Council comments

Comments from Council are shown in **Figure 7–1**..Council was also briefed on 12 October 2022 in the Transport Working Group.

Figure 7–1 Council comments

RE: Wentworth Point new high school CTMP submission and consultation (SSD-11802230)

Reply | Reply All | Forward

MP Mary Park <MPark@cityofparramatta.nsw.gov.au>

To Andy Yung; Bruce Mills; steven.finnan@transport.nsw.gov.au; Stephen Kennett

Cc Marco Amorelli; Adam Greentree; Sandra Lim; Jonathan Busch; Sherwin Rasquinha; Shawn Cen; Behzad Saleh

Fri 30/09/2022 4:21 PM

Works Zone Application Form 2021 - 2022 v.pdf
577 KB

Hi Andy,

Thanks for sending this through.

Our Traffic and Transport team have reviewed the provided documentation. They have no concerns with the CTMP provided that the below conditions/requirements are on any final approval:

1. A dilapidation report for the existing roundabout, kerb and gutter, traffic islands and other Council assets in Burroway Road is to be provided to Council's Traffic and Transport Services (traffic@cityofparramatta.nsw.gov.au) with photos of the facility before construction commences and after completion. The applicant is liable to repair any damage caused to any Council asset to the satisfaction of Council's Civil Assets section.
2. Waterways Street and Wentworth Place are privately owned roads that are managed by the respective stratas. Hill Road north of Burroway Road is managed by Sydney Olympic Park. The applicant must obtain concurrence from the respective road managers prior to erecting any signage.
3. The Builder is to set up a hotline for nearby residents and parents of the school children that they can call should they have any complaints, concerns or need assistance regarding issues related to the construction traffic/activity and or construction worker parking.
4. Heavy vehicle trips during school zone times should not occur to ensure the safety of school children given the sites close proximity to Wentworth Point Public School.
5. An off-street construction worker parking area is to be established in parts of the lots that do not form part of the development. The capacity of construction work carpark must be enough to accommodate the workforce for all stages of the development.
6. The installation of a 'No Stopping' restriction to facilitate construction vehicle access will require an application for a Works Zone and approval through the Parramatta Traffic Committee. I have attached last years Works Zone application form but please note that the fees for this have been updated for this year (please see Council's 2022/23 Fees and Charges for the new fees).
7. Pedestrian movements are to maintained along Burroway Road at all times. Traffic Controllers are to be present during construction working hours to halt pedestrians whilst construction vehicles are entering/exiting the site only. At all times vehicles, entering and exiting the site are to be required to give way to pedestrians travelling on the footpath
8. All activities, including loading / unloading vehicles and storage for equipment, materials and waste are to be within the works site and are not to impede traffic flow
9. The Builder is to keep the roadway (including footpath) in a serviceable state for the duration of the project. Road pavement/footpath damaged as a result of truck movements/ construction activity is to be maintained during the duration of development by developer at no cost to Council to satisfaction of Council's Supervisor Civil Assets.
10. Affected residents and businesses must be notified in writing prior to the start of the various phases of construction. The notification must include the hotline number in that they can call for construction traffic related complaints/concerns. A copy of the notification shall be submitted to City of Parramatta Council. Access to these residents and businesses must be maintained unless otherwise agreed. Any comments are to be recorded and taken into consideration when planning construction activities.
11. Occupation of any part of the footpath or road (mobile crane, skip bin, carrying out work, erecting/dismantling hoarding, reconstruction of footpath and the like) during construction works of the development shall require a Road Occupancy Permit from Council. The applicant is to obtain a Temporary Road Occupancy Permit through Council's Traffic and Transport Services, prior to occupying any part of the footpath or road.
12. The applicant is required to obtain a Hoarding/Tower Crane permit from Council prior to erecting any Hoarding/Tower Crane on Council road/footpath/construction site. The application can be access via Council's website.
13. City of Parramatta Council is to be notified of any future disruption to roadways and footpaths and any changes to the CTMP. The final approved version of the CTMP and any subsequent revisions are to be provided to Council for its records. It is to be noted that additional conditions may be applied to the CTMP by Council in future should public amenity be detrimentally affected.

Kind regards,
Mary

Transport for NSW Comments

TfNSW comments received on 14 October 2022 are provided in **Table 7-1**. TfNSW was also briefed on 12 October 2022 in the Transport Working Group.

Table 7-1 TfNSW comments and responses

TfNSW comment	Response	Status
Introduction – states address as "3 Burroway Road, Wentworth Park". Please amend to shown Wentworth Point.	Completed, refer to **Section 1.1**.	Closed
Construction traffic – workers should be encouraged to utilise nearby public transport services. Please detail strategies and options for worker public transport usage.	Completed, refer to **Section 6.2**.	Closed
Construction vehicle haulage routes – how will opposing vehicles trying to access / egress the site be managed? Marshalling or queuing of construction vehicles is not permitted to occur on any public roads.	Truck movements to site will be managed so that if trucks arrive, the driveway will be sufficiently clear so that they can enter site without queuing in the road network. This will be managed by site managers and traffic controllers. This is clarified in **Section 4.4**.	Closed
Swept path – vehicles not permitted to encroach kerb or opposite of road whilst turning. Confirm swept path 15 of 16 is only appliable during layback construction	Correct, this is only proposed during the contra flow traffic control. This is clarified in **Section 2.5**.	Closed
Any parking removal is subject to Council approval . Any changes to parking as shown on the submitted TGS must be approved by council.	Noted	N/A
Construction parking impacts – workers should be encouraged to access site via public transport.	Accepted. The Construction Worker Transportation Strategy identifies that workers will be encouraged to use public transport to site (refer **Section 6.2**).	Closed
Impacts to marina square – is the contra flow only in place for the duration of layback construction or the entire works? Please clarify within CTMP. What is the layback construction timeframe?	The contra-flow is only required during the construction of the layback. The reason is that the layback construction requires construction activities on the road, which means drivers won't be able to use all of the road space. This is made clearer, including the work program in **Section 4.3**.	Closed


SCT
Consulting

Appendix E Construction Noise and Vibration Management Sub-Plan

Norman Disney & Young
A TETRA TECH COMPANY

Report

Roberts Co
Wentworth Point New High School
Construction Noise and Vibration Management Plan

Revision: 1.4 – Main Works Assessment **Issued**: 27 September 2022

Table of Contents

1 INTRODUCTION

1.1 Purpose

The purpose of this report is to assist the contractor with suitable noise and vibration control measures to enable the works associated with the main works and construction of the Wentworth Point new high school located at Wentworth Point, NSW.

The proposed development is for the construction of a school whereby the project is known as Wentworth Point new high school. The project is located within the peninsula of Wentworth Point at 3 Burroway Road, Wentworth Park, and comprises a gymnasium, performing arts learning spaces, science and engineering workshops, typical learning spaces, library and staff areas. A playing field located on the adjacent site to the north will be subject to a Joint Use Agreement with Parramatta City Council.

As per the 2022/2023 budget papers, this project is now referred to as "Wentworth Point new high school". Future documentation relating to this project, including this document, will be labelled accordingly.

Due to the SSD-11802230 application being submitted as "Sydney Olympic Park new high school", the project name will remain the same on the Planning Portal and future documentation may reference this.

Please also note 'Wentworth Point new high school' is the placeholder name for the school. The school naming will occur closer to opening, following a community consultation process.

1.2 Objective of study

- Identify the local Council requirements relating to Construction Noise.
- A quantitative assessment to identify the expected noise levels from expected equipment used in the proposed construction.
- Provide advice on any mitigation measures needed to comply with the relevant requirements.
- Set out a noise complaints management procedure.

1.3 Authority

Authority to undertake this report was provided by Adam Greentree of Roberts Co.

1.4 Information Sources

- NSW EPA – Interim Construction Noise Guideline
- BS 5228-1:2009 - Code of practice for noise and vibration control on construction and open sites, Part 1 Noise.
- Briefing email 'Roberts Co – Noise and Vibration Plan for Mainworks' dated 07 February 2022.

1.5 SSDA Conditions

Table 1 below details the SSDA conditions and the area of the report where they are addressed.

Table 1: SSDA Conditions

Condition		Report Location
B15. 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);	Section 5
(c)	describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;	Section 5
(d)	include strategies that have been developed with the community for managing high noise generating works;	Section 8
(e)	describe the community consultation undertaken to develop the strategies in condition B15(d)	Section 8
(f)	include a complaints management system that would be implemented for the duration of the construction; and	Section 9
(g)	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 B12.	Section 6

1.6 Revision History

Table 2: Revision History

Revision	Date of Issue	Comments
1.0	18 February 2022	Main Works Assessment
1.1	06 April 2022	Minor Amendments
1.2	19 September 2022	Minor Amendments
1.3	20 September 2022	Minor Amendments
1.4	27 September 2022	Minor Amendments

2 TERMINOLOGY

2.1 Noise

Noise levels are quantified in decibels, zero decibels being the threshold of audibility for a normally hearing young person and 140 decibels being a very loud sound that will cause discomfort or pain.

Decibel, dB: The decibel scale is logarithmic. A doubling in loudness would subjectively be represented by an increase in noise levels of 10 decibels (dB). A small change of 3dB would be just noticeable to most listeners. Decibels are not actually a unit of sound pressure but are simply an expression of a ratio from a standardised sound pressure level representing zero decibels.

A-weighted Decibel, dBA: In most instances the district and regional councils, New Zealand Standards and International Standards require assessments to adopt "A" weighted decibels. The "A" weighting is applied in an attempt to match the response of the human ear. "A" weighted decibels can be measured with a sound level meter which has been electronically adjusted to an international standard.

The spread of noise over a time period can be expressed in a number of ways. Three of the most commonly used for environmental applications are:

L_{10}: The sound level exceeded for ten per cent of the time. This identifies loud, non-continuous sounds or the louder parts of continuous sounds.

L_{eq}: The average sound pressure level over the measurement period.

L_{MAX}: The loudest single event over the measurement period.

3 NOISE AND VIBRATION CRITERIA

3.1 Site Location and Overview

The main works involve the excavation, piling, concrete pouring, façade and fit-out works on the development site located at 7 Burroway Road. The project site is as depicted in Figure 1 below. A dirt bund exists at the western boundary of the site indicated in Figure 1.

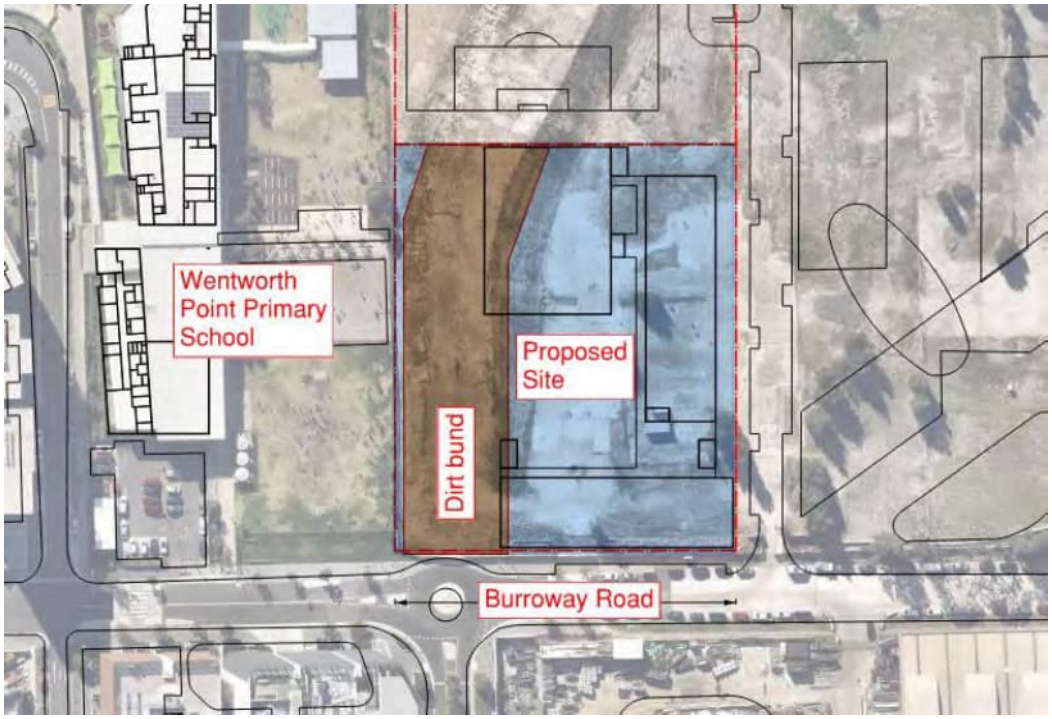


Figure 1. Project Location

3.2 Nearest Noise Sensitive Receivers

The proposed development is located adjacent to, and has been assessed to, the following:

1. Wentworth Point Primary School (to the west)
2. 17 Wentworth Place, an existing residential apartment complex (to the south)
3. Block H, a proposed residential development (to the south)
4. A proposed mixed-use development (to the east).
5. Future peninsula park (to the north)

However, for the purposes of this main works assessment, construction noise will be only assessed to existing receivers (**Wentworth Point Primary School** and the residential tower at **17 Wentworth Place**) as the other receiver locations are currently empty sites. These noise sensitive receivers are depicted in Figure 2 below.

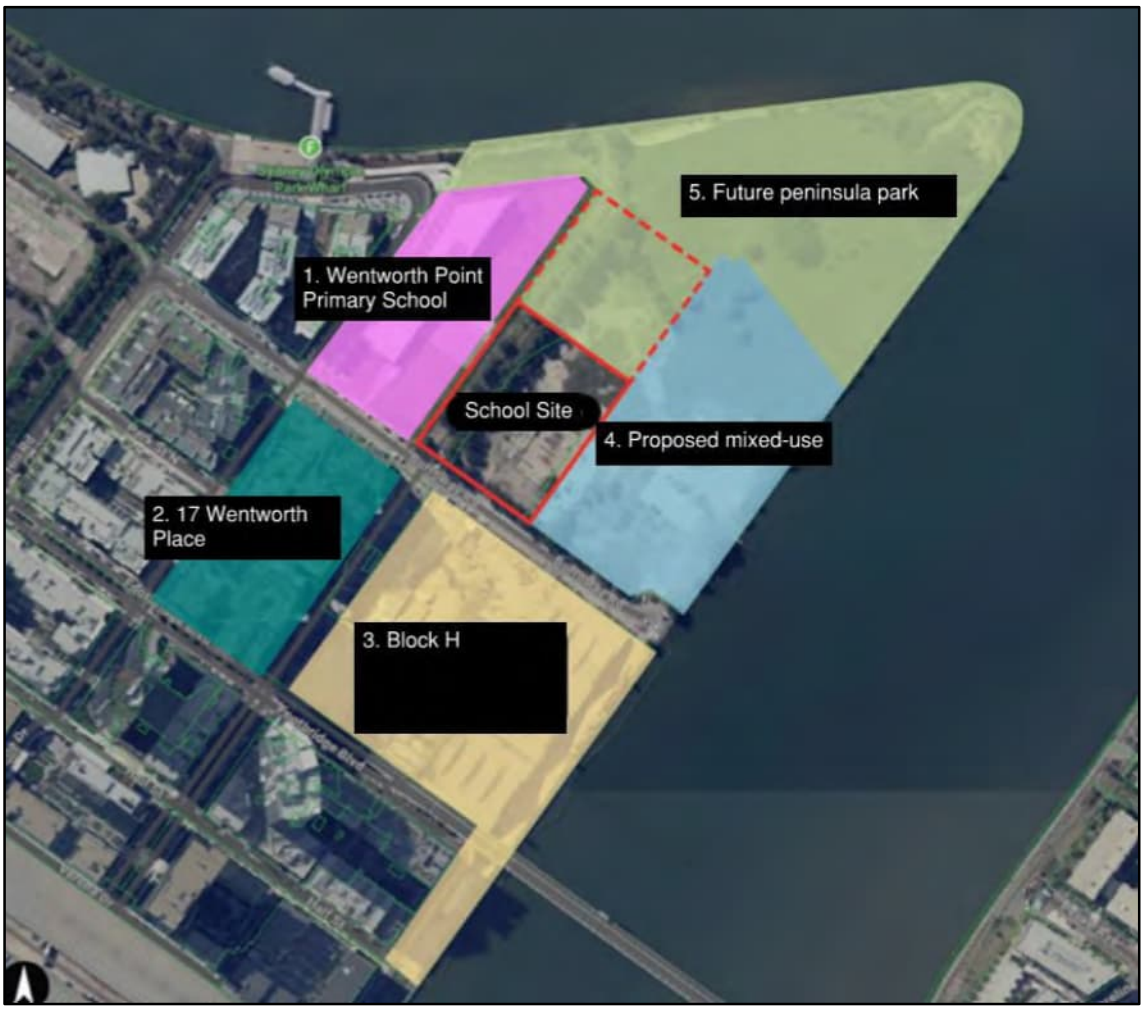


Figure 2. Noise Sensitive Receivers

3.3 Construction Noise Criteria

3.3.1 Interim Construction Noise Guideline

The NSW Interim Construction Noise Guideline was developed by the NSW-Department of Environment & Climate Change DECC, NSW which incorporates the EPA. The Guideline contains detailed procedures for the assessment and management of construction noise impacts.

The guideline presents two ways of assessing construction noise impacts – the quantitative method, which is generally suited to longer term construction works and the qualitative method, which is generally suited to short term works (usually not more than 3 weeks) such as infrastructure maintenance.

It is expected that the length of the construction works associated with the development would be more than 3 weeks and therefore a quantitative method has been used for this assessment.

Table 3 sets out the management levels for noise at residence and other sensitive land uses, respectively. Restrictions to the hours of construction may apply to activities that generate noise at residences above the 'highly noise affected management level' which is >75dBA. Affected properties above 75 dBA will require community consultation and a Construction Noise & Vibration Management Plan (CNVMP).

Table 3. Noise at Residences and Other Sensitive Land Uses using Quantitative Assessment

Receiver Type	Recommended Hours	Time of Day	Management Level $L_{eq,15min}$ [dBA]
Residential	Recommended Standard Hours	Monday – Friday 7am to 6pm No work on Weekends or Public Holidays	**Noise Affected** RBL + 10 (Assessed externally)
			Highly noise affected 75 (Assessed externally)
Classrooms at schools and other education institutions		When properties are being used (i.e., Classroom operational hours)	45* (Internal noise level)

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

***Where internal noise levels cannot be measured, external noise levels may be used. A conservative estimate of the difference between internal and external noise levels is 10 dB for buildings other than residences. Some buildings may achieve greater performance, such as where windows are fixed (that is, cannot be opened).

3.3.2 Application of Noise Affected Levels

As per the NSW Interim Construction Noise Guideline:

"The **noise affected** level represents the point above which there may be some community reaction to noise.

- Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.
- The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.

The **highly noise affected** level represents the point above which there may be strong community reaction to noise.

- Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account:
  - 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)
  - If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times."

3.3.3 Noise Management Levels

Noise Management Levels (NML) associated with the construction works on the project site are presented in Table 4 below.

Table 4. Construction Noise Management Levels, Leq 15min

Receivers	Recommended Hours	Period	RBL $L_{A90,15mins}$ [dBA]	Management Level [dBA]
Surrounding Residences	All Hours (Standard Construction Hours)	When in use	46 dB(A)*	**Noise Affected** (46 + 10) = **56 dB(A)** (Assessed externally) **Highly noise affected** **75 dB(A)** (Assessed externally)
Classrooms at Wentworth Point Primary School				**45 dB(A)** (Internal noise level)
* Unattended noise measurements were carried out on the site between Tuesday 20th April and Monday 3rd May 2021 to establish existing background noise levels.				

3.4 Construction Vibration Criteria

The effects of construction vibration upon buildings can be separated into three main categories:

- Perceptibility of the occupants to the vibration and the possibility of them being disturbed or annoyed.
- Vulnerability of the building structures to vibration induced damaged.
- Vulnerability of the contents of the building that includes types of equipment, activities and processes.

3.4.1 Human Response to Vibration

Humans are very sensitive to vibration, and they can be disturbed, annoyed and have their work activities interfered with if the levels are too high. The Interim Construction Noise Guideline references *"Assessing Vibration: a technical guideline"* (Vibration Guideline) issued by the Department of Environment and Conservation NSW for measurement and assessment of vibration. The Vibration Guideline provides vibration criteria for continuous, impulsive and intermittent vibration

Continuous vibration	Impulsive vibration	Intermittent vibration
Machinery, steady road traffic, continuous construction activity (such as tunnel boring machinery).	Infrequent: Activities that create up to 3 distinct vibration events in an assessment period, e.g. occasional dropping of heavy equipment, occasional loading and unloading. Blasting is assessed using ANZECC (1990).	Trains, nearby intermittent construction activity, passing heavy vehicles, forging machines, impact pile driving, jack hammers. Where the number of vibration events in an assessment period is three or fewer this would be assessed against impulsive vibration criteria.

The criteria are discussed in more detail in the following sections.

3.4.2 Continuous and impulsive vibration (1-80 Hz)

According to the Vibration Guideline for continuous and impulsive vibration, assessment of impact should be considered on the basis of weighted root-mean-square acceleration values and results are to be compared against the following preferred and maximum values given for each orthogonal axis. The frequency weightings as per BS6841:1987 (reproduced in Appendix B3 of the guideline) are to be applied to the RMS measurement values (1-80Hz). The criteria in the Vibration Guideline are derived from the limiting values of the assessment curves and multiplying factors from BS 6472:1992 (the curves are no longer referenced in the superseded version of the standard BS 6472:2008). We have assumed hotels will be assessed as per the criteria for residences.

Table 2.2 Preferred and maximum weighted rms values for continuous and impulsive vibration acceleration (m/s^2) 1–80 Hz

Location	Assessment period[1]	Preferred values		Maximum values	
		z-axis	x- and y-axes	z-axis	x- and y-axes
Continuous vibration					
Critical areas[2]	Day- or night-time	0.0050	0.0036	0.010	0.0072
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
Workshops	Day- or night-time	0.04	0.029	0.080	0.058
Impulsive vibration					
Critical areas[2]	Day- or night-time	0.0050	0.0036	0.010	0.0072
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

1 Daytime is 7.00 am to 10.00 pm and night-time is 10.00 pm to 7.00 am

2 Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate tasks require more stringent criteria than the human comfort criteria specified above. Stipulation of such criteria is outside the scope of this policy, and other guidance documents (e.g. relevant standards) should be referred to. Source: BS 6472–1992

The Vibration Guideline notes *"Activities should be designed to meet the preferred values where an area is not already exposed to vibration. Where all feasible and reasonable measures have been applied, values up to the maximum value may be used if they can be justified. For values beyond the maximum value, the operator should negotiate directly with the affected community. Situations exist where vibration above the preferred values can be acceptable, particularly for temporary disturbances and infrequent events of short-term duration. An example is a construction or excavation project."*

3.4.3 Intermittent vibration (1-80 Hz)

According to the Vibration Guideline for intermittent vibration, assessment of impact should be considered on the basis of vibration dose values (VDV). Acceptable values of vibration dose are given as follows. We have assumed hotels will be assessed as per the criteria for residences.

Table 2.4 Acceptable vibration dose values for intermittent vibration ($m/s^{1.75}$)

Location	Daytime[1]		Night-time[1]	
	Preferred value	Maximum value	Preferred value	Maximum value
Critical areas[2]	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

1 Daytime is 7.00 am to 10.00 pm and night-time is 10.00 pm to 7.00 am.
2 Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas.
Source: BS 6472–1992

3.4.4 Structural Response to Vibration - German Standard DIN 4150-3:1999

The German Standard DIN 4150-3 Structural Vibration Part 3: Effects on building and structures is commonly used in Australia to evaluate the effects of vibration on structures primarily used for static loading.

The response of a building to vibration is affected by several factors that include its type of foundation, the underlying ground conditions, its construction and the state of the building. Please note the construction vibration limits are designed to ensure the structural integrity of nearby buildings and are not for human comfort. the limits are well above perceptibility.

According to DIN 4150 short term vibration refers to vibration which does not occur often enough to cause structural fatigue and which does not produce resonance in the structure being evaluated (e.g. transient thumps and one off shock-type events). Long-term vibration refers to all types of vibration not covered by the definition of 'short-term vibration'. The criteria for short-term and long-term vibration are listed in the following.

3.4.5 Guideline Values for evaluation of short-term vibration - DIN 4150-3:1999

The vibration limits of table 1 in DIN 4150-3:1999 (replicated in Table 5 below) refer to the evaluation of the effects of short-term vibration on structures. The criteria are the peak particle velocities (ppv) measured on any foundation or uppermost full storey of any building not related to the site.

It should however be noted that compliance with the vibration limits to avoid structural damage of buildings, cannot provide certainty. If damage occurs despite compliance with the standard, it is to be assumed that other causes are responsible, however, further investigations are necessary. And conversely, exceeding the limits does not necessarily lead to damage.

Table 5. DIN 4150-3 Construction Vibration Limits – Short Term

Type of Structures	Guideline values for vibration velocity (mm/s)			
	Vibration at the foundation at a frequency of			Vibration at horizontal plane of highest floor at all frequencies
	1Hz to 10Hz	10 to 50 Hz	50 to 100Hz (and above)	
Buildings for commercial purposes, **Industrial building** and building of similar design	20	20 to 40	40 to 50	40
Dwellings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	15
Structures that because of their particular sensitivity to vibration, cannot be classified as above and are of great intrinsic value (e.g. listed buildings under preservation order)	3	3 to 8	8 to 10	8

3.4.6 Guideline Values for evaluation of long-term vibration - DIN 4150-3:1999

The vibration limits of table 3 in DIN 4150-3:1999 refer to the evaluation of the effects of long-term vibration on structures. The criteria are the peak particle velocities measured on the uppermost full storey of any building not related to the site and are listed in Table 6.

According to the standard, *exceeding the values listed below does not necessarily lead to damage*.

If a building is subject to harmonic vibration, then maximum values can occur in floors other than the top floor, or in the foundation. The values given also apply in these cases.

Table 6. DIN 4150-3 Construction Vibration Limits – Long Term

Type of Structures	Guideline values for velocity, vi, in mm/s of vibration in horizontal plane of highest floor, at all frequencies
Buildings for commercial purposes, Industrial building and building of similar design	10
Dwellings and buildings of similar design and/or occupancy	5
Structures that because of their particular sensitivity to vibration, cannot be classified as above and are of great intrinsic value (e.g. listed buildings under preservation order)	2.5

4 CONSTRUCTION NOISE ASSESSMENT

4.1 Expected Construction Programme and Methodology

According to the information provided by the construction team and the client for this project, we expect the main works of construction to be split into the following major tasks:

- **Piling –** 4 months
- **Excavation –** 3 months
- **Concrete pouring** - 7 months
- **Material transport/handling –** Life cycle of the project
- **Fitout works –** 6 months

4.2 Expected Construction Activities

According to the information provided by the construction team and the client for this project, we expect the critical construction equipment to consist of the following:

Table 7. Expected Construction Activities/Equipment per Task

Piling	Excavation	Concrete Pouring	Material Transport	Façade / Fitout works
Large rotary bored piling rig	Articulated truck (up to 20 daily trips)	Concrete trucks (up to 30 trucks on pour dates)	Articulated truck (Rigid vehicles with an occasional semi-truck)	Articulated truck (Rigid vehicles with an occasional semi-truck)
Tracked excavator	Tracked excavator	Mobile concrete pumps with boom arm (up 2 pumps on pour dates)	Tracked mobile crane	Tracked mobile crane
				Hand tools (Hand saws, drills and concrete saws)

4.3 Expected Construction Equipment Noise Levels

The current list of proposed equipment respective reference acoustic data is outlined in Table 7 below. Any additional equipment proposed will need to be assessed acoustically, with the report updated and mitigations included where required.

Table 8. Proposed Construction Equipment List

Equipment	L_{eq} Sound Pressure Level at 10m (dBA)	Source and Reference
Articulated dump truck, 25t	81	BS5228-2009/ Table C5 Ref 16
Tracked excavator 40t	79	BS5228-2009/ Table C2 Ref 14
Large rotary bored piling rig, 110t	84	BS5228-2009/ Table C3 Ref 14
Concrete mixer truck	79	BS5228-2009/ Table C4 Ref 27
Mobile concrete pumps with boom arm, 26t	80	BS5228-2009/ Table C4 Ref 29
Tracked mobile crane, 105t	75	BS5228-2009/ Table C4 Ref 52

4.4 Noise Propagation to Noise Sensitive Receivers

Predicted noise levels at the external receivers from all construction activities are as follows.

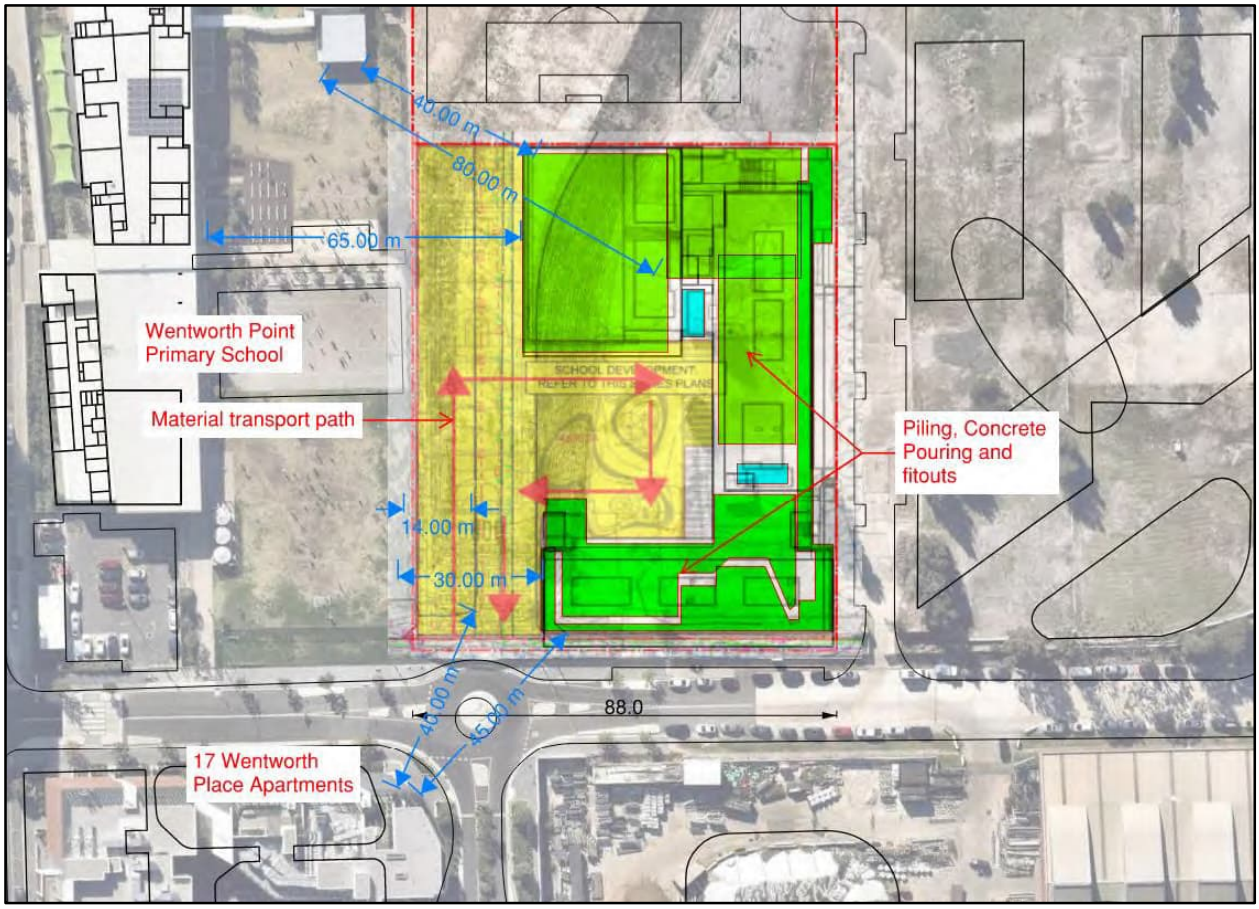


Figure 3. Noise Sensitive Receiver Locations and Distances

Please note that these values represent a 'worst case' scenario where the source is at the closest possible distance to the receiver and not incorporating any mitigation measures, except where stated. It is likely that noise levels are lower than these 'worst case' predictions.

Table 9. Predicted Construction External Noise Levels to Noise Sensitive Receivers

Activity	L_{eq} Sound Pressure Level at Receivers		
	Wentworth Primary School: Playground (Distance: ~30m)	Wentworth Primary School: Classrooms (Distance: ~40m)	17 Wentworth Place Apartments (Distance: ~40m)
Piling (Piling rig and tracked excavator running simultaneously)	**< 75 dBA**	**< 75 dBA** (Avg. 67 dBA @ 80m)	**< 75 dBA** (Avg. 70 dBA @ 70m)
Excavation (Tracked excavator and dump truck running simultaneously)	**77 dBA**	**< 77 dBA** (Avg. 71 dBA @ 80m)	**< 77 dBA** (Avg. 72 dBA @ 70m)
Concrete Pouring (4 trucks running simultaneously)	**76 dBA**	**< 76 dBA** (Avg. 67 dBA @ 80m)	**< 76 dBA** (Avg. 68 dBA @ 70m)
Material Transport (Truck pass-by)	**86 dBA (Pass-by Max)**	**< 77 dBA (Pass-by Max)** (Avg. 71 dBA @ 80m)	**< 77 dBA (Pass-by Max)** (Avg. 72 dBA @ 75m)
Façade / Fitout works (Noise primarily from mobile crane as fitout works enclosed by façade)	**64 dBA**	**61 dBA** (Avg. 56 dBA @ 70m)	**61 dBA** (Avg. 55 dBA @ 80m)

There is a 3~4-metre-tall dirt bund along the site boundary, between the area of works and the playground, which is expected to act as a natural noise barrier (should it remain intact). It is predicted that this will reduce construction noise levels by between **4-9 dB** where there is no line-of-sight between the receivers and machinery (i.e. effectiveness will depend on the location of the receiver and source in relation to the dirt bund). However, it is understood that the bund will be removed during the early stages of works and has not been accounted for in this assessment.

It is noted that due to the receiver height of the residential tower at 17 Wentworth Place, noise barriers will be ineffective at this location unless direct line-of-sight from noisy activities is removed.

5 NOISE MITIGATION MEASURES

5.1 Site Specific Noise Mitigation

From the predicted noise levels shown in Section 4.4 above, it is recommended that noise mitigation measures are put in place to minimize the effects of construction noise to neighbouring properties.

5.1.1 Piling

As the dirt bund will not be intact during piling activities, we recommend localized barriers/hoarding (where practical) to minimise noise emissions to the Wentworth Point Primary School playground and classrooms. A minimum barrier height of **2m** is recommended to replace the bund during piling.

5.1.2 Excavation

We recommend localized barriers/hoarding to minimise noise emissions to Wentworth Point Primary School when the dirt bund is being excavated. A minimum barrier height of **2m** is recommended to replace the bund during excavation. It is understood that these works will entail the removal of the dirt bund.

5.1.3 Concrete Pouring

For this assessment, a worst-case scenario of 4 concrete trucks running simultaneously has been allowed for. To minimise noise emissions, it is recommended that the number of concrete trucks and pumps running simultaneously is minimised where possible. It is understood that these works will be completed after removal of the dirt bund.

5.1.4 Material Transport

Due to the ability of trucks to move around site, a noise barrier/bund is not expected to provide much noise mitigation when equipment is located far away from the barrier. It is recommended that vehicle acceleration and engine idling is minimised as far as practical along the material transport path.

Should barriers near the noise sources be impractical, an alternative option would be to erect noise barriers near the ground level receivers (such as the nearest classrooms). This mitigation method is recommended upon confirmation of noise levels obtained by site measurement.

5.1.5 Façade / Fitout Works

Where internal works are to occur, it is recommended that noisy work (such as concrete cutting and grinding) is to be done on floors where the building envelope is enclosed to minimise noise emissions. Solid/plywood hoarding is recommended for noisy works in areas not enclosed by the building façade.

5.1.6 Predicted Construction Noise Levels after Noise Mitigation Methods

With the above noise mitigation methods in place, Table 10 predicts the expected noise levels at the noise sensitive receivers.

Table 10. Predicted Construction Noise Levels to Noise Sensitive Receivers with Noise Mitigation

Activity	L_{eq} Sound Pressure Level at Receivers		
	Wentworth Primary School: Playground (Distance: ~30m)	**Wentworth Primary School: Classrooms (Distance: ~40m)**	**17 Wentworth Place Apartments (Distance: ~40m)**
Piling (Piling rig and tracked excavator running simultaneously)	**69 dBA**	**< 69 dBA** (Avg. 65 dBA* @ 80m)	**< 75 dBA** (Avg. 70 dBA @ 70m)
Excavation (Tracked excavator and dump truck running simultaneously)	**73 dBA***	**< 74dBA*** (Avg. 69 dBA @ 80m)	**< 74dBA*** (Avg. 70 dBA @ 70m)
Concrete Pouring (2 trucks running simultaneously)	**73 dBA**	**< 73 dBA** (Avg. 67 dBA @ 80m)	**< 73 dBA** (Avg. 68 dBA @ 70m)
Material Transport (Truck pass-by)	**86 dBA (Pass-by Max)**	**< 77 dBA (Pass-by Max)** (Avg. 71 dBA @ 80m)	**< 77 dBA (Pass-by Max)** (Avg. 72 dBA @ 75m)
Façade / Fitout works (Noise primarily from mobile crane as fitout works enclosed by façade)	**64 dBA**	**61 dBA** (Avg. 56 dBA @ 70m)	**61 dBA** (Avg. 55 dBA @ 80m)
***Predicted noise level should a noise barrier be used effectively where practical, either at the source or receiver locations.			

Due to the ability of the dump truck and tracked excavator to move around site, a noise barrier/bund is not expected to provide much noise mitigation when equipment is located far away from the barrier. We also note that these noise levels will also reduce as the distance between the equipment and receiver increases.

5.2 General Noise Mitigation Measures

In addition to measures for mitigating noise exceedances outlined in Section 5.1, general guidelines should be followed to minimise overall noise.

Measures will be put in place where necessary to mitigate construction noise to affected neighbouring properties. The mitigation measures which are likely to be put in place include:

- Selection of quiet / muffled equipment
- Trucks and other vehicles should use non-tonal reversing alarms
- Vehicle warning devices such as horns will not be used as signalling devices
- Dropping equipment/materials from a height or into trucks is to be avoided

Affected neighbours should also be given the contact details of the nominated person who will be responsible for the implementation of the Construction Noise Management Plan. The nominated person/s is listed in Section 5.2.4.

The complaints procedure set out in Section 9 shall be adhered to.

5.2.1 Time Management of Activities

Limiting the amount of time each equipment is able run will further reduce noise emissions. For example, halving the running time, such as allowing the piling rig to run 7 minutes for every 15 minutes will provide a further **3 dB** reduction.

5.2.2 General Site Activity

When noisy equipment (for example but not limited to angle grinders, jack hammers, hammering) is to be used on site near the occupied buildings, this may potentially breach noise limits. If site conditions are proved to be more difficult and construction becomes noisier as a result, a further method of mitigating noise effects is to reduce the percentage of running time for key equipment.

5.2.3 Material Handling

Care should be taken when loading and unloading materials such that no excessive noise is produced

5.2.4 Methods of Noise Management

This section sets out written procedures that will, if properly implemented by the identified responsible persons, ensure that noise emissions are controlled to appropriate levels.

1. The relevant authority/Roberts Co. shall be provided with the name(s) and contact telephone number(s) of the Site Manager or other identified person(s) who will be responsible for the implementation of the Construction Noise Management Plan (the nominated Roberts Co. personnel to be confirmed at a later date).

Name of person responsible for implementing CNVMP	TBC
Cellular phone number:	TBC
Email address:	TBC
Name of person responsible for implementing CNMP	TBC
Cellular phone number:	TBC
Email address:	TBC

2. The implementation of the Noise Management Plan shall be included in the written job description of the identified responsible person(s). At least one responsible person shall be present on site at all times.

3. The identified responsible person(s) shall ensure that:

- Noise from the construction works is measured and assessed in accordance with:
  - NSW EPA – Interim Construction Noise Guideline
  - All identified noise measures are in place and effective at all times
  - Any noise complaints are responded to in a prompt and reasonable manner, following the methodology set out below.

4. Measured or available reference noise levels for additional equipment not covered in this report shall be used to predict the levels of noise that will be generated at identified sensitive receivers.
5. Where the predicted noise levels exceed the recommendations of NZS 6803:1999, options for safe, practicable and cost-effective additional noise control measures shall be identified.
6. In the event that any complaint is received due to the construction noise, this shall be monitored by a suitable trained person under the direction of an identified responsible. Additional measurements shall be taken to reduce the noise impact. Please refer to Section 6 for details.
7. Suitable noise monitoring locations shall be identified that are representative of the most equipment surrounding residential premises. The location of monitoring will be determined on a case-by-case basis, taking into consideration the receiver, and location of activity deemed noisy.
8. In the event that the measured noise levels are found to exceed the construction noise limits the Site Manager or other responsible person shall be advised. Options for further noise control measures shall be investigated and implemented where and as soon as possible. The relevant authority/Schools Infrastructure NSW will be informed of the exceedances and any noise control measures implemented.
9. The Site Manager shall require all contractors to maintain road-going vehicles in a roadworthy condition at all times and ensure that all relevant noise control equipment is fitted and operating effectively.
10. A complaint record log shall be kept at the site office and in the event of a complaint being received relating to noise, the identified responsible person should be the site Foreman.
11. If activities are identified that are considered to be generating excessive noise, the identified person shall take appropriate all practicable action to reduce noise to a reasonable level and contact the complainant and advise them of the outcome of the investigation and make a written note of the event and the outcome.
12. In situations where engineering controls are rendered ineffective or not feasible, Administrative Noise Control Measure will be utilised. These may include:
    - Job rotation
    - Job redesign, and rosters
    - Redesign of plant and methodology of work
    - Sound barriers/materials
13. It is advisable to carry on a training and education procedures for all construction personnel on good noise management practices.

5.3 Noise Barrier Construction

5.3.1 Required Barrier Height 2m or Less

Where required barrier height is 2m or less, noise barriers should be of minimum 2.5kg/m^2 surface mass, 25mm thickness, and height of 2m. Echo Barriers are a viable option for installation should the barrier height required (from mitigations) be 2m or lower. These should be located between the activity and nearest

receiver as depicted below. The activity should occur at a distance 5m or less from the noise barrier in order to maximise effectiveness of the barriers.

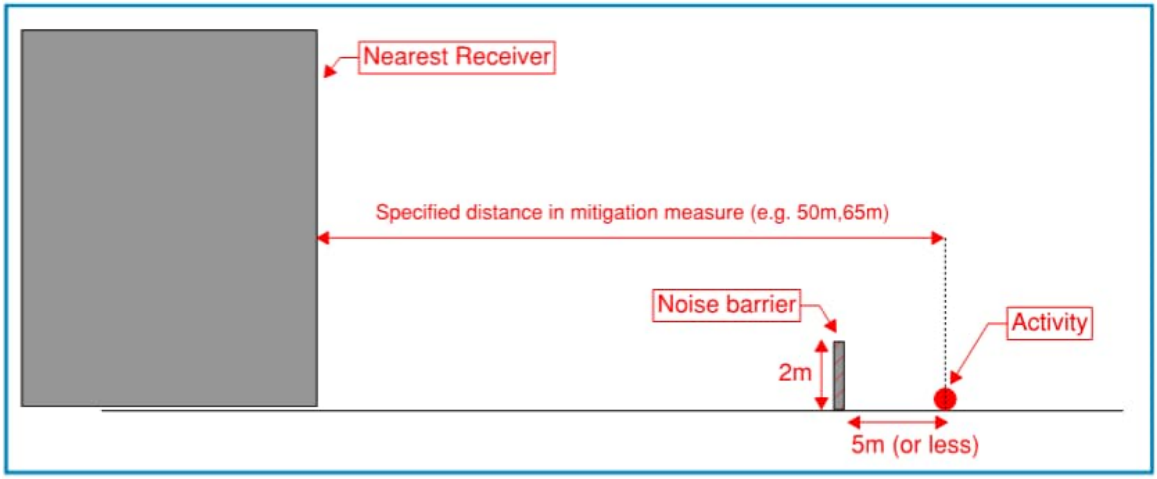


Figure 4. General Noise Barrier Installation

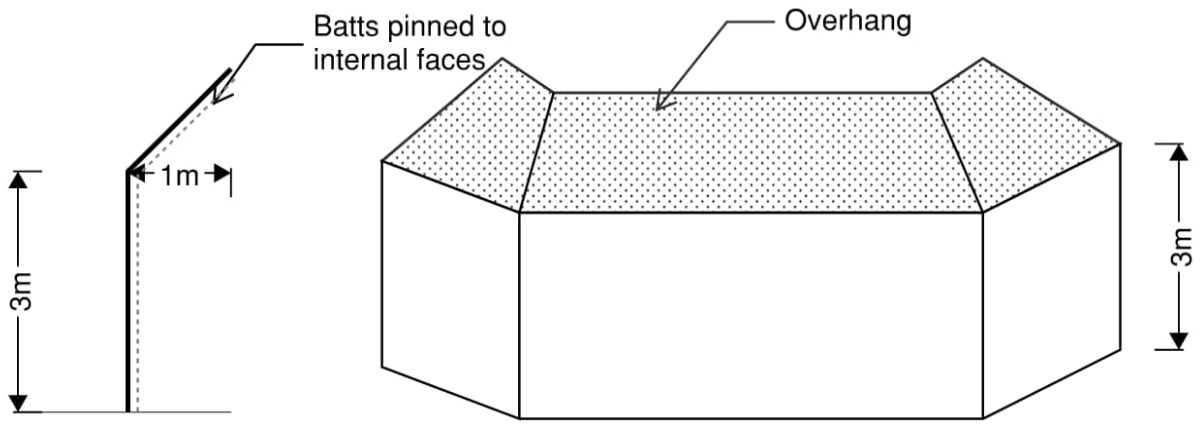
5.3.2 Required Barrier Height Greater than 2m

Where required noise barrier heights exceed readily available products, a larger custom screen will need to be erected. This should be 17mm plywood or 9mm minimum thickness cement sheet (minimum 12 Kg/m2), with no gaps between the panels (or approved equivalent). There should also be absorption in the form of 75mm thick, minimum 32 kg/m^2, fibreglass or polyester batts pinned to the internal faces of the screen. The absorption will prevent 'bouncing' of the noise and prevent it reflecting behind the equipment.

The screen should also have an overhang placed at no more than 1m from the noisiest part of the equipment.

The overhang is a way of increasing the effective height of the barrier, particularly for areas where a nearby receiver located at a higher floor may overlook the plant. The diagram below should illustrate the effect we are looking to achieve. The noise source should be located such that the overhang breaks direct line-of-sight between the noise source and nearby receiver.

Figure 5. Depiction of Localised Noise Barrier



Alternatively, a full enclosure can be considered to absorb noise in all directions.

6 CONSTRUCTION NOISE MONITORING

Monitoring of noise is an important part of managing noise emissions from construction sites. We recommend noise monitoring to be undertaken in the event of any complaints received (the results of which shall be submitted to Schools Infrastructure NSW/Roberts Co within one week of receiving the complaint).

6.1 Location

Noise monitoring may occur at the facade of any neighbouring building, such as outside the classrooms of Wentworth Point Primary School or at 17 Wentworth Place apartments. Should noise monitoring outside classrooms be impractical, the noise logger may be placed within the site boundary as close as possible to the classrooms.

Noise trigger levels will then be determined by the location of the logger and be set subsequent to a site assessment during deployment.

6.2 Extent of Monitoring

We would suggest that the best means of conducting measurements is to utilise qualified acoustic engineers with Type 1/Class 1 hand-held sound level meter. When reporting results, the engineer should exclude traffic noise from construction noise to establish the actual level of noise being produced by the site. Furthermore, they can identify what types of equipment are creating the most noise and if needed, advise the Site Manager on additional mitigation measures and whether the complaint management procedures are required (Refer to Section 9).

In the event that complaints are received, the degree and duration of monitoring should reflect the extent of complaints and compliance. Permanent logging stations are available but are an expensive and often ineffective method of policing compliance. While they have the ability to continuously record noise levels 24-7, and even issue alerts if certain levels are exceeded, they are not able to easily identify whether the noise source in question was due to a construction activity or some other localised event unrelated to construction. This makes the data gathered copious but generally unusable for enforcement.

The following procedure is proposed for noise monitoring:

- Noise monitoring is to be undertaken if a complaint is received
- Monitoring to be conducted as per the NSW EPA – Interim Construction Noise Guideline
- Results of routine monitoring shall be submitted to Schools Infrastructure NSW. Results of monitoring in the event of any complaints shall be submitted to the Team leader within 1 week of receiving the complaint

7 CONSTRUCTION VIBRATION

Due to the construction types proposed and average distances between the works and receivers, we do not anticipate any significant vibration effects with regards to DIN 4150-3 compliance for the protection of building structures. The most intensive activity is expected to be the piling works.

We do not anticipate that there will be issues with regard to compliance with the vibration limits presented in the criteria above.

If problems and/or complaints arise on site, these should be dealt with as per the requirements for noise, i.e. any vibration complaints should be followed up by monitoring to establish the cause and levels of vibration, with any necessary mitigation measures taken following this.

If it is not practical to measure within adjacent dwellings, we propose that the vibration assessment be made at ground level either outside or inside the dwellings (whichever is possible), with prediction methodologies used to establish whether vibration levels are either near, or clearly well below, compliance limits.

7.1 Preliminary Vibration Assessment

It is important to note that construction vibration levels depend on several factors. These include the activity, the machine, the geology of the ground and the distance between the building and the source. Surface works are expected to have a lower vibration impact than ground compacting/piling works.

Compliance with vibration limits is expected based on ensuring ground compacting equipment is selected to adherer to minimum safe working distances. While these magnitudes do not predict cosmetic/structural damage, it is anticipated that human response/comfort would be impacted at these distances. The current RMS Construction Noise and Vibration Guideline sets safe working distances for vibrating plant and equipment. These are summarised below in Table 11.

Table 11. RMS Plant Vibration Safe Operating Distances - Construction Noise and Vibration Guideline 2016

Plant Item	Rating / Description	Minimum working distance	
		Cosmetic damage (BS 7385)	Human response (OH&E Vibration Guideline)
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	4 m	7 m
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	44 m	73 m
Jackhammer	Handheld	2 m (nominal)	2 m
Pile Boring	< 800 mm	2 m (nominal)	4 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	20 m
Vibratory Roller	< 200 kN (Typically 4-6 tonnes)	12 m	40 m

Based on the required construction activities to be undertaken as part of the project, as well as the proximity of the surrounding receivers to the site, the resulting construction vibration is unlikely to negatively impact on any of the surrounding receivers. NDY's SSDA response is attached in the appendix at the end of this report.

8 COMMUNITY LIAISON

An important part of managing construction noise is to manage community expectations.

It is important for all personnel on construction sites to maintain good relations with their neighbours and to respect the rights of these neighbours to live or work nearby without being subjected to unreasonable or excessive noise.

Consultation and co-operation between Schools Infrastructure NSW (SINSW)/Roberts Co, the contractor and the neighbours before commencement of work, and the removal of uncertainty, helps reduce adverse reactions to noise. It is understood that, at the time of writing, this process is underway.

It is recommended that this is completed as per SINSW standard processes, such as but not limited to:

- Information sessions
- Information booths
- Notifications
- Online resources and contacts
- Contact cards

It is recommended that a public relations person/team is identified for the project who will be responsible for overseeing the community liaison process.

9 COMPLAINTS MANAGEMENT SYSTEM

For this project, it is noted that School Infrastructure NSW manages all enquires and complaints for the project.

As per SINSW standard processes, should complaints be raised during construction, they will need to be logged, managed, closed out and resolved by SINSW within 24-48 hours.

The contractor and School are to refer all complaints through SINSW so they can be recorded and managed appropriately.

Please refer to the following SINSW community contact card details for further information.

10 CONCLUSION

Main works construction noise for the Wentworth Point new high school development has been reviewed to form a CNVMP for the purposes of meeting the NSW Interim Construction Noise Guideline. On review, the following conclusions were made:

- Construction activities, when assessed at the shortest possible distances (worst-case scenario) to both noise sensitive receivers, is predicted to exceed the 'Highly Noise Affected' noise levels. However, when assessed based on average distances, noise levels from all assessed activities are predicted to comply.
- As the dirt bund is removed, excavation and material transport activities without noise mitigation are expected to produce ~77 dBA at the external façade of the Wentworth Point Primary School classrooms (when activities are happening at the closest distance to the school). When assessed based on an average distance from the construction site to the face, this predicted noise level reduces to ~71 dBA.
- Localised barriers/hoarding to the western site perimeter is recommended during the excavation of the bund.
- Localised barriers at the closest affected classroom façades are recommended to be explored upon confirmation of noise levels by site measurement.
- Incorporation of noise mitigation strategies outlined in this document is expected to allow construction works to be undertaken whilst comply with the NSW Interim Construction Noise Guideline.

APPENDIX - VIBRATION PRE-CONSTRUCTION SURVEY RESPONSE

19 September 2022

Roberts Co
Level 9, 60 Castlereagh Street
Sydney NSW 2000
Australia

Attention: Adam Greentree

WENTWORTH POINT NEW HIGH SCHOOL – VIBRATION PRE-CONSTRUCTION SURVEY

Due to the construction types proposed and average distances between the works and receivers, we do not anticipate any significant vibration effects with regards to DIN 4150-3 compliance for the protection of building structures. The most vibration intensive activity is expected to be the piling works.

We do not anticipate that there will be issues with regard to compliance with the vibration limits and construction methodology presented in the NDY Construction Noise and Vibration Management Plan (rp211028s0013b[1.2]_Construction Noise and Vibration Management Plan.pdf).

Given the above, it is proposed that the desktop pre-construction assessment in the NDY Construction Noise and Vibration Management Plan will satisfy the SSDA requirements and that a vibration pre-construction survey is not strictly necessary. However, should complaints arise, the noise and vibration monitoring strategy described in the Construction Noise and Vibration Management Plan will be adhered to.

We trust this information is of assistance, please do not hesitate to contact us if you have any questions or require anything further.

NORMAN DISNEY & YOUNG

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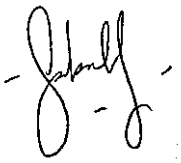
NDY QA SYSTEM

Revision No:	1.4
Revision Date:	27 September 2022
Reason Description:	Main Works Assessment

Authorisation By: Kanvin Chen

Client Name:	Roberts Co
Client Contact:	Adam Greentree
Project Leader:	Kanvin Chen
Editor:	Kanvin Chen

Verification By: Gabriel Lu



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Appendix F Construction Waste Management Sub-Plan

Waste Management Plan

Wentworth Point New High School

Date: 12 September 2022

Document Details

Title	Construction Waste Management Plan
Client	The Crown in right of the State of New South Wales, acting through the NSW Department of Education
Document Reference Number	RCo-ENV-PLN-002
Principal Contractor	Roberts Co
Roberts Co Project No.	20016
Principal Contractor ABN	68 627 689 418
Project Address	3 Burroway Road, Wentworth Point NSW 2127

Document Authorisation

Adam Greentree	Ben Drayton	Sorcha Brennan
PROJECT MANAGER	**SITE MANAGER**	**PROJECT HSE MANAGER / ADVISOR**
Date	**Date**	**Date**

TABLE OF CONTENTS

1 DOCUMENT CONTROL

All changes made to the Project Construction Waste Management Plan are recorded in the amendment table below. The version number and date of revision for the current document revision are shown in the footer of the document.

1.1 Revision History

Revision	Date	Description of changes	Prepared by	Approved by
0	12/09/22	For Review	Gavin Finlayson	Adam Greentree

1.2 Management reviews

Review date	Details	Reviewed by
12/09/22	Issued For Review	Adam Greentree

1.3 Controlled copies

Name	Position	Date	Revision

2 DEFINITIONS AND ABBREVIATION

Term/Abbreviation	Definition
CWMP	Construction Waste Management Plan
HSE	Health, Safety and Environment
EPA	Environment Protection Authority
OEH	Office of Environment and Heritage
RCo	Roberts Co
The Project	Wentworth Point New High School

Table 01 – Terms of reference, definitions and abbreviations.

3 PURPOSE AND APPLICATION

This Construction Waste Management Plan (CWMP) for Wentworth Point New High School ("**The Project**") describes the Roberts Co system for managing and minimising waste impacts of its activities, meeting its legislative and contractual obligations. In particular, the plan has been developed to address requirements of Condition B17 from the project conditions of approval.

DA Consent No.	Consent Condition of Approval
SSD-11802230	B17

Table 02 – Development Application – Condition of Approval

3.1 Project Scope

The Project will incorporate the following:

A multi-level, multi-purpose, integrated high school building containing:

- Collaborative general and specialist learning units with a combination of enclosed and open spaces;
- Four level central library, with primary school library located on ground floor and high school library on
- Laboratories and workshops;
- Staff workplaces;
- Canteens;
- Outdoor learning play and recreational areas (both covered and uncovered).
- Associated site landscaping and public domain improvements;
- Construction of ancillary infrastructure and utilities as required.

4 OBJECTIVES AND TARGETS

4.1 Objectives

The objective of this CWMP is to ensure that all risks associated with construction waste management are considered and managed effectively during construction.

This CWMP seeks to ensure that construction waste is managed effectively to prevent any negative environmental impact on the surrounding environment or receiving resource recovery and waste facilities.

This CWMP aims to satisfy the following objectives:

- Address the requirements of planning approval condition B17;
- Address the requirements of the relevant environmental legislation as it applies to this project;
- Summarise potential impacts on the environment from the proposed works, and;
- Document environmental procedures to control potential environmental impacts.

4.2 Targets

The following targets have been identified in terms of waste management for the project;

- Waste products are recovered and reused on site where reasonable and practical;
- Undertaken recovery / recycling of all recyclable materials such as concrete, steel, aluminium, paper and plastics. This may be undertaken on site or at an offsite recovery facility;
- All residual waste products are sent to appropriately licensed destinations for recycling, reuse, treatment or disposal;
- No contamination incident occurring as a result of waste storage, transport or disposal;
- No rejection of loads by the receiving facility for non-compliant wastes;
- Regulated wastes stored, transported, tracked and disposed of as per regulated waste legislation;
- No construction waste/litter to leave the site in an uncontrolled manner;
- Documentation of the intended management of wastes e.g., avoid, reduce, reuse, recycle or dispose to ensure waste is managed in accordance with accepted standards and appropriately implemented waste control measures, and;
- Implementation of waste minimisation initiatives where practical.

5 LEGAL AND OTHER REQUIREMENTS

The waste legislation and regulatory framework relevant to the appropriate jurisdiction can be found in via the following links:

NSW	Waste Avoidance and Resource Recovery 2001 (WARR)1

Website Links

NSW www.legislation.nsw.gov.au/view/html/inforce/current/act-2001-058

VIC www.sustainability.vic.gov.au/about-us/our-mission/our-strategies/statewide-waste-and-resource-recovery-infrastructure-plan-swrrip

5.1 Environmental Legislation (Acts)

All material that is imported to or exported from the Wentworth Point New High School will be undertaken in strict accordance with the requirements of the following;

NSW	Protection of the Environment Operations (POEO) Act 1997

This includes:

– Ensuring waste is classified appropriately and in accordance with relevant guidelines;

– Waste materials are disposed of correctly at the appropriately licensed facilities, and;

– Other materials are removed to facilities lawfully able to accept such materials.

5.2 Environmental Regulations

The proposed works shall be undertaken in accordance with the following regulations;

NSW	Protection of the Environment Operations (Waste) Regulations 2014

5.3 Waste Classification Guidelines, Part 1: Classifying Waste

All wastes generated and proposed to be disposed off-site shall be assessed, classified and managed in accordance with this guideline.

5.4 Asbestos Regulations

Asbestos containing materials shall be undertaken in accordance with the requirements of the:

NSW	– Work, Health and Safety Act 2011 – Work, Health and Safety Regulation 2017 – Code of Practice - How to safely remove Asbestos, December 2011 – Waste Classification Guidelines: Part 1: Classifying Waste (DECC 2008)

6 WASTE CLASSIFICATION

Waste is generally classified on the basis of its potential harm to the environment. A summary of the waste classification requirements is provided below.

6.1 NSW

Waste Classification	Description
Special Waste	– Special waste includes asbestos waste and waste tyres. – Asbestos waste means any material or material that contains the fibrous form of mineral silicates. – Waste Tyres is any used, rejected or unwanted tyres including shredded or tyre pieces.
Liquid Waste	– Liquid waste means any waste that: – Has an angle of repose of less than 5 degrees, or – Becomes free-flowing at or below 60 degrees Celsius or when it is transported, or – Is not generally capable of being picked up by a spade or shovel.
General Solid Waste (putrescible)	– Household waste that contains putrescible organics waste from litter bins collected by local councils.
General Solid Waste (non-putrescible)	– Glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal – Paper or cardboard – Grit, sediment, litter and gross pollutants from stormwater treatment devices, stormwater management systems that has no free liquids – Garden & wood waste – Containers previously containing dangerous goods, as defined under the Australian Code for the Transport of Dangerous Goods by Road and Rail, where residues have been appropriately removed by washing or vacuuming drained – Oil filters (mechanically crushed), rags and oil-absorbent materials that only contain non-volatile petroleum hydrocarbons and have no free liquids – Drained motor oil containers that do not contain free liquids

Waste Classification	Description
	– Synthetic fibre waste from fibreglass, polyesters and other plastics and is packaged securely to prevent dust emissions, that is confirmed as not being asbestos waste – Virgin excavated natural material – Building and demolition waste – Asphalt waste, including asphalt from road construction and waterproofing works – Cured concrete waste from batch plants – Fully cured and set thermosetting polymers and fibre-reinforcing resins, glues, paints, coatings and inks

Table 03 – Waste Classifications (NSW)

Further details on the classification of waste can be found in the OEH's Waste Classification Guidelines 2008.

7 WASTE MANAGEMENT

7.1 Waste Sources

The following information in this section outlines the anticipated waste and management options to address the generated waste. All waste will be removed progressively with minimal amount stored on site.

Waste that is not removed immediately will be stored in designated areas in proprietary storage facilities until it is reused or removed.

Waste will be classified according to the OEH Waste Classification Guidelines (2008).

Waste Category	Waste Generated	Classification
Waste produced from the demolition of the existing structures and roadways	– Concrete – Asphalt / bitumen – Steel – Brick – Internal fittings	General Solid
Waste from on-site maintenance and servicing of plant and equipment – note minor servicing only. Major servicing to be completed off site. (non-liquid)	– Drained and crushed oil filters and grease tubes – Used and defective parts – Oil soaked rags – Used oil absorbent materials	General Solid
Waste from crib sheds and office areas	– Food scraps, waste wrappers, waste-paper towels	General Solid Putrescible
Office and packaging waste (non-liquid)	– Paper, cardboard, glass, plastic (no food scraps etc)	General Solid

Waste Category	Waste Generated	Classification
Waste from construction activities (non-liquid)	– Waste is not contaminated or mixed with any other type of waste and does not contain asbestos – Plasterboard – Concrete pour residues – Aggregates – Damaged and off cuts of PVC pipes – Rejected or defective precast concrete – Steel waste – Used Geotextile – Timber waste	General Solid
Any waste that meets the criteria for assessment as dangerous goods under the Australian Code for the Transport of Dangerous Goods by Road and Rail	– Poisonous (toxic) substances and corrosive substances – Non-sag epoxy mortar binder – Synthetic rubber-based adhesive – Epoxy resins – Batteries	Hazardous

Table 05 – Sources of Waste

7.2 Waste Minimisation and Recycling

The following strategies will be implemented on site to minimise the generation of waste:

- Include project waste strategy in the project induction;
- Establishment of a combined waste collection system by a reputable service provider;
- Appropriate quantities of materials will be ordered to minimise wastage;
- Quality of materials supplied will be controlled to reduce rework and problems due to quality and additional material consumption;
- Prefabricated elements used where practical and reasonable;
- Establishment of comingled recycling receptacles for packaging and food container waste;
- Waste steel will be separated and disposed of into the steel recycling bin provided on site;
- Form work will be reused as often as possible;
- Waste timber and formwork will be sent to a recycling facility;
- Waste concrete will be sent to a recycling facility;
- Any green waste is to be mulched and removed from site. Where possible, with regard to the species, it is to be reused for landscaping purposes off site, and;
- Recycling of general waste such as paper, cardboard, aluminium cans and similar materials from offices and site facilities. Source separation will be provided for these facilities as shown below.

7.3 Waste Storage and Handling

During demolition and excavation, waste will be removed by a suitably licensed contractor and sent to pre-approved waste and resource recovery facilities. The handling, storage and transport of hazardous materials and waste shall be in accordance with Roberts Co Project Work, Health and Safety Management Plan, the National Code of Practice, the relevant Safety Data Sheet (SDS) on the product and the hazardous materials management procedures.

During construction, Roberts Co will provide the appropriate bins required dependent on the stage of the project including (but not limited to skip bins tipper bins, wheelie / Otto bins, recycling bins and food scrap bins throughout the duration of the project.

The type of bin will be required for the various activities being carried out;

– 240L bins will be utilised during the structure phase on the decks to be fed into 1.5m3 site bins;
– 240L bins during typical floor services and fit out stages to be fed into 1.5m3 site bins;
– 240L bins during the finishes to completion to be fed into 1.5m3 site bins; and
– The bins above will be progressively fed into 15m3 Marrells throughout the project.

Storage of waste oils and chemicals shall be in a purpose built secured bunded area. The capacity of the bunded area is to be at least 110% of the chemical stored within. An emergency response spill kit shall be located adjacent to the bunded area.

All storage containers and locations for the various waste streams shall be clearly labelled to ensure that mixing of wastes is avoided.

All material removed during the de-silting of drainage structures and sediment structures shall be disposed of in an approved disposal area on site.

Where spoil material is to be removed from the site for offsite disposal, Roberts Co must ensure that the waste is classified in accordance with the OEH Waste Classification Guidelines.

Figure 1 –Excavation storage and recycling areas.

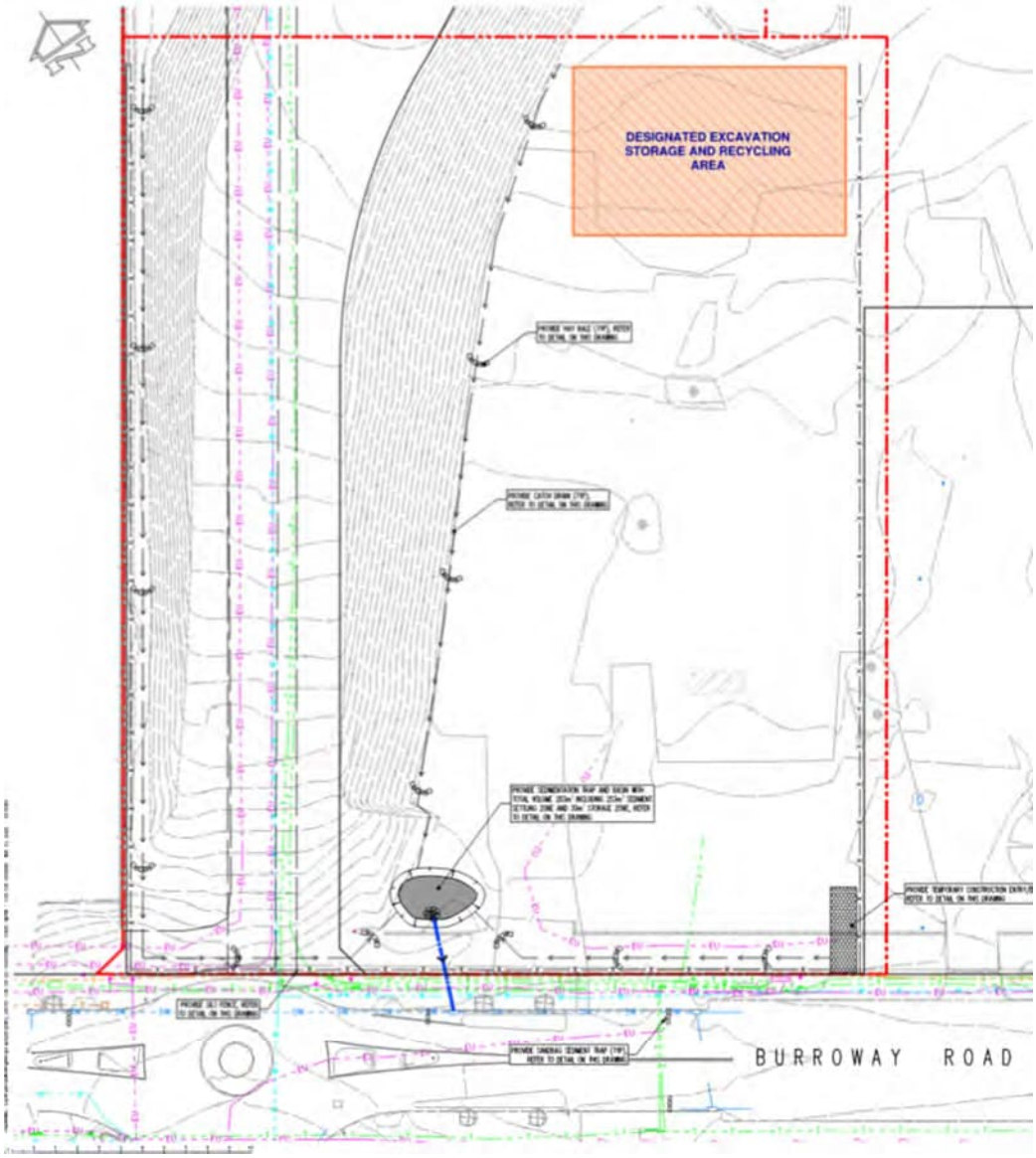
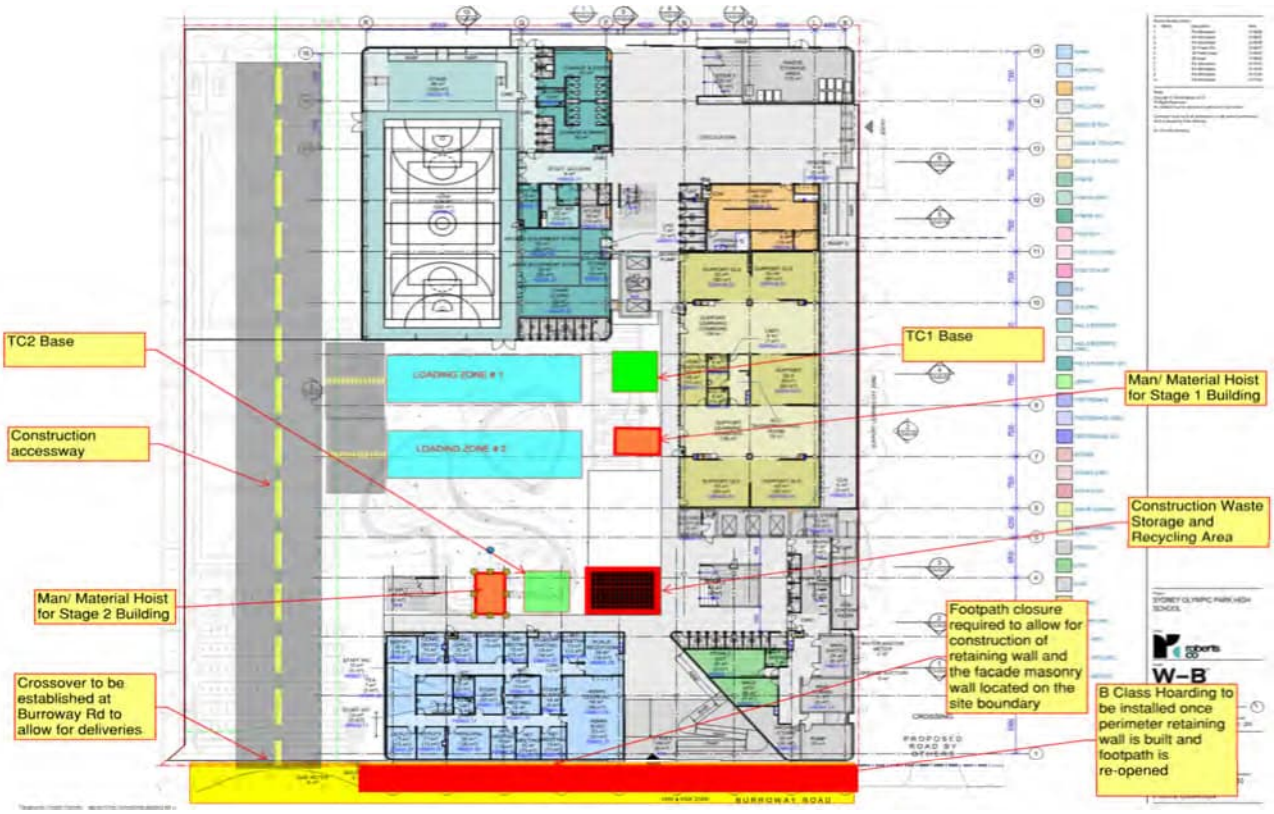


Figure 2 – Construction Waste storage and recycling areas.



7.4 Waste Forecast – Construction Phase

The objectives during demolition, excavation and construction waste management are to;

- Reduce the demand for waste disposal during demolition and construction;
- Maximise resource recovery through reuse and recycling;
- Assist in achieving Federal and Local Government waste minimisation targets in accordance with overarching regulations and plans;
- Document wastes that may be generated as part of the demolition and construction works (identification and proposed disposal method and destination), and;
- Aim to be awarded 2 credit points for Waste Management as stipulated under Green Star Office version 3. Two credit points are awarded where 90% of waste, by weight, generated on-site during the construction phase is re-used or recycled.

The above target will be achieved through maintained and consistent reuse and recycling efforts throughout the entire construction phase. Other construction and demolition related issues such as impact of the development on surrounding land used and public streets are addressed in the Construction Management Plan.

7.5 Types and quantities of waste

The following estimates of waste type and quantities have been made based on the anticipated extent of demolition and construction works. Demolition and Construction waste generation data has been provided by RCo based on similar projects of comparable type and size.

7.5.1 Excavation types and quantities of waste materials

There is no demolition associated with this project.

Table 05 identifies the types of materials likely to be generated during excavation. Accurate records of amount, type and destination of waste materials will be recorded and retained throughout the scope of works.

Material types	Anticipated Quantities
Soil (ENM)	450 m3
Soil (GSW)	1,500 m3
Concrete, Bricks, Tiles,	2,500 m3

Table 05 - Proposed waste material types and estimated generation.

7.5.2 Construction types and quantities of waste materials

An indicative forecast of generated waste generated throughout the construction activities is located in table 06 below. The table (06) represents the waste material type, estimated volumes calculated in recyclable percentages. The anticipated recycling and reuse rate for construction waste is 90% as per the project waste objective target set out in section 7.4 of this plan.

The estimated generation of construction waste is based on an average of 170m3 per month over a 18-month construction duration. Therefore, an estimated waste total of 3,060 m3 will be generated with the following estimated breakdown of waste type.

Waste Material types	Percentage (Approx.)
Heavy Recyclable Materials (soil, dirt, sand, rubble, brick, concrete, tiles, marble, stone)	28%
Light Recyclable Materials (cardboard, paper, plastic, plasterboard)	24%
Metals (ferrous, non-ferrous)	13%
Recyclable Timber / Green Waste	25%
Land Fill Waste	10%
Total Recycled Waste	90%

Table 06 - Waste Management and Resource Recovery Plan. A 90% recycling and reuse rate is expected.

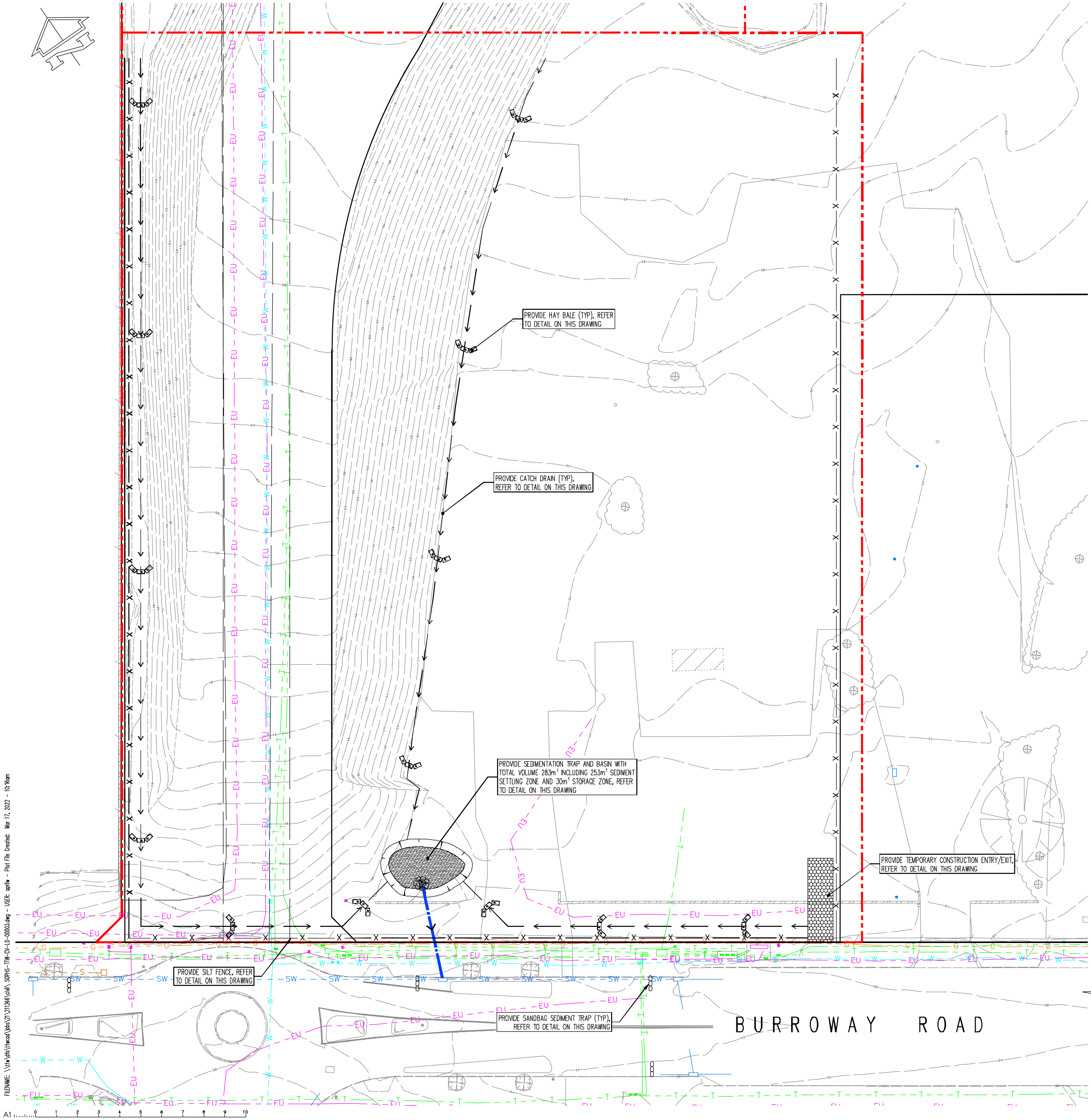
8 WASTE RECORDS

Records of waste disposal must be maintained. All material that leaves the site must be classified and its disposal or recovery location recorded. Waste records are recorded on a central register.

Where any external waste contractors are used by Roberts Co, a copy of the relevant environment protection licence and disposal forms shall be obtained and verified.

All records will be filed, stored, and archived in accordance with the Roberts Co project filing index. In any case, records will be maintained for a minimum of four (4) years.

Appendix G Construction Soil and Water Management Sub-Plan

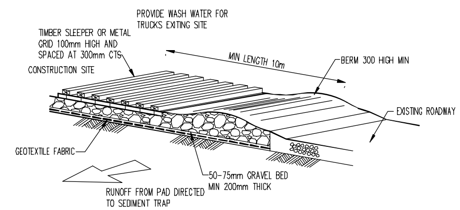


EROSION AND SEDIMENT CONTROL NOTES

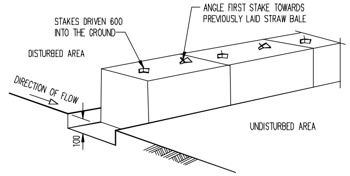
1. All work shall be generally carried out in accordance with
   (A) Local authority requirements,
   (B) EPA – Pollution control manual for urban stormwater,
   (C) LANDCOM NSW – Managing Urban Stormwater: Soils and Construction ("Blue Book").
2. Erosion and sediment control drawings and notes are provided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

Sequence Of Works

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

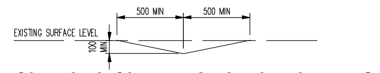


TEMPORARY CONSTRUCTION VEHICLE EXIT
NTS

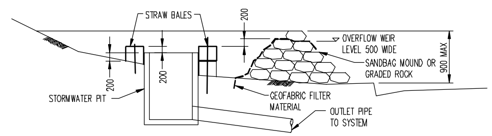


HAY BALE SEDIMENT FILTER
NTS

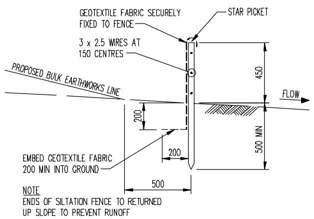
NOTE: STAKE TO BE EITHER TAR COATED STAR OR 50 x 50 HARDWOOD



TYPICAL SECTION THROUGH CATCH DRAIN
SCALE 1: 20

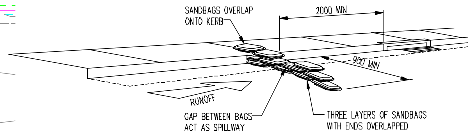


SEDIMENTATION TRAP
NTS



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

SILTATION FENCE DETAIL
SCALE 1: 20



SANDBAG KERB SEDIMENT TRAP
NTS

WATER QUALITY TESTING REQUIREMENTS

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

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

EROSION AND SEDIMENT CONTROL LEGEND

—x——x—	Siltation fence
——←——	Catch drain
(symbol)	Hay bale barriers
(symbol)	Sandbag sediment trap

0 2.5 5 7.5 10 12.5 15 17.5 20m
1:250 A1 1:500 A3

FOR CONSTRUCTION CERTIFICATE

REV	DESCRIPTION	CHK	DR	DATE
D	ISSUE FOR CC1	SF	JH	17.03.22
C	DRAFT CC1	SF	JH	08.03.22
B	ISSUE FOR TENDER	SF	JH	01.02.22
A	ISSUE FOR TENDER	SF	JH	20.12.21

ARCHITECT:
WOODS BAGOT
LEVEL 2
60 CARRINGTON STREET
SYDNEY NSW 2000
PO BOX N19
GROSVENOR PLACE NSW 1220

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

PROJECT:
SYDNEY OLYMPIC PARK HIGH SCHOOL (SOPHS)
7-9 BURROWAY ROAD,
WENTWORTH POINT NSW 2127

DRAWING NAME:
SEDIMENT AND EROSION CONTROL PLAN AND DETAILS

TTW JOB No: 211266

SCALE : A1 AS NOTED
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AUTHORISED BY
DRAWING No SOPHS-TTW-CV-L0-00003
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Appendix H Construction Flood and Emergency Sub-Plan

TTW Structural Civil Traffic Façade

Construction Flood Emergency Management Plan

Sydney Olympic Park High School

Prepared for Roberts Co / 23 September 2022

211266

TTW (NSW) PTY LTD (ACN 649 974 112)
(ABN 74 649 974 112) I Consulting Engineers
Level 6, 73 Miller Street, North Sydney NSW 2060

Your Partner in Engineering

Contents

1.0 Introduction

Taylor Thomson Whitting (TTW) has been engaged by Roberts Co to prepare a Flood Emergency Management Plan (FEMP) to be implemented during the construction of the proposed Sydney Olympic Park new High School at 7-11 Burroway Road, Wentworth Point.

TTW and Schools Infrastructure NSW (SINSW) representative Roberts Co have consulted the relevant NSW State Emergency Services (SES) officers in developing an operational plan between 28 July and 04 August 2022. The consultation is also relevant to developing a plan for the construction phase. Minutes of the consultation is shown in figure 1.0 below.

The purpose of this FEMP is to summarise the flood risks within the site during construction, identify preparation measures that should be undertaken, and provide an action plan with steps to be completed during a flood event.

Nemesio Biason Jr

From: Nemesio Biason Jr
Sent: Thursday, 4 August 2022 9:41 AM
To: Elspeth O'Shannessy
Cc: David McDonnell; Georgia Sedgmen; Sandra Lim
Subject: RE: Sydney Olympic Park high School

Hi Elle,
As per our latest correspondences, below is the updated minutes of our meeting/consultation.

- *SES Flood data portal flood mapping is based on the Parramatta Council's adopted flood study being the SKM's "Lower Parramatta River Floodplain Risk Management Flood" study 2005*
- *BOM do not provide flash flood warning system but provide potential for flash flooding for a very large scale area as part of their detailed severe thunderstorm warning.*
- *The site is considered Lower risk than other sites that SES has reviewed– The school is elevated high at 4.0mRL and dry, well above the PMF flood level of 2.42mRL.*
- *No current flood warning area that covers Lower Parramatta River catchment. The closest one is at Silverwater Rd Bridge. Department of Education (DoE) is to monitor any flood warnings from SES, BOM, Parramatta Council, Media outlets (television, radio stations) instead as a source of flood warning for the site.*
- *There are risks associated with sheltering in place which is why it is the preferred strategy for schools to close prior to commencing the school day or prior to inundation of the roads. For example secondary emergencies (e.g. fire or medical), complexities with resupply and given the age of the student potential for them or carers to enter the dangerous floodwater.*
- *Primary priority is the closure of school in any road closure within the Precinct and ahead of any major flooding.*
- *Second Priority is school closure upon receiving any flood warning and evacuate out prior to PMF flood*
- *Make sure there is enough time to evacuate, Look at depth and velocity*
- *Evaluate the peak critical PMF storm event which could be hours to a day.*
- *Only need to evacuate if it is a PMF, and students being high school students can self-evacuate or guided by guardians to higher grounds.*
- *In the worst case scenario, or couldn't evacuate – The site is safe as an "On-site refuge" being at 4.0RL being 1.58m above the PMF flood level.*
- *It was suggested to Check Glenwood School's flood emergency response plan.*

Regards
Nemesio

Figure 1.0: SES Consultation

1.1 Reference Documents

The FEMP has been prepared with reference to the following:

- NSW Government Floodplain Development Manual (2005);
- NSW State Emergency Service (SES) guidelines, and;
- FloodSafe guidelines and the relative FloodSafe Tool Kits.

1.2 SSDA Conditions of Consent

Item	Condition	Section Reference
B18	The Construction Flood Emergency Management Sub-Plan must address, but not be limited to, the following: (a) Be prepared by a suitably qualified and experienced person(s)	1.0 – 9.0
	(b) Address the provisions of *Floodplain Risk Management Guidelines* (EHG)	1.0 – 9.0
	(c) Include details of: i. The flood emergency responses for both construction phases of the development; ii. Predicted flood levels; iii. Flood warning time and flood notification; iv. Assembly points and evacuation routes; v. Evacuation and refuge protocols; and vi. Awareness training for employees and contractors, and users/visitors	i. 3.0, 5.0 ii. 2.1 iii. 3.0 iv. 5.0 v. 5.0, 6.0, 7.0 vi. 6.0
B21	Prior to the commencement of construction, the Applicant must prepare and implement for the duration of construction; (a) Flood warning and notification procedures for construction workers on site	3.0, 4.0
	(b) Evacuation and refuge protocols	5.0

2.0 Flood Behaviour

The flood analysis within this report has been based on a flood study assessment conducted by Sinclair Knight Merz (SKM) on behalf of Parramatta City Council. The following section provides a summary of the findings of the assessment and TTW's analysis.

2.1 Peak Flood Levels

Design flood levels obtained from the study conducted by SKM for the 5% AEP, 1% AEP and Probable Maximum Flood (PMF) events corresponding to the development area are specified in Table 1.

Table 1 Design Flood Levels - Extract from Lower Parramatta River Study and Plan (2005)

Flood Event	20% AEP	5% AEP	2% AEP	1% AEP	PMF
Design Flood Level (mAHD)	1.27	1.34	1.39	1.42	2.42

Based on this, the peak flood levels for the site are 1.42m AHD for the 1% Annual Exceedance Probability (AEP) storm event and 2.42m AHD for the Possible Maximum Flood (PMF) event. A minimum Finished Floor Level of 4m AHD has been adopted for the site which exceeds both the flood planning level (1% AEP level + 0.5m freeboard) and the PMF from mainstream riverine flooding from the adjacent Parramatta River.

As the Wentworth Point road network is generally located above the 1% AEP flood level, there is no concern with flood risk in this event. The flood evacuation procedures in the following sections of this report should be followed where flood warnings advise of imminent flooding above the 1% AEP flood level and up to the PMF.

The duration of PMF inundation is likely to be longer than a day as flood levels subside slowly. Therefore, shelter-in-place emergency responses are unsuitable as the primary flood emergency strategy. In the event of a forecasted flood emergency, the contractor shall close the site and advise all workers to stay home.

We note that there is currently no formal response flood warning system in place for the lower Parramatta River. However, the Upper Parramatta river section has a formal flood warning system in place with the closest one being in Silverwater Rd bridge. As per our consultation with SES, the head contractor is to monitor flood warnings from SES, BoM, Parramatta Council, and media outlets (televisions, radio stations) instead as a source of flood warning for the site which is generally received up to 7 days in advance prior to a flood commencing. Consequently, there would be sufficient time prior to a flood event to:

- Prepare for a flood
- Respond when a flood is likely
- Respond during a flood
- Recover after a flood
- Close the site
- Notify workers to stay home

The road network to the south of site is of low hazard as shown in figure 2.0 where it is subject to shallow flooding where able-bodied people would be able to wade safely. Trucks could also be used to assist evacuation.

Currently, earthworks are scheduled for a short duration of one month to be undertaken during summer. The risk is therefore low as these conditions are unlikely for flooding.

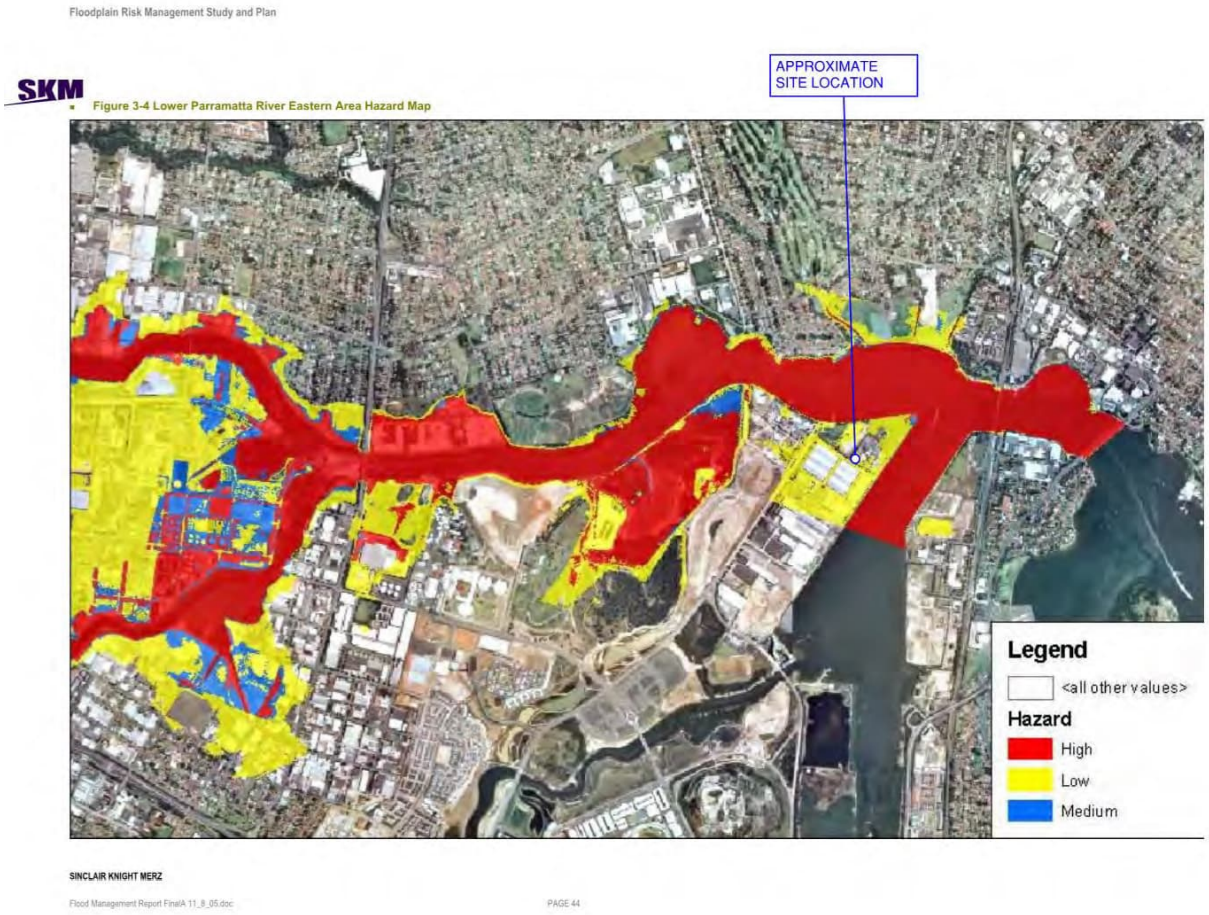

Figure 2.0: Flood Hazard Classification (Extract from Lower Parramatta River Study and Plan (2005))

3.0 Flood Warnings and Notifications

3.1 Flood Watches and Warnings

Severe weather and thunderstorm warnings are issued by the Bureau of Meteorology (BOM). These warning are continually updated with descriptions of the likely conditions, including predicted extreme rainfall depths.

Flood warnings are issued by the BOM when flooding is occurring or is expected to occur in an area. Warmings may include specific predictions of flood depths dependent on real-time rainfall and river level data. These warnings are distributed to councils, police and the relevant local State Emergency Services (SES), as well as being available on the BOM website

A **Standard Emergency Warning Signal** (SEWS) will be used by SES to precede all *Top Priority* Flood Warnings and all Evacuation Warnings. Once activated Evacuation Orders are broadcast over the radio stations.

A ***Flood watch*** is issued by the BOM up to four days prior to a flood event. A watch is generally updated daily and may be issued before, during or after rainfall has occurred.

Flood warnings are issued by the BOM when flooding is occurring or expected to occur in a particular area. Warnings may include specific predictions of flood depths dependent on real-time rainfall and river level data. These warnings are distributed to Council, Police and the relevant local SES, as well as being available on the BOM website, through telephone weather warnings and radio broadcasts.

SES Evacuation Warning is a warning message from SES advising the community to prepare for likely evacuation. The warning advises people what to do and what to prepare to take with them.

A ***Flood Evacuation Order*** is a notification to the community, authorised by the SES, when the intent of an Incident Controller is to instruct a community to immediately evacuate in response to an imminent threat. It also advises where people should go and may advise which evacuation route to take.

Visual Observation

Site management must visually monitor the flood levels on Burroway Road during severe rainfall events and initiate flood response procedures in the event of flood levels appearing to approach inundation.

3.2 Coordination of Flood Evacuation Warnings and Orders

The overall coordination of the road evacuation routes will be conducted by the SES. The head contractor is to communicate warning messages and orders from the SES to personnel and workers on site.

3.3 Public Address System

The site will have an alert system for workers on site in the event of an emergency. The site will have an Evacuation Procedure with assembly points as part of the Emergency Management Plan.

Across the proposed site, the ground floor level has been set at RL 4.00m AHD and majority of external areas are located above the PMF flood level. As such, the assembly point can be anywhere within the site after earthworks have been completed. Before this point, the assembly point shall be set at the high point of the site.

4.0 Flood Response

4.1 Contractor Responsibilities

Once the site is in operation the roles and responsibilities in Table 2 below will need to be delegated to specific personnel. In the event of a severe flood, it is the responsibility of the head contractor to ensure these tasks are undertaken.

Table 2 Contractor Flood Responsibilities

Role	Location	Responsibilities
Head Contractor **Site Manager / Foreman**	On site	- Inform site personnel of flood risk - Coordinate flood evacuation drills - Decide if evacuation is required prior to warnings from SES - Liaise with SES
Head Contractor **First Aid Officer**	On site	- Coordinate assistance for less able workers and personnel during evacuation - Prepare a Flood Emergency Kit that includes a portable radio, torch, spare batteries, first aid materials, emergency contact numbers, candles, waterproof matches, waterproof bags and required medications.
Head Contractor **Site Personnel**	On site	- Coordinate evacuation of workers and assist in evacuation

4.2 Key Contact Details

In the event of a severe flood, key telephone numbers have been listed in Table 3.0 below.

Table 3 Key Contact Numbers

IMPORTANT TELEPHONE NUMBERS	
Contractor	**tba**
Foreman	**tba**
Site Office	**tba**
First Aid Officer	**tba**
OUTSIDE SITE CONTACTS ***** Ambulance / Fire – Call Office numbers shown above to contact***	
State Emergency Services	**132 500**
Busways	**1300 692 929**
Burwood Bus Depot	**131 500**
Concord Hospital	**9767 5000**
Police – Ryde	**9808 7401**

5.0 Assembly Point and Evacuation Routes

5.1 Emergency Assembly Point

An Emergency Assembly Point will be nominated that is within and central to the site. Before earthworks have been completed on site, the assembly point will be the high point of the site. Once earthworks have been completed, the site will be higher than the PMF level and the assembly point can therefore be nominated anywhere within the site.

As it is intended that the flood evacuation warning will be provided prior to flooding occurring, egress from the site can occur on Burroway Road to the south of the site.

5.2 Evacuation Routes

The following information is provided for information only. For "Flood Response Actions" – refer to Section 7 of this FEMP for details.

As per consultation with SES, if necessary, evacuation to higher ground is the most appropriate route in such proximity to the river. As shown in figure 3.0 below, all workers or personnel on site are to assemble and evacuate to higher ground at Bennelong Parkway or across Bennelong Bridge.

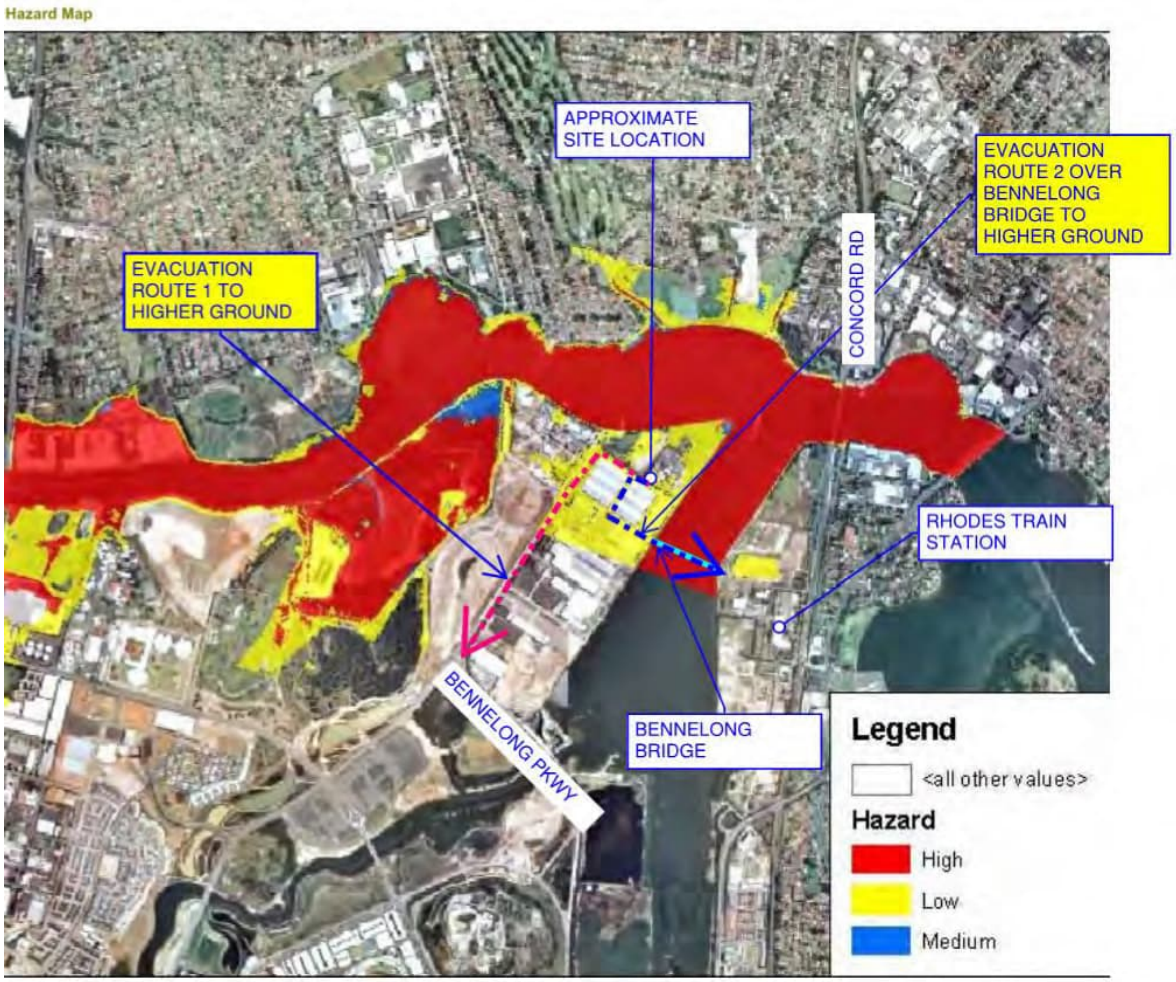

Figure 3.0: Evacuation Routes (Extract from Lower Parramatta River Study and Plan (2005))

6.0 Preparation for Flood Response

6.1 Education

6.1.1 Site Personnel

As part of the preparation for a flood event, those with responsibilities within this Plan should review and be familiar with their roles. Inductions should be held to educate personnel on their role during a flood event.

6.1.2 Workers

To increase awareness on site, it is recommended that all inducted workers are made aware of the potential flood risk and actions that will be undertaken during a flood event. Evacuation drills should be undertaken regularly to ensure that all workers are aware of the procedures for evacuation.

6.2 Evacuation Drills

It is recommended that evacuation drills be held at a minimum of twice yearly to ensure all personnel and workers are aware of and familiar with their flood response actions, the sound of the alert and the location of the assembly point.

6.3 Flood Emergency Kit

A Flood Emergency Kit should be prepared prior to a flood event taking place and regularly checked to ensure that supplies within the kit are sufficient and in working condition. This check could occur after the evacuation drill takes place to provide a regular schedule. The Kit should include:

- Radio with spare batteries;
- Torch with spare batteries;
- First aid kit and other medicines;
- Candles and waterproof matches;
- Waterproof bags;
- A copy of the Site Emergency Management Plan; and
- Emergency contact numbers.

This Emergency Kit should be stored in a waterproof container and is the responsibility of the First Aid Officer.

7.0 Flood Response Actions

WHEN A FLOOD WATCH IS ISSUED the following actions should be undertaken:

1. Ensure the emergency kit is ready to use.
2. Listen to the local radio station for updates on forecasted flood heights and timings.
3. Call SES for an update and possible evacuation advice.
4. Notify all workers of the flood watch and assist availability of workers to assist with emergency actions if required.
5. Ensure workers are familiar with the safe flood evacuation route

WHEN A FLOOD WARNING IS ISSUED the following actions should be undertaken:

1. Undertake the actions nominated under the "flood watch".

2. **During Site Hours**:

- **For life-threatening emergencies phone 000 immediately.**

- **Coordinate the safe return of workers in consultation with SES and transport operators to their homes.**

- **Call Busway (Bus Operator is to be confirmed) and coordinate the required transport resources for evacuation of non-able-bodied personnel/workers.**

- **Send SMS to emergency contacts**

- **Direct All workers to the Assembly point within the site before the property is flooded.**

- **Evacuate workers and personnel**

NOTE: Avoid driving or walking through floodwaters. These are the main causes of death during flooding. Although the site may not be flooded, safe travel arrangements for workers to go home is likely to be disrupted by flooding and/or road closures.

3. **Outside of Site Hours**:

- Close the site and notify workers of the temporary closure of the site

8.0 Limitations and Revision of the Flood Emergency Response Plan

This FEMP only addresses the evacuation strategies during extreme flooding events for workers on site during construction and is considered a guide only. It does not cover individual safe travel for workers when their safe travel arrangements may be disrupted by flooding and/or road closures.

It is the head contractor's responsibility to ensure this FEMP is current and updated as necessary to be in line with relevant standards, directorate, legislation, and the Regional's State Emergency Management Plan to ensure the health, safety and welfare of all personnel, workers and others.

9.0 Recommendations

1) Head contractor to liaise with The Transport Services Functional Area for Buses resources allocation and arrangement for non-able-bodied personnel prior to commencing construction on site.

2) Prepare Emergency Management Plan that addresses the recommendations of this FEMP, particularly Section 4.0.

3) Update the Important Telephone Numbers in Section 4 of this report prior to site being operational.

4) Flood-educate personnel and workers through Education and Evacuation Drills as detailed in the Section 6 of this FEMP.

5) Head contractor to review and update this FEMP as necessary once a year.

6) **All personnel and workers to be familiar with Flood Response Actions as detailed in the Section 7 of this FEMP**.

Prepared by
TTW (NSW) PTY LTD

STEPHEN FOK
Senior Civil Engineer

Reviewed & Authorised By
TTW (NSW) PTY LTD

NEMESIO BIASON JR.
Associate Director

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Appendix I Asbestos Management Plan

Geosyntec consultants

engineers | scientists | innovators

Asbestos Management Plan – Wentworth Park new High School

7 Burroway Road, Wentworth Point, NSW 2127

RobertsCo
21 October 2022

AU122229 CEMP App I

Quality Management

Document Distribution

Issue/Revision	Issue 1	Revision 1	Revision 2
Remarks	DRAFT	FINAL	
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This report was prepared in accordance with the scope of services set out in the contract between Geosyntec Consultants Pty Ltd (ABN 23 154 745 525) and the client.

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Attachments

1 Introduction

1.1 Background

Geosyntec Consultants Pty Ltd (Geosyntec) was engaged by RobertsCo Pty Ltd (the Client), to prepare a Construction Environmental Management Plan (CEMP) for the Wentworth Point new High School redevelopment project, located at 7 Burroway Road, Wentworth Point, NSW (the project site). The site location is presented in Figure 1 and the site layout is presented in Figure 2, Appendix A.

As per the 2022/2023 budget papers, this is now referred to as "Wentworth Point new high school". Future documentation relating to this project, including this document, will be labelled accordingly.

Due to the SSD-11802230 application being submitted as "Sydney Olympic Park new high school", the project name will remain the same on the Planning Portal and future documentation may reference this.

Please also note 'Wentworth point new high school' is the placeholder name for the school. The school naming will occur closer to opening, following a community consultation process.

Based on review of current spatial data, the site is legally identified as Lot 1 in DP 121276305, and occupies an area of approximately 1 ha. The site is currently vacant land which has been partially capped with up to 2m of certified Virgin Excavated Natural Material (VENM). The proposed redevelopment is understood to include school buildings and open space areas within the development footprint, and is consistent with the definition of 'HIL C' as presented in Schedule B1 of National Environment Protection (Assessment of Site Contamination) Measure (1999) as amended in 2013 (NEPM 2013), which includes public open space land use and secondary schools.

Mr Andrew Lau from JBS&G, an NSW EPA accredited Contaminated Land Auditor, has been appointed by Schools Infrastructure NSW to conduct an audit of the proposed school development with respect to land contamination. This is to ensure that the investigations and any remedial works are undertaken in accordance with the requirements of the NSW Contaminated Land Management Act (1997) so that the land is fit for purpose, and meet requirements of **SSD-11802230**.

The site is impacted with contaminants associated with previous light industrial land use, filling, hazardous building materials, and suspected petroleum storage and infrastructure.

A Remediation Action Plan (RAP) was prepared by Parsons Brinckerhoff (PB) in 2015 for a portion of land identified as Area 1 (part of a wider area known as Stage 1), which included the site.

In 2019, Stage 1 remediation works were undertaken on the wider peninsula site which involved the placement of a cap on part of the area occupied by the proposed school site. The capping works were undertaken by Landcom with Zoic Environmental being the environmental consultant and Mr Andrew Lau appointed as the NSW EPA accredited Site Auditor for these works. Details of the capping works were presented in the following document:

- Zoic Environmental (March 2020) Interim Validation Report Early Works Package Headland Park Wentworth Point Development, 7, 9 and 11 Burroway Road, Wentworth Point, NSW 2127 (Ref: 18170 EW VAL).

The report confirms the placement of capping material in the same configuration that is presently located in this area with the completed works being endorsed by the Site Auditor.

In March 2022 Geosyntec (formerly Zoic) prepared a RAP addendum, to advise on required additions / amendments to the approved PB (2015) RAP, to enable the site to be remediated to

meet the suitable of the revised end use of the site as a school. The RAP addendum required: validation criteria udpates, remediation requirements for identified underground storage tanks and other infrastructure, validation works sampling and analysis plan, requirements for reinstatement of the marker and capping layer following excavations, management measure for the previously placed cap in the western portion of the site, and discussion of ground gas protection systems.

The RAP addendum was endorsed by the Site Auditor, and **condition C32(c) of the SSD** states the recommendations of the Remedial Action Plan Addendum (1 March 2022 prepared by Geosyntec) must be complied with.

The preferred remedial strategy as presented in the PB (2015) RAP, and addendum Geosyntec (2022) RAP, included development of a CEMP for implementation through the remediation and redevelopment works for the infrastructure phase of the project. This CEMP has been prepared in general accordance with the requirements as described in the PB (2015) RAP, the addendum Geosyntec (2022) RAP, and the draft SSD conditions, and has been adapted to meet the requirements of the site.

1.2 Objectives

This AMP form part of the Construction Environmental Management Plan for the SOPHS redevelopment works at the site.

The objective of this AMP is to provide guidance and strategies for the handling, management and treatment of asbestos including the removal, transport and disposal of asbestos-impacted soils from the site if required, in order to protect the health of onsite workers, visitors and potential offsite receptors and prevent potential spread of asbestos contamination offsite.

Specific aims of this AMP are to:

- Outline safe working conditions for workers;
- Outline procedures to manage works where asbestos may be encountered during development activities, including excavation of potential asbestos-impacted soils;
- Outline measures for the safe onsite storage and (where required) disposal of asbestos containing material (ACM) and asbestos-impacted soils in accordance with relevant legal and statutory requirements; and
- Outline ongoing management requirements to ensure that risk posed by potential asbestos contamination is appropriately managed.

1.3 Regulatory Framework

All asbestos-related works including asbestos remediation works will be undertaken in accordance with, but not limited to, all relevant sections of the following guidelines and regulations:

- Work Health and Safety Act 2011.
- Work Health and Safety Regulations 2017.
- Protection of the Environment Operations Act 1997 and associated Regulations.
- WorkCover NSW (now SafeWork NSW) (2014) 'Managing Asbestos in or on Soil', March 2014.
- NSW EPA (2014) 'Waste Classification Guidelines, Part 1: Classifying Waste'.
- National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended in 2013 (NEPM, 2013).

- WA DoH (2009) 'Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia'.

The above guidelines and regulations have been considered in the preparation of this AMP.

All parties involved in site works must ensure that they currently, and for the duration of the project, hold all appropriate licences, approvals and permits for working with asbestos, including excavation, transport and disposal of asbestos waste. These may include, but are not limited to:

- Notification to SafeWork NSW (required 10 days before licensed asbestos removal work is commenced). Notification for friable asbestos removal work, if required, should be accompanied by an Application for Permit for friable asbestos removal works.
- Permit from SafeWork NSW for any removal work involving friable asbestos (if relevant or required)

1.4 Certification and Approval

This AMP is to be reviewed and endorsed by the Site Auditor. Once endorsed by the Site Auditor, the AMP is to be submitted to relevant statutory authorities.

1.5 Project Description

The proposed redevelopment is understood to include school buildings and open space areas within the development footprint.

The Wentworth Point new high school (previously known as the Sydney Olympic Park new high school) is a new high school for 1530 students.

The project was originally to be developed in 2 stages – Stage 1 a Stream 5 school for 850 students, and Stage 2 upgrade to a Stream 9 school for 1530 students.

Development of the school will be in 2 phases:

- Phase 1 to construct all teaching spaces,
- Phase 2 to complete the multipurpose hall, sports courts, and landscaping (once TfNSW/Landcom's peninsula masterplan is amended and the road relocation approved).

With Waterfront views, maritime access and green parkland surrounds, Sydney Olympic Park High School will be a landmark educational facility for SINSW. This future high school has the responsibility to contribute to this growing suburb and be the heart of Wentworth Point's culturally diverse community.

The adjoining land to the east (being developed under separate approval) includes the redevelopment of Burroway Road along the eastern boundary of the school, which will provide car parking, drop off zones, and delivery for the school.

2 Site Identification and Description

2.1 Site Identification

The site location is shown in Figure 1, with the site layout plan in Figure 2, Appendix A. Information in the following section was sourced from the Zoic Environmental Pty Ltd (Zoic) (2019) SAQP – Headland Park (File reference: 18170 SAQP Peninsula Park Landcom 19Feb19 Final) for 7, 9 and 11 Burroway Road, Wentworth Point, NSW 2127, which encompassed the site. The site identification and land use details include:

Table 2.1: Site Identification

Title	Details
Street Address:	7 Burroway Road, Wentworth Point, NSW 2127
Property Description:	Lot 1 DP 1276305 (formerly parts of Lots 202, 203 and 204, DP 1216628)
Current Site Ownership:	NSW Department of Education
Geographical Coordinates:	Lat: -33.824002° Long: 151.080528°
Property Size:	Approximately 0.7 hectares
Local Government Area:	City of Parramatta Council (formerly Auburn City Council)
Zoning – Existing:	B1 Neighbourhood Centre and R4 High Density Residential

2.2 Surrounding Land Use

Land uses immediately adjoining the Site are described as follows:

Table 2.3: Immediate Site Surrounds

Title	Details
North:	Vacant land comprising part of the proposed Wentworth Point Peninsula Park redevelopment area followed by Parramatta River.
East:	Vacant land comprising part of the Wentworth Point Marina and Rowing Club redevelopment area followed by Homebush Bay.
South:	Burroway Road followed by a construction site.
West:	Wentworth Point Public School followed by Marina Square Shopping Mall.

2.3 Site Conditions

The site condition is based on published information and a review of past reports and is presented in Table 3.1.

Table 2.2: General Site Conditions

Title	Details
Topography and Drainage:	The site is approximately less than 10m Australian Height Datum (AHD). In general, the site is relatively level and has been subjected to historical filling associated with land reclamation which has altered topography. Surface water is expected to infiltrate into unsealed areas or consist of overland flow and ultimately drain to the Parramatta River or Homebush Bay which are located to the north and east of the site respectively.
Site Surface & Vegetation:	The site surface consists of concrete slabs in the centre and eastern portions, and previously placed VENM material in the western portion. Vegetation at the site comprises some trees and shrubs growing between the concrete slabs and some grasses growing on the VENM material.
Condition of Buildings & Roads:	There are currently no buildings or roads onsite.
Relevant Local Sensitive Environments:	Local sensitive receiving environments include Parramatta River and Homebush Bay, located away from the northern and eastern boundaries respectively.

3 Asbestos Register

The PB (2015) RAP provided a summary of contamination issues at the site. The RAP identified asbestos (bonded and friable) as a contaminant of potential concern (COPC) within the fill material across the wider Stage 1 area, which encompasses the site.

An asbestos register including previous detections within the site from the PB (2015) RAP is provided in Appendix B.

4 Implementation of This AMP

This AMP is applicable for the development activities within the site, where potential ACM could be present.

4.1 Roles and Responsibilities

4.1.1 Roles

Description of the key roles of involved parties is provided below.

Principal Contractor (RobertsCo)

Under the provisions of the Work Health and Safety Regulation 2017 prepared under the Work Health and Safety Act 2011, the Principal Contractor must be appointed as the "person conducting a business or undertaking" (PCBU).

The Principal Contractor has the responsibilities set out in the Work Health and Safety Act and Regulations and the Safe Work Australia Codes of Practice.

The Principal Contractor will also be responsible for co-ordinating health and safety activities related to asbestos for the project.

Competent Person or Licensed Asbestos Assessor

A Competent Person or an Asbestos Assessor shall be engaged to assess any suspected asbestos containing materials encountered during the remediation, validation and development works and provide advice on appropriate procedures for its handling, treatment or management.

A Competent Person is defined in SafeWork Australia (2011a) as "a person who has acquired, through training, qualification or experience, the knowledge and skills to carry out the task" – in this case the task is asbestos identification.

An Asbestos Licensed Assessor is a person who holds an asbestos assessor licenced by SafeWork NSW.

Given friable asbestos may be potentially present at the site, airborne asbestos monitoring and dust monitoring during any asbestos works should be completed by an Asbestos Assessor. Laboratory analysis for air monitoring is discussed in Section 5.3.5.

Licensed Asbestos Removalist

A SafeWork NSW licensed asbestos removalist will be required to undertake asbestos removal as follows:

- Class A (friable) licensed asbestos removal contractor shall be engaged if friable asbestos is identified.
- Class B (non-friable) licensed asbestos removal contractor if more than 10 m^2 of non-friable asbestos is identified for removal or if there is doubt about the total quantity.

For smaller quantities of non-friable asbestos, a suitably trained and experience contractor is required to conduct the removal work.

The asbestos removal contractor will remove ACM or asbestos impacted soils from the site and remediate or dispose of them to a suitably licensed waste facility or transfer the material to an onsite containment area (if available). The licensed asbestos removal contractor will be the primary person responsible for works on site involving ACM or asbestos impacted soils.

Given friable asbestos may be potentially present at the site, asbestos removal works should be completed by a Class A (friable) licensed asbestos removal contractor.

4.1.2 Responsibilities

Description of the key roles and responsibilities of involved parties in relation to this AMP is provided below in Table 4.1.

Table 4.1. Key roles and responsibilities of involved parties in relation to this AMP

Role	Responsibility
Principal Contractor RobertsCo	• Approval of the AMP. • Provision of safe working environments relating to asbestos. • Ensure that all persons involved with the project have undertaken the appropriate workplace health and safety training and have been inducted into the CEMP. • Ensure that all persons involved with asbestos in asbestos restricted areas have been inducted into this AMP. • Ensure that all persons working on the project have been provided with the appropriate workplace health and safety training relating to asbestos, asbestos awareness and identification of asbestos containing materials (ACM). • Ensure that all persons working in the project area are appropriately trained for the specific works they undertake. • Keep all training and induction records relevant to this AMP for persons involved in this project. • Ensure that a site-specific safety plan for works in areas where potential asbestos contamination may be encountered is prepared for the site. • Ensure that any subcontractors provide adequate SWMS for activities where asbestos may be encountered. • Monitor the compliance with this AMP and relevant regulations, codes and guidelines. • Control access into areas where asbestos is known to exist. • Be responsible for the project work at all times until all works are completed. • Maintain and update the Asbestos Register for this project. • Auditing compliance with the AMP. • Manage accident and emergency procedures related to asbestos. • Inform the Asbestos Assessor of new asbestos finds. • Engage a suitably experienced and licensed asbestos removalist and ensure they maintains appropriate licences and permits. • Maintain material tracking records relating to the excavation, stockpiling and disposal of asbestos containing materials. • Keep air monitoring records. • Compliance with all other applicable statutory responsibilities related to management of asbestos in the workplace.
Subcontractor(s) and their Supervisor(s) To be Engaged	• Understand the requirements of the CEMP and this AMP. • Prepare SWMS, as required by the Principal Contractor, for specific activities undertaken within the project where asbestos may be encountered. • Take reasonable care for their own safety and the safety of others. • Attend site inductions, asbestos awareness training and identification of ACM training, and, follow all site rules and work instructions related to asbestos. • Take immediate action to rectify asbestos hazards that should arise during the course of the work. • Immediately report unexpected finds (including asbestos) to site supervisor. • Comply with the CEMP, this AMP, SSP, SWMS and other relevant OHS legislation and industry standards. • Establish and maintain a positive safety climate on the project. • Compliance all other applicable statutory responsibilities related to management of asbestos in the workplace.
Licenced Asbestos Removalist To be Engaged	• Notify SafeWork NSW in writing at least five days before removal work commences in accordance with Safe Work Australia (2011b).

Role	Responsibility
	• Obtain Permit from SafeWork NSW for any friable asbestos removal works. • Undertake asbestos removal work in accordance with Safe Work Australia (2011a & 2011b). • Compliance with all other applicable statutory responsibilities related to management of asbestos in the workplace.
Suitably Qualified Environmental Consultant / Asbestos Assessor Geosyntec	• Provision of safe working environment. • Issue this AMP and coordinate works to review/update the AMP, as necessary. • Provide onsite supervision of all potential asbestos works. • Provide air monitoring services, when required by the SafeWork Australia Codes and/or the Principal Contractor and arrange for display of daily results for information of workers. • Engage suitably qualified and competent staff and/or contractors to manage works in areas impacted with asbestos. • Provide advice on handling, management and treatment of potential asbestos impacted material. • Be available, if required, for consultation with regards to conditions and requirements of this AMP. • Provide validation of excavation, waste classification and other advice in relation to asbestos. • Other activities that may be required by the Principal Contractor from time to time.

4.2 Training and Induction

The Principal Contractor shall ensure that:

- Workers undertaking work onsite must be trained and be given appropriate occupational health and safety training in relation to asbestos, asbestos awareness training and training in the identification of asbestos containing materials (ACM) which may be encountered during their work
- Workers undertaking work within the site must be inducted into the CEMP
- Workers undertaking work in areas where asbestos may be encountered must be inducted into this AMP
- Other visitors entering the site understand the site safety provisions, including those covered in the CEMP and this AMP, as required
- Persons undertaking site induction acknowledge that they have understood the requirements of the site safety and environmental obligations related to asbestos
- Records of the site induction relating to asbestos must be kept

4.3 Audit and Revision of this AMP

The implementation of this AMP should be audited at regular intervals throughout the duration of construction works to confirm that the requirements of the AMP are understood and being implemented and to assess its ongoing suitability.

The audit shall include a site walkover and an assessment of induction, tracking and monitoring records prepared under this AMP. Should the review identify inconsistencies, these shall be documented in a review report and recommendations made for correcting these inconsistencies. The audit shall be documented in a brief audit report which will include recommendations for revisions to the AMP.

In the event that site conditions are substantially different than previously observed and/or the audit process recommends revision of this AMP, this AMP should be updated.

4.4 Non-Conformance to this AMP

In the event of a non-conformance to this AMP, the source and nature of the event will be investigated, the effectiveness of the existing controls reviewed and modified where practical, and necessary strategies will be implemented to minimise further impacts.

If necessary, the AMP will be updated as required to rectify non-conformance with the AMP.

5 Management Plan for Asbestos Impacted Soil

5.1 Asbestos Types, Risk and Potential Exposure Pathways

At the time of preparation of this AMP, friable and non-friable ACM had been identified within the fill material within the wider Stage 1 area which encompasses the site, as detailed in the PB (2015) RAP.

Non-friable ACM is defined by SafeWork Australia (2011b) as "… material containing asbestos that is not friable asbestos, including material containing asbestos fibres, reinforced with a bonding compound." This includes bonded asbestos fragments found in soil.

Friable asbestos is defined by SafeWork Australia (2011b) as "… material that is in a powder form or that can be crumbled, pulverised or reduced to a powder by hand pressure when dry, and contain asbestos." This includes soil impacted with asbestos fibres or fibre bundles, or asbestos fragments which can easily produce asbestos fibre or fibre bundles.

Mechanical disturbance of non-friable asbestos may result in the production of friable asbestos.

Asbestos poses a human health risk through the inhalation of its fibres (WA DoH 2009). If deposited in the lungs, the fibres can initiate diseases which may produce major health effects, such as asbestosis, lunch cancer and/or mesothelioma.

Potential exposure pathways for asbestos relevant to this AMP are considered to be:

- Inhalation of asbestos fibres by workers/visitors during excavation of asbestos containing soil
- Inhalation of asbestos fibres by workers/visitors from stockpiled material containing asbestos
- Inhalation of asbestos fibres by workers or others onsite or offsite during transport of asbestos containing material

5.2 Health and Safety Management

5.2.1 Safe Work Method Statements (SWMS)

The Principal Contractor or subcontractors undertaking works must prepare site specific job hazard assessment and relevant safe work method statements for the work undertaken. The SWMS must include activities where asbestos may be encountered and strategy to minimise exposure to asbestos in accordance to this AMP, including requirements of personal protective equipment (PPE).

Safe Work Method Statements must:

- Describe how work is to be carried out;
- Identify the safety risks;
- Describe the control measures that must be applied to the work;
- Describe the equipment used in the work;
- Describe any standards or codes applicable to the work; and
- Training and qualifications required of persons undertaking the work.

SWMS prepared by the contractors must be reviewed and approved by the Principal Contractor.

5.2.2 Site Access Control, Barriers and Signage

The overall construction area will be secured by fencing, which limits access to public. The Principal Contractor shall also maintain site access control in areas where ACM has been identified or may potentially be present ('restricted asbestos area'). Site access to restricted asbestos areas will be determined by the Site Supervisor. Only authorised and appropriately inducted and trained persons are to be permitted in restricted asbestos areas.

Appropriate warning signs and/or barriers are to be placed around restricted asbestos areas maintaining at least 3m buffer from the impacted area, in accordance with the following regulations and guidelines:

- Standards Australia (1994) 'AS 1319-1994: Safety Signs for the Occupational Environment'; and
- Safe Work Australia (2011b) 'Code of Practice: How to Safely Remove Asbestos', December 2011.

Given asbestos was generally identified to be present within the fill material across the wider Stage 1 area encompassing the site, it is anticipated that areas that are being excavated are generally considered as 'restricted asbestos area'. Access to restricted asbestos areas will be controlled and permitted by the Principal Contractor only after persons entering the site have been advised of the potential contamination hazards. This shall at least include notification of the potential presence of asbestos containing materials and asbestos impacted soils.

Any authorised person accessing the restricted asbestos area should do so in accordance with health and safety requirements as indicated in this AMP. The implementation of the health, safety and environmental requirements should be administered by the Principal Contractor. Site access will not be allowed until workers have been inducted, have signed in, and if entering the restricted asbestos areas must use the required PPE (Section 5.2.3). Upon exiting the site, personnel must remove and dispose of/clean the PPE in the provided decontamination area.

Restricted asbestos area boundaries shall be determined by the Principal Contractor in consultation with the Asbestos Assessor and will vary according to the location and size of the required daily activities. Any restricted asbestos area boundaries will be designed to allow other site works not involving significant intrusive works to continue without being required to adhere to this AMP.

It may be found that restricted asbestos area boundaries require to be assigned to the site boundaries, in which case all site workers must adhere to the requirements of this AMP.

Workers entering restricted asbestos areas must be inducted to this AMP.

5.2.3 Personal Protective Equipment (PPE) Requirement

Requirements of PPE will be determined by the Principal Contractor, depending on the type of work for each activity, and must be covered in the site specific SWMS.

In areas where asbestos containing materials or asbestos impacted soils are not exposed, no additional PPE is required above the standard construction site PPE outlined by the Principal Contractor for the site.

Should suspected ACM be identified outside the restricted asbestos areas, then the Asbestos Assessor should be contacted. If the presence of asbestos is confirmed the additional items of PPE are required in addition to the standard construction site PPE outlined by the Principal Contractor for the site, and applies for any ground workers within the restricted asbestos areas.

The minimum level of additional PPE required for onsite personnel working in a restricted asbestos area is listed below:

- **Body Protection.** Fluorescent or white disposable coveralls (Tyvek suits) are to be worn during excavation activities. For workers undertaking work in the restricted area for asbestos, disposable Tyvek suits must be worn. Disposable gloves should also be worn for workers contacting soils. Disposable Tyvek coveralls and gloves must be removed when leaving the restricted asbestos area and are to be considered as potentially contaminated with asbestos and will therefore need to be disposed as asbestos contaminated waste.
- **Respiratory Protection.** Respiratory protection is required to prevent inhalation of airborne dusts. A minimum of a P2 rated disposable mask or respirator fitted with a P2 rated cartridge will be used in the restricted asbestos area.
- **Foot Protection.** Steel toed boots are to be worn by personnel working on-site.

Eating, drinking, chewing gum or tobacco, smoking or other practices that involves hand to mouth transfer increases the probability of ingestion of foreign matter into the body. Hands must be thoroughly washed before eating, drinking or smoking. Smoking, drinking or eating is not permitted onsite.

Plant operators must close cabin doors and windows when operating within restricted asbestos areas for asbestos.

5.3 Asbestos Management During Construction Works

5.3.1 General intrusive works in areas where asbestos has not been identified

Management of general intrusive works during the construction in areas where asbestos has not been identified is as follows:

- Intrusive work onsite in areas where asbestos has not been identified shall only be carried out by suitably qualified and experienced contractors, who have received asbestos awareness training and have been trained in the recognition of asbestos;
- Intrusive works can be undertaken in a manner similar to that normally undertaken on similar construction projects, although the ground conditions should be carefully observed by the operator and/or others noting the presence of any evidence of ACM;
- If no visual evidence of ACM is observed works can continue as normal.
- If visual evidence of ACM is observed and/or ACM is encountered (i.e. new asbestos finds), works should cease and the Supervisor informed and should be managed as described in Section 5.3.3 below.

5.3.2 Intrusive Works in Areas where Asbestos Contaminated Fill Materials are not Exposed

Management of general intrusive works during the construction in areas where asbestos contaminated fill materials are not exposed (see Section 3) is as follows:

- In areas where asbestos contaminated fill materials are not yet exposed shall only be carried out by suitably qualified and experienced contractors, who have received asbestos awareness training and have been trained in the recognition of asbestos;
- A spotter who has received asbestos awareness training and have been trained in the recognition of asbestos should be present to observe the soils being disturbed in the intrusive excavation;
- Intrusive works can be undertaken in a manner similar to that normally undertaken on similar construction projects, although the ground conditions shall be carefully observed by the operator and the spotter noting the presence of any evidence of ACM;

- If visual evidence of ACM is observed and/or ACM is exposed, works should cease and the Supervisor informed and should be managed as described in Section 5.3.3 below.
- Where excavations occur in the area capped with virgin excavated natural material (VENM) located in the west of the site, the above points apply. If excavations proceed beyond the marker layer present beneath the VENM cap into underlying site fill soils, the work area is classified as a restricted asbestos area and the below sections apply. The marker layer and VENM cap must be reinstated following completion of such works, with photographic records of reinstatement kept.

5.3.3 Intrusive Works in Areas Classified as Restricted Asbestos Areas

Areas where asbestos has been identified in previous contamination investigations are described in Section 3 are for the purpose of this AMP defined as restricted asbestos areas.

Management of intrusive work in areas classified as restricted asbestos areas will be as follows:

- Intrusive work onsite within restricted asbestos area shall only be carried out by suitably qualified and experienced contractors, who have received asbestos awareness training and have been trained in the recognition of asbestos, which may be encountered during their work.
- Access to the restricted asbestos area must be controlled as per Section 5.2.2.
- Excavation work within the restricted asbestos area must be observed by an Asbestos Assessor.
- Stockpile management of asbestos impacted material shall be undertaken in accordance with Section 5.3.6.
- Transport and disposal of asbestos impacted material shall be undertaken in accordance with Section 5.3.7.
- An asbestos decontamination area must be present within the restricted asbestos area. Decontamination of asbestos shall be undertaken in accordance with Section 5.3.8.

Specific management controls during intrusive work within the restricted area for asbestos are as follows:

Prior to work commencing

- SafeWork NSW should be notified for all asbestos removal work comprising: any friable asbestos removal; and non-friable asbestos removal >10m2 or if there is doubt about the total area. Notifications must be submitted at least 5 days prior to any asbestos being disposed of offsite.
- A SafeWork NSW Permit is required for all friable asbestos removal works. The SafeWork NSW Permit shall be sought by the licenced asbestos removal contractor. Friable asbestos removal permits must be submitted at least 7 days prior to any friable asbestos being disposed of offsite.
- An observation of the surface soil in the area of the excavation should be undertaken. If a small number of ACM fragments are observed, they shall be picked up by a licenced asbestos removalist (if practicable) and placed into a labelled asbestos waste bag and stored in a designated waste storage area for offsite disposal by a licenced asbestos removalist. If significant number of ACM fragments is observed, they shall be dealt with during the excavation as described by the following section. Records of the ACM finds should be maintained in the Asbestos Register for the site by the Principal Contractor (attached in Appendix B).

During excavation

- Personnel undertaking work within the restricted asbestos area must wear minimum PPE as listed in Section 5.2.3. Air monitoring must be undertaken within or adjoining the restricted asbestos area in accordance with Section 5.3.5.
- The excavation shall be kept damp by water spraying during excavation works to reduce the potential of dust generation in accordance with Section 5.3.9.
- Any open excavation shall be covered with HDPE sheeting or similar and secured at the end of each working day.
- Management of potential asbestos impacted soil shall be decided by an Asbestos Assessor in accordance with guidance provided in the PB (2015) RAP, National Environment Protection Measure (NEPM) (as amended 2013), SafeWork NSW (2014) and other appropriate guidelines.

Post *excavation*

Given that 'cap and contain' has been selected as the preferred remediation strategy for the wider Wentworth Point redevelopment area, remediation of asbestos restricted areas is not required.

5.3.4 New Asbestos Finds and Determination of New Restricted Areas

The strategy for new asbestos finds encountered during the construction is as follows:

- If suspected ACM is encountered in areas outside an existing asbestos restricted area, work must cease within 10m radius of the area. The suspected ACM must be left onsite and appropriately isolated (e.g. by covering) until the area is inspected by the Asbestos Assessor. The Asbestos Assessor will confirm the presence or absence of asbestos. The handling, treatment and/or management of ACM and potentially ACM impacted soil will be decided by a Licensed Asbestos Assessor. If the presence of asbestos is confirmed, the area of at least within 10m radius of the find must be included in the asbestos restricted area and managed as per Section 5.3.3 of this AMP for the remaining duration of the works. Such areas can only be considered as 'cleared' once the material has been capped in accordance with the PB (2015) RAP.
- Records of the ACM finds should be maintained in the Asbestos Register for the site by the Principal Contractor (attached in Appendix B).

5.3.5 Air Monitoring

Asbestos air monitoring is to be carried out by an Asbestos Assessor during any works within a restricted asbestos area which results in disturbance of the ground surface. The purpose of the air monitoring is to verify that the control measures in place to minimise the generation of asbestos fibres into the air are working satisfactorily and that there is no exposure of asbestos fibres to adjacent areas. The air monitoring devices will be placed at the boundaries of the restricted area for asbestos determined as appropriate by the Asbestos Assessor or a Competent Person. The Asbestos Assessor may also consider it to be appropriate to include monitoring on individuals or monitoring on machinery – this would only be carried out following consultation with the Principal Contractor.

Sample collection and analysis will be conducted in accordance with the National Occupational Health and Safety Commission (NOHSC) 'Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition, 3003 – 2005'.

The analysis will be performed by a NATA registered laboratory and reported on endorsed certificates. The results of air monitoring shall be available on a 24-hour turnaround time basis. Daily air monitoring reports shall be kept by the Principal Contractor or site supervisor who should

be able to be produced upon request or display the results in prominent locations to keep workers informed of the results.

Air monitoring test results should be below 0.01 fibres/mL throughout the duration of any ground disturbance works in the restricted asbestos area, to demonstrate the adequacy of the control measures implemented. The following table shows the actions that will come into force should fibre levels exceed this action level of 0.01 fibres/mL.

Table 5.1: Action Levels

Action Level (fibres/mL)	Control / Action
<0.01	Continue with control measures
≥ 0.01 and ≤ 0.02	Review control measures, investigate cause and implement controls to minimise further release
≥ 0.02	Stop removal work, and where applicable notify SafeWork NSW. Investigate cause including enclosure & equipment where present and clean immediate area. Do not recommence work until air test results return readings of < 0.01 fibres/ml

5.3.6 Management of Asbestos-Impacted Stockpiles

Stockpiles of potentially asbestos impacted material must be kept damp when in use and/or covered if remaining for more than 24 hours. Covers will need to extend beyond the perimeter of the stockpiles and be secured to prevent being blown away by wind.

Appropriate management of asbestos impacted stockpiles will be critical in instances where friable asbestos has been identified. The Asbestos Assessor should be consulted on the requirements for management and monitoring of friable asbestos stockpiles.

5.3.7 Transport and Disposal of Asbestos Impacted Soils

Each truck transporting potentially asbestos impacted material for transportation onsite or offsite shall be double lined with 1000 gauge polythene sheeting. Each truck shall be filled to within the maximum weight limit and the load will then be adequately covered during transportation to landfill.

Waste requiring offsite disposal must be disposed of in accordance with appropriate guidelines, including (but not limited to) the NSW EPA (2014) 'Waste Classification Guidelines Part 1: Classifying Waste'.

Any waste classified as Special Waste (Asbestos) must also be logged under the Waste Locate system to satisfy tracking requirements for asbestos waste.

Disposal of asbestos impacted waste must be to appropriately licensed landfills.

All vehicles entering and exiting the site will be required to comply with the NHVL (national heavy vehicle legislation)

5.3.8 Decontamination of Equipment and PPE

Machinery used for the handling (e.g. excavation) and treatment of asbestos impacted soil may become contaminated with asbestos and will need to be decontaminated by washing down prior to leaving the site. All wash down liquids will need to be collected and managed appropriately.

Decontamination will involve hosing / removal of soil from the tracks and bucket as far as reasonably practicable by the Site Supervisor. Tools used shall be hosed down / wiped clean with a damp cloth.

Upon completion of works, boots and clothing will be wiped down with a damp cloth and disposable PPE and Respiratory Protective Equipment (RPE) disposed of as asbestos waste. Non-disposable RPE should be wet-wiped and placed in a sealed container for future use.

5.3.9 Dust Management

The following dust management measures shall be undertaken, as appropriate:

- Keeping excavation areas, stockpiles and haulage pathways damp.
- Keeping haulage vehicles covered and providing designated site access for haulage vehicles.
- Appropriate decontamination of haulage vehicles.
- Maintaining access roads to ensure no significant dust at the site boundary.
- Providing dust suppressors to equipment, where appropriate.
- Monitoring of dust levels at the site boundary.

If significant dust is visible at the site boundary, then additional dust control measures shall be employed, which may include:

- Reducing the area of soil exposed (by covering or minimising size of excavations etc.)
- Temporarily suspending activities until wind speed reduce
- Additional use of water spray

6 Contingency Plans and Control Measures

A list of contingency items and control measures with respect to asbestos and this AMP is provided below in Table 6.1:

Table 6.1: Contingency Plans and Control Measures

Contingency Item	Control Measures
Person undertaking work in the restricted area for asbestos has not undertaken induction into the AMP.	Principal Contractor or a person appointed by the Principal contractor shall prepare a non-conformance report and assess reason of the non-conformance. Person undertaking work shall be inducted into this AMP.
Significant asbestos find is encountered in the work area	Report to Principal Contractor, who should contact the Asbestos Assessor to provide advice on handling, treatment and management of the material.
ACM is found on a stockpile or material that has been excavated	Location of the original material should be revealed from material tracking data. Principal Contractor should be informed. Asbestos Assessor should provide advice on management of the material in the original location as well as the location where it has been placed.
ACM is found on haulage pathway	Principal Contractor or a person appointed by the Principal Contractor shall prepare a non-conformance report and assess reason of the non-conformance. Review of procedure of transport of asbestos contaminated material shall be undertaken by the Principal Contractor. Rectification of the procedure shall be undertaken, if considered appropriate. ACM shall be collected and disposed of appropriately in accordance with Safe Work Australia (2011b).
Significant dust generation	Stop work, undertake more dust suppression. Do not commence work again until dust suppression is adequately undertaken.
Asbestos impacted stockpile disposed of inappropriately (e.g. to landfill which is not licenced to receive asbestos)	Principal Contractor or a person appointed by the Principal Contractor shall immediately contact landfill. Principal Contractor or a person appointed by the Principal Contractor shall prepare a non-conformance report and assess reason of the non-conformance. Rectification of the procedure shall be undertaken, if considered appropriate. The Asbestos Assessor shall be engaged to assess appropriate management strategy. Incident may need reporting to NSW EPA.

Relevant emergency contacts are as follows:

Table 6.2: Emergency Contacts

Emergency Contact	Details
Project Manager	RobertsCo
Superintendent	To be Appointed
Principal Contractor	RobertsCo
Environmental Consultant	Geosyntec
SafeWork NSW	131 050
NSW EPA	131 555

7 Communication and Consultation

7.1 Internal Communication

Communication and consultation regarding asbestos management will occur between workers involved with asbestos management (including Project Manager, Principal Contractor's Environmental Manager / Coordinator, Site Foreman, Environmental Consultant, Occupational Hygienist) and other workers onsite through tool-box talks, inductions and general communication onsite where necessary. This may include communication of asbestos management procedures as outline in Section 5 (e.g. standard safety protocols during excavation), new asbestos finds, new restricted areas and upcoming removal works.

7.2 External Communication

7.2.1 Regulatory Authorities

Communication with a range of Regulatory Authorities shall be undertaken throughout the Project. This communication shall be through the Project Manager. Any communication from a regulator must be notified to the Principal Contractor's Environmental Manager / Coordinator, and records of all communications retained and appropriately filed.

7.2.2 Consultation with Neighbours

RobertsCo has indicated that the ultimate client, School Infrastructure NSW, will inform neighbours of the works.

7.2.3 Media

All contact with the media shall be through the Client. Under no circumstances is the Project staff to engage with the media.

8 References

NSW EPA (2015) Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997. NSW DECC, Sydney.

NEPM (2013) National Environment Protection (Assessment of Site Contamination) Measure, Schedule A and Schedules B(1)-B(9). National Environment Protection Council, Adelaide.

NOHSC (2005) 'Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition, 3003 - 2005', National Occupational Health and Safety Commission.

NSW EPA (2014) NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste

Parsons Brinckerhoff (PB, 9 January 2015) Detailed Remediation Action Plan – Infrastructure Delivery, Wentworth Point Development, Ref: 2207004B-RES-REP-001 Rev C.

Protection of the Environment Operations Act 1997

SafeWork Australia (2011a) 'Code of Practice: How to Manage and Control Asbestos in the Workplace'.

SafeWork Australia (2011b) 'Code of Practice: How to Safely Remove Asbestos', December 2011.

Standards Australia (1994) 'AS 1319-1994: Safety Signs for the Occupational Environment'.

WA DoH (2009) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia.

Waste Avoidance and Resource Recovery Act 2001

Waste Management Act 2000

WorkCover NSW (now SafeWork NSW) (2014) 'Managing Asbestos in or on Soil'.

9 Limitations

This report has been prepared by Geosyntec Consultants Pty Ltd ("Geosyntec") for use by the Client who commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the Client and other parties. The findings of this report are based on the scope of work outlined in Section 1. The report has been prepared specifically for the Client for the purposes of the commission, and use by any explicitly nominated third party in the agreement between Geosyntec and the Client. No warranties, express or implied, are offered to any third parties and no liability will be accepted for use or interpretation of this report by any third party (other than where specifically nominated in an agreement with the Client).

This report relates to only this project and all results, conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose. This report should not be reproduced without prior approval by the Client, or amended in any way without prior written approval by Geosyntec.

Geosyntec's assessment was limited strictly to identifying environmental conditions associated with the subject property area as identified in the scope of work and does not include evaluation of any other issues.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigation.

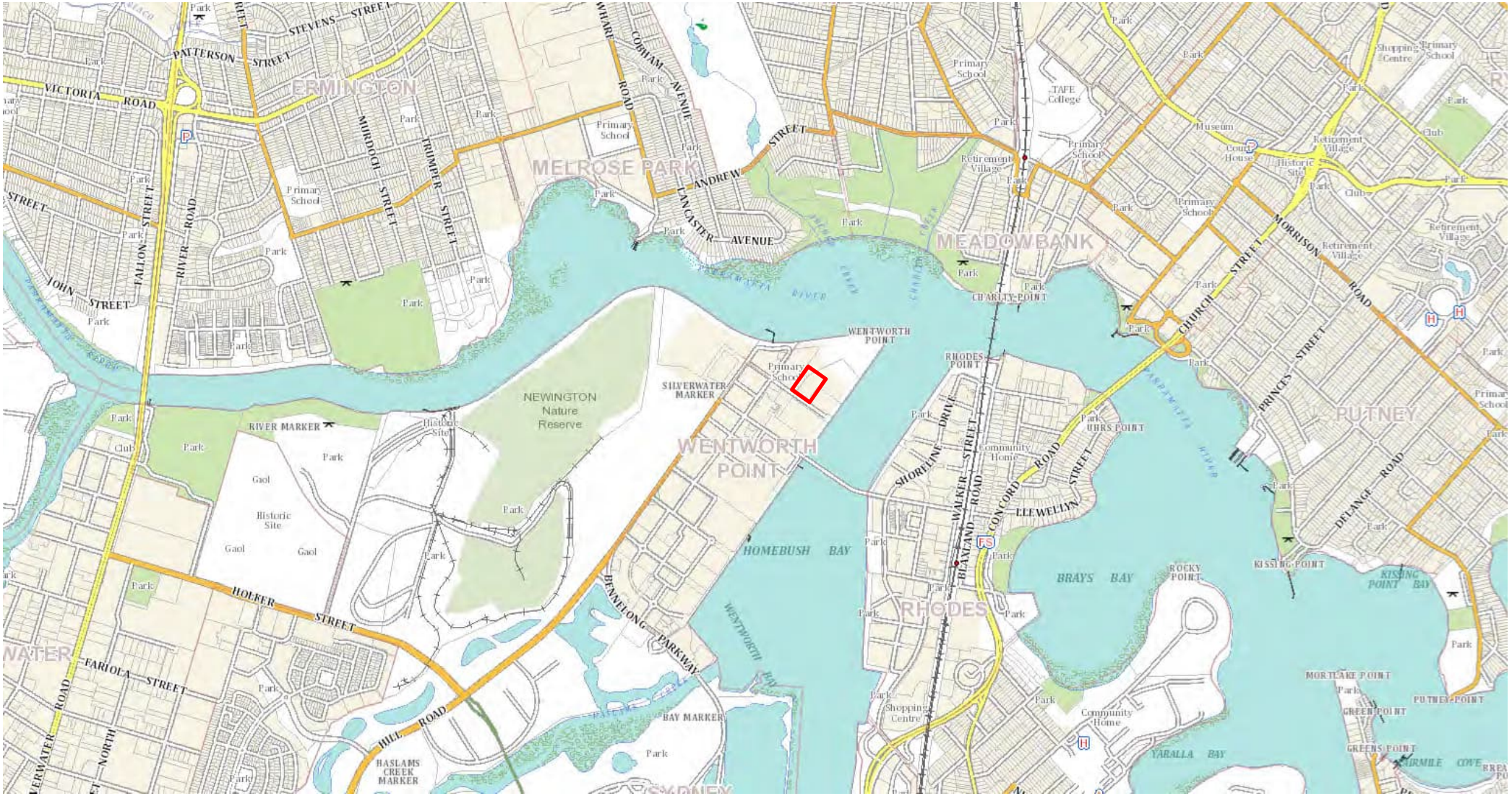
This report does not comment on any regulatory obligations based on the findings. This report relates only to the objectives stated and does not relate to any other work conducted for the Client.

The absence of any identified hazardous or toxic materials on the site should not be interpreted as a guarantee that such materials do not exist on the site.

All conclusions regarding the site are the professional opinions of the Geosyntec personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, Geosyntec has not independently verified and assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Geosyntec, or developments resulting from situations outside the scope of this project.

Geosyntec is not engaged in environmental assessment and reporting for the purpose of advertising sales promoting, or endorsement of any client interests, including raising investment capital, recommending investment decisions, or other publicity purposes. The Client acknowledges that this report is for its exclusive use.

Attachment A Figures



LEGEND

Approximate Site Boundary

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Six Maps.

Approx. 200 m

Datum: GDA 1994 MGA Zone 56 - AHD

Figure 1: Site Location Plan

Site Address: 7 Burroway Road, Wentworth Point, NSW

Client: RobertsCo Pty Ltd

Job Number: AU122229

Date: 16 September 2022

Geosyntec consultants

LEGEND

Approximate Site Boundary

Approx. 20 m

Datum: GDA 1994 MGA Zone 56 - AHD

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Nearmap.

Figure 2: Site Layout Plan

Site Address: 7 Burroway Road, Wentworth Point, NSW

Client: RobertsCo

Job Number: AU122229

Date: 16 September 2022

Geosyntec consultants

Attachment B Asbestos Register

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Asbestos Register

Wentworth Point Redevelopment – Marina and Overwater Rowing Club

ID	Date of Identification	Location	Item Description, Including Condition of ACM (Friable/Bonded)	Approximate Size and Weight	Laboratory Testing	Fate of ACM
1B09b - Soil	Historical investigation	Fill material within the site 0-0.1m beneath original site surface	Chrysotile, Unknown Material Type	Unknown	Yes, indicating presence of asbestos in soil sample	To be capped during construction OR disposed of under NSW waste Classification Guidelines should offsite disposal be required.
1B03 - Soil	Historical investigation	Fill material within the site 0.1m beneath original site surface	Chrysotile, Unknown Material Type	Unknown	Yes, indicating presence of asbestos in soil sample	To be capped during construction OR disposed of under NSW waste Classification Guidelines should offsite disposal be required.
1BW01 - Soil	Historical investigation	Fill material within the site 0.4-0.5m beneath original site surface	Chrysotile, Unknown Material Type	Unknown	Yes, indicating presence of asbestos in soil sample	To be capped during construction OR disposed of under NSW waste Classification Guidelines should offsite disposal be required.
List is to be updated during construction						

Appendix J Acid Sulfate Soil Management Plan

Geosyntec consultants

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Acid Sulfate Soil Management Plan – Wentworth Point new High School

7 Burroway Road, Wentworth Point, NSW 2127

RobertsCo
21 October 2022

AU122229 CEMP App J

Quality Management

Document Distribution

Issue/Revision	Issue 1	Revision 1	Revision 2
Remarks	DRAFT	Final	
Date	16 September 2022	21 October 2022	
Prepared by	Olivia Zurek	Olivia Zurek	
Reviewed by	Lange Jorstad	Lange Jorstad	
Signature	DRAFT		
File reference	Appendix J - Revision 1 Acid Sulphate Soil Management Plan	Appendix J - Revision 1 Acid Sulphate Soil Management Plan 12Oct2022	
Distribution	• RobertsCo • Geosyntec Electronic File	• RobertsCo • Geosyntec Electronic File	

This report was prepared in accordance with the scope of services set out in the contract between Geosyntec Consultants Pty Ltd (ABN 23 154 745 525) and the client.

Geosyntec Consultants Pty Ltd
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Table of Contents

Attachments

Terminology

AASS	Actual acid sulfate soil
ASS	Acid sulfate soil
ASSMAC	Acid Sulfate Soil Management Advisory Council
CEMP	Construction environmental management plan
EPA	Environment Protection Authority
mAHD	metres Australian Height Datum
mBGL	Metres below ground level
NEPM	National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)
PASS	Potential acid sulfate soil
POEO	Act Protection of the Environment Operations Act 1997 (NSW)
PPE	Personal protective equipment
SPOCAS	Suspension peroxide oxidation combined acidity and sulfate
SPOS	Peroxide-oxidisable sulfur
SWL	Standing water level
SWMS	Safe work method statement
TAA	Total actual acidity
TPA	Titratable peroxide acidity
TSA	Titratable sulfidic acidity
VENM	Virgin excavated natural material
WHS	Work health and safety

the ASSMAC (1998) action criteria. It was concluded that 'PASS are likely to exist below the water table (i.e. 1.5 m BGL and below), in the darker coloured material observed'.

1.4 Objectives

This ASSMP forms part of the Construction Environmental Management Plan.

The objectives of this ASSMP is to provide guidance on the environmental management of ASS during the remediation, excavation and construction works to be followed by the Principal Contractor and their sub-contractors, and provide appropriate mechanisms to reduce the potential on-site and off-site environmental impacts and mitigate the risks associated with the disturbance of PASS.

The following issues are addressed in the ASSMP:

- strategies for the management of PASS during development
- implementation of a soil and groundwater monitoring program; and
- contingency procedures to be implemented in the event of the failure of management strategies

This document has been prepared to give guidance on management of ASS, in accordance with the NSW Acid Sulfate Soils Management Advisory Committee's ASSMAC (1998) Acid Sulfate Soil (ASS) Assessment Guidelines.

1.5 Review and Approval

This ASSMP is to be reviewed and endorsed by the Site Auditor. Once endorsed by the Site Auditor, the ASSMP is to be submitted to Council and the NSW EPA before the certification of the works.

2 Site Information

2.1 Site Identification

A summary of Site identification details is provided below.

Table 2.1: Site Identification

Title	Details
Street Address:	7 Burroway Road, Wentworth Point, NSW (formerly 3 Burroway Road)
Property Description:	Lot 1 in Deposited Plan 1276305 (formerly Lot 202 DP1216628,Lot 204 D P 1216628 and Lot 204 DP1216628)
Current Site Ownership:	Roads and Maritime Services (RMS)
Property Size:	0.7 hecatre
Local Government Area:	City of Parramatta Council
Zoning – Existing:	B1 Neighbourhood Centre and R4 High Density Residential (Auburn LEP (2010))

2.2 Local Environmental Plan

A review of the Auburn Local Environmental Plan 2010 (ASS Map – Sheet ASS_009), which at the time of writing had not been consolidated to a new City of Parramatta Council Local Environmental Plan, indicates that the Site is located in an ASS risk Class 2 area.

2.3 Acid Sulfate Soil Risk Map

A review of the Prospect/Parramatta River 1:25,000 Acid Sulfate Soils Risk Map indicates that the Site is classified as 'Disturbed Terrain' that includes filled areas that occur during the reclamation of low-lying swamps for urban development. Other activities that result in the classification of a disturbed terrain include dredging, heavy ground disturbance through urban development and/or construction of dams or levees.

2.4 Site Conditions

The site condition reports are summarised below in Table 2.2.

Table 2.2: General Site Conditions

Title	Details
Topography:	The Site is relatively level at an elevation of less than 10 metres Australian Height Datum (mAHD) and has been subjected to historical filling associated with land reclamation which has altered the original topography.
Superficial Geology:	Based on the Sydney Geological Series Sheet 9130, the Site is underlain by man-made fill comprising dredged sand and mud, demolition rubble and/or industrial and household waste (up to 2.4 mBGL). The fill is underlain by Quaternary Age alluvial deposits (1–4.8 mBGL). Ferruginous and humic cementation may occur in places and shell layers are common. Highly weathered, grey sandstone was encountered at one borehole location at 4.4–4.8 mBGL.
Depth to Groundwater:	Depth to groundwater ranges between 0.6 mBGL to 3.7 mBGL, and standing water levels (SWL) ranged between 0.5 mAHD and 2.7 mAHD.
Flow Direction:	Groundwater flows northwest and northeast towards the Parramatta River and Homebush Bay respectively.

2.5 Previous ASS Investigations

The Site, as a portion of Wentworth Point Peninsula Park Project, has been subject to a number of historical ASS investigations. A list of most relevant reports is provided below:

- WSP 2009a, Acid Sulfate Soil Management Plan Harbour Radio Pty Limited (2GB) Burroway Road, Homebush Bay, NSW.
- WSP 2009b, Environmental Site Assessment Harbour Radio Pty Limited (2GB), Burroway Road, Homebush Bay, NSW.
- GHD, 2012, Additional Contamination Assessment – Stage 1 Area, incorporates results from the 2010 detailed site investigation.
- Parsons Brinckerhoff (PB) 2014, Proposed management of acid sulfate soils prepared for the Wentworth Point Development.
- WSP 2014, Soil Contamination Assessment Burroway and Hill Road, Wentworth Point Development, HomebushBay, NSW 2127.
- Parsons Brinckerhoff (PB) 2015, Detailed Remediation Action Plan – Infrastructure Delivery, Wentworth Point Development.

3 Extent of Management

3.1 Proposed Redevelopment

The proposed works will include the removal and remediation of surrounding soil of several USTs approximately 3m bgl. It will also include excavation, pile soil and inground service trenching.

Site layout for the site is provided as Appendix A, which indicate the areas requiring excavation.

The proposed remediation works for the infrastructure delivery include the bulk excavation of specific cut-to-fill areas to depths that may extend up to 3.0 mBGL (WSP, 2015). Based on the proposed excavation depth, indicative volumes of soil to be disturbed, and the Site located in an area of high occurrence of ASS materials at or near the ground surface, any materials that are excavated and suspected of containing PASS and/or ASS should be assessed and managed according to management measures and mitigation strategies discussed in the following sections.

3.2 Assessment Criteria

The following assessment criteria for field and laboratory testing have been developed with reference to the ASSMAC guidelines (1998).

ASS are usually found in estuarine environments up to 10 mAHD and generally consist of clays and sands containing pyritic material. The field indicators of ASS include:

- iron staining on any drain surfaces
- unusually clear or milky green water discharging from the site
- jarosite horizons or mottling due to iron in the subsurface
- corrosion of concrete or steel structures
- presence of any sulfurous odours.

Analytical results are assessed against the following criteria taken from ASSMAC (1998). Action criteria are based on texture and clay content of the soil being analysed and the total volume of soil to be disturbed. For the purpose of this plan the adopted action criteria is conservatively applied for coarse texture soils, based on the natural soils encountered including clay, sand and sandy clay. As the potential amount of ASS requiring excavation is unknown both the criteria for 1 to 1,000 tonnes disturbed and for >1,000 tonnes disturbed have been considered; for coarse soils the criteria are the same for both categories. Table 3.2 outlines the assessment criteria.

Table 3.1: Adopted Action Criteria

Analyte	Units	Action Criteria (Coarse Soils)	
		1 to 1,000 tonnes disturbed	>1,000 tonnes disturbed
S_{POS}	%	0.03	0.03
TTA + TPA	mol H^+/T	18	18
TSA	mol H^+/T	18	18

S_{POS} – Peroxide-oxidisable sulfur
TAA – Total actual acidity
TPA – Titratable peroxide acidity
TSA – Titratable sulfidic acidity

4 ASS Management Strategy

The following sections outline management measures and mitigation strategies to be undertaken to manage areas where potential or actual ASS materials are present at the Site.

General construction environmental management for the proposed works is presented in the CEMP. This ASSMP provides specific information for the management of ASS at the site and is a sub-plan to the CEMP.

4.1 ASS General Management Strategies

There are a range of control and management measures available when dealing with the possible disturbance of ASS. Such measures can be implemented individually or jointly as part of a combined approach.

PB (2014) summarises the following general strategies as outlined in ASSMAC (1998):

- Avoidance – where ASS areas are avoided altogether (total avoidance) or development activities are adjusted so that the more severe areas are left undisturbed (partial avoidance).
- Oxidation prevention – ASS are innocuous if they are not allowed to oxidise. Oxidation can be prevented by avoidance, water table control, in situ capping, or removal and burial below the water table.
- Acid neutralisation – acid present or produced by oxidation in the soil can be controlled by the addition of alkaline agents such as agricultural lime for example.
- Leachate treatment – where the sulfidic content of the soil is very low (quantity), deliberate oxidation with leachate collection and treatment might be appropriate. This method is generally only applicable to sands, given the lengthy drying times for clay, and would require pilot trials prior to implementation.
- Disposal to landfill – the ASS may be removed and disposed of at an appropriate landfill facility. Untreated ASS would require treatment as a contaminated soil for the purpose of transport and disposal.

It is considered that avoidance of PASS/ASS is not viable as the proposed excavation is anticipated to extend to a depth greater than 1.5mbgl.

Therefore, the most feasible management strategies are summarised as follows:

- For PASS generated from the landward section of the launching channel, the material can be treated by addition of an alkaline agent such as agricultural lime. The treated PASS can then be reused in other parts of the site or the wider Wentworth Point redevelopment (where possible). The treated PASS can only be placed beneath the proposed capping layer to be constructed as part of the overall Wentworth Point development. No treated PASS can be placed below the water table.
- Dewatering associated with the works to be undertaken within the cofferdam and the excavation required as part of the launching channel construction may result in the exposure of PASS.

5 Testing and Management Procedures for Acid Sulfate Soils

As part of the development works will involve the excavation of PASS/ASS, the management strategy to be adopted for the site during the excavation and construction works in order to mitigate the impacts of PASS/ASS on the surrounding environment will include the following steps:

- Appoint a suitably qualified person to manage the acid sulfate soil issues during the earthworks
- Minimise the amount of PASS/ASS required to be excavated
- Excavate and stockpile spoil in separate layers based on geological units and moisture content (i.e., saturated or dry) and reinstate spoil in the same order to ensure that PASS remain saturated.
- Reinstate PASS/ASS under the water table with 16 hours of excavation works (where possible)
- Undertake monitoring and laboratory testing of excavated soils (mainly based on visual assessment, field testing and laboratory testing) to assess the potential presence of acid generating potential during excavation activities and establish liming rates
- Excavated PASS/ASS can be managed through either offsite disposal or on-site treatment
- Manage and monitor dewatering activities to minimise the ingress of groundwater into the excavation and to maintain the groundwater table in the area.

In the case of the exposed sediments within the cofferdam, the material will undergo in-situ cement-lime mixing to increase the geotechnical specification of the sediments. This should reduce the potential for acid generation. Further testing is required to be undertaken to assess whether additional liming is required prior to onsite reuse or offsite disposal.

5.1 Training and Responsibilities

The Principal Contractor should appoint a suitably qualified person who will be responsible for managing ASS at the site during the proposed remediation, excavation and construction works. It is expected that daily attendance to the site will be required to facilitate soil sampling required under this ASSMP.

The appointed person should be familiar with:

- This ASSMP
- Council and other relevant statutory requirements
- Recognition of PASS and ASS
- ASS testing and treatment procedures
- Onsite management of ASS activities
- The NSW ASSMAC Guideline

The classification of ASS/PASS during excavation should be carried out by personnel trained in the identification of ASS and be based on visual classification and the field peroxide test. If required, a suitably qualified environmental consultant should be engaged to assist or train the Principal Contractor in the identification of acid sulfate soils and sampling and analysis.

5.2 Screening of Soils During Excavation

The following procedures are recommended for the Principal Contractor for the sampling and stockpiling of excavated materials. This should be carried out by personnel trained in identifying and testing ASS in the field. Depending on site constraints, other equivalent procedures may be adopted by the Principal Contractor:

- Site excavations will be observed and logged by personnel trained in identifying and testing PASS/ASS in the field
- Excavated soils from depth greater than 1.5m below ground level or excavated sediments from Homebush Bay are considered as PASS/ASS and will be required to be field tested as per Section 5.4
- Based on the field classification tests, soils/sediments suspected as being PASS/ASS will be stockpiled separately to materials assessed as not PASS/ASS. Temporary stockpiling of such materials should be carried out as per Section 5.6.
- Soils/sediments assessed as having a low risk of ASS will be stockpiled in accordance with the Construction Environmental Management Plan (CEMP) with the objective to reduce water ponding, and to control surface erosion and sediment transport outside the stockpiled areas. These soils can be reused within the wider redevelopment area beneath the proposed capping layer. Any surplus soil or sediments generated from Homebush Bay will require to be classified under Parts 1 and 4 of the NSW EPA (2014) Waste Classification Guidelines for offsite disposal.

5.3 Visual Classification

A preliminary visual check by personnel trained in the identification of PASS will be based on material type, colour and consistency:

- PASS are generally grey in colour. Soils may start turning a brown colour when acid is being generated.
- Soils may have a sulfurous (rotten egg) odour. Caution is urged as the low lying terrain may mean that peat could be present, which can have a similar type of odour.
- There may be some bubbling occurring in soils when exposed to air and acidification is occurring. This only happens if acidification takes place relatively quickly.

5.4 Field Test Classification

Section 6.5 in the WSP/PB (2017) has specified the soil sampling frequency for PASS/ASS:

Field pH measurements will be need to be undertaken at a frequency of 1 sample per 25m3 of excavated soils from below 1.5m below ground level. Field pH readings of 4 or less than 5.5 will indicate that the soils are acid and may be the result of limited oxidation of sulfides. Field screening should be carried out by personnel trained in the identification of PASS/ASS and based on the protocols presented in the NSW Acid Sulfate Soil Manual (second edition, March 1998).

5.5 Laboratory Testing for Assessing Liming Rate

Based on the results of the visual classification and field testing, samples will be collected by personnel trained in the identification of ASS and submitted for laboratory analysis using the chromium reducible sulfur suite (Scr) method to confirm the results of the field test and determine the required liming rate.

Sample will be submitted for Sc analysis at a minimum rate of 10% of the total number of field screened samples, or at a minimum 1 sample per treatment batch.

5.6 Temporary Stockpiling

Where stockpiling exceeds two days, excavated soils will be bunded and covered with plastic to help slow the oxidation process. Where extended periods of stockpiling occur (i.e. greater than two weeks) soils will be removed to a treatment pad and lime applied. Normal stormwater and sediment controls should be in place. Extended periods of stockpiling will require leachate collection and monitoring. Where monitoring of the leachate indicates low pH, the addition of lime will be required prior to discharge to stormwater. It should be noted that discharge to stormwater requires approval from Council, and will be subject to other criteria such as the presence of contaminants, pH and suspended solids.

5.7 Bulk Earthworks

Given the heterogeneity and chemical composition of fill soils, highly variable nature of the Quaternary alluvium beneath the Site, and the nature of the proposed site works, avoidance of ASS materials is not considered viable. Staged excavation works should be implemented in the areas PASS/ASS have been identified. Care should be taken during the bulk earthworks to minimise disturbance of groundwater and prevent oxidation of soils below groundwater table.

- Where potential or actual ASS is required to be excavated, the following considerations should be taken into account (ASSMAC, 1998):
- Where the sulfidic layer is <0.5 m deep, these areas should ideally be left undrained with minimal disturbance (i.e. generally these areas are best left waterlogged).
- Where the sulfidic layer is between 0.5 and 2.0 m deep, drainage and excavation should only be attempted in accordance with a properly designed management plan:
  - if the sulfidic layer is 0.5 to 1 mBGL, excavation should be limited to areas less than 0.3 mBGL
  - if the sulfidic layer is 1 to 1.5 mBGL, excavation should be limited to areas less than 0.5 mBGL
  - if the sulfidic layer is more than 1.5 mBGL, excavation should be limited to areas no greater than 1 mBGL.
- Where areas are 'scalded' or degraded and devoid of vegetation, no further drainage or excavation should be undertaken. Remediation strategies should be developed.

Prior to excavation works, the following controls and management measures should be implemented to manage the PASS/ASS at the Site.

Table 5.1: Management of ASS materials prior to excavation works

Title	Details
Wash Bays	Wash bays should be installed at the site to minimise off-site tracking of contaminated materials by machinery. Wash bays should be used prior to trucks/machinery leaving the Site or when moving from an excavation area to a clean area of the Site. Leachate controls should be employed around wash bays to minimise the spread of contamination. These should include collection of runoff.
Staged Excavation Planning	Staged excavation works should be implemented in the areas PASS/ASS have been identified by laboratory analysis of soil samples or are suspected, to minimise the risks posed to the environment and to minimise oxidation of in situ materials. To achieve this, the excavation area should be excavated systematically as a series of smaller 'cells' rather than one large area.

Title	Details
	Where ASS materials are left in situ as the uppermost layer and exposed (i.e. not saturated), areas should be either capped with clean virgin excavated natural material (VENM) or concrete as soon as possible prior to moving to the next area. Ideally, the optimum 'cell' size should be calculated based on the area that can be completed (including capping works) in a single day. Prior to commencement, a works schedule should be prepared indicating when each area will be excavated and capped. Areas should be marked out prior to the excavation works taking place.

5.8 Management Options for ASS/PASS

Where PASS is excavated, excavated PASS materials may be managed by one (or a combination) of the following methods:

- neutralisation of PASS materials where reuse on-site above the water table is required (Option A)
- reburial of excavated PASS materials below the water table (Option B) and
- disposal of excess treated/untreated PASS material to a licensed off-site facility where it cannot be reused on-site (Option C).

Management options for ASS/PASS have been outlined and evaluated in the following table.

Table 5.2 Management options for ASS/PASS

Option	Details	Evaluation of Applicability
Option A: Treatment of PASS and on-site reuse	PASS is excavated and neutralised with lime. The treated material will be re-used on site above the water table with adequate capping.	This option is suitable for PASS materials excavated above/below water table to be used for raising the levels for the development.
Option B: Reburial of excavated PASS materials below the water table	Excavated PASS materials may be re-used on-site by burying the materials in an area of the site located below the water table.	This option is suitable for saturated PASS materials (below water table) and not suitable for fill materials.
Option C: Disposal of excess treated/untreated PASS material to licences off-site facility	A waste classification is assigned for the off-site disposal of PASS to a licensed offsite facility.	Potential option for situations of limited spatial area for treatment or volume of excavation larger than treatment / reburial capacity.

5.9 Preferred Option for Management of ASS/PASS

As outlined in the table above, the most viable and therefore the preferred option for managing ASS/PASS during the proposed site works is Option A (Treatment of PASS and on-site reuse) in coupled with Option B (Reburial of excavated PASS materials below the water table). The management procedure for both options is outlined below.

5.9.1 Treatment of PASS and on-site reuse (Option A)

During bulk earthworks, where PASS materials are to be reused on-site in areas not saturated or more than 16 hours after excavation, these materials must be treated prior to reuse.

The procedures outlined in the following table should be implemented for this option:

Table 5.3: Management procedures for Option A – Treatment and on-site reuse

Procedure	Details
Step 1: Lime Selection and Liming Rate Adoption	The most common material used to neutralise acidic sediments is agricultural lime (aglime as CaCO3). Aglime (pH 8.2) is the safest and cheapest neutralising agent (Manual, 1998). Based on the results from the assessment undertaken along Burroway Road (WSP, 2014), the liming rate would be between 0.04 tonnes of lime per tonne of disturbed soil and 0.12 tonnes of lime per tonnes of soil. These rates are based on the average and maximum Peroxide-oxidisable sulfur (SPOS) from the assessment. Appendix B provides the neutralising calculations worksheet from ASSMAC (1998) which can be used to determine the appropriate dosing rates based on laboratory data from any ASS identified during the works. When estimating lime requirements in accordance with ASSMAC (1998) guidelines, a safety factor of at least 1.5 to 2 times the weight/volume should be applied to allow for inefficient mixing of the lime and its low reactivity. In addition, the purity and effective neutralising values also needs to be included in the estimation of lime requirement, as specified in ASSMAC (1998).
Step 2: Set up Treatment Area/s	Treatment must be undertaken on a developed hardstand area or suitable engineered pad or limed pad. The hardstand area would require appropriate drainage controls to ensure that any runoff is collected. The limed pad should be at least 100mm thick and this thickness should be maintained for the duration of treatment works. The purpose of this guard layer is to minimise the risk of acidic water leaching from the base of the treatment area into the groundwater. Dependent upon the rate of spoil generation, several bunded treatment areas may be necessary for stockpiling and treatment. An earthworks strategy should be prepared to ensure that sufficient space is available on site to accommodate treatment of the PASS.
Step 3: Spoil Management	Stockpiles containing PASS materials should be placed to minimise environmental impact from any leachate. ASSMAC (1998) indicates that the design of stockpile(s) should include the following controls: • all stockpiles to be bunded to retain any water run-off from the treated materials • establish leachate collection and treatment systems including an impervious pad on which to place the stockpile • if an impervious pad has not been established under the stockpile, as a precautionary measure, an apron of fine lime should be applied below the stockpile when stockpiling materials for any length of time • minimise the surface area exposed to oxidation – consider using some form of artificial capping if storage is for longer than a few weeks • minimise the amount of water infiltration – consider using some form of artificial capping • establish diversion banks upslope to prevent run-on water • establish sediment control structures to ensure sulfidic material is not eroded – consider using some form of capping. To manage spoil effectively and meet the above requirements, excavated materials should be stored in a designated area at each site and reused or disposed of off-site as soon as possible following excavation with appropriate management procedures.
Step 4: Excavation & Handling	PASS disturbed during development works should be immediately transferred to the designated treatment area and spread out in 150 mm to 300 mm thick layers. If possible the layers should be allowed to dry in order to aid the mixing process. The layers should then be interspersed with the appropriate amount of lime to aid in the effective mixing of lime and soil. Lime should be applied to the excavated material within the treatment area as soon as possible. If circumstances prevent the spreading and treatment of the material, the surface area of the stockpile should be minimised by forming a relatively high coned shape and avoiding 'spreading-out' of the stockpile. This will limit the surface area exposed to oxidation. Water infiltration should be minimised by covering the stockpile during wet weather. This will limit the formation and transport of acid leachate due to rainfall. The stockpile should be bunded to prevent erosion of the PASS and any movement of potentially acid leachate. Upstream surface runoff water should also be diverted around the stockpile.
Step 5a: Lime Treatment	An excavator or other suitable equipment (as deemed appropriate by the excavation contractor) should be used to thoroughly mix the lime through the soil. Alternatively use of a pug mill may be considered dependent upon the volume of soil to be treated in a timely fashion. Monitoring should be undertaken by qualified personnel to ensure the mixing is undertaken to a suitable extent as neutralisation success relies on effective mixing of the neutralising agents and soil.
Step 5b: Lime Buffer	Establishing a 'lime buffer' at the face of any recent excavation which exposes ASS by sandbagging the face and incorporating lime under and in the sandbags so that the acid leachate flows through the sandbags; backfilling the face with clean fill mixed with lime/sand mix; and excavating a trench behind the face and incorporating a lime/sand mix or barrier so that the acid leachate/water must pass through. Insoluble coatings and preferred pathways may limit the effectiveness of lime buffers.

Procedure	Details
Step 5c: Capping	To minimise the generation of acids, open excavations where the uppermost exposed layer contains PASS materials should be capped as soon as possible or left saturated. If capping is necessary, one (or a combination) of the following capping options should be used: • cap with clean, imported VENM (tested to ensure it meets the appropriate criteria for imported VENM materials) • cap with re-used soil from on-site (tested to ensure it is within the adopted site assessment criteria and does not contain ASS) • cap with concrete. Capping should occur within 16 hours to minimise the environmental risks associated with acid generation. Where concrete or other building materials are to be placed directly in contact with PASS or AASS, appropriate materials should be chosen that are resistant to the long-term effects of sulfate and sulfuric acid which may be produced by the soils.
Step 6: pH Testing and Monitoring	The pH of the soil should be checked using the test method(s) outlined in the ASS Manual 1998 (Methods 21A and or 21Af) to confirm that PASS have been neutralised by lime addition. If required, additional lime should be added to the soil and additional mixing undertaken. Following treatment with lime the pH of the soil should be in the 5.5 to 8.5 range.
Step 7: Re-use on Site	Following treatment and validation, treated PASS materials could be re-used on site above groundwater table for raising the ground level. Treated PASS should not be spread over sensitive areas (e.g. mangroves) or directly adjacent to waterways. The area where the treated PASS is going to be placed should be cleared. The area should be dusted with lime. The neutralised PASS should then be spread across the placement area in layers. Care should be taken not to disturb the underlying soil. On completion, the surface of the neutralised PASS should be dusted with additional lime prior to capping. A suitable capping layer should be placed over the neutralised PASS. The finished surface should be turfed or paved to minimise the potential for erosion.

5.9.2 Reburial of excavated PASS materials below the water table (option B)

The procedures outlined in the following table should be implemented for this option:

Table 5.4: Management procedures for Option B – Reburial below the water table

Procedure	Details
Step 1: Excavation & Reburial	This mitigation strategy may involve reburial of the excavated PASS materials as quickly as possible prior to acid generation by over-excavation (in a staged approach) to provide capacity for disposal of the PASS materials at the bottom of a constructed void preferable below a permanent water table. Cut and fill budget should be prepared to ensure that there is adequate capacity to maintain the PASS materials in anaerobic conditions in the void. This must be done within 16 hours of excavation works to avoid acid generation. If the material is to remain exposed at the surface, it should be capped (refer Table 4.3). If the material is required to be stored for longer than 16 hours, then it must either be: • placed in a temporary holding area where it remains saturated (either below the water table in another area of the site or in an artificial saturated area filled with water). As a safety measure, some lime should usually be added and the water needs to be monitored and treated if the pH drops below 6.5. • treated as per Option A.
Step 2: Treatment (subject to duration of PASS materials exposed to oxygen)	As per Table 4.3.

5.10 Alternative Management Option for ASS/PASS

Option C – Disposal of excess treated/untreated PASS material to a licensed off-site facility is considered as an optional management strategy for situations of limited spatial area for treatment or volume of excavation larger than treatment/reburial capacity encountered.

5.10.1 Disposal at a Licensed Landfill (Option C)

If excavated PASS materials cannot be re-used on site, they should be disposed of at a suitably licensed waste facility. Excavated soils containing ASS should be disposed of in accordance with the NSW EPA (2014) waste classification guidelines, as follows:

- For VENM containing PASS (pH of 5.5 or more):
  - the materials must be kept wet at all times during excavation and subsequent handling, transport and storage
  - the receiving landfill must be licensed by the NSW EPA to dispose of PASS below the water table
  - the materials must be received at the receiving landfill within 16 hours of being dug up.
- For Actual ASS (AASS, pH of 5.5 or less) or PASS that has dried out, undergone any oxidation of its sulfidic minerals or is not VENM:
  - the materials must be treated (neutralised) on-site through liming, mixing and testing to ensure that the mixing of lime materials is successful. Monitoring of pH should be carried out regularly during and after the neutralisation procedure to establish the effectiveness of the treatment
  - following neutralisation, testing should be undertaken to classify the treated material in accordance with the NSW EPA (2014) Waste Classification Guidelines - Part 1: Classifying Waste (2014) and Waste Classification Guidelines Part 4: Acid Sulfate Soils (2014), and the excess treated materials should be disposed to an NSW EPA licensed landfill facility.

The receiving landfill must be licensed by the EPA to accept the class of waste as per the classification. The landfill should be informed prior to receiving the waste that the material contained ASS and was treated in accordance with the neutralising techniques outlined in ASSMAC (1998).

Information should be recorded/filed for each batch of material tested and disposed of off-site. This should include the origin of material, the volume, a description of the materials, laboratory results and disposal certificates.

The costs associated with the off-site disposal can be significant and should be assessed at an early stage of the project to avoid significant future unexpected additional costs.

The procedures outlined in the following table should be implemented for this option:

Table 5.5: Management procedures for Option C – Disposal at a Licenced Landfill

Procedure	Details
Step 1: Contact Landfill	Prior to commencement of excavation works, the landfill should be contacted and the necessary approvals should be obtained for disposal.
Step 2: Excavation & Handling	Natural soil classed as PASS should be excavated/disturbed in stages. PASS must be kept wet at all times during excavation and subsequent handling, transport and storage until they can be disposed of safely.
Step 3: pH Testing	The pH of the soil should be checked using the test method(s) outlined in the ASS Manual 1998 (Methods 21A and or 21Af). The pH of each load and the time of extraction should be recorded and forwarded to the landfill. If the pH is less than 5.5 then the material is not suitable for disposal and Option A should be implemented.
Step 4: Transport for VENM containing PASS (pH of 5.5 or more) **OR**	Provided that the pH of the excavated PASS is not less than 5.5, PASS material can be loaded onto trucks and transported immediately to the landfill. Prior to burial the landfill will check the pH of each load. Any loads that do not meet the acceptance pH criteria will be turned away.
Step 4: Treatment for AASS/PASS (pH of 5.5 or less)	As per Table 4.3.

Procedure	Details
Step 5: Waste Classification and Disposal	Following neutralisation, testing should be undertaken to classify the treated material in accordance with the NSW EPA (2014) Waste Classification Guidelines and the excess treated materials should be disposed to a NSW EPA licensed landfill facility.

6 Groundwater Management

Some dewatering may be required given the proposed remediation works for the infrastructure delivery include the bulk excavation of specific cut-to-fill areas to depths that may extend up to 3.0 mBGL (WSP, 2015).

The procedure for managing groundwater seepage and dewatering during development works is outlined in the following table:

Table 6.1: Management procedure for dewatering

Procedure	Details
Step 1: Minimise the depth of dewatering	Where possible the depth of dewatering should be minimised to reduce the generation of ASS and/or acidic conditions. Excavation and dewatering works should be staged over short durations to reduce the time and volume of PASS exposed to oxidation.
Step 2: Approvals for Groundwater Disposal	Reference should be made to the local council, NSW Office of Water/WaterNSW, Sydney Water and other relevant authority's approval requirements for further information in relation to disposal of water to either the sewer or stormwater systems.
Step 3: pH Testing and Neutralisation	Water pumped from the excavation should be placed in a portable tank, or appropriate holding facility, where samples can be obtained for testing. The water should be in the pH range of 6.5 to 8.5 (NSW Government, 2009). If the pH is outside of this range, treatment will be necessary prior to disposal. Based on the disposal option chosen for the development, additional screening for contaminants may be required by the relevant authorities prior to disposal.
Step 3: On-going groundwater monitoring	In the event that extended pumping of water is necessary during the construction period, the level and quality of the groundwater should be monitored on a regular basis over the entire construction period. The pH should be measured and recorded on a regular basis. Immediate advice is to be sought from an experienced consultant if the pH at any location is not within 10% of the initial pH at the commencement of pumping. If required, corrective action should be taken as soon as possible. Laboratory analysis will be required on water samples as part of the corrective action to assess the quantity of neutralising agents required if treatment is necessary. The groundwater monitoring program refer to Section 7.

7 Monitoring Program

The overall objective of monitoring is to measure the effectiveness of the proposed strategies in achieving the desired outcomes. Monitoring will assist in identifying and addressing any non-conformances and providing information for implementing corrective actions within an appropriate timeframe. Table 6.1 outlines the monitoring program during the works.

Table 7.1: Monitoring Program

Procedure	Details
General	Monitoring of ASS control/management procedures including excavation methods, spoil management measures, and dewatering and groundwater management should be undertaken. ASS pollution incident response investigations, including management and/or remediation measures, should be prepared as required.
Soil Monitoring Program	The following will constitute the soil monitoring program during the works: • Field pH measurements of all materials excavated should be taken and logged to provide broad coverage of the excavated material types encountered. One sample should be collected per 25 m^3 of excavated soil materials for on-site pH testing. • Field pH readings of 4 or less will indicate that ASS are present with oxidising sulfides, readings of greater than 4 but less than 5.5 indicate that the soils are acidic and may be the result of limited oxidation of sulfides. • Where soils are required to be limed, materials should be tested to ensure that the neutralisation process has been successful. Field testing should be undertaken at a rate of one per 50 m3, if changes in liming rates or material are observed additional samples should be collected. Laboratory testing (SPOCAS or chromium suite) should be undertaken at a rate of 25% of field samples to confirm the results. • For waste disposal: - material is pre-classified as PASS material as per the NSW EPA (2014) waste classification guidelines providing it is delivered to the receiving waste facility within 16 hours of excavation - if soil is not delivered to the waste facility within 16 hours it will require liming and testing to ensure that the material has been successfully neutralised and to classify the material as per the NSW EPA (2014) waste classification guidelines. Information should be recorded and filed for each batch of soil tested. Information should include the origin of the material, the volume, a description of the materials, laboratory results and disposal certificates (where appropriate).
Water Monitoring Program	The following will constitute the water monitoring program during the works: • Any pumped water from the excavations and runoff collected will be stored in retention basins or fully contained tanks on-site. • Water samples should be representative of the stored water and may require sampling from different depths, particularly if the water has been stored long enough to allow it to settle. • Water stored in basins/tanks should be tested for metals (aluminium, arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel and zinc) and cations and anions to characterise the water quality. In addition, the water should be tested for physical parameters on-site including dissolved oxygen, electrical conductivity, pH, reduction/oxidation potential, temperature and turbidity. • If runoff is stored separately to any pumped water, the requirement for site runoff can be met via the following water quality criteria being tested for and met prior to off-site discharge of collected runoff: - total suspended solids not greater than 1,500 mg/L - pH between 6.5 and 9.0 - iron not greater than 500 µg/L - aluminium not greater than 5 µg/L for pH <6.5, not greater than 100 µg/L for pH >6.5 - no visible oil or grease film. ASSMAC (1998) provides water quality performance criteria to be met for the discharge of water into the environment are summarised, as summarised below.

Procedure	Details		
	Water Quality Indicator	**Fresh water**	**Marine Water**
	pH	6.5-9.0	<0.2 pH unit change
	Iron (total)	500 µg/L	Not applicable
	Total dissolved solids	<1500mg/L	>1500mg/L
	Aluminium	5 µg/L for pH <6.5	Not applicable

8 Contingency Plan

8.1 Incident and Emergency Response

There is a potential for incidents and emergency response requirements relating to ASS issues, particularly pollution/contamination of surrounding areas and waterways from acid contamination. The contractor is to have appropriate incident reporting mechanisms (including near miss reporting) and these are incorporated into the Site work health and safety (WHS) plans and CEMP. Some issues that may arise unexpectedly include:

- interception of existing unknown AASS and/or PASS identified through field inspections/measurements or observed adverse reactions with flora and/or fauna (including site workers and public)
- inclement weather or incorrect management practices causing erosion and transportation of AASS and/or PASS materials off-site from stockpiles and active construction excavations.

The emergency response procedures will include:

- immediate containment of acid runoff from stockpiles or areas of excavation by bunding
- communication between the project manager, site managers, supervisors and contractors detailing the pollution incident requiring response/action
- site inspection to assess extent of severity of the emergency/incident
- based on the assessed severity of the incident by Roads and Maritime, the project manager will determine the need to notify regulators potentially including the NSW EPA; notifications should detail the type and extent of potential impacts and remediation requirements
- monitoring and/or management of incidents which may include soil or groundwater sampling and analysis, spill clean-up, investigation materials, correction of erosion control measures and remediation of affected area (if required)
- incident reporting detailing all investigation and remediation actions taken and remediation results carried out
- environmental incidents will be reported immediately to the site supervisor who will contact the project manager. All incidences will be investigated and the appropriate course of action will be taken to address the issues. Serious environmental incidents will be reported to the NSW EPA.

8.2 Non-Conformance Preventative and Corrective Action

In the event of a non-conformance, the source and nature of the event will be investigated, the effectiveness of the existing controls reviewed and modified where practical, and necessary strategies will be implemented to minimise further impacts.

Prior to undertaking any remediation or excavation, a safe work method statement (SWMS) will be prepared that defines safe procedures to protect the health and safety of personnel. The SWMS will include the following:

- all workers will wear personal protective equipment (PPE) that may include breathing apparatus, protective overalls, gloves, safety boots and hard hat
- decontamination facilities made available to ensure workers are free of any contamination prior to leaving the workplace
- ASS areas are separated from the remaining activities by appropriate fencing and signage. Access to the site is restricted only to personnel directly involved in the works.

9 References

ASSMAC 1998, Acid Sulfate Soil Manual.

Browns Smart Consulting 2014, Road Bulk Earthworks Plan

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Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines.

National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).

NSW EPA 2017, Guidelines for the NSW Site Auditor Scheme (3rd edition).

NSW EPA 2014, Waste Classification Guidelines, Part 1: Classifying waste.

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NSW EPA 1995, Sampling Design Guidelines.

NSW EPA 1997, Guidelines for Consultants Reporting on Contaminated Sites.

Parsons Brinckerhoff (PB) (2015) Proposed Management of Acid Sulfate Soils prepared for the Wentworth Point development, Ref: 2207004B-CLM-LTR-002 RevB.

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Stone, Y., Ahern, C. R., and Blunden, B. 1998, Acid Sulfate Soils Manual 1998. Acid Sulfate Soil Management Advisory Committee, Wollongbar, NSW, Australia

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WSP 2009a, Acid Sulfate Soil Management Plan Harbour Radio Pty Limited (2GB) Burroway Road, Homebush Bay, NSW.

WSP 2009b, Environmental Site Assessment Harbour Radio Pty Limited (2GB), Burroway Road, Homebush Bay, NSW.

WSP 2014a, Soil Contamination Assessment Burroway and Hill Road, Wentworth Point Development, Homebush Bay, NSW 2127.

WSP 2014b, Proposed management of acid sulfate soils.

WSP 2015, Detailed Remediation Action Plan – Infrastructure Delivery, Wentworth Point Development.

10 Limitations

This report has been prepared by Geosyntec Consultants Pty Ltd ("Geosyntec") for use by the Client who commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the Client and other parties. The findings of this report are based on the scope of work outlined in Section 1. The report has been prepared specifically for the Client for the purposes of the commission, and use by any explicitly nominated third party in the agreement between Geosyntec and the Client. No warranties, express or implied, are offered to any third parties and no liability will be accepted for use or interpretation of this report by any third party (other than where specifically nominated in an agreement with the Client).

This report relates to only this project and all results, conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose. This report should not be reproduced without prior approval by the Client, or amended in any way without prior written approval by Geosyntec.

Geosyntec's assessment was limited strictly to identifying environmental conditions associated with the subject property area as identified in the scope of work and does not include evaluation of any other issues.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigation.

This report does not comment on any regulatory obligations based on the findings. This report relates only to the objectives stated and does not relate to any other work conducted for the Client.

The absence of any identified hazardous or toxic materials on the site should not be interpreted as a guarantee that such materials do not exist on the site.

All conclusions regarding the site are the professional opinions of the Geosyntec personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, Geosyntec has not independently verified and assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Geosyntec, or developments resulting from situations outside the scope of this project.

Geosyntec is not engaged in environmental assessment and reporting for the purpose of advertising sales promoting, or endorsement of any client interests, including raising investment capital, recommending investment decisions, or other publicity purposes. The Client acknowledges that this report is for its exclusive use.

Attachment A Figures

LEGEND

Site Boundary

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Nearmaps

Approx. 50 m

Datum: GDA 1994 MGA Zone 56 - AHD

Figure 1: Site Layout Plan

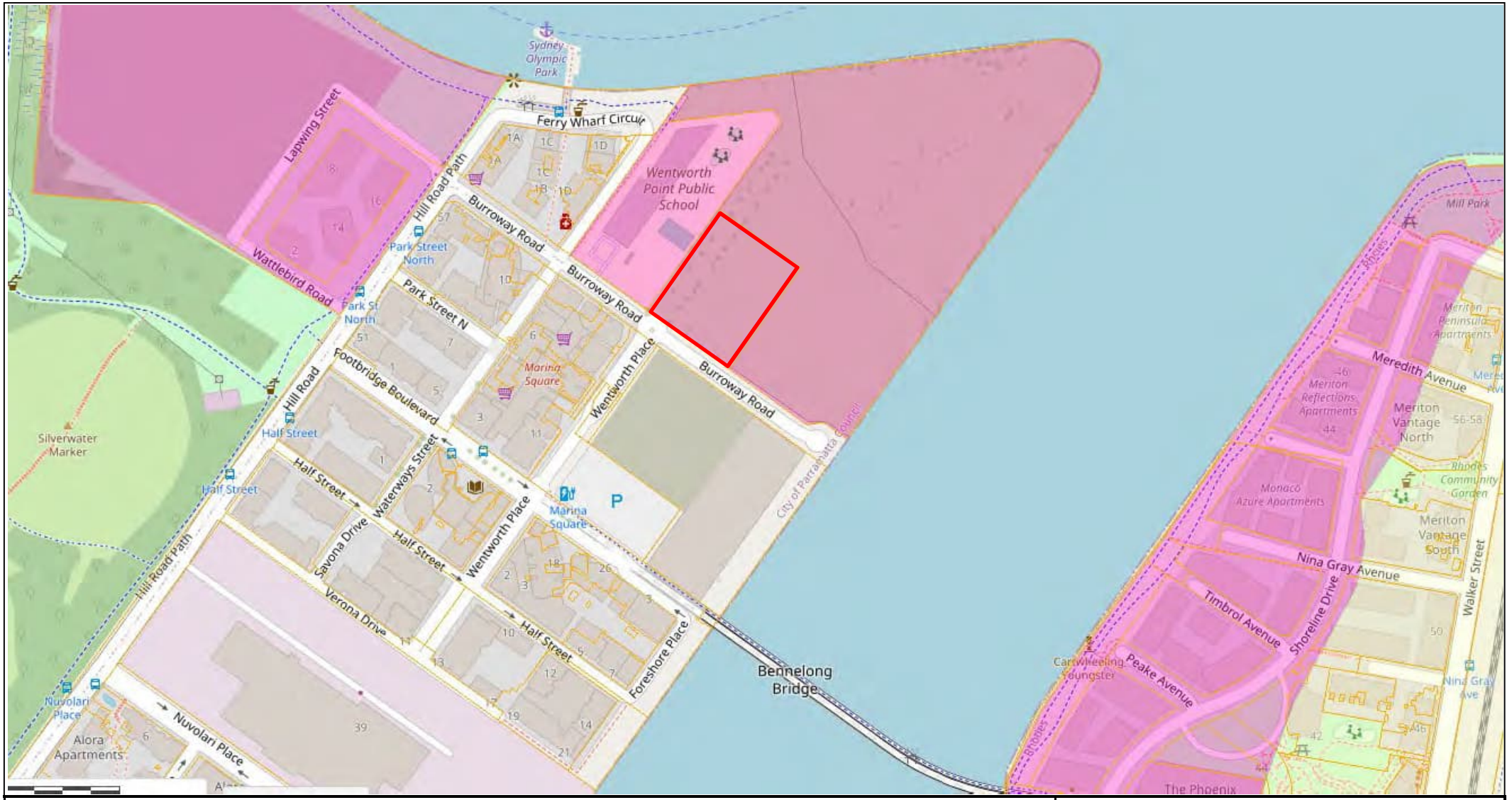
Site Address: 7 Burroway Road, Wentworth Point, NSW 2127

Client: RobertsCo

Job Number: AU122229

Date: 16 September 2022

Geosyntec consultants



LEGEND

Site Boundary

Acid Sulfate Soils

- NA
- Class 1
- Classes 2 & 2a
- Class 2b
- Class 3
- Class 4
- Class 5

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of SEED NSW

Approx. 50 m

Datum: GDA 1994 MGA Zone 56 - AHD

Figure 2: Acid Sulfate Soil Risk Map

Site Address: 7 Burroway Road, Wentworth Point, NSW 2127

Client: RobertsCo

Job Number: AU122229

Date: 16 September 2022

Geosyntec consultants

Attachment B Liming Rate Table

TABLE 4.5 Treatment categories and lime required to treat a weight of disturbed acid sulfate soils – based on soil analysis

The tonnes (t) of pure fine lime required to fully treat the total weight/volume of ASS can be read from the table at the intersection of the weight of disturbed soil (row) with the soil sulfur analysis (column). Where the exact weight or soil analysis figure does not appear in the heading of the row or column, use the next highest value (or calculate values exactly using factors from Table 4.6).

Disturbed soil	**Soil Analysis - Oxidisable Sulfur (S %)** or equivalent TPA/TAA													
(tonnes)	***0.03***	***0.06***	***0.1***	***0.2***	***0.4***	***0.6***	***0.8***	***1***	***1.5***	***2***	***2.5***	***3***	***4***	***5***
1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.1	0.1	0.1	0.2	0.2
5	0.05	0.05	0.05	0.05	0.1	0.1	0.2	0.2	0.4	0.5	0.6	0.7	0.9	1.2
10	0.05	0.05	0.05	0.1	0.2	0.3	0.4	0.5	0.7	0.9	1.2	1.4	1.9	2.3
15	0.05	0.05	0.1	0.1	0.3	0.4	0.6	0.7	1.1	1.4	1.8	2.1	2.8	3.5
20	0.05	0.1	0.1	0.2	0.4	0.6	0.7	0.9	1.4	1.9	2.3	2.8	3.7	4.7
25	0.05	0.1	0.1	0.2	0.5	0.7	0.9	1.2	1.8	2.3	2.9	3.5	4.7	5.9
35	0.05	0.1	0.2	0.3	0.7	1.0	1.3	1.6	2.5	3.3	4.1	4.9	6.6	8.2
50	0.1	0.1	0.2	0.5	0.9	1.4	1.9	2.3	3.5	4.7	5.9	7.0	9.4	11.7
75	0.1	0.2	0.4	0.7	1.4	2.1	2.8	3.5	5.3	7.0	8.8	10.5	14.0	17.6
100	0.1	0.3	0.5	0.9	1.9	2.8	3.7	4.7	7.0	9.4	11.7	14.0	18.7	23.4
200	0.3	0.6	0.9	1.9	3.7	5.6	7.5	9.4	14.0	18.7	23.4	28.1	37.5	46.8
500	0.7	1.4	2.3	4.7	9.4	14.0	18.7	23.4	35.1	46.8	58.5	70.2	93.6	117.1
750	1.1	2.1	3.5	7.0	14.0	21.1	28.1	35.1	52.7	70.2	87.8	105.3	140.5	175.6
1,000	1.4	2.8	4.7	9.4	18.7	28.1	37.5	46.8	70.2	93.6	117.1	140.5	187.3	234.1
2,000	2.8	5.6	9.4	18.7	37.5	56.2	74.9	93.6	140.5	187.3	234.1	280.9	374.6	468.2
5,000	7.0	14.0	23.4	46.8	93.6	140.5	187.3	234.1	351.2	468.2	585.3	702.3	936.4	1170.5
10,000	14.0	28.1	46.8	93.6	187.3	280.9	374.6	468.2	702.3	936.4	1170.5	1404.6	1872.8	2341.0

L	**Low treatment**: (<0.1 t lime). Apply 0.05 t (1 bag) or 0.1 t (2 bags) of lime to prevent some soil acidity from the ASS disturbance.
M	**Medium treatment:** (>0.1 to 1 t lime).
H	**High treatment**:(>1 to 5 t lime).
VH	**Very High treatment:** (>5 tonne lime).

A detailed management plan is required if disturbing > 1,000 tonnes of ASS (oxidisable S ≥0.03 %S or equivalent TPA or TAA.)

Lime rates are for pure fine $CaCO_3$ using a safety factor of 1.5. A factor that accounts for Effective Neutralising Value is needed for commercial grade lime (see Management Guidelines).

An approximate volume (cubic m) can be obtained by dividing weight (tonne) by bulk density (t/m^3).

Appendix K Environmental Risk Register

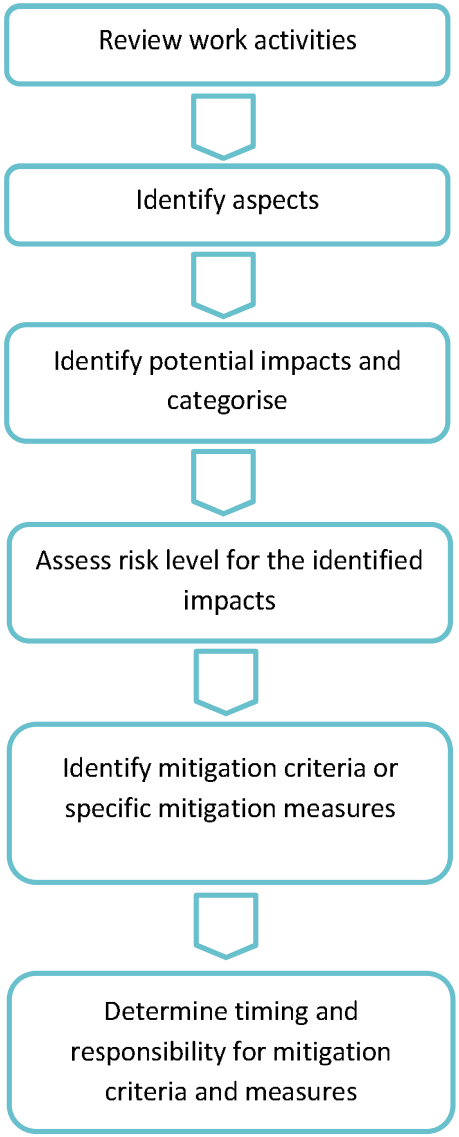
Environmental Aspects and Impacts: SOPHS Early Works

The process used to develop possible mitigation measures after an environmental risk has been identified, is illustrated in the Figure to the right.

The mitigation measures developed to control the identified environmental impacts are presented in the following tables. Also shown are the associated levels of risk of impact and responsible party for the implementation of the respective mitigation measure. In accordance with the roles and responsibilities described in Section 3.

As defined in ISO 14001, an environmental aspect is “an element of an organisation’s activities, products or services that can interact with the environment” (SAI Global, 2004). Environmental aspects within this project are specific actions or items that could cause an impact.

The risk assessment matrix on the following page is used to determine the level of risk for identified potential impacts from the proposed works.



Severity	How severe are potential adverse impacts on:			What is the likelihood (risk) of this level of severity?			
	Human Health	**Environment**	**Construction schedule and/or project costs**	**Very Likely**	**Likely**	**Unlikely**	**Very Unlikely**
Catastrophic	Death, life-threatening injuries, permanent disability / ill health	Catastrophic environmental incident, serious risk and/or damage to onsite or offsite receptors, regulatory involvement, significant onsite and offsite remediation, financial penalties enforced, legal action	Severe delays, significant cost increases, possible project termination	16	15	13	10
Major	Major illness or injury requiring surgery / hospitalisation	Major environmental incident, onsite and offsite contaminant migration, regulatory notification and remediation needed	Lengthy project delays / major cost increases	14	12	9	6
Moderate	Injury or illness requiring treatment and resulting in lost time	Moderate environmental incident, contained onsite, requires some remedial action	Moderate project delays and cost increases	11	8	5	3
Minor	Minor injury or exposure not requiring medical attention	Minor environmental incident, localised	Minor project delays / some additional costs	7	4	2	1

Should additional environmental impacts relating to changed or additional work activities be identified during the project, the risks are to be assessed according to this procedure. Following this risk assessment system, mitigation measures must be selected as required, with responsibility allocated and the details documented in the relevant table, as part of the ongoing review of the CEMP.

Erosion and Sedimentation Risks					
Aspect	**Impact**	**Risk of Impact**	**Mitigation Criteria or Management Measure**	**Risk After Mitigation / Management**	**Responsibility**
Pre-construction					
Erosion and sediment control design	Inappropriate design, resulting in offsite transport of sediment to roads, and/or stormwater drains	12	An approved erosion and sediment control plan (ESCP) is to be implemented with controls in place.	4	Project Engineers / Site Manager
Construction					
Site preparation	Sediment mobilisation and surface runoff from site establishment and clearing.	12	Prior to commencement of site work, install all erosion and sediment control measures based on an erosion and sediment control plan and ensure controls are operational in accordance with approved ESCP.	4	Site Manager
Vehicle traffic leaving site	Sediment tracked offsite by vehicle wheels.	8	Appropriate measures are to be implemented during the construction period to ensure vehicles leaving the premises are sufficiently free from dirt, aggregate or other materials such that material are not transported onto public roads. These may include shake-down areas at access points and truck wash-down facilities.	4	Site Manager
Transport of materials to and from site	Loss of load resulting in pollution of roads	5	Truck loads shall be covered. Should any material be transported onto the road or any spills occur it is to be cleaned up prior to cessation of the same day's work and/or commencement of any rain event.	2	Site Manager
Stormwater run-off	Run-off resulting in soil erosion.	12	Do not stockpile materials on drainage lines. Ensure stockpile slopes and batters are not excessive. Control stormwater runoff during construction in accordance with the ESCP.	5	Site Manager

Erosion and Sedimentation Risks Cont.					
Aspect	**Impact**	**Risk of Impact**	**Mitigation Criteria or Management Measure**	**Risk After Mitigation / Management**	**Responsibility**
Exposed surfaces and stockpiling of fill and construction materials	Offsite transport of sediment to roads and stormwater drains. Loss of fill material.	12	Maintain a project ESCP: Daily operational check of control measures by Project Engineer or nominated person. Additional inspections to be carried out by the Site Manager / Project Engineer after each storm event to assess adequacy of the erosion control measures, repair/replace any dysfunctional erosion control devices, and clean up any sediment that has left the site or is deposited on public land or drainage channels.	5	Site Manager / Project Engineer

Water quality					
Aspect	**Impact**	**Risk of Impact**	**Mitigation Criteria or Management Measure**	**Risk After Mitigation / Management**	**Responsibility**
Pre-construction					
Design of erosion and sedimentation control	Inappropriate design, resulting in localised ponding or flooding, excessive runoff, erosion and pollution of local area.	12	Controls to be installed in accordance with the ESCP. Any discharge to the street stormwater system is to be approved by the Council in writing prior to discharge.	4	Contractor / Site Manager
Construction					
Discharge of waters from site	Discharge of sediment laden waters into watercourses.	14	Any discharge to the street stormwater system is to be approved by the Council in writing prior to discharge. Implement ESCP.	2	Site Manager
Plant and equipment refueling, chemical use and storage	Accidental spills and leaks into nearby watercourses during refueling of equipment or storage of fuels and chemical.	8	Refuel plant and equipment in a location away from drains and watercourses. Ensure sufficient spill response kits are accessible on site at all times. Chemicals to be stored on site must comply with the management measures in the CEMP. Ensure site induction covers dangerous/hazardous goods and appropriate spill response procedure.	2	Site Manager
General use of construction site	Waste, litter etc. entering waterways via stormwater drains.	4	Ensure contractors leave the construction work sites free of debris and other rubbish (daily) and at the completion of the works. Provide sufficient number of and type of suitable receptacles on site for general waste, recyclable materials and other waste types (as required).	2	Project Manager / Site Manager

Noise and Vibration Management					
Aspect	**Impact**	**Risk of Impact**	**Mitigation Criteria or Management Measure**	**Risk After Mitigation / Management**	**Responsibility**
Pre-construction/Construction					
Pre-construction and construction activities resulting in noise complaints	Disturbance of onsite receptors/personnel, local residents, potential noise complaints. Non-conformance with Consent Conditions.	8	Comply with defined work hours: 7.00am to 6.00pm Monday to Friday, 8.00am to 3:30pm Saturdays, no work on Sundays or public holidays. All subcontractors to be managed to ensure they work only within defined hours.	4	Site Manager

Traffic Management					
Aspect	**Impact**	**Risk of Impact**	**Mitigation Criteria or Management Measure**	**Risk After Mitigation / Management**	**Responsibility**
Pre-construction / construction					
Parking due to construction related vehicles	Loss of parking availability in local streets.	8	All site personnel are to be advised of parking allocations. Ensure work vehicles and plant/equipment do not obstruct vehicular or pedestrian traffic on roadways, footpaths or access to land uses unless absolutely necessary.	4	Site Manager
Construction traffic movements to and from site (deliveries and site staff)	Increased traffic volume on roads during construction.	8	Haul routes to be identified and communicated to staff, personnel and subcontractors. Co-ordinate deliveries to avoid peak periods where feasible. Implement traffic management plans, including use of designated routes. Implement traffic control plan, including traffic controller where necessary.	4	Site Manager
Pedestrian movements surrounding construction site / site occupant movements	Pedestrian/occupant confusion, interference with vehicles, potential incident due to conflict between pedestrian/occupant and construction access points.	15	Identify traffic controls required. Restrict site access to personnel and authorised people only in accordance with WorkCover 2000 Regulations. Provide appropriate restriction signage.	9	Project Manager

Heritage Management					
Aspect	**Impact**	**Risk of Impact**	**Mitigation Criteria or Management Measure**	**Risk After Mitigation / Management**	**Responsibility**
Construction					
Discovery of unexpected find of heritage item/artifact	Impact on that heritage item in the event that correct steps are not taken.	8	Follow heritage protocol for unexpected heritage finds.	5	Site Manager

Air Quality					
Aspect	**Impact**	**Risk of Impact**	**Mitigation Criteria or Management Measure**	**Risk After Mitigation / Management**	**Responsibility**
Construction					
Operation of plant and equipment	Air pollution from emissions	1	Ensure equipment and machinery is maintained and not left idling when not in use.	1	Site Manager
Vehicle movement, earthworks, handling and transport of spoil and fill	Dust generated from earthworks, including materials handling and wheel dust	4	Cover all loads of excavated material and other erodible materials that are transported to and from the work site. Avoid or restrict dust generating activities during windy conditions.	2	Site Manager
Management of stockpiles, exposed areas and general site	Wind erosion of exposed surfaces and stockpiles	4	Keep areas adjacent to the work sites free of construction soil or dust. Monitor all work sites, general work areas, stockpiles and skip bins for dust generation and water down or cover affected areas especially stockpiles of waste material. Minimise soil and vegetation disturbance, in order to minimise dust generation.	2	Site Manager
Excavation works	Release of dust from excavation	4	Implement dust suppression measures appropriate for the specific works; no dust is to leave the site. Wetting down / water carts can be used to minimise dust release.	2	Site Manager

Waste Management					
Aspect	**Impact**	**Risk of Impact**	**Mitigation Criteria or Management Measure**	**Risk After Mitigation / Management**	**Responsibility**
Construction					
Earthworks and construction	Generation of waste including potentially recyclable or reusable materials	12	Waste Management is to be based on the waste hierarchy, and is to maximise recycling and reuse of waste material and construction wastes, and to minimise waste to landfill. Waste management is to include the following steps. All material leaving site is to be disposed of at a suitable location lawfully able to accept the waste it is receiving. All material leaving the site is to be disposed of in accordance with the provisions of the Protection of the Environment Operations Act 1997 and the NSW EPA (2014) Waste Classification Guidelines, Part 1: Classifying Waste. The waste disposal facility must be appropriately licensed to receive the class of waste being delivered as described in the respective waste classification. Monitor waste volumes and record their method and location of disposal and whether or not that location was a place that could lawfully be used as a waste facility for that waste.	9	Project Manager

Waste Management					
Aspect	**Impact**	**Risk of Impact**	**Mitigation Criteria or Management Measure**	**Risk After Mitigation / Management**	**Responsibility**
Construction					
Earthworks and construction	Generation of waste leading to disposal - construction waste	7	Provide a sufficient number of and type of suitable receptacles onsite for general waste, recyclable materials and other waste types (as required). Maximise segregation of wastes. Recycle and divert from landfill surplus soil, rock, and other excavated material where possible. Separately collect and stream quantities of waste concrete, bricks, blocks, timber, metals, plasterboard, paper, and packaging, glass, and plastics and offer them for recycling where practical. Ensure that no waste from the site is conveyed to or deposited at any place that cannot lawfully be used as a waste facility for that waste.	2	Project Manager

Appendix L Contingency and Emergency Response Plan

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Appendix L: Contingency and Emergency Response Plan

1 Incident and Emergency procedures

1.1 Inductions

All site personnel must undergo a Roberts Co site induction prior to accessing the Site. The following emergency details will be discussed as part of the induction process:

- the name(s) of any first aiders on site
- the location of first aid kits and fire extinguishers
- emergency procedure details for the site, including contact details for emergency services and the nearest hospital
- site addresses details and map with route to nearest hospital highlighted
- location of the site assembly area
- location of environmentally sensitive areas and access requirements.

2 Incident/Emergency Response

All unplanned events, irrespective how minor, shall be reported at the first opportunity to the site supervisor and project manager. In the event that an environmental incident occurs which results in noncompliance with environmental requirements the incident will be classified as an emergency.

Any pollution or other environmental incident which occurs should be immediately managed and contained as much as can be safely done. The severity of the incident should be assessed and notification made to the appropriate parties:

- The Site Manager and the Environmental Site Representative should be notified of all environmental incidents.
- The RMS Project Manager must be notified as soon as possible of all significant pollution event or environmental emergency.
- Appropriate regulatory authorities, such as the NSW EPA, WorkCover, Council etc., should be notified as required.

Emergency contacts are listed in Table 1 below.

Table 1: Emergency Contacts

Emergency Contacts/Person/Agency	
Site Manager – Ben Drayton	0439 719 570
Environmental Site Representative – Ben Drayton	0439 719 570
Mainland Civil Environmental manager – James McMillan	0404 202 312

Emergency Services	
Emergency	000
Police – non-emergency (Ryde)	02 9808 7401
Ambulance – non-emergency (Auburn)	02 9320 7777
NSW Fire and Rescue – non-emergency (Rhodes)	02 9743 4241
NSW Health, Myhealth Medical (Wentworth Point)	02 9023 3200
Other	
City of Parramatta	1300 617 058
WorkCover	13 10 50
Sydney Water	13 20 90
Ausgrid	13 13 88

Discharge of water containing contamination, suspended matter, any oils or similar materials or any foaming or nonbiodegradable detergents into the waterways on and adjacent to the work area is to be avoided using all proper controls. Any release of water may be a breach of NSW EPA regulations and may be subject to action by the NSW EPA.

Any occurrence which may result in the contamination of the land, surface or groundwater or air must be immediately reported to the EPA, site supervisor and RMS immediately. Any occurrence which does or may result in exposure of site workers or the public to contamination must be immediately reported to the site supervisor and RMS immediately and to emergency services if necessary.

3 Spill Management

In the event of a chemical spill, including potentially contaminated groundwater, the following procedures will be implemented:

- Work will be immediately ceased, and the spill will be contained and cleaned up using the spill kit.
- For large leaks, which cannot be contained using the spill kit, or leaks that leave the site, emergency services will be contacted for assistance (000).
- All leaks and spills to be reported as environmental incidents.

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