short-stay parking restrictions, and Kiss and Ride restriction (i.e., No Parking restriction). Connectivity between the kerbside parking area and the footpath / School Gates along McHatton Street is provided by three staircases.

Of the five existing pedestrian access gates, only one gate located along the McHatton Street frontage does not consist of steps / stairs between the footpath and the school site. This gate is located on McHatton Street, to the east of the main pedestrian access to the existing Administration Building.

All other accesses, especially the existing gate along Bay Road consists of steps / stairs.

The Site and surrounding context are demonstrated in **Figure 1** below.

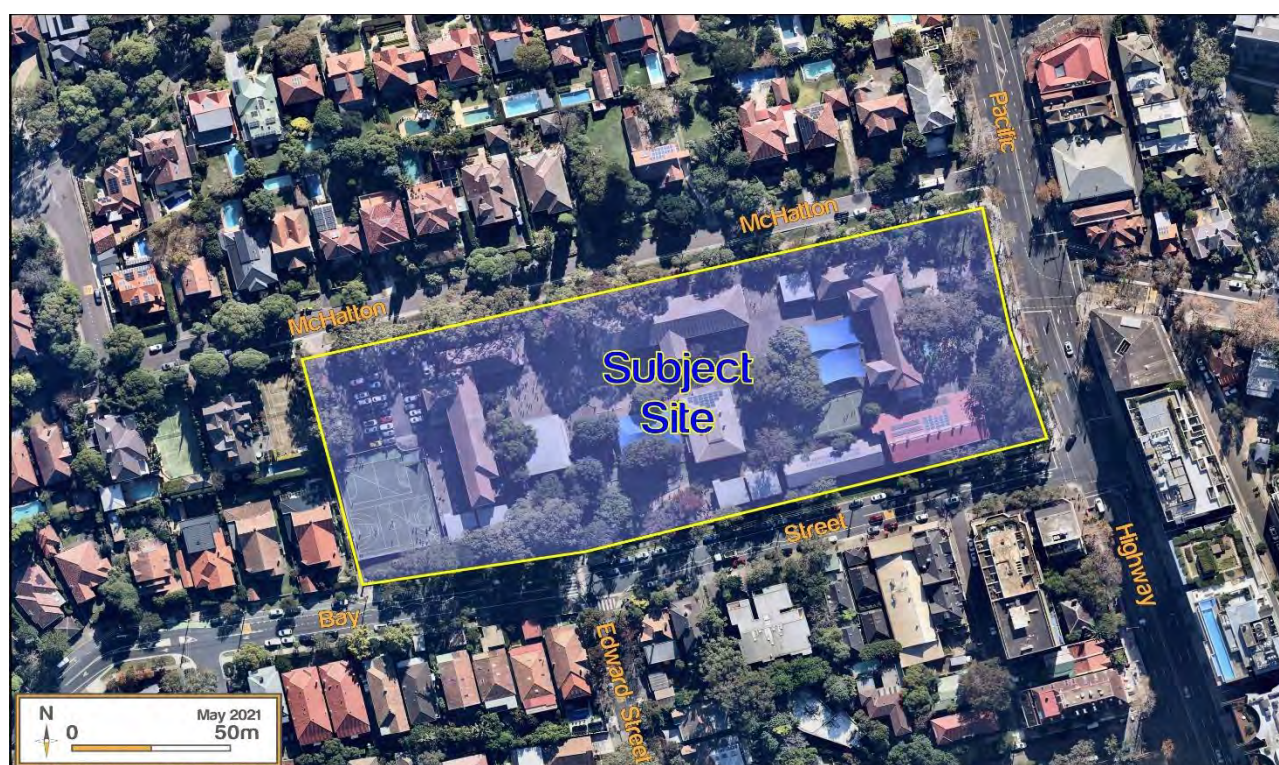


Figure 1: Site Location

1.4 Authority Requirements

The purpose of this document is to address the relevant conditions of State Significant Development SSD-11869481. The relevant Condition of Consent (B15 and B19) is reproduced below:

B15. The Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP) must be prepared to achieve the objective of ensuring safety and efficiency of the road network and address, but not be limited to, the following:

- (a) be prepared by a suitably qualified and experienced person(s);*
- (b) be prepared in consultation with Council and TfNSW;*
- (c) detail:*
 - (i) measures to ensure road safety and network efficiency during construction in consideration of potential impacts on general traffic, cyclists and pedestrians and bus services;*
 - (ii) measures to ensure the safety of vehicles and pedestrians accessing adjoining properties where shared vehicle and pedestrian access occurs;*
 - (iii) heavy vehicle routes, access and parking arrangements;*
 - (iv) the swept path of the longest construction vehicle entering and exiting the site in association with the new work, as well as manoeuvrability through the site, in accordance with the latest version of AS 2890.2; and*
 - (v) arrangements to ensure that construction vehicles enter and leave the site in a forward direction unless in specific exceptional circumstances under the supervision of accredited traffic controller(s).*

B19. A Driver Code of Conduct must be prepared and communicated by the Applicant to heavy vehicle drivers and must address the following:

- (a) minimise the impacts of earthworks and construction on the local and regional road network;*
- (b) minimise conflicts with other road users;*
- (c) minimise road traffic noise; and*
- (d) ensure truck drivers use specified routes.*

The conditions are outlined below with the corresponding sections of the report in response to them.

TABLE 3: RESPONSE TO SSD-11869481 CONDITIONS

Condition No.	Condition	Response
15	The Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP) must be prepared to achieve the objective of ensuring safety and efficiency of the road network and address, but not be limited to, the following:	Noted
a)	be prepared by a suitably qualified and experienced person(s);	Refer to Section 1.2. See CVs in Appendix I.

b)	be prepared in consultation with Council and TfNSW;	Refer to Section 1.6.
c(i)	measures to ensure road safety and network efficiency during construction in consideration of potential impacts on general traffic, cyclists and pedestrians and bus services;	Refer to Section 3.
(ii)	measures to ensure the safety of vehicles and pedestrians accessing adjoining properties where shared vehicle and pedestrian access occurs;	Refer to Sections 3.3 and 3.5.
(iii)	heavy vehicle routes, access and parking arrangements;	Refer to Sections 2.3, 2.8 and 3.2.
(iv)	the swept path of the longest construction vehicle entering and exiting the site in association with the new work, as well as manoeuvrability through the site, in accordance with the latest version of AS 2890.2; and	Refer to Section 2.3. See swept path assessments in Appendix E.
(v)	arrangements to ensure that construction vehicles enter and leave the site in a forward direction unless in specific exceptional circumstances under the supervision of accredited traffic controller(s).	Refer to Section 2.1.
B19	<p>A Driver Code of Conduct must be prepared and communicated by the Applicant to heavy vehicle drivers and must address the following:</p> <ul style="list-style-type: none"> (a) minimise the impacts of earthworks and construction on the local and regional road network; (b) minimise conflicts with other road users; (c) minimise road traffic noise; and (d) ensure truck drivers use specified routes. 	Refer to Appendix C

1.5 Site Related Data

1.5.1 Road Details

The key roads in proximity of the site are summarised in **Figure 2** with reference to the site plan and road hierarchy in **Table 4**.

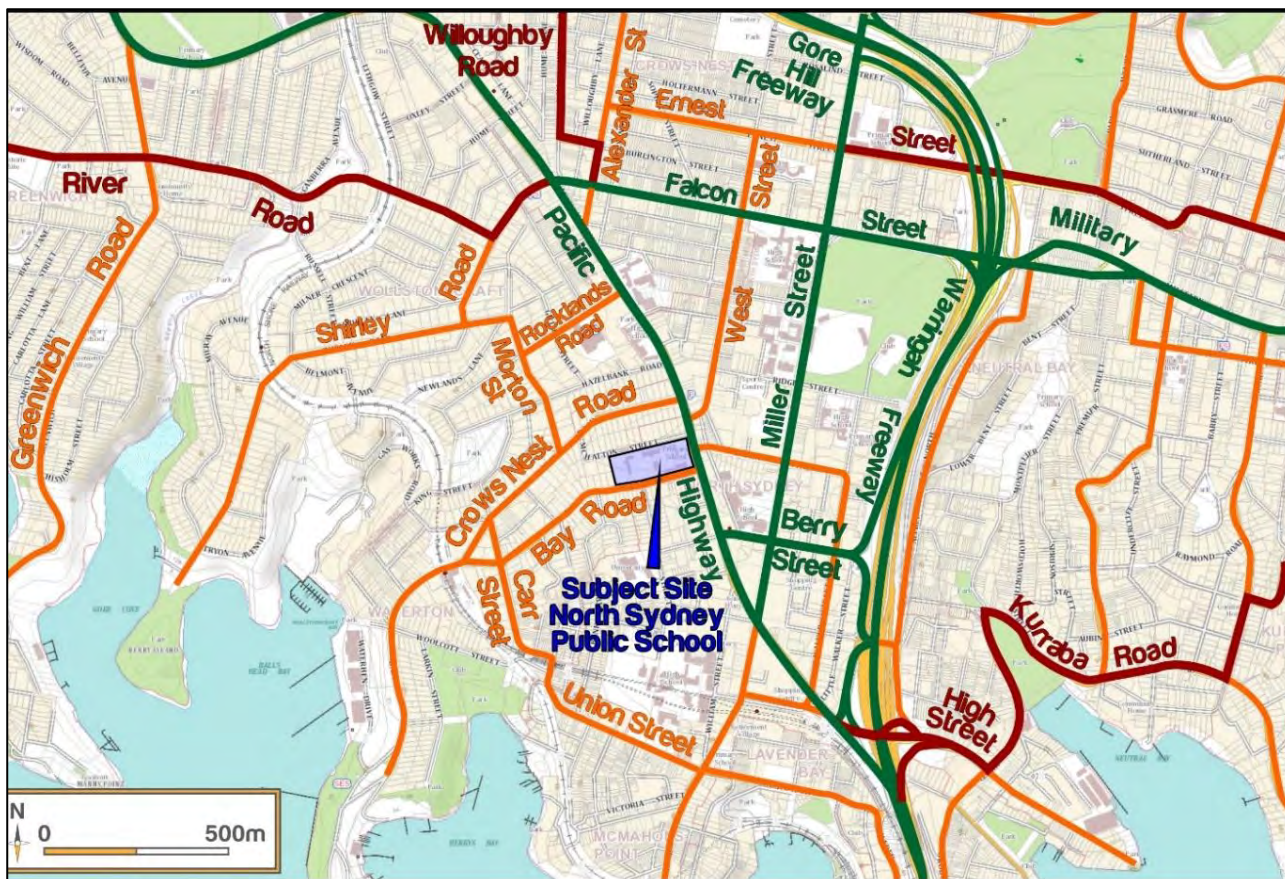


Figure 2: Site Context and Road Hierarchy

TABLE 4: LOCAL ROAD NETWORK

Road Name	Section	Speed Limit	Parking	Traffic Volumes and Peak Times	Urban / Rural
Pacific Highway	Bay Road to McHatton Street	60 km/h	No	~60,000	Urban
Bay Road	Carr Street to Pacific Highway	50 km/h	Yes – subject to parking restrictions	~10,000	Urban
McHatton Street	-	50 km/h	Yes – subject to parking restrictions	< 5,000	Urban
Edward Street	Bay Road to Mount Street	50 km/h	Yes – subject to parking restrictions	< 5,000	Urban

1.5.2 Crash History

A review of the TfNSW Centre for Road Safety database has been undertaken to establish the crash history within the immediate vicinity of the Site. The results are based on crashes over a five-year period between

2014 and 2019. Locations of recorded crashes are shown in **Figure 3** and details summarised in **Table 5**. A review of the crashes indicate that the majority of crashes occurred along the Pacific Highway, with four crashes occurring at the Pacific Highway/ Bay Road signalised intersection and two crashes occurring at the Pacific Highway/ McLaren Street signalised intersection.

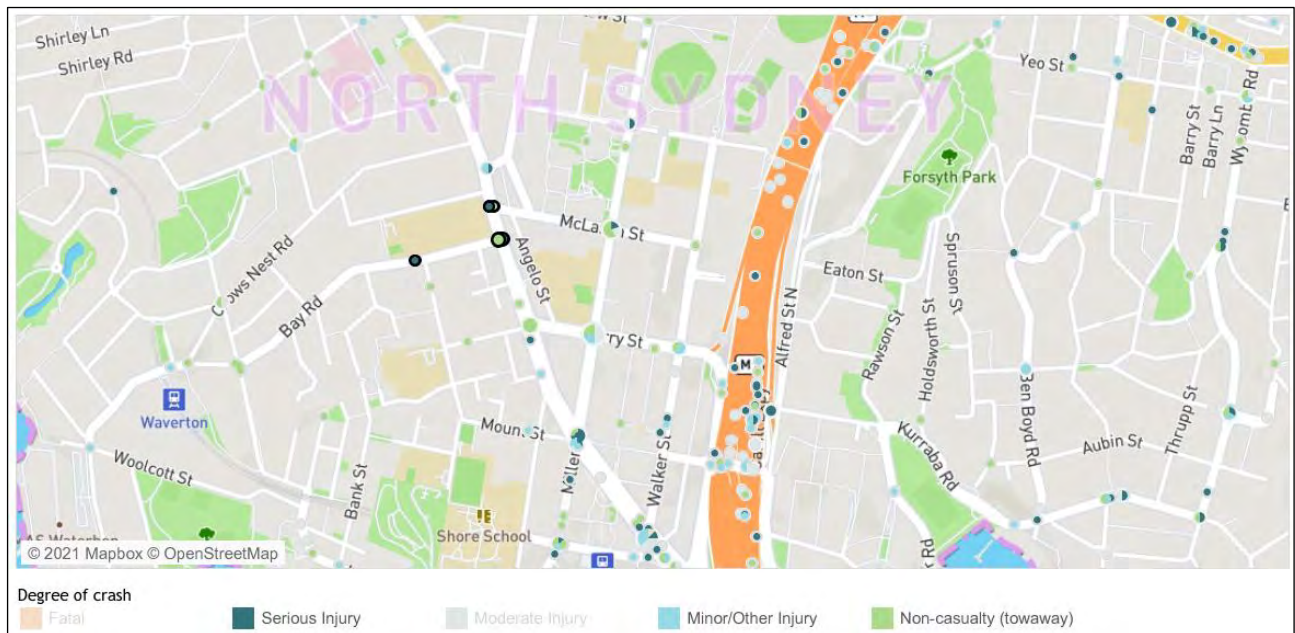


Figure 3: Crash Locations

TABLE 5: CRASH HISTORY

Reporting Year	Lighting	RUM Description	Location	Injury
2015	Daylight	10 – Cross-traffic	Pacific Highway/ McLaren Street	Non-casualty
	Daylight	71 – Off Road Left - object	Pacific Highway/ McLaren Street	1 serious injury
2016	Darkness	10 – Cross Traffic	Pacific Highway/ Bay Road	Non-casualty
2017	Daylight	74 – On-road out of control	Bay Road, west of Edward Street	1 serious injury
	Daylight	0 – Ped nearside	Pacific Highway/ Bay Road	1 serious injury
2018	Daylight	21 – Right through	Pacific Highway/ Bay Road	Non-casualty
	Daylight	0 – Ped nearside	Pacific Highway/ Bay Road	1 serious injury

1.5.3 Vulnerable Road Users

TABLE 6: VULNERABLE ROAD USERS

Road Name	Pedestrian	Cycling	Public Transport
Pacific Highway	Yes	No	Yes / Bus stops
Bay Road	Yes	Yes	Yes / Bus stops
McHatton Street	Yes	No	No
Edward Street	Yes	No	No

1.5.4 Neighbouring Works

The school will remain operational throughout the duration of the construction program, with exception to school holiday period.

Sydney Metro City & Southwest line is currently under construction, with the closest site being the Crows Nest station.

The project team is unaware of any other neighbouring works at the time of preparation of this CPTMP.

1.6 Stakeholder Engagement

1.6.1 Stakeholder Engagement Plan

Taylor will liaise with relevant stakeholders regarding construction schedules and trucks routes and will raise any potential conflict with stakeholder at the earliest time. Stakeholder consultation actions required by Taylor are detailed in **Table 7**

1.6.2 Stakeholder Notification

In the event that any disruptions to roadways / footpath occur as a result of construction works, the procedure outlined below is to be followed:

- If any future disruptions to roadways / footpaths are required, Council / TfNSW is to be notified first and depending on the extent of the disruption the contractor is to notify affected property occupiers using letter drops and Variable Message Sign (VMS)
- If any unforeseen disruptions to roadways / footpaths occur, Council / TfNSW is to be notified first and depending on the extent of the disruption the contractor is to notify affected property occupiers via traffic controllers and Variable Message Sign (VMS)
- In the event that heavy vehicle damage to Council / TfNSW assets / infrastructure, contractors will notify North Sydney Council's Traffic & Transport team and / or Assets Branch.

TABLE 7: STAKEHOLDER CONSULTATION ACTIONS

Stakeholder	Action
TfNSW	Council to submit CPTMP to stakeholder. The project team to liaise with stakeholder through

	Council to address comments and re-submit final CPTMP to Council
North Sydney Council	The project team to submit CPTMP to stakeholder. The project team to liaise with stakeholder to address comments and re-submit final CPTMP
Transport Management Centre (TMC)	Council to submit CPTMP to stakeholder. Taylor to liaise with stakeholder through Council to address comments and re-submit final CPTMP to Council
NSW Police	Council to submit CPTMP to stakeholder. Taylor to liaise with stakeholder through Council to address comments and re-submit final CPTMP to Council
Emergency Services	Taylor to attend fortnightly meetings with TfNSW and Emergency Services if necessary

1.6.3 Stakeholder Consultation

Over the course of the development of this Plan, Ason Group has consulted with key stakeholders including Transport for NSW (TfNSW), North Sydney Council, Sydney Buses, the School Principal and the SINSW. This section provides details of consultation undertaken by the Project Team in its preparation of this CPTMP. Details of the consultation is summarised in the following table and included in **Appendix G**.

- Consultation record with North Sydney Council (See details in **Appendix F**)

TABLE 8: NORTH SYDNEY COUNCIL CONSULTATION RECORD

Identified Party to Consult:	North Sydney Council (NSC)
Consultation type:	E-mail correspondence
When is consultation required?	Prior to submission
Why	Council is the local road authority and is in charge of coordinating activities on the local road networks.
Consultation Record 01	
When was consultation scheduled/held	Tuesday, 30 th November 2021
When was consultation held	Tuesday, 30 th November 2021
Identify persons and positions who were involved	North Sydney Council Iman Mohammadi (NSC) Tarini Pathak (Turner & Townsend) Jeremy Farrington (Department of Education) Alfred Jury (Department of Education)

	<p>Dora Choi (Ason Group)</p> <p>Wendy Zheng (Ason Group)</p>
Provide the details of the consultation	<p>North Sydney Council's comments in relation to the draft CPTMP for North Sydney Public School</p>
What specific matters were discussed?	<p>It is suggested to split the CPTMP into 2 stages (stage 1-2) and (Stage 3-5) as builder has not been appointed and the appointed builder's methodology may be different to what is proposed under the draft CTMP.</p> <p>In addition, Council's approval cannot be issued until the DA is determined with conditions related to the CPTMP.</p> <p>The draft CPTMP has been assessed with general traffic Comments below:</p> <ol style="list-style-type: none"> 1. The provision of an on-site parking area for employees, tradesperson, and construction vehicles as far as possible to avoid reliance on the available on-street parking for employees and tradespersons. 2. The access to the site from Bay Rd requires a Temporary Driveway at the proposed location. It should be also noted that there is a Bus Zone located at this location which may need to be relocated subject to STA's written approval. In addition, the proposed temporary driveway is subject to separate approval from Council's Development Engineer and must accommodate the largest truck size accessing the site. 3. The proposed truck route to the site from Edward Street is not supported as Edward and Mount Street are congested in the morning and especially in the afternoon peak. In addition, turning path of the MRV entering Bay Rd from Edward St, conflicts with westbound traffic. 4. The proposed 85m long WZ is excessive for the use of 8.8 MRVs and will result in unnecessary loss of on-street parking, therefore is not supported by Council. The maximum length supported for the proposed WZ is determined by the turning path of the MRV accessing the WZ. This can be addressed under the 2nd CTMP for works at stages 3-5 5. Any footpath closure required a Permit from North Sydney Council prior to closure of footpath. 6. Occupation/closure of road requires a permit from North Sydney Council. <p>Turning paths:</p> <ol style="list-style-type: none"> 1. MRV turning left onto the site from McHatton Street travels over the existing street sign and bollard at each end of driveway access and possible conflict with parked vehicle/s. In that regard, parked vehicle either side of McHatton Street are required to be as shown on the plan to ensure clearance is achieved. Note, No Parking on the northern side of McHatton St is used for drop off/pick up purposes.

	<ol style="list-style-type: none"> MRV turning right onto McHatton from the site is required to be submitted to ensure clearance with street furniture and parked vehicles MRV turning left onto McHatton St from Pacific Highway, travels over pedestrian Fence and conflicts with eastbound traffic. This is a safety concern and needs to be addressed.
What matters were resolved?	<ul style="list-style-type: none"> CPTMP has been updated and split into 2 stages (stage 1-2) and (stage 3-5) The CPTMP does not propose an on-site parking area for employees, tradesperson, and construction vehicles
What matters are unresolved?	<ul style="list-style-type: none"> New truck route to the Site from Pacific Highway into Crows Nest Road / Harriott Road into Bay Road has been proposed and awaiting Council's approval Maximum work zone length on Bay Road that is acceptable by Council MRV turning paths
Any remaining points of disagreement?	N.A.
How will Taylor address matters not resolved?	Matters unresolved will be discussed in further consultation engagement between stakeholders
Consultation Record 02	
When was consultation scheduled/held	Tuesday, 22 nd February 2022 to Wednesday, 23 rd February 2022
When was consultation held	Tuesday, 22 nd February 2022 to Wednesday, 23 rd February 2022
Identify persons and positions who were involved	<p>Iman Mohammadi (NSC)</p> <p>Wendy Zheng (Ason Group)</p>
Provide the details of the consultation	Consultation with North Sydney Council to discuss the strategies proposed in the Construction Traffic Management Plan (CTMP)
What specific matters were discussed?	<ul style="list-style-type: none"> Would a truck route accessing the site from Pacific Highway into Crows Nest Road / Harriott Road into Bay Road be acceptable to Council What is the maximum work zone length on Bay Road that is supportable by Council
What matters were resolved?	<ul style="list-style-type: none"> Council could support the proposed truck route accessing the site from Pacific Highway into Crows Nest Road / Harriott Road into Bay Road depending on the following factors: <ul style="list-style-type: none"> truck size, turning paths of trucks at critical locations and frequency of trucks on daily basis duration of trucks traveling through development stages.

	<ul style="list-style-type: none"> – It should be noted that all measures should be considered to minimise disruptions to the road networks and inconvenient made to the community. • The maximum work zone length on Bay Road that is supportable by Council is dependent on the size of the largest truck permitted for this development: <ul style="list-style-type: none"> – Additional spaces can be occupied to accommodate the additional plants/trucks by obtaining a Stand Plant Permit from Council – It should be noted that Works Zone shall only be used for loading and unloading of materials from/to the site and shall not be used for parking vehicles/trucks etc • Council has provided STA contact for North Sydney Council for temporary bus stop relocation
What matters are unresolved?	N.A.
Any remaining points of disagreement?	N.A.
How will Taylor address matters not resolved?	N.A.

- Consultation record with TfNSW (See details in **Appendix G**):

TABLE 9: TFNSW CONSULTATION RECORD

Identified Party to Consult:	Transport for NSW (TfNSW)
Consultation type:	E-mail correspondence
When is consultation required?	Prior to submission
Why	TfNSW is the local road authority and is in charge of coordinating activities on the local road networks.
When was consultation scheduled/held	Tuesday, 30 th November 2021
When was consultation held	Tuesday, 30 th November 2021
Identify persons and positions who were involved	TfNSW Tarini Pathak (Turner & Townsend) Jeremy Farrington (Department of Education) Alfred Jury (Department of Education) Iman Mohammadi (NSC)

	<p>Dora Choi (Ason Group)</p> <p>Wendy Zheng (Ason Group)</p>
Provide the details of the consultation	<p>TfNSW response regarding the CPTMP – North Sydney School Upgrades Revision 01</p>
What specific matters were discussed?	<p>Transport for NSW (TfNSW), Greater Sydney Division has reviewed the Construction & Pedestrian Management Plan – North Sydney School Upgrades Revision 01 and endorse the proposed temporary construction arrangements for Stage 1 & 2 only, subject to the following conditions:</p> <ul style="list-style-type: none"> Any Traffic Guidance Schemes (TGS) prepared are to comply with AS1742.3 and Transport for NSW's "Traffic Control at Worksites" manual and be signed by a person with TfNSW certification to prepare a TGS. Proponent must apply and obtain approval from the Transport Management Centre for a Road Occupancy Licence (ROL) for any required lane closures and/or Speed Zone Authorisations as part of the ROL that may impact the state road network or is within 100m of traffic signals. Access to be maintained for residents, businesses and emergency vehicles at all times. No marshalling or queuing of construction vehicles is to occur on public roads. Arriving vehicles that are not able to use parking bay/work zone must continue to a holding point until space becomes available. When heavy vehicles are entering or leaving the site a traffic controller is to be provided to manage any conflicts between pedestrians and heavy vehicles. Vehicles should enter and leave the site in a forward facing direction when safe to do so. Transport for New South Wales reserve the right to alter the CTMP Conditions at any time to maintain safe and efficient traffic and pedestrian movements in this area. Any approved Works Zone should only be used for work activities. No infrastructure, including bins, tanks or traffic control equipment should be left on the road when the works zone is not in use by a vehicle. All non-vehicular items must be contained with the work area and not on the carriageway. Any traffic control devices, including signage and line marking, should be installed by the proponent and must conform with Australian Standards 1742. Queues are not to impact the Pacific Highway at any time. Bus movements along Bay Riad are to be prioritised <p>Endorsement of the CTMP is not an approval to the type of traffic management or delineation devices used, nor is it an approval to any traffic guidance schemes depicted within the CTMP. It is assumed that the proponent has used type approved devices and has developed its traffic guidance schemes in accordance with the relevant Australian Standards and Guidelines.</p> <p>The proponent is to ensure local residents, businesses, schools and other stakeholders in the affected area as well as</p>

	<p>emergency service organisations are notified of the changes associated with the CTMP, prior to its implementation.</p> <p>Please ensure this CTMP is shared and adhered to by all contractors. If the CTMP changes, please forward a copy to Developments.CJP@transport.nsw.gov.au or further review and endorsement.</p>
What matters were resolved?	Split the CTMP into 2 stages (stage 1-2) and (Stage 3-5)
What matters are unresolved?	N.A.
Any remaining points of disagreement?	N.A.
How will Taylor address matters not resolved?	N.A.

- Consultation with bus company – Busways (See details in **Appendix H**):

TABLE 10: BUSABOUT CONSULTATION RECORD

Identified Party to Consult:	Busways
Consultation type:	E-mail correspondence
When is consultation required?	Prior to submission
Why	Busways is the bus company providing service for the bus stop located on Bay Road in front of North Sydney Public School
When was consultation scheduled/held	Thursday, 24 th February 2022 to Friday, 25 th February 2022
When was consultation held	Thursday, 24 th February 2022 to Friday, 25 th February 2022
Identify persons and positions who were involved	<p>Janine Crawford (Busways)</p> <p>Steve Grady (Busways)</p> <p>Wendy Zheng (Ason)</p>
Provide the details of the consultation	Consultation with Busways to discuss the relocation of bus stop (Stop ID 206077) on Bay Road during construction period
What specific matters were discussed?	<ul style="list-style-type: none"> • The preferred location and length for the relocated bus stop

What matters were resolved?	<ul style="list-style-type: none"> Busways agrees to relocate bus zone to the west of the existing marked pedestrian crossing at the frontage of the school on Bay Street. See Figure 4. The Bus Zone requires 20 meters in length to accommodate a 12.5 metre long bus as on the departure side of the proposed bus zone, the No Stopping section located to the east of the proposed Bus Zone can accommodate buses pulling out of the bay
What matters are unresolved?	N.A.
Any remaining points of disagreement?	N.A.
How will Taylor address matters not resolved?	N.A.



Figure 4: Proposed Relocated Bus Zone

2 Proposed Works and Staging

2.1 Overview of Works

It is estimated that the total duration of the construction works will be approximately 11 months from the commencement date.

2.1.1 Stage 1 – Site Establishment

TABLE 11: STAGE 1

Criteria	Response
Description of Key Activities	Installation of temporary demountables Installation of site amenities Installation of fencing and class A hoarding Temporary removal of heritage wall section
Max. Vehicle Size	8.8m Medium Rigid Vehicle
Vehicle Movement Frequency	10 movements / day
Truck Access Requirements	Traffic controllers may be required
Vehicle access / egress in a forward direction (Y / N)	Y
Out of Hours Deliveries (Y/N)	No – refer section 2.2 for construction hours. Deliveries to align with these hours.
Contractor Parking	None provided on site
Pedestrian Control	Wire mesh fencing to provide separation from construction zone. Pedestrian controller present on footpath during operations.
Public Transport Services Affected	Bus route 265 may be affected.
Road Occupancy Requirements (if yes, provide further details)	Yes for hoarding installation – subject to separate ROL application
Lane or Footpath Closures (if yes, provide further details)	Yes – pedestrian management to be implemented at the Bay Road footpath to redirect pedestrians when required.
Traffic Control Plan	see Appendix A for applicable TGS

2.1.2 Stage 2 – Demolition & Excavation

TABLE 12: STAGE 2

Criteria	Response
Description of Key Activities	Protection of Bay Road heritage elements Demolition of Building C and temporary buildings Excavation and levelling of site in preparation of Asbestos management and removal
Max. Vehicle Size	8.8m Medium Rigid Vehicle
Vehicle Movement Frequency	14 movements / day
Truck Access Requirements	Traffic controllers may be required
Vehicle access / egress in a forward direction (Y / N)	Y
Out of Hours Deliveries (Y/N)	No – refer section 2.2 for construction hours. Deliveries to align with these hours.
Contractor Parking	None provided on site
Pedestrian Control	Wire mesh fencing to provide separation from construction zone. Pedestrian controller present on footpath during operations.
Public Transport Services Affected	Bus route 265 may be affected.
Road Occupancy Requirements (if yes, provide further details)	n/a
Lane or Footpath Closures (if yes, provide further details)	Yes – pedestrian management to be implemented at the Bay Road footpath to redirect pedestrians when required.
Traffic Control Plan	see Appendix A for applicable TGS

2.1.3 Stage 3 – Crane Installation (Subject to Confirmation by Taylor)

TABLE 13: STAGE 3

Criteria	Response
Description of Key Activities	Installation of crane
Max. Vehicle Size	19m Articulated Vehicle
Vehicle Movement Frequency	4 movements / day
Truck Access Requirements	Traffic controllers to manage access and egress Road closures and detours as required
Vehicle access / egress in a forward direction (Y / N)	Y
Out of Hours Deliveries (Y/N)	Yes – refer section 2.2 for construction hours. Deliveries to occur after detours and road closures have been set up
Contractor Parking	None provided on site

Pedestrian Control	Wire mesh fencing to provide separation from construction zone. Pedestrian controller present on footpath during operations.
Public Transport Services Affected	Bus route 265 will be affected.
Road Occupancy Requirements (if yes, provide further details)	n/a
Lane or Footpath Closures (if yes, provide further details)	Yes – pedestrian management to be implemented at the Bay Road footpath to redirect pedestrians when required.
Traffic Control Plan	Included as part of the crane installation specific CTMP

2.1.4 Stage 4 – Main Works

TABLE 14: STAGE 4

Criteria	Response
Description of Key Activities	Construction of Buildings I and J.
Max. Vehicle Size	8.8m Medium Rigid Vehicle
Vehicle Movement Frequency	10 movements / day
Truck Access Requirements	Traffic controllers may be required
Vehicle access / egress in a forward direction (Y / N)	Y
Out of Hours Deliveries (Y/N)	No – refer section 2.2 for construction hours. Deliveries to align with these hours.
Contractor Parking	None provided on site
Pedestrian Control	Class A Hoarding and wire mesh fencing to provide separation from construction zone. Pedestrian controller present on footpath during operations.
Public Transport Services Affected	Bus route 265 may be affected.
Road Occupancy Requirements (if yes, provide further details)	n/a
Lane or Footpath Closures (if yes, provide further details)	Yes – pedestrian management to be implemented at the Bay Road footpath to redirect pedestrians when required.
Traffic Control Plan	see Appendix A for applicable TGS

2.1.5 Stage 5 – External Works

TABLE 15: STAGE 5

Criteria	Response
Description of Key Activities	Completion of external hardstand, entry to the south and all soft landscaping.

Max. Vehicle Size	8.8m Medium Rigid Vehicle
Vehicle Movement Frequency	6 movements / day
Truck Access Requirements	Traffic controllers may be required
Vehicle access / egress in a forward direction (Y / N)	Y
Out of Hours Deliveries (Y/N)	No – refer section 2.2 for construction hours. Deliveries to align with these hours.
Contractor Parking	None provided on site
Pedestrian Control	Class A Hoarding and wire mesh fencing to provide separation from construction zone. Pedestrian controller present on footpath during operations.
Public Transport Services Affected	Bus route 265 may be affected.
Road Occupancy Requirements (if yes, provide further details)	n/a
Lane or Footpath Closures (if yes, provide further details)	Yes – pedestrian management to be implemented at the Bay Road footpath to redirect pedestrians when required.
Traffic Control Plan	see Appendix A for applicable TGS

2.2 Construction Traffic Hours

Given sensitivity constraints of the surrounding community, it is proposed that specific construction activities occur outside of school operating hours following consultation with the School. Work hour timings per SSD Condition C4 are provided below.

TABLE 16: HOURS OF WORK

Activity	Day	Time
Construction Work Hours	Monday – Friday Saturday Sunday and Public Holiday	7 am to 6pm 8 am to 1 pm No work is permitted
Construction Traffic Hours (during school holidays)	Monday – Friday Saturday Sunday and Public Holiday	7 am to 6pm 8 am to 1 pm No work is permitted
Construction Traffic Hours (during school term)	Monday – Friday Saturday Sunday and Public Holiday	7 am to 8am, 9.30am to 2.30pm, 4pm to 6 pm 8 am to 1 pm No work is permitted

It is anticipated that construction works will not be conducted outside of the hours outlined above. Should a requirement for work outside of these nominated hours be required, Taylor will consult with the School and North Sydney Council to seek approval for these works.

2.3 Truck Routes

It is proposed that construction vehicles enter and exit the Site via the routes shown in **Figure 5** and **Figure 6**. A copy of the truck route maps shall be provided to all drivers prior to attending the Site.

All construction vehicles are to access the site from Pacific Highway when the work zone is not in use.

When the work zone is not in use, the proposed access into the site is via turning right from McHatton Street or Bay Road after entering from the Pacific Highway. If construction vehicle access into the school is required during the school term vehicle are to enter from Bay Road only.

When the work zone on Bay Road is required, all vehicles are to drive into the work zone via Bay Road from Harriott Street / Crows Nest Road and exit onto the Pacific Highway from Bay Road.

No trucks are to be queued on local roads. Mobile phones, two-way radios or application-based solutions should be used to coordinate truck arrivals.

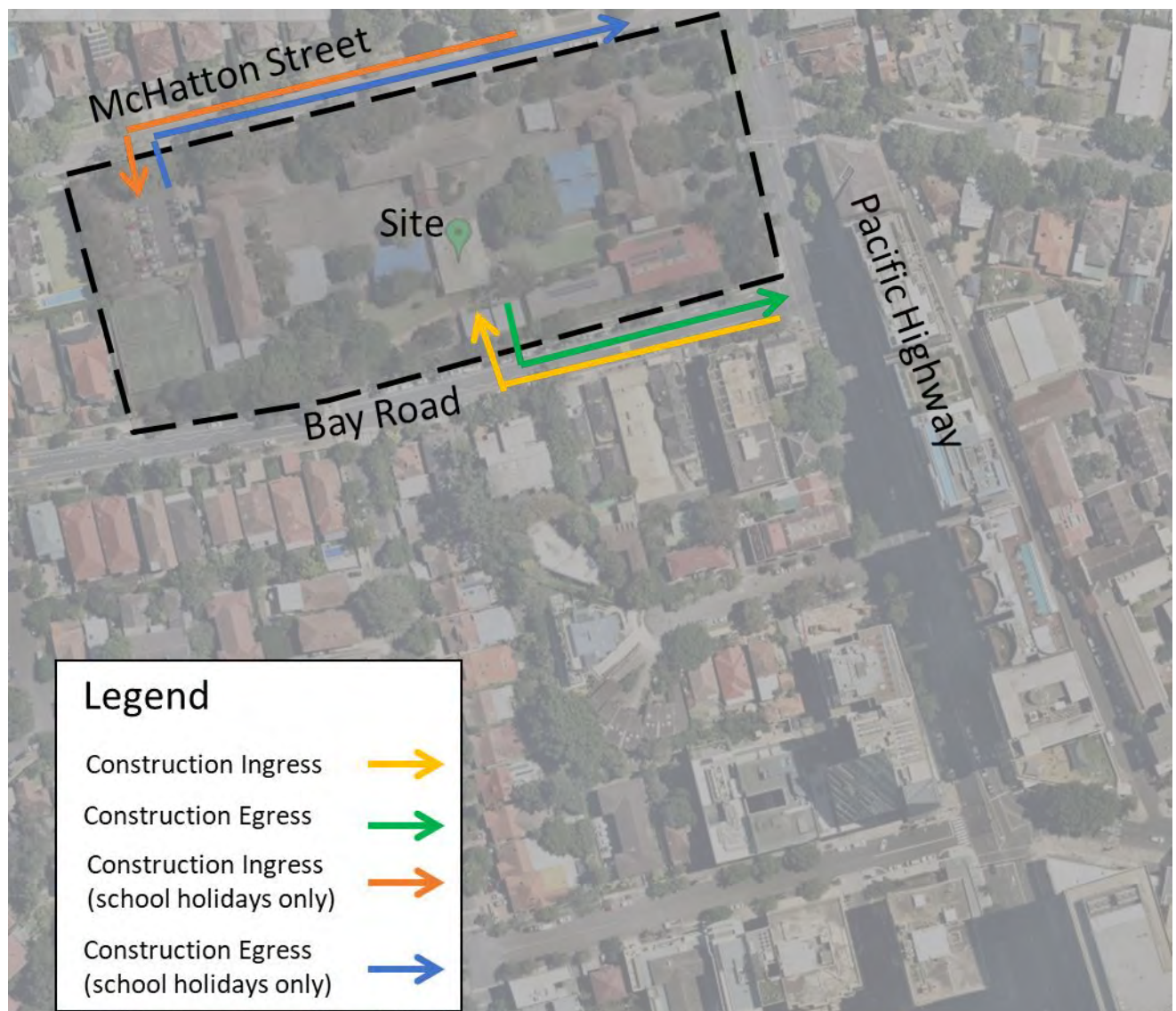


Figure 5: Construction Access – Stages 1 & 2



Figure 6: Stage 3 to 5 Construction Access

Swept path assessments for MRV entering and exiting the site via the surrounding road network are included in **Appendix E**.

2.4 Crane Installation

Crane installation in Stage 3 will be subject to a separate, stage specific CPTMP that will be developed by Taylor, and their tower crane supply contractor.

2.5 Temporary Traffic Management Method

Prior to the Bay Road work zone being in use, stop and hold will be applied on Bay Road and McHatton Street when construction vehicles are entering and exiting the site. Pedestrian controllers will be utilizing retractable barriers to hold pedestrians when required.

Stage 3 temporary traffic management method will be subject to a separate CTMP for the crane installation.

When the work zone is in use, stop and hold will likely be required on Bay Road when construction vehicles are exiting the work zone. Pedestrian controllers will be utilizing retractable barriers to hold pedestrians when required.

2.6 Risk Assessment

Risk assessment is attached in Appendix B.

2.7 Site Contact

The nominated site contacts from Taylor are:

- Michael Ettrick
 - Senior Project Manager;
 - Contact detail: +61 410 466 630
- Tom Udovcic
 - Site Engineer;
 - Contact detail: +61 407 323 363

2.8 Site Access

During Stage 1, initial access to the site will be via staff carpark access on McHatton Street as demonstrated in **Figure 7** and will be restricted to vehicles up to 8.8m Medium Rigid Vehicles (MRV) only. Vehicles will exit the site through the staff carpark and turn right to access the Pacific Highway.



Figure 7: McHatton Street Access Arrangement

Once the temporary removal of heritage wall on Bay Road has been completed, vehicles up to MRV can access the site from Bay Road as shown in Figure 8: Bay Road Access Arrangement.

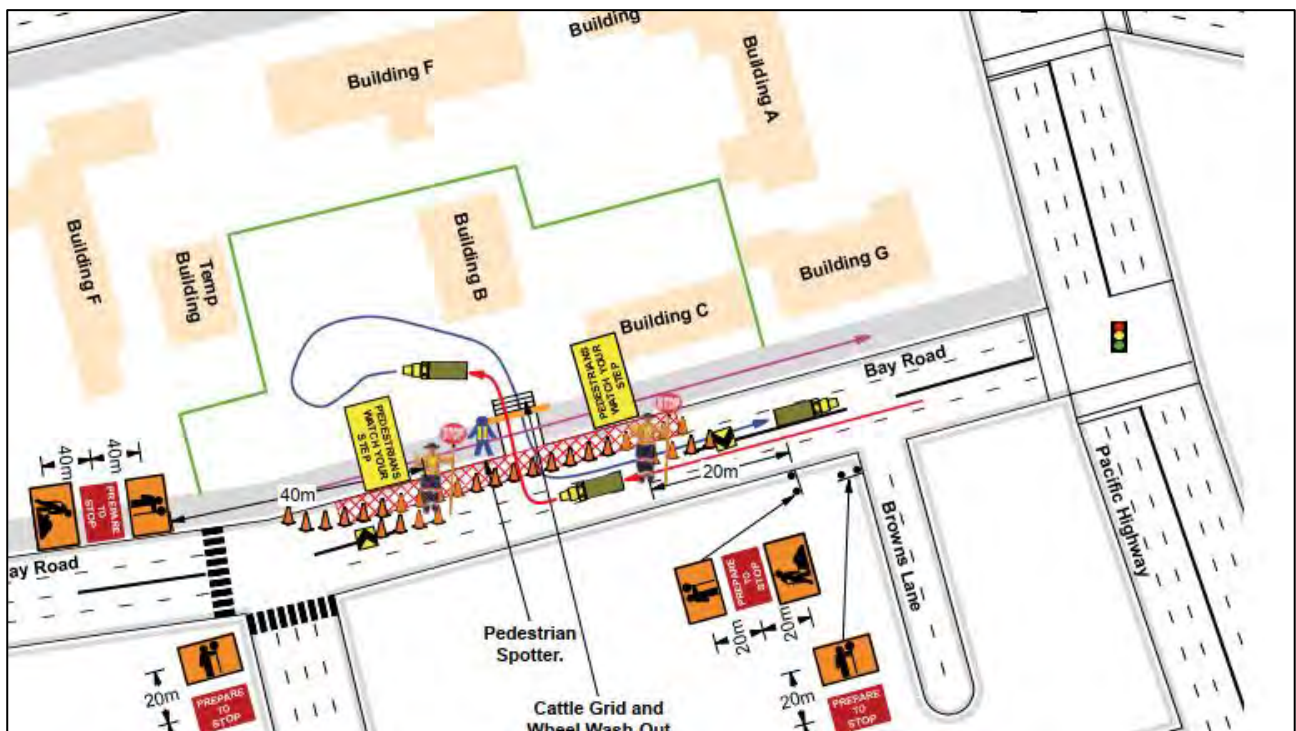


Figure 8: Bay Road Access Arrangement

2.9 Works Zone

A temporary works zone spanning 40m on the Bay Road frontage is proposed to handle material delivery to the Construction Site.

A Work Zone Permit (WZP) from North Sydney Council is required to implement the Work Zone. If excavation and/or road opening works on a public road is required, Taylor will obtain a Road Opening Permit.

Occasionally where large concrete pours and use of concrete pumps and the like are required, the work zone can be extended and occupied to accommodate the additional plants/trucks by obtaining a Stand Plant Permit from Council.

3 Traffic Management

3.1 Vehicle Management

In accordance with TfNSW requirements, all vehicles transporting loose materials will have the entire load covered and/or secured to prevent any large items, excess dust or dirt particles depositing onto the roadway during travel to and from the site. All drivers are to be familiar with the Driver Code of Conduct before attending the Site. A copy of the Code is included in **Appendix C**.

All subcontractors must be inducted by the lead contractor to ensure that the procedures are met for all vehicles entering and exiting the construction site. The lead contractors will monitor the roads leading to and from the site and take all necessary steps to rectify any road deposits caused by site vehicles.

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

At no stage shall un-planned queueing occur on the public road network. It is expected that a schedule for deliveries of materials and goods will be established prior to that day, with Traffic Controllers maintain radio contact with construction vehicles at all times. This schedule shall be prepared by utilising construction traffic management software (such as Mooven or other similar products).

3.2 Construction Worker Parking

No construction worker parking will be provided on site. The site is very accessible via public transport and public on-street parking availability is limited.

To encourage the use of public transport, an on-site secure tool storage facility would be provided by the project team to allow construction workers to drop off and securely store their tools and equipment for the project within the Site.

A Construction Worker Transportation Strategy has been prepared with the objective to minimise demand for parking in nearby public and residential streets or public parking facilities. This Strategy is included in **Appendix D**.

3.3 Pedestrian and Cyclist Management

During construction, pedestrian movements will be maintained along the Bay Road and McHatton Street frontages of the site. Before the installation of any hoarding, it is expected that site fencing is required in locations adjacent to works area that involve the partial opening of the existing heritage fence. The site fencing will be located as close as possible to the property boundary, maintaining maximum footpath width along the Bay Road frontage of the site to minimise impact on pedestrian amenity.

Traffic controller(s) will be present at the site accesses to manage pedestrian and vehicular traffic to ensure public safety while construction vehicles enter and exit the site. Pedestrians will not be directed to use the other footpath by use of signage alone. Also, traffic controls would need to be in accordance with AS1742.3 and TfNSW 'Traffic Control at Worksites' manual at all times.

Should any unforeseen activities require the temporary closure of any pedestrian access, a TGS should be developed and implemented by the contractor to ensure a safe alternative for pedestrians traversing these routes in the vicinity of the site.

3.4 Fencing Requirements

Class A hoarding and wire mesh site boundary fencing will be utilised along the entire boundary of the site and will be maintained for the duration of the construction program. The fencing is to ensure unauthorised persons are kept out of the Site and hoarding to ensure pedestrian access along Bay Road.

Site access gates would be provided along the McHatton Street and Bay Road frontages depending on stage and will be closed at all times outside of the permitted construction hours.

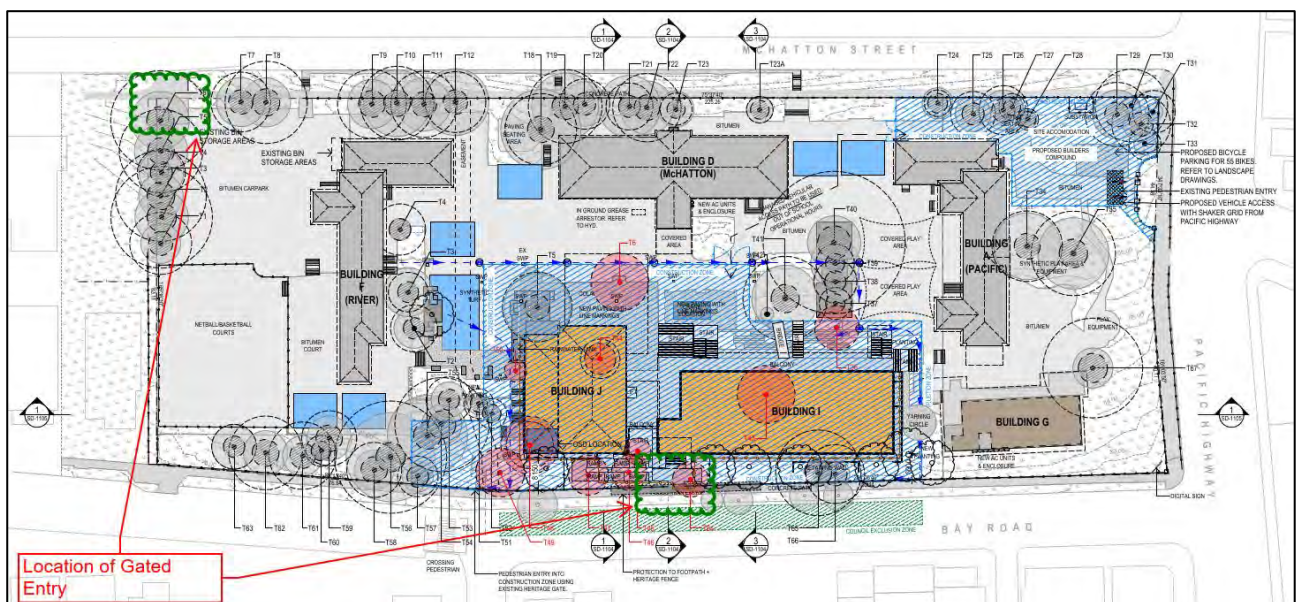


Figure 9: Fencing and site access gates location

3.5 Traffic Control

Site-specific TGS's shall be developed and submitted to Council for approval, as required, to reflect specific work activities and/or changes to road conditions. See **Appendix A**.

3.6 Authorised Traffic Controller

There is a requirement for an authorised traffic controllers to be present throughout all stages of the project. The responsibilities include:

- Implementation of the Traffic Control Plan.

- Pedestrian and cyclist management, to ensure that adverse conflicts between vehicle movements and pedestrians do not occur.
- Supervision of all vehicle movements across pedestrian footpaths at all times, and
- Supervision of all loading and unloading of construction materials during the deliveries in the construction phase of the project.

Refer to **Appendix A** for the Traffic Guidance Scheme for details of the proposed work zone, location of traffic controllers and associated traffic management measures.

3.7 Driver Code of Conduct

All drivers shall adhere to the Driver Code of Conduct, outlined in **Appendix C**.

3.8 Worker Induction

All workers and subcontractors engaged on-site would be required to complete a site induction. The induction should include permitted access routes to and from the construction site for all vehicles, as well as standard environmental, work, health and safety (WHS), driver protocols and emergency procedures.

Any workers required to undertake works or traffic control within the public domain would be suitably trained and covered by adequate and appropriate insurances.

4 Monitoring and Review

4.1 Monitoring Program

This CPTMP shall be subject to ongoing review and will be updated accordingly. Regular reviews will be undertaken by the on-site coordinator. Review of the CPTMP shall occur daily. All and any reviews undertaken should be documented, however key considerations regarding the review of the CPTMP shall be:

- Tracking deliveries against the volumes outlined within report. Deliveries will be tracked against approved volumes and will keep a vehicle log - including Rego & time of entry - for the purpose of assessing the effectiveness of these monitoring programs.
- To identify any shortfalls and develop an updated action plan to address issues that may arise during construction (Parking and access issues)
- To ensure TGS's are updated (if necessary) by "Prepare a Work Zone Traffic Management Plan" card holders to ensure they remain consistent with the set-up on-site.
- Regular checks to ensure all loads are entering and leaving site covered as outlined within this CPTMP.
- A Dilapidation report shall be undertaken every periodically to assess the condition of the road and note whether there has been any reduction in quality of the road as result of construction vehicles.

The development of a program to monitor the effectiveness of this CPTMP shall be established by the Contractor. This process is expected to form part of the monitoring plan required to be included as part of the overarching Construction Environmental Management Plan (CEMP), of which this CPTMP forms a part.

The roadway (including footpath) must be kept in a serviceable condition for the duration of construction. At the direction of Council, undertake remedial treatments such as patching at no cost to Council.

4.2 Work Site Inspections, Recording and Reporting

Recording and reporting of the monitoring programs shall be done in accordance with Section E.3, E.4 and E.5 of the TCAWs Manual. As such, the structure, schedule and frequency of these activities have been considered and identified.

To inspect, review and audit the temporary traffic management (TTM) arrangements implemented on site, the following actions are to be undertaken by suitably qualified personnel in accordance with TCAWS 6.1 requirements during all phases of construction, being:

TABLE 17: EXAMPLE REVIEW OF ACTIVITIES

Activity			Frequency or Details
Shift Inspections	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Weekly Inspections	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
TMP Review	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Road Safety Audit	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Comments			

Given that the length of construction and that no regular works have been proposed outside of the site, monthly TTM inspections is considered to be sufficient.

4.3 Contingency Plan

A contingency plan shall be established by the Contractor and is to be included in the overarching CEMP. Notwithstanding, **Table 18** outlines an indicative plan to be undertaken by Taylor in the event that the monitoring program identifies the management plan is not effective in managing the construction impacts.

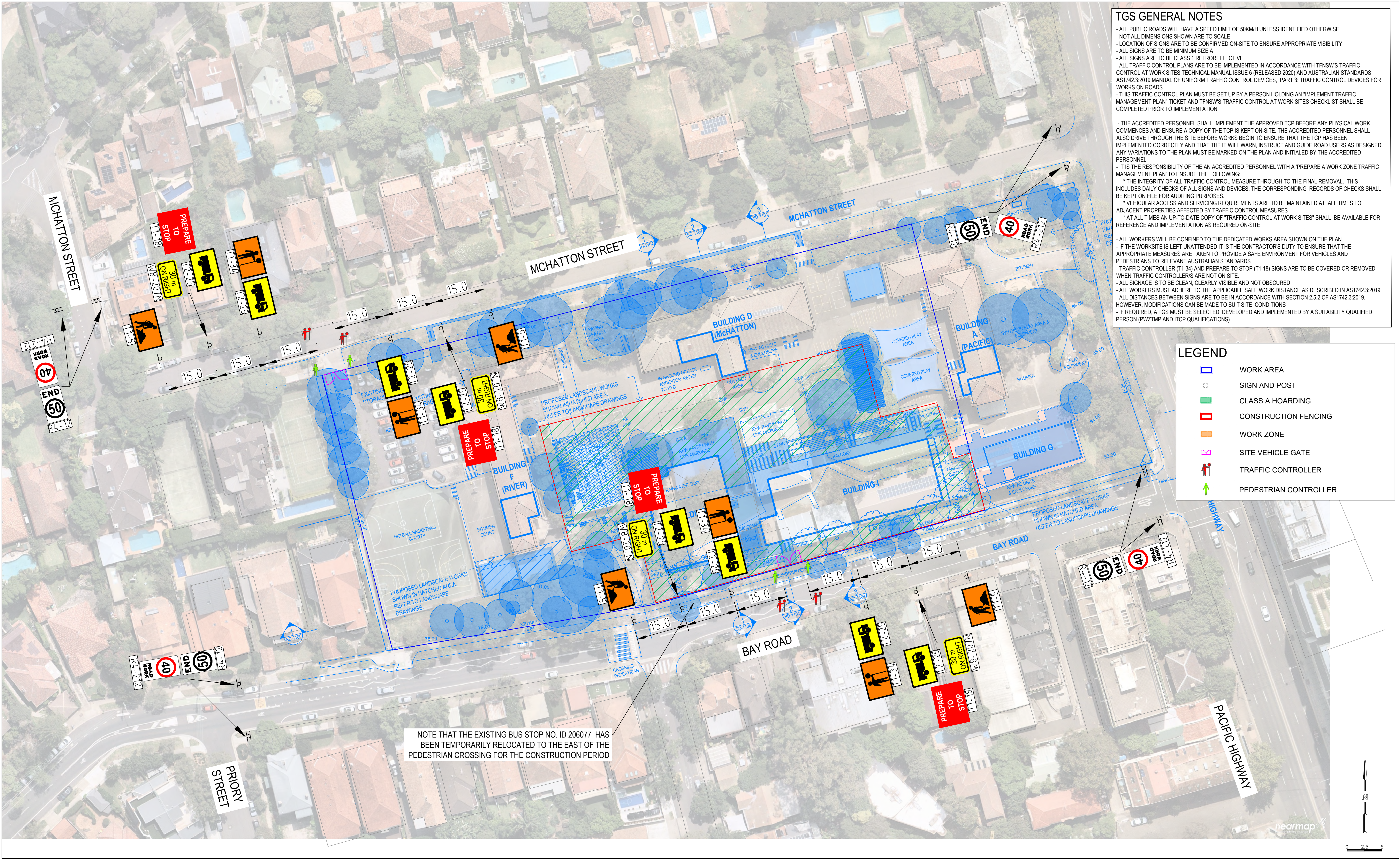
TABLE 18: CONTINGENCY PLAN

Risk		Condition Green	Condition Amber	Condition Red
Construction Movements	Trigger	Construction traffic volume is in accordance with permissible and programmed volume and time constraints	Construction traffic volumes exceeds programmed volume but is within permissible volume constraints	Construction traffic volumes exceeds permissible volume and time constraints
	Response	No response required	Review and investigate construction activities, and where appropriate, implement additional remediation measures such as: <ul style="list-style-type: none"> Review CPTMP and update where necessary Provide additional training. 	As with Condition Amber, plus; <ul style="list-style-type: none"> If it is concluded that construction activities were directly responsible for the exceedance, submit an incident report to government agencies. Stop all transportation into and out of the site.
	Trigger	No construction vehicle movement during peak periods	Construction vehicle movement close to peak periods	Construction vehicle movement during peak periods
	Response	No response required Continue monitoring program	Review and investigate construction activities, and where appropriate, implement additional remediation measures such as: <ul style="list-style-type: none"> Provide additional training (including toolbox talks and further notification of Driver Code of Conduct) 	As with Condition Amber, plus; <ul style="list-style-type: none"> If it is concluded that construction activities were directly responsible for the exceedance, submit an incident report to government agencies. Stop all transportation into and out of the site. Review CPTMP and update where necessary.
Queuing	Trigger	No queuing identified	Queuing identified within site	Queuing identified on the public road

	Response	No response required Continue monitoring program	Review the delivery schedule prepared by the builder. If drivers are not following the correct schedule, then they should be provided with additional training and an extra copy of the Driver Code of Conduct	As with Condition Amber, plus <ul style="list-style-type: none"> Review and investigate construction activities. If it is concluded that construction activities were directly responsible for the exceedance, submit an incident report to government agencies. Temporary halting of activities and resuming when conditions have improved. Stop all transportation into and out of the site. Review CPTMP and update where necessary, provide additional training.
Noise	Trigger	Noise levels do not exceed imposed noise constraints	Noise levels in minor excess of imposed noise constraints	Noise levels greatly in excess of imposed noise constraints
	Response	No response required	Undertake all feasible and reasonable mitigation and management measures to minimise noise impacts.	As with Condition Amber If noise levels cannot be kept below applicable limits, then a different construction method or equipment must be utilised.
Traffic Guidance Scheme	Trigger	No observable issues	Minor inconsistencies with TGS to onsite operations	Near miss or incident occurring regardless of / as a result of the TGS being implemented
	Response	No response required	Traffic Controller to amend TGS on site and to keep a log of all changes	Stop work until an investigation has been undertaken into the incident. There are to be changes made to the TGS to ensure that the safety of all workers, students and civilians are catered for.
Dust	Trigger	No observable dust	Minor quantities of dust in the air and tracking on to the road	Large quantities of dust in the air and tracking on to the road
	Response	No response required	Review and investigate construction activities and respective control measures, where	As with Condition Amber. <ul style="list-style-type: none"> If it is concluded that construction

			<p>appropriate. Implement additional remedial measures, such as:</p> <ul style="list-style-type: none"> • Deployment of additional water sprays • Relocation or modification of dust-generating sources • Check condition of vibrating grids to ensure they are functioning correctly. • Temporary halting of activities and resuming when conditions have improved 	<p>activities were directly responsible for the exceedance, submit an incident report to government agencies.</p> <ul style="list-style-type: none"> • Implement relevant responses and undertake immediate review to avoid such occurrence in future.
--	--	--	---	---

Appendix A. Traffic Guidance Scheme



AMENDMENTS			
02	14.03.22	TGS	WZ MK WZ
01	11.03.22	TGS	WZ MK XX
REV	DATE	DESCRIPTION	DRW CHK APP

GENERAL NOTES

This drawing is provided for information purposes only and should not be used for construction.

Base Plan prepared by Fulton Trotter, received 17.09.2021.

Bay Road has a posted speed limit of 50km/hr.

Swept path assessments completed at 10 km/h and 300mm clearance.

DESIGNED	PAPER SIZE
Wendy Zheng	A1
CHECKED BY	DATE
M. KONG	11.03.2022
APPROVED BY	SCALE
W. ZHENG	1:500_1

CLIENT
TAYLORS
PROJECT
1903
NORTH SYDNEY PUBLIC SCHOOL

DOCUMENT INFORMATION
TRAFFIC GUIDANCE SCHEME
DURING SCHOOL HOLIDAYS
DRAWING STATUS
FOR CONSTRUCTION

asongroup	
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FILE NAME	SHEET
AG1903-02-v02.dwg	AG01

Appendix B. Risk Assessment

Upgrade to North Sydney Public School

Risk Assessment

Project Number	1903		
Project Name	Upgrade to North Sydney Public School		
Site Location	182 Pacific Highway, North Sydney (Lot 1 in DP 184591 and Lot 1 in DP 184559)		
Date of Assessment	11 th March 2022		
Revision	Issue A		
Name	Company	Title	
W. Zheng	Ason Group	Senior Traffic Engineer	
Document Control			
Date Issued	Revision	Issued By	Checked By
11/03/2022	Draft	S. Kong	W. Zheng

Risk Matrix		Consequence				
		Minor	Major	Severe	Critical	Catastrophic
		A	B	C	D	E
Very Unlikely	1	Low	Low	Medium	Medium	Medium
Unlikely	2	Low	Low	Medium	Medium	High
Possible	3	Low	Medium	High	High	High
Likely	4	Medium	Medium	High	High	Extreme
Almost Certain	5	Medium	High	High	Extreme	Extreme

Description	
A - Minor	Could result in injury or illness not resulting in a lost workday or minimal environmental damage not required to be notified under jurisdiction requirements.
B - Major	Could result in injury or illness resulting in one or more lost workday(s) or environmental damage can be mitigated and is not required to be notified under jurisdiction
C - Severe	requirements where restoration activities can be accomplished.
D - Critical	Could result in permanent partial disability, injuries or illness that may result in
E - Catastrophic	hospitalisation of persons or environmental damage can be mitigated and is required to be notified under jurisdiction requirements.

Likelihood Descriptor	Design Likelihood
1 - Very unlikely	Industry experience suggests design failure is very unlikely. It can be assumed failure
2 - Unlikely	Industry experience suggests design failure is unlikely to occur in the life of design.
3 - Possible	Industry experience suggests design failure is possible sometime during the life of the
4 - Likely	Industry experience suggests design failure is likely to occur during the life of the product.
5 - Almost certain	Industry experience suggests design failure is almost certain to occur during the life of the

Risk Assessment

ID. Ref	Risk and/ or Hazard	Risk Description	Location	Existing Control	Initial Risk Rating			Design Response to risk and /or hazard	Status of Risk	Assignment of risk or hazard	Residual risk rating		
					C	L	RR				C	L	RR
1	Unauthorized Access to the Site	Site prevents unauthorised access	Entire Site	Nil	C	3	High	Boundary fence will be provided as part of the works. The design provides a defined separation between public areas and work area.	Design Solution	Main Contractor	B	2	Low
2	Interaction between pedestrians and vehicles	Vehicles and pedestrians to be separates as best possible	Entire Site & Access Roads	Nil	D	3	High	Footpath and pedestrian crossings will be retained. Pedestrian controllers to be provided at all site accesses. Reduction of posted speed limit to 40kmph along the school's frontage roads. Truck drivers will be inducted to drive safely and at posted speed limit at all times.	Design Solution	Main Contractor	B	2	Low
3	Potential vehicle conflict points	Vehicles can crash with each other while manoeuvring within the site	Entire Site & Access Roads	Nil	B	3	Medium	Truck visitation will be programmed in a way that only one vehicle will arrive or depart at any one time. In addition, truck drivers will be inducted to	Design Solution	Main Contractor	B	1	Low

ID. Ref	Risk and/ or Hazard	Risk Description	Location	Existing Control	Initial Risk Rating			Design Response to risk and /or hazard	Status of Risk	Assignment of risk or hazard	Residual risk rating		
					C	L	RR				C	L	RR
								drive safely and no more than 10kmph within the site at all times.					
4	Fatigue	Injury caused by fatigue	Entire Site	Nil	C	3	High	Toolbox meetings and regular breaks (in line with WHS practices) to minimise fatigue	Design Solution	Main Contractor	B	1	Low
5	Fall risks	Injury due to falls (in general)	Entire Site	Nil	E	3	High	Ensuring level changes across the site to be minimised as best possible, with additional black & yellow hazard tape/markings being installed where appropriate. Installation of handrails where level changes / ramps grades are significant.	Design Solution	Main Contractor	C	2	Medium
6	Misdirected access into neighbouring site	Vehicle in unsafe locations	Entire Site	Nil	C	3	High	Ensuring appropriate directional signage has been provided to ensure vehicles do not access the wrong construction site, which could create potential safety breaches and hazards	Design Solution	Main Contractor	B	2	Low

ID. Ref	Risk and/ or Hazard	Risk Description	Location	Existing Control	Initial Risk Rating			Design Response to risk and /or hazard	Status of Risk	Assignment of risk or hazard	Residual risk rating		
					C	L	RR				C	L	RR
								for all parties. In addition, all drivers will undertake an induction of the site layout prior to arriving to the site.					
7	Conflicting Traffic Management	Coordinating Traffic Controllers could create misleading and wrong advice	Entire Site	Nil	C	3	High	Toolbox meetings, regular liaison with all construction teams and review of signage plans on site in order to minimise contradicting signage.	Design Solution	Main Contractor	C	2	Medium

Appendix C. Driver Code of Conduct

Drivers Code of Conduct

Safe Driving Policy for North Sydney Demonstration School, Bay Road, North Sydney.

Objectives of the Drivers Code of conduct

- To minimise the impact of earthworks on the local and regional road network;
- To minimise conflict with other road users;
- To minimise road traffic noise; and
- To ensure truck drivers use specified heavy vehicles routes between the Site and the sub-regional road network.

Code of Conduct

All vehicle operators accessing the site must:

- Take reasonable care for his or her own personal health and safety;
- Not adversely, by way of actions or otherwise, impact on the health and safety of other persons;
- Notify their employer if they are not fit for duty prior to commencing their shift;
- Obey all applicable road rules and laws at all times;
- In the event an emergency vehicle behind your vehicle, pull over and allow the emergency vehicle to pass immediately;
- Obey the applicable driving hours in accordance with legislation and take all reasonable steps to manage their fatigue and not drive with high levels of drowsiness;
- Obey all on-site signposted speed limits and comply with directions of traffic control supervisors in relation to movements in and around temporary or fixed work areas;
- Ensure all loads are safely contained / restrained, as necessary;
- Drive over devices – located at the site's access – to vibrate off and wash off any loose material attached to heavy vehicles;
- Operate their vehicles in a safe and professional manner, with consideration for all other road users;
- Hold a current Australian State or Territory issued driver's licence;
- Notify their employer or operator immediately should the status or conditions of their driver's license change in any way;
- Comply with other applicable workplace policies, including a zero tolerance of driving while under the influence of alcohol and/or illicit drugs;
- Not use mobile phones when driving a vehicle or operating equipment. If the use of a mobile device is required, the driver shall pull over in a safe and legal location prior to the use of any mobile device;
- Advise management of any situations of which you know, or think, may present a threat to workplace health and safety;
- Drive according to prevailing conditions (such as during inclement weather) and reduce speed, if necessary; and
- Have necessary identification documentation at hand and ready to present to security staff on entry and departure from the Site, as necessary, to avoid unnecessary delays to other vehicles.

Crash or incident Procedure

- Stop your vehicle as close to it as possible to the scene, making sure you are not hindering traffic. Ensure your own safety first, then help any injured people and seek assistance immediately if required.
- Ensure the following information is noted:
 - Details of the other vehicles and registration numbers;
 - Names and addresses of the other vehicle drivers;
 - Names and addresses of witnesses; and
 - Insurers details.
- Give the following information to the involved parties:
 - Name;
 - Address; and
 - Company details
- If the damaged vehicle is not occupied, provide a note with your contact details for the owner to contact the company.
- Ensure that the police are contacted should the following circumstances occur:
 - If there is a disagreement over the cause of the crash;
 - If there are injuries; and / or
 - If you damage property other than your own.
- As soon as reasonably practical, report all incident details to your manager.

Appendix D. Construction Worker Transportation Strategy

Upgrade to North Sydney Public School (SSDA - 11869481)

Construction Worker Transport Strategy

North Sydney

11/03/2022

Ref: P1903r03



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Document Control

Project No	P1903
Project	Upgrade to North Sydney Public School
Client	Taylor Construction
File Reference	P1903r03 Construction Worker Transport Strategy_Upgrade to North Sydney Public School

Revision History

Revision No.	Date	Details	Author	Approved by
	11/03/2022	Draft	A. Ji	

This document has been prepared for the sole use of the Client and for a specific purpose, as expressly stated in the document. Ason Group does not accept any responsibility for any use of or reliance on the contents on this report by any third party. This document has been prepared based on the Client's description of its requirements, information provided by the Client and other third parties.

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1 Introduction

1.1 Overview

Ason Group has been engaged by Taylor Construction (Taylor) to prepare a Construction Worker Transportation Strategy (CWTS) for the demolition and construction works at North Sydney Public School at 182 Pacific Highway, North Sydney (the Site).

This CWTS details the measures and strategies to be undertaken during construction to minimise the effects of construction worker parking demand on the community.

This report is to be read in conjunction with the Construction Traffic and Pedestrian Management Sub-Plan.

1.2 Purpose

The purpose of this document is to address the relevant conditions of State Significant Development SSD-11869481. The relevant Condition of Consent (B21) is reproduced below:

Prior to the commencement of construction, the Applicant must submit a Construction Worker Transportation Strategy to the Certifier. The Strategy must detail the provision of sufficient parking facilities or other travel arrangements for construction workers in order to minimise demand for parking in nearby public and residential streets or public parking facilities. A copy of the strategy must be provided to the Planning Secretary for information.

1.3 Scope and Application of Strategy

It is the intent of this Strategy to outline the management of construction worker transportation to and from the Site. In particular, the Strategy has been prepared to manage construction worker car parking to minimise demand for parking in nearby public and residential streets during the construction of the school.

Recognising the need for these procedures to adapt to changing circumstances in order to achieve the desired management of construction worker travel, the Strategy may be varied from time to time to account for the changing circumstances. Those circumstances include changes to the site, altered traffic conditions and / or off-site operational imperatives during construction.

Any changes to the Strategy shall be communicated to all construction workers, impacted community members and stakeholders.

Taylor will be responsible for the review and update of this Strategy when required which will be reviewed per stage of the project.

2 Site Details

2.1 Site & Location

The Site, Lot 1 in DP 184591 and Lot 1 in DP 184559, is located at 182 Pacific Highway, North Sydney NSW 2060. The site is bounded by the Pacific Highway to the east, McHatton Street to the north, low-density residential developments to the west and Bay Road to the south. The Site is rectangular in shape and has an approximate area of 1.93 hectares.

The site is currently occupied by the North Sydney Public School, located adjacent to the North Sydney CBD and within proximity to a number of educational establishments including the North Sydney campus of the Australian Catholic University, Shore Preparatory and Senior Schools, Monte Sant' Angelo Mercy College and Cammeraygal High School.

The Site shown relative to the surrounding development context is provided in **Figure 1**.

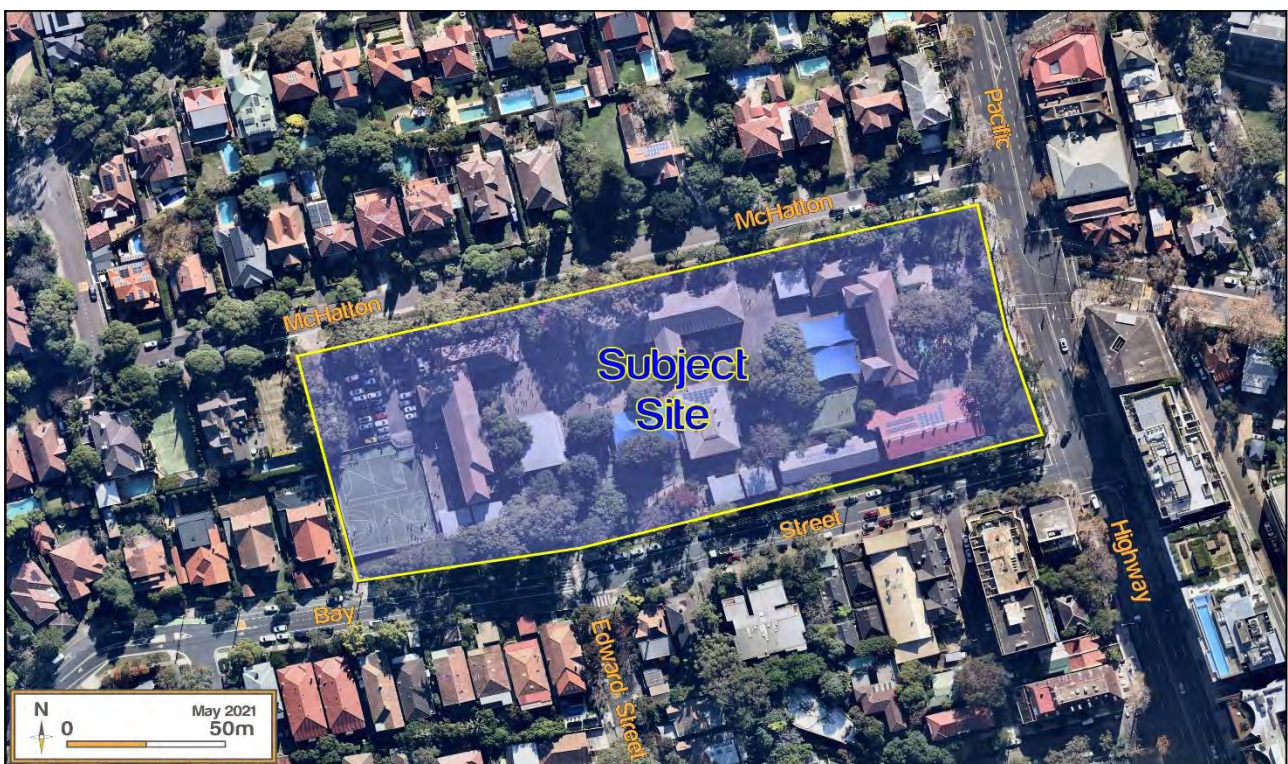


Figure 1: Site Location

2.2 Surrounding Road Network

The key roads in the proximity of the Site are summarised in **Table 1** with reference to the Site plan and road hierarchy in **Figure 2**.

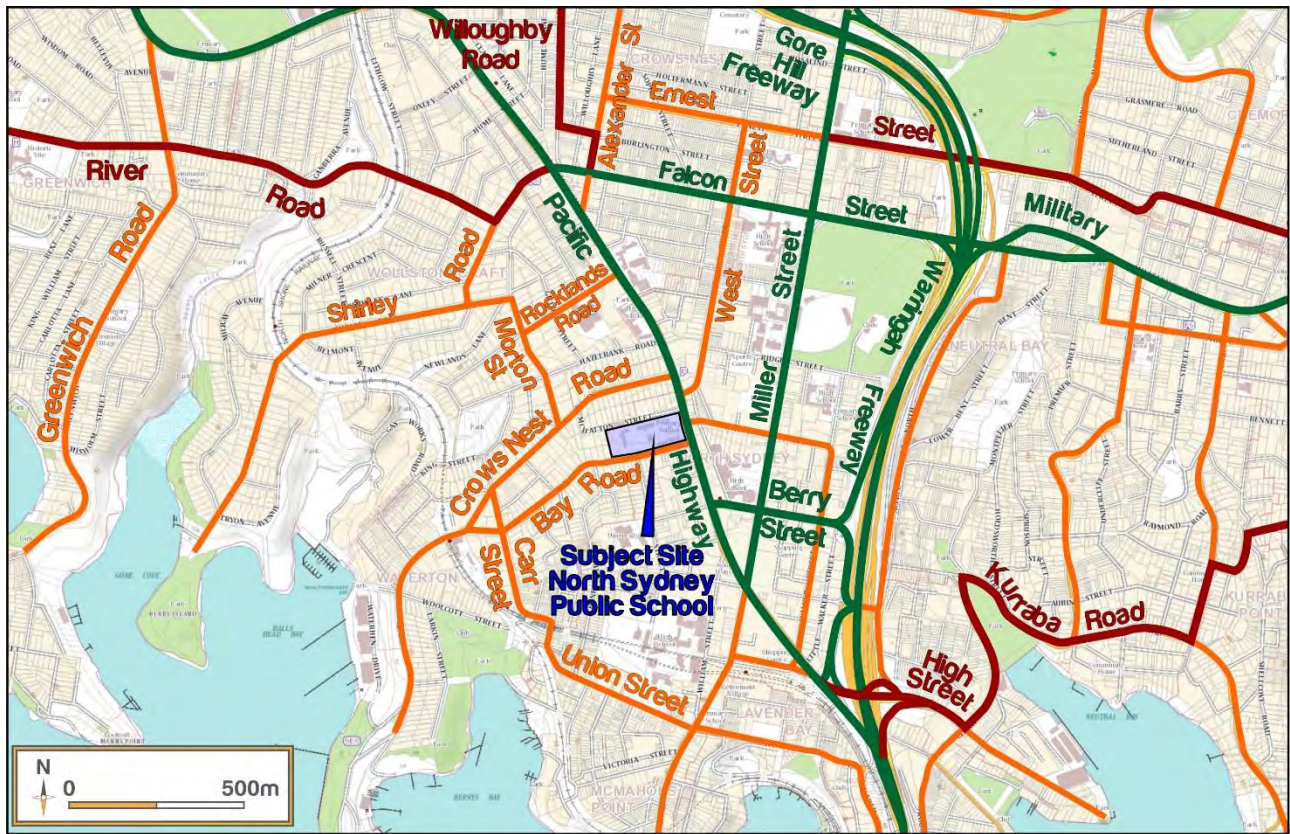


Figure 2: Road Hierarchy

TABLE 1: LOCAL ROAD NETWORK

Road Name	Road Classification	AADT (vpd)	Speed Limit	Parking
Pacific Highway	State Road	~60,000	60 km/hr	No
Bay Road	Local Road	~10,000	50 km/hr	Yes – subject to parking restrictions
McHatton Street	Local Road	< 5,000	50 km/hr	Yes – subject to parking restrictions
Edward Street	Local Road	< 5,000	50 km/hr	Yes – subject to parking restrictions

2.3 Existing Public Transport

2.3.1 Train Connectivity

The Site is situated in the proximity of two existing train stations, being Waverton Station (approximately 650m) and North Sydney Station (~950m), with Waverton Station being the preferred option relating to walking distance.

Key serviceability details are provided in **Table 2**, with reference to **Figure 3** below.

TABLE 2: EXISTING TRAIN SERVICES

Line	Name	Frequency
T1	North Shore & Western Line	Moderate Frequency (5-10 services per hour)
T9	Northern Line	Low Frequency (2-4 services per hour)
CCN	Central Coast & Newcastle Line	Low Frequency (1-2 services per hour)

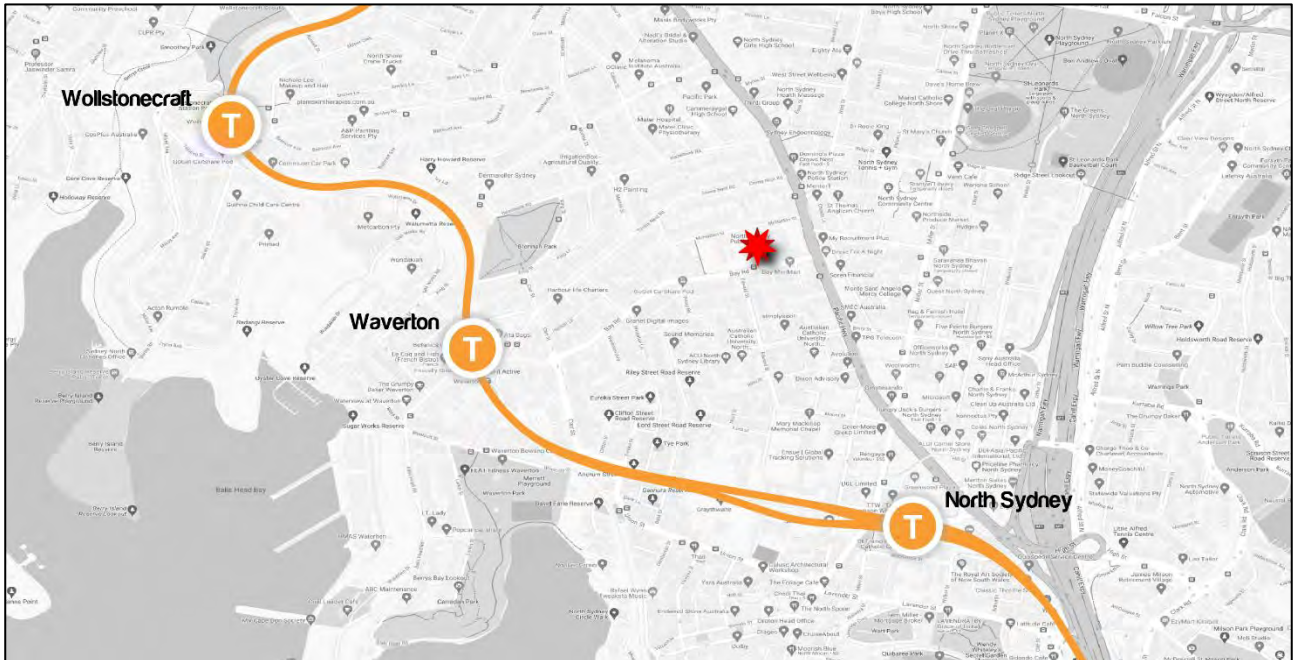


Figure 3: Train Stations

2.3.2 Public Bus Services

With reference to existing public bus service connectivity for the area, immediate to the Site is a bus stop along Bay Road which services the school and provides access for a single route during the AM Peak. Route details for the 265 are provided below in **Table 3** and **Figure 4**.

TABLE 3: EXISTING PUBLIC BUS CONNECTIVITY

Route	Description	Service Frequency
265	Lane Cove to North Sydney via Greenwich	2 services per hour

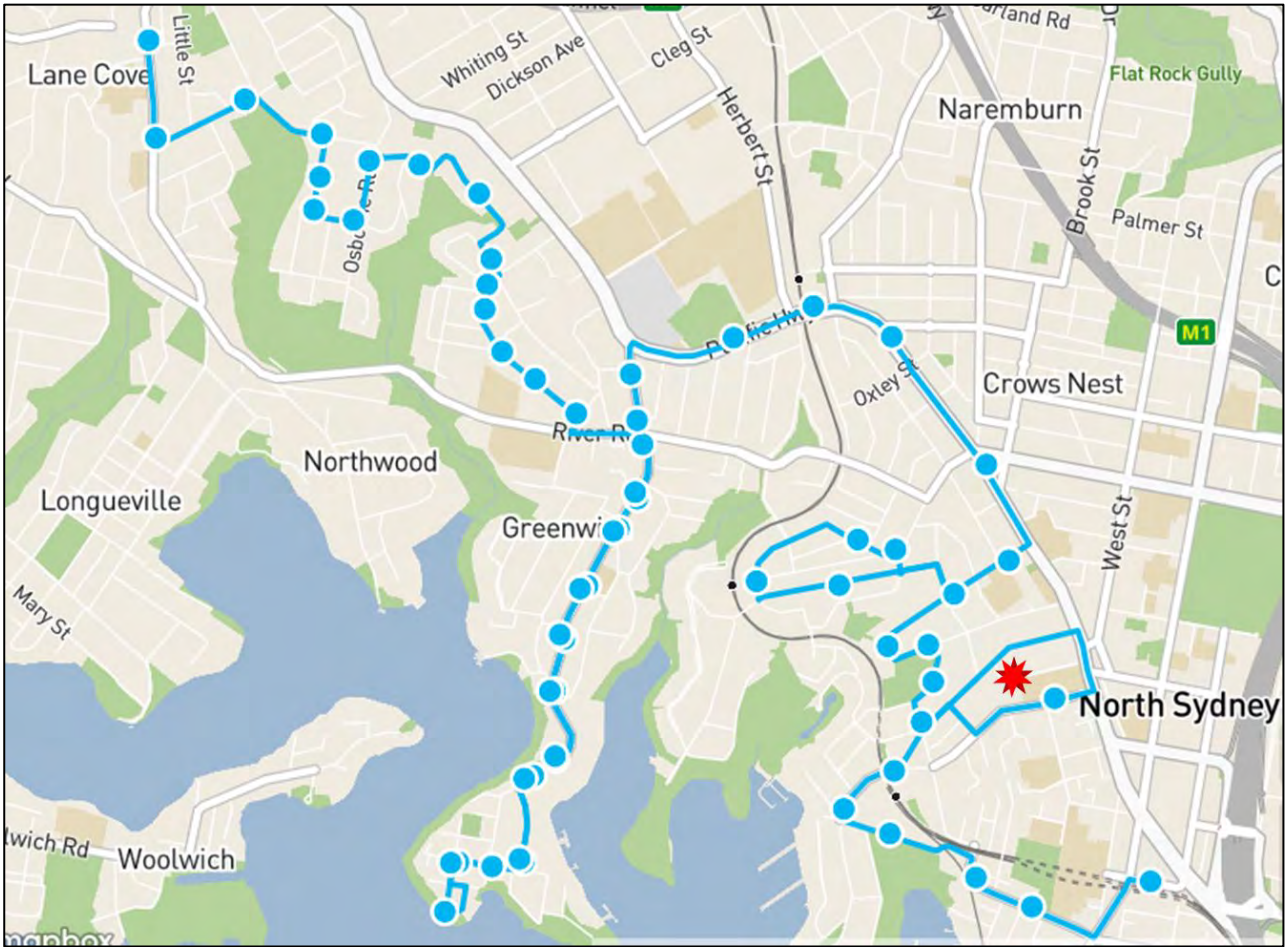


Figure 4: Route 265

In addition to the above, a bus stop location situated 100m north of the school along Pacific Highway provides for a number of key routes throughout greater North Sydney and the Sydney CBD area. A summary of these routes is captured in **Table 4**, with mapping extents broadly demonstrated in **Figure 5**.

TABLE 4: EXISTING PUBLIC BUS ROUTES

Route	Description	Route	Description
-------	-------------	-------	-------------

115	Chatswood to City Bridge St via North Sydney	287	Ryde to Milsons Point via St Leonards & North Sydney
200	Gore Hill to Bondi Junction	290	Epping to City Erskine St via Macquarie University & North Sydney
252	Gladesville to City King Street Wharf via North Sydney	291	Epping to McMahons Pt
254	Riverview to McMahons Point	320	Gore Hill to Mascot
261	Lane Cove to City King Street Wharf via Longueville	N90	Hornsby to City Town Hall via Chatswood (Night Service)
286	Denistone East to Milsons Point via St Leonards & North Sydney	N91	Macquarie Park to Bondi Junction via City Town Hall (Night Service)

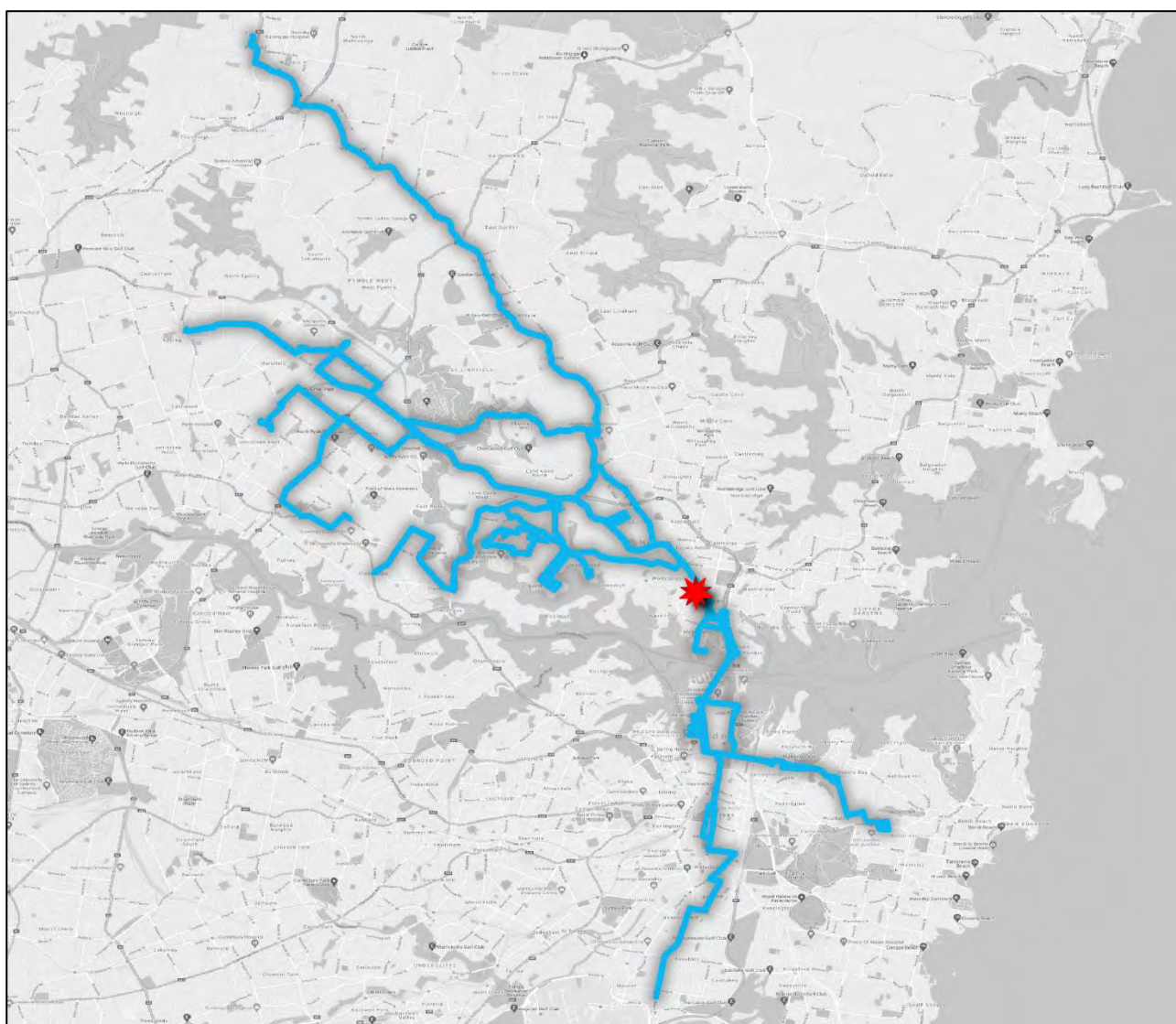


Figure 5: Public Bus Service Extents

2.4 Existing Active Transport

2.4.1 Pedestrian Network & Connectivity

The Site is situated within an established suburb adjacent to a developed business centre in the North Sydney CBD. With reference to the pedestrian network, desktop studies as well as on-site observations confirm that the broader road network is accompanied by pedestrian footpaths, either on one or both sides of all streets.

Immediate to the Schools' frontage on Bay Road, a raised zebra crossing provides safe pedestrian access to the school. To the frontage along the Pacific Highway, full movements for pedestrian crossings at the traffic signals are provided. A throughfare also exists to the west between Bay Road and McHatton Street. These locations provide a broader catchment to the wider pedestrian network.

Figure 6 below shows Council's Walking Map within the context of the Public School, having regard for defined "walking routes" separate to the provision of pedestrian pathways/ footpaths.

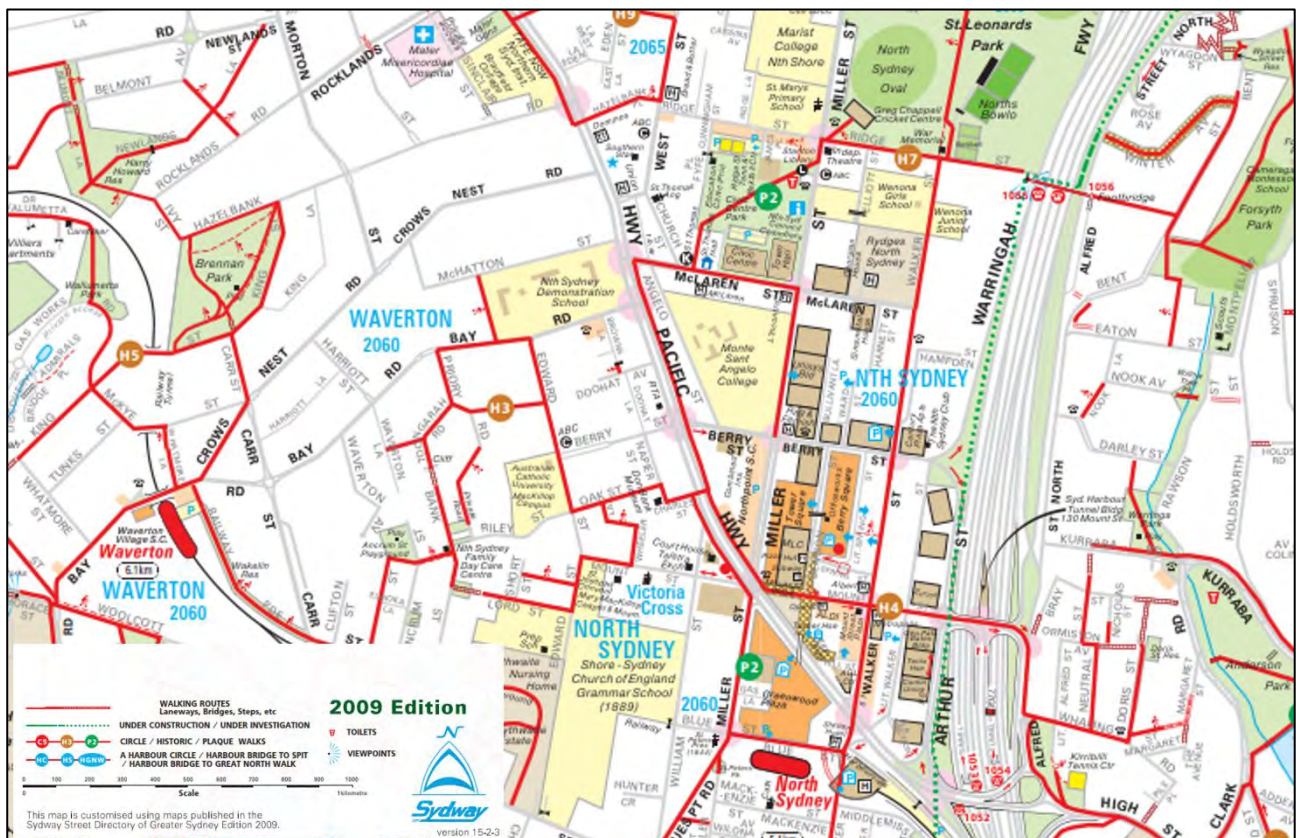


Figure 6: North Sydney Walking Map¹

¹ North Sydney Council. *North Sydney Walking Map 2009*

In addition, the Education Precinct Public Domain Masterplan (EPPDM) has identified the following pedestrian access improvements surrounding the Site, as shown in.

These pedestrian access improvements are predominately focussed to the south of the Site, along Berry Street, Oak Street and Mount Street.

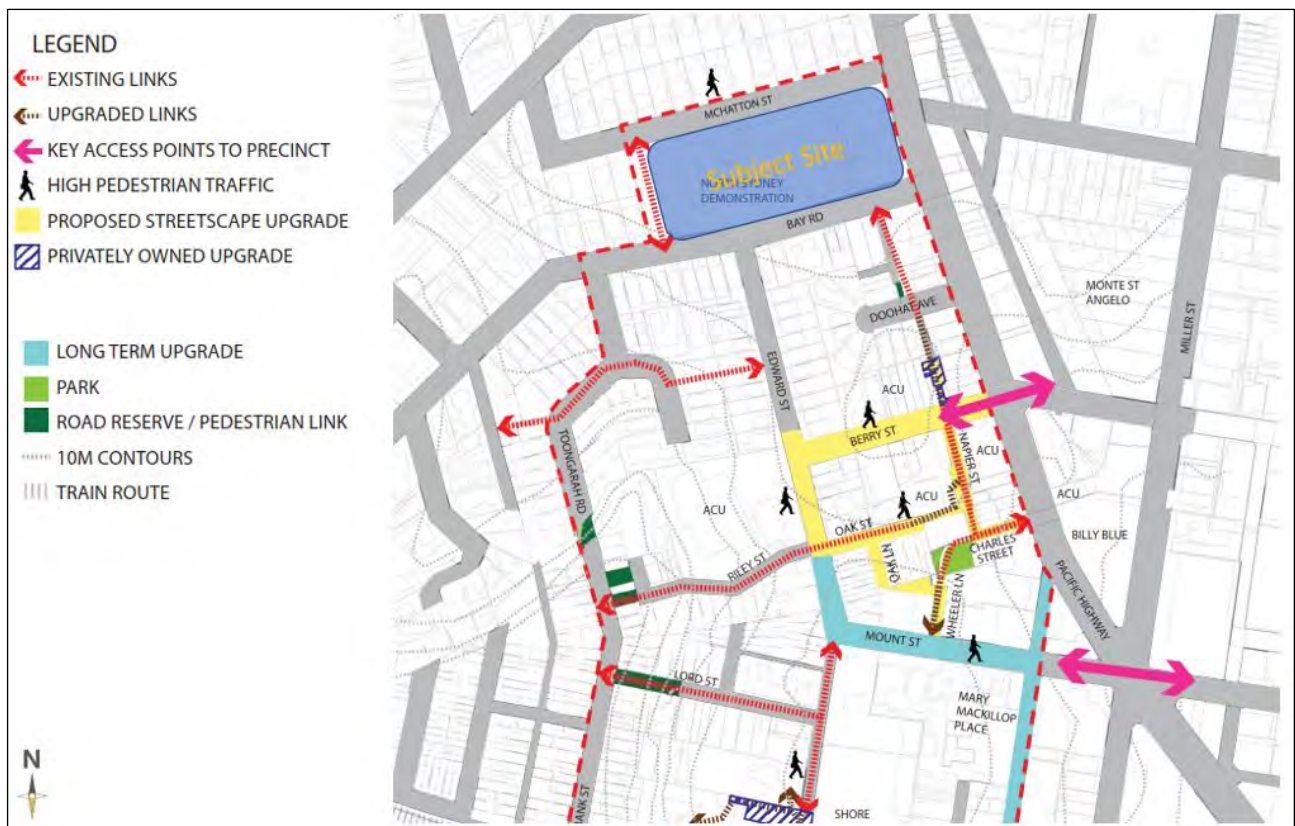


Figure 7: Pedestrian Access Improvements²

2.4.2 Cycling Network

With reference to existing cycling infrastructure within the Council area, **Figure 8** below captures the extent of the North Sydney Bike Map in the proximity of the School. Surrounding the school includes a mix of shared user paths and on-road bicycle routes.

Specifically, the Council map identifies the Pacific Highway as a “High Current Bicycle Use” corridor. It is considered that this is defined by the usage of both on and off-road cyclists accessing the corridor.

² Education Precinct Public Domain Masterplan – Location Precinct Public Domain Masterplan



Figure 8: North Sydney Bicycle Path Network

In addition to Council's cycling map, Service NSW provides a Cycleway Finder map for the locality and characterises specific bicycle routes and infrastructure by the degree of difficulty to which the route can be traversed. Based on the figure below, the school is generally surrounded by 'moderate difficulty' routes, which effectively capture on-road cycling provisions.

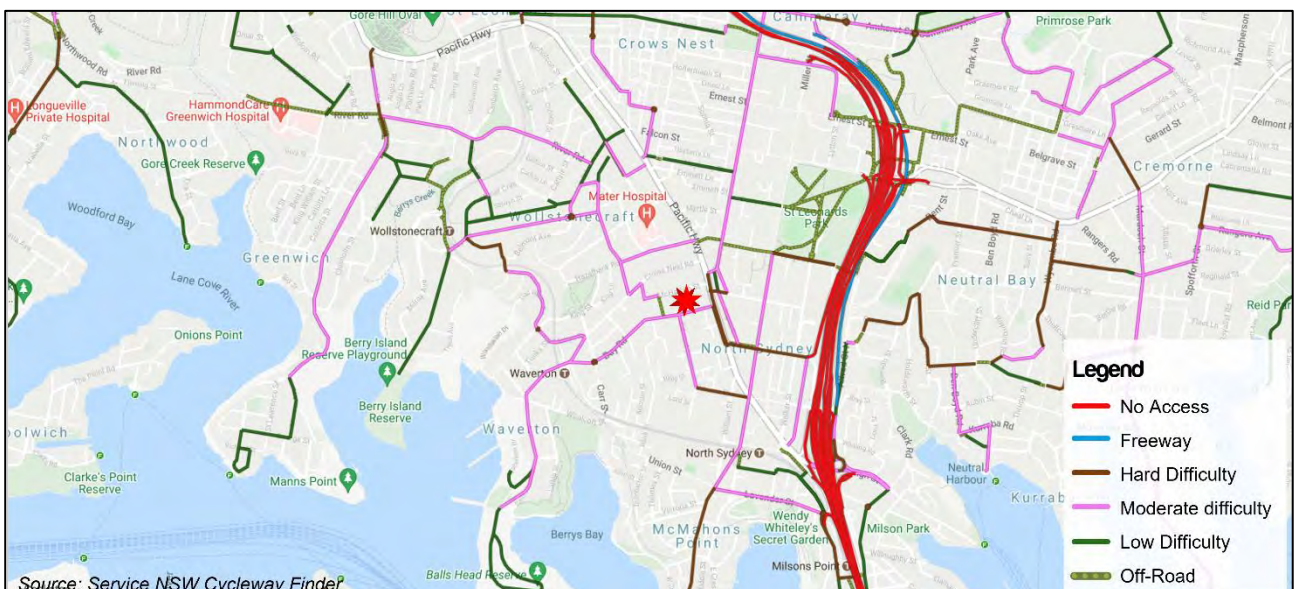


Figure 9: North Sydney Cycleway Finder Map

3 Key Management Stakeholders

3.1 Taylor

Taylor being the manager of the site has a duty of care to ensure the safety of all staff working on the Site and the surrounding community. Traffic management arrangements should be implemented to enable the orderly use of trafficable space provided within the Site and the road network surrounding it. Whilst every effort will be made to eliminate traffic safety risks, in instances where risks cannot be fully eliminated, traffic management measures are proposed to mitigate those risks.

Taylor shall:

- Ensure all staff is provided with sufficient training to abide by the parking strategy outlined in this plan. This includes responsibility for measures to ensure that all staff and visitors are familiar with site-specific rules through appropriate site induction procedures, including being inducted into this Construction Worker Transport Strategy.
- Conduct all travel in a safe, professional and legal manner.
- Be familiar with and address their respective duty of care requirements in accordance with the application under the WH&S Act 2011 requirements.
- Ensure WH&S Incident logbooks are maintained and undertake necessary action(s) in relation to any reported issues.

3.2 North Sydney Council (NSC)

Where and when applicable, Council shall be contacted when necessary. Council's responsibilities are largely focused on issues affecting the local community and businesses, management of the local road network and coordinating special events which may affect the availability of publicly available parking.

3.3 Transport for NSW (TfNSW)

Where and when applicable, TfNSW shall be contacted, specifically relating to any impacts to the Pacific Highway.

3.4 Stakeholder Consultation

Over the course of the development of this Plan, Ason Group has consulted with key stakeholders including Transport for NSW (TfNSW), North Sydney Council, Sydney Buses, the School Principal and the SINSW as part of the CPTMP. Details of consultation undertaken by the Project Team are included in Section 1.6.3 of the CPTMP.

4 Construction Worker Parking

4.1 Construction Worker Numbers

The proposed number of workers per construction stage is outlined in Table 5: Stages & Phases of Construction below. Note that the number of workers proposed per stage will range from an average to a maximum, for example in Stage 1 the average number of workers on-site per day will be 10 and the maximum will be 12.

TABLE 5: STAGES & PHASES OF CONSTRUCTION

Stage	Timeline	Description	Worker Number
1	Mid-March to April 2022	Installation of temporary demountables Installation of site amenities Installation of fencing and class A hoarding Temporary removal of heritage wall section	10 – 12 people
2	End March to July 2022	Protection of Bay Road heritage elements Demolition of Building C and temporary buildings Excavation and levelling of the site in preparation of Asbestos management and removal	20 – 25 people
3	May 2022	Installation of crane	25 – 30 people
4	July 2022 to January 2023	Construction of Buildings I and J.	80 – 85 people
5	October to December 2022	Completion of external hardstand, entry to the south and all soft landscaping.	80 – 85 people

4.2 Construction Hours

The approved construction hours have been outlined below per SSD Condition C4.

Given sensitivity constraints of the surrounding community, it is proposed that specific construction activities occur outside of school operating hours following consultation with the School. Both approved (during school holidays) and proposed work hour timings (during school terms) are provided below.

TABLE 6: HOURS OF WORK

Activity	Day	Time
Construction works (during school holidays)	Monday – Friday	7 am to 6 pm
	Saturday	8 am to 1 pm
	Sunday & Public Holidays	No Work to be carried out

Construction Works (during school terms)	Monday – Friday	7 am to 8 am, 9:30 am to 2:30 pm, 4 pm to 5pm
	Saturday	8 am to 1 pm
	Sunday & Public Holidays	No Work to be carried out

It is anticipated that construction works and deliveries will not be conducted or undertaken outside of the hours outlined above. Should out-of-work hours be required, Taylor will lodge an application for an Out of Work Hours Permit with Council to seek approval for these works.

4.3 Construction Worker Parking

No construction worker parking will be provided on-site. The site is very accessible via public transport and public on-street parking availability is limited.

To encourage the use of public transport, an on-site secure tool storage facility would be provided by the project team to allow construction workers to drop off and securely store their tools and equipment for the project within the Site.

5 Construction Worker Parking Strategy

5.1 Travel Arrangements for Construction Workers

As detailed in Section 2, the Site is located in close proximity to existing train stations and bus stops with frequent services during both AM and PM Peak. As such, it is expected that the majority of the construction workers will be able to access the Site via public transport.

To encourage public transport usage, an on-site secure tool storage area would be provided by Taylor to allow construction workers to drop off and securely store their tools and equipment for the project within the Site instead of bringing it to the Site every day.

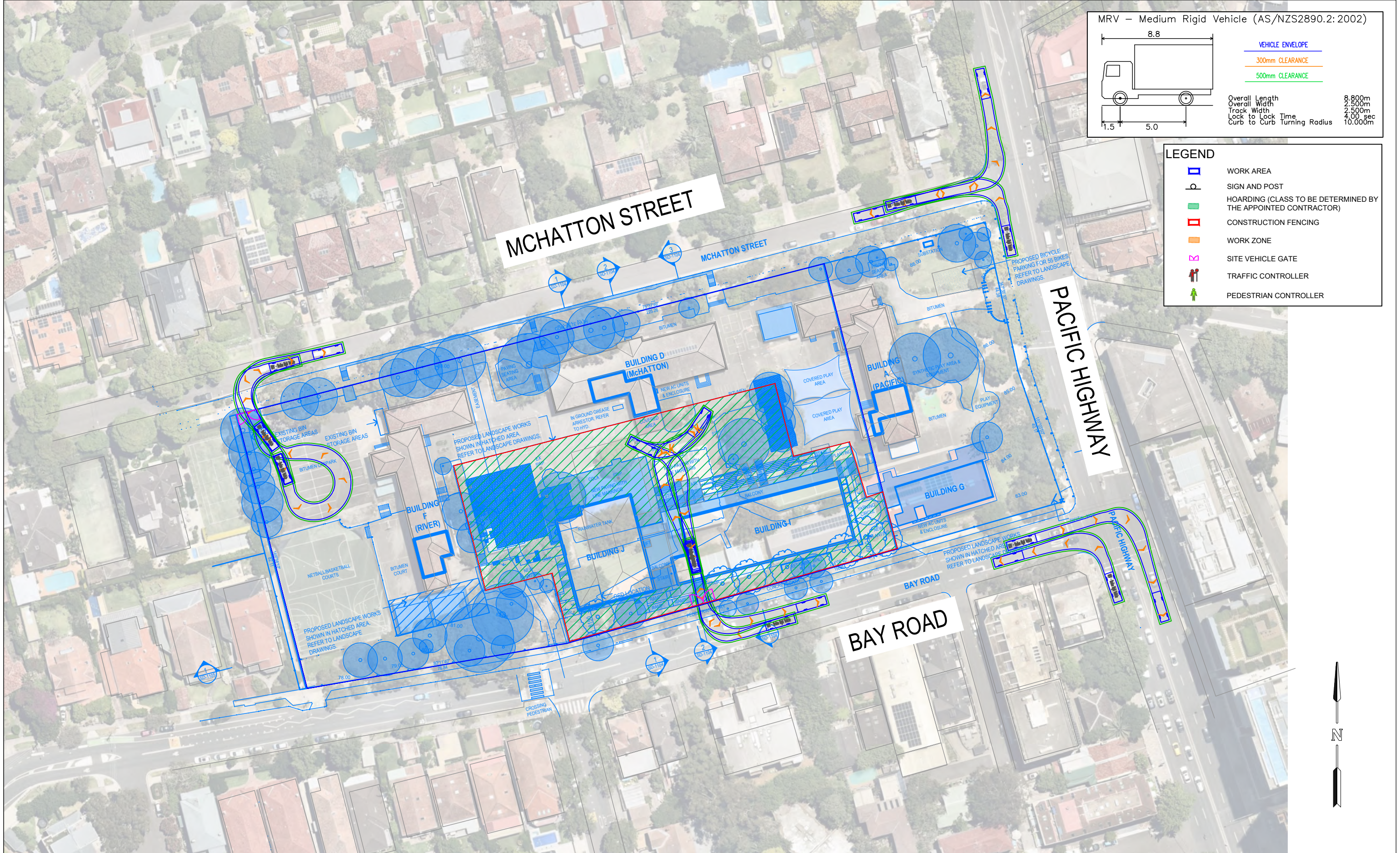
Additionally, the site amenities will include fridges, microwaves, etc to encourage workers to drop off their lunch on-site at the start of the day and not leave the Site for lunch.

5.2 Parking Arrangements for Construction Workers

No construction worker parking will be provided on-site and public on-street parking availability is limited with parking restrictions. It is recommended that construction workers travel to and from the Site via public transport.

Appendix E. Swept Path Assessment

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	Wendy Zheng	A3	SINSW	SWEPT PATH ASSESSMENT		
	APPROVED BY	DATE	PROJECT	SCHOOL ACCESS OVERVIEW		
	X.XXXX	11.03.2022	1723			
SCALE	<div>0510</div>		NORTH SYDNEY PUBLIC SCHOOL		FILE NAME	SHEET
Custom					AG1903-01-v01.dwg	AG01

AS/NZS 2890.2:2002

MRV - Medium Rigid Vehicle (AS/NZS2890.2:2002)

8.8

1.5 5.0

VEHICLE ENVELOPE

300mm CLEARANCE

500mm CLEARANCE

Overall Length 8.800m

Overall Width 2.500m

Track Width 2.500m

Lock to Lock Time 4.00 sec

Curb to Curb Turning Radius 10.000m

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ENTRY

EXIT

PACIFIC HIGHWAY

MACHATTON STREET

SUBSTATION

PROPOSED BICYCLE PARKING FOR 55 BIKE REFER TO LANDSCAPE DRAWINGS.

88.00

87.00

3.0

2.9

3.0

3.0

2.9

3.0

88.00

87.00

3.0

2.9

3.0

PROPOSED BICYCLE PARKING FOR 55 BIKE REFER TO LANDSCAPE DRAWINGS.

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DESIGNED

Wendy Zheng

APPROVED BY

X.XXXX

SCALE

Custom

PAPER SIZE

A3

DATE

11.03.2022

0 10 20

CLIENT

SINSW

PROJECT

1723

NORTH SYDNEY PUBLIC SCHOOL

DOCUMENT INFORMATION

SWEPT PATH ASSESSMENT

MCHATTON STREET ACCESS

FILE NAME

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SHEET

AG02

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MRV – Medium Rigid Vehicle (AS/NZS2890.2: 2002)

8.8

VEHICLE ENVELOPE

300mm CLEARANCE

500mm CLEARANCE

Overall Length

Overall Width

Track Width

Lock to Lock Time

Curb to Curb Turning Radius

8.800m

2.500m

2.500m

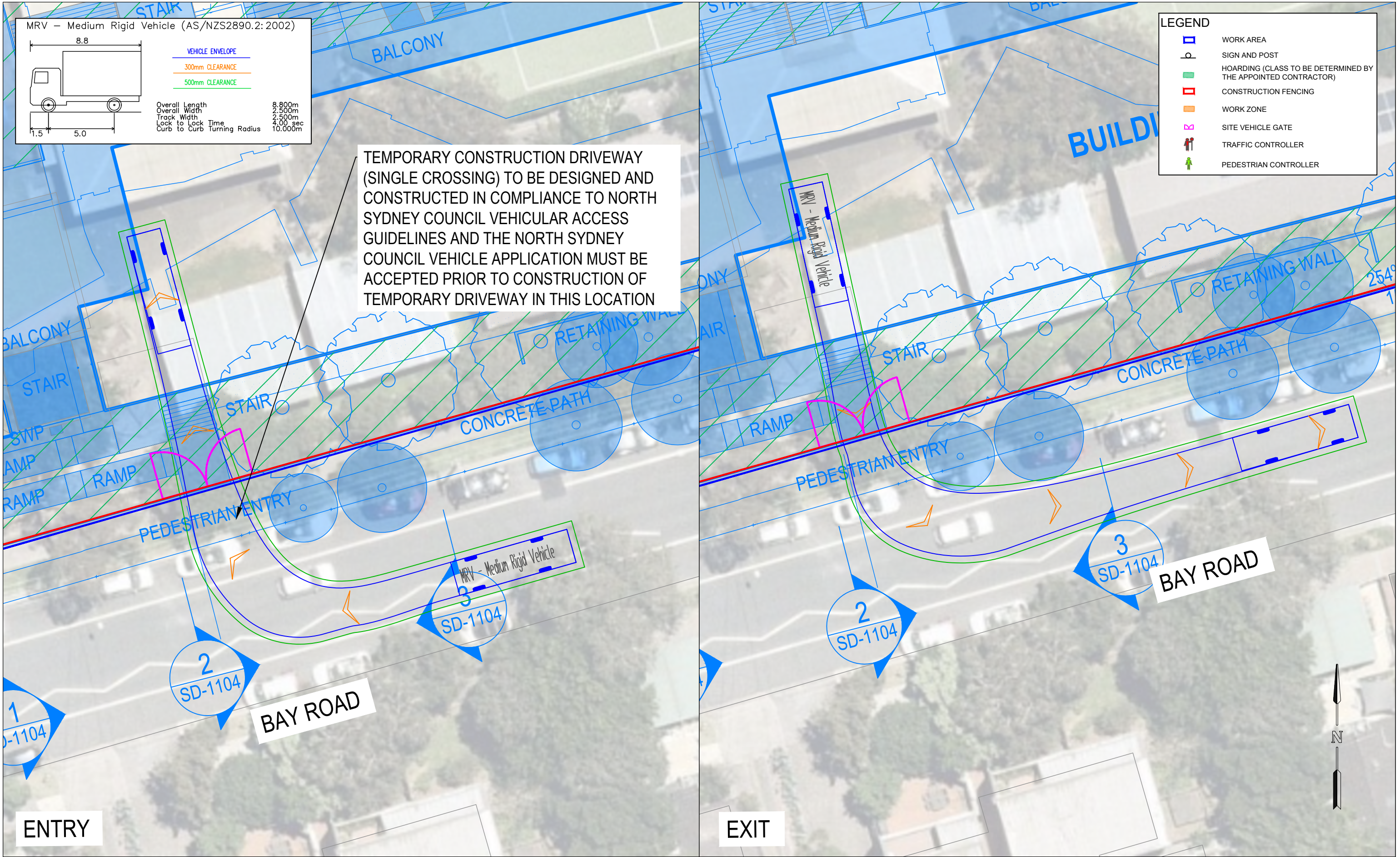
4.00 sec

10.000m

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	SCALE 1:250_m	0 10 20	NORTH SYDNEY PUBLIC SCHOOL	BAY ROAD ACCESS	
				FILE NAME AG1903-01-v01.dwg	SHEET AG03

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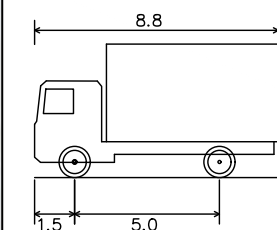


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	SCALE 1:250_m		NORTH SYDNEY PUBLIC SCHOOL	SITE ACCESS	
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AS/NZS 2890.2:2002
MRV - Medium Rigid Vehicle (AS/NZS2890.2:2002)
8.8
1.5 5.0
Overall Length 8.800m
Overall Width 2.500m
Track Width 2.500m
Lock to Lock Time 4.00 sec
Curb to Curb Turning Radius 10.000m
VEHICLE ENVELOPE
300mm CLEARANCE
500mm CLEARANCE
LEGEND
WORK AREA
SIGN AND POST
HOARDING (CLASS TO BE DETERMINED BY THE APPOINTED CONTRACTOR)
CONSTRUCTION FENCING
WORK ZONE
SITE VEHICLE GATE
TRAFFIC CONTROLLER
PEDESTRIAN CONTROLLER
ENTRY
EXIT
MCHATTON STREET
EXISTING BIN STORAGE AREAS
BITUMEN CARPARK
GENERAL NOTES
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PAPER SIZE
A3
CLIENT
SINSW
APPROVED BY
X.XXXX
DATE
11.03.2022
PROJECT
1723
NORTH SYDNEY PUBLIC SCHOOL
DOCUMENT INFORMATION
SWEPT PATH ASSESSMENT
SITE ACCESS (SCHOOL HOLIDAYS)
FILE NAME
AG1903-01-v01.dwg
SHEET
AG05
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MRV - Medium Rigid Vehicle (AS/NZS2890.2:2002)



Overall Length 8.800m
Overall Width 2.500m
Track Width 2.500m
Lock to Lock Time 4.00 sec
Curb to Curb Turning Radius 10.000m

LEGEND

- WORK AREA
- SIGN AND POST
- HOARDING (CLASS TO BE DETERMINED BY THE APPOINTED CONTRACTOR)
- CONSTRUCTION FENCING
- WORK ZONE
- SITE VEHICLE GATE
- TRAFFIC CONTROLLER
- PEDESTRIAN CONTROLLER

ENTRY

MCHATTON STREET

EXISTING BIN
STORAGE AREAS

EXISTING B
STORAGE

BITUMEN CARPARK

EXIT

MCHATTON STREET

EXISTING BIN
STORAGE AREAS

EXISTING BIN
STORAGE AREAS

BITUMEN CARPARK

GENERAL NOTES

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PAPER SIZE
A3

CLIENT
SINSW

DOCUMENT INFORMATION

SWEPT PATH ASSESSMENT

SITE ACCESS (SCHOOL HOLIDAYS)

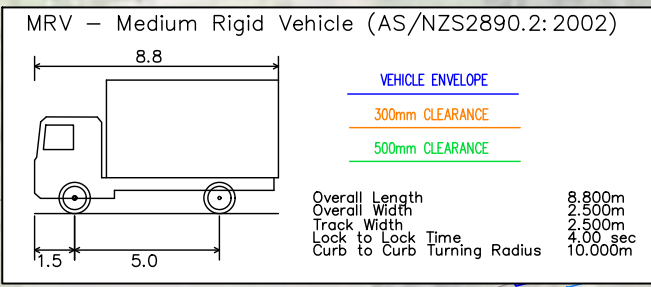
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SHEET
AG05

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AS/NZS 2890.2:2002
MRV - Medium Rigid Vehicle (AS/NZS2890.2:2002)
8.8
1.5 5.0
Overall Length 8.800m
Overall Width 2.500m
Track Width 2.500m
Lock to Lock Time 4.00 sec
Curb to Curb Turning Radius 10.000m
VEHICLE ENVELOPE
300mm CLEARANCE
500mm CLEARANCE
SCHOOL HOLIDAYS ONLY
GENERAL NOTES
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AS/NZS 2890.2:2002
MRV - Medium Rigid Vehicle (AS/NZS2890.2:2002)
8.8
1.5 5.0
Overall Length 8.800m
Overall Width 2.500m
Track Width 2.500m
Lock to Lock Time 4.00 sec
Curb to Curb Turning Radius 10.000m
VEHICLE ENVELOPE
300mm CLEARANCE
500mm CLEARANCE
SCHOOL HOLIDAYS ONLY
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MCHATTON STREET

EXISTING BIN STORAGE AREAS

EXISTING BIN STORAGE AREAS

BITUMEN CARPARK

SCHOOL HOLIDAYS ONLY

LEGEND

- WORK AREA
- SIGN AND POST
- HOARDING (CLASS TO BE DETERMINED BY THE APPOINTED CONTRACTOR)
- CONSTRUCTION FENCING
- WORK ZONE
- SITE VEHICLE GATE
- TRAFFIC CONTROLLER
- PEDESTRIAN CONTROLLER

COVERED AREA

NEW PAVING WITH LINE MARKINGS

STAIR

STAIR

BALCONY

BUILDING

BUILDING J

LIFT

BALCONY

STAIR

OSD LOCATION

RAMP

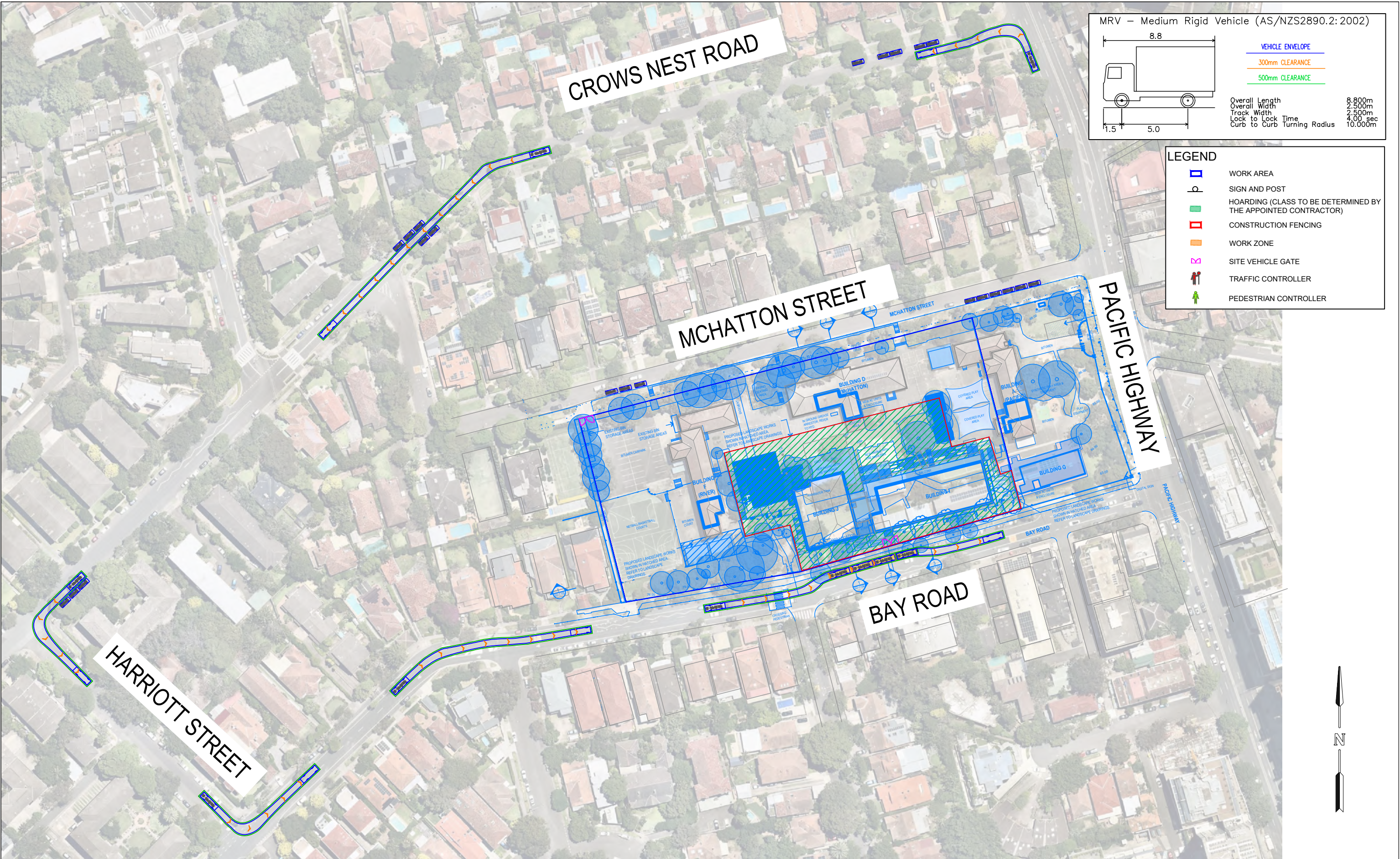
RAMP



STAIR

BAY ROAD

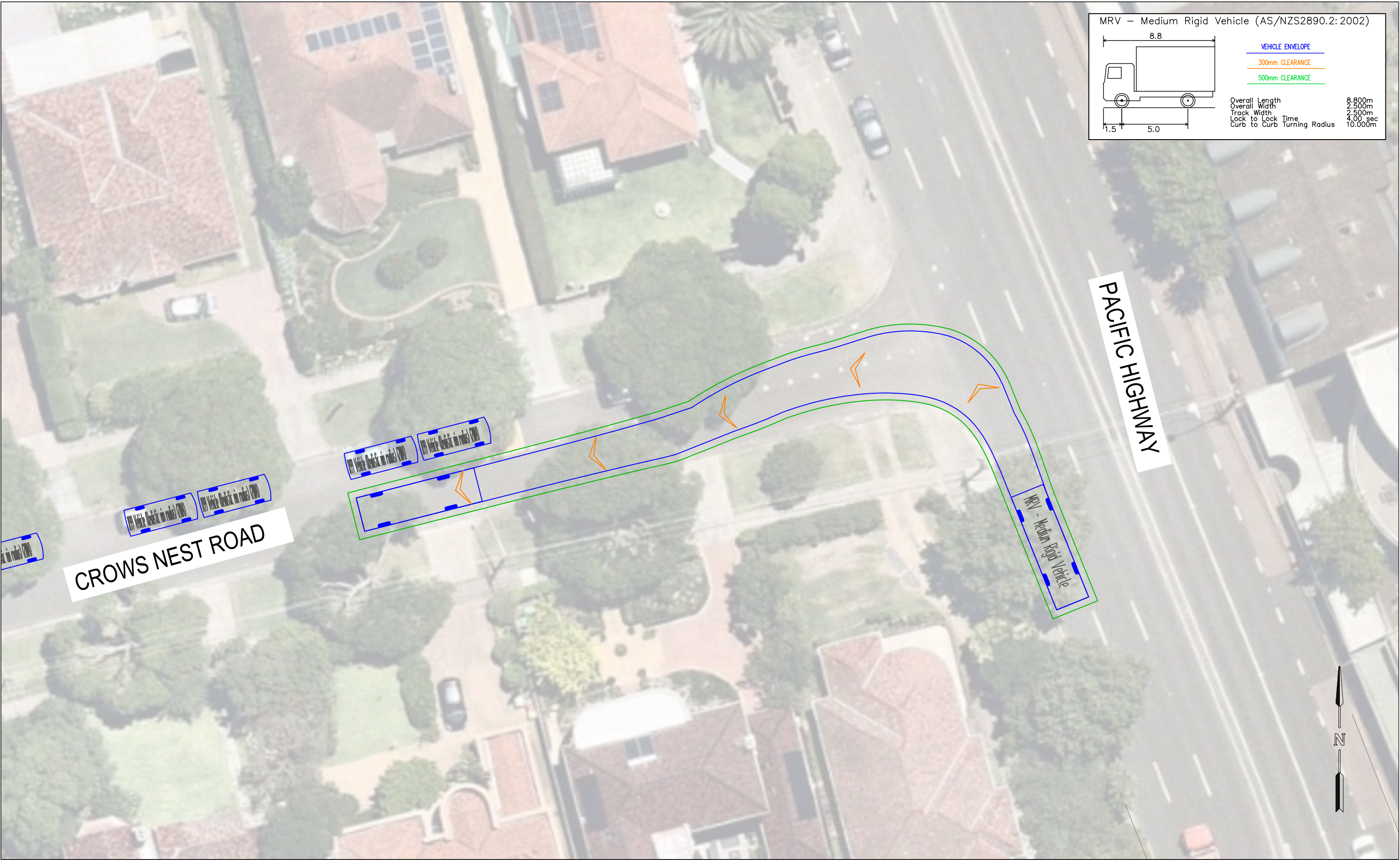
PEDESTRIAN ENTRY



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			NORTH SYDNEY PUBLIC SCHOOL	FILE NAME AG1903-01-v01.dwg	SHEET AG06	



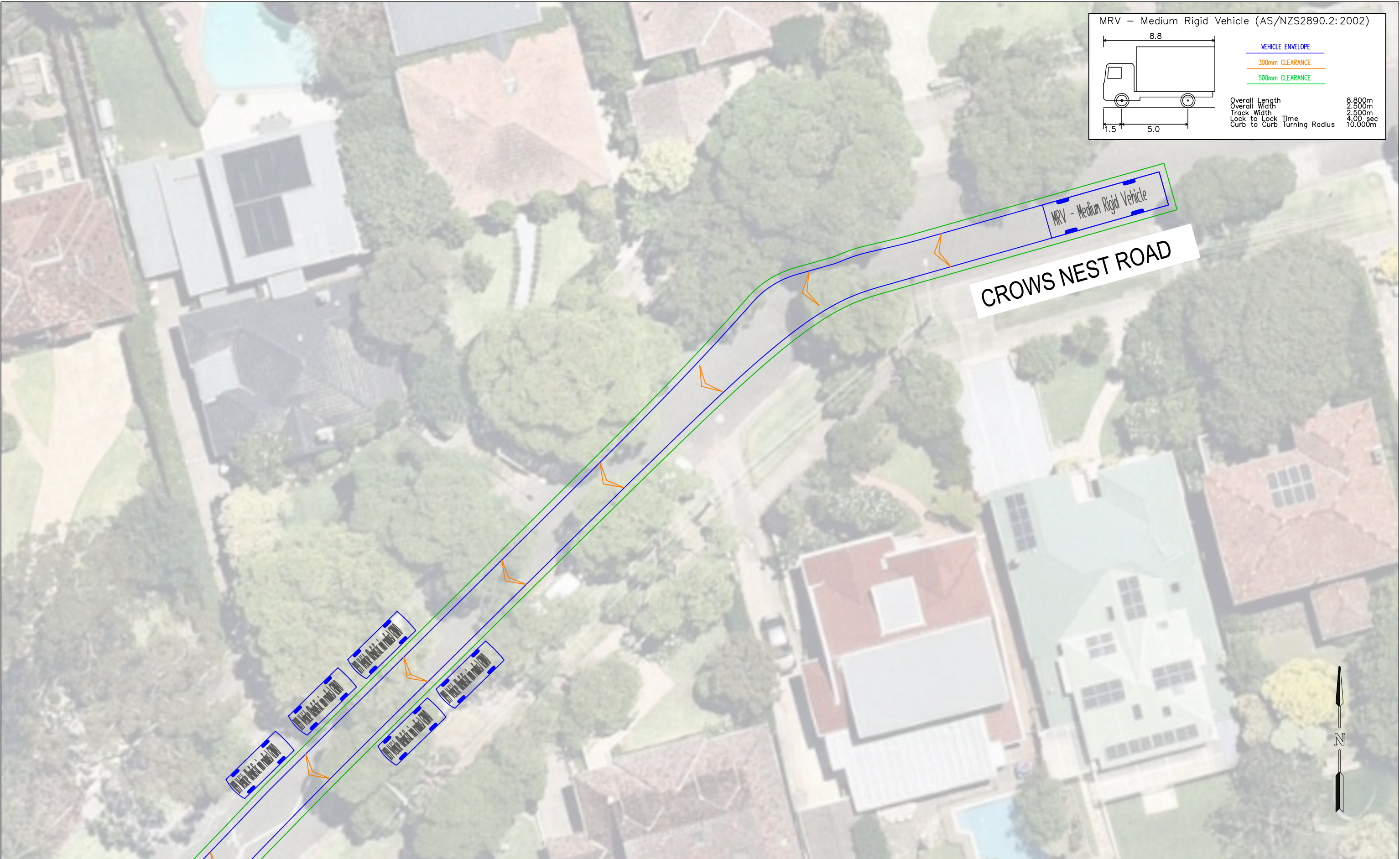
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	<div>APPROVED BY</div> <div>X.XXXX</div>	<div>DATE</div> <div>11.03.2022</div>	<div>PROJECT</div> <div>1723</div>		<div>BAY ROAD WORK ZONE ACCESS OVERVIEW</div>	
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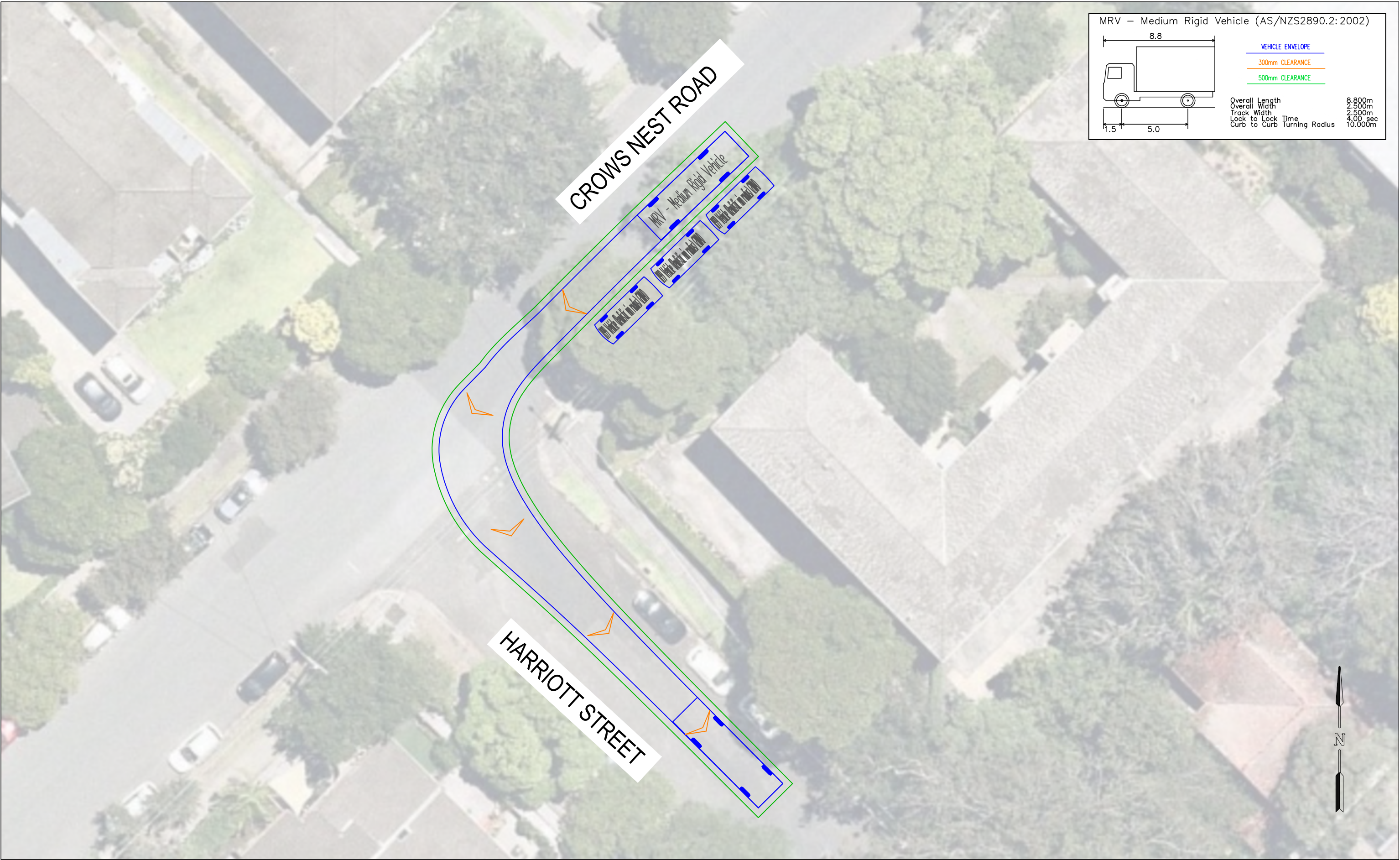


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	<div>APPROVED BY</div> <div>X.XXXX</div>	<div>DATE</div> <div>11.03.2022</div>	<div>PROJECT</div> <div>1723</div>		<div>BAY ROAD WORK ZONE ACCESS</div>		
	<div>SCALE</div> <div>1:250_m</div>	<div></div>	<div>NORTH SYDNEY PUBLIC SCHOOL</div>		<div>FILE NAME</div> <div>AG1903-01-v01.dwg</div>		<div>SHEET</div> <div>AG08</div>

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MRV – Medium Rigid Vehicle (AS/NZS2890.2: 2002)

8.8

VEHICLE ENVELOPE

300mm CLEARANCE

500mm CLEARANCE

Overall Length

Overall Width

Track Width

Lock to Lock

Curb to Curb

Time

Turning Radius

8.800m

2.500m

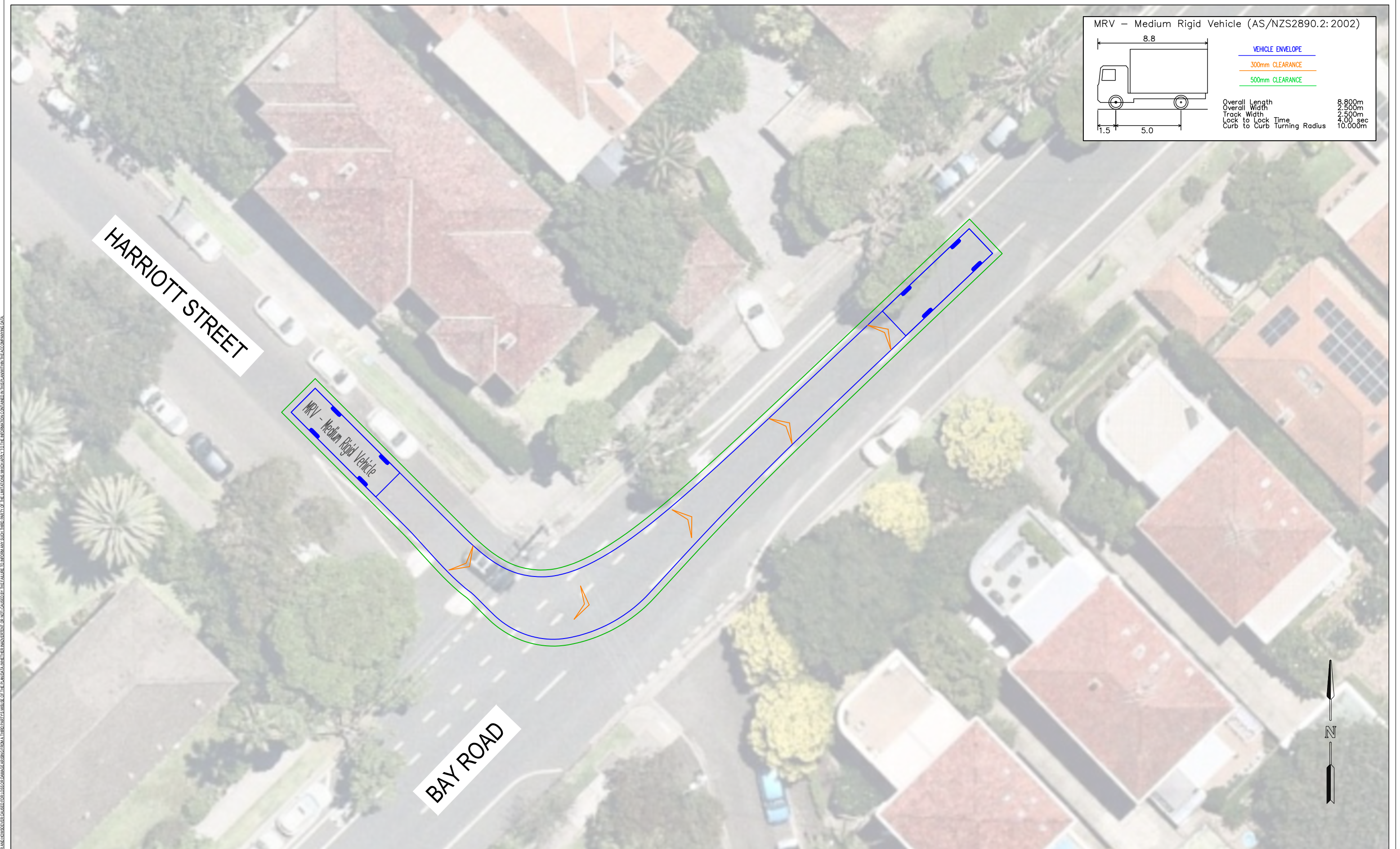
2.500m

4.00m

10.000m

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	APPROVED BY		DATE		PROJECT		SWEPT PATH ASSESSMENT			
	X.XXXX		11.03.2022		1723		BAY ROAD WORK ZONE ACCESS			
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				NORTH SYDNEY PUBLIC SCHOOL						

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Swept path assessments completed at 10 km/h and 500mm clearance.

PLOT DATE: 11/03/2022 8:44:34 PM | CAD REFERENCE: C:\Users\Wendy Zheng\Documents\projects\1903 - North Sydney Ps Taylors\AG1903-01-v01.dwg | Wendy Zheng

ASON ACCEPTS NO RESPONSIBILITY WHATSOEVER FOR THE USE OF UNAPPROVED PLANS IN ANY CONSTRUCTION OR FOR ANY COMMERCIAL PURPOSES. SET OUT DIMENSIONS OF ALL DESIGN LINES, GRID LINES, CONTROL LINES, RECOVERY MARKS AND BENCH MARKS SHOULD BE VERIFIED AND CONFIRMED AGAINST THE LATEST INFORMATION AT CONSTRUCTION. ASON IS TO BE NOTIFIED IMMEDIATELY OF ANY ERROR OR DISCREPANCY AND THE MATTER RESOLVED PRIOR TO THE COMMENCEMENT OR CONTINUATION OF ANY WORK. THIS NOTE IS AN INTRINSIC PART OF THIS PLAN DATA. REPRODUCTION OF THIS PLAN OR ANY PART OF IT WITHOUT THE WRITTEN PERMISSION OF ASON GROUP IS PROHIBITED. ASON GROUP IS NOT RESPONSIBLE FOR THE CONSEQUENCES OF ANY SUCH REPRODUCTION OR FOR ANY DAMAGE TO PERSONS OR PROPERTY CAUSED BY THE USE OF THIS PLAN OR ANY PART OF IT. THE INFORMATION CONTAINED IN THIS PLAN IS FOR INFORMATION ONLY AND IS NOT TO BE USED FOR ANY OTHER PURPOSE. THE INFORMATION CONTAINED IN THIS PLAN IS FOR INFORMATION ONLY AND IS NOT TO BE USED FOR ANY OTHER PURPOSE. THE INFORMATION CONTAINED IN THIS PLAN IS FOR INFORMATION ONLY AND IS NOT TO BE USED FOR ANY OTHER PURPOSE.



GENERAL NOTES This drawing is provided for information purposes only and should not be used for construction. Base Plan prepared by Nearmap. Bay Road has a posted speed limit of 50km/hr. Swept path assessments completed at 10 km/h and 500mm clearance.	DESIGNED Wendy Zheng	PAPER SIZE A3	CLIENT SINSW	DOCUMENT INFORMATION SWEPT PATH ASSESSMENT BAY ROAD WORK ZONE ACCESS	
	APPROVED BY X.XXXX	DATE 11.03.2022	PROJECT 1723		
	SCALE 1:250_m		NORTH SYDNEY PUBLIC SCHOOL	FILE NAME AG1903-01-v01.dwg	SHEET AG12
				asongroup Suite 17.02, Level 17, 1 Castlereagh St Sydney NSW 2000 info@asongroup.com.au	

Appendix F. Record of Council Consultation

Helen Kut

From: Wendy Zheng <wendy.zheng@asongroup.com.au>
Sent: Wednesday, 11 May 2022 5:01 PM
To: Michael Ettrick; Cassandra Zughbi; Tom Udovcic
Cc: Dora Choi
Subject: FW: North Sydney PS - Draft CPTMP
Attachments: RE: North Sydney PS - Draft CPTMP

Hi Michael

Please see below for TfNSW approval of the CTMP submitted.

Please talk to Busways about what they require for the temporary bus stop – I had put very explicit wording and a photo about relocation of existing bus stop but clearly TfNSW is still sticking to their requirement for tactiles.

The Busways contact is Steve Grady:

Steve Grady

Network Infrastructure Supervisor – Sydney

Busways Penrith
47-53 Mullins Road
Penrith NSW 2750

T (02) 4721-8871 | M 0438 537 903 | W busways.com.au



Regards,
Wendy Zheng
Senior Traffic Design Engineer | Ason Group

T: +61 2 9083 6601 | M: +61 401 969 768 | E: wendy.zheng@asongroup.com.au
A: Suite 17.02, Level 17, 1 Castlereagh Street, Sydney NSW 2000

From: Development Applications <Developments.CJP@transport.nsw.gov.au>
Sent: Wednesday, 11 May 2022 4:56 PM
To: Wendy Zheng <wendy.zheng@asongroup.com.au>
Cc: Dora Choi <dora.choi@asongroup.com.au>
Subject: Re: North Sydney PS - Draft CPTMP

Hi Wendy,

Note that Crows Nest Road is no longer part of the construction access route. Consequently:

Transport for NSW (TfNSW), Greater Sydney Division has reviewed the **Construction & Pedestrian Management Plan – North Sydney Public School Upgrades Revision 04** and endorse the proposed temporary construction arrangements subject to the following conditions:

- Any Traffic Guidance Schemes (TGS) prepared are to comply with AS1742.3 and Transport for NSW's "Traffic Control at Worksites" manual and be signed by a person with TfNSW certification to prepare a TGS.
- Proponent must apply and obtain approval from the Transport Management Centre for a Road Occupancy Licence (ROL) for any required lane closures and/or Speed Zone Authorisations as part of the ROL that may impact the state road network or is within 100m of traffic signals.
- Access to be maintained for residents, businesses and emergency vehicles at all times.
- No marshalling or queuing of construction vehicles is to occur on public roads. Arriving vehicles that are not able to use parking bay/work zone must continue to a holding point until space becomes available.
- When heavy vehicles are entering or leaving the site a traffic controller is to be provided to manage any conflicts between pedestrians and heavy vehicles.
- Vehicles should enter and leave the site in a forward facing direction when safe to do so.
- Any approved Works Zone should only be used for work activities. No infrastructure, including bins, tanks or traffic control equipment should be left on the road when the works zone is not in use by a vehicle. All non-vehicular items must be contained within the work area and not on the carriageway.
- Any traffic control devices, including signage and line marking, should be installed by the proponent and must conform with Australian Standards 1742.
- Queues are not to impact the Pacific Highway at any time.
- Bus movements along Bay Rd are to be prioritised.
- The proponent is to pay for all associated costs with relocating the temporary bus stop including any infrastructure requirements (B-Flags, timetable cases etc). Temporary bus stop to be constructed in line with TfNSW style guide and made DDA compliant (Tactiles etc). At completion of project, proponent is responsible for the reinstatement of the bus stop to its original location.
- Transport for New South Wales reserve the right to alter the CTMP Conditions at any time to maintain safe and efficient traffic and pedestrian movements in this area.
-

Endorsement of the CTMP is not an approval to the type of traffic management or delineation devices used, nor is it an approval to any traffic guidance schemes depicted within the CTMP. It is assumed that the proponent has used type approved devices and has developed its traffic guidance schemes in accordance with the relevant Australian Standards and Guidelines.

The proponent is to ensure local residents, businesses, schools and other stakeholders in the affected area as well as emergency service organisations are notified of the changes associated with the CTMP, prior to its implementation.

Please ensure this CTMP is shared and adhered to by all contractors. If the CTMP changes, please forward a copy to Developments.CJP@transport.nsw.gov.au or further review and endorsement.

Transport for NSW



Transport
for NSW


From: Wendy Zheng <wendy.zheng@asongroup.com.au>
Sent: Monday, 9 May 2022 8:38 AM
To: Development Applications <Developments.CJP@transport.nsw.gov.au>
Cc: Dora Choi <dora.choi@asongroup.com.au>
Subject: RE: North Sydney PS - Draft CPTMP

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Hi Development Team

Thank you for your comments.

Please see below for the download link to the updated CTMP:

 [\[1903\] North Sydney PS CTMP](#)

Please let me know if you have any questions.

Regards,

Wendy Zheng

Senior Traffic Design Engineer | Ason Group

T: +61 2 9083 6601 | **M:** +61 401 969 768 | **E:** wendy.zheng@asongroup.com.au

A: Suite 17.02, Level 17, 1 Castlereagh Street, Sydney NSW 2000

From: Development Applications <Developments.CJP@transport.nsw.gov.au>
Sent: Thursday, 24 March 2022 2:15 PM
To: Wendy Zheng <wendy.zheng@asongroup.com.au>
Cc: Dora Choi <dora.choi@asongroup.com.au>
Subject: RE: North Sydney PS - Draft CPTMP

Hi Wendy,

The management of Crows Nest Road will need to include traffic controllers to operate a 1 lane alternate flow TGS when construction vehicles want to utilise the approach route. Signage by itself is insufficient.

The revised CTMP should include the Crows Nest Rd TGS and statement confirming the bus stop relocation and reinstatement requirements specified below.

Project & Service Changes | Customer Journey Planning | Greater Sydney

25 Garden Street Eveleigh NSW 2015

Transport for NSW



Transport
for NSW

From: Wendy Zheng <wendy.zheng@asongroup.com.au>
Sent: Thursday, 24 March 2022 11:56 AM
To: Development Applications <Developments.CJP@transport.nsw.gov.au>
Cc: Dora Choi <dora.choi@asongroup.com.au>
Subject: RE: North Sydney PS - Draft CPTMP

CAUTION: This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

Hi Development Team

In response to comments regarding Table 10, the project team is happy to relocate the existing bus stop and associated infrastructure (see photo of existing bus stop taken today) attached to the temporary location and reinstate to existing condition following completion of construction.

Regarding the use of Crows Nest Road, this is the only route that Council has conditionally supported for construction access as Council does not want us to use the Mount St / Edward St / Bay Road route and the Carr Street access to Bay Road is too narrow and steep for construction access.

The project team is happy to adopt a TGS in the placement of warning and temporary signage along Crows Nest Road to warn drivers. Additionally the construction vehicle drivers will be inducted to site so they know to not impede local access.

Please let us know whether this is acceptable and we will update the CTMP accordingly.

Please let us know if a meeting to discuss the above to provide any clarifications required.

Regards,

Wendy Zheng

Senior Traffic Design Engineer | Ason Group

T: +61 2 9083 6601 | **M:** +61 401 969 768 | **E:** wendy.zheng@asongroup.com.au

A: Suite 17.02, Level 17, 1 Castlereagh Street, Sydney NSW 2000

From: Development Applications <Developments.CJP@transport.nsw.gov.au>

Sent: Wednesday, 23 March 2022 9:34 AM

To: Wendy Zheng <wendy.zheng@asongroup.com.au>

Cc: Dora Choi <dora.choi@asongroup.com.au>

Subject: RE: North Sydney PS - Draft CPTMP

Thank you for providing Transport for NSW with a copy of the Construction Traffic Management Plan (CTMP).

Please see below the following comments, requests for additional information and/or issues to note:

- Table 10 - Note the proponent is to pay for all associated costs with relocating the temporary bus stop including any infrastructure requirements (B-Flags, timetable cases etc);
- Table 10 - Temporary bus stop to constructed in line with TfNSW style guide and made DDA compliant (Tactiles etc);
- Table 10 - At completion of project, proponent is responsible for the reinstalment of the bus stop to its original location.
- Clause 2.3 – TfNSW does not support the use of Crows Nest Rd by heavy vehicles. The road is too narrow to support two-way operation. Further consideration could be given if there was active management (traffic control) utilised on Crows Nest Rd to ensure conflicting movements were managed and local access was not impeded.

Upon making the required amendments, please forward an updated copy your submission to Developments.CJP@transport.nsw.gov.au for further review and endorsement.

Project & Service Changes | Customer Journey Planning | Greater Sydney

25 Garden Street Eveleigh NSW 2015

Transport for NSW



Transport
for NSW

From: Wendy Zheng <wendy.zheng@asongroup.com.au>
Sent: Tuesday, 15 March 2022 12:16 PM
To: Development Applications <Developments.CJP@transport.nsw.gov.au>; Peter Keyes <Peter.KEYES@transport.nsw.gov.au>
Cc: Dora Choi <dora.choi@asongroup.com.au>
Subject: RE: North Sydney PS - Draft CPTMP

Some people who received this message don't often get email from wendy.zheng@asongroup.com.au. [Learn why this is important](#)

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Hi Peter

The North Sydney PS SSD has been approved and we have updated our CTMP accordingly to account for it.

Consultation with the bus company was completed and the record attached for relocating the bus stop on Bay Road and priority given to the bus route.

Please find the report here:  [\[1903\] North Sydney PS CTMP](#) for review and see attached for the SSD conditions.

Feel free to contact myself or Dora if you have any questions and if you can please let us know the timing for feedback it would be greatly appreciated.

Regards,

Wendy Zheng

Senior Traffic Design Engineer | Ason Group

T: +61 2 9083 6601 | **M:** +61 401 969 768 | **E:** wendy.zheng@asongroup.com.au

A: Suite 17.02, Level 17, 1 Castlereagh Street, Sydney NSW 2000

From: Development Applications <Developments.CJP@transport.nsw.gov.au>

Sent: Tuesday, 30 November 2021 3:08 PM

To: Tarini Pathak <Tarini.Pathak@turntown.com>

Cc: Jeremy Farrington <Jeremy.Farrington@det.nsw.edu.au>; Alfred Jury <Alfred.Jury3@det.nsw.edu.au>; Dora Choi <dora.choi@asongroup.com.au>; Wendy Zheng <wendy.zheng@asongroup.com.au>; Iman Mohammadi

Transport for NSW (TfNSW), Greater Sydney Division has reviewed the **Construction & Pedestrian Management Plan – North Sydney School Upgrades Revision 01** and endorse the proposed temporary construction arrangements for **Stage 1 & 2 only**, subject to the following conditions:

- Any Traffic Guidance Schemes (TGS) prepared are to comply with AS1742.3 and Transport for NSW's "Traffic Control at Worksites" manual and be signed by a person with TfNSW certification to prepare a TGS.
- Proponent must apply and obtain approval from the Transport Management Centre for a Road Occupancy Licence (ROL) for any required lane closures and/or Speed Zone Authorisations as part of the ROL that may impact the state road network or is within 100m of traffic signals.
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- When heavy vehicles are entering or leaving the site a traffic controller is to be provided to manage any conflicts between pedestrians and heavy vehicles.
- Vehicles should enter and leave the site in a forward facing direction when safe to do so.
- Transport for New South Wales reserve the right to alter the CTMP Conditions at any time to maintain safe and efficient traffic and pedestrian movements in this area.
- Any approved Works Zone should only be used for work activities. No infrastructure, including bins, tanks or traffic control equipment should be left on the road when the works zone is not in use by a vehicle. All non-vehicular items must be contained with the work area and not on the carriageway.
- Any traffic control devices, including signage and line marking, should be installed by the proponent and must conform with Australian Standards 1742.
- **Queues are not to impact the Pacific Highway at any time.**
- **Bus movements along Bay Rd are to be prioritised.**

Endorsement of the CTMP is not an approval to the type of traffic management or delineation devices used, nor is it an approval to any traffic guidance schemes depicted within the CTMP. It is assumed that the proponent has used type approved devices and has developed its traffic guidance schemes in accordance with the relevant Australian Standards and Guidelines.

The proponent is to ensure local residents, businesses, schools and other stakeholders in the affected area as well as emergency service organisations are notified of the changes associated with the CTMP, prior to its implementation.

Please ensure this CTMP is shared and adhered to by all contractors. If the CTMP changes, please forward a copy to Developments.CJP@transport.nsw.gov.au or further review and endorsement.

OFFICIAL

From: Tarini Pathak <Tarini.Pathak@turntown.com>

Sent: Tuesday, 30 November 2021 8:38 AM

To: Iman Mohammadi <Iman.Mohammadi@northsydney.nsw.gov.au>; Peter Keyes <Peter.KEYES@transport.nsw.gov.au>

Cc: Jeremy Farrington <Jeremy.Farrington@det.nsw.edu.au>; Alfred Jury <Alfred.Jury3@det.nsw.edu.au>; Dora Choi <dora.choi@asongroup.com.au>; Wendy Zheng <wendy.zheng@asongroup.com.au>

Subject: North Sydney PS - Draft CPTMP

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Turner & Townsend Confidential

Hi Iman/ Peter,

In preparation for today's session, please see attached a draft CPTMP that will be presented and discussed at the 12:15 meeting today.

Thanks,
Tarini

Tarini Pathak
Senior Project Manager, Australia
Turner & Townsend
One Wharf Lane, Level 19, 171 Sussex Street, Sydney, NSW, 2000
t: +61 (0) 2 8245 0000 | m: +61 (0) 431 114 155 | www.turnerandtownsend.com

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ABN 88 123 154 585

Turner & Townsend Limited

For further information and registration details visit our website
<https://clicktime.symantec.com/3DF6n2CteEv8JP1ZAviseCR7VN?u=http%3A%2F%2Fwww.turnerandtownsend.com>

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OFFICIAL



Ms Wendy Zheng
Ason Group
Suite 17.02, Level 17
1 Castlereagh Street
Sydney NSW 2000

13 May 2022

Dear Ms Zheng

RE: 182 PACIFIC HIGHWAY, WAVERTON (NORTH SYDNEY PUBLIC SCHOOL) – CONSTRUCTION AND PEDESTRIAN TRAFFIC MANAGEMENT PLAN

I refer to the Construction Traffic and Pedestrian Management Plan prepared by “Ason Group” dated 9 May 2022 for Development Application SSD 11869481 at 182 Pacific Highway, Waverton.

Council raises no objection to this CTMP and proposed works subject to conditions of approval.

Please find attached the conditions of approval. Please note the construction management program is a condition that forms part of the development application covered under section B15 of the determination for the site. Therefore, any non-compliance with these construction management program conditions of approval constitutes a breach of the conditions of approval for the development application.

Should you have any enquiries regarding this matter, please contact me on 9936 8100.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Iman Mohammadi'.

Iman Mohammadi
Public Projects Engineering Officer

CONDITIONS OF APPROVAL FOR WORKS ZONE

182 Pacific Highway, Waverton

1. All works on any public road are to be undertaken in accordance with AS 1742.3.
2. Approval must be obtained from Council for all temporary construction vehicular crossings
3. Temporary construction site driveway entrances and exits are subject to separate Temporary Driveway Crossing approval by Council's Development Engineer to accommodate the maximum truck size accessing the site as proposed and approved in this CTMP.
4. No truck and dog trailers are to be used for this site.
5. The maximum size of construction vehicles to be used for the subject site must not exceed a medium rigid truck of 8.8m in length.
6. The proposed truck route through Mount Street and Edward Street is only permitted outside school hours, 8-9:30am and 2:30-4pm during school term.
7. Crane installation at stage 3 of development delivery must be considered under a separate CTMP for Council's consideration/approval.
8. Installation of any Works Zone is subject to the applicant acknowledge acceptance of the conditions of approval, in writing and paying all appropriate Council advertised fees and charges, including the cost of the signage, and is subject to separate approval from the North Sydney Traffic Committee.
9. Any approved Works Zone is to be used only to pick up and drop off materials and equipment. Construction vehicles are not to wait or park in the Works Zone, Truck Zone and Loading Zone.
10. The residents/shopkeepers of Bay Rd are to be notified by letter that the existing parking on the northern sider of Bay Rd, is to be removed and a Works Zone 7am to 5pm Monday to Friday, 8am to 1pm Saturday is to be installed. A copy of the notification is to be provided to Council before the signs are installed. The notification is to have the name and number of the site manager in case of complaints. The notification is to be distributed to the residents within 100 metre radius of the site.
11. A letter from north Sydney Public School needs to be submitted to Council prior to the WZ approval, acknowledging the proposed Work Zone and impacts on the existing on-Street parking and the and that Council is unable to assist in providing additional drop off/pick up areas for the school during school development period.
12. Any truck movement that causes delays to traffic must be managed by manned Traffic controllers.
13. Any Traffic Control Plans (TCP) prepared are to comply with AS1742.3 and Transport for NSW "Traffic Control at Worksites" manual V6 (2020) and be signed by a person with RMS certification to prepare TCP's. A copy of the TCP is to be held on site at all times by the responsible traffic controllers.
14. Access to adjoining residents and businesses are to be maintained at all times.
15. The adjoining residents and businesses are to be updated on a monthly basis and at key construction stages, particularly in relation to construction vehicle movements, and be provided with a phone number to contact the site manager.
16. The applicant shall provide monthly updates and notices at key stages of development particularly in relation to heavy vehicle movements and traffic changes, including monthly updates posted in a prominent position on the site hoarding including contact details of the site manager.
17. At no time shall Bay Road or any other road be blocked by any vehicle or works associated with the construction of the proposed development. Through traffic is to be maintained at all times.

18. Bay Road or any other road are not to be used as a waiting area for trucks delivering to or awaiting pick up of materials etc. from the proposed development.
19. Construction vehicles are not to queue in Bay Road or any other road.
20. Materials are to be stored on-site. At no time, are materials to be stored on any public road or any Council property.
21. Tower cranes shall be located wholly on-site.
22. Mobile cranes shall be located wholly on-site or with an approved Stand Plant Permit Concrete pumps shall be located wholly on-site or with an approved Stand Plant Permit, unless the pump and trucks can stand wholly within the signposted Works Zone.
23. All pump lines crossing Council footpaths must be ramped over to allow safe pedestrian/ wheelchair traffic at all times.
24. Pedestrian access on Bay Road or any other roads must be maintained at all times.
25. Pedestrian access and the diversion of pedestrians shall be carried out in accordance with Australian Standard 1742.3 and 1742.10.
26. If a Permit to Stand Plant or Temporary Road Closure is required, application must be made to NSW Police, North Shore Local Area command.
27. If a Permit to Stand Plant is required, application must be made to Council in accordance with Council's Stand Plant Permit Form and Conditions.
28. If a Temporary Road Closure is required, application must be made to Council in accordance with Council's Temporary Road Closure Form and Conditions.
29. A traffic route map and conditions are to be made available to truck drivers engaged for this development.
30. A list of truck drivers' names with their licences and vehicle plate numbers and conditions are to be kept on-site by the applicant at all times, and be made available for inspection by Council Officers, Police Officers and Council Rangers.
31. Repeated failure to comply with these conditions will result in removal of any Works Zone under notice.
32. Prior to the installation of the Works Zone signs, the applicant must pay the appropriate fees and acknowledge acceptance of these conditions of approval, in writing.
33. The applicant must give North Sydney Council (NSC) at least 2 weeks written notice if they wish to suspend the Works Zone. NSC may, at its sole discretion, allow for the suspension of the Works Zone subject to certain conditions. (Note: Generally, a Works Zone suspension will not be allowed if the suspension period is less than 4 weeks). The applicant will not be required to pay the lease fees for any period of Works Zone suspension.
34. The applicant must give NSC at least 2 weeks written notice if the Works Zone is no longer required. The applicant must notify NSC Traffic Operations Officer at Engineering@northsydney.nsw.gov.au for the Works Zone to be removed.
35. The applicant must notify NSC if the Works Zone is required to be extended with at least 2 weeks written notice prior to the expiry date. It's the applicant's responsibility to pay for the Works Zone lease fee if the Works Zone signs remain.
36. All Traffic Management Plans and Traffic Control Plans must be endorsed with the name of the person preparing the plan along with their level of certified qualification and certificate number. Only persons with current "Select/Modify Traffic Control Plans" or "Design Audit Traffic Control Plans" tickets are qualified to develop and endorse Traffic Management Plans and Traffic Control Plans.

Appendix G. Record of TfNSW Consultation

Wendy Zheng

From: Development Applications <Developments.CJP@transport.nsw.gov.au>
Sent: Tuesday, 30 November 2021 3:08 PM
To: Tarini Pathak
Cc: Jeremy Farrington; Alfred Jury; Dora Choi; Wendy Zheng; Iman Mohammadi
Subject: RE: North Sydney PS - Draft CPTMP
Attachments: P1723r03 CPTMP_North Sydney Public School, North Sydney.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Transport for NSW (TfNSW), Greater Sydney Division has reviewed the **Construction & Pedestrian Management Plan – North Sydney School Upgrades Revision 01** and endorse the proposed temporary construction arrangements for **Stage 1 & 2 only**, subject to the following conditions:

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- Vehicles should enter and leave the site in a forward facing direction when safe to do so.
- Transport for New South Wales reserve the right to alter the CTMP Conditions at any time to maintain safe and efficient traffic and pedestrian movements in this area.
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- Any traffic control devices, including signage and line marking, should be installed by the proponent and must conform with Australian Standards 1742.
- **Queues are not to impact the Pacific Highway at any time.**
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The proponent is to ensure local residents, businesses, schools and other stakeholders in the affected area as well as emergency service organisations are notified of the changes associated with the CTMP, prior to its implementation.

Please ensure this CTMP is shared and adhered to by all contractors. If the CTMP changes, please forward a copy to Developments.CJP@transport.nsw.gov.au or further review and endorsement.

OFFICIAL



From: Tarini Pathak <Tarini.Pathak@turntown.com>
Sent: Tuesday, 30 November 2021 8:38 AM
To: Iman Mohammadi <Iman.Mohammadi@northsydney.nsw.gov.au>; Peter Keyes <Peter.KEYES@transport.nsw.gov.au>
Cc: Jeremy Farrington <Jeremy.Farrington@det.nsw.edu.au>; Alfred Jury <Alfred.Jury3@det.nsw.edu.au>; Dora Choi <dora.choi@asongroup.com.au>; Wendy Zheng <wendy.zheng@asongroup.com.au>
Subject: North Sydney PS - Draft CPTMP

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Turner & Townsend Confidential

Hi Iman/ Peter,

In preparation for today's session, please see attached a draft CPTMP that will be presented and discussed at the 12:15 meeting today.

Thanks,
Tarini

Tarini Pathak
Senior Project Manager, Australia
Turner & Townsend
One Wharf Lane, Level 19, 171 Sussex Street, Sydney, NSW, 2000
t: +61 (0) 2 8245 0000 | m: +61 (0) 431 114 155 | www.turnerandtownsend.com

Turner & Townsend Thinc Pty Ltd
ABN 88 123 154 585

Turner & Townsend Limited

For further information and registration details visit our website
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Appendix H. Record of Busways Consultation

Angela Ji

From: Wendy Zheng
Sent: Monday, 7 March 2022 12:26 PM
To: Angela Ji
Subject: FW: North Sydney Demonstration School, Bay Road (Stop ID 206077) Relocation
Attachments: Bay Road, Waverton-North Sydney Demonstration School.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Bus consultation

From: Steve Grady <sgrady@busways.com.au>
Sent: Friday, 25 February 2022 8:13 AM
To: Wendy Zheng <wendy.zheng@asongroup.com.au>; Janine Crawford <janinecrawford@busways.com.au>; Jason Roberts <jasonroberts@busways.com.au>
Cc: Dora Choi <dora.choi@asongroup.com.au>; Michael Ettrick <michaele@taylorau.com.au>
Subject: RE: North Sydney Demonstration School, Bay Road (Stop ID 206077) Relocation

Hi Wendy,

Many thanks for the update and information regarding the proposed upgrade of the school.

Busways have no issues with relocating the timed Bus Zone on Bay Street whilst construction is ongoing.

As I mentioned, the preferred location for a bus zone is west of the existing marked pedestrian crossing at the frontage of the school on Bay Street. The location that I am suggesting is suitable as it is still close to the entrance to the school. The Bus Zone will only need to be 20 metres in length to accommodate a 12.5 metre long bus as on the departure side of the proposed bus zone, there is the No Stopping section where the bus can utilise when pulling out from the kerb.

I have attached an aerial photo of the location, showing the preferred location of the relocated bus zone for your assistance.

If there is anything else that I can assist you with, then please don't hesitate to get back to me.

Regards

Steve Grady

Network Infrastructure Supervisor – Sydney

Busways Penrith
47-53 Mullins Road
Penrith NSW 2750

T (02) 4721-8871 | M 0438 537 903 | W [busways.com.au](https://www.busways.com.au)



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From: Wendy Zheng <wendy.zheng@asongroup.com.au>
Sent: Thursday, 24 February 2022 6:01 PM
To: Steve Grady <sgrady@busways.com.au>; Janine Crawford <janinecrawford@busways.com.au>; Jason Roberts <jasonroberts@busways.com.au>
Cc: Dora Choi <dora.choi@asongroup.com.au>; Michael Ettrick <michaele@taylorau.com.au>
Subject: RE: North Sydney Demonstration School, Bay Road (Stop ID 206077) Relocation

Hi Steve

Thank you for the call.

As discussed, North Sydney Demonstration School Upgrade is due to commence construction soon which will involve the utilization of Bay Road as a work zone between Bay Road and Pacific Highway.

The proposed work zone for the most part will not affect the existing bus zone on Bay Road in front of the school but during heavy delivery times North Sydney Council will allow additional construction vehicles under a Stand Plant Permit which will intrude into the bus zone.

It would be safer for all involved if the bus stop can be temporarily relocated during the construction period preferably on the east side of the pedestrian crossing from where it is now.

Please let us know where the preferred relocated location is for the bus stop and the length, we're happy to work with Council and Busways for an outcome that would work for all involved.

If you have any questions feel free to call me.

Regards,
Wendy Zheng
Senior Traffic Design Engineer | Ason Group

T: +61 2 9083 6601 | **M:** +61 401 969 768 | **E:** wendy.zheng@asongroup.com.au
A: Suite 17.02, Level 17, 1 Castlereagh Street, Sydney NSW 2000

From: Steve Grady <sgrady@busways.com.au>
Sent: Thursday, 24 February 2022 1:45 PM
To: Janine Crawford <janinecrawford@busways.com.au>; Jason Roberts <jasonroberts@busways.com.au>
Cc: Wendy Zheng <wendy.zheng@asongroup.com.au>; Dora Choi <dora.choi@asongroup.com.au>
Subject: RE: North Sydney Demonstration School, Bay Road (Stop ID 206077) Relocation

Hi Janine,

I have left a voice mail for Wendy to call me back in relation to this matter.

Cheers,

Steve Grady

Network Infrastructure Supervisor – Sydney

Busways Penrith
47-53 Mullins Road
Penrith NSW 2750



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From: Janine Crawford <janinecrawford@busways.com.au>
Sent: Thursday, 24 February 2022 12:40 PM
To: Jason Roberts <jasonroberts@busways.com.au>; Steve Grady <sgrady@busways.com.au>
Cc: wendy.zheng@asongroup.com.au; dora.choi@asongroup.com.au
Subject: FW: North Sydney Demonstration School, Bay Road (Stop ID 206077) Relocation

Hi Jason – please see Wendy’s email below re planning a temporary relocation of a bus stop to accommodate improvement works are done on North Sydney Public School.

Could you please facilitate introduction to the appropriate person on the infrastructure team.

Thanks

Janine Crawford

Marketing Manager

National Support Office

5 Bridge Street, Pymble 2073

M +61 447 470 112 | W busways.com.au



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From: Wendy Zheng <wendy.zheng@asongroup.com.au>
Sent: Thursday, 24 February 2022 12:30 PM
To: Janine Crawford <janinecrawford@busways.com.au>
Cc: Dora Choi <dora.choi@asongroup.com.au>
Subject: North Sydney Demonstration School, Bay Road (Stop ID 206077) Relocation

Hi Janine

Thank you for answering my call, as discussed we are looking into the temporary relocation of the bus stop on Bay Road in front of North Sydney Demonstration School for construction works.

Please forward my details through to your planning department and we can pick up the conversation from there.

Regards,

Wendy Zheng

Senior Traffic Design Engineer | Ason Group

T: +61 2 9083 6601 | M: +61 401 969 768 | E: wendy.zheng@asongroup.com.au

A: Suite 17.02, Level 17, 1 Castlereagh Street, Sydney NSW 2000



Appendix I. Author CV

Dora has 20 years of professional experience across the fields of urban planning, and traffic and transport engineering. With specialities in concept and schematic traffic design, road safety engineering, construction traffic management planning and major event traffic and transport operations planning, Dora focus on achieving practical, customer centred solutions commensurate with the project type, purpose and level of user experience established in collaboration with clients, delivery partners and project teams.

Dora's expertise in land use development planning and design has specific focus on car park design, traffic

management system design, and loading facilities design and design of traffic systems based on the operational requirements as well as future adaptability of spaces. Dora has been involved in a broad range of traffic and transport projects providing high quality service and end to end project advice to a range of public and private sector clients.

Dora has worked on a broad range of inter-disciplinary design teams where she collaborated with clients and consultants of various disciplines in achieving forward thinking outcomes that considers both current and future needs of end users.

QUALIFICATIONS & EDUCATION

- Post Graduate Diploma in Transport and Traffic (Monash)
- Post Graduate Diploma Planning & Design (Melbourne)
- Bachelor of Science (Auckland)

- Current Ason Group (Principal Lead: Traffic Management & Operations)
- 2018 – 2020 GTA Consultants (Associate Director)
- 2008 – 2018 Ratio Consultants (Senior Associate)
- 2013 – 2014 G20 Taskforce, Department of the Prime Minister and Cabinet (Assistant Director – Transport)
- 2007 – 2008 City of Melbourne (Senior Traffic Engineer)
- 2006 – 2007 City of Port Phillip (Transport Engineering Officer)
- 2005 – 2006 City of Port Phillip (Melbourne 2006 Commonwealth Games Operations Planner)
- 2000 – 2005 City of Port Phillip (Various Roles)

PROFESSIONAL BACKGROUND

KEY SKILLS

- Transport Management and Operations Planning
- Transport Design
- Event Traffic and Transport Management Operations Planning and Delivery
- Stakeholder management

KEY PROJECTS

Warrick Lane Precinct, Blacktown NSW Blacktown City Council

The Warrick Lane Precinct (The Precinct) is located within the Blacktown City Centre, 500 metres east of Blacktown

Railway Station. The 2.8-hectare site has been identified for redevelopment as part of the of the Blacktown City Centre Transformation. The objective of the transformation is to provide employment, housing, social, cultural,

Principal Lead – Traffic Management & Operations

Email: dora.choi@asongroup.com.au

Phone: 0450 923 889

recreation and transport infrastructure within a framework of sustainability and design excellence.

Dora was engaged by Blacktown City Council to provide traffic and transport advice on the transformation project, and managed the delivery of a range of transport engineering output including schematic and detailed design input to the Project, Transport Impact Assessment in multiple phases, DA stage and Detailed Stage Construction Traffic and Pedestrian Management Plan preparation and worked closely with the broader project team.

Blacktown Health Precinct, Blacktown NSW Blacktown City Council

Blacktown Health Precinct is located to the east of the Blacktown City Centre. The Health Precinct has been identified as a transformation project of the Blacktown City Council to support the forecasted growth in population planned for Blacktown. The objective of the transformation is to provide employment and social infrastructure within a framework of sustainability and design excellence.

Dora was engaged by Blacktown City Council to provide traffic and transport advice on the transformation project, and managed the delivery of a range of transport engineering output including masterplan, strategic transport analytics and design input to the Project.

Woolworths National Loading Facilities Transport Management Safety Review | Woolworths

Dora was the National Technical Leader for the development and delivery of a loading facilities transport management safety review program for the Supermarkets branch of Woolworths which involved the development and delivery of a transport management inspection, review and reporting program involving over 1000 stores. Dora worked closely with the Health and Safety section of Woolworths and was a key member of the delivery team of the study.

Woolworths Drive Program Design Standards Development and Test Fit | Woolworths

Dora was the National Technical Design Lead for the review and provision of technical design advice to inform the development of standard layout and the design guideline of drive through facilities for Woolworth Supermarket assets.

Dora has completed a series of test fits across a number of stores located in NSW, SA, WA and NT reviewing and providing design options to retrofit drive through facilities.

Woolworths Minchinbury Distribution Centre (NSW) | Woolworths

Dora was the Project Director and Transport Engineering Lead for the redesign of loading, circulation and parking facilities within the existing Woolworths Minchinbury Distribution Centre and associated Development Application Transport Assessment and Modification application.

Woolworths Fresh Refrigerated Distribution Centre (VIC) | Fabcot

Dora was the Transport Engineering Lead from feasibility phase of the project, to completion of Planning Permit application and associated Concept to Schematic Design phases of the Woolworths Fresh Project in Truganina, Victoria. The project involved the development of a fourth leg to a roundabout, B-Double queuing areas, vehicle circulation, as well as parking facilities and design of a channelised right turn facility along Foundation Road.

Woolworths Melbourne South Regional Distribution Centre (VIC) | Fabcot

Dora was the Transport Engineering Lead for the project and has provided transport engineering input from the development of the Principal's Project Requirement, assisting the Project Architect in the development of a reference design, assistance in provision of transport engineering advice to inform site selection, subsequent Concept and Schematic Design work, and Transport Impact Assessment for the Planning Application.

Victoria Police Centre (2016 – 2020) and City West Police Complex (2011 – 2015), Melbourne | Cbus Property

The recently completed Victoria Police Centre and the City West Police Complex located at the corner of Spencer Street and La Trobe Street, Melbourne forms a custom-designed, integrated precinct.

Dora was the Transport Engineering Lead for the project since 2011 and has worked collaboratively with both the Project Principal, representatives of Victoria Police and the Project Design Team to develop custom designed solutions

Principal Lead – Traffic Management & Operations

Email: dora.choi@asongroup.com.au

Phone: 0450 923 889

to traffic and transport facilities associated with the development. Dora prepared Transport Assessment reports, technical memorandums, and heavily involved in consultation with authorities and stakeholder consultation.

Secure Facilities, Melbourne | Reserve Bank of Australia

Dora was the Traffic Management Lead for the Secure Facilities developed by the Reserve Bank of Australia in Craigieburn, Melbourne.

Dora was engaged to develop traffic management arrangements, functional requirements and specifications embedded into the architectural, civil and security arrangements of the project.

Other Select Projects:

Education

Alex Avenue Public School | NSW Department of Education

Dora was the Transport Engineering Lead for the project, and assisted in the preparation of contingency parking and site access design, responses to Response to Submissions, development of School Transport Plan, and liaison with Council.

Estella Public School | NSW Department of Education

Dora was the Transport Engineering Lead for the project, and assisted in the preparation of responses to Response to Submissions, development of site access design, School Transport Plan, and liaison with key stakeholders.

Barramurra Public School | NSW Department of Education

Dora was the Transport Engineering Lead for the project, and assisted in the preparation of responses to Response to Submissions, development of site access design, School Transport Plan, and liaison with key stakeholders.

Hastings Secondary College (Port Macquarie Campus) | NSW Department of Education

Dora was the Transport Engineering Lead for the project, and assisted in the preparation of contingency parking and site access design, responses to Response to Submissions,

development of Preliminary School Transport Plan, and liaison with Council.

Murrumbateman Public School | NSW Department of Education

Dora is the Transport Engineering Lead for the project, and assisted in the preparation of responses to Response to Submissions, development of site access design, School Transport Plan, and liaison with key stakeholders.

Googong Public School | NSW Department of Education

Dora is the Transport Engineering Lead for the project, and assisted in the preparation of responses to Response to Submissions, development of site access design, School Transport Plan, and liaison with key stakeholders.

North Sydney Public School | NSW Department of Education

Dora is the Transport Engineering Lead for the project, and assisted in the preparation of contingency parking and site access design, responses to Response to Submissions, development of School Transport Plan, and liaison with Council.

Mixed Use

Langston Place, Epping (NSW) | Cbus Property

88 Walker Street, North Sydney | Billbergia

1 Dension Street, North Sydney | Multiplex and The Winten Property Group

435 Collins Street, Melbourne (VIC) | Cbus Property

140 – 150 Queen Street, Melbourne (VIC) | Cbus Property

Community

Tom Wills Community Oval | Sydney Olympic Park Authority

Wendy is a qualified civil engineer with eight years of work experience across project management, traffic engineering, construction management, and civil and drainage design

During this time, Wendy has been involved in numerous projects for both private organisations and government agencies in Australia and United Kingdom.

Wendy has demonstrated her ability across numerous areas of traffic engineering, transport construction, and civil design and has been involved in many significant projects.

Past projects have ranged in size from detailed design of intersection upgrades to the preparation of Construction Traffic Management Plans, Traffic Control Plans, and Construction and Occupation Certification for both private

and public clients. Wendy also has experience dealing with the Transport Management Centre to obtain Road Occupancy Licenses as well as negotiating with Sydney Coordination Office for CTMP approvals.

While working in the UK Wendy was involved in the management, design and delivery of several large scale projects for local councils such as the School Streets project for Haringey and Liveable Streets programme in Tower Hamlets.

Wendy has worked on a broad range of inter-disciplinary design teams where she collaborated with clients and consultants of various disciplines in achieving forward thinking outcomes that considers both current and future needs of end users.

QUALIFICATIONS & EDUCATION

- Master of Engineering Management (University of Technology Sydney)
- BE Civil Engineering w Architecture (University of New South Wales)
- RMS Prepare a Work Zone Traffic Management Plan Card (Combined orange and red card)
- WorkCover Occupational Health and Safety Construction Induction Card.
- Member of Engineers Australia

PROFESSIONAL BACKGROUND

- 2020 – Current: Ason Group
Senior Traffic Design Engineer
- 2019 – 2020: Project Centre Limited (UK)
Senior Traffic Engineer
- 2019 – 2019: WSP (UK)
Senior Engineer
- 2016 – 2019: GTA Sydney
Consultant and Senior Consultant
- 2012 – 2016: The Hills Shire Council
Graduate, and Civil Design Engineer

KEY SKILLS

- Transport Management and Operations Planning
- Transport Design
- Civil and Drainage Design
- Stakeholder management
- Autocad suite / Microstation
- Vehicle tracking / Autoturn

KEY PROJECTS & EXPERIENCE

388 George Street, Sydney | Multiplex

Wendy was the Project Manager and Traffic Management Lead for the Construction Traffic Management Planning for the development, as well as the internal traffic management works with the adjoining building that include coordination with Sydney Light Rail Works and construction activities of other nearby developments.

David Jones Elizabeth Street, Sydney | Mainbrace

Wendy was the Project Manager and Traffic Management Lead for the Construction Traffic Management Planning for

the development in obtaining the first approval for nighttime concrete works in the CBD from SCO and overtime ROLs while liaising with adjoining developments and Sydney Metro.

Langston Place, Epping | Hutchison Builders

Wendy was the Project Manager and Traffic Management Lead for the Construction Traffic Management Planning for the development in obtaining the first approval for construction works during Epping to Chatswood rail replacement period from the expanded SCO.

Appendix 9 – Construction Noise & Vibration Management Sub-Plan

Refer to [Condition B16] Construction Noise & Vibration Management Sub Plan



North Sydney Public School – Construction Noise and Vibration Management Sub Plan

Taylor Construction Group

Report number: 220015-NSPS-CNVMSP-220113-R2

Date: 9 June 2022

Version: For Information

Project Number: 220015

DOCUMENT CONTROL

Project Name	North Sydney Public School – Construction Noise and Vibration Management Sub Plan
Project Number	220015
Report Reference	220015-NSPS-CNVMS-22013-R2
Client:	Taylor Construction Group

Revision	Description	Reference	Date	Prepared	Checked	Authorised
1	Issue 1	220015-NSPS-CNVMS-220113-R1	13 January 2022	Ben White	Matt Furlong	Ben White
2	Issue 2	220015-NSPS-CNVMS-220113-R2	9 June 2022	Ben White	Matt Furlong	Ben White

PREPARED BY:

Pulse White Noise Acoustics Pty Ltd
ABN 95 642 886 306
Level 5, 73 Walker Street, North Sydney, 2060
1800 4 PULSE

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 the 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 to prepare a Construction Noise and Vibration Management Sub Plan (CNVMSP) for the construction activities to be undertaken as part of the North Sydney Public School upgrade including item B16 of the SSD-11869481.

This assessment has been undertaken based on the previously completed Marshall Day Acoustics *North Sydney Public School Upgrade - SSDA Noise and Vibration Assessment* dated 13 August 2021 and reference: Rp 001 20210481 which has been included in the project submission and a site noise survey completed at the site and detailed in this report.

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

The author of this report is a director of Pulse White Noise Acoustics who is a member of the Australian Acoustic Society, details including Ben's CV and membership of the AAS are included in Appendix B.

1.1 Site Layout and Development Overview

The North Sydney Public School is located to the west of the Pacific Highway and include McHatton Street to the north and Bay Road to the south. See **Error! Reference source not found.** below.

It is proposed to upgrade the site, demolishing existing various permanent and temporary buildings and constructing a new 3 level building for administration, Library Homebase rooms and a Hall. The existing library in building G will be internally refurbished and converted to 3 Homebase rooms. The project also will include minor refurbishment of student WCs and canteen.

The upgrade of North Sydney Public School includes the scope of works including the SSD-11869481 submission.

Residential receivers which are located within proximity to the site include a combination of single and two storey dwellings with windows overlooking the school property.

The nearest sensitive receivers to the site have been identified below.

- | | |
|---------------------|---|
| Receiver 1: | 225-229 Pacific Highway – Residential multi story apartment block located opposite the site on the Pacific Highway to the east. |
| Receiver 2: | 174-180 Pacific Highway – Multi story mixed use residential and commercial receiver located to the south of the site opposite on Bay Street. |
| Receiver 3: | 4 -6 Bay Road – Commercial receivers located to the south of the site opposite on Bay Street. |
| Receiver 4: | 8 to 18 Bay Road – Single and 2 story residential dwellings located to the south of the site opposite on Bay Street. |
| Receiver 5: | 20 to 40 Bay Road - Single and 2 story residential dwellings located to the south of the site opposite on Bay Street. |
| Receiver 6: | 11 to 17 Bay Road - Single and 2 story residential dwellings located to the west of the site on Bay Street. |
| Receiver 7: | 1 to 5 McHatton Street - Single and 2 story residential dwellings located to the west of the site on McHatton Street. |
| Receiver 8: | 6 to 18 McHatton Street - Single and 2 story residential dwellings located to the north of the site opposite on McHatton Street. |
| Receiver 9: | 22 to 30 McHatton Street - Single and 2 story residential dwellings located to the north of the site opposite on McHatton Street. |
| Receiver 10: | 188 Pacific Highway - Single level residential dwelling located to the north east of the site on the corner of the Pacific Highway and McHatton Street. |

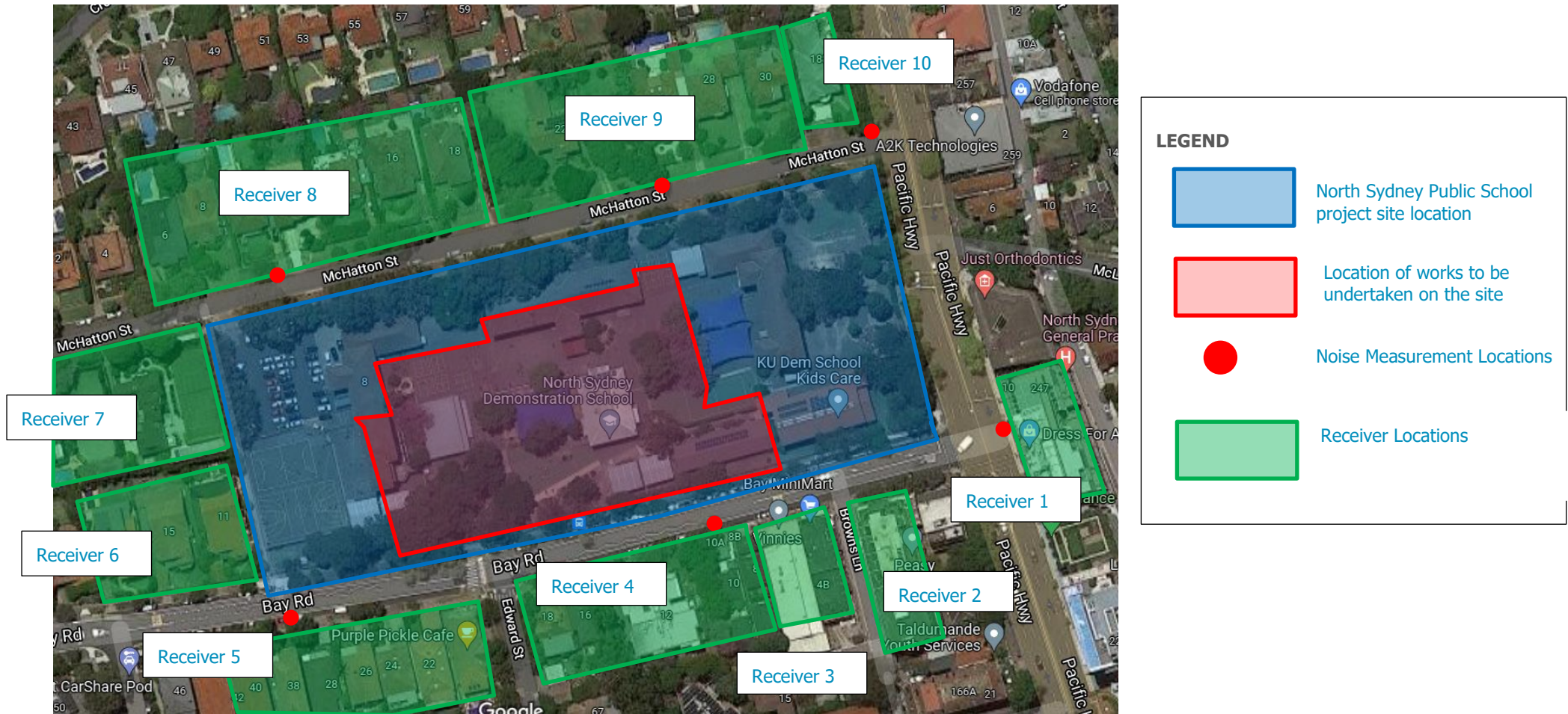


Figure 1 Site Map, Measurement Locations and Surrounding Receivers

1.2 SSD Compliance

This CNVSP has been prepared in accordance with the SSD-11869481 consent condition B16 which includes the states:

- B16. The Construction Noise and Vibration Management Sub-Plan must address, but not be limited to, the following:
- (a) be prepared by a suitably qualified and experienced noise expert;
 - (b) describe procedures for achieving the noise management levels in EPA's *Interim Construction Noise Guideline* (DECC, 2009);
 - (c) describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;
 - (d) describe the measures to be implemented to ensure that the noise generated by the construction activities do not have adverse impacts on the ongoing operation of the school;
 - (e) include strategies that have been developed with the community for managing high noise generating works including (but not limited to) respite periods during the day;
 - (f) describe the community consultation undertaken to develop the strategies in condition B16(e);
 - (g) include a complaints management system that would be implemented for the duration of the construction; and
 - (h) include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the implemented management measures in accordance with the requirements of condition B13.

This report has been undertaken in accordance with the requirements of Item B16 of the project's conditions of consent. Details of conditions of consent and sections of the report which include the required items required by the consent are included in the table below.

Table 1 SSD Compliance Table

SSD Condition number	Requirement	Report Reference for Satisfaction
B16	<i>B16. The Construction Noise and Vibration Management Sub-Plan must address, but not be limited to, the following:</i>	-
(a)	<i>be prepared by a suitably qualified and experienced noise expert;</i>	Ben white is a director of Pulse White Noise Acoustics, Ben's CV and membership of the Australian Acoustic Society is included in Appendix B.
(b)	<i>describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009);</i>	Sections 4.1
(c)	<i>describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;</i>	Section 6.1 and 6.2
(d)	<i>describe the measures to be implemented to ensure that the noise generated by the construction activities do not have adverse impacts on the ongoing operation of the school;</i>	Section 6.1 and 6.2
(e)	<i>include strategies that have been developed with the community for managing high noise generating works including (but not limited to) respite periods during the day;</i>	Section 6.5.4 and Section 6.5.5.
(f)	<i>describe the community consultation undertaken to develop the strategies in condition B16(e);</i>	Section 6.5.2 and Appendix C
(g)	<i>include a complaints management system that would be implemented for the duration of the construction; and</i>	Section 6.6
(h)	<i>include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the implemented management measures in accordance with the requirements of condition B11</i>	Section 6.2.2 and Section 6.3.2

2 PROJECT DESCRIPTION

The proposed works to be undertaken as part of the North Sydney Public School upgrades includes the demolition of a number of existing structures on the site, including temporary buildings, Building B, covered areas, and Building C. Details of the required demolition to be undertaken as part of the project are detailed in Figure 2 below.

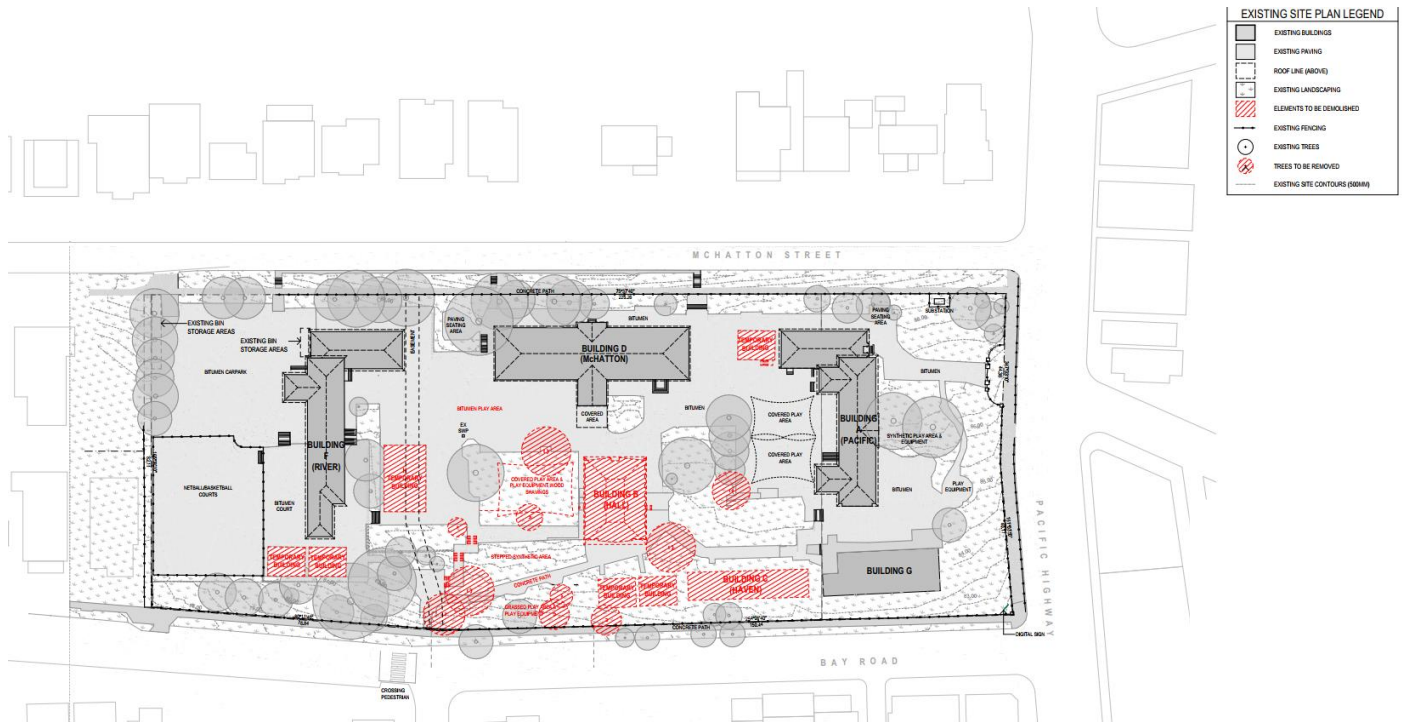


Figure 2 Required Demolition on the site

Demolition required to be undertaken on the site does not required removal of Significant areas of concrete structures or the like. All demolition works are located within the exiting North Sydney School site and include distance separation to the surrounding residential receivers within proximity of the site.

Construction on the site includes new buildings, predominantly to the south of the site on Bay Road. Construction is to include new school buildings and will include standards construction methodologies. Details of the construction to be undertaken on the site are included in Figure 3 below.

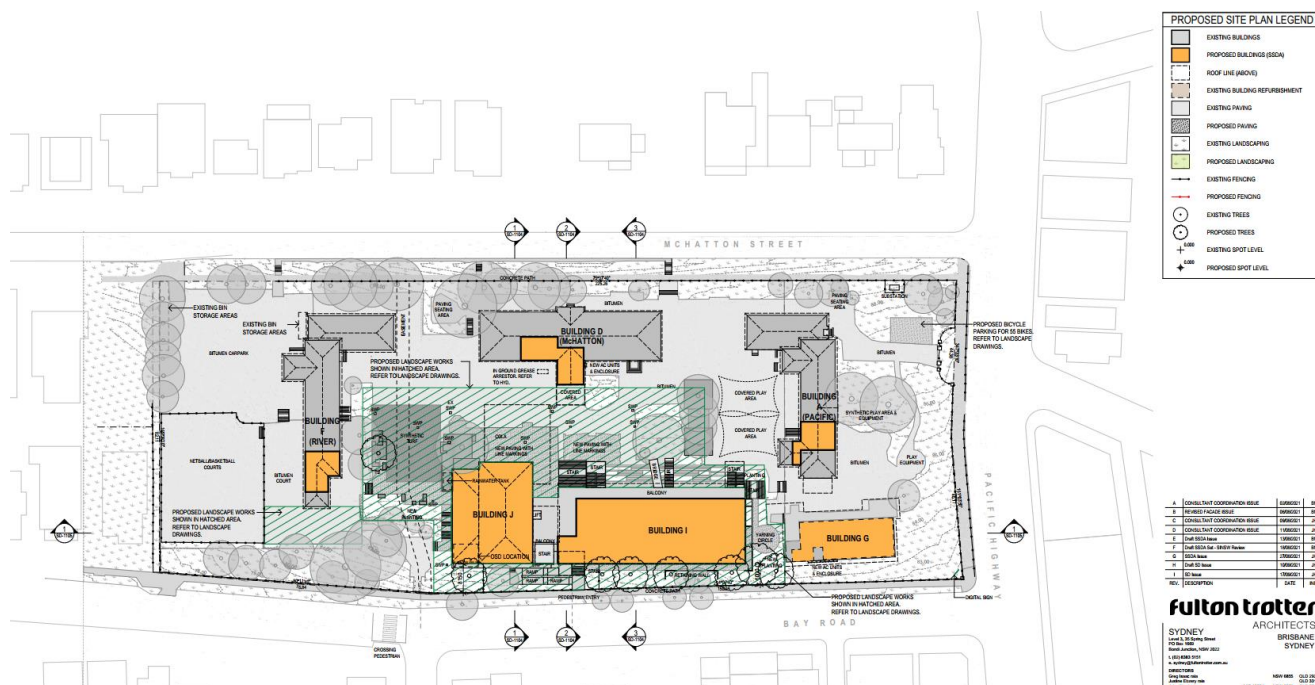


Figure 3 New construction on the Site

Construction on the site include building located within the existing North Sydney School site, which are not located on the boundary of the site to neighbouring residential receivers. Based on the location of the required works to be undertaken on the site there is a distance separation between areas where works are to be conducted and residential receivers within proximity of the site.

3 EXISTING ACOUSTIC ENVIRONMENT

Environmental noise constantly varies in level with time. Therefore, it is necessary to measure noise in terms of quantifiable time periods with statistical descriptors. Typically environmental noise is measured over 15 minute periods and relevant statistical descriptors of the fluctuating noise are determined to quantify the measured level.

Noise (or sound) consists of minute fluctuations in atmospheric pressure capable of detection by human hearing. Noise levels are expressed in terms of decibels, abbreviated as dB or dBA, the "A" indicating that the noise levels have been frequency weighted to approximate the characteristics of normal human hearing. Because noise is measured using a logarithmic scale, 'normal' linear arithmetic does not apply, e.g. adding two sound sources of equal values result in an increase of 3 dB (i.e. 60 dBA plus 60 dBA results in 63 dBA). A change of 1 dB or 2 dB in the sound level is difficult for most people to detect, whilst a 3 dB – 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change roughly corresponds to a doubling or halving in loudness.

Specific acoustic terminology is used in this assessment report. An explanation of common acoustic terms is included in Appendix A.

This assessment has been undertaken based on the previously completed Marshall Day Acoustics *North Sydney Public School Upgrade - SSDA Noise and Vibration Assessment* dated 13 August 2021 and reference: Rp 001 20210481 which has been included in the SSD submission SSD-11869481 and the acoustic site noise survey detailed in this section of the report.

As part of the Marshall Day Acoustics *North Sydney Public School Upgrade - SSDA Noise and Vibration Assessment* background noise levels within the vicinity of the site have been determined and are detailed in Section 4 of the *North Sydney Public School Upgrade - SSDA Noise and Vibration Assessment*.

The Rating Background Noise Level (RBL) is the background noise level used for assessment purposes and includes the 90th percentile of the daily background noise levels during each assessment period, being day, evening and night. The RBL LA90 (15minute) and LAeq noise levels which are presented within the Marshall Day Acoustics *North Sydney Public School Upgrade - SSDA Noise and Vibration Assessment* are detailed in the table below.

Table 2 Presented Background Noise Levels - Marshall Day Acoustics *North Sydney Public School Upgrade - SSDA Noise and Vibration Assessment*

Location	Daytime 7:00 am to 6:00 pm	Evening 6:00 pm to 10:00 pm	Night-time 10:00 pm to 7:00 am
	LA90 ¹ (dBA)	LA90 ¹ (dBA)	LA90 ¹ (dBA)
Southeast of the site Receiver 1	55	50	45
South of the site Receivers 2 and 3	50	45	40
South of the site Receivers 4 and 5	45	40	35
West of the site Receivers 6 and 7	45	40	35
North of the site Receiver 8	45	40	35
North of the site Receiver 9	50	45	40
North of the site Receiver 10	55	50	45
<i>Note 1: The LA90 noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.</i>			

3.1.1 Noise Survey Measurements

In addition to the previously undertaken Marshall Day Acoustics *North Sydney Public School Upgrade - SSDA Noise and Vibration Assessment* an acoustic noise survey of the site has been conducted as part of this assessment. The site survey has included attended noise survey which has been undertaken to supplement the *SSD Noise and Vibration Assessment*. The site noise survey was undertaken during a typical daytime period when construction on the site will be undertaken. The attended noise levels measurements were undertaken using a Bruel and Kjaer 2236C type meter. The meter was calibrated before and after testing and no significant drift was recorded. All noise level measurements were undertaken in accordance with the measurement requirements of the Australian Standard AS1055:2018 '*Acoustics - Description and measurement of environmental noise*'.

The attended and unattended noise locations were selected to obtain suitable noise levels for the assessment of background noise levels ($L_{90(t)}$) as well as the impact from traffic movements ($Leq(t)$).

The existing noise survey was undertaken at the site on the 14th January 2022 during a typical daytime periods when construction would be undertaken. The results of the attended noise level measurements are detailed in the table below.

Table 3 Acoustic Site Survey Results

Measurement Location	Time of measurement	Measured $L_{Aeq, 15min}$ dB(A)	Measured $L_{A90, 15min}$ dB(A)	Comments
Pacific Highway Southeast of the site	9.15am to 9.30am	68	57	Majority of noise resulting from transportation noise including traffic noise from roadways within vicinity of the site.
Bay Road – East South of the site	9.35am to 9.50am	65	55	
Bay Road – West South of the site	10.00am to 10.15am	64	51	
McHatton Street – West North of the site	10.20am to 10.35am	58	47	
McHatton Street – East North of the site	10.40am to 10.55am	64	52	
Pacific Highway Northeast of the site	11.00am to 11.15am	67	56	

The background noise levels used in this assessment include the more conservative levels of both the previously completed Marshall Day Acoustics *North Sydney Public School Upgrade - SSDA Noise and Vibration Assessment* and the site acoustic survey detailed above.

4 NOISE AND VIBRATION CRITERIA

Relevant noise and vibration criteria for construction activities are detailed in this section of the report.

4.1 Construction Noise Objectives

Relevant construction noise objectives applicable to this project are outlined below.

4.1.1 NSW EPA (Former DECC) Interim Construction Noise Guideline (ICNG) 2009

Noise objective 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 4 below.

Table 4 NMLs for Quantitative Construction Noise Assessment

Receiver Type	Time of Day	Noise Management Level $L_{Aeq(15minute)}^{1,2}$	How to Apply
Residential	Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays Or Project approved working hours included in the SSD Consent	Noise affected RBL + 10 dB	<p>The noise affected level represents the point above which there may be some community reaction to noise.</p> <p>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.</p> <p>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.</p>
		Highly noise affected 75 dBA	<p>The highly noise affected level represents the point above which there may be strong community reaction to noise.</p> <p>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:</p> <ol style="list-style-type: none"> 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	<p>A strong justification would typically be required for works outside the recommended standard hours.</p> <p>The proponent should apply all feasible and reasonable work practices to meet the noise affected level.</p> <p>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.</p>

Receiver Type	Time of Day	Noise Management Level $L_{Aeq(15\text{minute})}^{1,2}$	How to Apply
offices, retail outlets: external	When is use	$L_{Aeq(15\text{ min})}$ 70 dB(A)	During construction, the proponent should regularly update the occupants of the commercial and industrial premises regarding noise levels and hours of work.
<p><i>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.</i></p> <p><i>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 Industrial Noise Policy (EPA 2000).</i></p>			

Construction noise levels at other noise receivers are outlined below:

- Construction noise levels within classrooms other educational institutions is not recommended to exceed 45dBA $L_{Aeq,15\text{minute}}$ when measured internally.
- Construction noise levels at offices and retail outlets are not recommended to exceed 70dBA $L_{Aeq,15\text{minute}}$ when measured externally.

Based on the measured background noise levels summarised in Section 1.2, and the NMLs outlined above, the construction noise criteria to be used in this assessment are listed in Table 5.

Table 5 NMLs as basis for the acoustic assessment

Receiver Location	NML, dB $L_{Aeq(15\text{minute})}$	
	Standard Hours Monday to Friday: 7:00am to 6:00pm Saturday: 8:00am to 1:00pm	Outside Standard Hours All hours not listed in the adjacent column.
Receiver 1 – Residential 225-229 Pacific Highway	NAFL: 65 (RBL (55) + 10dB)	HNAL: 75 RBL + 5dB
Receiver 2 – Residential 174-180 Pacific Highway	NAFL: 60 (RBL (50) + 10dB)	
Receiver 3 – Commercial 4-6 Bay Road	NAFL: 70	
Receiver 4 – Residential 8-18 Bay Road	NAFL: 55 (RBL (45) + 10dB)	
Receiver 5 – Residential 20-40 Bay Road	NAFL: 55 (RBL (45) + 10dB)	
Receiver 6 – Residential 11-17 Bay Road	NAFL: 55 (RBL (45) + 10dB)	
Receiver 7 – Residential 1-5 McHatton Street	NAFL: 55 (RBL (45) + 10dB)	
Receiver 8 – Residential 8-18 McHatton Street	NAFL: 55 (RBL (45) + 10dB)	
Receiver 9 – Residential 22-30 McHatton Street	NAFL: 60 (RBL (50) + 10dB)	
Receiver 10 – Residential 188 Pacific Highway	NAFL: 65 (RBL (55) + 10dB)	

4.2 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.
- Effects on building contents – where vibration can cause damage to fixtures, fittings and other non-building related objects.
- Effects on building structures – where vibration can compromise the integrity of the building or structure itself.

4.2.1 Vibration Criteria – Human Comfort

Vibration effects relating specifically to the human comfort aspects of the project are taken from AV-TG. This type of impact can be further categorised and assessed using the appropriate criterion as follows:

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

Table 6 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
Critical working areas (e.g. hospital operating theatres, precision laboratories)	Day or night-time	0.0050	0.010	0.10	0.20
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
Workshops	Day or night-time	0.04	0.029	0.080	0.058

Table 7 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
Critical working areas (e.g. hospital operating theatres, precision laboratories)	Day or night-time	0.0050	0.010	0.10	0.20
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
Workshops	Day or night-time	0.64	0.46	1.28	0.92

Table 8 Intermittent vibration impacts criteria (m/s^{1.75}) 1 Hz-80 Hz

Location	Daytime		Night-time	
	Preferred Values	Maximum Values	Preferred Values	Maximum Values
Critical working areas (e.g. hospital operating theatres, precision laboratories)	0.10	0.20	0.10	0.20
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
Workshops	0.80	1.60	0.80	1.60

4.2.2 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).

4.2.3 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 below.

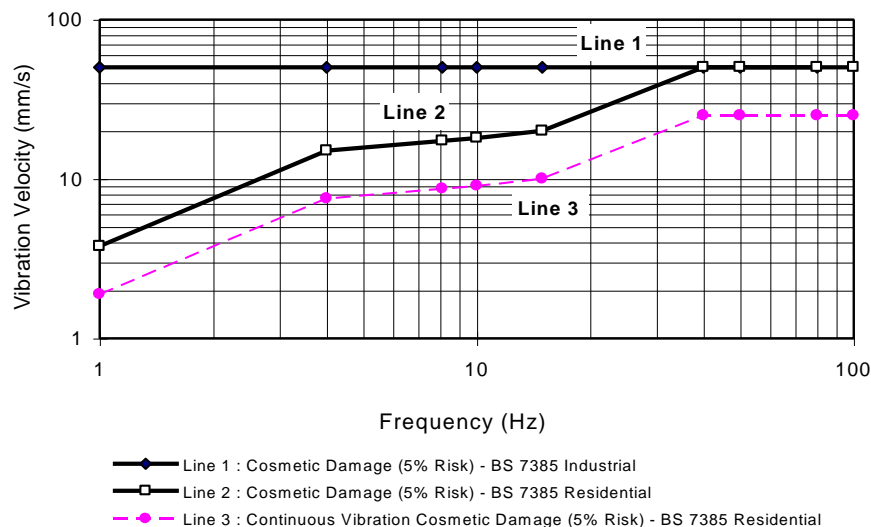
Table 9 Transient vibration criteria as per standard BS 7385 Part 2 - 1993

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 9 relate to transient vibration which does not cause resonant responses in buildings.

Where the dynamic loading caused by continuous vibration events is such that it results in dynamic magnification due to resonance (especially at the lower frequencies where lower guide values apply), then the values in Table 9 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 9, 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 the 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 9 should not be reduced for fatigue considerations.

4.2.4 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 10. The criteria are frequency dependent and specific to particular categories of structures.

Table 10 Structural damage criteria as per standard DIN 4150 Part 3 - 1999

Type of Structure	Peak Component Particle Velocity, mm/s			Vibration of horizontal plane of highest floor at all frequencies
	Vibration at the foundation at a frequency of 1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz ¹	
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
<i>Note 1: For frequencies above 100Hz, at least the values specified in this column shall be applied.</i>				

Based on the required works to be undertaken on the site including demolition, ground works and construction compliance with the relevant construction vibration criteria is expected to be complied with based on the location works within the North Sydney School site (see Figure 2 and Figure 3 above) and the distance separation to the surrounding receivers.

5 NOISE AND VIBRATION ASSESSMENT

This section of the report details the assessment of construction noise and vibration resulting from the required works to be undertaken on the site.

5.1 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 10 below.

Table 11 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 and Demolition	Excavator	112	117
	Hand held jack hammer ¹	111	
	Dump truck ¹	104	
	Concrete saw ¹	114	
	Skid steer	110	
	Power hand tools	109	
Structure	Hand held jack hammer ¹	106	115
	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.



5.2 Predicted Construction Noise Levels

Predicted construction noise levels are presented below for each of the surrounding receivers in accordance with the NSW EPA ICNG.

Note:

- Predicted noise levels presented below are given in a range, this includes the expected minimums as well as the maximums.
- With regards to the maximum noise levels in the range, these are typically experienced when plant/works are within close proximity to a boundary. In our experience whilst these levels above NML's and considered intrusive they will only occur for a short time and is not a representation of noise levels during the entire construction period.

**Table 12 Receiver 1 – Summary of preliminary predicted construction noise levels**

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted <u>Individual</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Predicted <u>Combined</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Noise Management Level dBA L _{Aeq} 15 minutes	Summary of Result							
Site Establishment Works	Mobile crane	113	56 to 69	59 to 72	Noise Affected Level 65 Highly Noise Affected Level 75	Works indicatively predicted to have the potential to exceed the noise management level when working near the receiver.							
	Power hand tools		55 to 68										
	Semi Rigid Vehicle		46 to 59										
Ground Works and Demolition	Excavator	117	58 to 71	63 to 76			Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.						
	Handheld jack hammer		52 to 65										
	Dump truck		45 to 58										
	Concrete saw		55 to 68										
	Skid steer		56 to 69										
	Power hand tools		55 to 68										
Structure	Handheld jack hammer	115	47 to 60	61 to 74									
	Concrete saw		55 to 68										
	Power hand tools		55 to 68										
	Welder		47 to 60										
	Concrete pump truck		56 to 69										
	Concrete agitator truck		54 to 67										
Internal Works	Power hand tools	109	55 to 68	55 to 68									
Common and External Works	Concrete agitator truck	114	54 to 67	60 to 73									
	Saw cutter		45 to 58										
	Dump truck		45 to 58										
	Concrete saw		55 to 68										
	Power hand tools		55 to 68										

**Table 13 Receiver 2 – Summary of predicted construction noise levels**

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted <u>Individual</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Predicted <u>Combined</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Noise Management Level dBA L _{Aeq} 15 minutes	Summary of Result
Site Establishment Works	Mobile crane	113	56 to 72	59 to 75	Noise Affected Level 60	Works indicatively predicted to have the potential to exceed the noise management level when working near the receiver.
	Power hand tools		55 to 71			
	Semi Rigid Vehicle		46 to 63			
Ground Works and Demolition	Excavator	117	58 to 74	63 to 79	Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.
	Handheld jack hammer		52 to 69			
	Dump truck		45 to 62			
	Concrete saw		55 to 72			
	Skid steer		56 to 72			
	Power hand tools		55 to 71			
Structure	Handheld jack hammer	115	47 to 64	61 to 78		
	Concrete saw		55 to 72			
	Power hand tools		55 to 71			
	Welder		47 to 63			
	Concrete pump truck		56 to 72			
	Concrete agitator truck		54 to 70			
Internal Works	Power hand tools	109	55 to 71	55 to 61		
Common and External Works	Concrete agitator truck	114	54 to 70	60 to 76		
	Saw cutter		45 to 62			
	Dump truck		45 to 62			
	Concrete saw		55 to 72			
	Power hand tools		55 to 71			

**Table 14 Receiver 3 - Summary of predicted construction noise levels**

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted <u>Individual</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Predicted <u>Combined</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Noise Management Level dBA L _{Aeq} 15 minutes	Summary of Result
Site Establishment Works	Mobile crane	113	56 to 72	59 to 75	Noise Affected Level 70	Works indicatively predicted to have the potential to exceed the noise management level when working near the receiver.
	Power hand tools		55 to 71			
	Semi Rigid Vehicle		46 to 63			
Ground Works and Demolition	Excavator	117	58 to 74	63 to 79	Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.
	Handheld jack hammer		52 to 69			
	Dump truck		45 to 62			
	Concrete saw		55 to 72			
	Skid steer		56 to 72			
	Power hand tools		55 to 71			
Structure	Handheld jack hammer	115	47 to 64	61 to 78		
	Concrete saw		55 to 72			
	Power hand tools		55 to 71			
	Welder		47 to 63			
	Concrete pump truck		56 to 72			
	Concrete agitator truck		54 to 70			
Internal Works	Power hand tools	109	55 to 71	55 to 61		
Common and External Works	Concrete agitator truck	114	54 to 70	60 to 76		
	Saw cutter		45 to 62			
	Dump truck		45 to 62			
	Concrete saw		55 to 72			
	Power hand tools		55 to 71			

**Table 15 Receiver 4 - Summary of predicted construction noise levels**

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted <u>Individual</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Predicted <u>Combined</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Noise Management Level dBA L _{Aeq} 15 minutes	Summary of Result
Site Establishment Works	Mobile crane	113	56 to 72	59 to 75	Noise Affected Level 55	Works indicatively predicted to have the potential to exceed the noise management level when working near the receiver.
	Power hand tools		55 to 71			
	Semi Rigid Vehicle		46 to 63			
Ground Works and Demolition	Excavator	117	58 to 74	63 to 79	Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.
	Handheld jack hammer		52 to 69			
	Dump truck		45 to 62			
	Concrete saw		55 to 72			
	Skid steer		56 to 72			
	Power hand tools		55 to 71			
Structure	Handheld jack hammer	115	47 to 64	61 to 78		
	Concrete saw		55 to 72			
	Power hand tools		55 to 71			
	Welder		47 to 63			
	Concrete pump truck		56 to 72			
	Concrete agitator truck		54 to 70			
Internal Works	Power hand tools	109	55 to 71	55 to 61		
Common and External Works	Concrete agitator truck	114	54 to 70	60 to 76		
	Saw cutter		45 to 62			
	Dump truck		45 to 62			
	Concrete saw		55 to 72			
	Power hand tools		55 to 71			

**Table 16 Receiver 5 - Summary of predicted construction noise levels**

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted <u>Individual</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Predicted <u>Combined</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Noise Management Level dBA L _{Aeq} 15 minutes	Summary of Result							
Site Establishment Works	Mobile crane	113	56 to 68	59 to 71	Noise Affected Level 55 Highly Noise Affected Level 75	Works indicatively predicted to have the potential to exceed the noise management level when working near the receiver.							
	Power hand tools		55 to 67										
	Semi Rigid Vehicle		46 to 58										
Ground Works and Demolition	Excavator	117	58 to 70	63 to 75		Noise Affected Level 55 Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.						
	Handheld jack hammer		52 to 64										
	Dump truck		45 to 57										
	Concrete saw		55 to 67										
	Skid steer		d to 68										
	Power hand tools		55 to 67										
Structure	Handheld jack hammer	115	47 to 59	61 to 73				Noise Affected Level 55 Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.				
	Concrete saw		55 to 67										
	Power hand tools		55 to 67										
	Welder		47 to 59										
	Concrete pump truck		56 to 68										
	Concrete agitator truck		54 to 66										
Internal Works	Power hand tools	109	55 to 67	55 to 67						Noise Affected Level 55 Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.		
Common and External Works	Concrete agitator truck	114	54 to 66	60 to 72								Noise Affected Level 55 Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.
	Saw cutter		45 to 57										
	Dump truck		45 to 57										
	Concrete saw		55 to 67										
	Power hand tools		55 to 67										

**Table 17 Receiver 6 - Summary of predicted construction noise levels**

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted <u>Individual</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Predicted <u>Combined</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Noise Management Level dBA L _{Aeq} 15 minutes	Summary of Result							
Site Establishment Works	Mobile crane	113	55 to 68	58 to 71	Noise Affected Level 55 Highly Noise Affected Level 75	Works indicatively predicted to have the potential to exceed the noise management level when working near the receiver.							
	Power hand tools		54 to 67										
	Semi Rigid Vehicle		45 to 58										
Ground Works and Demolition	Excavator	117	57 to 70	62 to 75			Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.						
	Handheld jack hammer		51 to 64										
	Dump truck		44 to 57										
	Concrete saw		54 to 67										
	Skid steer		55 to 68										
	Power hand tools		54 to 67										
Structure	Handheld jack hammer	115	46 to 59	60 to 73									
	Concrete saw		54 to 67										
	Power hand tools		54 to 67										
	Welder		46 to 59										
	Concrete pump truck		55 to 68										
	Concrete agitator truck		53 to 66										
Internal Works	Power hand tools	109	54 to 67	54 to 67									
Common and External Works	Concrete agitator truck	114	53 to 66	59 to 72									
	Saw cutter		44 to 57										
	Dump truck		44 to 57										
	Concrete saw		54 to 67										
	Power hand tools		54 to 67										

**Table 18 Receiver 7 - Summary of predicted construction noise levels**

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted <u>Individual</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Predicted <u>Combined</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Noise Management Level dBA L _{Aeq} 15 minutes	Summary of Result
Site Establishment Works	Mobile crane	113	55 to 68	58 to 71	Noise Affected Level 55 Highly Noise Affected Level 75	Works indicatively predicted to have the potential to exceed the noise management level when working near the receiver. Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.
	Power hand tools		54 to 67			
	Semi Rigid Vehicle		45 to 58			
Ground Works and Demolition	Excavator	117	57 to 70	62 to 75		
	Handheld jack hammer		51 to 64			
	Dump truck		44 to 57			
	Concrete saw		54 to 67			
	Skid steer		55 to 68			
	Power hand tools		54 to 67			
Structure	Handheld jack hammer	115	46 to 59	60 to 73		
	Concrete saw		54 to 67			
	Power hand tools		54 to 67			
	Welder		46 to 59			
	Concrete pump truck		55 to 68			
	Concrete agitator truck		53 to 66			
Internal Works	Power hand tools	109	54 to 67	54 to 67		
Common and External Works	Concrete agitator truck	114	53 to 66	59 to 72		
	Saw cutter		44 to 57			
	Dump truck		44 to 57			
	Concrete saw		54 to 67			
	Power hand tools		54 to 67			

**Table 19 Receiver 8 - Summary of predicted construction noise levels**

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted <u>Individual</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Predicted <u>Combined</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Noise Management Level dBA L _{Aeq} 15 minutes	Summary of Result							
Site Establishment Works	Mobile crane	113	56 to 68	59 to 71	Noise Affected Level 55 Highly Noise Affected Level 75	Works indicatively predicted to have the potential to exceed the noise management level when working near the receiver.							
	Power hand tools		55 to 67										
	Semi Rigid Vehicle		46 to 58										
Ground Works and Demolition	Excavator	117	58 to 70	63 to 75		Noise Affected Level 55 Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.						
	Handheld jack hammer		52 to 64										
	Dump truck		45 to 57										
	Concrete saw		55 to 67										
	Skid steer		d to 68										
	Power hand tools		55 to 67										
Structure	Handheld jack hammer	115	47 to 59	61 to 73				Noise Affected Level 55 Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.				
	Concrete saw		55 to 67										
	Power hand tools		55 to 67										
	Welder		47 to 59										
	Concrete pump truck		56 to 68										
	Concrete agitator truck		54 to 66										
Internal Works	Power hand tools	109	55 to 67	55 to 67						Noise Affected Level 55 Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.		
Common and External Works	Concrete agitator truck	114	54 to 66	60 to 72								Noise Affected Level 55 Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.
	Saw cutter		45 to 57										
	Dump truck		45 to 57										
	Concrete saw		55 to 67										
	Power hand tools		55 to 67										

**Table 20 Receiver 9 - Summary of predicted construction noise levels**

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted <u>Individual</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Predicted <u>Combined</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Noise Management Level dBA L _{Aeq} 15 minutes	Summary of Result
Site Establishment Works	Mobile crane	113	56 to 72	59 to 75	Noise Affected Level 60	Works indicatively predicted to have the potential to exceed the noise management level when working near the receiver.
	Power hand tools		55 to 71			
	Semi Rigid Vehicle		46 to 63			
Ground Works and Demolition	Excavator	117	58 to 74	63 to 79	Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.
	Handheld jack hammer		52 to 69			
	Dump truck		45 to 62			
	Concrete saw		55 to 72			
	Skid steer		56 to 72			
	Power hand tools		55 to 71			
Structure	Handheld jack hammer	115	47 to 64	61 to 78		
	Concrete saw		55 to 72			
	Power hand tools		55 to 71			
	Welder		47 to 63			
	Concrete pump truck		56 to 72			
	Concrete agitator truck		54 to 70			
Internal Works	Power hand tools	109	55 to 71	55 to 61		
Common and External Works	Concrete agitator truck	114	54 to 70	60 to 76		
	Saw cutter		45 to 62			
	Dump truck		45 to 62			
	Concrete saw		55 to 72			
	Power hand tools		55 to 71			

**Table 21 Receiver 10 - Summary of predicted construction noise levels**

Phase	Activity	Aggregate Sound Power Level (dBA re 1pW)	Predicted <u>Individual</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Predicted <u>Combined</u> Noise Level at Receiver dBA L _{Aeq} 15 minutes	Noise Management Level dBA L _{Aeq} 15 minutes	Summary of Result
Site Establishment Works	Mobile crane	113	56 to 72	59 to 75	Noise Affected Level 65	Works indicatively predicted to have the potential to exceed the noise management level when working near the receiver.
	Power hand tools		55 to 71			
	Semi Rigid Vehicle		46 to 63			
Ground Works and Demolition	Excavator	117	58 to 74	63 to 79	Highly Noise Affected Level 75	Mitigations of construction noise and community consultation required to be undertaken including measures detailed in Section 6 of this report.
	Handheld jack hammer		52 to 69			
	Dump truck		45 to 62			
	Concrete saw		55 to 72			
	Skid steer		56 to 72			
	Power hand tools		55 to 71			
Structure	Handheld jack hammer	115	47 to 64	61 to 78		
	Concrete saw		55 to 72			
	Power hand tools		55 to 71			
	Welder		47 to 63			
	Concrete pump truck		56 to 72			
	Concrete agitator truck		54 to 70			
Internal Works	Power hand tools	109	55 to 71	55 to 61		
Common and External Works	Concrete agitator truck	114	54 to 70	60 to 76		
	Saw cutter		45 to 62			
	Dump truck		45 to 62			
	Concrete saw		55 to 72			
	Power hand tools		55 to 71			

5.3 Construction Traffic Noise Assessment

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.

It is proposed that the construction traffic would access the site via the Pacific Highway, McHatton Street and Bay Road. All construction traffic will access the site and use the surrounding roadways in accordance with the site Construction Management plan.

5.4 Vibration Assessment

In order to maintain compliance with the human comfort vibration criteria discussed in Section 4.2, it is recommended that the indicative safe distances listed in table below should be maintained. These indicative safe distances should be validated prior to the start of construction works by undertaking measurements of vibration levels generated by construction and demolition equipment by the contractor.

Additionally, any vibration levels should be assessed in accordance with the criteria discussed in Section 4.2.

Table 22 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
Vibratory pile driver	Sheet piles	2 – 20	20
Jackhammer	Hand held	1	Avoid contact with structure and steel reinforcements

6 NOISE AND VIBRATION MANAGEMENT PLAN

6.1 Acoustic Management Procedures

Table 23 below summarises the management procedures recommended for airborne noise and vibration impact. These procedures are also further discussed in the report as well as recommended mitigation measures. Hence, where applicable, links to further references are provided in Table 23.

Table 23 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 6 For noise impact, also refer to Section 6.1 For vibration impact, also refer to Section 6.3.1
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 6.
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 6 and Section 6.2.3. For vibration impact, refer to Section 6.3.2
Complaints Management System	CMS	Implement a management system which includes procedures for receiving and addressing complaints from affected stakeholders	Refer to Section 6.6
Specific Notification	SN	Individual letters or phone calls to notify stakeholders that noise levels are likely to exceed noise objectives. Alternatively, contractor could visit stakeholders individually in order to brief them in regards to the noise impact and the mitigation measures that will be implemented.	Refer to Section 6.
Respite Offer	RO	Offer provided to stakeholders subjected to an ongoing impact.	-
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).	-

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 6.1.1

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 6.1.2.

6.1.1 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 0). The allocation of these procedures is summarised in Table 24 below.

Table 24 Allocation of noise management procedures – residential receivers

Construction Hours	Exceedance over NML (dB)	Management Procedures (see definition above)
Approved Construction Hours	0 - 3	GMM
Mon – Fri: 7:00 am to 7:00 pm	4 - 10	GMM, PN, V ¹ , CMS, AC
Sat: 8:00 am – 1:00 pm	> 10	GMM, PN, V, CMS, SN, AC
Outside Standard Hours	0 - 10	GMM, AC
Mon – Fri: 7:00 am to 8:00 am	11 - 20	GMM, PN, V ¹ , CMS, AC
Sat: 7:00 am to 8:00 am	> 20	GMM, PN, V, CMS, SN, RO, AC
<i>Notes</i>		
1. Verification monitoring to be undertaken upon complaints received from affected receivers		

Please note the following regarding the allocation of these procedures:

- In addition to the above the projects *Conditions of Consent* (including item C8) require works to include the following:
 - Rock Breaking, rock hammering, sheet piling and similar activities may only be carried out between the following hours:
 - 9am to 12 midday – Monday to Friday.
 - 2 pm to 5pm – Monday to Friday.
 - 9am to 12 midday – Saturday's.
- The allocation of procedures is based on the assumptions used for noise level predictions (refer to Section 5.1). Consequently, these allocations can be further refined once additional details of the construction program become available.

6.1.2 Allocation of Vibration Management Procedures

Table 25 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 25 Allocation of vibration management procedures

Construction Hours	Exceedance Scenario	Management Procedures
Approved Construction Hours Mon – Fri: 7:00 am to 7:00 pm Sat: 8:00 am – 1:00 pm	Over human comfort criteria (refer to Section 4.2)	GMM, PN, V, RO
	Over building damage criteria (refer to Section 4.2)	GMM, V, AC
Outside Standard Hours Mon – Fri: 7:00 am to 8:00 am Sat: 7:00 am to 8:00 am	Over human comfort criteria (refer to Section 4.2)	GMM, SN, V, RO, CMS
	Over building damage criteria (refer to Section 4.2)	GMM, V, AC

6.2 Site Specific Noise Mitigation Measures (including High Noise Affected Levels)

Predicted noise levels outlined in section 5.1 indicate exceedances above the Noise Management Levels (NMLs) as well as the Highly Noise Affected Level (HNAL) when in proximity to a boundary. To militate against any exceedances, the site will need to introduce periods of respite for activities which are creating noise levels above the HNAL and including activities such as piling, hydraulic hammering and the like (i.e. greater than 75dBA). See below.

Table 26 Recommended Respite Periods

Monday to Friday	Saturday
7:00am to 8:00am – No noisy works (<u>Respite Period</u>)	8:00am to 9:00am – No noisy works (<u>Respite Period</u>)
8:00am to 11:30am – Works	9:00am to 12:00pm – Works
11:30am to 12:30pm – No noisy works (<u>Respite Period</u>)	12:00pm to 1:00pm – No noisy works (<u>Respite Period</u>)
12:30pm to 3:30pm – Works	
3:30pm to 4:30pm – No noisy works (<u>Respite Period</u>)	
4:30pm to 6:00pm – Works	

6.2.1 General Mitigation Measures

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.

Construction works are to be conducted in accordance with the Conditions of Consent, which includes item C15 and include the following:

The Applicant must implement, where practicable and without compromising the safety of construction staff and members of the public, the use of 'quackers' to ensure noise impacts on surrounding noise sensitive receivers are minimised.

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. Works will be undertaken in conjunction with the Community Communication Strategy, as required by Item B7 of the Conditions of Consent.

All construction vehicles (including concrete agitator trucks) do not arrive at the site or surrounding residential precincts outside of the construction hours of works outlined in the consent conditions, including:

- 7am to 7pm Monday to Friday
- 8am to 1pm Saturdays

6.2.2 Noise Monitoring

Noise monitoring will be performed by an acoustical consultant directly engaged by the contractor.

Noise monitoring is recommended to be undertaken by attended noise measurements at the start of any new phase of works (i.e. demolition, excavation or remediation works etc.). The statistical parameters to be measured should include the following noise descriptors: LAmin, LA90, LA10, LA1, LAmax and LAeq. Unattended noise measurements should be conducted over consecutive 15 minute periods at the commencement of demolition and ground works on the site.

This monitoring should also be complemented by undertaking attended noise measurements in order to:

- Differentiate between construction noise sources and other extraneous noise events (such as road traffic and aircraft noise)
- Note and identify any excessive noise emitting machinery or operation.

In addition to the above detailed measurements, should any complaints be received which have not been determined previously, it should be confirmed by conducting additional attended noise measurements.

The survey methodology and any equipment should comply with the requirements discussed in Standard AS 1055.1-1997.

6.2.3 Noise Mitigation Measures for Non-Residential Receivers

Where exceedances have been identified in Section 5.2, the following mitigation measures are recommended:

- Undertake general mitigation measures as discussed in Section 6.
- 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. These updates can also be issued through an email distribution list or via social media and in accordance with consent condition B7 requiring a Community Communication Strategy.
- Signage to be posted in order to provide stakeholders information regarding project details, emergency contacts and enquiry contact information in accordance with consent condition C1 requiring a site notice.

6.2.4 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. The assessment is required to be undertaken in coordination with the contractors undertaking the works to be conducted.

6.2.5 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) and proactive mechanical maintenance.

6.3 Vibration Mitigation Measures

6.3.1 General Mitigation Measures

As part of the CNVMP, 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 to surrounding receivers.
- Investigate the feasibility of rescheduling the hours of operation of major vibration generating plant and equipment to within the allowable time set within the consent conditions which include 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.
- Use lower vibration generating items of construction plant and equipment; that is, smaller capacity plant.
- Minimise conducting vibration generating works consecutively in the same area (if applicable).
- Schedule a minimum respite period of at least 30 minutes after a period of continuous 2 hours of work.
- Use only dampened rock breakers and/or "city" rock breakers to minimise the impacts associated with rock breaking works.
- Conduct attended measurements of vibration generating plant at commencement of works in order to validate the indicative safe working distances advised in Table 22 and, consequently, to establish safe working distances suitable to the project. Measurements should be conducted at the nearest affected property boundary. These safe working distances should be defined by considering the vibration criteria discussed in Section 5.4 (i.e., criteria for structural damage, human comfort and impact to scientific or medical equipment).

6.3.2 Vibration Monitoring

Vibration monitoring should be undertaken continuously at the nearest most affected structures.

The monitoring location 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.

The vibration monitoring system 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 (detailed in section 4.2).

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 vibration monitoring equipment would be downloaded and analysed by the acoustical consultant monthly including reporting of the collected data.

Reports of the measured vibration levels and their likely impacts would be prepared by the acoustical consultant and issued to the contractor monthly.

Vibration monitoring should be undertaken including the following:

1. Vibration Monitoring to include long term continuous vibration logging.
2. Monitors set to record maximum vibration levels including Peak Particle Velocity (PPV) magnitudes.
3. Monitors are required to be SMS enabled such that any events recorded above 'alert levels can be instantaneously sent to suitable builder, acoustic consultant and contractor representatives.
4. In the event results re received above 'alert levels the following response to events are required as detailed in the table below.
5. Vibration monitoring should be undertaken for the periods including demolition, exaction and construction of the building structure including installation of concrete to ground floor as a minimum or on agreement with neighbouring stake holders in the event monitoring details no negative impacts during the construction of the project.

Table 27 Required Response to Vibration Events

Location/ Receiver Type	Event Type		
	Trigger	Alert	Alarm, Stop Work
Surrounding Residential Dwellings	6 mm/s	7 mm/s	8 mm/s
<i>See Section below for response to Event Types</i>			

The required response to recorded event types detailed in the table above are included in the following table.

Table 28 Required Response to Vibration Events

Event Type	Required Response
Trigger level	All events above the trigger level are required to be recorded by the vibration monitors.
Alert	<p>Temporarily cease the vibration generating activity and assess the reason for vibration exceedances. Modify the related construction practice to prevent future exceedances. Keep records of subsequent breaches to demonstrate that vibrations for modified activity do not reach Alert Level.</p> <p>All <i>Alert</i> events are to be SMS messaged to the building contractor site manager, subcontractor and acoustic consultant.</p>
Alarm	<p>Stop Work Event</p> <p>All <i>Alarm</i> events are to be SMS messaged to a relevant Richard Crookes, subcontractor and acoustic consultant.</p> <p>The activity generating the vibration levels is to be stopped immediately.</p> <p>Suitable representatives of the building contractor, the relevant Subcontractor, Heritage Consultant and acoustic consultant.</p> <p>Vibration monitoring report to be completed. Visual assessment of affected property will be conducted to assess whether damage is evident.</p> <p>The item/s of work generating the vibration events is not be recommenced until an action plan is agreed and implemented.</p>

6.4 Noise and Vibration Monitoring

As part of the management of noise from the proposed construction activities to be undertaken on the site the following noise and vibration monitoring is to be undertaken:

1. Noise Monitoring– Attended noise monitoring of excavation and construction activities is to be undertaken during the following periods:
 - a. Commencement of any rock breaking or sawing on the site.
 - b. In response to any ongoing complaints received from neighbours.
2. Vibration – Based on the proximity of the surrounding receivers to the works magnitudes of vibration resulting from construction activities required to be undertaken on the site are not expected to approach vibration limits detailed in Section 4.2 of this report, therefore permanent continuous vibration monitoring is not recommended.

Attended vibration monitoring is to be undertaken at the following periods:

- a. Commencement of any high vibration generating activities including hydraulic hammering, rock breaking or vibration rolling on the site.
- b. receiver location in the event complaints resulting from construction activities resulting from the perception of vibration are experienced by the occupants of buildings within the vicinity of the site.

6.5 SINSW Complaints Management Process

6.5.1 Enquiries and complaints management

SINSW manages enquiries, and complaints in a timely and responsive manner and detailed in the SINSW Community Consultation Summary report.

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 as detailed in the complaints handling procedure is set out in the Community Communication Strategy.

6.5.2 Complaints management process

All complaints will be conducted using the SINSW Community Communication Strategy for the project.

Any face to face complaints will be directed to the hotline as detailed in the Community Communication Strategy.

6.5.3 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.

6.5.4 Community Notifications

Prior to the works onsite being undertaken, it is recommended that community consultation with the neighbouring affected parties be undertaken. These include the locations detailed in the figure below.

Figure 5 Required Community Notification Area



Communication notification, 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.

6.5.5 Community Engagement

It is proposed that throughout the duration of the project, continued meetings with both the school principals will be undertaken on a regular basis to monitor and mitigate any impacts of construction noise and vibration on the school community.

Community engagement has been undertaken during the design and approvals basis of the project and detailed in the Community Communication Strategy in accordance with condition B9.

6.6 Complaints Management System

Should complaints arise they must be dealt with in a responsible and uniform manner, therefore, a management system to deal with complaints is detailed above.

Complaints will be undertaken in conjunction with the SINSW complaints management system as detailed in the Community Consultant Summary Report and the Community Communication Strategy documents developed by SINSW to ensure compliance with Condition B9 of the projects Conditions of Consent.

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

6.8 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.

6.8.1 Additional Recommendations

- 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.

6.8.2 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.
- Operating plant and equipment in the quietest and most efficient manner.

6.8.3 On Site Noise Mitigation

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

6.8.4 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.

6.8.5 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.

6.8.6 Miscellaneous Recommendations

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.

It is advised that mobile plant and trucks operating on site for a significant portion of the project are to have reversing alarm noise emissions minimised. This is to be implemented subject to recognising the need to maintain occupational safety standards without compromising the safety of construction staff and members of the public.

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

7 CONCLUSION

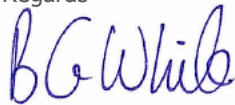
This report details the Construction Noise and Vibration Management Sub Plan for the works required to complete the North Sydney Public School project.

An assessment of noise and vibration impacts from the required processes to be undertaken during the construction period of the project (including demolition, ground works 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* and the projects *Conditions of Consent* will be achieved.

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

Regards

A handwritten signature in blue ink that reads "Ben White".

Ben White
Director

Pulse White Noise Acoustics



APPENDIX A: ACOUSTIC GLOSSARY

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; <table> <tr> <td>0dB</td><td>the faintest sound we can hear</td></tr> <tr> <td>30dB</td><td>a quiet library or in a quiet location in the country</td></tr> <tr> <td>45dB</td><td>typical office space. Ambience in the city at night</td></tr> <tr> <td>60dB</td><td>Martin Place at lunch time</td></tr> <tr> <td>70dB</td><td>the sound of a car passing on the street</td></tr> <tr> <td>80dB</td><td>loud music played at home</td></tr> <tr> <td>90dB</td><td>the sound of a truck passing on the street</td></tr> <tr> <td>100dB</td><td>the sound of a rock band</td></tr> <tr> <td>115dB</td><td>limit of sound permitted in industry</td></tr> <tr> <td>120dB</td><td>deafening</td></tr> </table>	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
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120dB	deafening																				
dB(A)	<i>A-weighted decibels</i> 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 <i>pitch</i> . 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																				



NAFL	Noise Affected Level - As referred to in the EPA's <i>Interim Construction Noise Guideline</i> as the affected noise level for the trigger of construction noise mitigation requirements.
HNAL	High Noise Affected Level – As referred to in the EPA's <i>Interim Construction Noise Guideline</i> .
AV-TG	NSW EPA <i>Assessing Vibration Technical Guideline</i> .

APPENDIX B – BEN WHITE CV AND AAS MEMBERSHIP

Curriculum Vitae – Benjamin White



Employment Experience:

Director – Pule White Noise Acoustics
Present

November 2020 –

Director - White Noise Acoustics:

March 2019 – Present

Director/Engineer - Acoustic Logic Consultancy:
July 2018

March 2001 –

Experience:

Ben White the Director of White Noise has over 17 years of experience in acoustic.

Ben has significant experience in providing acoustic services and expert advice in the following areas:

- Residential acoustic reports including aircraft noise (AS2021) assessments, traffic noise, train noise and vibration assessments.
- Noise emission assessments for various projects including assessments with planning requirements using EPA, Department of Planning, Council DCP's and similar regulatory requirements.
- Planning approvals including Development Applications for multi dwelling residential developments, commercial developments, hotels and boarding houses, places of entertainment, carparks, mixed use developments, shopping centres and the like.
- Expert court witness including Land and Environment Court and other expert witness work.
- Project planning and specifications for types of projects including residential, commercial, retail, hotel accommodation, warehouses and industrial developments and mixed-use projects.
- Project delivery for all types of projects including, design advice and project delivery requirements at all stages of projects during design and construction.
- Certification works including on site testing for the provision of certification of all types of projects including items required to comply with Part F5 of the BCA as well as project specific acoustic requirements.
- Mechanical design and advice for the treatments of mechanical services with project requirements.
- External façade design and specification.
- Specialised acoustic design advice including areas of projects.
- Issues with existing building include site surveys and audits as well as advice regarding rectification if required.

AUSTRALIAN ACOUSTICAL SOCIETY



This is to certify that

BENJAMIN WHITE

was admitted to the grade of

MEMBER

of the Australian Acoustical Society

on 27th October 2020

and is entitled to use the letters

M.A.A.S.

issued on 26th November 2020

S. Moore

President

[Signature]

General Secretary



This certificate remains the property of the Australian Acoustical Society

Appendix 10 – Construction Waste Management Sub-Plan

Refer to [Condition B17] Construction Waste Management Plan

North Sydney Public School

JUNE 2022

**Operational and Construction
Waste Management Plan**



**WASTE AUDIT AND
CONSULTANCY SERVICES**

Level 21 / 133 Castlereagh Street
Sydney, NSW 2000

Telephone (02) 9199 4521

www.wasteaudit.com.au

This report contains confidential information. It has been compiled by Waste Audit and Consultancy Services (Aust) Pty Ltd on behalf of Taylor Construction Group.

This Waste Management Plan is not a substitute for legal advice on the relevant environmental legislation, which applies to Taylor Construction Group, its contractors or other bodies. Accordingly, Waste Audit and Consultancy Services (Aust) Pty Ltd will not be liable for any loss or damage that may arise out of this project, other than loss or damage caused as a direct result of Waste Audit and Consultancy Services (Aust) Pty Ltd's negligence.

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1 Introduction

1.1 Overview

This Operational and Construction Waste Management Plan has been prepared on behalf of Taylor Construction Group to accompany a Development Application for the North Sydney Public School Development.

The current student population is 869. However, it is proposed to have this increase to 1,012 students.

The Plan has been developed with consideration of the North Sydney Council's and other Authority's requirements. It is intended to inform the design of the waste services by identifying the estimated waste profile for the development and providing the total area required by the recommended equipment/systems.

In doing so this Plan, which includes waste estimates and related management requirements, has been developed in accordance with the North Sydney Council's *North Sydney Development Control Plan 2013*.

These sources have been referred to in the development of the waste estimates and related requirements. They are intended to inform the design of the waste services by identifying the estimated waste profile for the development and providing the total area required by the recommended equipment/systems.

Waste audit and management strategies are recommended for new developments to provide support for the building design and promote strong sustainability outcomes for the building. All recommended waste management plans will comply with council codes and any statutory requirements. The waste management plan has three key objectives:

1. **Ensure waste is managed to reduce the amount of waste and recyclables to land fill** by assisting staff to segregate appropriate materials that can be recycled; displaying signage to remind and encourage recycling practices; and through placement of recycling and waste bins to reinforce these messages.
2. **Recover, reuse and recycle** generated waste wherever possible.
3. **Compliance** with all relevant legislation, codes and policies.

Management strategies reflect current best-practice requirements, and relevant Sections of the *Protection of the Environment Operations Act 1997* and the NSW Environment Protection Authority *Waste Classification Guidelines, Part 1: Classifying Waste*, as well as consideration of industry best practice for this type of development.

Other legislation and policies referred to for the development of this Waste Management Plan included:

- Protection of the Environment Operations (Waste) Regulation 2014
- Waste Avoidance and Resource Recovery Act 2007

- Waste Avoidance and Resource Recovery Strategy 2014-2021

1.2 SEARs Requirements

This report has been prepared having regard to the Secretary's Environmental Assessment Requirements issued for the project by DPIE, ref no SSD-11869481 issued on the 24th December 2020.

Preparation of this Operational Waste Management Plan has been undertaken with reference to the relevant SEARs requirement 20. *Waste* below, as well as industry best practices.

Identify, quantify and classify the likely waste streams to be generated during construction and operation and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site.

2 Waste Management

2.1 Waste Streams

Based on the development profile (as per Section 1), the following are the waste streams that would be expected on a regular basis:

- Comingled recycling (eg., cardboard/paper, glass and plastic containers);
- General waste; and

All garden waste will be managed by the School gardener. There will be a requirement that this waste be either used on site, or disposed of at a composting facility. Disposal to landfill will not be a permitted option.

2.2 Waste Generation Estimates

Calculations for the types and quantities of waste that will be generated have been based on current waste generation for the School and comparisons with similar size schools as determined by audits conducted by Waste Audit.

Based on 869 students, it is estimated that the School generates a total of approximately **1.74 m³** of waste/recyclables per day (approximately **8.7 m³** per week). Note that this is not all increased volumes as it is essentially the number of students/staff that determine the volume of wastes and recyclables generated.

The increase to 1,012 students will increase the waste/recyclables per day to approximately **2.03 m³** (approximately **10.12 m³** per week)

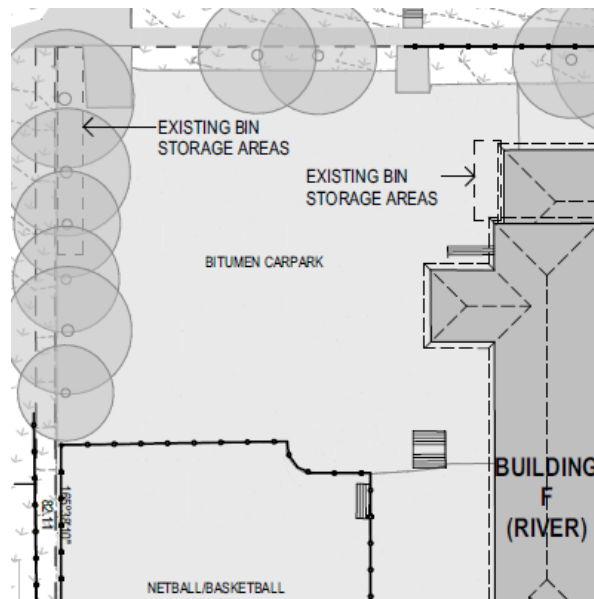
There will be seasonality – in that wastes/recyclables will be reduced significantly during non-teaching periods (with other issues such as comingled recyclables generated more in the warmer times, than the cooler ones). In addition, at the end of terms (and particularly end of year, there will be increases in waste and recyclables generated due to “clean-ups”.

2.3 Waste Management Servicing

A private contractor is used for the collection of wastes and recyclables. This is a five times per week service for general waste and comingled recycling. However, additional services can be arranged as required.

To manage the volumes, the School has a number of 120/240 litre mobile garbage bins that are used for both general waste and comingled recycling. In addition, there are a number of 1100 litre mobile garbage bins for general waste and 600 litre bins for recyclables that are serviced five times per week.

These bins are serviced from their storage areas as per the figures below:



2.4 Operational Procedures

The following summarises the recommended waste and recycling systems that will be implemented.

- MGB for waste and recyclables are located around School grounds for use by staff and students.
- All MGB and bins are managed by School cleaning staff.
- All MGB are transported to the collection area from their locations on the School grounds by cleaning staff with the contents emptied into the larger (1100 and 660 litre MGB).

Other aspects for the management of wastes/recyclables include:

- Relevant rooms within the classrooms, office area and laboratories will be provided with small (15 litre) bins for both waste and recyclables in each room.
- Staff and students will be provided with information on the proper use of the waste management system and all will be encouraged to maximise the separation of general waste and mixed recyclables to aid the proper disposal of all materials.
- Cleaners will be responsible for emptying bins into the 240 litre MGB's.
- It will be the responsibility of School staff to ensure that waste areas remain clean.

Signage will be a crucial element of the waste management system. Appendix A contains examples of signage. These are the type of signs that should be used throughout the buildings. Other signs can be accessed from the NSW EPA website at: <http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm>.

It is recommended that all signs should;

- Clearly identify the waste/recycling stream;
- Use correct waste/recycling stream colour coding;
- Identify what can and cannot be disposed of in the receptacle; and
- Include highly visual elements to accommodate for individuals with inadequate English literacy.
- As part of the staff induction process, a waste and recycling toolkit will be provided. This toolkit will include the details of each of the systems in place; acceptance criteria for each stream and how each stream is managed.

2.5 Education

Staff and students will be advised as to correct segregation by information conveyed via newsletters, signage and staff advising students, regarding the waste management systems including how to use the system, which items are appropriate for each stream and collection regimes.

3 Construction Waste Management Principles

3.1 Waste Management Principles

The following waste hierarchy will be used as a guiding principle:



Avoid and Reduce

Minimise the production of waste materials in the construction process by:

- Assessing and taking into consideration the resultant waste from different design and construction options
- Purchasing materials that will result in less waste, which have minimal packaging, are pre-cut or fabricated.
- Not over ordering products and materials

Reuse

Ensure that where ever possible, materials are reused either on site or offsite.

- Identify all waste products that can be reused
- Put systems in place to separate and store reusable items
- Identify the potential applications for reuse both onsite and offsite and facilitate reuse

Recycling

Identify all recyclable waste products to be produced on site.

- Provide systems for separating and stockpiling of recyclables
- Provide clear signage to ensure recyclable materials are separated

- Process the material for recycling either onsite or offsite

Note: In some cases, it may be more economical to send the unsorted waste to specialised waste contractors who will separate and recycle materials at an offsite location.

Disposal

Waste products which cannot be reused or recycled will be removed and disposed of. The following will need to be considered:

- Ensure the chosen waste disposal contractor complies with regulatory requirements
- Implement regular collection of bins

Section 143 of the Protection of the Environment Operations Act 1997 requires waste to be transported to a place that can lawfully accept it. It will be the responsibility of the site developers to ensure all contractors clearly specify where all wastes are to be transported, the capacity of the nominated facilities to receive/manage the waste and to ensure that reports on management aspects (types, quantities and disposal pathways) are provided.

3.2 Liquid Waste

Liquid waste may be produced on site for environmental control measures such as:

- Site and vehicle cleaning
- Dust control waste

The following measures will be taken to minimise the impact of liquid waste:

- 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

3.3 Stormwater Pollution Prevention

All actions will be undertaken to avoid pollution entering stormwater drains and for litter generation. The following will be initiated:

- i. Prior to commencement of any works a Safe Work Method Statement will be completed and reviewed to determine potential for stormwater pollution and/or litter generation
- ii. The proponent (contractor), will need to develop a management strategy to manage the potential for these issues to be realised

- iii. Site inspections will be conducted during the working day to monitor potential for stormwater pollution generation and where identified, works will cease until appropriate controls are implemented
- iv. Waste water and storm water will be managed and disposed of in accordance with Water Authority requirements.

3.4 Litter Management

- i. Daily site inspections will be conducted to identify litter, remedy the situation and investigate the cause so as to reduce the potential for the issue to occur in the future.
- ii. Sufficient quantities of bins (and/or bin space), will be made available so as to avoid dumping of materials outside bins
- iii. All waste/recycling bins will have covers so as to ensure that wastes cannot be blown out during windy conditions. This will also apply to relevant stocks of materials to be used in construction.
- iv. Personnel will be allocated the role of litter management in that they will periodically inspect the site and surrounds for litter and if identified collect and dispose of it.

3.5 Records

Records will be kept of all wastes and recyclables generated and either used on site, or transported off-site during the construction stages of the development.

It will be a condition of appointment that all waste/recycling contractors involved in the construction stages provide these records, and that they also contain details of the facilities that the materials are transported to.

These records will be made available to Council on request.

3.6 Waste/recyclables storage (on-site)

All waste and recycling materials will be stored in bins provided by the appointed contractor(s). These bins will be appropriately coloured and signed to indicate what materials are to be deposited into them and located so as to maximise the recovery of reusable/recyclable materials.

As construction activities progress, the designated bins will be moved so as to maximise the collection of materials that will be diverted from landfill. This will also involve relocating signage advising as to correct waste management.

3.7 Waste/recyclables treatment (on-site)

There will be no treatment of wastes or recyclables on-site except for possible removal of contaminants prior to forwarding to off-site recyclers.

4 Construction Materials

4.1 Overview

The following summarises the types, quantities and management systems for construction materials that may be generated during construction (of the new three storey building).

Finalisation of the system(s) that will be implemented for the recovery of materials and for disposal of others to landfill will occur following appointment of contractor(s). A component of the appointment will be that contractors will be required to provide data as to the disposal pathway (eg., materials, volumes and final disposal site), as well as a validation process for this information.

The appointed contractor(s) will also be responsible for sourcing speciality re cycling facilities for the materials that cannot be reused on site

4.2 Estimated Volumes

The following table details the estimated composition by m² of construction waste to be generated for the total site.

The quantity of waste materials to be generated onsite are estimates and therefore the systems that will be put in place need to incorporate flexibility to allow for variation in the total quantities generated. Active site management during the construction phase will ensure all waste/recyclable materials are disposed of appropriately and that all waste receptacles are of sufficient capacity to manage onsite activities.

Composition and Management of Construction waste by m²

Materials on site		Destination		
Type of material	Estimated volume (m ³)	On-site (Reuse or recycle)	Off-site	Disposal
Excavation material	30m ³	Will either be stockpiled for use during construction if required and if not disposed off-site.	Collected and used as clean fill by the appointed contractor and/or forwarded to various facilities such as garden landscapers, or roadworks.	Facility TBA upon appointment of contractor.

Materials on site		Destination		
Type of material	Estimated volume (m ³)	On-site (Reuse or recycle)	Off-site	Disposal
Concrete	2m ³	Separated on site and crushed for use in pavement construction where possible	Collected by contractor and disposed at concrete recycling facility	Disposal to Austip Recycling
Mixed plastics	8m ³	No on-site reuse	Collected by contractor for recycling. Facility TBA upon appointment of contractor.	Disposal to BM Recycling
Timber	10m ³	Separated and where feasible, reused for further formwork	Unused material separate and stockpiled onsite. Collected by specialist timber subcontractor for recycling	Facility TBA upon appointment of contractor
Plasterboard	5m ³	Unused material taken back by supplier for reuse where possible	Material to be separated and stockpiled onsite. Collected by the waste subcontractor on a weekly basis (or as required) for recycling.	Disposal to BM Recycling
Metal	3m ³	No on-site reuse	Collected by specialist metal subcontractor for recycling	Disposal to Sell & Parker Metal Recycling

Materials on site		Destination		
Type of material	Estimated volume (m ³)	On-site (Reuse or recycle)	Off-site	Disposal
Bricks	1m ³	Bricks will be stockpiled and reused wherever possible.	Acceptable quality bricks collected by a contractor and sold for reuse. Unusable bricks will be collected and recycled at an appropriate facility.	Disposal to Austip Recycling
Soil/Sand/Gravel	0.5m ³	Will be stockpiled for reuse.	Excavation materials will be collected and used as clean fill by the waste contractor with appropriate notification as to location	Disposal to BM Recycling
Glazing	0.2m ³	No on-site reuse	Recyclers consulted as to potential for recycling and if suitable separated for recycling.	Disposal to BM Recycling
Mixed Recyclables	15m ³	No on-site reuse	Contractor appointed to collect and recycle	Disposal to BM Recycling
General waste	45m ³	No on-site reuse	No recycling or reuse	Disposal to BM Recycling

4.3 Other Materials

A range of other materials may be present on the site once the construction activities commence.

All potentially recyclable materials are to be separated and stored on-site for an appointed waste/recycling contractor to inspect and to determine the suitability of the material for recycling (or even reuse). If approved for either action, then the contractor can then remove the items.

For materials that are not designated as potentially able to be reused or recycled, then they are to be disposed of at a landfill licenced to receive those specific materials.

4.4 Hazardous Waste Materials - Construction

If needed to be used, contractors employed to manage any identified hazardous wastes will be required (prior to appointment), to demonstrate their compliance with NSW EPA and WorkCover requirements for management of the specific materials they are contracted to manage.

The following are the recommended approaches for managing the wastes and other materials that were identified during the site analysis.

The key principles that need to be adhered to are¹:

1. All hazardous wastes need to be correctly identified and managed in accord with all relevant legislation and Codes of Practices.
2. Hazardous materials need to be separated into their individual categories and not mixed with any other materials

Any identified hazardous materials will be transported by vehicles permitted to do so and disposed at sites licenced to receive the specific hazardous material(s). Records of all loads leaving the site will be maintained and made available to any relevant personnel/organisation.

Any identified hazardous wastes will be managed in accord with the *Protection of the Environment Operations Act 1997* and *Protection of the Environment Operations (Waste) Regulation 2014*.

¹ Reference should be made to the NSW EPA publication, Waste Classification Guidelines Part 1: Classifying Waste.

5 Contracts and purchasing

Each subcontractor working on the site will be required to adhere to this Waste Management Plan.

The Head Contractor will ensure each subcontractor:

- Takes practical measures to prevent waste being generated from their work
- Implements procedures to ensure waste resulting from their work will be actively managed and where possible recycled, as part of the overall site recycling strategy or separately as appropriate
- Ensures that the right quantities of materials are ordered, minimally packaged and where practical pre-fabricated. Any oversupplied materials are returned to the supplier
- Implements source separation of off cuts to facilitate reuse, resale or recycling.

The Site Manager will be responsible for:

- Ensuring there is a secure location for on-site storage of materials to be reused on site, and for separated materials for recycling off site.
- Engaging appropriate waste and recycling contractors to remove waste and recycling materials from the site
- Co-coordinating between subcontractors, to maximise on site reuse of materials
- Monitoring of bins on a regular basis by site supervisors to detect any contamination or leakage
- Ensuring the site has clear signs directing staff to the appropriate location for recycling and stockpiling station/s. And that each bin/skip/stockpile is clearly sign posted
- Providing training to all site employees and subcontractors in regards to the WMP as detailed in section 6 below.

Should a subcontractor cause a bin to be significantly contaminated, the Site Manager will be advised by a non-conformance report procedure. The offending subcontractor will then be required to take corrective action, at their own cost. The non-conformance process would be managed by the Head Contractors' Quality Management Systems

6 Training and Education

All site employees and sub-contractors will be required to attend a site specific induction that will outline the components of the WMP and explain the site specific practicalities of the waste reduction and recycling strategies outlined in the WMP.

All employees are to have a clear understanding of which products are being reused/recycled on site and where they are stockpiled. They are also to be made aware of waste reduction efforts in regards to packaging.

The site manager will post educational signage in relation the recycling activities on site in breakout areas, lunch rooms etc.

Appendix A – Example Signage



Example wall posters



Example bin lid stickers



Appendix 11 – Construction Soil & Water Management Sub-Plan



Diagram illustrating the layout of a catchment area with various features and their corresponding symbols:

- Batter**: Represented by a horizontal line with vertical tick marks.
- Siltation fence**: Represented by a horizontal line with 'X' marks.
- Stormwater pit with Geotextile filter surround**: Represented by a dashed rectangular box containing horizontal lines.
- Hay bale barriers**: Represented by a triangular symbol containing a star.
- Catch drain**: Represented by a horizontal line with arrows pointing towards it.

Scale : A1	Drawn	Authorised
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Plot File Created: Feb 23, 2022 - 3:48pm

Sheet Subject

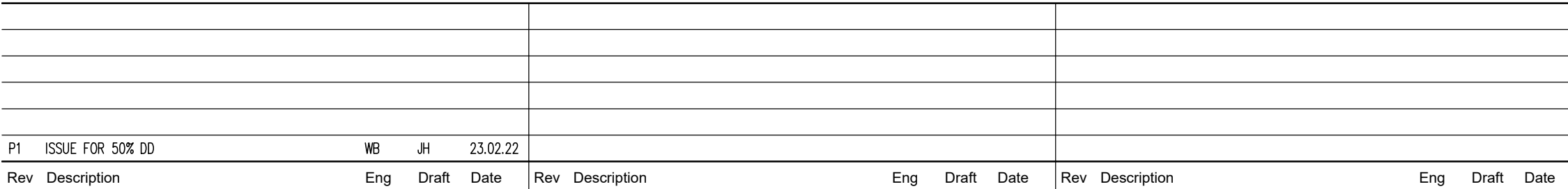
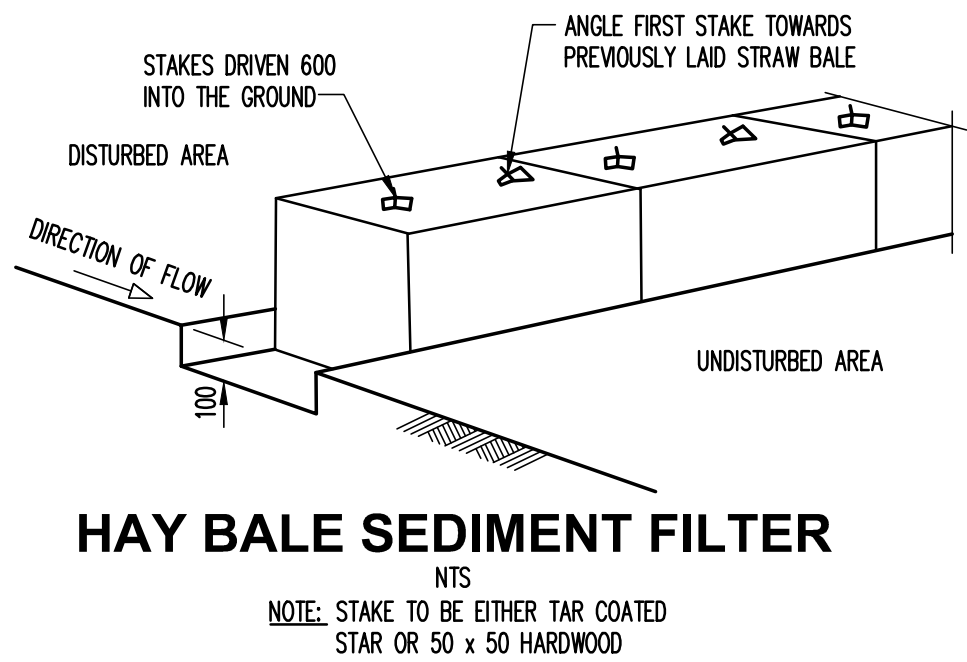
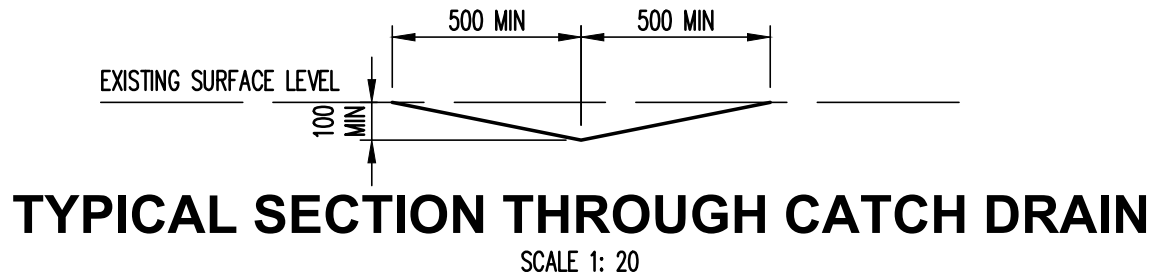
EROSION & SEDIMENT CONTROL PLAN








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 slope these works then the design may be required to be modified. Variation to these details may require approval by the relevant authorities.
3. 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 any 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.

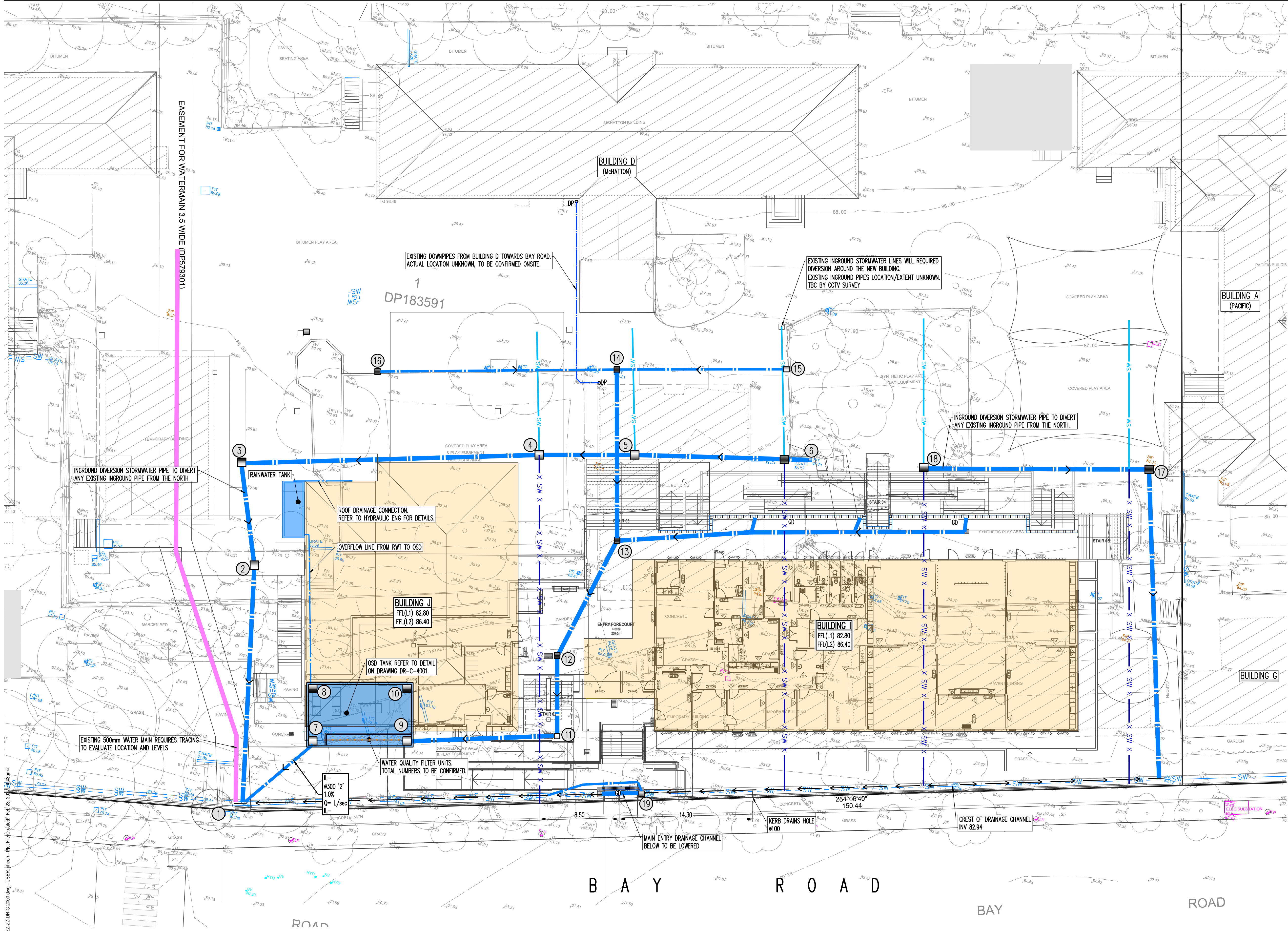
1. Prior to commencement of excavation the following soil management devices must be installed.
- 1.1. Construct silt fences below the site and across all potential runoff sites.
- 1.2. Construct temporary construction entry/exit and divert runoff to suitable control systems.
- 1.3. Construct measures 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.

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.



THIS DRAWING HAS BEEN PREPARED USING COLOUR		
		
		
		
Scale : A1	Drawn	Authorised
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Drawing No	Revision	
NSPS-TTW-0ZZ-ZZ-DR-C-0002	P1	
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THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING
NSPS-TTW-0XX-XX-DR-0002

SITEWORKS LEGEND

- F22.20 Finished surface level
- Stormwater pit, flow direction and line with:
 - Invert level upstream
 - Pipe size and class
 - Pipe grade
 - Flow (Litres per second)
 - Invert level downstream
- Grated drain
- Subsoil drainage line (100 dia) - refer detail sheets
- IR Intermediate riser with subsoil drainage line (100 dia)
- FP Flushing point with subsoil drainage line (100 dia)
- DP Down pipe
- Water flow path
- SW Existing stormwater pipe
- X SW X Existing stormwater to be removed

PIT SCHEDULE

Note: Grate size does not necessarily reflect pit size, refer pit type details, shown on detail sheets - DR-C-4000
Final internal pit dimensions are to comply with AS3500

Type	Description	Cover (Clear Opening)	Number
A	Kerb inlet pit 1800 lintel	450 x 900 Class D galvanised mild steel grate hinged to frame	-
B	Surface inlet pit	600 x 900 Class D galvanised mild steel grate hinged to frame	-
C	Junction pit	600 x 900 Class D cast iron cover with concrete infill	-
D		Existing pit to be demolished and removed	-
E		Existing pit to remain	-

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0 2 4 6 8 10 12 14 16m
1:200 A1 1:400 A3

Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date
P1	ISSUE FOR 50% DD	WB	JH	23.02.22										

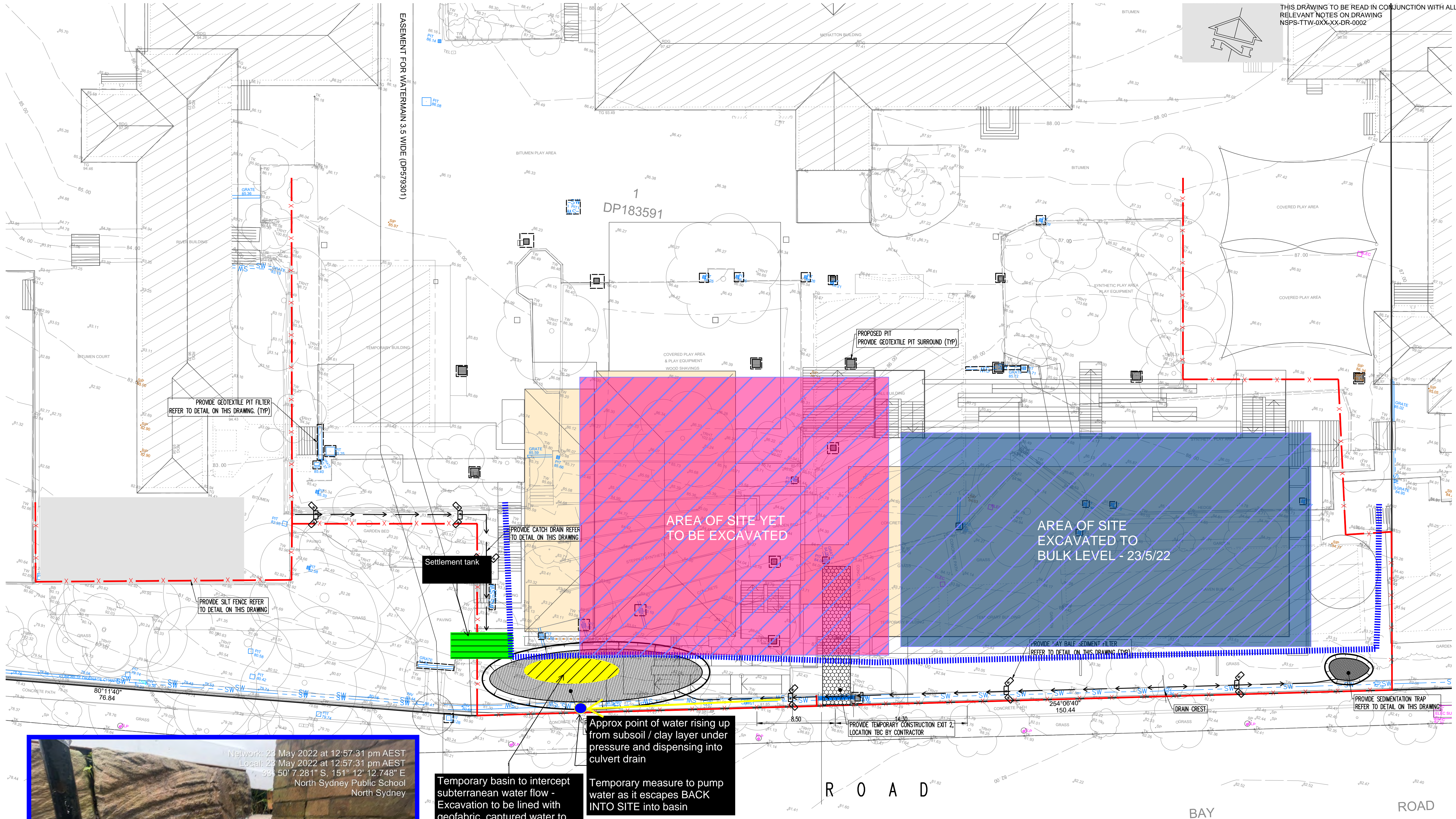
Architect
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Façade
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Project
NORTH SYDNEY PUBLIC
SCHOOL
Job No
211019

Sheet Subject
STORMWATER MANAGEMENT
PLAN

Scale : A1
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Authorised
NB
Drawing No
NSPS-TTW-0ZZ-ZZ-DR-C-2000
Revision
P1
Plot File Created: Feb 23, 2022 - 4:43pm



Network: 23 May 2022 at 12:57:31 pm AEST
Local: 23 May 2022 at 12:57:31 pm AEST
36° 50' 7.281" S, 151° 12' 12.748" E
North Sydney Public School
North Sydney

Temporary basin to intercept subterranean water flow - Excavation to be lined with geofabric, captured water to be then pumped to settlement tank, treated with flocculant to clear before released to stormwater

Approx point of water rising up from subsoil / clay layer under pressure and dispensing into culvert drain

Temporary measure to pump water as it escapes BACK INTO SITE into basin

EROSION AND SEDIMENT CONTROL LEGEND

- Butter
- Siltation fence
- Stormwater pit with Geotextile filter surround
- Hay bale barriers
- Catch drain

THIS DRAWING HAS BEEN PREPARED USING COLOUR

Scale: A1
1:200
Drawn: JH
Authorised: NB

Drawing No: Revision:

ADDITIONAL TEMPORARY MEASURES FOR UNDER GROUND WATER FLOW (EXPERIENCED MAY 2022)

Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date
P1	ISSUE FOR 50% DD				W6	JH			23.02.22					

Architect
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612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

Project
NORTH SYDNEY PUBLIC SCHOOL
Job No
211019

Sheet Subject
EROSION & SEDIMENT CONTROL PLAN



Experience

2019 – Current
Associate Director, TTW

2013 – 2019
Associate, TTW

2004 – 2013
Senior Civil Engineer, TTW

2003 – 2004
Design Engineer,
BMD Consulting Pty Ltd

2002 – 2003
Civil Design Engineer,
Cardno Willing Pty Ltd

2001 – 2002
QA/Design Engineer,
Cootamundra Shire Council

Associate Director, Nemesisio Biason joined TTW in 2004 as a highly technical civil engineer. He has detailed knowledge of construction projects which spans across commercial, retail, residential, industrial, educational, healthcare and public buildings. Including experience with legal expert witness, water sensitive urban design, stormwater design, flood study, earthworks, pavement and masterplanning.

He brings a practical and adaptive approach to his work, understanding that every project is unique and requires a responsive and collaborative solution. He has a strong network of clients and works cohesively with architect, client and contractors.

Nemesisio Biason

Associate Director

BE CPEng, NER

nemesisio.biasonjr@ttw.com.au

Accommodation

Iglu Redfern
233 Johnston Street, Annandale
Block G, Wentworth Point
7-9 Kent Road, Mascot
ILU, Croydon
7 Cremorne Point Road, Cremorne
Trades Hall, Sydney
Zenith Apartments, Kings Cross
7-9 Kent Road, Mascot

Commercial

Balikpapan, Indonesia – Stormwater Design
100 Pacific Highway, North Sydney – Civil Design
16-40 Mount Street, North Sydney – Civil and Public Domain Design for the 5 Green Star Project
Dubai Airport Roof Drainage
7-9 Kent Road, Mascot

Retail

Fairy meadow Shopping Centre Development – Civil Design
Hobart Parliament Square
Charlestown Square North Piazza

Sports + Leisure

Australian Rugby Development Centre, Moore Park – Civil Design
Strathfield Golf Course – Civil Design
Wollongong Leisure Commercial Development – Civil Design
Aerial Rope Park, St Mary's
Moorebank Sports Club extension and Car Park

Art + Culture

Orange Regional Museum – Civil Design (Winner of NSW AIA – NSW Premier's Prize and Sulman Medal)
Anzac Memorial Education and Interpretation Centre – Civil Design (\$40m)
Rooty Hill Performing Arts Centre
NSW Art Gallery Storage Facility, Lilyfield – Civil Design
Burelli St, Wollongong (Salvation Army Site) – Civil Design

Education

Macquarie Library, Macquarie University
LEES1 Project, University of Sydney – Civil Design
Wallace Wurth Redevelopment, UNSW – Civil Design
Macquarie University – South Precincts
Danebank Anglican Girls School
North Sydney TAFE, Westbourne Street Entrance
Hurlstone Hawkesbury High School
UNSW Electrical Engineering Building Capital Renewal & modernization Project
St Marks, Stanhope Gardens
Wenona School, North Sydney
Glenfield Agriculture High School
Building Education Revolution (BER) Schools – Leonay, Wyoming, James Erskine, Blaxland, Pymble, Llandilo, Cambridge Park, Ellison, Luddenham and Werrington County Public Schools
Glenfield High School
Danebank School Redevelopment

Healthcare + Research + Aged Care

Sir Moses Montefiore Jewish Home, Randwick
Graythwaite Rehabilitation Centre, Ryde Hospital
Blue Haven Community Centre
Condobolin Retirement Village
Prince of Wales – Neuroscience Research Precinct Stage 2A
BUPA Sutherland
Northshore Private Hospital

Nemesio Biason

What is it about the industry that motivates you?

It motivates me to see the engineering and construction industry thriving in its ability to meet client and community expectations despite working in highly-constrained time and financial parameters, and yet still delivering high-end and innovative projects.

Government + Public

Wynyard Walk, Sydney (Winner of NSW CIA Excellence in Infrastructure Projects)

80 Alfred Street, Milsons Point – Public Domain Works Design

5-11 Meriton Street, Gladesville – Public Domain Works Design

15 Strathford, Cammeray – Public Domain Works Design

Block 8, Central Park – Public Domain Works Design

207-211 Darlinghurst Road, Darlinghurst – Public Domain Works Design

20 Alfred Street, Milson's Point
Willoughby Council Kerb and Gutter and Drainage Design, Castle Cove

Civil

Accessways + Car Parks

Westpoint Shopping Centre, Blacktown – Alpha Street New Carpark Entry/Exit Design

Macquarie University – Gumnut Childcare Car Park – Design and Project Management

Flood Mitigation

Superlot 5, Little Bay – Stormwater, Civil, and Flood Assessment

Merrylands City Central Project – Civil Design and Flood Advice

Bass Hill Plaza – Flood Damage Investigation (Peer Review)

Wynyard Walk, Sydney – Stormwater Expert Witness

434-444 Elizabeth Street, Surry Hills
Roads + Stormwater

Echuca RSL Club – Stormwater Analysis

Stage 1, St. Mary's Leagues Club – Civil and Stormwater Design

18a Bradleys Head Road, Mosman – Stormwater Design

Phoenix Theatre Gallery, Chippendale – Stormwater and Public Domain Works Design

Rooty Hill RSL, Rooty Hill – Civil Design and Flood Study

Civil Continued

Flood Mitigation (Cont'd)

176-184 George Street, Concord – Flood Management

10-20 McEvoy Street, Waterloo – Flood Study

Macquarie Park Cemetery – Stormwater, Prioritisation Analysis 37 ha Catchment
Emirates 6-star Resort Development, Wolgan Valley – Flood Study (18,525ha catchment)

Dunmore Stable, Dunmore – Flood Study (11,500ha catchment)

47& 57 Princes Hwy Albion Park Rail – Flood Study (10,700ha catchment)

Baker Street, Banksmeadow Industrial Development - Flood Study

1 – 3 Dunning Avenue, Roseberry – Flood Study

Railway Parade, Burwood – Stormwater Analysis (11ha catchment)

10-20 McEvoy Street, Waterloo – Flood Expert Witness

New South Head Rd, Double Bay – Flood Study (240ha catchment)

ACT Prison – Catchment and Overland Flowpath Analysis

Jakarta International School – Flood Study (27ha catchment)

Richard Johnson Anglican School – Sites Detention Basin Analysis

Claremont, Nyngan – Flood Analysis

Subdivision + Infrastructure

Berkeley Industrial Subdivision

Burroway Road – Road and Drainage Design

Macquarie University – Campus Wide Infrastructure (Road works, Stormwater, Sewer and Water), Masterplanning for 2031 and Flood Studies

Macquarie University – Balaclava Road Extension and Roundabout Design

697 Anzac Parade, Maroubra – Stormwater Diversion

Blacktown Showground Project – Stormwater Design

Berkeley Road Industrial Subdivision Stage 2, Berkeley – Flood Study (46ha catchment) and Civil Design

Appendix 12 – Environmental Risk Assessment

HSE RISK REGISTER

■ ■ ■ HSE-R-01

Hazard Identification Risk Assessment and Control (HIRAC)

The project/ site manager, in consultation with the project team, any relevant stakeholders and the HSE manager, shall develop a site-specific safety HSE Risk Assessment for major tasks prior to the commencement of the project using Taylor Construction **HSE-R-01 HSE Risk Register**. The Risk Assessment shall be regularly reviewed and, if required, updated to include any new work processes or hazards. Once completed, this Risk Assessment is to be included in **appendix 13** of the **WHS-PLAN-02 Project Workplace Health and Safety Plan**.

Under the WHS Regulations, a Risk Assessment is not mandatory for construction work. However, it is required for specific situations. A Risk Assessment is not necessary if the risk and how to control it is already known. The project/ site manager shall be responsible for ensuring that relevant sections of the Risk Assessment are made available to the successful subcontractor performing the nominated works and uploaded onto the preferred document management system for access by engaged subcontractors. Controls nominated in the risk assessment need to be considered and adopted by the subcontractors

■ Building element/ location

This column nominates typical activities that may be relevant to each project.

■ Project hazards identified

The first step in the risk management process is for the project team and stakeholders to identify the hazards associated with construction work. Examples of hazards include: the construction workplace itself, including its location, layout, condition and accessibility; the use of ladders; incorrectly erected equipment; unguarded holes, penetrations and voids; unguarded excavations, trenches, shafts and lift wells; unstable structures such as incomplete scaffolding or mobile platforms; fragile and brittle surfaces such as cement sheet roofs, fibreglass roofs, skylights and unprotected formwork decks; falling objects such as tools, debris and equipment; collapse of trenches; structural collapse; the handling, use, storage, transport or disposal of hazardous chemicals; the presence of asbestos and asbestos-containing materials; welding fumes, gases and arcs; hazardous manual tasks; the interface with other works or trade activities; the physical working environment, for example the potential for electric shock, immersion or engulfment, fire or explosion, slips, trips, falls, people being struck by moving plant, exposure to noise, heat, cold, vibration, radiation, static electricity or a contaminated atmosphere, and the presence of a confined space.

■ Applicable to the project

Each building element is to be reviewed by the project manager in consultation with the site manager, foreman, leading hand and the HSE manager. Choose either 'Y' or 'N' on 'Applicable to project' column in grey. If at the time of first review the listed building elements are not relevant to the project, do not delete rows.

■ Assess the risks

Assessing the risks includes considering the severity of any injury or illness that could occur -for example, is it a small, isolated hazard that could result in a minor injury or is it a significant hazard that could have wide ranging and severe effects? - and the likelihood or chance that someone will suffer an illness or injury - for example, consider the number of people exposed to the hazard.

■ The hierarchy of control measures: **eliminating the risk> substitution> isolation> engineering controls> administrative controls> (PPE)**

In this column there are nominated controls that need to be implemented by Taylor Construction and/ or the subcontractor performing the tasks to eliminate, control or minimise risks. Prior project experiences, industry knowledge and resources are to be considered. Project-specific controls may be added to this column.

■ Combination of control measures


In many cases, a combination of control measures may be implemented to control a risk. When selecting and implementing a combination of control measures, it is important to consider whether any new risks might be introduced as a result and, if so, whether the combination of the control measures should be reviewed.

■ Responsibility

In the final column, the persons who shall be responsible for implementing these controls must be nominated. SWMS need to nominate person/s who will be responsible to monitor and supervise the work

Document Name	Prepared By	Approved By	Last Review	Version No	No. Pages
HSE-R-01 HSE Risk Register	Andrew Andreou/	SIT	05/01/2021	12	Page 1 of 40



Project information				Information/ reports provided	
Project name	North Sydney Public School 2208			<ul style="list-style-type: none"> Monthly HSE Report LTI Reports KPI Reports 	<ul style="list-style-type: none"> Industry Safety Alerts (e-mail and server) External / Internal alerts New/ amended acts, standards, regulations, COP (where applicable)
Project address	Corner Bay Rd and Pacific Hwy, Waverton, Nth Syd				
Date of review	07/02/2022				
Version number					
Project description:					
Risk review					
DIRECTLY INVOLVED IN THE DEVELOPMENT OR REVIEWED ONLY					Reference documents
POSITION	NAME	TICK	SIGNATURE	Review	
General Manager	Ben Folkard	<input type="checkbox"/>		<input type="checkbox"/>	Project Workplace Health and Safety Plan
Operations Man'	Chris Bellemore	<input type="checkbox"/>		<input type="checkbox"/>	Workplace Health and Safety Act 2011
Constr' Manager	Dean Fondas	<input type="checkbox"/>		<input type="checkbox"/>	Workplace Health and Safety Regulation 2017
Project Manager	Michael Ettrick	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Australian standards (refer for those applicable contained in HSE plan)
Site Manager	Andy Payne	<input checked="" type="checkbox"/>	<i>Andy Payne</i>	<input checked="" type="checkbox"/>	Industry approved codes of practice (refer to HSE plan)
Foreman	TBA	<input type="checkbox"/>		<input type="checkbox"/>	National codes of practice (refer for those applicable contained in the plan)
HSE Manager	Andrew Andreou	<input type="checkbox"/>		<input type="checkbox"/>	SafeWork NSW publications and safety alerts
Safety advisor	Dan Morrison	<input checked="" type="checkbox"/>	<i>Dan Morrison</i>	<input checked="" type="checkbox"/>	Safety in Design Risk Assessment
Annual reports, LTI and MTI frequency rates (internal/ industry)					
When undertaking the Risk Assessment, the assessor should follow the guidelines of the matrix below:					

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HSE-R-01 HSE Risk Register	Template - Andrew Andreou/	SIT	January 2021	11	Page 2 of 40



*S= safety

E= environmental

Likelihood \ Consequence	5 Almost certain (50 times per year)	4 Likely (10 times per year)	3 Possible (1 per year)	2 Unlikely (1 every ten years)	1 Rare (> 1 every ten years)
5: Catastrophic S*: Fatality, long-term illness E*: Long-term perm. damage	Extreme (EXT) 25	Extreme (EXT) 20	High (H) 15	Moderate (M) 10	Moderate (M) 5
4: Major S: Extensive injury E: Medium effect/ off-site release	Extreme (EXT) 20	High (H) 16	Moderate (M) 12	Moderate (M) 8	Low (L) 4
3: Moderate S: Medical treatment E: Moderate effect/ off-site emission	High (H) 15	Moderate (M) 12	Moderate (M) 9	Moderate (M) 6	Low (L) 3
2: Minor S: First Aid E: Min off-site impact	Moderate (M) 10	Moderate (M) 8	Moderate (M) 6	Low (L) 4	Very low (VL) 2
1: Insignificant S: Pain, inconvenience E: No off-site impact	Moderate (M) 5	Low (L) 4	Low (L) 3	Very low (VL) 2	Very low (VL) 1

Risk Score	Description of risk	Management action
20 - 25	Extreme	Immediate action required. Stop work or process if possible and/ or introduce immediate risk controls. Must not continue without robust controls in place.
13 -16	High	Actions required to further mitigate the risk. Additional management attention may be required including detailed research and planning at senior levels to reduce or manage risk.
5 -12	Moderate	Manage using standard controls and SWMS/ JSEA. May require specific attention or allocation of resources.
< 5	Low/ very low	Follow routine procedures or normal work practices. Unlikely to require specific allocation of resources. Accept risk where adequate controls are in place.

Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	
											1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other

Section A – Site establishment/ general

1	Design and build ability	Hazards are to be identified on a project-by-project basis in consultation with the project manager, HSE manager and project stakeholders (client, architect, consultants).	Y	2	3	5	<ul style="list-style-type: none"> A Project Management Plan has been developed. The project team, including any stakeholders required, have completed a Safety in Design Risk Assessment using QSE-F-03b. A method has been nominated to communicate changes in design during the construction phase. The project manager is to be responsible for obtaining the Safety in Design Risk Assessment from the designer. No input into the design for 'construct only' project review and make documented comments on the Safety in Design Risk Assessment. 	2	3	5	1
2	Establish a site-specific HSE Plan Establish an OHS consultation process	Potential site risks not identified. Failure to comply with legal requirements. Not complying with legislative requirements.	Y	3	3	9	<ul style="list-style-type: none"> Prepare site-specific HSE Plans, including: <ul style="list-style-type: none"> QSE-PLAN-01 Project Management Plan (PMP) WHS-PLAN-02 Project Workplace Health and Safety Plan (PWHSP) E-PLAN-03 Project Environmental Management Plan (PEMP) SE-P-07 Project Emergency Control Management Plan Traffic Plans Revisions are to be undertaken as the need arises, not exceeding six (6) months. 	2	2	4	1

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HSE-R-01 HSE Risk Register	Template - Andrew Andreou/	SIT	January 2021	11	Page 3 of 40



							<ul style="list-style-type: none"> Establish a WHS consultation process using S-F-04 WHS Consultation Statement as soon as practically possible. 				
3	Site-specific induction	Site personnel unaware of site-specific requirements.	Y	4	Y	14	<ul style="list-style-type: none"> All personnel to work on site are to attend the site-specific induction prior to commencing work. Site specific induction is not to commence until the employees has uploaded required information and registered their details on Hammertech Visual checks are to be made of individual's qualifications. All workers must have a valid construction induction card. Taylor Construction site induction to our system: <ul style="list-style-type: none"> Site rules and safety/ emergency requirements. Consultation arrangements on site. Location of amenities. Location of first aid facilities. Reporting procedures. Any site-specific hazards. All workers are to be inducted by their respective supervisor into their site-specific SWMS. Employees must read, understand and, where possible, give inputs to add value to their task/ site specific SWMS prior to commencing works. All personnel attending site-specific induction are to provide photo identification Workers to have site rules made available to them. Workers identification and qualifications to be registered. An induction sticker/ card that gives evidence to their site-specific induction to be on the worker always. 	3	3	9	1 & 2

Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other

Section A – Site establishment/ general

4	Subcontractors to provide site-specific high-risk SWMS for review	<p>Subcontractors' SWMS fails to meet the site-specific requirements.</p> <p>Subcontractor not inducting employees into the requirements of the employer's Safety Plan.</p>	Y	16	1 2	16	<ul style="list-style-type: none"> All subcontractors to be made aware of HSE requirements prior to commencing work. Contract administrator to issue all successful tenderers form QSE 15.23 Contractor's HSE Requirements for completion and sign-off. Site-specific SWMS submitted 5-7 days prior by the subcontractor and reviewed by Taylor Construction prior to subcontractor commencing. SWMS is to be reviewed by and signed off by Taylor Construction site management prior to the subcontractor commencing on site. All employees are to receive site induction, industry induction and SWMS. Taylor Construction is to provide subcontractors with access to site HSE Plan; Employees are to be inducted by their respective supervisors into their company's Site Safety Plan, and task-specific SWMS prior to commencing work on site; Taylor Construction is to provide subcontractors access to relevant sections of the project Risk Register. 	8	5	5	1 & 2
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5	Location, layout, condition and accessibility	QSE concerns with neighbours and members of the public. Interaction with members of the public, tenant, visitors, trespassers, school children, etc. Impact with construction processes inside boundary fencing.	Y	4	4	16	<ul style="list-style-type: none"> Ensure public safety through securing the boundary of the site with security fencing. Fencing to be erected and maintained by competent contractor; All mandatory signage to be prominently displayed at all access/ egress points. Contact details of project manager to be identified; Erect signage directing unauthorised personnel to keep out; Where the risk has been identified, drop zones will be barricaded off within public areas, using physical barriers and/ or spotters engaged; Taylor Construction is to maintain regular consultation with neighbours, adjacent sites in relation to protection of their staff, visitors and assets; a Complaints Register; All works that may have an impact on neighbouring sites/ public areas must have controls nominated in specific SWMS; Taylor Construction is to notify neighbours that may be impacted by major works on sites close to their homes prior to works commencing and to ensure that the impact of site works on the public are kept to a minimum; Erect signage directing unauthorised personnel to keep out; Boundary fence to be maintained and inspected during safety walks; Gates to be closed and locked at the end of each day and kept locked during no work on site; Traffic and/ or pedestrian control may be required during periods of heavy traffic or pedestrian flow. 	3	4	12	1
6	Emergency preparedness evacuations	Site Emergency Control Management Plan not developed.	Y	3	4	12	<ul style="list-style-type: none"> Emergency Control Management Plan SE-P-07 to be established and those assigned with responsibilities to be trained in its contents and their role. <p>Procedures to be outlined for:</p> <ul style="list-style-type: none"> Medical emergencies. Contaminated material. Recovery using crane Breach of utility/ service Chemical, biological or radiological emergency Any applicable wildlife issues. Fire or explosions. Bomb threat Structural collapse, including collapses during earthworks. Plant failure or collapse Natural disasters 	2	3	6	1
Section A – Site establishment/ general											
							<ul style="list-style-type: none"> Emergency equipment to be tested at regular intervals and details recorded; Evacuation drills to be held at least once every six (6) months with details recorded; Include details in site induction; Display emergency signage and names of key roles; Training is to be provided in accordance with AS 3745:2010 'Planning for emergencies in facilities'; The Emergency Control Management Plan must be reviewed and, where applicable, updated after any major incident and/ or as a result of six (6) monthly evacuation drill results. 				
7	Inground services	Damage to utilities Personnel injuries Plant damage Core drill Saw cutting	Y	12	1 6	12	Gas/ water/ electricity/ data/ storm water sewage: <ul style="list-style-type: none"> Identify power supply and source; Have power turned off by energy supply authority; Complete services search, i.e. Dial Before You Dig; Isolate services where possible when working around or within close proximity; Induct employees (site and industry inductions); Safe Work Method Statements for work around inground services; All temp inground HV to be signposted and concrete encased; Spotter required where earthmoving machinery is used and whilst services are uncovered; 	12	8	8	1,2,3

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							<ul style="list-style-type: none"> Hand excavate and expose services that may be affected; Underground services: subcontractor carrying out the work should allow for inaccuracies and the possibility of other unknown or hidden services; Dial before you dig documents to be kept on file for reference and use by subcontractors; If Dial Before You Dig are not clear or available for areas of concern, ground penetrating radar may be required to locate any known services. 				
8	Temporary services	Contact temporary services: electrical, fire Contact temporary services: water, sewer	Y	5	5	16	<ul style="list-style-type: none"> No live work permitted to electrical services; Subcontractors to verify electrical works are performed and comply with all relevant sections of the applicable AS/NZS 3000:2018, AS/ NZS 3012:2019 and electrical requirements applicable to the state/ area where works are being performed; Sufficient task lighting to all work areas is to be provided; All temporary electrical installs to have identifiable signposting; All temporary wiring to be protected from mechanical damage by use of protective shroud and/ or other means; Temporary services to be located in areas that do not interfere with construction works; Fire extinguishers to be located at each temporary power board; All temporary water and sewer services to be located away from high traffic areas; Temporary boards to be certified and signed off by subcontractor. 	3	4	1 2	1 1,2

Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification			Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking	Likelihood	Consequence	Risk ranking	1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other

Section A – Site establishment/ general

9	First aid	Insufficient or inappropriate first aid facilities Communication/ contacting first aiders Insufficient number of trained first aid personnel on site during working hours, which can result in further injuries to worker due to sudden movement and/ or					<ul style="list-style-type: none"> First aid requirements and facilities established need to comply with local requirements SafeWork NSW Code of Practice 'First aid in the workplace' 2019 At the commencement of the project a suitably trained first aid, in consultation with the PM, SM and/ or safety officer, will conduct an assessment using SE-F-04 Site Emergency Preparation Checklist First aid equipment and facilities should be located at convenient areas and where there is a higher risk of an injury or illness occurring. At the commencement of the high-risk construction, an industry compliant first aid kit must be available. All projects in which 25 or more workers are engaged shall also have available a soft pack mobile kit that can be easily transported on site if required. Primary first aider is to conduct regular inspections of each kit to ensure the contents are current and available. Access to first aid kits must remain clear of any obstruction. All first aid kits must remain unlocked during hours of operation. The primary first aider attending to the injured worker needs to assess the situation, determine the extent of injuries and what first response treatment is required. He or she needs to determine if the injury is of a nature that will require off-site treatment or if emergency services must be called. 				1, 2
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		transport to first aid facility for further treatment					<ul style="list-style-type: none"> If the injury is of a nature that the injured workers are unable to leave the area without any major assistance and will need to be carried from the location, then the emergency services will be immediately called to take over the treatment and removal of worker from the incident location. Taylor Construction first aiders will only remove the injured workers from the location if they are in immediate danger. In accordance with Appendix C- 'First aid facilities' of the 'First aid in the workplace' code of practice, a first aid room is recommended for high-risk workplaces with one hundred (100) workers or more. If a first aid facility is established on site, then the following items need to be included in the room: <ul style="list-style-type: none"> A first aid kit appropriate for the workplace. Hygienic hand cleanser and disposable paper towels. A cupboard for storage. A container with disposable lining for soiled waste. A container for the safe disposal of sharps. A bowl or bucket with a minimum of two (2) litres capacity. Electric power points. A chair and a table or desk. Access to a telephone and/ or emergency call system. The names and contact details of first aiders and emergency organisations. A sink with hot and cold water. <p>First aid room needs to be well lit and ventilated, have an entrance that is clearly marked with first aid signage and maintained clean and free from any unrelated construction material.</p> <p>The PM/ SM, in consultation and/ or HSE committee, needs to consider if the following items are required when establishing a first aid facility:</p> <ul style="list-style-type: none"> Automated external defibrillator <p>Adequately trained first aid personnel to be always on site whilst construction work is in being carried out. High-risk workplaces: one first aider for every 25 workers.</p> <ul style="list-style-type: none"> The person nominated to maintain the first aid room should be an occupational first aider. All additional first aiders need to hold a nationally recognised statement issued by a registered training organisation (RTO); It's a requirement that a first aider holds a current 'provide first aid' certificate, as a minimum. First aid treatment and reporting must be included in site induction and regularly covered in toolbox talks. All incident reports must only be documented if reported by the worker on the day of incident. An effective communication system needs to be adopted on site so workers can advise of injuries. This may include any combination of a nurse call system, alarm, two-way radios or air horns. The system adopted and locations must be discussed with workers during site induction. Name, photo and contact number of each Taylor Construction first aider must be displayed adjacent to the first aid kit, induction room and notice board if available. 	3	3	9	
		Working at height or on uneven or slippery surfaces	Y	4	4	16					
		Electricity									
		Machinery and equipment									
		Hazardous chemicals									
		Extreme Temperatures									

Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

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Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other
Section B – General construction activities/ conditions											
1	Construction vehicle, site access, vehicle movements to and from site	Vehicles/ mobile equipment/ machinery collision Unauthorised access to site Impact with pedestrians Collision with workers	Y	3	5	15	<ul style="list-style-type: none">A Traffic Management Plan is to be developed by an accredited and authorised person prior to commencement on site and, where required by DA, consent conditions submitted to the relevant authorities for review;The requirements of the Traffic Management Plan Procedure QSE-OP-39 must be adopted and adhered to by those responsible when setting up and removing traffic management devices and equipment;Traffic Control Set-Up Check Sheet S-F-21 to be completed where traffic and/ or pedestrian management is required to minimise the impact on the public;High-visibility clothing to be worn by all site personnel during all works;Site map showing gates, roads, unloading and storage areas to be communicated at site induction. TMP to be signposted in an applicable area (i.e., at main entrance and induction and meeting room).Prior to commencing any work on site which involves the interface of mobile powered plant, vehicle, and pedestrian traffic, including deliveries and the removal of materials from site, a suitable ON-SITE TRAFFIC / PEDESTRIAN MANAGEMENT PLAN shall be developed by Taylor and implemented to reduce the likelihood of conflict between either or all the above, plan must be displayed and communicated to all those that may be impacted by this.High-visibility vests to be worn when controlling traffic.Vehicles to travel only on approved roadways, loads secured and covered;Plant and equipment are not to be floated on/ off site, unless a Taylor Construction management representative is present;Pedestrians to have the right of way always;Plant movements to be controlled by competent personnel only;Spotters to be used in areas of compromised visibility (i.e. reversing);Plant delivered to site to be inspected by Taylor Construction management and registered to site. All mobile plant delivered to site is to be used only when it has been established that the plant is compliant to Taylor’s legislative maintenance and inspections requirements;Access gates to be securely closed when not in use and locked when site is not operational;TMP to be signposted in applicable areas (i.e. at main entrance and induction/ meeting room);Where possible, traffic to enter and leave from designated access and egress points in a forward motion;All drivers are to remain with vehicles always, unless they are escorted by a site inducted person.	2	5	1 2	1,2
2	Flammable liquid	Fire/ explosion Spills Chemical dust Contaminated soil	Y	4	4	16	<ul style="list-style-type: none">Flammable material not to be stored on site, if possible;All flammable liquids are to be identified and relevant notification and SDS to be issued to Taylor Construction prior to products being brought to site;Fire extinguisher to be kept in close proximity to storage area;All containers to be clearly labelled. No storage of flammable liquids in non-ventilated containers and lunch shed;Store oxygen and acetylene cylinders separately, at least four (4) metres apart;Flashback arresters to be installed on all oxy/ acetylene equipment;Restrain cylinders upright by the use of chain or other suitable means;SDS to be available and accessible to the first aid persons and the users of products;Flammable storage to be located away from high traffic areas;	3	3	1 2	1,2

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							<ul style="list-style-type: none"> Warning signage to be displayed prominently. Storage of hazardous substances and flammable materials to be kept to a minimum. 				
Section B – General construction activities/ conditions											
	Hazardous goods (use, handling and storage)	Fire/ explosion Personal contamination Public exposed to chemicals	Y	4	4	16	<ul style="list-style-type: none"> Hazardous substances to be substituted with less hazardous items where possible; All hazardous items to be isolated and signposted; All hazardous substances and dangerous goods are to be identified and relevant notification and SDS to be issued to Taylor Construction prior to products being brought to site; Where required, a Risk Assessment is to be completed or provided by the user on the hazards associated with the handling of product/ chemicals; All hazardous substances and dangerous goods to be stored as per local statutory authority requirements and AS1940 (e.g. lockable cages, bunds with appropriate signage displayed); Designated storage area to be defined and shown on site map where required; A hazardous substance/ dangerous goods/ MSDS register is to be established and located where they can be easily accessible to the first aiders; Spill kits to be available on site and persons trained in their application; Control measures must be nominated in the products. SDS are to be implemented and monitored; subcontractor employees are to be familiar with the SDS, their location and application to their task; Keep others away from hazard, install barricades and warning signs 	3	3	1 2	1,2
3	Hot works	Fire Explosion Property damage Personnel hazards, including burns Eye damage Chemical hazards	Y	5	5	20	<ul style="list-style-type: none"> Where possible, hot works are to be completed off-site; Isolate hot work activities from other trades and public; Hot works activities to be signposted; SWMS to be task-specific and incorporate the immediate environment; Hot works permits to be used (site-specific requirements); Keep flammable materials away from other workers and work activities; Maintain good housekeeping; Sparks/ slags to be contained to the same level that task is being completed on. If working near a drop area, ensure barricades, spotter and signage is installed; Provide fire extinguishers and ensure they are within easy reach of users; Welding works to have screens erected; Work areas to be adequately ventilated; Good ventilation to be maintained throughout the activity. 	4	4	1 2	1,2

Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking		Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking
										1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other

Section B – General construction activities/ conditions

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4	Housekeeping and working environment	Slips, trips, falls Emergency control Property damage Material falling from heights Materials becoming airborne Inclement weather conditions Adverse temperatures Rain, dust, wind, lightning, thunder Flooding Exposure to UV rays Noise, vibration Dehydration, heat stress Exposure to cold environments	Y	5	5	20	<ul style="list-style-type: none"> Materials that have no packaging or waste material to be selected for use on site where possible; Regular removal of material to be coordinated; All materials to be stacked and stored in a secure manner that will have minimal impact on other trades; Access ways to be kept clear and well lit; lighting to be adequate so as not to create excessive glare or reflection, allowing employees to work safely; Lighting is adequate to allow persons who are not employees to move safely within the place of work and facilitates safe access to and egress from the place of work, including emergency exits; Regular safety walks to highlight any problem areas and ensure responsible parties to remedy; Regular clean-up and removal of trade debris and excess material on site; Placement of waste and construction debris to be kept clear of all designated access and egress points of the project. This includes site entry, exit and emergency points and all completed levels of the project; Excess concrete is not to be lifted by reo; stressing cable, etc. put into it and lifted by crane; No material to be stored on scaffold or building edge; Conduct regular formal and informal inspection of work areas; No mobile scaffold or free-standing ladders to be used during periods of extreme conditions (i.e. strong winds, lightning heavy rain); Penetrations to be covered over and highlighted; Intermediate and temporary handrails to be progressively installed; Vertical protruding reo bars to have bar caps fitted and maintained; Appropriate PPE to be issued to personnel dewatering (i.e. gum boots, raincoats); Materials to be secured (tied down) from windy conditions; Taylor Construction management and/ or site WHS consultative process have the authority to close works areas due to the impact of rain/ weather; Works to be staged in a manner that will minimise the impact of weather on workers where possible; Regular inspection of work areas during inclement weather; Pumps, squeegees and brooms to be used to remove water; appropriate PPE to be issued to personnel dewatering; Works to be staged in a manner that will minimise the likelihood of flooding and adverse weather on workers where possible; Works to be rotated to minimise exposure to high UV hours (middle of the day) wherever possible; SPF 30+, safety helmet brims, sleeved shirts, pants, tinted eyewear and gloves to be provided by employers; Where there is a potential for exposure to noise in excess of 85 dB continuously for eight hours, or a daily noise dose of 1.0, or where there is a potential for exposure to vibration to arms and hands from tools for greater than 4 hours in a 24-hour period, or where there is a potential for whole body vibration in excess of exposure levels 	4	4	1 2	1,2
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Section B – General construction activities/ conditions

5						<p>nominated for machinery or plant by the manufacturer, documented procedures outlining the control are to be provided;</p> <ul style="list-style-type: none"> Appropriate ear protection must be worn; take note of signage and restricted areas; Subcontractor's SWMS to address the control of noise during their activities; Plant and equipment to be maintained (i.e. exhausts); Community complaints register to be maintained by Taylor Construction; Use methods to suppress dust such as water spray, dust barriers, etc.; Subcontractor's SWMS to identify the requirements for frequent clean-ups; Subcontractors to control the dust created during their tasks in SWMS; Cool drinking water to be provided at work areas where strenuous activities are being completed; Provision of site amenities with air conditioning; Contractor's SWMS to identify and control heat stress exposure in their activities where applicable and control accordingly; Provision of amenities that are of sound construction and weatherproof; 				
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							<ul style="list-style-type: none"> Provision of heating equipment for food; PPE and the staging of works that will reduce or eliminate the exposure of workers to cold environments. 				
6	Manual handling	Personal injury	Y	4	5	20	<ul style="list-style-type: none"> Activities requiring prolonged manual handling tasks to be eliminated in work procedures where possible; Mechanical aids to be used where possible; SWMS to nominate the use of mechanical aids available to be utilised on site (i.e. site tower crane, hoist, and forklift); Materials to be selected that minimise the use of manual handling; Materials over 20kg are not to be carried by one person. Items such as tiles (25kg) to be carried via team lifting techniques; Material storage to be staged in a manner that reduces the amount of manual handling whenever possible; All SWMS are to address the task-specific manual handling needs in their tasks; All employees to be educated in the correct manual handling techniques by their employer. Evidence of which is to be made available by subcontractor upon request; Personnel required to perform tasks that require prolonged periods of manual handling should be consulted in this requirement; Manual handling tasks to be completed in a manner that reduces the likelihood of repetitive strain; All workers to be encouraged to only lift within a person's capacity. 	3	4	9	1,2

Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other

Section B – General construction activities/ conditions

7	Handling materials	Manual handling Use of mechanical devices Use of loading platforms Crush, collision	Y	4	5	20	<ul style="list-style-type: none"> Stage and coordinate works that will eliminate the requirement for repetitive material handling. Reduce the amount and distance that material will need to be handled. Isolate areas around movements. Modes of mechanical use implemented by the subcontractor are to be nominated and effectively controlled in SWMS. Options include, but are not limited to: forklifts, pallet trolleys, telehandlers, mobile cranes and hoists; SWMS reviewed for installation and use of scaffold loading platforms. SWL signage to be displayed. All loads to be secured. Inspection and maintenance of plant to be nominated in SWMS. Applicable tickets and licenses to be provided at induction. Site HSE Plan to identify the inspections to be completed by Taylor Construction upon delivery. SWMS to state that loading platforms are to be kept free of rubbish and trip materials. Subcontractor's SWMS to identify the safe working load of platforms and ensure material is less than the prescribed. Signpost and clearly isolate movement corridors. 	3	4	12	1,2
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							<ul style="list-style-type: none">• Loads to have designated lift points with current engineer's certificate.• Loads to be rigged by appropriately certified and competent persons only.• High-vis clothing to be worn by everyone on site.				
8	Deliveries to and from site, Chain of Responsibility (CoR)	Breach of National Heavy Vehicle Law (HVNL) Fatigue Overloading Speed Material Roll off	Y	4	4	1 6	<p>Operator/manager/scheduler responsibilities</p> <p>as an operator, manager, or scheduler of a business involved in road transport, your responsibilities also include ensuring that</p> <ul style="list-style-type: none">■ rosters and schedules do not require drivers to exceed driving hours regulations or speed limits■ you keep records of your drivers' activities, including work and rest times■ you take all reasonable steps to ensure drivers do not work while impaired by fatigue or drive-in breach of their work or rest options■ vehicles are regularly maintained, and if speed limiters are fitted, they are functioning properly■ vehicles are not loaded in a way which exceeds mass or dimension limits■ drivers moving freight containers have a valid Container Weight Declaration■ loads are appropriately restrained with appropriate restraint equipment (see the Load restraint guide for more information) <p>Consignor/consignee responsibilities (allocator)</p> <p>As consignor or consignee your responsibilities include ensuring that:</p> <ul style="list-style-type: none">■ loads do not exceed vehicle mass or dimension limits■ goods carried on your behalf are able to be appropriately secured■ operators carrying freight containers have a valid Container Weight Declaration■ your delivery requirements do not require or encourage drivers to:■ exceed the speed limits■ exceed regulated driving hours■ fail to meet the minimum rest requirements■ allow a driver to drive while impaired by fatigue <p>Loading manager/loader/packer responsibilities</p> <p>Loading managers, loaders and packers must ensure that loading a fatigue-regulated heavy vehicle will not cause or contribute to the driver driving while impaired by fatigue or in contravention of road transport laws.</p> <p>Loading manager responsibilities include:</p> <ul style="list-style-type: none">■ working with other off-road parties to make reasonable arrangements to manage loading/unloading time slots■ ensuring vehicles are loaded/unloaded as quickly and efficiently as possible■ putting systems in place for unexpected jobs – for example where there have been unexpected road delays.■ Loader responsibilities include ensuring a vehicle's load:■ does not exceed vehicle mass or dimension limits■ does not cause the vehicle to exceed mass limits■ is placed in a way so it does not become unstable, move or fall off the vehicle.■ documentation about the vehicle's load is not false or misleading	3	5	1 5	1 & 2

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9	Mobile plant	Crush, collision Poor condition of plant Unauthorised use of plant Fumes, noise Rollover Structural collapse Cross contamination Mobile plant coming into contact with overhead power lines Electrocution	Y	5	5	2 5	<ul style="list-style-type: none"> Isolate plant movements from other pieces of plant and persons; SWMS to outline and address controls for when mobile plant will be used on suspended slabs. SWMS to provide documented evidence that the total gross weight of the plant will not exceed that of the engineered weight to be carried by the structure; The keys must not be left in the cabin or item of plant if the machine is unattended; Taylor Construction project/ site manager or nominated site representative will conduct a review of plant and required documents using S-F-18 Plant Pre-Start Assessment prior to the plant has been permitted on site. This shall be conducted irrespective of the duration or frequency the mobile plant is to be operated on site; Taylor Construction project/ site manager or nominated site representative will register all items of mobile plant brought to site using S-F-12 Plant Register; Subcontractor/ sole trader is to provide a register of mobile plant to Taylor Construction prior to operating the plant; SWMS to identify and control when works are to be completed in the vicinity of mobile plant; Plant maintenance records to be submitted prior to use; S-F-18 Plant Pre-Start Assessment to be available prior to plant use. Must be current (<5 years old); SWMS to acknowledge the inspections that will be carried out by Taylor Construction management upon delivery to site; Mobile plant is to be used in well-ventilated areas; if this is not possible, extractor fans are to be used to manage any toxic emissions, or the plant be replaced with gas/ electric powered version; 	3	5	1 5	1,2
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Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	
											1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other

Section B – General construction activities/ conditions

10							<ul style="list-style-type: none"> All mobile plant operators shall be responsible for inspecting the area that they are to operate to ensure that the plant is suited for the purpose, location and stability of ground its working in; If plant is working in enclosed area with excessive toxic emissions, air monitoring may be required; If mobile plant is required to be used on a suspended slab, permissions must be obtained by the operator from a Taylor Construction site manager on the load capacity of the slab. Engineers confirmation may be required in certain circumstances and at no stage is the load capacity to be exceeded without the prior written consent of an engineer; If operations of mobile plant are emitting prolonged elevated noise levels, the project manager will be responsible for real time monitoring of noise to be conducted and recorded using QSE-F-21 Noise Map and Register; Daily pre-use inspection to be carried out and documented on all mobile plant by operator Subcontractors to have task-specific SWMS for use of mobile plant; Operators of mobile plant to have appropriate certification issued by a statutory authority or training records acceptable to Taylor Construction. Subcontractors to complete relevant section of Site Induction Form and Mandatory Safety Requirements SE-F-11 for each employed operator; 				
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							<ul style="list-style-type: none">• All operators of EWP to be trained and have a certificate issued by an RTO. This is a minimum requirement for the use and operation of any EWP where a certificate of competency (over 11 metres) issued by a statutory authority is not necessary. Operators require a certificate of competency for booms over 11 metres;• Full safety harness to be worn in all boom lifts;• Access to and from mobile plant whilst it is in motion or elevated is prohibited unless in the event of an emergency;• Certificate issued for a scissor lift type EWP is not acceptable for use of a boom type EWP under 11m or vice versa;• Check mobile plant does not operate in proximity of overhead power lines; refer to local requirements;• SWMS to nominate the location of any overhead power lines located on site;• SWMS to adequately nominate who is completing the works, the controls and minimum distance that must be obtained during the activity and training achieved by persons completing the task;• Subcontractors to have task-specific SWMS for use of mobile plant;• If mobile plant has been operated in a contaminated area of the project, it must be cleaned and washed prior to leaving that area.				
11	Penetrations and wall openings	Penetration covers not adequate to take loads imposed Persons, materials or plant falling through penetrations Persons, material or plant falling through wall penetrations	Y	4	4	16	<ul style="list-style-type: none">• Design to minimise the need for penetrations where possible.• All floor penetrations to have fixed, suitable coverings.• All penetrations are to be constructed or protected in such a manner that it eliminates the risk of man and material falling through.• Penetrations over 150mm in diameter to have mesh cast in the concrete and covered in accordance with industry practice;• Columns, beams and penetrations in formwork to be covered and secured with F81 mesh or handrails.• Large mechanical penetrations to have temp handrail fitted, completed with mesh and kickboards;• Signpost penetrations and coverings.• Penetration coverings to be monitored during site inspections;	3	5	1 5	1,2

Section B – General construction activities/ conditions

12							<ul style="list-style-type: none">Penetration coverings in high traffic areas to be constructed in a manner that will hold the gross weight of the plant and be securely fixed.Trades who can remove penetration coverings and the controls implemented to ensure the safety of oneself and other trades on site (i.e. replacing covers, cutting minimum space out of mesh to put their services through, etc.) are nominated in their respective SWMS;Large wall penetrations to have temp handrail fitted, completed with mesh and kickboards.Lift openings to be securely covered until such times as lockable lift gates are fitted.Lift cages to be inspected during safety walks.Lift cages to display applicable signage.				
13	Supply and use of personal protective clothing and equipment (PPE)	PPE not complying to applicable Australian Standard Personal injury due to inappropriate PPE being provided	Y	4	4	16	<ul style="list-style-type: none">Work activities that could eliminate the requirement for workers to be reliant on PPE to be employed.PPE used to comply with appropriate Australian Standard.Engineering solutions to be employed wherever possible (i.e., guards on machinery, extraction vacuums, etc.)Mandatory PPE requirements to be signposted in common areas and at main entrance.Taylor Construction and subcontractors to monitor PPE usage and application.PPE that does not limit or hinder the operator from performing the task safely to be selected.Provide sunscreen, safety helmet and brims as required.	3	4	1 2	1,2
14	Stairs and access condition and accessibility	Slips, trips and falls Insufficient lighting	Y	4	4	16	<ul style="list-style-type: none">Ramps and low-risk access methods to be incorporated in the build;Designated access ways to be identified on the site plan;Isolate plant from pedestrian movements;Access ways to be well illuminated;Access/ egress ways/ directions to be signposted and enforced by Taylor Construction management;Materials not to be stored along designated access ways;Access ways to be maintained and inspected on a regular basis;	3	4	1 2	1,2

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							<ul style="list-style-type: none"> • Handrails to be fitted to stairs prior to stripping of formwork; • Ladders to be used only as a last resort and for access only. Ladders can only be worked from where it is not reasonably practicable to use other means, as covered in the site HSE Plan; • Where ladders are to be used, they must be tied off at the top, footed at the bottom with a minimum one (1) m past platform step-off; • Lighting to be fitted to stairs and access/ egress ways as work proceeds; • Subcontractors to provide task lighting; • Emergency lights to be fitted to areas where safe access/ egress is necessary in the event of power loss and insufficient day light. 				
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Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	

1. Taylor
2. Subcontractor (nominate by name)
3. Architect/ other

Section B – General construction activities/ conditions

15	Structural collapse	Personal injury Collapse of structure	Y	4	4	16	<ul style="list-style-type: none"> Engineer or geo technician to sign off structural elements, including load bearing capacity of any existing concrete slabs or load bearing surface; Engineer to inspect formwork in accordance with AS 3610.1:2018 requirements; Temporary structures such as formwork to be isolated from other trades access whilst under construction; Temporary supporting structures to be signposted (i.e. temporary columns, props, frames, beams); Subcontractor erecting temporary structure to have the isolation procedures nominated in SWMS; Engineer sign-off for all structural elements; Engineer to inspect and sign off crane base prior to pouring of the concrete pad; Engineers documentation showing formwork setup required (i.e. table form, bondek, conventional, etc); Concrete strength at time of stripping for both conventional and post tension slabs required; Taylor Construction, in consultation with the concreter, is to agree on the pouring techniques that will be used and the sequencing requirements (pump, kibble). The engineer is to be consulted prior to the pour to determine the suitability of bracing and/ or back propping already installed and if additional supports are required; Bracing required for raking formwork; Engineers report not to be issued more than two working days prior to pour; Engineer to inspect formwork in accordance with AS 3610.1:2018 requirements. A certificate to clearly state that formwork meets the requirements of this Australian Standard is required. 	3	4	12	1,2
16	Use of/ working with electrical equipment and installations	Electrocution Damage to supply boards Poor or damaged wiring Access to boards Fire	Y	4	16	16	<ul style="list-style-type: none"> Substitute electrical power tools with battery operated tools where possible; All temporary electrical installs to have adequate warning signage displayed; All temporary distribution boards to be tested upon installation and periodically tested thereafter as required by local legislation; Temporary boards to have compliance certificate issued by licenced contractor prior to use; Live power supply to main switchboards not covered by earth leakage protection should be adequately protected and signposted; Works undertaken after permanent power supply has been installed and ELCB does not exist will require persons to use portable earth leakage devices; Temporary electrical installations carried out in accordance with AS/NZS 3012:2018 and local legislative requirements. Permanent electrical installations to be carried out in accordance with AS/NZS 3000:2018; Switchboards to be fitted with class 2RCDs; All electrical equipment to be inspected shall be tested and tagged prior to use in accordance local and Taylor's requirements, i.e. regulations and codes of practice; Distribution boards to be located where extension leads when used they do not exceed the maximum lengths specified by the local statutory authority; Extension leads to be elevated on insulated hooks or stands. Leads to be set up leaving clear access and not to be trip hazards; 	3	4	12	1,2

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							<ul style="list-style-type: none"> Handrails to be installed as soon as possible after concrete floor slab has been poured, and prior to stripping formwork where possible; 				
Section B – General construction activities/ conditions											
19							<ul style="list-style-type: none"> Handrails erected as fall protection are to meet Australian Standard specifications and be nominated by the trade erecting the protection; Penetrations over 150mm in diameter to have mesh cast in and covered in accordance with best industry practice; Column, beam and penetrations in formwork to be covered and secured with mesh or handrails; Large mechanical penetrations to have temp handrail fitted, completed with mesh and kickboards; Perimeter scaffolding is to be inspected by a suitably certified scaffolder and the inspection to be registered and repeated monthly or after alterations is made; Lift openings to be fully meshed, until such times as lockable lift gates are fitted; Access to the working platform of the mobile scaffold may be by means of a temporary stairway, scaffold stairs or ladders. 				
20	Use of safety harnesses and attachments	Fall from heights Product failure	Y	5	5	25	<ul style="list-style-type: none"> All safety harnesses and attachments used on site shall comply with the requirements of AS/NZS 1891.4:2009 'Industrial fall-arrest systems and devices, part 4: selection, use and maintenance'; All fixing points are to be approved; All safety harnesses and attachments used on site must be inspected and certified by an authorised person at periods not exceeding six (6) months; Harness Register to be issued to Taylor Construction nominating all harnesses and attachments to be used and date of last maintenance inspection; Employees required to use a safety harness shall be required to have successfully completed a registered training course 'Working at heights'; SWMS for works using harness shall be issued to Taylor Construction; S-F-07 Safety Harness Permit to be completed and signed off prior to use of harnesses and attachments; Proposed height rescue method to be documented in SWMS if use of safety harness is required as a control. SWMS is to include a step by step procedure, equipment and training required for performing a height rescue; All fixed static points to be signed off by competent persons prior to use. 	2	5	1 0	1, 2
21	Contaminated soil and water	Conducting works in areas of unidentified contamination	Y	5	5	25	<ul style="list-style-type: none"> Preliminary Contamination Assessment (PCA) performed for work areas; Contaminated areas identified, segregated and appropriate control measures and safeguards adopted; Correct contamination soil and water handling/ storage and disposal procedures followed; All contaminated groundwater entering service trenches or excavation to be removed, treated and re-used/ disposed of appropriately. 	2	5	5	1, 2

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Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other
Section B – General construction activities/ conditions											
22	Asbestos and hazardous building materials	Damage or works to buildings or structures containing asbestos, PCBs in lights and/ or lead-based paints Disposal of asbestos and other hazardous building waste	Y	4	20	16	<ul style="list-style-type: none">Works will be conducted in accordance with QSE-OP-02 Asbestos Management Procedure;All hazardous materials removed by licensed contractor prior to demolition commencing;Independent clearance survey performed on areas following removal of hazardous materials;Contractor to provide SWMS for removal works and be appropriately licensed;Real time air monitoring to be conducted and reports made available to the project manager and communicated to site employees;If real time monitoring has highlighted that employees have been exposed to above recommended levels, medical surveillance may be required. The project manager, in consultation with the HSE manager and a senior manager, will be consulted and the requirements of SE-OP-35 Health Monitoring Procedure will be implemented;Unexpected finds protocol to be included in site plan and site induction;Any wastes removed to be segregated and stored in a safe manner pending disposal;Hazardous materials transported and disposed off-site in an appropriate manner by licensed contractor prior to demolition;Employees involved in the removal and management process to adhere to PPE requirements;Areas affected to be signposted and barricaded warning other workers and members of the public of potential dangers;All hazardous materials disposed off-site to DECC licensed landfill;All waste dockets (both truck and tip) are to be retained.	4	12	12	1,2
23	Confined space entry	No training Drowning Sprains and strains Falling unconscious Entrapment; collapse of structure, excavation or trench Unauthorised entry by others Falling down open penetration	Y	4	12	16	<p>A confined space is identified when the following criteria are met:</p> <p>1. Is the space enclosed or partly enclosed?</p> <p>2. Is the space at atmospheric pressure during occupancy?</p> <p>3. Is the space designed primarily as a place of work?</p> <p>If questions 1 and 2 are answered YES, and question 3 NO, determine if the space may at any time:</p> <p>4. Have an oxygen deficiency or excess;</p> <p>5. Have an atmosphere which contains potentially harmful levels of contaminants ;</p> <p>6. Cause engulfment.</p> <p>If any one of the items from 4 to 6 is answered YES, then it is a confined space.</p> <p>Assessments that answer YES to questions 1 and 2 and NO to questions 3 will be kept in a register maintained by the relevant Taylor Construction site employee.</p> <ul style="list-style-type: none">All confined spaces will be clearly signposted and secured at all times;All employees required to enter any area deemed a 'confined space' shall be required to inform Taylor Construction site manager and confined space entry permit must be issued;Testing of atmospheric gases within confined spaces must be conducted by suitably qualified persons prior to permit being issued and employees permitted to enter area;Monitors used to test for atmospheric cases to be calibrated and included in calibration register	4	12	12	1,2

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							<ul style="list-style-type: none">All employees entering the confined space must be trained and hold the relevant competency requirements;SWMS shall be developed, and employees consulted prior to any entry;Stand-by person must be available always whilst persons are within confined space;Confined space rescue kit must be available always.Spotter must be in place always whilst employees are working in a confined space or if a danger of entrapment exist from excavation or trench.				
24	Saw cutting and coring / drilling / piling	Unknow live services Others working in the vicinity of works or below	Y	5	5	25	Saw cutting and or coring activities shall not commence until the following has been completed <ul style="list-style-type: none">Drawings, instructions, specifications etc have been relayed to the responsible person and they are is clearly understood.area has been scanned (sure search) and or surveyed for the presence of any known services, gas, water, electricity, data (IF NOT SURE DON'T START)Taylor concrete cutting / Core hole permit has been issued prior to commencing, and it has been signed off the relevant parties. (must be issued by a Taylor representative)Safe Work Method statement and or work procedure has been read / understood and signed off by operator before commencingArea has been barricaded and signposted and all other employees are clear of the immediate work area and cleared from area directly below.Controls are adopted to reduce exposure to airborne dust and reduce sediment leaving construction areas, wet sawing, grinding, and drilling/coring techniques are preferred for brick, stone, asphalt, concrete and other hard materials and surfaces.Control are in place to not allow wet sawing, grinding, and drilling/coring generated wastewater to enter storm drains or watercourses without first being filtered. In addition, the sediment shall not be allowed to remain behind after the operation has ceased. Sweep up or shovel and dispose of residual sediment trapped behind control measures.S-F-39 Cutting, Coring and Drilling Permit, has been completed and issued by a Taylor Representative	2	5	10	1,2
	Covid-19 site requirements	Plant Operators Work areas Site Portaloo's Tool requirements Unable to carry out social distancing	Y	12	9	12	<ul style="list-style-type: none">Protocols adopted that will monitor that site mobile plant is only operated by a single designated operator and regularly cleaned where practicable. Where shared use is unavoidable, regularly clean the inside of vehicle cabs and between use where practicable. Note: this may not be applicable for small sites.The Controls that have been proposed/ adopted will limit the number of people in any indoor areas, including indoor meal areas, to one person per 4 square metres of space where it is safe to do soAll work areas / rooms have been segregated and signage installed to work within the NSW Health Guidelines (and Social distancing Markup document)Cleaning of site portaloo's will be happening daily and will be monitored as the workforce increasesIf sharing tools and equipment is unavoidable controls in place to ensure cleaning with a detergent solution or disinfectant wipes in between use, where practicableWhereby workers are unable to carry out social distancing due to heavy materials / products / equipment the construction process is to be reviewed to see if there is an alternate method for the works (i.e separate EWP's / working after hours / Plant used for heavy lifting etc)Whereby the above is not possible workers are to ensure that they are wearing correct PPE and MASKS to be ALWAYS worn. Disinfecting of tools etc to be completed	8	4	5	1,2,3

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Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	
1	Crane operation, including mobile cranes	Cranes not operated and/ or directed by qualified, authorised personnel	Y	5	5	25	Australian Standards AS 2550, AS 1418, AS 1353.2, AS 3775.1:2014 <ul style="list-style-type: none"> Cranes, including mobile cranes, to have current Risk Assessment available; All craneage is to be of adequate size and type to safely complete the given tasks. Expert advice to be obtained if required to ensure compliance; Adequate areas are to be zoned off as deemed necessary for the safe execution of the works; All crane drivers and dogmen are to hold relevant certificates of competency which are to be sighted and recorded by Taylor Construction prior to operating the crane on site; Crane maintenance to comply with the requirements contained in Australian standards 2550.1 and 2550.4; All workers are to be inducted to the specific work procedures for the tasks to be undertaken; SWMS must identify all site-specific hazards and their controls for lifts completed on site; Crane crew to conduct toolbox talks with operators of any other plant that may impact on their lifting area (i.e. concrete boom pumps); Cranes are to carry maintenance logs and must comply with QSE-OP-17 Plant and Equipment Procedure prior to use on site; Crane sitting sub-base strength to be determined if on suspended slab or made-up ground. Routine lifting operations may be performed after a Risk Assessment and a Safe Work Method Statement has been completed, and all people involved have been consulted and trained into these documents. A non-routine may also be completed using similar documents but will require greater detail. Prior to any lifting operation commencing, a review of the lift plan must be conducted. All lifting equipment to be inspected and tested as per Australian Standard; maintenance records to be supplied to Taylor Construction upon delivery and each scheduled inspection thereafter. Demarcation of walkways around mobile crane operations; SWMS must identify all site-specific hazards and their controls for lifts completed on site; All loads to be secured (i.e. timber bundles strapped); The SWL of the crane and chains/ slings used not to be exceeded; Crane not to be used during lightning or storms. Fire extinguisher to be installed on cranes; Crane to cease operation when wind loads exceed recommended standards; If mobile cranes are used, ensure where possible that set-up is in a well-ventilated area and that any exhaust fumes are not drifting back towards other site employees; If a mobile crane is to be used for prolonged periods of the day and is located within close proximity to other site employees, ensure that the noise level generated is at an acceptable recommended level. Monitoring may need to be conducted to verify compliance; Traffic controls and road closures to be in place where required. 	2	5	10	1,2
		Cranes not maintained in accordance with manufacturers and/ or supplier's specifications	Y	5	5	25		2	5	10	
		Injury to persons from impact with crane or suspended load									
		Insufficient sole plates for outriggers on mobile cranes									
		Unstable base for cranes									

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		Structural collapse Noise, fumes	Y	5	5	25	<ul style="list-style-type: none"> All demolition works to be carried out in accordance with AS 2601 and the Code of Practice for Demolition Work 2016; Subcontractor to provide Taylor Construction with sequence and methodology that will be implemented during demolition phase. Where the potential exists that the stability of adjoining buildings, walls or other structures may be impacted or compromised by the proposed demolition operations, works will not commence until such time that the PCBU has commissioned licensed professional to determine that surrounding structures are sufficiently removed from the demolition influence zone and, as such, will be unaffected by the demolition activity. Barricades and signage to be installed around areas under demolition or entire area is to be isolated from other workers and the public. Asbestos clearance certificate to be provided by certified person. Contractor to provide Taylor Construction with all relevant licences and permits required prior to commencement. Obtain a copy of the Asbestos Register for the workplace before demolition work is carried out; If asbestos is found to be present prior or during the demolition process, it is to be removed by a licensed subcontractor (where quantity is above 10 m² or any friable quantity). Ensure removal compliance with all authority, codes, and SWMS requirements. If there is no Asbestos Register, works must not be carried out until the structure or plant has been inspected to determine whether asbestos or asbestos-containing materials (ACM) are fixed to or installed in the structure or plant. Before starting any demolition work, the PCBU is to conduct a walk-through inspection of all areas of the workplace, including basements for evidence of any hazardous substances that have been stored or are present on site. If present, remove or organise for the safe removal prior to demolition work commencing. Ensure that the demolition is undertaken by competent persons; All plant and equipment are to be inspected and recorded in S-F-12 Plant and Equipment Register and regularly inspected during the works; Only trained, competent or appropriately ticketed personnel to operate mobile plant; All services to be disconnected and verified as isolated prior to commencement; All employees must be inducted (site, industry and task-specific SWMS); Use PPE: hard hat, high-vis clothing, safety boots, appropriate eye protection; Excessive dust generated from demolition is to be managed by way of wetting down area; <p>The noise level generated must be at an acceptable recommended level. Monitoring may need to be conducted and documented using QSE-F-21 Noise Map and Register.</p>	3	4	1 2	1,2
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Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification			Untreated risk ranking				Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other

Section C – Construction workplace

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4	Erection, dismantling, altering and use of hoists	Use of incomplete or inadequate hoist Structural integrity for ties Falls Overloading of hoist System failure Operation of hoist	N / A				<ul style="list-style-type: none"> Hoist to be erected in accordance with Australian Standards requirements; Documented information written in plain English shall be provided on the hoist equipment. The documentation shall include: <ul style="list-style-type: none"> Supplier and the means of product identification; A list of all components with descriptions from which they can be identified; Instructions for erection, dismantling, use, transportation and storage; Guidance for servicing and inspection of the equipment and the rejection of damaged components; Nominal weight in kilograms; Details giving sufficient information to determine duty loadings, max heights and max location of ties; Handover certificate to be issued by the company installing hoist prior to hoist being used; Hoist to have daily pre-use inspection completed by a competent person with details recorded in Daily Logbook; Periodic inspections in accordance with manufacturers/ supplier's specifications; SWL to be clearly displayed; All landings to be secured by lockable gates. Gate is not to open until hoist cart is at the same level; All hoists erected, altered and/or dismantled by licensed riggers; Hoist to be installed as per reviewed drawings and modified and maintained in a safe manner; The location and tie systems shall be in accordance with the engineer's requirements; Hoist enclosure to be installed in accordance with AS 2550.7 and AS 1418; Steel fixing wire shall not be used to secure the enclosure; Regular visual inspections to be completed by Taylor Construction foreman and site WHS consultative process; Incomplete hoists are to display appropriate signage and have measures erected or in place that will stop unauthorised use; Hoist to only be operated by a competent person (ticketed); Hoist operator to continually lookout for obstructions and notify supervisor of any foreseeable problems; Operator to secure hoist to prevent unauthorised use. 	N / A			N/A
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Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification			Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence		Likelihood	Consequence	Risk ranking	
										1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other

Section C – Construction workplace

5	Erection, dismantling and altering scaffolding	Use of incomplete or inadequate scaffold by site employees Poor design of scaffold	Y	5	5	25	<ul style="list-style-type: none"> Scaffolds must be erected in accordance with Australian Standards requirements; Documented Scaffold Plan written in plain English shall be provided on the scaffolding system/ equipment; The Scaffold Plan should include a Site Layout Plan, detail the elevations and sections of the scaffold and address the following issues: <ul style="list-style-type: none"> Basis of design and the type of scaffold required; 	3	5	15	1,2
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		<p>Mix and match components</p> <p>Unauthorised removal of scaffold ties</p> <p>Overloading of planks</p> <p>Scaffold collapse</p> <p>Impact or effects to scaffold by mobile plant used on site</p> <p>Stability of ground surface</p> <p>Overhead or underground assets</p> <p>Erection or dismantling by unauthorised persons</p>				<ul style="list-style-type: none"> Foundations (including ground conditions required); The weight bearing capacity of the surface where the scaffold is to be erected; Size and weight of the scaffold (for example: dead, live and environmental loads); Supporting structure and any bracing required; Access and egress; Tying and anchors (that is, where anchors will be placed on the supporting structure; and types of anchors to be used); The type of edge protection to be used; Details giving sufficient information to determine: duty loadings, max heights and max number of working platforms. Handover certificate issued by scaffolding contractor prior to scaffold being used and/ or after each 30-day inspection or when scaffold is altered (raised/ lowered); Scaffold is to be categorised by the scaffolder as 'light', 'medium' or 'heavy duty'; All scaffolds where item and/ or object can fall four (4) m or more to be erected by licensed scaffolders. Scaffold to be installed as per design drawings and modified and maintained in a safe manner; The location and tie systems shall not obstruct clear access along the full length of any working platform or access way; All platforms shall be capable of supporting their design loads; Steel fixing wire shall not be used to secure planks; The minimum unobstructed access of any working bay shall not be less than 450mm, regardless of the shape; Edge protection shall be provided at the open ends and sides of all platforms, landings and along temporary stairways from which a person or object could fall a distance exceeding two (2) m; Guardrails shall be set at a height of not less than 900mm above the platform and no greater than 100mm outside the edge of the platform; Toe boards shall not extend less than 150mm above the working platform surface; Edge protection shall be comprised of one of the following: <ul style="list-style-type: none"> Guardrails, mid rails and toe boards; Guardrail and infill panels. 				
5						<ul style="list-style-type: none"> The clear width of an access platform shall not be less than: <ul style="list-style-type: none"> 450 mm for persons and hand tools only; 675 mm for persons and materials; 900 mm for emergency access. Safe work procedures and/ or training for trades utilising the scaffold to access their activity are to nominate that no scaffold is to be altered or erected unless it is completed by a certified scaffolder with applicable training for the task and with permission given from Taylor Construction management; Regular inspections to be completed by Taylor Construction foreman and site WHS consultative process. Base of scaffold that may be potentially exposed to impact by mobile plant or construction vehicles is to be guarded using physical barriers or barricades are to be installed, keeping plant and vehicles at a safe distance from base of scaffold; Incomplete scaffolds are to display appropriate signage and have measures erected or in place that will stop unauthorised use; Handrails, mid rails and kickboards to be in place; Ladders to be inspected regularly for defects and clearly labelled for industrial use; Handover certificate issued by scaffolding contractor prior to scaffold being used; Scaffold to be installed as per reviewed drawings and modified and maintained in a safe manner; Scaffold to be adequately tied or racked as per engineers design; Scaffold to be set on firm footing and protected from plant movements; 				1,2

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						<ul style="list-style-type: none">Incomplete scaffolds are to display appropriate signage;Engineer's design is to be followed on site for the erection and dismantle of scaffold;Loading bays to be signposted with the engineered safe working loads and is not to be exceeded;					
6	Excavation and trenching	Contamination of land and surrounding environment Mobile plant Collapse of existing buildings or excavation Collapse of trench Injury to persons	Y	5	5	25	<ul style="list-style-type: none">Site Safety Plan including SWMS reviewed prior to commencement;Obtain Geotech report on ground conditions.Where the stability of adjoining buildings, walls or other structures is endangered by excavation trenching operations, works are not to commence until a competent person approves works;Project Workplace Health and Safety Plan and Emergency Control Management Plan to include procedures for managing emergency situations caused by a collapse of excavation or trench. All parties involved in this process are to be made aware of this and include controls in work practices;Contractors performing excavation works on site are to submit SWMS that incorporate the information outlined in the project HSE Risk register;Obtain Dial before You Dig report. If unsure of locations, ground searches to be conducted using ground penetrating radar;	3	4	1 2	1,2

Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification			Untreated risk ranking			Risk mitigation controls	Residual risk ranking		Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence		Likelihood	Consequence	Risk ranking
									1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other

Section C – Construction workplace

7						<ul style="list-style-type: none"> Traffic Management Plan must be reviewed, ensuring it reduces the frequency of plant movements impacting on other trades and the public; plant movements should also be away from excavations and persons who are designated as observers during excavations; Taylor Construction project/ site manager or nominated site representative will conduct a review of plant and required documents using S-F-18 Plant Pre-Start Assessment prior to the plant being permitted on site. This shall be conducted irrespective of the duration or frequency the mobile plant is to be operated on site; When mobile equipment is operated adjacent to an excavation or trench, a warning system such as barricades, hand or mechanical signals or wheel stops blocks shall be utilized. If possible, the grade should be away from the excavation/ trench; Measures to be implemented to minimise noise and dust. Suppression techniques to be nominated in contractor's SWMS and implemented as required; Effective sediment controls to be in place and maintained throughout the works; Barriers that will control excavation material on site are to be installed and star pickets to have bar caps; Air quality and noise monitoring to be undertaken as required; Stormwater treated and released in line with statutory authority requirements and guidelines; Wheel wash or cattle grid/ shaker to be installed in order to minimise mud and slurry being transported on surrounding roads; All pits, pier holes and manholes to be highlighted and barricaded to prevent persons and/ or plant falls into excavation; 				1,2
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							<ul style="list-style-type: none">• All trenches deeper than 1.5 m to be battered, stepped or raked in accordance with local statutory authority and/ or code requirements;• Suitable access shall be established to allow safe egress of plant and workers into and out of the excavation or trench;• Ladder access to be provided in accordance with local requirements;• All temporary supporting structures to be provided with engineer's certificate for the application on site;• Stormwater to be collected and diverted away from excavations;• SWMS to nominate the selected controls to be undertaken during activity;• Flooding to be controlled in subcontractor's SWMS.				
8	Formwork erection and removal	Collapse of structure Falls from heights Unauthorised entry to formwork decks	Y	5	5	25	<ul style="list-style-type: none">• Prior to the commencing of works and the installation of any support for suspended formwork decks, an engineer (such as a suitably qualified civil engineer experienced in structural design) is to be responsible for overseeing the safe design and certification of the complete formwork structure. This includes the design of the formwork support structure, the formwork deck and connection details, and certification that the formwork drawings and other formwork documentation have been completed;• High-Risk Activity SWMS are required to cover formwork methods and controls for convention formwork, decks, walls, columns, stairs, lift or stair cores and stripping formwork;• Formwork erected above two (2) frames to have full-catch deck installed;	2	4	8	1,2,3

Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other

Section C – Construction workplace

9		Incomplete formwork decks					<ul style="list-style-type: none"> Lazy joist to extend a minimum of 1.5 m in each direction if these are to be used to control persons and materials from falling below; Formworker to perform as much of the erection from the ground as possible, minimising the risk of falls from leading edges; Leading edges to be maintained to a minimum. Do not open up multiple work faces; Joist to be placed at 450 mm centres and secured in place; Barricades, fencing, signage and bunting to be progressively installed to restrict access by others; Access and egress to new deck walls, lift or stair shafts should be adequate and acceptable and secured in place; Temporary handrails to be installed progressively and be constructed in an industry approved manner; All formwork to be erected and removed/ stripped to the requirements of the local statutory authority and AS 3610 as a minimum standard, and Taylor Construction requirements; Penetrations and deck openings to be covered and secured progressively; Engineer's report is not to be issued more than two (2) working days prior to pour. Not to pour without certificate being available on site; SWMS to be periodically reviewed for suitability as per risk categorisation; Secure all materials against possible windy conditions; Suitable and correctly constructed work platforms are to be used by workers working on columns, blade walls and lift shafts, etc. at all times; 				
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							<ul style="list-style-type: none">Taylor Construction, with the assistance of the relevant subcontractor, is to monitor unauthorised entry to decks under construction;All timber/ ply to be strapped before being craned.				1,2
10 A	Structural steel erection	Falls Structural collapse Inclement weather Transport Mobile equipment/ machinery Tools Manual handling Temperature	Y	3	5	15	<ul style="list-style-type: none">Safe methods of installation to prevent falls are to be established, including the use of mobile cranes, scissor lifts and boom lifts;Safety harness permit to be issued by Taylor Construction;Footings for support of columns during erection should be checked by a competent person to ensure adequate structural capacity for the erection conditions, such as wind loadings on columns to prevent rotation of column in the footing;During erection, the stability of the structure should be verified by a certified engineer or a competent person who has been nominated in the Safety Plan, in the following circumstances:At the end of the workday or during temporary cessations of work. The effectiveness of temporary guys, bracing and supports should also be inspected at the beginning of each shift;When fastenings may be incomplete, for example, during lining-up and adjustment of level procedures;During high winds or when high winds are forecast;	2	4	8	1,2
		Fire/ explosion Electrical					<ul style="list-style-type: none">When the structure or parts of it may be subject to construction loads, for example, the stacking of parts and lifting or freeing of components which may have become inadvertently wedged in position;Where required by design, erection should start in a nominated braced bay in order that the structure can be plumbed and made self-supporting.Loadings of concrete slabs to be approved prior to landing plant or equipment;All plant and equipment are to be inspected and recorded in S-F-12 Plant and Equipment Register and regularly inspected during the works;Only trained, competent and appropriately ticketed personnel to operate mobile plant;Lifting gear to be inspected and certified and listed on register;Area below to be barricaded off and warning signage displayed;Ticketed riggers to erect and install;Welding masks, screens to be used;All employees inducted into site induction, industry induction and SWMS;MSDS to be submitted for all products and chemical substances;All roofs to have restricted access.				
10 B	Post-tensioning	Dead/ live end failure during stressing Mechanical failure Overloading of deck Hazards to other trades working in the vicinity Falls from heights	Y	1 2	1 6	15	<ul style="list-style-type: none">SWMS to be completed by contractor controlling the isolation procedure for tensioning;Stressor foreman to check with Taylor Construction site manager prior to landing new coil and bri-pack onto deck under construction;All workers to remain two (2) metres back from leading edge or perimeters if fall protection is not in place (i.e. scaffold, temporary handrails, etc.);Jacks to be calibrated, cable pushers, grout pumps to be tested and tagged;Only trained/ competent personnel to operate jacks/ strand pusher;Backing board to be in place when final stressing;Stressor foreman to obtain confirmation from Taylor Construction site manager that concrete has reached required strength prior to initial and finals stress commencing;Area to be barricaded while stressing or installing;Stressing cable to run through separate ducting/ conduit where it is not possible to set coil up in close proximity to cable pusher to minimise whipping when passing through other work areas;Exposed cable ends to have bar caps taped on;Where possible, use mechanical lifting device;Install safety signage to inform workers of risks and dangers;References: SafeWork NSW Code of Practice 'Mono-strand post-tensioning of concrete buildings';	6	1 2	1 2	1,2

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Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other
Section C – Construction workplace											
10 C	Reinforcement	Falls Access Manual handling Temperature Electrical Noise Environmental: wind, rain, lightning, dust Equipment/ machinery Tools Waste minimisation	Y	3	5	15	<ul style="list-style-type: none">Site Safety Plan, including SWMS, reviewed prior to commencement;Access to area of works or new decks shall only be allowed through designated access ways or scaffold stairs;Safety mesh to cover deep beams once reo is in place in beam thickenings;Works to be monitored during extreme conditions, and employees transferred to unaffected areas of the project during inclement weather conditions;Reo required to be scheduled and placed on area of slab or new deck, which shall minimise the requirement for employees to carry and transport required reo to desired location;Steel fixer not to access new deck until perimeter scaffold and/ or temporary handrails are installed;SWMS to detail access requirements and systems required to be used when tying steel to walls, columns and stairs;Bar caps to be installed to all starter bars or bars cranked;All column penetrations to be covered if left unattended;Power tools to be tested and tagged monthly, use only RCD protected supply;MSDS for epoxy;All employees inducted into site Induction, industry induction and SWMS;PPE to be used: safety helmet, high-vis clothing, safety footwear, hearing protection, gloves and sunscreen.	2	5	10	1,2
11	Precast installation (AFS)	Panel failure Crane lifting failure Fall from heights (man and material) Panels falling, causing personal injury and property damage Unauthorised entry to area	N / A				<ul style="list-style-type: none">Site Safety Plan, including SWMS, reviewed prior to commencement;All precast-tilt up panels and erection requirements to comply with the requirements contained in the National Code of Practice 'Precast, tilt-up and concrete elements in building construction' 2008;Taylor Construction precast hold point to be completed prior to any precast installation;Engineer to certify ground bearing capacity prior to erection of any precast panel;All lifting chains, shackles, lifting clutches and lifting inserts to be certified prior to any lifting of panels;Crane crew to be trained and competent in the erection of precast panels;Methods of fixing and positioning of panels to be identified in contractor's SWMS;No work to take place below panel erection areas;Ensure crane operator is made aware of panel weight and crane load limit is not exceeded;Barricading and warning signage to be in place;Bracing installed as required and locked in place;All required engineer's certification and sign-off to be available prior to commencement;Installers exposed to falls of greater than two (2) metres are to be trained in working at heights and secured by safety harness;Bracing plan to be signed off by engineer prior to commencement of installation.	N/A			N/A

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Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other
Section C – Construction workplace											
12	Installation of tower crane, including self-erecting cranes	Legal requirements not met Crane failure, including support base Personnel falling whilst installing, relocating, and/ or removing Hazard to unrelated trades and public Overhead hazards Material falling Poor servicing of tower crane	Y	1 2	1 6	16	<p>Before selecting a crane for a particular application, the PM shall obtain the following prior to determining the type of crane:</p> <ul style="list-style-type: none">The rated capacity of the crane;Classification of the crane considering the application, including:<ul style="list-style-type: none">Type of loads to be lifted;Mass of loads to be lifted;Frequency of lifts.The project/ site manager shall ensure that, prior to the erection of the crane, a competent person shall design, inspect and certify that the loads imposed by the crane can be sustained by the crane base in piles and capping beam, ground or any other means of support relied upon;Tower crane erection permit to be obtained from Taylor Construction and council. <p>Erection, commissioning and dismantling:</p> <ul style="list-style-type: none">Provide name and competency of the person assigned to supervise the erection, commissioning or dismantling of the crane;Any special transport conditions (permits) or project access or loading requirements for the delivery, storing and dismantling of the crane;Copies of procedures, policy and SWMS for the assembly or dismantling of the crane also required for any additional mobile plant, equipment and tools that may be used as part of the erection or dismantle of the crane;Provide evidence or written statement confirming that all parts and components used on the crane comply with the manufacturer's performance and strength requirements;Nominate persons responsible for obtaining statutory or council permits required for the erection operation or dismantling of the crane;Traffic control requirements. <p>Maintenance and thorough examination:</p> <p>Prior to installation and operation of the crane, the supplier shall provide to Taylor Construction:</p> <ul style="list-style-type: none">Evidence that the crane has undergone a periodic third-party inspection to provide independent advice on whether the level of maintenance and repairs are in accordance with AS 2550.1:2011 (mandatory) .Evidence that the crane has been thoroughly examined by a competent person before being commissioned for the first time and after any substantial alteration or repair;Evidence that the crane has been maintained in accordance with the manufacturer's instructions at intervals which consider the intensity of use and operating environment;Once the crane has been erected and is certified by a third-party for use, it is not to be operated until such time as the HSE/ construction manager has issued approval for its operation to the site team.	8	1 6	1 2	1,2
			Y	1 2	1 6	16		8	1 6	1 2	

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Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	1. Taylor 2. Subcontractor (nominate by name) 3. Architect/ other
Section C – Construction workplace											
15	Hydraulic installation and drainage	Falls Manual handling Temperature Electrical Noise Kinetic Equipment, machinery Tools Waste minimisation Chemical substances Pollution to land/ water/ air	Y	4	4	16	<ul style="list-style-type: none">Site Safety Plan, including SWMS, reviewed prior to commencement;All plant and equipment are to be inspected and recorded in S-F-12 Plant and Equipment Register and regularly inspected during the works;Only trained, competent and appropriately ticketed personnel to operate mobile plant;Use only earth leakage protected supply;Use insulated lead stands or hooks to elevate leads. Inspect, test and tag monthly;All employees inducted into site induction, industry induction and SWMS;PPE to be used: safety helmet, high-vis clothing, safety boots, appropriate safety hearing protection and sunscreen;MSDS to be submitted for all products and chemical substances;All waste to be placed in appropriate bins.	2	4	8	1,2
16	Mechanical installation	Falls Vehicles, mobile equipment, machinery Tools Manual handling Temperature Fire/ explosion Electrical Chemicals Noise	Y	4	4	16	<ul style="list-style-type: none">Site Safety Plan, including SWMS, reviewed prior to commencement;All plant and equipment are to be inspected and recorded in S-F-12 Plant and Equipment Register and regularly inspected during the works;Only trained, competent and appropriately ticketed personnel to operate mobile plant;Use only earth leakage protected supply;Use insulated lead stands or hooks to elevate leads. Inspect, test and tag monthly;Lifting equipment to be regularly inspected;All employees inducted into site induction, industry induction and SWMS;SDS to be submitted for all chemical/ hazardous substances;PPE to be used: safety helmet, high-vis clothing, safety boots, appropriate safety hearing protection and sunscreen.	2	5	10	1,2
17	1. Plasterboard 2. Cladding 3. Façade installation/ louveres Fire system installation Rendering	Falls Material falling Manual handling Cuts and abrasions Mobile equipment, machinery Tools Temperature Electrical	Y	4	5	20	<ul style="list-style-type: none">All plant and equipment are to be inspected and recorded in the plant and equipment register and regularly inspected during the works;Only trained, competent and appropriately ticketed personnel to operate mobile plant;Mobile platform to be erected in accordance to manufactures requirements (above 4 metres scaffolder);All employees inducted into site induction, industry induction and SWMS;Laser in use signage to be displayed;All brickies scaffold erected to be braced and sitting on stable surface;Only experienced operators to use brick saw;Brick saw to be set up in a manner to avoid run-off, and guarded against unauthorised use by others;	2	5	10	1,2

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							<ul style="list-style-type: none"> Exclusion zones to be installed in areas around and below work zones. Mobile scaffold and/ or scissor lifts to be used when working at heights; 				
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Project - Hazard Identification Risk Assessment and control (HIRAC) considered:

Identification				Untreated risk ranking			Risk mitigation controls	Residual risk ranking			Responsibility
#	Building element/ location	Project hazards identified	Applicable to project	Likelihood	Consequence	Risk ranking		Likelihood	Consequence	Risk ranking	

Section C – Construction workplace

18	Tiling (wall, floor) and terrazzo paving Painting Joinery/ fit-out	Chemical substances Noise Working in confined spaces Heat Use of ladders Use of mobile plant Poor access to work face Storage of materials and dangerous goods Environmental hazards	Y	4	5	20	<ul style="list-style-type: none"> Employees competent in use of mobile plant only to operate plant; Only platform ladders to be used for working-off. Extension ladders for access use only. If step ladders are to be used, ladder permit to be issued by Taylor Construction; If painting on roof or painting work on split levels requiring the use of a step ladder, a platform ladder must be used. Ladders shall not be used within two (2) metres of fall areas or open penetrations; Work in well-ventilated areas. If natural ventilation is not possible, use artificial ventilation or required PPE; Paints and any chemicals required are to be stored in lockable, well-ventilated area; When washing rollers and paint brushes do not allow water run-off into stormwater of site drainage system; SDS to be submitted for all chemical/ hazardous substances; Mechanical lifting devices and trolleys to be utilised; PPE to be used: safety helmet, high-vis clothing, safety boots, appropriate safety hearing protection and sunscreen; Mixing buckets/ mixer wash-out to be disposed of appropriately; Working platforms, scaffold and EWP to be installed and operated by competent persons only; Taylor's preference is not to have any MDF particle boards cut on site. If minor cuts are required, all cutting must be done in well-ventilated and isolated room using a saw fitted with vacuum, away from other trades or members of the public; Mechanical lifting devices to be utilised to move heavy material; Suitable industrial strength working platforms to be used at all times. 	2	5	10	1,2
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Section D - Environmental aspects. Environmental Risk Matrix

When it is not reasonably practicable to eliminate the risk, workplace health and safety legislation requires the hierarchy of controls to be implemented

Hierarchy of controls	The measure of what is reasonably practicable
1. Eliminate the hazard altogether (e.g. design change)	<p>Something is 'practicable' if it's capable of being done. Whether it is also 'reasonable', the following must be considered:</p> <ul style="list-style-type: none"> The severity of any injury or harm to health or the environment that may occur; The predictability of the risk and the likelihood of the injury or harm occurring as a result; How much is known about the risk and the methods of reducing, eliminating or controlling the risk; and the availability, suitability and cost of the safeguards. <p>The risk and its potential severity of injury or environmental harm must be weighed against the overall cost and feasibility of the controls needed to remove it. Common practice and knowledge throughout a relevant industry is to be considered when determining whether a control is 'reasonably practicable'. Individual employers could not claim that they did not know what to do about certain hazards if those hazards are well known and documented for their industrial sector and controls are readily available. While cost is a factor, it is not an excuse for failure to provide appropriate controls, particularly where there is risk of serious, or frequent but less severe, injury or environmental harm.</p>
2. Substitute the hazard with a safer alternative (e.g. use alternate materials or substances)	
3. Isolate the hazard from anyone who could be harmed (e.g. provide an enclosure or fencing)	
4. Use engineering controls to reduce the risk (e.g. provide guards to machinery)	
5. Use administrative controls to reduce the risk (e.g. provide adequate training and documented procedures)	
6. Use PPE (personal protective clothing and equipment), e.g. provide hand, ear and eye protection	

Likelihood \ Consequence	5 Almost certain (50 times per year)	4 Likely (10 times per year)	3 Possible (1 per year)	2 Unlikely (1 every ten years)	1 Rare (> 1 every ten years)
5: Catastrophic S*: fatality, long term illness E*: long-term perm damage	Extreme (EXT) 25	Extreme (EXT) 20	High (H) 15	Moderate (M) 10	Moderate (M) 5
4: Major S: Extensive injury E: Medium effect/ off-site release	Extreme (EXT) 20	High (H) 16	Moderate (M) 12	Moderate (M) 8	Low (L) 4
3: Moderate S: Medical treatment E: Moderate effect/ off-site emission	High (H) 15	Moderate (M) 12	Moderate (M) 9	Moderate (M) 6	Low (L) 3
2: Minor S: First Aid E: Min off site impact	Moderate (M) 10	Moderate (M) 8	Moderate (M) 6	Low (L) 4	Very low (VL) 2
1: Insignificant S: Pain, inconvenience E: No off-site impact	Moderate (M) 5	Low (L) 4	Low (L) 3	Very low (VL) 2	Very low (VL) 1

Environmental significance

Each environmental aspect shall be assessed and given an impact status

E = Significant in emergency situations
S = Significant in routine operations
M = Minor significance in routine operations
N = No significant impact in routine operations

*S= safety; E= environmental

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Activity	Environmental aspect	Environmental impact	Legal requirements	Environmental actions, controls and criteria	Risk rating	Significance	Monitoring required			
							Resp.	Type	Freq.	Record
Demolition Excavation Construction	Dust generation Particulate emissions (general)	Air pollution	NSW POEO Act 1997 (Protection of the Environment Operations Act), sections 124-126	<ul style="list-style-type: none"> Install shade cloth on perimeter fencing; Vehicle corridors will be clearly identified and restricted to control vehicle access onsite; Limit vehicle speed onsite to 40km/h; Fixed and mobile (water tanker) water sprays; Reduce work activities/ stop work during moderate to high wind velocity periods; Maintain equipment. Smokey plant to be stopped until repair works completed. 	12	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist
Demolition	Dust generation (demolition)	Air pollution	NSW POEO Act 1997, sections 124-126	<ul style="list-style-type: none"> Breakers and crushing equipment to be fitted with dust filtration equipment or water sprays to control dust emissions. 	12	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist
Construction Excavation	Dust generation (construction)	Air pollution	NSW POEO Act 1997, sections 124-126	<ul style="list-style-type: none"> Minimise areas of site to be excavated and stage works where possible; Dust suppression strategies to be used, i.e. water sprays, soil binders, hydro mulching, controlled speed onsite, road base, shaker grids; Stockpiled topsoils and rubble will be restricted to 4m high; Stabilise if in situ for >4-6months; On site drilling or coring operations will be undertaken by equipment fitted with air filtration equipment. 	9	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist
Demolition Excavation Construction	Odour	Air pollution Odour	NSW POEO Act 1997, section 129; Local Government Act 1993, section 125	<ul style="list-style-type: none"> If odorous materials uncovered, recover immediately; Seek advice from consultant regarding soil/ materials management. 	1	N	SM	Visual	Daily	Diary
Demolition Excavation Construction	Emissions to Air	Air pollution	NSW POEO Act 1997, sections 124, 125, 139	<ul style="list-style-type: none"> Ensure machinery is maintained correctly. 	6	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist
Construction Fit-out	Greenhouse	Resource use Air pollution Global warming	AGBR Greenstar	<ul style="list-style-type: none"> Ensure purchased electrical products/ whitegoods products comply with specification for CFCS and energy ratings; Low solvent paints to be used as a priority; Building to conform to AGBR or Green Star performance criteria; Deliveries/ transport from site effectively planned to limit inefficient transport, assist back loading, etc. 	4	N	SM			
Demolition Excavation Construction	Stormwater (discharge from sedimentation basins, flooding)	Water contamination	NSW POEO Act 1997, sections 120,122 Protection of the Environment Operations (General) Regulation 1998, clause 55	<ul style="list-style-type: none"> Water quality to meet ANZECC Water Quality Guidelines: PH 6.5-8.5, Turbidity <50NTU, No visible oil or grease; Obtain advice for use of flocculants to settle sediment from water; Sedimentation pond to be maintained at low levels to ensure capacity during rainfall event; Do not discharge if contaminants suspected. Obtain advice. 	99	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist

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Activity	Environmental aspect	Environmental impact	Legal requirements	Environmental actions, controls and criteria	Risk rating	Significance	Monitoring required			
							Resp.	Type	Freq.	Record
			Local Government Act 1993, section 638 ANZECC Water Quality Guidelines NSW Office of Environment & Heritage 'Managing Urban Stormwater' 2004							
Demolition Excavation Construction	Adjoining waterways (dewatering, soil erosion and run-off)	Water contamination Erosion	NSW POEO Act 1997, sections 120, 122 POEO (General) Regulation 1998, clause 55 Local Government Act 1993, section 638 ANZECC Water Quality Guidelines NSW Office of Environment & Heritage 'Managing Urban Stormwater' 2004	<ul style="list-style-type: none"> Temporary drainage systems will be established to divert clean waters around the land development areas as appropriate; Erect silt fences, bunds and construct swale drains; Inspect at least weekly and after rainfall; Maintain and/ or replace as required; Street sweepers will be employed on a regular basis; Install erosion and sediment controls before work starts; Leave as much vegetation as possible; Install temporary fences to define 'no go' areas in those areas that are not to be disturbed. Include the area under the canopy of trees so that tree roots will not be damaged by soil compaction; Divert run-off from upslope away from the site but ensure that you do not flood your neighbours. For example, dig drainage channels (catch drains sized to accommodate the upslope catchment); Install sediment controls downslope of the site to catch sediment. Leave or lay a kerbside turf strip (for example, the nature strip) to slow the speed of water flows and to trap sediment; Limit vehicle entry and exit to one point, and lay geotextile and blue metal to stabilise it for all-weather access; Clearly mark the access points and give an access map to all suppliers; Protect all drains with a gravel sausage made from geotextile filled with blue metal; Save the topsoil and stockpile it for use later in revegetation. Never place it around trees as this will kill them; Store all stockpiles and building materials behind sediment fences. Cover them with plastic to prevent erosion by wind; Get council approval before placing stockpiles or other materials on the nature strip or footpath; Connect downpipes from the guttering to the stormwater drain as soon as the roof goes on; Surround the wash-out area with a sediment fence that slows down the water flow. Site this area upslope of another sediment control; Fill in all trenches immediately after services have been laid; Spread the topsoil back when the work is finished and revegetate the site as soon as possible to control erosion; Remove the sediment and erosion controls only after this is done; 	9	M	SM	Visual Inspection	Daily Weekly	Diary Site Inspection Checklist

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Activity	Environmental aspect	Environmental impact	Legal requirements	Environmental actions, controls and criteria	Risk rating	Significance	Monitoring required			
							Resp.	Type	Freq.	Record
				<ul style="list-style-type: none"> Sweep the road and footpath regularly. Washing down is not a preferred method; Never place any materials in the gutter or on the road. You will be fined for this; Filter or settle-out all water pumped off the site. The water must be clear before it enters the stormwater system or creeks. Gypsum can be applied to muddy (turbid) water to help clay particles settle. 						
Construction Fit-out	Sewer (trade waste)	Water pollution	NSW POEO (General) Regulation 1998, clause 55 Sydney Water Act 1994, section 49 Hunter Water Act 1991, section 31 Local Government Act 1993, section 68 (clause 4 of Part C of the Table) Sydney Water 'Consent to Discharge Industrial Trade Wastewater', Special Conditions Schedule 6 paragraphs 1-2	<ul style="list-style-type: none"> No paints or other chemical to be poured down drains; If required, obtain trade waste licence for discharge or local council approval. 	4	N	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist
Excavation	Land (acid sulphate soils, contaminated soils, imported fill)	Contaminated waterways Soil contamination	NSW Contaminated Land Management Act 1997, section 60 Contaminated Land Management Regulation 2013 Acid Sulphate Soils Management Advisory Committee	<ul style="list-style-type: none"> Potential for acid sulphate soils will be assessed based on the sites proximity to low-lying coastal areas, e.g. coastal plains, wetlands and mangroves where the surface elevation is less than five metres above mean sea level; Stop work if unexpected potentially contaminated soils are encountered; Obtain waste classification from consultant in accordance with DECC Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-Liquid Wastes (June 2004) www.environment.nsw.gov.au/waste/envguidlms/index.htm. Where required, a Remediation Action Plan will be developed and implemented; Sign-off by site auditor may be required to validate clean-up; Any groundwater or ponded rainwater will be tested and classified by consultants prior to disposal; Check Geotech requirements. Ensure soil classification suitable for land use, i.e. schools, residential, commercial, etc. 	9	M	SM			
Demolition Excavation Construction	Land	Contaminated waterways Soil contamination	NSW Contaminated Land Management Act 1997, section 60; Contaminated Land Management Regulation 2013 POEO Act 1997, section 142A-E ANZECC publication: Organochlorin Pesticides Waste Management Plan (1999)	<ul style="list-style-type: none"> If odorous soils (rotten egg gas) or grey/ yellowed mottled soils encountered, stop work; If suspected, consultant to prepare Acid Sulphate Soil Management Plan (ASSMP); Excavation and neutralisation to be supervised by consultants as per ASSMP; The requirements to import fill will be minimised by utilising on site cut material wherever possible; All analysis certificates shall be handed over as part of the completion documents to the client; 	4	N	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist

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							Resp.	Type	Freq.	Record
				<ul style="list-style-type: none"> Mark up locations where fill compacted in site plan. Survey if required. 						
Design procurement	Resources: water, materials, energy	Resource use Landfill Air pollution		<ul style="list-style-type: none"> For 'design and construct' jobs, refer to the design specification for ESD requirements and product choices; Buy local wherever possible to reduce impacts of transport on environment. 	4	N	SM	Design review	As per review schedule	Design meeting minutes, purchase orders/ contracts
Demolition Excavation Construction	Noise	Community complaints	NSW POEO Act 1997, sections 139, 140	<ul style="list-style-type: none"> Refer to DA for noise restrictions and working hours; Use hoarding or acoustic mats as required. Situate generators and plant away from sensitive receivers; Turn off machinery. Maintain equipment and stop noisy plant until repaired; No early deliveries. 	6	N	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist
Demolition Excavation Construction	Vibration	Community complaints, Damage to structures	NSW POEO Act 1997, sections 139, 140	<ul style="list-style-type: none"> Conduct Dilapidation Report prior to work starting; Limit the use of vibratory rollers, rock breakers, impact piling, etc. adjacent to buildings (>7m); Regenerated noise may also transfer through bedrock and building structures; Obtain advice if required. 	9	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist
Demolition Excavation Construction	Community	Community concerns Noise restricted access		<ul style="list-style-type: none"> Provide information (e.g. signage, letterbox drops) to community on programmed works; Provide contact name for inquiries; Advise locals of 'noisy' work; If required in noise sensitive areas and/ or in response to complaints, engage consultants to undertake monitoring at nominated receivers; Vehicles will not be permitted to queue outside the site or in residential areas unless a defined area is established which does not adversely impact on neighbours. 	9	M	SM	Visual inspection	Daily	Diary Community Feedback Form Non-Conformance Report
Demolition Excavation Construction	Flora	Destruction of flora Erosion	NSW State Environmental Planning Policy No 14 - Coastal Wetlands, section 7(1, 5), 7A Native Vegetation Act 2003, section 12 Forestry Act 2012, section 27(1) National Parks and Wildlife Act 1974, sections 117(1), 118(1)	<ul style="list-style-type: none"> Review planning documentation to determine the presence of any protected, threatened or significant flora. Obtain approvals as required; Engage arborist to develop tree management plan or refer DA and arborist reports; Education and training at site toolbox meetings and induction; Report all sightings to the site manager. Fence or barricade protected flora at the drip zone. Erect 'Keep Out' signage; Do not stack materials under or against trees; The potential for reuse of vegetative wastes by mulching, chipping or on-site placement of trunks or limbs shall be reviewed for each project. 	6	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist

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Activity	Environmental aspect	Environmental impact	Legal requirements	Environmental actions, controls and criteria	Risk rating	Significance	Monitoring required			
							Resp.	Type	Freq.	Record
Demolition Excavation Construction	Fauna	Destruction of fauna	NSW Environmental Planning and Assessment Act 1979, sections 5A, 8A, 8B, 79B, 111, 112-112E Threatened Species Conservation Act NSW 1995 National Parks and Wildlife Act 1974, Part 8A	<ul style="list-style-type: none"> All native animals protected; Review planning documentation to determine the presence of any protected, threatened or significant fauna. Obtain approvals as required; Site rules and induction to include information regarding fauna protection; For injured animals, call WIRES to relocate. 	6	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist
Demolition Construction	Waste Litter	Landfill Contamination of waterways Soil contamination	NSW POEO Act 1997, sections 116, 142, 143, 144-146 NSW Waste Avoidance and Resource Recovery Act 2001 Crown Land Management Act 2016 Marine Safety Act 1998 POEO (Waste) Regulation 2014, clause 4.9, 12, 16, 17, 23	<ul style="list-style-type: none"> Hazardous materials surveys to be completed; Materials to be removed prior to demolition; Registers and waste disposal requirements as per SafeWork NSW and DECC/EPA requirements for removal, storage, transport and disposal. General site wastes: use one bin system and sort in contractor's yard to produce quantities of material for recycling, reuse, disposal, etc.; Empty drums are to be taken off-site for disposal; Do not overfill skip bins and provide plenty for use. Cover where potential for windblown litter. 	6	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist
Pre-construction	Landfilling	Landfill Contamination of waterways Soil contamination	NSW POEO Act 1997, sections 116, 142	<ul style="list-style-type: none"> Reduce, reuse and then dispose. Dispose of hard construction wastes for recycled gravels and sands; Do not send soil to landfill until alternatives for beneficial reuse have been explored as per consultants advice; Consideration should be given to chipping of the vegetation and reuse; Reuse packaging to protect works. 	6	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist
Construction	Chemicals	Contamination of waterways Soil contamination Fumes Worker's safety	NSW POEO Act 1997, sections 116, 142 NSW Workplace Health and Safety Regulation 2017 Sydney Water 'Consent to Discharge Industrial Trade Wastewater', Special Conditions Schedule 6, paragraphs 1-2	<ul style="list-style-type: none"> Chemicals to be stored in bunded areas (impervious + 110% of largest container) away from stormwater drains and pits; Refer to SafeWork NSW Code of Practice for Storage and Handling of Dangerous Goods, DECC Guidelines for Bunding and Spill Management. Appropriate chemicals storage is in conformance with: <ul style="list-style-type: none"> AS 1940 The Storage and Handling of Flammable and Combustible Liquids Storage and Handling of Dangerous Goods SafeWork NSW Code of Practice DEC requirements Ponded water within bunds will not be discharged to stormwater; Fuel and hydraulic leaks to be cleaned up immediately; Drilling muds to be contained within bunds and reused; Liquid paints not to be poured down drains. Spread on waste cardboard or similar and leave to dry. Paint brushes to be rinsed and paint solids allowed to settle. Container of paint solids to be disposed to liquid waste facility; Construct concrete washout pit for washout, away from stormwater drains. Send back to batch plant where possible; 	6	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist

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							Resp.	Type	Freq.	Record
				<ul style="list-style-type: none"> Concrete cuttings to be contained and wet vac to prevent run-off into stormwater drains; Storage of bulk fuels (>200L) on site is prohibited. All refuelling shall be undertaken by a mobile facility with appropriate spill control and containment control equipment; SDS must be provided to the foreman prior to a chemical being received on site and by subcontractors using chemicals/ products. 						
Demolition Excavation Construction	Traffic	Site access restrictions Community safety Pollution	Local government requirements	<ul style="list-style-type: none"> Develop and implement Traffic Management Plans. Submit to local council as required; Signage and notices regarding disruptions; Use crushed concrete, mulches, etc. along site access roads; Install shakers and wheel wash as required; Organise regular street sweeping; Haulage routes and rules will be provided to subcontractors prior to commencing on site; All loads of soil, demolition wastes, general wastes, etc. are to be tarped. 	6	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist
Demolition Refurbishment	Hazardous materials (lead paint)	Air contamination Contaminated waterways Soil contamination	NSW POEO Act 1997, section 142	<ul style="list-style-type: none"> If disturbing or removing dust or paint that could contain lead, wear a respirator or dust mask and protective clothing; Seal the rooms with plastic; Do not use open-flame torches on lead paint, as they create lead fumes. If you must use a heat gun, use it on the lower setting to keep the paint temperature below 370 degrees centigrade; Avoid using dry-sanding techniques: keep the surface wet to minimise dust; Don't sweep or use a domestic vacuum cleaner to clean up; lead dust will pass right through it. Use a high-efficiency particulate air (HEPA) vacuum cleaner. These can be hired; When finished, wipe all surfaces with a damp cloth and high-phosphate detergent; Wash face and hands before eating, drinking or smoking; Refer to 'Lead Safe: A Renovator's Guide to the Dangers of Lead' and AS4361.2:1998 'Guide to Lead Paint Management: Part 2 Residential and Commercial Buildings'. 	6	M	SM			
Demolition Fit-out	Hazardous materials (asbestos)	Workers health Air contamination Contaminated waterways Soil contamination	NSW POEO Act 1997, section 142 NSW PEO (Waste) Regulation 2014, part 7 NSW Code of Practice 'How to Safely Remove Asbestos'	<ul style="list-style-type: none"> A licence subcontractor must be used to demolish, remove, repair or disturb asbestos; A SafeWork NSW asbestos licence is required to remove 10 square metres or more of bonded asbestos; A SafeWork NSW licence is required to remove, repair or disturb friable asbestos. 	9	M	SM			
Demolition Excavation Construction	Aboriginal heritage	Destruction of heritage items	NSW Heritage Act 1977, section 146 National Parks and Wildlife Act 1974, sections 90-91	<ul style="list-style-type: none"> Education and training at site toolbox meetings and induction; It is illegal to destroy heritage items; Review local or regional environmental plans, or the State Heritage Register is to be consulted prior to work starting onsite; 	6	M	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist

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							Resp.	Type	Freq.	Record
				<ul style="list-style-type: none"> Obtain excavation permit issued by the Heritage Council of NSW if required; Any heritage relics or sites discovered during construction shall be reported to the NSW Heritage Office; Work in the subject area to cease until specialist advice is obtained; The area will be fenced, and signs erected to restrict access; Heritage consultants may be required to provide advice on demolition/ construction processes and finishes. 						
Demolition Excavation Construction	European heritage	Destruction of heritage items	NSW Heritage Act 1977	<ul style="list-style-type: none"> Education and training at site toolbox meetings and induction; It is illegal to destroy heritage items. Check the DECC Aboriginal Heritage Information Management System (AHIMS); Also check the register of the National Estate; Obtain approval from NPWS (Section 90 consent); Any evidence of Aboriginal relics discovered during construction shall be reported to the National Parks and Wildlife Service; Local land council representatives may be required to monitor stripping/ excavation; Work in the subject area to cease until specialist advice is obtained; The area will be fenced, and signs erected to restrict access. 	4	N	SM	Visual inspection	Daily Weekly	Diary Site Inspection Checklist
Demolition Excavation Construction	Emergency preparedness	Workers health Air contamination Contaminated waterways Soil contamination		<ul style="list-style-type: none"> Spill kit on site; Refer to the SDS for advice and procedures; All spills must be reported to the site manager and cleaned up. Complete TCG Accident/ Incident Report; Sediment pond pumped out regularly to maintain capacity in case of emergency; Ensure you know where stormwater drains are and have materials to block them in case of a fire. 	6	M	SM	Inspection	Weekly	Site Inspection Checklist
Demolition Excavation Construction	Notifiable pests - fire ants	Destruction of native species		<ul style="list-style-type: none"> Notify a DPI inspector within 24 hours if you see a fire ant (a notifiable pest). 	6	M	SM	Inspection	Monthly	Site Inspection Checklist

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Appendix 13 – Contamination Status of Development Areas



Douglas Partners

Geotechnics | Environment | Groundwater

Report on
Supplementary Contamination Investigation

North Sydney Public School Upgrade
North Sydney Public School, Bay Road, Waverton

Prepared for
Taylor Construction Group Pty Ltd

Project 210392.00
March 2022

Integrated Practical Solutions



Document History

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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	<i>Lisa Teng</i>	4 March 2022
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Report on Supplementary Contamination Investigation

North Sydney Public School Upgrade

North Sydney Public School, Bay Road, Waverton

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by to complete this supplementary contamination investigation (SCI) for the proposed North Sydney Public School Upgrade site (the 'investigation area') located within North Sydney Public School, Bay Road, Waverton. The site is shown on Drawing 1, Appendix A.

The investigation was undertaken in accordance with DP's proposal 210392.00.P.001.Rev0 dated 29 October 2021.

The objective of the SCI is to assess the suitability of the site for the proposed development and whether further investigation and/or management is required. It is understood that the report will be used to assist the design and construction of the proposed school upgrade. DP understands that a preliminary site investigation (PSI) and detailed site investigation (DSI) were previously carried out at the site by Tetra Tech Coffey (see Section 6). This SCI was undertaken to provide additional coverage of the subsurface conditions at the site.

This report must be read in conjunction with all appendices including the notes provided in Appendix B.

The following key guidelines were consulted in the preparation of this report:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013); and
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

It is noted that a geotechnical investigation was undertaken concurrently with this investigation and is reported under a separate cover¹.

2. Proposed Development

The proposed school upgrade includes:

- Construction of a new building which includes 16 homebases, school hall, administration, school library and a covered outdoor learning area (COLA);
- Upgrade of existing canteen;
- Refurbishments of amenities in building A, D and F; and

¹ Douglas Partners *Report on Geotechnical Investigation, North Sydney Public School Upgrades, North Sydney Public School, Bay Road, Waverton*, dated March 2022 (DP reference: 210392.00.R.002)

- Refurbishment of build G (the existing library) into 3 classrooms.

DP understands that the proposed school upgrades are preliminarily staged as follows:

- Stage 1 – Relocation of temporary demountable buildings;
- Stage 2 – Demolition of Buildings B and C;
- Stage 3 – Construction of new Buildings I and J;
- Stage 4 – Relocation of library and refurbishment of Building G; and
- Stage 5 – Removal all temporary buildings and demountable buildings off-site.

3. Scope of Work

The following scope of work was undertaken for this investigation:

- Review of previous reports (provided by the client);
- Service location of test locations using electromagnetic scanning and ground penetrating radar;
- Survey of test locations using a high precision differential GPS;
- Excavation of eight test pits (TP301 to TP308) with a 5 tonne excavator to a depth of between 0.9 m to 2.0 m;
- Collection of soil samples by an environmental scientist at regular intervals or where signs of contamination were identified;
- Screening of samples for volatile organic compounds (VOCs) with a photoionisation detector (PID);
- Dispatch of selected samples to a National Association of Testing Authorities (NATA) accredited laboratory for the analysis of a combination of the following analytes:
 - o Heavy metals;
 - o Total recoverable hydrocarbons (TRH);
 - o Benzene ,toluene, ethyl benzene and xylenes (BTEX);
 - o Polycyclic aromatic hydrocarbons (PAH);
 - o Organochlorine pesticides (OCP);
 - o Organophosphorus pesticides (OPP);
 - o Polychlorinated Biphenyls (PCB);
 - o Phenols;
 - o Asbestos;
 - o TCLP for metals and PAH; and
 - o Quality assurance and control samples including inter- and intra- laboratory replicates, trip spikes and trip blanks;
- Preparation of this report.

It is noted that four geotechnical boreholes (BH201 to BH204) were drilled for geotechnical purposes and no contamination samples were collected from these boreholes.

4. Investigation Area Information

Site Address	North Sydney Public School, Bay Road, Waverton,
Legal Description	Part of Lot 1 Deposited Plan 183591
Approximate Area	3000 m ²
Zoning	SP2 Infrastructure – Educational Establishment
Local Council Area	North Sydney Council
Current Use	Primary School
Surrounding Uses (of the NSPS Site)	<p>North – Low density residential and educational establishments</p> <p>East – Adjacent to pacific highway with mixed use including education establishments, medium to density residential and commercial land uses</p> <p>South – Medium to high density residential with educational establishments and commercial uses including the north shore train line beyond.</p> <p>West – low to high density residential and the north shore train line</p> <p>DP notes that further towards the south west are multiple parks and reserves located between low to medium density residential dwellings which extend to multiple Bays that form a part of Sydney Harbour.</p>

The school boundary and investigation area are shown on Figure 1.



Figure 1: Site Location

5. Environmental Setting

Regional Topography	The regional geography consists of undulating slopes with rounded crests and ridges with gently inclined slopes which typical become rolling to steep hills that are narrower as they slope down towards Sydney Harbour.
Investigation Area Topography	The topography of the investigation area slopes from the northern boundary (approximately RL 88 m AHD) towards the southern boundary (approximately RL 82 m AHD).
Soil Landscape	Reference to the 1:100 000 Soils Landscape Sheet shows the site underlain by Blacktown Residual Soils typically shallow to moderately deep red and brown podzolic which may be moderately reactive highly plastic subsoils with low soil fertility and poor soil drainage.
Geology	Reference to the Sydney 1:100 000 Geology Sheet, the NSPS site is underlain by Ashfield Shale of the Wianamatta Group. The site is also mapped close to the boundary with Hawkesbury Sandstone (typically medium to coarse grained quartz sandstones) and it is possible that the tests on the site may intersect the Mittagong Formation, which is a transitional unit between the Ashfield Shale and the Hawkesbury Sandstone which usually comprises interbedded siltstones and sandstones.
Acid Sulfate Soils	The site is not mapped on the NSW 1:25000 Acid Sulfate Soil Risk Map to have acid sulfate soils present.
Surface Water	Surface water from the site is likely to be intercepted by man made stormwater channels. However, any additional runoff would likely flow towards Lavender Bay
Groundwater	Review of site topography and regional geography suggests that any groundwater would be within the bedrock and unlikely to be intercepted by the proposed development. However, it is likely to be some perched water between the soil and rock interface. Reference to the NSW Water digital bore information indicates that there is only one registered groundwater well was in close proximity to the site, however, no groundwater level data was provided.

6. Previous Reports and Site History

The following previous reports are relevant to the current investigation:

- Tetra Tech Coffey ('TTC') *North Sydney Public School, Preliminary Site Investigation, Department of Education* dated 1 October 2021 (Report Reference: SYDGE290593-AD)(TTC, 2021a);
- Tetra Tech Coffey ('TTC') *North Sydney Public School, Detailed Site Investigation, Department of Education* dated 16 August 2021 (Report Reference: SYDGE290593-R01)(TTC, 2021b);

- Department of Education *Asbestos Register, North Sydney Public School (2766)*, last revision dated 5 November 2020 (DoE 2020a); and
- Department of Education c/o, *North Sydney Public School, Asbestos in Grounds Management Plan*, dated May 2020 (WSP report reference: 2766_ASB_150514_AMP) (DoE 2020b).

Preliminary Site Investigation (TTC 2021a)

The PSI included a desktop review of the NSPS site history including a review of previous Coffey reports, published geological, soil landscape, topographical, hydrogeological, salinity and acid sulfate soil maps, registered groundwater bore database, historical aerial photographs, current and historical land title deeds, a search of online public records / registers held by the NSW Environment Protection Authority (EPA), a site walkover and a discussion with a site representative.

Results of the PSI indicate that the NSPS site was a grassed area (of a low-density residential property) around the 1930s. However, it was indicated that the school was opened and occupied in 1931, although there was no aerial imagery to show what buildings occupied the site. By 1943, the site was occupied by multiple large buildings with the possibility of an air raid shelter (likely removed by 1955) was located near the southern boundary. Minor school developments appeared to have been undertaken around the early to mid-1960s, early 1980s, late 2000s and 2018.

A previous report (not available to DP) was reviewed by TTC as part of the PSI and indicated samples of fill which recorded concentrations of PAHs and TRHs, where the carcinogenic concentrations of PAH exceeded the health-based assessment criteria and were attributed to asphalt inclusions in the fill.

The PSI concluded that uncontrolled fill material was used across the NSPS site for the various developments. Potential asbestos containing materials (ACM) and lead paint were also suspected within some of the existing structures. It was recommended that an intrusive investigation be undertaken to characterise the fill materials.

Detailed Site Investigation (TTC 2021b)

The detailed site investigation (DSI) undertaken by TTC was for the proposed development footprint. The investigation included collating the findings of a preliminary site investigation (PSI) (previously undertaken by TTC) as well as a Limited Stage 2 Environmental Assessment for the whole NSPS site.

Subsequently, the DSI comprised an intrusive investigation across the proposed development area involving the drilling of 9 boreholes (HA1 to HA9) using a hand auger to depths of between 0.5 m to 1.1 m and two combined geotechnical and environmental boreholes (BH04 and BH05) to depths of 4.92 m and 5.00 m, respectively. Subsurface conditions encountered indicated the proposed development area was underlain by variable fill materials including brown to grey sandy clay with some gravel, sand and gravelly sand of variable thickness from 0.4m to 0.6m underlain by residual soils. Small fragments of ash were observed in HA2 and H4 and other anthropogenic materials such as asphalt and brick were observed in HA6 and HA8.

Results indicated that all samples were within the adopted site assessment criteria (for a residential A land use for human health criteria and / urban residential / public open space for ecological criteria) with the exception of arsenic (in HA7/0.2-0.3m) and benzo(a)pyrene in (HA2/0.1-0.2m, HA3/0.1-0.2m, HA4/0.1-0.2m, HA5/0.1-0.2m and HA8/0.2-0.3m). Results from the DSI are included with results from our current investigation in the summary tables in Appendix C.

The DSI concluded that the site could be made suitable for the proposed development subject to the following recommendations (in summary):

- A hazardous building materials survey to be completed prior to the demolition of each structure on site.
- The development of a construction environmental management plan;
- Additional investigation of soil conditions beneath existing buildings; and
- The appropriate management of any unexpected finds of contamination.

Asbestos Register and Asbestos Management Plan (DoE 2020a and DoE 2020b)

The asbestos register held by the DoE identifies historical fibro in ground at the NSPS site as well as asbestos present in several of the existing buildings on site. Asbestos within the buildings have been identified as both bonded and friable (in Building B only). The register also references an asbestos management plan (AMP) for the NSPS site.

The AMP identifies asbestos in ground in the area beneath building B (see extracted site plan, Appendix A) as non-friable asbestos fragments were observed on the ground surface.

7. Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e. it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

Potential Sources

Based on the review of previous investigations (PSI and DSI) and the results of the current investigation (SCI), the following potential sources of contamination and associated contaminants of potential concern (COPC) have been identified and are shown in Table 2 below. The possible pathways between the above sources (S1 to S3) and receptors (R1 to R5) identified in DP (2019) are also provided in Table 2 below.

Table 2: Summary of Potential Complete Pathways

Potential Source and Contaminants of Concern	Pathway	Receptor
S1 - Uncontrolled Filling Metals / metalloids, TRH, BTEX, PAH, OCP, OPP, PCB, phenols, and asbestos.	P1 - Ingestion and dermal contact	R1 - End users
	P2 - Inhalation of dust and / or vapours	R2 - Construction and maintenance workers
	P2 - Inhalation of dust and / or vapours	R3 - Adjacent site users
	P4 - Contact with terrestrial ecology	R5 - Terrestrial ecology
S2 - Previous Site Use OCPs, OPPs and PCBs.	P1 - Ingestion and dermal contact	R1 - End users
	P2 - Inhalation of dust and / or vapours	R2 - Construction and maintenance workers
	P2 - Inhalation of dust and / or vapours	R3 - Adjacent site users
	P4- Contact with terrestrial ecology	R5 - Terrestrial ecology
S2 - Existing Buildings On Site Asbestos, lead based paints, PCB capacitors and synthetic mineral fibre (SMF).	P1 - Ingestion and dermal contact	R1 - End users
	P2 - Inhalation of dust and / or vapours	R2 - Construction and maintenance workers
	P2 - Inhalation of dust and / or vapours	R3 - Adjacent site users

8. Sampling and Analysis Quality Plan

8.1 Data Quality Objectives

The SCI was devised with reference to the seven-step data quality objective process which is provided in Appendix B Schedule B2, NEPC (2013). The DQO process is outlined in Appendix I.

8.2 Soil Sampling Rationale

Based on the CSM and DQO the following sampling rationale was adopted.

A combination of a systematic sampling strategy and a judgemental sampling strategy were adopted to determine borehole/test pit locations. Locations were based on site history information and the CSM with the rationale provided below. Borehole / test pit locations are shown on Drawing 1, in Appendix A.

Test pits TP301 to TP308 and existing hand augers HA1 to HA9

For an area of approximately 3000 m² a minimum of 9 test locations are recommended for the detection of circular hot spots using a systemic grid sampling pattern in Table A of NSW EPA (1995).

DP notes that although the 9 test locations drilled as part of TTC (2021), an additional 8 test locations were completed by DP as part of this current investigation. The increased density of test locations was required to increase site coverage across the accessible areas of the site as asbestos was suspected to be present in the fill. Test pits were also excavated as they improve the ability to visually observe the presence of potential ACM in soil.

DP also notes that at the time of the investigation (20 to 25 January 2022) the site was currently occupied by the school and the existing school buildings were still present. Within the investigation area, only the two demountable buildings had been relocated to another area of the school. As such, additional investigations beneath the existing permanent buildings and structures at the site have not been completed as part of this investigation.

Soil samples were collected from test pits TP301 to TP308 at depths of approximately 0-0.1 m, 0.4-0.5 m, 0.9-1.0 m and every 0.5 m thereafter, and changes in lithology or signs of contamination.

The general sampling methods are described in the field work methodology, included in Appendix D.

A total of 14 soil samples were selected for analysis with 10 samples analysed from fill and 4 from natural materials, given that field observations and site history suggested that contamination is more likely to be associated with fill than natural soils. At least one sample from each test location was selected for analysis, with more samples selected where fill was deepest.

Samples were analysed for the primary COPC including heavy metals, TRH, BTEX, PAH, and asbestos, with a smaller number also analysed for OCP, OPP, PCB phenols, pH, CEC, iron and clay content.

DP notes that four boreholes (BH201 to BH204) were drilling for the geotechnical investigation and no samples were collected from these test locations. However, the boreholes logs have been included to provide additional data on subsurface conditions encountered.

9. Site Assessment Criteria

The site assessment criteria (SAC) applied in the current investigation are informed by the CSM (Section 7) which identified human and environmental receptors to potential contamination on the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic Residential A (including primary schools) land use scenario. The derivation of the SAC is

included in Appendix E and the adopted SAC are listed on the summary analytical results tables in Appendix C.

10. Results

10.1 Field Work Results

The borehole and test pit logs for this assessment are included in Appendix G. The logs recorded the following general sub-surface profile:

- FILL: Pale brown and dark brown silty sand / silty clay with inclusions of rootlets, gravel, concrete and anthropogenic materials to depths of between 0.2 m to 1.4 m;
- Silty CLAY: medium to high plasticity brown / grey mottled orange-brown / pale yellow-brown / pale grey to depths of between 2.5 m – 3.7 m; underlain by
- SILTSTONE underlain by SANDSTONE – see geotechnical report for additional details.

Fragments of fibre cement (asbestos containing material (ACM)) were identified in the fill materials in test pit TP302 along with anthropogenic materials including building debris, bricks, glass and gravel. Laboratory testing confirmed the presence of asbestos in the fibre cement fragment, as well as identifying friable asbestos in matted fibrous material from samples collected for fibrous asbestos / asbestos fines analysis. It is noted that TP302 was in an area that had a synthetic grass covering which was removed at the test location.

There was no other visual or olfactory evidence (e.g. staining, odours, free phase product) to suggest the presence of contamination within the soils.

The PID screening indicated that the sub-surface conditions were generally absent of VOC with all recorded values of less than 1 ppm.

No free groundwater was observed during excavation of test pits or augering during the drilling of boreholes and the use of water during rock coring precluded the observation of groundwater. Groundwater is expected to be beyond the depths of the proposed development. However, it is anticipated that there is likely to be perched water at the soil and rock interface. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

10.2 Laboratory Analytical Results

The results of laboratory analysis are summarised in the following tables in Appendix C:

- Table C1: Summary of Results of Soil Analysis; and
- Table C2: Summary of Waste Classification Assessment.

The laboratory certificates of analysis together with the chain of custody and sample receipt information are provided in Appendix C.

11. Discussion

11.1 Soils

The analytical results for all contaminants in all samples were below the SAC with the exception of:

- Arsenic in sample HA7_0.9-1.0 at a concentration of 140 mg/kg exceeded the HIL and EIL of 100 mg/kg. This exceedance is not, however, considered to be of concern as HA7 is located in the proposed building footprint. As such, there will be no foreseeable direct exposure to this soil contamination for site occupants or ecological receptors. Furthermore, the calculated 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL) for all near surface fill samples is 33.92 mg/kg which is within the HIL and EIL;
- Copper in samples TP302/0.1-0.2 and TP305/0.1-0.2 at concentrations of 340 mg/kg and 130 mg/kg, respectively which exceed the EIL of 120 mg/kg. These exceedances are not, however, considered to be of concern as TP302 and TP305 are located in the proposed building footprint. As such, there will be no foreseeable direct exposure to this soil contamination for ecological receptors;
- Lead in sample TP302/0.1-0.2 at 630 mg/kg which exceeded the HIL of 300 mg/kg. This exceedance is not, however, considered to be of concern as TP302 is located in the proposed building footprint. As such, there will be no foreseeable direct exposure to this soil contamination for site occupants. Furthermore, the 95%(UL) for all fill samples is 170.2 mg/kg which is within the HIL;
- Zinc in samples HA7_0.9-1.0, TP302/0.1-0.2, TP302/0.6-0.7 and TP307/0.1-0.2 at concentrations of 870 mg/kg, 1100 mg/kg, 440 mg/kg and 410 mg/kg, respectively which exceeded the EIL of 350 mg/kg. This exceedance is not, however, considered to be of concern as HA7, TP302 and TP307 are located in the proposed building footprint. As such, there will be no foreseeable direct exposure to this soil contamination for ecological receptors;
- TRH fraction F3 (C16-C3) in samples HA5_0.1-0.2, HA7_0.1-0.2, HA8_0.2-0.3 at concentrations of 310 mg/kg, 350 mg/kg and 590 mg/kg which exceeded the EIL of 300 mg/kg;
- Benzo(a)pyrene in samples HA2_0.1-0.2, HA3_0.1-0.2, HA4_0.1-0.2, HA5_0.1-0.2, HA8_0.2-0.3, TP303/0.2-0.3, TP307/0.1-0.2 and TP308/0.1-0.2 at concentrations of 1.9 mg/kg, 0.8 mg/kg, 0.9 mg/kg, 1.1 mg/kg, 0.8 mg/kg, 3.4 mg/kg, 0.92 mg/kg, 2.5 mg/kg, respectively exceeded the ESL of 0.7 mg/kg. It is noted that the B(a)P ESL is a low reliability value. Higher reliability screening levels have been published in CRC CARE *Risk-based Management and Remediation Guidance for Benzo(a)pyrene* (CRC CARE, 2017). The high reliability value of 33 mg/kg (or ranging from 21 mg/kg to 135 mg/kg) for fresh B(a)P suggests that the concentrations of B(a)P detected at the site are unlikely to pose an unacceptable risk to terrestrial ecosystems and therefore the exceedances are not considered to be of concern;
- Benzo(a)pyrene TEQ in samples HA2_0.1-0.2, TP303/0.1-0.2 and TP307/0.1-0.2 at concentrations of <4mg/kg, 5.1 mg/kg and 3.5 mg/kg, respectively which exceeded the HIL of 3 mg/kg. Furthermore, the 95% UCL of the mean B(a)P concentration for all fill samples is 1.832 mg/kg which is below the HIL ;

Multiple fragments of a fibre cement sheet (ACM) were observed in test pit TP302 and the fill profile included other anthropogenic materials such as building debris, bricks, glass and concrete. A fragment of fibre cement sheet (ACM) was analysed at the laboratory and the presence of chrysotile asbestos was confirmed. Soil samples from the fill in TP302 were also analysed for fibrous asbestos

and asbestos fines (FA/AF) and results indicated both bonded and friable asbestos was identified in the soil. Asbestos was not identified in any of the other test locations sampled.

Copies of the statistical analysis output are included in Appendix C.

11.2 Preliminary Waste Classification

11.2.1 Fill

NSW EPA (2014) contains a six-step procedure for determining the type of waste and the waste classification. Part of the procedure, for materials not classified as special waste or pre-classified waste, is a comparison of analytical data initially against contaminant threshold (CT) values specific to a waste category. Alternatively, the data can be assessed against specific contaminant concentration (SCC) thresholds when used in conjunction with toxicity characteristic leaching procedure (TCLP) thresholds.

The CT, SCC, and TCLP values relevant to this waste classification are shown in the Table C2 (Appendix C). The following Table 3 presents the results of the six step procedure outlined in EPA (2014) for determining the type of waste and the waste classification. This process applies to the fill at the site.

Table 3: Six Step Classification

Step	Comments	Rationale
1. Is it special waste?	Yes – Test Pit TP302	Asbestos containing material (ACM) was identified in fragments of fibre cement material in fill containing anthropogenic materials in test pit TP302 and the identified anthropogenic materials consistent with potential ACM, from the surface (below a synthetic grass cover) to 1.2 m Asbestos was detected by the analytical laboratory in a fragment of fibre cement sheeting and in soils samples from TP302.
	No	No asbestos-containing materials (ACM), or coal tar, clinical or related waste, or waste tyres were observed in the other test pits or boreholes;
2. Is it liquid waste?	No	Materials composed of a soil matrix.
3. Is the waste “pre-classified”?	No	Filling and natural material did not fall into one of the pre-classified categories
4. Does the Waste have hazardous waste characteristics	No	Waste not observed to/ or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances or corrosive substances, substances liable to spontaneous combustion.
5. Chemical Assessment	Conducted	Refer to Table C2 in Appendix C.
6. Is the Waste Putrescible?	No	All observed components of filling composed of materials pre-classified as non-putrescible (i.e. soil).

As shown in Table F2 (Appendix F) all contaminant concentrations for the analysed fill samples were within the contaminant thresholds (CT1s) for general solid waste (GSW) with the exception of the following:

- Arsenic in sample HA7_0.9-1.0 with a concentration of 140 mg/kg marginally exceeded the CT1 for GSW of 100 mg/kg but was within the CT2 of 400 mg/kg (no TCLP was undertaken as part of the TTC 2021 investigation). However, the 95% UCL for all near surface fill samples is 33.92 mg/kg which is within the CT1 for GSW;
- Lead in samples HA4_0.1-0.2, HA7_0.9-1.0, HA8_0.2-0.3, TP302/0.6-0.7, TP305/0.1-0.2, TP306/0.1-0.2 (exceedance in replicate sample BD2-21012022) and TP7/0.1-0.2 exceeded the CT1 for GSW and sample TP2/0.1-0.2 exceeded the CT2 for restricted solid waste (RSW). Additional toxicity characteristic leaching procedure (TCLP) extract and analysis was conducted and all results were within the SCC1 and TCLP1 thresholds for GSW;
- Nickel in sample HA9_0.2-0.3 with a concentration of 84 mg/kg exceeded the CT1 for GSW of 40 mg/kg but was below the CT2 of 160 mg/kg (no TCLP was undertaken as part of the TTC 2021 investigation). However, the 95% UCL for all near surface fill samples is 20.96 mg/kg which is within the CT1 for GSW;
- Benzo(a)pyrene in samples TP303/0.1-0.2, TP307/0.1-0.2 and TP308/0.1-0.2 exceeded the CT1 for GSW. Additional TCLP extract and analysis was conducted and all results were within the SCC1 and TCLP1 thresholds for GSW;

Therefore, the following preliminary *in situ* waste classifications have been provided:

- Fill across the majority of the investigation area is preliminary classified as GSW (non-putrescible) with the exception of:
 - o Fill around test pit TP302 is classified as Special Waste Asbestos – GSW (non-putrescible); and
- Natural soils are preliminarily classified as VENM.

It is noted that further *in situ* or *ex situ* investigation including visual and analytical processes are required to confirm this waste classification, prior to offsite disposal. Additionally, any areas where asbestos is later identified, the material would be classified as Special Waste Asbestos in conjunction with the chemical classification provided above.

11.2.2 Natural

The POEO Act defines (VENM) as:

'natural material (such as clay, gravel, sand, soil or rock fines):

(a) that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities and

(b) that does not contain any sulfidic ores or soils or any other waste.

The following publications with background concentration ranges for Australian soils have been referenced in assessing the concentrations of analytes:

- *National Environmental Protection (Assessment of Site Contamination) Measure* (1999) Schedule B (1) Guidelines on the Investigation Levels for Soil and Groundwater, (NEPC 1999) [typical background ranges as sourced from Berkman (1989)];
- *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites* (1992), Environmental Soil Quality Guidelines Column A Background (ANZECC A) (ANZECC 1992); and
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2000), Volume 3, Table 9.2.16 Datasets used to derive suggested upper background values for uncontaminated Australian soils (ANZECC 2000).

The following Table 4 presents the results of the assessment of natural soils and rock underlying fill at the site with reference to the VENM definition and EPA advice outlined above.

Table 4: VENM Classification Procedure

Item	Comments	Rationale
1. Is the material natural?	Yes	Soils are of natural origin (with reference to the borehole and test pit logs)
2. Are there current or previous land uses that have (or may have) contaminated the materials?	Yes	Potential contamination from previous land use (Refer to Section 6).
3. Are manufactured chemicals or process residues present?	Testing undertaken	Testing was undertaken to assess for the presence of chemicals.
4. Are sulfidic ores or soils present?	No	Site located in an area of no known occurrence of acid sulfate soils (see Section 5).
5. Are naturally occurring asbestos soils present?	No	Based on the geology, naturally occurring asbestos is not considered to be an issue of concern for the subject materials.
6. Is there any other waste present?	No	Apart from filling in the soil strata above containing some anthropogenic materials, there were no other wastes observed to be present.

As shown in Table C2, Appendix C, all analytical results for the analysed natural samples were within the background ranges. Based on the available contamination testing results, natural materials are preliminarily classified as VENM, although further assessment by visual and analytical means is required for a final waste classification.

11.3 Data Quality Assurance and Quality Control

The data quality assurance and quality control (QA/QC) results are included in Appendix E. Based on the results of the field QA and field and laboratory QC, and evaluation against the data quality indicators (DQI) it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

12. Conclusions and Recommendations

The SCI comprised a review of previous reports, previous investigation results and an intrusive soil investigation to assess the suitability of the investigation area for the proposed development and whether further investigation and / or management of contamination is required.

All of the chemical contaminant concentrations were within the adopt SAC, either individually or statistically, or were minor exceedances of ecological criteria which were not considered a concern as they lie within the proposed building footprints where access to soil would be limited as discussed in Section 11.1. However, asbestos has been identified in test location TP302 within the fill profile and was noted in the Asbestos Register within Building B. As such, there is a risk that additional asbestos may be present within the fill soil in untested parts of the site.

DP recommends that the following be undertaken:

- Additional investigations are recommended to better characterise the degree, extent and nature of asbestos encountered in fill. Based on the current test results, the area shown shaded pink in Drawing 2 (Area of Environmental Concern) has been initially identified for remediation, however additional investigations will assist in confirming the lateral and vertical extent of this area;
- Additional investigations are also recommended to address the data gaps presented by the existing buildings and structures where investigation is not currently possible;
- Undertake a walkover by a qualified occupational hygienist or suitably qualified environmental consultant to identify any suspected ACM within any building demolition footprints and nearby surface areas;
- Development of appropriate management plans including an Asbestos Management Plan which outlines the procedures required for the appropriate management of asbestos during excavations or site formation;
- Development of a Remediation Action Plan (RAP) be prepared detailing the works required to render the site suitable for the proposed development including a protocol for any additional finds of asbestos. The RAP should also include an Unexpected Finds Protocol outlining the procedures that would be undertaken in the event unexpected contamination is encountered during excavation works; and
- Appropriate management of unexpected contamination finds during excavations or site formation;

Based on the results of the investigation, it is considered that the investigation area can be made suitable for the proposed residential (primary school) development subject to implementation of the recommendations above.

DP notes that the presence of asbestos in fill may present constraints on the proposed development e.g., aesthetics, acceptability and practicality for the developer / user, asbestos licenced contractor requirements during development and disposal. These should be discussed with the appropriate stakeholders and consultants.

Preliminary *in situ* waste classifications have also been provided as follows:

- The fill across the majority of the investigation area is preliminary classified as GSW (non-putrescible) with the exception of:

- o Fill around test pit TP302 is classified as Special Waste Asbestos – GSW (non-putrescible); and
- Natural soils are preliminarily classified as VENM.

The preliminary waste classifications should be further assessed using visual and / or analytical means and be undertaken by a suitably qualified environmental consultant to confirm a final waste classification.

DP notes that demolition/refurbishments are to be undertaken at some existing blocks and recommends that a hazardous building materials survey should be undertaken prior to the refurbishments/demolition of any of these buildings.

13. References

CRC CARE. (2017). *Risk-based Management and Remediation Guidance for Benzo(a)pyrene*. Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (1995). *Contaminated Sites, Sampling Design Guidelines*. NSW Environment Protection Authority.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land*. Contaminated Land Guidelines: NSW Environment Protection Authority.

14. Limitations

Douglas Partners (DP) has prepared this report for this project at North Sydney Public School, Bay Road, Waverton in accordance with DP's proposal 210392.00.P.001.Rev0 dated 29 October 2021 and acceptance received from Taylor Construction Pty Ltd. The work was carried out under Taylor consultancy agreement with DP for the North Sydney Public School Upgrade. This report is provided for the exclusive use of Taylor Construction 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 DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP 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, some of it by others. Sub-surface conditions can change abruptly due to

variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP 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 environmental 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. DP 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 DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Asbestos has been detected by observation and by laboratory analysis, in fill materials at one of the test locations sampled and analysed. Building demolition materials, such as concrete, brick and glass were observed in the some of the fill and is indicative of the possible presence of hazardous building materials (HBM), including asbestos.

Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions (as discussed above), and to parts of the site being inaccessible and not available for inspection/sampling and reasonable access. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that no additional asbestos is not present.

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Appendix A

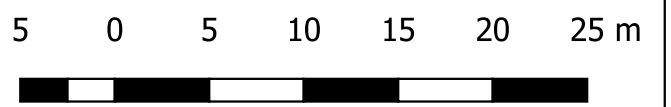
Drawings



LOCALITY MAP

Notes:
1. Basemap from nearmap.com (dated 21/12/2021)
2. Test locations and boundaries shown are approximate only

- Legend
- School Boundary
 - Investigation Area
 - Proposed Buiding Footprint
 - Borehole Location (Tetrtech Coffey, 2021)
 - Hand Auger Location (Tetrtech Coffey 2021)
 - Geotechnical Borehole Location (Current Investigation)
 - Test Pit Location (Current Investigation)

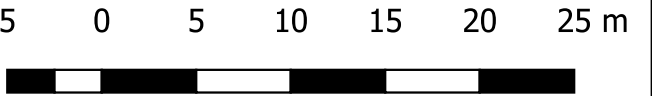




LOCALITY MAP

Notes:
1. Basemap from nearmap.com (dated 21/12/2021)
2. Test locations and boundaries shown are approximate only

- Legend
- School Boundary
 - Investigation Area
 - Proposed Buiding Footprint
 - Area of Environmental Concern
 - Borehole Location (Tetratech Coffey, 2021)
 - Hand Auger Location (Tetratech Coffey 2021)
 - Geotechnical Borehole Location (Current Investigation)
 - Test Pit Location (Current Investigation)
 - Borehole Location (Tetratech Coffey, 2019)



2766 - North Sydney Public School

Site Plan (10497)



Appendix B

About This Report

About this Report

Douglas Partners



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.

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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 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.

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.

Appendix C

Summary of Analytical Results

Table C1: Summary of Laboratory Results – Site Assessment Criteria

				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	
Site Assessment Criteria - Commercial Land Use																											
HIL A				100	20	100	6,000	300	40	400	7,400													3	300	100	
HSL A&B	0- <1m	(clay)												45	280			0.5	160	55	40	3					
EIL/ ESL	0-<2m	(fine)		100		410	120	1,100		35	350		120	180	120	300	2,800	50	85	70	105	170	0.7				
Management Limit		(fine)										800	1,000			3,500	10,000										
Direct Contact A												4,400	3,300			4,500	6,300	100	14,000	4,500	12,000	1,400				3,000	
Laboratory Results - Previous Investigation (TTC 2021)																											
HA1_0.1-0.2	0.1-0.2	FILL	21/01/2022	7.1	<0.4	9.8	26	46	<0.1	<5	42	<20	36	<20	<50	120	<100	<0.1	<0.1	<0.1	<0.3	<0.1	0.6	0.7	2.7	<0.5	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA1_0.7-0.8	0.7-0.8	NATURAL	21/01/2022	15	<0.4	13	22	20	<0.1	<5	8.2	<20	<20	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.3	<0.1	<0.5	<0.5	<0.5	-	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA2_0.1-0.2	0.1-0.2	FILL	21/01/2022	16	<0.4	29	76	100	0.2	22	110	<20	<20	<20	<50	290	<100	<0.1	<0.1	<0.1	<0.3	<0.1	1.9	<4	16	<0.5	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA2_0.7-0.8	0.7-0.8	NATURAL	21/01/2022	11	<0.4	7.6	15	12	<0.1	<5	5.8	<20	<20	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.3	<0.1	<0.5	<0.5	<0.5	-	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA3_0.1-0.2	0.1-0.2	FILL	21/01/2022	6.4	<0.4	16	30	51	<0.1	6.7	74	<20	<20	<20	<50	220	<100	<0.1	<0.1	<0.1	<0.3	<0.1	0.8	1	5.9	<0.5	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA3_0.5-0.6	0.5-0.6	NATURAL	21/01/2022	5.5	<0.4	9.3	16	19	<0.1	<5	7.8	<20	<20	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.3	<0.1	<0.5	<0.5	<0.5	-	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA4_0.1-0.2	0.1-0.2	FILL	21/01/2022	13	<0.4	18	26	180	0.2	5.5	130	<20	<20	<20	<50	230	<100	<0.1	<0.1	<0.1	<0.3	<0.1	0.9	<2	7.5	<0.5	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA4_0.7-0.8	0.7-0.8	NATURAL	21/01/2022	16	<0.4	9.3	16	23	<0.1	<5	8.2	<20	<20	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.3	<0.1	<0.5	<0.5	<0.5	-	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA5_0.1-0.2	0.1-0.2	FILL	21/01/2022	5.4	<0.4	9	16	46	<0.1	<5	47	<20	<20	<20	<50	310	<100	<0.1	<0.1	<0.1	<0.3	<0.1	1.1	<2	12.4	<0.5	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA5_0.8-0.9	0.8-0.9	FILL	21/01/2022	26	<0.4	8.7	7.9	20	<0.1	<5	<5	<20	<20	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.3	<0.1	<0.5	<0.5	<0.5	-	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA6_0.1-0.2	0.1-0.2	FILL	21/01/2022	2.6	<0.4	12	54	16	<0.1	11	71	<20	<100	<20	<250	<500	<500	<0.1	<0.1	<0.1	<0.3	<0.1	<0.5	<0.5	<0.5	<10	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA6_0.4-0.5	0.4-0.5	FILL	21/01/2022	4.2	<0.4	16	31	27	<0.1	13	45	<20	<100	<20	<250	<500	<500	<0.1	<0.1	<0.1	<0.3	<0.1	<0.5	<0.5	<0.5	-	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA7_0.1-0.2	0.1-0.2	FILL	21/01/2022	7.7	<0.4	15	45	61	0.1	7.1	110	<20	<20	<20	<50	350	<100	<0.1	<0.1	<0.1	<0.3	<0.1	0.7	<1	5.3	<0.5	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA7_0.9-1.0	0.9-1.0	FILL	21/01/2022	140	1.1	21	78	190	0.4	13	870	<20	25	<20	<50	210	<100	<0.1	<0.1	<0.1	<0.3	<0.1	0.5	0.6	4.8	-	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA8_0.2-0.3	0.2-0.3	FILL	21/01/2022	4.2	<0.4	14	41	110	0.1	7.2	160	<20	<100	<20	<250	590	<100	<0.1	<0.1	<0.1	<0.3	<0.1	0.8	<1	4.2	<10	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
HA8_0.7-0.8	0.7-0.8	NATURAL	21/01/2022	3.9	<0.4	10	22	14	<0.1	<5	21	<20	<20	<20	<50	<100	<100	<0.1	<0.1	<0.1	<0.3	<0.1	<0.5	<0.5	<0.5	-	
				100 100	20 -	100 100	6000 120	300 1100	40 -	400 25	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.				

Table C1: Summary of Laboratory Results – Site Assessment Criteria

				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	^b Naphthalene	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	
Site Assessment Criteria - Commercial Land Use																											
HIL A				100	20	100	6,000	300	40	400	7,400							0.5	160	55	40	3		3	300	100	
HSL A&B	0- <1m	(clay)												45	280												
EIL/ ESL	0-<2m	(fine)		100		410	120	1,100		35	350		120	180	120	300	2,800	50	85	70	105	170	0.7				
Management Limit		(fine)										800	1,000			3,500	10,000										
Direct Contact A												4,400	3,300			4,500	6,300	100	14,000	4,500	12,000	1,400				3,000	
BD2-21012022	0.1 - 0.2 m	FILL	21/01/2022	8	<1	15	46	147	0.1	8	204	<10	<50	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<1	<0.5	<0.5	NT	<1	
				100 100	20 -	100 410	6000 120	300 110000	40 -	400 35	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
TP306 - (TRIPLICATE)	0.1 - 0.2 m	FILL	21/01/2022	6	0.4	12	35	95	0.2	6	130	-	-	-	-	-	-	0.5	160	55	40	-	-	-	300	100	
				100 100	20 -	100 410	6000 120	300 110000	40 -	400 35	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
TP307	0.1 - 0.2 m	FILL	21/01/2022	6	0.9	14	54	250	0.7	9	410	<25	<50	<25	<50	110	<100	<0.2	<0.5	<1	<1	<0.1	0.92	1.2	8.8	100	
				100 100	20 -	100 410	6000 120	300 110000	40 -	400 35	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
TP307 (silica gel cleanup)	0.1 - 0.2 m	FILL	21/01/2022	-	-	-	-	-	-	-	-	-	<50	-	-	<100	<100	-	-	-	-	-	-	-	-	-	
				100 100	20 -	100 410	6000 120	300 110000	40 -	400 35	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
TP308	0.1 - 0.2 m	FILL	21/01/2022	5	<0.4	9	28	52	0.1	4	53	<25	<50	<25	<50	130	<100	<0.2	<0.5	<1	<1	<0.1	2.5	3.5	23	<5	
				100 100	20 -	100 410	6000 120	300 110000	40 -	400 35	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
TP308 (silica gel cleanup)	0.1 - 0.2 m	FILL	21/01/2022	-	-	-	-	-	-	-	-	-	<50	-	-	<100	<100	-	-	-	-	-	-	-	-	-	
				100 100	20 -	100 410	6000 120	300 110000	40 -	400 35	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -	100 -	
TP308	0.6 - 0.7 m	Silty CLAY	21/01/2022	4	<0.4	3	7	5	<0.1	<1	3	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05	100	
				100 100	20 -	100 410	6000 120	300 110000	40 -	400 35	7400 350	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 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 Ecological criteria applies to DDT only
 - * Chrysotile asbestos detected in a fragment of ACM >7mm with a fragment weight of 19.4696 g
 - ** Chrysotile asbestos identified in a fragment of fibre cement sheet >7mm with a fragment weight of 0.0638g and as fibrous asbestos in 0.3959g of fibrous matted material

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)

Table C1: Summary of Laboratory Results – Site

				OCP										OPP	PCB	Asbestos								
				DDT+DDE+DDD C	DDT	Atrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	All other analysed OCP	Chlorpyrifos	Total PCB	Asbestos (50 g)	Asbestos (500 ml)	Asbestos in Material	TAsbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation	FA and AF Estimation	FA and AF Estimation
			PQL	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1		0.001							<0.001
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	-	-		g/kg	-	g/kg	g	g	%(w/w)
Site Assessment Criteria - Commercial Land Use																								
HIL A				240		6	50	10	270	6	10	300		160	1									0.01
HSL A&B	0- <1m	(clay)																						
EIL/ ESL	0-<2m	(fine)		180 ±	180 ±																			
Management Limit		(fine)																						
Direct Contact A																								
Laboratory Results - Previous Investigation (TTC 2021)																								
HA1_0.1-0.2	0.1-0.2	FILL	21/01/2022	<0.05 240 180	<0.05 - 180	<0.05 6 - 180	<0.1 50 - 180	- 10 - 180	<0.05 270 - 180	<0.05 6 - 180	<0.05 10 - 180	<0.05 300 - 180	<0.05 - 180	<PQL 160 - 180	<0.1 1 - 180	NAD	-	-	-	-	-	-	-	-
HA1_0.7-0.8	0.7-0.8	NATURAL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	- 270 - 180	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	- 160 - 180	- 1 - 180	-	-	-	-	-	-	-	-	-
HA2_0.1-0.2	0.1-0.2	FILL	21/01/2022	<0.05 240 180	<0.05 - 180	<0.05 6 - 180	<0.1 50 - 180	- 10 - 180	<0.05 270 - 180	<0.05 6 - 180	<0.05 10 - 180	<0.05 300 - 180	<0.05 - 180	<PQL 160 - 180	<0.1 1 - 180	NAD	-	-	-	-	-	-	-	-
HA2_0.7-0.8	0.7-0.8	NATURAL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	- 270 - 180	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	- 160 - 180	- 1 - 180	-	-	-	-	-	-	-	-	-
HA3_0.1-0.2	0.1-0.2	FILL	21/01/2022	<0.05 240 180	<0.05 - 180	<0.05 6 - 180	<0.1 50 - 180	- 10 - 180	<0.05 270 - 180	<0.05 6 - 180	<0.05 10 - 180	<0.05 300 - 180	<0.05 - 180	<PQL 160 - 180	<0.1 1 - 180	NAD	-	-	-	-	-	-	-	-
HA3_0.5-0.6	0.5-0.6	NATURAL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	- 270 - 180	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	- 160 - 180	- 1 - 180	-	-	-	-	-	-	-	-	-
HA4_0.1-0.2	0.1-0.2	FILL	21/01/2022	<0.05 240 180	<0.05 - 180	<0.05 6 - 180	<0.1 50 - 180	- 10 - 180	<0.05 270 - 180	<0.05 6 - 180	<0.05 10 - 180	<0.05 300 - 180	<0.05 - 180	<PQL 160 - 180	<0.1 1 - 180	NAD	-	-	-	-	-	-	-	-
HA4_0.7-0.8	0.7-0.8	NATURAL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	- 270 - 180	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	- 160 - 180	- 1 - 180	-	-	-	-	-	-	-	-	-
HA5_0.1-0.2	0.1-0.2	FILL	21/01/2022	<0.05 240 180	<0.05 - 180	<0.05 6 - 180	<0.1 50 - 180	- 10 - 180	<0.05 270 - 180	<0.05 6 - 180	<0.05 10 - 180	<0.05 300 - 180	<0.05 - 180	<PQL 160 - 180	<0.1 1 - 180	NAD	-	-	-	-	-	-	-	-
HA5_0.8-0.9	0.8-0.9	FILL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	- 270 - 180	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	- 160 - 180	- 1 - 180	-	-	-	-	-	-	-	-	-
HA6_0.1-0.2	0.1-0.2	FILL	21/01/2022	<0.5 240 180	<0.5 - 180	<0.5 6 - 180	<1 50 - 180	- 10 - 180	<0.5 270 - 180	<0.5 6 - 180	<0.5 10 - 180	<0.5 300 - 180	<0.5 - 180	<0.5 160 - 180	<1 1 - 180	NAD	-	-	-	-	-	-	-	-
HA6_0.4-0.5	0.4-0.5	FILL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	- 270 - 180	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	- 160 - 180	- 1 - 180	-	-	-	-	-	-	-	-	-
HA7_0.1-0.2	0.1-0.2	FILL	21/01/2022	<0.05 240 180	<0.05 - 180	<0.05 6 - 180	<0.1 50 - 180	- 10 - 180	<0.05 270 - 180	<0.05 6 - 180	<0.05 10 - 180	<0.05 300 - 180	<0.05 - 180	<PQL 160 - 180	<0.1 1 - 180	NAD	-	-	-	-	-	-	-	-
HA7_0.9-1.0	0.9-1.0	FILL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	- 270 - 180	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	- 160 - 180	- 1 - 180	-	-	-	-	-	-	-	-	-
HA8_0.2-0.3	0.2-0.3	FILL	21/01/2022	<0.5 240 180	<0.5 - 180	<0.5 6 - 180	<0.1 50 - 180	- 10 - 180	<0.5 270 - 180	<0.5 6 - 180	<0.5 10 - 180	<0.5 300 - 180	<0.5 - 180	<0.5 160 - 180	<1 1 - 180	NAD	-	-	-	-	-	-	-	-
HA8_0.7-0.8	0.7-0.8	NATURAL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	- 270 - 180	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	- 160 - 180	- 1 - 180	-	-	-	-	-	-	-	-	-
HA9_0.2-0.3	0.2-0.3	FILL	21/01/2022	<0.05 240 180	<0.05 - 180	<0.05 6 - 180	<0.1 50 - 180	- 10 - 180	<0.05 270 - 180	<0.05 6 - 180	<0.05 10 - 180	<0.05 300 - 180	<0.05 - 180	<PQL 160 - 180	<0.1 1 - 180	NAD	-	-	-	-	-	-	-	-
HA9_0.9-1.0	0.9-1.0	NATURAL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	- 270 - 180	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	- 160 - 180	- 1 - 180	NAD	-	-	-	-	-	-	-	-
Laboratory Results - Current Investigation																								
TP301	0.1 - 0.3 m	FILL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	270 NT	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	160 160	1 1	NAD	-	-	-	-	-	-	-	-
TP301	0.6 - 0.7 m	FILL	21/01/2022	<0.1 240 180	<0.1 - 180	<0.1 6 - 180	<0.1 50 - 180	<0.1 10 - 180	NT 270	<0.1 6 - 180	<0.1 10 - 180	<0.1 300 - 180	<PQL - 180	<0.1 160 - 180	<0.1 1 - 180	-	NAD	-	NAD	NAD	NAD	-	-	<0.001
BD1/21012022	0.6 - 0.7 m	FILL	21/01/2022	<0.1 240 180	<0.1 - 180	<0.1 6 - 180	<0.1 50 - 180	<0.1 10 - 180	NT 270	<0.1 6 - 180	<0.1 10 - 180	<0.1 300 - 180	<PQL - 180	<0.1 160 - 180	<0.1 1 - 180	NAD	-	-	-	-	-	-	-	-
TP301 - (TRIPLICATE)	0.6 - 0.7 m	FILL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	270 270	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	160 160	1 1	-	-	-	-	-	-	-	-	-
TP301	1.7 - 1.8 m	Silty CLAY	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	270 270	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	160 160	1 1	NAD	-	-	-	-	-	-	-	-
TP302	0.1 - 0.2 m	FILL	21/01/2022	<0.1 240 180	<0.1 - 180	<0.1 6 - 180	<0.1 50 - 180	<0.1 10 - 180	270 270	<0.1 6 - 180	<0.1 10 - 180	<0.1 300 - 180	<PQL - 180	<0.1 160 - 180	<0.1 1 - 180	-	AD	-	3.3889*	NAD	AD	2.9204	NT	<0.001
TP302-FC1-0.2	0.2 m	MATERIAL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	270 270	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	160 160	1 1	-	-	Chrysotile Asbestos	-	-	-	-	-	-
TP302	0.6 - 0.7 m	FILL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	270 270	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	160 160	1 1	-	AD	-	0.3673**	NAD	AD	0.0096	0.3167	0.0353
TP302	1.3 - 1.4 m	Silty CLAY	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	270 270	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	160 160	1 1	-	-	-	-	-	-	-	-	-
TP303	0.1 - 0.2 m	FILL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	270 270	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	160 160	1 1	NAD	-	-	-	-	-	-	-	-
TP303 (silica gel cleanup)	0.1 - 0.2 m	FILL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	270 270	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	160 160	1 1	NAD	-	-	-	-	-	-	-	-
TP304	0.3 - 0.4 m	FILL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	270 270	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	160 160	1 1	-	NAD	-	NAD	NAD	NAD	NT	NT	<0.001
TP304	0.7 - 0.8 m	Silty CLAY	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	270 270	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	160 160	1 1	-	-	-	-	-	-	-	-	-
TP305	0.1 - 0.2 m	FILL	21/01/2022	- 240 180	- - 180	- 6 - 180	- 50 - 180	- 10 - 180	270 270	- 6 - 180	- 10 - 180	- 300 - 180	- - 180	160 160	1 1	NAD	-	-	-	-	-	-	-	-
TP306	0.1 - 0.2 m	FILL	21/01/2022	<0.1 240 180	<0.1 - 180	<0.1 6 - 180	<0.1 50 - 180	<0.1 10 - 180	NT 270	<0.1 6 - 180	<0.1 10 - 180	<0.1 300 - 180	<PQL - 180	<0.1 160 - 180	<0.1 1 - 180	NAD	-	-	-	-	-	-	-	-

Table C1: Summary of Laboratory Results – Sil

				OCP										OPP	PCB	Asbestos								
				DDT+DDE+DDD °	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	All other analysed OCP	Chlorpyrifos	Total PCB	Asbestos (50 g)	Asbestos (500 ml)	Asbestos in Material	TAsbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation	FA and AF Estimation	FA and AF Estimation
			PQL	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1		0.001							<0.001
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	-	-		g/kg	-	g/kg	g	g	%(w/w)
Site Assessment Criteria - Commercial Land Use																								
HIL A				240		6	50	10	270	6	10	300		160	1									0.01
HSL A&B	0- <1m	(clay)																						
EIL/ ESL	0-<2m	(fine)		180 °	180 °																			
Management Limit		(fine)																						
Direct Contact A																								
BD2-21012022	0.1 - 0.2 m	FILL	21/01/2022	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.1	-	-	-	-	-	-	-	-	-
				240 180	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	- -	160 -	1 -									
TP306 - [TRIPLICATE]	0.1 - 0.2 m	FILL	21/01/2022	-	-	-	-	-	270	-	-	-	-	160	1	-	-	-	-	-	-	-	-	-
				240 180	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	- -	160 -	1 -									
TP307	0.1 - 0.2 m	FILL	21/01/2022	-	-	-	-	-	270	-	-	-	-	160	1	NAD	-	-	-	-	-	-	-	-
				240 180	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	- -	160 -	1 -									
TP307 (silica gel cleanup)	0.1 - 0.2 m	FILL	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	NAD	-	-	-	-	-	-	-	-
				240 180	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	- -	160 -	1 -									
TP308	0.1 - 0.2 m	FILL	21/01/2022	<0.1	<0.1	<0.1	<0.1	<0.1	270	<0.1	<0.1	<0.1	<PQL	<0.1	<0.1	NAD	-	-	-	-	-	-	-	-
				240 180	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	- -	160 -	1 -									
TP308 (silica gel cleanup)	0.1 - 0.2 m	FILL	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	NAD	-	-	-	-	-	-	-	-
				240 180	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	- -	160 -	1 -									
TP308	0.6 - 0.7 m	Silty CLAY	21/01/2022	-	-	-	-	-	270	-	-	-	-	160	1	-	-	-	-	-	-	-	-	-
				240 180	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	- -	160 -	1 -									

Lab result

HIL/HSL value

EIL/ESL value

- Notes:
- a QA/QC replicate of sample listed directly below the primary sample
 - b Reported naphthalene laboratory result obtained from BTEXN suite
 - c Ecological criteria applies to DDT only
 - * Chrysotile asbestos detected in a fragment of ACM >7mm with a fragment weight of 19.4696 g
 - ** Chrysotile asbestos identified in a fragment of fibre cement sheet >7mm with a fragment weight of 0.0638g and as fibrous asbestos in 0.3959g of fibrous matted material

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)

Table C2: Summary of Laboratory Results – Waste Classification Criteria

				Metals								TRH					TPH	BTEX				PAH			Phenol		
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Lead in TCLP	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C9	TRH C10 - C14	TRH C15 - C28	TRH C29 - C36	C10-C36 recoverable hydrocarbons	C10-C36 petroleum hydrocarbons	Benzene	Toluene	Ethylbenzene	Xylenes (total)	Benzo(a)pyrene (BaP)	Benzo(a)pyrene (BaP) in TCLP	Total PAHs	Phenol	
			PQL	4	0.4	1	1	1	0.03	0.1	1	1	25	50	100	100	50	50	0.2	0.5	1	3	0.05		0.05	5	
Sample ID	Depth	Soil Matrix	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	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/L	mg/kg	mg/kg	
Waste Classification Criteria [†]																											
CT1				100	20	100	-	100	-	4	40	-	650	-	-	-	-	10000	10000	10	288	600	1000	0.8	-	200	288
SCC1				500	100	1900	-	1500	-	50	1050	-	650	-	-	-	-	10000	10000	18	518	1080	1800	10	-	200	518
TCLP1				N/A	N/A	N/A	-	N/A	5	N/A	N/A	-	N/A	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.04	N/A	N/A
CT2				400	80	400	-	400	-	16	160	-	2600	-	-	-	-	40000	40000	40	1152	2400	4000	3.2	-	800	1152
SCC2				2000	400	7600	-	6000	-	200	4200	-	2600	-	-	-	-	40000	40000	72	2073	4320	7200	23	-	800	2073
TCLP2				N/A	N/A	N/A	-	N/A	-	N/A	N/A	-	N/A	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A
Published Background Levels																											
NEPC (1999)				1-50	1	5-1000	2-100	2-200	-	0.03	5-500	10-300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
ANZECC (1992)				0.2-30	0.04-2	0.5-110	1-190	<2-200	-	0.001-0.1	2-400	2-180	-	-	-	-	-	-	0.05 - 1	0.1 - 1	-	-	-	-	0.95-5	0.03 – 0.5	
ANZECC (2000)				1-53	0.016-0.78	2.5-673	0.4-412	2-81	-	-	1-517	1-263	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Laboratory Results - Previous Investigation (TTC 2021)																											
HA1_0.1-0.2	0.1-0.2	FILL	28/08/2021	7.1	<0.4	9.8	26	46	-	<0.1	<5	42	<20	36	88	55	179	179	<0.1	<0.1	<0.1	<0.3	<0.5	-	2.7	<0.5	
HA1_0.7-0.8	0.7-0.8	NATURAL	28/08/2021	15	<0.4	13	22	20	-	<0.1	<5	8.2	<20	<20	<50	<50	<50	<50	<0.1	<0.1	<0.1	<0.3	<0.5	-	<0.5	-	
HA2_0.1-0.2	0.1-0.2	FILL	28/08/2021	16	<0.4	29	76	100	-	0.2	22	110	<20	<20	200	130	330	330	<0.1	<0.1	<0.1	<0.3	<4	-	16	<0.5	
HA2_0.7-0.8	0.7-0.8	NATURAL	28/08/2021	11	<0.4	7.6	15	12	-	<0.1	<5	5.8	<20	<20	<50	<50	<50	<50	<0.1	<0.1	<0.1	<0.3	<0.5	-	<0.5	-	
HA3_0.1-0.2	0.1-0.2	FILL	28/08/2021	6.4	<0.4	16	30	51	-	<0.1	6.7	74	<20	<20	130	120	250	250	<0.1	<0.1	<0.1	<0.3	<1	-	5.9	<0.5	
HA3_0.5-0.6	0.5-0.6	NATURAL	28/08/2021	5.5	<0.4	9.3	16	19	-	<0.1	<5	7.8	<20	<20	<50	<50	<50	<50	<0.1	<0.1	<0.1	<0.3	<0.5	-	<0.5	-	
HA4_0.1-0.2	0.1-0.2	FILL	28/08/2021	13	<0.4	18	26	180	-	0.2	5.5	130	<20	<20	140	130	270	270	<0.1	<0.1	<0.1	<0.3	<1	-	7.5	<0.5	
HA4_0.7-0.8	0.7-0.8	NATURAL	28/08/2021	16	<0.4	9.3	16	23	-	<0.1	<5	8.2	<20	<20	<50	<50	<50	<50	<0.1	<0.1	<0.1	<0.3	<0.5	-	<0.5	-	
HA5_0.1-0.2	0.1-0.2	FILL	28/08/2021	5.4	<0.4	9	16	46	-	<0.1	<5	47	<20	<20	180	180	360	360	<0.1	<0.1	<0.1	<0.3	<2	-	12.4	<0.5	
HA5_0.8-0.9	0.8-0.9	FILL	28/08/2021	26	<0.4	8.7	7.9	20	-	<0.1	<5	<5	<20	<20	<50	<50	<50	<50	<0.1	<0.1	<0.1	<0.3	<0.5	-	<0.5	-	
HA6_0.1-0.2	0.1-0.2	FILL	28/08/2021	2.6	<0.4	12	54	16	-	<0.1	11	71	<20	<100	<250	340	340	340	<0.1	<0.1	<0.1	<0.3	<0.5	-	<0.5	<10	
HA6_0.4-0.5	0.4-0.5	FILL	28/08/2021	4.2	<0.4	16	31	27	-	<0.1	13	45	<20	<100	<250	340	340	340	<0.1	<0.1	<0.1	<0.3	<0.5	-	<0.5	-	
HA7_0.1-0.2	0.1-0.2	FILL	28/08/2021	7.7	<0.4	15	45	61	-	0.1	7.1	110	<20	<20	200	220	420	420	<0.1	<0.1	<0.1	<0.3	<1	-	5.3	<0.5	
HA7_0.9-1.0	0.9-1.0	FILL	28/08/2021	140	1.1	21	78	190	-	0.4	13	870	<20	25	130	130	285	285	<0.1	<0.1	<0.1	<0.3	0.5	-	4.8	-	
HA8_0.2-0.3	0.2-0.3	FILL	28/08/2021	4.2	<0.4	14	41	110	-	0.1	7.2	160	<20	<100	330	380	710	710	<0.1	<0.1	<0.1	<0.3	<1	-	4.2	<10	
HA8_0.7-0.8	0.7-0.8	NATURAL	28/08/2021	3.9	<0.4	10	22	14	-	<0.1	<5	21	<20	<20	<50	<50	<50	<50	<0.1	<0.1	<0.1	<0.3	<0.5	-	<0.5	-	
HA9_0.2-0.3	0.2-0.3	FILL	28/08/2021	2.2	<0.4	85	29	11	-	<0.1	84	64	<20	<20	51	<50	51	51	<0.1	<0.1	<0.1	<0.3	<0.5	-	1.6	<0.5	
HA9_0.9-1.0	0.9-1.0	NATURAL	28/08/2021	6.5	<0.4	12	17	24	-	<0.1	<5	35	<20	<20	<50	<50	<50	<50	<0.1	<0.1	<0.1	<0.3	<0.5	-	<0.5	-	
Laboratory Results - Current Investigation																											
TP301	0.1 - 0.3 m	FILL	21/01/2022	<4	<0.4	<1	1	<1	-	<0.1	<1	6	<25	<50	<100	<100	<50	-	<0.2	<0.5	<1	<3	<0.05	-	<0.05	-	
TP301	0.6 - 0.7 m	FILL	21/01/2022	5	<0.4	7	20	30	-	<0.1	2	61	<25	<50	<100	<100	<50	NT	<0.2	<0.5	<1	<3	0.5	-	4.1	<5	
BD1/21012022	0.6 - 0.7 m	FILL	21/01/2022	5	<0.4	9	19	77	-	<0.1	3	87	<25	<50	<100	<100	<50	NT	<0.2	<0.5	<1	<3	0.4	-	3.1	<5	
TP301 - (TRIPLICATE)	0.6 - 0.7 m	FILL	21/01/2022	4	<0.4	8	21	65	-	<0.1	3	82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
TP301	1.7 - 1.8 m	FILL	21/01/2022	7	<0.4	5	12	8	-	<0.1	<1	2	<25	<50	<100	<100	<50	-	<0.2	<0.5	<1	<3	<0.05	-	<0.05	-	
TP302	0.1 - 0.2 m	FILL	21/01/2022	7	2	28	340	630	0.88	0.3	19	1100	<25	<50	<100	<100	<50	-	<0.2	<0.5	<1	<3	0.2	-	1.1	<5	
TP302-FC1-0.2	0.2 m	MATERIAL	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
TP302	0.6 - 0.7 m	FILL	21/01/2022	6	2	17	110	200	2.4	0.2	20	440	<25	<50	<100	<100	<50	-	<0.2	<0.5	<1	<3	0.56	-	6.1	-	
TP302	1.3 - 1.4 m	FILL	21/01/2022	8	<0.4	5	10	9	-	<0.1	<1	4	<25	<50	<100	<100	<50	-	<0.2	<0.5	<1	<3	<0.05	-	<0.05	-	
TP303	0.1 - 0.2 m	FILL	21/01/2022	9	<0.4	11	49	84	-	0.2	4	110	<25	<50	110	120	220	<50	<0.2	<0.5	<1	<3	3.4	<0.001	32	-	
TP304	0.3 - 0.4 m	FILL	21/01/2022	<4	<0.4	7	15	10	-	<0.1	2	20	<25	<50	<100	<100	<50	-	<0.2	<0.5	<1	<3	0.2	-	1.9	-	
TP304	0.7 - 0.8 m	FILL	21/01/2022	7	<0.4	4	10	7	-	<0.1	<1	3	<25	<50	<100	<100	<50	-	<0.2	<0.5	<1	<3	<0.05	-	<0.05	-	
TP305	0.1 - 0.2 m	FILL	21/01/2022	13	2	25	130	280	0.08	0.3	7	220	<25	<50	<100	<100	<50	-	<0.2	<0.5	<1	<3	0.6				

Table C2: Summary of Laboratory Results – Waste Classification Criteria

				OCP		OPP	pcb	Asbestos		
				Total Endosulfan	Total Analysed OCP	Total Analysed OPP	Total PCB	Asbestos (4kg)	Asbestos (500ml)	Asbestos ID in materials
			PQL	0.05	0.1	0.1	0.1			
Sample ID	Depth	Soil Matrix	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
Waste Classification Criteria ^f										
CT1				60	<50	4	<50	-	-	-
SCC1				108	<50	7.5	<50	-	-	-
TCLP1				N/A	N/A	N/A	N/A	-	-	-
CT2				240	<50	16	<50	-	-	-
SCC2				432	<50	30	<50	-	-	-
TCLP2				N/A	N/A	N/A	N/A	-	-	-
Published Background Levels										
NEPC (1999)				-	-	-	-	-	-	-
ANZECC (1992)				<0.001 - <0.97			0.02 – 0.1	-	-	-
ANZECC (2000)				-	-	-	-	-	-	-
Laboratory Results - Previous Investigation (TTC 2021)										
HA1_0.1-0.2	0.1-0.2	FILL	28/08/2021	<0.05	0.16	<PQL	<0.1	NAD	-	-
HA1_0.7-0.8	0.7-0.8	NATURAL	28/08/2021	-	-	-	-	-	-	-
HA2_0.1-0.2	0.1-0.2	FILL	28/08/2021	<0.05	<0.1	<PQL	<0.1	NAD	-	-
HA2_0.7-0.8	0.7-0.8	NATURAL	28/08/2021	-	-	-	-	-	-	-
HA3_0.1-0.2	0.1-0.2	FILL	28/08/2021	<0.05	<0.1	<PQL	<0.1	NAD	-	-
HA3_0.5-0.6	0.5-0.6	NATURAL	28/08/2021	-	-	-	-	-	-	-
HA4_0.1-0.2	0.1-0.2	FILL	28/08/2021	<0.05	<0.1	<PQL	<0.1	NAD	-	-
HA4_0.7-0.8	0.7-0.8	NATURAL	28/08/2021	-	-	-	-	-	-	-
HA5_0.1-0.2	0.1-0.2	FILL	28/08/2021	<0.05	<0.1	<PQL	<0.1	NAD	-	-
HA5_0.8-0.9	0.8-0.9	FILL	28/08/2021	-	-	-	-	-	-	-
HA6_0.1-0.2	0.1-0.2	FILL	28/08/2021	<0.5	<1	<0.5	<1	NAD	-	-
HA6_0.4-0.5	0.4-0.5	FILL	28/08/2021	-	-	-	-	-	-	-
HA7_0.1-0.2	0.1-0.2	FILL	28/08/2021	<0.05	<0.1	<PQL	<0.1	NAD	-	-
HA7_0.9-1.0	0.9-1.0	FILL	28/08/2021	-	-	-	-	-	-	-
HA8_0.2-0.3	0.2-0.3	FILL	28/08/2021	<0.5	<1	<0.5	<1	NAD	-	-
HA8_0.7-0.8	0.7-0.8	NATURAL	28/08/2021	-	-	-	-	-	-	-
HA9_0.2-0.3	0.2-0.3	FILL	28/08/2021	<0.05	<0.1	<PQL	<0.1	NAD	-	-
HA9_0.9-1.0	0.9-1.0	NATURAL	28/08/2021	-	-	-	-	-	-	-
Laboratory Results - Current Investigation										
TP301	0.1 - 0.3 m	FILL	21/01/2022	-	-	-	-	NAD	-	-
TP301	0.6 - 0.7 m	FILL	21/01/2022	NT	<0.1	<0.1	<0.1	-	NAD	-
BD1/21012022	0.6 - 0.7 m	FILL	21/01/2022	NT	<0.1	<0.1	<0.1	NAD	-	-
TP301 - (TRIPPLICATE)	0.6 - 0.7 m	FILL	21/01/2022	-	-	-	-	-	-	-
TP301	1.7 - 1.8 m	FILL	21/01/2022	-	-	-	-	NAD	-	-
TP302	0.1 - 0.2 m	FILL	21/01/2022	-	<0.1	<0.1	<0.1	-	AD*	-
TP302-FC1-0.2	0.2 m	MATERIAL	21/01/2022	-	-	-	-	-	-	Chrysotile Asbestos
TP302	0.6 - 0.7 m	FILL	21/01/2022	-	-	-	-	-	AD**	-
TP302	1.3 - 1.4 m	FILL	21/01/2022	-	-	-	-	-	-	-
TP303	0.1 - 0.2 m	FILL	21/01/2022	-	-	-	-	NAD	-	-
TP304	0.3 - 0.4 m	FILL	21/01/2022	-	-	-	-	-	NAD	-
TP304	0.7 - 0.8 m	FILL	21/01/2022	-	-	-	-	-	-	-
TP305	0.1 - 0.2 m	FILL	21/01/2022	-	-	-	-	NAD	-	-
TP306	0.1 - 0.2 m	FILL	21/01/2022	NT	<0.1	<0.1	<0.1	NAD	-	-
BD2-21012022	0.1 - 0.2 m	FILL	21-Jan-22 15:00	<0.05	<0.05	<0.05	<0.1	-	-	-
TP306 - (TRIPPLICATE)	0.1 - 0.2 m	FILL	21/01/2022	-	-	-	-	-	-	-
TP307	0.1 - 0.2 m	FILL	21/01/2022	-	-	-	-	NAD	-	-
TP308	0.1 - 0.2 m	FILL	21/01/2022	-	<0.1	<0.1	<0.1	NAD	-	-
TP308	0.6 - 0.7 m	FILL	21/01/2022	-	-	-	-	-	-	-
Notes:										
■ CT1 exceedance ■ TCLP1 and/or SCC1 exceedance ■ CT2 exceedance ■ TCLP2 and/or SCC2 exceedance ■ Asbestos detection										
NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable										
a	QA/QC replicate of sample listed directly below the primary sample									
b	Total chromium used as initial screen for chromium(VI).									
c	Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)									
d	Criteria for scheduled chemicals used as an initial screen									
e	Criteria for Chlorpyrifos used as initial screen									
f	All criteria are in the same units as the reported results									
*	3.3889 grams of bonded chrysotile asbestos detected in a fragment of ACM >7mm with a fragment weight of 19.4696 g									
**	0.3673 g of bonded and friable chrysotile asbestos identified in a fragment of fibre cement sheet >7mm with a fragment weight of 0.0638g and as fibrous asbestos in 0.3959g of fibrous matted material									
PQL	Practical quantitation limit									

CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
NEPC (1999)	NEPC (1999) National Environment Protection Measure (Assessment of Site Contamination) Schedule B1, Table 5-A, Background Ranges
ANZECC (1992)	ANZECC/NHMRC (1992) Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, Environmental Soil Quality Guidelines Background A [ANZECC A];
ANZECC (2000)	ANZECC (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 3, Table 9.2.16 Datasets used to derive suggested upper background values for uncontaminated Australian soils

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Data Sets with Non-Detects											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.14/03/2022 3:09:37 PM								
5	From File			WorkSheet.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10	Arsenic											
11												
12	General Statistics											
13	Total Number of Observations				27	Number of Distinct Observations				17		
14						Number of Missing Observations				9		
15	Number of Detects				25	Number of Non-Detects				2		
16	Number of Distinct Detects				17	Number of Distinct Non-Detects				1		
17	Minimum Detect				2.2	Minimum Non-Detect				4		
18	Maximum Detect				140	Maximum Non-Detect				4		
19	Variance Detects				727.7	Percent Non-Detects				7.407%		
20	Mean Detects				12.79	SD Detects				26.98		
21	Median Detects				6	CV Detects				2.109		
22	Skewness Detects				4.735	Kurtosis Detects				23.07		
23	Mean of Logged Detects				1.976	SD of Logged Detects				0.821		
24												
25	Normal GOF Test on Detects Only											
26	Shapiro Wilk Test Statistic				0.338	Shapiro Wilk GOF Test						
27	5% Shapiro Wilk Critical Value				0.918	Detected Data Not Normal at 5% Significance Level						
28	Lilliefors Test Statistic				0.377	Lilliefors GOF Test						
29	5% Lilliefors Critical Value				0.173	Detected Data Not Normal at 5% Significance Level						
30	Detected Data Not Normal at 5% Significance Level											
31												
32	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
33	KM Mean			12.02	KM Standard Error of Mean				5.024			
34	KM SD			25.58	95% KM (BCA) UCL				22.1			
35	95% KM (t) UCL			20.59	95% KM (Percentile Bootstrap) UCL				21.85			
36	95% KM (z) UCL			20.29	95% KM Bootstrap t UCL				58.79			
37	90% KM Chebyshev UCL			27.09	95% KM Chebyshev UCL				33.92			
38	97.5% KM Chebyshev UCL			43.4	99% KM Chebyshev UCL				62.01			
39												
40	Gamma GOF Tests on Detected Observations Only											
41	A-D Test Statistic			3.232	Anderson-Darling GOF Test							
42	5% A-D Critical Value			0.773	Detected Data Not Gamma Distributed at 5% Significance Level							
43	K-S Test Statistic			0.296	Kolmogorov-Smirnov GOF							
44	5% K-S Critical Value			0.18	Detected Data Not Gamma Distributed at 5% Significance Level							
45	Detected Data Not Gamma Distributed at 5% Significance Level											
46												
47	Gamma Statistics on Detected Data Only											
48	k hat (MLE)			1.007	k star (bias corrected MLE)				0.913			
49	Theta hat (MLE)			12.7	Theta star (bias corrected MLE)				14.01			
50	nu hat (MLE)			50.36	nu star (bias corrected)				45.65			
51	Mean (detects)			12.79								
52												
53	Gamma ROS Statistics using Imputed Non-Detects											
54	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											

	A	B	C	D	E	F	G	H	I	J	K	L
55	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
56	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
57	This is especially true when the sample size is small.											
58	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
59	Minimum				0.01	Mean				11.85		
60	Maximum				140	Median				6		
61	SD				26.14	CV				2.207		
62	k hat (MLE)				0.625	k star (bias corrected MLE)				0.58		
63	Theta hat (MLE)				18.96	Theta star (bias corrected MLE)				20.42		
64	nu hat (MLE)				33.73	nu star (bias corrected)				31.32		
65	Adjusted Level of Significance (β)				0.0401							
66	Approximate Chi Square Value (31.32, α)				19.53	Adjusted Chi Square Value (31.32, β)				18.94		
67	95% Gamma Approximate UCL (use when $n \geq 50$)				18.99	95% Gamma Adjusted UCL (use when $n < 50$)				19.59		
68												
69	Estimates of Gamma Parameters using KM Estimates											
70	Mean (KM)				12.02	SD (KM)				25.58		
71	Variance (KM)				654.2	SE of Mean (KM)				5.024		
72	k hat (KM)				0.221	k star (KM)				0.221		
73	nu hat (KM)				11.93	nu star (KM)				11.94		
74	theta hat (KM)				54.42	theta star (KM)				54.38		
75	80% gamma percentile (KM)				16.63	90% gamma percentile (KM)				36.31		
76	95% gamma percentile (KM)				60.3	99% gamma percentile (KM)				125.3		
77												
78	Gamma Kaplan-Meier (KM) Statistics											
79	Approximate Chi Square Value (11.94, α)				5.186	Adjusted Chi Square Value (11.94, β)				4.903		
80	95% Gamma Approximate KM-UCL (use when $n \geq 50$)				27.67	95% Gamma Adjusted KM-UCL (use when $n < 50$)				29.27		
81												
82	Lognormal GOF Test on Detected Observations Only											
83	Shapiro Wilk Test Statistic				0.82	Shapiro Wilk GOF Test						
84	5% Shapiro Wilk Critical Value				0.918	Detected Data Not Lognormal at 5% Significance Level						
85	Lilliefors Test Statistic				0.21	Lilliefors GOF Test						
86	5% Lilliefors Critical Value				0.173	Detected Data Not Lognormal at 5% Significance Level						
87	Detected Data Not Lognormal at 5% Significance Level											
88												
89	Lognormal ROS Statistics Using Imputed Non-Detects											
90	Mean in Original Scale				11.98	Mean in Log Scale				1.876		
91	SD in Original Scale				26.08	SD in Log Scale				0.868		
92	95% t UCL (assumes normality of ROS data)				20.54	95% Percentile Bootstrap UCL				21.55		
93	95% BCA Bootstrap UCL				27.04	95% Bootstrap t UCL				58.9		
94	95% H-UCL (Log ROS)				14.22							
95												
96	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
97	KM Mean (logged)				1.894	KM Geo Mean				6.649		
98	KM SD (logged)				0.826	95% Critical H Value (KM-Log)				2.306		
99	KM Standard Error of Mean (logged)				0.162	95% H-UCL (KM -Log)				13.59		
100	KM SD (logged)				0.826	95% Critical H Value (KM-Log)				2.306		
101	KM Standard Error of Mean (logged)				0.162							
102												
103	DL/2 Statistics											
104	DL/2 Normal					DL/2 Log-Transformed						
105	Mean in Original Scale				11.99	Mean in Log Scale				1.881		
106	SD in Original Scale				26.08	SD in Log Scale				0.86		
107	95% t UCL (Assumes normality)				20.55	95% H-Stat UCL				14.1		
108	DL/2 is not a recommended method, provided for comparisons and historical reasons											

	A	B	C	D	E	F	G	H	I	J	K	L
109												
110	Nonparametric Distribution Free UCL Statistics											
111	Data do not follow a Discernible Distribution at 5% Significance Level											
112												
113	Suggested UCL to Use											
114	95% KM (Chebyshev) UCL					33.92						
115												
116	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
117	Recommendations are based upon data size, data distribution, and skewness.											
118	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
119	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
120												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.14/03/2022 2:37:02 PM								
5	From File			WorkSheet.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Benzo(a)Pyrene TEQ											
12												
13	General Statistics											
14	Total Number of Observations				34		Number of Distinct Observations				10	
15							Number of Missing Observations				0	
16	Minimum				0.5		Mean				1.015	
17	Maximum				5.1		Median				0.5	
18	SD				1.093		Std. Error of Mean				0.187	
19	Coefficient of Variation				1.077		Skewness				2.694	
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic				0.544		Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value				0.933		Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic				0.329		Lilliefors GOF Test					
25	5% Lilliefors Critical Value				0.15		Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
30	95% Student's-t UCL				1.332		95% Adjusted-CLT UCL (Chen-1995)				1.416	
31							95% Modified-t UCL (Johnson-1978)				1.346	
32												
33	Gamma GOF Test											
34	A-D Test Statistic				5.126		Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value				0.761		Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic				0.285		Kolmogorov-Smirnov Gamma GOF Test					
37	5% K-S Critical Value				0.153		Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)				1.847		k star (bias corrected MLE)				1.704	
42	Theta hat (MLE)				0.549		Theta star (bias corrected MLE)				0.595	
43	nu hat (MLE)				125.6		nu star (bias corrected)				115.9	
44	MLE Mean (bias corrected)				1.015		MLE Sd (bias corrected)				0.777	
45							Approximate Chi Square Value (0.05)				92.02	
46	Adjusted Level of Significance				0.0422		Adjusted Chi Square Value				90.97	
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))				1.278		95% Adjusted Gamma UCL (use when n<50)				1.292	
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic				0.682		Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk Critical Value				0.933		Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic				0.292		Lilliefors Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L	
55	5% Lilliefors Critical Value					0.15	Data Not Lognormal at 5% Significance Level						
56	Data Not Lognormal at 5% Significance Level												
57													
58	Lognormal Statistics												
59	Minimum of Logged Data					-0.693	Mean of logged Data					-0.28	
60	Maximum of Logged Data					1.629	SD of logged Data					0.662	
61													
62	Assuming Lognormal Distribution												
63	95% H-UCL					1.197	90% Chebyshev (MVUE) UCL					1.277	
64	95% Chebyshev (MVUE) UCL					1.432	97.5% Chebyshev (MVUE) UCL					1.648	
65	99% Chebyshev (MVUE) UCL					2.072							
66													
67	Nonparametric Distribution Free UCL Statistics												
68	Data do not follow a Discernible Distribution (0.05)												
69													
70	Nonparametric Distribution Free UCLs												
71	95% CLT UCL					1.323	95% Jackknife UCL					1.332	
72	95% Standard Bootstrap UCL					1.324	95% Bootstrap-t UCL					1.567	
73	95% Hall's Bootstrap UCL					1.368	95% Percentile Bootstrap UCL					1.326	
74	95% BCA Bootstrap UCL					1.418							
75	90% Chebyshev(Mean, Sd) UCL					1.577	95% Chebyshev(Mean, Sd) UCL					1.832	
76	97.5% Chebyshev(Mean, Sd) UCL					2.185	99% Chebyshev(Mean, Sd) UCL					2.88	
77													
78	Suggested UCL to Use												
79	95% Chebyshev (Mean, Sd) UCL					1.832							
80													
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
82	Recommendations are based upon data size, data distribution, and skewness.												
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).												
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												
85													

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Data Sets with Non-Detects											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.14/03/2022 2:33:40 PM								
5	From File			WorkSheet.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10	Benzo(a)Pyrene TEQ											
11												
12	General Statistics											
13	Total Number of Observations				34	Number of Distinct Observations				10		
14	Number of Detects				10	Number of Non-Detects				24		
15	Number of Distinct Detects				7	Number of Distinct Non-Detects				4		
16	Minimum Detect				0.6	Minimum Non-Detect				0.5		
17	Maximum Detect				5.1	Maximum Non-Detect				4		
18	Variance Detects				2.353	Percent Non-Detects				70.59%		
19	Mean Detects				1.5	SD Detects				1.534		
20	Median Detects				0.8	CV Detects				1.023		
21	Skewness Detects				1.975	Kurtosis Detects				3.016		
22	Mean of Logged Detects				0.0883	SD of Logged Detects				0.749		
23												
24	Normal GOF Test on Detects Only											
25	Shapiro Wilk Test Statistic				0.64	Shapiro Wilk GOF Test						
26	5% Shapiro Wilk Critical Value				0.842	Detected Data Not Normal at 5% Significance Level						
27	Lilliefors Test Statistic				0.378	Lilliefors GOF Test						
28	5% Lilliefors Critical Value				0.262	Detected Data Not Normal at 5% Significance Level						
29	Detected Data Not Normal at 5% Significance Level											
30												
31	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
32	KM Mean				0.807	KM Standard Error of Mean				0.166		
33	KM SD				0.914	95% KM (BCA) UCL				1.113		
34	95% KM (t) UCL				1.089	95% KM (Percentile Bootstrap) UCL				1.082		
35	95% KM (z) UCL				1.081	95% KM Bootstrap t UCL				2.149		
36	90% KM Chebyshev UCL				1.306	95% KM Chebyshev UCL				1.532		
37	97.5% KM Chebyshev UCL				1.846	99% KM Chebyshev UCL				2.462		
38												
39	Gamma GOF Tests on Detected Observations Only											
40	A-D Test Statistic				1.359	Anderson-Darling GOF Test						
41	5% A-D Critical Value				0.738	Detected Data Not Gamma Distributed at 5% Significance Level						
42	K-S Test Statistic				0.309	Kolmogorov-Smirnov GOF						
43	5% K-S Critical Value				0.271	Detected Data Not Gamma Distributed at 5% Significance Level						
44	Detected Data Not Gamma Distributed at 5% Significance Level											
45												
46	Gamma Statistics on Detected Data Only											
47	k hat (MLE)				1.724	k star (bias corrected MLE)				1.274		
48	Theta hat (MLE)				0.87	Theta star (bias corrected MLE)				1.178		
49	nu hat (MLE)				34.49	nu star (bias corrected)				25.47		
50	Mean (detects)				1.5							
51												
52	Gamma ROS Statistics using Imputed Non-Detects											
53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											

	A	B	C	D	E	F	G	H	I	J	K	L
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58	Minimum				0.01	Mean				0.448		
59	Maximum				5.1	Median				0.01		
60	SD				1.057	CV				2.358		
61	k hat (MLE)				0.287	k star (bias corrected MLE)				0.281		
62	Theta hat (MLE)				1.563	Theta star (bias corrected MLE)				1.595		
63	nu hat (MLE)				19.5	nu star (bias corrected)				19.11		
64	Adjusted Level of Significance (β)				0.0422							
65	Approximate Chi Square Value (19.11, α)				10.2	Adjusted Chi Square Value (19.11, β)				9.878		
66	95% Gamma Approximate UCL (use when $n \geq 50$)				0.84	95% Gamma Adjusted UCL (use when $n < 50$)				0.867		
67												
68	Estimates of Gamma Parameters using KM Estimates											
69	Mean (KM)				0.807	SD (KM)				0.914		
70	Variance (KM)				0.835	SE of Mean (KM)				0.166		
71	k hat (KM)				0.781	k star (KM)				0.731		
72	nu hat (KM)				53.08	nu star (KM)				49.73		
73	theta hat (KM)				1.034	theta star (KM)				1.104		
74	80% gamma percentile (KM)				1.325	90% gamma percentile (KM)				2.005		
75	95% gamma percentile (KM)				2.705	99% gamma percentile (KM)				4.367		
76												
77	Gamma Kaplan-Meier (KM) Statistics											
78	Approximate Chi Square Value (49.73, α)				34.54	Adjusted Chi Square Value (49.73, β)				33.91		
79	95% Gamma Approximate KM-UCL (use when $n \geq 50$)				1.162	95% Gamma Adjusted KM-UCL (use when $n < 50$)				1.184		
80												
81	Lognormal GOF Test on Detected Observations Only											
82	Shapiro Wilk Test Statistic				0.766	Shapiro Wilk GOF Test						
83	5% Shapiro Wilk Critical Value				0.842	Detected Data Not Lognormal at 5% Significance Level						
84	Lilliefors Test Statistic				0.261	Lilliefors GOF Test						
85	5% Lilliefors Critical Value				0.262	Detected Data appear Lognormal at 5% Significance Level						
86	Detected Data appear Approximate Lognormal at 5% Significance Level											
87												
88	Lognormal ROS Statistics Using Imputed Non-Detects											
89	Mean in Original Scale				0.566	Mean in Log Scale				-1.377		
90	SD in Original Scale				1.013	SD in Log Scale				1.235		
91	95% t UCL (assumes normality of ROS data)				0.86	95% Percentile Bootstrap UCL				0.87		
92	95% BCA Bootstrap UCL				1.009	95% Bootstrap t UCL				1.471		
93	95% H-UCL (Log ROS)				0.976							
94												
95	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
96	KM Mean (logged)				-0.446	KM Geo Mean				0.64		
97	KM SD (logged)				0.528	95% Critical H Value (KM-Log)				1.961		
98	KM Standard Error of Mean (logged)				0.0971	95% H-UCL (KM -Log)				0.881		
99	KM SD (logged)				0.528	95% Critical H Value (KM-Log)				1.961		
100	KM Standard Error of Mean (logged)				0.0971							
101												
102	DL/2 Statistics											
103	DL/2 Normal					DL/2 Log-Transformed						
104	Mean in Original Scale				0.728	Mean in Log Scale				-0.769		
105	SD in Original Scale				1.005	SD in Log Scale				0.834		
106	95% t UCL (Assumes normality)				1.02	95% H-Stat UCL				0.911		
107	DL/2 is not a recommended method, provided for comparisons and historical reasons											
108												

	A	B	C	D	E	F	G	H	I	J	K	L
109	Nonparametric Distribution Free UCL Statistics											
110	Detected Data appear Approximate Lognormal Distributed at 5% Significance Level											
111												
112	Suggested UCL to Use											
113	KM H-UCL				0.881							
114												
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness.											
117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
119												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Data Sets with Non-Detects											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.14/03/2022 7:47:55 PM								
5	From File			WorkSheet.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10	Nickel											
11												
12	General Statistics											
13	Total Number of Observations				24	Number of Distinct Observations				18		
14						Number of Missing Observations				12		
15	Number of Detects				20	Number of Non-Detects				4		
16	Number of Distinct Detects				16	Number of Distinct Non-Detects				2		
17	Minimum Detect				2	Minimum Non-Detect				1		
18	Maximum Detect				84	Maximum Non-Detect				5		
19	Variance Detects				317.6	Percent Non-Detects				16.67%		
20	Mean Detects				12.58	SD Detects				17.82		
21	Median Detects				7.15	CV Detects				1.417		
22	Skewness Detects				3.716	Kurtosis Detects				15.15		
23	Mean of Logged Detects				2.07	SD of Logged Detects				0.894		
24												
25	Normal GOF Test on Detects Only											
26	Shapiro Wilk Test Statistic				0.524	Shapiro Wilk GOF Test						
27	5% Shapiro Wilk Critical Value				0.905	Detected Data Not Normal at 5% Significance Level						
28	Lilliefors Test Statistic				0.29	Lilliefors GOF Test						
29	5% Lilliefors Critical Value				0.192	Detected Data Not Normal at 5% Significance Level						
30	Detected Data Not Normal at 5% Significance Level											
31												
32	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
33	KM Mean			10.88	KM Standard Error of Mean				3.418			
34	KM SD			16.31	95% KM (BCA) UCL				16.66			
35	95% KM (t) UCL			16.74	95% KM (Percentile Bootstrap) UCL				17.13			
36	95% KM (z) UCL			16.5	95% KM Bootstrap t UCL				25.68			
37	90% KM Chebyshev UCL			21.13	95% KM Chebyshev UCL				25.77			
38	97.5% KM Chebyshev UCL			32.22	99% KM Chebyshev UCL				44.88			
39												
40	Gamma GOF Tests on Detected Observations Only											
41	A-D Test Statistic			0.895	Anderson-Darling GOF Test							
42	5% A-D Critical Value			0.763	Detected Data Not Gamma Distributed at 5% Significance Level							
43	K-S Test Statistic			0.166	Kolmogorov-Smirnov GOF							
44	5% K-S Critical Value			0.199	Detected data appear Gamma Distributed at 5% Significance Level							
45	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
46												
47	Gamma Statistics on Detected Data Only											
48	k hat (MLE)			1.222	k star (bias corrected MLE)				1.072			
49	Theta hat (MLE)			10.29	Theta star (bias corrected MLE)				11.73			
50	nu hat (MLE)			48.89	nu star (bias corrected)				42.89			
51	Mean (detects)			12.58								
52												
53	Gamma ROS Statistics using Imputed Non-Detects											
54	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											

	A	B	C	D	E	F	G	H	I	J	K	L
55	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
56	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
57	This is especially true when the sample size is small.											
58	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
59	Minimum				0.01	Mean				10.48		
60	Maximum				84	Median				6.85		
61	SD				16.89	CV				1.611		
62	k hat (MLE)				0.483	k star (bias corrected MLE)				0.45		
63	Theta hat (MLE)				21.71	Theta star (bias corrected MLE)				23.28		
64	nu hat (MLE)				23.17	nu star (bias corrected)				21.61		
65	Adjusted Level of Significance (β)				0.0392							
66	Approximate Chi Square Value (21.61, α)				12.05	Adjusted Chi Square Value (21.61, β)				11.54		
67	95% Gamma Approximate UCL (use when n>=50)				18.8	95% Gamma Adjusted UCL (use when n<50)				19.62		
68												
69	Estimates of Gamma Parameters using KM Estimates											
70	Mean (KM)				10.88	SD (KM)				16.31		
71	Variance (KM)				266.1	SE of Mean (KM)				3.418		
72	k hat (KM)				0.445	k star (KM)				0.417		
73	nu hat (KM)				21.35	nu star (KM)				20.01		
74	theta hat (KM)				24.46	theta star (KM)				26.09		
75	80% gamma percentile (KM)				17.64	90% gamma percentile (KM)				30.5		
76	95% gamma percentile (KM)				44.55	99% gamma percentile (KM)				79.74		
77												
78	Gamma Kaplan-Meier (KM) Statistics											
79	Approximate Chi Square Value (20.01, α)				10.86	Adjusted Chi Square Value (20.01, β)				10.39		
80	95% Gamma Approximate KM-UCL (use when n>=50)				20.05	95% Gamma Adjusted KM-UCL (use when n<50)				20.96		
81												
82	Lognormal GOF Test on Detected Observations Only											
83	Shapiro Wilk Test Statistic				0.953	Shapiro Wilk GOF Test						
84	5% Shapiro Wilk Critical Value				0.905	Detected Data appear Lognormal at 5% Significance Level						
85	Lilliefors Test Statistic				0.0957	Lilliefors GOF Test						
86	5% Lilliefors Critical Value				0.192	Detected Data appear Lognormal at 5% Significance Level						
87	Detected Data appear Lognormal at 5% Significance Level											
88												
89	Lognormal ROS Statistics Using Imputed Non-Detects											
90	Mean in Original Scale				10.85	Mean in Log Scale				1.833		
91	SD in Original Scale				16.68	SD in Log Scale				1.003		
92	95% t UCL (assumes normality of ROS data)				16.68	95% Percentile Bootstrap UCL				17.19		
93	95% BCA Bootstrap UCL				20.2	95% Bootstrap t UCL				25.29		
94	95% H-UCL (Log ROS)				17.62							
95												
96	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
97	KM Mean (logged)				1.844	KM Geo Mean				6.319		
98	KM SD (logged)				0.973	95% Critical H Value (KM-Log)				2.506		
99	KM Standard Error of Mean (logged)				0.208	95% H-UCL (KM -Log)				16.86		
100	KM SD (logged)				0.973	95% Critical H Value (KM-Log)				2.506		
101	KM Standard Error of Mean (logged)				0.208							
102												
103	DL/2 Statistics											
104	DL/2 Normal					DL/2 Log-Transformed						
105	Mean in Original Scale				10.81	Mean in Log Scale				1.811		
106	SD in Original Scale				16.69	SD in Log Scale				1.047		
107	95% t UCL (Assumes normality)				16.65	95% H-Stat UCL				18.67		
108	DL/2 is not a recommended method, provided for comparisons and historical reasons											

	A	B	C	D	E	F	G	H	I	J	K	L
109												
110	Nonparametric Distribution Free UCL Statistics											
111	Detected Data appear Approximate Gamma Distributed at 5% Significance Level											
112												
113	Suggested UCL to Use											
114	95% KM Adjusted Gamma UCL					20.96	95% GROS Adjusted Gamma UCL					19.62
115												
116	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
117	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
118												
119	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
120	Recommendations are based upon data size, data distribution, and skewness.											
121	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
122	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
123												

Appendix D

Asbestos Register and Asbestos Management Plan

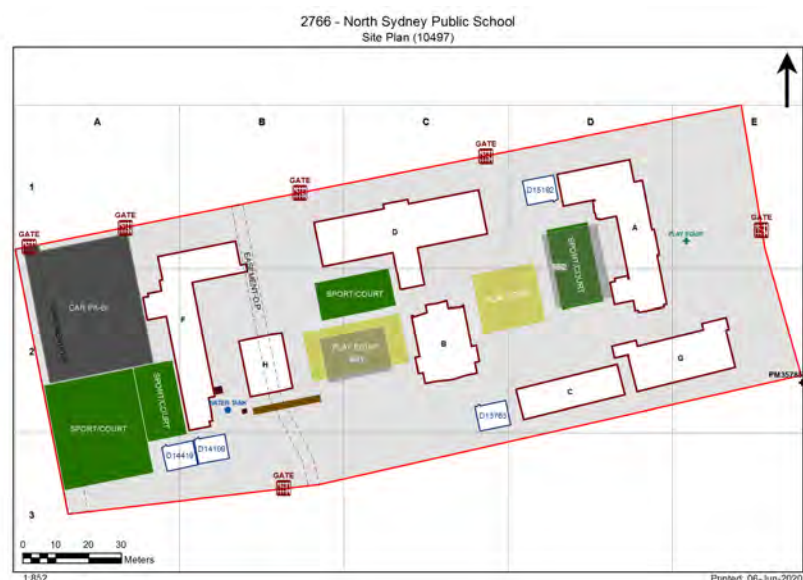
Asbestos Register

(Hazardous Materials and Risk Assessment)

School:	North Sydney Public School (2766)
Region:	Northern Sydney AMU
State Electorate:	North Shore
Local Government Area:	North Sydney

Last Reviewed By:	Greencap 24-JUN-2015
Last Revised By:	OHMS Hygiene 05-NOV-2020

Historical Fibro In Grounds Investigations/Events	Yes
Please refer to the latest site specific Asbestos Management Plans available from the Department's website (Refer to Note 2).	



Preface to Asbestos Register

Limitations

Asbestos Registers established (first surveyed 2007/08) and maintained for the Department of Education (DoE) are limited in extent, in that:

1. All inspections and surveys of materials and finishes in DoE facilities are non-disturbance, with
2. Samples undertaken by hygienist to determine whether a sample is an Asbestos Containing Material (ACM),
3. The hygienist may apply a single sample to like materials within a space and adjoining spaces, but not normally between buildings,
4. Successive inspections have reduced any inconclusive records such as 'assumed asbestos' in difficult to access areas, by undertaking additional sampling with lifting devices.
5. In compliance with WHS Act 2011 and WHS Regulations 2017, additional inspections have been undertaken in ceiling spaces and sub-floor areas where access is possible.
 - Where the ground floor is slab on ground, no inspection is made beneath the slab.
 - Where fibro fragments (ACM taken for sampling) are located in ceiling spaces or sub floor voids air monitoring is normally undertaken at time of sampling, and clearance undertaken as soon as practicable.
6. No attempt has been made to identify any ACM that is hidden from view or encapsulated within
 - Any wall cavity
 - Sub floor area, particularly formwork for slabs in/on ground,
 - Services (that may use ACM) such as: pipe lagging, asbestos cement pipes, flues.
7. All known ACM in Grounds (Fibro in Grounds) is made available in associated site specific asbestos management plans in DoE electronic files.
Notwithstanding information provided, ACM may be present in grounds from time to time and caution must be exercised prior to any grounds disturbance.

Use of the Asbestos Register

Prior to any disturbance works being undertaken in a building to which this asbestos register applies it will be necessary to confirm the extent of any ACM by a disturbance investigation:

- If the building was built prior to 2003
- If any ACM has been identified in the Asbestos Register for the building.

Update of Asbestos Registers

Asbestos Register Data is updated regularly by the DoE Hygienist Panel via the Online Asbestos Register Tool (Managed by Business Systems, School Infrastructure NSW). Internal users can view the latest edition of the Asbestos Register in the AMS.

Please note: The Department's external website may not contain the latest revision of the Asbestos Register.

Notes 1: Vermiculite

- During 2018/19, all vermiculite occurrences in DoE schools identified in 2007/08, were 'composite tested' in accordance with a safe work NSW agreed procedure. This required multiple testing of all vermiculite occurrences.
- During the period 2007/08 to 2018/19, some vermiculite has been over sheeted and a warning is indicated for schools where this has happened.

Note 2: DoE website link for information is here:

<https://www.schoolinfrastructure.nsw.gov.au/about-us/workingwithus/schools-asbestos-register.html>
<https://education.nsw.gov.au/about-us/strategies-and-reports/our-reports-and-reviews/schools-asbestos-register>

Note 3: Material Condition Assessment

The material condition assessment descriptors from Section 3 of the Asbestos Management Plan (AMP) is extracted below. Please read the AMP in its entirety for further information.

3.3.2.1 Material condition assessment

The OART records the material condition of identified ACM in the following format:

Rating	Description
Good condition (1)	For non-friable asbestos that is sealed and has no visible damage. This primarily related to asbestos cement (AC) sheet and vinyl tiles
Minimal damage (2)	For non-friable asbestos that has a very small amount of damage, eg hairline cracks.
Some damage / unsealed (3)	For non-friable asbestos with significant breakage or several small areas where material has been damaged, revealing loose asbestos fibres. Non-friable asbestos that is unsealed.
Poor condition (4)	For non-friable asbestos that has extensive damage. Visible asbestos debris
Friable asbestos (5)	Any occurrence of friable asbestos

Product	Material Description	Extent	Location	Material Condition	Risk Status	Remediation Priority	Result
B00A - General Learning - 1930 - Brick/Block							
Exterior							
Underfloor Voids	Non Accessible Area						
Interior							
B00A - R0001 - Practical Activities - 1hb - 14.61 m2							
Floor Coverings Res/Textile	Vinyl Tiles	20m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R0002 - Home Base - 47.69 m2							
No Asbestos							
B00A - R0003 - Home Base - 64.46 m2							
No Asbestos							
B00A - R0004 - External Movement - 1.48 m2							
No Asbestos							
B00A - R0005 - Cleaning Distributed Store - 1.64 m2							
No Asbestos							
B00A - R0006 - External Movement - 1.48 m2							
No Asbestos							
B00A - R0007 - General Storeroom - 2.19 m2							
No Asbestos							
B00A - R0008 - Movement - 9.53 m2							
No Asbestos							
B00A - R0009 - Personal Effects Storage - 8.2 m2							
No Asbestos							
B00A - R0010 - Staff Toilet - 6.99 m2							
No Asbestos							
B00A - R0011 - Staff Room Annexe - 14.13 m2							
No Asbestos							
B00A - R0012 - External Movement - 1.65 m2							
No Asbestos							
B00A - R0013 - Staff Toilet - 4.01 m2							
No Asbestos							
B00A - R0014 - Home Base - 47.54 m2							
Furniture / Fixtures - Blackboard	Flat AC Sheeting	4	North	Minimal Damage (2)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R0015 - Home Base - 47.54 m2							
Furniture / Fixtures - Blackboard	Flat AC Sheeting	8	South facing	Minimal Damage (2)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R0016 - Home Base - 53.02 m2							
No Asbestos							
B00A - R0017 - Home Base - 47.41 m2							
Furniture / Fixtures - Blackboard	Flat AC Sheeting	8	South facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R0018 - Staff Toilet - 6.46 m2							
No Asbestos							
B00A - R0019 - Cleaning Distributed Store - 7.61 m2							
No Asbestos							
B00A - R0020 - Withdrawal Space - 1hb - 36.55 m2							
No Asbestos							
B00A - R0022 - Personal Effects Storage - 5.01 m2							

No Asbestos							
B00A - R0023 - Movement - 3.89 m2							
No Asbestos							
B00A - R0024 - External Movement - 1.81 m2							
No Asbestos							
B00A - R0025 - External Movement - 1.8 m2							
No Asbestos							
B00A - R0026 - Movement - 94.45 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	94m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1001 - General Storeroom - 4.73 m2							
No Asbestos							
B00A - R1002 - Staff Room Annexe - 13.01 m2							
No Asbestos							
B00A - R1003 - Movement - 4.42 m2							
No Asbestos							
B00A - R1004 - Home Base - 49.43 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	49m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1005 - Home Base - 48.36 m2							
Furniture / Fixtures - Blackboard	Flat AC Sheeting	8	South facing	Minimal Damage (2)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	48m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1006 - Personal Effects Storage - 28.46 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	28m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1007 - Personal Effects Storage - 16.32 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	16m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1008 - Home Base - 52.66 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	52m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1009 - Practical Activities - 1hb - 16.36 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	16m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1010 - Home Base - 48.49 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	49m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1011 - Practical Activities - 1hb - 15.7 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	16m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1012 - Home Base - 52.09 m2							
Furniture / Fixtures - Blackboard	Flat AC Sheeting	6	South	Minimal Damage (2)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	52m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1013 - Personal Effects Storage - 14.76 m2							
No Asbestos							
B00A - R1014 - Movement - 5.36 m2							
No Asbestos							
B00A - R9001 - Out Of School Hours Care Centre - 51.76 m2							
Ceiling Structures/Linings	Flat AC Sheeting	52m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R9002 - General Storeroom - 4.22 m2							

Ceiling Structures/Linings	Flat AC Sheeting	5m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R9003 - Staff Room Annexe - 14.62 m2							
Ceiling Structures/Linings	Flat AC Sheeting	15m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R9004 - Drinking Facilities - 14.4 m2							
No Asbestos							
B00A - R9005 - Handwashing Facilities - 15.12 m2							
Ceiling Structures/Linings	Flat AC Sheeting	16m2	Throughout	Minimal Damage (2)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R9006 - Toilets - Boys - 20.26 m2							
Ceiling Structures/Linings	Flat AC Sheeting	21m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R9007 - Toilets - Girls - 17.44 m2							
Ceiling Structures/Linings	Flat AC Sheeting	18m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R9008 - Movement - 2.64 m2							
No Asbestos							
B00A - R9009 - General Storeroom - 5.04 m2							
No Asbestos							
B00B - Communal Facilities - 1950 - Brick/Block							
Exterior							
Ceiling Voids	Non Accessible Area						
Underfloor Voids	Flat AC Sheeting	1	Variable positions	Minimal Damage (2)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos) , Crocidolite (blue asbestos)
Interior							
B00B - R0002 - Communal Space - 234.49 m2							
Wall Linings Internal - Infill	Low Density Fibre Board (AIB)	4m2	South	Friable Asbestos (5)	Low (1)	Medium Priority (4-5)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00B - R0004 - Movement - 3.51 m2							
Wall Linings Internal - Infill	Low Density Fibre Board (AIB)	4m2	Variable positions	Friable Asbestos (5)	Low (1)	Medium Priority (4-5)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00B - R0005 - Staff Toilet - 1.88 m2							
No Asbestos							
B00B - R0006 - Movement - 3.19 m2							
No Asbestos							
B00B - R0007 - Hall Chair Store - 6.38 m2							
No Asbestos							
B00B - R0008 - Raised Platform - 45.71 m2							
No Asbestos							
B00B - R0009 - Hall Chair Store - 6.4 m2							
No Asbestos							
B00B - R0010 - Movement - 3.13 m2							
No Asbestos							
B00B - R0011 - Staff Toilet - 1.88 m2							
No Asbestos							
B00B - R0012 - Movement - 3.51 m2							
Wall Linings Internal - Infill	Low Density Fibre Board (AIB)	4m2	South	Friable Asbestos (5)	Low (1)	Medium Priority (4-5)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00B - R9001 - General Assistant/Bulk Store - 28.54 m2							
No Asbestos							
B00B - R9002 - Main Switch Board - 6.37 m2							
No Asbestos							

B00C - General Learning - 1955 - Concrete

Exterior

Eaves Linings	Flat AC Sheeting	26.00m2	South facing, East facing, West facing	Some Damage - Unsealed (3)	Low (1)	Medium Priority (4-5)	Chrysotile (white asbestos) , Amosite (brown asbestos)
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Interior

B00C - R0001 - Personal Effects Storage - 14.37 m2

Ceiling Structures/Linings	Flat AC Sheeting	14m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos) , Crocidolite (blue asbestos)
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B00C - R0002 - Home Base - 53.61 m2

No Asbestos

B00C - R0003 - Practical Activities - 1hb - 13.3 m2

Ceiling Structures/Linings	Flat AC Sheeting	14m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos) , Crocidolite (blue asbestos)
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B00C - R0004 - Home Base - 53.61 m2

Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	54m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
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B00C - R0005 - Movement - 3.48 m2

Ceiling Structures/Linings	Flat AC Sheeting	4m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos) , Crocidolite (blue asbestos)
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B00C - R0006 - Personal Effects Storage - 13.54 m2

No Asbestos

B00C - R0007 - Practical Activities - 1hb - 13.3 m2

Ceiling Structures/Linings	Flat AC Sheeting	14m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos) , Crocidolite (blue asbestos)
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B00C - R0008 - Home Base - 53.61 m2

Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	54m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
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B00C - R0009 - Personal Effects Storage - 7.02 m2

Ceiling Structures/Linings	Flat AC Sheeting	7m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos) , Crocidolite (blue asbestos)
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B00C - R0010 - Home Base Store - 7.15 m2

Ceiling Structures/Linings	Flat AC Sheeting	8.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos), Amosite (Brown asbestos), Crocidolite (blue asbestos)
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B00C - R0011 - Home Base - 53.61 m2

Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	54m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
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B00D - General Learning - 1930 - Brick/Block

Interior

B00D - R0001 - Home Base - 45.8 m2

Furniture / Fixtures - Blackboard	Flat AC Sheeting	20	Variable positions	Minimal Damage (2)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
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B00D - R0002 - Home Base - 45.8 m2

Furniture / Fixtures - Blackboard	Flat AC Sheeting	16	Variable positions	Minimal Damage (2)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
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B00D - R0003 - Home Base - 45.8 m2

Furniture / Fixtures - Blackboard	Flat AC Sheeting	16	Variable positions	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
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B00D - R0004 - Home Base - 55.32 m2

Furniture / Fixtures - Blackboard	Flat AC Sheeting	16	Variable positions	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R0005 - Practical Activities - 1hb - 45.8 m2							
No Asbestos							
B00D - R0006 - Staff Room - 45.79 m2							
Furniture / Fixtures - Blackboard	Flat AC Sheeting	12	Variable positions	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R0007 - Staff Room - 45.8 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	45m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R0012 - Staff Toilet - 2.79 m2							
No Asbestos							
B00D - R0013 - General Storeroom - 4.72 m2							
Floor Coverings Res/Textile	Vinyl Tiles	5m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R0014 - Duplicating Workroom - 19.72 m2							
No Asbestos							
B00D - R0015 - General Storeroom - 6.18 m2							
No Asbestos							
B00D - R0016 - Withdrawal Space - 1hb - 41.17 m2							
Furniture / Fixtures - Blackboard	Flat AC Sheeting	12	Variable positions	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R0017 - General Storeroom - 6.03 m2							
No Asbestos							
B00D - R0019 - Staff Toilet - 2.16 m2							
No Asbestos							
B00D - R0020 - General Storeroom - 1.62 m2							
No Asbestos							
B00D - R0022 - External Movement - 1.65 m2							
Ceiling Structures/Linings	Flat AC Sheeting	2m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R0024 - Movement - 159.3 m2							
No Asbestos							
B00D - R0025 - Movement - 30.61 m2							
No Asbestos							
B00D - R9001 - General Storeroom - 3.75 m2							
No Asbestos							
B00D - R9002 - Movement - 12.69 m2							
Ceiling Structures/Linings	Flat AC Sheeting	13m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R9003 - Drinking Facilities - 16.02 m2							
Ceiling Structures/Linings	Flat AC Sheeting	17m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R9004 - Movement - 8.88 m2							
Ceiling Structures/Linings	Flat AC Sheeting	9m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R9005 - P.E Store - 8.72 m2							
Ceiling Structures/Linings	Flat AC Sheeting	9m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R9006 - General Storeroom - 8.84 m2							
Ceiling Structures/Linings	Flat AC Sheeting	9m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R9007 - Toilets - Boys - 26.08 m2							

Ceiling Structures/Linings	Flat AC Sheeting	27m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R9008 - Toilets - Girls - 31.89 m2							
Ceiling Structures/Linings	Flat AC Sheeting	32m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R9009 - Canteen - 35.52 m2							
Ceiling Structures/Linings	Flat AC Sheeting	36m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R9010 - Movement - 9.33 m2							
Ceiling Structures/Linings	Flat AC Sheeting	10m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R9011 - Canteen Covered Area - 40.83 m2							
No Asbestos							
B00F - Administration/Library - 1930 - Brick/Block							
Exterior							
Ceiling Voids	Non Accessible Area						
Interior							
B00F - R0001 - Garden Store - 3.41 m2							
No Asbestos							
B00F - R0002 - Practical Activities - 1hb - 12.97 m2							
No Asbestos							
B00F - R0003 - Home Base - 47.9 m2							
No Asbestos							
B00F - R0004 - Practical Activities - 1hb - 14.57 m2							
No Asbestos							
B00F - R0005 - Home Base - 47.64 m2							
No Asbestos							
B00F - R0006 - Clerical Office - 28.01 m2							
No Asbestos							
B00F - R0007 - Staff Toilet - 3.78 m2							
No Asbestos							
B00F - R0008 - Staff Toilet - 3.78 m2							
No Asbestos							
B00F - R0009 - Principal - 15.4 m2							
No Asbestos							
B00F - R0010 - External Movement - 1.85 m2							
No Asbestos							
B00F - R0012 - Duplicating Workroom - 13.37 m2							
No Asbestos							
B00F - R0014 - Staff Room Annexe - 9.06 m2							
No Asbestos							
B00F - R0015 - Movement - 2.19 m2							
No Asbestos							
B00F - R0016 - General Storeroom - 5.11 m2							
No Asbestos							
B00F - R0017 - External Movement - 1.75 m2							
No Asbestos							
B00F - R0018 - External Movement - 1.76 m2							
No Asbestos							
B00F - R0023 - Security Store - 5.13 m2							
Floor Coverings Res/Textile	Vinyl Tiles	6m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R0024 - Special Programs Room - 47.76 m2							

No Asbestos							
B00F - R0025 - Staff Room Annexe - 6.45 m2							
Floor Coverings Res/Textile	Vinyl Tiles	7m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R0026 - Movement - 21.09 m2							
Floor Coverings Res/Textile	Vinyl Tiles	21m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R0027 - External Movement - 1.68 m2							
No Asbestos							
B00F - R0028 - General Storeroom - 10.96 m2							
Floor Coverings Res/Textile	Vinyl Tiles	11m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R0029 - Staff Toilet - 2.61 m2							
No Asbestos							
B00F - R0030 - Movement - 4.07 m2							
Floor Coverings Res/Textile	Vinyl Tiles	5m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R0031 - Movement - 4.29 m2							
No Asbestos							
B00F - R0032 - External Movement - 1.68 m2							
No Asbestos							
B00F - R0033 - Entry Vestibule - 40.3 m2							
No Asbestos							
B00F - R0034 - Movement - 23.7 m2							
No Asbestos							
B00F - R0035 - Movement - 5.51 m2							
No Asbestos							
B00F - R0036 - Interview - 9.16 m2							
No Asbestos							
B00F - R0037 - Deputy Principal - 17.11 m2							
No Asbestos							
B00F - R0038 - Special Programs Room - 13.71 m2							
No Asbestos							
B00F - R0039 - Home Base - 47.61 m2							
No Asbestos							
B00F - R0040 - Special Programs Room - 47.62 m2							
No Asbestos							
B00F - R0041 - Movement - 12.52 m2							
No Asbestos							
B00F - R0042 - Movement - 18.05 m2							
No Asbestos							
B00F - R1001 - Movement - 7.54 m2							
No Asbestos							
B00F - R1002 - General Storeroom - 11.01 m2							
No Asbestos							
B00F - R1003 - Home Base - 49.52 m2							
No Asbestos							
B00F - R1004 - Withdrawal Space - 1hb - 19.85 m2							
No Asbestos							
B00F - R1005 - Withdrawal Space - 1hb - 28.2 m2							
No Asbestos							
B00F - R1006 - Home Base - 48.79 m2							

Furniture / Fixtures - Blackboard	Flat AC Sheeting	6.00	All surfaces	Some Damage - Unsealed (3)	Low (1)	Medium Priority (4-5)	Chrysotile (white asbestos)
B00F - R1007 - Movement - 50.97 m2							
Floor Coverings Res/Textile	Vinyl Tiles	51m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R1008 - Practical Activities - 1hb - 16.53 m2							
Floor Coverings Res/Textile	Vinyl Tiles	17m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R1009 - Home Base - 48.78 m2							
No Asbestos							
B00F - R1010 - Practical Activities - 1hb - 22.07 m2							
Floor Coverings Res/Textile	Vinyl Tiles	23m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R1011 - Home Base - 48.78 m2							
Furniture / Fixtures - Blackboard	Flat AC Sheeting	6	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R1012 - General Storeroom - 7.03 m2							
No Asbestos							
B00F - R1013 - General Storeroom - 9.23 m2							
No Asbestos							
B00F - R1014 - Movement - 6.39 m2							
Floor Coverings Res/Textile	Vinyl Tiles	4m2	Variable positions	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R1015 - Movement - 5.85 m2							
No Asbestos							
B00F - R9001 - General Storeroom - 5.16 m2							
No Asbestos							
B00F - R9002 - Movement - 2.23 m2							
No Asbestos							
B00F - R9003 - External Movement - 1.74 m2							
No Asbestos							
B00F - R9004 - Drinking Facilities - 18.58 m2							
No Asbestos							
B00F - R9005 - External Movement - 1.67 m2							
No Asbestos							
B00F - R9006 - Movement - 22.54 m2							
Ceiling Structures/Linings	Flat AC Sheeting	23m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R9007 - Toilets - Girls - 29.79 m2							
Ceiling Structures/Linings	Flat AC Sheeting	30m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R9008 - Toilets - Boys - 34.76 m2							
Ceiling Structures/Linings	Flat AC Sheeting	35m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Partition Walls (Cubicles)	Compressed AC Sheet	16m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00F - R9009 - Movement - 3.59 m2							
No Asbestos							
B00F - R9010 - Kiln Room - 35.32 m2							
No Asbestos							
B00F - R9011 - Drinking Facilities - 9.7 m2							
Ceiling Structures/Linings	Flat AC Sheeting	10m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00G - Library/General Learning - 2010 - Brick/Veneer							

Interior	
B00G- R0001 - Reading Area - 231.62 m2	
No Asbestos	
B00G- R0002 - Library Office/Workroom - 26.58 m2	
No Asbestos	
B00G- R0003 - Communications Room - 7.97 m2	
No Asbestos	
B00G- R0004 - K.L.A. Store - 20.2 m2	
No Asbestos	
B00G- R0005 - Staff Toilet - 4.92 m2	
No Asbestos	
B00G- R0006 - Toilet - Lobby - 2.68 m2	
No Asbestos	
B00G- R0007 - Cleaning Distributed Store - 3.45 m2	
No Asbestos	
B00G- R0008 - Distribution Board - .62 m2	
No Asbestos	Note: No inspection of live electrical installation
B00G- R0009 - External Movement - 97.42 m2	
No Asbestos	
B00G- R0010 - External Stairs - 16.66 m2	
No Asbestos	
B00G- R0011 - External Stairs - 15.78 m2	
No Asbestos	
B00G- R1001 - Practical Activities - 1hb - 20.3 m2	
No Asbestos	
B00G- R1002 - Home Base - 58.87 m2	
No Asbestos	
B00G- R1003 - Home Base Store - 5.91 m2	
No Asbestos	
B00G- R1004 - Withdrawal Space - 1hb - 9.1 m2	
No Asbestos	
B00G- R1005 - Practical Activities - 1hb - 18.9 m2	
No Asbestos	
B00G- R1006 - Home Base - 60.47 m2	
No Asbestos	
B00G- R1007 - Home Base Store - 6.73 m2	
No Asbestos	
B00G- R1008 - Practical Activities - 1hb - 19.15 m2	
No Asbestos	
B00G- R1009 - Home Base - 60.23 m2	
No Asbestos	
B00G- R1010 - Home Base Store - 6.14 m2	
No Asbestos	
B00G- R1011 - Withdrawal Space - 2hb - 11.47 m2	
No Asbestos	
B00G- R1012 - External Movement - 72.29 m2	
No Asbestos	
B00G- R1013 - External Stairs - 16.66 m2	
No Asbestos	
B00G- R1014 - External Stairs - 15.78 m2	
No Asbestos	

B00H - General Learning - 2004 - Fibre Cement Clad

Interior

B00H - R0001 - External Movement - 36.48 m2

No Asbestos

B00H - R0002 - Practical Activities - 1hb - 20.23 m2

No Asbestos

B00H - R0003 - Home Base - 58.88 m2

No Asbestos

B00H - R0004 - Home Base Store - 5.66 m2

No Asbestos

B00H - R0005 - Withdrawal Space - 2hb - 10.62 m2

No Asbestos

B00H - R0006 - Practical Activities - 1hb - 20.26 m2

No Asbestos

B00H - R0007 - Home Base - 58.93 m2

No Asbestos

B00H - R0008 - Home Base Store - 5.66 m2

No Asbestos

Demountables

OS 602 13763 - Learning Unit - Standard With P.A.A. - Placement Date : 17-DEC-2015

Note: This refurbished demountable may have asbestos present in remnant mastic in re-used window frames and remnant adhesive in the re-used floor.

No Asbestos Found

OS 602 14109 - Learning Unit - Standard With P.A.A. - Placement Date : 08-APR-2017

Note: This refurbished demountable may have asbestos present in remnant mastic in re-used window frames and remnant adhesive in the re-used floor.

No Asbestos Found

OS 602 14419 - Learning Unit - Standard With P.A.A. - Placement Date : 08-APR-2017

Note: This refurbished demountable may have asbestos present in remnant mastic in re-used window frames and remnant adhesive in the re-used floor.

No Asbestos Found

OS 602 14580 - Learning Unit - Standard With P.A.A. - Placement Date : 29-DEC-2009

Note: This refurbished demountable may have asbestos present in remnant mastic in re-used window frames and remnant adhesive in the re-used floor.

No Asbestos Found

OS 602 15192 - Learning Unit - Standard With P.A.A. - Placement Date : 14-JAN-2013

Note: This refurbished demountable may have asbestos present in remnant mastic in re-used window frames and remnant adhesive in the re-used floor.

No Asbestos Found

NSW DEPARTMENT OF EDUCATION
C/O - PUBLIC WORKS ADVISORY

NORTH SYDNEY PUBLIC SCHOOL

ASBESTOS IN GROUNDS MANAGEMENT PLAN

MAY 2020

CONFIDENTIAL



Question today
Imagine tomorrow
Create for the future




North Sydney Public School
Asbestos in Grounds Management Plan

NSW Department of Education
C/o - Public Works Advisory

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REV	DATE	DETAILS
1	27/05/2020	First Issue

	NAME	DATE	SIGNATURE
Prepared by:	Ned Price	27/05/2020	
Reviewed by:	Matthew Murray	27/05/2020	
Approved by:	Matthew Murray	27/05/2020	

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DEFINITIONS

ACM	Asbestos containing material
Air Monitoring	<p>Air monitoring involved sampling airborne asbestos fibres to assist in assessing exposure to asbestos and the effectiveness of implemented control measures. It must be conducted in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Dust, 2nd Edition [NOHSC: 3003 (2005)].</p> <p>It is a DoE requirement that air monitoring is a requirement when any form of asbestos disturbance works is undertaken.</p>
AMD	Asset Management Directorate (DoE state office)
AMP	Asbestos Management Plan
AMU	Asset Management Unit (DoE regional office)
Asbestos	Defined as the fibrous form of mineral silicates; belonging to the serpentine and amphibole groups of rock-forming minerals, including actinolite, amosite, crocidolite, chrysotile, anthophyllite, tremolite, or any mixture containing one or more of these.
Asbestos Assessor	A person who is SafeWork NSW licensed in accordance with the regulations for air monitoring, clearance inspections or the issuing of clearance certificates for class A asbestos removal work.
Class A Licensed Asbestos Removalist	As per Part 8.10 of the WHS Regulations, a contractor, SafeWork NSW licensed to remove all types and quantities of asbestos.
Contaminated Land Management Act	Contaminated Land Management Act 1997
Contaminated	Contaminated Land Management Regulation 2013
Class B Licensed Asbestos Removalist	As per Part 8.10 of the WHS Regulations, a contractor, SafeWork NSW licensed to remove any amount of non-friable asbestos or ACM.
Competent person	<p>For a clearance inspection under clause 473 – <i>A person who has acquired through training or experience, the knowledge and skills and is able to carry out a clearance inspection:</i></p> <ul style="list-style-type: none"> a. a certification in relation to the specified VET course for asbestos assessor work, or b. a tertiary qualification in work health and safety, occupational hygiene, science, building, construction or environmental health.
DoE	Department of Education
Facility manager	Person with responsibility for the DoE Facility or a suitably appointed delegate
Fibrous cement	Cement based building material containing reinforcement of either asbestos or non-asbestos fibres. Trade names include but are not limited to Super Six, Hardiflex, Hardiplank and Villaboard.

Friable asbestos	Any material that contains asbestos and is in a powder form or can be crumbled, pulverised or reduced to powder by hand pressure when dry.
Hygienist	Note: for the purpose of this plan, the hygienist will also be a competent person / asbestos assessor / SafeWork NSW accredited licensed asbestos assessor as defined by regulations and selected from DoE hygienist panel.
Hygienist panel (contract)	A Public Works contract that provides a panel of three contractors for the supply of occupational hygienist services to DoE for the management of assets to ensure compliance with the relevant legislation, including the NSW Work Health and Safety (WHS) Regulation 2017, particularly as this related to asbestos.
Licensed asbestos removalist	Means a person conducting a business or undertaking who is SafeWork NSW licensed under the WHS Regulations to carry out class A or class B asbestos removal work.
Non-friable asbestos	Means material containing asbestos that is not friable asbestos, including material containing asbestos fibres reinforced with a bonding compound.
NSW EPA	New South Wales Environment Protection Authority
Permit to work	A Permit to work authority will need to be issued to and signed by the contractor, acknowledging presence of asbestos containing materials in the work area/s identified in the register prior to commencing work. The contractor is to indicate the control measures to be used. Permit to work authorities will only be issued by the DoE Facility Manager.
PCBU	Person conducting a business or undertaking
POEO	Protection of the Environment Operations (POEO) Act
PWA	Public Works Advisory, a division of Department of Finance, Services and Innovation
SSAMP	Site specific Asbestos Management Plan; also known as Asbestos in Grounds Management Plan
WHS Act	NSW Work Health and Safety Act 2011
WHS Regulation	NSW Work Health and Safety Regulation 2017

1 INTRODUCTION

1.1 BACKGROUND

Since 2003 NSW Department of Education (DoE) has had a separate Fibro in Grounds program to address school sites that have grounds asbestos related issues, these are typically fragments of non-friable AC (asbestos containing), FC (fibre cement) fragments.

1.2 SCOPE

WSP Australia Pty Limited (WSP) was engaged by NSW Department of Education (DoE) C/o - Public Works Advisory (the Client) to produce this Site Specific Asbestos Management Plan (SSAMP) for North Sydney Public School (the site).

The SSAMP has been developed to address DoE's obligations under the *NSW Work Health and Safety Regulation 2017* and *NSW Work Health and Safety Act 2011* as it relates to the presence of asbestos in grounds, by managing and minimising asbestos related health risks to personnel working on or visiting the site.

This SSAMP is to be read in conjunction with any existing asbestos register for the site and the overarching Asbestos Management Plan (AMP) for NSW Government Schools.

1.3 OBJECTIVES

The SSAMP details the approach to be taken by the DoE in managing asbestos in grounds by documenting procedures designed to minimise the risk of exposure to asbestos of all personnel on the site, including all DoE and Public Works Advisory personnel, teaching staff, maintenance staff, students, maintenance contractors and other visitors.

The SSAMP contains the following information:

- scope and limitations of the SSAMP
- asbestos related regulatory requirements
- organisational responsibilities
- details of in-ground asbestos containing materials (ACM) when previous ACM ground works have been undertaken
- an asbestos in grounds register for already known asbestos issued detected on the site
- overview of the risk assessment process
- management of in-situ asbestos containing materials in grounds
- emergency response procedures
- safe working practices
- training, and
- requirements for asbestos removal.

The SSAMP should be updated where there is a reoccurrence of asbestos in grounds, when an asbestos Clearance Certificate is produced or remediation works completed.

2 REGULATORY FRAMEWORK

This SSAMP has been developed in accordance with the following applicable legislation and codes of practice:

- *Contaminated Land Management Act 2008*
- Contaminated Land Management Regulation 2013
- *NSW Work Health and Safety Act 2011*
- NSW Work Health and Safety Regulation 2017
- How to Manage and Control Asbestos in the Workplace: Code of Practice 2016
- How to Safely Remove Asbestos: Code of Practice 2016
- NSW EPA Waste Classification Guidelines – Part 1: Classification of waste 2014
- *Protection of the Environment Operations Act 1997*

3 RESPONSIBILITIES

The DoE, as a person with management or control of a workplace (PCBU) has an obligation under Part 8.3 of the NSW Work Health and Safety Regulation 2017 to assess the risk of harm to the health and safety of any person arising from asbestos hazards.

Those responsible for the management of DoE facilities and Contractors are duty holders who have a duty of care. Each duty holder is required to comply with all relevant NSW legislation.

This SSAMP is designed for all duty holders where asbestos and asbestos containing materials may be present in grounds. Duty holders include those responsible for the management of DoE facilities, such as:

- school principal
- AMU managers
- asset management directorate
- workers including voluntary staff, and
- contractors.

4 ASBESTOS IN GROUNDS

4.1 ASBESTOS IN GROUNDS OCCURRENCES

A summary of asbestos in grounds occurrences and remediation works completed is provided in Table 4.1.

Table 4.1 Asbestos in Grounds Occurrences at North Sydney Public School

DATE	AREA	LOCATION	INCIDENT	REMEDIAL MEASURE / TREATMENT	COMMENT
October 2013	A	Area beneath building B, accessible via the GA's work room.	Non-friable fibre cement fragments were observed on the ground surface.	A sparrow pick was performed on the visibly accessible ground surface portion. An asbestos clearance certificate was provided following the successful remediation works.	Topsoil has become exposed in an area where asbestos containing materials may be present below clean soils/clean fill.

The approximate location of each area is detailed on the Site Plan in Appendix A.

4.2 ASBESTOS IN GROUNDS REGISTER

The location, type and condition of asbestos identified in grounds at the school is recorded in the asbestos in grounds register detailed in Table 4.2. The accompanying risk assessment has been performed following remediation works in accordance with the DoE AMP.

Table 4.2 Asbestos in Grounds Register for North Sydney Public School

AREA	LOCATION*	MATERIAL DESCRIPTION	EXTENT	MATERIAL CONDITION	RISK STATUS^	CONTROL PRIORITY	MAINTENANCE REQUIREMENTS
A	Area beneath building B, accessible via the GA's work room.	Non-friable fibre cement fragments were observed on the ground surface	Throughout – potential below surface ground	Unknown	Low	Low	<p>The area should remain restricted to staff and students. Contractors undertaking electrical or other work in the area should utilize PPE such as dust masks and gloves as the soil is loose and air flow is restricted.</p> <p>The area is also considered to be a 'confined space', and appropriate measures must be undertaken prior to entry. No excavation should be conducted as there is potential to disturb contaminated material underneath the surface.</p> <p>A sign warning of potential exposure to asbestos and requesting PPE and a read-through of the school's register should be attached to the entry door so that contractors are made aware of the site's specifications prior to opening the door.</p>

AREA	LOCATION*	MATERIAL DESCRIPTION	EXTENT	MATERIAL CONDITION	RISK STATUS^	CONTROL PRIORITY	MAINTENANCE REQUIREMENTS
<p>* Refer to Appendix A – Site Plan for details of area locations</p> <p>^ Risk assessment conducted following remediation works</p> <p>RISK ASSESSMENT FACTORS</p> <p>Low Risk: Asbestos containing materials that pose a low health risk to personnel, employees and the general public providing they remain undisturbed.</p> <p>Medium Risk: Asbestos containing materials that pose a moderate risk to people in the area – there is a medium potential for the material to release asbestos fibres if disturbed.</p> <p>High Risk: Asbestos containing materials that pose a high health risk to personnel of the public in area of the material. There is a high potential for the material to release asbestos fibres if disturbed, or a potential for the materials to release fibres even if undisturbed.</p>							

5 SITE MANAGEMENT REQUIREMENTS

5.1 RE-INSPECTIONS

In order to monitor the effectiveness of onsite management it is essential that the affected areas are regularly inspected. Visual inspections of the asbestos remedial measures should be carried out to ensure that they are maintained adequately. Reinspections will be the responsibility of the Principal or site manager. Such inspections should occur on the following occasions:

- at three monthly intervals (e.g. a walkover of remediated areas to ensure that applications of mulch, turf, etc. have been maintained)
- as part of routine building inspections
- after a period of prolonged heavy rain (e.g. a walkover of remediated areas to ensure that applications of mulch, turf, etc. have not been disturbed by heavy rain)
- whenever damage or disturbance has been reported (e.g. a walkover of remediated areas to ensure that applications of mulch, turf, etc. have not been disturbed by events such as vehicle trafficking).

Should areas of exposed soil or geo-fabric be identified where previous containment has occurred or where encapsulating measures appear to be damaged or are no longer effective, then these areas should be re-covered immediately. Some remedial measures, such as added surface layers of mulch and topsoils, will require ongoing maintenance to ensure that a sufficient barrier layer is in place.

Some sites, for example those with no new occurrence of asbestos in the past 5 years, are inspected at 12-monthly intervals and/or as points indicated above.

Records of these inspections should be kept using the Site Management Requirements checklists provided in Appendix B.

5.2 ASBESTOS INCIDENT PROCEDURE

This asbestos incident procedure aims to set out the steps to be taken for asbestos management when suspected ACMs have been found in DoE Facility grounds. Scenarios where suspected ACMs may be found in DoE Facility grounds include:

- Illegal dumping of suspected asbestos waste - dumped asbestos waste can be mixed with general builders' waste, which may include rubble and spoil.
- Single source at surface such as fibrous cement sheeting – this is usually due to demolition of a structure containing asbestos such as a building or fence where waste has been left at the surface or buried instead of being properly disposed of.
- Extensive surface contamination – this can be as a result of imported waste materials (schools may also be situated on old landfill sites) used for landscaping or from demolition of domestic dwellings previously found on the site, with fibrous cement fragments becoming exposed over time due to surface erosion and soil dynamics, or due to demolition of structures containing ACM.
- Fill materials – fill materials have been widely used in DoE Facilities, typically for landscaping / levelling purposes. Fill may also be present in building footprints. Fill generally comprises builders' rubble, typically bricks, although older fill often contains waste fibrous cement materials in addition to other building materials. Fill may also be generated on-site to build up depressions or level grounds.

- In-ground asbestos cement pipes – it is possible that asbestos cement drainage pipes may be present in-situ within the ground at DoE facilities. While such materials remain buried and in operation they represent a low risk.

The following procedure is set out as a guide to follow where suspected ACMs have been found at the surface of DoE Facility grounds:

- Restrict access immediately.
- Do not attempt to dispose of / move material.
- Check asbestos in grounds asbestos register.
- Contact DoE AMU on 132 779 as soon as practicable and Incident Report and Support Hotline on 1800 811 523.
- DoE or their representatives will arrange inspections and testing if necessary by consultant from DoE hygienist panel.
- DoE or their representatives to arrange removal of ACMs / remediation of site.
- Once asbestos removal or remediation works have been completed, an asbestos clearance certificate will be issued to return area to normal use.
- Site specific AMP is updated to enter area into asbestos in grounds register.

6 SAFE WORKING PRACTICES

6.1 GENERAL

Prior to commencing any works to grounds on any DoE facility, the asbestos in grounds register on-site must be consulted to determine if any known asbestos containing materials are present that are at risk of being disturbed (<https://education.nsw.gov.au/about-us/strategies-and-reports/our-reports-and-reviews/schools-asbestos-register>).

If documented asbestos containing materials are present in the area and may be impacted upon by the proposed works, the asbestos must be removed/encapsulated under controlled conditions prior to the commencement of any works.

If unknown materials or undocumented materials suspected of containing asbestos are encountered during works, such materials are to be treated as if they contain asbestos and any work that may impact on that material must immediately cease, pending sampling and analysis by a qualified person selected from the DoE hygienist panel. This will allow the DoE to determine what control methods are required.

6.2 PERMIT TO WORK

If it is determined, after consulting the asbestos in grounds register, that asbestos containing materials are present in the vicinity of the planned works, a permit to work authority will need to be issued to, and signed by, the contractor. Permit to work authorities will only be issued by the DoE Facility Manager. All asbestos works must be managed by an agent of DoE, such as Department of Public Works, following approval from the directorate. All asbestos works are to be undertaken outside of school hours.

Before being issued with a permit to work, individuals will be required to read and understand this SSAMP as well as copies of asbestos removal control plans or risk assessments prepared by DoE hygienist panel members. Individuals must be aware of their legal obligations in relation to health and safety specified in the NSW Work Health and Safety Act 2011 and the NSW Work Health and Safety Regulation 2017.

Workers engaged in the removal of asbestos and asbestos containing materials will not be issued with a permit to work unless they are employed by a company holding an asbestos removal licence issued by SafeWork NSW appropriate for the type of asbestos containing materials concerned.

The permit to work formally places a responsibility for compliance with this SSAMP and the NSW Work Health and Safety Regulation 2017 on the signatories.

The permit to work is designed to ensure appropriate work practices are employed in the vicinity of asbestos containing materials. The permit to work will document what asbestos is to be removed, encapsulated or otherwise protected, prior to the contracted maintenance or building works proceeding. The permit to work will also indicate whether other requirements such as use of personal protective equipment (PPE), the installation of barricading and airborne fibre monitoring are necessary and may provide recommendation for further consultation, sampling or investigation by a member of the DoE hygienist panel prior to permit and contract finalisation.

When a project involves a team of more than one worker, the person in charge of the team will be issued with the permit to work. That person will be responsible to ensure their workers are aware of their responsibilities. That person will also be responsible to ensure that each worker's signature appears on the appropriate section of the permit.

When work is completed, or the permit to work expires (whichever occurs first), the permit shall be signed by the contractor and returned to the DoE Facility Manager to cancel it after ensuring that a safe situation exists. The DoE Facility Manager shall review any documentation provided by the DoE hygienist panel member, such as asbestos air monitoring and asbestos clearance inspection certificate/s, and inspect the work area to ensure that it is fit for purpose prior to returning it to normal use. The AMU can provide assistance if required.

The DoE Asset Management Directorate shall be advised immediately by any site personnel of any incidents of non-compliance with the SSAMP that have occurred.

The DoE Facility Manager will maintain a register of all permits to work that have been issued and cancelled.

It will be a condition of engagement of contractors who are required to work on-site that a permit to work be issued and cancelled as required.

6.3 CONTRACTOR HEALTH AND SAFETY

Prior to undertaking any work that involves the removal, repair or disturbance of asbestos containing materials, a Safe Work Method Statement (SWMS) will be prepared that defines safe procedures to protect the health and safety of personnel. This statement should include the following measures, as a minimum:

- confirmation of their review of the relevant asbestos register, asbestos removal control plan and other relevant documentation, prior to preparation of the SWMS.
- review of risks associated with their possible exposure to asbestos or ACMs.
- all workers shall wear appropriate Personal Protective Equipment (PPE) for the work undertaken. This may include protective coveralls, gloves and safety boots.
- all workers shall wear appropriate Respiratory Protective Equipment (RPE) for the work undertaken.
- decontamination procedures and measures (if applicable).
- asbestos removal areas and buffer zones.
- asbestos air monitoring samples (number and frequency).

In addition,

- a reference to all appropriate licences and insurances held by the contractor should be included.
- a reference as an additional safety measure, that all works are to be undertaken outside school hours, should be included. Appropriate measures are to be included regarding this requirement.

The Safe Work Method Statement (SWMS) should be reviewed by the Agent of DoE that engages the contractor as per the requirements of the permit to work.

6.4 AWARENESS TRAINING

It is best practice that DoE Asset Management personnel and Facilities Maintenance Contractors who are not likely to be exposed to asbestos but work in areas where asbestos is, or may be present, in grounds be provided with an asbestos awareness training. It is recommended that such training shall include the following:

- overview of asbestos related legislation (State), standards and codes of practice.
- information on the presence of asbestos in DoE Facility grounds, including the types of asbestos and typical locations where asbestos may be encountered
- information should be provided on the differences between friable and non-friable products
- highlighting the need to avoid disturbing in-situ asbestos containing materials
- procedures to be followed in the event disturbed asbestos containing materials are identified, or unknown materials / products suspected of containing asbestos are encountered, including the relevant point of contact within the DoE
- information about general methods of asbestos management and removal

- information about airborne asbestos air monitoring.

Asbestos awareness training is to be provided by a consultant selected from the DoE hygienist panel.

7 ASBESTOS REMOVAL

A detailed and site specific work scope and technical specification will be developed by an agent of DoE or their representative, such as PWA, prior to the removal of ACMs from any DoE facility grounds. The removal of ACMs shall be performed by a licensed asbestos removal contractor selected from the DoE hygienist panel (i.e. the appropriate licence for the removal of asbestos issued by SafeWork NSW).

Please note, any work that involves disturbing asbestos must be administered by DoE or their representative.

It is DoE policy to engage a Class A licensed contractor as best practice for all occurrences of asbestos contaminated soil. The contractor will be engaged by an agent of DoE from a panel approved by DoE and all engagements will be according to SafeWork NSW guidelines and follow the advice of the hygienist / competent (asbestos assessor) person engaged from the DoE hygienist panel.

7.1 ASBESTOS IN GROUNDS GENERAL REMOVAL PROCEDURES

All works carried out that involves disturbance of ACMs (including removal) must be administered by DoE or their representative.

All removals are to be undertaken according to:

- *Contaminated Land Management Act 2008*
- Contaminated Land Management Regulation 2013
- NSW Work Health and Safety Act 2011
- NSW Work Health and Safety Regulation 2017
- How to Manage and Control Asbestos in the Workplace: Code of Practice 2016
- How to Safely Remove Asbestos: Code of Practice 2016
- NSW EPA Waste Classification Guidelines – Part 1: Classification of waste 2014
- Other relevant documentation issued from time-to-time by SafeWork NSW or NSW EPA.

Follow the advice of the hygienist / competent (asbestos assessor) person engaged from the DoE hygienist panel to conduct a risk assessment and determine the most appropriate control measures and remediation strategies prior to asbestos removal works getting underway.

Several examples of common circumstances involving soil and ACM have been determined. For each of those circumstances, the following procedures should be followed.

7.1.1 SPARROW-PICKING OF ACM FRAGMENTS

- Following determination of the area affected by fragments of ACMs by a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel and approval to commence works from DoE, a permit will be issued to engage a friable licensed asbestos contractor.
- It is likely that fragments of ACM are in the form of asbestos cement sheeting (ACS), bituminous membrane or vinyl tile.
- The asbestos removal contractor approved by DoE is engaged to sequentially and systematically travel across each area and remove all instances of fragments of potential ACM from exposed ground surfaces.
- All works are to require asbestos air monitoring provided by a hygienist selected from the DoE hygienist panel.

- All works to require an asbestos clearance inspection undertaken by a hygienist selected from the DoE hygienist panel following the completion of the asbestos removal works.
- All documents, including licenses, airborne asbestos monitoring, asbestos clearance inspections and tipping dockets, is to be provided to DoE.
- All records are to be updated.

7.1.2 *ENCAPSULATION OF SOIL CONTAINING ACM ON-SITE*

- Ensure that the area is isolated in the interim and any potential dust is managed.
- Ensure that a document such as a remedial action plan (RAP), including a site specific asbestos management plan (SSAMP) is prepared or updated by a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel, detailing the encapsulation method (including comments on suitability for intended land use, e.g. car park) and environmental management requirements during implementation (e.g. dust and noise management). If the selected hygienist requires additional soil expertise, then engage a suitably experienced contaminated land management consultant, preferably from within their own company and known to DoE, with experience gained from DoE sites.
- Ensure that a permit is received from DoE to commence works.
- The AMP will determine if the asbestos is friable / non-friable and the extent of impact (lateral and vertical) through selected sampling and analysis.
- That document is to be submitted to SafeWork NSW, along with a permit application to SafeWork NSW by the selected asbestos removal contractor.
- DoE to obtain written approval from EPA before work permit is granted by DoE.
- DoE to verify compliance under WH&S Act and POEO Act.
- Notification by DoE is to be made to the respective council to allow inclusion on the site s149 certificate (under the NSW EPA Act 1997).
- In addition, the area to be encapsulated is to be documented / surveyed in such a manner to accurately determine location and depth at a later date.
- Upon receipt of both above mentioned permits from DoE and SafeWork NSW, works are to commence, along with asbestos air monitoring by a hygienist selected from the DoE hygienist panel during the encapsulation process.
- Upon completion an inspection is undertaken by the hygienist consultant to confirm activities as detailed within the RAP/AMP have been implemented and providing comment that the land has been remediated / encapsulated to allow for intended use and a site management plan is prepared to manage any future subsurface activities that may be required for the site (e.g. excavation of a trench to install new electricity cables or stormwater).

7.1.3 *EXCAVATION OF SOIL CONTAINING ACM FROM SITE*

The preferred method is encapsulation of soils on-site, however if excavation and removal of soils from site becomes necessary, then the following is to be implemented as a general guide:

- Ensure that the area is isolated in the interim and any potential dust is managed.
- Ensure that a document such as a remedial action plan (RAP) including an asbestos removal control plan (ARCP) is prepared by a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel providing recommendations for the excavation of soil so as to provide for environmental management requirements during implementation (e.g. dust and noise management). If the selected hygienist requires additional soil expertise, then they are to involve a suitably experienced contaminated land management consultant, preferably from within their own company and known to DoE, with experience gained from DoE sites.

- Ensure that a permit is received from DoE to commence works.
- The ARCP will determine if the asbestos is friable / non-friable.
- That document is to be submitted to SafeWork NSW, along with notification to SafeWork NSW by the selected asbestos removal contractor.
- Upon receipt of both above mentioned permits from DoE and SafeWork NSW, works are to commence, along with asbestos air monitoring by a hygienist selected from the DoE hygienist panel during the removal process.
- Upon completion of soil removal (that portion contaminated with ACM), an inspection is undertaken by the hygienist consultant to confirm activities as detailed within the RAP/ARCP have been implemented and providing comment that those works have been completed in respect to asbestos contamination to a satisfactory level to allow for the next stage of works to commence. The site management plan (inclusive of a possible unexpected finds protocol) continues to be followed to manage any future occurrence of subsurface ACM that may be exposed during the excavation of soils on-site.

Following the investigation, the material should be classified in accordance with NSW EPA Waste Classification Guidelines – Part 1: Classification of waste 2014, and taken to an approved landfill site that is licensed to receive waste relevant to its classification.

8 LIMITATIONS

This Report is provided by WSP Australia Pty Limited (*WSP*) for NSW Department of Education (*Client*) in response to specific instructions from the Client and in accordance with WSP's proposal dated 21/07/2016 and agreement with the Client dated 12/10/2016 (*Agreement*).

PERMITTED PURPOSE

This Report is provided by WSP for the purpose described in the Agreement and no responsibility is accepted by WSP for the use of the Report in whole or in part, for any other purpose (*Permitted Purpose*).

QUALIFICATIONS AND ASSUMPTIONS

The services undertaken by WSP in preparing this Report were limited to those specifically detailed in the Report and are subject to the scope, qualifications, assumptions and limitations set out in the Report or otherwise communicated to the Client.

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Where the survey identifies that hazardous materials are on site, the Conclusions are indicative of the presence of hazardous materials and cannot be regarded as absolute without further extensive sampling, outside the scope of the services set out in the Agreement. Site conditions, including the extent and visibility of hazardous materials, can change with time. On all sites, varying degrees of non-uniformity of conditions are encountered and the presence of hazardous materials which are not visually apparent at the time of inspection, are not likely to be detected. No monitoring, common testing or sampling technique provides results that are totally representative of the presence or non-presence of hazardous materials at the Site.

Hazardous materials that could be routinely encountered in the normal day-to-day activities occurring on the Site, have been identified and assessed, however there is no guarantee that the Site is free of hazardous materials, since future activities may reveal hazardous materials in areas inaccessible or unknown to WSP.

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DISCLAIMER

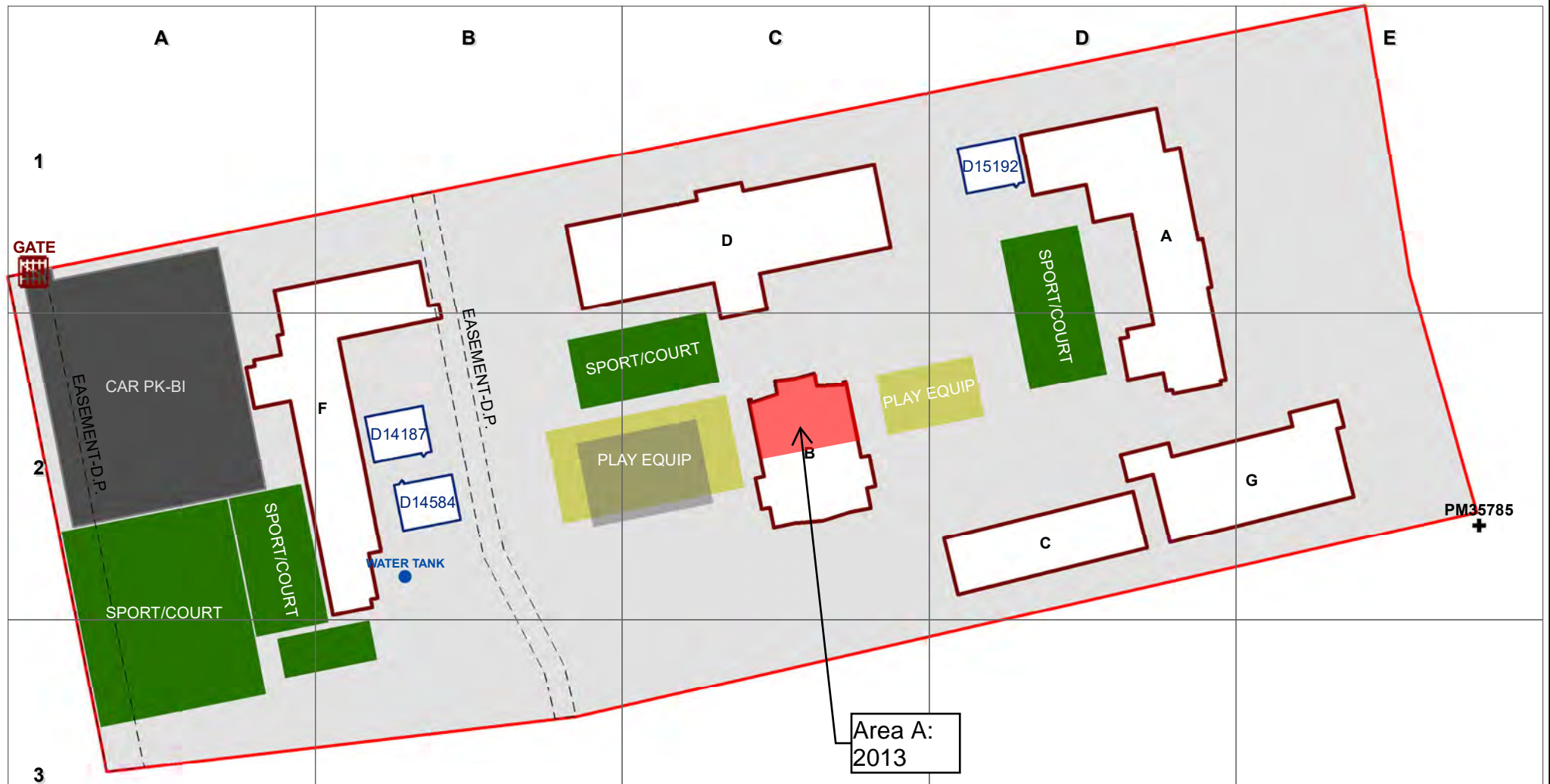
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APPENDIX A

SITE PLAN



2766 - North Sydney Public School
Site Plan (10497)



APPENDIX B

SITE MANAGEMENT REQUIREMENTS - CHECKLISTS



B1 SITE MANAGEMENT REQUIREMENTS - CHECKLISTS

Table B.1 Three-Monthly Interval Checklist

AREA	LOCATION	INSPECTION DETAILS	INITIAL INSPECTION	SUBSEQUENT THREE-MONTLY INSPECTIONS				
			DATE	DATE	DATE	DATE	DATE	DATE
A	Area beneath building B, accessible via the GA's work room.	Surface cover adequate? (Y/N)						
		Suspected asbestos materials visible? (Y/N)						

Table B.2 Incident Inspection Checklist (e.g following heavy rain or disturbance)

AREA	LOCATION	INSPECTION DETAILS	INITIAL INSPECTION	SUBSEQUENT INCIDENT INSPECTIONS				
			DATE	DATE	DATE	DATE	DATE	DATE
A	Area beneath building B, accessible via the GA's work room.	Surface cover adequate? (Y/N)						
		Suspected asbestos materials visible? (Y/N)						

Appendix E

Site Assessment Criteria

Appendix E – Site Assessment Criteria

The proposed development will include the redevelopment of the investigation areas located within the public school (primary school) with land use remaining as a primary school.

The Site Assessment Criteria (SAC) applied in the current investigation is informed by the CSM which identified human and ecological receptors of potential contamination on the site (Section 5). Analytical results were assessed (as a Tier 1 assessment) against the SAC comprising the investigation and screening levels of Schedule B1, *National Environment Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013 (NEPC, 2013). The NEPC guidelines are endorsed by the NSW EPA under the CLM Act 1997. Petroleum based health screening levels for direct contact have been adopted from the *Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) Technical Report no.10 Health screening levels for petroleum hydrocarbons in soil and groundwater* (2011) as referenced by NEPC (2013).

The investigation and screening levels are applicable to generic land use settings and include consideration of, where relevant, the soil type and the depth of contamination. The investigation and screening levels are not intended to be used as clean up levels. Rather, they establish concentrations above which further appropriate investigation (e.g., Tier 2 assessment) should be undertaken. They are intentionally conservative and are based on a reasonable worst-case scenario.

The investigation and screening levels applied in the current investigation comprise levels adopted are for a residential A (which includes primary schools) land use scenario.

E1 Soils

E1.1 Health Investigation and Screening Levels

The Health Investigation Levels (HIL) and Health Screening Levels (HSL) are scientifically-based, generic assessment criteria designed to be used in the first stage (Tier 1) of an assessment of potential human health risk from chronic exposure to contaminants.

HILs are applicable to assessing health risk arising *via* all relevant pathways of exposure for a range of metals and organic substances. The HIL are generic to all soil types and apply generally to a depth of 3 m below the surface for residential use. Site-specific conditions may determine the depth to which HILs apply for other land uses.

HSLs are applicable to selected petroleum compounds and fractions to assess the risk to human health via inhalation and direct contact pathways. HSL have been developed for different land uses, soil types and depths to contamination.

The generic HIL and HSL are considered to be appropriate for the assessment of contamination at the site. Given the proposed land use the adopted HIL and HSL are:

- **HIL- A** - residential A; and
- **HSL- A** - residential A.

In addition, the HSL adopted are predicated on the inputs summarised in Table E1.

Table E1: Inputs to the Derivation of HSLs

Variable	Input	Rationale
Potential exposure pathway	Ingestion Soil vapour intrusion (inhalation) Direct contact*	All three potential exposure pathways are identified in the CSM. It is noted that direct contact HSLs are generally not the risk drivers for further site assessment for the same contamination source as the HSLs for vapour intrusion (NEPM, 2013).
Soil Type	Sand	Silty sand, silty clay fill was generally recorded across the site.
Depth to contamination	0 m to <1 m	Fill comprising was generally present to depths ranging from 0 m to 1.2 m bgl and may be retained on site.

* Developed by CRC CARE (2011)

The adopted soil HIL and HSL for the potential contaminants of concern are presented in Table E2.

Table E2: Health Investigation and Screening Levels (HIL and HSL) in mg/kg Unless Otherwise Indicated

Contaminants		HIL- A and HSL - A Direct Contact	HSL - A Vapour Intrusion
Metals	Arsenic	100	-
	Cadmium	20	-
	Chromium (VI)	100	-
	Copper	6,000	-
	Lead	300	-
	Mercury (inorganic)	40	-
	Nickel	400	-
	Zinc	7,400	-
PAH	Benzo(a)pyrene TEQ ¹	3	-
	Naphthalene	-	3
	Total PAH	300	-
TRH	F1	4,400 ³	45
	F2 ³	3,300 ³	280
	F3	4,500	-
	F4	6,300	-
BTEX	Benzene	100	0.5
	Toluene	14,000	480
	Ethylbenzene	4,500	NL
	Xylenes	12,000	110
Phenol	Pentachlorophenol	100	-
	Phenol	3,000	-
OCP	Aldrin + Dieldrin	6	-
	Chlordane	50	-
	DDT+DDE+DDD	240	-
	Endosulfan	270	-
	Endrin	10	-
	Heptachlor	6	-
	HCB	10	-
	Methoxychlor	300	-
OPP	Chlorpyrifos	160	-
PCB ²		1	-

Notes:

- 1 sum of carcinogenic PAH
- 2 non dioxin-like PCBs only
- 3 HSL-A for fractions C6-10 includes BTEX and fraction C10-16 includes naphthalene

E1.2 Ecological Investigation Levels

Ecological Investigation Levels (EIL) have been derived for selected metals and organic compounds and are applicable for assessing risk to terrestrial ecosystems (NEPC, 2013). EIL depend on specific soil physiochemical properties and land use scenarios and generally apply to the top 2 m of soil, which corresponds to the root zone and habitation zone of many species. The EIL is determined for a

contaminant based on the sum of the ambient background concentration (ABC) and an added contaminant limit (ACL). The ABC of a contaminant is the soil concentration in a specific locality that is the sum of naturally occurring background levels and the contaminants levels that have been introduced from diffuse or non-point sources (e.g. motor vehicle emissions). The ACL is the added concentration (above the ABC) of a contaminant above which further appropriate investigation and evaluation of the impact on ecological values is required.

The EIL is calculated using the following formula:

$$\text{EIL} = \text{ABC} + \text{ACL},$$

The ABC is determined through direct measurement at an appropriate reference site (preferred) or through the use of methods defined by Olszowy et al *Trace element concentrations in soils from rural and urban areas of Australia*, Contaminated Sites monograph no. 4, South Australian Health Commission, Adelaide, Australia 1995 (Olszowy, 1995) or Hamon et al, *Geochemical indices allow estimation of heavy metal background concentrations in soils*, Global Biogeochemical Cycles, vol. 18, GB1014, (Hamon, 2004). ACL is based on the soil characteristics of pH, CEC and clay content.

EIL (and ACLs where appropriate) have been derived in NEPC (2013) for only a short list of contaminants comprising As, Cu, Cr (III), DDT, naphthalene, Ni, Pb and Zn. An *Interactive (Excel) Calculation Spreadsheet* may be used for calculating site-specific EIL for these contaminants, and has been provided in the ASC NEPM Toolbox available on the SCEW (Standing Council on Environment and Water) website (<http://www.scew.gov.au/node/941>).

The adopted EIL, derived from Tables 1B (1) to 1B (5), Schedule B1 of NEPC (2013) the *Interactive (Excel) Calculation Spreadsheet* are shown in the following Table E3. The following site specific data and assumptions have been used to determine the EILs:

- A protection level of 95% of species has been adopted;
- The EILs will apply to the top 2 m of the soil profile;
- Given the likely source of soil contaminants (i.e., historical site use / fill) the contamination is considered as “aged” (>2 years);
- ABCs have been derived using the *Interactive (Excel) Calculation Spreadsheet* using input parameters of NSW for the State in which the site is located, and low for traffic volumes; and
- Site specific pH, and CEC values have been used as input parameters in the *Interactive (Excel) Calculation Spreadsheet*. Based on median pH and CEC values for soil types collected across the site, the soil profile (in the upper layers) has an average pH of 6.36 (range 6.2 to 6.5) and CEC of 10.36 cmol/kg (range 6.1 to 15).

Table E3: Ecological Investigation Levels (EIL) in mg/kg

Analyte		EIL ¹	Comments
Metals	Arsenic	100	Adopted parameters: pH of 6.4 (average tested) CEC of 5 (assumed) Clay content of 10% (assumed) Iron not tested as EIL aged criteria was adopted Traffic Volume: High
	Copper	120	
	Nickel	35	
	Chromium III	410	
	Lead	1100	
	Zinc	350	
PAH	Naphthalene	170	
OCP	DDT	180	

Notes: 1. ACL calculated for urban residential and public open space used as conservative EIL

E1.3 Ecological Screening Levels - Petroleum Hydrocarbons

Ecological Screening Levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. ESL apply to the top 2 m of the soil profile as for EIL.

ESL have been derived in NEPC (2013) for petroleum fractions F1 to F4 as well as BTEX and Benzo(a)pyrene. Site specific data and assumptions as summarised in Table E4 have been used to determine the ESL. The adopted ESL, from Table 1B (6), Schedule B1 of NEPC (2013) are shown in Table E5.

Table E4: Inputs to the Derivation of ESL

Variable	Input	Rationale
Depth of ESL application	Top 2 m of the soil profile	The top 2 m depth below ground level corresponds to the root zone and habitation zone of many species.
Land use	Urban residential and public open space	Proposed future land-use.
Soil Texture	Coarse	The most conservative values based on fill present at the site.

Table E5: Ecological Screening Levels (ESL) in mg/kg

Analyte		ESL	Comments
TRH	F1	180*	All ESLs are low reliability apart from those marked with * which are moderate reliability
	F2	120*	
	F3	300	
	F4	2800	
BTEX	Benzene	50	
	Toluene	85	
	Ethylbenzene	70	
	Xylenes	105	
PAH	Benzo(a)pyrene	0.7	

E1.4 Management Limits - Petroleum Hydrocarbons

In addition to appropriate consideration and application of the HSL, 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.

Management Limits to avoid or minimise these potential effects have been adopted in NEPC (2013) as interim Tier 1 guidance. Management Limits have been derived in NEPC (2013) for the same four petroleum fractions as the HSL (F1 to F4). The adopted Management Limits, from Table 1B (7), Schedule B1 of NEPC (2013) are shown in the following Table E6. The following site specific data and assumptions have been used to determine the Management Limits:

- The Management Limits will apply to any depth within the soil profile;
- The Management Limits for residential, parkland and public open space apply; and
- A fine soil texture has been adopted due to the presence of clay in filling as well as being the more conservative limits.

Table E6: Management Limits in mg/kg

Analyte		Management Limit
TRH	F1 [#]	800
	F2 [#]	1000
	F3	3500
	F4	10 000

Separate management limits for BTEX and naphthalene are not available hence these have not been subtracted from the relevant fractions to obtain F1 and F2

E1.5 Asbestos in Soil

Bonded asbestos-containing material (ACM) is the most common form of asbestos contamination across Australia, generally arising from:

- Inadequate removal and disposal practices during demolition of buildings containing asbestos products;
- Widespread dumping of asbestos products and asbestos containing fill on vacant land and development sites; and
- Commonly occurring in historical fill containing unsorted demolition materials.

Mining, manufacturing or distribution of asbestos products may result in sites being contaminated by friable asbestos including free fibres. Severe weathering or damage to bonded ACM may also result in the formation of friable asbestos comprising fibrous asbestos (FA) and/or asbestos fines (AF).

Asbestos only poses a risk to human health when asbestos fibres are made airborne and inhaled. If asbestos is bound in a matrix such as cement or resin, it is not readily made airborne except through substantial physical damage. Bonded ACM in sound condition represents a low human health risk, whilst both FA and AF materials have the potential to generate, or be associated with, free asbestos fibres. Consequently, FA and AF must be carefully managed to prevent the release of asbestos fibres into the air.

As asbestos was identified in fill, the NEPC (2013) criteria for FA and AF for a residential A land use have been adopted as the screening criterion for any soil samples collected in the vicinity of the ACM. Where ACM is not observed, the reporting limit of 0.1g/kg has been applied. NEPC (2013) defines the various asbestos types referred to above as follows:

- Bonded ACM:** Asbestos containing material which is in sound condition, bound in a matrix of cement or resin, and cannot pass a 7 mm x 7 mm sieve.
- FA:** Fibrous asbestos material including severely weathered cement sheet, insulation products and woven asbestos material. This material is typically unbonded or was previously bonded and is now significantly degraded and crumbling.
- AF:** Asbestos fines including free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve.

Health Screening Levels (HSL) for asbestos in soil, which are based on likely exposure levels for different scenarios, have been adopted in NEPC (2013) from the Western Australian Department of Health (WA DoH) publication *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia 2009* (WA DoH 2009).

On the basis of the proposed land use, and in accordance with Table E7, Schedule B1, NEPC (2013) the following asbestos HSL is to be adopted for any future asbestos assessment:

Table E7: Health Screening Levels for Asbestos Contamination in Soil (% w/w)

Form of Asbestos	HSL
	Residential A
Bonded ACM	0.01%
FA and AF	0.001 %
All Forms of Asbestos	No visible asbestos for surface soil

Appendix F

Fieldwork Methodology

Appendix F

Fieldwork Methodology

F1.0 Guidelines

The following key guideline was consulted for the field work methodology:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)* [NEPM] (NEPC, 2013).

F2.0 Soil Sampling

Soil sampling was carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures comprise:

- Collect soil samples directly from the middle of the excavator bucket at the nominated sample depth;
- Transfer samples in laboratory-prepared glass jars with Teflon lined lids by hand, capping immediately and minimising headspace within the sample jar;
- Collect replicate samples in zip-lock bags for PID screening;
- Collect ~40 g to 50 g samples in zip-lock bags for asbestos (presence / absence) analysis or collect 500ml samples in zip-lock bags for asbestos (FA/AF) analysis;
- Wear a new disposable nitrile glove for each sample point thereby minimising potential for cross-contamination;
- Collect 10% replicate samples for QC purposes;
- Label sample containers with individual and unique identification details, including project number, sample location and sample depth (where applicable);
- Place samples into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain of custody documentation.

F2.1 Field Testing

Field testing was carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures comprise:

PID Field Test

- Calibrate the PID with isobutylene gas at 100 ppm and with fresh air prior to commencement of each successive day's field work;
- Allow the headspace in the PID zip-lock bag samples to equilibrate; and

- Screen (test pits) using the PID.

F3.0 References

HEPA. (2020). *PFAS National Environmental Management Plan (NEMP)*. Version 2.0: Heads of EPAs Australia and New Zealand and Australian Government Department of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

Douglas Partners Pty Ltd

Appendix G

Test Pit and Borehole Logs

BOREHOLE LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 86.08 AHD
EASTING: 333759.4
NORTHING: 6254686.7
DIP/AZIMUTH: 90°/-

BORE No: BH201
PROJECT No: 210392.00
DATE: 24 - 25/1/2022
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
86	0.2	FILL/TOPSOIL/Silty SAND: fine to medium, pale brown and dark brown, moist																A			4,4,2 N = 6
	0.7	FILL/Silty SAND: fine to medium, dark brown, trace rootlets and gravel, w~PL																A			
85	1	Silty CLAY CL-CI: low to medium plasticity, dark grey, trace rootlets and sand, w~PL, apparently firm, residual																A			
	1.5	Silty CLAY CI-CH: medium to high plasticity, pale grey, w~PL, apparently stiff to very stiff, residual																S			
84	2																				6,14,11 N = 25
		Below 2.86m: trace siltstone gravel																S			
83	3															2.86-3.10m: cly					PL(A) = 0.1
	3.42															3.1m: CORE LOSS: 320mm					
	3.7	SILTSTONE: pale grey and grey-brown, 5% clay, very low strength bands, highly weathered, fragmented to fractured, Ashfield Shale														3.8m: J45° & 85°, st/un, ro, cly		C	80	0	
82	4															4.05m: J80°, un, ti					
																4.15m: J45°, pl, sm, cly					PL(A) = 0.3
																4.22m: J50°, pl, ro, cln					
																4.27m: J80°, un, ro, cly co					
																4.50-4.85m: Cs					
81	5															4.85-5.00m: fg, fe					PL(A) = 0.2
																5m: CORE LOSS: 450mm		C	70	0	
	5.45															5.45-6.00m: fg, fe, cly					
80	6															6.05m: J70°, un, ro, fe					PL(A) = 0.7
																6.12m: CORE LOSS: 330mm					
																6.45-6.85m: fg, fe					
																6.52-6.58m: Sz, fg					
	6.45															6.6m: J30°, pl, ro, fe					PL(A) = 0.7
																6.62-6.85m: fg, fe, st 150mm					
																6.85m: J45°, pl, sm, cln					
																6.95m: J45°, pl, ro, fe					
	6.75	SILTSTONE: grey-brown, low to medium strength, highly and slightly weathered, fragmented to fractured, Ashfield Shale														7.05-7.20m: J (x3)					PL(A) = 0.7
																20°-30°, pl, sm, fe					
																7.20-7.35m: fg, fe					
																7.52m: CORE LOSS: 100mm					
78	8															7.65m: J45°, pl, sm, ca					PL(A) = 0.7
																7.80-8.15m: B (x10) 0°, cly					
																8.15-8.20m: fg					
																8.20-8.35m: J80°, pl, ro, fe					
77	9	SILTSTONE: grey, medium then high strength, fresh, unbroken, Ashfield Shale																			PL(A) = 1.8
	9.7	SANDSTONE: Refer to following page																			
	10.0															9.80-9.83m: Ds					

RIG: Commachio Geo 205

DRILLER: Numac

LOGGED: SR

CASING: HWT to 2.5m

TYPE OF BORING: SFA to 2.5m, NMLC Coring to 11.9m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 86.08 AHD
EASTING: 333759.4
NORTHING: 6254686.7
DIP/AZIMUTH: 90°/--

BORE No: BH201
PROJECT No: 210392.00
DATE: 24 - 25/1/2022
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength				Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low			Low	Medium	High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
76		SANDSTONE: pale grey and grey, laminated, approximately 25% siltstone, high and very high strength, fresh, slightly fractured to unbroken, Mittagong Sandstone														10m: J80°, un, ro, cln	C	100	98	PL(A) = 3.1	
11																	10.75m: B0°, cly, fg, 10mm	C	100	97	PL(A) = 2
12	11.9		Bore discontinued at 11.9m Target Depth Reached														11.87m: B0°, cly 10mm				
13																					
14																					
15																					
16																					
17																					
18																					
19																					

RIG: Commachio Geo 205

DRILLER: Numac

LOGGED: SR

CASING: HWT to 2.5m

TYPE OF BORING: SFA to 2.5m, NMLC Coring to 11.9m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS:

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
PID	Photo ionisation detector (ppm)	PL(A)	Point load axial test Is(50) (MPa)
PL(D)	Point load diametral test Is(50) (MPa)	pp	Pocket penetrometer (kPa)
S	Standard penetration test	V	Shear vane (kPa)

BORE: BH201

PROJECT: 210392.00

MAR 2021



Douglas Partners
Geotechnics | Environment | Groundwater

Project No: 210392.00

BH ID: BH 201

Depth: 2.86 - 7.00 m

Core Box No.: 1/2



210392.00 NORTH SYDNEY 25/01/22 BH201 STARTS 2.86m

3 CORE LOSS
3.10 - 3.42 m



5 CORE LOSS
5.00 - 5.45 m

6 CORE LOSS
6.12 - 6.45 m

2.86 m - 7.00 m

BORE: BH201

PROJECT: 210392.00

MAR 2021



Douglas Partners
Geotechnics | Environment | Groundwater

Project No: 210392.00

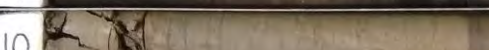
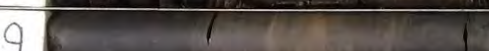
BH ID: BH 201

Depth: 7.00 - 11.90 m

Core Box No.: 2/2



7 CORE LOSS
7.52 - 7.62 m



11 BH201
END 11.9m

7.00 - 11.90 m

BOREHOLE LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 84.75 AHD
EASTING: 333840.8
NORTHING: 6254695
DIP/AZIMUTH: 90°/-

BORE No: BH202
PROJECT No: 210392.00
DATE: 24/1/2022
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
	0.1	CONCRETE																						
	0.4	FILL/Silty CLAY: low to medium plasticity, pale brown, with rootlets, sand and concrete, w~PL																A						
	0.7	Silty CLAY Cl: medium plasticity, dark brown, trace gravel, w~PL, apparently firm to stiff, residual																A						
		Silty CLAY Cl-CH: medium to high plasticity, pale yellow-brown, w~PL, apparently stiff to very stiff, residual																S						3,6,9 N = 15
	2.66	Below 2.5m: dark grey, relict rock structure																S						15,5/10 refusal
		SILTSTONE: grey to grey-brown, very low strength with low to medium strength bands, highly weathered, fragmented to fractured, Ashfield Shale																C	100	0				PL(A) = 0.3
			</																					

RIG: Commachio Geo 205

DRILLER: Numac

LOGGED: SR

CASING: HWT to 2.5m

TYPE OF BORING: SFA to 2.5m, NMLC Coring to 11.8m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 84.75 AHD
EASTING: 333840.8
NORTHING: 6254695
DIP/AZIMUTH: 90°/--

BORE No: BH202
PROJECT No: 210392.00
DATE: 24/1/2022
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
74	10.15	SANDSTONE: <i>Refer to previous page</i> SANDSTONE: medium to coarse grained, slightly weathered then fresh, unbroken, Hawkesbury Sandstone															9.85m: J45°, pl, sm, cln 9.93-9.96m: Cs 10m: J60°, pl, ro, cln 10.10-10.16m: Cs	C	100	82	PL(A) = 0.9
73	11																		C	100	100
72	11.8	Bore discontinued at 11.8m Target Depth Reached																			
71	12																				
70	13																				
69	14																				
68	15																				
67	16																				
66	17																				
65	18																				
64	19																				

RIG: Commachio Geo 205

DRILLER: Numac

LOGGED: SR

CASING: HWT to 2.5m

TYPE OF BORING: SFA to 2.5m, NMLC Coring to 11.8m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

BORE: BH202

PROJECT: 210392.00

MAR 2021



Project No: 210392.00
BH ID: BH 202
Depth: 2.66 - 7.00 m
Core Box No.: 1/2



210392.00 NORTH SYDNEY 24/11/22 BH202 STARTS 2.66m



2.66 m - 7.00 m

BORE: BH202

PROJECT: 210392.00

MAR 2021



Project No: 210392.00
BH ID: BH 202
Depth: 7.00 - 11.80 m
Core Box No.: 2/2



7.00 m - 11.80 m

BOREHOLE LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 82.75 AHD
EASTING: 333771.8
NORTHING: 6254665.8
DIP/AZIMUTH: 90°/-

BORE No: BH203
PROJECT No: 210392.00
DATE: 20 - 21/1/2022
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering EW HW MW SW FS FR	Graphic Log	Rock Strength Ex Low Very Low Low Medium High Very High Ex High	Water	Fracture Spacing (m) 0.01 0.05 0.10 0.50 1.00	Discontinuities B - Bedding J - Joint S - Shear F - Fault	Sampling & In Situ Testing			
									Type	Core Rec. %	RQD %	Test Results & Comments
82.75	0.3	FILL/Silty CLAY: low to medium plasticity, dark brown, trace rootlets and sand, w~PL							A			5,8.12 N = 20
82.6	0.6	FILL/Silty CLAY: low to medium plasticity, dark brown, trace sand and gravel, w~PL							A			
81.5	1	Silty CLAY Cl: medium plasticity, pale yellow-brown, w~PL, apparently very stiff, residual							A			
81.2									S			
80.5	2											
80.2	2.68	Below 2.5m orange-grey and mottled red-brown, relict rock structure						2.68-3.40m: cly	S	100	0	10,12,11 N = 23
79.8	3	CLAY Cl-CH: medium to high plasticity, pale grey-brown, trace ironstone, w~PL, apparently very stiff, residual							C	88	0	PL(A) = 0.3
79.5	3.4							3.54-3.58m: Cs 3.62m: B0°, fe, cly 10mm 3.7m: J65°, he/ti, cly 3.77m: CORE LOSS: 170mm 3.94-4.15m: Cs 4.15-4.70m: fg, fe, cly				PL(A) = 0.3
78.5	4	SILTSTONE: pale grey and grey-brown, 10% clay, very low and low to medium strength, highly weathered, fragmented to fractured, Ashfield Shale						4.77-4.87m: Cs 4.95m: B0°, fe, cly 10mm 5.05 & 5.10m: B (x2), fe, fg 5-10mm 5.4m: J25°, pl, ro, fe 5.47m: B0°, fe 5.57m: J30°, pl, ro, fe 5.61m: J60°, pl, ro, fe 5.85m: B0°, fe, cly 5.96m: B0°, fe, cly 6.22m: B0°, fe, fg 5mm	C	100	53	PL(A) = 0.4
77.5	5	SILTSTONE: grey-brown, medium strength, slightly weathered, slightly fractured, Ashfield Shale										
77.2	5.1								C	100	100	PL(A) = 1.4
76.5	6	SANDSTONE: fine grained, pale grey and grey, laminated/bedded, high strength, slightly weathered then fresh, slightly fractured and unbroken, Mittagong Formation										PL(A) = 2.9
76.2	6.0								C	100	100	PL(A) = 2.5
75.5	7											
75.2	8								C	100	100	PL(A) = 1.8
74.5	9											
74.2	9.15	SANDSTONE: medium to coarse grained, pale grey, cross-bedded, high strength, fresh, unbroken, Hawkesbury Sandstone						9.12m: B0°, cly co 2mm	C	100	100	

RIG: Commachio Geo 205

DRILLER: Numac

LOGGED: SR

CASING: HWT to 2.5m

TYPE OF BORING: SFA to 2.5m, NMLC Coring to 11.15m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 82.75 AHD
EASTING: 333771.8
NORTHING: 6254665.8
DIP/AZIMUTH: 90°/--

BORE No: BH203
PROJECT No: 210392.00
DATE: 20 - 21/1/2022
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
		SANDSTONE: medium to coarse grained, pale grey, cross-bedded, high strength, fresh, unbroken, Hawkesbury Sandstone <i>(continued)</i>																C	100	100	PL(A) = 1.1
	11.15	Bore discontinued at 11.15m Target Depth Reached																C	100	100	PL(A) = 2.4
	11																				
	72																				

RIG: Commachio Geo 205 **DRILLER:** Numac **LOGGED:** SR **CASING:** HWT to 2.5m
TYPE OF BORING: SFA to 2.5m, NMLC Coring to 11.15m
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS:

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BORE: BH203

PROJECT: 210392.00

MAR 2021



Project No: 210392.00
BH ID: BH 203
Depth: 2.68 - 7.00 m
Core Box No.: 1/2



210392.00 NORTH SYDNEY 21/01/22 BH203 STARTS 2.68m

3

4

5

6

CORE LOSS
3.77m - 3.94m

2.68 m - 7.00 m

BORE: BH203

PROJECT: 210392.00

MAR 2021



Project No: 210392.00
BH ID: BH 203
Depth: 7.00 - 11.15 m
Core Box No.: 2/2



7

8

9

10

11

BOREHOLE END AT 11.15m

7.00 m - 11.15 m

BOREHOLE LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 83.28 AHD
EASTING: 333812.4
NORTHING: 6254673.1
DIP/AZIMUTH: 90°/-

BORE No: BH204
PROJECT No: 210392.00
DATE: 20/1/2022
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering	Graphic Log	Rock Strength	Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
								B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
83.0	0.2	FILL/Silty CLAY: low to medium plasticity, dark brown, trace rootlets and sand, w~PL								A			7,9,14 N = 23
82.65	0.65	Silty CLAY Cl: medium plasticity, brown, trace sand and gravel, w<PL, residual								A			
82.0	1	Silty CLAY Cl-CH: medium to high plasticity, grey, w<PL, apparently stiff to very stiff, residual								A			
81.0	2									S			
80.7	2.7	Below 2.5m: dark grey, relict rock structure								S			12,21/130 refusal
80.0	3	SILTSTONE: grey and grey-brown, laminated, very low strength, highly weathered, fragmented to fractured, Ashfield Shale					2.8m: J70°, fe, ti 3.05m: J45°, un, ro, cly 3.1m: J80°, un, ro, fe 3.2m: J45°, fe, ti			C	100	0	PL(A) = 0.1
79.0	4						4.1m: B0°, fe 4.25m: B0°, fe			C	100	0	
78.0	4.75	SILTSTONE: pale grey, very low then low strength, highly weathered, slightly fractured, Ashfield Shale					4.52m: J80°, pl, ro, fe 4.7m: B0°, cly 5mm 4.91m: B0°, fe 5.08m: B10°, fg 10mm			C	92	10	
77.0	5.47						5.33m: CORE LOSS: 140mm 5.47-5.65m: Ds 5.78-5.90m: Cs			C	100	100	
76.0	5.88	SANDSTONE: fine grained, laminated, approximately 25% siltstone laminations and beds, high and very high strength, slightly weathered and unbroken, Mittagong Sandstone											PL(A) = 1
75.0	7												PL(A) = 2.6
74.0	8						8.18m: B0°, cly co 2mm						PL(A) = 4.2
	8.9	SANDSTONE: medium to coarse grained, pale grey, cross-bedded, medium to high strength, fresh, unbroken, Hawkesbury Sandstone					8.78m: B0°, cly co 8.78-8.90m: Cs			C	100	99	PL(A) = 2.1
													PL(A) = 1

RIG: Commachio Geo 205

DRILLER: Numac

LOGGED: SR

CASING: HWT to 2.5m

TYPE OF BORING: SFA to 2.5m, NMLC Coring to 10.40m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 83.28 AHD
EASTING: 333812.4
NORTHING: 6254673.1
DIP/AZIMUTH: 90°/--

BORE No: BH204
PROJECT No: 210392.00
DATE: 20/1/2022
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
73	10.4	SANDSTONE <i>Refer to previous page</i>																C	100	99	PL(A) = 1.4
		Bore discontinued at 10.4m Target Depth Reached																			
11																					
72																					
12																					
71																					
13																					
70																					
14																					
69																					
15																					
68																					
16																					
67																					
17																					
66																					
18																					
65																					
19																					
64																					

RIG: Commachio Geo 205

DRILLER: Numac

LOGGED: SR

CASING: HWT to 2.5m

TYPE OF BORING: SFA to 2.5m, NMLC Coring to 10.40m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BORE: BH204

PROJECT: 210392.00

MAR 2021



Douglas Partners
Geotechnics | Environment | Groundwater

Project No: 210392.00

BH ID: BH 204

Depth: 2.73 - 7.00 m

Core Box No.: Y₂



210392.00 North Sydney 20/1/22 BH204 START 2.73 m

3

4

5

6

CORE LOSS
5.33 - 5.47

2.73 m - 7.00 m

BORE: BH204

PROJECT: 210392.00

MAR 2021



Douglas Partners
Geotechnics | Environment | Groundwater

Project No: 210392.00

BH ID: BH 204

Depth: 7.00 - 10.40 m

Core Box No.: Z₂



7

8

9

10

END OF BOREHOLE @ 10.4 m




7.00 m - 10.40 m

TEST PIT LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 86.39 AHD
EASTING: 333769.8
NORTHING: 6254695.7

PIT No: TP301
PROJECT No: 210392.00
DATE: 21/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
86	0.4	FILL/SAND: fine to medium, grey and brown, low plasticity, moist, w~PL		E	0.1		PID<1 ppm					
					0.3							
					0.6		PID<1 ppm					
					0.7							
85	1.4	FILL/Silty SAND: dark brown, with rootlets, clay and gravel, w~PL		E*	1.2		PID<1 ppm					
					1.3							
					1.7		PID<1 ppm					
					1.8							
85	1.4	Silty CLAY CL: low plasticity, grey mottled orange-brown, trace rootlets, w<PL, residual		E	1.2		PID<1 ppm					
					1.3							
					1.7		PID<1 ppm					
					1.8							
2.0		Pit discontinued at 2.0m										

RIG: 1 Tonne excavator with 300mm bucket
 Target Depth Reached

LOGGED: SR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Blind replicate BD1/21012022 taken from 0.6-0.7m

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 84.66 AHD
EASTING: 333766.8
NORTHING: 6254678.2

PIT No: TP302
PROJECT No: 210392.00
DATE: 21/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
84		FILL/Silty SAND: fine to coarse, dark brown, with building debris, bricks, glass, fragments of fibre cement sheet (asbestos containing material (ACM)) and gravel, trace clay, w~PL										
				E*	0.1		PID<1 ppm					
					0.2							
				E*	0.6		PID<1 ppm					
1					0.7							
1.2		Silty CLAY Cl: medium plasticity, grey mottled orange, trace rootlets, w~PL, residual										
				E	1.3		PID<1 ppm					
					1.4							
83												
1.8		Pit discontinued at 1.8m Target Depth Reached										

RIG: 1 Tonne excavator with 300mm bucket

LOGGED: SR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Fragments of ACM observed at 0.2m and 0.6m, ACM fragment sampled as 'TP2-FC1-0.1-0.2'
 TP302 was beneath a synthetic grass covering

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 82.30 AHD
EASTING: 333764.9
NORTHING: 6254661.9

PIT No: TP303
PROJECT No: 210392.00
DATE: 21/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
82		FILL/TOPSOIL/Silty CLAY: low to medium plasticity, dark brown, with sand and roots, w~PL										
				E	0.1		PID<1 ppm					
					0.2							
0.6		Silty CLAY CI-CH: medium to high plasticity, grey mottled orange-brown, trace rootlets, w~PL, residual										
				E	0.7		PID<1 ppm					
					0.8							
1												
1.2		Pit discontinued at 1.2m Target Depth Reached										
81												

RIG: 1 Tonne excavator with 300mm bucket

LOGGED: SR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

- ☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	sp	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 86.56 AHD
EASTING: 333795.1
NORTHING: 6254711

PIT No: TP304
PROJECT No: 210392.00
DATE: 21/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		ASPHALTIC CONCRETE										
	0.25	FILL/Silty CLAY: low plasticity, dark brown, with rootlets, trace sand, w~PL		E	0.3		PID<1 ppm					
					0.4							
	0.6	Silty CLAY CL: low plasticity, grey mottled orange-brown, trace rootlets, w~PL, stiff, residual		E	0.7		PID<1 ppm					
					0.8							
	1.2	Pit discontinued at 1.2m Target Depth Reached										

RIG: 1 Tonne excavator with 300mm bucket

LOGGED: SR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

- ☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	sp	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 83.96 AHD
EASTING: 333799.9
NORTHING: 6254680.3

PIT No: TP305
PROJECT No: 210392.00
DATE: 21/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
82	0.4	FILL/TOPSOIL/Silty CLAY: low plasticity, dark brown, with sand and rootlets, medium sand, moist, w~PL		E	0.1		PID<1 ppm					
					0.2							
83	1.1	Silty CLAY CL: low plasticity, grey mottled orange, trace rootlets, w~PL, residual		E	0.5		PID<1 ppm					
					0.6							
84	1.1	Pit discontinued at 1.1m Target Depth Reached										

RIG: 1 Tonne excavator with 300mm bucket

LOGGED: SR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

- ☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2



SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 83.63 AHD
EASTING: 333814.7
NORTHING: 6254676.4

PIT No: TP306
PROJECT No: 210392.00
DATE: 21/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
83		FILL/TOPSOIL/Silty CLAY: low plasticity, dark grey, with sand, rootlets, medium sand, w~PL		E*	0.1		PID<1 ppm					
					0.2							
	0.5	Silty CLAY Cl: medium plasticity, grey mottled orange, trace rootlets, w~PL residual		E	0.6		PID<1 ppm					
					0.7							
1												
1.2		Pit discontinued at 1.2m Target Depth Reached										
82												

RIG: 1 Tonne excavator with 300mm bucket

LOGGED: SR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Blind replicate BD2/21012022 taken from 0.1-0.2m

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 84.58 AHD
EASTING: 333835.9
NORTHING: 6254692.1

PIT No: TP307
PROJECT No: 210392.00
DATE: 21/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILL/TOPSOIL/Silty CLAY: low to medium plasticity, dark grey, trace sand and rootlets, w~PL			0.1		PID<1 ppm					
				E	0.2							
	0.4	Silty CLAY Cl: medium plasticity, grey mottled orange-brown, trace rootlets, w~PL, residual			0.6		PID<1 ppm					
				E	0.7							
	1.3	Pit discontinued at 1.3m Target Depth Reached										

RIG: 1 Tonne excavator with 300mm bucket

LOGGED: SR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

- ☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Taylor Construction Pty Ltd
PROJECT: North Sydney Public School Upgrade
LOCATION: Bay Road, Waverton

SURFACE LEVEL: 83.53 AHD
EASTING: 333843.5
NORTHING: 6254681.7

PIT No: TP308
PROJECT No: 210392.00
DATE: 21/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
83	0.4	FILL/TOPSOIL/Silty CLAY: high plasticity, dark brown and grey, with rootlets, w~PL		E	0.1		PID<1 ppm					
					0.2							
82	0.9	Silty CLAY Cl: medium plasticity, grey mottled orange-brown, trace rootlets, w~PL, residual		E	0.6		PID<1 ppm					
					0.7							
1	0.9	Pit discontinued at 0.9m Target Depth Reached										

RIG: 1 Tonne excavator with 300mm bucket

LOGGED: SR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

- ☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

Appendix H

Laboratory Certificates of Analysis, Samples Receipt Advice and Chain
of Custody Documentation

CERTIFICATE OF ANALYSIS 287470

Client Details

Client	Douglas Partners Pty Ltd
Attention	Lisa Teng
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	<u>210392.00, North Sydney (NSPS)</u>
Number of Samples	22 Soil, 1 Material
Date samples received	27/01/2022
Date completed instructions received	27/01/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.
 Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	07/02/2022
Date of Issue	07/02/2022
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Asbestos Approved By

Analysed by Asbestos Approved Analyst: Wonnie Condos
 Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Diego Bigolin, Inorganics Supervisor
 Dragana Tomas, Senior Chemist
 Loren Bardwell, Development Chemist
 Lucy Zhu, Asbestos Supervisor
 Steven Luong, Organics Supervisor
 Thomas Beenie, Lab Technician

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil

Our Reference		287470-1	287470-2	287470-4	287470-5	287470-6
Your Reference	UNITS	TP1	TP1	TP1	TP2	TP2
Depth		0.1-0.3	0.6-0.7	1.7-1.8	0.1-0.2	0.6-0.7
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	88	86	84	78	74

vTRH(C6-C10)/BTEXN in Soil

Our Reference		287470-7	287470-9	287470-11	287470-12	287470-13
Your Reference	UNITS	TP2	TP3	TP4	TP4	TP5
Depth		1.3-1.4	0.1-0.2	0.3-0.4	0.7-0.8	0.1-0.2
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	77	74	81	85	77

vTRH(C6-C10)/BTEXN in Soil

Our Reference		287470-15	287470-17	287470-19	287470-20	287470-21
Your Reference	UNITS	TP6	TP7	TP8	TP8	BD1/21012022
Depth		0.1-0.2	0.1-0.2	0.1-0.2	0.6-0.7	-
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	86	87	81	78	80

vTRH(C6-C10)/BTEXN in Soil

Our Reference		287470-22	287470-23
Your Reference	UNITS	TS	TB
Depth		-	-
Date Sampled		22/01/2022	22/01/2022
Type of sample		Soil	Soil
Date extracted	-	31/01/2022	31/01/2022
Date analysed	-	31/01/2022	31/01/2022
TRH C ₆ - C ₉	mg/kg	[NA]	<25
TRH C ₆ - C ₁₀	mg/kg	[NA]	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	[NA]	<25
Benzene	mg/kg	110%	<0.2
Toluene	mg/kg	111%	<0.5
Ethylbenzene	mg/kg	112%	<1
m+p-xylene	mg/kg	114%	<2
o-Xylene	mg/kg	114%	<1
Naphthalene	mg/kg	[NA]	<1
Total +ve Xylenes	mg/kg	[NA]	<3
Surrogate aaa-Trifluorotoluene	%	82	86

svTRH (C10-C40) in Soil						
Our Reference	UNITS	287470-1	287470-2	287470-4	287470-5	287470-6
Your Reference		TP1	TP1	TP1	TP2	TP2
Depth		0.1-0.3	0.6-0.7	1.7-1.8	0.1-0.2	0.6-0.7
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	31/01/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	98	100	97	101	97

svTRH (C10-C40) in Soil						
Our Reference	UNITS	287470-7	287470-9	287470-11	287470-12	287470-13
Your Reference		TP2	TP3	TP4	TP4	TP5
Depth		1.3-1.4	0.1-0.2	0.3-0.4	0.7-0.8	0.1-0.2
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	01/02/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	110	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	120	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	220	<50	<50	<50
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	200	<100	<100	120
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	200	<50	<50	120
Surrogate o-Terphenyl	%	95	99	95	96	98

svTRH (C10-C40) in Soil

Our Reference		287470-15	287470-17	287470-19	287470-20	287470-21
Your Reference	UNITS	TP6	TP7	TP8	TP8	BD1/21012022
Depth		0.1-0.2	0.1-0.2	0.1-0.2	0.6-0.7	-
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	01/02/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	100	110	130	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	100	110	130	<50	<50
Surrogate o-Terphenyl	%	95	92	97	94	96

PAHs in Soil						
Our Reference		287470-1	287470-2	287470-4	287470-5	287470-6
Your Reference	UNITS	TP1	TP1	TP1	TP2	TP2
Depth		0.1-0.3	0.6-0.7	1.7-1.8	0.1-0.2	0.6-0.7
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	01/02/2022	31/01/2022	01/02/2022	31/01/2022	01/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.2	<0.1	<0.1	0.6
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Fluoranthene	mg/kg	<0.1	0.6	<0.1	0.2	1.0
Pyrene	mg/kg	<0.1	0.6	<0.1	0.2	1
Benzo(a)anthracene	mg/kg	<0.1	0.4	<0.1	<0.1	0.5
Chrysene	mg/kg	<0.1	0.4	<0.1	0.1	0.5
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.7	<0.2	0.2	0.8
Benzo(a)pyrene	mg/kg	<0.05	0.5	<0.05	0.2	0.56
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.3	<0.1	<0.1	0.3
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.3	<0.1	0.1	0.4
Total +ve PAH's	mg/kg	<0.05	4.1	<0.05	1.1	6.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	0.6	<0.5	<0.5	0.8
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	0.7	<0.5	<0.5	0.8
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	0.7	<0.5	<0.5	0.8
Surrogate <i>p</i> -Terphenyl-d14	%	125	101	125	98	124

PAHs in Soil						
Our Reference		287470-7	287470-9	287470-11	287470-12	287470-13
Your Reference	UNITS	TP2	TP3	TP4	TP4	TP5
Depth		1.3-1.4	0.1-0.2	0.3-0.4	0.7-0.8	0.1-0.2
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	01/02/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.6	<0.1	<0.1	0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	2.0	0.1	<0.1	0.3
Anthracene	mg/kg	<0.1	0.7	<0.1	<0.1	0.1
Fluoranthene	mg/kg	<0.1	4.6	0.3	<0.1	0.8
Pyrene	mg/kg	<0.1	4.7	0.3	<0.1	0.8
Benzo(a)anthracene	mg/kg	<0.1	2.9	0.2	<0.1	0.5
Chrysene	mg/kg	<0.1	2.4	0.2	<0.1	0.4
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	5.3	0.3	<0.2	0.8
Benzo(a)pyrene	mg/kg	<0.05	3.4	0.2	<0.05	0.60
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	2.0	0.1	<0.1	0.3
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.6	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	2.5	0.2	<0.1	0.4
Total +ve PAH's	mg/kg	<0.05	32	1.9	<0.05	5.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	5.1	<0.5	<0.5	0.8
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	5.1	<0.5	<0.5	0.8
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	5.1	<0.5	<0.5	0.9
Surrogate p-Terphenyl-d14	%	122	120	121	119	123

PAHs in Soil						
Our Reference		287470-15	287470-17	287470-19	287470-20	287470-21
Your Reference	UNITS	TP6	TP7	TP8	TP8	BD1/21012022
Depth		0.1-0.2	0.1-0.2	0.1-0.2	0.6-0.7	-
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	31/01/2022	01/02/2022	31/01/2022	01/02/2022	31/01/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	0.2	0.4	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	0.8	1.6	<0.1	0.2
Anthracene	mg/kg	0.1	0.2	0.5	<0.1	<0.1
Fluoranthene	mg/kg	0.6	1.4	3.6	<0.1	0.5
Pyrene	mg/kg	0.7	1.3	3.7	<0.1	0.5
Benzo(a)anthracene	mg/kg	0.4	0.8	2.1	<0.1	0.3
Chrysene	mg/kg	0.4	0.7	1.7	<0.1	0.3
Benzo(b,j+k)fluoranthene	mg/kg	0.8	1	3.6	<0.2	0.6
Benzo(a)pyrene	mg/kg	0.56	0.92	2.5	<0.05	0.4
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3	0.6	1.3	<0.1	0.2
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.4	0.6	1.5	<0.1	0.3
Total +ve PAH's	mg/kg	4.7	8.8	23	<0.05	3.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.7	1.2	3.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.8	1.2	3.5	<0.5	0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.8	1.3	3.5	<0.5	0.6
Surrogate p-Terphenyl-d14	%	91	119	90	121	88

Organochlorine Pesticides in soil						
Our Reference		287470-2	287470-5	287470-15	287470-19	287470-21
Your Reference	UNITS	TP1	TP2	TP6	TP8	BD1/21012022
Depth		0.6-0.7	0.1-0.2	0.1-0.2	0.1-0.2	-
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	88	84	83	81

Organophosphorus Pesticides in Soil						
Our Reference	UNITS	287470-2	287470-5	287470-15	287470-19	287470-21
Your Reference		TP1	TP2	TP6	TP8	BD1/21012022
Depth		0.6-0.7	0.1-0.2	0.1-0.2	0.1-0.2	-
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	88	84	83	81

PCBs in Soil						
Our Reference		287470-2	287470-5	287470-15	287470-19	287470-21
Your Reference	UNITS	TP1	TP2	TP6	TP8	BD1/21012022
Depth		0.6-0.7	0.1-0.2	0.1-0.2	0.1-0.2	-
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	88	84	83	81

Acid Extractable metals in soil

Our Reference		287470-1	287470-2	287470-4	287470-5	287470-6
Your Reference	UNITS	TP1	TP1	TP1	TP2	TP2
Depth		0.1-0.3	0.6-0.7	1.7-1.8	0.1-0.2	0.6-0.7
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/02/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
Date analysed	-	01/02/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
Arsenic	mg/kg	<4	5	7	7	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	2	2
Chromium	mg/kg	<1	7	5	28	17
Copper	mg/kg	1	20	12	340	110
Lead	mg/kg	<1	30	8	630	200
Mercury	mg/kg	<0.1	<0.1	<0.1	0.3	0.2
Nickel	mg/kg	<1	2	<1	19	20
Zinc	mg/kg	6	61	2	1,100	440

Acid Extractable metals in soil

Our Reference		287470-7	287470-9	287470-11	287470-12	287470-13
Your Reference	UNITS	TP2	TP3	TP4	TP4	TP5
Depth		1.3-1.4	0.1-0.2	0.3-0.4	0.7-0.8	0.1-0.2
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/02/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
Date analysed	-	01/02/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
Arsenic	mg/kg	8	9	<4	7	13
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	2
Chromium	mg/kg	5	11	7	4	25
Copper	mg/kg	10	49	15	10	130
Lead	mg/kg	9	84	10	7	280
Mercury	mg/kg	<0.1	0.2	<0.1	<0.1	0.3
Nickel	mg/kg	<1	4	2	<1	7
Zinc	mg/kg	4	110	20	3	220

Acid Extractable metals in soil

Our Reference		287470-15	287470-17	287470-19	287470-20	287470-21
Your Reference	UNITS	TP6	TP7	TP8	TP8	BD1/21012022
Depth		0.1-0.2	0.1-0.2	0.1-0.2	0.6-0.7	-
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/02/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
Date analysed	-	01/02/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
Arsenic	mg/kg	4	6	5	4	5
Cadmium	mg/kg	<0.4	0.9	<0.4	<0.4	<0.4
Chromium	mg/kg	10	14	9	3	9
Copper	mg/kg	27	54	28	7	19
Lead	mg/kg	74	250	52	5	77
Mercury	mg/kg	0.1	0.7	0.1	<0.1	<0.1
Nickel	mg/kg	4	9	4	<1	3
Zinc	mg/kg	92	410	53	3	87

Acid Extractable metals in soil

Our Reference		287470-24	287470-25
Your Reference	UNITS	TP1 - [TRIPLICATE]	TP6 - [TRIPLICATE]
Depth		0.6-0.7	0.1-0.2
Date Sampled		21/01/2022	21/01/2022
Type of sample		Soil	Soil
Date prepared	-	01/02/2022	01/02/2022
Date analysed	-	01/02/2022	01/02/2022
Arsenic	mg/kg	4	6
Cadmium	mg/kg	<0.4	0.4
Chromium	mg/kg	8	12
Copper	mg/kg	21	35
Lead	mg/kg	65	95
Mercury	mg/kg	<0.1	0.2
Nickel	mg/kg	3	6
Zinc	mg/kg	82	130

Misc Soil - Inorg						
Our Reference		287470-2	287470-5	287470-15	287470-19	287470-21
Your Reference	UNITS	TP1	TP2	TP6	TP8	BD1/21012022
Depth		0.6-0.7	0.1-0.2	0.1-0.2	0.1-0.2	-
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Moisture						
Our Reference	UNITS	287470-1	287470-2	287470-4	287470-5	287470-6
Your Reference		TP1	TP1	TP1	TP2	TP2
Depth		0.1-0.3	0.6-0.7	1.7-1.8	0.1-0.2	0.6-0.7
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	01/02/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
Moisture	%	8.6	15	14	20	22

Moisture						
Our Reference	UNITS	287470-7	287470-9	287470-11	287470-12	287470-13
Your Reference		TP2	TP3	TP4	TP4	TP5
Depth		1.3-1.4	0.1-0.2	0.3-0.4	0.7-0.8	0.1-0.2
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	01/02/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
Moisture	%	18	17	18	18	22

Moisture						
Our Reference	UNITS	287470-15	287470-17	287470-19	287470-20	287470-21
Your Reference		TP6	TP7	TP8	TP8	BD1/21012022
Depth		0.1-0.2	0.1-0.2	0.1-0.2	0.6-0.7	-
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/01/2022	31/01/2022	31/01/2022	31/01/2022	31/01/2022
Date analysed	-	01/02/2022	01/02/2022	01/02/2022	01/02/2022	01/02/2022
Moisture	%	17	23	15	18	16

Asbestos ID - soils						
Our Reference	UNITS	287470-1	287470-4	287470-9	287470-13	287470-15
Your Reference		TP1	TP1	TP3	TP5	TP6
Depth		0.1-0.3	1.7-1.8	0.1-0.2	0.1-0.2	0.1-0.2
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	03/02/2022	03/02/2022	03/02/2022	03/02/2022	03/02/2022
Sample mass tested	g	Approx. 45g	Approx. 45g	Approx. 40g	Approx. 40g	Approx. 40g
Sample Description	-	Brown sandy soil	Beige coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils				
Our Reference	UNITS	287470-17	287470-19	287470-21
Your Reference		TP7	TP8	BD1/21012022
Depth		0.1-0.2	0.1-0.2	-
Date Sampled		21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil
Date analysed	-	03/02/2022	03/02/2022	03/02/2022
Sample mass tested	g	Approx. 45g	Approx. 40g	Approx. 45g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils NEPM					
Our Reference		287470-2	287470-5	287470-6	287470-11
Your Reference	UNITS	TP1	TP2	TP2	TP4
Depth		0.6-0.7	0.1-0.2	0.6-0.7	0.3-0.4
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	07/02/2022	07/02/2022	07/02/2022	07/02/2022
Sample mass tested	g	823.32	861.76	897.15	703.96
Sample Description	-	Grey coarse-grained soil & rocks	Grey coarse-grained soil & rocks	Grey coarse-grained soil & rocks	Grey coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	Chrysotile asbestos detected Organic fibres detected	Chrysotile asbestos detected Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos ^{#1}	g/kg	<0.1	3.3889	0.3637	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	See Above	See Above	No visible asbestos detected
ACM >7mm Estimation*	g	—	2.9204	0.0096	—
FA and AF Estimation*	g	—	—	0.3167	—
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	0.0353	<0.001

Asbestos ID - materials		
Our Reference		287470-8
Your Reference	UNITS	TP2-FC1-0.2
Depth		0.2
Date Sampled		21/01/2022
Type of sample		Material
Date analysed	-	01/02/2022
Mass / Dimension of Sample	-	120x70x8mm
Sample Description	-	Beige compressed fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected
Trace Analysis	-	[NT]

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	<p>Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004.</p> <p>Results reported denoted with * are outside our scope of NATA accreditation.</p> <p>NOTE #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF)</p> <p>NOTE #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres.</p> <p>Estimation = Estimated asbestos weight</p> <p>Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.</p>
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.

Method ID	Methodology Summary
Org-020	<p>Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.</p> <p>F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.</p> <p>Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).</p>
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	<p>Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.</p> <p>Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PCBs" is simply a sum of the positive individual PCBs.</p>
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	<p>Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS.</p> <p>Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.</p>
Org-022/025	<p>Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.</p> <p>For soil results:-</p> <ol style="list-style-type: none"> 1. 'EQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. <p>Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.</p>
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	<p>Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.</p> <p>Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.</p>

Client Reference: 210392.00, North Sydney (NSPS)

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	287470-5
Date extracted	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
Date analysed	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
TRH C ₆ - C ₉	mg/kg	25	Org-023	<25	2	<25	<25	0	83	77
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	2	<25	<25	0	83	77
Benzene	mg/kg	0.2	Org-023	<0.2	2	<0.2	<0.2	0	79	72
Toluene	mg/kg	0.5	Org-023	<0.5	2	<0.5	<0.5	0	78	72
Ethylbenzene	mg/kg	1	Org-023	<1	2	<1	<1	0	88	83
m+p-xylene	mg/kg	2	Org-023	<2	2	<2	<2	0	84	80
o-Xylene	mg/kg	1	Org-023	<1	2	<1	<1	0	82	76
Naphthalene	mg/kg	1	Org-023	<1	2	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	101	2	86	75	14	91	78

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	31/01/2022	31/01/2022		[NT]	[NT]
Date analysed	-			[NT]	15	31/01/2022	31/01/2022		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-023	[NT]	15	<25	<25	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	[NT]	15	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	15	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	15	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	15	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	15	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	15	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	15	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	15	86	77	11	[NT]	[NT]

Client Reference: 210392.00, North Sydney (NSPS)

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	287470-5
Date extracted	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
Date analysed	-			31/01/2022	2	01/02/2022	01/02/2022		31/01/2022	01/02/2022
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	2	<50	<50	0	95	101
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	2	<100	<100	0	105	106
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	2	<100	<100	0	127	81
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	2	<50	<50	0	95	101
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	2	<100	<100	0	105	106
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	2	<100	<100	0	127	81
Surrogate o-Terphenyl	%		Org-020	98	2	100	96	4	89	93

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	31/01/2022	31/01/2022		[NT]	[NT]
Date analysed	-			[NT]	15	01/02/2022	01/02/2022		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	[NT]	15	<50	<50	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	[NT]	15	<100	<100	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	[NT]	15	<100	<100	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	[NT]	15	<50	<50	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	[NT]	15	100	110	10	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	[NT]	15	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	15	95	94	1	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	287470-5
Date extracted	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
Date analysed	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	92	101
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	87	95
Fluorene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	93	101
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	2	0.2	0.5	86	94	98
Anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	0.2	67	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	2	0.6	1	50	92	100
Pyrene	mg/kg	0.1	Org-022/025	<0.1	2	0.6	0.9	40	95	107
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	2	0.4	0.4	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	2	0.4	0.5	22	71	79
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	2	0.7	0.8	13	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	2	0.5	0.58	15	114	116
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	2	0.3	0.3	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	2	0.3	0.3	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	122	2	101	92	9	89	97

QUALITY CONTROL: PAHs in Soil						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	31/01/2022	31/01/2022		[NT]	[NT]
Date analysed	-			[NT]	15	31/01/2022	31/01/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	15	0.1	0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	15	0.2	0.3	40	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	15	0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	15	0.6	0.7	15	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	15	0.7	0.7	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	15	0.4	0.4	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	15	0.4	0.4	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	15	0.8	0.8	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	15	0.56	0.58	4	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	15	0.3	0.3	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	15	0.4	0.4	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	15	91	89	2	[NT]	[NT]

Client Reference: 210392.00, North Sydney (NSPS)

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	287470-5
Date extracted	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
Date analysed	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	82	90
HCB	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	89	96
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	81	93
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	77	85
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	88	98
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	90	103
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	92	99
Endrin	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	86	114
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	88	98
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	80	87
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	91	2	89	87	2	80	88

Client Reference: 210392.00, North Sydney (NSPS)

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	31/01/2022	31/01/2022		[NT]	[NT]
Date analysed	-			[NT]	15	31/01/2022	31/01/2022		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	15	84	84	0	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	287470-5
Date extracted	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
Date analysed	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	66	76
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	91	102
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	75	69
Malathion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	97	122
Chlorpyrifos	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	98	113
Parathion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	72	72
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	94	107
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	91	2	89	87	2	80	88

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	31/01/2022	31/01/2022		[NT]	[NT]
Date analysed	-			[NT]	15	31/01/2022	31/01/2022		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	15	84	84	0	[NT]	[NT]

Client Reference: 210392.00, North Sydney (NSPS)

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	287470-5
Date extracted	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
Date analysed	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	107	80
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	91	2	89	87	2	80	88

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	31/01/2022	31/01/2022		[NT]	[NT]
Date analysed	-			[NT]	15	31/01/2022	31/01/2022		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	15	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	15	84	84	0	[NT]	[NT]

Client Reference: 210392.00, North Sydney (NSPS)

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	287470-5
Date prepared	-			01/02/2022	2	01/02/2022	01/02/2022		01/02/2022	01/02/2022
Date analysed	-			01/02/2022	2	01/02/2022	01/02/2022		01/02/2022	01/02/2022
Arsenic	mg/kg	4	Metals-020	<4	2	5	4	22	103	102
Cadmium	mg/kg	0.4	Metals-020	<0.4	2	<0.4	<0.4	0	99	86
Chromium	mg/kg	1	Metals-020	<1	2	7	7	0	99	85
Copper	mg/kg	1	Metals-020	<1	2	20	24	18	98	#
Lead	mg/kg	1	Metals-020	<1	2	30	48	46	99	#
Mercury	mg/kg	0.1	Metals-021	<0.1	2	<0.1	<0.1	0	111	89
Nickel	mg/kg	1	Metals-020	<1	2	2	3	40	99	81
Zinc	mg/kg	1	Metals-020	<1	2	61	77	23	103	#

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	15	01/02/2022	01/02/2022		[NT]	[NT]
Date analysed	-			[NT]	15	01/02/2022	01/02/2022		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	15	4	6	40	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	15	<0.4	0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	15	10	12	18	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	15	27	61	77	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	15	74	110	39	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	15	0.1	0.2	67	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	15	4	6	40	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	15	92	130	34	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	287470-5
Date prepared	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
Date analysed	-			31/01/2022	2	31/01/2022	31/01/2022		31/01/2022	31/01/2022
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	2	<5	<5	0	98	97

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Acid Extractable Metals in Soil:

- The laboratory RPD acceptance criteria has been exceeded for 287470-2 for Pb. Therefore a triplicate result has been issued as laboratory sample number 287470-24.
- The laboratory RPD acceptance criteria has been exceeded for 287470-15 for Cu. Therefore a triplicate result has been issued as laboratory sample number 287470-25.
- # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures.

We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.

Note: Samples 287470-1, 4, 9, 13, 15, 17, 19, 21 were sub-sampled from jars provided by the client.

Asbestos-ID in soil: NEPM

This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Factual description of asbestos identified in the soil samples: NEPM

Sample 287470-5; Chrysotile asbestos identified in 19.4696g of fibre cement material >7mm

Sample 287470-6; Chrysotile asbestos identified in 0.0638g of fibre cement material >7mm

Sample 287470-6; Chrysotile asbestos identified in 0.3959g of fibrous matted material

Project No: 210392.00				Suburb: North Sydney (NSPS)				To: Lab name: Envirolab Services							
Project Manager: Lisa Teng				Order Number:				Sampler: GS				Lab address: 12 Ashley St, Chatswood NSW 2067			
Email: Lisa.Teng@douglaspartners.com.au								Attn: Sample Receipt							
Turnaround time: <input checked="" type="checkbox"/> Standard <input type="checkbox"/> 72 hour <input type="checkbox"/> 48 hour <input type="checkbox"/> 24 hour <input checked="" type="checkbox"/> Same day								Contact: (02) 9910 6200 Email: samplereceipt@envirolab.com.au							
Prior Storage: <input checked="" type="checkbox"/> Fridge <input type="checkbox"/> Freezer <input type="checkbox"/> Shelf				Do samples contain 'potential' HBM? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (If YES, then handle, transport and store in accordance with FPM HAZID)											

Lab ID	Sample ID			Date Sampled	Sample Type	Container Type	Analytes												Notes/ Preservation/ Additional Requirements
	Location / Other ID	Depth From	Depth To		S - soil W - water	G - glass P - plastic	Combo- 8A	Combo- 3A	Combo- 3	Asbestos In Material	TRH & BTEX	Asbestos 500 ml	TCLP(HM/P AH)	Hold	Combo 8				
1	TP1	0.1	0.3	21/01/22	S	G/P		x											
2	TP1	0.6	0.7	21/01/22	S	G/P	x					x							
3	TP1	1.2	1.3	21/01/22	S	G/P							x						
4	TP1	1.7	1.8	21/01/22	S	G/P		x											
5	TP2	0.1	0.2	21/01/22	S	G/P						x			x				
6	TP2	0.6	0.7	21/01/22	S	G/P			x			x							
7	TP2	1.3	1.4	21/01/22	S	G/P			x										
8	TP2-FC1-0.2	0.2		21/01/22	S	G/P				x									
9	TP3	0.1	0.2	21/01/22	S	G/P		x											
10	TP3	0.7	0.8	21/01/22	S	G/P								x					
11	TP4	0.3	0.4	21/01/22	S	G/P			x			x							
12	TP4	0.7	0.8	21/01/22	S	G/P			x										
13	TP5	0.1	0.2	21/01/22	S	G/P		x											
14	TP5	0.5	0.6	21/01/22	S	G/P								x					

Metals to analyse:

Number of samples in container:

Send results to: Douglas Partners Pty Ltd

Address: 96, Hermitage Road, West Ryde NSW

Relinquished by: Srikanth-Raghuraman

Transported to laboratory by: Courier

Phone: 9809 0666

Date: 27/01/2022

Signed:

LAB RECEIPT

Lab Ref. No: 287470

Received by: TJHAN

Date & Time: 21-1-2022 @ 1335

Signed:

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Lab No: 287470

Date Received: 21-1-2022

Time Received: 1335

Received By: TJHAN

Temp: Cool/Ambient

Cooling: Ice/Coolpack

Security: Intact/Broken/None

Project No: 210392.00	Suburb: North Sydney (NSPS)	To: Lab name: Envirolab Services
Project Manager: Lisa Teng	Order Number:	Dispatch date: 27/01/2022
		Lab address: 12 Ashley St, Chatswood NSW 2067

Lab ID	Sample ID			Date Sampled	Sample Type	Container Type	Analytes											Notes/ Preservation/ Additional Requirements
	Location / Other ID	Depth From	Depth To		S - soil W - water	G - glass P - plastic	Combo- 8A	Combo- 3A	Combo- 3	Asbestos In Material	TRH, BTEX	Asbestos 500 ml	TCLP(HM/P AH)	Hold	Combo 8			
15	TP6	0.1	0.2	21/01/22	S	G/P	x											
16	TP6	0.6	0.7	21/01/22	S	G/P								x				
17	TP7	0.1	0.2	21/01/22	S	G/P		x										
18	TP7	0.6	0.7	21/01/22	S	G/P								x				
19	TP8	0.1	0.2	21/01/22	S	G/P	x											
20	TP8	0.6	0.7	21/01/22	S	G/P			x									
21	BD1-21012022			21/01/22	S	G/P	x											
	BD2-21012022			22/01/22	S	G/P	x											Send this to Inter-lab - ALS
22	TS			22/01/22	S	G/P					x							
23	TB			22/01/22	S	G/P					x							

CERTIFICATE OF ANALYSIS 287470-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Lisa Teng
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	<u>210392.00, North Sydney (NSPS)</u>
Number of Samples	additional analysis
Date samples received	27/01/2022
Date completed instructions received	04/02/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	11/02/2022
Date of Issue	08/02/2022
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Kyle Gavrily, Chemist

Authorised By



Nancy Zhang, Laboratory Manager

sTPH in Soil (C10-C40)-Silica				
Our Reference		287470-A-9	287470-A-17	287470-A-19
Your Reference	UNITS	TP3	TP7	TP8
Depth		0.1-0.2	0.1-0.2	0.1-0.2
Date Sampled		21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	04/02/2022	04/02/2022	04/02/2022
Date analysed	-	08/02/2022	08/02/2022	08/02/2022
TPH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50
TPH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100
TPH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100
TPH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50
TPH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100
TPH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100
Surrogate o-Terphenyl	%	89	92	93

TCLP Preparation - Acid

Our Reference		287470-A-5	287470-A-6	287470-A-9	287470-A-13	287470-A-17
Your Reference	UNITS	TP2	TP2	TP3	TP5	TP7
Depth		0.1-0.2	0.6-0.7	0.1-0.2	0.1-0.2	0.1-0.2
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
pH of soil for fluid# determ.	pH units	8.3	8.4	8.2	8.1	8.1
pH of soil TCLP (after HCl)	pH units	1.8	1.8	1.8	1.8	1.8
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.3	5.1	5.0	5.0	5.0

TCLP Preparation - Acid

Our Reference		287470-A-19
Your Reference	UNITS	TP8
Depth		0.1-0.2
Date Sampled		21/01/2022
Type of sample		Soil
pH of soil for fluid# determ.	pH units	8.0
pH of soil TCLP (after HCl)	pH units	1.8
Extraction fluid used	-	1
pH of final Leachate	pH units	4.9

PAHs in TCLP (USEPA 1311)				
Our Reference		287470-A-9	287470-A-17	287470-A-19
Your Reference	UNITS	TP3	TP7	TP8
Depth		0.1-0.2	0.1-0.2	0.1-0.2
Date Sampled		21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	07/02/2022	07/02/2022	07/02/2022
Date analysed	-	08/02/2022	08/02/2022	08/02/2022
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(b,k)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate <i>p</i> -Terphenyl-d14	%	119	115	124

Metals from Leaching Fluid pH 2.9 or 5					
Our Reference		287470-A-5	287470-A-6	287470-A-13	287470-A-17
Your Reference	UNITS	TP2	TP2	TP5	TP7
Depth		0.1-0.2	0.6-0.7	0.1-0.2	0.1-0.2
Date Sampled		21/01/2022	21/01/2022	21/01/2022	21/01/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	07/02/2022	07/02/2022	07/02/2022	07/02/2022
Date analysed	-	07/02/2022	07/02/2022	07/02/2022	07/02/2022
Lead	mg/L	0.88	2.4	0.08	0.06

Method ID	Methodology Summary
INORG-004	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-004	<p>Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311.</p> <p>Please note that the mass used may be scaled down from default based on sample mass available.</p> <p>Samples are stored at 2-6oC before and after leachate preparation.</p>
Metals-020	Determination of various metals by ICP-AES following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Leachates are extracted with Dichloromethane and analysed by GC-MS/GC-MSMS.

Client Reference: 210392.00, North Sydney (NSPS)

QUALITY CONTROL: sTPH in Soil (C10-C40)-Silica						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			07/02/2022	[NT]	[NT]	[NT]	[NT]	04/02/2022	[NT]
Date analysed	-			08/02/2022	[NT]	[NT]	[NT]	[NT]	08/02/2022	[NT]
TPH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	75	[NT]
TPH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	70	[NT]
TPH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	94	[NT]
TPH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	75	[NT]
TPH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	75	[NT]
TPH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	94	[NT]
Surrogate o-Terphenyl	%		Org-020	84	[NT]	[NT]	[NT]	[NT]	109	[NT]

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			07/02/2022	[NT]	[NT]	[NT]	[NT]	07/02/2022	[NT]
Date analysed	-			08/02/2022	[NT]	[NT]	[NT]	[NT]	08/02/2022	[NT]
Naphthalene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	78	[NT]
Acenaphthylene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	81	[NT]
Fluorene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	84	[NT]
Phenanthrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	98	[NT]
Anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	90	[NT]
Pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	95	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	63	[NT]
Benzo(b)fluoranthene in TCLP	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	92	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	104	[NT]	[NT]	[NT]	[NT]	97	[NT]

Client Reference: 210392.00, North Sydney (NSPS)

QUALITY CONTROL: Metals from Leaching Fluid pH 2.9 or 5						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			07/02/2022	[NT]	[NT]	[NT]	[NT]	07/02/2022	[NT]
Date analysed	-			07/02/2022	[NT]	[NT]	[NT]	[NT]	07/02/2022	[NT]
Lead	mg/L	0.03	Metals-020	<0.03	[NT]	[NT]	[NT]	[NT]	94	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Lisa Teng

Sample Login Details

Your reference	210392.00, North Sydney (NSPS)
Envirolab Reference	287470-A
Date Sample Received	27/01/2022
Date Instructions Received	04/02/2022
Date Results Expected to be Reported	11/02/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	additional analysis
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	17
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolab.com.au	Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:



Envirolab Services Pty Ltd

ABN 37 112 535 645

12 Ashley St Chatswood NSW 2067

ph 02 9910 6200 fax 02 9910 6201

customerservice@envirolab.com.au

www.envirolab.com.au

Sample ID	sTPH in Soil (C10-C40)-Silica	TCLP Preparation - Acid	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(b)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	Lead	On Hold
TP1-0.1-0.3																					✓
TP1-0.6-0.7																					✓
TP1-1.2-1.3																					✓
TP1-1.7-1.8																					✓
TP2-0.1-0.2		✓																		✓	
TP2-0.6-0.7		✓																		✓	
TP2-1.3-1.4																					✓
TP2-FC1-0.2-0.2																					✓
TP3-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
TP3-0.7-0.8																					✓
TP4-0.3-0.4																					✓
TP4-0.7-0.8																					✓
TP5-0.1-0.2		✓																		✓	
TP5-0.5-0.6																					✓
TP6-0.1-0.2																					✓
TP6-0.6-0.7																					✓
TP7-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TP7-0.6-0.7																					✓
TP8-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
TP8-0.6-0.7																					✓

Sample ID	sTPH in Soil (C10-C40)-Silica	TCLP Preparation - Acid	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(b)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	Lead	On Hold
BD1/21012022																					✓
TS																					✓
TB																					✓
TP1 - [TRIPLICATE]-0.6-0.7																					✓
TP6 - [TRIPLICATE]-0.1-0.2																					✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Ming To

Subject: FW: Additional Testing

Ref: 287470-A
TAT: Standard
Due: 11/02/2022
M7

287470-A



From: Lisa Teng <Lisa.Teng@douglaspartners.com.au>
Sent: Friday, 4 February 2022 5:11 PM
To: Aileen Hie <AHie@envirolab.com.au>
Cc: Samplereceipt <Samplereceipt@envirolabservices.com.au>
Subject: Additional Testing

CAUTION: This email originated from outside of the organisation. Do not act on instructions, click links or open attachments unless you recognise the sender and know the content is authentic and safe.

Hi Aileen,

Would we be able to schedule the following additional test please?
They are close to holding time, is there anyway to have them prepped today but results on standard TAT please??

ELSJOb 287470 DP 210392.00

PAH TCLP

- 9 - TP3/0.1-0.2
- 19 - TP8/0.1-0.2
- 17 - TP7/0.1-0.2

Silica gel clean up and chromatograms of:

- 9 - TP3/0.1-0.2
- 19 - TP8/0.1-0.2
- 17 - TP7/0.1-0.2

Lead TCLP"

- 5 - TP2/0.1-0.2
- 6 - TP2/0.6-0.7
- 13 - TP5/0.1-0.2
- 17 - TP7/0.1-0.2

Thank you as always!

Lisa Teng | Environmental Engineer
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 9809 0666 | M: +61 437 976 196 | E: Lisa.Teng@douglaspartners.com.au



To find information on our COVID-19 measures, please visit douglaspartners.com.au/news/covid-19

CERTIFICATE OF ANALYSIS

Work Order : **ES2202937**
Client : **DOUGLAS PARTNERS PTY LTD**
Contact : LISA TENG
Address : 96 HERMITAGE ROAD
 WEST RYDE NSW, AUSTRALIA 2114
Telephone : ----
Project : 210392.00
Order number : ----
C-O-C number : ----
Sampler : GS
Site : ----
Quote number : EN/222
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 8
Laboratory : Environmental Division Sydney
Contact : Sepan Mahamad
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61 2 8784 8555
Date Samples Received : 28-Jan-2022 16:00
Date Analysis Commenced : 01-Feb-2022
Issue Date : 04-Feb-2022 16:57



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Brendan Schrader	Laboratory Technician	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EG005T: Poor precision was obtained for Chromium on sample EP2200832 # 001. Confirmed by redigestion and reanalysis.
- EG035: Positive Mercury result ES2202937 #1 has been confirmed by reanalysis.
- **EA200: As only one sample container was submitted for multiple tests, sub sampling was conducted prior to Asbestos analysis. As this has the potential to understate detection, results should be scrutinised accordingly.**
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BD2-21012022	----	----	----	----
			Sampling date / time	21-Jan-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2202937-001	-----	-----	-----	-----
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	17.2	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	----	----	----	----
Asbestos (Trace)	1332-21-4	5	Fibres	No	----	----	----	----
Asbestos Type	1332-21-4	-	--	-	----	----	----	----
Sample weight (dry)	----	0.01	g	30.0	----	----	----	----
APPROVED IDENTIFIER:	----	-	--	B.SCHRADER	----	----	----	----
Synthetic Mineral Fibre	----	0.1	g/kg	No	----	----	----	----
Organic Fibre	----	0.1	g/kg	No	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	8	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	15	----	----	----	----
Copper	7440-50-8	5	mg/kg	46	----	----	----	----
Lead	7439-92-1	5	mg/kg	147	----	----	----	----
Nickel	7440-02-0	2	mg/kg	8	----	----	----	----
Zinc	7440-66-6	5	mg/kg	204	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.1	----	----	----	----
EP035SF: Total Phenol by Segmented Flow Analyser								
Phenols (Total)	----	1	mg/kg	<1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD2-21012022	----	----	----	----
Sampling date / time					21-Jan-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2202937-001	-----	-----	-----	-----
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		<0.05	----	----	----	----
4,4'-DDE	72-55-9	0.05	mg/kg		<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	----	----	----	----
4,4'-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	----
4,4'-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD2-21012022	----	----	----	----
				Sampling date / time	21-Jan-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2202937-001	-----	-----	-----	-----
				Result	----	----	----	----	----
EP068B: Organophosphorus Pesticides (OP) - Continued									
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		0.6	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		0.6	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		1.2	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD2-21012022	----	----	----	----
Sampling date / time				21-Jan-2022 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2202937-001	-----	-----	-----	-----	-----
Result				----	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%	69.2	----	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%	73.2	----	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%	93.6	----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%	81.6	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	83.4	----	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%	68.4	----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%	90.0	----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	97.2	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	86.5	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	74.1	----	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	91.1	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	90.3	----	----	----	----	----

Page : 7 of 8
Work Order : ES2202937
Client : DOUGLAS PARTNERS PTY LTD
Project : 210392.00



Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Sample ID - Sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	BD2-21012022 - 21-Jan-2022 00:00	A soil sample.



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(SOIL) EA200: AS 4964 - 2004 Identification of Asbestos in Soils

QUALITY CONTROL REPORT

Work Order	: ES2202937	Page	: 1 of 10
Client	: DOUGLAS PARTNERS PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: LISA TENG	Contact	: Sepan Mahamad
Address	: 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 2114	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: 210392.00	Date Samples Received	: 28-Jan-2022
Order number	: ----	Date Analysis Commenced	: 01-Feb-2022
C-O-C number	: ----	Issue Date	: 04-Feb-2022
Sampler	: GS		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Brendan Schrader	Laboratory Technician	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4150331)									
ES2202958-043	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	10	11	9.8	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	16	11	35.1	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	9	8	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	30	39	26.9	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	14	15	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	62	49	22.9	0% - 50%
EP2200832-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	56	# 74	27.7	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	10	10	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	7	8	21.1	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	82	68	18.2	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	32	32	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	442	468	5.6	0% - 20%
EP035SF: Total Phenol by Segmented Flow Analyser (QC Lot: 4150786)									
EP2200978-001	Anonymous	EP035SF: Phenols (Total)	----	1	mg/kg	<1	<1	0.0	No Limit
EP2201051-008	Anonymous	EP035SF: Phenols (Total)	----	1	mg/kg	<1	<1	0.0	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4150340)									
ES2202692-002	Anonymous	EA055: Moisture Content	----	0.1	%	4.9	4.9	0.0	No Limit
ES2202958-047	Anonymous	EA055: Moisture Content	----	0.1	%	18.0	14.8	19.6	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4150332)									
EP2200832-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES2202854-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 4147414)									
ES2202834-021	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 4147413)									
ES2202834-021	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit		
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 4147413)									
ES2202834-021	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 4147413) - continued									
ES2202834-021	Anonymous	EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4147412)									
ES2202834-021	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		205-82-3							
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenzo(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4147411)									
ES2202143-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES2202834-021	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4149327)									
ES2202692-002	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES2203027-002	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4147411)									
ES2202143-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES2202834-021	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit

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 Work Order : ES2202937
 Client : DOUGLAS PARTNERS PTY LTD
 Project : 210392.00



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4147411) - continued									
ES2202834-021	Anonymous	EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4149327)									
ES2202692-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES2203027-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080: BTEXN (QC Lot: 4149327)									
ES2202692-002	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES2203027-002	Anonymous	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
		EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit



Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4150331)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	104	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	102	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	116	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	108	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	103	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	105	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	95.8	66.0	133
EP035SF: Total Phenol by Segmented Flow Analyser (QCLot: 4150786)								
EP035SF: Phenols (Total)	----	1	mg/kg	<1	20 mg/kg	89.0	79.9	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4150332)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	94.2	70.0	125
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4147414)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	81.0	62.0	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 4147413)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	89.3	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	92.5	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	88.5	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.9	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.8	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	89.0	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	91.6	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	96.1	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.6	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	93.4	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	93.0	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	91.5	66.0	116
EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	90.6	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	94.9	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.2	69.0	115
EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	91.4	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	98.4	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.4	62.0	124
EP068: 4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	88.9	66.0	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	93.4	64.0	122



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP068A: Organochlorine Pesticides (OC) (QCLot: 4147413) - continued								
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	95.6	54.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4147413)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	90.3	59.0	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.6	62.0	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	92.4	54.0	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	93.0	67.0	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	93.3	70.0	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	86.3	72.0	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	83.3	68.0	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	84.5	68.0	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	83.8	69.0	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	88.5	76.0	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	83.8	64.0	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	83.9	70.0	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	97.1	69.0	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	90.2	66.0	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	90.8	68.0	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	99.0	62.0	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.8	68.0	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	87.8	65.0	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	90.5	41.0	123
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4147412)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	94.8	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	88.3	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	91.1	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	93.5	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	95.2	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	91.6	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	96.1	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	96.8	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	90.0	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	91.8	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	87.5	68.0	116
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	93.9	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	80.8	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	90.0	61.0	121
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	88.6	62.0	118
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	88.5	63.0	121



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4147411)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	104	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	107	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	107	71.0	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4149327)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	93.3	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4147411)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	106	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	106	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	111	63.0	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4149327)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	80.8	68.4	128
EP080: BTEXN (QCLot: 4149327)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	80.4	62.0	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	83.1	67.0	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	82.0	65.0	117
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	93.0	66.0	118
	106-42-3							
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	91.8	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	86.2	63.0	119

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4150331)							
EP2200832-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	93.0	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	94.5	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	103	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	92.3	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	94.4	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	93.3	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	93.4	66.0	133
EP035SF: Total Phenol by Segmented Flow Analyser (QCLot: 4150786)							
EP2200978-001	Anonymous	EP035SF: Phenols (Total)	----	20 mg/kg	93.7	76.0	131



Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4150332)							
EP2200832-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	95.7	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4147414)							
ES2202834-021	Anonymous	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	85.0	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 4147413)							
ES2202834-021	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	103	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	101	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	100.0	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	104	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	101	70.0	130
		EP068: 4,4'-DDT	50-29-3	2 mg/kg	97.3	70.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4147413)							
ES2202834-021	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	109	70.0	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	102	70.0	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	118	70.0	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	92.1	70.0	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	79.4	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4147412)							
ES2202834-021	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	84.9	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	92.2	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4147411)							
ES2202834-021	Anonymous	EP071: C10 - C14 Fraction	----	480 mg/kg	111	73.0	137
		EP071: C15 - C28 Fraction	----	3100 mg/kg	108	53.0	131
		EP071: C29 - C36 Fraction	----	2060 mg/kg	111	52.0	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4149327)							
ES2202692-002	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	97.3	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4147411)							
ES2202834-021	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	102	73.0	137
		EP071: >C16 - C34 Fraction	----	4320 mg/kg	111	53.0	131
		EP071: >C34 - C40 Fraction	----	890 mg/kg	102	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4149327)							
ES2202692-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	94.1	70.0	130
EP080: BTEXN (QCLot: 4149327)							
ES2202692-002	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	90.4	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	89.2	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	89.1	70.0	130



Sub-Matrix: SOIL

Laboratory sample IDSample IDMethod: CompoundCAS Number				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
				Concentration	MS	Low	High
EP080: BTEXN (QCLot: 4149327) - continued							
ES2202692-002	Anonymous	EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	85.6	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	92.9	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	77.0	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2202937	Page	: 1 of 6
Client	: DOUGLAS PARTNERS PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: LISA TENG	Telephone	: +61 2 8784 8555
Project	: 210392.00	Date Samples Received	: 28-Jan-2022
Site	: ----	Issue Date	: 04-Feb-2022
Sampler	: GS	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- Duplicate outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG005(ED093)T: Total Metals by ICP-AES	EP2200832--001	Anonymous	Chromium	7440-47-3	27.7 %	0% - 20%	RPD exceeds LOR based limits

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055) BD2-21012022	21-Jan-2022	----	----	----	02-Feb-2022	04-Feb-2022	✓
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Snap Lock Bag - ACM/Asbestos Grab Bag (EA200) BD2-21012022	21-Jan-2022	----	----	----	01-Feb-2022	20-Jul-2022	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) BD2-21012022	21-Jan-2022	02-Feb-2022	20-Jul-2022	✓	02-Feb-2022	20-Jul-2022	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) BD2-21012022	21-Jan-2022	02-Feb-2022	18-Feb-2022	✓	03-Feb-2022	18-Feb-2022	✓
EP035SF: Total Phenol by Segmented Flow Analyser							
Soil Glass Jar - Unpreserved (EP035SF) BD2-21012022	21-Jan-2022	02-Feb-2022	04-Feb-2022	✓	04-Feb-2022	04-Feb-2022	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066) BD2-21012022	21-Jan-2022	02-Feb-2022	04-Feb-2022	✓	03-Feb-2022	14-Mar-2022	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068) BD2-21012022	21-Jan-2022	02-Feb-2022	04-Feb-2022	✓	03-Feb-2022	14-Mar-2022	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068) BD2-21012022	21-Jan-2022	02-Feb-2022	04-Feb-2022	✓	03-Feb-2022	14-Mar-2022	✓

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 Work Order : ES2202937
 Client : DOUGLAS PARTNERS PTY LTD
 Project : 210392.00



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) BD2-21012022	21-Jan-2022	02-Feb-2022	04-Feb-2022	✓	03-Feb-2022	14-Mar-2022	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) BD2-21012022	21-Jan-2022	02-Feb-2022	04-Feb-2022	✓	03-Feb-2022	04-Feb-2022	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) BD2-21012022	21-Jan-2022	02-Feb-2022	04-Feb-2022	✓	03-Feb-2022	04-Feb-2022	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) BD2-21012022	21-Jan-2022	02-Feb-2022	04-Feb-2022	✓	03-Feb-2022	04-Feb-2022	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	10	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	10	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol By Discrete Analyser	EP035SF	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol By Discrete Analyser	EP035SF	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol By Discrete Analyser	EP035SF	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol By Discrete Analyser	EP035SF	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl ₂) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
Total Phenol By Discrete Analyser	EP035SF	SOIL	In house: Referenced to ISO 14402. Phenols are extracted in 1M NaOH. The extract is diluted by 10 and then in-line-distilled at pH 1- 4. The distillate, containing steam-volatile phenolic compounds is then oxidised by hexacyanoferrate(III). The resulting quinones react with 4-aminoantipyrine forming red condensation products, which are measured spectrometrically in a flow spectrometer at 505 nm. This method is compliant with NEPM Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	Method	Matrix	Method Descriptions
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Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Extraction for Total Phenols in soil	EP035-PR	SOIL	In house: Soil sub-sample is extracted in 1M NaOH by tumbling for between 6 and 16 hours. The resulting extract is diluted 10 times with reagent grade water prior to analysis.
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

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Appendix I

Data Quality Objectives, Quality Assurance and Quality Control

Appendix I

Data Quality Objectives, Quality Assurance and Quality Control

11.0 Data Quality Objectives

The DSI has been devised broadly in accordance with the seven-step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)* [NEPM] (NEPC, 2013).

Step	Summary
1: State the problem	<p>The objective of the investigation was to confirm the contamination status of the site with respect to the proposed land use. The report was being undertaken to support the design and construct stage of the project.</p> <p>A conceptual site model (CSM) has been prepared (Section 7) for the proposed development.</p> <p>The project team consisted of experienced environmental engineers and scientists working in the roles of Project Principal, Project Reviewer, Project Manager and field staff.</p>
2: Identify the decisions / goal of the study	<p>The site history had identified possible contaminating previous uses which are identified in the CSM (Section 7). The CSM identifies the associated contaminants of potential concern (COPC) and the likely impacted media. The site assessment criteria (SAC) for each of the COPC are detailed in Appendix E.</p> <p>The decision is to establish whether or not the results fall below the SAC or whether or not the 95% upper confidence limit of the sample population falls below the SAC. On this basis, an assessment of the site's suitability was undertaken, from a contamination perspective, to determine whether (or not) further assessment and / or remediation is required.</p>
3: Identify the information inputs	<p>Inputs to the investigation include the results of analysis of samples to measure the concentrations of COPC identified in the CSM (Section 7) at the site using NATA accredited laboratories and methods, where possible. The SAC for each of the COPC are detailed in Appendix E.</p> <p>A photoionization detector (PID) was used on-site to screen soils for VOC. PID readings were used to inform sample selection for laboratory analysis.</p>
4: Define the study boundaries	<p>The lateral boundaries of the investigation area are shown on Drawing 1, Appendix A. The vertical boundaries are to the extent of contamination impact as determined from the site history assessment and site observations. The assessment was limited to the timeframe over which the field investigation was undertaken. Constraints to the assessment are identified and discussed in the conclusions of the report, Section 14.</p>
5: Develop the analytical approach (or decision rule)	<p>The decision rule is to compare all analytical results with SAC (Appendix E, based on NEPC (2013)). Where guideline values were absent, other sources of guideline values accepted by NEPC (2013) were adopted where possible.</p> <p>Where a sample result exceeded the adopted criterion, a further site-specific assessment was made as to the risk posed by the presence of that contaminant(s).</p>

Step	Summary
	Initial comparisons were with individual results then, where required, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL)) to assess potential risks posed by the site contamination. Quality control results were assessed according to their relative percent difference (RPD) values. For field duplicates, triplicates and laboratory results, RPDs should generally be below 30%; for field blanks, results should be at or less than the limits of reporting (NEPC, 2013). The field and laboratory quality assurance assessment is included in Appendix I.
6: Specify the performance or acceptance criteria	<p>Baseline condition: Contaminants at the site and/or statistical analysis of data (in line with NEPC (2013)) exceed human health and environmental SAC and pose a potentially unacceptable risk to receptors (null hypothesis).</p> <p>Alternative condition: Contaminants at the site and statistical analysis of data (in line with NEPC (2013)) comply with human health and environmental SAC and as such, do not pose a potentially unacceptable risk to receptors (alternative hypothesis).</p> <p>Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it is assumed that the baseline condition is true.</p> <p>Uncertainty that may exist due to the above potential decision errors shall be mitigated as follows:</p> <ul style="list-style-type: none"> As well as a primary screening exercise, the use of the 95% UCL as per NEPC (2013) was applied, i.e.: 95% is the defined confidence level associated with the UCL on the geometric mean for contaminant data. The resultant 95% UCL shall be screened against the corresponding SAC. The statistical assessment will only be able to be applied to certain data-sets, such as those obtained via systematic sampling. Identification of areas for targeted sampling will be via professional judgement and errors will not be able to have a probability assigned to them.
7: Optimise the design for obtaining data	<p>As the purpose of the sampling program is to assess for potential contamination across the site, the sampling program was reliant on professional judgement to identify and sample the potentially affected areas.</p> <p>Further details regarding the proposed sampling plan are presented in Section 8.</p>

11.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA/QC) procedures and results are summarised in the following Table 1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details. The relative percentage difference (RPD) results, along with the other field QC samples are included at the end of this appendix.

Table 1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation	C
Holding times	Various based on type of analysis	C
Intra-laboratory replicates	7% of primary samples; <30% RPD	PC
Inter-laboratory replicates	7% of primary samples; <30% RPD	PC
Trip Spikes	1 per sampling event; 60-140% recovery	PC
Trip Blanks	1 per sampling event; <PQL	PC
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Laboratory Duplicate	1 per lab batch; As laboratory certificate	C
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

Notes:

C = compliance; PC = partial compliance; NC = non-compliance

The RPD results were all within the acceptable range, with the exception of those indicated in Table QA1. The exceedances are not, however, considered to be of concern given that:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred;
- Replicates, rather than homogenised duplicates, were used to minimise risk of volatile loss, hence greater variability can be expected;
- Most of the recorded concentrations being relatively close to the PQL; and
- The majority of RPDs within a replicate pair being within the acceptable limits.

Intra-laboratory duplicates represented 7% of primary samples, and one set of trip spikes and blanks was used for the investigation. Given that RPDs were relatively low and that the trip spike and blank results were within their respective criteria, this is considered acceptable for this investigation.

In summary, the QC data is determined to be of sufficient quality to be considered acceptable for the assessment.

12.0 Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs) as outlined in NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013):

- Completeness: a measure of the amount of usable data from a data collection activity;
- Comparability: the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness: the confidence (qualitative) of data representativeness of media present on-site;
- Precision: a measure of variability or reproducibility of data; and
- Accuracy: a measure of closeness of the data to the 'true' value.

Table 2: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Systematic and selected target locations sampled.
	Preparation of borehole logs, sample location plan and chain of custody records.
	Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody.
	Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM).
	Completion of chain of custody (COC) documentation.
	NATA accredited laboratory results certificates provided by the laboratory.
	Satisfactory frequency and results for field and laboratory quality control (QC) samples as discussed in Section 1.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project.
	Experienced samplers used.
	Use of NATA registered laboratories, with test methods the same or similar between laboratories.
	Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled.
	Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs.
	Samples were extracted and analysed within holding times.
	Samples were analysed in accordance with the COC.
Precision	Field staff followed standard operating procedures.
	Acceptable RPD between original samples and replicates.
	Satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures.
	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been generally complied with.

I3.0 Conclusion

Based on the results of the field QA and field and laboratory QC, and evaluation against the DQIs it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment

I4.0 References

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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Table QA1: Relative Percentage Difference Results – Intra- and Inter--laboratory Replicates

			Metals								TRH						BTEX				PAH				
			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	
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	
Intralaboratory Replicate																									
BD1/21012022	0 m	21/01/2022	5	<0.4	9	19	77	<0.1	3	87	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	0.4	<0.5	3.1	
TP1	0.6 - 0.7 m	21/01/2022	5	<0.4	7	20	30	<0.1	2	61	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	0.5	0.6	4.1	
		Difference	0	0	2	1	47	0	1	26	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	1	
		RPD	0%	0%	25%	5%	88%	0%	40%	35%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	22%	18%	28%	
Interlaboratory Replicate																									
BD2-21012022	0 m	21-Jan-22 15:00	8	<1	15	46	147	0.1	8	204	<10	<50	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<1	<0.5	<0.5	NT	
TP6	0.1 - 0.2 m	21/01/2022	4	<0.4	10	27	74	0.1	4	92	<25	<50	<25	<50	100	<100	<0.2	<0.5	<1	<1	<0.1	0.56	0.7	4.7	
		Difference	4	0.6	5	19	73	0	4	112	15	0	15	0	0	0	0	0	0	0.5	0.9	0.06	0.2	-	
		RPD	67%	86%	40%	52%	66%	0%	67%	76%	86%	0%	86%	0%	0%	0%	0%	0%	67%	67%	164%	11%	33%	-	

Table QA1: Relative Percentage Difference Results – Intra- and Inter--laboratory Replicates

			Phenol	OCP														OPP	PCB								
			Phenol	DDD	DDT+DDE+DDD ^c	DDE	DDT	Aldrin & Dieldrin	Endosulfan I	Total Chlordane	Endosulfan II	Endosulfan Sulphate	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyrifos	Aroclor 1016	Total PCB	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	
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	
Intralaboratory Replicate																											
BD1/21012022	0 m	21/01/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
TP1	0.6 - 0.7 m	21/01/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
		Difference	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	
		RPD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Interlaboratory Replicate																											
BD2-21012022	0 m	21-Jan-22 15:00	<1	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	NT	<0.1	NT	NT	NT	NT	NT	NT	
TP6	0.1 - 0.2 m	21/01/2022	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
		Difference	4	0.05	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	-	0.05	0.05	0.1	0.05	-	0	-	-	-	-	-	-	
		RPD	133%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	-	67%	67%	67%	67%	-	0%	-	-	-	-	-	-	

Table QA2: Trip Blank Results - Soils (mg/kg)

Sample ID	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TB	<0.2	<0.5	<1	<1	<2

Table QA3: Trip Spike Results – Soils (% Recovery)

Sample ID	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TS	110	111	112	114	114

Appendix 14 – Environmental Legal and Other Requirements Register



[SE-P-01 Legal and Other Requirements Procedure](#)

[E-R-01 Environmental Legal and Other Reqts Register](#)

Thank you

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**MAIL TYPE**

General Correspondence

MAIL NUMBER

Taylor-GCOR-000351

REFERENCE NUMBER

Taylor-RFI-000060

Fwd: SSDA Requirements / Modification 4.55 / CDVC Requirements Deliverables

From Mr Thomas Udovcic - Taylor Construction Group

To Tarini Pathak - Turner & Townsend Pty Limited

Cc (4) Mr Alfred Jury - NSW Department of Education
Mrs Cassandra Zughbi - Taylor Construction Group
Michael Ettrick - Taylor Construction Group
Ms Stephanie Leaper - Turner & Townsend Pty Limited

Sent Monday, 11 April 2022

MESSAGE

Hi Tarini,

As requested, please see below confirmation of receipt of the CEMP (Condition B14) & CTPMSP (Condition B21) from Phillip Chun.

Any questions please let me know.

Thanks.

Regards,

Thomas Udovcic

Taylor Construction Group

From: E Jones Coles

Sent: 11/04/2022 3:31:50 PM AEST (GMT +10:00)

To: Thomas Udovcic

Cc: Frank de Pasquale, Michael Ettrick, Cassandra Zughbi

Mail Number: PCHUN-GCOR-000124

Subject: Re: SSDA Requirements / Modification 4.55 / CDVC Requirements Deliverables

Hi Tom,

Confirming receipt of the Construction Environmental Management Plan (CEMP) and the Construction Worker Transportation Strategy to address conditions B14 and B21.

Please note these documents need to be submitted to the Planning Secretary for information, please provide evidence of this submission in due course.

Regards,

Emrys Jones Coles

Building Code Consultant

Philip Chun

T +61 2 9412 2322 **M** +61 420 310 454

emrys.jonescoles@philipchun.com www.philipchun.com

Suite 404, 44 Hampden Road, Artarmon, NSW 2064

From: T Udovcic

Sent: 11/04/2022 6:43:18 AM AEST (GMT +10:00)

To: Emrys Jones Coles

Cc: Michael Ettrick, Cassandra Zughbi

Mail Number: Taylor-RFI-000150

Subject: Re: SSDA Requirements / Modification 4.55 / CDVC Requirements Deliverables

Hi Emrys,

Notwithstanding the below, can you please also provide a statement confirming the attached CTPMSP satisfactorily closes out Condition B21 of the SSDA?

To make your life easier, I have reattached the CEMP (Condition B14) to assist in completion of my correspondence below.

Any questions please let me know.

Thanks.

Regards,

Thomas Udovcic

Taylor Construction Group

From: T Udovcic

Sent: 11/04/2022 6:38:51 AM AEST (GMT +10:00)

To: Emrys Jones Coles

Cc: Michael Ettrick, Cassandra Zughbi

Mail Number: Taylor-RFI-000149

Subject: Fwd: SSDA Requirements / Modification 4.55 / CDVC Requirements Deliverables

Hi Emrys,

Please see attached.