ASPECT INDUSTRIAL ESTATE

Construction Environmental Management Plan
Building Works - Lot 1
SSD 10448

Prepared for:

Richard Crookes Constructions
Level 3
4 Broadcast Way
Artarmon NSW 2064

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Richard Crookes Constructions (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
630.30402-R01-v1.3-20221223	16 February 2023	Drew Williams	Alanna Ryan	Alanna Ryan

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1 Introduction

1.1 Development Overview

Aspect Industrial Estate (AIE) is a regional warehouse, distribution and industrial centre located at Kemps Creek within the Penrith local government area (LGA) and forms part of the broader Mamre Road Precinct located within the Western Sydney Employment Area (WSEA) (see **Figure 1**).

Mirvac Property Services (Aust) Pty Ltd (Mirvac) obtained the State Significant Development (SSD) Consent SSD 10448 on 24 May 2021 from the Department of Planning and Environment (DPE) for the AIE Concept Proposal and Stage 1 Development of the AIE (AIE – Stage 1). A copy of SSD 10448 is attached as **Appendix A**. A modification (MOD) has been requested for SSD 10448 (MOD 1) for an administrative change to the consent imposing a Work Authorisation Deed with Transport for NSW to allow temporary construction access on Mamre Road. A second modification has been requested for SSD 10448 (MOD 2) for amendments to layouts of Warehouses 1 and 3 and Access Road 2.

The AIE Concept Proposal comprises 11 industrial or warehouse and distribution centre buildings, internal road network layout, building locations, gross floor area (GFA), car parking, concept landscaping, building heights, setbacks and built form parameters (see **Figure 2**).

In accordance with the approved Staging Plan (see **Figure 4**), dated 17 June 2022 required by Conditions A10 and A19, Schedule 2 of SSD 10448, AIE – Stage 1 includes the following works:

- **Bulk Earthworks (BEW) & Infrastructure**: Estate-wide earthworks, infrastructure and services; and
- **Building Works**: Construction and use of warehouse and distribution centre buildings proposed in Lots 1 and 3.

A Master Construction Environmental Management Plan (CEMP) (SLR, 2022) (Master CEMP) has been prepared to cover the estate-wide earthworks, infrastructure and services of the approved construction works (Stage 1 – BEW & Infrastructure).

The construction and use of warehouse and distribution centre buildings proposed in Lots 1 and 3 will be covered in separate CEMPs for Lot 1 and Lot 3.

This Construction Environmental Management Plan (CEMP) has been prepared to cover only the construction and use of warehouse and distribution centre buildings proposed in Lot 1. This is outlined in detail in **Table 1** below:

Table 1 Detailed Stage 1 Development of the AIE

Stage 1 Development of AIE – Stage 1	Where Addressed
Pre-commencement works including demolition and removal of existing rural structures; site remediation works (as defined within the Remediation Action Plan); and heritage salvage works (if applicable).	Master CEMP (Stage 1 – BEW & Infrastructure)

Stage 1 Development of AIE – Stage 1	Where Addressed
Subdivision construction works including: Creation of roads and access infrastructure, including a signalised intersection with Mamre Road. Clearing of existing vegetation on the subject site and associated dam dewatering and decommissioning. Realignment of existing creek and planting in accordance with a Vegetation Management Plan. On-site bulk earthworks including any required ground dewatering. Importation, placement and compaction of fill as per the Fill Importation Protocol (FIP) (Arcadis 2020a). Construction of boundary retaining walls. Delivery of stormwater infrastructure, trunk service connections, utility infrastructure. Boundary stormwater management, fencing and landscaping. Construction and dedication of internal road network to Penrith City Council. Construction and operation of signalised intersection with Mamre Road.	Master CEMP (Stage 1 – BEW & Infrastructure)
Building works including the construction and fit out of two warehouse and distribution buildings on Lots 1 and 3,(see **Figure 3**).	This CEMP (Stage 1 – Building Works Lot 1) Separate CEMP (Stage 1 - Building Works Lot 3)
Subdivision of Stage 1	Master CEMP (Stage 1 – BEW & Infrastructure)
Signage	Master CEMP (Stage 1 – BEW & Infrastructure)

Future stages of the Estate, including subsequent industrial or warehouse distribution centres buildings, will be confirmed as tenants are secured and will be subject to separate development applications.

1.2 Lot 1 Sub Plan

This CEMP is a sub plan to the Master CEMP for Lot 1. Building works involve the construction and fit out of warehouses and distribution buildings on Lot 1 and construction and fit out of a café at Lot 1, including:

- Detailed on-lot earthworks to refine final levels and establish final building pads;
- On-lot stormwater and utility infrastructure and services connection;
- Construction of warehouse building as shown on the Stage 1 Architectural Plans;
- Fit out of buildings as shown on Stage 1 Architectural Plans, including standard racking and office fit out; and
- Landscaping of development sites in accordance with Stage 1 Landscape Plans.

Source: Urbis EIS 2020

Figure 1 Regional Locality

Source: Urbis RtS 2021

Figure 2 AIE Masterplan

Source: Site Image Landscape Architects RtS 2021

Figure 3 Stage 1

Figure 4 Staging Plan

1.3 CEMP Context

This CEMP has been prepared to address the specific requirements of SSD 10448 and in consideration of the *Guideline for the Preparation of Environmental Management Plans* (Department of Infrastructure, Planning and Natural Resources 2004).

It is noted again that this CEMP has been prepared to cover only Stage 1 – Building Works for Lot 1. Stage 1 - BEW & Infrastructure is covered in the Master CEMP and Stage 1 – Building Works for Lot 3 will be covered in a separate CEMP, as outlined in **Section 1.1** and **Table 1** above.

This CEMP contains the following key components:

- A description of the construction activities to be undertaken on site, including construction staging and timing;
- Environmental management framework, including key contacts, roles and responsibilities, and regulatory requirements;
- Environmental management commitments and responsibilities;
- Monitoring, inspections and reporting requirements;
- Complaints management strategy;
- Environmental incident management strategy; and
- Inclusion of specialist management plans and protocols, listed below:
  - Construction Traffic Management Plan (CTMP);
  - Soil and Water Management Plan (including Erosion and Sediment Control Plan);
  - Salinity Management Plan (SMP);
  - Construction Noise and Vibration Management Plan (CNVMP);
  - Construction Air Quality Management Plan (CAQMP);
  - Vegetation Management Plan (VMP);
  - Unexpected Finds Protocol – Contamination (UFP – Contamination);
  - Waste Management Plan (WMP);
  - Community Consultation and Complaints Handling Strategy (CCCHS)
  - Flora and Fauna Management Plan (FFMP);
  - Groundwater Management Plan (GWP); and
  - Unexpected Finds Protocol – Heritage (UFP – Heritage).

The CEMP and specialist management plans will be reviewed, implemented, and monitored together as an integrated suite of documents.

The CEMP will be reviewed by an independent Environmental Representative (ER) to ensure it is consistent with the requirements in or under the Consent for SSD10448. The ER will make a written statement to this effect before the submission of the CEMP to the Planning Secretary.

1.3.1 Scope

This CEMP has been prepared to satisfy Conditions E1, E2, E3 and E4 of SSD 10448. The specific requirements of these consent conditions, along with where these requirements have been addressed within this CEMP, are listed in **Table 2**. In addition to this, all conditions of consent relevant to this CEMP are attached at **Appendix B**, including reference to where they have been addressed.

Table 2 CEMP Conditions Review

SSD 10448 Consent Condition	CEMP Section
E1. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	Section 1.3
(a) detailed baseline data;	Appended Management Plans
(b) details of: (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 3.3
(ii) any relevant limits or performance measures and criteria; and	Appended Management Plans
(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Appended Management Plans
(c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Section 4 Appended Management Plans
(d) a program to monitor and report on the: (i) impacts and environmental performance of the development; and (ii) effectiveness of the management measures set out pursuant to paragraph (c) above;	Section 5 Appended Management Plans
(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 5.2
(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 6
(g) a protocol for managing and reporting any: (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria); (ii) complaint; (iii) failure to comply with statutory requirements; and	Section 5.1
(h) a protocol for periodic review of the plan.	Section 6
Note: the Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans	Noted
E2. The Applicant must prepare a Construction Environmental Management Plan (CEMP) in accordance with the requirements of condition E1 and to the satisfaction of the Planning Secretary.	This Plan, refer to Condition E1 cross references above

SSD 10448 Consent Condition	CEMP Section
E3. As part of the CEMP required under condition E2 of this consent, the Applicant must include the following:	-
(a) Construction Traffic Management Plan (see condition D1);	Section 4.5 Appendix I
(b) Erosion and Sediment Control Plan (see condition D25);	Section 4.6 Appendix J (Attachment A)
(c) Salinity Management Plan (see condition D33);	Section 4.6 Appendix K
(d) Construction Noise Management Plan (see condition D44);	Section 4.2 Appendix G
(e) Construction Air Quality Management Plan (see condition 56);	Section 4.4 Appendix H
(f) Vegetation Management Plan (see Condition 69)	Sections 4.8 Appendix N
(g) Contamination Unexpected finds procedure (see Condition 77);	Section 4.11 Appendix Q
(h) Waste Management Plan (see condition 75); and	Section 4.7 Appendix M
(i) Community Consultation and Complaints Handling.	Section 4.13 Appendix F
E4. The Applicant must:	-
(a) not commence construction of the development until the CEMP is approved by the Planning Secretary; and	This CEMP and appended management plans will be referred to the Secretary for approval
(b) carry out the construction of the development in accordance with the CEMP approved by the Planning Secretary and as revised and approved by the Planning Secretary from time to time.	Noted

It is also noted that Mirvac, the construction contractor and any engaged subcontractors shall at all times operate in compliance with Condition C1 of SSD10448 which reads:

In addition to meeting the specific performance measures and criteria in this consent, all reasonable and feasible measures must be implemented to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction and operation of the Stage 1 Development, and any rehabilitation required under this consent.

1.3.2 Objectives

The objectives of this CEMP are to:

- Establish the framework for managing and mitigating the potential for adverse environmental impacts as a result of the construction of Stage 1 – Building Works for Lot 1;
- Clearly and concisely document the commitments made in the EIS (Urbris 2020) and Response to Submissions (RTS) (Urbis 2021), including relevant management plans, that are required to be implemented with during construction;
- Demonstrate to DPE how the applicant proposes to meet all of its regulatory obligations including those outlined in the Conditions of Consent;
- Outline the controls to be implemented by the contractor to meet those obligations;
- Clearly and concisely document the conditions imposed by SSD 10448 that are required to be implemented and/or complied with during the construction phase; and
- Assist to establish Stage 1 – Building Works for Lot 1 in a manner that avoids (where possible) or minimises impact to the surrounding environment and community.

1.3.3 Preparation

This CEMP has been prepared by SLR Consulting (Australia) Pty Ltd (SLR). SLR provides global environmental and advisory solutions from a network of offices in Asia-Pacific, Europe, North America and Africa. Author qualifications are listed in **Table 3** below:

Table 3 Author Qualifications

Name, Role & Division	Qualifications	Experience
Alanna Ryan Principal Consultant Environmental Assessment & Management	B Env Sc Grad Cert Community Relations	Alanna is a Principal Environmental Consultant with over 15 years experience in industry. Experience Alanna has includes Environmental Management Systems (incorporating risk assessment/management, strategies, management plans, inspections and auditing) and statutory reporting.

Name, Role & Division	Qualifications	Experience
Drew Williams Senior Project Consultant – Environmental Assessment & Management	B. EnvSc, DIP. Arch	Drew is a Senior Project Consultant with over 7 years industry experience in the mining and continuous manufacturing sectors. Drew has worked across 2 large scale open cut coal mines in the Hunter Valley and an Ammonium Nitrate manufacturing facility in Newcastle NSW. Drew has gained a wealth of experience during his various environmental management roles including environmental compliance, environmental reporting, environmental monitoring, environmental management systems, contaminated land management, waste management, erosion and sediment control design and project management, heritage management, disturbance approvals, contractor management, licencing and approvals. Since starting with SLR Consulting, Drew has gained experience in a wide range of environmental projects and aspects.

1.3.4 Consultation

In accordance with SSD 10448, consultation has been undertaken with the applicable stakeholders which is summarised in **Table 4**, and documentation attached at **Appendix C**.

Table 4 Consultation

Condition	Comment
Staging Plan A10. Prior to the commencement of construction of any stage of the Concept Proposal, the Applicant shall prepare a Staging Plan for the Development, to the satisfaction of the Planning Secretary. The plan shall: a) be prepared in consultation with Council, utility and service providers and other relevant stakeholders; …	In accordance with Condition A1, Mirvac developed a staging Plan and has consulted with the relevant parties required under the relevant CEMP sub-management plan conditions. Correspondence from DPIE confirming no further consultation is required was received 23/11/2022.
Evidence of Consultation A18. Where conditions of this consent require consultation with an identified party, the Applicant must: (a) consult with the relevant party prior to submitting the subject document to the Planning Secretary for approval; and (b) provide details of the consultation undertaken including: (i) the outcome of that consultation, matters resolved and unresolved; and (ii) details of any disagreement remaining between the party consulted and the Applicant and how the Applicant has addressed the matters not resolved.	**CEMP Consultation**: In accordance with Condition C8, Mirvac has consulted with relevant parties required under the relevant CEMP sub-management plan conditions. A copy of this consultation including any matters resolved or unresolved is attached at **Appendix C**. **General consultation**: Consultation required under the conditions of consent will be undertaken by the Applicant or the Applicant's representative and provide a minimum of 10 business days' consultation period. Details of this consultation will be provided to the Planning Secretary in accordance with Condition C8(b) prior to submitting any documentation to the Planning Secretary in accordance with Condition C8(a).

Condition	Comment
Notification of Commencement C7. The date of commencement of each of the following phases of the Stage 1 Development must be notified to the Department in writing, at least one month before that date: (a) construction; and (b) operation.	Noted – The Applicant will notify The Department in writing of the intended commencement date of construction within the prescribed timeframe.
Evidence of Consultation C8. Where conditions of this consent require consultation with an identified party, the Applicant must: (a) consult with the relevant party prior to submitting the subject document to the Planning Secretary for approval; and (b) provide details of the consultation undertaken including: (i) the outcome of that consultation, matters resolved and unresolved; and (ii) details of any disagreement remaining between the party consulted and the Applicant and how the Applicant has addressed the matters not resolved.	Consultation required under the conditions of consent will be undertaken by the Applicant or the Applicant's representative and will provide a minimum 10 business day consultation period. Details of this consultation will be provided to the Planning Secretary in accordance with Condition C8(b) prior to submitting any documentation to the Planning Secretary in accordance with Condition C8(a).
Protection of Public Infrastructure C12. Before the commencement of construction, the Applicant must: (a) consult with the relevant owner and provider of services that are likely to be affected by the Stage 1 Development to make suitable arrangements for access to, diversion, protection, and support of the affected infrastructure; (b) prepare a dilapidation report identifying the condition of all public infrastructure in the vicinity of the site (including roads, gutters, and footpaths); and (c) submit a copy of the dilapidation report to the Planning Secretary and TfNSW.	(a) The Applicant has undertaken dial before you dig investigations and detailed survey and potholing to confirm any services likely to be affected by the Stage 1 development. The applicant has made suitable arrangements for either access to, diversion of, protection, and support of any affected infrastructure which includes the following: - Endeavour Energy - Telstra / NBN - Jemena - TfNSW - Sydney Water - Penrith City Council - Landowner at 833B (in accordance with Condition D12) (b) A dilapidation report has been prepared in accordance with this condition. (c) **Planning Secretary:** Dilapidation report was uploaded to the Major Projects Portal on 02/06/2022 under Post Approval Document SSD-10448-PA-4. The Planning Secretary acknowledged receipt of the dilapidation report on 03/06/2022. **TfNSW:** Dilapidation report was provided to TfNSW via email on 02/06/2022. TfNSW acknowledged receipt on 02/06/2022.

Condition	Comment
External Walls and Cladding C24. Prior to the issue of: (a) any Construction Certificate relating to the construction of external walls (including the installation of finishes and claddings such as synthetic or aluminium composite panels); and (b) an Occupation Certificate, the Applicant must provide the Certifier with documented evidence that the products and systems proposed for use or used in the construction of external walls (including finishes and claddings such as synthetic or aluminium composite panels) comply with the requirements of the BCA. The Applicant must provide a copy of the documentation given to the Certifier to the Planning Secretary within seven days after the Certifier accepts it.	The Applicant will provide documented evidence to the Certifier and Planning Secretary in accordance with Condition C24.
Utilities and Services C28. Before the issue of a Subdivision or Construction Certificate for any stage of the development, the Applicant (whether or not a constitutional corporation) is to provide evidence, satisfactory to the Certifier, that arrangements have been made for: (a) the installation of fibre-ready facilities to all individual lots and/or premises in a real estate development project to enable fibre to be readily connected to any premises that is being or may be constructed on those lots; and (b) the provision of fixed-line telecommunications infrastructure in the fibre-ready facilities to all individual lots and/or premises in a real estate development project demonstrated through an agreement with a carrier.	The Applicant will provide evidence to the Certifier in accordance with Condition 28.

Condition	Comment
Environmental Representative C31. The Applicant must engage an Environmental Representative (ER) to oversee construction of the Stage 1 Development. Unless otherwise agreed to by the Planning Secretary, construction of the Stage 1 development must not commence until an ER has been approved by the Planning Secretary and engaged by the Applicant. The approved ER must: … e) review the CEMP required in Condition E2 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this consent and if so: (i) make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary); or (ii) make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary/Department for information or are not required to be submitted to the Planning Secretary/Department); … (j) attend the Mamre Road Precinct Working Group (see Condition C34) in a consultative role in relation to the environmental performance of the Stage 1 development; and …	This CEMP will be reviewed by the ER and a written statement will be provided to the Planning Secretary in accordance with Condition 31(e). ER will attend the Mamre Road Precinct Working Group (see Condition C34), as scheduled

Condition	Comment
Mamre Road Precinct Working Group C34. Within three months of the commencement of construction of the Stage 1 Development and until all components of the Stage 1 development are constructed and operational, the Applicant must establish and participate in a working group with relevant consent holders in the MRP, to the satisfaction of the Planning Secretary. The purpose of the working group is to consult and coordinate construction works within the MRP to assist with managing and mitigating potential cumulative environmental impacts. The working group must: (a) comprise at least one representative of the Applicant, the Applicant's ER, and relevant consent holders in the MRP; (b) meet periodically throughout the year to discuss, formulate and implement measures or strategies to improve monitoring, coordination of the approved industrial developments in the MRP; (c) regularly inform Council, TfNSW, Sydney Water and the Planning Secretary of the outcomes of these meetings and actions to be undertaken by the working group; (d) review the performance of approved industrial developments in the MRP and identify trends in the data with respect to cumulative construction traffic, erosion and sediment control, noise, stormwater management and waterway health objectives under the MRP DCP; (e) review community concerns or complaints with respect to environmental management; (f) identify interim traffic safety measures to manage construction traffic and how these measures will be coordinated, communicated, funded and monitored in the MRP; and (g) provide the Planning Secretary with an update and strategies, if a review under subclause (d) and (e) identifies additional measures and processes are required to be implemented by the working group. C35. Three (3) months prior to completion of construction of all components of the Stage 1 development, the Applicant is eligible to exit the working group required under condition C34. The Applicant must: (a) consult with the Planning Secretary; (b) provide confirmation that all components of the Stage 1 development are operational; and (c) advise on the date of the proposed exit.	The Project Principal and ER have been nominated as responsible for attending and representing the Stage 1 Development at the Mamre Road Precinct Working Group (MRPWG) and will execute all responsibilities as they relate to the Stage 1 Development within Conditions C34 and C35 from commencement to completion of construction. Mirvac have commenced preparation of a protocol for the establishment and facilitation of the Mamre Road Precinct Working Group (MRPWG) to be implemented within three months of the commencement of construction (See MRPWG Protocol at **Appendix R**).

Condition	Comment
Construction Traffic Management Plan D1. Prior to the commencement of construction of the Stage 1 Development, the Applicant must prepare a Construction Traffic Management Plan (CTMP) for the development to the satisfaction of the Planning Secretary. The plan must form part of the CEMP required by condition E2 and must: (a) be prepared by a suitably qualified and experienced person(s); (b) be prepared in consultation with Council and TfNSW; …	Undertaken as part of the Construction Traffic Management Plan (see Appendix I).
Access Arrangements D10. Prior to the commencement of construction of any works (excluding bulk earthworks) for Buildings 1 or 3, the Applicant must submit design plans to the satisfaction of the relevant roads authority, which demonstrates the proposed accesses to the development are designed to accommodate the turning path of a 30 m PBS Level 2 vehicle. D11. Prior to the commencement of any construction works (excluding bulk earthworks) for Warehouse 1 as described in the EIS, the Applicant must prepare and submit design plans in consultation with TfNSW, FRNSW, and Council, and to the satisfaction of the Planning Secretary, demonstrating access to the development from Access Road 1 complies with relevant FRNSW and TfNSW access requirements.	Consultation required under the conditions of consent will be undertaken by the Applicant or the Applicant's representative and will provide a minimum 10 business day consultation period. Details of this consultation will be provided to the Planning Secretary in accordance with Condition C8(b) prior to submitting any documentation to the Planning Secretary in accordance with Condition C8(a).
Stormwater Management Plan D30. Within three (3) months prior to the commencement of operation of either Building 1 or 3 of the Stage 1 Development, the Applicant must prepare a Stormwater Management Plan (SMP) to the satisfaction of the Planning Secretary. The SMP must: (a) be prepared by a suitably qualified chartered professional engineer with experience in modelling, design, and supervision of WSUD systems whose appointment has been endorsed by the Planning Secretary; (b) be prepared in consultation with the Environment and Heritage, Sydney Water, DPE, and Council;	The requirements under Condition D30 will be satisfied prior to the commencement of operation of Building 1 of the Stage 1 development.
Biodiversity D67. The Applicant must provide the Planning Secretary with evidence that: a) the retirement of ecosystem credits has been completed (see Condition D65); or b) a payment has been made to the Biodiversity Conservation Fund (see Condition D66), prior to undertaking any clearing of native vegetation and *Myotis macropus* habitat.	Noted – The Applicant has provided evidence of completed credit retirement and payment to the Planning Secretary prior to the undertaking of any clearing of native vegetation and *Myotis macropus* habitat.

2 Development Description

2.1 Location

AIE is located at 788-864 Mamre Road, Kemps Creek, and is legally described as Lots 54 - 58 DP 259135 in the Mamre Road Precinct within the broader WSEA, which falls within the Penrith LGA. AIE is approximately 56.3 hectares, and is located approximately 6.5km north-east of the future Western Sydney International (Nancy-Bird Walton) Airport (WSA), 13.5km south-east of the Penrith CBD and 40km west of the Sydney CBD.

The site is bound by rural land uses. The site is bound by Mamre Road to the west and agricultural uses to the north, south and east. The historic land uses on the site include rural residential, grazing, dairy farming, poultry farming and horticulture. This land has been rezoned to facilitate future employment with the Mamre Road Precinct.

Lot 1 is located in the north-west corner of the AIE, representing the gateway to the estate. Lot 1 is primarily accessed via Access Road 01 with a secondary access via Access Road 02.

2.2 Construction Staging and Activities

In accordance with the approved Staging Plan, dated 17th June 2022 required by Conditions A10 and A19, Schedule 2 of SSD 10448, AIE – Stage 1 includes the following works:

- **Bulk Earthworks (BEW) & Infrastructure**: Estate-wide earthworks, infrastructure and services; and
- **Building Works**: Construction and use of warehouse and distribution centre buildings proposed in Lots 1 and 3.

Stage 1 – Building Works for Lot 1 consists of the construction and fit out of a warehouse and distribution building on Lot 1 and the construction and fit out of a café. Stage 1 is illustrated in **Figure 2.**

Table 5 summarises key aspects of the construction stages:

Table 5 Construction Staging and Activities

Stage	Indicative Dates	Indicative Duration	Activities
Stage 1 – Building Works (Lot 1)	January 2023	12-18 months	Warehouse / Lot 1 construction and fit out

All works will be undertaken in accordance with the Approved Development Consent SSD 10448.

2.3 Construction Hours

Construction hours will be in accordance with Conditions D41 and D42 of Development Consent SSD 10448, which are reproduced below:

D41. The Applicant must comply with the hours detailed in Table 4, unless otherwise agreed in writing by the Planning Secretary.

Table 4 Hours of Work

Activity	Day	Time
Earthworks and construction	Monday – Friday Saturday	7 am to 6 pm 8 am to 1 pm
Operation	Monday – Sunday	24 hours

D42. Works outside of the hours identified in condition may be undertaken in the following circumstances:

(a) works that are inaudible at the nearest sensitive receivers;

(b) works agreed to in writing by the Planning Secretary;

(c) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or

(d) where it is required in an emergency to avoid the loss of lives, property or to prevent environmental harm.

The construction hours will be provided to all staff and contractors in the induction (see **Section 3.4.1**). The movements of staff and contractors will be recorded for this project (see **Section 5.1**).

2.4 Construction Site Access

All construction vehicles for the AIE stage 1 will enter and depart the site from / to Mamre Road via a temporary access driveway, which will be constructed on the alignment of the future Access Road. It is anticipated that the largest vehicle accessing the site will be a 20m Articulated Vehicle (AV), which the temporary driveway will be designed for.

Further, in accordance with the Construction Traffic Management Plan (CTMP) (Ason 2022), construction management protocols require that vehicles entering the site access road will have right of way in order to ensure that there is no queuing on Mamre Road.

It is anticipated that for the first stages of construction (at least), access to and from the site onto Mamre Road will be restricted to left-in and left-out movements until the signalised intersection becomes operational.

Site access is detailed within **Figure 5** below.

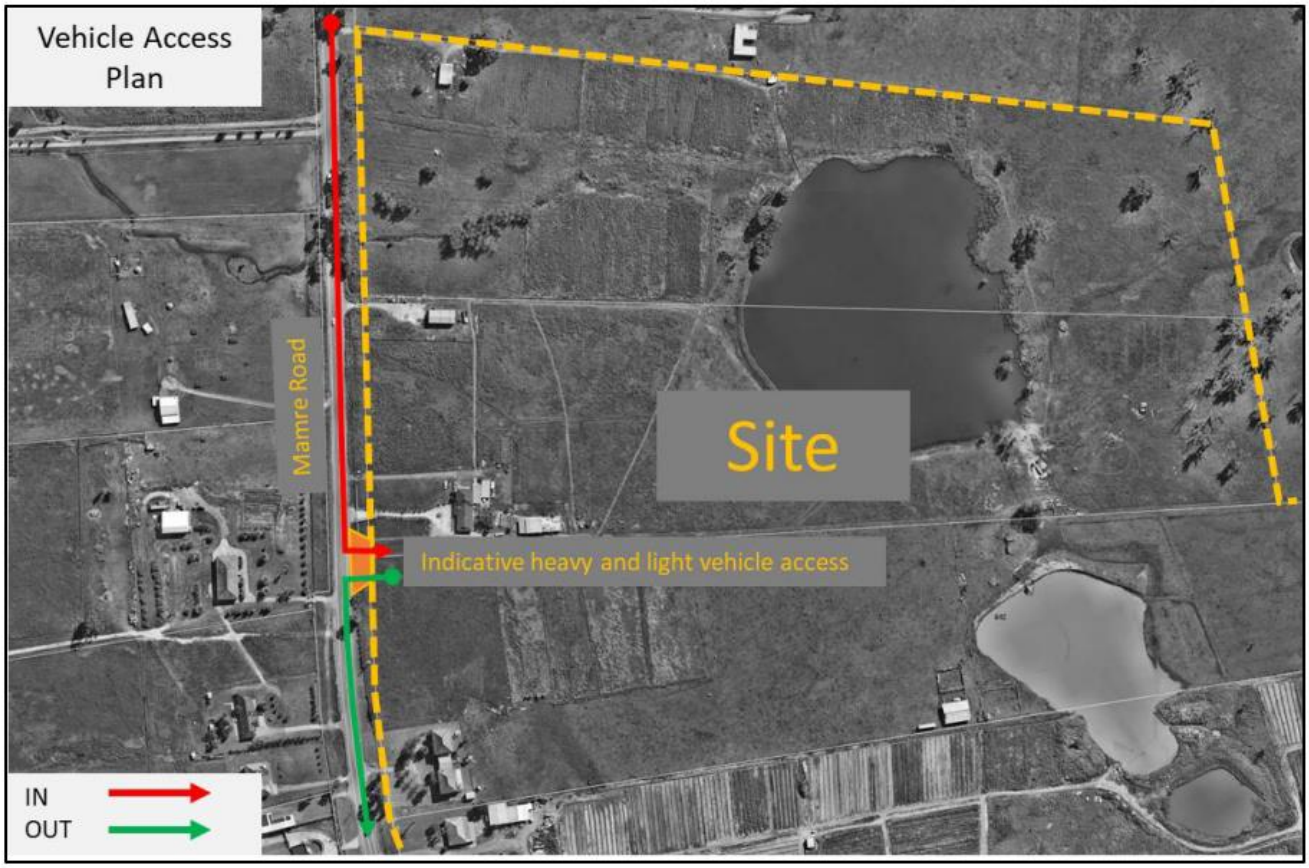

Figure 5 Site Entry Movements

2.5 Construction Contact Details

Table 6 lists the key contacts during the construction of Stage 1 – Building Works for Lot 1.

Table 6 Construction Contact List

Role	Name	Company	Contact Details
Project Principal	Daniel Brook	Mirvac	daniel.brook@mirvac.com 0421 128 584
Contractor's Project Manager	Dean Quarisa	Richard Crookes Constructions	quarisad@richardcrookes.com.au 0437 405 636
Contractor's Environmental Advisor	Vesna Kocovic	Richard Crookes Constructions	Kocovicv@richardcrookes.com.au 0499 568 905
Contractor Work Health and Safety (WHS) Coordinator	Mark Mackey	Richard Crookes Constructions	mackeym@richardcrookes.com.au 0428 145 220
Project Environmental Representative	Maurice Pignatelli	OptimeE	0407 493 176 maurice@optimenv.com.au
Principal's Environmental Consultant (PEC)	Carl Vincent	ERSED	0424 203 046 carl.vincent@ersed.com.au
Communications and Community Liaison Representative	Alanna Ryan	SLR Consulting	02 4037 3258 aryan@slrconsulting.com

3 Environmental Management Framework

3.1 Environmental Management Policy

Richard Crookes Constructions (RCC), and all sub-contractors engaged by RCC, will implement their Environmental Policy throughout the duration of construction. A copy of the Environmental Policy is attached as **Appendix D**.

3.2 Roles and Responsibilities

The Construction Contractor for Stage 1 – Building Works for Lot 1 is Richard Crookes Constructions (RCC), and all sub-contractors engaged by RCC.

The Construction Contractor will review, implement and monitor this CEMP and specialist management plans together as an integrated suite of documents.

The key personnel responsible for environmental management during construction of Stage 1 – Building Works for Lot 1 are listed in **Table 7**

Table 7 Personnel Responsible for Environmental Management

Role	Responsibilities
Project Principal	• Environmental reporting responsibility associated with the development. • Overall responsibility for environmental management and compliance with SSD 10448 and relevant legislation; • Liaise with the Proponent to keep them informed of the project's progress; • Record, notify, investigate and respond to any environmental incidents and, where necessary, develop and implement corrective actions; • Consult and engage with any subcontractors or interfacing contractors regarding the environmental management of the Site; • Attend the Environmental Review Group (ERG) meetings; and • Provide adequate environmental inductions/training to employees and contractors regarding their requirements under this CEMP. • Provide Project Environmental Representative (ER) with all documentation requested by the ER in order for the ER to perform their functions specified below and a copy of any assessment carried out by the Applicant of whether proposed work is consistent with the consent (which must be provided to the ER before the commencement of the subject work) • Attend the Mamre Road Precinct Working Group in a representative role in relation to the Stage 1 development.
Contractor's Project Manager	• All the responsibilities attributed to the Construction Contractor throughout this CEMP. • Environmental reporting responsibility associated with the development. • ensuring that the appropriate management response and handling procedures are instigated and carried through in the event of an incident and/or non-compliance.

Role	Responsibilities
Contractor's Environmental Advisor	• Assist the contractor to execute the responsibilities attributed to the Construction Contractor throughout this CEMP; • Provide guidance and assistance to the Contractor regarding the environmental reporting responsibilities associated with the development; • Guide the contractor to ensure that the appropriate management response and handling procedures are instigated and carried through in the event of an incident and/or non-compliance.

Project Environmental Representative	• Be a suitably qualified and experienced person who was not involved in the preparation of the EIS, RtS, ADR, and any additional information for the Stage 1 Development and is independent from the design and construction personnel for the Stage 1 Development.
	• Receive and respond to communication from the Planning Secretary in relation to the environmental performance of the Stage 1 development.
	• Consider and inform the Planning Secretary on matters specified in the terms of this consent.
	• Consider and recommend to the Applicant any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community.
	• Review the CEMP required in Condition E2 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this consent and if so:
	  • make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary) or
	  • make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary/Department for information or are not required to be submitted to the Planning Secretary/Department).
	• Regularly monitor the implementation of the CEMP to ensure implementation is being carried out in accordance with the document and the terms of this consent.
	• As may be requested by the Planning Secretary, help plan, attend, or undertake audits of the development commissioned by the Department including scoping audits, programming audits, briefings, and site visits.
	• As may be requested by the Planning Secretary, assist the Department in the resolution of community complaints.
	• Provide advice to the Applicant on the management and coordination of construction works on the site with adjoining sites in the Mamre Road Precinct in relation to construction traffic management, earthworks and sediment control and noise.
	• Prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an Environmental Representative Quarterly Report providing the information set out in the Environmental Representative Protocol under the heading 'Environmental Representative Quarterly Reports'. The Environmental Representative Quarterly Report must be submitted within seven calendar days following the end of each quarter for the duration of the ER's engagement for the development, or as otherwise agreed with the Planning Secretary
	• Attend the Mamre Road Precinct Working Group in a consultative role in relation to the environmental performance of the Stage 1 development.

Role	Responsibilities
Contractor's WHS Coordinator	• Ensure the legislative and corporate safety, health and environment management measures and controls are implemented and maintained; • Participate in risk and hazard identification and control; • Participate in incident investigations and management; and • Participate in health and safety inspections.
Principal's Environmental Consultant (PEC)	• Provide the Principal advice and guidance relating to Environmental reporting responsibilities associated with the development; • Provide the Principal advice and guidance relating to environmental management and compliance with SSD 10448 and relevant legislation; • Assist the Principal in providing the Project Environmental Representative (ER) with all documentation requested by the ER in order for the ER to perform their functions; • Provide guidance for the reporting, notification, investigation and response to any environmental incidents and, where necessary, develop and implement corrective actions; • Providing advice to the Principal in relation to any subcontractors or interfacing contractors regarding the environmental management of the Site.
Communications and Community Liaison Representative	• Lead and manage the community involvement activities, including liaison with property owners and key stakeholders; • Be the primary daily contact to the public handling of enquiries / complaints management / interface issues; • Maintain the complaints register and make available the complaints register to the ER on a daily basis. • Be available for contact by local residents and the community at all reasonable times to answer any questions; • Liaise with property owners to co-ordinate access and to deal with specific property related issues arising from the upgrade works; • Lead the delivery of communication and community engagement strategies and plans; • Facilitate meetings, forums and arranging interviews to address concerns from community; • Provide advice and participate with the project teams to improve and enhance the delivery of communication services to the community; • Build, maintain collaborative and consultative working relationships with internal and external stakeholders; and • Be available for contact by local residents, key stakeholders and community representatives to answer queries and provide more information or feedback.
All employees, contractors and subcontractors	• Ensure familiarity, implementation and compliance with this CEMP and appended management plans; • Support the Proponent's commitment to sustainability, environmental management and compliance; • Work in a manner that will not harm the environment or impact on surrounding receptors; • Report all environmental incidents, non-compliances and complaints to the Project Manager without delay; • Immediately notify the Contractor's Project Manager of any hazard or potential hazard that may result in an incident and/or non-compliance, regardless of the nature or scale; • Take immediate action (where it is safe to do so) to prevent, stop, contain and/or minimise any adverse impact associated with an incident and/or non-compliance; and • Report any inappropriate construction practices and/or environmental management practices to the Project Manager without delay.

3.3 Statutory Requirements

3.3.1 SSD 10448

The Development will be constructed in accordance with Condition C2 of SSD 10448, The Development will be carried out:

(a) in compliance with the conditions of the Development Consent;

(b) in accordance with all written directions of the Planning Secretary;

(c) in accordance with the EIS (Urbis, 2020), the Response to Submissions (Urbis 2021) and Additional Development Report (Urbis 2022);

(d) in accordance with the Modification Assessments;

(e) in accordance with the Development Layout attached to the Development Consent at Appendix 2; and

(f) in accordance with the management and mitigation measures attached to the Development Consent at Appendix 4.

In accordance with Condition C3 of SSD 10448, consistent with the requirements of the Development Consent, the Planning Secretary may make written directions to Mirvac in relation to:

(a) the content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this consent, including those that are required to be, and have been, approved by the Planning Secretary; and

(b) the implementation of any actions or measures contained in any such document referred to in condition C2(a) of the Development Consent.

In accordance with Condition C4 of SSD 10448, the conditions of this consent and directions of the Planning Secretary prevail to the extent of any inconsistency, ambiguity or conflict between them and a document listed in condition C2(c) or C2(e). In the event of an inconsistency, ambiguity or conflict between any of the documents listed in condition C2(c) or C2(e), the most recent document prevails to the extent of the inconsistency, ambiguity or conflict.The Project Manager will be notified if any inconsistencies are identified.

SSD 10448 imposes a number of environmental performance and management requirements applicable to the construction of Stage 1 – Building Works for Lot 1.

A copy of the Consent for SSD 10448 is attached at **Appendix A** and all conditions of consent relevant to this CEMP are attached at **Appendix B**.

3.3.2 Other licences, permits, approvals and consents

Table 8 summarises the additional licences, permits, approvals and consents required throughout these works. This information has been summarised from the SSD 10448 Consent Conditions, the EIS (Urbis 2020), and contributions from Mirvac. It is the Construction Contractor's responsibility to ensure that any license, permit, approvals listed in (but not limited to) **Table 8,** has been obtained in the required timeframe.

A current list of licences, permits, approvals and consents, and their status, including any new additions as the project progresses, will be included in the Construction Contractor's monthly report to Mirvac.

It is noted that an Environment Protection Licence (EPL) is not required, although the EPA have advised that if any future tenancies involve a scheduled activity pursuant to the POEO Act, an EPL would be required prior to undertaking the activity (NSW DPE 2022).

Table 8 Other licences, permits, approvals and consents

Licence, permit, approval or consent	Person Responsible	Timing	References / Notes
All licences, permits, approvals and consents as required by law must be obtained and maintained as required for the development. No condition of this consent removes any obligation to obtain, renew or comply with such licences, permits, approvals and consent.	Mirvac, Construction Contractor	Ongoing	SSD 10448 Condition AN1
Relevant approvals obtained from Endeavour Energy, or relevant service provider.	Construction Contractor	Prior to the construction of any electricity utility works to service each stage of the development	SSD 10448 Condition B17
Construction and occupation certificates for the proposed building works obtained.	Construction Contractor	Prior to construction/occupation	SSD 10448 C15
Documented evidence that the products and systems proposed for use or used in the construction of external walls (including finishes and claddings such as synthetic or aluminium composite panels) comply with the requirements of the BCA.	Construction Contractor	Prior to the issue of the Construction Certificate	SSD 10448 C24
All relevant approvals from utility service providers.	Mirvac, Construction Contractor	Before construction of any utility works	SSD 10448 Condition C26
A Compliance Certificate for water and sewerage infrastructure servicing at the site will be obtained.	Mirvac, Construction Contractor	Before the commencement of operation	SSD 10448 Condition C27
Evidence to the Certifier that arrangements have been made for: (a) the installation of fibre-ready facilities to all individual lots … (b) the provision of fixed-line telecommunications infrastructure in the fibre-ready facilities to all individual lots …	Construction Contractor	Prior to the issue of the Construction Certificate	SSD 10448 Condition C28.
Evidence from the carrier that the fibre ready facilities are fit for purpose.	Mirvac, Construction Contractor	Before final Occupation Certificate issued	SSD 10448 Condition C29
Works-as-executed drawings signed by a registered surveyor demonstrating that the stormwater drainage and finished ground levels have been constructed as approved	Construction Contractor	Before final Occupation Certificate issued	SSD 10448 Condition 30

Licence, permit, approval or consent	Person Responsible	Timing	References / Notes
The Applicant must construct and operate the Stage 1 Phase 1 road works shown in **Figure 4:** in **Appendix 2 of SSD 10448** to the satisfaction of relevant road authority.	Construction Contractor (Mirvac for operation)	Prior to issue of an Occupation Certificate for Building 1 or 3 (whichever is first)	SSD 10448 Condition D6
A Road Occupancy Licence (ROL) must be obtained from TfNSW Transport Management Centre for any works that may impact on traffic flows on Mamre Road during construction.	Construction Contractor	Prior to works that may impact on traffic flows on Mamre Road during construction.	SSD 10448 Condition D15
D67. The Applicant must provide the Planning Secretary with evidence that: c) the retirement of ecosystem credits has been completed (see Condition D65); or d) a payment has been made to the Biodiversity Conservation Fund (see Condition D66)	Mirvac	Prior to undertaking any clearing of native vegetation and *Myotis macropus* habitat.	SSD 10448 Condition D67
D73. Agreement from Council obtained for the design of the waste storage area for each warehouse.	Construction Contractor	Prior to the commencement of construction of Building 1 and 2	SSD 10448 Condition 73
If fauna is to be relocated on site, the following permit would be required to be held by the contractor relocation the fauna: ▪ Catch and Release Licence - Biodiversity Conservation Act 2016 (for possums and reptiles).	Construction Contractor	During fauna relocation	EIS Section 5.6.3

3.4 Inductions and Environmental Training

The Contractor's Project Manager will ensure that all employees and contractors involved in the project are appropriately inducted and trained prior to commencing work on site. Training in relation to environmental responsibilities and implementation of this CEMP will take place initially through the site induction training and then on an ongoing basis through 'toolbox talks' (or similar).

All employees, contractors (and their sub-contractors) conducting environmental training and site staff assigning work activities will demonstrate that they are competent and appropriately trained to train and manage construction site specific environmental issues.

Inductions and Training will meet the objectives of Condition C19 of SSD 10448, which is to eensure that all employees, contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the SSD 10448 Consent Conditions relevant to activities they carry out in respect of the development.

A register of all environmental training carried out, including dates, names of persons trained, and trainer name and qualification details will be established and maintained for the duration of works.

3.4.1 Environmental Induction Training

The environmental induction training will cover all elements of the CEMP and will include, as a minimum, the following:

Table 9 Environmental Induction Training

Inductions and Environmental Training	Reference / Notes
Purpose and objectives of the CEMP	Section 1.2
Obligation to minimise harm to the environment	Section 1.2.1
Hours of Construction	Section 2.3
Requirements of due diligence and duty of care	Section 3.1
Conditions of any environmental licences, permits and consent approvals	Section 3.3
Potential environmental emergencies on site and the emergency response procedures (including the Emergency Spill Response Plan), locations and training in the use of emergency spill kits for spills on water and on land	Section 3.5 and Section 4
Reporting, and notification and management requirements for pollution, contamination and other environmental incidents, and for damage and maintenance to environmental controls	Section 3.5 and 5.1
High-risk activities and associated environmental safeguards i.e. earthworks, vegetation clearing, night works, operation and maintenance of concrete washouts, and washing, refuelling and maintenance of plant and equipment	Section 4
Location of reuse bins, washing, refuelling and maintenance of vehicles, plant and equipment	Section 4
Noise, vibration, and air quality management controls	Section 4.2, 4.3 and 4.4
Drivers' code of Conduct	Section 4.5
Construction Traffic Management including permitted access routes to and from the construction site for all vehicles, as well as standard environmental, work, health and safety (WHS), driver protocols and emergency procedures.	Section 4.5
Sound erosion and sediment control practices, water quality controls and sediment basin management	Section 4.6
Waste minimisation principles	Section 4.7
Stop work protocol in the event of the discovery of Aboriginal or Historic item or object of significance	Section 4.10
Induction requirements as per the UFP – Contamination	Section 4.11
When there is a risk of fire being caused by work such as welding, thermal or oxygen cutting, heating or other fire producing or spark producing operations or when burning off is proposed, training will be provided to all personnel in fire prevention, fire safety and basic firefighting skills.	Section 4.12

3.4.2 Toolbox Talks

Toolbox talks or similar will be held to identify environmental issues and controls when works commence in a new area of the site or a new activity, as well as when environmental issues arise on site. The toolbox talk will include but not be limited to:

- A description of the activity and the area;
- Identification of the environmental issues and risks for the area (including fauna or flora); and
- Outline the mitigations measures for the works and the area (see **Section 4**).

3.5 Incident and Non-Compliance Response and Handling Procedure

For the purposes of this CEMP, SSD 10448 describes an 'incident' as an occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance. SSD 10448 describes a 'non-compliance' as an occurrence, set of circumstances or development that is a breach of the consent.

Material Harm is defined within SSD 10448 as harm that:

(a) *involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial, or*

(b) *(b) results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)*

Table 10 below summarises the required notification timeframes and responsible parties for incident and/or non compliance notification with further details provided within this section at the provided Cross Reference(s).

Table 10 Material Harm Incident and Non Compliance Notification

Notification Requirement	Responsible	Timeframe	Reference
Incidents			
Upon awareness of an incident, the Contractors Project Manager shall be notified of and provided with all relevant information pertaining to the potential or actual incident.	Any person engaged as an employee or undertaking an activity with regard to Stage 1 – Building Works for Lot 1	Immediately after becoming aware of a potential or actual incident	CEMP 3.5.2
The Contractor's Project Manager will notify Mirvac of any incident including all relevant information pertaining to the incident.	Contractor's Project Manager	Immediately after becoming aware of a potential or actual incident	CEMP 3.5.2
Mirvac will notify DPE of an incident in writing via the Major Projects Website.	Mirvac	Immediately	CEMP 3.5.1.2
An Event Notification Report will be completed and provided to Mirvac. This is attached to this CEMP as **Appendix E**.	Contractor's Project Manager	Within 24 hours	Appendix E
Mirvac will provide a formal written notification of an incident to DPE via the Major Projects Website.	Mirvac	Within 7 days after becoming aware of incident	CEMP 3.5.1.2
Mirvac will provide DPE and any relevant public authorities a detailed report on the incident	Mirvac	Within 30 days of the incident occurring or as otherwise agreed to by the Planning Secretary	CEMP 3.5.1.1 & 3.5.1.2
Non-Compliance			
Provide written notification of the non-compliance to the Major Projects website.	Mirvac	Within 7 days after becoming aware of non-compliance	CEMP 3.5.1.3

3.5.1 Notification Requirements

3.5.1.1 Under the Protection of the Environment Operations Act 1997 (POEO Act)

Notification responsibilities for incidents that have caused or threatened to cause material harm to the environment are also detailed in Section 148 of the POEO Act. In summary, these are broadly categorised as:

Duty of an employee or any person undertaking an activity:

Any person engaged as an employee or undertaking an activity with regard to Stage 1 – Building Works for Lot 1 will, immediately after becoming aware of any potential incident (even if outside of normal business hours), notify the Contractor's Project Manager who will notify Mirvac of the incident and all relevant information about it. The Contractor's Project Manager will be available 24 hours a day, seven days a week and have the authority to stop or direct works.

Duty of an employer or occupier of the premises to notify:

The employer or occupier of the premises (in this case Mirvac) on which the incident occurred, who is notified (or otherwise becomes aware of) of the incident, will immediately notify the relevant authorities about the incident and all relevant information.

Under the POEO Act, "*relevant authority*" means any of the following:

- The appropriate regulatory authority – the Environment Protection Authority (EPA);
- If the EPA is not the appropriate regulatory authority – the local authority for the area in which the pollution incident occurs (i.e. Council);
- NSW Public Health Unit;
- SafeWork NSW; and
- Fire and Rescue NSW.

Table 11 lists the contact details for these authorities. The person reporting the pollution incident will provide the following key details:

- Location of the pollution incident/emergency;
- Nature of the pollution incident/emergency;
- Their name and contact details; and
- Details of any required assistance.

Table 11 Regulatory Authority Contact List for Material Harm Incidents

Regulatory Authority / Stakeholder	Key Contact	Contact Details
Department of Planning, Industry and Environment (DPE)	Compliance Unit	Major Projects Portal
Environment Protection Authority (EPA)	Environment Line	131 555 info@environment.nsw.gov.au
	Head office (Sydney)	02 9995 5000

Regulatory Authority / Stakeholder	Key Contact	Contact Details	
Environment, Energy and Science (EES) Group	Main switchboard	1300 361 967 info@environment.nsw.gov.au	
Penrith City Council	Main switchboard	02 4732 777 council@penrith.city	
Water NSW	Main switchboard	1300 662 077 Customer.Helpdesk@waternsw.com.au	
	Incident Notification Number – 24 hours	1800 061 069	
NSW Public Health Unit	Sydney Local Health District	Business hours: 1300 066 055 After hours: 02 9515 6111	
SafeWork NSW	Incident Notification Hotline	131 050 Select Option 3 to report a "Serious Incident or Fatality" – this will result in the incident being recorded and the appropriate person being contacted.	
Emergency Services	NSW Police NSW Fire and Rescue NSW Ambulance Service	131 444 1300 729 579 -	In case of emergency – 000

3.5.1.2 Under the Conditions of SSD 10448

In accordance with Condition E10 of Development Consent SSD 10448, once Mirvac becomes aware of an incident Mirvac is required to immediately notify the Planning Secretary via the Major Projects website. The notification must identify the development (including the development application number and the name of the development if it has one) and set out the location and nature of the incident.

In accordance with Appendix 6 of Development Consent SSD 10448 a written incident notification addressing the requirements of Appendix 6 is required to be provided to the Planning Secretary via the Major Projects website within seven days. The written notification of an incident must:

- Identify the development and application number;
- Provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
- Identify how the incident was detected;
- Identify when the applicant became aware of the incident;
- Identify any actual or potential non-compliance with conditions of consent;
- Describe what immediate steps were taken in relation to the incident;
- Identify further action(s) that will be taken in relation to the incident; and
- Identify a project contact for further communication regarding the incident.

In accordance with Appendix 6 of Development Consent SSD 10448 a detailed incident report is then to be provided to the Planning Secretary and any other relevant public authorities within 30 days of the incident. The Incident Report must include:

- Summary of the incident;
- Outcomes of an incident investigation, including identification of the cause of the incident;
- Details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and
- Details of any communication with other stakeholders regarding the incident.

3.5.1.3 Non-Compliances

In accordance with Condition E11 of SSD 10448, the Planning Secretary must be notified in writing via the Major Projects website within seven days after the Proponent becomes aware of any non-compliance.

E12 of SSD 10448 states a non-compliance notification must identify the development and the application number for it, set out the condition of consent that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

E13 of SSD 10448 notes that a non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

3.5.2 Incidents and Non-Compliance Handling Procedure

Upon becoming aware of an incident and/or non-compliance, the procedure outlined in **Figure 6** will be followed.

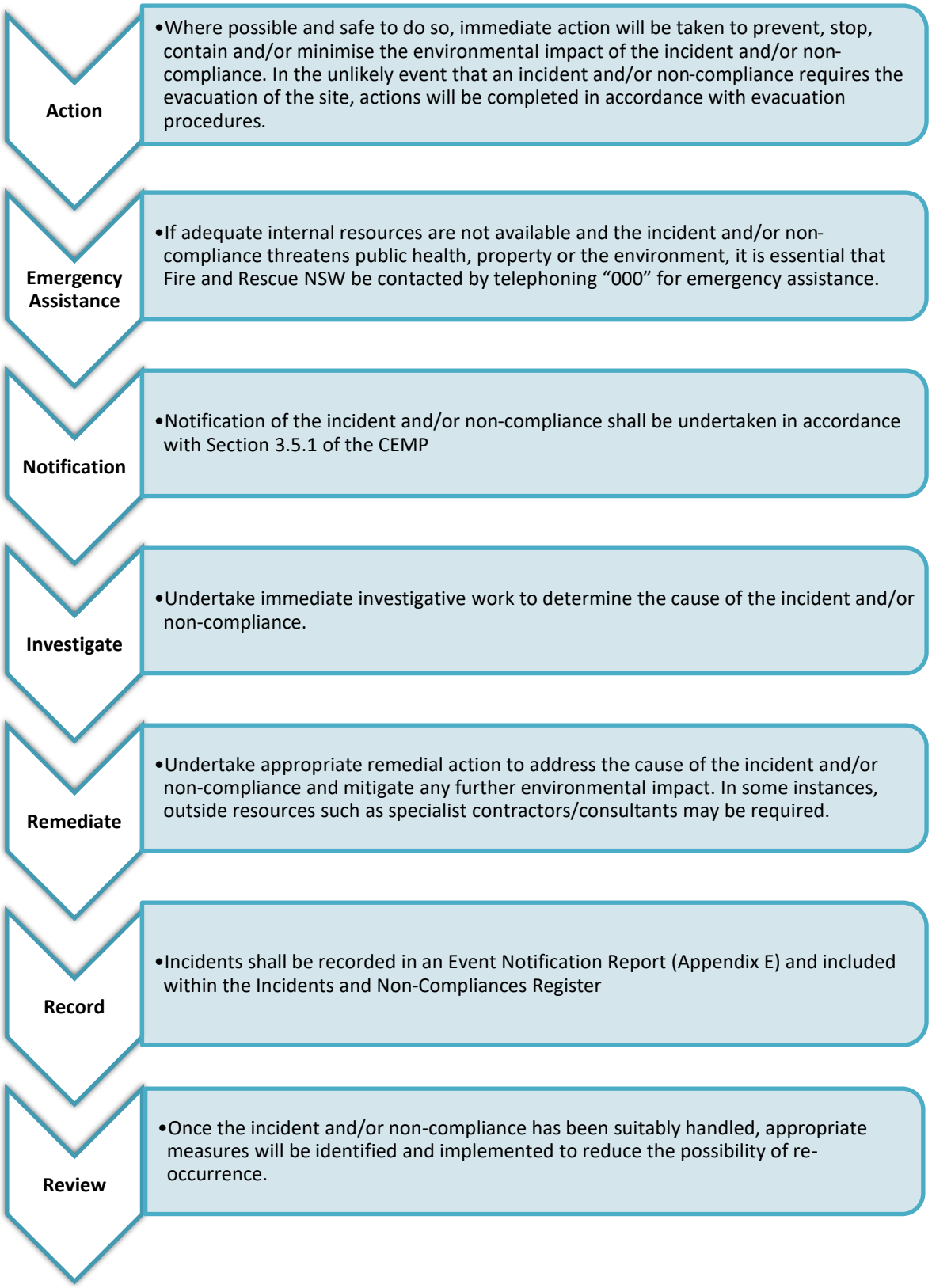

Figure 6 Incidents and Non-Compliance Handling Procedure

3.5.3 Incidents and Non-Compliance Register

An Incidents and Non-Compliance Register will be maintained during construction and will contain the following:

- A copy of the environmental incident and non-compliance notification requirements and handling procedure contained above in **Section 3.5.1** and **3.5.2**;
- Site evacuation procedures;
- A separate reference sheet containing the contact details for the contacts listed in **Table 6** and the contact details for the regulatory authorities listed in **Table 11**
- Blank hard copies of the Event Notification Report; and
- Copies of all completed Event Notification Reports, which are to be maintained for at least five years after the event to which they relate.

3.5.4 Minor Environmental Incidents

There is the possibility of minor environmental incidents occurring as part of this project. SLR have defined a 'Minor Environmental Incident' as an incident where there has been no potential or actual material harm to the environment (see 'material harm' definition outlined in **Section 3.5.3**). Examples may include excessive dust impacts sighted by the project team or a small contained hydrocarbon spill that does not leave a site boundary and are cleaned up without residual on-site environmental harm (RMS, 2018).

Minor environmental incidents will still be handled under the process outlined in **Section 3.5.2** except there will be no requirement for notification of government agencies. All minor or major incidents will be recorded in the Incidents and Non-Compliance Register. A minor incident does not constitute a non-compliance under the conditions of SSD 10448.

3.6 Complaints Response and Handling Procedure

All complaints will be handled in accordance with the *Community Consultation and Complaints Handling Strategy* (CCCHS) (SLR, 2022) (see **Appendix F**).

All employees who take receipt of a complaint, either verbal or written, are to take note of the name and contact details of the complainant and the nature of the complaint and immediately notify the Contractor's Project Manager, who will then contact the CCLR to commence.

The following complaints handling procedure is duplicated from the CCCHS for quick reference. For further detail please consult the CCCHS.

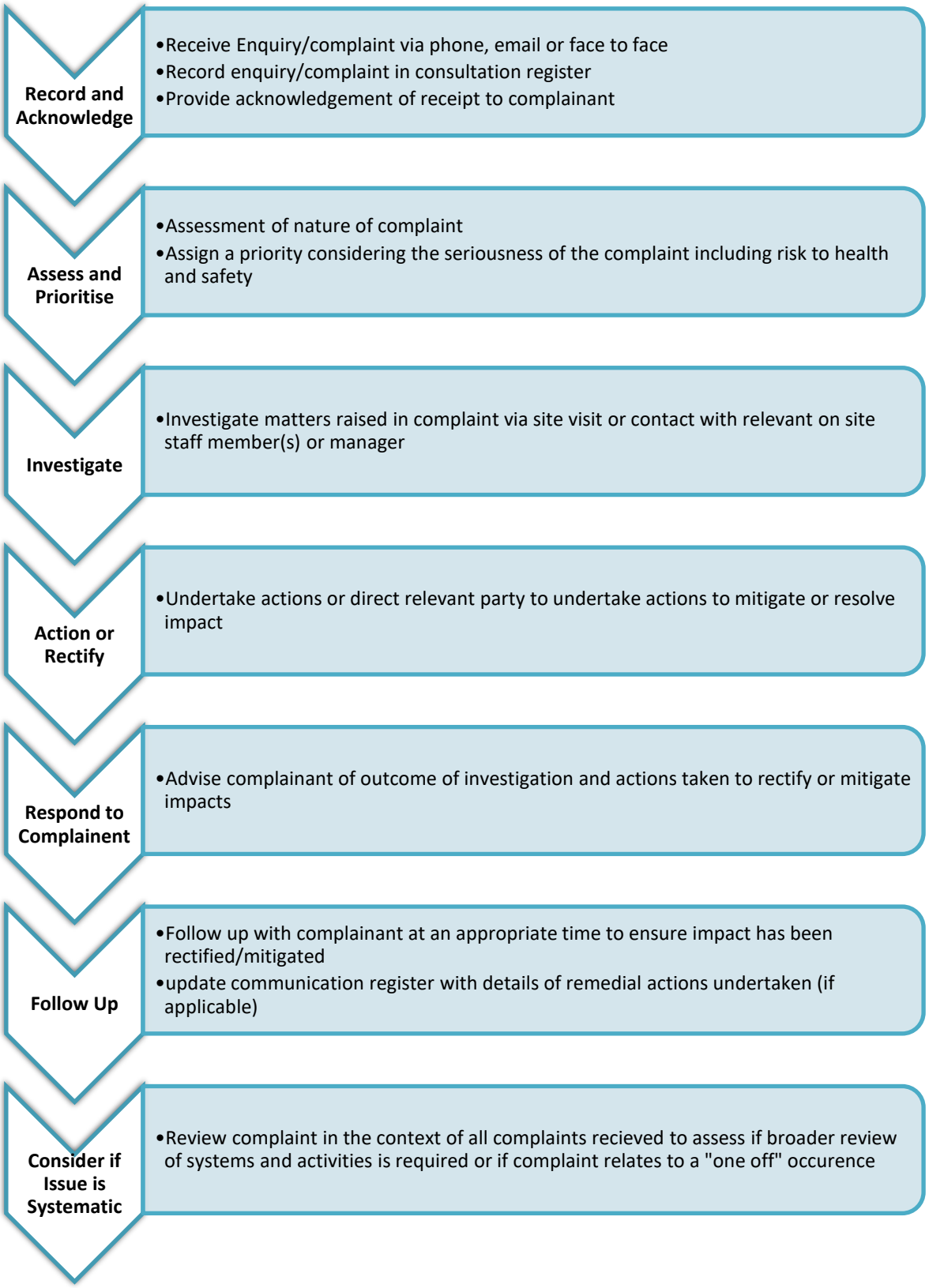

Figure 7 Complaints Handling Procedure

1. Record and Acknowledge

Any employee who takes receipt of a complaint, either verbal or written, are to immediately notify the Contractor's Project Manager who will then contact the Communications and Community Liaison Representative. The Contractor's Project Manager will be available 24 hours a day, seven days a week and have the authority to stop or direct works. All relevant contact details are available in **Table 6**.

In the normal course of events, the first contact for complaints will usually be made in person or by telephone.

The complainant's name, address and contact details, along with the nature of the complaint, will be requested. If the complainant refuses to supply the requested information, a note will be made on the form and complainant advised of this.

2. Assess and Prioritise

The CCLR will prioritise all complaints by considering the seriousness of the complaint including risk to health and safety and will attempt to provide an immediate response via phone or email. This will be undertaken in accordance with the CCCHS (SLR, 2022).

3. Investigate

A field investigation will be initiated in an attempt to confirm details relevant to the complaint and the cause of the problem. Any monitoring information and/or records at and around the time of the complaint will be reviewed for any abnormality or incident that may have resulted in the complaint.

If the complaint is due to an incident, the notification requirements and handling procedures outlined in **Section 3.5.3** and **3.5.4** respectively will be followed.

4. Action or Rectify

Once the cause of the complaint has been established, every possible effort will be made to undertake appropriate action to rectify the cause of the complaint and mitigate any further impact. The Communications and Community Liaison Representative will assess whether the complaint is founded or unfounded and delegate the remediation of the issue to the Contractor's Project Manager for action, as required.

5. Respond to Complainant

The Communications and Community Liaison Representative will oversee the rectification of the issue and respond to the complainant once the issue has been resolved. The complainant will be provided with a follow up verbal response on what action is proposed within two hours during night-time works (between the hours of 6:00 pm and 10:00 pm) and 24 hours at other times. Where a complaint cannot be resolved by the initial or follow-up verbal response, a written response will be provided to the complainant within ten days.

6. Record

It is imperative that an assessment of the situation is carried out and documented to minimise the potential for similar complaints in the future. On this basis, every complaint received is to be recorded in the Complaints Register (Appendix A of the CCCHS). A copy of the completed form will be maintained for at least five years. The complaint will also be recorded in the Complaints Register, as per **Section 3.6.4**.

7. Preventative Action

Once the complaint has been suitably handled, appropriate measures will be identified and implemented to negate the possibility of re-occurrence. The Community Correspondence Register is not finalised until the preventative actions are completed and recorded on the form.

3.6.1 Complaints Register

A Complaints Register will be maintained during construction and will contain the following:

- A copy of the environmental complaint handling procedure contained in **Section 3.6.3**;
- A separate reference sheet containing the contact details listed in **Table 6**;
- Blank hard copies of the Community Correspondence Register, and
- Copies of all completed Community Correspondence Register, which are to be maintained for at least five years after the event to which they relate.

In accordance with Condition C32 of SSD 10448, the complaints register shall be made available to the appointed ER on a daily basis.

3.7 Dispute Resolution

In the event that a dispute arises between the Proponent and a public authority, in relation to an applicable requirement in this consent or relevant matter relating to the construction of Stage 1 – Building Works for Lot 1, either party may refer the matter to the Planning Secretary for resolution. The Planning Secretary's determination of any such dispute will be final and binding on the parties.

In the case of a dispute between the Proponent and a community member/complainant, either party may refer the matter to the DPE and/or relevant regulatory authority for consideration, advice and/or negotiation. Consent Condition C31 identifies the ER may be requested by the Planning Secretary to assist in the resolution of community complaints.

Additional information can be located in the CCCHS (SLR 2022) attached as **Appendix F**.

4 Environmental Management Commitments

Environmental aspects with the potential to be impacted through the construction of Stage 1 - Building Works for Lot 1 are addressed in the following sub-sections. These issues have specific regulatory requirements imposed by SSD 10448 and/or are considered to have the highest potential to result in a non-compliance with a legislative requirement or generate community complaints. The tables in this section are a compliance management tool outlining how controls are to be implemented.

The Construction Contractor will ensure that the checklists included in their Project Management Plan, including the Daily Observations Checklist and Weekly Environmental Checklist, address all relevant management commitments outlined in the CEMP and appended management plans.

4.1 General

Table 12 lists the general environmental controls that will be implemented throughout the construction to minimise the potential for adverse impacts on the local environmental and surrounding receptors.

Table 12 General Construction Environmental Management Controls

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
All reasonable and feasible measures will be implemented to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from construction.	Construction Contractor	Ongoing	SSD 10448 Condition C1
All licences, permits, approvals and consents as required by law will be obtained and maintained as required for the development. See Section 3.3 of this CEMP.	Mirvac and Construction Contractor	As required	SSD 10448 Condition AN1
Works will not commence until an Environmental Representative (ER) has been approved by the Planning Secretary and engaged by Mirvac.	Mirvac	Prior to commencing construction	SSD 10448 Condition C31

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
All plant and equipment will be maintained in accordance with manufacturers requirements. A Plant and Equipment Maintenance Schedule and record is to be prepared and maintained onsite. The Plant and Equipment Maintenance Schedule is to be issued to the Superintendent on a quarterly basis. Plant prestart will be completed to ensure plant is operating as expected with any issues noted for rectification at the earliest possible opportunity. Noise amelioration will be fitted as per manufacturers requirements. No modifications are to be made to noise amelioration devices. Only qualified and experienced personnel are to maintain and operate plant and equipment.	Construction Contractor	Ongoing	SSD 10448 Condition C22
Construction employees and contractors will be suitably inducted and trained in accordance with Section 3.4 of this CEMP.	Construction Contractor	Prior to commencing construction and ongoing	CEMP Section 3.4
The incidents and complaints will be promptly and effectively addressed in accordance with the management strategies contained within Sections 3.5 and 3.6 of this CEMP.	Construction Contractor	Ongoing	CEMP Sections 3.5 and 3.6
All monitoring records will be maintained to demonstrate compliance with the CEMP, including: • Site environmental inspection reports • Environmental monitoring data and • Internal and external audit reports • Reports of environmental incidents, environmental, associated actions taken, and follow-up actions • Minutes of management review meetings • Induction and training records	Construction Contractor	For 5 years after completion date	Best practise
Construction will comply with section 120 of the POEO Act, which prohibits the pollution of waters.	Construction Contractor	Ongoing	SSD 10448 Condition D27 CEMP Section 4.6 SWMP Appendix J

4.2 Noise

Construction noise will be managed in accordance with the Construction Noise and Vibration Management Plan (CNVMP) (SLR 2022), attached as **Appendix G**.

The environmental management controls in **Table 13** will be implemented to minimise the potential for adverse noise impacts during construction.

Table 13 Environmental Management Controls for Noise

Measure	Person Responsible	Timing / Frequency	Reference / Notes
All listed mitigation and management measures outlined in Section 7.2 of the CNVMP will be implemented throughout construction. These mitigation measures cover the following activities: • Project Planning • Scheduling for High Noise or Vibration Generating Works • Site Layout • Training • Plant and Equipment Source Mitigation • Screening • Community Consultation • Monitoring	Construction Contractor	Ongoing	CNVMP Section 7.2

4.3 Vibration

Construction vibration will be managed in accordance with the Construction Noise and Vibration Management Plan (CNVMP) (SLR 2022), attached as **Appendix G**.

The environmental management controls in **Table 14** will be implemented to minimise the potential for adverse vibration impacts during construction

Table 14 Environmental Management Controls for Vibration

Measure	Person Responsible	Timing / Frequency	Reference / Notes
All listed mitigation and management measures outlined in Section 7.2 of the CNVMP will be implemented throughout construction. These mitigation measures cover the following activities: • Project Planning • Scheduling for High Noise or Vibration Generating Works • Site Layout • Training • Plant and Equipment Source Mitigation • Screening • Community Consultation • Monitoring • Vibration	Construction Contractor	Ongoing	CNVMP Section 7.2

4.4 Air Quality

Construction air quality will be managed in accordance with the Construction Air Quality Management Plan (CAQMP) (SLR 2022), attached as **Appendix H**.

The environmental management controls in **Table 15** will be implemented to minimise the potential for adverse dust emissions and impacts during construction.

Table 15 Environmental Management Controls for Air Quality

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
All required and highly recommended Dust and Odour Mitigation measures outlined in Section 9 of the AQMP will be implemented throughout construction. These mitigation measures cover the following activities: • Communications • Site Management • Preparing and Maintaining the Site • Operating Vehicle/Machinery and Sustainable Travel • Operations • Waste Management Desirable mitigation measures will be considered and implemented where it is a reasonable step to minimise dust generated during works.	Construction Contractor	Ongoing	CAQMP Section 9

4.5 Traffic

Construction traffic will be managed in accordance with the Construction Traffic Management Plan (CTMP) (Ason 2022), attached as **Appendix I**.

The environmental management controls in **Table 16** will be implemented to ensure road safety and network efficiency during construction.

Table 16 Environmental Management Controls for Traffic

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
All management and mitigation measures relating to proposed works and staging outlined in **Section 2** of the CTMP will be implemented throughout construction. These mitigation measures cover the following activities: • Construction Hours • Truck Routes • Temporary Traffic Management Method • Risk Assessment • Site Contact • Site Access • Work Zones	Construction Contractor	Ongoing	CTMP Section 2

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
All management and mitigation measures relating to traffic management outlined in **Section 3** of the CTMP will be implemented throughout construction. These mitigation measures cover the following activities: • Cumulative Impacts • Impacts on the Surrounding Network • Vehicle Management • Contractor Parking • Pedestrian and Cyclist Management • Fencing Requirements • Traffic Control • Authorised Traffic Controller • Driver Code of Conduct • Worker Induction	Construction Contractor	Ongoing	CTMP Section 3

4.6 Water and Soil

Erosion and sediment control will be managed in accordance with the Soil and Water Management Plan (SWMP), attached as Appendix **J. The** Erosion and Sediment Control Plan (ESCP) (WEM 2022) is included within the SWMP..

Salinity management will be managed in accordance with the Salinity Management Plan (SMP) (PSM 2022) attached as **Appendix K**.

Groundwater will be managed in accordance with the Groundwater Management Plan – Rev C (GMP) (Arcadis 2020c), attached as **Appendix L.**

Importation of fill and dam dewatering are not applicable to this CEMP.

The environmental management controls in **Table 16** will be implemented to minimise the potential for adverse water and soil impacts during construction.

Table 17 Environmental Management Controls for Water and Soil

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
Erosion and Sediment Control			
All erosion and sediment control measures indicated within the ESCP shall be implemented during construction	Construction Contractor	Ongoing	ESCP Section 8
The water quality measures outlined in Appendix 5 of SSD 10448 will be implemented throughout construction	Construction Contractor	Ongoing	SSD 10448 Appendix 5 Water Quality
Salinity Management			

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
All listed mitigation and management measures outlined in Section 6 of the SMP will be implemented throughout construction. These mitigation measures cover the following activities: • Earthworks • Imported soils • Gardens and landscaped areas • Roads, footpaths and hardstand areas • Surface water, stormwater and drainage • Durability of concrete structures in contact with the ground • Durability of steel structures in contact with the ground.	Construction Contractor	Ongoing	SMP Section 6
Groundwater Management All listed mitigation and management measures outlined in GMP will be implemented throughout construction.	Construction Contractor	Ongoing	IFP

4.7 Waste

Waste will be managed in accordance with the Waste Management Plan (WMP) (MRA 2022), attached as **Appendix M**.

The environmental management controls in **Table 18** will be implemented to minimise the potential for adverse impacts as a result of waste generated during construction.

Table 18 Environmental Management Controls for Waste

Environmental Management Control	Responsibility	Timing / Frequency	Reference / Notes
All listed mitigation and management measures outlined in Section 3 of the WMP will be implemented throughout construction. These mitigation measures cover the following activities: • Demolition waste • Construction waste • Waste contractors and facilities • Site documentation	Construction Contractor	Ongoing	WMP Section 3
Where relevant to construction, the best practise requirements outlined in Section 6.1 of the WMP will be implemented.	Construction Contractor	Ongoing	WMP Section 6.1
Suitable measures will be put in place to manage pests and vermin including maintaining general cleanliness on site and of waste storage areas to prevent the occurrence of vermin issues, and arranging appropriate controls if necessary e.g. traps.	Construction Contractor	Ongoing	SSD 10448 Condition D72
Waste must be secured and maintained within designated waste storage areas at all times and must not leave the site onto neighbouring public or private properties.	Construction Contractor	Ongoing	SSD 10448 Condition D74

Environmental Management Control	Responsibility	Timing / Frequency	Reference / Notes
All waste materials removed from the site must only be directed to a waste management facility or premises lawfully permitted to accept the materials.	Construction Contractor	Ongoing	SSD 10448 Condition D76

4.8 Biodiversity

Vegetation management will be managed in accordance with the Vegetation Management Plan (VMP) (Ecological 2021), attached as **Appendix N**.

Flora and fauna management will be managed in accordance with the Flora and Fauna Management Plan (FFMP) (Ecological 2021), attached as **Appendix O**.

The environmental management controls in **Table 19** will be implemented to minimise the potential for adverse biodiversity impacts during construction.

Table 19 Environmental Management Controls for Biodiversity

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
All construction and management works outlined in Section 4 of the VMP will be implemented throughout construction. These works cover the following activities: • Earthworks and the construction of the riparian channel • Fencing and Interpretive Signage • Installation of Fauna Habitat in the VMP Area • Vegetation management works	Construction Contractor	Ongoing	VMP Section 4
All relevant environmental actions outlined in Section 2.1 of the FFMP will be implemented throughout construction. These actions cover the following objectives: • General • Reduce harm to biodiversity • Reduce harm to aquatic biodiversity • Reduce spread of priority weeds • Reduce potential noise impacts to native fauna	Construction Contractor	Ongoing	FFMP Section 2.1

4.9 Visual Amenity

The environmental management controls in **Table 20** will be implemented to minimise the potential for adverse visual amenity impacts during construction.

Table 20 Environmental Management Controls for Visual Amenity

Reporting Requirement	Person Responsible	Timing / Frequency	References / Notes
Lighting will comply with the latest version of AS 4282.			SSD 10448

Reporting Requirement	Person Responsible	Timing / Frequency	References / Notes
Lighting will be mounted, screened and directed in such a manner that it does not create a nuisance to surrounding properties or the public road network.	Construction Contractor	Prior to commencing construction and ongoing	Condition D39
All signage and fencing will be erected in accordance with the plans in the ADR. (Note: This condition does not apply to temporary construction and safety related signage and fencing).			SSD 10448 Condition D40

4.10 Heritage

The environmental management controls outlined in **Table 21** will be implemented in the event of the discovery of Aboriginal or Historic item or object of significance.

In addition to this, if any further instruction is required, please refer to the Unexpected Finds Protocol – Heritage, prepared by Artefact (2022) and attached as **Appendix P**.

Table 21 Environmental Management Controls for Heritage

Environmental Management Control	Responsibility	Timing / Frequency	Reference / Notes
If any item or object of Aboriginal heritage significance is identified on site all work in the immediate vicinity of the suspected Aboriginal item or object will cease immediately, a 10 m wide buffer area around the suspected item or object will be cordoned off and Heritage NSW will be contacted immediately.	Construction Contractor	Ongoing	SSD 10448 Condition D62
Work in the immediate vicinity of the Aboriginal item or object will only recommence in accordance with the provisions of Part 6 of the *National Parks and Wildlife Act 1974* (NSW).			SSD 10448 Condition D63
If any archaeological relics are uncovered during the course of the work, then all works will cease immediately in that area. Unexpected finds will be evaluated and recorded in accordance with the requirements of Heritage NSW.			SSD 10448 Condition D64

4.11 Hazardous Goods and Contamination

The discovery of unexpected contaminated material will be managed in accordance with the Unexpected Finds Protocol – Contamination (UFP - Contamination) (Arcadis 2022), attached as **Appendix Q**.

The environmental controls that will be implemented to minimise the potential for environmental incidents relating to the hazardous goods and contamination are presented in **Table 22**

Table 22 Environmental Management Controls for Dangerous Goods

Environmental Management Control	Responsibility	Timing / Frequency	Reference / Notes
The discovery of unexpected contaminated material will be managed in accordance with the UFP – Contamination, including: • Personal Protective Equipment to be worn • Identification of Unexpected Finds • Unexpected Finds Register • Assessment of Unexpected Finds • Validation of Unexpected Finds • Validation of Imported Fill Material	Construction Contractor	Ongoing	UFP – Contamination Section 4 and 6 Appendix B Appendix C Appendix D
Training and Induction requirements outlined in the UFP - Contamination will be implemented throughout construction.	Construction Contractor	Prior to Construction and Ongoing	UFP – Contamination Section 3
The quantities of dangerous goods stored and handled will be below the threshold quantities listed in the Department of Planning's Hazardous and Offensive Development Application Guidelines – Applying SEPP 33 at all times.	Construction Contractor	Ongoing	SSD 10448 Condition D70
Chemicals, fuels and oils will be stored in bunded areas in accordance with relevant Australian Standards and/or the Storing and Handling of Liquids: Environmental Protection – Participants Manual (Department of Environment and Climate Change 2007).	Construction Contractor	Ongoing	SSD 10448 Condition D71

4.12 Fire Safety and Emergency

The environmental controls that will be implemented to minimise the potential for environmental incidents relating to fire are presented in **Table 23**.

Table 23 Environmental Management Controls for Fire Safety and Emergency

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
In the event of emergency, the contact details in **Table 11** will be contacted.	Construction Contractor	In the event of an emergency	Section 3.5.3
Emergency vehicle access to and from the Site will be available at all times during construction.	Construction Contractor	Ongoing	Best practice
Cutting, welding, grinding or other activities likely to generate fires will not be undertaken in the open on days when a total fire ban is proclaimed, unless an exemption is granted by the relevant Fire Service.	Construction Contractor	Ongoing	Best practice
When there is a risk of fire being caused by work such as welding, thermal or oxygen cutting, heating or other fire producing or spark producing operations or when burning off is proposed, training will be provided to all personnel in fire prevention, fire safety and basic firefighting skills.	Construction Contractor	As required	Best practice

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
Appropriate firefighting equipment will be provided as required for the safety of persons and property.	Construction Contractor	Prior to commencing construction and ongoing	Best practice
Fire extinguishers will be located at work locations where hot work is being undertaken or flammable gases are stored.	Construction Contractor	Ongoing	Best practice
Construction plant will be fitted with fire extinguishers, as required/appropriate.	Construction Contractor	Ongoing	SSD 10448 Condition C22
Waste material will not be burnt on site and no fires of any kind will be lit on site.	Construction Contractor	Ongoing	Best practice

4.13 Community

Community consultation and complaints at Stage 1 – Building Works for Lot 1 will be managed in accordance with the Community Consultation and Complaints Handling Strategy (CCCHS) (SLR 2022), attached as **Appendix F**.

The community management controls in **Table 24** will be implemented to minimise the potential for adverse impacts to the community during construction.

Table 24 Environmental Management Controls for the Community

Environmental Management Control	Person Responsible	Timing / Frequency	References / Notes
All listed mitigation and management measures outlined in Section 4 of the CCCHS will be implemented throughout construction. These measures cover the following activities: • Communication, management and mitigation tools • Notification procedure • Complaints procedure	Construction Contractor	Ongoing	CCCHS Section 4

4.14 Sustainability

The sustainability management controls in **Table 24** will be implemented to improve sustainability performance during construction.

Table 25 Environmental Management Controls for the Sustainability

Environmental Management Control	Person Responsible	Timing / Frequency	References / Notes
Best practice efficiency measures outlined in Section 4 of the ESD Report will be implemented as relevant to construction, including: • Water efficiency • Building management • Waste management	Construction Contractor	Ongoing	ESD Report Section 4

5 Monitoring and Reporting

5.1 Environmental Monitoring and Reporting

Table 26 summarises the monitoring and reporting requirements for the construction of Stage 1 – Building Works for Lot 1 as set out in SSD 10448 and relevant management plans.

Prior to the commencement of construction, the Construction Contractor will ensure their Project Management Plan includes a detailed Monitoring and Reporting Matrix to clearly document the specific applicable forms, registers or reports that will be used (this might include Supervisor Diary, Weekly Environmental Inspection Checklist, Waste Register, Complaints Register etc). The Construction Contractor will provide a copy of this matrix to Mirvac and the ER.

The Construction Contractor will ensure the checklists included in the Project Management Plan, including the Daily Observations Checklist and Weekly Environmental Checklist, address all relevant monitoring and reporting commitments outlined in the CEMP and appended management plans.

Table 26 Monitoring and Reporting Requirements

Aspect	Monitoring / Inspection Requirement	Person Responsible	Timing / Frequency	References / Notes
Daily				
General	Daily observation will be recorded in Supervisor's Diary or similar, including plant and equipment prestart checks that include environmental observations (including weather, erosion, sediment control dust, etc.).	Construction Contractor	Daily	Best practice
General	The Applicant must provide the ER with the complaints register	Construction Contractor	Daily	SSD 10448 Condition C32
General	Compliance with site rules	Construction Contractor	Daily	Best Practice
Air Quality	The Air Quality Monitoring program provided in Section 12 of the CAQMP shall be implemented.	Construction Contractor	Daily	CAQMP Section 12
Weekly				
General	The Weekly Environmental Checklist will be completed as part of general environmental site inspection to ensure all relevant environmental controls listed in this CEMP are in place and any required maintenance and/or remediation works are identified and undertaken.	Construction Contractor	Weekly	Best practice

Aspect	Monitoring / Inspection Requirement	Person Responsible	Timing / Frequency	References / Notes
General	The Construction Contractor will report environmental performance during regular management meetings and/or 'toolbox talks'. Items to be discussed include: • Results of any monitoring activities undertaken; • Any environmental incidents that have occurred during the previous period, including the management / corrective actions taken; • Any complaints that have been received during the previous period, including any management / corrective actions taken.	Construction Contractor	Weekly	Section 3.4
General	The PEC (or alternative delegate when PEC is unavailable) to attend weekly ER Inspections at the commencement of the project, reducing to fortnightly/monthly on a risk basis.	Mirvac	Weekly at commencement	Best practice
Monthly				
General	The Applicant must provide the ER with all documentation requested by the ER in order for the ER to perform their functions specified in condition C31 (including preparation of the ER monthly report), as well as: b) a copy of any assessment carried out by the Applicant of whether proposed work is consistent with the consent (which must be provided to the ER before the commencement of the subject work).	Mirvac and Construction Contractor	As required by the ER to perform their role under the conditions of consent	SSD 10448 Condition C32
Soil	Monthly audits of erosion and sediment controls shall be undertaken by CPESC and kept on record for the duration of the construction and an additional 12 months following construction works.	Principal's Environmental Consultant	Monthly	SSD 10448 Condition D26
Soil	Inspections will be undertaken of sediment basins weekly and immediately after rainfall events to assess storage capacity and water quality treatment prior to discharge, and clean to requirements.	Principal's Environmental Consultant	Weekly	ESCP

Aspect	Monitoring / Inspection Requirement	Person Responsible	Timing / Frequency	References / Notes
Community	The following will be monitored: • Total number of complaints • Number of complaints relating to lack of consultation / misinformation / confusion • Number of enquiries relating to information previously disseminated • Number of complaints / enquiries within defined categories based on theme or subject • Close-out actions and follow-up • Response timeframes	Communications and Community Liaison Representative	Monthly	CCCHS Section 5.1
Community	The monthly community consultation summary will be made publicly available on the project web page and shall include: • A summary of community consultation activities undertaken within the preceding month • A summary of all enquiries and complaints received within the preceding month, including details of response and/or remediation activities	Communications and Community Liaison Representative	Monthly	CCCHS Section 5.2
Event Based				
Incident / Non-Compliance	In the event of an Incident or Non-Compliance, an Event Notification Report will be completed, as outlined in **Table 10** in Section 3.5 of the CEMP.	Project's Construction Manager	In the event of an Incident or Non-Compliance	Section 3.5
Water	All discharges will be recorded on a discharge permit which will include: • Volume to be discharged • Treatment details (e.g. Coagulant/ flocculant used, dosage, • duration and treatment date) • Water quality monitoring results (including date and time of • testing) • Discharge water quality results • Date and time of discharge	Principal's Environmental Consultant	As required	ESCP
Water	Pumped discharge of any water off site will be monitored regularly to ensure that tested water quality meets all applicable criteria.	Principal's Environmental Consultant	As required	ESCP

Aspect	Monitoring / Inspection Requirement	Person Responsible	Timing / Frequency	References / Notes
Other				
Noise & Vibration	Noise and/or vibration reporting and monitoring will be conducted in accordance with Section 7.3 of the CNVMP	Construction Contractor	Ongoing	CNVMP Section 7.3
Air Quality	All dust and air quality incidents and complaints will be investigated and responded to as per Section 11 of the CAQMP.	Construction Contractor	As required	CAQMP Section 9
Traffic	Monitoring and review of the CTMP and onsite traffic management effectiveness shall be undertaken in accordance with Section 4 of the CTMP	Construction Contractor	Ongoing	CTMP Section 4
Contamination	Any material identified as contaminated will be disposed off-site, with the disposal location and results of testing submitted to the Planning Secretary, prior to its removal from the site.	Construction Contractor	As required	SSD 10448 Condition D77
Contamination	Clearance / validation reports will be prepared at the completion of the management of each unexpected find. The clearance / validation letter will be prepared in accordance with Section 6.5.1 of the UFP and relevant EPA published or endorsed guidelines.	Construction Contractor	As required	UFP Section 6.5.1
Waste	A logbook of waste management and collection will be maintained on-site and include the details described in Section 3.4 of the WMP.	Construction Contractor	Ongoing	WMP Section 3.4
Waste	Waste management documentation, logbook and associated dockets and receipts will be made available for inspection by authorised Council Officer at any time during site works.	Construction Contractor	Ongoing	WMP Section 3.4
General	Inspection and maintenance of all plant and equipment items to ensure optimal operating condition.	Construction Contractor	As specified by the manufacturer / supplier	Best practice
General	All incoming and outgoing traffic movement to be monitored and recorded as per Section 4.1 of the CTMP to ensure adherence to the approved construction hours as per Section 2.3 of this CEMP.	Construction Contractor	Ongoing	Best practice

Aspect	Monitoring / Inspection Requirement	Person Responsible	Timing / Frequency	References / Notes
General	The Project Manager will be notified if any inconsistencies are identified between the documents listed in Section 3.3 of this CEMP.	Construction Contractor	As required	CEMP Section 3.3
General	Compliance Reports of the Development will be prepared and submitted to DPE reviewing the environmental performance of the development in accordance with the *Compliance Reporting Post Approval Requirements* (DPE 2020) and will: (a) identify any trends in the monitoring data over the life of the development; (b) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and (c) describe what measures will be implemented over the next year to improve the environmental performance of the development	Mirvac	Within 3 months after the commencement of construction and in the same month each subsequent year (or such other timing as agreed by the Planning Secretary) for the duration of construction works	SSD 10448 Condition E14
General	Each Compliance Report will be made publicly available.	Mirvac	No later than 60 days after submitting it to the DPE and notify the DPE in writing at least 7 days before this is done.	SSD 10448 Condition E15
General	Access to information shall be facilitated through the publication of environmental performance and monitoring results on the project website, as detailed within the CCCHS	Mirvac	48 hours prior to commencing construction and ongoing	SSD 10448 Condition E17 CCCHS Section 4.3.1

Aspect	Monitoring / Inspection Requirement	Person Responsible	Timing / Frequency	References / Notes
General	A copy of all environmental records will be maintained, including: • Site environmental inspection reports • Environmental monitoring data • Internal and external audit reports • Reports of environmental incidents, environmental, associated actions taken, and follow-up actions • Minutes of management review meetings • Induction and training records • Register of all complaints and non-compliances.	Mirvac / Construction Contractor	For at least 5 years after completion	Best practice

5.2 Contingency Management Plan

Table 27 lists the actions to be implemented if inspections, monitoring and/or auditing indicate that the mitigation measures listed in **Section 4** and the specialist management plans are not effective in managing environmental impacts.

Table 27 Contingency Plan

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Noise and Vibration				
Noise impacts at sensitive receiver locations	Trigger	Noise levels do not exceed applicable NMLs	Noise levels exceed applicable NMLs	Noise levels exceed Highly Noise Affected criteria (75 dBA)
	Response	On-going best practice management measures to minimise noise emissions	Undertake all feasible and reasonable mitigation and management measures to minimise noise impacts (aiming to achieve NMLs)	Works exceeding the Highly Noise Affected criteria will be managed in accordance with the strategies for high-noise generating works determined through community consultation, as detailed in Section **7.1** and **7.2**.
Vibration impacts at sensitive receiver locations	Trigger	Vibration intensive works undertaken outside minimum working distance for the specific equipment in use	Vibration intensive works undertaken within minimum working distance for the specific equipment in use	Vibration levels exceed applicable vibration limits
	Response	On-going best practice management measures to minimise vibration emissions	Undertake vibration monitoring for the duration of the works to confirm vibration levels.	Stop work. Undertake all feasible and reasonable mitigation and management measures to ensure vibration levels are below applicable limits. If vibration levels cannot be kept below applicable limits then a different construction method or equipment must be utilised.

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Air Quality				
Visible dust leaving the site	Trigger	Daily inspections show that there is no visible dust leaving the site.	Daily inspections show that there is visible dust leaving the site.	Daily inspections show that there is visible dust leaving the site multiple times during a day OR from multiple locations within the site.
	Response	Continue monitoring program as normal.	Review and investigate construction activities and respective control measures. Where appropriate, implement additional remedial measures, such as: • *Deployment of additional water sprays, water trucks etc*	Undertake an investigation of the dust generating activities, and if necessary, temporarily halt the dust generating activities

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Dust deposition reading of >4g/m^2/month	Trigger	Dust deposition rates are less than 4 g/m^2/month at all the dust gauges.	Dust deposition rate greater than 4 g/m^2/month is recorded by any of the dust gauges	Dust deposition rates greater than 4 g/m^2/month are recorded by two or more dust gauges for two months in a row.
	Response	Continue monitoring program as normal.	• AIE Project Manager to analyse data to try to identify the source(s) of dust. Consideration should be given to the differences between the monitoring closer to other construction sites compared to those further away for identification of potential cumulative impacts. • Construction Contractor to review operations to reduce dust emissions from the identified key source(s). Implement any additional mitigation measures as required, such as additional watering.	• AIE Project Manager to review and investigate construction activities and respective control measures for the monitoring period. • If it is concluded that construction activities at AIE were directly responsible for the exceedance (i.e. the exceedance event was not caused due to high regional dust levels or local non-project dust source), Construction Contractor to submit an incident report to government agencies.

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Intense Meteorological Conditions	Trigger	Normal Meteorological Conditions	Forecast winds greater than 5 m/s and dry conditions.	Forecast winds greater than 10 m/s and dry conditions.
	Response	Continue monitoring program as normal.	• Limit the activities that generate dust within 200 m of downwind sensitive activities. • Additional visual inspection of exposed areas and activities. • Assess the need for additional controls such as increased water application rates.	Stop activities that generate dust up to 200 m downwind of the construction activities, until wind eases.

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Complaints received regarding nuisance dust	Trigger	There are no complaints received during the construction	An air-quality related complaint is received from a nearby resident	Further complaints (more than 2) are received from the same complainant after the additional mitigation measures have been implemented

	Response	Continue monitoring program as normal.	• Report the complaint to the regulator, in line with complaints handling procedure (See **Section 3.6**).
			• Review timing of the complaint compared to known site activities to identify if particular site activities (or lack of activity in the case of mitigation measures) are contributing to the complaints.
			• Review and investigate construction activities and increase dust suppression measures (additional watering, covering stockpiles etc), where appropriate.
				• Review monitoring data from the existing monitors to investigate the likelihood of onsite activities contributing.
				• The investigation should take into account (but not limited to) regional dust/particulate data, prevailing wind data on the day/time of complaints, onsite activities at the time of complaints and offsite activities at the time of complaints.
				• Conduct real time air quality monitoring at the complaint location (or as near as practicable) including meteorology if required. This monitoring should be conducted in consultation with a suitably qualified air quality professional.
				• Identify the following from any monitoring conducted:
				  • Monitoring method;
				  • Location, frequency and duration of monitoring;
				  • Assessment against compliance with criteria identified in **Section 5.2** of the CAQMP
				  • Recommendations for further mitigation

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Traffic				
Construction movements	Trigger	Construction traffic volume is in accordance with permissible and programmed volume and time constraints.	Construction traffic volumes exceeds programmed volume but is within permissible volume constraints.	Construction traffic volumes exceeds permissible volume and time constraints.
	Response	No response required. Continue monitoring program.	Review and investigate construction activities, and where appropriate, implement additional remediation measures such as: • Review CTMP and update where necessary • Provide additional training	As with Condition Amber, plus; • If it is concluded that construction activities were directly responsible for the exceedance, submit an incident report to government agencies. • Stop all transportation into and out of the site.
Queuing	Trigger	No queuing identified.	Queuing identified within site.	Queuing identified on the public road.
	Response	No response required. Continue monitoring program.	Review the delivery schedule prepared by the builder. If drivers are not following the correct schedule, then they should be provided with additional training and an extra copy of the Driver Code of Conduct.	As with Condition Amber, plus • Review and investigate construction activities. • If it is concluded that construction activities were directly responsible for the exceedance, submit an incident report to government agencies. • Temporary halting of activities and resuming when conditions have improved. • Stop all transportation into and out of the site. • Review CTMP and update where necessary, provide additional training.

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Traffic noise	Trigger	Noise levels do not exceed imposed noise constraints	Noise levels in minor excess (<10dBA) of imposed noise constraints	Noise levels greatly in greatly excess (>10dBA) of imposed noise constraints
	Response	No response required	Undertake all feasible and reasonable mitigation and management measures to minimise noise impacts.	Undertake all feasible and reasonable mitigation and management measures to ensure noise levels are below Highly Noise Affected criteria. If noise levels cannot be kept below applicable limits, then a different construction method or equipment must be utilised. Response to also be consistent with the CNVMP.
Traffic Guidance Scheme	Trigger	No observable issues	Minor inconsistencies with TGS to onsite operations	Near miss or incident occurring regardless of / as a result of the TGS being implemented
	Response	No response required Continue monitoring TGSs.	Traffic Controller to amend TGS on site and to keep a log of all changes.	Stop work until an investigation has been undertake into the incident. There are to be changes made to the TGS to ensure that the safety of all workers, students and civilians are catered for.
Traffic Air Quality Impacts	Trigger	No observable dust	Minor quantities of dust in the air and tracking on to the road.	Large quantities of dust in the air and tracking on to the road.

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
	Response	No response required	Review the ESCP and investigate construction activities and respective control measures, where appropriate. Implement additional remedial measures, such as: • Deployment of additional water sprays • Relocation or modification of dust-generating sources • Check condition of vibrating grids to ensure they are functioning correctly • Temporary halting of activities and resuming when conditions have improved	As with Condition Amber. • If it is concluded that construction activities were directly responsible for the exceedance, submit an incident report to government agencies. • Implement relevant responses and undertake immediate review to avoid such occurrence in future.
Water and Soil				
Soil / dust / mud on public road network	Trigger	No soil / dust / mud tracked onto the public road network.	Evidence of soil / dust / mud at entry but none tracked onto public roads.	Evidence of soil / dust / mud tracked onto the public roads.
	Response	Continue ESCP/CEMP implementation.	Check condition of wheel wash facility to ensure it is functioning correctly.	Check condition of wheel wash facility to ensure it is functioning correctly. Stop work and clean soil / dust / mud off road network (e.g. engage street sweeper).

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Erosion	Trigger	No evidence of erosion.	Minor gully or tunnel erosions present and/or rilling. Evidence of sediment or sediment laden water leaving the site.	Significant gully or tunnel erosions present and/or rilling. Evidence of sediment or sediment laden water leaving the site.
	Response	Continue ESCP / CEMP implementation.	A suitably trained person to inspect the site. Review of erosions and sediment structures. Remediate as appropriate.	A suitably trained person to inspect the site. Review of erosion and sediment structures. Remediate as soon as practical.
Water management structures	Trigger	Water management structures have been designed, constructed and managed in accordance with the Blue Book and the ESCPs.	Inspections indicate that water management structures illustrate minor non-compliance with the Blue Book and the ESCPs.	Inspections indicate a failure of the water management structures.
	Response	Continue ESCP / CEMP implementation.	A suitably trained person to inspect the site. Review of water management structures. Remediate as appropriate.	A suitably trained person to inspect the site. Remediate as soon as practical. Review of engineering design and revise ESCPs.
Water Quality Monitoring	Trigger	Water quality monitoring results are in accordance with Section 5.5 of SMP and approved by the ER.	Water quality monitoring results exceed the criteria listed in Section 5.5 of SMP and not approved by the ER.	Follow up water quality monitoring results exceed the criteria listed Section 5.5 of SMP and not approved by the ER.
	Response	Continue ESCP / CEMP implementation.	Follow up water quality monitoring will be undertaken to ensure results are just an anomaly and not a trend.	Appropriate measures are implemented. Follow up water quality monitoring is undertaken to ensure they satisfy the criteria in Section 5.5 of SMP and are approved by the ER.

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Waste				
Waste	Trigger	Inspections identified no waste outside of dedicated bins and stockpiles.	Inspections identified minimal waste outside of dedicated bins and stockpiles.	Inspections identified large quantities of waste outside of dedicated bins and stockpiles. Complaints received regarding waste.
	Response	Continue WMP / CEMP implementation.	The waste is cleaned up immediately.	The waste is cleaned up immediately. The Communications and Community Liaison Representative is also notified and the complaints handling process outlined in **Section 3.6** and the CCCHS is implemented.
Heritage				
Heritage	Trigger	No unknown heritage items uncovered.	Potential heritage item uncovered.	Potential heritage item uncovered causing significant delays to project.
	Response	Continue CEMP implementation.	Stop work and implement the unexpected finds protocol.	Stop work and implement the unexpected finds protocol. Heritage item to be salvaged and removed from site by a qualified archaeologist.
Hazardous Goods and Contamination				
Unexpected Contamination	Trigger	No contamination uncovered during earthworks.	Areas of possible contamination uncovered.	Areas of contamination uncovered.
	Response	Continue CEMP implementation.	Stop work immediately and the contamination assessed according to the UFP.	Stop work immediately. A validation report is to be prepared following remediation.

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Bushfire				
Bushfire	Trigger	No bushfire or bushfire prone weather.	Bushfire prone weather during summer.	Bushfire in the vicinity of the site.
	Response	Continue CEMP implementation.	Ensure grass is kept short and vegetation is minimal at the site. Weather is to be monitored twice daily for chance of bushfire.	Stop work and contact NSW Fire and Rescue on '000'. Evacuate the site as directed by NSW Fire and Rescue.
Community				
Submission	Trigger	General feedback/comment (no complaint or query).	Enquiry made by formal or informal channels.	Complaint made by formal or informal channels.
	Response	Acknowledge receipt and record in Complaints Register. No further response required.	Acknowledge receipt and record in Complaints Register. Direct enquiry to relevant person for actioning and response within 5 days.	Acknowledge receipt and record in Complaints Register. Respond to complaint immediately if possible, if not direct enquiry to relevant person for actioning and provide complainant with a follow up verbal response on what action is proposed within two hours during construction works (including night and weekend works) and 24 hours at other times.
Media	Trigger	Positive story in print, online, radio or television.	Neutral or advisory story in print, online, radio or television.	Negative story in print, online, radio or television.
	Response	Record in Complaints Register and advise the proponent media/marketing team. No further response required.	Record in Complaints Register and advise the proponent media/marketing team. No further response required.	Record in Complaints Register and advise the proponent Project Team for further action and response. Contact relevant person for actioning and response within 48 hours

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Unscheduled Event	Trigger	Event occurring outside of plan or schedule without impact or potential impact.	Event occurring outside of plan or schedule with minor impact or potential impact.	Event occurring outside of plan or schedule with major impact or potential impact.
	Response	No response required. Identify opportunities for improvement to manage potential future events.	Contact relevant person for actioning and response within 48 hours. Acknowledge in Complaints Register. Identify opportunities for improvement to manage potential future events.	Contact relevant person for actioning and response immediately. Acknowledge in Complaints Register. Identify opportunities for improvement to manage potential future events.
Political Interest	Trigger	General or non-specific enquiry by Local, State or Federal political representative.	Enquiry or complaint relating to minor issue by Local, State or Federal political representative.	Enquiry or complaint relating to major issue by Local, State or Federal political representative.
	Response	CCLR in conjunction with The Proponent Project Team to prepare and provide response or assign response task to relevant staff member for comment. Record in Complaints Register.	CCLR in conjunction with the proponent Project Team to prepare and provide response within 48 hours. Record in Complaints Register.	CCLR in conjunction with the proponent Project Team to prepare and provide response within 24 hours. Record in Complaints Register.

6 Review and Improvement of Environmental Performance

Review and improvement of environmental performance against CEMP will be undertaken at least quarterly and will include participation by the Proponent. The review will comprise, as a minimum, the following:

- Identification of areas of opportunity for improved environmental performance;
- Analysis of the causes of incidents and non-compliances, including those identified in environment inspections and audits (see Section 3.5);
- Verification of the effectiveness of corrective and preventative actions; and
- Highlighting any changes in procedures resulting from process improvement.

Condition E8 of SSD 10448 also states that all strategies, plans and programs required under SSD 10448 will be reviewed and Planning Secretary notified of the review within three months of:

- the submission of a Compliance Report under condition E14;
- the submission of an incident report under condition E10;
- the approval of any modification of the conditions of this consent; or
- the issue of a direction of the Planning Secretary under Condition C.2(b) which requires a review.

This CEMP and all relevant strategies, plans and programs will also be reviewed and, if necessary, revised in the following circumstances:

- Where there is any change to the scope of the construction activities and/or disturbance footprint;
- Where it is identified that the environmental performance is not meeting the objectives of the CEMP; and/or
- At the request of a relevant regulatory authority.

Notwithstanding the review requirements outlined above, in accordance with the requirements of Condition E1(h) the following is provided as the protocol for periodic review of this CEMP and all management plans required under SSD 10448.

- All management plans required under SSD 10448 are to be reviewed every 6 months by their original Author and the ER.
- The periodic review is to take account of any required changes to procedures, updates or changes to best practice, any non-compliances in the proceeding 6 month period and whether changes can be made to improve the environmental performance of the development.

As per Condition E9 where documents are revised under the above reviews the revised documents will be sent to DPE within 6 weeks of review. All employees and contractors will be informed of any revisions to the CEMP by the Contractor's Project Manager during toolbox talks.

In accordance with Conditions A19 and C9 of SSD 10488, Mirvac may, at their discretion, seek to stage, combine or update strategies, plans or programs required under SSD 10488. In this instance, Mirvac, with the approval of the Planning Secretary, may:

(a) prepare and submit any strategy, plan or program required by this consent on a staged basis (if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program);

(b) combine any strategy, plan or program required by this consent (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined); and

(c) update any strategy, plan or program required by this consent (to ensure the strategies, plans and programs required under this consent are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the development).

In accordance with Conditions A20 and C10 of SSD 10488, if the Planning Secretary agrees, a strategy, plan or program may be staged or updated without consultation being undertaken with all parties required to be consulted in the relevant condition of the Development Consent. In accordance with Conditions A21 and C11 of SSD 10488, If approved by the Planning Secretary, updated strategies, plans, or programs supersede the previous versions of them and must be implemented in accordance with the condition that requires the strategy, plan or program.

7 References

Arcadis (2020) Unexpected Finds Protocol (UFP - Contamination)

Arcadis (2020b) Groundwater Management Plan

Artefact (2021) Unexpected Finds Protocol (UFP – Heritage)

Ason (2022) Construction Traffic Management Plan

Department of Environment and Climate Change (2007) Storing and Handling of Liquids: Environmental Protection – Participants Manual

Department of Environment and Conservation (2006) Assessing Vibration: a technical guideline

Department of Industry (2012) Guidelines for Controlled Activities on Waterfront Lands

Department of Infrastructure, Planning and Natural Resources (2004) Guideline for the Preparation of Environmental Management Plans

Ecological (2021) Flora and Fauna Management Plan (FFMP)

Ecological (2021) Vegetation Management Plan (VMP)

Department of Planning and Environment (2018) Compliance Reporting Post Approval Requirements

Environment Protection Authority (2007) Approved Methods for Sampling and Analysis of Air Pollutants in NSW

Environment Protection Authority (2014) Waste Classification Guidelines Part 1: Classifying Waste

Environment Protection Authority (2017) Guidelines for the NSW Site Auditor Scheme (3rd Edition)

Environment Protection Authority (2019) Standard Recycling Signs. Accessed: http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm.

German Institute for Standardisation (Deutsches Institut für Normung) (1999) DIN 4150 – Structural vibration - Effects of vibration on structures

Landcom (2004) Bluebook – Managing Urban Stormwater, Soils and Construction (Volume 1)

Landcom (2008) Bluebook – Managing Urban Stormwater, Soils and Construction (Volume 2D Main Road Construction)

MRA (2022) Waste Management Plan

NSW Department of Planning and Environment (NSW DPE) (2022) Aspect Industrial estate State Significant Development Assessment SSD-10448 (Assessment Report)

PSM (2022) Salinity Management Plan

Roads and Maritime Services (2016) Construction Noise and Vibration Guideline

SLR Consulting (2022) Community Consultation and Complaint Handling Strategy

SLR Consulting (2022) Construction Air Quality Management Plan

SLR Consulting (2022) Construction Environmental Management Plan Aspect Industrial Estate

Standards Australia (1997) AS 4282 – 1997: Control of the obtrusive effects of outdoor lighting

Standards Australia (2001) AS 2601 – 2001: The Demolition of Structures

Standards Australia (2017) AS 2419.1 – 2017: Fire hydrant installations System design, installation and commissioning

Stantec (2020) SSD – AIE Masterplan & Stage 1 ESD Report (ESD Report)

Urbis (2020) Aspect Industrial Estate – Environmental Impact Statement

Urbis (2021) Aspect Industrial Estate – Response to Submissions SSD-10448

Western Earthmoving (WEM) (2022) Erosion & Sediment Control Plan

APPENDIX A

Development Consent SSD 10448

Development Consent

Section 4.38 of the *Environmental Planning and Assessment Act 1979*

As delegate of the Minister for Planning under delegation executed on 9 March 2022, I determine:

a) to grant consent to the Staged Development Application referred to in Schedule 1, subject to the Concept Proposal conditions and Stage 1 Development Application conditions in Schedule 2;

b) that pursuant to section 4.37 of the *Environmental Planning and Assessment Act 1979* (NSW), any subsequent development under the Concept Proposal is only considered to be State Significant Development should the development meet the relevant criteria in Schedule 1 of State Environmental Planning Policy (Planning Systems) 2021 (or any substituted SEPP).

These conditions are required to:

- prevent, minimise, or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the development.

Chris Ritchie
Director
Industry Assessments

Sydney 24 MAY 2022

The Department has prepared a consolidated version of the consent which is intended to include all modifications to the original determination instrument.

The consolidated version of the consent has been prepared by the Department with all due care. This consolidated version is intended to aid the consent holder by combining all consents relating to the original determination instrument, but it does not relieve a consent holder of its obligation to be aware of and fully comply with all consent obligations as they are set out in the legal instruments, including the original determination instrument and all subsequent modification instruments.

CONSOLIDATED CONSENT

SCHEDULE 1

Application Number:	SSD-10448
Applicant:	Mirvac Projects Pty Ltd
Consent Authority:	Minister for Planning
Site:	Lots 54-58 DP 259135 788-882 Mamre Road, Kemps Creek NSW 2178
Development:	The Staged Development Application for the Aspect Industrial Estate comprised of: • a Concept Proposal for the staged development of an industrial estate comprising of 11 buildings with a total GFA of up to 243,431 square metres (m2) for industrial, warehousing and distribution centres, and café uses; and • Stage 1 development comprising site preparation works, vegetation clearing, realignment of the existing creek, construction of access roads and eastern half of Mamre Road/ Access Road 1 intersection works, construction, fit out, and operation of one warehouse and one industrial building with ancillary offices, car parks, landscaping, signage, construction and operation of services and utilities, and subdivision of the site into three lots.

SUMMARY OF MODIFICATIONS

Application Number	Determination Date	Decider	Modification Description
SSD-10448-MOD-1	25 August 2022	Principal Planning Officer, Industry Assessments	Modification to include additional conditions required by TfNSW for SSD-10448
SSD-10448-MOD-2	30 November 2022	Team Leader, Industry Assessments	Modification to Concept Plan and Stage 1 Development layouts

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DEFINITIONS

ADR	Amended Development Report titled 'SSD-10448 Aspect Industrial Estate Amended Development Report', prepared by Urbis and dated 5 May 2022
Applicant	Mirvac Projects Pty Ltd, or any person carrying out any development to which this consent applies
BCA	Building Code of Australia
BC Act	*Biodiversity Conservation Act 2016* (NSW)
Calendar year	A period of 12 months commencing on 1 January
CAQMP	Construction Air Quality Management Plan
Carrier	Operator of a telecommunication network and/ or associated infrastructure, as defined in s 7 of the *Telecommunications Act 1997* (Cth)
CDWMP	Construction and Demolition Waste Management Plan
Certifier	A council or an accredited certifier (including principal certifiers) who is authorised under s 6.5 of the EP&A Act to issue Part 6 certificates
CEMP	Construction Environmental Management Plan
CNMP	Construction Noise Management Plan
Conditions of this consent	Conditions contained in Schedule 2 of this consent
Concept Proposal	Concept layout of 11 buildings and ancillary offices for industrial, warehousing and distribution centres, and café uses, as described in the EIS, Response to Submissions and ADR
Construction	The demolition and removal of buildings or works, the carrying out of works for the purpose of the development, including bulk earthworks and erection of buildings and other infrastructure permitted by this consent
Council	Penrith City Council
Day	The period from 7 am to 6 pm on Monday to Saturday, and 8 am to 6 pm on Sundays and Public Holidays
Decommissioning	The controlled process of safely retiring a facility from service, including decontamination, dismantling, and disposal after the cessation of operations
Demolition	The deconstruction and removal of buildings, sheds, and other structures on the site
Department	Department of Planning and Environment
Development	The development described in Schedule 1, the EIS, Response to Submissions, and ADR, including the construction and operation of 11 buildings, ancillary offices and associated infrastructure for industrial, warehousing and distribution centres, and café uses, as shown on the plans in Appendix 1, and as modified by the conditions of this consent
Development layout	The Plans at Appendix 1 of this consent
DPE	Has the same meaning of the Department
Earthworks	Bulk earthworks, site levelling, import and compaction of fill materials, excavation for installation of drainage and services, to prepare the site for construction
E&H	Environment and Heritage Group, DPE
EIS	The Environmental Impact Statement titled Aspect Industrial Estate Environmental Impact Statement, prepared by Urbis, dated November 2020, submitted with the application for consent for the development
ENM	Excavated Natural Material
Environment	As defined in section 1.4 of the EP&A Act
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2000 (NSW)
ER	Environmental Representative
Evening	The period from 6 pm to 10 pm
Fibre-ready facility	As defined in s 372W of the *Telecommunication Act 1997* (Cth)

Heritage	Encompasses both Aboriginal and historic heritage including sites that predate European settlement, and a shared history since European settlement
Heritage item	An item as defined under the *Heritage Act 1977* (NSW), and assessed as being of local, State and/or National heritage significance, and/or an Aboriginal Object or Aboriginal Place as defined under the *National Parks and Wildlife Act 1974* (NSW), the World Heritage List, or the National Heritage List or Commonwealth Heritage List under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth), or anything identified as a heritage item under the conditions of this consent
Incident	An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance *Note: 'material harm' is defined in this consent*
IWCM	Integrated Water Cycle Management
Land	Has the same meaning as the definition of the term in section 1.4 of the EP&A Act
Material harm	Is harm that: (a) involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial, or (b) results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)
Minister	New South Wales Minister for Planning (or delegate)
Mitigation	Activities associated with reducing the impacts of the development prior to or during those impacts occurring
Modification Assessments	The document assessing the environmental impacts of a proposed modification of this consent and any other information submitted with the following modification application made under the EP&A Act: a) Section 4.55(1) Application to Amend SSD-10448, Aspect Industrial Estate, prepared by Urbis, dated 19 July 2022. b) Section 4.55(1A) Application to Amend SSD-10448, Aspect Industrial Estate, prepared by Urbis, dated June 2022.
Monitoring	Any monitoring required under this consent must be undertaken in accordance with section 9.40 of the EP&A Act
MRP	Mamre Road Precinct
MRP DCP	Mamre Road Precinct Development Control Plan (NSW Government, 2021)
Night	The period from 10 pm to 7 am on Monday to Saturday, an 10 pm to 8 am on Sundays and Public Holidays
Non-compliance	An occurrence, set of circumstances or development that is a breach of this consent
Night	The period from 10 pm to 7 am on Monday to Saturday, and 10 pm to 8 am on Sundays and Public Holidays
NML	Noise Monitoring Locations
Non-compliance	An occurrence, set of circumstances or development that is a breach of this consent
NRAR	Natural Resources Access Regulator, DPE
OEMP	Operational Environmental Management Plan
Operation	The use of warehouse and industrial buildings for storage, distribution or manufacture of goods upon completion of construction as described in the EIS and ADR
PA	Means a planning agreement within the meaning of the term in section 7.4 of the EP&A Act.
Planning Secretary	Planning Secretary under the EP&A Act, or nominee
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)

Precinct-Wide Stormwater Infrastructure	Refers to future regional stormwater infrastructure for the MRP to be operated by a stormwater management authority
Principal Certifier	The certifier appointed as the principal certifier for the building work under s 6.6(1) of the EP&A Act or for the subdivision work under s 6.12(1) of the EP&A Act
Reasonable	Means applying judgement in arriving at a decision, taking into account: mitigation benefits, costs of mitigation versus benefits provided, community views, and the nature and extent of potential improvements
Registered Aboriginal Parties	Means the Aboriginal persons identified in accordance with the document entitled '*Aboriginal cultural heritage consultation requirements for proponents 2010'* (DECCW)
Registered Surveyor	Means registered surveyor within the meaning of the term in the *Surveying and Spatial Information Act 2002* (NSW)
Response to Submissions (RtS)	The Applicant's response to issues raised in submissions received in relation to the application for consent for the development under the EP&A Act and includes the document titled Aspect Industrial Estate Response to Submissions SSD-10448, prepared by Urbis, dated 5 March 2021
Roads authority	As defined in dictionary of the *Roads Act 2003* (NSW)
Sensitive receivers	A location where people are likely to work, occupy or reside, including a dwelling, school, hospital, office, or public recreational area
Site	The land defined in Appendix 1
Stage 1 development	Sitewide bulk earthworks, retaining walls, estate basin, riparian corridor realignment, construction of access roads and the Mamre Road / Access Road 1 intersection construction and operation of buildings 1 and 3, café, landscaping services and utilities installation and subdivision, as described in the EIS, Response to Submissions and ADR
Stage 1 Phase 1 Road Works	Involves construction and operation of a signalised intersection at Mamre Road, Access Road 1 between Mamre Road and Access Road 2, and Access Road 2 as identified in Figure 1 at Appendix 1
Stage 1 Phase 2 Road Works	Involves construction and operation of a roundabout at Access Roads 1 and 3 intersection, the remaining portion of Access Road 1 between Access Road 2 and the roundabout, and Access Road 3 to the south of the roundabout (excludes Access Road 3 - North)
TfNSW	Transport for New South Wales
VENM	Virgin Excavated Natural Material
WAD	Works Authorisation Deed
WSUD	Water Sensitive Urban Design

SCHEDULE 2

PART A CONDITIONS FOR CONCEPT PROPOSAL

TERMS OF CONSENT

A1. The development may only be carried out:

(a) in compliance with the conditions of this consent;

(b) in accordance with all written directions of the Planning Secretary;

(c) in accordance with the EIS, Response to Submissions (RtS), and Amended Development Report (ADR);

(d) in accordance with the Modification Assessments;

(e) in accordance with the Development Layout in Appendix 1; and

(f) in accordance with the management and mitigation measures in Appendix 4.

A2. Consistent with the requirements in this consent, the Planning Secretary may make written directions to the Applicant in relation to:

(a) the content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this consent, including those that are required to be, and have been, approved by the Planning Secretary; and

(b) the implementation of any actions or measures contained in any such document referred to in condition A2(a).

A3. The conditions of this consent and directions of the Planning Secretary prevail to the extent of any inconsistency, ambiguity or conflict between them and a document listed in condition A1(c) or A1(f). In the event of an inconsistency, ambiguity or conflict between any of the documents listed in condition A1(c) or A1(f), the most recent document prevails to the extent of the inconsistency, ambiguity or conflict.

FUTURE DEVELOPMENT APPLICATIONS

A4. In accordance with section 4.22 of the EP&A Act, each subsequent stage of the Concept Proposal (excluding Stage 1 development) is to be subject to future development applications (DAs). Future DAs are to be consistent with the terms of this consent.

LIMITS OF CONSENT

A5. This consent lapses five years after the date from which it operates unless the development has physically commenced on the land to which the consent applies before that date.

A6. The Applicant must ensure any future development of the site is consistent with the *Mamre Road Precinct Development Control Plan 2021* (NSW Government, 2021) (MRP DCP).

A7. The maximum GFA for future development on the site for the land uses described in **Table 1** must not exceed the limits described in that table.

Table 1 *Maximum GFA of the Concept Proposal*

Land Use	Maximum GFA (m^2)
Warehouse and distribution centres and general industrial	232,381
Ancillary offices	11,050
Total	**243,431**

A8. A future road widening corridor along the western boundary must not be developed and must be maintained and preserved for the future Mamre Road widening works as shown in **Figure 1** in **Appendix 1**.

A9. The largest vehicle permitted to access the site is a 30 m Performance Based Standards (PBS) Level 2 Type B.

A9A. The maximum height for future development on the site described in Table 1A must not be exceeded.

Table 1A *Maximum Building Height of the Concept Proposal*

Land Use	Height (m)
Warehouse 1	• 16.0 m (excluding rooftop plant) • 18.4 m (including rooftop plant)
All other warehouses	13.7 m

STAGING PLAN

A10. Prior to the commencement of construction of any stage of the Concept Proposal, the Applicant shall prepare a Staging Plan for the Development, to the satisfaction of the Planning Secretary. The plan shall:

(a) be prepared in consultation with Council, utility and service providers and other relevant stakeholders;

(b) describe how the implementation of the Concept Proposal, would be staged to ensure it is carried out in an orderly and economic way and minimises construction impacts;

(c) show the likely sequence of DAs that will be lodged to develop the Site, with the estimated timing for each Stage and identification of any overlapping construction and operational activities;

(d) include concept design for the staged delivery of landscaping, focusing on early implementation of screen planting to minimise the visual impact of subsequent development stages; and

(e) include conceptual design for the provision of services, utilities and infrastructure to the Site, including stormwater management infrastructure and any future road upgrades.

A11. The Applicant must:

(a) not commence construction of any stage of the Development until the Staging Plan required by Condition A12 is approved by the Planning Secretary; and

(b) implement the most recent version of the Staging Plan approved by the Planning Secretary.

A12. The Planning Secretary may require the Applicant to address certain matters identified in the Staging Plan. The Applicant must comply with any such requirements of the Planning Secretary given as part of the Staging Plan approval.

Notes:

- *The Applicant may amend the Staging Plan as desired, with the approval of the Planning Secretary.*
- *The Staging Plan is intended to broadly describe the development sequence for the Site and the delivery of infrastructure for all stages. It is not required to provide detailed design for latter Stages.*

TRAFFIC

A13. The Applicant must monitor operational traffic for all developments in the concept proposal for a period of 12 months following commencement of operation of each development under the relevant stage. This must include, but not be limited to:

(a) details of the number and frequency of truck numbers generated by the relevant stage of the Concept Proposal along with any approved developments under the concept proposal;

(b) verification of the predicted traffic numbers and level of service against the relevant stage of the Concept Proposal, and analyse the potential cause of any significant discrepancies; and

(c) consideration of the current capacity and efficiency of the existing road network including Mamre Road.

FUTURE INFRASTRUCTURE REQUIREMENTS

A14. The Applicant must prepare an Infrastructure Review to support each future stage of the Concept Proposal. The Infrastructure Review must demonstrate the surrounding road infrastructure can accommodate the relevant stage and other approved developments in the MRP. The Infrastructure Review must:

(a) detail traffic volumes from all operating stages of the Concept Proposal;

(b) include background traffic volumes from key roads within the MRP, including Mamre Road;

(c) assess the operating performance of key intersections in the MRP, including Mamre Road and Access Road 1;

(d) detail the current level of approved development within the MRP, including total approved GFA;

(e) consider consistency with the latest approved Concept Proposal traffic volumes;

(f) demonstrate the road network has sufficient capacity to accommodate the proposed stage of the Concept Proposal, and if the proposed stage would trigger the need for any road upgrades, including those identified in the traffic modelling for the MRP;

(g) if road upgrades are required to support the proposed stage, identify the timing and mechanisms to contribute to the delivery of the required road upgrades.

A15. The outcomes of the Infrastructure Review must be used to inform the Staging Plan required by Condition A10.

NOISE LIMITS

A16. The Applicant must:

(a) ensure the Development at the site does not exceed the noise limits outlined in Table 2 when measured at the identified locations shown in Appendix 3; and

(b) ensure the cumulative noise emission of fixed external mechanical plant for each warehouse building do not exceed 90 dB(A) and do not exhibit tonal characteristic or strong low frequency content.

Table 2 *Operational Noise Limits for Development dB(A)*

Location	Day	Evening	Night	
	$L_{Aeq\ (15\ minute)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	L_{Amax}
NML 1	50	50	47	63
NML 2	62	62	60	79
NML 3	64	64	61	79
NML 4	65	65	62	82
NML 5	66	66	64	82

Note:

- *Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry (EPA, 2017) (as may be updated or replaced from time to time). Refer to the plan in Appendix 3 for the location of residential sensitive receivers.*

MAMRE ROAD PRECINCT WORKING GROUP

A17. For the duration of construction works for each development under the Concept Proposal, and until all components of the development under the Concept Proposal are operational, the Applicant must participate in the Mamre Road Precinct Working Group with relevant consent holders in the MRP to the satisfaction of the Planning Secretary (see Condition C34 in Schedule 2).

EVIDENCE OF CONSULTATION

A18. Where conditions of this consent require consultation with an identified party, the Applicant must:

(a) consult with the relevant party prior to submitting the subject document to the Planning Secretary for approval; and

(b) provide details of the consultation undertaken including:

(i) the outcome of that consultation, matters resolved and unresolved; and

(ii) details of any disagreement remaining between the party consulted and the Applicant and how the Applicant has addressed the matters not resolved.

STAGING, COMBINING AND UPDATING STRATEGIES, PLANS OR PROGRAMS

A19. With the approval of the Planning Secretary, the Applicant may:

(a) prepare and submit any strategy, plan or program required by this consent on a staged basis (if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program);

(b) combine any strategy, plan or program required by this consent (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined); and

(c) update any strategy, plan or program required by this consent (to ensure the strategies, plans and programs required under this consent are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the development).

A20. If the Planning Secretary agrees, a strategy, plan or program may be staged or updated without consultation being undertaken with all parties required to be consulted in the relevant condition in this consent.

A21. If approved by the Planning Secretary, updated strategies, plans, or programs supersede the previous versions of them and must be implemented in accordance with the condition that requires the strategy, plan, or program.

ADVISORY NOTES

AN1. All licences, permits, approvals and consents as required by law must be obtained and maintained as required for the development. No condition of this consent removes any obligation to obtain, renew or comply with such licences, permits, approvals and consent.

PART B CONDITIONS FOR FUTURE DEVELOPMENT APPLICATIONS

TRAFFIC AND ACCESS

Traffic Impact Assessment

B1. Future DAs shall be accompanied by a traffic impact assessment (TIA). The TIA must:

(a) assess the impacts on the safety and capacity of the surrounding road network and access points during construction and operation of the relevant stage in accordance with relevant TfNSW guidelines;

(b) include traffic monitoring data collected under Condition **Error! Reference source not found.** and incorporate t he relevant findings into this assessment;

(c) demonstrate internal roads and car parking complies with relevant Australian Standards and the car parking rates in Condition B2;

(d) demonstrate the Mamre Road/Access Road 1 intersection can accommodate operational traffic associated with the relevant stage;

(e) detail the scope and timing of any required road or intersection upgrades to service the relevant stage if the assessment under sub-clause (d) identifies that additional upgrades are required; and

(f) detail measures to promote non-car travel modes, including a Sustainable Travel Plan identifying pedestrian and cyclist facilities to service the relevant stage of the development.

Car Parking

B2. Car parking must be provided in accordance with the RMS Guide to Traffic Generating Developments and at the following rates:

- warehouse and distribution centre: 1 space per 300 m^2
- office: 1 space per 40 m^2
- café: 1 space per 10 m^2.

Access

B3. Future developments on the site must meet the following requirements:

(a) internal roads, driveways and parking (including grades, turn paths, sight distance requirements, aisle widths, aisle lengths and parking bay dimensions) associated with the development are constructed and maintained in accordance with the latest version of Australian Standards *AS 1428.1 Design for Access and Mobility - General Requirements for Access - New Building Work*, AS 2890.1, AS 2890.2 and AS 2890.6;

(b) the swept path of the longest vehicle entering and exiting the site, as well as manoeuvrability through the site, is in accordance with the relevant Austroads guidelines;

(c) vehicles must not queue on the public road network;

(d) heavy vehicles and bins associated with the development are not parked on local roads or footpaths in the vicinity of the site;

(e) all vehicles are wholly contained on site before being required to stop;

(f) all loading and unloading of materials is carried out on-site;

(g) all vehicles enter and exit the site in a forward direction;

(h) all trucks entering or leaving the site with loads have their loads covered and do not track dirt onto the public road network; and

(i) the proposed turning areas in the car park are kept clear of any obstacles, including parked cars, at all times.

Bicycle Parking and End-of-Trip Facilities

B4. Bicycle parking and end-of-trip facilities is to be provided with suitable pedestrian connections linking these facilities with the offices/ warehouses in accordance with relevant guidelines and standards.

FUTURE FREIGHT NETWORK

B5. Future DAs must make appropriate provision for the freight network identified in the MRP DCP, including the alignment and width of the corridor and access to the network within the site, to the satisfaction of TfNSW.

STORMWATER MANAGEMENT

B6. Future development on the site must achieve compliance with the Integrated Water Cycle Management (IWCM) controls in the MRP DCP in accordance with the *Draft Technical Guidance for achieving Wianamatta South Creek*

Stormwater Management Targets (NSW Government, 2022). The Applicant must ensure sufficient land is reserved for stormwater management purposes, unless the Applicant provides evidence that an agreement is in place to demonstrate that the development is integrated into the regional stormwater system.

B7. Future DAs must include an update to the Stormwater Management Strategy (SMS) required under Condition D30(e). The strategy must:

(a) be prepared by a suitably qualified chartered professional engineer with experience in modelling, design, and supervision of WSUD systems in consultation with the relevant stormwater management authority;

(b) consider the approved or as modified stormwater management system for preceding stages of the development, including compliance of this system with the IWCM controls of the MRP DCP (refer to Condition D30);

(c) demonstrate the relevant stage can comply with the IWCM controls of the MRP DCP;

(d) include an assessment of any impacts on salinity and sodic soils from the future development including any proposed WSUD infrastructure; and

(e) detail what infrastructure may be required to connect to a precinct-wide stormwater management system for the relevant stage.

DEVELOPMENT CONTRIBUTIONS

B8. Prior to the issue of a Construction Certificate (or at a time otherwise permitted by the contributions plan or agreed by Council) for any future stage of the Development, the Applicant must pay contributions to Council as required in accordance with the Penrith City Mamre Road Precinct Development Contributions Plan 2022, or any other contributions plan as in force when the later consent takes effect.

Note: Subject to agreement between Council and the Applicant, local contributions may be satisfied by a planning agreement or works-in-kind agreement between Council and the Applicant.

B9. *The Environmental Planning and Assessment (Special Infrastructure Contribution – Western Sydney Aerotropolis) Determination 2022* requires special infrastructure contributions to be made for development on rezoned land within the Western Sydney Aerotropolis Special Infrastructure Contributions Area (within the meaning of that Determination). Accordingly, any special infrastructure contribution imposed by a condition of consent to a subsequent development application in relation to the site to which this consent applies is to be determined in accordance with that Determination, or any subsequent determination of the Minister under section 7.23 of the *Environmental Planning and Assessment Act 1979* (NSW), as in force when the later consent takes effect.

NOISE AND VIBRATION

B10. Future DAs must be accompanied by a Noise and Vibration Impact Assessment. The assessment must:

(a) identify the noise and vibration impacts during construction and operation;

(b) demonstrate compliance with the noise limits in Condition A16;

(c) provide an analysis of all external plant and equipment, including but not limited to, forklifts, air conditioners and refrigeration systems and on-site vehicle movements;

(d) incorporate noise mitigation measures, such as increased building setbacks, building insulation, noise barriers, layout of truck loading areas or source controls, to demonstrate the noise limits in Condition A16 can be achieved;

(e) recommend mitigation and management measures (excluding measures at receivers) to be implemented to minimise noise during construction and operation.

VISUAL AMENITY

Landscaping

B11. Landscaping design for future developments must comply with the relevant requirements under the MRP DCP.

B12. Future development must be accompanied by a Landscape Plan consistent with the key principles and plant species described in the Landscape Plans titled Aspect Industrial Estate, Mamre Road, Kemps Creek Landscape Masterplan, Dated October 2020.

Outdoor Lighting

B13. Future development must ensure compliance with Australian Standards *AS/NZS 1158.3.1:2005 Pedestrian Area (Category P) Lighting* and *AS/NZS 4282:2019 Control of Obtrusive Effects of Outdoor Lighting*.

Signage

B14. Future development must include details of any external advertising signage and demonstrate compliance with the requirements of Condition D40 and Chapter 3 of the State Environmental Planning Policy (Industry and Employment) 2021 (or any substituted SEPP).

Glazing

B15. The visible light reflectivity from building materials used in façades along Mamre Road and the internal road frontages must meet the minimum requirements of the MRP DCP.

BUSHFIRE PROTECTION

B16. The Applicant shall ensure future DAs comply with:

(a) the relevant provisions of *Planning for Bushfire Protection* (NSW RFS, 2019);

(b) the construction standards and asset protection zone requirements recommended in the Bushfire Assessment for the Proposed Aspect Industrial Estate, prepared by Australian Bushfire Protection Planners Pty Limited, dated 6 October 2020; and

(c) Australian Standard *AS2419.1-2005 Fire hydrant installations System design, installation, and commissioning*.

ENDEAVOUR ENERGY

B17. The Applicant must obtain relevant approvals from Endeavour Energy, or relevant service provider, prior to the construction of any electricity utility works to service each stage of the development.

SYDNEY WATER

B18. Before the commencement of operation of any future developments, the Applicant must obtain a Compliance Certificate for water and sewerage infrastructure servicing of the site under section 73 of the *Sydney Water Act 1994* (NSW).

EXTERNAL WALLS AND CLADDING

B19. The external walls of all future buildings must comply with the relevant requirements of the BCA.

B20. Future development involving the construction of external walls must ensure that the products and systems proposed for use or used in the construction of external walls (including finishes and claddings such as synthetic or aluminium composite panels) comply with the requirements of the BCA.

Note: Documentary evidence that these comply with the BCA will need to be provided to the Certifier prior to the issue of any construction certificate for these works and prior to the Occupation Certificate. A copy of the documentation given to the Certifier will also be required to be provided to the Planning Secretary within seven days after the Certifier accepts it.

PART C STAGE 1 DEVELOPMENT GENERAL CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

C1. In addition to meeting the specific performance measures and criteria in this consent, all reasonable and feasible measures must be implemented to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction and operation of the Stage 1 Development, and any rehabilitation required under this consent.

TERMS OF CONSENT

C2. The Stage 1 development may only be carried out:

(a) in compliance with the conditions of this consent;

(b) in accordance with all written directions of the Planning Secretary;

(c) in accordance with the EIS, RtS, and ADR;

(d) in accordance with the Modification Assessments;

(e) in accordance with the Development Layout in Appendix 2; and

(f) in accordance with the management and mitigation measures in Appendix 4.

C3. Consistent with the requirements in this consent, the Planning Secretary may make written directions to the Applicant in relation to:

(a) the content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this consent, including those that are required to be, and have been, approved by the Planning Secretary; and

(b) the implementation of any actions or measures contained in any such document referred to in condition C2(a).

C4. The conditions of this consent and directions of the Planning Secretary prevail to the extent of any inconsistency, ambiguity or conflict between them and a document listed in condition C2(c) or C2(f). In the event of an inconsistency, ambiguity or conflict between any of the documents listed in condition C2(c) or C2(f), the most recent document prevails to the extent of the inconsistency, ambiguity or conflict.

LIMITS OF CONSENT

Lapsing

C5. This consent lapses five years after the date from which it operates unless the Stage 1 Development has physically commenced on the land to which the consent applies before that date.

Maximum GFA

C6. The maximum GFA for the Stage 1 Development must not exceed the limits described in **Table 3**.

Table 3 *Maximum GFA for the Stage 1 Development*

Land Use	Maximum GFA (m^2)
Warehouse 1	
Warehouse and distribution centres and general industrial	32,686
Ancillary offices	1,200
Subtotal	**33,886**
Warehouse 3	
Warehouse and distribution centres and general industrial	20,735
Ancillary offices	800
Subtotal	**21,535**
Total	**55,421**

NOTIFICATION OF COMMENCEMENT

C7. The date of commencement of each of the following phases of the Stage 1 Development must be notified to the Department in writing, at least one month before that date:

(a) construction; and

(b) operation.

EVIDENCE OF CONSULTATION

C8. Where conditions of this consent require consultation with an identified party, the Applicant must:

(a) consult with the relevant party prior to submitting the subject document to the Planning Secretary for approval; and

(b) provide details of the consultation undertaken including:

(i) the outcome of that consultation, matters resolved and unresolved; and

(ii) details of any disagreement remaining between the party consulted and the Applicant and how the Applicant has addressed the matters not resolved.

STAGING, COMBINING AND UPDATING STRATEGIES, PLANS OR PROGRAMS

C9. With the approval of the Planning Secretary, the Applicant may:

(a) prepare and submit any strategy, plan or program required by this consent on a staged basis (if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program);

(b) combine any strategy, plan or program required by this consent (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined); and

(c) update any strategy, plan or program required by this consent (to ensure the strategies, plans and programs required under this consent are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the development).

C10. If the Planning Secretary agrees, a strategy, plan or program may be staged or updated without consultation being undertaken with all parties required to be consulted in the relevant condition in this consent.

C11. If approved by the Planning Secretary, updated strategies, plans, or programs supersede the previous versions of them and must be implemented in accordance with the condition that requires the strategy, plan or program.

PROTECTION OF PUBLIC INFRASTRUCTURE

C12. Before the commencement of construction, the Applicant must:

(a) consult with the relevant owner and provider of services that are likely to be affected by the Stage 1 Development to make suitable arrangements for access to, diversion, protection, and support of the affected infrastructure;

(b) prepare a dilapidation report identifying the condition of all public infrastructure in the vicinity of the site (including roads, gutters, and footpaths); and

(c) submit a copy of the dilapidation report to the Planning Secretary and TfNSW.

C13. Unless the Applicant and the applicable authority agree otherwise, the Applicant must:

(a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by carrying out the development; and

(b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development.

DEMOLITION

C14. All demolition must be carried out in accordance with *Australian Standard AS 2601-2001 The Demolition of Structures* (Standards Australia, 2001).

STRUCTURAL ADEQUACY

C15. All new buildings and structures, and any alterations or additions to existing buildings and structures, that are part of the development, must be constructed in accordance with the relevant requirements of the Building Code of Australia (BCA).

Note:

- *Under Part 6 of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works.*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of the development.*

SUBDIVISION

C16. Prior to the issuing of a Subdivision Certificate for any stage of the development, detailed work-as-executed drawings shall be prepared and signed by a Registered Surveyor, which show the finished surface levels of the access road,

internal roads, drainage, and any areas of fill, carried out under this consent. The work-as-executed drawing must be submitted to the Certifier and Council prior to the issue of a Subdivision Certificate.

C17. Prior to the issuing of a Subdivision Certificate for any stage of the development, the Applicant must provide to the Certifier evidence that all matters required to be registered on title, including easements, have been lodged for registration or registered at the Land Registry Services.

C18. Prior to the issuing of a Subdivision Certificates for any stage of the development, a certificate from an electricity and telecommunications provider must be submitted to the Certifier certifying that satisfactory service arrangements to the site have been established.

COMPLIANCE

C19. The Applicant must ensure that all of its employees, contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the conditions of this consent relevant to activities they carry out in respect of the development.

DEVELOPMENT CONTRIBUTIONS

C20. Prior to the issue of a Construction Certificate (or at a time otherwise permitted by the contributions plan or otherwise agreed by Council) for any building in the Stage 1 Development, the Applicant must pay contributions to Council in accordance with the Penrith City Mamre Road Precinct Development Contributions Plan 2022.

Note: subject to agreement between Council and the Applicant, local contributions may be satisfied by a planning agreement or works-in-kind agreement between Council and the Applicant.

C21. A special infrastructure contribution must be made in accordance with the Environmental Planning and Assessment (Special Infrastructure Contribution – Western Sydney Aerotropolis) Determination 2022 (2022 Determination) as in force when this development consent takes effect, for the first stage of development to which this consent applies.

A person may not apply for a subdivision certificate or construction certificate (as the case may require, having regard to the 2022 Determination) in relation to the first stage of development unless the person provides, with the application, written evidence from the Department of Planning and Environment that the special infrastructure contribution for the first stage of development (or that part of the development for which the certificate is sought) has been made or that arrangements are in force with respect to the making of the contribution.

A special infrastructure contribution may also be required to be made for further development that consists of, or involves, development on rezoned land within the meaning of the 2022 Determination on the site to which this consent applies.

Any special infrastructure contribution imposed by a condition of consent to a subsequent development application is to be determined in accordance with the 2022 Determination, or any subsequent determination of the Minister under section 7.23 of the Environmental Planning and Assessment Act 1979, as in force when that later consent takes effect.

More information

A request for assessment by the Department of Planning and Environment of the amount of the contribution that is required under this condition can be made through the NSW planning portal (https://www.planningportal.nsw.gov.au/development-assessment/contributions/sic-online-service). Please refer enquiries to SIContributions@planning.nsw.gov.au.

OPERATION OF PLANT AND EQUIPMENT

C22. All plant and equipment used on site, or to monitor the performance of the Stage 1 Development, must be:

(a) maintained in a proper and efficient condition;

(b) noise amelioration featured; and

(c) operated in a proper and efficient manner.

EXTERNAL WALLS AND CLADDING

C23. The external walls of all buildings including additions to existing buildings must comply with the relevant requirements of the BCA.

C24. Prior to the issue of:

(a) any Construction Certificate relating to the construction of external walls (including the installation of finishes and claddings such as synthetic or aluminium composite panels); and

(b) an Occupation Certificate, the Applicant must provide the Certifier with documented evidence that the products and systems proposed for use or used in the construction of external walls (including finishes and claddings such as synthetic or aluminium composite panels) comply with the requirements of the BCA.

C25. The Applicant must provide a copy of the documentation given to the Certifier to the Planning Secretary within seven days after the Certifier accepts it.

UTILITIES AND SERVICES

C26. Before the construction of any utility works associated with the Stage 1 Development, the Applicant must obtain relevant approvals from service providers.

C27. Before the commencement of operation of the development, the Applicant must obtain a Compliance Certificate for water and sewerage infrastructure servicing of the site under section 73 of the *Sydney Water Act 1994* (NSW).

C28. Before the issue of a Subdivision or Construction Certificate for any stage of the development, the Applicant (whether or not a constitutional corporation) is to provide evidence, satisfactory to the Certifier, that arrangements have been made for:

(a) the installation of fibre-ready facilities to all individual lots and/or premises in a real estate development project to enable fibre to be readily connected to any premises that is being or may be constructed on those lots; and

(b) the provision of fixed-line telecommunications infrastructure in the fibre-ready facilities to all individual lots and/or premises in a real estate development project demonstrated through an agreement with a carrier.

C29. Before the issue of the final Occupation Certificate the Applicant must demonstrate that the carrier has confirmed in writing they are satisfied that the fibre ready facilities are fit for purpose.

WORKS AS EXECUTED PLANS

C30. Before the issue of the final Occupation Certificate, works-as-executed drawings signed by a registered surveyor demonstrating that the stormwater drainage and finished ground levels have been constructed as approved, must be submitted to the Principal Certifier.

ENVIRONMENTAL REPRESENTATIVE

C31. The Applicant must engage an Environmental Representative (ER) to oversee construction of the Stage 1 Development. Unless otherwise agreed to by the Planning Secretary, construction of the Stage 1 development must not commence until an ER has been approved by the Planning Secretary and engaged by the Applicant. The approved ER must:

(a) be a suitably qualified and experienced person who was not involved in the preparation of the EIS, RtS, ADR, and any additional information for the Stage 1 Development and is independent from the design and construction personnel for the Stage 1 Development;

(b) receive and respond to communication from the Planning Secretary in relation to the environmental performance of the Stage 1 development;

(c) consider and inform the Planning Secretary on matters specified in the terms of this consent;

(d) consider and recommend to the Applicant any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community;

(e) review the CEMP required in Condition E2 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this consent and if so:

(i) make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary); or

(ii) make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary/Department for information or are not required to be submitted to the Planning Secretary/Department);

(f) regularly monitor the implementation of the CEMP to ensure implementation is being carried out in accordance with the document and the terms of this consent;

(g) as may be requested by the Planning Secretary, help plan, attend or undertake audits of the development commissioned by the Department including scoping audits, programming audits, briefings, and site visits;

(h) as may be requested by the Planning Secretary, assist the Department in the resolution of community complaints;

(i) provide advice to the Applicant on the management and coordination of construction works on the site with adjoining sites in the Mamre Road Precinct in relation to construction traffic management, earthworks and sediment control and noise;

(j) attend the Mamre Road Precinct Working Group (see Condition C34) in a consultative role in relation to the environmental performance of the Stage 1 development; and

(k) prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an **Environmental Representative Quarterly Report** providing the information set out in the Environmental

Representative Protocol under the heading 'Environmental Representative Quarterly Reports'. The **Environmental Representative Quarterly Report** must be submitted within seven calendar days following the end of each quarter for the duration of the ER's engagement for the development, or as otherwise agreed with the Planning Secretary.

C32. The Applicant must provide the ER with all documentation requested by the ER in order for the ER to perform their functions specified in condition C31 (including preparation of the ER monthly report), as well as:

(a) the complaints register (to be provided on a daily basis); and

(b) a copy of any assessment carried out by the Applicant of whether proposed work is consistent with the consent (which must be provided to the ER before the commencement of the subject work).

C33. The Planning Secretary may at any time commission an audit of an ER's exercise of its functions under condition E16. The Applicant must:

(a) facilitate and assist the Planning Secretary in any such audit; and

(b) make it a term of their engagement of an ER that the ER facilitate and assist the Planning Secretary in any such audit.

MAMRE ROAD PRECINCT WORKING GROUP

C34. Within three months of the commencement of construction of the Stage 1 Development and until all components of the Stage 1 development are constructed and operational, the Applicant must establish and participate in a working group with relevant consent holders in the MRP, to the satisfaction of the Planning Secretary. The purpose of the working group is to consult and coordinate construction works within the MRP to assist with managing and mitigating potential cumulative environmental impacts. The working group must:

(a) comprise at least one representative of the Applicant, the Applicant's ER, and relevant consent holders in the MRP;

(b) meet periodically throughout the year to discuss, formulate and implement measures or strategies to improve monitoring, coordination of the approved industrial developments in the MRP;

(c) regularly inform Council, TfNSW, Sydney Water and the Planning Secretary of the outcomes of these meetings and actions to be undertaken by the working group;

(d) review the performance of approved industrial developments in the MRP and identify trends in the data with respect to cumulative construction traffic, erosion and sediment control, noise, stormwater management and waterway health objectives under the MRP DCP;

(e) review community concerns or complaints with respect to environmental management;

(f) identify interim traffic safety measures to manage construction traffic and how these measures will be coordinated, communicated, funded and monitored in the MRP; and

(g) provide the Planning Secretary with an update and strategies, if a review under subclause (d) and (e) identifies additional measures and processes are required to be implemented by the working group.

C35. Three (3) months prior to completion of construction of all components of the Stage 1 development, the Applicant is eligible to exit the working group required under condition C34. The Applicant must:

(a) consult with the Planning Secretary;

(b) provide confirmation that all components of the Stage 1 development are operational; and

(c) advise on the date of the proposed exit.

APPLICABILITY OF GUIDELINES

C36. References in the conditions of this consent to any guideline, protocol, Australian Standard, or policy are to such guidelines, protocols, standards, or policies in the form they are in as at the date of this consent.

C37. However, consistent with the conditions of this consent and without altering any limits or criteria in this consent, the Planning Secretary may, when issuing directions under this consent in respect of ongoing monitoring and management obligations, require compliance with an updated or revised version of such a guideline, protocol, Standard or policy, or a replacement of them.

ADVISORY NOTES

AN1. All licences, permits, approvals and consents as required by law must be obtained and maintained as required for the development. No condition of this consent removes any obligation to obtain, renew or comply with such licences, permits, approvals and consents.

PART D STAGE 1 DEVELOPMENT SPECIFIC ENVIRONMENTAL CONDITIONS

TRAFFIC AND ACCESS

Construction Traffic Management Plan

D1. Prior to the commencement of construction of the Stage 1 Development, the Applicant must prepare a Construction Traffic Management Plan (CTMP) for the development to the satisfaction of the Planning Secretary. The plan must form part of the CEMP required by condition E2 and must:

(a) be prepared by a suitably qualified and experienced person(s);

(b) be prepared in consultation with Council and TfNSW;

(c) detail the traffic management and contingency measures that are to be implemented for the site, particularly during the construction works for the Mamre Road/Access Road 1 intersection, to ensure access to the site and road safety and network efficiency is maintained, including interim traffic safety controls and management measures;

(d) detail heavy vehicle routes, access, and parking arrangements;

(e) include a Driver Code of Conduct to:

(i) minimise the impacts of earthworks and construction on the local and regional road network;

(ii) minimise conflicts with other road users;

(iii) minimise road traffic noise; and

(iv) ensure truck drivers use specified routes;

(f) include a program to monitor the effectiveness of these measures; and

(g) if necessary, detail procedures for notifying residents and the community (including local schools), of any potential disruptions to routes.

D2. The Applicant must:

(a) not commence construction until the CTMP required by condition D1 is approved by the Planning Secretary; and

(b) implement the most recent version of the CTMP approved by the Planning Secretary for the duration of construction.

Operational Traffic Monitoring Program

D3. Prior to commencement of operation of Building 1 or 3 and for a minimum period of 12 months of operation, the Applicant must establish an Operational Traffic Monitoring Program. The program must verify light and heavy vehicle traffic numbers, including the heavy vehicle volumes limited by Condition D3A, against the prediction in the Aspect Industrial Estate, Mamre Road Precinct – Modification 2 to State Significant Development Application (SSD-10448) Traffic Impact Assessment prepared by Ason Group, dated 25 July 2022. The Program must also monitor the effectiveness of the traffic management measures to the satisfaction of the Planning Secretary and include but not be limited to the following:

(a) detail the numbers and frequency of truck movements, sizes of trucks, vehicle routes and hours of operation;

(b) queue monitoring at the Mamre Road/Access Road 1 intersection and background travel counts on Mamre Road;

(c) verify the predicted traffic numbers and level of service against the actual impacts of the Stage 1 Development, and analyse the potential cause of any significant discrepancies;

(d) consider the current capacity and efficiency of the existing road network including Mamre Road; and

(e) include procedures for the reporting and monitoring of results to evaluate the traffic performance of the Stage 1 Development.

D3A. The Applicant must ensure the total number of hourly heavy vehicles entering Warehouse 1 from Access Road 1 does not exceed 22 or is in line with Part 6 of Austroads Standards Guide to Traffic Management, whichever is lesser.

Internal Access Roads

D4. Prior to the commencement of any construction works for Building 1 or 3 (excluding site-wide bulk earthworks) as described in the ADR, the Applicant must:

(a) prepare a concept design of the Stage 1 Phase 2 road works in accordance with the design requirements in the MRP DCP and in consultation with the relevant roads authority, to the satisfaction of the Planning Secretary; and

(b) consult with the relevant roads authority concerning the processes for dedication of the lands for the internal Access Roads 1 and 3 (North and South) including the roundabout shown in Figure 1: in Appendix 1.

D5. Within one month of registration of lot(s) for internal Access Roads 1 and 3 including the roundabout at the Land Registry Services, the Applicant must notify the Planning Secretary that the lands for the internal Access Roads 1 and 3 (North and South) has been dedicated.

D6. Prior to issue of an Occupation Certificate for Building 1 or 3 (whichever is the first), the Applicant must construct and operate the Stage 1 Phase 1 road works shown in **Figure 4:** in **Appendix 2** to the satisfaction of relevant road authority.

D7. Within six months of the approval of this consent or as otherwise agreed by the Planning Secretary, the Applicant must prepare and submit the following plans to facilitate the construction and delivery of Access Road 3 – North, in consultation with Council and landowner of 784-786 Mamre Road, Kemps Creek (Lot 59 DP259135), and to the satisfaction of the Planning Secretary:

(a) a Staging Plan for the riparian corridor realignment works and Access Road 3 – North construction, including:

i. details of the scope of works to be undertaken on the site and the adjoining site at 784-786 Mamre Road, Kemps Creek (Lot 59 DP259135) (see **Figure 4:**);

ii. details of how the further riparian corridor realignment and road construction works at the junction between the site and 784-786 Mamre Road, Kemps Creek (Lot 59 DP259135) will be coordinated and delivered;

iii. an arrangement on timing of the works; and

(b) a detailed design plan of Access Road 3 – North prepared in accordance with the design requirements under the MRP DCP.

Note: The detailed design of Access Road 3 - North and any changes to the approved riparian corridor alignment may require modification(s) to SSD-10448 or separate DA(s).

D8. Prior to issue of an Occupation Certificate for any other buildings or warehouses in the Development, the Applicant must ensure the Stage 1 Phase 2 road works are constructed and operational.

D9. The Applicant must ensure that the portion of Access Road 3 – North to be located on the site is constructed and operational in accordance with the design plans required under Condition D7.

Access Arrangements

D10. Prior to the commencement of construction of any works (excluding bulk earthworks) for Buildings 1 or 3, the Applicant must submit design plans to the satisfaction of the relevant roads authority, which demonstrates the proposed accesses to the development are designed to accommodate the turning path of a 30 m PBS Level 2 vehicle.

D11. Prior to the commencement of any construction works (excluding bulk earthworks) for Warehouse 1 as described in the EIS, the Applicant must prepare and submit design plans in consultation with TfNSW, FRNSW, and Council, and to the satisfaction of the Planning Secretary, demonstrating access to the development from Access Road 1 complies with relevant FRNSW and TfNSW access requirements.

D11A. The Applicant must ensure:

(a) Warehouse 1 driveway on Access Road 1 is used by inbound heavy vehicles only;

(b) Warehouse 3 driveway on Access Road 1 adjacent Warehouse 2 is used by inbound heavy vehicles only;

(c) Warehouse 3 driveway on Access Road 1 opposite Warehouse 8 car park driveway is used by fire engines only; and

(d) Warehouse 3 driveway on Access Road 2 is used by outbound heavy vehicles, inbound and outbound light vehicles.

D11B. Prior to the commencement of operation of Warehouse 3, the Applicant must:

(a) install stop signs at Warehouse 3 where the loading area adjoins the private driveway to the north of the Warehouse 3 building; and

(b) finish line-marking of the private driveway to the north of the Warehouse 3 building.

Mamre Road/Access Road 1 intersection works

D12. Prior to the Applicant entering into a Works Authorisation Deed (WAD) required by condition D13 the Applicant must:

(a) obtain landowners consent and enter into an agreement with the owner(s) of 833B Mamre Road, Kemps Creek (Lot 28, DP258414) to relocate or remove an existing gated driveway on that property outside of the footprint of the Mamre Road/Access Road 1 intersection signals to the satisfaction of Council and the Planning Secretary;

(b) provide a copy of the landowner's consent and signed agreement described under condition D12(a) to TfNSW and the Planning Secretary; and

(c) remove and relocate the driveway in accordance with the agreement.

D13. The Applicant must enter into a Works Authorisation Deed for the Mamre Road/Access Road 1 intersection works with TfNSW. The WAD must be executed prior to the submission of the detailed design required by condition D12 to TfNSW for approval.

D13A. The Applicant must enter into a WAD with TfNSW for establishing a temporary left in/left out construction access and left-turn lane on Mamre Road to be used by vehicles during Stage 1 construction. The WAD must:

(a) include details of the removal of the temporary left in/left out construction access and left-turn lane on Mamre Road; and

(b) be executed prior to commencement of construction of the temporary left in/left out construction access and left-turn lane on Mare Road.

D13B. The Applicant must: ensure the temporary left in/left out construction access and left turn lane is:

(a) ensure the temporary left in/left out construction access and left-turn lane are maintained at no cost to TfNSW;

(b) remove the temporary left in/left out construction access and left-turn lane at the completion and commissioning of the Mamre Road/Access Road 1 intersection, at no cost to TfNSW; and

(c) reinstate shoulder along Mamre Road within three months of satisfying Condition D6, at cost to TfNSW.

D14. Prior to the issue of a construction certificate for the Mamre Road/Access Road 1 intersection (the intersection) construction, the Applicant must finalise and submit the detailed design of the intersection works, including an endorsed Traffic Signal Plan (TSP) to TfNSW for approval. The TSP must:

(a) demonstrate the proposed traffic control light at the intersection is designed in accordance with Austroads Guide to Road Design, RMS Signal Design Manual, and Australian Codes of Practice; and

(b) be approved and endorsed by a suitably qualified practitioner.

D15. The Applicant must obtain a Road Occupancy Licence (ROL) from TfNSW Transport Management Centre for any works that may impact on traffic flows on Mamre Road during construction.

Redundant Driveways on Mamre Road

D16. The Applicant must remove redundant driveways on Mamre Road within the site's boundaries and replace with kerb and gutter to match existing in accordance with TfNSW requirements. Detailed design plans of the proposed kerb and gutter are to be submitted to TfNSW for approval prior to the issue of a Construction Certificate and commencement of any road works within Mamre Road.

Structural integrity of road infrastructure

D17. Prior to commencement of any works on Mamre Road, the Applicant must prepare and submit detailed design plans and hydraulic calculations of any changes to the stormwater drainage system to TfNSW for approval.

D18. At least six weeks prior to commencement of bulk earthworks within Mamre Road, the Applicant must submit design drawings and documents relating to the excavation of the site and support structures in accordance with TfNSW Technical Direction GTD2012/001.

D19. Should the Applicant propose to excavate below the level of the base of the footings of the adjoining roads and driveways, at least seven days prior to commencement of excavation, the Applicant must provide notice of the intention to excavate below the base of the footings to owner(s) of that roads and driveways. The notice must include complete details of the proposed excavation including but not limited to the extent and duration of works.

Parking

D20. The Applicant must provide sufficient parking facilities on-site, including for heavy vehicles and for site personnel, to ensure that traffic associated with the development does not utilise public and residential streets or public parking facilities.

Operating Conditions

D21. The Applicant must ensure:

(a) internal roads, driveways and parking (including grades, turn paths, sight distance requirements, aisle widths, aisle lengths and parking bay dimensions) associated with the development are constructed and maintained in accordance with the latest version of *AS 2890.1:2004 Parking facilities Off-street car parking* (Standards Australia, 2004) and *AS 2890.2:2002 Parking facilities Off-street commercial vehicle facilities* (Standards Australia, 2002);

(b) the swept path of the longest vehicle entering and exiting the site, as well as manoeuvrability through the site, is in accordance with the relevant AUSTROADS guidelines;

(c) the development does not result in any vehicles queuing on the public road network;

(d) heavy vehicles and bins associated with the development are not parked on local roads or footpaths in the vicinity of the site;

(e) all vehicles are wholly contained on site before being required to stop;

(f) all loading and unloading of materials is carried out on-site;

(g) all trucks entering or leaving the site with loads have their loads covered and do not track dirt onto the public road network; and

(h) the proposed turning areas in the car park are kept clear of any obstacles, including parked cars, at all times.

Workplace Travel Plan

D22. Prior to the commencement of operation of any part of the development, the Applicant must prepare a Workplace Travel Plan and submit a copy to the Planning Secretary. The Workplace Travel Plan must form part of the OEMP required by condition E5 and must:

(a) be prepared in consultation with TfNSW and Council;

(b) outline facilities and measures to promote public transport usage, such as car share schemes and employee incentives; and

(c) describe pedestrian and bicycle linkages and end of trip facilities available on-site.

D23. The Applicant must implement the most recent version of the Workplace Travel Plan for the duration of the development.

SOILS, WATER QUALITY AND HYDROLOGY

Imported Soil

D24. The Applicant must:

(a) ensure that only VENM, ENM, or other material approved in writing by the EPA is brought onto the site;

(b) keep accurate records of the volume and type of fill to be used; and

(c) make these records available to the Planning Secretary upon request.

Erosion and Sediment Control

D25. Prior to the commencement of any construction or other surface disturbance, the Applicant must design and detail the erosion and sediment control measures for the site to ensure the construction phase IWCM controls in the MRP DCP are achieved. Detailed Erosion and Sediment Control Plans (ESCP) and drawings must:

(a) be prepared by a Chartered Professional Erosion and Sediment Control (CPESC) specialist;

(b) be prepared in accordance with *Managing Urban Stormwater: Soils and Construction – Volume 1: Blue Book* (Landcom, 2004) and with the WSUD design principles set out in the *Draft Technical Guidance for achieving Wianamatta South Creek Stormwater Management Targets* (NSW Government, 2022);

(c) demonstrate the construction approach and timing to ensure the construction phase stormwater quality targets can be met; and

(d) be included in the CEMP required by condition E2.

D26. The Applicant must ensure delivery and operation of all construction phase erosion and sediment controls on the site is supervised and certified by a CPESC. Monthly audits are to be completed by CPESC and kept on record for the duration of the construction and an additional 12 months following completion of construction works. Discharge Limits

Discharge Limits

D27. The development must comply with section 120 of the POEO Act, which prohibits the pollution of waters, except as expressly provided for in an EPL.

Stormwater Management System

D28. Prior to the commencement of operation of the development, the Applicant must implement the Stormwater Management System described in the ADR amended by Modification Assessments and as shown in Figure 2 in Appendix 2. The design and subsequent construction and establishment of the WSUD systems must be supervised and certified by a suitably qualified chartered professional engineer with experience in modelling, design, and supervision of WSUD systems.

D29. All stormwater infrastructure, including bio-retention basins, shall remain under the ownership, control, and care of the registered proprietor of the lots. Upstream drainage catchment pipes are to be located outside of the public road reserve and remain in private ownership, in accordance with Council requirements.

Stormwater Management Plan

D30. Within three (3) months prior to the commencement of operation of either Building 1 or 3 of the Stage 1 Development, the Applicant must prepare a Stormwater Management Plan (SMP) to the satisfaction of the Planning Secretary. The SMP must:

(a) be prepared by a suitably qualified chartered professional engineer with experience in modelling, design, and supervision of WSUD systems whose appointment has been endorsed by the Planning Secretary;

(b) be prepared in consultation with the Environment and Heritage, Sydney Water, DPE, and Council;

(c) describe the baseline soil, surface water and groundwater conditions at the site;

(d) detail a monitoring program to monitor:

(i) surface water flows and quality;

(ii) surface water storage and use;

(iii) sediment basin operation;

(iv) the performance of the Stage 1 stormwater management system to demonstrate compliance with the IWCM controls in the MRP DCP;

(e) detail a stormwater management strategy and designs of each WSUD system, including:

(i) description of how the requirements and objectives of the IWCM controls of the DCP will be achieved, including provisions for how stormwater will be managed and monitored;

(ii) details of how the Stage 1 Development will be designed and developed so it can potentially connect to precinct-wide stormwater infrastructure, if required

(iii) engineering drawings completed and certified by a chartered professional engineer with experience in modelling, design, and supervision of WSUD systems that detail the WSUD measures;

(iv) landscape drawings that include planting and hardscape details of the WSUD systems;

(f) include a protocol for investigation of any non-compliances of the IWCM controls in the MRP DCP controls described in condition D30(d) and continency measures that would be implemented should issues arise;

(g) include evidence that the design and mix of WSUD infrastructure has considered ongoing operation and maintenance, including a detailed lifecycle cost assessment (including capital, operation/maintenance, and renewal costs over 30 years); and

(h) include a Maintenance Plan for WSUD measures.

D31. The Applicant must:

(a) not commence the operation of the development until the SMP required by condition D30 is approved by the Planning Secretary;

(b) implement the most recent version of the SMP approved by the Planning Secretary for the duration of the development; and

(c) ensure all WSUD systems are constructed under the supervision of a suitably qualified chartered professional engineer with experience in modelling, design, and supervision of WSUD systems.

Easements and Maintenance

D32. Prior to the issue of any Occupation Certificate, a restriction on the use of land and positive covenant relating to the:

(a) stormwater management system (including on-site detention and water sensitive urban design)

(b) trunk drainage

shall be registered on the title of the property. The restriction on the use of land and positive covenant shall be in Council's standard wording as detailed in Council's Stormwater Specification for Building Developments - Appendix F, available on Council's Website.

D33. The stormwater management system must continue to be operated and maintained in perpetuity for the life of the development in accordance with the final operation and maintenance management plan. Regular inspection records are required to be maintained and made available Council on request. All necessary improvements are required to be made immediately upon awareness of any deficiencies in the stormwater management systems.

Dam Decommissioning Strategy

D34. Prior to commencement of construction of the Stage 1 Development, the Applicant must implement the Dam Decommissioning Strategy included in the EIS. The Applicant must implement the most recent version of the Dam Decommissioning Strategy for the duration of construction.

Groundwater Management Plan

D35. Prior to commencement construction of the Stage 1 Development, the Applicant must implement the Groundwater Management Plan included in the EIS. The Applicant must implement the most recent revision of the Groundwater Management Plan for the duration of the development.

Salinity Management

D36. The Applicant must prepare a Salinity Management Plan, which must form part of the CEMP in accordance with Condition E2, that addresses all aspects of the Stage 1 development. The Applicant must implement the most recent revision of the Salinity Management Plan for the duration of construction.

VISUAL AMENITY

Landscaping

D37. Prior to the commencement of operation, the Applicant must prepare a Landscape Management Plan to manage the revegetation and landscaping works on-site, to the satisfaction of the Planning Secretary. The plan must form part of an OEMP in accordance with condition E5. The plan must:

(a) detail the species to be planted on-site;

(b) demonstrate the species are suitable in relation to wildlife management in proximity to the future Western Sydney Airport;

(c) describe the monitoring and maintenance measures to manage revegetation and landscaping works; and

(d) be consistent with the Applicant's Management and Mitigation Measures detailed at Appendix 4.

D38. The Applicant must:

(a) not commence operation until the Landscape Management Plan is approved by the Planning Secretary.

(b) must implement the most recent version of the Landscape Management Plan approved by the Planning Secretary; and

(c) maintain the landscaping and vegetation on the site in accordance with the approved Landscape Management Plan required by condition D37 for the life of the development.

Lighting

D39. The Applicant must ensure the lighting associated with the development:

(a) complies with the latest version of AS 4282-1997 - *Control of the obtrusive effects of outdoor lighting* (Standards Australia, 1997); and

(b) is mounted, screened, and directed in such a manner that it does not create a nuisance to surrounding properties or the public road network.

Signage and Fencing

D40. All signage and fencing must be erected in accordance with the development plans included in the ADR.

Note: *This condition does not apply to temporary construction and safety related signage and fencing.*

NOISE

Hours of Work

D41. The Applicant must comply with the hours detailed in **Table 4**, unless otherwise agreed in writing by the Planning Secretary.

Table 4 *Hours of Work*

Activity	Day	Time
Earthworks and construction	Monday – Friday Saturday	7 am to 6 pm 8 am to 1 pm
Operation	Monday – Sunday	24 hours

D42. Works outside of the hours identified in condition D41 may be undertaken in the following circumstances:

(a) works that are inaudible at the nearest sensitive receivers;

(b) works agreed to in writing by the Planning Secretary;

(c) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or

(d) where it is required in an emergency to avoid the loss of lives, property or to prevent environmental harm.

Construction Noise Limits

D43. The development must be constructed to achieve the construction noise management levels detailed in *the Interim Construction Noise Guideline* (DECC, 2009) (as may be updated or replaced from time to time). All feasible and reasonable noise mitigation measures must be implemented and any activities that could exceed the construction noise management levels must be identified and managed in accordance with the management and mitigation measures in the Appendix 4.

Construction Noise Management Plan

D44. The Applicant must prepare a Construction Noise Management Plan (CNMP) for the development to the satisfaction of the Planning Secretary. The Plan must form part of a CEMP in accordance with condition E2 and must:

(a) be prepared by a suitably qualified and experienced noise expert whose appointment has been endorsed by the Planning Secretary;

(b) be approved by the Planning Secretary prior to the commencement of construction of each phase of the development;

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

(d) describe the measures to be implemented to manage high noise generating works, in close proximity to sensitive receivers, particularly for noise mitigation eligible receivers shown in **Figure 7:** in **Appendix 5**, including but not limited to the following:

(i) details of a real-time noise monitoring system to identify occurrence of highly noise affected levels as defined in the *Interim Construction Noise Guideline*; and

(ii) describe procedures for implementing respite periods and temporary relocation following identification of highly noise affected levels.

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

D45. The Applicant must:

(a) not commence construction of any relevant stage until the CNMP required by condition D44 is approved by the Planning Secretary; and

(b) implement the most recent version of the CNMP approved by the Planning Secretary for the duration of construction.

Noise Agreement

D46. Prior to the commencement of operation of the Stage 1 development an, the Applicant must enter into an agreement with the noise mitigation eligible receivers shown in **Figure 6** in **Appendix 4**.

D47. Prior to the commencement of operation of the Stage 1 development, the Applicant must submit copies of the noise agreements required under Condition D46 to the Planning Secretary.

D48. The noise agreement required under Condition D46 must be in force until the existing residential use ceases on the land subject to the agreement or a development application for general industrial or other employment uses applies to the land, whichever is the sooner.

Vibration Criteria

D49. Vibration caused by construction at any residence or structure outside the site must be limited to:

(a) for structural damage, the criteria set in the latest version of *DIN 4150-3:2016-12 Vibration in Buildings – Part 3: Effects on Structures* (German Institute for Standardisation, 2016); and

(b) for human exposure, the acceptable vibration values set out in the *Environmental Noise Management Assessing Vibration: a technical guideline* (DEC, 2006) (as may be updated or replaced from time to time).

D50. The Applicant must offer and, if the offer is accepted, implement monitoring of vibration levels during construction at 884-902 Mamre Road (Lot 53 DP259135), to the satisfaction of the Planning Secretary. Any vibration monitoring must be undertaken during the entirety of the construction period. If the criteria in Condition D49 are exceeded, management and mitigation measures must be developed and implemented to address any exceedances.

Dilapidation Reporting

D51. Prior to commencement of construction, the Applicant must offer and prepare (if the offer is accepted) a pre-construction dilapidation report at 884-902 Mamre Road (Lot 53 DP259135). The report must be submitted to the Planning Secretary and the relevant property owner(s) prior to construction works commencing on the site.

Operational Noise Limits

D52. The Applicant must:

(a) establish five (5) noise monitoring locations at the site's boundaries as shown in **Appendix 3** prior to commencement of operation of the Stage 1 Development; and

(b) undertake noise monitoring at the five locations to confirm that noise generated by the operation of the Stage 1 Development does not exceed the noise limits in **Table 5**.

(c) ensure the cumulative noise emission of fixed mechanical plant for each warehouse building must be no more than 90 dBA and must not exhibit tonal characteristic or strong low frequency content.

Table 5 *Stage 1 Development Operational Noise Limits dB(A)*

Location	Day	Evening	Night	
	$L_{Aeq\ (15\ minute)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	L_{Amax}
NML 1	37	37	37	48
NML 2	49	49	46	58
NML 3	48	48	46	58
NML 4	46	46	44	56
NML 5	66	66	62	82

Note:

- *Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry (EPA, 2017) (as may be updated or replaced from time to time).*

Noise Verification Report

D53. Within three months of the commencement of operation of the Stage 1 Development, the Applicant must submit a noise verification report to the satisfaction of the Planning Secretary. The report must be prepared by a suitably qualified and experienced acoustic consultant and include:

(a) an analysis of compliance with noise limits specified in condition D52;

(b) an outline of mitigation and management measures to reduce any exceedances of the limits specified in condition D52 (excluding measures to be implemented at the receivers); and

(c) a description of contingency measures in the event management actions are not effective in reducing noise levels to an acceptable level.

AIR QUALITY

Dust Minimisation

D54. The Applicant must take all reasonable steps to minimise dust generated during all works authorised by this consent.

D55. During construction, the Applicant must ensure that:

(a) exposed surfaces and stockpiles are suppressed by regular watering;

(b) all trucks entering or leaving the site with loads have their loads covered;

(c) trucks associated with the development do not track dirt onto the public road network;

(d) public roads used by these trucks are kept clean; and

(e) land stabilisation works are carried out progressively on site to minimise exposed surfaces.

Construction Air Quality Management Plan

D56. Prior to the commencement of construction, the Applicant must prepare a Construction Air Quality Management Plan (CAQMP) to the satisfaction of the Planning Secretary. The CAQMP must form part of the CEMP required by condition E2 and must:

(a) be prepared by a suitably qualified and experienced person(s);

(b) detail and rank all emissions from all sources during construction of the development, including particulate emissions;

(c) describe a program that is capable of evaluating the performance of the construction and determining compliance with key performance indicators;

(d) identify the control measures that that will be implemented for each emission source; and

(e) nominate the following for each of the proposed controls:

(i) key performance indicator;

(ii) monitoring method;

(iii) location, frequency, and duration of monitoring;

(iv) record keeping;

(v) complaints register;

(vi) response procedures; and

(vii) compliance monitoring.

D57. The Applicant must:

(a) not commence construction until the CAQMP required by condition D56 is approved by the Planning Secretary; and

(b) implement the most recent version of the CAQMP approved by the Planning Secretary for the duration of the development.

Odour Management

D58. The Applicant must ensure the development does not cause or permit the emission of any offensive odour (as defined in the POEO Act).

ABORIGINAL HERITAGE

Statutory Requirements

D59. Prior to the commencement of construction of Stage 1 development, the Applicant must register identified Aboriginal items or objects on the Heritage NSW Aboriginal Heritage Information Management System (AHIMS) Aboriginal Sites Register.

Archaeological Salvage

D60. Prior to the commencement of construction of Stage 1, the Applicant must engage a suitably qualified and experienced expert to undertake an archaeological salvage excavation of the MAM AS 1901. The Applicant must undertake the salvage excavation in accordance with the requirements of Heritage NSW, and must:

(a) implement the methodology for the reburial of all salvaged Aboriginal objects within the site detailed in the Reburial Methodology, prepared by artefact, dated 26 February 2021; and

(b) provide the Registered Aboriginal Parties (RAPs) an opportunity to collect Aboriginal objects across the site.

D61. The Applicant must prepare an archaeological report of the salvage excavation undertaken in accordance with Condition D60. An interim report of the salvage excavation must be provided to the satisfaction of the Planning Secretary within one month of completion of the salvage work and a final report provided within 12 months of completion of the salvage work.

Unexpected Finds Protocol

D62. If any item or object of Aboriginal heritage significance is identified on site:

(a) all work in the immediate vicinity of the suspected Aboriginal item or object must cease immediately;

(b) a 10 m wide buffer area around the suspected item or object must be cordoned off; and

(c) Heritage NSW must be contacted immediately.

D63. Work in the immediate vicinity of the Aboriginal item or object may only recommence in accordance with the provisions of Part 6 of the *National Parks and Wildlife Act 1974* (NSW).

HISTORIC HERITAGE

Unexpected Finds Protocol

D64. If any archaeological relics are uncovered during the course of the work, then all works must cease immediately in that area. Unexpected finds must be evaluated and recorded in accordance with the requirements of Heritage NSW and details included in the salvage excavation report required under Condition D60(b).

BIODIVERSITY

D65. Prior to any clearing or construction works the Applicant must purchase and retire 1 ecosystem credit to offset the removal of *Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion* and 3 species credits to offset the removal of *Myotis macropus* at the site. The ecosystem and species credits must be retired in accordance with the requirements of the E&H Group's Biodiversity Offsets Scheme and the *Biodiversity Conservation Act 2016* (NSW).

D66. The requirement to retire ecosystem and species credits (see Condition D65) may be satisfied by payment to the Biodiversity Conservation Fund of an amount equivalent to the number and classes of ecosystem and species credits, as calculated by the E&H Group's Biodiversity Offsets Payment Calculator.

D67. The Applicant must provide the Planning Secretary with evidence that:

(a) the retirement of ecosystem credits has been completed (see Condition D65); or

(b) a payment has been made to the Biodiversity Conservation Fund (see Condition D66),

prior to undertaking any clearing of native vegetation and *Myotis macropus* habitat.

D68. Prior to commencement of dam dewatering and construction of the Stage 1 Development, the Applicant must implement the Flora and Fauna Management Plan included in the RtS. The Applicant must implement the most recent revision of the Flora and Fauna Management Plan for the duration of construction works.

Vegetation Management Plan – Riparian Corridor

D69. Within six (6) months of the commencement of operation, the Applicant must complete the revegetation of the realigned riparian corridor in accordance with the Vegetation Management Plan (VMP) included in the RTS and ensure that the realigned riparian corridor provides for a full hierarchy of appropriate ground cover, shrubs and trees. The Applicant must implement the most recent version of the VMP for a maintenance period of up to five years following the completion of the establishment phase of the VMP.

HAZARDS AND RISK

Dangerous Goods

D70. The quantities of dangerous goods stored and handled at the site must be below the threshold quantities listed in the Department of *Planning's Hazardous and Offensive Development Application Guidelines – Applying SEPP 33* at all times.

Bunding

D71. The Applicant must store all chemicals, fuels and oils used on-site in appropriately bunded areas in accordance with the requirements of all relevant Australian Standards, and/or EPA's *Storing and Handling of Liquids: Environmental Protection – Participants Manual* (Department of Environment and Climate Change, 2007).

WASTE MANAGEMENT

Pests, Vermin and Noxious Weed Management

D72. The Applicant must:

(a) implement suitable measures to manage pests, vermin and declared noxious weeds on the site; and

(b) inspect the site on a regular basis to ensure that these measures are working effectively, and that pests, vermin or noxious weeds are not present on site in sufficient numbers to pose an environmental hazard or cause the loss of amenity in the surrounding area.

Note: For the purposes of this condition, noxious weeds are those species subject to an order declared under the Biosecurity Act 2015 (NSW).

Waste Storage and Processing

D73. Prior to the commencement of construction of Building 1 and 2, the Applicant must obtain agreement from Council for the design of the waste storage area for each warehouse.

D74. Waste must be secured and maintained within designated waste storage areas at all times and must not leave the site onto neighbouring public or private properties.

Waste Management Plan

D75. The Applicant must implement the Waste Management Plan (WMP) prepared by MRA Consulting Group, dated 30 September 2020 in the EIS for the duration and construction and operation of Stage 1 of the development.

Statutory Requirements

D76. All waste materials removed from the site must only be directed to a waste management facility or premises lawfully permitted to accept the materials.

Unexpected Finds

D77. Prior to the commencement of earthworks, the Applicant must prepare an unexpected contamination procedure to ensure that potentially contaminated material is appropriately managed. The procedure must form part of the of the CEMP in accordance with condition E2 and must ensure any material identified as contaminated and is required to be removed from the site must be disposed off-site, with the disposal location and results of testing submitted to the Planning Secretary, prior to its removal.

PART E STAGE 1 DEVELOPMENT ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Management Plan Requirements

E1. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:

(a) detailed baseline data;

(b) details of:

(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);

(ii) any relevant limits or performance measures and criteria; and

(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;

(c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;

(d) a program to monitor and report on the:

(i) impacts and environmental performance of the development; and

(ii) effectiveness of the management measures set out pursuant to paragraph (c) above;

(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;

(f) a program to investigate and implement ways to improve the environmental performance of the development over time;

(g) a protocol for managing and reporting any:

(i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);

(ii) complaint;

(iii) failure to comply with statutory requirements; and

(h) a protocol for periodic review of the plan.

Note: *the Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans*

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

E2. The Applicant must prepare a Construction Environmental Management Plan (CEMP) in accordance with the requirements of condition E1 and to the satisfaction of the Planning Secretary.

E3. As part of the CEMP required under condition E2 of this consent, the Applicant must include the following:

(a) Construction Traffic Management Plan (see condition D1);

(b) Erosion and Sediment Control Plan (see condition D25);

(c) Salinity Management Plan (see condition D33);

(d) Construction Noise Management Plan (see condition D44);

(e) Construction Air Quality Management Plan (see condition D56);

(f) Vegetation Management Plan (see Condition D69);

(g) Contamination Unexpected finds procedure (see Condition D77);

(h) Waste Management Plan (see condition D75); and

(i) Community Consultation and Complaints Handling.

E4. The Applicant must:

(a) not commence construction of the development until the CEMP is approved by the Planning Secretary; and

(b) carry out the construction of the development in accordance with the CEMP approved by the Planning Secretary and as revised and approved by the Planning Secretary from time to time.

OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

E5. The Applicant must prepare an Operational Environmental Management Plan (OEMP) in accordance with the requirements of condition E1 and to the satisfaction of the Planning Secretary.

E6. As part of the OEMP required under condition E5 of this consent, the Applicant must include the following:

(a) describe the role, responsibility, authority, and accountability of all key personnel involved in the environmental management of the development;

(b) describe the procedures that would be implemented to:

(i) keep the local community and relevant agencies informed about the operation and environmental performance of the development;

(ii) receive, handle, respond to, and record complaints;

(iii) resolve any disputes that may arise;

(iv) respond to any non-compliance;

(v) respond to emergencies; and

(c) include the following environmental management plans:

(i) Operational Traffic Monitoring Program (see condition **Error! Reference source not found.**);

(ii) Workplace Travel Plan (see condition D22);

(iii) Landscape Management Plan (see condition D37);

(iv) Stormwater Management Plan (see condition D30);

(v) Vegetation Management Plan (see Condition D69); and

(vi) Waste Management Plan (see condition D75).

E7. The Applicant must:

(a) not commence operation until the OEMP is approved by the Planning Secretary; and

(b) operate the development in accordance with the OEMP approved by the Planning Secretary (and as revised and approved by the Planning Secretary from time to time).

REVISION OF STRATEGIES, PLANS AND PROGRAMS

E8. Within three months of:

(a) the submission of a Compliance Report under condition E14;

(b) the submission of an incident report under condition E10;

(c) the approval of any modification of the conditions of this consent; or

(d) the issue of a direction of the Planning Secretary under condition C2(b) which requires a review,

the strategies, plans and programs required under this consent must be reviewed, and the Planning Secretary must be notified in writing that a review is being carried out.

E9. If necessary to either improve the environmental performance of the development, cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary. Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within six weeks of the review.

Note: *This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.*

REPORTING AND AUDITING

Incident Notification, Reporting and Response

E10. The Planning Secretary must be notified in writing via the Major Projects website immediately after the Applicant becomes aware of an incident. The notification must identify the development (including the development application number and the name of the development if it has one) and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix 6.

Non-Compliance Notification

E11. The Planning Secretary must be notified in writing to the Major Projects website within seven days after the Applicant becomes aware of any non-compliance.

E12. A non-compliance notification must identify the development and the application number for it, set out the condition of consent that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

E13. A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

Compliance Reporting

E14. Within three months after the commencement of construction of the Stage 1 Development, and in the same month each subsequent year (or such other timing as agreed by the Planning Secretary) for the duration of construction works, the Applicant must submit a Compliance Report to the Department reviewing the environmental performance of the development to the satisfaction of the Planning Secretary. Compliance Reports must be prepared in accordance with the Compliance Reporting Post Approval Requirements (Department 2020) and must also:

(a) identify any trends in the monitoring data over the life of the development;

(b) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and

(c) describe what measures will be implemented over the next year to improve the environmental performance of the development.

E15. The Applicant must make each Compliance Report publicly available no later than 60 days after submitting it to the Planning Secretary and notify the Planning Secretary in writing at least 7 days before this is done.

Monitoring and Environmental Audits

E16. Any condition of this consent that requires the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the EP&A Act. This includes conditions in respect of incident notification, reporting and response, non-compliance notification, compliance reporting and independent auditing.

Note: *For the purposes of this condition, as set out in the EP&A Act, "monitoring" is monitoring of the development to provide data on compliance with the consent or on the environmental impact of the development, and an "environmental audit" is a periodic or particular documented evaluation of the development to provide information on compliance with the consent or the environmental management or impact of the development.*

ACCESS TO INFORMATION

E17. At least 48 hours before the commencement of construction until the completion of all works under this consent, the Applicant must:

(a) make the following information and documents (as they are obtained or approved) publicly available on its website:

(i) the documents referred to in condition C2 of this consent;

(ii) all current statutory approvals for the development;

(iii) all approved strategies, plans and programs required under the conditions of this consent;

(iv) the proposed staging plans for the development if the construction, operation or decommissioning of the development is to be staged;

(v) regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent;

(vi) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;

(vii) a summary of the current stage and progress of the development;

(viii) contact details to enquire about the development or to make a complaint;

(ix) a complaints register, updated monthly;

(x) the Compliance Report of the development;

(xi) audit reports prepared as part of any Independent Audit of the development and the Applicant's response to the recommendations in any audit report;

(xii) any other matter required by the Planning Secretary; and

(b) keep such information up to date, to the satisfaction of the Planning Secretary.

APPENDIX 1 CONCEPT PROPOSAL

Table 6 *Schedule of Approved Plans – Concept Proposal*

Drawing No	Title	Issue	Date
Architectural Plan prepared by SBA Architects			
MP 02	Aspect Industrial Estate Lots 54-58 (DP 259135) Mamre Road, Kemps Creek – SSDA MOD2 Estate Masterplan	G	28/11/2022
Landscape Plan prepared by Site Image Landscape Architects			
003	Aspect Industrial Estate Kemps Creek Landscape Masterplan MOD 2	H	21/10/2022
Tree Canopy Plan prepared by Site Image Landscape Architects			
MOD2_SK001	Kemps Creek Lots 54-58 DP259135 Mamre Road Kemps Creek NSW Tree Canopy Plan	L	28/11/2022

Figure 1: *Concept Proposal*

MOD2 CANOPY COVER				
	Area (m2)	10% Canopy Cover	Current Canopy Cover	Current % Canopy Cover
Total Site Area	558,323	55,832.30		
Warehouse 1	61,170	6,117.00	6,372.30	10.4%
Warehouse 2	40,172	4,017.20	3,533.00	8.8%
Warehouse 3	42,755	4,275.50	4,338.10	10.1%
Warehouse 4	41,365	4,136.50	4,429.80	10.7%
Warehouse 5	28,160	2,816.00	2,449.30	8.7%
Warehouse 6	37,371	3,737.10	2,547.50	6.8%
Warehouse 7	37,622	3,762.20	2,107.10	5.6%
Warehouse 8	49,112	4,911.20	3,286.60	6.7%
Warehouse 9	35,135	3,513.50	3,681.38	10.5%
Warehouse 10	33,332	3,333.20	1,791.00	5.4%
Warehouse 11	38,830	3,880.00	3,091.40	8.0%
Sub-total (Warehouse alotments)	**444,994.00**	**44,499.40**	**37,627.48**	**8.5%**
Stormwater Lot	18,190	1,819.00	8,003.76	44.0%
Riparian Zone (Less C2 area)	20,988	2,098.80	14,084.10	67.1%
Total (Excluding public roads and C2 Land)	**484,172**	**48,417.20**	**59,715.34**	**12.3%**
C2 Land	12,772	1,277.20	6,386.00	50.0%
Public Roads	47,375	4,737.50	6,542.00	13.8%
C2 Land	14,004			
Total (Including public roads and C2 Land)	558,323	55,832.30	72,643	13.0%

The contractor shall check and verify all work on site (including work by others) before commencing the landscape installation. Any discrepancies are to be reported to the Project Manager or Landscape Architect prior to commencing work. Do not scale this drawing. Any required dimensions not shown shall be referred to the Landscape Architect for confirmation.

Issue	Revision Description	Drawn	Check	Date
L	Revised For Comments	JW	NM	28.11.2022
K	Revised For Comments	JW	NM	25.11.2022
J	Riparian Canopy Revisions	JW	NM	23.11.2022
I	Response to Comments	RH	NM	07.11.2022
H	Response to Comments	RH	NM	02.11.2022
G	Architectural Coordination	RH	NM	21.10.2022
F	Architectural Coordination	RH	NM	20.10.2022
E	MOD 2 Tree Canopy Areas	RH	NM	15.09.2022
D	Architectural Coordination	RH	NM	14.07.2022
C	Response to Comments	RH	NM	22.06.2022
B	MOD1 Tree Canopy Areas	RH	NM	17.06.2022
A	MOD1 Tree Canopy Areas	JW	NM	09.06.2022

Client:
Mirvac

Project:
Kemps Creek
Lots 54-58 DP259135 Mamre Road
Kemps Creek NSW

Level 1, 3-5 Baptist Street
Redfern NSW 2016
Australia

Tel: (61 2) 8332 5600
Fax: (61 2) 9580 2877
www.siteimage.com.au

Site Image (NSW) Pty Ltd
ABN 44 801 262 360

SITE IMAGE
Landscape Architects

PRELIMINARY

Drawing Name:
Tree Canopy Plan

Scale: 1:2000 @ A1
0 10 20 50 100m

Job Number: SS19-4178
Drawing Number: MOD2_SK001
Issue: L

NOT FOR CONSTRUCTION
A1

***Figure 1A**: Tree Canopy Plan*

APPENDIX 2 STAGE 1 DA PLANS

Table 7 Schedule of Approved Plans – Stage 1 DA Plans

Drawing No	Title	Issue	Date
Architectural Plan prepared by SBA Architects			
DA100	Aspect Industrial Estate Lots 54-58 (DP 259135) Mamre Road, Kemps Creek – Overall Site Plan	W	30/11/2022
DA101	Aspect Industrial Estate Lots 54-58 (DP 259135) Mamre Road, Kemps Creek – Signage Plan	G	05/08/2022
DA110	Aspect Industrial Estate Lots 54-58 (DP 259135) Mamre Road, Kemps Creek – Lot 1 Site & Warehouse Floor Plan	DD	19/10/2022
DA310	Aspect Industrial Estate Lots 54-58 (DP 259135) Mamre Road, Kemps Creek – Lot 3 Site & Warehouse Floor Plan	M	19/10/2022

Figure 2: *Stage 1 Plan*

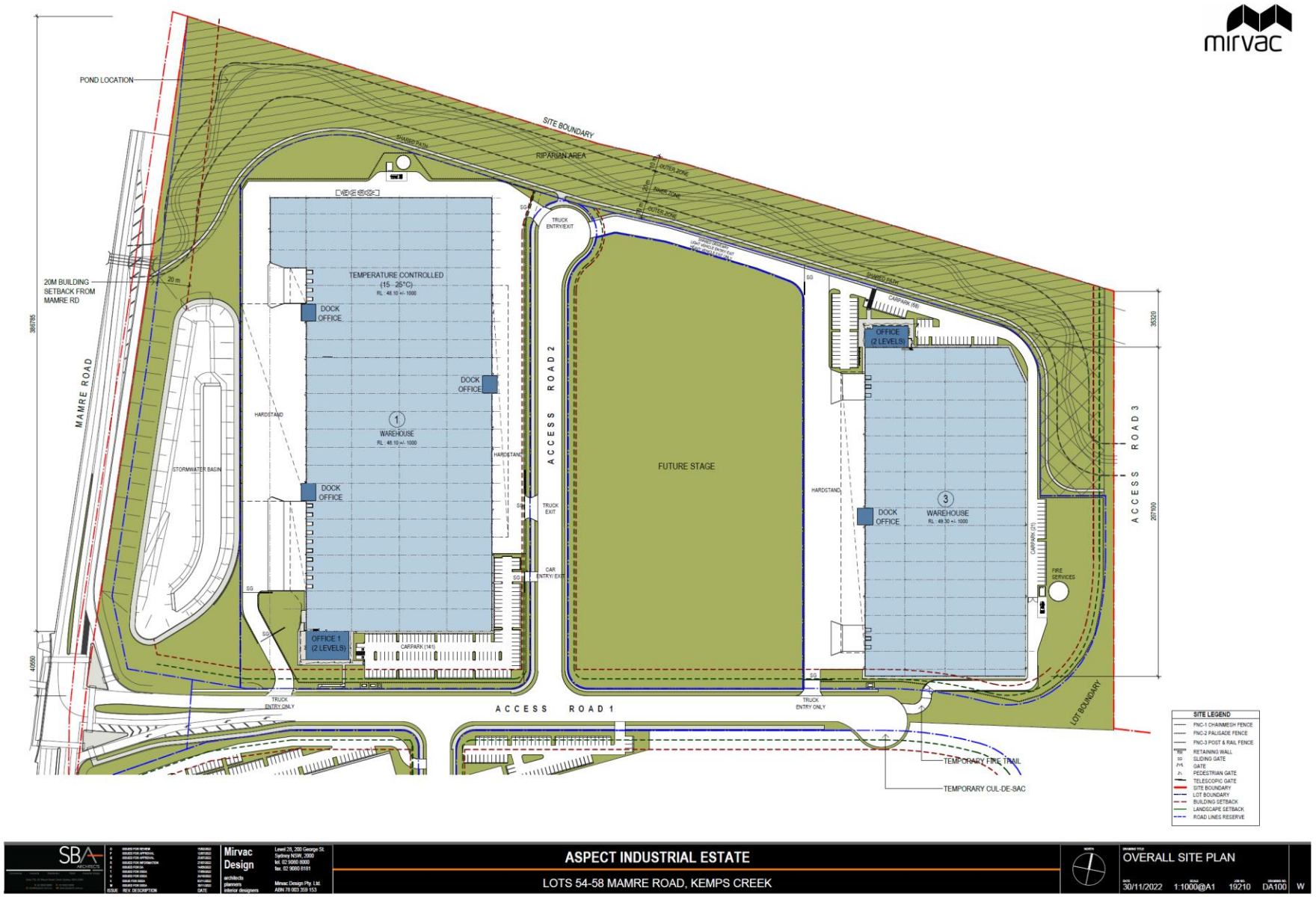

***Figure 2A**: Stage 1 Phase 1 Plan*

Figure 3: *Stage 1 Landscape Plan*

Figure 4: *Stage 1 Development Road Works Phasing Plan*

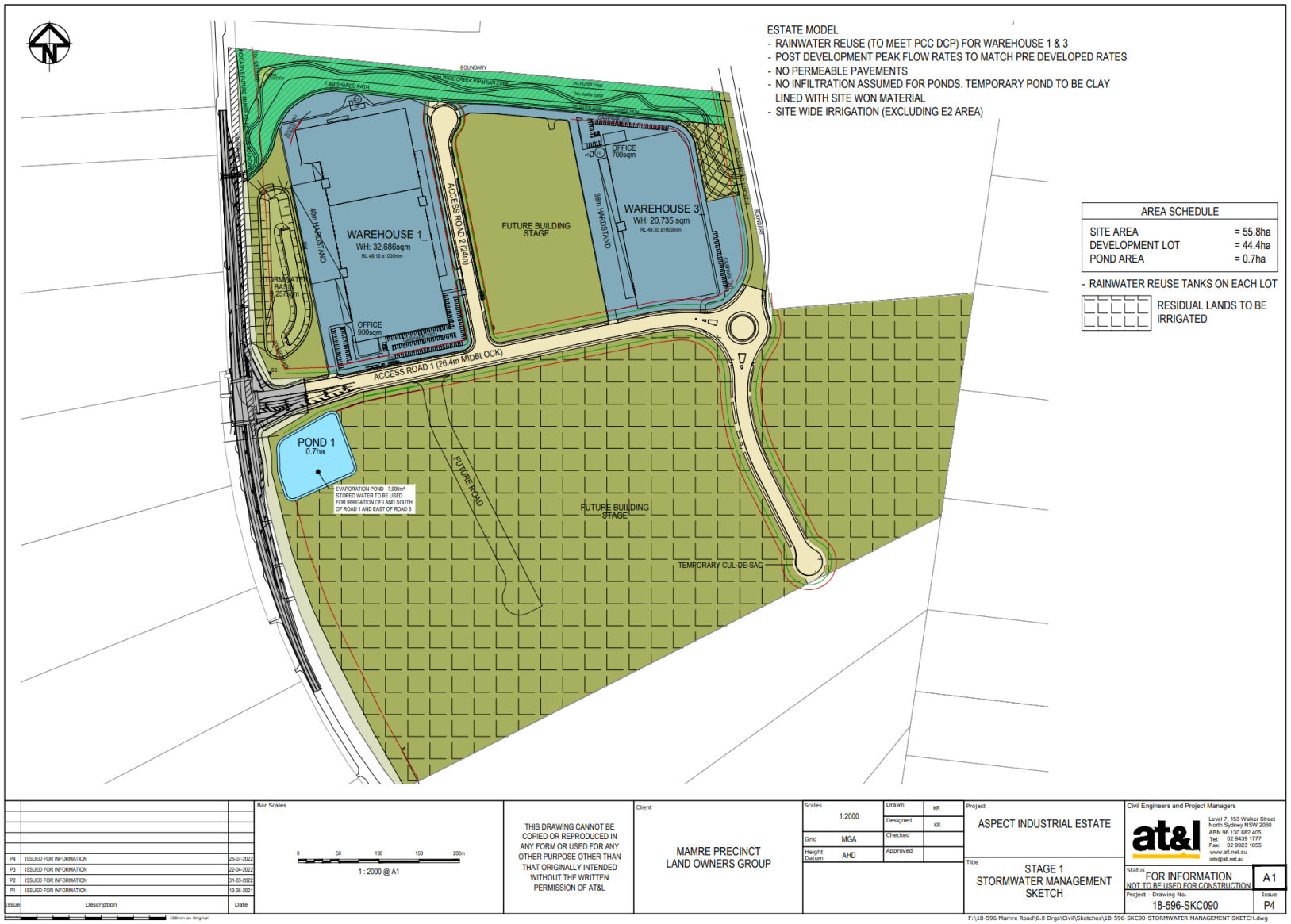

Figure 5: *Stage 1 Stormwater Management Plan*

APPENDIX 3 NOISE MONITORING LOCATIONS

Figure 6: *Noise Monitoring Locations Plan*

APPENDIX 4 NOISE MITIGATION ELIGIBLE RECEIVERS LOCATIONS

Figure 7: *Noise mitigation eligible receivers to the west of Mamre Road*

APPENDIX 5 APPLICANT'S MANAGEMENT AND MITIGATION MEASURES

Issue	SSD DA Component	Mitigation and Management
Construction Management		
General Construction Management	Stage 1 Development	▪ A CEMP to be prepared for the AIE Stage 1 Development capturing standard and specific management and mitigation measures as described in the SSD DA, EIS and supporting technical documents.
Operational Management		
General Operational Management	Concept Masterplan Stage 1 Development	▪ An OEMP to be prepared for the AIE capturing standard and specific operational management and mitigation measures as described in the SSD DA, EIS and supporting technical documents.
Transport		
Construction Traffic	Stage 1 Development	▪ Preparation of a CTMP to form part of the CEMP addressing issues such as: – Track haul routes, delivery schedules and curfews; – Protocols for the management of construction traffic moving onto and off the site.
Urban Design and Visual		
Site Layout and Design	Concept Masterplan	▪ Future development of the AIE to proceed in accordance with the approved Concept Proposal and DCP.
Development Controls	Concept Masterplan	▪ Design and development controls to be established for

Issue	SSD DA Component	Mitigation and Management
		the AIE in the form of a DCP to guide future development on the site.
Visual Impact	Concept Masterplan Stage 1 Development	▪ Design and development controls to be established for the AIE in the form of a DCP to guide future development on the site. ▪ Landscaping of key interfaces including western boundary to minimise visual impact.
Soils and Water		
Water Usage	Stage 1 Development	▪ Rainwater tanks to be provided for each development site with size determined in accordance with the Penrith City Council DCP requirements. ▪ Irrigation and toilet flushing for development to be plumbed to rainwater tanks. ▪ Consideration to be given to other possible rainwater reuse opportunities such as truck washing. ▪ Measures and considerations for the minimisation of water use during construction and operation to be incorporated into CEMP and OEMP as relevant.
Soils	Stage 1 Development	▪ Mitigation measures inherent to the civil design of the proposal. ▪ Sediment and erosion control measures are proposed as detailed in **Appendix F** and **Appendix G**.
Salinity	Stage 1 Development	▪ A Salinity Management Plan to be prepared for the proposed development.

Issue	SSD DA Component	Mitigation and Management
		▪ Management measures described in the Salinity Management Plan to be adopted in the CEMP and OEMP as relevant.
Contamination	Stage 1 Development	▪ Identified areas of potential contamination to be subject to further investigation prior to the development of affected land. ▪ Adoption of unexpected finds procedure for hazardous and contaminated materials management and removal during demolition and excavation.
Earthworks	Stage 1 Development	▪ Civil design achieves appropriate site levels with minimal impact on hydrology. ▪ Import of fill to be managed in accordance with CEMP. ▪ Erosion and sediment control measures included in SSD DA package (**Appendix F** and **Appendix G**).
Mineral Resources	Concept Masterplan	▪ No mitigation required. Proposed development does not impact existing mining leases in the area.
Surface Water	Stage 1 Development	▪ Stormwater issues addressed through design measures incorporated into proposed development. ▪ Stormwater management system designed to meet the requirements of Penrith City Council's Engineering Works and WSUD guidelines, and relevant NOW guidelines. ▪ Detailed on-lot stormwater for future stages of the AIE to be

Issue	SSD DA Component	Mitigation and Management
		designed and assessed under future applications.
Groundwater	Stage 1 Development	▪ Methods and management of any required dam dewatering required, as outlined in **Appendix W**, during construction works to be detailed in the CEMP.
Flooding	Stage 1 Development	▪ OSD designed to ensure that development does not increase stormwater peak flows in downstream areas for events up to and including 1:100 year ARI. ▪ OSD designed to mitigate post-development flows to pre-development flows for peak ARI events. ▪ Finished floor levels to have a minimum 500mm freeboard to 100 year overland flows.
Water Quality	Stage 1 Development	▪ Erosion and sediment controls as detailed in **Appendix F** and **Appendix G** to be implemented through CEMP. ▪ Stormwater to be treated to compliant levels prior to discharge. ▪ Gross Pollutant Trap (GPT) to be installed within each development site on the final downstream stormwater pit prior to discharge. ▪ WSUD measures adopted to achieve target reductions for the AIE: – 85% Total Suspended Solids – 60% Total Phosphorus – 45% Total Nitrogen – 90% Gross Pollutants

Issue	SSD DA Component	Mitigation and Management
Infrastructure		
Capacity and Upgrades	Concept Masterplan	▪ Management of issues in respect of infrastructure capacity and upgrades is in the form of design responses described in **Section 2.5.6** of the EIS.
Delivery and Staging	Concept Masterplan Stage 1 Development	▪ Management of issues in respect of infrastructure capacity and upgrades is in the form of design responses described in **Sections 2.4.7** and **2.5.6.** ▪ Staging of development of the AIE would be aligned with infrastructure and services delivery.
Other Environmental Issues		
Flora and Fauna	Concept Masterplan Stage 1 Development	▪ Implementation of the Biodiversity Offset Strategy for the site. ▪ Preparation of a Biodiversity Management Plan for the site to inform the CEMP and OEMP as relevant to manage potential impacts to biodiversity during construction and operation. ▪ Restoration of retained areas of vegetation including riparian corridors and the Biodiversity Offset Area; ▪ Native grassland restoration to other areas of the site including road batters and outside batters of bio-retention basins; and ▪ Ongoing maintenance and management of these areas in accordance with the provisions of the Biodiversity Offset Strategy.

Issue	SSD DA Component	Mitigation and Management
Waterways and Riparian Lands	Concept Masterplan Stage 1 Development	▪ Realignment of creek to occur in accordance with design and management measures described in **Appendix P** including: – Revegetation to use appropriate native aquatic macrophyte and River-flat Eucalypt-forest species within the riparian area. – Ongoing management of riparian lands on the site to be in accordance with the Vegetation Management Plan (**Appendix P**).
Construction Noise	Stage 1 Development	▪ Construction hours to be limited to 7:00am – 6:00pm Monday to Friday and 8:00am – 1:00pm Saturdays. ▪ Where construction noise levels are predicted to be above the NMLs, all feasible and reasonable work practices are investigated to minimise noise emissions. ▪ If construction noise levels are still predicted to exceed the NMLs, potential noise impacts would be managed via site specific construction noise management plans. ▪ Construction works should be conducted during standard construction hours, with OOHW minimised as far as reasonable and feasible. ▪ Locations for vibration intensive equipment should be reviewed during the preparation of the site specific Construction Noise and Vibration Management Plans (CNVMP) for construction works adjacent to sensitive receivers.

Issue	SSD DA Component	Mitigation and Management
		▪ Further noise management measures to be incorporated into the CEMP as appropriate.
Operational Noise	Stage 1 Development	▪ Further assessment of potential operational noise impacts to be undertaken in respect to any operations proposed within the AIE with an atypical noise profile.
Air Quality and Odour – Construction	Stage 1 Development	▪ CEMP to include standard air quality control measures, contingency plans and response procedure and suitable reporting and performance monitoring procedures. ▪ CEMP to include standard odour mitigation measures for construction including keeping excavation surfaces moist, covering excavation faces and/or stockpiles, use of soil vapour extraction systems and regular monitoring of discharges as appropriate.
Air Quality and Odour – Operational	Stage 1 Development	▪ Further assessment of potential air quality impacts to be undertaken in respect of any specific operations proposed within the AIE with an atypical air emissions profile. ▪ Specific operations proposed within the AIE with the potential for generation of odour would be subject to further assessment.
Indigenous Heritage	Stage 1 Development	▪ Archaeological salvage excavation and monitoring to be undertaken in the presence of relevant Aboriginal stakeholders prior to ground disturbance and

Issue	SSD DA Component	Mitigation and Management
		excavation work in identified areas. ▪ Result of detailed archaeological excavation and any suitable salvaged materials to be managed in accordance with the NPW Act and direction from relevant Aboriginal stakeholders. ▪ Implementation of Unexpected Finds Protocol.
Non-Indigenous Heritage	Stage 1 Development	▪ Constructions works to cease should artefacts be uncovered during ground disturbance and DPC-Heritage notified. ▪ Implementation of Unexpected Finds Protocol.
Greenhouse Gas and Energy Efficiency	Stage 1 Development	▪ Future stages of development within the AIE would be subject to assessment in relation to energy efficiency and greenhouse gas emissions.
Waste Management – Construction	Stage 1 Development	▪ Detailed construction waste minimisation and management measures to be included in the CEMP as described in **Appendix Y**.
Waste Management – Operations	Stage 1 Development	▪ Detailed construction waste minimisation and management measures to be included in the OEMP as described in **Appendix Y**.

APPENDIX 6 INCIDENT NOTIFICATION AND REPORTING REQUIREMENTS

WRITTEN INCIDENT NOTIFICATION REQUIREMENTS

1. A written incident notification addressing the requirements set out below must be submitted to the Planning Secretary via the Major Projects website within seven days after the Applicant becomes aware of an incident. Notification is required to be given under this condition even if the Applicant fails to give the notification required under condition E10 or, having given such notification, subsequently forms the view that an incident has not occurred.
2. Written notification of an incident must:
   a. identify the development and application number;
   b. provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
   c. identify how the incident was detected;
   d. identify when the applicant became aware of the incident;
   e. identify any actual or potential non-compliance with conditions of consent;
   f. describe what immediate steps were taken in relation to the incident;
   g. identify further action(s) that will be taken in relation to the incident; and
   h. identify a project contact for further communication regarding the incident.

INCIDENT REPORT REQUIREMENTS

3. Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Planning Secretary, the Applicant must provide the Planning Secretary and any relevant public authorities (as determined by the Planning Secretary) with a detailed report on the incident addressing all requirements below, and such further reports as may be requested.
4. The Incident Report must include:
   a. a summary of the incident;
   b. outcomes of an incident investigation, including identification of the cause of the incident;
   c. details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and
   d. details of any communication with other stakeholders regarding the incident.

APPENDIX B

Relevant Conditions of Consent

Table A Development Consent SSD 10448

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
PART A – CONDITIONS FOR CONCEPT PROPOSAL	
Terms of Consent	
A1. The development may only be carried out: a) in compliance with the conditions of this consent; b) in accordance with all written directions of the Planning Secretary; c) in accordance with the EIS, Response to Submissions (RtS), and Amended Development Report (ADR); d) In accordance with the Development Layout in Appendix 1; and e) in accordance with the management and mitigation measures in Appendix 4.	This CEMP has been prepared in accordance with these documents
A2. Consistent with the requirements in this consent, the Planning Secretary may make written directions to the Applicant in relation to: a) the content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this consent, including those that are required to be, and have been, approved by the Planning Secretary; and b) the implementation of any actions or measures contained in any such document referred to in condition A2(a).	Section 3.3
A3. The conditions of this consent and directions of the Planning Secretary prevail to the extent of any inconsistency, ambiguity or conflict between them and a document listed in condition A1(c) or A1(e). In the event of an inconsistency, ambiguity or conflict between any of the documents listed in condition A1(c) or A1(e), the most recent document prevails to the extent of the inconsistency, ambiguity or conflict.	Section 3.3
A9. The largest vehicle permitted to access the site is a 30 m Performance Based Standards (PBS) Level 2 Type B.	Construction Traffic Management Plan (Appendix I)
Staging Plan	
A10. Prior to the commencement of construction of any stage of the Concept Proposal, the Applicant shall prepare a Staging Plan for the Development, to the satisfaction of the Planning Secretary. The plan shall: a) be prepared in consultation with Council, utility and service providers and other relevant stakeholders; b) describe how the implementation of the Concept Proposal, would be staged to ensure it is carried out in an orderly and economic way and minimises construction impacts; c) show the likely sequence of DAs that will be lodged to develop the Site, with the estimated timing for each Stage and identification of any overlapping construction and operational activities; d) include concept design for the staged delivery of landscaping, focusing on early implementation of screen planting to minimise the visual impact of subsequent development stages; and e) include conceptual design for the provision of services, utilities and infrastructure to the Site, including stormwater management infrastructure and any future road upgrades.	Section 1.1 Section 1.2.4 Section 2.2
A11. The Applicant must: a) not commence construction of any stage of the Development until the Staging Plan required by Condition A12 is approved by the Planning Secretary; and b) implement the most recent version of the Staging Plan approved by the Planning Secretary.	Section 1.3.4

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
A12. The Planning Secretary may require the Applicant to address certain matters identified in the Staging Plan. The Applicant must comply with any such requirements of the Planning Secretary given as part of the Staging Plan approval. *Notes:* • *The Applicant may amend the Staging Plan as desired, with the approval of the Planning Secretary.* • *The Staging Plan is intended to broadly describe the development sequence for the Site and the delivery of infrastructure for all stages. It is not required to provide detailed design for latter Stages.*	Noted
Mamre Road Precinct Working Group	
A17. For the duration of construction works for each development under the Concept Proposal, and until all components of the development under the Concept Proposal are operational, the Applicant must participate in the Mamre Road Precinct Working Group with relevant consent holders in the MRP to the satisfaction of the Planning Secretary (see Condition C34 in Schedule 2).	Section 3.2
Evidence of Consultation	
A18. Where conditions of this consent require consultation with an identified party, the Applicant must: a) consult with the relevant party prior to submitting the subject document to the Planning Secretary for approval; and b) provide details of the consultation undertaken including: (i) the outcome of that consultation, matters resolved and unresolved; and (ii) details of any disagreement remaining between the party consulted and the Applicant and how the Applicant has addressed the matters not resolved.	Section 1.3.4
Staging, Combining and Updating Strategies, Plans or Programs	
A19. With the approval of the Planning Secretary, the Applicant may: a) prepare and submit any strategy, plan or program required by this consent on a staged basis (if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program); b) combine any strategy, plan or program required by this consent (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined); and c) update any strategy, plan or program required by this consent (to ensure the strategies, plans and programs required under this consent are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the development).	Section 6
A20. If the Planning Secretary agrees, a strategy, plan or program may be staged or updated without consultation being undertaken with all parties required to be consulted in the relevant condition in this consent.	Section 6
A21. If approved by the Planning Secretary, updated strategies, plans, or programs supersede the previous versions of them and must be implemented in accordance with the condition that requires the strategy, plan, or program.	Section 6
Advisory Notes	
AN1. All licences, permits, approvals and consents as required by law must be obtained and maintained as required for the development. No condition of this consent removes any obligation to obtain, renew or comply with such licences, permits, approvals and consent.	Section 3.3

<table>
<tr><th>Relevant Consent Conditions SSD 10448</th><th>Where Addressed in CEMP</th></tr>
<tr><td colspan="2">PART C – STAGE 1 DEVELOPMENT GENERAL CONDITIONS</td></tr>
<tr><td colspan="2">Obligation to Minimise Harm to the Environment</td></tr>
<tr><td>C1. In addition to meeting the specific performance measures and criteria in this consent, all reasonable and feasible measures must be implemented to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction and operation of the Stage 1 Development, and any rehabilitation required under this consent.</td><td>Section 1.2.1
Section 3.2
Section 3.4.1
Section 4.1</td></tr>
<tr><td colspan="2">Terms of Consent</td></tr>
<tr><td>C2. The Stage 1 development may only be carried out:
a) in compliance with the conditions of this consent;
b) in accordance with all written directions of the Planning Secretary;
c) in accordance with the EIS, RtS, and ADR;
d) in accordance with the Development Layout in Appendix 2; and
e) in accordance with the management and mitigation measures in Appendix 4.</td><td>Section 3.3</td></tr>
<tr><td>C3. Consistent with the requirements in this consent, the Planning Secretary may make written directions to the Applicant in relation to:
a) the content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this consent, including those that are required to be, and have been, approved by the Planning Secretary; and
b) the implementation of any actions or measures contained in any such document referred to in condition C2(a).</td><td>Section 3.3</td></tr>
<tr><td>C4. The conditions of this consent and directions of the Planning Secretary prevail to the extent of any inconsistency, ambiguity or conflict between them and a document listed in condition C2(c) or C2(e). In the event of an inconsistency, ambiguity or conflict between any of the documents listed in condition C2(c) or C2(e), the most recent document prevails to the extent of the inconsistency, ambiguity or conflict.</td><td>Section 3.3</td></tr>
<tr><td colspan="2">Limits of Consent</td></tr>
<tr><td colspan="2">Maximum GFA</td></tr>
<tr><td>C6. The maximum GFA for the Stage 1 Development must not exceed the limits described in Table 3.
Table 3 Maximum GFA for the Stage 1 Development
<table>
<tr><th>Land Use</th><th>Maximum GFA (m²)</th></tr>
<tr><td>Warehouse 1</td><td></td></tr>
<tr><td>Warehouse and distribution centres and general industrial</td><td>32,686</td></tr>
<tr><td>Ancillary offices</td><td>1,200</td></tr>
<tr><td>Subtotal</td><td>33,886</td></tr>
<tr><td>Warehouse 3</td><td></td></tr>
<tr><td>Warehouse and distribution centres and general industrial</td><td>20,735</td></tr>
<tr><td>Ancillary offices</td><td>800</td></tr>
<tr><td>Subtotal</td><td>21,535</td></tr>
<tr><td>Total</td><td>55,421</td></tr>
</table>
</td><td>Noted</td></tr>
</table>

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
Notification of Commencement	
C7. The date of commencement of each of the following phases of the Stage 1 Development must be notified to the Department in writing, at least one month before that date: a) construction; and b) operation.	Section 1.3.4
Evidence of Consultation	
C8. Where conditions of this consent require consultation with an identified party, the Applicant must: a) consult with the relevant party prior to submitting the subject document to the Planning Secretary for approval; and b) provide details of the consultation undertaken including: (i) the outcome of that consultation, matters resolved and unresolved; and (ii) details of any disagreement remaining between the party consulted and the Applicant and how the Applicant has addressed the matters not resolved.	Section 1.3.4
Staging, Combining and Updating Strategies, Plans or Programs	
C9. With the approval of the Planning Secretary, the Applicant may: a) prepare and submit any strategy, plan or program required by this consent on a staged basis (if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program); b) combine any strategy, plan or program required by this consent (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined); and c) update any strategy, plan or program required by this consent (to ensure the strategies, plans and programs required under this consent are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the development).	Section 6
C10. If the Planning Secretary agrees, a strategy, plan or program may be staged or updated without consultation being undertaken with all parties required to be consulted in the relevant condition in this consent.	Section 6
C11. If approved by the Planning Secretary, updated strategies, plans, or programs supersede the previous versions of them and must be implemented in accordance with the condition that requires the strategy, plan or program.	Section 6
Protection of Public Infrastructure	
C12. Before the commencement of construction, the Applicant must: a) consult with the relevant owner and provider of services that are likely to be affected by the Stage 1 Development to make suitable arrangements for access to, diversion, protection, and support of the affected infrastructure; b) prepare a dilapidation report identifying the condition of all public infrastructure in the vicinity of the site (including roads, gutters, and footpaths); and c) submit a copy of the dilapidation report to the Planning Secretary and TfNSW.	Section 1.3.4
C13. Unless the Applicant and the applicable authority agree otherwise, the Applicant must: a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by carrying out the development; and b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development.	Noted

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
Demolition	
C14. All demolition must be carried out in accordance with *Australian Standard AS 2601-2001 The Demolition of Structures* (Standards Australia, 2001).	Section 4.1
Structural Adequacy	
C15. All new buildings and structures, and any alterations or additions to existing buildings and structures, that are part of the development, must be constructed in accordance with the relevant requirements of the Building Code of Australia (BCA). *Note:* • *Under Part 6 of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works.* • *Part 8 of the EP&A Regulation sets out the requirements for the certification of the development.*	Section 4.1
Compliance	
C19. The Applicant must ensure that all of its employees, contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the conditions of this consent relevant to activities they carry out in respect of the development.	Section 3.4
Operation of Plant and Equipment	
C22. All plant and equipment used on site, or to monitor the performance of the Stage 1 Development, must be: a) maintained in a proper and efficient condition; b) noise amelioration featured; and c) operated in a proper and efficient manner.	a) Section 5.1 b) Section 4.2 c) Section 1.3.2, Section 3.2 Please also refer to the Construction Noise Vibration Management Plan (Appendix G)
External Walls and Cladding	
C23. The external walls of all buildings including additions to existing buildings must comply with the relevant requirements of the BCA.	Noted
Utilities and Services	
C26. Before the construction of any utility works associated with the Stage 1 Development, the Applicant must obtain relevant approvals from service providers.	Section 3.3
C27. Before the commencement of operation of the development, the Applicant must obtain a Compliance Certificate for water and sewerage infrastructure servicing of the site under section 73 of the *Sydney Water Act 1994* (NSW).	Section 3.3
C29. Before the issue of the final Occupation Certificate the Applicant must demonstrate that the carrier has confirmed in writing they are satisfied that the fibre ready facilities are fit for purpose.	Section 3.3
Environmental Representative	

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
C31. The Applicant must engage an Environmental Representative (ER) to oversee construction of the Stage 1 Development. Unless otherwise agreed to by the Planning Secretary, construction of the Stage 1 development must not commence until an ER has been approved by the Planning Secretary and engaged by the Applicant. The approved ER must: a) be a suitably qualified and experienced person who was not involved in the preparation of the EIS, RtS, ADR, and any additional information for the Stage 1 Development and is independent from the design and construction personnel for the Stage 1 Development; b) receive and respond to communication from the Planning Secretary in relation to the environmental performance of the Stage 1 development; c) consider and inform the Planning Secretary on matters specified in the terms of this consent; d) consider and recommend to the Applicant any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community; e) review the CEMP required in Condition E2 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this consent and if so: (i) make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary); or (ii) make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary/Department for information or are not required to be submitted to the Planning Secretary/Department); f) regularly monitor the implementation of the CEMP to ensure implementation is being carried out in accordance with the document and the terms of this consent; g) as may be requested by the Planning Secretary, help plan, attend or undertake audits of the development commissioned by the Department including scoping audits, programming audits, briefings, and site visits; h) as may be requested by the Planning Secretary, assist the Department in the resolution of community complaints; i) provide advice to the Applicant on the management and coordination of construction works on the site with adjoining sites in the Mamre Road Precinct in relation to construction traffic management, earthworks and sediment control and noise; j) attend the Mamre Road Precinct Working Group (see Condition C34) in a consultative role in relation to the environmental performance of the Stage 1 development; and k) prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an **Environmental Representative Quarterly Report** providing the information set out in the Environmental Representative Protocol under the heading 'Environmental Representative Quarterly Reports'. The **Environmental Representative Quarterly Report** must be submitted within seven calendar days following the end of each quarter for the duration of the ER's engagement for the development, or as otherwise agreed with the Planning Secretary.	The ER is independent and is responsible for fulfilling their role under the conditions of approval and in accordance with the *Environmental Representative* Protocol. Section 1.3.4 Section 3.2
C32. The Applicant must provide the ER with all documentation requested by the ER in order for the ER to perform their functions specified in condition C31 (including preparation of the ER monthly report), as well as: a) the complaints register (to be provided on a daily basis); and b) a copy of any assessment carried out by the Applicant of whether proposed work is consistent with the consent (which must be provided to the ER before the commencement of the subject work).	Section 3.6.1 and Section 5.1

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
C33. The Planning Secretary may at any time commission an audit of an ER's exercise of its functions under condition E16. The Applicant must: a) facilitate and assist the Planning Secretary in any such audit; and b) make it a term of their engagement of an ER that the ER facilitate and assist the Planning Secretary in any such audit.	Section 5.1
Mamre Road Precinct Working Group	
C34. Within three months of the commencement of construction of the Stage 1 Development and until all components of the Stage 1 development are constructed and operational, the Applicant must establish and participate in a working group with relevant consent holders in the MRP, to the satisfaction of the Planning Secretary. The purpose of the working group is to consult and coordinate construction works within the MRP to assist with managing and mitigating potential cumulative environmental impacts. The working group must: a) comprise at least one representative of the Applicant, the Applicant's ER, and relevant consent holders in the MRP; b) meet periodically throughout the year to discuss, formulate and implement measures or strategies to improve monitoring, coordination of the approved industrial developments in the MRP; c) regularly inform Council, TfNSW, Sydney Water and the Planning Secretary of the outcomes of these meetings and actions to be undertaken by the working group; d) review the performance of approved industrial developments in the MRP and identify trends in the data with respect to cumulative construction traffic, erosion and sediment control, noise, stormwater management and waterway health objectives under the MRP DCP; e) review community concerns or complaints with respect to environmental management; f) identify interim traffic safety measures to manage construction traffic and how these measures will be coordinated, communicated, funded and monitored in the MRP; and g) provide the Planning Secretary with an update and strategies, if a review under subclause (d) and (e) identifies additional measures and processes are required to be implemented by the working group.	Section 1.3.4 MRPWG Protocol
C35. Three (3) months prior to completion of construction of all components of the Stage 1 development, the Applicant is eligible to exit the working group required under condition C34. The Applicant must: a) consult with the Planning Secretary; b) provide confirmation that all components of the Stage 1 development are operational; and c) advise on the date of the proposed exit.	MRPWG Protocol (Appendix R)
Applicability of Guidelines	
C36. References in the conditions of this consent to any guideline, protocol, Australian Standard, or policy are to such guidelines, protocols, standards, or policies in the form they are in as at the date of this consent.	Noted
C37. However, consistent with the conditions of this consent and without altering any limits or criteria in this consent, the Planning Secretary may, when issuing directions under this consent in respect of ongoing monitoring and management obligations, require compliance with an updated or revised version of such a guideline, protocol, Standard or policy, or a replacement of them.	Noted
Advisory Notes	
AN1. All licences, permits, approvals and consents as required by law must be obtained and maintained as required for the development. No condition of this consent removes any obligation to obtain, renew or comply with such licences, permits, approvals and consents.	Section 4.1 Section 3.3

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
PART D – STAGE 1 DEVELOPMENT SPECIFIC ENVIRONMENTAL CONDITIONS	
Traffic and Access	
Construction Traffic Management Plan	
D1. Prior to the commencement of construction of the Stage 1 Development, the Applicant must prepare a Construction Traffic Management Plan (CTMP) for the development to the satisfaction of the Planning Secretary. The plan must form part of the CEMP required by condition E2 and must: a) be prepared by a suitably qualified and experienced person(s); b) be prepared in consultation with Council and TfNSW; c) detail the traffic management and contingency measures that are to be implemented for the site, particularly during the construction works for the Mamre Road/Access Road 1 intersection, to ensure access to the site and road safety and network efficiency is maintained, including interim traffic safety controls and management measures; d) detail heavy vehicle routes, access, and parking arrangements; e) include a Driver Code of Conduct to: (i) minimise the impacts of earthworks and construction on the local and regional road network; (ii) minimise conflicts with other road users; (iii) minimise road traffic noise; and (iv) ensure truck drivers use specified routes; f) include a program to monitor the effectiveness of these measures; and g) if necessary, detail procedures for notifying residents and the community (including local schools), of any potential disruptions to routes.	Section 4.5 c) Section 1.3.4 Please also refer to the Construction Traffic Management Plan (Appendix I)
D2. The Applicant must: a) not commence construction until the CTMP required by condition D1 is approved by the Planning Secretary; and b) implement the most recent version of the CTMP approved by the Planning Secretary for the duration of construction.	Section 4.5 Please also refer to the Construction Traffic Management Plan (Appendix I)
Internal Access Roads	
D4. Prior to the commencement of any construction works for Building 1 or 3 (excluding site-wide bulk earthworks) as described in the ADR, the Applicant must: a) prepare a concept design of the Stage 1 Phase 2 road works in accordance with the design requirements in the MRP DCP and in consultation with the relevant roads authority, to the satisfaction of the Planning Secretary; and b) consult with the relevant roads authority concerning the processes for dedication of the lands for the internal Access Roads 1 and 3 (North and South) including the roundabout shown in Figure 1: in Appendix 1.	Section 1.3.4
D6. Prior to issue of an Occupation Certificate for Building 1 or 3 (whichever is the first), the Applicant must construct and operate the Stage 1 Phase 1 road works shown in **Figure 4:** in **Appendix 2** to the satisfaction of relevant road authority.	Section 3.3.2
Mamre Road/Access Road 1 Intersection Works	

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
D12. Prior to the Applicant entering into a Works Authorisation Deed (WAD) required by condition D13 the Applicant must: a) obtain landowners consent and enter into an agreement with the owner(s) of 833B Mamre Road, Kemps Creek (Lot 28, DP258414) to relocate or remove an existing gated driveway on that property outside of the footprint of the Mamre Road/Access Road 1 intersection signals to the satisfaction of Council and the Planning Secretary; b) provide a copy of the landowner's consent and signed agreement described under condition D12(a) to TfNSW and the Planning Secretary; and c) remove and relocate the driveway in accordance with the agreement.	Section 1.3.4
D13. The Applicant must enter into a Works Authorisation Deed for the intersection works with TfNSW. The WAD must be executed prior to the submission of the detailed design required by condition D12 to TfNSW for approval.	Section 3.3
D13A. The Applicant must enter into a WAD with TfNSW for establishing a temporary left in/left out construction access and left-turn lane on Mamre Road to be used by vehicles during Stage 1 construction. The WAD must: (a) include details of the removal of the temporary left in/left out construction access and left-turn lane on Mamre Road; and (b) be executed prior to commencement of construction of the temporary left in/left out construction access and left-turn lane on Mare Road.	Appendix I Construction Traffic Management Plan
D13B. The Applicant must: ensure the temporary left in/left out construction access and left turn lane is: (a) ensure the temporary left in/left out construction access and left-turn lane are maintained at no cost to TfNSW (b) remove the temporary left in/left out construction access and left-turn lane at the completion and commissioning of the Mamre Road/Access Road 1 intersection, at no cost to TfNSW; and (c) reinstate shoulder along Mamre Road within three months of satisfying Condition D6, at cost to TfNSW.	Appendix I Construction Traffic Management Plan
D14. Prior to the issue of a construction certificate for the Mamre Road/Access Road 1 intersection (the intersection) construction, the Applicant must finalise and submit the detailed design of the intersection works, including an endorsed Traffic Signal Plan (TSP) to TfNSW for approval. The TSP must: a) demonstrate the proposed traffic control light at the intersection is designed in accordance with Austroads Guide to Road Design, RMS Signal Design Manual, and Australian Codes of Practice; and b) be approved and endorsed by a suitably qualified practitioner.	Section 3.3 Appendix I Construction Traffic Management Plan
D15. The Applicant must obtain a Road Occupancy Licence (ROL) from TfNSW Transport Management Centre for any works that may impact on traffic flows on Mamre Road during construction.	Section 3.3 Construction Traffic Management Plan (Appendix I)
Parking	
D20. The Applicant must provide sufficient parking facilities on-site, including for heavy vehicles and for site personnel, to ensure that traffic associated with the development does not utilise public and residential streets or public parking facilities.	Section 4.5 Appendix I Construction Traffic Management Plan

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
Workplace Travel Plan	
D23. The Applicant must implement the most recent version of the Workplace Travel Plan for the duration of the development.	Will be addressed in operational phase
Soils, Water Quality and Hydrology	
Imported Soil	
D24. The Applicant must: a) ensure that only VENM, ENM, or other material approved in writing by the EPA is brought onto the site; b) keep accurate records of the volume and type of fill to be used; and c) make these records available to the Planning Secretary upon request.	Not applicable
Erosion and Sediment Control	
D25. Prior to the commencement of any construction or other surface disturbance, the Applicant must design and detail the erosion and sediment control measures for the site to ensure the construction phase IWCM controls in the MRP DCP are achieved. Detailed Erosion and Sediment Control Plans (ESCP) and drawings must: a) be prepared by a Chartered Professional Erosion and Sediment Control (CPESC) specialist; b) be prepared in accordance with *Managing Urban Stormwater: Soils and Construction – Volume 1: Blue Book* (Landcom, 2004) and with the WSUD design principles set out in the *Draft Technical Guidance for achieving Wianamatta South Creek Stormwater Management Targets* (NSW Government, 2022); c) demonstrate the construction approach and timing to ensure the construction phase stormwater quality targets can be met; and d) be included in the CEMP required by condition E2.	Section 4.6 Soil and Water Management Plan (Appendix J) Appendix A Erosion and Sediment Control Plan
D26. The Applicant must ensure delivery and operation of all construction phase erosion and sediment controls on the site is supervised and certified by a CPESC. Monthly audits are to be completed by CPESC and kept on record for the duration of the construction and an additional 12 months following completion of construction works.	Section 4.6 Salinity Management Plan (Appendix K)
Discharge Limits	
D27. The development must comply with section 120 of the POEO Act, which prohibits the pollution of waters, except as expressly provided for in an EPL.	Section 4.1
Stormwater Management System	
D28. Prior to the commencement of operation of the development, the Applicant must implement the Stormwater Management System described in the ADR and as shown in Figure 2 in Appendix 2. The design and subsequent construction and establishment of the WSUD systems must be supervised and certified by a suitably qualified chartered professional engineer with experience in modelling, design, and supervision of WSUD systems.	Noted
D29. All stormwater infrastructure, including bio-retention basins, shall remain under the ownership, control, and care of the registered proprietor of the lots. Upstream drainage catchment pipes are to be located outside of the public road reserve and remain in private ownership, in accordance with Council requirements.	Noted
Dam Decommissioning Strategy	

<table>
<tr><th>Relevant Consent Conditions SSD 10448</th><th>Where Addressed in CEMP</th></tr>
<tr><td>D34. Prior to commencement of construction of the Stage 1 Development, the Applicant must implement the Dam Decommissioning Strategy included in the EIS. The Applicant must implement the most recent version of the Dam Decommissioning Strategy for the duration of construction.</td><td>Noted. Relevant to Estate CEMP.</td></tr>
<tr><td colspan="2">Groundwater Management Plan</td></tr>
<tr><td>D35. Prior to commencement construction of the Stage 1 Development, the Applicant must implement the Groundwater Management Plan included in the EIS. The Applicant must implement the most recent revision of the Groundwater Management Plan for the duration of the development.</td><td>Noted. Relevant to Estate CEMP.</td></tr>
<tr><td colspan="2">Salinity Management</td></tr>
<tr><td>D36. The Applicant must prepare a Salinity Management Plan, which must form part of the CEMP in accordance with Condition E2, that addresses all aspects of the Stage 1 development. The Applicant must implement the most recent revision of the Salinity Management Plan for the duration of construction.</td><td>Section 4.6
Salinity Management Plan (Appendix K)</td></tr>
<tr><td colspan="2">Visual Amenity</td></tr>
<tr><td colspan="2">Lighting</td></tr>
<tr><td>D39. The Applicant must ensure the lighting associated with the development:
a) complies with the latest version of AS 4282-1997 - Control of the obtrusive effects of outdoor lighting (Standards Australia, 1997); and
b) is mounted, screened, and directed in such a manner that it does not create a nuisance to surrounding properties or the public road network.</td><td>Section 4.9</td></tr>
<tr><td colspan="2">Signage and Fencing</td></tr>
<tr><td>D40. All signage and fencing must be erected in accordance with the development plans included in the ADR.
Note: This condition does not apply to temporary construction and safety related signage and fencing.</td><td>Section 4.9</td></tr>
<tr><td colspan="2">Noise</td></tr>
<tr><td colspan="2">Hours of Work</td></tr>
<tr><td>D41. The Applicant must comply with the hours detailed in Table 4, unless otherwise agreed in writing by the Planning Secretary.
Table 4 Hours of Work
<table>
<tr><th>Activity</th><th>Day</th><th>Time</th></tr>
<tr><td>Earthworks and construction</td><td>Monday – Friday
Saturday</td><td>7 am to 6 pm
8 am to 1 pm</td></tr>
<tr><td>Operation</td><td>Monday – Sunday</td><td>24 hours</td></tr>
</table></td><td>Section 2.3
Please also refer to the Construction Noise and Vibration Management Plan (Appendix G)</td></tr>
</table>

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
D42. Works outside of the hours identified in condition D41 may be undertaken in the following circumstances: a) works that are inaudible at the nearest sensitive receivers; b) works agreed to in writing by the Planning Secretary; c) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or d) where it is required in an emergency to avoid the loss of lives, property or to prevent environmental harm.	Section 2.3 Please also refer to the Construction Noise and Vibration Management Plan (Appendix G)
Construction Noise Limits	
D43. The development must be constructed to achieve the construction noise management levels detailed in *the Interim Construction Noise Guideline* (DECC, 2009) (as may be updated or replaced from time to time). All feasible and reasonable noise mitigation measures must be implemented and any activities that could exceed the construction noise management levels must be identified and managed in accordance with the management and mitigation measures in the Appendix 4.	Section 2.3 Please also refer to the Construction Noise and Vibration Management Plan (Appendix G)
Construction Noise Management Plan	
D44. The Applicant must prepare a Construction Noise Management Plan (CNMP) for the development to the satisfaction of the Planning Secretary. The Plan must form part of a CEMP in accordance with condition E2 and must: a) be prepared by a suitably qualified and experienced noise expert whose appointment has been endorsed by the Planning Secretary; b) be approved by the Planning Secretary prior to the commencement of construction of each phase of the development; c) describe procedures for achieving the noise management levels in EPA's *Interim Construction Noise Guideline* (DECC, 2009) (as may be updated or replaced from time to time); d) describe the measures to be implemented to manage high noise generating works, in close proximity to sensitive receivers, particularly for noise mitigation eligible receivers shown in **Figure 7:** in **Appendix 5**, including but not limited to the following: (i) details of a real-time noise monitoring system to identify occurrence of highly noise affected levels as defined in the *Interim Construction Noise Guideline*; and (ii) describe procedures for implementing respite periods and temporary relocation following identification of highly noise affected levels. (iii) include a complaints management system that would be implemented for the duration of the development.	Section 4.2 Please also refer to the Construction Noise and Vibration Management Plan (Appendix G))
D45. The Applicant must: a) not commence construction of any relevant stage until the CNMP required by condition D44 is approved by the Planning Secretary; and b) implement the most recent version of the CNMP approved by the Planning Secretary for the duration of construction.	Section 4.2 Please also refer to the CNVMP (Appendix G)
Vibration Criteria	

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
D49. Vibration caused by construction at any residence or structure outside the site must be limited to: a) for structural damage, the criteria set in the latest version of *DIN 4150-3:2016-12 Vibration in Buildings – Part 3: Effects on Structures* (German Institute for Standardisation, 2016); and b) for human exposure, the acceptable vibration values set out in the *Environmental Noise Management Assessing Vibration: a technical guideline* (DEC, 2006) (as may be updated or replaced from time to time).	Section 4.3 Please also refer to the Construction Noise and Vibration Management Plan (Appendix G)
D50. The Applicant must offer and, if the offer is accepted, implement monitoring of vibration levels during construction at 884-902 Mamre Road (Lot 53 DP259135), to the satisfaction of the Planning Secretary. Any vibration monitoring must be undertaken during the entirety of the construction period. If the criteria in Condition D49 are exceeded, management and mitigation measures must be developed and implemented to address any exceedances.	Section 4.3 Please also refer to the Construction Noise and Vibration Management Plan (Appendix G)
Dilapidation Reporting	
D51. Prior to commencement of construction, the Applicant must offer and prepare (if the offer is accepted) a pre- construction dilapidation report at 884-902 Mamre Road (Lot 53 DP259135). The report must be submitted to the Planning Secretary and the relevant property owner(s) prior to construction works commencing on the site.	Section 4.3 Please also refer to the Construction Noise and Vibration Management Plan (Appendix G)
Air Quality	
Dust Minimisation	
D54. The Applicant must take all reasonable steps to minimise dust generated during all works authorised by this consent.	Section 4.4 Please also refer to the Construction Air Quality Management Plan (Appendix H)
D55. During construction, the Applicant must ensure that: a) exposed surfaces and stockpiles are suppressed by regular watering; b) all trucks entering or leaving the site with loads have their loads covered; c) trucks associated with the development do not track dirt onto the public road network; d) public roads used by these trucks are kept clean; and e) land stabilisation works are carried out progressively on site to minimise exposed surfaces.	Section 4.4 Please also refer to the Construction Air Quality Management Plan (Appendix H) and Construction Traffic Management Plan (Appendix I)
Construction Air Quality Management Plan	

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
D56. Prior to the commencement of construction, the Applicant must prepare a Construction Air Quality Management Plan (CAQMP) to the satisfaction of the Planning Secretary. The CAQMP must form part of the CEMP required by condition E2 and must: a) be prepared by a suitably qualified and experienced person(s); b) detail and rank all emissions from all sources during construction of the development, including particulate emissions; c) describe a program that is capable of evaluating the performance of the construction and determining compliance with key performance indicators; d) identify the control measures that that will be implemented for each emission source; and e) nominate the following for each of the proposed controls: (i) key performance indicator; (ii) monitoring method; (iii) location, frequency, and duration of monitoring; (iv) record keeping; (v) complaints register; (vi) response procedures; and (vii) compliance monitoring.	Section 4.4 Please also refer to the Construction Air Quality Management Plan (Appendix H)H).
D57. The Applicant must: a) not commence construction until the CAQMP required by condition D56 is approved by the Planning Secretary; and b) implement the most recent version of the CAQMP approved by the Planning Secretary for the duration of the development.	Section 4.4 Please also refer to the Construction Air Quality Management Plan (Appendix H)
Odour Management	
D58. The Applicant must ensure the development does not cause or permit the emission of any offensive odour (as defined in the POEO Act).	Section 4.4 Please also refer to the Construction Air Quality Management Plan (Appendix H)
Aboriginal Heritage	
Statutory Requirements	
D59. Prior to the commencement of construction of Stage 1 development, the Applicant must register identified Aboriginal items or objects on the Heritage NSW Aboriginal Heritage Information Management System (AHIMS) Aboriginal Sites Register.	Section 4.10 Please also refer to the UFP (Appendix P).
Archaeological Salvage	

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
D60. Prior to the commencement of construction of Stage 1, the Applicant must engage a suitably qualified and experienced expert to undertake an archaeological salvage excavation of the MAM AS 1901. The Applicant must undertake the salvage excavation in accordance with the requirements of Heritage NSW, and must: a) implement the methodology for the reburial of all salvaged Aboriginal objects within the site detailed in the Reburial Methodology, prepared by artefact, dated 26 February 2021; and b) provide the Registered Aboriginal Parties (RAPs) an opportunity to collect Aboriginal objects across the site.	Noted
D61. The Applicant must prepare an archaeological report of the salvage excavation undertaken in accordance with Condition D60. An interim report of the salvage excavation must be provided to the satisfaction of the Planning Secretary within one month of completion of the salvage work and a final report provided within 12 months of completion of the salvage work.	Noted
Unexpected Finds Protocol	
D62. If any item or object of Aboriginal heritage significance is identified on site: a) all work in the immediate vicinity of the suspected Aboriginal item or object must cease immediately; b) a 10 m wide buffer area around the suspected item or object must be cordoned off; and c) Heritage NSW must be contacted immediately.	Section 4.10 Please also refer to the UFP (Appendix P).
D63. Work in the immediate vicinity of the Aboriginal item or object may only recommence in accordance with the provisions of Part 6 of the *National Parks and Wildlife Act 1974* (NSW).	Section 4.10 Please also refer to the UFP (Appendix P).
Historic Heritage	
Unexpected Finds Protocol	
D64. If any archaeological relics are uncovered during the course of the work, then all works must cease immediately in that area. Unexpected finds must be evaluated and recorded in accordance with the requirements of Heritage NSW and details included in the salvage excavation report required under Condition D60(b).	Section 4.10 Please also refer to the UFP (Appendix P).
Biodiversity	
D65. Prior to any clearing or construction works the Applicant must purchase and retire 1 ecosystem credit to offset the removal of *Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion* and 3 species credits to offset the removal of *Myotis macropus* at the site. The ecosystem and species credits must be retired in accordance with the requirements of the E&H Group's Biodiversity Offsets Scheme and the *Biodiversity Conservation Act 2016* (NSW).	Noted
D66. The requirement to retire ecosystem and species credits (see Condition D65) may be satisfied by payment to the Biodiversity Conservation Fund of an amount equivalent to the number and classes of ecosystem and species credits, as calculated by the E&H Group's Biodiversity Offsets Payment Calculator.	Noted
D67. The Applicant must provide the Planning Secretary with evidence that: a) the retirement of ecosystem credits has been completed (see Condition D65); or b) a payment has been made to the Biodiversity Conservation Fund (see Condition D66), prior to undertaking any clearing of native vegetation and *Myotis macropus* habitat.	Section 3.3

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
D68. Prior to commencement of dam dewatering and construction of the Stage 1 Development, the Applicant must implement the Flora and Fauna Management Plan included in the RtS. The Applicant must implement the most recent revision of the Flora and Fauna Management Plan for the duration of construction works.	Section 4.8 Please also refer to the Flora and Fauna Management Plan (Appendix O).
Hazards and Risk	
Dangerous Goods	
D70. The quantities of dangerous goods stored and handled at the site must be below the threshold quantities listed in the Department of *Planning's Hazardous and Offensive Development Application Guidelines – Applying SEPP 33* at all times.	Section 4.11
Bunding	
D71. The Applicant must store all chemicals, fuels and oils used on-site in appropriately bunded areas in accordance with the requirements of all relevant Australian Standards, and/or EPA's *Storing and Handling of Liquids: Environmental Protection – Participants Manual* (Department of Environment and Climate Change, 2007).	Section 4.11
Waste Management	
Pests, Vermin and Noxious Weed Management	
D72. The Applicant must: a) implement suitable measures to manage pests, vermin and declared noxious weeds on the site; and b) inspect the site on a regular basis to ensure that these measures are working effectively, and that pests, vermin or noxious weeds are not present on site in sufficient numbers to pose an environmental hazard or cause the loss of amenity in the surrounding area. *Note: For the purposes of this condition, noxious weeds are those species subject to an order declared under the Biosecurity Act 2015 (NSW).*	Section 4.7 and 4.8 Please also refer to the Flora and Fauna Management Plan (Appendix O).
Waste Storage and Processing	
D73. Prior to the commencement of construction of Building 1 and 2, the Applicant must obtain agreement from Council for the design of the waste storage area for each warehouse.	Section 4.7
D74. Waste must be secured and maintained within designated waste storage areas at all times and must not leave the site onto neighbouring public or private properties.	Section 4.7
Waste Management Plan	
D75. The Applicant must implement the Waste Management Plan (WMP) prepared by MRA Consulting Group, dated 30 September 2020 in the EIS for the duration and construction and operation of Stage 1 of the development.	Section 4.7 Please also refer to the Waste Management Plan (Appendix M).
Statutory Requirements	
D76. All waste materials removed from the site must only be directed to a waste management facility or premises lawfully permitted to accept the materials.	Section 4.7 Please also refer to the Waste Management Plan (Appendix M).
Unexpected Finds	

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
D77. Prior to the commencement of earthworks, the Applicant must prepare an unexpected contamination procedure to ensure that potentially contaminated material is appropriately managed. The procedure must form part of the of the CEMP in accordance with condition E2 and must ensure any material identified as contaminated and is required to be removed from the site must be disposed off-site, with the disposal location and results of testing submitted to the Planning Secretary, prior to its removal.	Section 4.11 Please also refer to the UFP (Appendix Q).
PART E – STAGE 1 DEVELOPMENT ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING ENVIRONMENTAL MANAGEMENT	
Management Plan Requirements	
E1. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include: a) detailed baseline data; b) details of: (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) any relevant limits or performance measures and criteria; and (iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria; d) a program to monitor and report on the: (i) impacts and environmental performance of the development; and (ii) effectiveness of the management measures set out pursuant to paragraph (c) above; e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; f) a program to investigate and implement ways to improve the environmental performance of the development over time; g) a protocol for managing and reporting any: (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria); (ii) complaint; (iii) failure to comply with statutory requirements; and h) a protocol for periodic review of the plan. ***Note:*** *the Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans*	Section 1.3.1, Table 2 (CEMP Conditions Review Table)
Constructions Environmental Management Plan	
E2. The Applicant must prepare a Construction Environmental Management Plan (CEMP) in accordance with the requirements of condition E1 and to the satisfaction of the Planning Secretary.	The plan

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
E3. As part of the CEMP required under condition E2 of this consent, the Applicant must include the following: a) Construction Traffic Management Plan (see condition D1); b) Erosion and Sediment Control Plan (see condition D25); c) Salinity Management Plan (see condition D33); d) Construction Noise Management Plan (see condition D44); e) Construction Air Quality Management Plan (see condition D56); f) Vegetation Management Plan (see Condition D69); g) Contamination Unexpected finds procedure (see Condition D77); h) Waste Management Plan (see condition D75); and i) Community Consultation and Complaints Handling.	Section 1.3.1, Table 2 (CEMP Conditions Review Table)
E4. The Applicant must: a) not commence construction of the development until the CEMP is approved by the Planning Secretary; and b) carry out the construction of the development in accordance with the CEMP approved by the Planning Secretary and as revised and approved by the Planning Secretary from time to time.	Section 1.3.1, Table 2 (CEMP Conditions Review Table)
Revision of Strategies, Plans and Programs	
E8. Within three months of: a) the submission of a Compliance Report under condition E14; b) the submission of an incident report under condition E10; c) the approval of any modification of the conditions of this consent; or d) the issue of a direction of the Planning Secretary under condition C2(b) which requires a review, the strategies, plans and programs required under this consent must be reviewed, and the Planning Secretary must be notified in writing that a review is being carried out.	Section 6 (Review and Improvement of Environmental Performance)
E9. If necessary to either improve the environmental performance of the development, cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary. Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within six weeks of the review. ***Note:*** *This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.*	Section 6 (Review and Improvement of Environmental Performance)
Reporting and Auditing	
Incident Notification, Reporting and Response	

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
E10. The Planning Secretary must be notified in writing via the Major Projects website immediately after the Applicant becomes aware of an incident. The notification must identify the development (including the development application number and the name of the development if it has one) and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix 6.	Section 3.5 and Section 5.1
Non-Compliance Notification	
E11. The Planning Secretary must be notified in writing to the Major Projects website within seven days after the Applicant becomes aware of any non-compliance.	Section 3.5 and Section 5.1
E12. A non-compliance notification must identify the development and the application number for it, set out the condition of consent that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.	Section 3.5 and Section 5.1
E13. A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.	Section 3.5 and Section 5.1
Compliance Reporting	
E14. Within three months after the commencement of construction of the Stage 1 Development, and in the same month each subsequent year (or such other timing as agreed by the Planning Secretary) for the duration of construction works, the Applicant must submit a Compliance Report to the Department reviewing the environmental performance of the development to the satisfaction of the Planning Secretary. Compliance Reports must be prepared in accordance with the Compliance Reporting Post Approval Requirements (Department 2020) and must also: a) identify any trends in the monitoring data over the life of the development; b) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and c) describe what measures will be implemented over the next year to improve the environmental performance of the development.	Section 5.1
E15. The Applicant must make each Compliance Report publicly available no later than 60 days after submitting it to the Planning Secretary and notify the Planning Secretary in writing at least 7 days before this is done.	Section 5.1
Monitoring and Environmental Audits	
E16. Any condition of this consent that requires the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the EP&A Act. This includes conditions in respect of incident notification, reporting and response, non-compliance notification, compliance reporting and independent auditing. ***Note:*** *For the purposes of this condition, as set out in the EP&A Act, "monitoring" is monitoring of the development to provide data on compliance with the consent or on the environmental impact of the development, and an "environmental audit" is a periodic or particular documented evaluation of the development to provide information on compliance with the consent or the environmental management or impact of the development.*	Section 5.1
Access to Information	

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
E17. At least 48 hours before the commencement of construction until the completion of all works under this consent, the Applicant must: a) make the following information and documents (as they are obtained or approved) publicly available on its website: (i) the documents referred to in condition C2 of this consent; (ii) all current statutory approvals for the development; (iii) all approved strategies, plans and programs required under the conditions of this consent; (iv) the proposed staging plans for the development if the construction, operation or decommissioning of the development is to be staged; (v) regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent; (vi) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; (vii) a summary of the current stage and progress of the development; (viii) contact details to enquire about the development or to make a complaint; (ix) a complaints register, updated monthly; (x) the Compliance Report of the development; (xi) audit reports prepared as part of any Independent Audit of the development and the Applicant's response to the recommendations in any audit report; (xii) any other matter required by the Planning Secretary; and b) keep such information up to date, to the satisfaction of the Planning Secretary.	Section 5.1 CCCHS Section 4.3.1
APPENDIX 5 – APPLICANT'S MANAGEMENT AND MITIGATION MEASURES	
Construction Management A CEMP to be prepared for the AIE Stage 1 Development capturing standard and specific management and mitigation measures as described in the SSD DA, EIS and supporting technical documents.	This CEMP
Transport Preparation of a CTMP to form part of the CEMP addressing issues such as: - Truck haul routes, delivery schedules and curfews; - Protocols for the management of construction traffic moving onto and off the site.	Section 4.5 Please also refer to Construction Traffic Management Plan (Appendix I)
Measures and considerations for the minimisation of water use during construction and operation to being incorporated into CEMP and OEMP as relevant.	Section 4.14
Soils Mitigation measures inherent to the civil design of the proposal.	Soil and Water Management Plan (Appendix J)
Sediment and erosion control measures are proposed as detailed in Appendix F and Appendix G.	Soil and Water Management Plan (Appendix J)
Salinity A Salinity Management Plan to be prepared for the proposed development.	Salinity Management Plan (Appendix K)

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
Management measures described in the Salinity Management Plan to be adopted in the CEMP and OEMP as relevant.	Salinity Management Plan (Appendix K)
Contamination Adoption of unexpected finds procedure for hazardous and contaminated materials management and removal during demolition and excavation.	Section 4.11 Please also refer to the UFP (Appendix Q).
Earthworks - Civil design achieves appropriate site levels with minimal impact on hydrology - Import of fill to be managed in accordance with the CEMP - Erosion and sediment control measures included in SSD DA package (Appendix F and Appendix G).	Noted Section 4.6 Please also refer to the IFP (Appendix Q). Noted
Groundwater Methods and management of any required dam dewatering required, as outlined in Appendix W (Dam Dewatering Report), during construction works to be detailed in the CEMP.	Section 4.6 Please also refer to the Groundwater Management Plan (Appendix L).

Water Quality
- Erosion and sediment controls as detailed in Appendix F and Appendix G to be implemented through CEMP.
- Stormwater to be treated to compliant levels prior to discharge.
- Gross Pollutant trap (GPT) to be installed within each development site on the final downstream stormwater pit prior to discharge.
- WSUD measures adopted to achieve target reductions for the AIE
  ○ 85% Total Suspended Solids
  ○ 60% Total Phosphorus
  ○ 45% Total Nitrogen
  ○ 90% Gross Pollutants
	Section 4.6

Flora and Fauna Preparation of a Biodiversity Management Plan for the site to inform the CEMP and OEMP as relevant to manage potential impacts to biodiversity during construction and operation.	Section 4.8 Please also refer to the FFMP (Appendix O).
Waterways and Riparian Lands Realignment of creek to occur in accordance with design and management measures described in Appendix P of the EIS including: - Revegetation to use appropriate native aquatic macrophyte and River-flat Eucalypt-forest species within the riparian area. - …	Section 4.8 Please also refer to the Vegetation Management Plan (Appendix N).

Relevant Consent Conditions SSD 10448	Where Addressed in CEMP
Construction Noise • Construction hours to be limited to 7:00am – 6:00pm Monday to Friday and 8:00am – 1:00pm Saturdays. • Where construction noise levels are predicted to be above the NMLs, all feasible and reasonable work practices are investigated to minimise noise emissions. • If construction noise levels are still predicted to exceed the NMLs, potential noise impacts would be managed via site specific construction noise management plans. • Construction works should be conducted during standard construction hours, with OOHW minimised as far as reasonable and feasible. • Locations for vibration intensive equipment should be reviewed during the preparation of the site specific Construction Noise and Vibration Management Plans (CNVMP) for construction works adjacent to sensitive receivers. • Further noise management measures to be incorporated into the CEMP as appropriate.	Section 4.2 Please also refer to the Construction Noise and Vibration Management Plan (Appendix G)
Air Quality and Odour – Construction - CEMP to include standard air quality control measures, contingency plans and response procedure and suitable reporting and performance monitoring procedures. - CEMP to include standard odour mitigation measures for construction including keeping excavation surfaces moist, covering excavation faces and/or stockpiles, use of soil vapour extraction systems and regular monitoring of discharges as appropriate.	Section 4.4 Please also refer to the Construction Air Quality Management Plan (Appendix H)
Indigenous Heritage • Archaeological salvage excavation and monitoring to be undertaken in the presence of relevant Aboriginal stakeholders prior to ground disturbance and excavation work in identified area. • Result of detailed archaeological excavation and any suitable salvaged materials to be managed in accordance with the NPW Act and direction form relevant Aboriginal stakeholders • Implementation of Unexpected Finds Protocol	Section 4.10 Please also refer to the UFP (Appendix P).
Non-Indigenous Heritage • Constructions works to cease should artefacts be uncovered during ground disturbance and DPC-Heritage notified. • Implementation of Unexpected Finds Protocol.	Section 4.10 Please also refer to the UFP (Appendix P).
Waste Management - Construction Detailed construction minimisation and management measures to be included in the CEMP as described in Appendix Y of the EIS.	Section 4.7 Please also refer to the Waste Management Plan (Appendix M).

APPENDIX C

Consultation

Aspect Industrial Estate: Consultation Summary
SSD 10448
Condition D1: CTMP

Organsiation	Plan provided to	Date Consultation commenced	Date Consultation completed	Response
TfNSW	Laura Van Putten Sydney Development Ruhul Chowdhury	8/06/2022	8/07/2022	No response received - closed 08/07/22
Penrith City Council	Gavin Cherry Council@penrith Rhian Greenup	8/06/2022	16/06/2022	Response received 16/06/22 - No objections raised

Adam Heinrich

From: Russell Hogan <russell.hogan@mirvac.com>
Sent: Friday, 8 July 2022 3:57 PM
To: Laura Van putten; Development Sydney
Cc: Alexandra Chung; Kym Dracopoulos; Adam Heinrich; Ruhul Chowdhury
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with TfNSW
Attachments: 1029r05v3 CTMP_Lot 54 - 58 Mamre Road, Kemps Creek.pdf; RE: AIE - SSD-10448 - Post Approval - Consultation with Council

Hi Laura,

Tried to call earlier, as an update we have now concluded review of the Construction Traffic Management Plan with our Environmental Representative and incorporated any comments received from stakeholder consultation.

We note we have not received any comments from TfNSW on this CTMP though note that we have sought to incorporate best practices into the CTMP based on other documentation approved from TfNSW within the Mamre Road Precinct.

We are now packaging up the final documentation and issuing our consolidated CEMP to the Planning Secretary. We will issue TfNSW a copy for information.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

T +61 2 9080 8154 **M** +61 424441231
Level 28, 200 George Street Sydney NSW 2000 Australia

From: Russell Hogan
Sent: Friday, 1 July 2022 10:16 AM
To: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>; Development Sydney <Development.Sydney@transport.nsw.gov.au>
Cc: Alexandra Chung <alexandra.chung@mirvac.com>; Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>; Ruhul Chowdhury <Ruhul.CHOWDHURY@transport.nsw.gov.au>
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with TfNSW

Hi Laura,

Mirvac have now closed out CEMP and sub-management plan (Incl. CTMP) comments received from Authorities and our Environmental Representative and are now seeking to issue the final compiled CEMP to the Planning Secretary for approval.

Please advise If TfNSW have any comments on the Construction Traffic Management Plan.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

T +61 2 9080 8154 **M** +61 424441231
Level 28, 200 George Street Sydney NSW 2000 Australia

From: Russell Hogan
Sent: Thursday, 16 June 2022 2:21 PM
To: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>; Development Sydney <Development.Sydney@transport.nsw.gov.au>
Cc: Alexandra Chung <alexandra.chung@mirvac.com>; Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>; Ruhul Chowdhury <Ruhul.CHOWDHURY@transport.nsw.gov.au>
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with TfNSW

Hi Laura,

Hope you're well.

Please see attached Penrith City Council advice that Council raise no objections to the attached CTMP.

Therefore we seek TfNSW' comments prior to reverting to the Planning Secretary for approval as part of the wider CEMP.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

T +61 2 9080 8154 **M** +61 424441231
Level 28, 200 George Street Sydney NSW 2000 Australia

From: Russell Hogan
Sent: Wednesday, 8 June 2022 12:24 PM
To: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>; Development Sydney <Development.Sydney@transport.nsw.gov.au>
Cc: Alexandra Chung <alexandra.chung@mirvac.com>; Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>; Ruhul Chowdhury <Ruhul.CHOWDHURY@transport.nsw.gov.au>
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with TfNSW

Hi Laura,

Thank you for your guidance below.

RE: SSD-10448 – Post Approval – Consultation with TfNSW – D1 - Construction Traffic Management Plan

Please see attached *draft* Construction Traffic Management Plan required under the abovementioned consent.

This document is required to be prepared in consultation with TfNSW and is required to be finalised and approved by the Planning Secretary prior to the commencement of construction. We therefore seek TfNSW' comments on the attached management plan which will ultimately be incorporated into the Construction Environmental Management Plan required under the consent..

Condition	Consent Timing	Mirvac target finalisation / issue to Planning Secretary for approval	To enable issue to Planning Secretary - we are seeking TfNSW comments by (if possible)
Condition D1 – Construction Traffic Management Plan (CTMP)	Prior to the commencement of construction of the Stage 1 Development	Tuesday 21 June 2022	Friday 17 June 2022

Relevant Condition extract for ease of reference

TRAFFIC AND ACCESS
Construction Traffic Management Plan
D1. Prior to the commencement of construction of the Stage 1 Development, the Applicant must prepare a Construction Traffic Management Plan (CTMP) for the development to the satisfaction of the Planning Secretary. The plan must form part of the CEMP required by condition E2 and must:

a) be prepared by a suitably qualified and experienced person(s);
b) **be prepared in consultation with Council and TfNSW**;
c) detail the traffic management and contingency measures that are to be implemented for the site, particularly during the construction works for the Mamre Road/Access Road 1 intersection, to ensure access to the site and road safety and network efficiency is maintained, including interim traffic safety controls and management measures;
d) detail heavy vehicle routes, access, and parking arrangements;
e) include a Driver Code of Conduct to:
   i. minimise the impacts of earthworks and construction on the local and regional road network;
   ii. minimise conflicts with other road users;
   iii. minimise road traffic noise; and
   iv. ensure truck drivers use specified routes;
f) include a program to monitor the effectiveness of these measures; and
g) if necessary, detail procedures for notifying residents and the community (including local schools), of any potential disruptions to routes.

D2. The Applicant must:

a) not commence construction until the CTMP required by condition D1 is approved by the Planning Secretary;

and

b) implement the most recent version of the CTMP approved by the Planning Secretary for the duration of construction.

Again, we are happy to coordinate a meeting to expedite resolution should TfNSW believe this to be appropriate.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

T +61 2 9080 8154 **M** +61 424441231
Level 28, 200 George Street Sydney NSW 2000 Australia

From: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>
Sent: Monday, 6 June 2022 5:31 PM
To: Russell Hogan <russell.hogan@mirvac.com>; Development Sydney <Development.Sydney@transport.nsw.gov.au>
Cc: Alexandra Chung <alexandra.chung@mirvac.com>; Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>; Ruhul Chowdhury <Ruhul.CHOWDHURY@transport.nsw.gov.au>
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with TfNSW

Hi Russell

Please note that the 2 conditions named below will need to go through my team in the first instance.

Can you please provide the relevant documentation so that I can proceed with the review.

Please note I am on leave this week.

Kind Regards,

Laura van Putten
A/Senior Land Use Assessment Coordinator
Planning and Programs
Greater Sydney
Transport for NSW

M 0429 505 961 **T** (02) 8849 2480 **E** laura.van.putten@transport.nsw.gov.au

transport.nsw.gov.au

27-31 Argyle Street
Parramatta NSW 2750

Transport for NSW

From: Russell Hogan <russell.hogan@mirvac.com>
Sent: Thursday, 2 June 2022 1:30 PM
To: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>; Development Sydney <Development.Sydney@transport.nsw.gov.au>
Cc: Alexandra Chung <alexandra.chung@mirvac.com>; Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>
Subject: AIE - SSD-10448 - Post Approval - Consultation with TfNSW
Importance: High

Hi Laura,

Hope you're all keeping well.

Seek your direction regarding AIE *Post Approval* consultation.

With reference to Mirvac's Aspect Industrial Estate SSD-10448 in Mamre Road Precinct, please see attached final signed consent as formally uploaded to the Major Projects Portal on 31 May 2022.

There are several *Post Approval* and Prior to *Commencement of Construction* items within the consent to which we are required to prepare in consultation with TfNSW.

These are as follows:

Item No.	Condition	Consent Timing	Mirvac target finalisation / issue to Planning Secretary for approval
1	Condition D1 – Construction Traffic Management Plan (CTMP)	Prior to the commencement of construction of the Stage 1 Development	Friday 17 June 2022
2	Condition D11 – Access Arrangements	Prior to the commencement of any construction works (excluding bulk earthworks) for Warehouse 1	Friday 15 July 2022

We seek TfNSW' advice as to who / how TfNSW would like to be engaged during the preparation / finalisation of the above documentation. We have draft final documents available for issue now, though seek TfNSW' advice on the best way to engage. If you consider appropriate, we would welcome a meeting between TfNSW / Mirvac to step through the documents in order to expedite a resolution.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

T +61 2 9080 8154 **M** +61 424441231
Level 28, 200 George Street Sydney NSW 2000 Australia

Mirvac acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Owners of the lands and waters of Austral
our respect to their Elders.

Adam Heinrich

From: Kathryn Saunders <kathryn.saunders@penrith.city>
Sent: Thursday, 16 June 2022 1:16 PM
To: Russell Hogan
Cc: Rhian Greenup; Alexandra Chung; Kym Dracopoulos; Adam Heinrich
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with Council
Attachments: 1029r05v3 CTMP_Lot 54 - 58 Mamre Road, Kemps Creek.pdf

Hi Russell,

Council has reviewed the draft CTMP and raises no objections. It is noted that the CTMP will need to address and include all requirements of Condition D1 and that the final CTMP will need to be prepared in consultation with TfNSW and be issued to the Planning Secretary for their confirmation that the condition is satisfied.

Kind regards,

Kathryn Saunders
Principal Planner

E kathryn.saunders@penrith.city
T +61247328567 | F | M
PO Box 60, PENRITH NSW 2751
www.visitpenrith.com.au
www.penrithcity.nsw.gov.au

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From: Russell Hogan <russell.hogan@mirvac.com>
Sent: Wednesday, 8 June 2022 11:39 AM
To: Gavin Cherry <Gavin.Cherry@penrith.city>; Penrith City Council - RECORDS <council@penrith.city>
Cc: Rhian Greenup <rhian.greenup@penrith.city>; Alexandra Chung <alexandra.chung@mirvac.com>; Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with Council

Hi Gavin,

Thank you for your guidance below. We agree on the approach.

RE: SSD-10448 – Post Approval – Consultation with Council – D1 - Construction Traffic Management Plan

Please see attached *draft* Construction Traffic Management Plan required under the abovementioned consent.

This document is required to be prepared in consultation with Council and is required to be finalised and approved by the Planning Secretary prior to the commencement of construction. We therefore seek Council's comments on the attached management plan which will ultimately be incorporated into the Construction Environmental Management Plan required under the consent..

Condition	Consent Timing	Mirvac target finalisation / issue to Planning Secretary for approval	To enable issue to Planning Secretary - we are seeking Council comments by (if possible)
Condition D1 – Construction Traffic Management Plan (CTMP)	Prior to the commencement of construction of the Stage 1 Development	Tuesday 21 June 2022	Friday 17 June 2022

Relevant Condition extract for ease of reference

TRAFFIC AND ACCESS
Construction Traffic Management Plan
D1. Prior to the commencement of construction of the Stage 1 Development, the Applicant must prepare a Construction Traffic Management Plan (CTMP) for the development to the satisfaction of the Planning Secretary. The plan must form part of the CEMP required by condition E2 and must:

a) be prepared by a suitably qualified and experienced person(s);
b) **be prepared in consultation with Council and TfNSW**;
c) detail the traffic management and contingency measures that are to be implemented for the site, particularly during the construction works for the Mamre Road/Access Road 1 intersection, to ensure access to the site and road safety and network efficiency is maintained, including interim traffic safety controls and management measures;
d) detail heavy vehicle routes, access, and parking arrangements;
e) include a Driver Code of Conduct to:
   i. minimise the impacts of earthworks and construction on the local and regional road network;
   ii. minimise conflicts with other road users;
   iii. minimise road traffic noise; and
   iv. ensure truck drivers use specified routes;
f) include a program to monitor the effectiveness of these measures; and
g) if necessary, detail procedures for notifying residents and the community (including local schools), of any potential disruptions to routes.

D2. The Applicant must:

a) not commence construction until the CTMP required by condition D1 is approved by the Planning Secretary;

and

b) implement the most recent version of the CTMP approved by the Planning Secretary for the duration of construction.

Again, we are happy to coordinate a meeting to expedite resolution should Council believe this to be appropriate.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

T +61 2 9080 8154 **M** +61 424441231
Level 28, 200 George Street Sydney NSW 2000 Australia

From: Gavin Cherry <Gavin.Cherry@penrith.city>
Sent: Thursday, 2 June 2022 3:27 PM
To: Russell Hogan <russell.hogan@mirvac.com>
Cc: Natasha Borgia <natasha.borgia@penrith.city>; Michael Alderton <Michael.Alderton@penrith.city>; Rhian Greenup <rhian.greenup@penrith.city>; Kathryn Saunders <kathryn.saunders@penrith.city>
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with Council

Afternoon Russell,

In the first instance please refer the documents to myself as my team will register them into our records system and then distribute them to the teams applicable.

This would not typically involve our City Planning Team and based on the below, would only relate to my unit, our Traffic Team and our Environmental Management Team,

The table below is extremely helpful to inform us of the relevant condition for each draft consultation document coupled with the copy of the consent.

I note your suggestion of a meeting but as we are not the consent authority and will be providing comment only, I would suggest that comments be obtained by my unit, provided to you and if you have any concerns or questions remain a meeting can be arranged at that point.

I hope this assists.

regards

Gavin Cherry
Development Assessment Coordinator

E Gavin.Cherry@penrith.city
T +61247328125 | F +612 4732 7958 | M
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www.penrithcity.nsw.gov.au

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From: Russell Hogan <russell.hogan@mirvac.com>
Sent: Thursday, 2 June 2022 11:31 AM
To: Gavin Cherry <Gavin.Cherry@penrith.city>; Natasha Borgia <natasha.borgia@penrith.city>; Michael Alderton <Michael.Alderton@penrith.city>; Penrith City Council - RECORDS <council@penrith.city>
Cc: Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Daniel Brook <daniel.brook@mirvac.com>; Alexandra Chung <alexandra.chung@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>

Subject: AIE - SSD-10448 - Post Approval - Consultation with Council
Importance: High

EXTERNAL EMAIL: This email was received from outside the organisation. Use caution when clicking any links or opening attachments.

Hi Gavin / Natasha / Michael,

Hope you're all keeping well.

Seek your direction regarding AIE *Post Approval* consultation.

With reference to Mirvac's Aspect Industrial Estate SSD-10448 in Mamre Road Precinct, please see attached final signed consent as formally uploaded to the Major Projects Portal on 31 May 2022.

There are several *Post Approval* and Prior to *Commencement of Construction* items within the consent to which we are required to prepare in consultation with Penrith City Council.

These are as follows:

Item No.	Condition	Consent Timing	Mirvac target finalisation / issue to Planning Secretary for approval
1	Condition A10 – Staging Plan	Prior to the commencement of construction of any stage of the Concept Proposal	Friday 17 June 2022
2	Condition D1 – Construction Traffic Management Plan (CTMP)	Prior to the commencement of construction of the Stage 1 Development	Friday 17 June 2022
3	Condition D11 – Access Arrangements	Prior to the commencement of any construction works (excluding bulk earthworks) for Warehouse 1	Friday 15 July 2022
4	Condition D73 – Waste Storage and Processing	Prior to the commencement of construction of Building 1 and 2	Friday 15 July 2022

We seek Council's advice as to who / how Council would like to be engaged during the preparation / finalisation of the above documentation. We have draft final documents available for issue now, though seek Council's advice on the best way to engage. If you consider appropriate, we would welcome a meeting between Council / Mirvac to step through the documents in order to expedite a resolution.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

T +61 2 9080 8154 **M** +61 424441231
Level 28, 200 George Street Sydney NSW 2000 Australia

Mirvac acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Owners of the lands and waters of Austral
our respect to their Elders.

APPENDIX D

Environmental Policy

ENVIRONMENTAL
POLICY

Richard Crookes Constructions Pty Limited promotes and encourages a sustainable environment throughout our business activities and sources our supplies and services in ways that prevent pollution and promote compliance with legal and other requirements.

The company implements Environmental Management System to aid us in meeting our corporate responsibilities. The System is certified as meeting the requirements of AS/NZS ISO 14001:2016 Environmental Management Systems.

These form part of the company's Project Management Plans and are supported by company procedures and guidelines.

Management intends that all employees of our company, relevant subcontractors and suppliers, are made aware of their environmental responsibilities and the environmental impacts associated with their activities, products and services.

Our company objectives for continual improvement in environmental management include:

- Reducing the number of environmental notices issued on the projects by implementing a program of inductions, training and monitoring.
- Minimising the impacts to the community through the development of project specific Environmental, Traffic management plans, stakeholder consultation plans and by timely and appropriate response to complaints.
- Minimising impacts on the environment using dust, soil and water, waste and chemical management practices that are regularly inspected and maintained.
- Achieve a waste minimisation figure of 85% through monthly reporting

The Continual improvement of the project environmental management plans and progress with achieving the company's objectives will be reviewed during management meetings, project reviews and following the results of internal and external audits.

The Policy will be made available to the public and interested parties on request. This Policy will be reviewed every two years.

Jamie Crookes
Managing Director
26th February 2022

APPENDIX E

Event Notification Report

EVENT NOTIFICATION REPORT

Plant Vehicle Property	Non work Related Motor Vehicle Accidents	Service Strike	Environmental	Injury	Break-in Theft	Conduct
☐	☐	☐	☐	☐	☐	☐

Date & Time Event Occurred	Event Reported by	Notification Form Completed by	Date Completed
Project Team	**Names**	**Project Name**	**WHS Site Representative**
Project Manager			
Site Supervisor			
Engineers			
Leading Hand/s			

1. DETAILS					
Event Description (Describe event using key words)					
Event first reported to		**Date reported**		**Time reported**	
Event details (below) Details specific names, dates, times, equipment, organisation/s, etc.					
What activity was being undertaken? Who was involved, time & duration of activity in progress					
Location on site					
INSERT OR ATTACH MAP / SKETCH & PHOTOS TO NOTIFICATION (Show location in relations to site and key areas – intersections, plant, activity, services, pot hole locations, survey pegs, chainages)					

2. PERSONS INVOLVED / & or near VICINITY					
Names of Directly involved & Witnesses	**Organisation**	**Position Tile**	**Capacity of involvement (Direct / in-direct witness)**	**Contact No.**	**Statement Taken**
					Y ☐
					Y ☐
					Y ☐
					Y ☐

3. IMMEDIATE ACTION TAKEN Tick items to signify the action taken immediately following the event occurring						
☐	Secure area / isolate	☐	Subcontractor Workers retained on site	☐	Medical Centre Ambulance	Other:
☐	Contacted Emergency services	☐	Photos of scene / area	☐	Spill control	
☐	Notified asset owner	☐	D & A testing	☐	Statements	

6. EXTERNAL NOTIFICATIONS made at time of Event Occurrence					
Agency	**Notified**	**Date / time notified**	**Agency**	**Notified**	**Date / time notified**
SafeWork NSW (WHS Co-ord responsible)	☐		**Subcontractor** PM responsible	☐	
EPA / DPIE (ER responsible)	☐		**Police / Fire / Amb**	☐	
Asset Owner PM responsible	☐		**Police Event No.** (if applicable)	☐	
Client (Org) PM responsible	☐		**Other** (Name)	☐	

7. FACTORS CONTRIBUTING TO THE INCIDENT							
Environment				**Equipment / materials**			
☐	Noise	☐	Surface gradient / conditions	☐	Tampering of plant / equipment	☐	Plant or equipment failure
☐	Lighting	☐	Dust / fume	☐	Inadequate maintenance	☐	Material / equipment too heavy / awkward
☐	Vibration	☐	Slip / trip hazard	☐	Inadequate guarding	☐	Plant or equipment unsuitable
☐	Weather	☐	Time / production pressures	☐	Other:		
Work systems				**People**			
☐	Hazard no identified	☐	No / inadequate risk assessment conducted	☐	No / Not followed Procedure	☐	Drugs / alcohol
☐	Hazard not reported	☐	No / inadequate controls implemented	☐	Fatigue	☐	Stress/ Pressures
☐	No/inadequate safe work procedure	☐	Inadequate training / supervision	☐	Change of routine	☐	Distraction / personal issues / stress
☐	Inadequate planning	☐	Other:	☐	Lack of communication	☐	Other:

Comment on selection		

8. CORRECTIVE ACTIONS				
Actions	**Assigned to**	**Completion date**	**Date complete**	**Verified by**

9. PM AND ER TO COMPLETE					
Matter has been reviewed, recorded, and correctly notified?				Yes ☐	No ☐
PM Signature:		ER Signature:			
Date:		Date:			

APPENDIX F

Community Consultation and Complaints Handling Strategy

ASPECT INDUSTRIAL ESTATE

Community Consultation and Complaints Handling Strategy

Prepared for:

Mirvac Projects Pty Ltd
Level 28
200 George Street
Sydney NSW 2000

SLR Ref: 660.30130.00000-R01
Version No: -v1.1
November 2022

PREPARED BY

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Mirvac Projects Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
660.30130.00000-R01-v1.1	11 November 2022	Alanna Ryan	Stephen Shoesmith	Stephen Shoesmith
660.30130.00000-R01-v1.0	15 July 2022	Kiera Plumridge	Kate McKinnon	Dan Thompson

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DOCUMENT REFERENCES

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1 Introduction

1.1 Background

Aspect Industrial Estate (AIE) is a regional warehouse, distribution and industrial centre located at Kemps Creek within the Penrith local government area (LGA) and forms part of the broader Mamre Road Precinct located within the Western Sydney Employment Area (WSEA) (see **Figure 1**).

Mirvac Property Services (Aust) Pty Ltd (Mirvac) lodged State Significant Development application SSD-10448 to the Department of Planning, Industry and Environment (DPIE) for the AIE Concept Masterplan and Stage 1 Development estate-wide earthworks, infrastructure and services, and construction and use of warehouse and distribution centre buildings proposed in Lots 1 and 3. Development consent for SSD-10448 was granted on 24 May 2022.

This Community Consultation and Complaints Handling Strategy (CCCHS) has been prepared on behalf of the Proponent. Specifically, it details how the Proponent and their contractors will engage and interact with relevant stakeholders and the community. The CCCHS integrates with the Construction Environmental Management Plan (CEMP) and associated suite of documents to provide a comprehensive guide and benchmark for the construction process that aligns with the Development Consent conditions.

1.2 Purpose

The CCCHS includes the following key aspects:

- Identification of consultation triggers and methods with adjacent landowners and residents, key stakeholders, relevant agencies, and the wider community
- The tools and actions to be undertaken throughout the construction program to disseminate information through notification of relevant stakeholders
- Enquiry and Complaint management protocols; and
- Monitoring and feedback mechanisms.

The CCCHS will be updated as the Project progresses to account for variations in the construction program and methodology and modifications to SSD-10448, along with changes in stakeholder situation that impacts on stakeholder interests, with these articulated through the feedback mechanisms.

SSD-10448 contains the following conditions of relevance to this CCCHS used to benchmark the contents:

- E17 – Access to Information
- C32 – Environmental Representative
- E3 – Construction Environmental Management Plan

The details of these conditions are identified within **Table 1** below, along with a cross reference to the relevant section of this CCCHS.

Table 1 Relevant Conditions of Consent

Condition Number	Condition Detail	Report Reference
E3	As part of the CEMP required under condition E2 of this consent, the Applicant must include the following: … (i) Community Consultation and Complaints Handling.	This Report
C32	The Applicant must provide the ER with all documentation requested by the ER in order for the ER to perform their functions specified in condition C31 (including preparation of the ER monthly report), as well as: (a) the complaints register (to be provided on a daily basis); and …	Section 5.2
E17	At least 48 hours before the commencement of construction until the completion of all works under this consent, the Applicant must: (a) make the following information and documents (as they are obtained or approved) publicly available on its website: (i) the documents referred to in condition C2 of this consent; (ii) all current statutory approvals for the development; (iii) all approved strategies, plans and programs required under the conditions of this consent; (iv) the proposed staging plans for the development if the construction, operation or decommissioning of the development is to be staged; (v) regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent; (vi) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; (vii) a summary of the current stage and progress of the development; (viii) contact details to enquire about the development or to make a complaint; (ix) a complaints register, updated monthly; (x) the Compliance Report of the development; (xi) audit reports prepared as part of any Independent Audit of the development and the Applicant's response to the recommendations in any audit report; (xii) any other matter required by the Planning Secretary; and (b) keep such information up to date, to the satisfaction of the Planning Secretary.	Section 4.3.1

1.3 Community Communications and Complaints Handling Strategy Scope

The CCCHS applies to works undertaken by the Proponent and their engaged contractors. This CCCHS outlines the method, triggers and timing of consultation, notification and complaints and queries handling required in the course of the construction of the development and arising from the requirements of the relevant consent conditions outlined in **Table 1.**

1.4 Project Description

SSD-10448 was approved on 24 May 2022, granting approval for the Aspect Industrial Estate comprising 11 industrial lots and Stage 1 works for site preparation, construction and use of two warehouse and distribution buildings, stormwater and associated works, internal road network, and signage. The development, as approved under SSD-10448 is outlined in **Table 2** below:

Table 2 Approved Development

Application Number	Development Description
SSD-10448	Aspect Industrial Estate including: • a Concept Proposal for the staged development of an industrial estate comprising of 11 buildings with a total GFA of up to 247,990 square metres (m2) for industrial, warehousing and distribution centres, and café uses; and • Stage 1 development comprising site preparation works, vegetation clearing, realignment of the existing creek, construction of access roads and eastern half of Mamre Road/ Access Road 1 intersection works, construction, fitout and operation of one warehouse and one industrial building with ancillary offices, car parks, landscaping, signage and a café, construction and operation of services and utilities, and subdivision of the site into three lots.

This CCCHS has been prepared to address all works approved under SSD 10448 including earthworks, infrastructure and built form. All contractors and sub contractors involved in delivering the project will be required to comply with the approved CCCHS.

Figure 1 below identifies the site masterplan.

Figure 1 Site Masterplan

2 Key Stakeholders and Potential Issues

2.1 Key Stakeholders

The key stakeholders likely to require consultation, notification and or likely to raise comment or complaint in the course of the construction of the project include (but are not limited to):

- Adjacent or nearby property owners or occupiers
- Local Council (Penrith City Council)
- State Government Departments, Offices or Agencies, including:
  - Environmental Protection Authority
  - Fire and Rescue NSW
  - NSW Rural Fire Service
  - Transport for New South Wales, including the former Roads and Maritime Services
  - Western Parkland City Authority
  - Western Sydney Airport
  - Western Sydney Planning Partnership
  - Department of Planning and Environment, specifically the:
    - Greater Sydney, Place and Infrastructure, Central Western Team
    - Industry Assessment
    - Environment, Energy and Science Group
    - Natural Resource Access Regulators and Water Group
  - Transport for NSW
  - NSW Rural Fire Service
  - Western City and Aerotropolis Authority
  - Western Sydney Airport
  - Western Sydney Planning Partnership
- Utility and Services Providers, including:
  - TransGrid
  - WaterNSW
  - Endeavour Energy
  - Sydney Water; and
- Other Interested Parties.

2.2 Previous Consultation

The Proponent and their representatives have previously undertaken consultation with agencies, the community and stakeholders during the development of the Project.

In response to public notification of the proposal, a total of 18 submissions were received, including one submission from the general public, five submissions from businesses or organisations, and 12 submissions from government or public authorities. In response to the issues raised, the Proponent revised several plans and consultant reports, which informed a Response to Submissions Report (Urbis, 2021) and Amended Development Report (Urbis, 2022).

For more information, refer to the Department of Planning and Environment's Major Project Assessments webpage at: https://www.planningportal.nsw.gov.au/major-projects/project/10448.

Consultation has also been undertaken to date with relevant stakeholders to satisfy conditions of SSD-10448 and to inform the preparation of management plans required under the Consent. Record of this consultation, where relevant is included within the management plans located within the Project CEMP.

2.3 Potential Issues and Strategies

The Proponent is committed to ongoing proactive consultation with the community and stakeholders while understanding the importance of addressing potential issues and minimising construction related impacts. **Table 3** outlines potential project issues that are likely or known to be of interest or concern to the community and stakeholders. The table also details communications related measures and strategies that the Proponent will undertake to manage and mitigate impacts.

Where an incident or non-compliance arises relating to environmental management and beyond the scope of matters relating to consultation, the CEMP identifies management and mitigation measures to address those matters, with reference to be made to Section 3.5 of the CEMP outlining Incident and Non-Compliance Response and Handling Procedure.

Table 3 Issue Identification and Mitigation

Potential Issue	Potential Key Impacts	Mitigation Strategy
Noise, Vibration, and Air Quality	Truck, machinery, and light vehicle movements within, to and from the site, along with civil works have potential to result in negative impacts associated with noise, vibration, and dust.	Sensitive receivers and affected stakeholders will be consulted prior to actions likely to generate high levels of noise or vibration in accordance with Section 4 of this Strategy. Up to date information on current works will be accessible to stakeholders and the wider public on the project web page. Additionally, should any works be likely to generate impacts beyond those identified within the approval's documentation consultation would be undertaken with the applicable managing agency. The CEMP, along with the supporting Construction Noise and Vibration Management Plan and Construction Air Quality Management Plan contain specific measures to manage these impacts. These management plans have been informed by commitments contained within the SSD approvals package, EPA standards and guidelines.
Construction Traffic	A temporary increase in traffic movements may be experienced associated with the import of fill material, the movement of construction machinery to and from the site and the movement of workers light vehicles.	The CEMP and supporting Construction Traffic Management Plan identify specific mechanisms to manage and mitigate these impacts including the development and implementation of a Driver Code of Conduct to be adhered to by all vehicle operators undertaking works in relation to the Site.
Stormwater, Sediment Control, Erosion, Water Quality	High rainfall events could result in localised flooding. Construction could result in impacts to local water quality, associated with sediment laden runoff.	Surrounding sensitive receivers will be consulted with in relation to adjacent works regarding flooding and water quality issues, with these items discussed as they arise via the construction phoneline, in accordance with Section 4 of this Strategy. The CEMP, along with the supporting Erosion and Sediment Control Plan identify specific mechanisms to manage and mitigate these impacts in accordance with the relevant Penrith City Council standards and commitments within the SSD approvals package.
Waste Management	Earthworks, demolition, and construction waste present at the site during works.	The CEMP and supporting Waste Management Plan identify specific mechanisms to manage and mitigate these impacts.

Potential Issue	Potential Key Impacts	Mitigation Strategy
Removal of Flora and Fauna	The project approval requires the removal of native and exotic flora and fauna to facilitate the development, with the associated potential for impacts on safety of immediately adjacent receivers, along with biodiversity and visual amenity.	Potentially affected receivers would be advised of works with the potential for impact via letter box drop and phone contact (if appropriate) and with these items discussed as they arise via the construction phoneline, in accordance with Section 4 of this Strategy. The CEMP, along with the supporting Vegetation Management Plan identify specific mechanisms to manage and mitigate these impacts.
Visual Amenity and Privacy	Visual impacts of earthwork and construction activities, along with potential impacts on the privacy of adjacent sensitive receivers.	Potentially affected receivers would be advised of works with the potential for impact via letter box drop and phone contact (if appropriate) and with these items discussed as they arise via the construction phoneline, in accordance with Section 4 of this Strategy. The CEMP and supporting Vegetation Management Plan identifies specific mechanisms to manage and mitigate these impacts.
Out of Hours Work	The identified impacts could be magnified due to the works being carried out while surrounding receivers are more likely to be home in the early morning/evening, or asleep, with correspondingly lower background noise levels.	Out of hours works to only be undertaken in accordance with Condition D42, where necessary and subject to endorsement from the applicable managing agency (where relevant). Should out of hours work with the potential for impact be proposed the potentially affected receivers would be advised via letter box drop in accordance with Section 4.4 of this Strategy.
Aboriginal Heritage	There is the potential for encountering items of Aboriginal Heritage during excavation.	Monitoring of works by appropriately qualified personnel, along with the implementation of an unexpected finds protocol in consultation with Aboriginal Stakeholders and Heritage Division of the Department of Planning, Industry and Environment The CEMP identifies specific mechanisms to manage and mitigate these impacts.
Hazardous Goods and Contamination	There is the potential for environmental incidents relating to the hazardous goods and contamination on site during construction.	The CEMP and supporting Unexpected Contamination Procedure identify specific mechanisms to manage and mitigate these impacts.

Potential Issue	Potential Key Impacts	Mitigation Strategy
Misinformation and Misunderstanding	Lack of project awareness within the wider community may result in complaints being raised by those unaware of the extent of the approval, with these complaints not directed through the appropriate project hotline. Unauthorised release of project information by the project team to the media, stakeholders or the community has potential to impact on project perception in the community.	The CCCHS includes measures at Section 4.3 to provide regular updates in plain language, supported by imagery to stakeholders and the wider community through public and private media. Contact details will be provided on site, the project web page and in all information issued. Information on project works, reporting and compliance is to be maintained and updated on the project website.
Emergency Event	Unforeseen emergency with the potential to impact on the community either directly, or indirectly through out of hours activities that may generate additional traffic or noise.	The CCCHS includes measures at Section 4.4 to provide updates in emergency events, with the CEMP identifying specific mechanisms to manage and mitigate these impacts from an environmental management perspective.

3 Communications and Community Liaison Representative

The Proponent will nominate a Communications and Community Liaison Representative (CCLR) who will provide the community and stakeholders with a single point of contact for all aspects of the project, responsible for receiving and disseminating information requests and complaints, along with addressing any interface issues. The CCLR will also facilitate property access should it be required.

The CCLR will be available for contact by local residents and the community at all reasonable times to answer any questions and address any concerns relating to the project. The CCLR will have up-to-date information on:

- Emerging stakeholders
- Planned construction activities
- Planned traffic arrangements
- Current landowner discussions with members of staff
- Planned community and stakeholder consultation
- Complaints or enquiries received
- Duties and accountabilities of staff; and
- Commitments to stakeholders made by the Proponent.

The CCLR will be responsible for recording, actioning and provided response to comments, queries or complaints received with relation to the construction of the project and will maintain the Complaints Register, including provision of periodic summary reports to the Environmental Representative in accordance with **Section 5.2** of this strategy.

At the time of writing, the contact details for the CCLR are as follows:

- Alanna Ryan – Principal – SLR

  aryan@slrconsulting.com 0407 430 453.

4 Community and Stakeholder Engagement

4.1 Objectives

The key objectives of the strategy are to meet the requirements of Condition E3(i) of SSD-10448 and:

- Keep the local community and key stakeholders informed of the progress of works relating to the Project
- Ensure that enquires and complaints received from the community or key stakeholders are addressed and responded to in a timely and effective manner
- Inform relevant parties in advance of potential disturbances and events likely to cause impact
- Be good neighbours and members of the local community throughout the duration of the project's lifespan
- Providing an open two communications channel to allow ongoing, iterative engagement; and
- Seek opportunities for improvement throughout the project.

4.2 Conduct

In their communications and consultation with the community and key stakeholders, the Proponent and their representatives will comply at all times with the requirements of the *Privacy and Personal Information Protection Act 1998 (NSW)* and the *Privacy Act 1988 (Cth)*.

4.3 Communication, Management and Mitigation Tools

A range of tools and techniques will be used to inform and engage with the community and stakeholders regarding the project. **Table 4** below provides an overview of the mechanisms to be utilised to notify and consult with local community and key stakeholders and measures to mitigate potential issues throughout the development.

Table 4 Communication Management and Mitigation Tools

Tool/ Technique	Description	Person Responsible	Audience	Frequency/timing	Specifications
Consultation Meetings	Meetings held to notify, discuss or consult on matters arising of relevance to community and or key stakeholders. Meetings to be held either face to face or on virtual platform(s)	CCLR	The wider community and key stakeholders.	Meetings to be held on an as needs basis dependant on matters to be discussed and appropriate timing of discussions	Details and matters to be discussed to be tailored to the purpose and aims of the meeting. Record of conversation (informal) or minutes of meeting (formal) to be recorded, retained by the CCLR and provided to all attendees following the meetings. A record of the discussion shall be included in the Complaints Register and actioned as required.
Complaints Register	Recording community and stakeholder interactions (including notification, consultation, queries, comments and complaints), along with associated remedial actions as required.	CCLR	The wider community and key stakeholders.	Project duration	The maintenance of the Complaints Register is required to satisfy the requirements of Condition (E1(g)(ii), E3(i) and E17(ix) of SSD-10448. The register will be continually updated to record community engagement, including information provided by the Proponent, feedback received, and remedial action undertaken where required.
Agency Meetings	Meetings with agencies to discuss matters relevant to their agency	CCLR and/or the Proponent	Relevant Agency	As required.	Meetings will be held as required to address matters relevant to specific agencies including the satisfaction of conditions of consent. These shall be undertaken either directly by the proponent or facilitated by the CCLR at the Proponent's discretion.

Tool/ Technique	Description	Person Responsible	Audience	Frequency/timing	Specifications
Notification Letterbox Drop	Letters would be provided to specific receivers identified as being potentially affected by construction. This may be undertaken in tandem with door knocking.	CCLR	Landowners and occupiers of the immediate area.	As required for the project duration.	Letter box drop details to be recorded in the Complaints Register. Timing of construction activity to be identified along with relevant contact details.
Email and phone	Where agreed to by the stakeholder and contact details provided, contact is made via email, phone and/or text message to notify or respond to query or complaint	CCLR	The wider community and key stakeholders.	As required for the project duration.	With the stakeholders consent, contact details shall be utilised to provide notification or further contact to respond to query or complaint. Recorded contact details are to kept private and used exclusively for the purpose of consultation on the project.
On Site Signage	Project information details.	CCLR	Visitors to the site and residents of the immediate area.	Project duration.	Contain key project contact details including the hotline and web page, along with relevant project and safety information.
Project Information and Complaints Number	Phone number to be contacted should information on the project be required or complaint lodged.	CCLR	The wider community and key stakeholders.	Project duration.	Phone number to be included on site signage, the web page and all project information material. Feedback provided to be incorporated into the Complaints Register and actioned as required.
Staff and Visitor Induction and Training	Project information details.	Site Forman and Management Staff	Staff and visitors to the site.	Project duration.	Key project safety information, contact details, emergency procedures and site information.

Tool/ Technique	Description	Person Responsible	Audience	Frequency/timing	Specifications
Toolbox and Prestart Meetings	Project information details.	Site Forman and Management Staff	Staff and visitors to the site.	Project duration.	Task specific safety information, emergency procedures and relevant project updates. All staff and subcontractors to be made aware of external and internal communications procedures
Website	A web page shall be established for the project	The Proponent	The wider community and key stakeholders.	Project duration.	Website address and phone number located on site signage and all project information material. Web page to provide all details outlined in **Section 4.3.1** below.

4.3.1 Project Website

The Proponent will establish a website to be accessible from at least 48 hours prior to commencement of construction until the completion of all works approved under SSD-10448.

The following information will be made available on the website and updated monthly or more frequently when necessary and as required by SSD-10448 Condition E17:

- The documents referred to in Condition C2 of the SSD-10448 consent
- All current statutory approvals for the Development
- All approved strategies, plans and programs required under the conditions of the SSD-10448 consent
- the proposed staging plans for the development if the construction, operation or decommissioning of the development is to be staged
- Regular reporting on the environmental performance of the Development in accordance with the reporting requirements in any plans or programs approved under the conditions of the SSD-10448 consent
- A comprehensive summary of the monitoring results of the Development, reported in accordance with the specifications in any conditions of the SSD-10448 consent, or any approved plans and programs
- A summary of the current stage and progress of the Development
- Contact details to enquire about the Development or to make a complaint
- A complaints register, updated monthly
- The compliance report of the development
- Audit reports prepared as part of any Independent Audit of the development and the Applicant's response to the recommendations in any audit report; and
- Any other matter required by the Planning Secretary.

4.4 Notification Procedure

Where notification is required pursuant to Condition(s) of SSD-10448, notification shall be undertaken within the timeframes outlined within the Consent. Where notification is required due to a potential impact or issue, notification shall be undertaken in accordance with **Table 5** below.

Table 5 Notification of Potential Impact or Issue

Potential Impact or Issue	Method of Contact/Consultation	Timeframe
High noise generating work	Email, Text Message or Letterbox drop – notifying of expected commencement, duration and affected hours	No less than 24 hours prior to the activity
Vibration intensive activity	Email, Text Message or Letterbox drop – notifying of expected commencement, duration and affected hours	No less than 24 hours prior to the activity
Traffic management disruption	Email, Text Message or Letterbox drop – notifying of expected commencement, duration and affected hours Variable Message Signs	No less than 24 hours prior to the activity

Potential Impact or Issue	Method of Contact/Consultation	Timeframe
Respite offerings	Email or phone calls will be undertaken to determine whether respite is required and appropriate scheduling and duration for respite periods	No less than 24 hours prior to the activity
Emergency Event	Email, Text Message or Letterbox drop – notifying of expected commencement, duration and affected hours	As soon as possible

4.5 Complaints Procedure

The Proponent is committed to the timely and effective management of enquiries and complaints relating to construction activities for the project. To this end, the following complaints procedure will be adhered to, enabling the receipt and recording of enquiries and complaints, along with the methods of response and resolution of issues raised.

The complaints handling procedure outlined below and illustrated in **Figure 2**.

4.5.1 Receiving and Recording Enquiries and Complaints

The Proponent will establish a Project email address and nominate a phone number for the receipt of enquiries and complaints relating to the development. The email account will be regularly monitored to receive and respond to customer feedback and enquiries. The phone number will be available for contact from the commencement of works. The CCLR will manage the phoneline from the commencement of the project until the completion of works. Where calls are received during hours of construction work (including out of hours works) all calls will be answered by the CCLR. Where calls are received outside of hours of construction works the caller will be invited to leave a message. All approaches from the community and stakeholders will be registered in the project's Complaints Register. The facilities established for receiving enquiries and complaints about the project during construction are shown in **Table 6**.

Table 6 Enquires and Complaints Facilities

Facility	Purpose	Detail
Phone number	A contact phone number and associated contact name (the CCLR) for questions/enquiries and the lodgement of complaints relating to the development.	02 4037 3258
Email Address	An email address for questions/enquiries and the lodgement of complaints relating to the development.	aryan@slrconsulting.com
Postal Address	A postal address for the receipt of questions/enquiries and the lodgement of complaints relating to the development.	10 Kings Road New Lambton NSW 2292
In person verbal	Verbal enquiries and complaints can be made formally during meetings or may be made informally where staff interact with members of the public in informal settings.	Where enquiry or complaint is made face to face to persons other than the CCLR, staff will immedicably notify the Contractor's Project Manager who will then contact the CCLR. Record of the conversation (including the recording of contact details with consent) will be made

Facility	Purpose	Detail
		by the staff member and provided to the CCLR immediately

The Proponent has established a Complaints Register to record all complaints and enquiries received by the above means. The Complaints Register will be maintained on a regular basis. The Complaints Register shall include the following details for all complaints or enquiries received:

- Date and time of complaint or enquiry
- Method by which the complaint or enquiry was made
- Name, address, contact telephone number of complainant (if no such details were provided, a note to that effect)
- Nature of complaint or enquiry
- Action taken in response including follow up contact with the complainant
- Any monitoring to confirm that the complaint or enquiry has been satisfactorily resolved; and
- If no action was taken, the reasons why no action was taken by you.

An excerpt of the Complaints Register is included at **Appendix A**.

4.5.2 Responding to and Resolving Enquiries and Complaints

Where a complaint or enquiry is received the CCLR will attempt to provide an immediate response if possible, via phone or email. Where a complaint or enquiry cannot be responded to immediately the CCLR will assess and prioritise the submission and provide the complainant or enquirer with a follow up verbal response on what action is proposed within two hours during construction works (including night and weekend works) and 24 hours at other times. Where a complaint or enquiry cannot be resolved by the initial or follow-up verbal response, a written response will be provided to the complainant or enquirer within ten days.

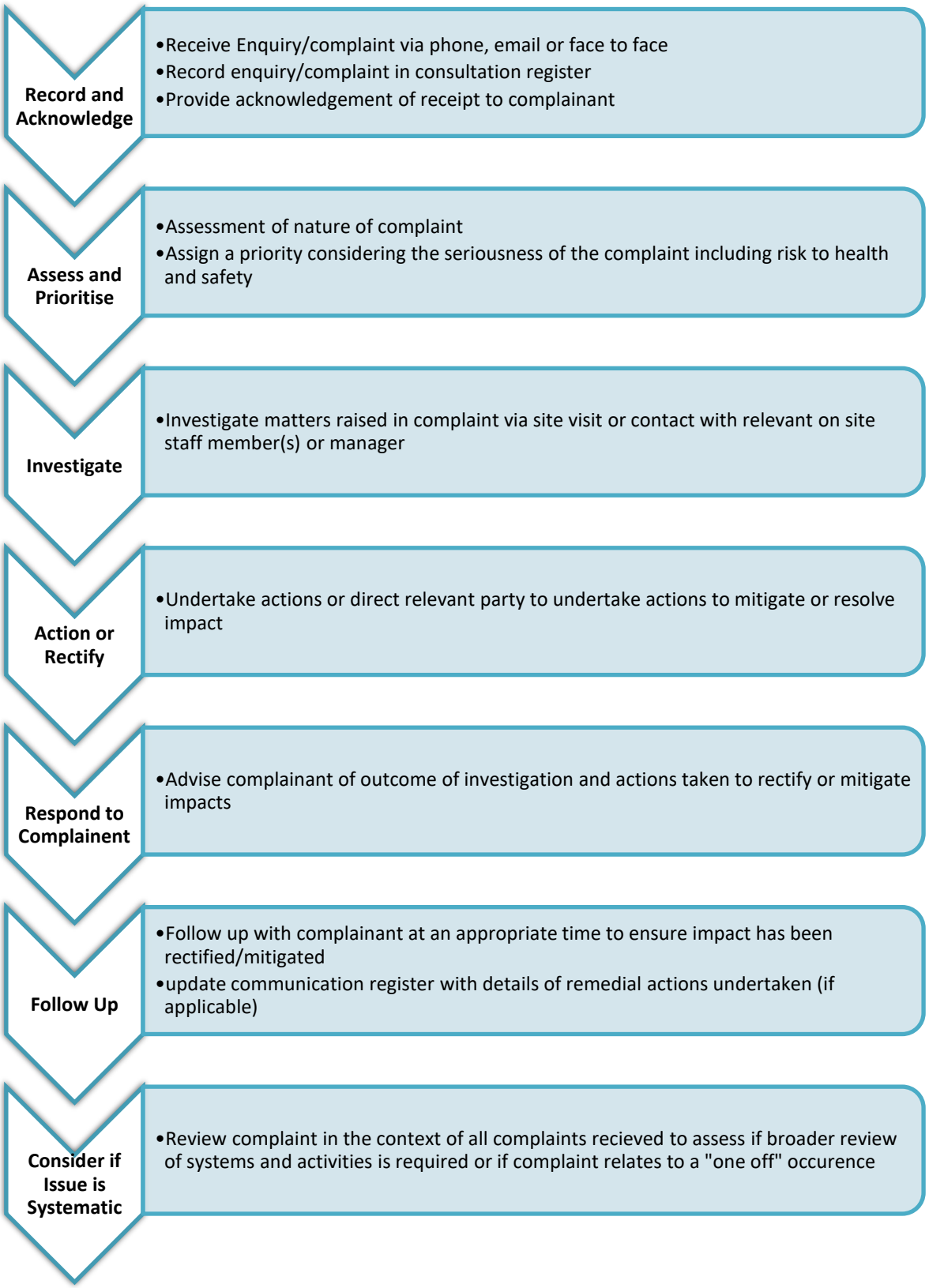
In the event of a complaint, the CCLR will assess whether the complaint is founded or unfounded and if necessary, delegate the resolution of the issue to the project manager for action or to the relevant project engineer. The CCLR will oversee the rectification of the issue and respond to the complainant once the issue has been resolved.

In the event of an enquiry, the CCLR will endeavour to provide an immediate response where they are in possession of the relevant information. Where more specific or detailed information is required, the CCLR will liaise with the project manager or relevant project engineer to obtain the information required to respond to the enquiry and provide this information to the enquiring party once in hand.

Where the above protocol is unsuccessful in resolving complaints, mediation may be undertaken at the discretion of the Proponent to facilitate negotiation between affected parties. This shall be performed with the assistance of the ER and potentially via an independent person (mediator) appointed by the Proponent as required.

A summary of complaints and enquiries will be provided on a monthly basis to the ER for inclusion in their monthly report, with records made publicly available.

Figure 2 Complaints Handling Procedure



4.5.3 Unreasonable Complainant Conduct

The NSW Ombudsman provides guidelines which define unreasonable complaint conduct as:

> *"…any behaviour by a current or former complainant which, because of its nature or frequency, raises substantial health, safety, resource or equity issues for the parties to a complaint."*

Whilst it is not envisioned that the project will attract complainants that exhibit this behaviour, where a complainant is seen to potentially have a negative impact on the CCLR or project team's health, safety, resourcing or equity of service, The Proponent shall adhere to the procedures and practices outlined within the NSW Ombudsman's "*Managing Unreasonable Complainant Conduct Practice Manual 2nd Edition"*.

4.6 Contingency Management Plan

In accordance with Condition E1(e) of the SSD-10448 consent, a contingency management plan has been developed to outline the management of unpredicted impacts and their consequences. Details of these events, their severity and response are detailed in **Table 7** below:

Table 7 Contingency Management Plan

Key Element	Trigger/ Response	Condition Green	Condition Amber	Condition Red
Submission	Trigger	General feedback/comment (no complaint or query).	Enquiry made by formal or informal channels.	Complaint made by formal or informal channels.
	Response	Acknowledge receipt and record in Complaints Register. No further response required.	Acknowledge receipt and record in Complaints Register. Direct enquiry to relevant person for actioning and response within 5 days.	Acknowledge receipt and record in Complaints Register. Respond to complaint immediately if possible, if not direct enquiry to relevant person for actioning and provide complainant with a follow up verbal response on what action is proposed within two hours during construction works (including night and weekend works) and 24 hours at other times.
Media	Trigger	Positive story in print, online, radio or television.	Neutral or advisory story in print, online, radio or television.	Negative story in print, online, radio or television.
	Response	Record in Complaints Register and advise the proponent media/marketing team. No further response required.	Record in Complaints Register and advise the proponent media/marketing team. No further response required.	Record in Complaints Register and advise the proponent Project Team for further action and response. Contact relevant person for actioning and response within 48 hours
Unscheduled Event	Trigger	Event occurring outside of plan or schedule without impact or potential impact.	Event occurring outside of plan or schedule with minor impact or potential impact.	Event occurring outside of plan or schedule with major impact or potential impact.

Key Element	Trigger/ Response	Condition Green	Condition Amber	Condition Red
	Response	No response required. Identify opportunities for improvement to manage potential future events.	Contact relevant person for actioning and response within 48 hours. Acknowledge in Complaints Register. Identify opportunities for improvement to manage potential future events.	Contact relevant person for actioning and response immediately. Acknowledge in Complaints Register. Identify opportunities for improvement to manage potential future events.
Political Interest	Trigger	General or non-specific enquiry by Local, State or Federal political representative.	Enquiry or complaint relating to minor issue by Local, State or Federal political representative.	Enquiry or complaint relating to major issue by Local, State or Federal political representative.
	Response	Community consultation team in conjunction with The Proponent Project Team to prepare and provide response or assign response task to relevant staff member for comment. Record in Complaints Register.	Community consultation team in conjunction with the proponent Project Team to prepare and provide response within 48 hours. Record in Complaints Register.	Community consultation team in conjunction with the proponent Project Team to prepare and provide response within 24 hours. Record in Complaints Register.

5 Monitoring, Reporting and Evaluation

Monitoring, Reporting and Evaluation will be undertaken to measure the effectiveness of community consultation, stakeholder engagement and responses to complaints and enquiries. Opportunities for improvement will be sought on a continuous basis, with an annual review of the CCCHS undertaken to formalise these incremental improvements.

5.1 Monitoring

The performance of this strategy will be monitored monthly based upon an assessment of the following data:

- Total number of monthly complaints
- Review of number of monthly complaints relating to lack of consultation/misinformation/confusion
- Review of number of monthly enquiries relating to information previously disseminated to the community through other channels
- Monthly review of enquiries or complaints of a similar nature or theme indicative of underlying systematic issues with the project or communication strategy; and
- Response timeframes, including initial acknowledgement and the response to enquiries or remediation of issue(s).

The parameters of monitoring and performance criteria are outlined in **Table 8** below.

Table 8 Summary of Monitoring Data

Monitoring Parameter	Rationale	Performance Criteria	Monitoring Frequency
Total number of complaints	The number of complaints received in total is indicative of the community's satisfaction with the project.	A reduction in number of complaints, baseline determined by number of complaints received in preceding months.	Monthly
Number of complaints relating to lack of consultation/misinformation/ confusion	Number of complaints relating to lack of consultation/ misinformation/ confusion is indicative of the effectiveness and clarity of communication tools utilized.	A reduction in number of complaints, baseline determined by number of complaints received in preceding month.	Monthly
Number of enquiries relating to information previously disseminated	Number of enquiries relating to information previously disseminated is indicative to the effectiveness of the delivery of information.	A reduction in number of enquiries, baseline determined by number of enquiries received in preceding month.	Monthly
Number of complaints/enquiries within defined categories based on theme or subject	A large number of complaints or enquiries relating to a single issue may be indicative of a systematic issue to be addressed as a priority.	A reduction in number of complaints, baseline determined by number of complaints received in preceding month.	Monthly

Monitoring Parameter	Rationale	Performance Criteria	Monitoring Frequency
Response timeframes	Response to enquiries and complaints should be timely to ensure effective responsiveness and rectification of issues and to encourage trust within the community.	Enquiries and complaints acknowledged within 48 hours. Urgent enquiries and complaints responded to within 48 hours of receipt, non-urgent enquiries and complaints responded to within 5 days.	Monthly

5.2 Reporting

Reporting shall be undertaken directly to the ER, with the Complaints Register to be provided to the approved ER in accordance with Conditions C32(a) of SSD-10448.

A monthly community consultation summary will be made publicly available on the project web page and shall include:

- A summary of community consultation activities undertaken within the preceding month
- A summary of all enquiries and complaints received within the preceding month, including details of response and/or remediation activities.

5.3 Evaluation and Review

Review of this strategy shall be undertaken in accordance with the provisions of the project CEMP (SLR, 2021).

Where performance criteria are not being satisfied, review of this strategy and its implementation will be undertaken by the CCLR and changes to the strategy may be made to rectify the short fall. Where systematic issues are identified associated with construction activities, the project manager will be advised and immediate rectification of the issue will be requested.

This strategy will be reviewed in accordance with Condition E8 of SSD-10448 and where necessary updated or revised in accordance with Condition E9 of SSD-10448.

6 References

- NSW Ombudsman (2012) *Managing Unreasonable Complainant Conduct Practice Manual 2nd Edition*
- SLR Consulting Australia (2022) *Construction Environmental Management Plan*
- Urbis (2020) *Aspect Industrial Estate Environmental Impact Statement*
- Urbis (2021) *Response to Submissions*
- Urbis (2022) *Amended Development Report*

APPENDIX A

Complaints Register

Date	Time	Responsible Party	In/Out	Initial Communication Method/Tool	Contact Name/ Organisation	Contact Details	Documentation Location (if applicable)	Communication Type: Complaint/ Enquiry/ Communication	Summary of Issues/ Details	Action Taken	Further Action/ Monitoring to Confirm Resolution

ASIA PACIFIC OFFICES

ADELAIDE
60 Halifax Street
Adelaide SA 5000
Australia
T: +61 431 516 449

BRISBANE
Level 16, 175 Eagle Street
Brisbane QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

CANBERRA
GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

DARWIN
Unit 5, 21 Parap Road
Parap NT 0820
Australia
T: +61 8 8998 0100
F: +61 8 9370 0101

GOLD COAST
Level 2, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

MACKAY
21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

MELBOURNE
Level 11, 176 Wellington Parade
East Melbourne VIC 3002
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

NEWCASTLE CBD
Suite 2B, 125 Bull Street
Newcastle West NSW 2302
Australia
T: +61 2 4940 0442

NEWCASTLE
10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

PERTH
Grd Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

SYDNEY
Tenancy 202 Submarine School
Sub Base Platypus
120 High Street
North Sydney NSW 2060
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

TOWNSVILLE
12 Cannan Street
South Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

WOLLONGONG
Level 1, The Central Building
UoW Innovation Campus
North Wollongong NSW 2500
Australia
T: +61 2 4249 1000

AUCKLAND
Level 4, 12 O'Connell Street
Auckland 1010
New Zealand
T: 0800 757 695

NELSON
6/A Cambridge Street
Richmond, Nelson 7020
New Zealand
T: +64 274 898 628

WELLINGTON
12A Waterloo Quay
Wellington 6011
New Zealand
T: +64 2181 7186

SINGAPORE
39b Craig Road
Singapore 089677
T: +65 6822 2203

APPENDIX G

Construction Noise and Vibration Management Plan

ASPECT INDUSTRIAL ESTATE

Lot 1 CEVA
Construction Noise and Vibration Management Plan

Prepared for:

Richard Crookes Constructions Pty Ltd
Level 3
4 Broadcast Way
Artarmon NSW 2064

SLR Ref: 610.31016.00000-R01
Version No: -v1.0
December 2022

PREPARED BY

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Richard Crookes Constructions Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.31016.00000-R01-v1.0	20 December 2022	Jonathan Caine Joshua Ridgway	Aaron Miller	Aaron Miller

CONTENTS

CONTENTS

DOCUMENT REFERENCES

TABLES

FIGURES

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APPENDICES

1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Richard Crookes Constructions (RCC) to prepare a Construction Noise and Vibration Management Plan (CNVMP) for construction works associated with the development of Lot 1/Warehouse 1 (the project) of Stage 1 of the Aspect Industrial Estate (AIE) located at Mamre Road, Kemps Creek, NSW.

This CNVMP addresses the potential noise and vibration impacts associated with the construction of Lot 1 / Warehouse 1 and details the mitigation and management procedures for dealing with potential impacts. Construction noise and vibration impacts were previously assessed for the estate as part of the *Aspect Industrial Estate SSDA Noise and Vibration Impact Assessment* prepared by SLR in February 2021 (the NVIA) and a Construction Noise and Vibration Management Plan for the AIE was prepared by SLR in July 2022.

This CNVMP is limited to the construction of Lot 1/ Warehouse 1 only, and does not cover the works for Warehouse 3 or any other infrastructure works associated with Stage 1.

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

SLR is suitably qualified to produce this CNVMP and is a member of the Australian Acoustical Society (AAS). SLR is also a member firm of the Association of Australasian Acoustical Consultants (AAAC). Endorsement of the SLR Acoustics and Vibration team in accordance with Condition D44(a) of the Development Consent has been granted by the Planning Secretary (refer to **Appendix B**).

2 Procedure for Implementing this CNVMP

This general procedure will be followed in order to implement this CNVMP on site:

1. Review the requirements of the Development Consent Conditions relevant to construction noise and vibration (refer to **Section 4**), the location of the nearest sensitive receivers (refer to **Section 2**) and the applicable Noise Management Levels (NMLs) (refer to **Section 6.2.2**).
2. Prior to commencement of construction phases/activities, confirm the assumptions regarding construction activities/locations/equipment/methodology detailed in **Section 7.1** are accurate and remain valid. Where different methodology or equipment is proposed, further validation of the predicted noise levels will be undertaken in accordance with **Section 7.1**.
3. Review the predicted noise levels for the proposed construction activities (refer to **Section 7.3** and any updated assessment undertaken in step 2) to confirm the predicted impacts for each activity. Each activity has “typical” noise level predictions, and “peak” noise level predictions using the noisiest equipment for that activity.
4. Where the noise impacts are predicted to be:
   - Below the relevant NMLs – undertake best practice noise management measures to minimise noise impacts
   - Above the NMLs – implement all feasible and reasonable noise mitigation and management measures relevant to that activity (refer to **Section 8.2**) to reduce the impacts (to below the NMLs where possible).

- Above 75 dBA – implement mitigation and management measures for highly noise affected receivers as per **Section 8.2** including consideration of respite periods and duration respite. Consultation with the individual highly noise affected residences must be undertaken to discuss the appropriate mitigation/respite solution for high noise works.

5. Review the minimum working distances for vibration intensive plant (refer to **Section 6.4.2**) and the vibration assessment results (refer to **Section 7.4**). Where vibration intensive plant is proposed to be used within the minimum working distances of vibration sensitive structures/receivers implement feasible and reasonable mitigation and management measures as per **Section 8.2**.
6. Undertake noise and/or vibration monitoring in accordance with **Section 8.3**, where required.
7. Where works are required out of the standard construction hours, additional assessment and documentation must be prepared for approval by the Planning Secretary (refer to **Section 7.2**).
8. Resolve any noise/vibration issues during construction works as per the contingency plan (refer to **Section 8.5**), and document and report incidents and complaints as per the requirements in **Sections 8.5** and **8.4**, respectively.

3 Development Overview

3.1 Site Description

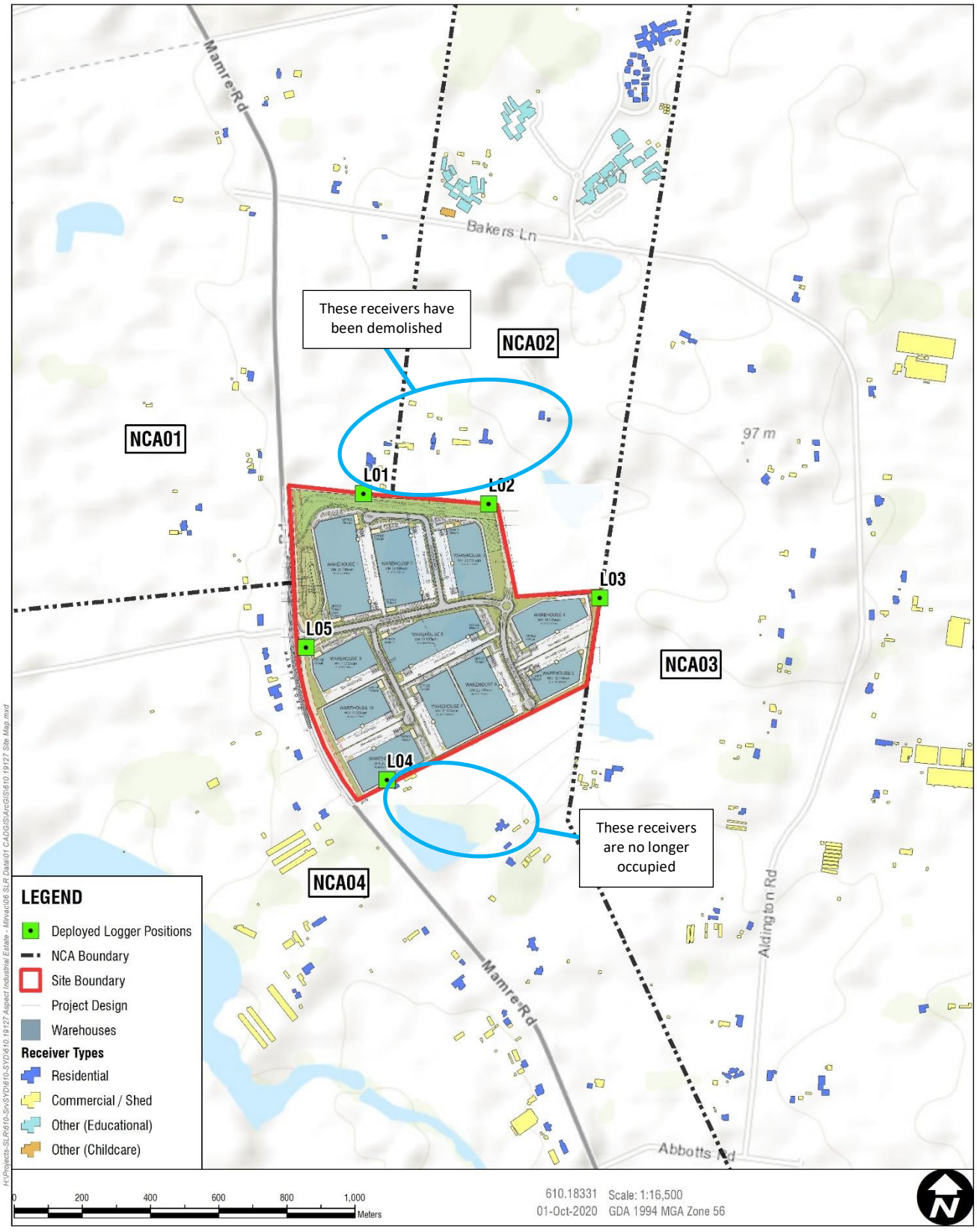
AIE is legally described as Lots 54-58 in DP 259135, with an area of around 56.3 hectares (ha). The project comprises the construction of Lot/Warehouse 1 of the AIE which is located east of Mamre Road, Kemps Creek, within the Penrith Local Government Area.

The estate has around 950 m of direct frontage to Mamre Road with a proposed intersection providing vehicular access via Mamre Road to the M4 Motorway and Great Western Highway to the north and Elizabeth Drive to the south.

The locations of the site and surrounding receivers are shown in **Figure 1**. The Masterplan design is shown in **Figure 2** and the Stage 1 design is shown in **Figure 3**. This CNVMP only concerns the construction of Warehouse 1 shown in **Figure 3**, and does not include the works to construct Warehouse 3 or any other infrastructure works associated with Stage 1.

It is noted that the nearest residences to the north of the site in NCA01 and NCA02 have been demolished since the preparation of the NVIA for the AIE. The residences to the south of the site on the adjacent lots in NCA04 have been confirmed by the developer of those lots to be vacant with no intention of occupation prior to being demolished (refer to **Appendix C**). These receivers are identified in blue circles in **Figure 1**, and have been excluded from the assessment of construction noise and vibration.

Figure 1 Site Location, Sensitive Receivers Areas and Modelled Buildings



Note 1: Figure sourced from the NVIA.

Figure 2 Proposed Masterplan Design

Note 1: Figure sourced from Urbis RTS 2021.

Figure 3 Proposed Stage 1 Design

Note 1: Figure sourced from Urbis RTS 2021.

3.2 Nearest Sensitive Receivers

The area surrounding the site has been divided into four Noise Catchment Areas (NCAs). The NCAs group together sensitive receivers with similar existing noise environments.

The NCAs and sensitive receivers in the area around the site are detailed in **Table 1** and shown in **Figure 1.**

Table 1 Sensitive Receivers

NCA	Direction from Site	Description
NCA01	Northwest North	This NCA includes receivers to the north and northwest of the site where the noise environment is influenced by road traffic noise from Mamre Road. The receivers in this NCA are primarily scattered rural residential dwellings with associated commercial/shed structures. The closest residential receivers to the site boundary are around 100 m to the northwest. The cluster of receivers close to the northern site boundary have been demolished and are not included in this assessment (refer to **Figure 1**).
NCA02	North	This NCA includes receivers to the north of the site where the noise environment is less influenced by road traffic noise from Mamre Road. Distant road traffic, natural noises (such as wind and insects), and local traffic on Bakers Lane primarily influence the noise environment in this NCA. The receivers in this NCA include several schools (eg Mamre Anglican School), a childcare centre, and the Emmaus Village residential area, all located to the north of Bakers Lane. The closest residential receivers to the site boundary (Emmaus Village) are around 1,250 m to the north, with the closest childcare and educational receivers around 800 m to the north. The cluster of receivers close to the northern site boundary have been demolished and are not included in this assessment (refer to **Figure 1**).
NCA03	East	This NCA includes receivers to the east of the site where the noise environment is influenced by distant road traffic noise, natural noises (such as wind and insects), and local road traffic on Aldington Road. The receivers in this NCA are primarily scattered rural residential dwellings with associated commercial/shed structures. The closest residential receivers to the site boundary are around 250 m to the southeast and around 500 m to the east.
NCA04	South Southwest West	This NCA includes receivers to the south, southwest and west of the site where the noise environment is influenced primarily by road traffic noise from Mamre Road. The receivers in this NCA are primarily scattered rural residential dwellings with associated commercial/shed structures. The closest residential receivers to the site boundary are around 70 m to the west and around 350 m to the south. The clusters of receivers on the lots adjacent to the southern site boundary have been confirmed by the developer of those lots to be vacant with no intention of occupation prior to being demolished and are not included in this assessment (refer to **Figure 1**).

4 Development Consent

This CNVMP has been prepared to accompany the Construction Environmental Management Plan (CEMP) for the Warehouse 1 construction works.

Development Consent for the AIE was approved by the Minister for Planning and Public Spaces in SSD 10448, dated May 2022. The conditions relevant to this CNVMP are reproduced in **Table 2**.

Table 2 Development Consent Conditions

<table>
<tr><th>Development Consent</th><th>Where Addressed</th></tr>
<tr><td colspan="2">Operation of Plant and Equipment</td></tr>
<tr><td>C22. All plant and equipment used on site, or to monitor the performance of the Stage 1 Development, must be:
a) maintained in a proper and efficient condition;
b) noise amelioration featured;
c) operated in a proper and efficient manner.</td><td>Section 8.2</td></tr>
<tr><td colspan="2">Noise</td></tr>
<tr><td>Hours of Work
D41. The Applicant must comply with the hours detailed in Table 4, unless otherwise agreed in writing by the Planning Secretary.
Table 4 Hours of Work
<table>
<tr><th>Activity</th><th>Day</th><th>Time</th></tr>
<tr><td>Earthworks and construction</td><td>Monday – Friday
Saturday</td><td>7 am to 6 pm
8 am to 1 pm</td></tr>
</table></td><td>Section 7.2</td></tr>
<tr><td>D42. Works outside of the hours identified in condition D41 may be undertaken in the following circumstances:
a) works that are inaudible at the nearest sensitive receivers;
b) works agreed to in writing by the Planning Secretary;
c) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or
d) where it is required in an emergency to avoid the loss of lives, property or to prevent environmental harm.</td><td>Section 7.2</td></tr>
<tr><td>Construction Noise Limits
D43. The development must be constructed to achieve the construction noise management levels detailed in the Interim Construction Noise Guideline (DECC, 2009) (as may be updated or replaced from time to time). All feasible and reasonable noise mitigation measures must be implemented and any activities that could exceed the construction noise management levels must be identified and managed in accordance with the management and mitigation measures in the Appendix 4.</td><td>Sections 2,6.2.2, 7, 8</td></tr>
<tr><td colspan="2">Construction Noise Management Plan</td></tr>
<tr><td>D44. The Applicant must prepare a Construction Noise Management Plan (CNMP) for the development to the satisfaction of the Planning Secretary. The Plan must form part of a CEMP in accordance with condition E2 and must:
a) be prepared by suitably qualified and experienced noise expert whose appointment has been endorsed by the Planning Secretary;</td><td>This CNVMP

Section 1</td></tr>
</table>

Development Consent	Where Addressed
b) be approved by the Planning Secretary prior to the commencement of construction of each stage of the development;	Refer to CEMP
c) describe procedures for achieving the noise management levels in EPA's *Interim Construction Noise Guideline* (DECC, 2009) (as may be updated or replaced from time to time);	**Section 2**
d) describe the measures to be implemented to manage high noise generating works, in close proximity to sensitive receivers, particularly for noise mitigation eligible receivers shown in Figure 7, in Appendix 5, including but not limited to the following:	**Section 8**
(i) details of a real-time noise monitoring system to identify occurrence of highly noise affected levels as defined in the *Interim Construction Noise Guideline*; and	**Section 8.3**
(ii) describe procedures for implementing respite periods and temporary relocation following identification of highly noise affected levels.	**Sections 2, 8.2**
e) include a complaints management system that would be implemented for the duration of the development.	**Section 8.4**
D45. The Applicant must: a) not commence construction of any relevant stage until the CNMP required by condition D44 is approved by the Planning Secretary; and b) implement the most recent version of the CNMP approved by the Planning Secretary for the duration of construction.	Refer to CEMP
Vibration Criteria D49. Vibration caused by construction at any residence or structure outside the site must be limited to: a) for structural damage, the criteria set in the latest version of *DIN 4150-3:2016-12 Vibration in Buildings – Part 3: Effects on Structures* (German Institute for Standardisation, 2016); and b) for human exposure, the acceptable vibration values set out in the *Environmental Noise Management Assessing Vibration: a technical guideline* (DEC, 2006) (as may be updated or replaced from time to time).	**Sections 6.4, 7.4,8.3.2**
D50. The Applicant must offer and, if the offer is accepted, implement monitoring of vibration levels during construction at 884-902 Mamre Road (Lot 53 DP259135), to the satisfaction of the Planning Secretary. Any vibration monitoring must be undertaken during the entirety of the construction period. If the criteria in Condition D49 are exceeded, management and mitigation measures must be developed and implemented to address any exceedances.	**Section 8.1**
Dilapidation Reporting D51. Prior to commencement of construction, the Applicant must offer and prepare (if the offer is accepted) a pre-construction dilapidation report at 884-902 Mamre Road (Lot 53 DP259135). The report must be submitted to the Planning Secretary and the relevant property owner(s) prior to construction works commencing on the site.	**Section 8.1**
Environmental Management	
Management Plan Requirements E1. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	This CNVMP
a) detailed baseline data;	**Section 5**

Development Consent	Where Addressed
b) details of: (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) any relevant limits or performance measures and criteria; and (iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria; d) a program to monitor and report on the: (i) impacts and environmental performance of the development; and (ii) effectiveness of the management measures set out pursuant to paragraph (c) above; e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; f) a program to investigate and implement ways to improve the environmental performance of the development over time; g) a protocol for managing and reporting any: (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria); (ii) complaint; (iii) failure to comply with statutory requirements; and h) a protocol for periodic review of the plan. *Note: the Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans*	**Section 4** **Section 6** **Sections** Error! Reference source not found., **8** **Section 8** **Section 8.3** **Section 8.5** **Section 9** **Section 8.5** **Section 8.4** **Section 8.5** **Section 9**
Appendix 5 – Applicant's Management and Mitigation Measures	
Construction Noise – Stage 1 Development • Construction hours to be limited to 7:00am – 6:00pm Monday to Friday and 8:00am – 1:00pm Saturdays. • Where construction noise levels are predicted to be above the NMLs, all feasible and reasonable work practices are investigated to minimise noise emissions. • If construction noise levels are still predicted to exceed the NMLs, potential noise impacts would be managed via site specific construction noise management plans. • Construction works should be conducted during standard construction hours, with OOHW minimised as far as reasonable and feasible. • Locations for vibration intensive equipment should be reviewed during the preparation of the site specific Construction Noise and Vibration Management Plans (CNVMP) for construction works adjacent to sensitive receivers. • Further noise management measures to be incorporated into the CEMP as appropriate.	**Section 7.2** **Section 8** **Section 8** **Section 7.2** This CNVMP **Section 8**

5 Existing Environment

5.1 Unattended Ambient Noise Monitoring

Unattended noise monitoring was completed at five locations at the boundary of the AIE in November 2019 as part of the NVIA. The measured noise levels have been used to determine the existing noise environment and to set the criteria used to assess the potential impacts from the project.

The monitoring equipment was positioned to measure existing noise levels that are representative of receivers potentially most affected by the project.

The noise monitoring equipment continuously measured existing noise levels in 15-minute periods during the daytime, evening and night-time.

The noise monitoring locations are shown in **Figure 1** and the results are summarised in **Table 3**. Further information regarding the monitoring, including methodology and detailed data, is provided in the NVIA.

Table 3 Summary of Ambient Noise Levels

ID	Address	Measured Noise Levels (dBA)					
		Background Noise (RBL)			Average Noise (L_{Aeq})		
		Day	Evening	Night	Day	Evening	Night
L01	**Lot 58 DP259135**	**39**	**39**	**32**	**50**	**49**	**50**
L02	**Lot 58 DP259135**	**35**	**33**	**32**	**43**	**42**	**43**
L03	Lot 56 DP259135	34	33	29	44	41	41
L04	Lot 54 DP259135	39	40	32	52	53	54
L05	**Lot 56 DP259135**	**42**	**43**	**34**	**59**	**59**	**56**

Note 1: The assessment periods are the daytime which is 7 am to 6 pm Monday to Saturday and 8 am to 6 pm on Sundays and public holidays, the evening which is 6 pm to 10 pm, and the night-time which is 10 pm to 7 am on Monday to Saturday and 10 pm to 8 am on Sunday and public holidays. See the NSW EPA *Noise Policy for Industry*.

Note 2: Locations most relevant to this project are shown in bold.

6 Assessment Criteria

6.1 Construction Noise and Vibration Guidelines

The standards and guidelines relevant to the development are listed in **Table 4**. These guidelines aim to protect the community and environment from excessive noise and vibration impacts during construction of projects.

Table 4 Construction Noise and Vibration Standards and Guidelines

Guideline/Policy Name	Where Guideline Used
Interim Construction Noise Guideline (ICNG) (DECC, 2009)	Assessment of airborne noise impacts on sensitive receivers
Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime Services, 2016)	Assessment and management protocols for noise and vibration impacts
Road Noise Policy (RNP) (DECCW, 2011)	Assessment of construction traffic impacts
BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings Part 2, BSI, 1993	Assessment of vibration impacts (structural damage) to non-heritage sensitive structures
DIN 4150:Part 3-2016 Structural vibration – Effects of vibration on structures, Deutsches Institute fur Normung, 1999	Screening assessment of vibration impacts (structural damage) to heritage sensitive structures, where the structure is found to be unsound
Assessing Vibration: a technical guideline (DEC, 2006)	Assessment of vibration impacts on sensitive receivers

6.2 Interim Construction Noise Guideline

The NSW *Interim Construction Noise Guideline* (ICNG) is used to assess and manage impacts from construction noise on residences and other sensitive land uses in NSW.

The ICNG contains procedures for determining project specific Noise Management Levels (NMLs) for sensitive receivers based on the existing background noise in the area. The 'worst-case' noise levels from construction of a project are predicted and then compared to the NMLs in a 15-minute assessment period to determine the likely impact of the project.

The NMLs are not mandatory limits, however, where construction noise levels are predicted or measured to be above the NMLs, feasible and reasonable work practices to minimise noise emissions are to be investigated.

Residential Receivers

The ICNG approach for determining NMLs at residential receivers is shown in **Table 5**.

Table 5 ICNG NMLs for Residential Receivers

Time of Day	NML $L_{Aeq(15minute)}$	How to Apply
Standard Construction Hours Monday to Friday 7:00 am to 6:00 pm Saturday 8:00 am to 1:00 pm No work on Sundays or public holidays	Noise affected RBL[1] + 10 dB	• The noise affected level represents the point above which there may be some community reaction to noise • Where the predicted or measured $L_{Aeq(15minute)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.

	Highly Noise Affected
	75 dBA
		• The Highly Noise Affected (HNA) 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 restructuring 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.

Outside Standard Construction Hours	Noise affected RBL + 5 dB	• A strong justification would typically be required for works outside the recommended standard hours • The proponent should apply all feasible and reasonable work practices to meet the noise affected level • Where all feasible and reasonable practises have been applied and noise is more than 5 dB above the noise affected level, the proponent should negotiate with the community.

Note 1: The RBL is the Rating Background Level and the ICNG refers to the calculation procedures in the NSW *Industrial Noise Policy* (INP). The INP has been superseded by the NSW EPA *Noise Policy for Industry* (NPfI).

'Other Sensitive' Land Uses and Commercial Receivers

The ICNG NMLs for 'other sensitive' non-residential land uses are shown in **Table 6**.

Table 6 NMLs for 'Other Sensitive' Receivers

Land Use	Noise Management Level $L_{Aeq(15minute)}$ (dBA) (Applied when the property is in use)	
	Internal	External
Classrooms at schools and other educational institutions	45	55[1]
Commercial	-	70

Note 1: It is assumed that these receivers have windows partially open for ventilation which results in internal noise levels being around 10 dB lower than the external noise level.

Sleep Disturbance

A method for assessing sleep disturbance is contained in the NPfI. Although the NPfI sleep disturbance criteria relates to industrial noise, it is also considered relevant for reviewing potential impacts from construction noise as a screening criteria to identify the need for further assessment. The NPfI notes that a detailed maximum noise level assessment should be undertaken where a project results in night-time noise levels which exceed 52 dBA L_{AFmax} or the prevailing background level plus 15 dB, whichever is the greater.

Works will be undertaken during standard daytime construction hours, in accordance with Condition D41. For works required during out of hours periods, and approved under Condition D42, the sleep disturbance screening level of night-time RBL plus 15 dB will be applied.

6.2.2 NML Summary

The NMLs for the project have been determined in accordance with the requirements of the ICNG and are shown in **Table 7**. Further information regarding the NMLs is provided in the NVIA.

Table 7 Project Specific Noise Management Levels (dBA)

Receiver Type	NCA	NML ($L_{Aeq(15minute)}$ – dBA)				Sleep Disturbance Screening Level (L_{Amax} dBA)
		Standard Construction Hours (RBL+10dB)	Out of Hours[4] (RBL+5dB)			
		Daytime	Daytime[3]	Evening	Night-time	Night-time
Residential	NCA01	49	44	44	37	52
Residential	NCA02	45	40	38	37	52
Residential	NCA03	45[1]	40	38	35	52
Residential	NCA04	49	44	44[2]	37	52
Educational	NCA01	55	55 (when in use)			-
Commercial	Various	70	70 (when in use)			-

Note 1: RBL increased to the minimum RBL specified in the NPfI.

Note 2: Where the evening RBL is higher than the daytime RBL, the daytime RBL has been used.

Note 3: Daytime out of hours is 7 am to 8 am and 1 pm to 6 pm on Saturday, and 8 am to 6 pm on Sunday and public holidays.

Note 4: In accordance with Condition D41, works will be undertaken during standard daytime construction hours. Where out of hours works are required and are approved under Condition D42, the out of hours NMLs apply.

6.3 Construction Road Traffic Noise Guidelines

The potential impacts from construction traffic on public roads are assessed under the NSW EPA *Road Noise Policy* (RNP) and Roads and Maritime (now Transport for NSW) *Construction Noise and Vibration Guideline* (CNVG).

An initial screening test is first applied to evaluate if existing road traffic noise levels are expected to increase by more than 2.0 dB as a result of construction traffic. Where this is considered likely, further assessment is required using the RNP base criteria shown in **Table 8**.

Table 8 RNP Criteria for Assessing Construction Vehicles on Public Roads

Road Category	Type of Project/Land Use	Assessment Criteria (dBA)	
		Daytime (7 am – 10 pm)	Night-time (10 pm – 7 am)
Freeway/ arterial/ sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq(15hour)}$ 60 (external)	$L_{Aeq(9hour)}$ 55 (external)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq(1hour)}$ 55 (external)	$L_{Aeq(1hour)}$ 50 (external)

Ason Group has provided traffic estimates and notes that:

- Between 20 and 30 trucks will deliver concrete on external hardstand pour days.
- Light vehicle movements from contractors will account for 20-100 vehicle movements per day.

It is therefore anticipated that construction traffic will result in a minimal increase (i.e. less than 2 dB) in the overall traffic noise levels along the construction haulage routes. As such, construction traffic noise impacts have not been assessed further.

6.4 Vibration Guidelines

The effects of vibration from construction work can be divided into three categories:

- Those in which the occupants of buildings are disturbed (**human comfort**). People can sometimes perceive vibration impacts when vibration generating construction work is located close to occupied buildings. Vibration from construction work tends to be intermittent in nature and the EPA's *Assessing Vibration: a technical guideline* (2006), which is stipulated in Development Consent Condition D49(b), provides criteria for intermittent vibration based on the Vibration Dose Value (VDV), as shown in **Table 9**.
- Those where building contents may be affected (**building contents**). People perceive vibration at levels well below those likely to cause damage to building contents. For most receivers, the human comfort vibration criteria are the most stringent and it is generally not necessary to set separate criteria for vibration effects on typical building contents. Exceptions to this can occur when vibration sensitive equipment, such as electron microscopes or medical imaging equipment, are in buildings near to construction work. No such equipment has been identified in the study area.
- Those where the integrity of the building may be compromised (**structural/cosmetic damage**). If vibration from construction work is sufficiently high, it can cause cosmetic damage to elements of affected buildings. Industry standard cosmetic damage vibration limits are specified in British Standard BS 7385 and German Standard DIN 4150, which is stipulated in Development Consent Condition D49(a). The limits are shown in **Table 10**, **Table 11** and **Table 12**.

The structural/cosmetic damage criteria are separated into vibration of two types:

- Vibration that does not give rise to dynamic magnification in the structure due to resonance. This is defined as 'short-term' vibration in German Standard DIN 4150, and 'transient' vibration in in British Standard BS 7385.

- Vibration that does give rise to dynamic magnification in the structure due to resonance. This is defined as 'long-term' vibration in German Standard DIN 4150, and 'continuous' vibration in in British Standard BS 7385.

Separate criteria are provided in German Standard DIN 4150 for 'short-term' and 'long-term' vibration and these are provided in **Table 11** and **Table 12** respectively. British Standard BS 7385 simply notes that the guideline levels for transient vibration should be reduced by 50% for continuous vibration.

Table 9 Human Comfort Vibration – Vibration Dose Values for Intermittent Vibration

Building Type	Assessment Period	Vibration Dose Value[1] ($m/s^{1.75}$)	
		Preferred	Maximum
Critical Working Areas (eg operating theatres or laboratories)	Day or night-time	0.10	0.20
Residential	Daytime	0.20	0.40
	Night-time	0.13	0.26
Offices, schools, educational institutions and places of worship	Day or night-time	0.40	0.80
Workshops	Day or night-time	0.80	1.60

Note 1: The VDV accumulates vibration energy over the daytime and night-time assessment periods, and is dependent on the level of vibration as well as the duration.

Table 10 Cosmetic Damage – BS 7385 Transient Vibration Values for Minimal Risk of Damage

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

Note 1: Where the dynamic loading caused by continuous vibration may give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values may need to be reduced by up to 50%.

Table 11 Cosmetic Damage – DIN 4150 Guideline Values for Short-term Vibration on Structures

Group	Type of Structure	Guideline Values Vibration Velocity (mm/s)				
		Foundation, All Directions at a Frequency of			Topmost Floor, Horizontal	Floor Slabs, Vertical
		1 to 10 Hz	10 to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	20
2	Residential buildings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	15	20
3	Structures that, because of their particular sensitivity to vibration, cannot be classified as Group 1 or 2 **and** are of great intrinsic value (eg heritage listed buildings)	3	3 to 8	8 to 10	8	20[1]

Note 1: It may be necessary to lower the relevant guideline value markedly to prevent minor damage.

Table 12 Cosmetic Damage – DIN 4150 Guideline Values for Long-term Vibration on Structures

Group	Type of Structure	Guideline Values Vibration Velocity (mm/s)	
		Topmost Floor, Horizontal	Floor Slabs, Vertical
		All frequencies	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	10	10
2	Residential buildings and buildings of similar design and/or occupancy	5	10
3	Structures that, because of their particular sensitivity to vibration, cannot be classified as Group 1 or 2 **and** are of great intrinsic value (eg heritage listed buildings)	2.5	10[1]

Note 1: It may be necessary to lower the relevant guideline value markedly to prevent minor damage.

6.4.1 Heritage Buildings or Structures

Heritage listed buildings and structures should be considered on a case-by-case basis but as noted in BS 7385 should not be assumed to be more sensitive to vibration, unless structurally unsound. Where a heritage building is deemed to be sensitive, the more stringent DIN 4150 Group 3 guideline values in **Table 11** and **Table 12** can be applied.

No heritage buildings have been identified in the vicinity of the development.

6.4.2 Minimum Working Distances for Vibration Intensive Works

Minimum working distances for typical vibration intensive construction equipment are provided in the CNVG and are shown in **Table 13**. The minimum working distances are for both cosmetic damage (from BS 7385 and DIN 4150) and human comfort (from the NSW EPA *Assessing Vibration: a technical guideline*). They are calculated from empirical data which suggests that where work is further from receivers than the quoted minimum distances then impacts are not considered likely.

Table 13 Recommended Minimum Working Distances from Vibration Intensive Equipment

Plant Item	Rating/Description	Minimum Distance		
		Cosmetic Damage		Human Response (NSW EPA Guideline)
		Residential and Light Commercial (BS 7385)	Heritage Items (DIN 4150, Group 3)	
Vibratory Roller	<50 kN (1–2 tonne)	5 m	11 m	15 m to 20 m
	<100 kN (2–4 tonne)	6 m	13 m	20 m
	<200 kN (4–6 tonne)	12 m	25 m	40 m
	<300 kN (7–13 tonne)	15 m	31 m	100 m
	>300 kN (13–18 tonne)	20 m	40 m	100 m
	>300 kN (>18 tonne)	25 m	50 m	100 m
Small Hydraulic Hammer	300 kg (5 to 12 t excavator)	2 m	5 m	7 m
Medium Hydraulic Hammer	900 kg (12 to 18 t excavator)	7 m	15 m	23 m
Large Hydraulic Hammer	1,600 kg (18 to 34 t excavator)	22 m	44 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	5 m to 40 m	20 m
Piling Rig – Bored	≤ 800 mm	2 m (nominal)	5 m	4 m
Jackhammer	Hand held	1 m (nominal)	3 m	2 m

The minimum working distances are indicative and will vary depending on the particular item of equipment and local geotechnical conditions. The distances apply to cosmetic damage of typical buildings under typical geotechnical conditions.

7 Construction Noise and Vibration Assessment

7.1 Construction Activities

Construction scenarios and corresponding items of plant have been provided by RCC.

The construction scenarios have been categorised into 'peak' and 'typical' works which have been used to define the likely range of potential noise impacts:

- '**Peak**' works represent the noisiest stages and can require noise intensive equipment, such as rockbreakers or concrete saws. While 'peak' works would be required at times, the noisiest works would not occur for the full duration of the works.
- '**Typical**' works represent typical noise emissions when noise intensive equipment is not in use. The 'Typical' works generally include most items of equipment for a given activity except for the loudest item. These items generally support the 'Peak' works activity and are referred to as 'supporting equipment'.

The representative construction activities and associated items of plant that will be used during the works are detailed in **Table 14**.

Table 14 NVIA Construction Scenario Descriptions

Equipment		Backhoe	Bobcat	Concrete Mixer Truck	Elevated Working Platform	Excavator (22 tonne)	Front End Loader	Generator	Grader	Hand Tools	Mobile Crane (100 tonne)	Roller - Smooth Drum	Truck	Ute	Water Pump	Water Tanker (8000 litre)	Excavator - Ripper	Truck (Hiab)
Sound Power Level		102	104	103	97	105	110	102	108	94	100	107	108	98	83	98	105	108
Scenario	Earthworks & Ingrounds	X	X	X		X	X	X	X			X	X	X	X	X	X	
	Structure		X	X	X	X	X	X		X	X	X	X	X	X			X
	Finishes, Fitout and Landscaping		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Note 1: Equipment classed as 'annoying' in the ICNG and requires a 5 dB correction.

Note 2: Sound power level data is taken from the DEFRA Noise Database, RMS *Construction and Vibration Guideline* and TfNSW *Construction Noise and Vibration Strategy*.

Prior to commencement of the construction stages included in **Table 14**, the methodology and equipment will be reviewed and confirmation provided that the assumptions in the CNVMP remain valid. Where different methodology or equipment is proposed, further validation of the predicted noise levels will be undertaken to ensure that the proposed mitigation measures are anticipated to be sufficient.

Where feasible, validation of noise levels during high noise works must be measured in advance of commencement of the works, ie test measurements of the equipment undertaking the works for a short period prior full commencement of the works.

7.2 Hours of Construction

Condition D41 requires construction activities to only be undertaken during the following hours:

- 7:00 am to 6:00 pm, Mondays to Fridays
- 8:00 am to 1:00 pm on Saturdays
- At no time on Sundays or Public Holidays.

Notwithstanding, Condition D42 allows out of hours work to be undertaken in the following circumstances:

- Works that are inaudible at the nearest sensitive receivers
- Works agreed to in writing by the Planning Secretary
- For the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons
- Where it is required in an emergency to avoid the loss of lives, property or to prevent environmental harm.

Works that are inaudible at the nearest receivers would typically be limited to fitout works inside the warehouse once it is built. Where noisier internal works or any external works are required out of hours a construction noise impact statement (CNIS) must be prepared detailing the proposed out of hours works activities, predicted noise and vibration impacts, and proposed mitigation and management measures. CNIS for out of hours works will be provided to the Planning Secretary for approval. This work must be agreed to in writing by the Planning Secretary in accordance with Condition D42(b). This assessment therefore only considers works that will occur in accordance with the hours stipulated in Condition D41.

7.3 Construction Noise Predictions

Noise impacts for the construction scenarios presented in **Table 14** have been predicted at nearby sensitive receivers using the ISO-9613 algorithm. The results are representative of the worst-case noise levels that are likely to occur during construction.

The assessment shows the predicted impacts based on the exceedance of the management levels, as per the categories in **Table 15**.

Table 15 Exceedance Bands and Impact Colouring

Exceedance of Management Level	Subjective Classification	Impact Colouring
No exceedance	Negligible	
1 to 10 dB	Low impact	
11 dB to 20 dB	Moderate impact	
>20 dB	High impact	

The predicted airborne noise impacts from construction works are summarised in **Table 16**. The predictions are representative of the highest noise levels that would likely be experienced at the surrounding receivers when the works are at their closest. The number of receivers predicted to experience exceedances of the NMLs are summarised in bands of 10 dB and are separated by construction works scenarios and activities.

For most construction activities, it is expected that the construction noise levels would frequently be lower than predicted at the most-exposed receiver, as the noise levels presented are based on each scenario occurring at the nearest point of the site to the receiver.

Table 16 Overview of NML Exceedances – NVIA Construction Scenarios – Day Standard Hours

Receiver Category	NCA	Exceedance Category[1]	Number of Receivers with Day Standard Hours NML Exceedance[2]					
			Earthworks & Ingrounds		Structure		Finishes, Fitout & Landscaping	
			'Typical'	'Peak'	'Typical'	'Peak'	'Typical'	'Peak'
Residential	NCA01	1-10 dB	6	6	6	6	6	6
		11-20 dB	-	-	-	-	-	-
		>20 dB	-	-	-	-	-	-
		HNA	-	-	-	-	-	-
	NCA02	1-10 dB	-	-	-	-	-	-
		11-20 dB	-	-	-	-	-	-
		>20 dB	-	-	-	-	-	-
		HNA	-	-	-	-	-	-
	NCA03	1-10 dB	1	1	1	1	1	1
		11-20 dB	-	-	-	-	-	-
		>20 dB	-	-	-	-	-	-
		HNA	-	-	-	-	-	-
	NCA04	1-10 dB	6	6	6	6	6	5
		11-20 dB	1	1	1	1	1	2
		>20 dB	-	-	-	-	-	-
		HNA	-	-	-	-	-	-
Other Sensitive	All NCAs	1-10 dB	-	-	-	-	-	-
		11-20 dB	-	-	-	-	-	-
		>20 dB	-	-	-	-	-	-
		HNA	-	-	-	-	-	-

Note 1: HNA = Highly Noise Affected, based on ICNG definition (i.e. predicted $L_{Aeq(15minute)}$ noise at residential receiver is 75 dBA or greater).

Note 2: Based on worst-case predicted noise levels.

The assessment of construction noise levels presented above identifies the following:

- Worst-case noise levels in NCA04 are predicted to be 61 dBA. These noise levels would only occur at receivers that are in close proximity to the site when noise intensive equipment, such as the front end loader, are used nearby.

- Individual receivers would be subject to a large range of worst-case impacts, depending on how far from the works they are. The highest impacts are seen when works are near to receivers and are generally lower when works are further away.
- The impacts at childcare, educational and commercial receivers are predicted to be compliant with the management levels for all construction scenarios and activities.

All feasible and reasonable noise mitigation measures will be applied to the construction work. Construction noise and vibration mitigation measures are discussed in **Section 8**.

7.4 Construction Vibration

Vibration intensive items of plant proposed for use during the construction of the site would include the use of smooth drum rollers.

Offset distances for the vibration intensive equipment have been determined from the CNVG minimum working distances for cosmetic damage and human response (see **Table 13**). There are no vibration sensitive receivers/structures within the minimum working distances for cosmetic damage (including heritage items) or human comfort. The receivers north of the site identified in the NVIA have since been demolished or permanently vacated.

Occupants of affected buildings may be able to perceive vibration impacts at times when vibration intensive equipment is in use. Where impacts are perceptible, they would likely only be apparent for relatively short durations when vibration intensive equipment is nearby.

8 Mitigation and Management Measures

The ICNG acknowledges that due to the nature of construction works it is inevitable that there will be impacts where construction is near to sensitive receivers. The worst-case noise impacts during construction of the project are predicted to be 'moderate' at only one receiver (833A Mamre Road, Kemps Creeks), and 'low' at 13 other receivers, all in the vicinity of the western boundary and north-west corner of the site. Works are also generally limited to daytime hours only.

All appropriate feasible and reasonable mitigation measures will be applied to the work to minimise the potential impacts, as far as practicable.

Specific receivers eligible for noise mitigation are identified in Figure 7 in Appendix 4 of the Development Consent. These receivers are shown in **Figure 4** and include 833A Mamre Road, Kemps Creek.

Figure 4 Mitigation Eligible Receivers

8.1 Consultation Undertaken to Date

The consultation activities undertaken to date are summarised below:

- A fact sheet and letterbox drop outlining the key features of the proposal and contact details for feedback was distributed in May 2020 to households on Mamre Road, Bakers Lane and Aldington Road, Kemps Creek.
- A near neighbour information letter was distributed accompanying the fact sheet and letterbox drop.
- Stakeholder notification was provided to members of Council and Government, along with the retirement village, schools and childcare centres in the area.
- An engagement email and phone line was established for feedback arising from the above fact sheets.
- Social media monitoring was undertaken to gather community thoughts, feedback and sentiment regarding the proposal.
- Agency consultation was undertaken with multiple government agencies.
- Responses were provided to agency and stakeholder feedback.

Consultation activities are detailed in full in the Urbis *Mamre Road Rezoning – Engagement Outcomes Report*.

Conditions D50 and D51 require consultation to be undertaken with the owner(s) of 884-902 Mamre Road (Lot 53 DP259135) to offer provision of a dilapidation report and vibration monitoring for the duration of works. The developer that owns this property has confirmed that the dwellings are vacant with no intention of occupation prior to demolition. As such, dilapidation reporting and vibration monitoring is not required for this property. Evidence of consultation is provided in **Appendix C**.

8.2 Standard Mitigation and Management Measures

The mitigation and management measures that would be applied to the project are detailed in **Table 17**.

Table 17 Environmental Management Controls for Construction Noise and Vibration

Measure	Person Responsible	Timing / Frequency	Reference / Notes
Project Planning			
Use quieter and less vibration emitting construction methods where feasible and reasonable.	Project Manager	Ongoing	Best practice
Works will be completed during standard daytime construction hours outlined in **Section 7.2**.			
Truck routes to site will be limited to major roads (refer to CTMP for details of traffic route control measures).			

Measure	Person Responsible	Timing / Frequency	Reference / Notes
Scheduling for High Noise or Vibration Generating Works			
Respite offers will be considered where high-noise works are predicted to exceed 75 dBA for residential receivers. For schools and other sensitive receivers a lower level of 65 dBA will be used to account for the sensitive daytime uses of these receivers. Respite offers will be considered for high-vibration works where the works are undertaken within the human comfort minimum working distances for all receiver types. Consultation with these receivers will be undertaken to determine appropriate respite periods, such as exam periods for schools.	Project Manager/ Communications and Community Liaison Representative	Ongoing	Best practice / Condition D44(d)(ii)
High-noise or vibration generating works will be carried out in continuous blocks no longer than three hours in length, with a minimum respite period of one hour between each block. 'Continuous' includes any period during which there is less than a one hour respite between ceasing and recommencing these works.			
Duration Respite will be considered where it may be beneficial to sensitive receivers to increase the duration of blocks of work or number of consecutive periods in order to complete the works more quickly. The project team will engage with the community where Duration Respite is considered in accordance with the Community Communication Strategy (CCS).			
In addition to respite periods and/or duration respite, temporary relocation measures can be offered to sensitive receivers where high-noise works are predicted to exceed 75 dBA, such as offer of alternative accommodation for high-noise works during out of hours periods.			
Notification detailing work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night-time period, any operational noise benefits from the works (where applicable) and contact telephone numbers will be undertaken in accordance with the CCS.			
Site Layout			
Compounds and worksites will be designed to promote one-way traffic and minimise the need for vehicle reversing.	Project Manager	Ongoing	Best practice
Where practicable, work compounds, parking areas, and equipment and material stockpiles will be positioned away from noise-sensitive locations and take advantage of existing screening from local topography.			
Documentation of how site layout has been considered to reduce noise impacts must be provided to the Contractor's Project Manager. This must occur any time there are significant changes to the site layout.			
Equipment that is noisy will be started away from sensitive receivers			

Measure	Person Responsible	Timing / Frequency	Reference / Notes
Training			
Training will be provided to all personnel on noise and vibration requirements for the project. Inductions and toolbox talks to be used to inform personnel of the location and sensitivity of surrounding receivers.	Project Manager	Ongoing	Best practice
Plant and Equipment Source Mitigation			
All plant and equipment must be maintained in a proper and efficient condition, operated in a proper and efficient manner, and feature standard noise amelioration measures where applicable.	Project Manager	Ongoing	Condition C22
Where practicable, tonal reversing alarms (beepers) will be replaced with non-tonal alarms (squawkers) on all equipment in use (subject to occupational health and safety requirements).			Best practice
Noisy equipment will be sited behind structures that act as barriers, or at the greatest distance from the noise-sensitive area. Equipment will be oriented so that noise emissions are directed away from any sensitive areas, where possible.			
Noise generating equipment will be regularly checked and effectively maintained, including checking of hatches/enclosures regularly to ensure that seals are in good condition and doors close properly against seals.			
Noise monitoring spot checks of equipment will be completed to ensure individual items are operating as expected			
Dropping materials from a height will be avoided.			
Loading and unloading will be carried out away from noise sensitive areas, where practicable.			
Trucks will not queue outside residential properties. Truck drivers will avoid compression braking as far as practicable.			
Truck movements will be kept to a minimum, ie trucks are fully loaded on each trip.			
Screening			
Where possible, install purpose-built screening or enclosures will be used around long-term fixed plant that has the potential to impact nearby receivers	Project Manager	Ongoing	Best practice
The layout of the site will take advantage of existing screening from local topography, where possible. Site huts, maintenance sheds and/or containers will be positioned between noisy equipment and the affected receivers.			
Community Consultation			
Notifications will be provided to the affected community where high impacts are anticipated or where out of hours works are required. Notification will be a minimum of 24 hours.		Ongoing	Best practice

Measure	Person Responsible	Timing / Frequency	Reference / Notes
Where complaints are received, work practices will be reviewed and feasible and reasonable practices implemented to minimise any further impacts. Refer to **Section 8.4**.	Communications and Community Liaison Representative		
Monitoring			
A real-time noise monitoring system must be installed at a location representative of the most-affected residences on the western side of Mamre Road to identify occurrence of highly noise affected levels (refer to **Figure 4**). Requirements of the real-time noise monitoring system are detailed in **Section 8.3**.	Environmental Coordinator	Ongoing	Condition D44(d)(i)
Noise and/or vibration monitoring will be conducted (as appropriate) when noise/vibration intensive works are being undertaken in close proximity to sensitive receivers.			Best practice
Noise and/or vibration monitoring will be conducted (as appropriate) in response to any complaints received to verify that levels are not substantially above the predicted levels.			
Refer to **Section 8.3** for full details of monitoring requirements.			
Vibration			
If vibration generating works are required within the minimum cosmetic damage working distances and considered likely to exceed the criteria: • Different construction methods with lower source vibration levels will be investigated and implemented, where feasible • Attended vibration measurements will be undertaken at the start of the works to determine actual vibration levels at the item. Works will cease if the monitoring indicates vibration levels are likely to, or do, exceed the relevant criteria.	Environmental Coordinator	Ongoing	Best practice
Where works are required within the cosmetic damage minimum working distances, building condition surveys will be completed before and after the works to ensure no cosmetic damage has occurred.			

8.3 Monitoring

8.3.1 Construction Noise Monitoring

In accordance with Condition D44(d)(i) a real-time noise monitoring system must be installed at a location representative of the most-affected residences on the western side of Mamre Road (refer to **Figure 4** and noting that 833A Mamre Road, Kemps Creek is the only receiver predicted to be subjected to 'moderate' impacts) to identify occurrence of highly noise affected levels as defined in the *Interim Construction Noise Guideline* (refer to **Table 5**).

This equipment is to be real-time enabled with an online portal, allowing the project team to investigate the noise impacts of work either as it happens or immediately afterward. Notifications (SMS/email) of exceedances of the established trigger level (75 dBA rolling $L_{Aeq(15minute)}$) will be enabled. The noise monitoring system is required to be capable of recording audio when noise levels approach 75 dBA L_{Amax} so that the source of the noise can be determined. Triggered photographs or video recording during audio recording is not required but would also assist in determining sources of noise.

To supplement the real-time noise monitoring, attended noise measurements will be undertaken at the start of noise intensive works that are near to sensitive receivers to verify the levels are as predicted and to check the effectiveness of mitigation and management measures. The contractor will undertake attended noise monitoring for rock excavation works where hammering and ripping of rock will be occurring, for demolition of existing structures works, and also for out of hours works associated with the intersection works. Attended noise monitoring will be conducted quarterly at a minimum.

Where feasible, validation of noise levels during high noise works must be measured in advance of commencement of the works, ie test measurements of the equipment undertaking the works for a short period prior full commencement of the works.

Attended noise monitoring will also be undertaken in response to any formal complaints. All monitoring will be completed by suitably qualified acoustic specialists. The location and extent of attended monitoring will be determined in consultation with project staff and would be dependent on the activities taking place.

The monitoring will take place during the expected noisiest construction periods and be representative / indicative of the impacts at the potentially affected sensitive receivers.

A noise monitoring report will be prepared after each attended monitoring survey. Monthly monitoring reports will be prepared for the real-time monitor.

All items of acoustic instrumentation utilised will be designed to comply with *IEC 61672.1-2004 Electroacoustics – Sound level meters* (AS IEC 61672) and carry current calibration certificates.

8.3.2 Construction Vibration Monitoring

Where vibration intensive works (such as rockbreaking, vibratory rolling or plate compacting) are required within the minimum working distances of sensitive receivers or structures (refer to **Section 6.4.2**), vibration will be monitored continuously for the duration of works within the minimum working distances.

Attended vibration measurements will be undertaken at the start of vibration intensive works within the minimum working distances to confirm the levels of vibration are below the applicable vibration limits (refer to **Section 6.4**).

Geophones will be installed by an acoustic consultant at the closest points of the sensitive structure to the vibration intensive works to continuously monitor vibration for the duration of the works. Should the works location change, the geophones will be relocated to remain at the closest point of the structure to the works.

The vibration monitoring equipment will have visible and audible alarms installed where operators of equipment can see/hear them:

- A warning vibration level of two-thirds (66%) of the applicable vibration limit will trigger a ‘warning’ alarm if exceeded.

- A 'halt work' alarm will trigger if vibration is measured equal to the applicable vibration limit. Actions to be carried out if the exceedance alarms are triggered are detailed in **Section 8.5**.

Vibration monitoring data will be downloaded and reported at the following timeframes:

- Monthly during works (at a minimum)
- Within one week of an exceedance of the vibration limit alarm level
- Upon completion of vibration monitoring.

All items of vibration instrumentation will be designed to comply with applicable guidelines and carry current calibration certificates.

8.3.3 Monitoring Reports

Noise and/or vibration monitoring reports will be provided to the relevant regulatory authorities after review, unless otherwise agreed by the relevant regulatory authorities. Monitoring reports would include the following details, at a minimum:

- Noise/vibration monitoring/measurement locations
- Date, time and length of noise monitoring/measurements
- Weather conditions during the measurements
- Name and position of personnel undertaking measurements
- Construction activities being undertaken during measurements
- Locations of construction equipment and distance from monitoring location
- Measured L_{Aeq} and L_{Amax} noise levels during construction works (for each activity) along with a comparison to the predicted noise levels (noise monitoring only)
- Measured L_{A90} background noise level in absence of the construction works (noise monitoring only)
- Measured vibration levels during construction works (for each activity) along with a comparison to the relevant vibration criteria (vibration monitoring only)
- Measured vibration levels and relevant details of any of exceedance of the warning vibration level or vibration limits (vibration monitoring only)
- Measured background vibration level in absence of the construction works (vibration monitoring only)
- Operator observations noting any extraneous noise/vibration sources or other points of relevance.

Note: A summary or monitoring and reporting is included in the CEMP for quick reference.

8.4 Complaints Management

Any complaint received in relation to the environmental performance or management of the development shall be managed and reported in accordance with the CEMP.

8.5 Contingency Plan

The following contingency management plan, shown in **Table 18**, would be used to manage noise and vibration impacts that are higher than expected.

Any incident or non-compliance shall be handled and reported in accordance with the CEMP. As detailed in the CEMP, all Condition Amber and Condition Red occurrences will be recorded and discussed during the toolbox talks.

The following events constitute an incident in terms of noise and vibration:

- Trigger of Condition Red for noise impacts during the standard construction hours detailed in Condition D41
- Any works occurring outside the standard construction hours detailed in Condition D41, where those works do not meet the allowable circumstances defined in Condition D42, including being agreed in writing by the Planning Secretary
- Trigger of Condition Red for vibration impacts at sensitive receivers.

Table 18 Contingency Management Plan

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Noise impacts at sensitive receiver locations	Trigger	Noise levels do not exceed applicable NMLs	Noise levels exceed applicable NMLs	Noise levels exceed Highly Noise Affected criteria (75 dBA)
	Response	On-going best practice management measures to minimise noise emissions	Undertake all feasible and reasonable mitigation and management measures to minimise noise impacts (aiming to achieve NMLs)	Works exceeding the Highly Noise Affected criteria will be managed in accordance with the strategies for high-noise generating works determined through community consultation, as detailed in **Section 8.1** and **8.2**.
Vibration impacts at sensitive receiver locations	Trigger	Vibration intensive works undertaken outside minimum working distance for the specific equipment in use	Vibration intensive works undertaken within minimum working distance for the specific equipment in use	Vibration levels exceed applicable vibration limits
	Response	On-going best practice management measures to minimise vibration emissions	Undertake vibration monitoring for the duration of the works to confirm vibration levels.	Stop work. Undertake all feasible and reasonable mitigation and management measures to ensure vibration levels are below applicable limits. If vibration levels cannot be kept below applicable limits then a different construction method or equipment must be utilised.

Note: This contingency management plan is replicated in the CEMP for quick reference.

8.6 Internal Audits

Periodic internal audits will be conducted to ensure that the development consent conditions and commitments and environmental management controls outlined in this CNVMP are being properly implemented. Audit reports will be used to inform of any corrective actions.

8.7 Roles and Responsibilities

Overall roles and responsibilities relating to the project are outlined in the CEMP. The key responsibilities specifically for noise and vibration management are as follows:

8.7.1 Contractor's Project Manager

- Ensuring appropriate resources are available for the implementation of this CNVMP
- Assessing data from inspections and providing project-wide advice to ensure consistent approach and outcomes are achieved
- Providing necessary training for project personnel to cover noise and vibration management
- Reviewing and update of this CNVMP, where necessary
- Commissioning suitably qualified consultants to complete noise and vibration monitoring. Ensuring environmental coordinators appropriately undertake attended noise and vibration measurements required by this CNVMP
- Assessing and (as required) mitigating risks of high noise and vibration levels before commencing works and ensuring that the appropriate controls are implemented
- Ceasing works in the event of excessive noise and vibration generation
- In the event that a noise or vibration complaint is received, implementing the procedure outlined in **Section 8.4**.

8.7.2 Environmental Coordinator

- Coordinating noise and/or vibration monitoring program, where required
- Review control measures in accordance with the CNVMP
- Identifying and reporting any high or non-compliant noise and vibration emissions.

8.7.3 All Workers on Site

- Observing any noise and vibration emission control instructions and procedures that apply to their work
- Taking action to prevent or minimise noise and vibration emission incidents
- Identifying and reporting noise and vibration emission incidents.

9 Review and Improvement of Noise Management Plan

Reviews, investigations, and improvements to this plan and the environmental performance shall be undertaken in accordance with the CEMP.

This CNVMP will be reviewed, and if necessary, updated in the following circumstances:

- Significant changes to the equipment, machinery and plant operated within the site
- Where it is identified via monitoring that the performance of the project is not meeting the objectives of the CNVMP
- At the request of the relevant regulatory authority or other relevant government agency.

All employees and contractors will be informed of any revisions to the CNVMP by Site Management during toolbox talks. The most recent version of the CNVMP as approved by the Planning Secretary, will be implemented for the duration of construction works.

APPENDIX A

Acoustic Terminology

1. Sound Level or Noise Level

The terms 'sound' and 'noise' are almost interchangeable, except that 'noise' often refers to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure. The human ear responds to changes in sound pressure over a very wide range with the loudest sound pressure to which the human ear can respond being ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or LP are commonly used to represent Sound Pressure Level. The symbol LA represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2×10^{-5} Pa.

2. 'A' Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an 'A-weighting' filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4,000 Hz), and less sensitive at lower and higher frequencies. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dB or 2 dB in the level of a sound is difficult for most people to detect, whilst a 3 dB to 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels.

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120	Heavy rock concert	Extremely noisy
110	Grinding on steel	
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	
80	Kerbside of busy street	Loud
70	Loud radio or television	
60	Department store	Moderate to quiet
50	General Office	
40	Inside private office	Quiet to very quiet
30	Inside bedroom	
20	Recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as 'linear', and the units are expressed as dB(lin) or dB.

3. Sound Power Level

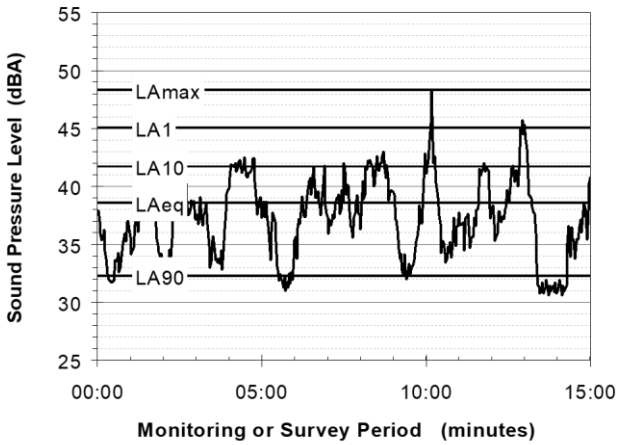
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 10^{-12} W.

The relationship between Sound Power and Sound Pressure is similar to the effect of an electric radiator, which is characterised by a power rating but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4. Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels L_{AN}, where L_{AN} is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the L_{A1} is the noise level exceeded for 1% of the time, L_{A10} the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

L_{A1} The noise level exceeded for 1% of the 15 minute interval.

L_{A10} The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.

L_{A90} The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.

L_{Aeq} The A-weighted equivalent noise level (basically, the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

5. Frequency Analysis

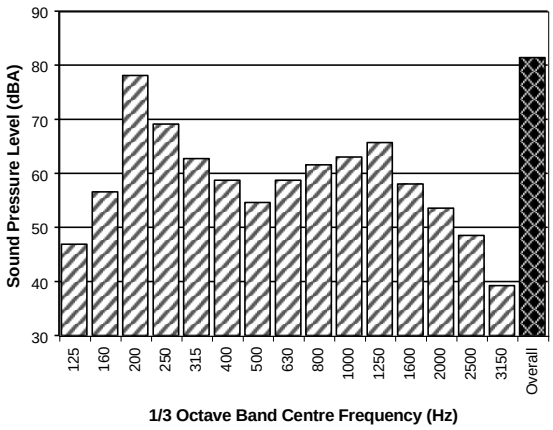
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (three bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



6. Annoying Noise (Special Audible Characteristics)

A louder noise will generally be more annoying to nearby receivers than a quieter one. However, noise is often also found to be more annoying and result in larger impacts where the following characteristics are apparent:

- **Tonality** - tonal noise contains one or more prominent tones (ie differences in distinct frequency components between adjoining octave or 1/3 octave bands), and is normally regarded as more annoying than 'broad band' noise.
- **Impulsiveness** - an impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.
- **Intermittency** - intermittent noise varies in level with the change in level being clearly audible. An example would include mechanical plant cycling on and off.
- **Low Frequency Noise** - low frequency noise contains significant energy in the lower frequency bands, which are typically taken to be in the 10 to 160 Hz region.

7. Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of 'peak' velocity or 'rms' velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as 'peak particle velocity', or PPV. The latter incorporates 'root mean squared' averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements (ie vertical, longitudinal and transverse).

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V, expressed in mm/s can be converted to decibels by the formula 20 log (V/Vo), where Vo is the reference level (10^{-9} m/s). Care is required in this regard, as other reference levels may be used.

8. Human Perception of Vibration

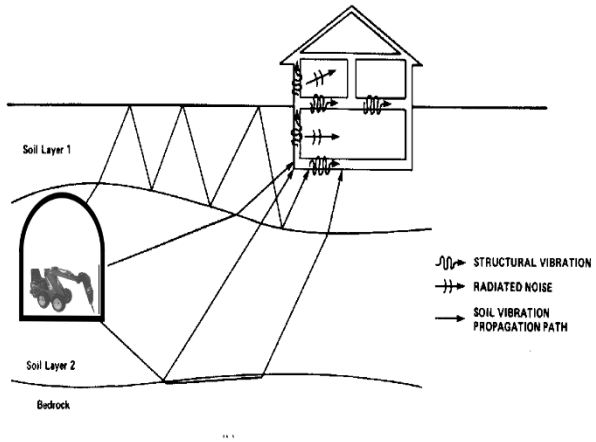
People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as 'normal' in a car, bus or train is considerably higher than what is perceived as 'normal' in a shop, office or dwelling.

9. Ground-borne Noise, Structure-borne Noise and Regenerated Noise

Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed 'structure-borne noise', 'ground-borne noise' or 'regenerated noise'. This noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of ground-borne or structure-borne noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

The following figure presents an example of the various paths by which vibration and ground-borne noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



The term 'regenerated noise' is also used in other instances where energy is converted to noise away from the primary source. One example would be a fan blowing air through a discharge grill. The fan is the energy source and primary noise source. Additional noise may be created by the aerodynamic effect of the discharge grill in the airstream. This secondary noise is referred to as regenerated noise.

APPENDIX B

Planning Secretary's Endorsement

Department of Planning and Environment

Our ref: SSD-10448-PA-5

Mr Russel Hogan

Mirvac Projects Pty Ltd

Level 28, 200 George Street

SYDNEY NSW 2000

16 June 2022

Subject: Aspect Industrial Estate (SSD-10448) Approval of Noise Consultants

Dear Mr Hogan

I refer to your request for the Planning Secretary's endorsement of suitably qualified and experienced noise consultants to prepare a Construction Noise Management Plan (CNMP) for the Stage 1 Development of the Aspect Industrial Estate (AIE) (SSD-10448). The request has been submitted in accordance with Condition D44(a), Schedule 2 of development consent SSD-10448.

The Department has carefully reviewed the request and curriculum vitae of Mr Joshua Ridgway, Mr Mark Irish, and Mr Antony Williams. The Department considers the nominated consultants to be suitably qualified and experienced.

The Department hereby approves the appointment of Mr Joshua Ridgway, Mr Mark Irish, and Mr Anthony Williams as the noise consultants to prepare the CNMP for the Stage 1 Development of the AIE.

Pleasure ensure that the approval is placed on the project website at the earliest convenience.

Should you have any questions in relation to this matter, please contact Bruce Zhang on 9274 6137 or bruce.zhang@planning.nsw.gov.au.

Yours sincerely,

Pamela Morales

A/Team Leader
Industry Assessments

As nominee of the Planning Secretary

APPENDIX C

Evidence of Consultation

ALTIS
PROPERTY PARTNERS

29 April 2022

Russell Hogan
Senior Development Manager
Mirvac
Level 28, 200 George St Sydney NSW 2000

Sent via Email russell.hogan@mirvac.com

Dear Russell,

Altis Kemps Creek Pty Ltd as trustee for the Altis Kemps Creek Investment Trust (**Altis**) is the owner of the properties being 884-902 Mamre Rd, Kemps Creek, and 904-928 Mamre Rd, Kemps Creek. Altis has lodged a State Significant Development Application (SSD-17647189) for the development of these properties and intend to commence development immediately following receipt of the SSD approval. Altis can confirm that the above-mentioned properties are both currently vacant and are not intended to be occupied for residential use prior to redevelopment of the site.

Yours sincerely,

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APPENDIX H

Construction Air Quality Management Plan

ASPECT INDUSTRIAL ESTATE - LOT 1

Construction Air Quality Management Plan

Prepared for:

Richard Crookes Constructions Pty Ltd
Level 3, 4 Broadcast Way
Artarmon, NSW, 2064

SLR Ref: 660.30248-R01
Version No: -v1.0
December 2022

PREPARED BY

SLR Consulting Australia Pty Ltd
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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Richard Crookes Constructions Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
660.30248-R01-v1.0	20 December 2022	Sahar Bagheri	K Lawrence	Sahar Bagheri

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DOCUMENT REFERENCES

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FIGURES

APPENDICES

1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Richard Crookes Constructions Pty Ltd (Richard Crookes) to prepare a Construction Air Quality Management Plan (CAQMP) for Lot 1 (the Site) within the Aspect Industrial Estate (AIE) located at 788-882 Mamre Road, Kemps Creek, New South Wales (NSW). Development Consent was granted for the AIE on 24 May 2022, as follows:

- A Concept Proposal for the staged development of an industrial estate comprising 11 buildings with a total Gross Floor Area (GFA) of up to 247,990 square metres (m^2) for industrial, warehousing and distribution centres, and café uses; and
- Stage 1 development comprising site preparation works, vegetation clearing, realignment of the existing creek, construction of access roads and eastern half of Mamre Road/ Access Road 1 intersection works, construction, fitout and operation of one warehouse and one industrial building with ancillary offices, car parks, landscaping, signage and a café, construction and operation of services and utilities, and subdivision of the site into three lots.

The aim of this CAQMP is to address potential air quality impacts on nearby sensitive receivers during the construction works on Lot 1, which is part of stage 1 of the development.

1.1 Objectives of the CAQMP

The objectives of this CAQMP are as follows:

- Maintain acceptable levels of amenity for surrounding receptors;
- Ensure compliance with relevant ambient air quality criteria for particulate matter and deposited dust at surrounding receptors;
- Maintain an effective response mechanism to deal with issues and complaints relating to dust emissions from the construction works;
- Outline air quality management commitments and responsibilities, including air quality compliance monitoring and reporting requirements; and
- Promote environmental awareness among employees and subcontractors.

2 Statutory Requirements

The Development Consent (SSD 10448) requirements stipulated for the construction of Lot 1, and where they have been addressed in this CAQMP, are shown in **Table 1**.

Table 1 Assessment against SSD 10448 Conditions

Conditions	Response / Section Reference
Dust Minimisation	
Condition D54	
The Applicant must take all reasonable steps to minimise dust generated during all works authorised by this consent.	**Section 0**
Dust Minimisation	
Condition D55	
During construction, the Applicant must ensure that: (a) exposed surfaces and stockpiles are suppressed by regular watering; (b) all trucks entering or leaving the sire with loads have their loads covered; (c) trucks associated with the development do not track dirt onto the public road network; (d) public roads used by these trucks are kept clean; and (e) land stabilisation works are carried out progressively on site to minimise exposed surfaces.	**Section 0**
Construction Air Quality Management Plan	
Condition D56	
Prior to the commencement of construction, the Applicant must prepare a Construction Air Quality Management Plan (CAQMP) to the satisfaction of the Planning Secretary. The CAQMP must form part of the CEMP required by condition E2 and must:	
(a) be prepared by a suitably qualified and experienced person(s);	**Appendix D**
(b) detail and rank all emissions from all construction activities, including particulate emissions;	**Section 4**
(c) describe a program that is capable of evaluating the performance of the construction and determining compliance with key performance indicators;	**Section 12**
(d) identify the control measures that will be implemented for each emission source; and	**Section 0**
(e) nominate the following for each of the proposed controls:	
(i) key performance indicator;	**Sections 5, 10 and 13**
(ii) monitoring method;	**Section 12**
(iii) location, frequency, and duration of monitoring;	**Section 12**
(iv) record keeping;	**Section 12**
(v) complaints register;	**Section 11**
(vi) response procedures; and	**Section 11**
(vii) compliance monitoring.	**Section 6 of the CEMP**
Condition D57	

Conditions	Response / Section Reference
The Applicant must: (a) not commence construction until the CAQMP required by condition D56 is approved by the Planning Secretary; and (b) implement the most recent version of the CAQMP approved by the Planning Secretary for the duration of the development.	This Report
Odour Management	
Condition D58	
The Applicant must ensure the development does not cause or permit the emission of any offensive odour (as defined in the POEO Act).	**Section 8**

3 Project Overview

3.1 Site Location

The Site is located within the AIE (see **Figure 2**), which located within the Western Sydney Employment Area (WSEA). The regional location of the Site is shown in **Figure 1**, with the AIE Concept Masterplan shown in **Figure 2** .

Figure 1 Regional Location of the Site

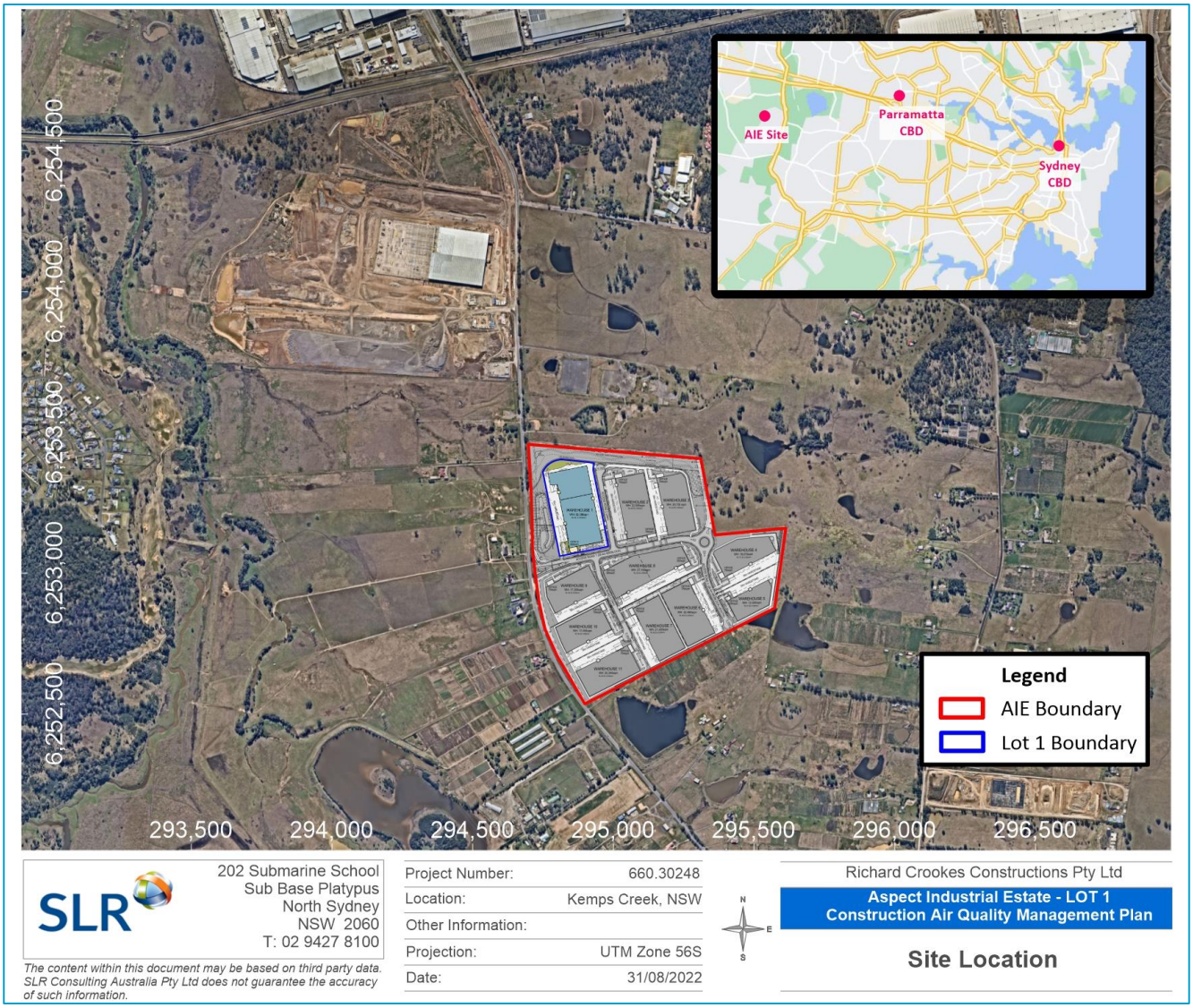
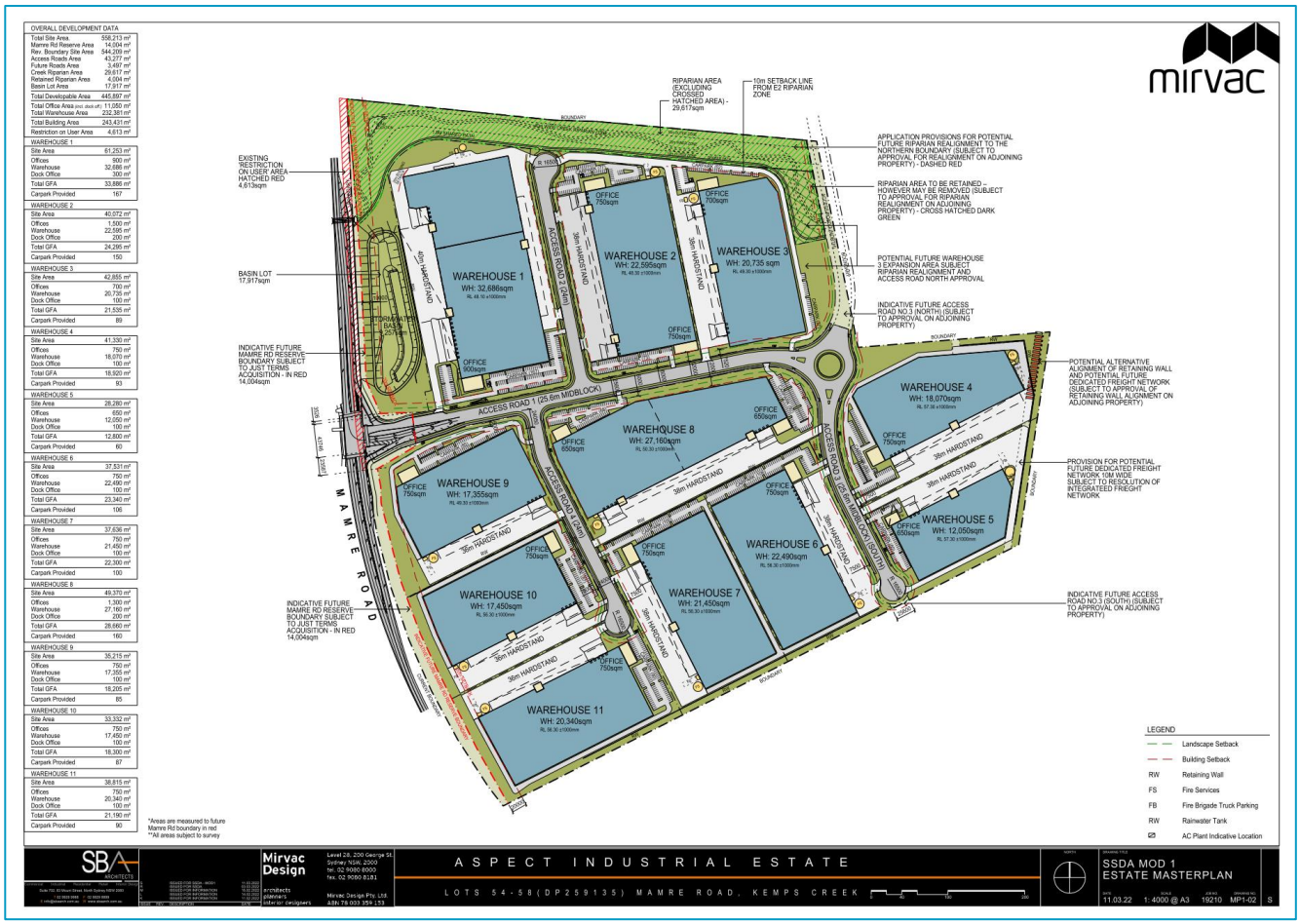


Figure 2 AIE Concept Masterplan



3.2 Surrounding Land Uses and Sensitive Receptors

As shown in **Figure 3**, the Site and the adjacent areas to the north and south of the Site are zoned as General Industrial (IN1), the areas east of the Site are zoned as Infrastructure (SP2), and the areas to the west of the Site are zoned as Public Recreation (RE1) and Environmental and Recreation (ENZ).

There are several residential receptors located approximately 170 meters (m) to the east of the Site and the nearest commercial receptors are located approximately 150 m to the northeast, south, and southwest of the Site boundary including amenities (such as office buildings or workshops; see **Figure 4**). Individuals in these areas could potentially experience air quality impacts due to the construction works at the Site.

Figure 3 Surrounding Land Uses

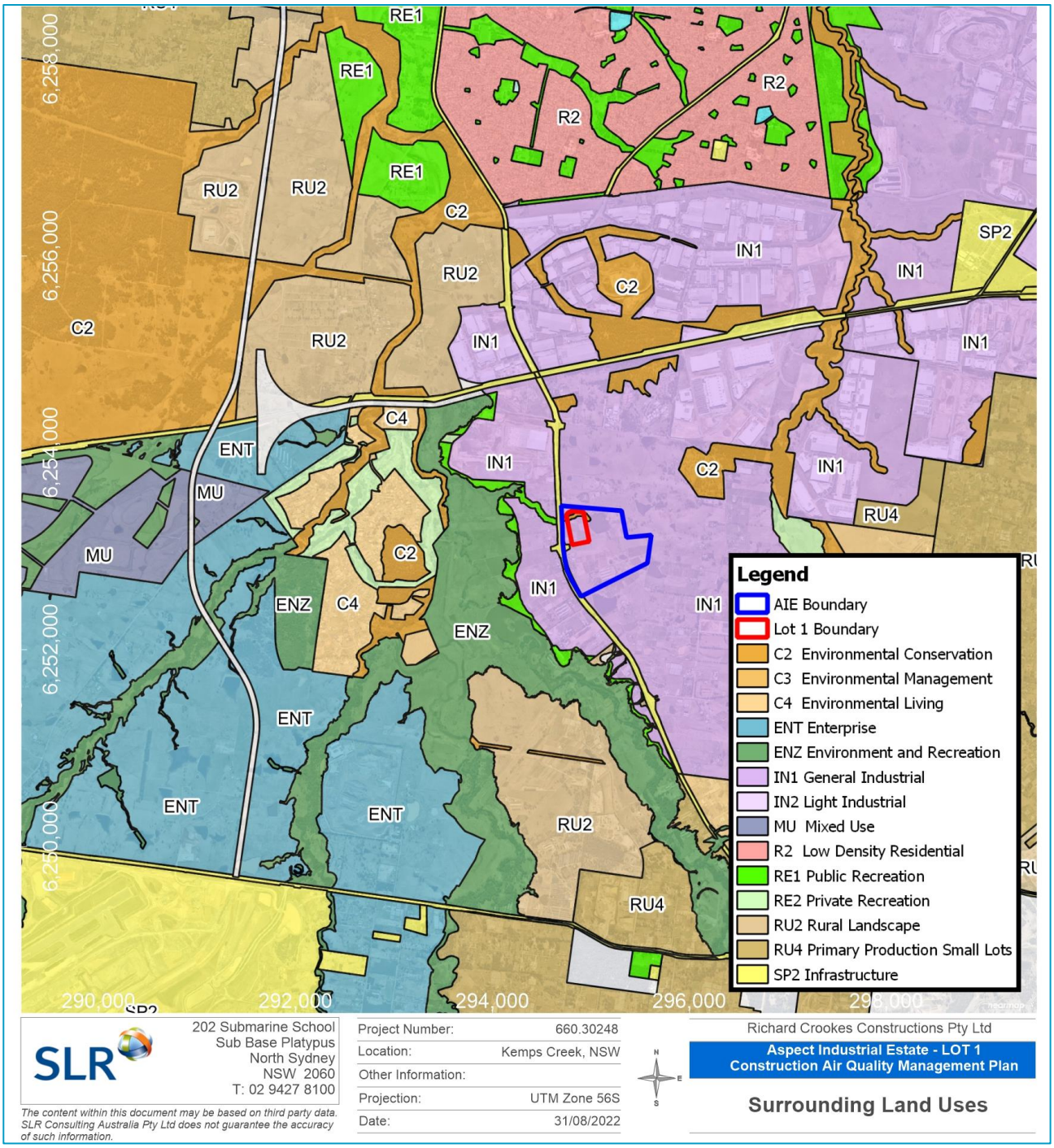
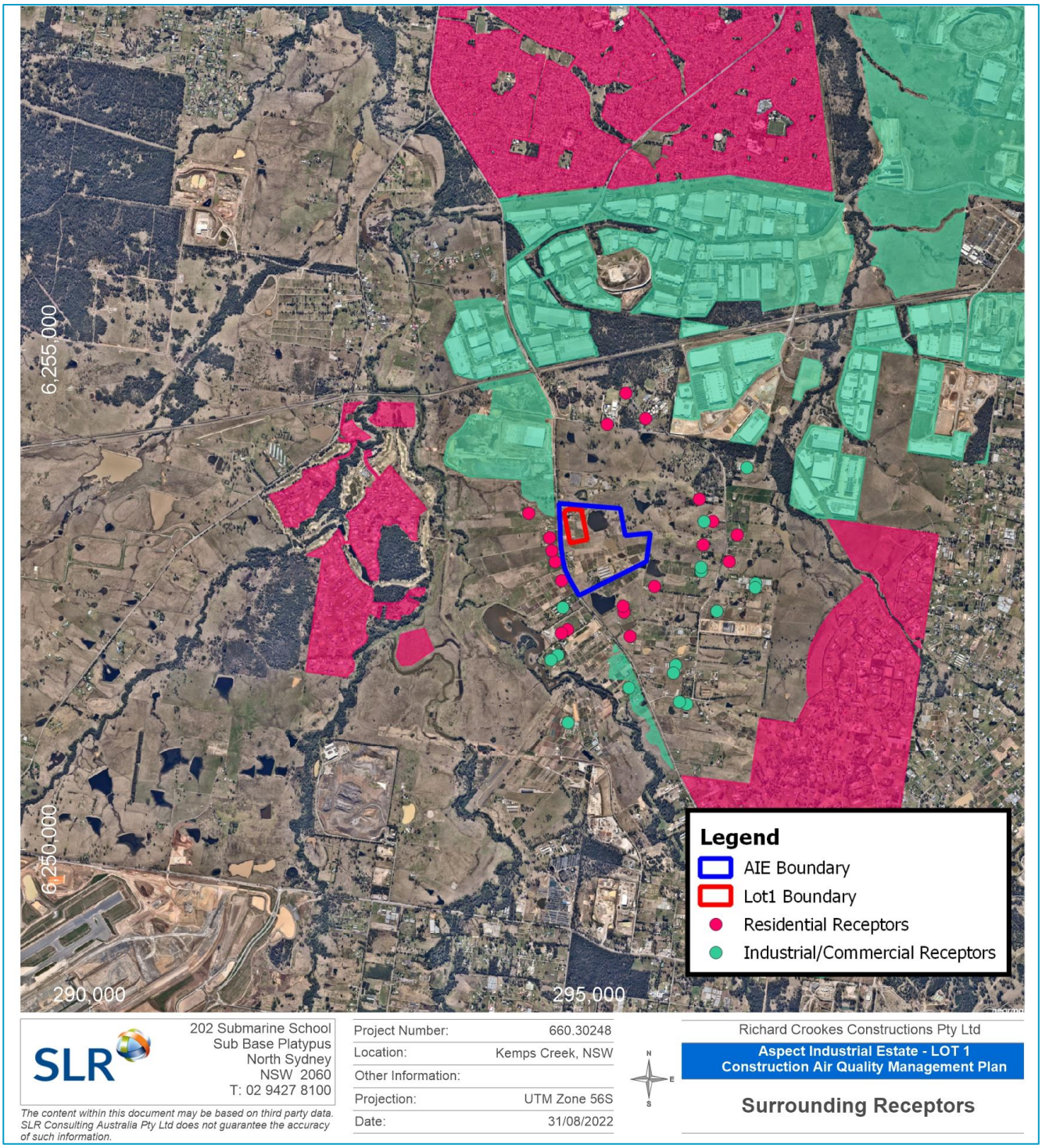


Figure 4 Locations of Surrounding Receptors



3.3 Construction Activities

Table 2 Construction Staging and Activities

Stage	Indicative Dates	Indicative Duration	Activities
Stage 1 – Building Works (Lot1)	January 2023	12 – 18 months	Warehouse/Lot 1 construction and fit out

3.4 Construction Hours

Construction hours will be in accordance with Conditions D41 and D42 of Development Consent SSD 10448, which are reproduced below:

D41. The Applicant must comply with the hours detailed in Table 4, unless otherwise agreed in writing by the Planning Secretary

Table 4: Hours of Work

Activity	Day	Time
Earthworks and Construction	Monday – Friday Saturday	7 am to 6 pm 8 am to 1 pm
Operation	Monday – Sunday	24 hours

D42. Works outside of the hours identified in condition D32 may be undertaken in the following circumstances:

a) works that are inaudible at the nearest sensitive receivers;

b) works agreed to in writing by the Planning Secretary;

c) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or

d) where it is required in an emergency to avoid the loss of lives, property or to prevent environmental harm.

The construction hours will be provided to all staff and contractors during their induction. The movements of staff and contractors will be recorded for this project.

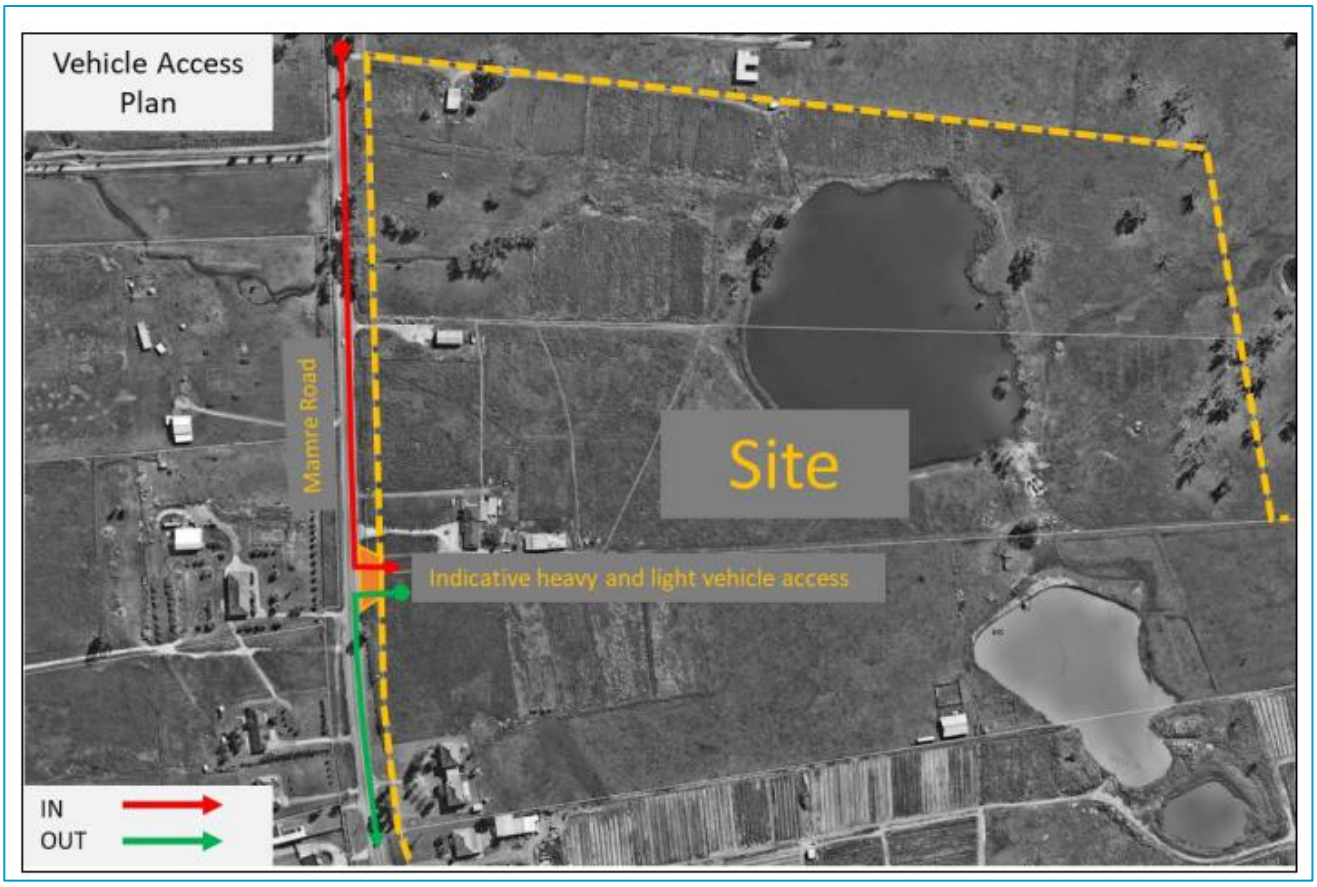
3.5 Construction Contact Details

Key contacts for the Construction Air Quality Management Plan are detailed in the CEMP.

3.6 Construction Site Access

The Site would be accessed via a new signalised intersection with Mamre Road. The location of this signalised intersection is consistent with Transport for NSW's Mamre Road Upgrade community updates and strategic design documentation (Urbis 2020). Detail of the intersection is shown at **Figure 5**.

Figure 5 Indicative Site Access Plan



Source: Ason 2020

4 Potential Sources of Air Emissions

During the construction works, fugitive dust emissions are considered to be the primary emission type, which could give rise to nuisance and/or health impacts for the surrounding sensitive areas. The key potential sources of dust associated with construction of Lot 1 have been identified as:

- Dust emissions from earthworks activities (e.g. excavation and loading of soils to trucks);
- Wind-generated dust from disturbed surfaces and stockpiles;
- Wheel-generated dust and particulate matter emissions in diesel exhaust emissions from on-site plant and equipment and construction traffic movements; and
- Particulate matter associated with exhaust emissions from increased/congested traffic emissions on the local road network due to road closures or diversions (if any).

In addition to the construction activities being carried out at any point in time, a number of other environmental factors may also affect the generation and dispersion of dust emissions, including:

- Wind direction - determines whether dust and suspended particles are transported in the direction of the sensitive receptors;
- Wind speed - governs the potential suspension and drift resistance of particles;
- Surface type - more erodible surface material types have an increased soil or dust erosion potential;
- Surface material moisture - increased surface material moisture reduces soil or dust erosion potential;
- Other external factors such as current works being undertaken by others outside of the defined Project boundaries and current climatic (dry) weather conditions;
- Rainfall or dew - rainfall or heavy dew that wets the surface of the soil reduces the risk of dust generation.

The construction activities are broadly divided into four categories i.e., demolition, earthworks, construction (building) and track out. Potential air quality impacts associated with dust emissions during construction of Lot 1 are addressed in **Section 7**.

Where diesel-powered mobile machinery and vehicles are being used, localised elevations in ambient concentrations of combustion-related pollutants (e.g. carbon monoxide, oxides of nitrogen etc) may also occur, however the potential for the relevant impact assessment criteria for these pollutants to be exceeded at surrounding sensitive areas will be negligible. Fugitive dust emissions are generally considered to have the greatest potential to give rise to downwind air quality impacts at the Site and therefore combustion emissions during demolition works have not been considered further.

5 Relevant Pollutants and Air Quality Criteria

5.1 Pollutants of Concern

As identified in **Section 4**, potential air pollutants of interest for the construction of Lot 1 is particulate matter and nuisance dust from construction activities.

The following sections outline the potential health and amenity issues associated with the above pollutants of concern, while **Section 5.2** identifies the relevant air quality assessment criteria.

5.1.1 Particulate Matter

Airborne contaminants that can be inhaled directly into the lungs can be classified on the basis of their physical properties as gases, vapours or particulate matter. In common usage, the terms “dust” and “particulates” are often used interchangeably. The health effects of particulate matter are strongly influenced by the size of the airborne particles. Smaller particles can penetrate further into the respiratory tract, with the smallest particles having a greater impact on human health as they penetrate to the gas exchange areas of the lungs. Larger particles primarily cause nuisance associated with coarse particles settling on surfaces.

The term “particulate matter” refers to a category of airborne particles, typically less than 30 microns (µm) in diameter and ranging down to 0.1 µm and is termed total suspended particulate (TSP). Particulate matter with an aerodynamic diameter of 10 microns or less is referred to as PM_{10}. The PM_{10} size fraction is sufficiently small to penetrate the large airways of the lungs, while $PM_{2.5}$ (2.5 microns or less) particulates are generally small enough to be drawn in and deposited into the deepest portions of the lungs. Potential adverse health impacts associated with exposure to PM_{10} and $PM_{2.5}$ include increased mortality from cardiovascular and respiratory diseases, chronic obstructive pulmonary disease and heart disease, and reduced lung capacity in asthmatic children.

5.1.2 Deposited Dust

Section 5.1.1 is concerned in large part with the health impacts of particulate matter. Nuisance dust impacts need also to be considered, mainly in relation to deposited dust. Dust can cause nuisance by settling on surfaces and possessions, affecting visibility and contaminating tank water supplies. High rates of dust deposition can also adversely affect vegetation by blanketing leaf surfaces.

5.1.3 Odour

Impacts from odorous air contaminants are often nuisance-related rather than health-related. Odour performance goals guide decisions on odour management but are generally not intended to achieve “no odour”.

The detectability of an odour is a sensory property that refers to the theoretical minimum concentration that produces an olfactory response or sensation. This point is called the *odour threshold* and defines one odour unit (ou). An odour goal of less than 1 ou would theoretically result in no odour impact being experienced.

In practice, the character of a particular odour can only be judged by the receiver’s reaction to it, and preferably only compared to another odour under similar social and regional conditions.

5.2 Ambient Air Quality Criteria

The NSW EPA criteria have been adopted, as discussed below.

5.2.1 Particulate Matter

State air quality guidelines specified by the NSW Environmental Protection Agency (EPA) for the pollutants identified in **Section 5.1** are published in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA 2017a) (hereafter 'Approved Methods'). The ground level air quality impact assessment criteria listed in Section 7 of the Approved Methods have been established by NSW EPA to achieve appropriate environmental outcomes and to minimise associated risks to human health as published in the Approved Methods. They have been derived from a range of sources and are the defining ambient air quality criteria for NSW and are considered to be appropriate for use in this assessment.

A summary of the relevant impact assessment criteria for particulate matter is provided in **Table 3**.

Table 3 NSW EPA Criteria for Particulate Matter

Pollutant	Averaging Period	Concentration
PM_{10}	24 Hours	50 µg/m^3
	Annual	25 µg/m^3
$PM_{2.5}$	24 Hours	25 µg/m^3
	Annual	8 µg/m^3

Source: EPA 2017a

On 18 May 2021, the National Environment Protection Council (NEPC) varied the National Environment Protection (Ambient Air Quality) Measure standard for NO_2, $PM_{2.5}$, and SO_2 based on the latest scientific understanding of the health risks arising from this pollutant. The updated standards for $PM_{2.5}$ are as follows:

- a 24-hour maximum of 20 µg/m^3; and,
- an annual average of 7 µg/m^3.

5.2.2 Deposited Dust

The relevant criterion for nuisance dust deposition is provided in **Table 4**. The rate of dust deposition is measured by means of a collection gauge, which catches the dust settling over a fixed surface area and over a period of about 30 days.

Table 4 NSW EPA Criterion of Nuisance Dust Deposition

Pollutant	Averaging Period	Assessment Criteria (g/m^2/month)
Deposited dust	Annual	2 (maximum increase in deposited dust level) 4 (maximum total deposited dust level)

Source: EPA 2017a

5.2.3 Odour

The equation used by the NSW EPA to determine the appropriate impact assessment criteria for complex mixtures of odorous air pollutants, as specified in the document '*Technical framework: assessment and management of odour from stationary sources in NSW*' (hereafter the Odour Framework [DEC 2006a]), is expressed as follows:

$$\text{Impact assessment criterion (ou)} = (\log_{10}(\text{population})-4.5)/-0.6$$

A summary of the impact assessment criteria given for various population densities, as drawn from the Odour Framework, is given in **Table 5**.

Table 5 NSW EPA Impact Assessment Criteria for Odours

Population of Affected Community	Impact Assessment Criteria for Complex Mixtures of Odours (ou) (nose-response-time average, 99th percentile)
Urban area (≥ 2000)	2.0
~300	3.0
~125	4.0
~30	5.0
~10	6.0
Single residence (≤ 2)	7.0

Source: DEC 2006

5.3 Local Government Air Quality Toolkit

The NSW EPA has developed the Local Government Air Quality Toolkit (EPA 2018), in response to requests from local Council officers for information and guidance on the common air quality issues they manage. Guidance is available under Part 3 of the Local Government Air Quality Toolkit for Construction Sites.

This document lists the common sources of emissions, and mitigation and management measures to control airborne dust levels from construction sites and has been consulted in the development of this CAQMP.

6 Existing Environment

6.1 Local Meteorology

The Bureau of Meteorology (BoM) maintains and publishes data from weather stations across Australia. The closest such station recording wind speed and wind direction data is the Horsley Park Automatic Weather Station (AWS), located approximately 5.5 km east of the Site (Station ID 67119). Full analysis of the wind roses and rainfall data can be found in **Appendix A**. The long term and short-term seasonal wind roses and long-term rainfall patterns observed at the Horsley Park AWS indicate that:

- Winds that would blow fugitive dust emissions from the demolition/construction works at the Site towards the nearest sensitive receptors located to the west and south, occur rarely during autumn and winter and are more likely to occur during summer and spring.

- The long-term wind and rainfall patterns suggest that construction activities at the Site have the greatest potential to impact on surrounding sensitive receptors during the months of May, and July to September.

6.2 Background Air Quality

Air quality monitoring is performed by the NSW Department of Planning, Industry and Environment (DPIE) at a number of monitoring stations across NSW. The nearest such station is located at St Marys, approximately 4.5 km northwest of the Site. The St Marys AQMS was commissioned in 1992 and is located on a residential property off Mamre Road, St Marys. It is situated in the centre of the Hawkesbury Basin and is at an elevation of 29 m.

A summary of the monitored particulate matter concentrations for the last five years (2017-2021) is presented in **Table 6** and the data are presented graphically in **Figure 6** and **Figure 7**.

Table 6 Summary of Air Quality Monitoring Data at St Marys AQMS (2017– 2021)

Pollutant	PM_{10}		$PM_{2.5}$	
	Maximum 24-hour	Annual	Maximum 24-hour	Annual
	$\mu g/m^3$			
2017	49.8	16.2	38.2	7.0
2018	100.5	19.4	80.5	7.8
2019	159.8	24.7	88.3	9.8
2020	260.3	18.9	82.5	7.6
2021	54.9	16.2	40.3	5.8
Criterion	**50**	**25**	**25**	**8**

Figure 6 Measured 24-Hour Average PM_{10} Concentrations at St Marys AQMS (2017 – 2021)

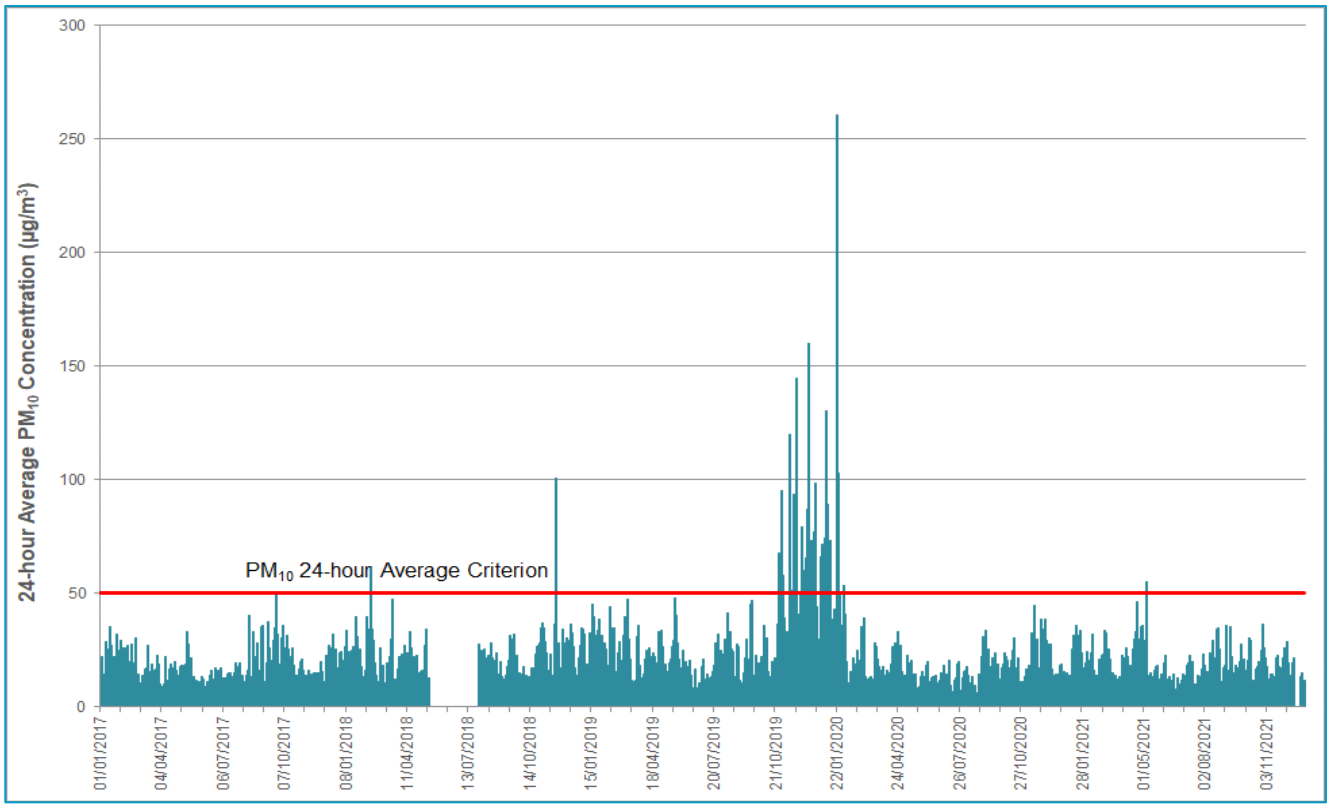
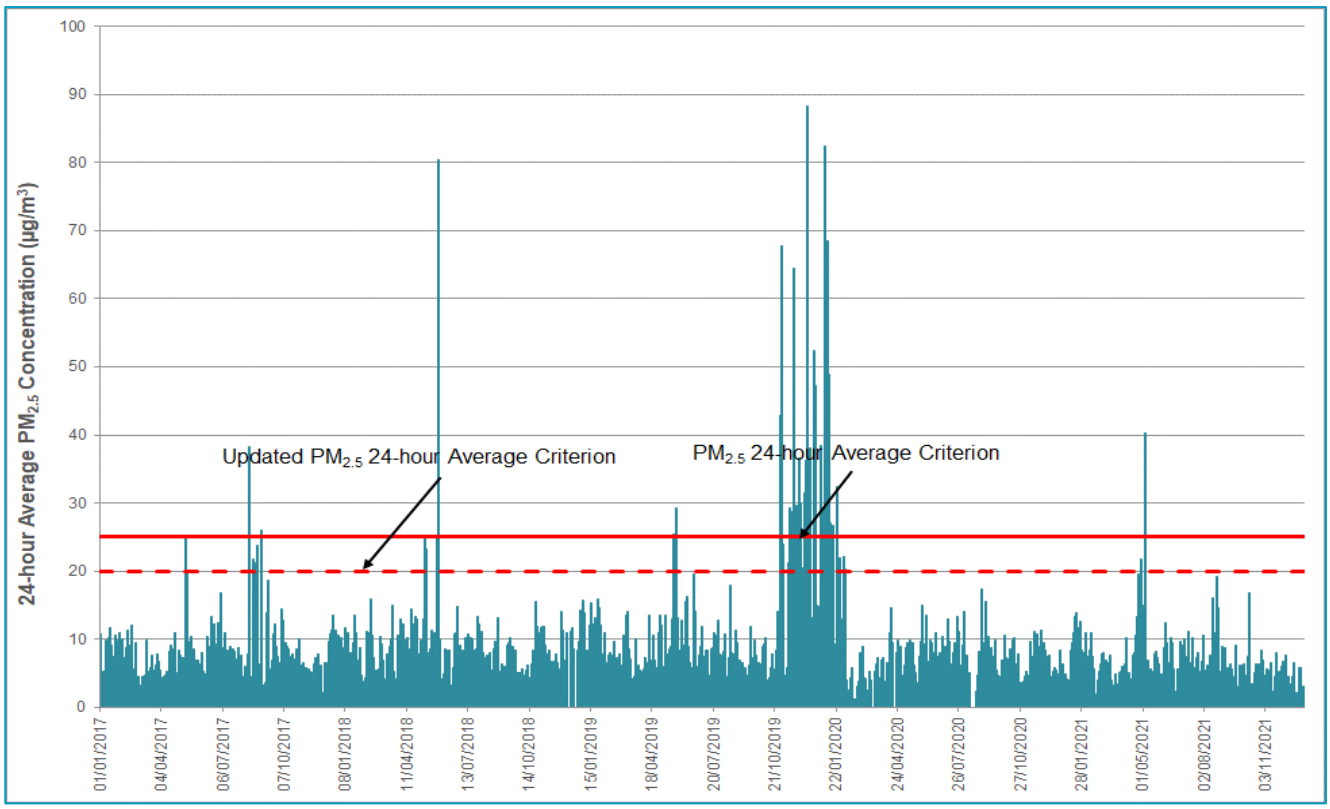


Figure 7 Measured 24-Hour Average $PM_{2.5}$ Concentrations at St Marys AQMS (2017– 2021)



A review of the ambient air quality data presented in **Table 6**, **Figure 6** and **Figure 7** shows that generally, the 24-hour average PM_{10} and $PM_{2.5}$ concentrations recorded by the St Marys AQMS are below the relevant guidelines, however isolated exceedances (normally on less than ten days per year) have been recorded in most years. The exception to this was the November 2019 to January 2020 period, when unprecedented and extensive bushfires within NSW resulted in an extended period of very elevated particulate concentrations across Sydney that were significantly above the 24-hour average guidelines. A review of the available compliance monitoring reports indicates that the intermittent exceedance days recorded during the other years were also primarily due to exceptional events such as bushfire emergencies, dust storms and hazard reduction burns.

In summary, even though the air quality is generally good in the Sydney region, there is potential for short term elevations in background particulate concentrations associated with regional events such as bushfires and dust storms etc to elevate local ambient particulate concentrations at the Site. Care needs to be taken to minimise emissions of dust from the construction works during these periods, to avoid exacerbating these particulate pollution events.

7 Assessment of Dust Emissions During Construction

The key potential health and amenity issues associated with construction of Lot 1 are:

- Elevated suspended particulate concentrations (PM_{10}); and
- Nuisance due to dust deposition (soiling of surfaces) and visible dust plumes that may potentially be observed to be leaving the site.

7.1 Construction Dust Impact Assessment Methodology

Quantitatively assessing impacts of fugitive dust emissions from construction projects using predictive modelling is seldom considered appropriate, primarily due to the uncertainty in the details of the construction activities, including equipment type, number, location and scheduling, which are unlikely to be available at the time of the assessment. Furthermore, they are also likely to change as construction progresses. In comparison, the equipment and operations of a mine or quarry are determined during the planning stages and more likely to remain consistent for long periods (several months or years).

Instead, it is considered appropriate to conduct a qualitative assessment. Potential impacts of dust emissions associated with proposed earthworks and construction activities at the Site have been performed based on the methodology outlined in the Institute of Air Quality Management (UK) (IAQM) document, "*Assessment of dust from demolition and construction*" (Holman et al 2014). This guidance document provides a structured approach for classifying construction sites according to the risk of air quality impacts, to identify relevant mitigation measures appropriate to the risk (see **Appendix B** for full methodology).

The IAQM approach has been used widely in Australia for the assessment of air quality impacts from construction projects and the identification of appropriate mitigation measures, which has been accepted by regulators across all states and territories for a variety of construction projects.

The IAQM method uses a four-step process for assessing dust impacts from construction activities:

- **Step 1**: Screening based on distance to the nearest sensitive receptor; whereby the sensitivity to dust deposition and human health impacts of the identified sensitive receptors is determined.
- **Step 2**: Assess risk of dust effects from activities based on:
  - the scale and nature of the works, which determines the potential dust emission magnitude; and
  - the sensitivity of the area surrounding dust-generating activities.
- **Step 3**: Determine site-specific mitigation for remaining activities with greater than negligible effects.
- **Step 4**: Assess significance of remaining activities after management measures have been considered.

7.2 Risk Assessment

7.2.1 Step 1 – Screening Based on Separation Distance

As noted in **Section 3.2**, a number of sensitive receptors are located within 150 m of the Site boundary.

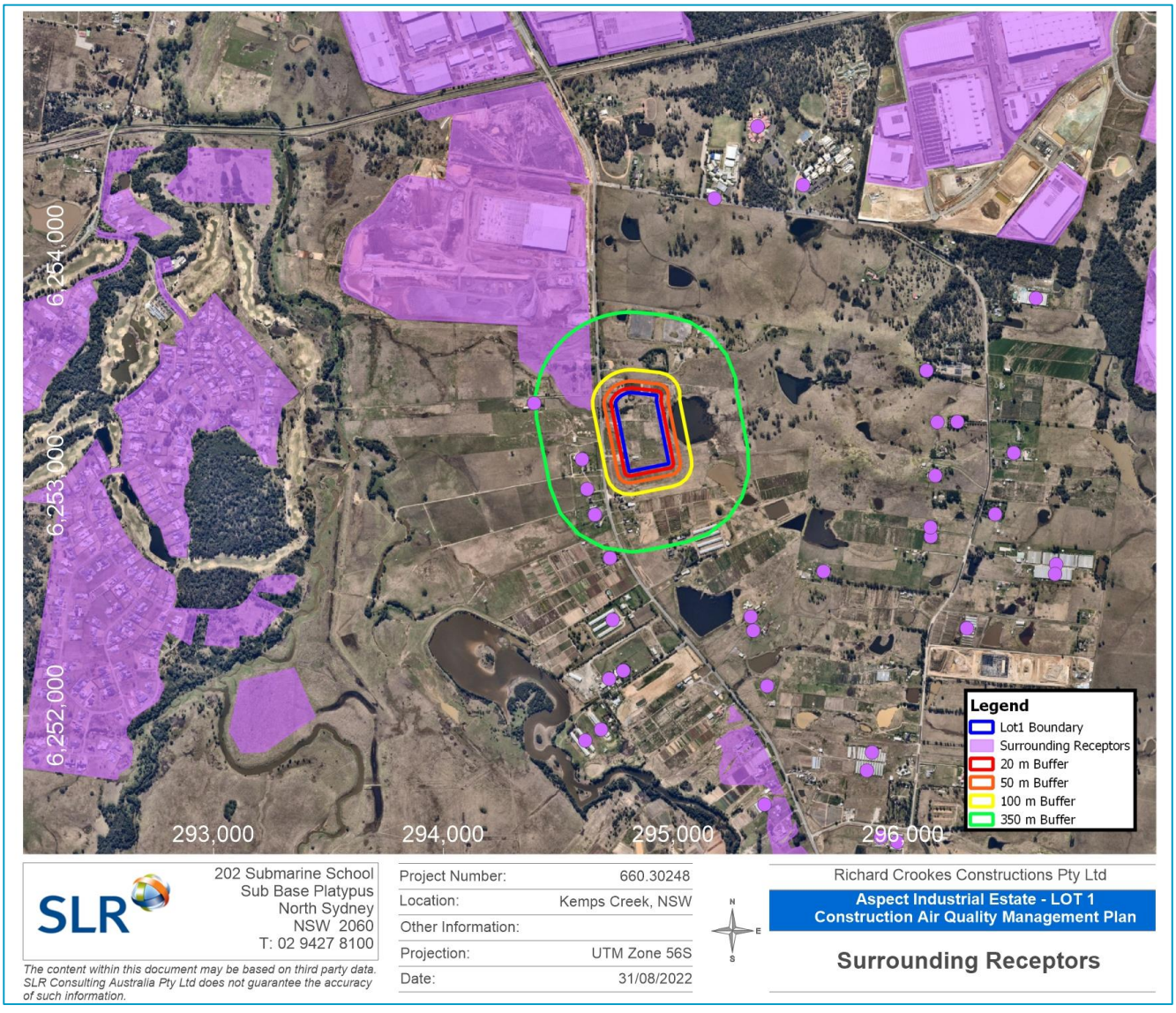
The IAQM screening criteria for further assessment is the presence of a 'human receptor' within:

- 350 m of the boundary of the site; or

- 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

As a 'human receptor' is located within 350 m of the boundary of the site, and within 500 m of the site entrance, further assessment is required. For the purpose of this assessment, the number of sensitive receptors is estimated to be between more than 100 within 350 m of the Site boundary (see **Figure 8**).

Figure 8 Density of Sensitive Receptors in the Vicinity of the Site



7.2.2 Step 2a – Assessment of Scale and Nature of the Works

Based upon the proposed works and the IAQM definitions presented in **Appendix B**, the dust emission magnitudes for each phase of the Lot 1 construction works have been categorised as presented in **Table 7**. Given that all earthworks and site preparation are done as a part of stage 1 works, no significant demolition activities are proposed as part of the works, hence the risk of dust impacts from demolition activities have not been assessed.

Table 7 Categorisation of Dust Emission Magnitude

Activity	Dust Emission Magnitude	Basis
Earthworks	Large	**IAQM Definition:** Total site area greater than 10,000 m^2, potentially dusty soil type (eg clay, which will be prone to suspension when dry due to small particle size), more than 10 heavy earth moving vehicles active at any one time, formation of bunds greater than 8 m in height, total material moved more than 100,000 t. **Relevance to this Project:** *Total area of the Site is estimated to be approximately 69,821 m^2.*
Construction	Large	**IAQM Definition:** Total building volume greater than 100,000 m^3, piling, on site concrete batching; sandblasting. **Relevance to this Project:** *The total warehouse area is 44,120 m^2 and the elevation of the warehouses is 16 m. Therefore, the total building volume will be 706,000 m^3.*
Trackout	Large	**IAQM Definition:** More than 50 heavy vehicle movements per day, surface materials with a high potential for dust generation, greater than 100 m of unpaved road length. **Relevance to this Project:** *It is estimated that more than 50 heavy vehicles movements per day will occur during the peak construction period.*

7.2.3 Step 2b – Risk Assessment

Receptor Sensitivity

Based on the criteria listed in **Table B1** in **Appendix B**, the sensitivity of the identified residential receptors in this study is concluded to be *high* for health impacts and *high* for dust soiling, as they are located where people may be reasonably expected to be present continuously as part of the normal pattern of land use. The sensitivity of the identified industrial/commercial receptors is concluded to be *medium* based on the criteria listed in **Table B1** in **Appendix B** for both health impacts and dust soiling.

Sensitivity of an Area

Based on the classifications shown in **Table B2** and **Table B3** in **Appendix B**, the sensitivity of the area to both dust soiling and health effects has been classified as ***low***. This categorisation has been made taking into account the individual receptor sensitivities (high for residential receptors and medium for industrial/commercial receptors) derived above, the 5-year mean background PM_{10} concentration of 19.1 µg/m^3 recorded at St. Marys AQMS (see **Section 6.2**) and the existing number of sensitive receptors present in the vicinity of the Site (ie more than 100 within 350 m).

Risk Assessment

Given the sensitivity of the general area is classified as '***low***' for dust soiling and for health effects, and the dust emission magnitudes for the various construction phase activities as shown in **Table 7**, the resulting risk of air quality impacts is as presented in **Table 8**.

Table 8 Preliminary Risk of Air Quality Impacts from Construction Activities (Uncontrolled)

Impact	Sensitivity of Area	Dust Emission Magnitude			Preliminary Risk		
		Earthworks	Construction	Trackout	Earthworks	Construction	Trackout
Dust Soiling	Low	Large	Large	Large	Low Risk	Low Risk	Low Risk
Human Health	Low				Low Risk	Low Risk	Low Risk

The results indicate that there is a ***low*** risk of adverse dust soiling and human health impacts during earthworks, construction, and trackout phases occurring at the off-site sensitive receptor locations, even if no mitigation measures were to be applied to control emissions during the construction works.

7.2.4 Step 3 - Mitigation Measures

A reappraisal of the predicted unmitigated air quality impacts on sensitive receptors has been performed to demonstrate the opportunity for minimising risks associated with the use of mitigation strategies. These are termed 'residual impacts'.

According to the IAQM method, no mitigation measures are required for a development with low risk of adverse dust soiling and human health effects during earthworks.

Mitigation measures targeting potential impacts from construction and trackout are provided in **Table 9** and **Table 10**. Implementing these measures should reduce the risk of these impacts from ***low*** to ***negligible***. These measures are designated as *highly recommended* (H) or *desirable* (D) by the dust IAQM method.

A range of mitigation measures relating to site preparations, truck movements and mobile machinery etc are also recommended by the IAQM for low risk sites, which have been considered in developing the list of project-specific mitigation measures in **Section 9**.

Table 9 IAQM Recommended Mitigation Measures Specific to Construction

Activity	Highly recommended or Desirable
Avoid scabbling (roughening of concrete surfaces) if possible.	D
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	D

H = Highly recommended; D = Desirable

Table 10 IAQM Recommended Mitigation Measures Specific to Trackout

Activity	Highly recommended or Desirable
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	D
Avoid dry sweeping of large areas.	D
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	D
Record all inspections of haul routes and any subsequent action in a site log book.	D

Activity	Highly recommended or Desirable
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	D

H = Highly recommended; D = Desirable

7.2.5 Step 4 - Residual Impacts

A reappraisal of the predicted unmitigated air quality impacts on sensitive receptors has been performed to demonstrate the opportunity for minimising risks associated with the use of mitigation strategies. These are termed 'residual impacts'. The results of the reappraisal are presented below in **Table 11**.

Table 11 Residual Risk of Air Quality Impacts from Construction

Impact	Sensitivity of Area	Residual Risk		
		Earthworks	Construction	Trackout
Dust Soiling	Low	Negligible Risk	Negligible Risk	Negligible Risk
Human Health	Low	Negligible Risk	Negligible Risk	Negligible Risk

The mitigated dust deposition and human health impacts for earthworks, construction and trackout phases are anticipated to be ***negligible***.

8 Assessment of Odour Emissions During Construction

To assess the odour nuisance risk, a qualitative odour assessment methodology has been adopted for this assessment. The following broad risk-based approach prescribed by the Institute of Air Quality Management (Bull et al 2018) has been adopted:

- **Nature of Impact**: does the impact result in an adverse or beneficial environment?
- **Receptor Sensitivity**: how sensitive is the receiving environment to the anticipated impacts? This may be applied to the sensitivity of the environment in a regional context or specific receptor locations.
- **Magnitude**: what is the anticipated scale of the impact?

The integration of sensitivity with impact magnitude is used to derive the predicted **significance** of that change. Full details of the methodology can be found in **Appendix C**.

In regard to the odour nuisance impacts, by addressing the FIDOL (Frequency, Intensity, Duration, Offensiveness and Location) factors, the potential for odour impacts from this source at the sensitive receptors may be evaluated.

- Frequency - the surrounding sensitive receptors located to the north, east, and west of the Site (see **Section 3.1**) have a low potential to experience odour impacts since no obvious odour sources are available within the Site. All northerly, westerly, and easterly winds occur less than 8% of the time, therefore there is a *low* likelihood that the surrounding receptors would experience frequent potential odour impacts from the Site.
- Intensity – based on the activities within the Site, the odour intensity from is expected to be negligible at the surrounding receptors. Given this, odours from the Site are likely to be of *low* intensity and generally of intermittent nature.
- Duration - Given that conducive wind directions only occur approximately 8% of the time, the potential duration of any odour impacts is concluded to be *low*.
- Offensiveness – Given the nature of the activities held at the Site, the very low intensity odours that may be detectable beyond the boundary of the Site would be expected to have a *low* level of offensiveness.
- Location - the impact of location on the acceptability of odours from the Site has been accounted for by the surrounding receptors sensitivity classifications detailed above in this section (*high*).

Given the above, the potential impact of odour emissions from the Site is considered to be ***negligible*** (ie Impact is predicted to cause no significant consequences) for the Site (see **Table 12**).

Table 12 Impact Significance – Odour from Lot 1

Potential Odour Exposure Impact	Receptor Sensitivity		
	Low	Medium	High
Very Large	Moderate adverse	Substantial adverse	Substantial adverse
Large	Slight adverse	Moderate adverse	Substantial adverse
Medium	Negligible	Slight adverse	Moderate adverse
Small	Negligible	Negligible	Slight adverse
Negligible	Negligible	Negligible	Negligible

In line with the IAQM method, it is concluded that the overall effect is ***not significant***.

9 Mitigation Measures

Development Consent SSD 10448 requires that the Applicant must take all reasonable steps to minimise dust generated during all works authorised by this consent. The potential for dust emissions during construction of Lot 1 and the potential impact (as discussed in **Section 4**) on surrounding sensitive receptors are anticipated to be largely controllable through a range of mitigation measures, including good site management, good housekeeping measures, appropriate vehicle maintenance and applying appropriate dust mitigation measures where required. The dust mitigation measures to be implemented during construction of Lot 1 are detailed in **Table 13**, which are consistent with those stipulated in the CAQMP for the AIE (SLR 2020).

Table 13 Site-Specific Management Measures Recommended by the IAQM

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
Communications			
The Community Communications Strategy will be implemented.	Communications and Community Liaison Representative	Prior to commencing construction and ongoing	Best practice
The name and contact details of person(s) accountable for air quality and dust issues will be displayed on the site boundary. This may be the Contractor's Project Manager.	Construction Contractor		
The head or regional office contact information will be displayed on site signage.			
Site Management			
All dust and air quality incidents will be investigated as per **Section 11** of this CAQMP.	Construction Contractor	Ongoing	**Section 11** of this document
All dust and air quality complaints will be responded to as per **Section 11** of this CAQMP.			
Where excessive dust events occur (i.e. prolonged visual dust in a particular area), additional watering of dust producing activities will be undertaken or activities temporarily halted until such times that the dust source is under control.		During excessive dust events	Best practice
Horsley Park Bureau of Meteorology station weather forecast will be reviewed daily (i.e. wind, rain) to inform site dust management procedures for the day.		Daily	
Preparing and Maintaining the Site			
All reasonable steps to minimise dust generated will be undertaken during construction.	Construction Contractor	Ongoing	SSD 10448 Condition D54
Exposed surfaces and stockpile will be suppressed by regular watering or use of approved dust suppressants.			SSD 10448 Condition D55a
Land stabilisation works will be carried out in such a way on site to minimise exposed surfaces.			SSD 10448 Condition D55e
Dust generating activities in areas close to receptors will be closely monitored and additional mitigation applied as required to best manage potential dust emissions			Best practice

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
Stockpiles that will be in place for more than 20 days and are not actively used as well as any stockpiles that are susceptible to wind or water erosion will be suitably protected from erosion within 10 days of the establishment of each stockpile. Temporary stabilisation of disturbed surfaces will be undertaken within two weeks of the stockpile being established.			
Site fencing and barriers will be kept clean using wet methods.			
Operating Vehicle/Machinery and Sustainable Travel			
Trucks associated with Lot 1 constructions will not track dirt off site and onto the public road network.	Construction Contractor	Ongoing	SSD 10448 Condition D55c
Project access roads used by delivery trucks will be kept clean.			SSD 10448 Condition D55d
All on-road vehicles will comply with relevant vehicle emission standards (prescribed by the NSW RMS), where applicable, and will be maintained in good condition, in accordance with manufacturer's specifications and the POEO Act.			Best practice
Delivery trucks will switch off engines whilst undertaking a delivery on-site, if idling time is likely to exceed 5 minutes.			
Vehicle speed limit restrictions are implemented on site, including: • General – 20 km/h • High risk area – 10 km/h • Haul routes – 50 km/h			
Truck queuing and unnecessary trips will be minimised through logistical planning and by the identification and use of specific park up/hold areas away from the Project.			
Operations			
Only cutting, grinding or sawing equipment fitted with suitable dust suppression systems, such as water sprays will be used.	Construction Contractor	Ongoing	Best practice
Adequate water supply will be available on the site for effective dust/particulate matter suppression using a combination of potable and non-potable water sources.			
Water carts will be used on all denuded or exposed surfaces and unsealed roads to minimise dust emissions.	Construction Contractor	Ongoing	Best practice
Equipment, inclusive of but not limited to, Environmental spill kits will be readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.			

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
Works will be assessed during strong winds or in weather conditions where high levels of airborne particulates may potentially impact the sensitive receivers. Continual monitoring of wind speed and direction will be undertaken to guide this decision and ensure that adequate mitigation measures are undertaken		Continuously and during high winds	
Waste Management			
All trucks entering or leaving the Site will have their loads covered.	Construction Contractor	Ongoing	SSD 10448 Condition D55b
No waste materials, timbers or any other combustible materials will be burnt on site.			Best practice

10 Performance Objectives

As required by condition D56 (e), **Table 14** summarises the performance objectives identified to assess the effectiveness of the control measures listed in **Section 0**.

Table 14 Summary of Parameters to Assess the Effectiveness of Control Measures

Parameter	Visible Dust	Odours	Dust Deposition	Complaints
Key Performance Indicator	No visible dust leaving the Site Boundary	No odours detected at the boundary of the Project Site	<4g/m^2/month	No complaints related to dust or other air quality issues
Monitoring method	Visual inspection/observations	Field observations	Dust Deposition gauges	-
Location, frequency, and duration of monitoring	Daily onsite inspection	Daily onsite inspection	**Section 12**	-
Record keeping	In a logbook			
Response procedures	**Section 13**			
Compliance monitoring	-	-	**Section 12**	-

11 Complaints Handling and Response Procedure

Any complaint received in relation to the environmental performance or management of the development shall be managed and reported in accordance with **Section 3.6** of the CEMP.

12 Air Quality Monitoring Program

As discussed in **Section 7**, the risk of construction dust emissions causing nuisance impacts at off-site sensitive receptor locations is concluded to be low. It is also noted that any impacts will be temporary and managed through the implementation of appropriate mitigation measures (see **Section 0**).

A summary of the on-site air quality monitoring programme to be implemented at the AIE is shown in **Table 15**. The recommended locations of the dust deposition gauges are shown in **Figure 9**. These locations will be finalised in consultation with various stakeholders, and matters such as land access for installation and monthly change over, siting in accordance with appropriate Australian Standards (including *AS3580.1.1 Methods for sampling and analysis of ambient air - Guide to siting air monitoring equipment*), personnel safety, equipment safety will be taken into consideration when finalising these locations.

Monitoring, including laboratory analysis and record keeping, is to be conducted in accordance with AS3580.10.1 *Methods for sampling and analysis of ambient air. Determination of particulate matter—Deposited matter—Gravimetric method*. All monitoring data will be documented within a log book and reported in monthly dust monitoring reports reflecting the activities recorded in the log book.

Daily observations of any identified visible dust emissions from the site (onsite and offsite on each boundary) will be made by the site supervisor, or their delegate in a logbook, including the intensity of the observations, wind speeds estimates (or observations from Horsley Park Automatic Weather Station[1]), rainfall, any known regional impacts (eg bushfires or regional dust events) and any observable triggers of dust emissions from site. High wind speed and low rainfall have a great potential for fugitive dust emissions during construction. Wind erosion of dust from exposed surfaces (ie, during the construction phase of the development) is usually initiated when wind speeds exceed the threshold friction velocity for a given surface or material, however a general rule of thumb is that wind erosion can be expected to occur above 5 m/s (USEPA 2006). Furthermore, dry periods (usually mid-winter to mid spring periods) cause elevated fugitive dust. A full analysis of the wind conditions and rainfall data can be found in **Appendix A**.

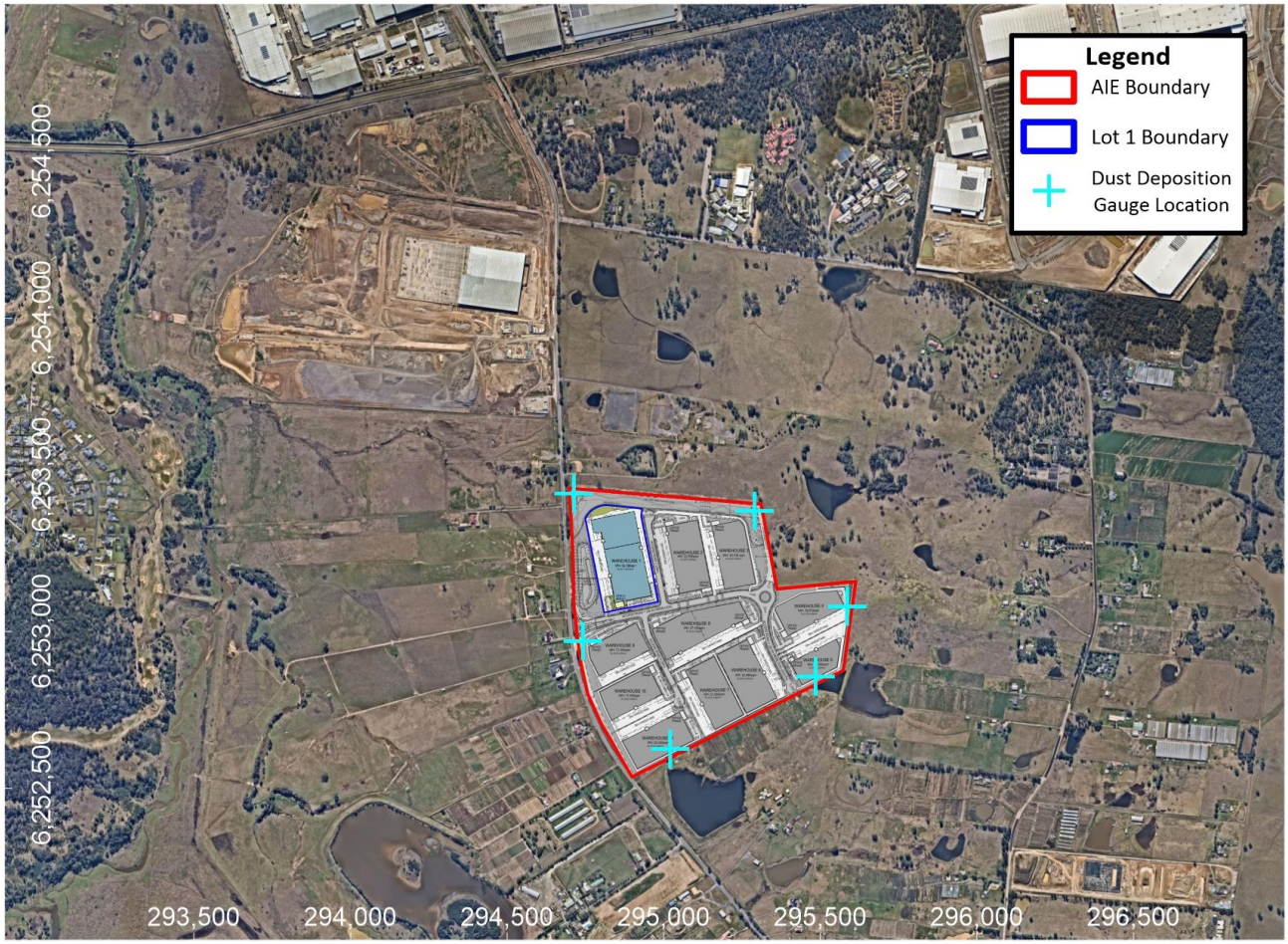
Table 15 Summary of On-Site Monitoring Programme

Pollutant	Equipment Used	Number of Monitoring Sites	Criterion (Averaging Period)
Deposited dust	Dust Deposition Gauges (DDGs)	6	4 g/m^2/month (annual average)
Visible emissions	None	Each boundary	Daily recorded observations of visible dust by the site supervisor (or delegate)

Note: A summary or monitoring and reporting is included in Section 5 of the CEMP for quick reference.

[1] http://www.bom.gov.au/climate/dwo/IDCJDW2062.latest.shtml

Figure 9 Proposed Air Quality Monitoring Locations for Lot 1 Construction



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Project Number:	660.30248
Location:	Kemps Creek, NSW
Other Information:	
Projection:	UTM Zone 56S
Date:	31/08/2022

Richard Crookes Constructions Pty Ltd

Aspect Industrial Estate - LOT 1
Construction Air Quality Management Plan

Proposed Monitoring Locations

13 Contingency Plan

As discussed in **Section 0**, a range of standard dust controls will be used to manage and mitigate the effects of fugitive dust during construction of Lot 1. Additional mitigation may also be required in the event that:

- Monitoring indicates that significant dust emissions are occurring;
- Weather conditions are changing such that dust emissions are more likely; and / or
- Complaints are received regarding dust.

If the recommended mitigation measures fail in controlling dust emissions and dust emissions may cause significant adverse effects on the surrounding receptors beyond the Lot 1 boundary, the dust generating activities shall be stopped until sufficient mitigation can be put in place.

The air quality contingency management plan for the construction of Lot 1 is shown in **Table 16**.

Table 16 Air Quality Contingency Management Plan for the Construction of Lot 1

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Visible dust leaving the site	Trigger	Daily inspections show that there is no visible dust leaving the site.	Daily inspections show that there is visible dust leaving the site.	Daily inspections show that there is visible dust leaving the site multiple times during a day OR from multiple locations within the site.
	Response	Continue monitoring program as normal.	Review and investigate construction activities and respective control measures. Where appropriate, implement additional remedial measures, such as: • *Deployment of additional water sprays, water trucks etc*	Undertake an investigation of the dust generating activities, and if necessary, temporarily halt the dust generating activities
Dust deposition reading of >4g/m^2/month	Trigger	Dust deposition rates are less than 4 g/m^2/month at all the dust gauges.	Dust deposition rate greater than 4 g/m^2/month is recorded by any of the dust gauges	Dust deposition rates greater than 4 g/m^2/month are recorded by two or more dust gauges for two months in a row.
	Response	Continue monitoring program as normal.	• AIE Project Manager to analyse data to try to identify the source(s) of dust. Consideration should be given to the differences between the monitoring closer to other construction sites compared to those further away for identification of potential cumulative impacts. • Construction Contractor to review operations to reduce dust emissions from the identified key source(s). Implement any additional mitigation measures as required, such as additional watering.	• AIE Project Manager to review and investigate construction activities and respective control measures for the monitoring period. • If it is concluded that construction activities at AIE were directly responsible for the exceedance (i.e. the exceedance event was not caused due to high regional dust levels or local non-project dust source), Construction Contractor to submit an incident report to government agencies.

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Intense Meteorological Conditions	Trigger	Normal Meteorological Conditions	Forecast winds greater than 5 m/s and dry conditions.	Forecast winds greater than 10 m/s and dry conditions.
	Response	Continue monitoring program as normal.	• Limit the activities that generate dust within 200 m of downwind sensitive activities. • Additional visual inspection of exposed areas and activities. • Assess the need for additional controls such as increased water application rates.	Stop activities that generate dust up to 200 m downwind of the construction activities, until wind eases.

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Complaints received regarding nuisance dust	Trigger	There are no complaints received during the construction	An air-quality related complaint is received from a nearby resident	Further complaints (more than 2) are received from the same complainant after the additional mitigation measures have been implemented

	Response	Continue monitoring program as normal.	• Report the complaint to the regulator, in line with complaints handling procedure (See **Section 11**).
			• Review timing of the complaint compared to known site activities to identify if particular site activities (or lack of activity in the case of mitigation measures) are contributing to the complaints.
			• Review and investigate construction activities and increase dust suppression measures (additional watering, covering stockpiles etc), where appropriate.
				• Review monitoring data from the existing monitors to investigate the likelihood of onsite activities contributing.
				• The investigation should take into account (but not limited to) regional dust/particulate data, prevailing wind data on the day/time of complaints, onsite activities at the time of complaints and offsite activities at the time of complaints.
				• Conduct real time air quality monitoring at the complaint location (or as near as practicable) including meteorology if required. This monitoring should be conducted in consultation with a suitably qualified air quality professional.
				• Identify the following from any monitoring conducted:
				  ◦ Monitoring method;
				  ◦ Location, frequency and duration of monitoring;
				  ◦ Assessment against compliance with criteria identified in **Section 5.2**;
				  ◦ Recommendations for further mitigation.

Note: This contingency management plan is replicated in Section 5 of the CEMP for quick reference.

14 Roles and Responsibilities

Overall roles and responsibilities relating to the project are outlined in Section 3.2 of the overarching CEMP. The key responsibilities specifically for dust management are as follows:

Contractor's Project Manager

- Ensuring appropriate resources/plant/personnel are available for the implementation of this CAQMP;
- Assessing data from inspections and providing project-wide advice to ensure consistent approach and outcomes are achieved;
- Providing necessary training for project personnel to cover air quality management;
- Reviewing and update of this CAQMP;
- Assessing and engaging (as required) additional mitigation controls to best manage the risks of elevated dust levels before commencing works each day and ensuring that the appropriate controls are implemented and effective;
- Reviewing weather forecasts daily and current observations of meteorological conditions (as recorded at Horsley Park AWS);
- Throughout the day, visually assessing the dust levels and the effectiveness of any dust controls that have been implemented, which may include engaging additional resources to reduce or mitigate the risk of dust leaving the site;
- Ceasing particular scopes of works as required in the event of excessive dust generation due to extreme weather conditions or inadequately controlled construction activities (eg high winds, surface dirt accumulation, etc.); and
- In the event that an air quality complaint is received, the procedure in Section 3.6 of the CEMP will be implemented (see **Section 11**).

Environmental Coordinator

- Undertaking dust monitoring program; and
- Review that control measures are working in accordance with the CAQMP.

All Workers on Site

- Observing any dust emission control instructions and procedures that apply to their work;
- Taking action to prevent or minimise dust emission incidents; and
- Identifying and reporting dust emission incidents.

15 Review and Improvement of the CAQMP

Reviews, investigations, and improvements to this plan shall be undertaken in accordance with **Section 6** of the CEMP.

16 References

- Bull. (2018). IAQM Guidance on the assessment of odour for planning – version 1.1, available at: . www.iaqm.co.uk/text/guidance/odour-guidance-2014.pdf. London: Institute of Air Quality Management.
- DEC 2006, Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales, Department of Environment and Conservation NSW, December 2006.
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- EPA 2018, Local Government Air Quality Toolkit, Module 3 – Guidelines for Managing Air Pollution, Part 3 – Guidance Notes for Construction Sites, available online at https://www.epa.nsw.gov.au/your-environment/air/air-nsw-overview/local-government-air-quality-toolkit, accessed on 17 July 2018.
- OEH 2017a, NSW Annual Compliance Report 2015, National Environment Protection (Ambient Air Quality) Measure, published by Office of Environment and Heritage, OEH 2017/0211, May 2017.
- OEH 2017b, NSW Air Quality Statement 2016 – Towards Cleaner Air, published by Office of Environment and Heritage, OEH 2017/0013, January 2017.
- OEH 2018, NSW Air Quality Statement 2017 – Clearing the Air, published by Office of Environment and Heritage, OEH 2018/0044, January 2018.
- OEH 2019, NSW Annual Air Quality Statement 2018, published by Office of Environment and Heritage, OEH 2019/0031, January 2019.
- SLR 2020, Aspect Industrial Estate, Air Quality Impact Assessment SSD 10448, October 2020.
- URBIS 2020, Environmental Impact Statement Aspect Industrial Estate, State Significant Development Application, prepared for: Mirvac, P0013978, November 2020.
- Ason 2020, Preliminary Construction Traffic Management Plan, Prepared for Mirvac, 1029, May 2020.
- USEPA 2006, AP42 Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, 13.2.5 – Industrial Wind Erosion, November 2006.

APPENDIX A

WIND ROSES AND RAINFALL DATA ANALYSIS

Wind Conditions

Local wind speed and direction influence the dispersion of air pollutants. Wind speed determines both the distance of downwind transport and the rate of dilution as a result of 'plume' stretching. Wind direction, and the variability in wind direction, determines the general path pollutants will follow and the extent of crosswind spreading. Surface roughness (characterised by features such as the topography of the land and the presence of buildings, structures and trees) will also influence dispersion.

The Bureau of Meteorology (BoM) maintains and publishes data from weather stations across Australia. The closest such station recording wind speed and wind direction data is the Horsley Park Automatic Weather Station (AWS), located approximately 5.5 km east of the Site (Station ID 67119). For this assessment, it is assumed that the wind conditions recorded at the Horsley Park AWS are representative of the wind conditions experienced at the Site.

Annual and seasonal wind roses for the years 2017 to 2021 compiled from data recorded by the Horsley Park AWS are presented in **Figure A1**. Wind roses show the frequency of occurrence of winds by direction and strength. The bars correspond to the 16 compass points (degrees from North). The bar at the top of each wind rose diagram represents winds blowing from the north (i.e. northerly winds), and so on. he length of the bar represents the frequency of occurrence of winds from that direction, and the widths of the bar sections correspond to wind speed categories, the narrowest representing the lightest winds. Thus, it is possible to visualise how often winds of a certain direction and strength occur over a long period, either for all hours of the day, or for particular periods during the day.

The 'Beaufort Wind Scale' (consistent with terminology used by the BoM) presented in **Table A1** was used to describe the wind speeds experienced at Aspect Industrial Area.

Table A1 Beaufort Wind Scale

Beaufort Scale #	Description	m/s	Description on land
0	Calm	0-0.5	Smoke rises vertically
1	Light air	0.5-1.5	Smoke drift indicates wind direction
2-3	Light/gentle breeze	1.5-5.3	Wind felt on face, leaves rustle, light flags extended, ordinary vanes moved by wind
4	Moderate winds	5.3-8.0	Raises dust and loose paper, small branches are moved
5	Fresh winds	8.0-10.8	Small trees in leaf begin to sway, crested wavelets form on inland waters
6	Strong winds	>10.8	Large branches in motion, whistling heard in telephone wires; umbrellas used with difficulty

Source: http://www.bom.gov.au/lam/glossary/beaufort.shtml

The annual wind roses for the years 2017 to 2021 (**Figure A1**) indicate that predominant wind directions in the area are consistently from the southwest quadrant. Very low frequencies of winds from the north-eastern quadrant were recorded across all years. The annual frequency of calm wind conditions was recorded to be approximately 19.6% for all the years between 2017 and 2021. Also, a review of the annual wind roses (**Figure A1**) indicates that:

- Winds that would blow fugitive dust emissions from the construction works towards the nearest sensitive receptors located to the south and west of the proposed construction activities occur approximately 7% of the time.

The seasonal wind roses for the years 2017 and 2021 (**Figure A1**) indicate that:

- In summer, wind speeds ranged from calm to fresh winds (between 0.5 m/s and 9.8 m/s). The majority of winds originated from eastern and south eastern quadrants, with very few winds from western directions. Calm wind conditions were recorded approximately 17.6% of the time during summer.
- In autumn, wind speeds ranged from calm to fresh winds (between 0.5 m/s and 9.1 m/s). The majority of winds originated from southwest quadrant, with very few winds from other directions. Calm wind conditions were observed to occur approximately 21.7% of the time during autumn.
- In winter, wind speeds ranged from calm to fresh winds (between 0.5 m/s and 10.1 m/s). The majority of winds originated from southwest quadrant, with very few winds from east and south directions. Calm wind conditions were observed to occur approximately 20.2% of the time during winter.
- In spring, wind speeds ranged from calm to fresh winds (between 0.5 m/s and 10.0 m/s). The frequency of winds are generally even in all directions. Calm wind conditions were observed to occur approximately 18.8% of the time during spring.

Wind erosion of dust from exposed surfaces (ie, during the construction phase of the development) is usually initiated when wind speeds exceed the threshold friction velocity for a given surface or material, however a general rule of thumb is that wind erosion can be expected to occur above 5 m/s (USEPA 2006). The frequency of wind speeds for the period of 2017-2021 is presented in **Figure A2**. The plot showed that the frequency of wind speeds exceeding 5 m/s for the period 2017-2021 at Horsley Park AWS was approximately 6%.

Figure A1 Annual Wind Roses for Horsley Park (2017 to 2021)

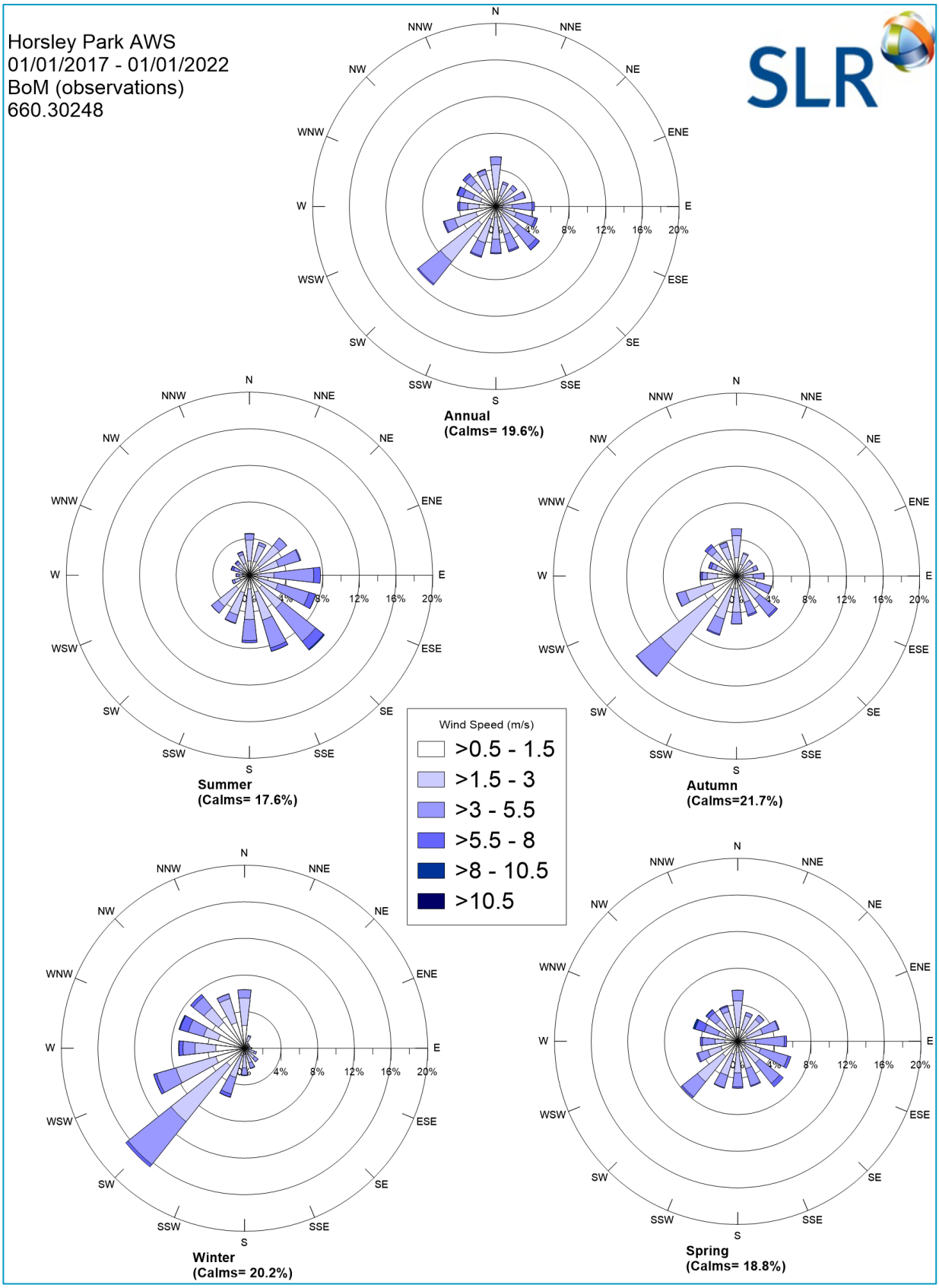
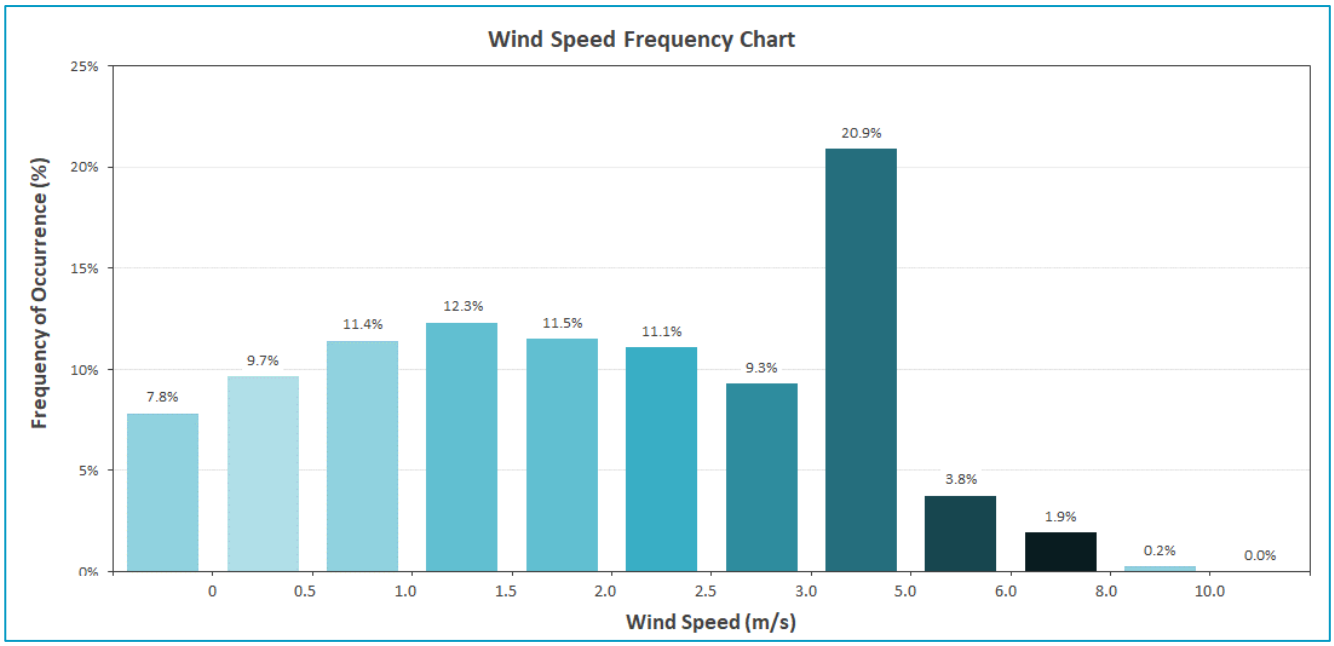


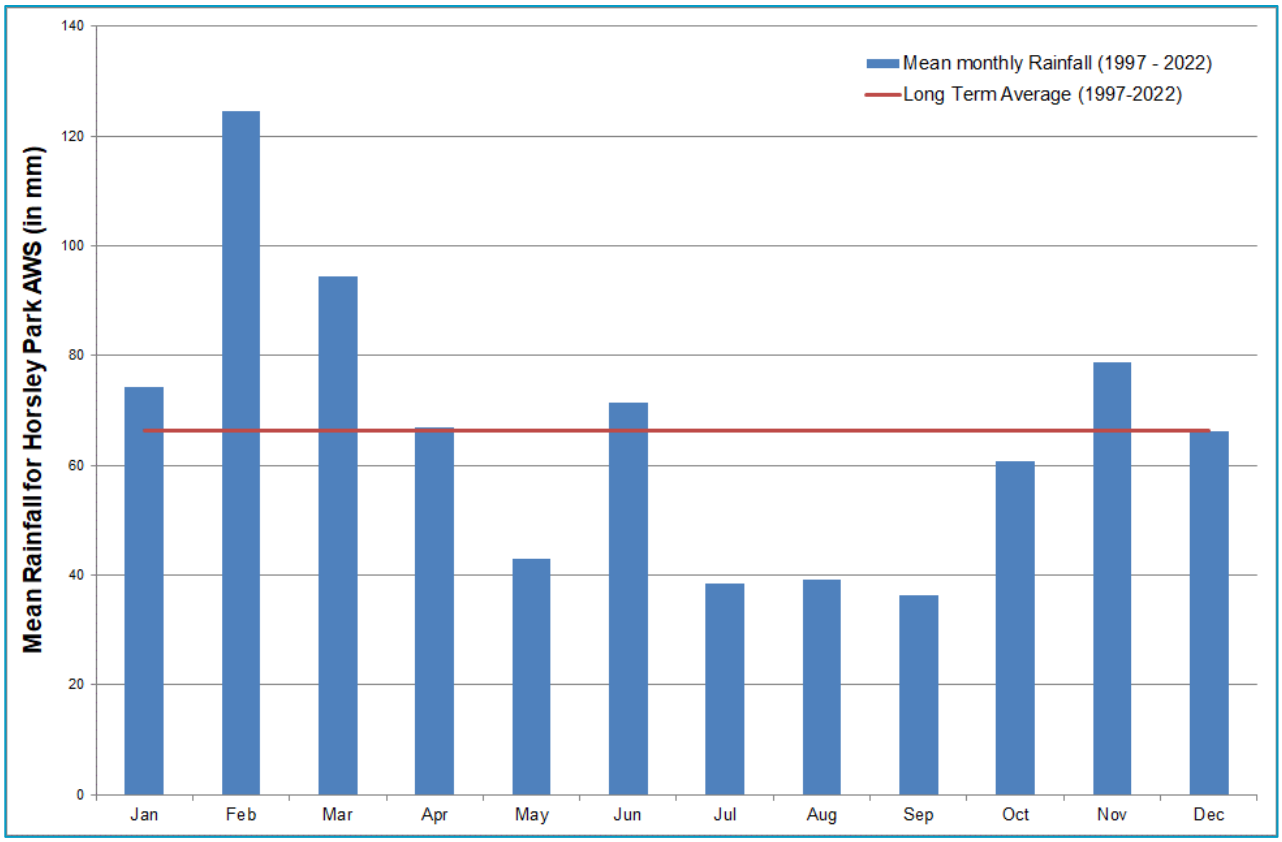
Figure A2 Wind Speed Frequency Chart for Horsley Park AWS – 2017-2021



Rainfall

Dry periods (no rainfall) have the greatest potential for fugitive dust emissions during construction. The long term monthly rainfall averages recorded at Horsley Park AWS rain gauge are shown in **Figure A4**. It is noted that generally rainfall is relatively low in mid-winter to mid spring periods. This rainfall pattern suggests that dust emissions from the construction activities at the Site have the greatest potential to impact on receptors during May and for the period of July to September.

Figure A3 Long term Mean Rainfall for Horsley Park AWS – 1997 to 2022



APPENDIX B

CONSTRUCTION PHASE RISK ASSESSMENT METHODOLOGY

Step 1 – Screening Based on Separation Distance

The Step 1 screening criteria provided by the IAQM guidance suggests screening out any assessment of impacts from construction activities where sensitive receptors are located more than 350 m from the boundary of the Site, more than 50 m from the route used by construction vehicles on public roads and more than 500 m from the Site entrance. This step is noted as having deliberately been chosen to be conservative and will require assessments for most projects.

Step 2a – Assessment of Scale and Nature of the Works

Step 2a of the assessment provides "dust emissions magnitudes" for each of four dust generating activities; demolition, earthworks, construction, and track-out (the movement of site material onto public roads by vehicles). The magnitudes are: *Large*; *Medium*; or *Small*, with suggested definitions for each category. The definitions given in the IAQM guidance for earthworks, construction activities and track-out, which are most relevant to this Development, are as follows:

Demolition *(Any activity involved with the removal of an existing structure [or structures]. This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time)*:

- ***Large***: Total building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level;
- ***Medium***: Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities 10-20 m above ground level; and
- ***Small***: Total building volume <20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.

Earthworks *(Covers the processes of soil-stripping, ground-levelling, excavation and landscaping)*:

- ***Large***: Total site area greater than 10,000 m^2, potentially dusty soil type (eg clay, which will be prone to suspension when dry due to small particle size), more than 10 heavy earth moving vehicles active at any one time, formation of bunds greater than 8 m in height, total material moved more than 100,000 t.
- ***Medium***: Total site area 2,500 m^2 to 10,000 m^2, moderately dusty soil type (eg silt), 5 to 10 heavy earth moving vehicles active at any one time, formation of bunds 4 m to 8 m in height, total material moved 20,000 t to 100,000 t.
- ***Small***: Total site area less than 2,500 m^2, soil type with large grain size (eg sand), less than five heavy earth moving vehicles active at any one time, formation of bunds less than 4 m in height, total material moved less than 20,000 t, earthworks during wetter months.

Construction *(Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc)*:

- ***Large***: Total building volume greater than 100,000 m^3, piling, on site concrete batching; sandblasting.

- ***Medium***: Total building volume 25,000 m^3 to 100,000 m^3, potentially dusty construction material (eg concrete), piling, on site concrete batching.
- ***Small***: Total building volume less than 25,000 m^3, construction material with low potential for dust release (eg metal cladding or timber).

Track-out *(The transport of dust and dirt from the construction / demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network)*:

- ***Large***: More than 50 heavy vehicle movements per day, surface materials with a high potential for dust generation, greater than 100 m of unpaved road length.
- ***Medium***: Between 10 and 50 heavy vehicle movements per day, surface materials with a moderate potential for dust generation, between 50 m and 100 m of unpaved road length.
- ***Small***: Less than 10 heavy vehicle movements per day, surface materials with a low potential for dust generation, less than 50 m of unpaved road length.

In order to provide a conservative assessment of potential impacts, it has been assumed that if at least one of the parameters specified in the 'large' definition is satisfied, the works are classified as large, and so on.

Step 2b – Risk Assessment

Assessment of the Sensitivity of the Area

- Step 2b of the assessment process requires the sensitivity of the area to be defined. The sensitivity of the area takes into account:
- The specific sensitivities that identified sensitive receptors have to dust deposition and human health impacts;
- The proximity and number of those receptors;
- In the case of PM_{10}, the local background concentration; and
- Other site-specific factors, such as whether there are natural shelters such as trees to reduce the risk of wind-blown dust.
- Individual receptors are classified as having *high*, *medium* or *low* sensitivity to dust deposition and human health impacts (ecological receptors are not addressed using this approach). The IAQM method provides guidance on the sensitivity of different receptor types to dust soiling and health effects as summarised in **Table B-1**. It is noted that user expectations of amenity levels (dust soiling) is dependent on existing deposition levels.

Table B-1 IAQM Guidance for Categorising Receptor Sensitivity

Value	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
Dust soiling	Users can reasonably expect a high level of amenity; or The appearance, aesthetics or value of their property would be diminished by soiling, and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods as part of the normal pattern of use of the land.	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or The appearance, aesthetics or value of their property could be diminished by soiling; or The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.	The enjoyment of amenity would not reasonably be expected; or Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.
	Examples: Dwellings, museums, medium and long term car parks and car showrooms.	*Examples: Parks and places of work.*	*Examples: Playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.*
Health effects	Locations where the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	Locations where human exposure is transient.
	Examples: Residential properties, hospitals, schools and residential care homes.	*Examples: Office and shop workers, but will generally not include workers occupationally exposed to PM_{10}.*	*Examples: Public footpaths, playing fields, parks and shopping street.*

According to the IAQM methods, the sensitivity of the identified individual receptors (as described above) is then used to assess the *sensitivity of the area* surrounding the active construction area, taking into account the proximity and number of those receptors, and the local background PM_{10} concentration (in the case of potential health impacts) and other site-specific factors. Additional factors to consider when determining the sensitivity of the area include:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and the receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area and if relevant, the season during which the works will take place;
- Any conclusions drawn from local topography;
- The duration of the potential impact (as a receptor may be willing to accept elevated dust levels for a known short duration, or may become more sensitive or less sensitive (acclimatised) over time for long-term impacts); and
- any known specific receptor sensitivities which go beyond the classifications given in the IAQM document.

The IAQM guidance for assessing the sensitivity of an area to dust soiling is shown in **Table B-2**. The sensitivity of the area should be derived for each of activity relevant to the project (i.e. construction and earthworks).

Table B-2 IAQM Guidance for Categorising the Sensitivity of an Area to Dust Soiling Effects

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Note: Estimate the total number of receptors within the stated distance. Only the *highest level* of area sensitivity from the table needs to be considered. For example, if there are 7 high sensitivity receptors < 20m of the source and 95 high sensitivity receptors between 20 and 50 m, then the total of number of receptors < 50 m is 102. The sensitivity of the area in this case would be high.

A modified version of the IAQM guidance for assessing the *sensitivity of an area* to health impacts is shown in **Table B-3**. For high sensitivity receptors, the IAQM methods takes the existing background concentrations of PM_{10} (as an annual average) experienced in the area of interest into account and is based on the air quality objectives for PM_{10} in the UK. As these objectives differ from the ambient air quality criteria adopted for use in this assessment (i.e. an annual average of 25 µg/m^3 for PM_{10}) the IAQM method has been modified slightly.

- This approach is consistent with the IAQM guidance, which notes that in using the tables to define the *sensitivity of an area*, professional judgement may be used to determine alternative sensitivity categories, taking into account the following factors:
- any history of dust generating activities in the area;
- the likelihood of concurrent dust generating activity on nearby sites;
- any pre-existing screening between the source and the receptors;
- any conclusions drawn from analysing local meteorological data which accurately represent the area, and if relevant the season during which the works will take place;
- any conclusions drawn from local topography;

- duration of the potential impact; and
- any known specific receptor sensitivities which go beyond the classifications given in this document.

Table B-3 IAQM Guidance for Categorising the Sensitivity of an Area to Dust Health Effects

Receptor sensitivity	Annual mean PM_{10} conc.	Number of receptors [a,b]	Distance from the source (m)				
			<20	<50	<100	<200	<350
High	>25 µg/m³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	21-25 µg/m³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	17-21 µg/m³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<17 µg/m³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>25 µg/m³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	21-25 µg/m³	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	17-21 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<17 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Notes: (a) Estimate the total within the stated distance (e.g. the total within 350 m and not the number between 200 and 350 m); noting that only the highest level of area sensitivity from the table needs to be considered.

(b) In the case of high sensitivity receptors with high occupancy (such as schools or hospitals) approximate the number of people likely to be present. In the case of residential dwellings, just include the number of properties.

Risk Assessment

The dust emission magnitude from Step 2a and the receptor sensitivity from Step 2b are then used in the matrices shown in **Table B-4** (demolition), **Table B-5** (earthworks and construction) and **Table B-6** (track-out) to determine the risk category with no mitigation applied.

Table B-4 Risk Category from Demolition Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table B-5 Risk Category from Earthworks and Construction Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table B-6 Risk Category from Track-out Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Step 3 - Site-Specific Mitigation

Once the risk categories are determined for each of the relevant activities, site-specific management measures can be identified based on whether the Site is a low, medium or high risk site.

Step 4 – Residual Impacts

Following Step 3, the residual impact is then determined after management measures have been considered.

APPENDIX C

ODOUR RISK ASSESSMENT METHODOLOGY

Nature of Impact

Predicted impacts may be described in terms of the overall effect upon the environment:

- **Beneficial**: the predicted impact will cause a beneficial effect on the receiving environment.
- **Neutral**: the predicted impact will cause neither a beneficial nor adverse effect.
- **Adverse**: the predicted impact will cause an adverse effect on the receiving environment.

Receptor Sensitivity

Sensitivity may vary with the anticipated impact or effect. A receptor may be determined to have varying sensitivity to different environmental changes, for example, a high sensitivity to changes in air quality, but low sensitivity to noise impacts. Sensitivity may also be derived from statutory designation which is designed to protect the receptor from such impacts.

Sensitivity terminology may vary depending upon the environmental effect, but generally this may be described in accordance with the following broad categories - Very high, High, Medium and Low.

Table C1 outlines the methodology used in this study to define the sensitivity of receptors to air quality impacts.

Table C1 Receptor Sensitivity to Odours

Sensitivity	Criteria
High	Surrounding land where: • users can reasonably expect enjoyment of a high level of amenity; and • people would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Examples may include residential dwellings, hospitals, schools/education and tourist/cultural.
Medium	Surrounding land where: • users would expect to enjoy a reasonable level of amenity, but wouldn't reasonably expect to enjoy the same level of amenity as in their home; or • people wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Examples may include places of work, commercial/retail premises and playing/recreation fields.
Low	Surrounding land where: • the enjoyment of amenity would not reasonably be expected; or • there is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Examples may include industrial use, farms, footpaths and roads.

Magnitude

Magnitude describes the anticipated scale of the anticipated environmental change in terms of how that impact may cause a change to baseline conditions. Magnitude may be described quantitatively or qualitatively. Where an impact is defined by qualitative assessment, suitable justification is provided in the text.

Table C2 Magnitude of Impacts

Magnitude	Description
Very Large	Impact is predicted to cause significant consequences on the receiving environment (may be adverse or beneficial)
Large	Impact is predicted to possibly cause statutory objectives/standards to be exceeded (may be adverse)
Medium	Predicted impact may be tolerated for most of the days, but maybe intolerable for some days.
Small	Predicted impact may be tolerated.
Negligible	Impact is predicted to cause no significant consequences.

Significance

The risk-based matrix provided below illustrates how the definition of the sensitivity and magnitude interact to produce impact significance.

Table C3 Impact Significance Matrix

Potential Odour Exposure Impact	Receptor Sensitivity		
	Low	Medium	High
Very Large	Moderate adverse	Substantial adverse	Substantial adverse
Large	Slight adverse	Moderate adverse	Substantial adverse
Medium	Negligible	Slight adverse	Moderate adverse
Small	Negligible	Negligible	Slight adverse
Negligible	Negligible	Negligible	Negligible

Where the overall effect is greater than “slight adverse”, the effect is likely to be considered significant. Note that this is a binary judgement: either it is “significant”, or it is “not significant”. Concluding that an effect is significant should not mean, of itself, that a development proposal is unacceptable, and the planning application should be refused; rather, it should mean that careful consideration needs to be given to the consequences, scope for securing further mitigation, and the balance with any wider environmental, social and economic benefits that the proposal would bring.

APPENDIX D

CURRICULUM VITAE OF AUTHOR

CURRICULUM VITAE

VARUN MARWAHA

ASSOCIATE

Air Quality, Asia-Pacific

QUALIFICATIONS

BEng	2006	Bachelor of Engineering - Chemical, University of Sydney

EXPERTISE

- Air Quality Dispersion modelling using a variety of software applications
- Meteorological and Ambient air quality monitoring & assessment for legislative compliance
- Australian state and federal regulatory compliance – Air Quality
- Opportunities and constraints reporting
- Detailed knowledge of air quality/meteorological interactions

Varun is an Associate Air Quality Consultant working within the Air Quality team. He has over 10 years of environmental and process engineering experience.

Varun has acquired a broad environmental experience including air quality (including odour) impact assessments, emission inventories (including National Pollutant Inventory), air quality dispersion modelling (including Ausplume, CALPUFF and CAL3QHCR), air quality monitoring (including odour), meteorological monitoring, meteorological modelling (The Air Pollution Model [TAPM] & CALMET), greenhouse gas assessments and overall project management.

Varun has conducted numerous environmental audits and prepared NPI reports for a range of industries including power stations throughout Australia.

Varun is a Certified Air Quality Professional (CAQP) and a Certified Practicing Project Manager (CPPM), and is respected for his contribution to the air quality industry.

PROJECTS

Sentosa Gateway Project, Singapore	The project involved the assessment of air impacts due to road traffic tunnel from Sentosa Island to mainland Singapore. The project proposed to build a tunnel for the outbound traffic from Sentosa with tunnel exits located on Lower Delta Road and Keppel Road. The emissions were quantified and modelled using CAL3QHCR and CALPUFF modelling suites to predict the roadside impacts. The project also included assessment of other sources of pollutants in the region for the cumulative assessment
Sydney Harbour Bridge, Sydney, NSW, Australia	Compliance Monitoring (Lead, PM_{10} and TSP). The project involves repainting the iconic Sydney Harbour Bridge. The process includes stripping the old paint (containing lead), preparation of the surface and repainting. The monitoring was conducted for lead concentration in the air along with the concentration of particulate (PM_{10} and TSP) was required. For lead monitoring, membrane filters were used and for particulate monitoring High Volume air samplers (HVAS) were employed.

CURRICULUM VITAE — VARUN MARWAHA

Capital Metro Project, Canberra, ACT, Australia (2018-2019)	The project involved preparation of Air Quality Impact Assessment (AQIA) for the proposed ACT Light Rail Stage 1 – Gungahlin to Civic Project, a 12 kilometre light rail service linking the fast- developing area of Gungahlin in the north, to the City. The emissions due to the operation of light rail network were quantified and compared to the existing regional air emissions levels. It was demonstrated that the regional emissions were likely to decrease significantly when compared with the current situation.
Proposed Residential Development, RMS	Road Traffic Impact Assessment. The project involved assessment of roadside impacts on the proposed residential development due to road traffic on a busy motorway. The aim of the project was to determine the maximum impacts and validating against the monitored roadside data. The emissions were quantified and modelled using CAL3QHCR modelling suite to predict the roadside impacts. The project also included assessment of other sources of pollutants in the region for the cumulative assessment. The modelling skills were put to test when integrating predicted results from several modelling suites (CAL3QHCR and CALPUFF)
Proposed Haul Roads (Fortescue Metals Group), WA, Australia	The project involved assessment of two possible options for building haul roads in separate directions. The aim of the project was to determine mine access route from the nearest transport facility. The emissions were quantified and modelled using CALPUFF modelling suite to predict the roadside impacts on the nearest receptors on each haul road route.
Confidential Highway Project, QLD, Australia	Emissions estimation and modelling for an air quality impact assessment for a proposed new highway in Queensland. Work included the estimation of vehicle emissions for the operational phase using the COPERT-Australia emissions modelling software and dispersion modelling of the road and tunnel emissions using CAL3QHCR and CALPUFF dispersion models.
MEMBERSHIPS	Clean Air Society of Australia and New Zealand (CASANZ)
	Member of Engineers Australia (EA)
	Institute of Chemical Engineers (IChemE)
ACCREDITATION	Certified Air Quality Professional (CAQP), CASANZ
	Certified Practicing Project Manager (CPPM), UNE
TRAINING	Advanced CALPUFF Course – Clean Air Society of Australia and New Zealand (CASANZ), 2008
	The Role of Meteorology in Dispersion Modelling – CASANZ, 2011
	Diploma of Project Management – University of New England, 2012

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APPENDIX I

Construction Traffic Management Plan

Construction Traffic Management Plan

Proposed Industrial Development

Warehouse 1 (CEVA) - Lot 54 – 58 Mamre Road, Kemps Creek
14/02/2023
P2083r01

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Document Control

Project No	2083
Project	Lot 1-5, DP 1285305, Mamre Road, Kemps Creek - Construction Traffic Management Plan
Client	Mirvac
File Reference	P2083r01v7 CTMP_WH1 Lot 1-5, DP 1285305 Mamre Road, Kemps Creek.docx

Revision History

Revision No.	Date	Details	Author	Approved by
-	11/11/2022	Draft	A. Ji	J. Laidler
I	06/12/2022	Issue	A. Ji	J. Laidler
II	07/12/2022	Issue	A. Ji	J. Laidler
III	22/12/2022	Issue	A. Ji	J. Laidler
IV	16/01/2023	Issue	A. Ji	J. Laidler
V	1/02/2023	Issue	A. Ji	J. Laidler
VI	13/02/2023	Issue	A. Ji	R. Bulter-Madden
VII	14/02/2023	Issue	A. Ji	R. Bulter-Madden

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Contents Continued

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APPENDICES

Appendix F. Initial Vehicle Management Plan (VMP)

1 Introduction

1.1 Introduction

Ason Group have been engaged by Richard Crookes Construction to prepare a Construction Traffic Management Plan (CTMP) for the construction of Warehouse 1, Lot 1 of the Aspect Industrial Estate (AIE), located at Lot 54 – 58 Mamre Road, Kemps Creek (the Site).

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

A separate CTMP has been prepared in relation to broader infrastructure and estate works. This Plan relates to construction of Warehouse 1 only but has regard for the cumulative impact of preceding construction activities in relevant sections below.

1.2 Project Representatives & Stakeholders

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

- James Laidler: Ticket No. 0052158569

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

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

TABLE 1: PROJECT REPRESENTATIVES AND STAKEHOLDERS

Name	Organisation	Role
Vesna Kocovic	Richard Crookes	Design Manager
Dean Quarisa	Richard Crookes	Project Manager
James Laidler	Ason Group	Senior Traffic Engineer

1.3 Project Details

This project relates to the construction of Warehouse 1 within the broader estate. It is not expected that any other works are associated with this CTMP.

Figure 1: Site Overview & Limit of Works

1.3.1 Proposed Construction Activity / Works

The proposed construction activities for Warehouse 1 is expected to begin in November 2022 and will generally be completed over a duration of 9 months, subject to authority approvals and inclement weather delays. The description of works is seen below. Construction shall not commence until the CTMP required by Condition D1 is approved.

TABLE 2: STAGING AND DURATION OF WORKS

Stage	Duration	Description
Warehouse 1, Lot 1	9 Months	Construction of new 34,000m^2 warehouse and 900m^2 office space

1.3.2 Site Location

The Site is located within Aspect Industrial Estate (AIE) on Lot 54 – 58 Mamre Road, Kemps Creek which is legally known as Lot 54-58 in DP 259135. The Site has an area of approximately 6.1 hectares (ha) and is positioned approximately 4 km north-west of the future Western Sydney International (Nancy-Bird Walton) Airport (WSA), 13 km south-east of the Penrith CBD and 40 km west of the Sydney CBD.

The AIE has a direct frontage to Mamre Road of approximately 950 metres with a proposed intersection providing vehicular access via Mamre Road to the M4 Motorway and Great Western Highway to the north and Elizabeth Drive to the south. Access to Site is provided via internal access roads connecting to Mamre Road, with heavy vehicle access available from Access Road 1 and 2, and light vehicle access available from Access Road 2.

The location of the Site is presented below in **Figure 2**.

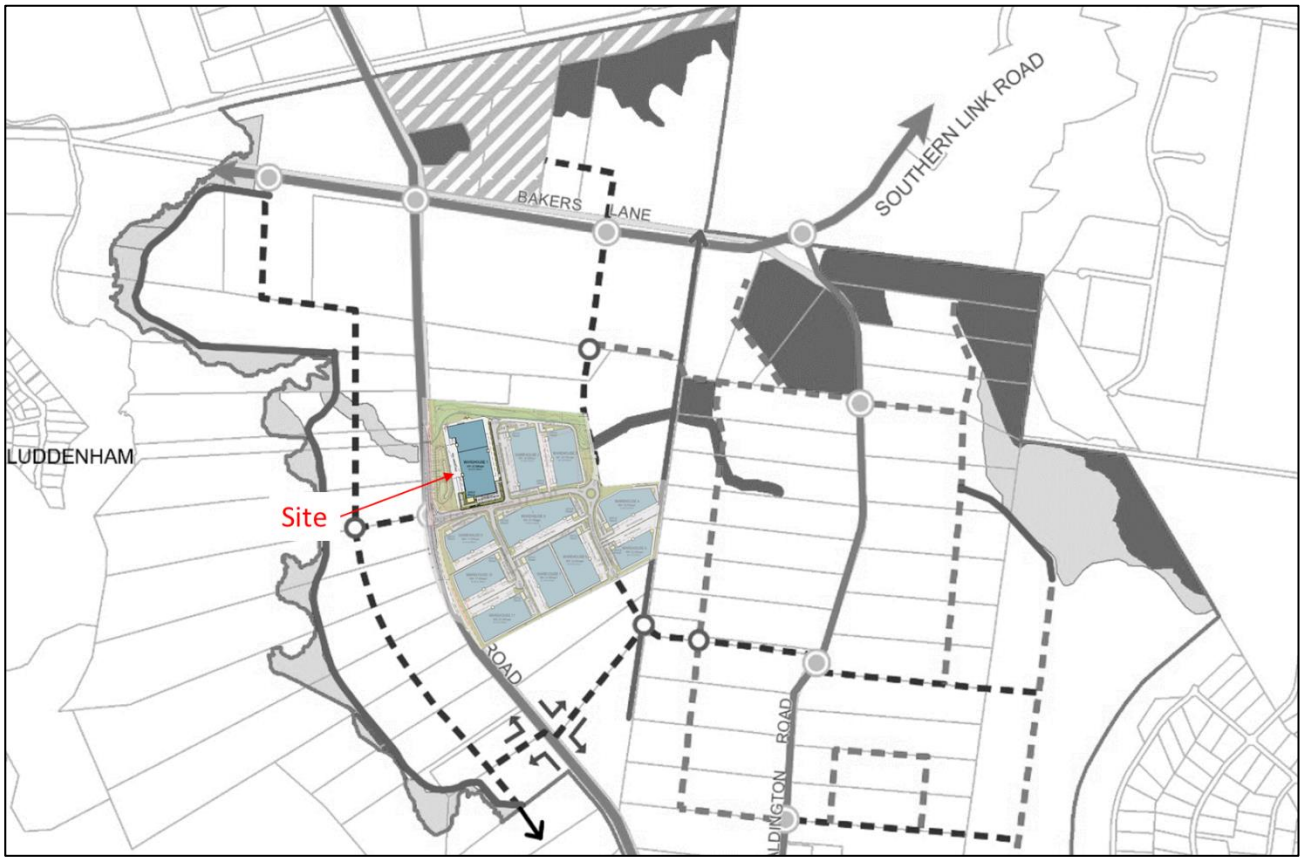


Figure 2: Site Location

1.4 Authority Requirements

The planning requirements include the conditions set out in the approved Development Consent (SSD 10448) dated 24 May 2022 and the mitigation/management measures outlined in the EIS.

The planning requirements and the corresponding traffic and access management measures applicable to Traffic Management for the Project are listed below in **Table 4**. Legislative and other requirements applicable to all aspects of the project are included in Section 3.3 of the CEMP.

1.4.1 Secretary's Environmental Assessment Requirements

Secretary's Environmental Assessment Requirements (SEARs, dated 30 April 2020) have been received from the Department of Planning and Environment (DPE); these include general SEARs provided by DPE, as well as more detailed SEARs provided by TfNSW, a number of which speak directly to the scope of work required in this CTMP.

A summary of the TfNSW SEARs is provided in **Table 3** below; where relevant, Ason Group has provided a summary response to each SEAR, and reference to the section of this CTMP providing a more detailed assessment of each SEAR.

TABLE 3: RESPONSE TO TFNSW REQUIREMENTS

Condition No.	Requirement	Response
1.11	The preparation of a preliminary Construction Pedestrian and Traffic Management Plan (CPTMP) to demonstrate the proposed management of the impact in relation to construction traffic addressing the following:	Noted.
1.11.1	Assessment of cumulative impacts associated with other construction activities (if any);	This CTMP has considered the cumulative construction impacts of future development across the Mamre Road Precinct, including the Mamre Road Upgrade and key connections to the existing and future regional road network. This is discussed further in **Section 3.3** It is noted that TfNSW has recently commenced a detailed traffic modelling assessment of the broader Mamre Road Precinct; the outcomes of this assessment will be instrumental to future revisions to this CTMP, as required.
1.11.2	an assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity;	An assessment of the existing crash data is provided in **Section 1.5.2.** An assessment of potential heavy vehicle impacts is provided in **Section 3.** As heavy vehicles will only utilise TfNSW Restricted Access Vehicle routes - routes which have little pedestrian activity – there is no expectation of any impacts on pedestrian safety.
1.11.3	details of construction program detailing the anticipated construction duration and highlighting significant and milestone	See **Section 2.1**.

	stages and events during the construction process;	
1.11.4	details of anticipated peak hour and daily construction vehicle movements to and from the site;	See **Section 3.2.**
1.11.5	details of on-site car parking and access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicle;	See **Section 2.7** and **Section 3.7**. Emergency Vehicle access has also been outlined within **Section 2.7,** with a dedicated emergency vehicle parking space being maintained at all times and left vacant unless occupied by an emergency vehicle. It should be noted that parking numbers will increase as construction progresses.
1.11.6	details of temporary cycling and pedestrian access during construction	See **Section 3.8**.

1.4.2 Conditions of Consent

The following consolidated consent have been received by the Department with respect to construction traffic management following the approval of SSD-10448 MOD 2[1].

TABLE 4: SSD 10448 REQUIREMENTS

Condition No.	Requirement	Response
A9	The largest vehicle permitted to access the site is a 30 m Performance Based Standards (PBS) Level 2 Type B.	Refer to **Section 2.7**
B3	Future developments on the site must meet the following requirements:	-
c)	vehicles must not queue on the public road network;	Refer to **Section 3.6**
d)	heavy vehicles and bins associated with the development are not parked on local roads or footpaths in the vicinity of the site;	Refer to **Section 3.6**
e)	all vehicles are wholly contained on site before being required to stop;	Refer to **Section 3.6**
f)	all loading and unloading of materials is carried out on-site;	Refer to **Section 3.6**
g)	all vehicles enter and exit the site in a forward direction;	Refer to **Section 3.6**
h)	all trucks entering or leaving the site with loads have their loads covered and do not track dirt onto the public road network; and	Refer to **Section 3.6**
i)	the proposed turning areas in the car park are kept clear of any obstacles, including parked cars, at all times.	Refer to **Section 3.6**

[1] https://www.planningportal.nsw.gov.au/major-projects/projects/aspect-industrial-estate

D1	Prior to the commencement of construction of the Stage 1 Development, the Applicant must prepare a Construction Traffic Management Plan (CTMP) for the development to the satisfaction of the Planning Secretary. The plan must form part of the CEMP required by condition E2 and must:	-
a)	be prepared by a suitably qualified and experienced person(s);	Consultants from Ason Group are suitably qualified Traffic Engineers, with relevant "Prepare a Work Zone Traffic Management Plan" accreditation. Refer to **Section 1.2** for relevant qualifications.
b)	be prepared in consultation with Council and TfNSW;	Consultation has been undertaken with Penrith City Council (see **Section 1.4.3** and **Appendix E**). The CTMP was also submitted to TfNSW on 11 December 2022 for review. TfNSW subsequently provided concurrence to the CTMP on 10 February 2023, subject to a number of conditions (see **Section 1.4.4** and **Appendix E)**. It is noted that consultation has been previously undertaken for the construction of the internal road network. This CTMP builds off that report.
c)	detail the traffic management and contingency measures that are to be implemented for the site, particularly during the Mamre Road/Access Road 1 intersection works to ensure access to the site and road safety and network efficiency is maintained, including interim traffic safety controls and management measures;	Refer **Section 3.4** with regard to impacts to traffic efficiency. This concludes that the construction traffic will not have a detrimental impact on the network. Furthermore, Traffic Guidance Schemes (TGSs) shall be developed for all works impact public roads and approved by the TfNSW Traffic Management Centre.
d)	detail heavy vehicle routes, access, and parking arrangements;	Site access arrangements – relevant to each stage – are outlined in subsequent sections of this report (Refer **Section 2.3**).
e)	include a Driver Code of Conduct to: i) minimise the impacts of earthworks and construction on the local and regional road network; (ii) minimise conflicts with other road users; (iii) minimise road traffic noise; and (iv) Ensure truck drivers use specified route	A Driver Code of Conduct is a requirement of and included in **Appendix A** of this CTMP. The Driver Code of Conduct addresses ways to minimise the impacts on the road network, with other road users, ensure truck routes are utilised and to manage pedestrian
f)	include a program to monitor the effectiveness of these measures; and	The Contractor shall include a program to monitor the effectiveness of the measures. Deliveries will be tracked against approved volumes and will keep a vehicle log – including vehicle registration number and time of entry – for the purpose of assessing the effectiveness of these monitoring programs. These programs will be completed in accordance with **Section 4.1** and **Table 19**
g)	if necessary, detail procedures for notifying residents and the community (including local schools), of any potential disruptions to routes.	The Contractor will notify the community liaison representative when traffic conditions are expected to exceed parameters with within Condition Green of Table 20. Measures that

		may be included within the strategy have been identified within **Section 4.1** and **Section 4.4**. Meetings are to be undertaken on a regular basis to keep key stakeholders informed of any upcoming events. Refer to overarching CEMP document as per E1 a) below.
D2	The Applicant must:	-
a)	not commence construction until the CTMP required by condition D1 is approved by the Planning Secretary; and	Noted and reiterated in **Section 1.3.1**.
b)	implement the most recent version of the CTMP approved by the Planning Secretary for the duration of construction.	Refer **Section 4.1** of this Plan which outlines requirement for this Plan to be updated regularly.
D20	The Applicant must provide sufficient parking facilities on-site, including for heavy vehicles and for site personnel, to ensure that traffic associated with the development does not utilise public and residential streets or public parking facilities.	Refer to **Section 3.7** with regard to contractor and heavy vehicle parking. Parking for construction vehicles will be made available on-site. This will be managed by the individual contractors engaged to perform the works with the location being dependent on the works being undertaken at the time.
D55	During construction, the Applicant must ensure that:	-
b)	all trucks entering or leaving the site with loads have their loads covered	Refer to **Section 3.6**
c)	trucks associated with the development do not track dirt onto the public road network	Refer to **Section 3.6**
d)	public roads used by these trucks are kept clean; and	Refer to **Section 3.6**
E1	Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	-
a)	detailed baseline data	Refer to **Section 4** Details further to this condition have been outlined within the overarching CEMP prepared by SLR
b)	Details of (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) any relevant limits or performance measures and criteria; and (iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Refer to **Section 4.** Otherwise, the statutory requirements have been outlined within Section 3.3 of the overarching CEMP, prepared by SLR, and provided separately.
c)	a description of the measures to be implemented to comply with the relevant	Refer to **Section 4**. Otherwise, the environmental management commitments have been outlined within

	statutory requirements, limits, or performance measures and criteria;	Section 4 of the overarching CEMP, prepared by SLR, and provided separately.
d)	a program to monitor and report on the: (i) impacts and environmental performance of the development; and (ii) effectiveness of the management measures set out pursuant to paragraph above;	Refer to **Section 4**. Otherwise, all aspects of the monitoring and reporting for the project have been outlined within Section 5 of the overarching CEMP, prepared by SLR, and provided separately.
e)	a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Refer to **Section 4.3** Otherwise, contingency management plan for the project has been outlined within Section 5.4 of the overarching CEMP, prepared by SLR, and provided separately.
f)	a program to investigate and implement ways to improve the environmental performance of the development over time;	Refer to **Section 4.1** Otherwise, the review and improvement of the environmental performance against the project have been outlined within Section 6 of the overarching CEMP, prepared by SLR, and provided separately.
g)	protocol for managing and reporting any: (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria); (ii) complaint; (iii) failure to comply with statutory requirements; and	Refer to **Section 4.2.1** for the management of incidents, **Section 4.4** (**Table 23**) for complaint management and **Section 4.3** for compliance management Details further to this condition have been outlined within the overarching CEMP prepared by SLR
h)	a protocol for periodic review of the plan.	Refer to **Section 4.1** Details further to this condition have been outlined within the overarching CEMP prepared by SLR
Appendix 5	Preparation of a CTMP to form part of the CEMP addressing issues such as: - Track Haulage routes, delivery schedules and curfews; - Protocols for the management of construction traffic moving onto and off the site.	The site access, haulage routes, schedules and time curfews – relevant to the project – are location within Section 2.3, 2.2, 2.7, 3.6, and Section 3.7 of this report..

The planning requirements include the conditions set out in the Infrastructure Approval (SSI 9471) dated 24 May 2022 and the mitigation/management measures outlined in the EIS.

The planning requirements and the corresponding traffic and access management measures applicable to Traffic Management for the Project are listed in Table 4 (SSD-10448 Requirements). Legislative and other requirements applicable to all aspects of the project are included in Section 3.3 of the CEMP.

1.4.3 Penrith City Council Consultation

Comments were provided by Penrith City Council on 21 December 2022. The relevant comments received, as well as the Ason Group responses to each, are summarised in the table below.

TABLE 5: RESPONSE TO COUNCIL COMMENTS

No.	Comment	Response
1	The delivery of oversized plant or structures that require special arrangements to transport along public roads will require approval from National Heavy Vehicle Regulator (NHVR) and Council.	Noted. This is acknowledged further in **Section 2.2**.
2	The access during construction shall be restricted to left-in and left-out until the proposed signals at the intersection of Mamre Road and Access Road becomes operational.	Noted, the access to and from the Site onto Mamre Road will be restricted to left-in-left-out (LILO) movements until the proposed signalised intersection becomes operational. Truck access routes during construction are discussed in **Section 2.3**. Interim site access layout is detailed in **Section 2.7.1.**
3	The largest vehicle which is to access the site via the temporary access driveway during construction should be restricted to 20m Articulated Vehicle (AV).	As per **Section 2.7.1**, the maximum sized vehicles utilising the temporary access would be 20m AVs.
4	Temporary traffic control measures on public road/road related area under the care and control of Penrith City Council will require obtaining Road Occupancy Permit (ROP) from the Council. Any excavation and/or road opening works on public road/road related area will require obtaining a Road Opening Permit from Council.	Noted. This is detailed in **Section 2.8**.

1.4.4 TfNSW Consultation

The CTMP was submitted to TfNSW for review on 11 December 2022. TfNSW subsequently provided concurrence to the CTMP on 10 February 2023, subject to a number of conditions. The conditions provided by TfNSW are standard requirements for construction and will be adhered to during the lifetime of this CTMP. Conditions received, as well as the responses to each, are summarised in **Table 6**.

The TfNSW correspondence is provided in **Appendix E**.

TABLE 6: RESPONSE TO TFNSW COMMENTS

No.	Comment	Response
1	Transport for NSW (TfNSW), Greater Sydney Division has reviewed the CTMP and endorse the proposed temporary construction arrangements, subject to the following conditions:	Noted. It is confirmed that the temporary LILO as approved under TfNSW WAD SYD19/01350 and presently under construction, will be completed and operational prior to commencement of construction activities

	A prerequisite for approval of this CTPM, the proponent is to implement the temporary Left in Left Out (LILO) arrangement, prior to commencement, as approved by the deed.	involved with Warehouse 1, as approved under SSD-10448 Mod 2.
2	Proponent is to obtain separate approval of the Traffic Signal Plan by TfNSW Greater Sydney Customer Journey Planning, Network Operations.	Noted, however, this is not applicable to Warehouse 1 construction activities. No traffic signals are proposed as part of the temporary LILO intersection as approved under TfNSW WAD SYD19/01350. It is excepted this relates to the signalised intersection, which is subject to a separate construction process.
3	Any Traffic Guidance Schemes (TGS) prepared are to comply with AS1742.3 and Transport for NSW's "Traffic Control at Worksites" manual and be signed by a person with TfNSW certification to prepare a TGS.	Noted.
4	Proponent must apply and obtain approval from the Transport Management Centre for a Road Occupancy Licence (ROL) for any required lane closures and/or Speed Zone Authorisations as part of the ROL that may impact the state road network or is within 100m of traffic signals.	Noted.
5	Access to be maintained for residents, businesses and emergency vehicles at all times.	Noted.
6	No marshalling or queuing of construction vehicles is to occur on public roads. Arriving vehicles that are not able to use parking bay/work zone must continue to a holding point until space becomes available.	Noted.
7	When heavy vehicles are entering or leaving the site a traffic controller is to be provided to manage any conflicts between pedestrians and heavy vehicles.	Noted.
8	Transport for New South Wales reserve the right to alter the CTMP Conditions at any time to maintain safe and efficient traffic and pedestrian movements in this area.	Noted.
9	Any approved Works Zone should only be used for work activities. No infrastructure, including bins, tanks or traffic control equipment should be left on the road when the works zone is not in use by a vehicle. All non-vehicular items must be contained with the work area and not on the carriageway. When a work zone is not in use, the area/lane must be opened up to allow for normal trafficable conditions.	Noted.
10	Should TfNSW Network and Asset Management, Network Operations, CJP Operations, Network and Safety or other TfNSW business area determine that that more information is to be provided for review and acceptance, including other TCS locations, this information must be submitted prior to the CTMP being implemented, or otherwise agreed upon.	Noted.

11	Any traffic control devices, including signage and line marking, should be installed by the proponent and must conform with Australian Standards 1742.	Noted.
12	Endorsement of the CTMP is not an approval to the type of traffic management or delineation devices used, nor is it an approval to any traffic guidance schemes depicted within the CTMP. It is assumed that the proponent has used type approved devices and has developed its traffic guidance schemes in accordance with the relevant Australian Standards and Guidelines. The proponent is to ensure local residents, businesses, schools and other stakeholders in the affected area as well as emergency service organisations are notified of the changes associated with the CTMP, prior to its implementation.	Noted.
13	Please ensure this CTMP is shared and adhered to by all contractors. If the CTMP changes, please forward a copy to Developments.CJP@transport.nsw.gov.au or further review and endorsement.	Noted.

1.5 Site Related Data

1.5.1 Road Details

The key roads surrounding the Site are as identified within **Figure 2** and summarised in **Table 7**.

TABLE 7: LOCAL ROAD NETWORK

Road Name	Section	Speed Limit	Parking	Traffic Volumes and Peak Times	Urban / Rural
Mamre Road	Great Western Highway and M4 & Elizabeth Dr	80 km/hr	No	AM Peak: 1,391[1] veh/hr PM Peak: 1,541[1] veh/hr	Urban
Erskine Park Road	Mamre Rd & M4	70 km/hr	No	-	Urban
Bakers Lane	Mamre Rd & Aldington Rd	60 km/hr (40 km/hr during school peaks)	No	-	Urban
Elizabeth Drive	M7 & The Northern Rd, Hume Highway & Mamre Rd	80 km/hr	No	2021 ADT: 26,516[2] veh/day	Urban

Notes: 1) According to Ason Group surveys conducted in 2018 on Mamre Road north of Bakers Lane W
2) Transport for NSW Traffic Volume Viewer

1.5.2 Crash History

A review of TfNSW's crash database has been undertaken to establish the crash history in the vicinity of the Site; the crash history for the 5-year period 2017 to 2021 (inclusive) is outlined below in **Table 8**. Of those crashes, the ones that occurred near the Site can be seen below.

TABLE 8: CRASH HISTORY

Year	Location	RUM Code[1]	Injury/Death
2017	Mamre Road, North of Site	39 – Other Same Direction	nil
2017	Mamre Road, North of Site	32 – Right Rear	nil
2017	Mamre Road, South of Site	20 – Head On	2 Killed 8 Injured
2017	Mamre Road, South of Site	49 – Other Manoeuvring	2 Injured
2019	Mamre Road, North of Site	30 – Rear End	4 Injured
2020	Mamre Road, South of Site	20 – Head On	1 Killed 1 Injured
2020	Mamre Road, South of Site	20 – Head On	2 Injured

Source: TfNSW Crash Statistics Website

These crash statistics show that 2 fatal crashes occurred on Mamre Road between 2017 and 2021.

1.5.3 Vulnerable Road Users

Vulnerable road users (VRU) are road users not in a car, bus or truck. In the event of a crash, VRUs have little to no protection from crash forces, therefore, need to be addressed within this CTMP. Provides context to VRUs surrounding the Site.

TABLE 9: PUBLIC AND ACTIVE TRANSPORT

Road Name	Pedestrian	Cycling	Public Transport
Mamre Road	No	Yes Within shoulder	None close to Site
Erskine Park Road	Yes Footpath Width = 2.6 m	Yes Bike trail	Yes Bus Stops
Bakers Lane	No	Yes Within shoulder	No
Elizabeth Drive	No	Yes Within shoulder	Yes Bus Stops

1.6 Stakeholder Engagement

1.6.1 Stakeholder Engagement Plan

Richard Crookes has consulted with required stakeholders regarding construction schedules and trucks routes and will raise any further conflicts with stakeholders at the earliest time. The Mamre Road Precinct Working Group (MRPWG) is a dedicated forum to consult with key stakeholders, and provides a platform to discuss programmes, impacts and any outcomes from previous engagements.

Engagement has been undertaken per Section 1.6.2 and is considered closed, as per evidence of engagement within **Appendix E.**

1.6.2 Stakeholder Notification

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

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

TABLE 10: STAKEHOLDER CONSULTATION ACTIONS

Stakeholder	Action
TfNSW	Mirvac to submit CTMP to stakeholder. Mirvac to liaise with stakeholder to address comments and re-submit final CTMP
Penrith City Council	Mirvac to submit CTMP to stakeholder. Mirvac to liaise with stakeholder to address comments and re-submit final CTMP
Transport Management Centre (TMC)	Tied to consultation with TfNSW. Any consultation will be undertaken in tandem with TfNSW.

2 Proposed Works and Staging

2.1 Overview of Works

The works proposed are to ensure the construction of Warehouse 1 at Lot 54 – 58 Mamre Road, Kemps Creek. The stages of works are shown in **Table 11**. It is estimated that the total duration of the construction works will be approximately 9 months from the commencement date.

TABLE 11: WAREHOUSE 1 CONSTRUCTION WORKS SUMMARY

Criteria	Response
Description of Key Activities	Construction works (Feb-23 to Aug-23)
Max. Vehicle Size	19m semi-trailers
Vehicle Movement Frequency	Approximately: 272 light vehicle movements / day + 184 heavy vehicle movements / day
Truck Access Requirements	All vehicles shall access via Mamre Road. Initial access shall be via the temporary construction access until such time as the Estate Roads and future signalised intersection are provided, whereby access will be provided through Access Road 1 and Access Road 2.
Vehicle access / egress in a forward direction (Y / N)	Y
Out of Hours Deliveries (Y/N)	N[1]
Contractor Parking	Y – a designated parking zone for site workers will be established on site to avoid any parking in the estate roads
Pedestrian Control	Y – a combination of the existing chainwire boundary fence and temporary fence panels will be used on site for pedestrian protection and control
Public Transport Services Affected	N
Road Occupancy Requirements (if yes, provide further details)	N
Lane or Footpath Closures (if yes, provide further details)	N[2]
Traffic Control Plan	Refer below.

Notes: 1) Out of hours deliveries will be coordinated in accordance with the Conditions of Consent.

2) All verge and road works in future public road reserve to be completed as part of separate construction package; subject to a separate CTMP.

2.2 Construction Hours

Based on the information provided to Ason Group, a summary of the construction hours is shown in **Table 12** which is in accordance with the Council guidelines and SSD approvals:

TABLE 12: HOURS OF WORK

Activity	Day	Time
Construction of Warehouse 1	Monday – Friday Saturday	7 am to 6 pm 8 am to 1 pm

No work Sundays or Public Holidays.

It is anticipated that construction works will not be conducted outside of the hours outlined above. Should out-of-hours work be required, Richard Crookes will lodge an application for an Out of Work Hours Permit with Penrith City Council to seek approval for these works. The type of works that might be undertaken outside the recommended standard hours are:

- The delivery of oversized plant or structures that police or other authorities determine require special arrangements to transport along public roads
- Emergency work to avoid the loss of life or damage to property, or to prevent environmental harm
- Maintenance and repair of public infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours
- Public infrastructure works that shorten the length of the project and are supported by the affected community
- Works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours.

Condition 42 of the Conditions of Consent outline that Works outside of the hours identified in condition may be undertaken in the following circumstances:

- Works that are inaudible at the nearest sensitive receivers;
- Works agreed to in writing by the Planning Secretary;
- For the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or
- Where it is required in an emergency to avoid the loss of lives, property or to prevent environmental harm.

2.3 Truck Routes

It is expected that all heavy vehicles will access the Site via the approved TfNSW Restricted Access Vehicles (RAV) Map for 26 m B-Double Access. The construction access shall be restricted to left-in-left-out until the signals are operational; the construction access routes on this basis are shown in **Figure 3**. Construction access will be via the approved heavy vehicle routes once the signalised intersection is complete.

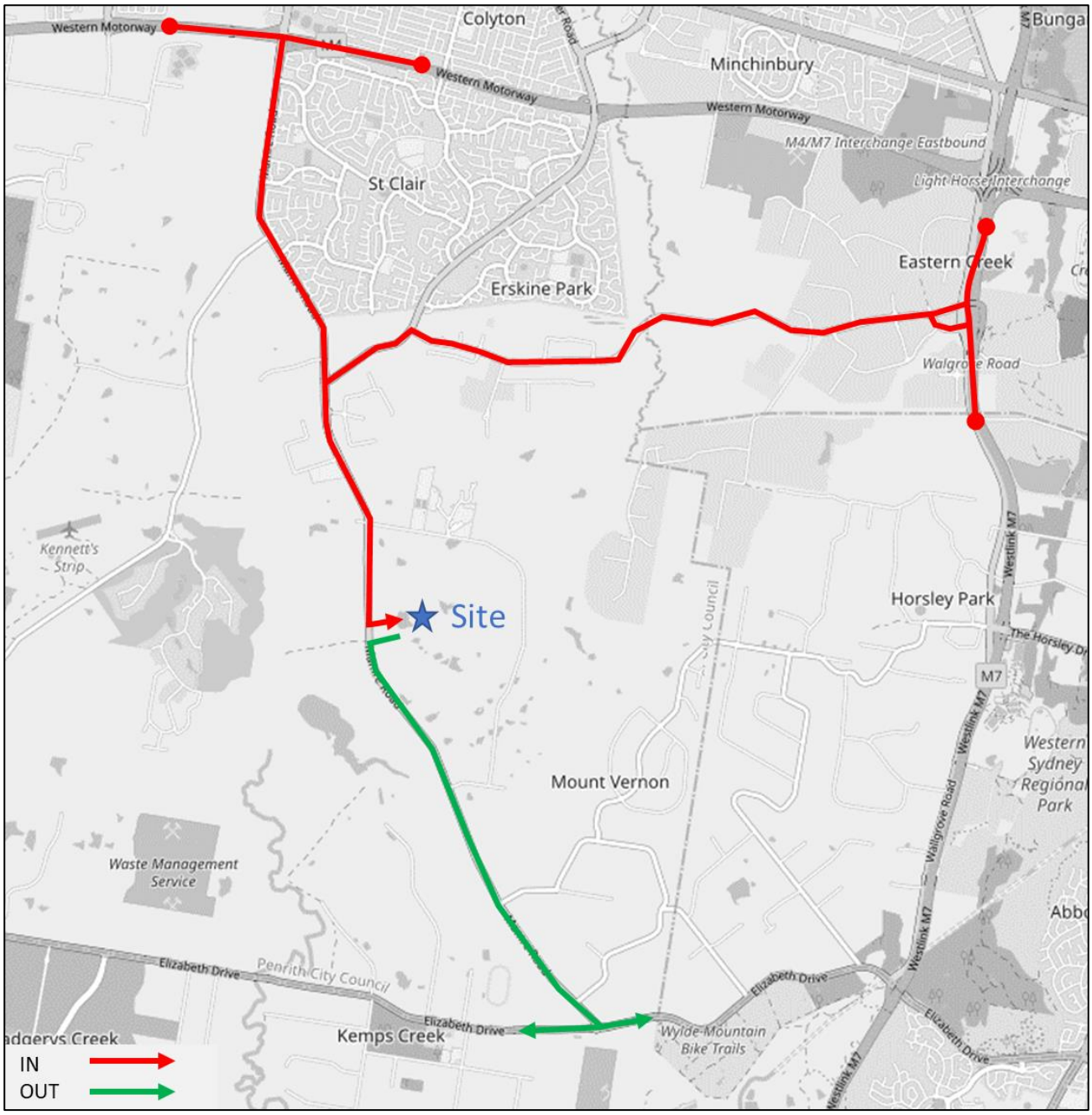


Figure 3: Construction Vehicle Route Map

- Arrival Trips:
  - Route 1: From M4 Western Motorway, southbound along Mamre Road and left into the Site.
  - Route 2: From Westlink M7, westbound on Old Wallgrove Road, Lenore Drive and Erskine Park Road, then south along Mamre Road and left into the Site.
- Departure Trips:
  - Route 1: From the Site, left onto Mamre Road then south to Elizabeth Drive and left to the M7 Motorway and sub-regional routes to the east.
  - Route 2: From the Site, left onto Mamre Road then south to Elizabeth Drive and right to Badgerys Creek and The Northern Road to the west.

A copy of the approved routes will be distributed by the Contractor to all drivers before their arrival to Site. No trucks are to be queued on local roads. Mobile phones, two-way radios or application-based solutions should be used to coordinate truck arrivals.

As can be shown in **Figure 4**, the TfNSW Restricted Access Vehicles (RAV) Map illustrates that b-doubles are capable of traveling to and from the Site within approved routes.

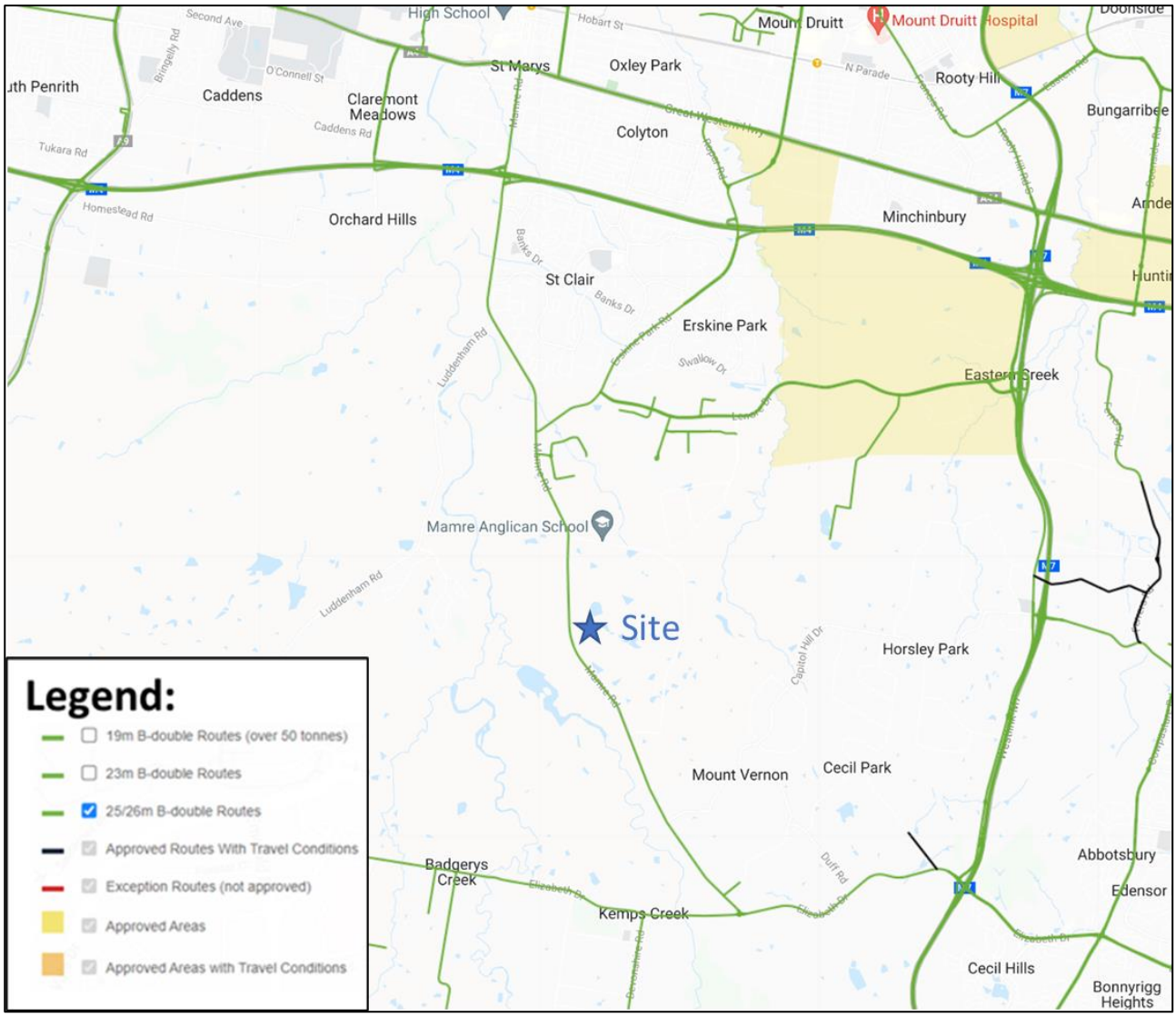
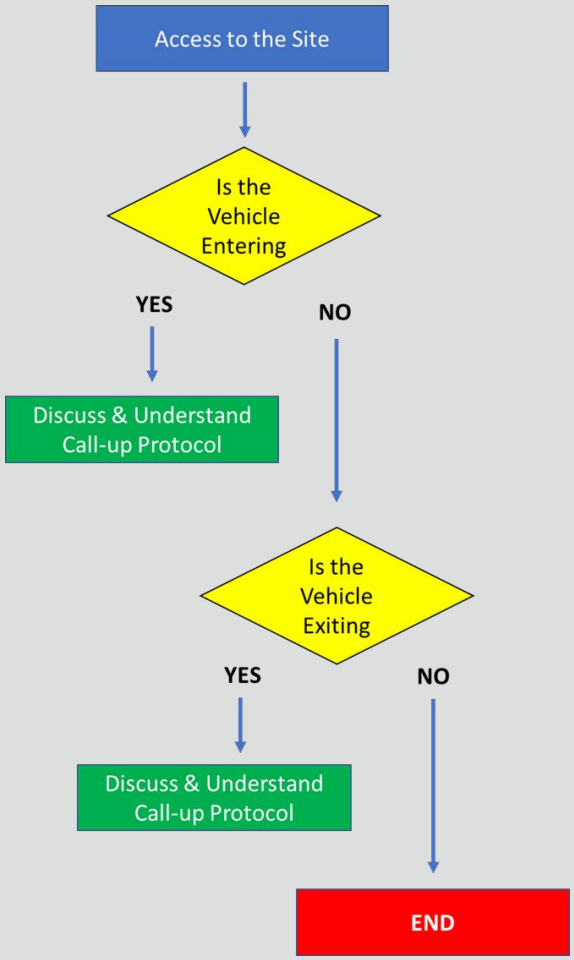


Figure 4: Restricted Access Map

2.4 Temporary Traffic Management Method

Traffic management shall be undertaken in accordance with the methodology outlined within the TGS, **Table 13** and attached within **Appendix C.** All road users are expected to be directed around the worksite in order to physically separate the road user from any hazards within the worksite.

TABLE 13: ACCESS PROTOCOLS & METHODOLGY

Procedure	Responsibility	Notes
	Site Manager / Foreman / Traffic Controller	**ENTRY PROTOCOL:** Via UHF radio, channel agreed at pre-start 1. Vehicle to advise gate controller when 200m from gate via UHF — vehicle to ensure flashing lights are on 2. Vehicle advises of metres from gate in 50m lots (i.e., 150 m from gate 100m from gate). 3. Gate Controller advises safe to enter, vehicle enters site and decelerates behind barriers 4. If not safe to enter, vehicle is to continue driving and not stop / queue on the public roadway 5. Vehicle uses road network to return and make another attempt at entering site
	Site Manager / Foreman / Traffic Controller	**EXIT PROTOCOL:** Via UHF radio, channel agreed at pre-start 1. Vehicle driver to radio Gate Controller to ensure exit is possible – vehicle to ensure flashing lights are on 2. If no issues driver to accelerate to exit gate and merge with traffic. 3. If driver cannot exit, Gate Controller to order vehicle to hold until gate is clear. **Gate Controller is not to stop traffic on the public road network**

2.5 Risk Assessment

A risk assessment is aimed to identify the hazards and risks associated with the works. The purpose of this risk assessment is to determine the controls required for the protection of the road workers and road users. A Risk assessment has been completed and is attached in **Appendix B**.

2.6 Site Contact

The key contacts for the Site during Construction have been outlined below.

TABLE 14: CONSTRUCTION CONTACT LIST

Role	Name	Company	Contact
Project Principal	Daniel Brook	Mirvac	0421 128 584 Daniel.brook@mirvac.com
Contractor Project Manager	Dean Quarisa	Richard Crookes Constructions	0437 405 636 QuarisaD@richardcrookes.com.au
Contractor Environmental Representative	Vesna Kocovic	Richard Crookes Constructions	0499 568 905 Kocovicv@richardcrookes.com.au
Contractor Work Health and Safety (WHS) Coordinator	Mark Mackey	Richard Crookes Constructions	0428 145 220 mackeym@richardcrookes.com.au
Project Environmental Representative	Maurice Pignatelli	OptimE	0407 493 176 maurice@optimenv.com.au
Principal's Environmental Consultant	Carl Vincent	ERSED	0424 203 046 carl.vincent@ersed.com.au
Communications and Community Liaison Representative	Alanna Ryan	SLR	02 4037 3258 aryan@slrconsulting.com

The list of key contacts shall be provided within the site induction to all staff and contractors, as well as be posted on the site shed. Consideration should also be given to presenting this list of contacts within the project's website.

2.7 Site Access

2.7.1 Interim Access

All access to the Site by construction personnel will be to/from Mamre Road via a temporary access driveway, reference TfNSW Work Authorisation Deed (WAD) DS2022 / 000659.

Condition A9 of the Conditions outline that

The largest vehicle permitted to access the site is a 30 m Performance Based Standards (PBS) Level 2 Type B.

The largest vehicle which is proposed to access the Site via this intersection would be a 20 m Articulated Vehicle (AV), which the temporary access driveway is designed to accommodate. Further, construction management protocols require that any vehicle entering the site access road will have right of way in order to ensure that there is no queuing on Mamre Road.

As outlined earlier, the access to and from the Site onto Mamre Road will be restricted to left-in-left-out (LILO) movements until the signalised intersection becomes operational. This LILO access is illustrated in **Figure 5**.

Access to emergency vehicles shall be maintained at all times. An emergency vehicle parking space will be maintained at all times and left vacant unless occupied by an emergency vehicle.

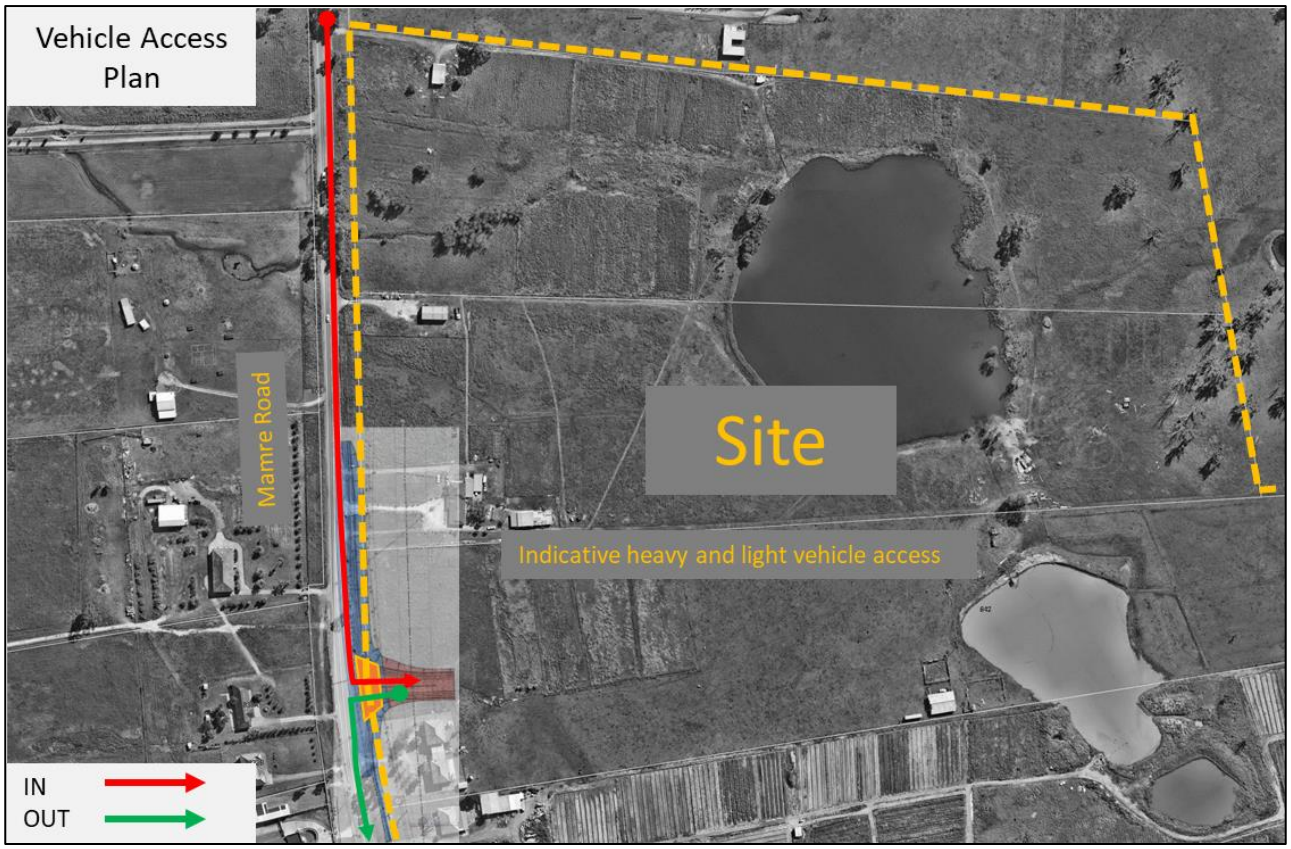


Figure 5: Site Access

It is noted that the temporary Site access has been approved under the TfNSW Work Authorisation Deed (WAD). Layout of the interim intersection is shown in reduced scale below.

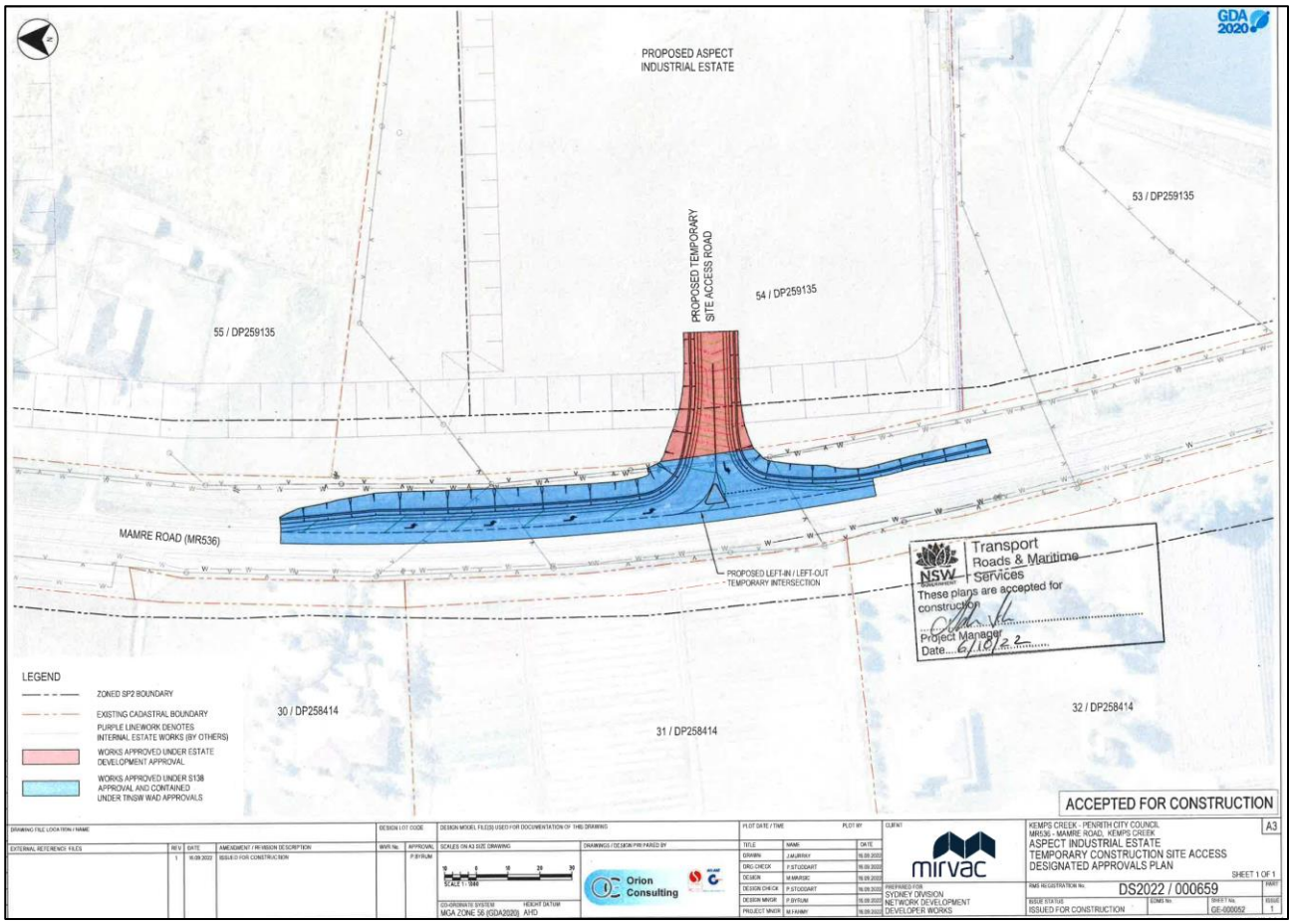


Figure 6: Approved temporary intersection layout under TfNSW WAD

2.7.2 Ultimate Access

Following the completion of the internal road network, all access to Warehouse 1 shall be from Access Road 1 and/or Access Road 2, as outlined below.

Figure 7: Ultimate Access Construction Vehicle Access Route

2.8 Works Zone

No Work Zone is required as it relates to the construction of Warehouse 1, all construction works will occur within Site boundary of Lot 1.

In the event that the implementation of further temporary traffic control measures on public road/road related area the contractor will obtain a Road Occupancy Permit (ROP) from the Penrith City Council, and in accordance with Condition E1(b)i). If excavation and/or road opening works on a public road is required, the contractor will obtain a Road Opening Permit.

3 Traffic Management

3.1 Approved Volumes

The traffic report (Ason Group Ref: 1029r04) supporting the Concept Plan, outlined the following relevant figures with regard to future operational traffic volumes associated with the Site:

- AM Peak: 577 movements per hour (movements, in & out combined)
- PM Peak: 602 movements per hour (movements, in & out combined)

For the purpose of this report, 1 truck is equal to 1 inbound movement plus 1 outbound movement which equals to a total of 2 movements.

3.2 Construction Vehicle Traffic Generation

3.2.1 Other Estate Works

For the assessment of the construction vehicle with reference to traffic report (Ason Group Ref: 1029r05v9) supporting the construction traffic management of the AIE, the approved AIE CTMP report nominates the following maximum construction vehicle generation associated with current works:

- 564 movements per day, with a maximum of 160 movements in either peak period

3.2.2 Warehouse 01 Construction Traffic

The anticipated vehicle movements generated by the construction of Warehouse 1 have been estimated having consideration of the likely requirements for construction staff, plant, equipment, and haulage. The anticipated construction schedule has been provided by the contractor, with the estimated peak daily construction traffic volumes are as follows:

- 272 Light Vehicle Movements per day
  (up to 20 & 30 movements in the AM & PM Peak Periods respectively)
- 184 Heavy Vehicle Movements per day
  (up to 30 & 0 movements in the AM & PM Peak Periods respectively)

Therefore, the expected maximum daily construction vehicles generation is:

- Up to 456 vehicle movements per day,
  (with a maximum of 50 movements in either peak period).

As such, it is shown that construction traffic will be less than the approved AIE CMTP construction traffic as well as the Site future operational traffic, and will therefore not have any unacceptable impacts on the surrounding road network more broadly.

Notwithstanding a further breakdown of trip distributions has been assessed as follows.

- Vehicle Split:
  - Light Vehicle: 69% of total traffic
  - Heavy Vehicle: 31% of total traffic

3.2.3 Cumulative Construction Traffic

Noting the construction of the internal road network and signalised intersection will still be underway whilst the construction of Warehouse 1 begins, it is important to determine the cumulative volumes as a result of both activities.

The following table outlines the expected construction volumes for the signalised intersection and internal works within the Site.

TABLE 15: DAILY FORECAST CONSTRUCTION VOLUMES

Development	Approved Volumes	Forecast Construction Volumes[1]	Difference
Internal Road Works	7,310	564	-6,280
Warehouse 1 Works		456	
Signalised Intersection Works		10	
Total	7,310	1,030	-6,280

3.3 Construction Traffic Impacts

The maximum of 50 vehicle movements during either peak period would not create any unacceptable traffic impacts to the surrounding road network.

Cumulative traffic volumes, as shown in Table 15, are significantly lower than the approved volumes, which suggests that the cumulative construction shall not create any unacceptable traffic impacts to the road network. As such, the infrastructure designed is sufficient to cater for the proposed traffic volumes.

Furthermore, noting that construction works for the signalised intersection shall be underway during the construction works of the Site, the contractor for each project shall liaise regularly in order to avoid any conflict of large deliveries and to ensure that the cumulative construction impacts are minimised and do not exceed approved operational limits.

3.4 Impact Mitigation on Surrounding Network

The impacts of construction traffic and the mitigating measures to be implemented are outlined below.

- **Construction Traffic in Mamre Road**: Construction traffic will initially use a temporary intersection to access the work area for the works. To ensure the impacts to motorists within the area are kept to a minimum, construction traffic will be contained with the prescribed volumes, as outlined within WEM's CTMP (To be prepared by the contractor upon execution of a WAD by the DWU).
- **Management of deliveries**: The Contractor will manage deliveries to shall ensure that construction vehicles, particularly heavy vehicles, will not exceed approved limits
- **Safety During Construction**: Safety to motorists and pedestrians throughout the area will be maintained during construction through the preparation and execution of Traffic Guidance Schemes (TGS's). A range of TGS's will be incorporated to the contractor CTMPs, for each access throughout construction, to identify all reasonably foreseeable hazards, assess the hazards, and manage the hazards as best possible by either eliminating or minimising the risks. TGS's shall be monitored and updated accordingly throughout the project.
- **Reporting**: Reporting and monitoring of movements during peak periods are to be undertaken to ensure that drivers are adhering to restricted times, and to ensure that the approved traffic generation, and subsequent impacts on the road network, are in line with those approved.

In summary, based on the traffic numbers currently envisaged, the traffic impacts are considered acceptable.

3.5 Construction Traffic – Temporary Access Modelling

A temporary access shall be construction to the facilitate construction works. Therefore, to ensure the development of a comprehensive assessment, the access to the Site shall be assessed through the provision of a left-in-left-out (LILO) access. The SIDRA layout for the proposed LILO intersection captured is provided below.

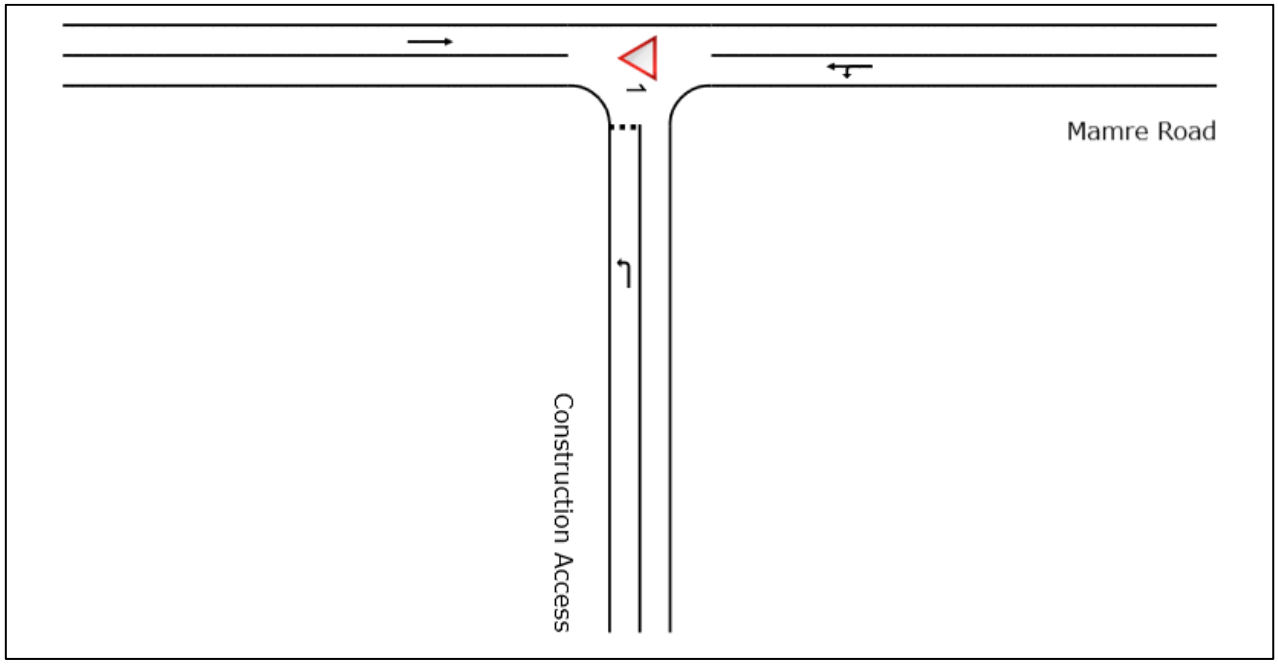


Figure 8: Interim Construction Access Layout Via Mamre Road / LILO

To ensure the development of a comprehensive baseline scenario, the cumulative impacts of both the following scenarios have been undertaken.

TABLE 16: INTERIM MODELLING SCENARIOS

Scenario	Description	Assessed Periods	Captured
1	Existing Construction Traffic	AM + PM	Surveys + 3% Growth Rate + Construction Vehicles (Intersection & internal Road Works
2	Warehouse 01 Construction Traffic	AM + PM	Scenario 01 + WH1 Construction Traffic

3.5.1 Baseline Modelling Results

The modelling results for Scenario 1 based on the implementation of base volumes are provided in the below table. Reference should be made to the full SIDRA modelling results in **Appendix D**.

TABLE 17: SCENARIO 1 – EXISTING CONSTRUCTION ACCESS

Intersection	Development Year	Period	Level of Service	Average Delay (sec)
Mamre Road / Construction Access	2022	AM	LoS A	10.2
		PM	LoS A	13.3

The above results demonstrate satisfactory performance for the intersection with a LoS of A for both the AM and PM periods, indicating that the temporary intersection contains adequate capacity for the base stage of the construction works.

3.5.2 Warehouse 01 Construction Impacts

The modelling results for Scenario 2 based on the implementation of base volumes PLUS volumes for the construction of the intersection and internal road network only. The modelling results are provided in the below table. Reference should be made to the full SIDRA modelling results in Appendix D.

TABLE 18: SCENARIO 2 – WH1 CONSTRUCTION ACCESS

Intersection	Development Year	Period	Level of Service	Average Delay (sec)
Mamre Road / Construction Access	2023	AM	A	10.2
		PM	B	16.1

The above results demonstrate satisfactory performance for the temporary construction intersection with a LoS of A in the AM peak and LoS B in the PM peak periods.

3.6 Vehicle Management

In accordance with TfNSW requirements and the Conditions of Consent, all drivers are to be familiar with the Driver Code of Conduct before attending the Site. A copy of the Code is included in **Appendix A**.

All vehicles transporting loose materials will have the entire load covered and/or secured to prevent any large items, excess dust or dirt particles depositing onto the roadway during travel to and from the site. Public roads used by construction vehicles are to be kept clean at all times. All vehicles enter and exit the site in a forward direction.

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

Vehicle movements to, from and within the site shall do so in a manner, which does not create unreasonable or unnecessary noise or vibration. No tracked vehicles will be permitted or required on any paved roads. Public roads, access points and internal parking areas will not be obstructed by any materials, unapproved vehicles, refuse skips or the like, under any circumstances. At no time shall heavy vehicles and bins associated with the development park on local roads or footpaths in the vicinity of the Site.

All vehicles are wholly contained on site before being required to stop. At no stage shall queuing or idling occur on the public road network. A schedule for deliveries of goods and materials will be established prior to that day, with Traffic Controllers to maintain radio contact with construction vehicles at all times. The anticipated deliveries will be made known to site personnel at daily prestart meetings.

3.7 Contractor & Heavy Vehicle Parking

Contractors will likely drive since there is no easily accessible public transport in close proximity to the Site. Onsite parking will be available. Suitable pedestrian connectivity shall be maintained between the work areas and this contractor parking at all times.

A dedicated area for the parking of contractor and heavy vehicles shall be developed and updated / relocated as the project progresses. The number of parking spaces provided within the Site throughout the construction will change as construction progresses, which will likely increase as construction progresses.

During each iteration of car parking location, there shall be enough parking to accommodate the expected maximum for that particular stage of (with the overall maximum being 136 light vehicles and 62 heavy vehicles).

It is expected that the location of dedicated heavy vehicle parking areas shall change as the construction of the internal road network progresses, therefore the location of parking spaces shall be outlined within the driver code of conduct and outlined within the regular toolbox meetings. Parking will be regularly monitored to ensure that no queuing onto roadway.

Notwithstanding, a Vehicle Management Plan (VMP) has been outlined within **Appendix F** to identify the access, parking and site shed for the initial phase of construction. A VMP for each stage thereafter will be prepared and distributed prior to implementation of the next phase of construction (See Section 2.1 for expected dates of each stage).

3.8 Pedestrian and Cyclist Management

Mamre Road does not have any footpaths, bicycle paths or shared paths fronting the Site.

However, in the unlikely event that there are pedestrians or cyclists needing to cross an access driveway they will be halted by an accredited Traffic Controller while construction vehicles are entering or exiting the Site. Once the construction vehicles are clear, the Traffic Controller can allow pedestrians/cyclists to continue along their journey.

3.9 Fencing Requirements

Fencing requirements will consist of fencing to the perimeter of the Site with a 1.8 m man-proof fence and temporary fence panels on the property boundary.

The fencing is to ensure unauthorised persons are kept out of the Site.

3.10 Traffic Control

As noted about in Section 3, there shall be additional works pertaining to the Site to be undertaken at the same time as the works outlined within Section 2.1.

A site-specific Traffic Guidance Scheme (TGS) is provided in Appendix C for the Site access following the completion of the temporary access.

It should be noted that an accredited Traffic Controller shall be on-site to supervise construction vehicles passing general traffic.

3.11 Authorised Traffic Controller

There is a requirement for an authorised traffic controllers to be present throughout the bulk earthworks, and construction stages of the project. The responsibilities include:

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

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

3.12 Driver Awareness & Code of Conduct

All drivers shall be made aware and adhere to the Driver Code of Conduct, outlined in **Appendix A.**

3.13 Worker Induction

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

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

4 Monitoring and Review

4.1 Monitoring Program

This CTMP shall be subject to a monthly review and will be updated accordingly. Regular reviews will be undertaken by the on-site coordinator during implementation and execution of this CTMP. Monitoring of this CTMP shall also be picked up in the Environmental checklists, with any incidents being reported within the weekly site meeting. The monitoring shall be undertaken in accordance with Condition E1(d) and Condition E1(h).

All and any reviews undertaken should be documented, however key considerations regarding the review of the CTMP shall be:

- To ensure the implementation of the CTMP and TGS's are consistent with the intent of this report, and that the most recent version of the CTMP and TGS (as approved by the Planning Secretary) is being implemented.
- Tracking deliveries against the volumes outlined within report. Deliveries will be tracked against approved volumes and will keep a vehicle log - including Rego & time of entry - for the purpose of assessing the effectiveness of these monitoring programs.

  It is expected the contractor will undertake a truck and car count/review with Mirvac to ensure volumes are within Condition Green of Table 21, and will be undertaken once a month. In addition, the Contractor is required to retain a log of all vehicles accessing the Site on a daily basis.
- To identify any shortfalls and develop an updated action plan to address issues that may arise during construction (Parking and access issues)
- To ensure TGS's are updated (if necessary) by "Prepare a Work Zone Traffic Management Plan" card holders to ensure they remain consistent with the set-up on-site.
- Regular checks to ensure all loads are entering and leaving site covered as outlined within this CTMP.

As such the table below provides triggers to monitor and review this CTMP.

TABLE 19: MONITORING & REVIEWS OF CTMP

Type of Review	Frequency	Considerations
Scheduled	The scheduled TMP review must be undertaken monthly or as specified otherwise	The scheduled CTMP review must consider the following: • CTMP and TGS are approved; • Identify required variations to the TGS, and ensure that they are updated, recorded, and approved; • Review any departures or variations of the CTMP and/or TGS to ensure they have been documented and approved; • Speed control effectiveness; and • Construction vehicle entry/egress suitability, with no queuing on the public road network at any time. • Construction vehicle daily / peak hour movements are compliant with approved volumes, with monthly reviews of the contractor's daily log book of vehicles required. • Periodic checks to ensure that heavy vehicles are using the correct access route • Periodic checks of noise generating items to ensure they are less than the prescribed 45 dBA.

Change Generated Review	The change generated review must be undertaken when implementing new traffic stages, switches, or other construction-based activities.	The change generated CTMP review must consider the following: • The work site is operating safely; • Delineation is effective with appropriate signage installed for changed conditions; • Safe passage is provided for all road users; • Road Safety Audits are arranged or confirmed as required • Accountability for approval and inspection is well understood and documented
Non-Compliance, Post Incident or Near Miss Review	The Non-Compliance, post-incident or near miss review must be undertaken following an incident or near miss.	Any non-compliance must be reported to immediately to the supervisor. A non-compliance is anything other than 'Condition Green' as outlined within Table 21. All workplace incidents must be reported immediately to the supervisor, who is to determine responsibility for investigating the incident. The incident and investigation must also be recorded in the incident reporting system of Transport The post incident or near miss CTMP review must consider: • Causal factors; • Contributory factors or changes required; and • Identified changes to TGS are completed, approved, recorded, and communicated. For any incidents or near miss (where required) a safety alert must also be prepared and distributed by the Transport project manager to share learnings with other work sites.

This monitoring process is expected to form part of the monitoring plan required to be included as part of the overarching Construction Environmental Management Plan (CEMP), of which this CTMP forms a part. The roadway (including footpath) must be kept in a serviceable condition for the duration of construction. At the direction of Council, undertake remedial treatments such as patching at no cost to Council.

4.2 Work Site Inspections, Recording and Reporting

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

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

TABLE 20: EXAMPLE REVIEW OF ACTIVITIES

Activity	`		Frequency or Details
Shift Inspections	☐ Yes	☐ No	
Regular Inspections	☐ Yes	☐ No	
TMP Review	☐ Yes	☐ No	
Road Safety Audit	☐ Yes	☐ No	
Other	☐ Yes	☐ No	
Comments			

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

4.2.1 Incident Management

For the purposes of this CTMP, an 'incident' is an occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance. Furthermore, a 'non-compliance' is an occurrence, set of circumstances or development that is a breach of the consent.

All incidents related to traffic, including those of the Principal Contractor, subcontractors, and/or visitors that occur during construction works will be managed in conjunction with the requirements outlined in Mirvac's Incident and Non-compliance Response and Handling Procedure (outlined within Section 3.5 of the CEMP).

Whilst it is noted that key Contractors will be implementing their own environmental management system procedures and processes, Mirvac will be responsible for ensuring that these systems and processes satisfy the requirements of the CEMP, including the incident management components. The Contractor will be responsible for providing all necessary documentation with regards to the incident investigation and close-out actions where required. The timing of the provision of this documentation is to align with Mirvac requirements.

Mirvac's Project Manager must be notified immediately of any environmental incident or near miss related to traffic. Such incidents may include, but not limited to:

- Vehicle crash or injury resulting from construction traffic related to the project
- Queuing onto Mamre Road, in breach of the requirements set out under this CTMP.
- Spill of any dangerous goods or hazardous substance to ground or water.
- Substantiated complaints received from members of the community or regulatory authorities relating to traffic management.
- Land-based off-site sediment loss to the environment, including sediment tracking onto the roadway.

Mirvac's Project Manager will be responsible for all notifiable environmental incidents in line with the regulatory notification requirements (outlined within Section 3.5.1 of the CEMP).

All environmental incidents will be reported immediately to DPE in writing via the Planning Portal after Mirvac becomes aware of the incident, as per Condition E10 of the conditions. Any notification to DPE must identify the development, including the application number, and set out the location and nature of the incident.

In the event of a notifiable non-compliance incident arising, the Principal Contractor will notify Mirvac's Project Manager immediately, who is then required to notify DPE in writing (via the Planning Portal) within 7 days, as per Condition 11 of the conditions. Any notification to DPE must

- identify the development, including the application number,
- set out the condition of approval that the development is non-compliant with,
- the way in which it does not comply,
- the reasons for the non- compliance (if known) and
- what actions have been taken, or will be taken, to address the non- compliance.

4.3 Contingency Plan

A contingency plan shall be established by the Contractor and is to be included in the overarching CEMP, in accordance with Condition E1(e). Notwithstanding, **Table 21** outlines an indicative plan to be undertaken by the builder in the event that the monitoring program identifies the management plan is not effective in managing the construction impacts.

This contingency plan can also be used for works on the Mamre Road / Access Road 1 intersection; however, it is expected that the Contractor (WEM) who is preparing the site specific CTMP's for the intersection works shall also provide an updated Contingency Plan. A Compliance Report must be submitted to the Department reviewing the environmental performance of the development to:

- identify any trends in the monitoring data over the life of the development;
- identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
- describe what measures will be implemented over the next year to improve the environmental performance of the development.

TABLE 21: CONTINGENCY PLAN

Risk		Condition Green	Condition Amber	Condition Red
Construction Movements	Trigger	Both peak hour and daily Construction traffic volumes are in accordance with volume and time constraints as outlined within Section 2.2 and Section 3.1 (136 LV & 62 HV Movements per day / 15 LV & 10 HV Movements in Peak Periods)	Construction traffic volumes exceeds programmed Peak volumes but is within permissible daily volume constraints (136 LV & 62 HV Movements per day / 15 LV & 10 HV Movements in Peak Periods)	Construction traffic volumes exceeds permissible volume and time constraints (136 LV & 62 HV Movements per)
	Response	No response required	Review and investigate construction activities, and where appropriate, implement additional remediation measures such as: • Review CTMP and update where necessary	As with Condition Amber, plus; • If it is concluded that construction activities were directly responsible for the exceedance, submit an incident

			• Provide additional training.	report to government agencies. • Stop all transportation into and out of the site.
Queuing	Trigger	No queuing identified	Queuing identified within site, but not on to public road	Queuing identified on the public road
	Response	No response required Continue monitoring program	Review the delivery schedule prepared by the builder. If drivers are not following the correct schedule, then they should be provided with additional training and an extra copy of the Driver Code of Conduct	As with Condition Amber, plus • Review and investigate construction activities. • If it is concluded that construction activities were directly responsible for the exceedance, submit an incident report to government agencies. • Temporary halting of activities and resuming when conditions have improved. • Stop all transportation into and out of the site. • Review CTMP and update where necessary, provide additional training. •
Noise	Trigger	Noise levels do not exceed imposed noise constraints, as outlined within the Noise Assessment Report (<45dBA), nor has there been a traffic noise related complaint	Noise levels in minor excess (<10dBA) of imposed noise constraints, or receipt of a single noise complaint	Noise levels greatly in excess (>10dBA) of imposed noise constraints or consistent noise complaints.
	Response	No response required	Undertake all feasible and reasonable mitigation and management measures to minimise noise impacts.	As with Condition Amber if noise levels cannot be kept below applicable limits, then a different construction method or equipment must be utilised.

Traffic Guidance Scheme	Trigger	No observable issues (TGS implements according to plan)	Minor inconsistencies with TGS to onsite operations (such as covered signs, missing signs, fallen cones, etc.)	Near miss or incident occurring regardless of / as a result of the TGS being implemented
	Response	No response required	Traffic Controller to amend TGS on site and to keep a log of all changes	Stop work until an investigation has been undertake into the incident. There are to be changes made to the TGS to ensure that the safety of all workers, students and civilians are catered for.
Dust	Trigger	No observable dust	Minor quantities of dust in the air and tracking on to the road	Large quantities of dust in the air and tracking on to the road
	Response	No response required	Review and investigate construction activities and respective control measures, where appropriate. Implement additional remedial measures, such as: • Deployment of additional water sprays • Relocation or modification of dust-generating sources • Check condition of vibrating grids to ensure they are functioning correctly. • Temporary halting of activities and resuming when conditions have improved	As with Condition Amber. • If it is concluded that construction activities were directly responsible for the exceedance, submit an incident report to government agencies. • Implement relevant responses and undertake immediate review to avoid such occurrence in future.

4.4 Communications Strategy

A communications strategy shall be established by the Contractor and is included in the overarching CEMP (refer to the community consultation strategy prepared separately).

A Communications and Community Liaison Representative (CCLR) shall be elected and shall be responsible for ensuring that the appropriate management response and handling procedures are instigated and carried through in the event of an environmental complaint.

All employees who are made aware of a complaint, either verbal or written, are to immediately notify the Contractor's Project Manager, who will then contact the CCLR. Upon becoming aware of a complaint, the protocol outlined below will be followed.

TABLE 22: RESPONSE STRATERGY

Ref	Protocol	Action
1	Record and acknowledge	Any employee who takes receipt of a complaint, either verbal or written, are to immediately notify the Contractor's Project Manager who will then contact the Communications and Community Liaison Representative. The Contractor's Project Manager will be available 24 hours a day, seven days a week and have the authority to stop or direct works. In the normal course of events, the first contact for complaints will usually be made in person or by telephone. The complainant's name, address, and contact details, along with the nature of the complaint, will be requested. If the complainant refuses to supply the requested information, a note will be made on the form and complainant advised of this.
2	Assess and prioritise	The CCLR will prioritise all complaints by severity for the risk to health and safety and will attempt to provide an immediate response via phone or email.
3	Investigate	An on-site investigation will be initiated in an attempt to confirm details relevant to the complaint and the cause of the problem. Any monitoring information and/or records at and around the time of the complaint will be reviewed for any abnormality or incident that may have resulted in the complaint.
4	Action or rectify	Once the cause of the complaint has been established, every possible effort will be made to undertake appropriate action to rectify the cause of the complaint and mitigate any further impact. The CCLR will assess whether the complaint is founded or unfounded and delegate the remediation of the issue to the Contractor's Project Manager for action, as required.
5	Respond to Complainant	The CCLR will oversee the rectification of the issue and respond to the complainant once the issue has been resolved. The complainant will be provided with a follow up verbal response on what action is proposed within two hours during night-time works (between the hours of 6:00 pm and 10:00 pm) and 24 hours at other times. Where a complaint cannot be resolved by the initial or follow-up verbal response, a written response will be provided to the complainant within ten days.
6	Record	It is imperative that an assessment of the situation is carried out and documented to minimise the potential for similar complaints in the future. On this basis, every complaint received is to be recorded in the Community Correspondence Register. A copy of the completed form will be maintained for at least five years
7	Preventative Action	Once the complaint has been suitably handled, appropriate measures will be identified and implemented to negate the possibility of re-occurrence. The Community Correspondence Register is not finalised until the preventative actions are completed and recorded on the form.

In addition to the above, the CCLR is to notify the community liaison representative when traffic is expected to exceed the parameters set within “Condition Green” of Table 21. Notwithstanding, **Table 23** outlines an indicative communication strategy to ensure that adequate communication with key stakeholders have been met.

TABLE 23: COMMUNICATIONS STRATERGY

Risk	Impact	Comms Channel
Wider Traffic Disruption	Wider community and stakeholders informed through local and wider advertising and notification	Stakeholder Meetings Stakeholder email blast
Construction related traffic	Ensure construction crews use traffic routes identified in the Traffic Management Plan, and Ensure residents in area are notified in advance to any traffic changes that may affect them	

Furthermore, ongoing communication will be undertaken so that all stakeholders are kept up to date of works and potential impacts.

Appendix A. Driver Code of Conduct

Drivers Code of Conduct

Safe Driving Policy for Warehouse 1, Lot 54 – 58 Mamre Road, Kemps Creek.

Objectives of the Drivers Code of conduct

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

Code of Conduct

The code of conduct requires that while driving any vehicle for work-related purposes. Drivers are to be issues with a copy of the Drivers Code of Conduct, and must comply with all of the following:

- Demonstrate safe driving and road safety activities.
- Abide by traffic, road, and environmental legislations.
- Follow site signage and instructions.
- Drivers must only enter and exit the site via the approved entry and exit points and travel routes.

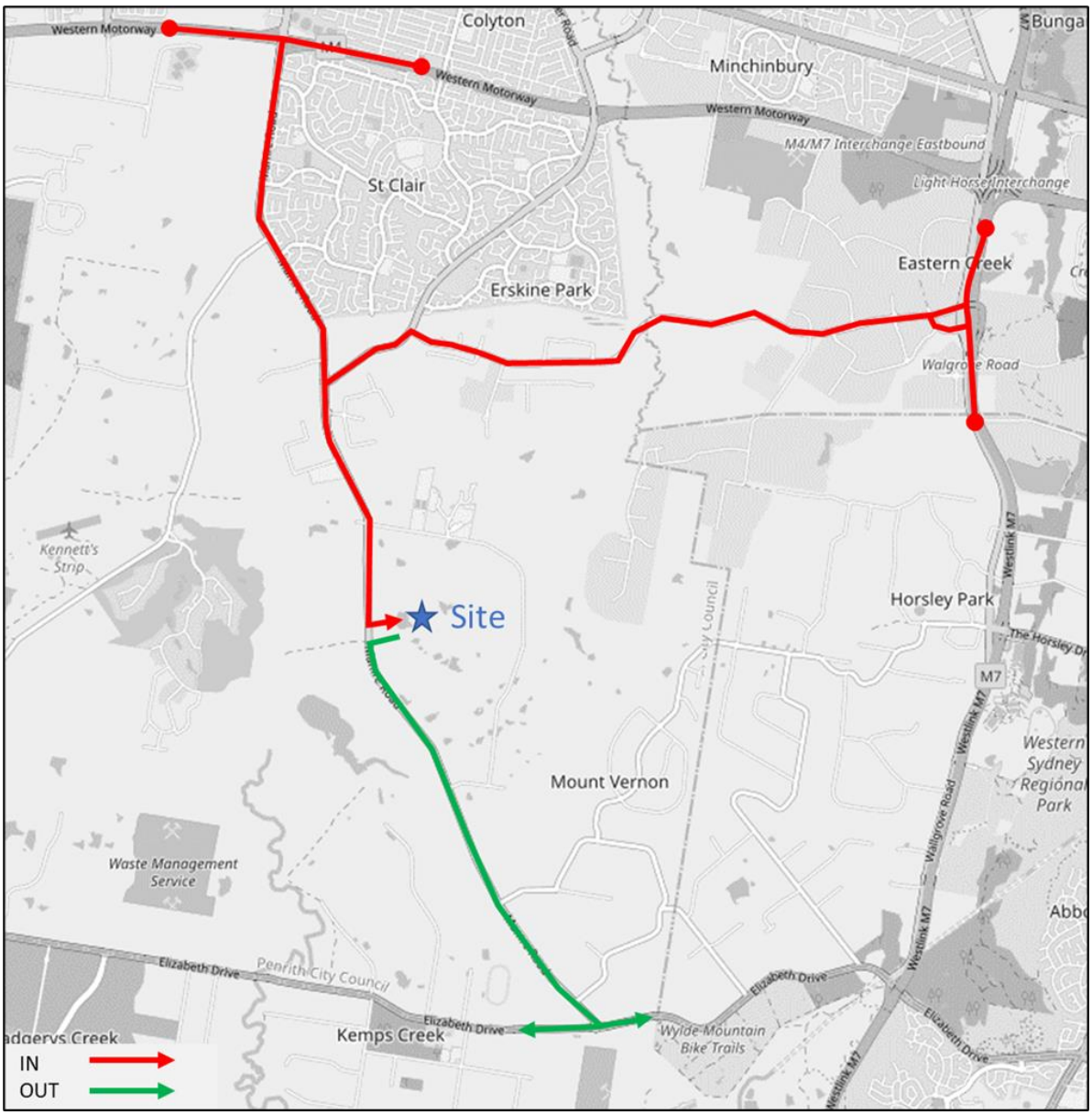
The below activities in any vehicles will be considered as a breach of conduct and will result in removal from site:

- Reckless or dangerous driving causing injury or death.
- Driving whilst disqualified or not correctly licensed.
- Drinking or being under the influence of drugs while driving
- Failing to stop after an incident.
- Loss of demerit points leading to suspension of licence.
- Any actions that warrant the suspension of a licence
- Exceeding the speed limit in place on any permanent or temporary roads

Driver Responsibilities

All Drivers on site must:

- Be responsible and accountable for their actions when operating a company vehicle or driving for the purposes of work.
- Display the highest level of professional conduct when driving a vehicle at all times.
- Ensure they have a current driver licence for the class of vehicle they are driving, and this licence is to be carried at all times.
- Immediately notify their supervisor or manager if their drivers' licence has been suspended, cancelled, or has had limitations applied.
- Comply with all traffic and road legislation when driving.
- Assess hazards while driving.
- Undertake daily pre-start checks of oil, tyre pressures, radiator, and battery levels of company vehicles they regularly used.
- Drive within the legal speed limits, including driving to the conditions.
- Not drive outside of the approved heavy vehicle routes. All drivers must obey weight, length and height restrictions imposed by the National Vehicle Regulator, and other Government agencies. Heavy Vehicles shall adhere to the selected routes.
- Be cognisant of the noise and emissions requirements imposed within the EIS, and in a broader sense, the NSW/ Australian Road Rules. Works must be constructed with the aim of achieving the construction noise management levels detailed in the Interim Construction Noise Guideline.
- Do not queue on public roads unless a prior approval has been sought.
- Be aware that at no time may a tracked plant be permitted or required on a paved road.
- Never drive under the influence of alcohol or drugs, including prescription and over the counter medication if they cause drowsiness – to do so will merit disciplinary measures.
- All drivers to report to their supervisor if they have been prescribed medication prior to the start of work.
- Wear a safety seat belt at all times when in the vehicle.
- Avoid distraction when driving – the driver will adjust car stereos/mirrors etc. before setting off or pull over safely to do so.
- Report ALL near-misses, crashes, and scrapes to their manager,
- Report infringements to a manager at the earliest opportunity.
- Report vehicle defects to a manager prior to the next use of the vehicle.
- Follow speed limits as imposed within the estate.
- Keep loads covered at all times.
- Park in dedicated light vehicle or heavy vehicle parking spaces.
- Follow the approved site access/egress routes only.
  - Arrival Trips:
    - Route 1: From M4 Western Motorway, southbound along Mamre Road and left into the Site.
    - Route 2: From Westlink M7, westbound on Old Wallgrove Road, Lenore Drive and Erskine Park Road, then south along Mamre Road and left into the Site.
  - Departure Trips:
    - Route 1: From the Site, left onto Mamre Road then south to Elizabeth Drive and left to the M7 Motorway and sub-regional routes to the east.
    - Route 2: From the Site, left onto Mamre Road then south to Elizabeth Drive and right to Badgerys Creek and The Northern Road to the west.



The Site Team Responsibilities

The Contractor is responsible to take all steps necessary to ensure company vehicles are as safe as possible and will not require staff to drive under conditions that are unsafe.

This will be achieved by undertaking the following:

- Ensuring all vehicles are well maintained and that the equipment enhances driver, operator, and passenger safety by way of:
  - Pre-commencement checks for all new plant arriving on-site and prior to undertaking any work.
  - Daily prestart inspections for all plant, vehicles, and equipment currently on-site.
  - All construction plant must be fitted with a flashing light, fire extinguisher and reverse alarms (or squawkers).
  - Ensure all operators onsite have a current verification of competency (VOC) for their current driver's licence of the appropriate class.

  - Ensure maintenance requirements are met and recorded.
- Identify driver training needs and arranging appropriate training or re-training. This may include providing the below:
  - Operator VOC assessment as part of all inductions.
  - Regular Toolbox discussions on safety features, managing fatigue, approved heavy routes, driver responsibility and drink-driving.
- Encouraging Safe Driving behaviour by:
  - Ensuring the subcontractor is informed if their staff become unlicensed.
  - Not covering or reimbursing staff speeding or other infringement notices
  - Ensuring Legal use of mobile phones in vehicles while driving only and that illegal use is not undertaken.
- Encouraging better fuel efficiency by:
  - Use of other transport modes or remote conferencing, whenever practical.
  - Providing training on, and circulating information about, travel planning and efficient driving habits.

Crash or incident Procedure

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

Environmental Procedures.

A range of measures shall be implemented to ensure the following;

- No dirt or debris from the construction vehicles is tracked on to the public road network.
- Reduce the impacts to sensitive receivers, including, where practicable, starting noisy equipment away from sensitive receivers and implementing respite periods.
- Watering of dusty activities will be undertaken, or activities temporarily halted and then resumed once weather conditions have improved.

- Containment measures for spillages will be provided at appropriate locations and in close proximity to staff car park areas, dangerous goods stores areas and main Project work areas.
- All vibratory compactors must not be used closer than 30 metres from residential buildings unless vibration monitoring confirms compliance with the vibration criteria, and
- Keep an accurate record which includes the range of measures undertaken to reduce environmental impacts.

Appendix B. Risk Assessment

Proposed Warehouse Development – Warehouse 1, Aspect Industrial Estate

Risk Assessment and Communication Tool

Project Number	2083r01
Project Name	Construction of warehouse and ancillary office
Site Location	Warehouse 1, Lot 54 – 58 Mamre Rd, Kemps Creek
Date of Assessment	24 August 2022
Revision	Issue I

Name	Company	Title

Document Control			
Date Issued	Revision	Issued By	Checked By
24/08/2022	Draft	J. Laidler	

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

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

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

Risk Assessment and Communication Tool

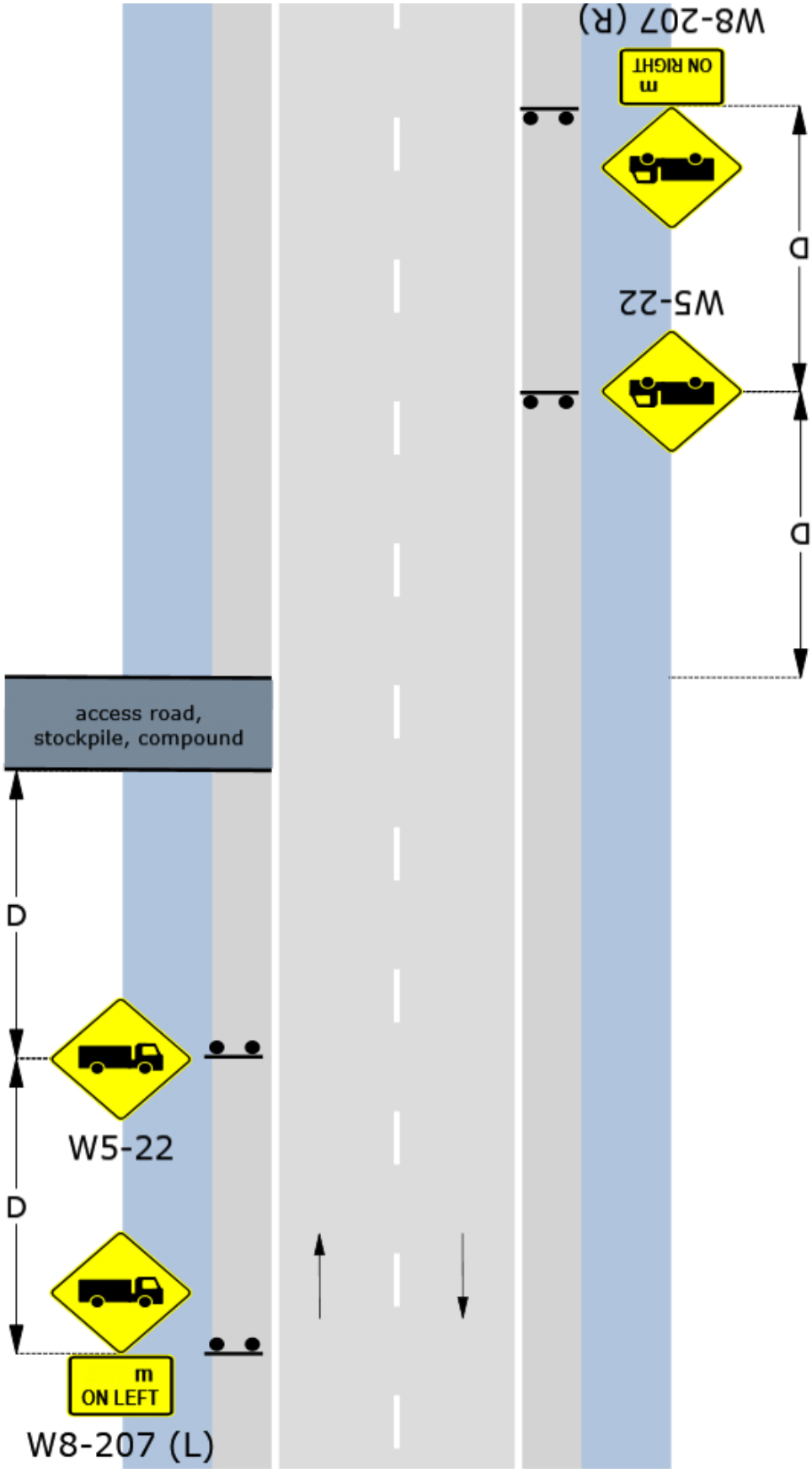
Example

ID. Ref	Risk and/ or Hazard	Risk Description	Location	Existing Control	Initial Risk Rating			Design Response to risk and /or hazard	Status of Risk	Assignment of risk or hazard	Residual risk rating		
					C	L	RR				C	L	RR
1	Unauthorized Access to the Site	Site prevents unauthorised access	Entire Site	Nil	C	3	High	Exclusion barriers will be provided as part of the main works. The design provides a defined separation between construction and work areas.	Design Solution	Main Contractor	B	2	Low
2	Interaction between pedestrians and vehicles	Vehicles and pedestrians to be separates as best possible	Entire Site & Access Roads	Nil	D	3	High	Dedicated footpath, pedestrian crossings and additional signage shall be provided to separate vehicles and pedestrians as best possible.	Design Solution	Main Contractor	B	2	Low
3	Potential vehicle conflict points	Vehicles can crash with each other while manoeuvring through the site	Entire Site & Access Roads	Nil	B	3	Medium	Roadways are capable of two-way flow. Nonetheless, Traffic Controllers shall limit movements within disrupted areas to limit any safety issues. Low speeds throughout the site also reduce potential for crashes	Design Solution	Main Contractor	B	1	Low

4	Fatigue	Injury caused by fatigue	Entire Site	Nil	C	3	High	Toolbox meetings and regular breaks (in line with WHS practices) to minimise fatigue	Design Solution	Main Contractor	B	1	Low
5	Fall risks	Injury due to falls (in general)	Entire Site	Nil	E	3	High	Ensuring level changes across the site to be minimised as best possible, with additional black & yellow hazard tape/marking being installed where appropriate. Installation of handrails where level changes / ramps grades are significant.	Design Solution	Main Contractor	C	2	Medium
6	Misdirected access into neighbouring site	Vehicle in unsafe locations	Entire Site	Nil	C	3	High	Ensuring appropriate directional signage has been provided to ensure vehicles do not access the wrong construction site, which could create potential safety breaches and hazards for all partied	Design Solution	Main Contractor	B	2	Low
7	Conflicting Traffic Management	Coordinating Traffic Controllers could create misleading and wrong advice	Entire Site	Nil	C	3	High	Toolbox meetings, regular liaison with all construction teams and review of signage plans on site in order to minimise contradicting signage.	Design Solution	Main Contractor	C	2	Medium

Appendix C. Traffic Guidance Scheme

D.4.7 Static: Access to depot, stockpile, quarry, gravel pit etc. all roads (formerly TCP 195)



TGS GENERAL NOTES

- ALL PUBLIC ROADS WILL HAVE A SPEED LIMIT OF 50KM/H UNLESS IDENTIFIED OTHERWISE
- NOT ALL DIMENSIONS SHOWN ARE TO SCALE
- LOCATION OF SIGNS ARE TO BE CONFIRMED ON-SITE TO ENSURE APPROPRIATE VISIBILITY
- ALL SIGNS ARE TO BE MINIMUM SIZE A
- ALL SIGNS ARE TO BE CLASS 1 RETROREFLECTIVE
- ALL TRAFFIC CONTROL PLANS ARE TO BE IMPLEMENTED IN ACCORDANCE WITH TFNSW'S TRAFFIC CONTROL AT WORK SITES TECHNICAL MANUAL ISSUE 6 (RELEASED 2020) AND AUSTRALIAN STANDARDS AS1742.3:2019 MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, PART 3: TRAFFIC CONTROL DEVICES FOR WORKS ON ROADS
- THIS TRAFFIC CONTROL PLAN MUST BE SET UP BY A PERSON HOLDING AN "IMPLEMENT TRAFFIC MANAGEMENT PLAN" TICKET AND TFNSW'S TRAFFIC CONTROL AT WORK SITES CHECKLIST SHALL BE COMPLETED PRIOR TO IMPLEMENTATION

- THE ACCREDITED PERSONNEL SHALL IMPLEMENT THE APPROVED TCP BEFORE ANY PHYSICAL WORK COMMENCES AND ENSURE A COPY OF THE TCP IS KEPT ON-SITE. THE ACCREDITED PERSONNEL SHALL ALSO DRIVE THROUGH THE SITE BEFORE WORKS BEGIN TO ENSURE THAT THE TCP HAS BEEN IMPLEMENTED CORRECTLY AND THAT THE IT WILL WARN, INSTRUCT AND GUIDE ROAD USERS AS DESIGNED. ANY VARIATIONS TO THE PLAN MUST BE MARKED ON THE PLAN AND INITIALED BY THE ACCREDITED PERSONNEL
- IT IS THE RESPONSIBILITY OF THE AN ACCREDITED PERSONNEL WITH A 'PREPARE A WORK ZONE TRAFFIC MANAGEMENT PLAN TO ENSURE THE FOLLOWING:
  * THE INTEGRITY OF ALL TRAFFIC CONTROL MEASURE THROUGH TO THE FINAL REMOVAL. THIS INCLUDES DAILY CHECKS OF ALL SIGNS AND DEVICES. THE CORRESPONDING RECORDS OF CHECKS SHALL BE KEPT ON FILE FOR AUDITING PURPOSES.
  * VEHICULAR ACCESS AND SERVICING REQUIREMENTS ARE TO BE MAINTAINED AT ALL TIMES TO ADJACENT PROPERTIES AFFECTED BY TRAFFIC CONTROL MEASURES
  * AT ALL TIMES AN UP-TO-DATE COPY OF "TRAFFIC CONTROL AT WORK SITES" SHALL BE AVAILABLE FOR REFERENCE AND IMPLEMENTATION AS REQUIRED ON-SITE

- ALL WORKERS WILL BE CONFINED TO THE DEDICATED WORKS AREA SHOWN ON THE PLAN
- IF THE WORKSITE IS LEFT UNATTENDED IT IS THE CONTRACTOR'S DUTY TO ENSURE THAT THE APPROPRIATE MEASURES ARE TAKEN TO PROVIDE A SAFE ENVIRONMENT FOR VEHICLES AND PEDESTRIANS TO RELEVANT AUSTRALIAN STANDARDS
- TRAFFIC CONTROLLER (T1-34) AND PREPARE TO STOP (T1-18) SIGNS ARE TO BE COVERED OR REMOVED WHEN TRAFFIC CONTROLLER/S ARE NOT ON SITE.
- ALL SIGNAGE IS TO BE CLEAN, CLEARLY VISIBLE AND NOT OBSCURED
- ALL WORKERS MUST ADHERE TO THE APPLICABLE SAFE WORK DISTANCE AS DESCRIBED IN AS1742.3:2019
- ALL DISTANCES BETWEEN SIGNS ARE TO BE IN ACCORDANCE WITH SECTION 2.5.2 OF AS1742.3:2019. HOWEVER, MODIFICATIONS CAN BE MADE TO SUIT SITE CONDITIONS
- IF REQUIRED, A TGS MUST BE SELECTED, DEVELOPED AND IMPLEMENTED BY A SUITABILITY QUALIFIED PERSON (PWZTMP AND ITCP QUALIFICATIONS)

W8-20 N 100m ON LEFT W5-22 50.000 W5-22 50.000 W5-22 W8-20 N 100m ON RIGHT

N

0 2.5 5

AMENDMENTS

REV	DATE	DESCRIPTION	DRW	CHK	APP
XX	XX.XX.XX	XX	XX	XX	XX

GENERAL NOTES

This drawing is provided for information purposes only and should not be used for construction.
Base Plan prepared by SBA Architect, received 07.12.2022.
Swept path assessments completed at 10 km/h and 300mm clearance.

DESIGNED: AngelaJi	PAPER SIZE: A3
CHECKED BY: J. Laidler	DATE: 07.12.2022
APPROVED BY: J. Laidler (Cert: 0034322012)	SCALE: 1:400

CLIENT

Richard Crookes

PROJECT

2083

Warehouse 1, Lot 54-58 Mamre Road

DOCUMENT INFORMATION

Traffic Guidance Scheme

Access Road 1

DRAWING STATUS: XXXX

FILE NAME: AG2083-01-v02.dwg

SHEET: AG01

asongroup
Suite 17.02, Level 17, 1 Castlereagh St
Sydney NSW 2000
info@asongroup.com.au

TGS GENERAL NOTES

- ALL PUBLIC ROADS WILL HAVE A SPEED LIMIT OF 50KM/H UNLESS IDENTIFIED OTHERWISE
- NOT ALL DIMENSIONS SHOWN ARE TO SCALE
- LOCATION OF SIGNS ARE TO BE CONFIRMED ON-SITE TO ENSURE APPROPRIATE VISIBILITY
- ALL SIGNS ARE TO BE MINIMUM SIZE A
- ALL SIGNS ARE TO BE CLASS 1 RETROREFLECTIVE
- ALL TRAFFIC CONTROL PLANS ARE TO BE IMPLEMENTED IN ACCORDANCE WITH TFNSW'S TRAFFIC CONTROL AT WORK SITES TECHNICAL MANUAL ISSUE 6 (RELEASED 2020) AND AUSTRALIAN STANDARDS AS1742.3:2019 MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, PART 3: TRAFFIC CONTROL DEVICES FOR WORKS ON ROADS
- THIS TRAFFIC CONTROL PLAN MUST BE SET UP BY A PERSON HOLDING AN "IMPLEMENT TRAFFIC MANAGEMENT PLAN" TICKET AND TFNSW'S TRAFFIC CONTROL AT WORK SITES CHECKLIST SHALL BE COMPLETED PRIOR TO IMPLEMENTATION

- THE ACCREDITED PERSONNEL SHALL IMPLEMENT THE APPROVED TCP BEFORE ANY PHYSICAL WORK COMMENCES AND ENSURE A COPY OF THE TCP IS KEPT ON-SITE. THE ACCREDITED PERSONNEL SHALL ALSO DRIVE THROUGH THE SITE BEFORE WORKS BEGIN TO ENSURE THAT THE TCP HAS BEEN IMPLEMENTED CORRECTLY AND THAT THE IT WILL WARN, INSTRUCT AND GUIDE ROAD USERS AS DESIGNED. ANY VARIATIONS TO THE PLAN MUST BE MARKED ON THE PLAN AND INITIALED BY THE ACCREDITED PERSONNEL
- IT IS THE RESPONSIBILITY OF THE AN ACCREDITED PERSONNEL WITH A 'PREPARE A WORK ZONE TRAFFIC MANAGEMENT PLAN TO ENSURE THE FOLLOWING:
  * THE INTEGRITY OF ALL TRAFFIC CONTROL MEASURE THROUGH TO THE FINAL REMOVAL. THIS INCLUDES DAILY CHECKS OF ALL SIGNS AND DEVICES. THE CORRESPONDING RECORDS OF CHECKS SHALL BE KEPT ON FILE FOR AUDITING PURPOSES.
  * VEHICULAR ACCESS AND SERVICING REQUIREMENTS ARE TO BE MAINTAINED AT ALL TIMES TO ADJACENT PROPERTIES AFFECTED BY TRAFFIC CONTROL MEASURES
  * AT ALL TIMES AN UP-TO-DATE COPY OF "TRAFFIC CONTROL AT WORK SITES" SHALL BE AVAILABLE FOR REFERENCE AND IMPLEMENTATION AS REQUIRED ON-SITE

- ALL WORKERS WILL BE CONFINED TO THE DEDICATED WORKS AREA SHOWN ON THE PLAN
- IF THE WORKSITE IS LEFT UNATTENDED IT IS THE CONTRACTOR'S DUTY TO ENSURE THAT THE APPROPRIATE MEASURES ARE TAKEN TO PROVIDE A SAFE ENVIRONMENT FOR VEHICLES AND PEDESTRIANS TO RELEVANT AUSTRALIAN STANDARDS
- TRAFFIC CONTROLLER (T1-34) AND PREPARE TO STOP (T1-18) SIGNS ARE TO BE COVERED OR REMOVED WHEN TRAFFIC CONTROLLER/S ARE NOT ON SITE.
- ALL SIGNAGE IS TO BE CLEAN, CLEARLY VISIBLE AND NOT OBSCURED
- ALL WORKERS MUST ADHERE TO THE APPLICABLE SAFE WORK DISTANCE AS DESCRIBED IN AS1742.3:2019
- ALL DISTANCES BETWEEN SIGNS ARE TO BE IN ACCORDANCE WITH SECTION 2.5.2 OF AS1742.3:2019. HOWEVER, MODIFICATIONS CAN BE MADE TO SUIT SITE CONDITIONS
- IF REQUIRED, A TGS MUST BE SELECTED, DEVELOPED AND IMPLEMENTED BY A SUITABILITY QUALIFIED PERSON (PWZTMP AND ITCP QUALIFICATIONS)

W5-22
W8-20TN
100m ON RIGHT
W5-22
W8-20TN
100m ON LEFT
W5-22
W5-22
W8-20TN
100m ON LEFT
W5-22
W8-20TN
100m ON RIGHT
W5-22
50.000
50.000
50.000
50.000
50.000
50.000
0 2.5 5
22

AMENDMENTS

REV	DATE	DESCRIPTION	DRW	CHK	APP
XX	XX.XX.XX	XX	XX	XX	XX

GENERAL NOTES

This drawing is provided for information purposes only and should not be used for construction.
Base Plan prepared by SBA Architect, received 07.12.2022.
Swept path assessments completed at 10 km/h and 300mm clearance.

DESIGNED: AngelaJi	PAPER SIZE: A3
CHECKED BY: J. Laidler	DATE: 07.12.2022
APPROVED BY: J. Laidler (Cert: 0034322012)	SCALE: 1:400

CLIENT

Richard Crookes

PROJECT

2083

Warehouse 1, Lot 54-58 Mamre Road

DOCUMENT INFORMATION

Traffic Guidance Scheme

Access Road 2

DRAWING STATUS	FILE NAME	SHEET
XXXX	AG2083-01-v02.dwg	AG02

asongroup
Suite 17.02, Level 17, 1 Castlereagh St
Sydney NSW 2000
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Appendix D. SIDRA Modelling Results

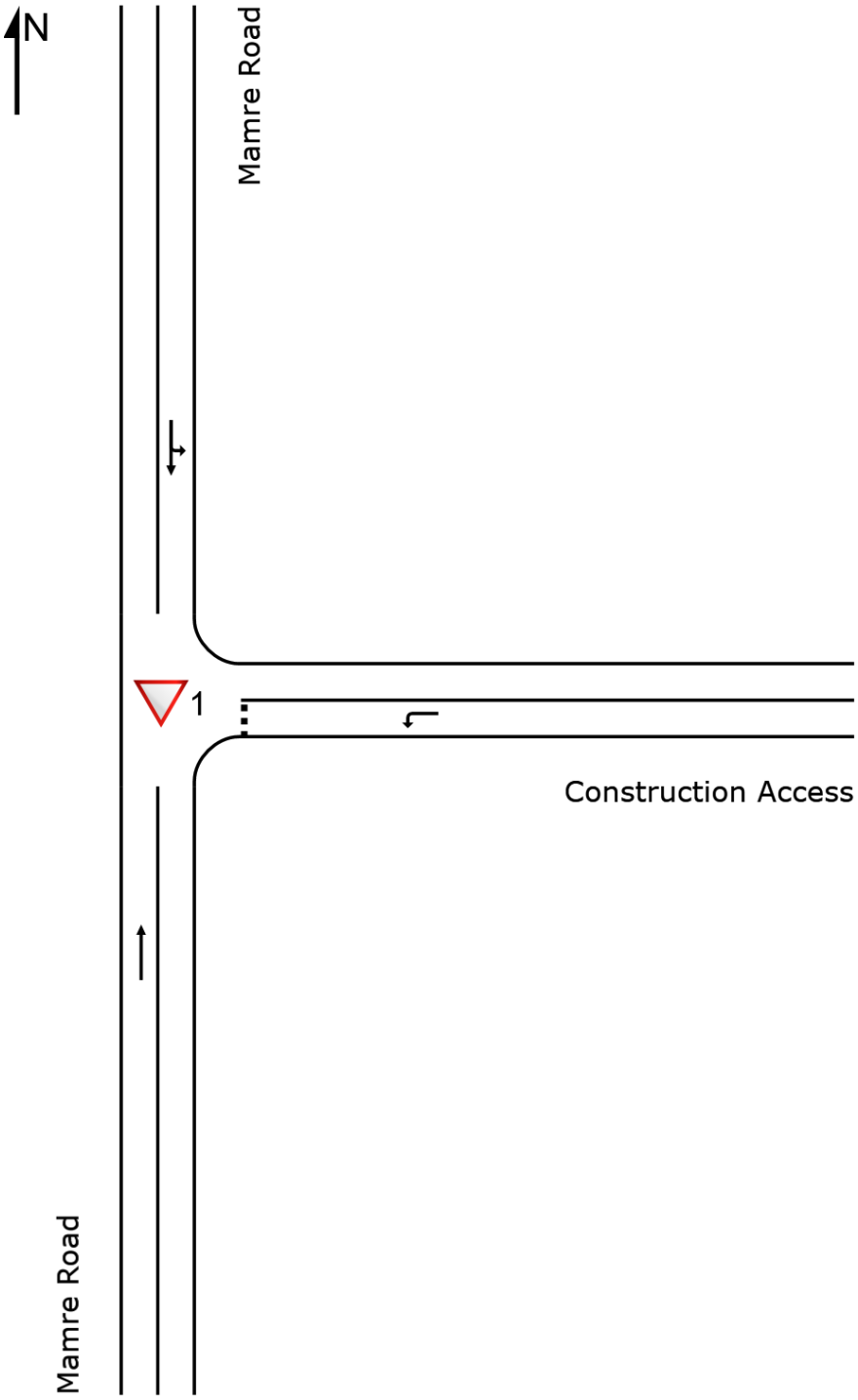
Baseline (Existing Construction)

SITE LAYOUT

Site: 1 [Scenario 1: 2022 Basline - Existing + Construction (Mamre Rd / Temp Site Access)_AM Peak (Site Folder: P2083 WH1 CTMP Baseline)]

Site: Mamre Road / Site Access
Scenario: AM Peak Existing + Construction
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 1 [Scenario 1: 2022 Basline - Existing + Construction (Mamre Rd / Temp Site Access)_AM Peak (Site Folder: P2083 WH1 CTMP Baseline)]

Site: Mamre Road / Site Access
Scenario: AM Peak Existing + Construction
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Mamre Road														
2	T1	871	94	917	10.8	0.503	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.5
Approach		871	94	917	10.8	0.503	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.5
East: Construction Access														
4	L2	1	0	1	0.0	0.002	3.7	LOS A	0.0	0.0	0.59	0.39	0.59	16.9
Approach		1	0	1	0.0	0.002	3.7	LOS A	0.0	0.0	0.59	0.39	0.59	16.9
North: Mamre Road														
7	L2	160	10	168	6.3	0.505	10.2	LOS A	0.0	0.0	0.00	0.22	0.00	67.5
8	T1	682	120	718	17.6	0.505	0.2	LOS A	0.0	0.0	0.00	0.22	0.00	76.0
Approach		842	130	886	15.4	0.505	2.1	NA	0.0	0.0	0.00	0.22	0.00	74.2
All Vehicles		1714	224	1804	13.1	0.505	1.1	NA	0.0	0.0	0.00	0.11	0.00	76.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Scenario 1: 2022 Basline - Existing + Construction (Mamre Rd / Temp Site Access)_PM Peak (Site Folder: P2083 WH1 CTMP Baseline)]

Site: Mamre Road / Site Access
Scenario: PM Peak Existing
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Mamre Road														
2	T1	759	91	799	12.0	0.442	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.6
Approach		759	91	799	12.0	0.442	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.6
East: Construction Access														
4	L2	155	5	163	3.2	0.460	13.3	LOS A	1.9	13.6	0.87	1.20	1.20	16.1
Approach		155	5	163	3.2	0.460	13.3	LOS A	1.9	13.6	0.87	1.20	1.20	16.1
North: Mamre Road														
7	L2	1	0	1	0.0	0.565	10.1	LOS A	0.0	0.0	0.00	0.00	0.00	73.2
8	T1	967	121	1018	12.5	0.565	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	79.3
Approach		968	121	1019	12.5	0.565	0.2	NA	0.0	0.0	0.00	0.00	0.00	79.3
All Vehicles		1882	217	1981	11.5	0.565	1.2	NA	1.9	13.6	0.07	0.10	0.10	60.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Project Case (with WH1 Construction Traffic)

MOVEMENT SUMMARY

Site: 1 [Scenario 2: 2022 Basline + WH1 Construction Traffic_AM Peak (Site Folder: P2083 WH1 CTMP Baseline+ WH1 Construction Traffic)]

Site: Mamre Road / Site Access
Scenario: AM Peak Existing + Construction
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Mamre Road														
2	T1	871	94	917	10.8	0.503	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.5
Approach		871	94	917	10.8	0.503	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.5
East: Construction Access														
4	L2	1	0	1	0.0	0.002	3.7	LOS A	0.0	0.0	0.59	0.39	0.59	16.9
Approach		1	0	1	0.0	0.002	3.7	LOS A	0.0	0.0	0.59	0.39	0.59	16.9
North: Mamre Road														
7	L2	210	14	221	6.7	0.535	10.2	LOS A	0.0	0.0	0.00	0.27	0.00	66.7
8	T1	682	120	718	17.6	0.535	0.2	LOS A	0.0	0.0	0.00	0.27	0.00	75.2
Approach		892	134	939	15.0	0.535	2.5	NA	0.0	0.0	0.00	0.27	0.00	73.0
All Vehicles		1764	228	1857	12.9	0.535	1.4	NA	0.0	0.0	0.00	0.14	0.00	75.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Scenario 2: 2022 Basline + WH1 Construction Traffic_PM Peak (Site Folder: P2083 WH1 CTMP Baseline+ WH1 Construction Traffic)]

Site: Mamre Road / Site Access
Scenario: PM Peak Existing
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Mamre Road														
2	T1	759	91	799	12.0	0.442	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.6
Approach		759	91	799	12.0	0.442	0.1	NA	0.0	0.0	0.00	0.00	0.00	79.6
East: Construction Access														
4	L2	205	7	216	3.4	0.610	16.1	LOS B	2.9	20.7	0.90	1.49	1.49	15.9
Approach		205	7	216	3.4	0.610	16.1	LOS B	2.9	20.7	0.90	1.49	1.49	15.9
North: Mamre Road														
7	L2	1	0	1	0.0	0.565	10.1	LOS A	0.0	0.0	0.00	0.00	0.00	73.2
8	T1	967	121	1018	12.5	0.565	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	79.3
Approach		968	121	1019	12.5	0.565	0.2	NA	0.0	0.0	0.00	0.00	0.00	79.3
All Vehicles		1932	219	2034	11.3	0.610	1.9	NA	2.9	20.7	0.10	0.16	0.16	55.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix E. Evidence of Consultation

Aspect Industrial Estate: Consultation Summary
SSD 10448
Condition D1: CTMP

Organsiation	Plan provided to	Date Consultation commenced	Date Consultation completed	Response
TfNSW	Laura Van Putten Sydney Development Ruhul Chowdhury	8/06/2022	8/07/2022	No response received - closed 08/07/22
Penrith City Council	Gavin Cherry Council@penrith Rhian Greenup	8/06/2022	16/06/2022	Response received 16/06/22 - No objections raised

Adam Heinrich

From: Russell Hogan <russell.hogan@mirvac.com>
Sent: Friday, 8 July 2022 3:57 PM
To: Laura Van putten; Development Sydney
Cc: Alexandra Chung; Kym Dracopoulos; Adam Heinrich; Ruhul Chowdhury
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with TfNSW
Attachments: 1029r05v3 CTMP_Lot 54 - 58 Mamre Road, Kemps Creek.pdf; RE: AIE - SSD-10448 - Post Approval - Consultation with Council

Hi Laura,

Tried to call earlier, as an update we have now concluded review of the Construction Traffic Management Plan with our Environmental Representative and incorporated any comments received from stakeholder consultation.

We note we have not received any comments from TfNSW on this CTMP though note that we have sought to incorporate best practices into the CTMP based on other documentation approved from TfNSW within the Mamre Road Precinct.

We are now packaging up the final documentation and issuing our consolidated CEMP to the Planning Secretary. We will issue TfNSW a copy for information.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

T +61 2 9080 8154 **M** +61 424441231
Level 28, 200 George Street Sydney NSW 2000 Australia

From: Russell Hogan
Sent: Friday, 1 July 2022 10:16 AM
To: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>; Development Sydney <Development.Sydney@transport.nsw.gov.au>
Cc: Alexandra Chung <alexandra.chung@mirvac.com>; Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>; Ruhul Chowdhury <Ruhul.CHOWDHURY@transport.nsw.gov.au>
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with TfNSW

Hi Laura,

Mirvac have now closed out CEMP and sub-management plan (Incl. CTMP) comments received from Authorities and our Environmental Representative and are now seeking to issue the final compiled CEMP to the Planning Secretary for approval.

Please advise If TfNSW have any comments on the Construction Traffic Management Plan.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

T +61 2 9080 8154 **M** +61 424441231
Level 28, 200 George Street Sydney NSW 2000 Australia

From: Russell Hogan
Sent: Thursday, 16 June 2022 2:21 PM
To: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>; Development Sydney <Development.Sydney@transport.nsw.gov.au>
Cc: Alexandra Chung <alexandra.chung@mirvac.com>; Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>; Ruhul Chowdhury <Ruhul.CHOWDHURY@transport.nsw.gov.au>
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with TfNSW

Hi Laura,

Hope you're well.

Please see attached Penrith City Council advice that Council raise no objections to the attached CTMP.

Therefore we seek TfNSW' comments prior to reverting to the Planning Secretary for approval as part of the wider CEMP.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

T +61 2 9080 8154 **M** +61 424441231
Level 28, 200 George Street Sydney NSW 2000 Australia

From: Russell Hogan
Sent: Wednesday, 8 June 2022 12:24 PM
To: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>; Development Sydney <Development.Sydney@transport.nsw.gov.au>
Cc: Alexandra Chung <alexandra.chung@mirvac.com>; Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>; Ruhul Chowdhury <Ruhul.CHOWDHURY@transport.nsw.gov.au>
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with TfNSW

Hi Laura,

Thank you for your guidance below.

RE: SSD-10448 – Post Approval – Consultation with TfNSW – D1 - Construction Traffic Management Plan

Please see attached *draft* Construction Traffic Management Plan required under the abovementioned consent.

This document is required to be prepared in consultation with TfNSW and is required to be finalised and approved by the Planning Secretary prior to the commencement of construction. We therefore seek TfNSW' comments on the attached management plan which will ultimately be incorporated into the Construction Environmental Management Plan required under the consent..

Condition	Consent Timing	Mirvac target finalisation / issue to Planning Secretary for approval	To enable issue to Planning Secretary - we are seeking TfNSW comments by (if possible)
Condition D1 – Construction Traffic Management Plan (CTMP)	Prior to the commencement of construction of the Stage 1 Development	Tuesday 21 June 2022	Friday 17 June 2022

Relevant Condition extract for ease of reference

TRAFFIC AND ACCESS
Construction Traffic Management Plan
D1. Prior to the commencement of construction of the Stage 1 Development, the Applicant must prepare a Construction Traffic Management Plan (CTMP) for the development to the satisfaction of the Planning Secretary. The plan must form part of the CEMP required by condition E2 and must:

a) be prepared by a suitably qualified and experienced person(s);
b) **be prepared in consultation with Council and TfNSW**;
c) detail the traffic management and contingency measures that are to be implemented for the site, particularly during the construction works for the Mamre Road/Access Road 1 intersection, to ensure access to the site and road safety and network efficiency is maintained, including interim traffic safety controls and management measures;
d) detail heavy vehicle routes, access, and parking arrangements;
e) include a Driver Code of Conduct to:
   i. minimise the impacts of earthworks and construction on the local and regional road network;
   ii. minimise conflicts with other road users;
   iii. minimise road traffic noise; and
   iv. ensure truck drivers use specified routes;
f) include a program to monitor the effectiveness of these measures; and
g) if necessary, detail procedures for notifying residents and the community (including local schools), of any potential disruptions to routes.

D2. The Applicant must:

a) not commence construction until the CTMP required by condition D1 is approved by the Planning Secretary;

and

b) implement the most recent version of the CTMP approved by the Planning Secretary for the duration of construction.

Again, we are happy to coordinate a meeting to expedite resolution should TfNSW believe this to be appropriate.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

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Level 28, 200 George Street Sydney NSW 2000 Australia

From: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>
Sent: Monday, 6 June 2022 5:31 PM
To: Russell Hogan <russell.hogan@mirvac.com>; Development Sydney <Development.Sydney@transport.nsw.gov.au>
Cc: Alexandra Chung <alexandra.chung@mirvac.com>; Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>; Ruhul Chowdhury <Ruhul.CHOWDHURY@transport.nsw.gov.au>
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with TfNSW

Hi Russell

Please note that the 2 conditions named below will need to go through my team in the first instance.

Can you please provide the relevant documentation so that I can proceed with the review.

Please note I am on leave this week.

Kind Regards,

Laura van Putten
A/Senior Land Use Assessment Coordinator
Planning and Programs
Greater Sydney
Transport for NSW

M 0429 505 961 **T** (02) 8849 2480 **E** laura.van.putten@transport.nsw.gov.au

transport.nsw.gov.au

27-31 Argyle Street
Parramatta NSW 2750

Transport for NSW

From: Russell Hogan <russell.hogan@mirvac.com>
Sent: Thursday, 2 June 2022 1:30 PM
To: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>; Development Sydney <Development.Sydney@transport.nsw.gov.au>
Cc: Alexandra Chung <alexandra.chung@mirvac.com>; Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>
Subject: AIE - SSD-10448 - Post Approval - Consultation with TfNSW
Importance: High

Hi Laura,

Hope you're all keeping well.

Seek your direction regarding AIE *Post Approval* consultation.

With reference to Mirvac's Aspect Industrial Estate SSD-10448 in Mamre Road Precinct, please see attached final signed consent as formally uploaded to the Major Projects Portal on 31 May 2022.

There are several *Post Approval* and Prior to *Commencement of Construction* items within the consent to which we are required to prepare in consultation with TfNSW.

These are as follows:

Item No.	Condition	Consent Timing	Mirvac target finalisation / issue to Planning Secretary for approval
1	Condition D1 – Construction Traffic Management Plan (CTMP)	Prior to the commencement of construction of the Stage 1 Development	Friday 17 June 2022
2	Condition D11 – Access Arrangements	Prior to the commencement of any construction works (excluding bulk earthworks) for Warehouse 1	Friday 15 July 2022

We seek TfNSW' advice as to who / how TfNSW would like to be engaged during the preparation / finalisation of the above documentation. We have draft final documents available for issue now, though seek TfNSW' advice on the best way to engage. If you consider appropriate, we would welcome a meeting between TfNSW / Mirvac to step through the documents in order to expedite a resolution.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

T +61 2 9080 8154 **M** +61 424441231
Level 28, 200 George Street Sydney NSW 2000 Australia

Mirvac acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Owners of the lands and waters of Austral
our respect to their Elders.

Adam Heinrich

From: Kathryn Saunders <kathryn.saunders@penrith.city>
Sent: Thursday, 16 June 2022 1:16 PM
To: Russell Hogan
Cc: Rhian Greenup; Alexandra Chung; Kym Dracopoulos; Adam Heinrich
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with Council
Attachments: 1029r05v3 CTMP_Lot 54 - 58 Mamre Road, Kemps Creek.pdf

Hi Russell,

Council has reviewed the draft CTMP and raises no objections. It is noted that the CTMP will need to address and include all requirements of Condition D1 and that the final CTMP will need to be prepared in consultation with TfNSW and be issued to the Planning Secretary for their confirmation that the condition is satisfied.

Kind regards,

Kathryn Saunders
Principal Planner

E kathryn.saunders@penrith.city
T +61247328567 | F | M
PO Box 60, PENRITH NSW 2751
www.visitpenrith.com.au
www.penrithcity.nsw.gov.au

PENRITH
CITY COUNCIL

Follow us

From: Russell Hogan <russell.hogan@mirvac.com>
Sent: Wednesday, 8 June 2022 11:39 AM
To: Gavin Cherry <Gavin.Cherry@penrith.city>; Penrith City Council - RECORDS <council@penrith.city>
Cc: Rhian Greenup <rhian.greenup@penrith.city>; Alexandra Chung <alexandra.chung@mirvac.com>; Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with Council

Hi Gavin,

Thank you for your guidance below. We agree on the approach.

RE: SSD-10448 – Post Approval – Consultation with Council – D1 - Construction Traffic Management Plan

Please see attached *draft* Construction Traffic Management Plan required under the abovementioned consent.

This document is required to be prepared in consultation with Council and is required to be finalised and approved by the Planning Secretary prior to the commencement of construction. We therefore seek Council's comments on the attached management plan which will ultimately be incorporated into the Construction Environmental Management Plan required under the consent..

Condition	Consent Timing	Mirvac target finalisation / issue to Planning Secretary for approval	To enable issue to Planning Secretary - we are seeking Council comments by (if possible)
Condition D1 – Construction Traffic Management Plan (CTMP)	Prior to the commencement of construction of the Stage 1 Development	Tuesday 21 June 2022	Friday 17 June 2022

Relevant Condition extract for ease of reference

TRAFFIC AND ACCESS
Construction Traffic Management Plan
D1. Prior to the commencement of construction of the Stage 1 Development, the Applicant must prepare a Construction Traffic Management Plan (CTMP) for the development to the satisfaction of the Planning Secretary. The plan must form part of the CEMP required by condition E2 and must:

a) be prepared by a suitably qualified and experienced person(s);
b) **be prepared in consultation with Council and TfNSW**;
c) detail the traffic management and contingency measures that are to be implemented for the site, particularly during the construction works for the Mamre Road/Access Road 1 intersection, to ensure access to the site and road safety and network efficiency is maintained, including interim traffic safety controls and management measures;
d) detail heavy vehicle routes, access, and parking arrangements;
e) include a Driver Code of Conduct to:
   i. minimise the impacts of earthworks and construction on the local and regional road network;
   ii. minimise conflicts with other road users;
   iii. minimise road traffic noise; and
   iv. ensure truck drivers use specified routes;
f) include a program to monitor the effectiveness of these measures; and
g) if necessary, detail procedures for notifying residents and the community (including local schools), of any potential disruptions to routes.

D2. The Applicant must:

a) not commence construction until the CTMP required by condition D1 is approved by the Planning Secretary;

and

b) implement the most recent version of the CTMP approved by the Planning Secretary for the duration of construction.

Again, we are happy to coordinate a meeting to expedite resolution should Council believe this to be appropriate.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

T +61 2 9080 8154 **M** +61 424441231
Level 28, 200 George Street Sydney NSW 2000 Australia

From: Gavin Cherry <Gavin.Cherry@penrith.city>
Sent: Thursday, 2 June 2022 3:27 PM
To: Russell Hogan <russell.hogan@mirvac.com>
Cc: Natasha Borgia <natasha.borgia@penrith.city>; Michael Alderton <Michael.Alderton@penrith.city>; Rhian Greenup <rhian.greenup@penrith.city>; Kathryn Saunders <kathryn.saunders@penrith.city>
Subject: RE: AIE - SSD-10448 - Post Approval - Consultation with Council

Afternoon Russell,

In the first instance please refer the documents to myself as my team will register them into our records system and then distribute them to the teams applicable.

This would not typically involve our City Planning Team and based on the below, would only relate to my unit, our Traffic Team and our Environmental Management Team,

The table below is extremely helpful to inform us of the relevant condition for each draft consultation document coupled with the copy of the consent.

I note your suggestion of a meeting but as we are not the consent authority and will be providing comment only, I would suggest that comments be obtained by my unit, provided to you and if you have any concerns or questions remain a meeting can be arranged at that point.

I hope this assists.

regards

Gavin Cherry
Development Assessment Coordinator

E Gavin.Cherry@penrith.city
T +61247328125 | F +612 4732 7958 | M
PO Box 60, PENRITH NSW 2751
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PENRITH
CITY COUNCIL

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From: Russell Hogan <russell.hogan@mirvac.com>
Sent: Thursday, 2 June 2022 11:31 AM
To: Gavin Cherry <Gavin.Cherry@penrith.city>; Natasha Borgia <natasha.borgia@penrith.city>; Michael Alderton <Michael.Alderton@penrith.city>; Penrith City Council - RECORDS <council@penrith.city>
Cc: Kym Dracopoulos <kym.dracopoulos@mirvac.com>; Daniel Brook <daniel.brook@mirvac.com>; Alexandra Chung <alexandra.chung@mirvac.com>; Adam Heinrich <adam.heinrich@orionconsulting.com.au>

Subject: AIE - SSD-10448 - Post Approval - Consultation with Council
Importance: High

EXTERNAL EMAIL: This email was received from outside the organisation. Use caution when clicking any links or opening attachments.

Hi Gavin / Natasha / Michael,

Hope you're all keeping well.

Seek your direction regarding AIE *Post Approval* consultation.

With reference to Mirvac's Aspect Industrial Estate SSD-10448 in Mamre Road Precinct, please see attached final signed consent as formally uploaded to the Major Projects Portal on 31 May 2022.

There are several *Post Approval* and Prior to *Commencement of Construction* items within the consent to which we are required to prepare in consultation with Penrith City Council.

These are as follows:

Item No.	Condition	Consent Timing	Mirvac target finalisation / issue to Planning Secretary for approval
1	Condition A10 – Staging Plan	Prior to the commencement of construction of any stage of the Concept Proposal	Friday 17 June 2022
2	Condition D1 – Construction Traffic Management Plan (CTMP)	Prior to the commencement of construction of the Stage 1 Development	Friday 17 June 2022
3	Condition D11 – Access Arrangements	Prior to the commencement of any construction works (excluding bulk earthworks) for Warehouse 1	Friday 15 July 2022
4	Condition D73 – Waste Storage and Processing	Prior to the commencement of construction of Building 1 and 2	Friday 15 July 2022

We seek Council's advice as to who / how Council would like to be engaged during the preparation / finalisation of the above documentation. We have draft final documents available for issue now, though seek Council's advice on the best way to engage. If you consider appropriate, we would welcome a meeting between Council / Mirvac to step through the documents in order to expedite a resolution.

Kind Regards,

Russell Hogan
Senior Development Manager
Integrated Investment Portfolio

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Level 28, 200 George Street Sydney NSW 2000 Australia

Mirvac acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Owners of the lands and waters of Austral
our respect to their Elders.

TfNSW Consultation Record

Rebecca Butler-Madden

To: Vesna Kocovic
Subject: RE: Conditional Approval - 54-58 Mamre Road, Kemps Creek

---

From: Development Applications <Developments.CJP@transport.nsw.gov.au>
Sent: Friday, February 10, 2023 4:01 pm
To: Daniel Brook <daniel.brook@mirvac.com>; Russell Hogan <russell.hogan@mirvac.com>
Cc: Laura Van putten <Laura.VAN.PUTTEN@transport.nsw.gov.au>; Adnan Islam <Adnan.Islam@transport.nsw.gov.au>; Benjamin Borger <Benjamin.BORGER@transport.nsw.gov.au>; Development CTMP CJP <development.CTMP.CJP@transport.nsw.gov.au>
Subject: Conditional Approval - 54-58 Mamre Road, Kemps Creek

Transport for NSW (TfNSW), Greater Sydney Division has reviewed the CTMP and endorse the proposed temporary construction arrangements, subject to the following conditions:

- A prerequisite for approval of this CTPM, the proponent is to implement the temporary Left in Left Out (LILO) arrangement, prior to commencement, as approved by the deed
- Proponent is to obtain separate approval of the Traffic Signal Plan by TfNSW Greater Sydney Customer Journey Planning, Network Operations.
- Any Traffic Guidance Schemes (TGS) prepared are to comply with AS1742.3 and Transport for NSW's "Traffic Control at Worksites" manual and be signed by a person with TfNSW certification to prepare a TGS.
- Proponent must apply and obtain approval from the Transport Management Centre for a Road Occupancy Licence (ROL) for any required lane closures and/or Speed Zone Authorisations as part of the ROL that may impact the state road network or is within 100m of traffic signals.

Access to be maintained for residents, businesses and emergency vehicles at all times.

No marshalling or queuing of construction vehicles is to occur on public roads. Arriving vehicles that are not able to use parking bay/work zone must continue to a holding point until space becomes available.

When heavy vehicles are entering or leaving the site a traffic controller is to be provided to manage any conflicts between pedestrians and heavy vehicles.

- Transport for New South Wales reserve the right to alter the CTMP Conditions at any time to maintain safe and efficient traffic and pedestrian movements in this area.
- Any approved Works Zone should only be used for work activities. No infrastructure, including bins, tanks or traffic control equipment should be left on the road when the works zone is not in use by a vehicle. All non-vehicular items must be contained with the work area and not on the carriageway. When a work zone is not in use, the area/lane must be opened up to allow for normal trafficable conditions
- Should TfNSW Network and Asset Management, Network Operations, CJP Operations, Network and Safety or other TfNSW business area determine that that more information is to be provided for review and acceptance, including other TCS locations, this information must be submitted prior to the CTMP being implemented, or otherwise agreed upon.
- Any traffic control devices, including signage and line marking, should be installed by the proponent and must conform with Australian Standards 1742

Endorsement of the CTMP is not an approval to the type of traffic management or delineation devices used, nor is it an approval to any traffic guidance schemes depicted within the CTMP. It is assumed that the proponent has used type approved devices and has developed its traffic guidance schemes in accordance with the relevant Australian Standards and Guidelines.
The proponent is to ensure local residents, businesses, schools and other stakeholders in the affected area as well as emergency service organisations are notified of the changes associated with the CTMP, prior to its implementation. Please ensure this CTMP is shared and adhered to by all contractors. If the CTMP changes, please forward a copy to Developments.CJP@transport.nsw.gov.au or further review and endorsement.

Operational Change| Customer Journey Planning | Greater Sydney
25 Garden Street Eveleigh NSW 2015
Transport for NSW

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Appendix F. Initial Vehicle Management Plan (VMP)

Items and locations shown are indicative only and subject to change to suit site conditions and staging requirements

APPENDIX J

Soil and Water Management Plan

ABN: 75 616 518 211

CEVA LOGISTICS - WAREHOUSE 1

ASPECT INDUSTRIAL ESTATE AT

MAMRE ROAD, KEMPS CREEK

SOIL & WATER MANAGEMENT

PLAN

August 2022 - Revision 1

Prepared for:

RICHARD CROOKES CONSTRUCTIONS

Prepared by:

ANDREW LITTLEWOOD

CPESC & Senior Soil Conservationist

Rubicon Enviro Pty Ltd | ACN: 616 518 211 | P O Box 7111, Redhead NSW 2290 M. 0429 953 626

E. andrew@rubiconenviro.com.au | W. www.rubiconenviro.com.au

ABN: 75 616 518 211

Document Status

Rev No.	Date	Revision Description	Prepared by	Reviewed		Approved	
				Name	Date	Name	Date
0	15/08/2022	Revision 0	A Littlewood				
1	02/12/2022	Revision 1	A Littlewood				

Document Authorship Information

Project	CEVA Logistics - Warehouse 1 - Aspect Industrial Estate at Mamre Road, Kemps Creek
Document	Soil & Water Management Plan
Document Author	Andrew Littlewood – Senior Soil Conservationist
Qualification	Certified Professional in Erosion and Sediment Control (CPESC No. 5988).
Relevant Training	• SEEC and IECA (Australasia) – 'Water Management on Construction sites' & 'Preparing and Reviewing Plans for Soil and Water Management' – 2009 • University of Western Sydney and Hawkesbury Global Ltd - Certificate of Attainment in Soil and Water Management for Urban Development - 2000
Experience – Years	22 years (2000 – 2022)
Current Employment	Director & Principal - Rubicon Enviro Pty Ltd (2016-2020)
Previous Employment	Senior Soil Conservationist & CPESC – TREES Pty Ltd (2008-2016)
Previous Employment	Erosion and Sediment Control Officer - Lake Macquarie City Council (2000 – 2007)
Professional Affiliations	Member of International Erosion Control Association (Australasia)

Contents

APPENDICES

Appendix A: Erosion & Sediment Control Plan

- Appendix A: Site Characteristics & Revised Universal Soil Loss Equation Assessment
- Appendix B: RUSLE Catchment Assessment & Sediment Basin Calculations
- Appendix C: Site Dewatering Procedure
- Appendix D: Site Dewatering Discharge Record
- Appendix E: Wet Weather Contingency Procedure
- Appendix F: Progressive Erosion & Sediment Control Plans
- Appendix G: Standard drawings

REFERENCED DOCUMENTS

Name of Document	Prepared by	Date
Aspect Industrial Estate - Environmental Impact Statement	Urbis Pty Ltd	November 2020
State Significant Development - Staged Development Application Consent No. SSD-10448	Department of Planning and Environment	May 2022
Pavement Plan	AT&L	April 2022
State Significant Development - Staged Development Application Consent No. SSD-10448-MOD-2	Department of Planning and Environment	November 2022

TABLES

FIGURES

1.0 INTRODUCTION

1.1 Context

Rubicon Enviro Pty Ltd (Rubicon) has been engaged by Richards Crookes Constructions (RCC) to prepare a Soil and Water Management Plan (SWMP) to support the construction of a proposed warehouse for CEVA Logistics which is known as Warehouse 1 (Lot 1) at Aspect Industrial Estate (AIE) at Mamre Road, Kemps Creek NSW 2178 (the Project).

This SWMP has been prepared to detail strategies and measures to assist with the management of soil and water impacts for the duration of earthworks, service installations and construction works at the Project site.

This SWMP is required to support the CEMP and has been prepared to address the requirements of a Development Application - State Significant Development (SSD) 10448 and subsequent Modification No. 2 (MOD2), and the Environmental Impact Statement, titled 'Aspect Industrial Estate - Environmental Impact Statement' prepared by Urbis Pty Ltd, dated November 2020.

1.2 Project Background

Aspect Industrial Estate (AIE) is a regional warehouse, distribution and industrial centre located at Kemps Creek within the Penrith local government area (LGA) and forms part of the broader Mamre Road Precinct located within the Western Sydney Employment Area.

Mirvac Property Services (Aust) Pty Ltd (Mirvac) obtained the Consent for SSD 10448 on 24 May 2022 from the Department of Planning and Environment (DPE) for the AIE Concept Proposal and Stage 1 Development of the AIE (AIE – Stage 1). The AIE Concept Proposal & Stage 1 comprises:

- A Concept Proposal for the staged development of an industrial estate comprising of 11 buildings with a total GFA of up to 247,990 square metres (m2) for industrial, warehousing and distribution centres, and café uses.
- Stage 1 development comprising site preparation works, vegetation clearing, realignment of the existing creek, construction of access roads and eastern half of Mamre Road/ Access Road 1 intersection works, construction, fit out and operation of one warehouse and one industrial building with ancillary offices, car parks, landscaping, signage and a café, construction and operation of services and utilities, and subdivision of the site into three lots.

In accordance with the Conditions A10 and A19 of Schedule 2 of SSD 10448, an 'Indicative Building Staging Plan' was approved on 17 June 2022, for the construction of AIE – Stage 1 which includes:

- Bulk Earthworks (BEW) & Infrastructure: Estate-wide earthworks, infrastructure, and services,
- Building Works: Construction and use of warehouse and distribution centre buildings proposed in Lots 1 and 3

Subsequent to the Stage 1 SSD Approval, a Modification Application (SSD-10448 MOD 2) was lodged, and a Modification Report was prepared by Urbis in June 2022. The MOD 2 Application seeks changes to both the Concept Plan and Stage 1 works plans. The relevant changes for the construction of 'Warehouse 1' building during Stage 1 are:

'Concept Master Plan

- *Re-location of Access Road 2 further west and the shortening of its length. The modification will re-locate the access road from the area between Warehouse/ Lot 2 and Warehouse/ Lot 3 to between Warehouse/ Lot 1 and Warehouse/ Lot 2.*

- *Adjustment of Lot 1, 2 and 3 configurations, site areas and warehouse alignments in accordance with the re-located Access Road 2 and new driveway connection.*
- *Adjusted car parking provision and hardstand areas across Lots 1, 2 and 3.*

Modifications to the Warehouse 1 built form including:

- *A decrease in warehouse GFA from 34,970sqm to 32,686sqm.*
- *Relocation of car parking to the south of the Warehouse 1 building with ingress/ egress relocated from Access Road 1 to Access Road 2.*
- *Provision of loading and hardstand areas along the north, east and west of the warehouse, including the introduction of hardstand, awnings and Roller Shutter Doors (RSDs) to the Mamre Road building frontage.*
- *Revised vehicular access arrangements with a 9.6m wide truck entry/exit way off Access Road 1 and two truck entry/exit ways off Access Road 2.*
- *Increase in overall warehouse ridge height from 13.7m to 16m, plus rooftop plant & equipment (18.4m at the maximum plant height).*
- *Updated landscaping provision across the surrounding area.*

The Mod 2 development consent was granted by DPE on 30/11/2022 for the revisions to the proposed layouts for warehouses and access roads, however, no changes were made to the relevant conditions of the Development Consent SSD 10448.

Prior to any works commencing that are the subject of this SWMP, the site will have had bulk earthworks undertaken by others under the approval of Development Consent SSD 10448 & Mod 1-2 for the Concept Proposal and Stage 1 Development.

1.3 Project Overview

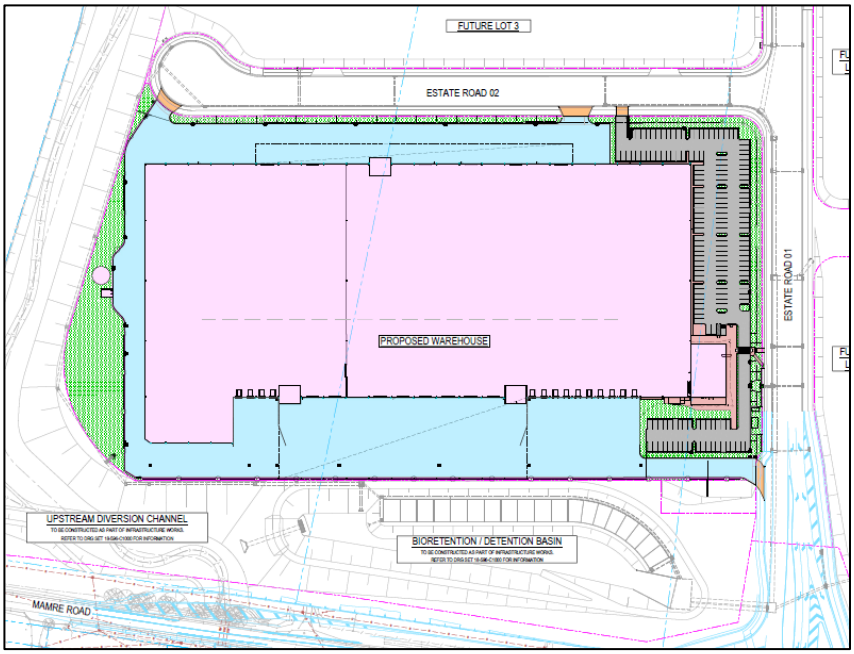
This SWMP addresses the management requirements for the bulk earthworks, services & infrastructure, drainage & operational stormwater, and construction of the Warehouse 1 development.

Key components of the project include:

- Site establishment and installation of environmental controls,
- Earthworks including excavation and filling for building pads, underground services, piling works & footings,
- Retaining wall construction,
- Structural steel frame erection,
- Installation of roofing, wall cladding, and internal services,
- Formwork, steel reinforcement fixing and internal concrete floor pours and external concrete apron pours, including asphalt light vehicle parking area,
- Internal fit out and services works.

The Project layout is shown below in Figure 1.3.

Figure 1.3: Warehouse 1 on Lot 1 at Aspect Industrial Estate at Mamre Road, Kemps Creek.
(Reproduced from AT&L Pavement Plan – April 2022)



1.4 Environmental management systems overview

The SWMP forms part of RCC's CEMP and the environmental management framework for the project.

The Primary Erosion and Sediment Control Plan (ESCP) has been prepared and is attached to this SWMP as Appendix A. The ESCP describes the intentions and fundamental principles for erosion and sediment control management for the duration of the entire project.

A series of staged Progressive Erosion and Sediment Control Plans (PESCPs) have also been prepared and are attached to ESCP as Appendix F. The PESCPs have been developed by Rubicon in consultation with the RCC construction & environmental personnel engaged on the Project. RCC will also seek the assistance of a Soil Conservationist (Certified Professional in Erosion & Sediment Control - CPESC) to review and oversee revisions of the PESCPs as required by the progression of work stages.

The PESCP's will be developed prior to any construction works commencing in the work zone and will be modified as required when:

- Site conditions evolve.
- Flow paths change.
- Construction activities that affect the characteristics of ground conditions change.

Management measures identified in these plans will be incorporated into site or activity specific Environmental Work Method Statements (EWMS) where required. EWMS will be developed and signed off by environment and management representatives prior to associated works.

A Soil Conservationist (CPESC) will be engaged and consulted throughout construction to provide advice on erosion and sediment control design, installation, maintenance, and the development of PESCPs.

The Project's Development Consent SSD 10448 – Condition D 26 requires that monthly soil and water management inspections are to be undertaken by a Soil Conservationist (CPESC) until the site has attained a degree of permanent stabilisation measures in accordance with 'Managing Urban Stormwater: Soils and Construction'. Landcom, Volume 1 (4th Edition) March 2004 (reprinted 2006) (known as the "Blue Book").

Used together, the CEMP, SWMP strategies, ESCP procedures, PESCP's and EWMS form management guides that clearly identify required environmental management actions for reference by the RCC's personnel and sub-contractors.

The RCC document review and control processes for this Plan are described in the Project CEMP.

2.0 PURPOSE & OBJECTIVES

2.1 Purpose

The purpose of this Plan is to describe how RCC will manage and minimise soil and water impacts during construction of the project.

2.2 Objectives

The key objective of the SWMP is to ensure that the potential impacts to soil and water quality are minimised. To achieve this objective, RCC is required undertake the following:

- Ensure appropriate controls and procedures are implemented during construction activities to avoid or minimise erosion and sedimentation impacts and potential impacts to water quality in creeks, waterways, and groundwater adjacent to the Project.
- Ensure compliance with the Consent Conditions of the Development Application approval by CCC, and the CCC Development Control Plan 2021, Part G – Miscellaneous Development Controls.
- Ensure appropriate measures are implemented to address the relevant mitigation measures detailed in the CMP, SWMP, ESCP, PESCP's & EWMS.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 3.1 of this Plan.

2.3 Targets

The following targets have been established for the management of soil and water impacts during the project:

- Ensure compliance with the relevant legislative requirements and environmental safeguards.
- Meet New South Wales Environment Protection Authority (NSW EPA) water quality discharge parameters for all planned water discharges and site dewatering.
- Manage downstream water quality impacts attributable to the project (i.e., maintain waterway health by avoiding the introduction of nutrients, sediment, and chemicals outside of that permitted by the NSW EPA and ANZECC guidelines).
- Ensure training on soil and water management is provided to all construction personnel through targeted training, site inductions and toolbox talks.

3.0 ENVIRONMENTAL REQUIREMENTS

3.1 Relevant legislation and guidelines

3.1.1 Legislation

Legislation and regulations relevant to soil and water management includes:

- *Environmental Planning and Assessment Act 1979* (EP&A Act).
- *Environmental Planning and Assessment Regulation 2000.*
- *Protection of the Environment Operations Act 1997* (POEO Act).
- *Water Management Act 2000.*
- *National Parks and Wildlife Act 1974*

Section 120 of the NSW POEO Act states that it is illegal to pollute waters. Under the POEO Act, 'water pollution' includes introducing litter, sediment, oil, grease, wash water, debris, and flammable liquids such as paint etc. into waters or placing such material where it is likely to be washed or blown into waters or the stormwater system or percolate into groundwater. All feasible steps should be taken to minimise the risk of pollution of waters.

3.1.2. Guidelines and standards

The main guidelines, specifications, and policy documents relevant to this Plan include:

- Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (EPA, March 2004).
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000).
- 'Bunding & Spill Management. Insert to the Environment Protection Manual for Authorised Officers' - Department of Environment and Conservation (DEC) 1997.
- Draft Technical Guidance for achieving Wianamatta South Creek Stormwater Management Targets (NSW Government, 2022);
- 'Managing Urban Stormwater: Soils and Construction. Volume 1' (known as the "Blue Book") (Landcom 2006).
- 'Managing Urban Stormwater: Soils and Construction - Volume 2A Installation of Services' (DECCW 2008).
- Water quality guidelines for the protection of aquatic ecosystems for lowland rivers and estuaries. (ANZECC, 2000).

3.2 Environmental management measures

The requirement for environmental safeguards and management measures are detailed in Development Consent SSD 10448, and they have remained unchanged for the MOD 2 Development Consent. The environmental management measures relevant to this Plan are listed Table 3-2 below. This includes reference to required outcomes, the timing of when the commitment applies, and the mitigation and management measure summary.

Table 3-2: Management measures relevant to construction soil and water management for the Development Consent SSD 10448.

Consent Condition	Requirement	Timing	Mitigation & Management
Condition D25	*'Prior to the commencement of any construction or other surface disturbance, the Applicant must design and detail the erosion and sediment control measures for the site to ensure the construction phase Integrated Water Cycle Management (IWCM) controls in the Mamre Road Precinct Development Control Plan (MRP DCP) are achieved. Detailed Erosion and Sediment Control Plans (ESCP) and drawings must:* *(a) be prepared by a Chartered Professional Erosion and Sediment Control (CPESC) specialist;* *(b) be prepared in accordance with Managing Urban Stormwater: Soils and Construction – Volume 1: Blue Book (Landcom, 2004) and with the WSUD design principles set out in the Draft Technical Guidance for achieving Wianamatta South Creek Stormwater Management Targets (NSW Government, 2022);* *(c) demonstrate the construction approach and timing to ensure the construction phase stormwater quality targets can be met; and* *(d) be included in the CEMP required by condition E2'*	Commencement duration and completion	• A Soil and Water Management Plan (SWMP) and associated Primary ESCP has been prepared by a CPESC, and they form part of the CEMP prepared for the development. The SWMP & ESCP detail the standards and specific management and mitigation measures. • The SWMP and Primary ESCP have been prepared in accordance with Managing Urban Stormwater: Soils and Construction – Volume 1: Blue Book (Landcom, 2004) and with the WSUD design principles set out in the Draft Technical Guidance for achieving Wianamatta South Creek Stormwater Management Targets • RCC to install, monitor and maintain sediment and erosion control measures as detailed in Table 6.1 of the SWMP and Table 9 of the ESCP which should ensure the construction phase stormwater quality targets will be met.
Condition D26	*'The Applicant must ensure delivery and operation of all construction phase erosion and sediment controls on the site is supervised and certified by a CPESC. Monthly audits are to be completed by CPESC and kept on record for the duration of the construction and an additional 12 months following completion of construction works.*	Commencement duration, completion and 12 months following completion	• A Soil Conservationist (CPESC) has been engaged to provide advice on erosion and sediment control design, installation, maintenance throughout construction stages. • Monthly inspections will be completed by the Soil Conservationist CPESC, and the inspections reports kept on record for the duration of the construction, and an additional 12 months following completion of construction.

4.0 EXISTING ENVIRONMENT

The following sections summarise what is known about factors influencing soils and water quality within and adjacent to the Project boundaries.

4.1 Topography and soil characteristics

The pre-existing land-use of the Project was a highly modified rural landscape, that was largely cleared pasture areas, minimal remnant native vegetation, and a few scattered dwellings. The pre-existing topography of the Project was characterised by relatively uniform, gently undulating rises on the Wianamatta Group shales. The landform to the east comprises of broad round crests and ridges with gently inclined slopes of 5% or less, intersected by a series of permanent and ephemeral watercourses.

Prior to the Stage 1 earthworks, the eastern boundary of the site has the highest elevation of the site, falling to the western boundary of the Project site. The Stage 1 Bulk Earthworks has altered the landform from a gentle, northwest facing slope to be an engineered pad that is largely at grade with Estate Road 1 on the eastern boundary, with a fill formation that forms a batter on the western side. The Project site is rectangular in shape and with an average grade of <1%. The eastern boundary of the site has the highest elevation of the site at falling to western boundary of the Project site.

Further reference to NSW Office of Environment & Heritage website resource '*eSPADE'*, identified the extent and characteristics of the 'Blacktown' (bt) soil landscape unit, and the 'South Creek' (sc) soil landscape unit that underlay the project footprint,

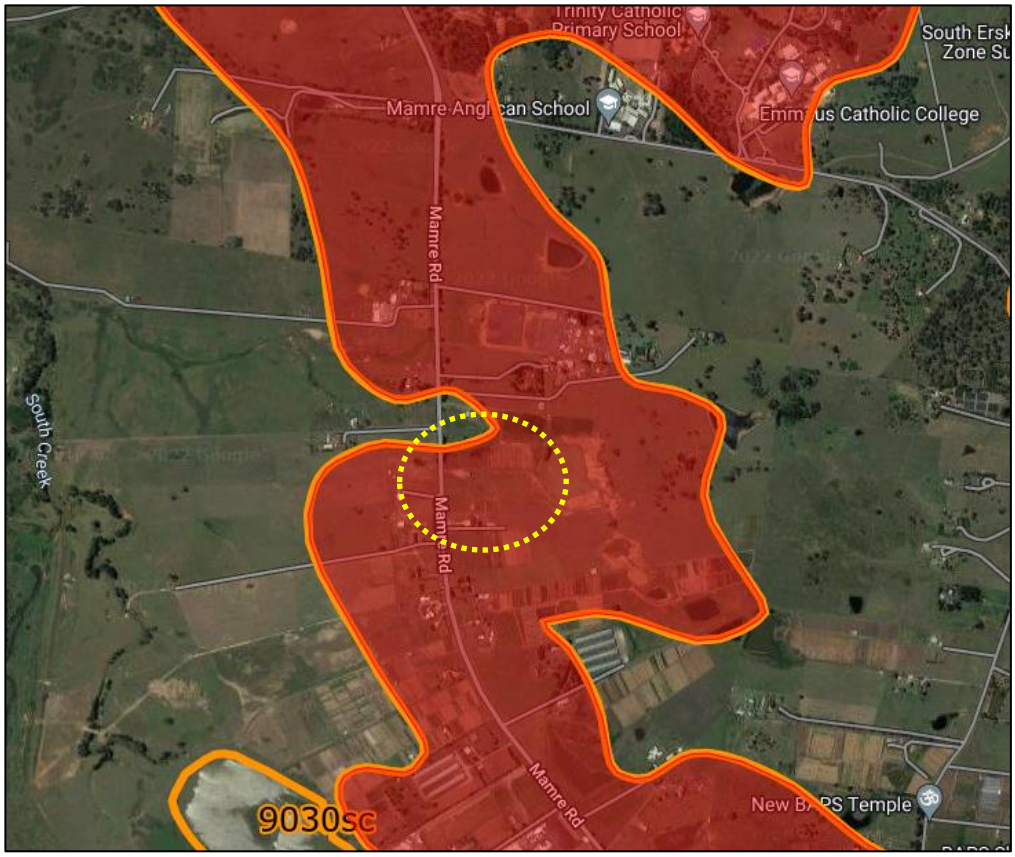
4.1.1. 'Blacktown' (bt) landscape unit

The 'Blacktown' landscape unit is the predominant soil landscape in the western Sydney area. The soil landscape occurs over the Wianamatta Group and Ashfield Shale which consists of laminite and dark grey siltstone, Bringelly Shale which consists of shale with occasional calcareous claystone, laminite and infrequent coal, and Minchinbury Sandstone consisting of fine to medium-grained quartz lithic sandstone.

The soils are characterised by Red and Brown Podzolic soils on mid to upper slopes grading to Yellow Podzolic soils on lower slopes and drainage lines.

The erosion hazard of the varying soil types is rated as Slight to Moderate for non-concentrated flows, ranging to Moderate to High for concentrated flows. Other physical limitations of the landscape unit include hard setting soil profiles, moderately reactive deep clays and High shrink-swell potential (localised). The chemical soil characteristics include generally acidic soils (pH commonly ranging from 5.0 – 7.0), low to moderate fertility, and localised sub-soil salinity.

Figure 4.1.1 – Extract map of the occurrence of the 'Blacktown' (bt) soil landscape unit from NSW Office of Environment & Heritage website resource 'eSPADE'



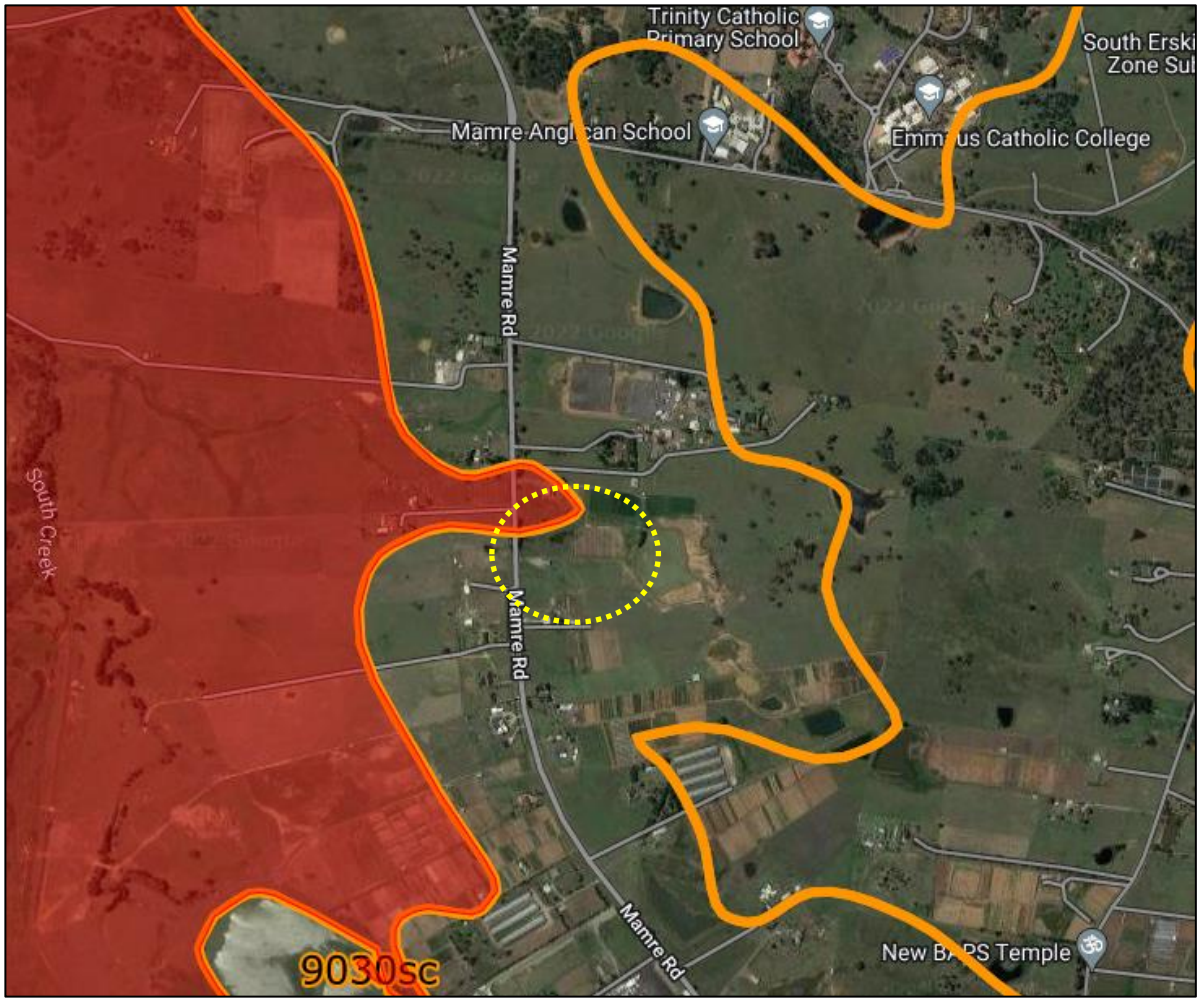
4.1.2. 'South Creek' (sc) landscape unit

This 'South Creek' soil landscape commonly occurs over the present active floodplain of many drainage networks of the Cumberland Plain. The topography consists of floodplains, valley flats and drainage depressions of the channels on the Cumberland Plain, with slopes being less than 5% generally and local relief of less than 10 metres. The geology is similar to adjoining soil landscapes with Quaternary alluvium derived from Wianamatta Group shales and Hawkesbury Sandstone

The soils commonly encountered are often very deep layered sediments over bedrock or relict soils. Red and Yellow Podzolic Soils are most common on terraces, with small areas of Structured Grey Clays, leached clays, and Yellow Solodic Soils. Structured Plastic Clays or Structured Loams are found in and immediately adjacent to drainage lines

The erosion hazard of this soil landscape is rated as is potentially very high to extreme as the area is an active floodplain and is presently being reworked by fluvial processes. Other physical limitations of the landscape unit include high erodibility, hard setting soil profiles, shrink-swell potential (localised), seasonal waterlogging, localised permanent high water tables, localised stoniness, and soil salinity. The chemical soil characteristics include strongly acidic soils, potential aluminium toxicity, low fertility, and localised potential for sodic soils.

Figure 4.1.2 – Extract map of the occurrence of the 'South Creek' soil landscape unit from NSW Office of Environment & Heritage website resource 'eSPADE'



4.2 Acid Sulphate Soils (ASS)

Potential Acid Sulfate Soils (PASS) are soils that have concentrations of iron sulphide layers that can oxidise when exposed to oxygen generating sulphuric acid. In general, these soils occur less than 5 metres elevation above sea level and are predominantly restricted to low-lying coastal areas, adjoining estuarine areas. More recently, acid sulphate soils have been identified in long-term, drought-affected inland areas where water levels have dropped in waterways and wetlands, exposing acid sulphate material that has subsequently oxidised.

The Project sits at an approximate elevation of 47m AHD and is not considered to be in close proximity to areas ASS affected areas. Further reference to the online soil mapping resource *'eSpade'* (NSW Department of Environment & Heritage) indicate that the site is not situated in an area at risk of Acid Sulphate Soils, with mapping indicating that the closest known occurrence is around the upper reaches of the Parramatta River, which is approximately 20km to the east of the Project, and the upper reaches of the Georges River which is approximately 18km to the south-east of the Project

4.3 Surface water

The proposed development is located to the east of the confluence of Kemps Creek and South Creek, on the South Creek floodplain, which forms part of the larger Hawkesbury-Nepean Basin. The pre-existing drainage patterns have been significantly altered by rural and pastoral activities. The pre-disturbance landform would have been relatively uniform, with undulating rises and alluvial flats occurring across the site, intersected by a series of creeks and tributaries associated with the South Creek drainage system.

The assessment of the existing water quality attributes of the Project catchments noted that vegetation across the Project has been heavily modified for agricultural purposes. Remnant native vegetation structure is only present in a few isolated areas, generally confined to the steeper slopes and adjacent to drainage lines. All drainage lines are almost devoid of riparian vegetation over their length and the contributing catchments have been under scrubbed of low to mid storey native vegetation for the purposes of agriculture.

In general terms, water quality in the area is likely to be typical of aquatic ecosystems that have been disturbed by agricultural practices. Long term agricultural land use has given rise to surface water pollution which would likely exceed the levels considered to be suitable for the sustainability of ecosystem integrity. The pre-existing area did not have water quality treatment measures in place as part of the drainage infrastructure.

The AIE precinct drains to the west via culverts under Mamre Road. The Stage 1 earthworks will re-align and existing unnamed watercourse, and also include the construction of a permanent, large water quality control basin which is located directly adjacent to the western boundary of the Project site.

4.4 Water Quality and Receiving Environment Assessment

The Project activities that have the potential risk of negative impacts on water quality parameters include:

- Installation of erosion and sediment controls.
- Ancillary site preparation, establishment, and operation.
- Bulk earthworks, trenching, earthworks, and underground services service installation.
- In-situ concrete works and concrete curing.
- Stormwater construction and drainage structures.
- Dewatering ‘dirty’ water from site areas and sediment control operations.
- Spills & leaks of fuels & oils from mobile and static machinery.
- Storage of chemicals, fuels & oils.
- Generation of building and construction waste.
- Importing, handling, stockpiling, and transporting materials & resources.
- Plant maintenance.
- General waste generation from compound/s & works areas.

The determination of the assessment of the drainage patterns, the heavily modified existing receiving environments, and the attributes of the receiving waters in the vicinity of the Project have been assessed as ‘standard’ in accordance with Blue Book Volume 1- Sect. 6.3.4 – (f) & Volume 2D – Table 6.1.

4.5 Groundwater

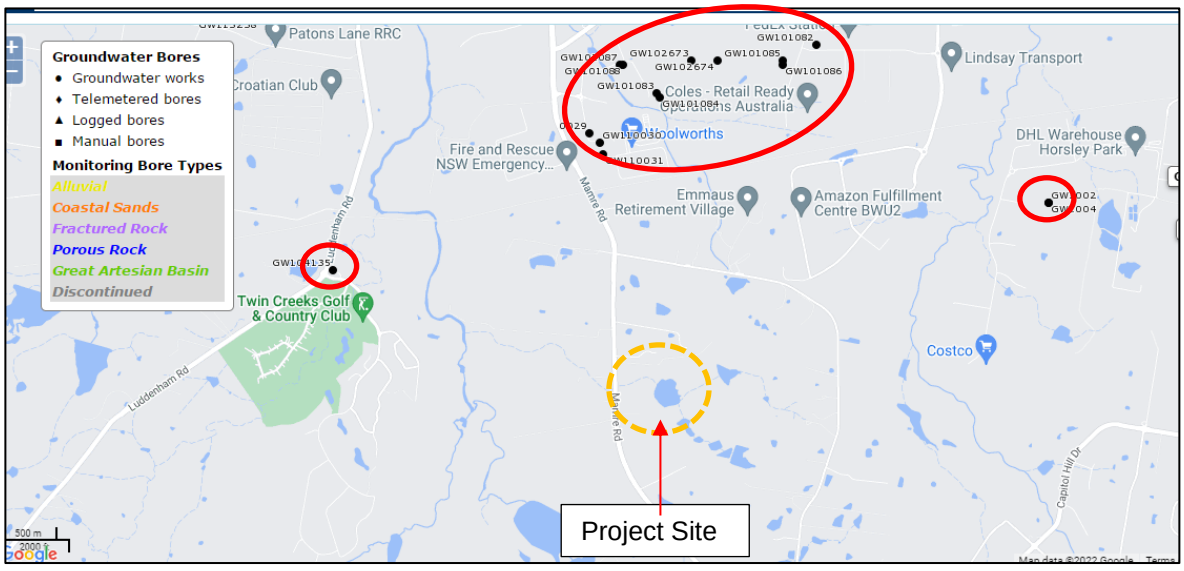
The presence of groundwater primarily impacts on erosion and sediment control during construction with regard to piling, foundation earthworks, trenching for drainage and services, culvert construction, and sediment control construction.

There are no obvious indicators of shallow groundwater sources, however the detectable presence of groundwater at or near the soil surface is highly dependent on seasonality and rainfall rates. Further assessment was undertaken utilising the NSW Groundwater Bore Database (Department of Primary Industries – Water 2018).

The database was reviewed for information on existing groundwater bores in a three-kilometre radius of the Project area. Fourteen (14) groundwater sites were located with the search radius, with the majority of site occurring in a cluster to the north of the Project, approximately 2 to 2.5km distant. Groundwater drill records for several sites were reviewed with final bore depths commonly being 50-60m below ground level. Groundwater table depths were not indicated.

In summary, the assessment indicates that groundwater is not likely to impact on the scope of the Project works. In summary, the assessment indicates that groundwater is not likely to impact on the scope of the Project works, however, construction activities such as piling, foundation earthworks, trenching, culverts, and basin construction should be closely monitored during works.

Figure 4.5 – Extract map from Water NSW of the presence of groundwater bores in the Project vicinity.
(Note: the Project site is circled in a dashed orange line and the nearest groundwater bores indicated are circled in red)



4.6 Rainfall

Rainfall data was assessed from the Sydney Equestrian Centre Automatic Weather Station (AWS), located approximately seven (7) kilometres east-southeast of the Project at Horsley Park. This data was recorded between 1997 to 2022. (Bureau of Meteorology, 2022). The Sydney Equestrian Centre AWS was also selected for the Project as it will provide real time weather monitoring during the proposed construction period.

Rainfall data collected shows that typically rainfall is higher during summer and autumn. Winter and spring are generally drier periods during the year. February is the wettest month, with a mean rainfall total of 124.5 millimetres. Both the mean and median average annual rainfall totals are 780.3 mm and 724.7 mm, respectively.

Table 4-5 below provides a summary of climate data at the weather station.

Table 4-6 - Summary of rainfall records

Summary of rainfall records from 1997 - 2022													
Summer			Autumn			Winter			Spring			Summer	
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Year
Mean rainfall	74.3	124.5	94.5	67.0	42.9	71.3	38.4	39.1	36.4	60.8	78.8	66.2	780.3
Mean rain days >1mm	7.8	7.6	8.7	6.5	5.0	6.3	5.0	4.0	4.7	5.9	7.2	7.2	75.9

Red = highest value blue = lowest value

4.7 Rainfall erosivity factor and design rainfall depth

The rainfall erosivity factor is a measure of the ability of rainfall to cause erosion (referred to as “R” in the Revised Universal Soil Loss Equation - RUSLE). The rainfall erosivity factor is used to determine the soil loss in tonnes per hectare over one year and is used in calculations when sizing construction sediment basins.

The rainfall erosivity factor which is referred to as the ‘R’ Factor has been assessed from an Intensity Frequency Duration Table (see below) prepared for the site based on the 2-year, 6 hours storm event of 9.13 mm/hour. The R Factor value of 1892 is calculated from the 0.5 ‘Exceedances per year’, 6 Hour storm of 9.13 mm/hour being ‘S’, where $R = 164.74(1.1177)^{s}S^{0.6444}$, as per the Blue Book - Appendix A2 & B.

The nearest ‘Blue Book’ centre for detailed rainfall depths is Blacktown which is approximately 13.5 kms north-east of The Project (Blue Book Volume 1- Table 6.3a). As noted above at Section 4.3, the Project was assessed as ‘standard’ in accordance with Blue Book Volume 1- Sect. 6.3.4 – (f) & Volume 2D – Table 6.1, however, we have elected to adopt the 5-day 85th percentile rainfall depth for Blacktown of 32.2mm.

Table 4.7 - Intensity Frequency & Duration Table

Location

Label: Not provided

Latitude: -33.8404 [Nearest grid cell: 33.8375 (S)]

Longitude: 150.7834 [Nearest grid cell: 150.7875 (E)]

Very Frequent Design Rainfall Depth (mm)

Issued: 14 August 2022

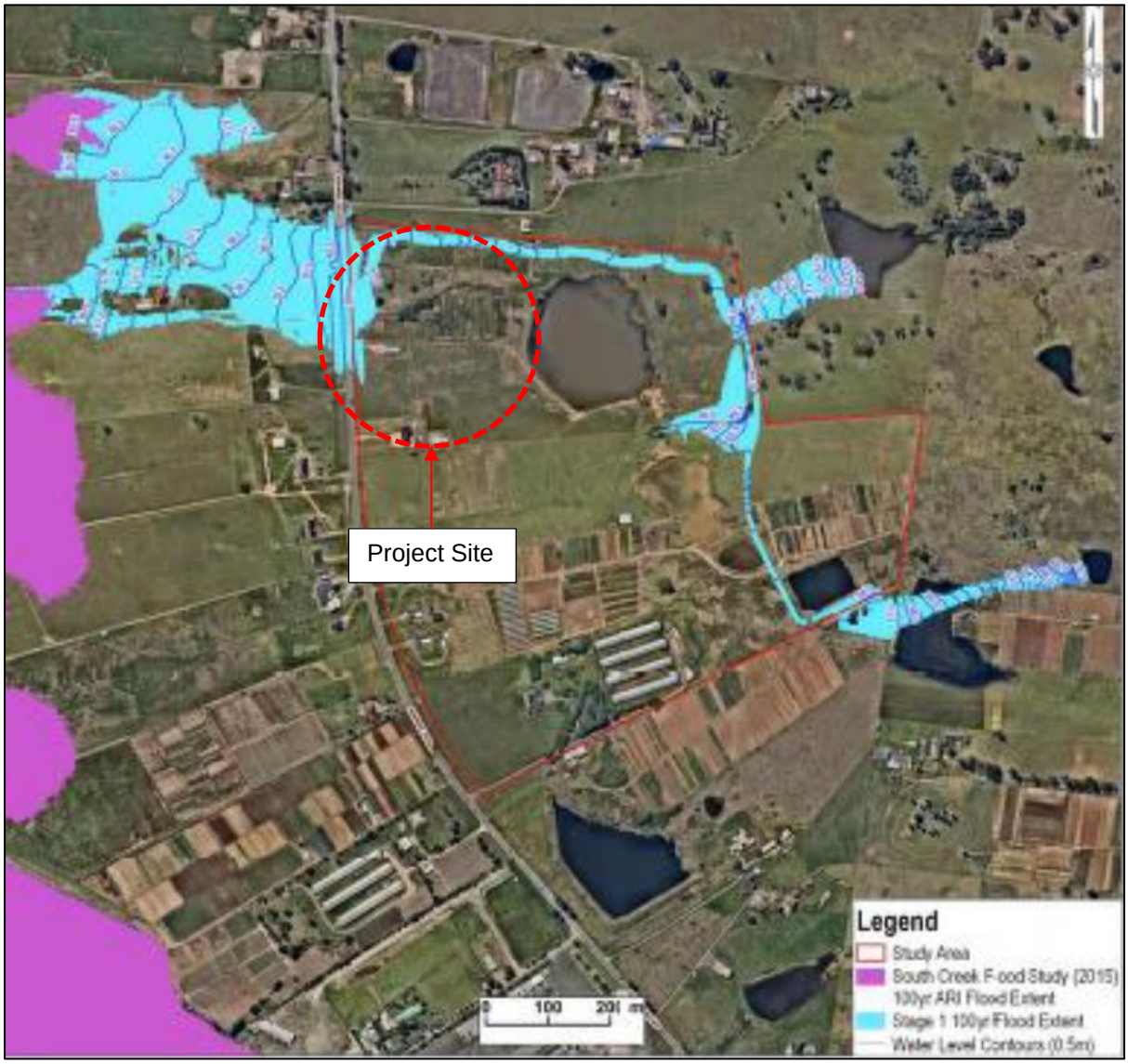
Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
FAQ for New ARR probability terminology

	Exceedance per Year (EY)							
Duration	**12EY**	**6EY**	**4EY**	**3EY**	**2EY**	**1EY**	**0.5EY#**	**0.2EY***
1 min	0.817	0.942	1.17	1.33	1.58	2.03	2.57	3.31
2 min	1.39	1.63	2.01	2.28	2.66	3.32	4.15	5.24
3 min	1.89	2.21	2.75	3.14	3.68	4.61	5.79	7.33
4 min	2.32	2.72	3.41	3.90	4.59	5.80	7.31	9.30
5 min	2.70	3.17	3.98	4.57	5.41	6.87	8.69	11.1
10 min	4.11	4.83	6.13	7.07	8.44	10.9	13.9	18.0
15 min	5.09	5.97	7.57	8.75	10.5	13.6	17.3	22.5
20 min	5.83	6.84	8.67	10.0	12.0	15.6	19.9	25.7
25 min	6.44	7.55	9.55	11.0	13.2	17.1	21.8	28.2
30 min	6.96	8.15	10.3	11.9	14.2	18.4	23.4	30.2
45 min	8.18	9.57	12.0	13.8	16.5	21.4	27.0	34.6
1 hour	9.11	10.6	13.4	15.3	18.3	23.6	29.7	37.7
1.5 hour	10.5	12.3	15.4	17.6	20.9	26.9	33.7	42.5
2 hour	11.7	13.6	17.0	19.5	23.1	29.6	37.0	46.3
3 hour	13.4	15.6	19.5	22.4	26.5	34.0	42.3	52.7
4.5 hour	15.4	18.0	22.5	25.9	30.7	39.5	49.0	60.9
6 hour	17.0	19.9	25.0	28.7	34.2	44.1	54.8	68.1
9 hour	19.6	22.9	28.9	33.4	40.0	51.9	64.7	80.8
12 hour	21.5	25.3	32.1	37.2	44.7	58.4	73.1	91.9
18 hour	24.5	29.0	37.2	43.2	52.3	69.0	86.9	111

4.8 Flooding

As noted above, the eastern boundary of the site has the highest elevation of the site at approximately 47m AHD. Further assessment was undertaken for the flooding risk of the Project site area by reference to the EIS mapping, specifically '*Figure 49 – Extent of Flooding on AIE (Pre-Development)*' and '*Figure 50 Extent of Flooding on AIE (Post-Development)'*. The 'Post Development' Flood Risk Map confirmed the Project building pad is unlikely to be at risk of flooding for the 1% (100-year) ARI Flood Event, however the adjacent re-aligned watercourse and permanent water quality control basin may be impacted by riverine flooding.

Figure 4.8 – Extract of 'Figure 50 - Extent of Flooding on AIE (Post-Development) EIS Flood Mapping"
(Note: The Project site is circled in a dashed red line)



5 ENVIRONMENTAL ASPECTS AND IMPACTS

5.1 Construction activities

Key aspects of the project that could result in adverse impacts to soils and water include:

- Installation of preliminary erosion and sediment controls and establishment of water diversions.
- Establishment of compounds, exclusion zones, and stockpile areas.
- Minor earthworks, site preparation and site access/temporary access roads.
- Trenching and earthworks for service installation.
- In-situ concrete works and concrete curing.
- Operation of internal haulage and access routes.
- Stormwater construction and drainage stabilisation, including temporary sediment controls.
- Dewatering 'dirty' water from site areas and sediment control operations
- Importing, handling, stockpiling, and transporting materials & resources.
- Compound operation including fuel and chemical storage, refuelling and chemical handling.
- Plant maintenance and spills & leaks of fuels & oils from mobile and static machinery.
- Generation of building and construction waste
- General putrescible waste from compound/s & works areas
- Noxious weed treatment including herbicide spraying.
- Topsoil replacement, revegetation, and landscaping
- Landscaping.

5.2 Impacts

The potential for impacts on soil and water will depend on a number of factors. Primarily, impacts will be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment. Potential impacts attributable to construction might include:

- Exposure and disturbance of soils during earthworks, creating the potential for off-site transport of eroded sediments and pollutants.
- Alteration of surface and subsurface flows that could cause disturbances to hydrology and hydraulics.
- Off-site discharge of water containing sediment from dewatering activities.
- Contamination of soils, and surface and groundwater from accidental spills or oil leaks. This might include grease or fuel from machinery and vehicles, construction sites or compounds, or spills of other chemicals that may be used during the course of construction.
- Disturbance of unidentified contaminated land e.g. pesticide/chemical concentrations in soil from historical land use practices, and subsequent generation of contaminated runoff.
- Litter and gross pollutants from construction activities.
- Erosion and sedimentation of active construction zones during construction of the project as a result of a large rainfall event or storm event.

6 ENVIRONMENTAL CONTROL MEASURES

Specific measures and requirements to address soil and water management are outlined in in Table 6-1.

Table 6-1 - Management and mitigation measures

ID	Measure / Requirement	When to implement	Responsibility	Reference
General				
SW1	Training will be provided to all project personnel, including relevant sub-contractors on sound erosion and sediment control practices and the requirements from this plan through inductions, toolboxes, and pre-start briefings.	Pre-construction Construction	Project Manager / Environmental Site Representative	Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW2	A Project Soil Conservationist (CPESC) will be engaged and consulted throughout construction to undertake monthly site inspections and to provide advice on erosion and sediment control design, installation, maintenance, and the development of PESCPs.	Pre-construction Construction	Project Manager / Environmental Site Representative	SSD 10448 Consent Condition D26 Best Practice
SW3	EWMSs may be prepared and implemented to manage soil and water impacts that include but are not limited to: • Activities assessed as having high environmental risk • Activities that impact on environmentally sensitive areas • Activities that pose a risk to receiving water quality • Earthworks including temporary stockpiling and disposal of excavated material and protocols for the management of contaminated material • Work around drainage lines and where construction water may be discharged into natural waterways • Construction and operation of sediment basins including connecting drainage for the associated catchment area; and drainage works.	Construction	Project Engineer / Supervisor / Environmental Site Representative	SSD 10448 Consent Condition D25 Best Practice
SW4	Contaminated soils and Acid Sulfate Soils and / or Potential Acid Sulfate Soils are to be managed in accordance with the Erosion and Sediment Control Plan, which forms Appendix A of this SWMP.	Pre-construction / Construction	Project Manager / Supervisor / Environmental Site Representative	SSD 10448 Consent Condition D25 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A

ID	Measure / Requirement	When to implement	Responsibility	Reference
Erosion and sediment control				
SW5	A Primary Erosion and Sediment Control Plan (ESCP) has been prepared by the Soil Conservationist (CPESC) and is included in Appendix A of this SWMP. The plan includes arrangements for managing wet weather events, including monitoring of potential high-risk events (such as storms) and specific controls and follow-up measures to be applied in wet weather. The Primary Erosion and Sediment Control Plan is to be referred to and considered when preparing progressive erosion and sediment control plans.	Pre-construction and construction	Environmental Site Representative / Project Soil Conservationist	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW6	Progressive Erosion and Sediment Control Plans (PESCPs) will be prepared and implemented in advance of construction. PESCPs will be updated as required.	Pre-construction and construction	Environmental Site Representative / Project Soil Conservationist	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW7	Hardstand material, rumble grids or similar will be provided at exit points from construction areas onto public roads to minimise the tracking of soil and particulates onto public roads.	Pre-construction / Construction	Project Engineer / Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW8	Site compounds, access tracks, stockpile sites and temporary work areas will be designed and located to minimise erosion and temporarily stabilised where required.	Pre-construction / Construction	Project Manager / Supervisor / Environmental Site Representative	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW9	Works will be programmed to minimise the extent and duration of unstabilised soil surfaces.	Pre-construction / Construction	Project Manager / Supervisor / Environmental Site Representative	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A

ID	Measure / Requirement	When to implement	Responsibility	Reference
SW10	Clean and dirty water runoff will be adequately separated to avoid mixing where possible through the use of diversions, clean water drains, and the early installation of permanent drainage infrastructure.	Pre-construction / Construction	Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW11	Stabilisation will be implemented for dormant areas exposed for four weeks or more (including stockpiles and batters); by providing soil surface protection (i.e. geotextile fabric, stabilised mulch, soil binder or spray grass)	Construction	Project Engineer / Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW12	Drains, banks, or diversions will be formed (and stabilised where required) to direct runoff from disturbed areas to sediment basins/sumps or adequate sediment control devices, and away from watercourses or tributary drainage lines. Lip berms and batter chutes with velocity dams will be progressively formed and maintained on fill formations.	Construction	Project Engineer / Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW13	Staged re-vegetation and/or other permanent stabilisation will be implemented in Site areas as work proceeds.	Construction	Project Engineer / Supervisor / Environmental Site Representative	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
Stockpiles				
SW14	Stockpiles will be: • located in designated stockpile sites, above 10-year flood levels, • located at least 5 m from likely areas of concentrated water flows and drainage lines, • topsoil stockpiles formed to heights to no greater than 2 m, and all other soil materials to be no higher than 5m, and batter slopes to be no steeper than 2:1, • established so that any slump of the stockpile will not affect erosion and sediment control measures or infringe on specified minimum clearance requirement,	Construction	Project Engineer / Supervisor / Environmental Site Representative	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A

ID	Measure / Requirement	When to implement	Responsibility	Reference
SW14	• covered or otherwise protected from erosion where stockpiles will be in place for more than 20 days, or temporary stockpiles that are susceptible to wind or water erosion, within 5 days of forming each stockpile. • managed to avoid contamination with noxious weeds and cross-mixing with other stockpiled materials. Weed growth on stockpiles will be monitored and suppressed as required.	Construction	Project Engineer / Supervisor / Environmental Site Representative	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
Water Quality Control				
SW15	Construction sediment basin/s will be designed and constructed in accordance with the requirements and procedures detailed in the Blue Book Volume's 1 & 2D. The construction sediment basin design/s, restoration and revegetation methodology will be formulated and/or reviewed by the Project Soil Conservationist.	Pre-construction / Construction	Project Soil Conservationist / Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW16	All sediment basins will have depth indicators installed that clearly show the sediment storage zone together with basin identification signage basin number.	Pre-construction / Construction	Project Soil Conservationist / Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW17	Run-off from areas within catchments (that are controlled by sediment basins, excavated sumps & compacted mulch sediment traps) is to be diverted to the sediment basins/sumps/traps/tanks in stabilised drainage lines where possible.	Pre-construction / Construction	Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW18	Suitable all-weather access will be constructed and maintained to sediment basins/sumps/traps/tanks to allow for testing, treatment, discharge, and maintenance.	Pre-construction / Construction	Project Engineer / Supervisor / Environmental Site Representative	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW19	Sediment basins/sumps/traps/tanks shall be flocculated with an appropriate approved flocculant (eg. gypsum) using an early dosing system to minimise the	Construction	Supervisor	NSW POEO Act 1997 SSD 10448 Consent Condition D25

ID	Measure / Requirement	When to implement	Responsibility	Reference
	settling time of suspended dispersible and small sediment particles and to maximise the efficiency of the basins.			EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW20	Prior to discharging any water from any sediment basins/sumps/traps/tanks, representative water samples will be obtained and tested to ensure that it meets the NSW EPA water quality criteria.	Construction	Environmental Site Representative / Supervisor	NSW POEO Act 1997 SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW21	Flocculant or coagulant (whether gypsum or another approved material) will be applied to settle suspended sediments as soon as possible after the conclusion of each rain event causing runoff. The cycle time to treat, dewater and return the maximum storage capacity to any individual water quality control device prior to the next rainfall event shall not exceed 5 days.	Construction	Environmental Site Representative / Supervisor	NSW POEO Act 1997 Best Practice Managing Urban Stormwater: Soils and Construction Volume 1
SW22	Subsequent to the initial series of basin sample tests, where a statistical correlation can be demonstrated between turbidity and Total Suspended Solids (TSS), an application may be made to the Principal to allow for the discharge of supernatant waters based on turbidity measurements before confirmatory laboratory data is available.	Construction	Environmental Site Representative	NSW POEO Act 1997 Best Practice Managing Urban Stormwater: Soils and Construction Volume 1
Dewatering				
SW23	Personnel responsible for approval and/or carrying out dewatering activities will be adequately trained and inducted on the dewatering procedures and requirements.	Construction	Environmental Site Representative / Supervisor	Best Practice Managing Urban Stormwater: Soils and Construction Volume 1
SW24	Water to be discharged from site will be discharged in accordance with a Site Dewatering Procedure. In accordance with NSW EPA water quality criteria, the water quality parameters for discharge from site discharge points will be: • Total Suspended Solids <50mg/L • pH 6.5 - 8.5 • Oil & grease – not visible.	Construction	Environmental Site Representative / Supervisor	NSW POEO Act 1997 SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A

ID	Measure / Requirement	When to implement	Responsibility	Reference
SW25	A site dewatering register will be maintained for site areas (other than sediment basins) that require treatment, dewatering, and discharge to off-site areas. The register will record: • dewatering procedure • date and time for each discharge at each location • water quality test results for each discharge • personnel approving the dewatering activities • evidence of discharge monitoring, or risk assessment and mitigation measures used to eliminate the risks of pollution or erosion.	Pre-construction / Construction	Environmental Site Representative / Project Engineer	NSW POEO Act 1997 SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW26	Water captured in water quality control devices and other site works areas will be reused for dust suppression, compaction, or other construction activities where possible. If a proposed source, other than a town water supply or natural water source, procedures will be developed for regular testing to ensure that the water is suitable for the purpose and is not hazardous to health and the environment.	Construction	Environmental Site Representative / Project Engineer / Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW27	All dewatering activities will be subject to prior approval from relevant project personnel. The dewatering activities will be monitored to ensure: • intake suction devices are positioned to prevent extraction or disturbance of settled sediments, • no erosion is occurring at discharge locations and/or downstream areas, • no inadvertent or intentional controlled discharge of untreated waters occurs.	Construction	Environmental Site Representative / Supervisor	NSW POEO Act 1997 SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
Site stabilisation and restoration				
SW28	Management and procedures for site stabilisation will be in accordance with the primary Erosion and Sediment Control Plan at Appendix A of this SWMP.	Construction	Environment Manager / Project Soil Conservationist	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW29	The rehabilitation of disturbed areas will be undertaken progressively as construction stages are completed and in accordance with procedures detailed in the Blue Book Volume's 1 & 2D.	Construction / Post construction	Environmental Site Representative / Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and

ID	Measure / Requirement	When to implement	Responsibility	Reference
				Construction Volumes 1 & 2A
SW30	Restoration of these areas includes; • topsoiling of the areas; • seeding, planting, watering and maintenance; • removal of temporary erosion control devices and of accumulated sediments • removal of unused construction materials and waste materials.	Construction / Post construction	Environmental Site Representative / Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
Spill prevention and response				
SW31	Management for spill prevention and response will be in accordance with the CEMP. An Emergency Spill Response Procedure has been developed in the CEMP.	Pre-construction / Construction	Environmental Site Representative / Supervisor / Project Manager	NSW POEO Act 1997 SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW32	Emergency wet and dry spill kits will be kept on site at locations described within the Emergency Spill Response Management Procedures (ie at compounds). All personnel will be made aware of the spill kit locations and will be trained in their use.	Construction	Environmental Site Representative / Supervisor	NSW POEO Act 1997 SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW33	A schedule of all hazardous materials kept on site during construction will be maintained for the duration of the project.	Construction	Environmental Site Representative / Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Best Practice
SW34	The ancillary facilities will be managed within the ESCP. The following measures will be included to limit sediment and other contaminations entering receiving waterways: • Chemicals will be stored within a sealed or bunded area not within 5 m of any aquatic habitat, any areas of concentrated water flow, flood prone or poorly drained areas, or on slopes steeper than 1:10 • Vehicle movements will be restricted to designated pathways where feasible and appropriate controls will be in place where plant is stored • Areas that will be exposed for extended periods, such as car parks and main access roads, will be stabilised where feasible.	Contractor	Construction	NSW POEO Act 1997 SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A

ID	Measure / Requirement	When to implement	Responsibility	Reference
SW35	All spills and associated environmental incidents are to be reported in accordance with the CEMP, and where applicable, in accordance with Section 148 of the NSW POEO Act 1997.	Construction	Environmental Site Representative / Supervisor	NSW POEO Act 1997 SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
Monitoring and inspections				
SW36	Nominated project personnel will conduct site inspections of erosion and sedimentation controls at least weekly. A Project Soil Conservationist (CPESC) will undertake monthly site inspections and provide a written report detailing identified issues and recommendations for remedial actions.	Construction	Environmental Site Representative / Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW37	All disturbed areas, revegetated/stabilised areas and all permanent and temporary erosion and sediment control works will be inspected: • At least weekly • Immediately before extended site shut down • At the conclusion of all rainfall events exceeding 10mm and during periods of prolonged rainfall as soon as practicable.	Construction	Environmental Site Representative / Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW38	Any rectification measures which are identified will be addressed and / or recorded to ensure appropriate rectification within the nominated timeframe. The timeframe for rectification works is based on a risk assessment of deficiencies in controls, being; • High: within 24 hours of inspection • Medium: within 3 working days of inspection; and • Low: within 3 working days of inspection.	Construction	Environmental Site Representative / Supervisor	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A
SW39	Monitoring of rainfall events (with observations of rainfall in millilitres) will be undertaken daily during normal work days.	Construction	Environmental Site Representative	SSD 10448 Consent Condition D25 EIS Section 6.1 - Table 41 Managing Urban Stormwater: Soils and Construction Volumes 1 & 2A

7 COMPLIANCE MANAGEMENT

7.1 Roles and responsibilities

The RCC Project Team's organisational structure and overall roles and responsibilities are outlined in CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 6 of this Plan.

7.2 Training

All employees, contractors and utility staff working on site will undergo site induction training relating to soil and water management issues. The induction training will address elements including:

- Existence and requirements of this sub-plan.
- Relevant legislation.
- Incident response, management and reporting.
- Roles and responsibilities for soil and water management.
- Water quality management and protection measures.

Targeted training in the form of toolbox talks or specific training will also be provided to personnel with a key role in soil and water management. Examples of training topics include:

- ERSED control installation methodology.
- Sediment basin/sump/trap/tank construction, operation, and maintenance.
- Working near or in drainage lines.
- Emergency response measures in high rainfall events.
- Preparedness for high rainfall events.
- Lessons learnt from incidents and other event e.g., high rainfall/flooding.
- Spill response.
- Stockpile location criteria.

7.3 Monitoring and inspection

Regular monitoring and inspections will be undertaken during construction. Monitoring and inspections will include, but not be limited to:

- Immediate areas and drainage lines adjacent to the Project area
- Construction water quality control devices prior to discharge.
- Weekly and post rainfall inspections to evaluate the effectiveness of erosion and sediment controls measures in accordance with Table 6-1.

Table 7-3 Inspection Schedule

Activity	Frequency	Location	Responsibility	Record
Environmental Site Inspection	Weekly	Site wide	Environmental Site Representative	Site inspection log
Rainfall Inspection (10mm or greater rainfall).	Prior to rainfall event, during event, within 24 hours after the event	Site wide	Environmental Site Representative	Site inspection log
Soil Conservationist (CPESC) site inspections	Monthly	Site wide	Environmental Site Representative	Inspection Report

7.4 Licences and permits

The water quality discharge criteria for the project are listed below, in Table 7-4.

Table 7-4 Discharge water quality criteria

Parameter	Criteria	Sampling method	Frequency
pH	6.5 –8.5	Probe	Daily during any discharge
Total Suspended Solids*	50 mg/L	Grab Sample	Daily during any discharge
Turbidity	TBA following correlation with TSS results	Probe or Grab Sample	Likely to be required daily during any discharge
Oil and Grease*	No visible	Visual inspection	Daily during any discharge

Any other relevant licences or permits will be obtained in the lead up to and during construction as required.

7.5 Weather monitoring

A rain gauge to be installed in the main compound will be used in the monitoring of rainfall events. The Wet Weather Contingency Procedure is detailed in the Project ESCP at Annexure E.

7.6 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental mitigation and management measures, compliance with this plan and other relevant approvals, licences, and guidelines.

7.7 Reporting

Reporting requirements and responsibilities are documented in the ESCP at Annexure E.

8 REVIEW AND IMPROVEMENT

8.1 Continuous improvement

Continuous improvement of this Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives, and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance.
- Determine the cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies.
- Verify the effectiveness of the corrective and preventative actions.
- Document any changes in procedures resulting from process improvement.
- Make comparisons with objectives and targets.

8.2 SWMP update and amendment

Any revisions to the SWMP will be undertaken in response to a change in the Project scope or staging, or in the event of an unexpected soil or water hazard emerging.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with RCC document control procedures.

Appendix A
Erosion and Sediment Control Plan

APPENDIX K

Salinity Management Plan

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Our Ref: PSM3739-031L

27 May 2022

Senior Development Manager
Mirvac
Level 28, 200 George Street
SYDNEY NSW 2000
russell.hogan@mirvac.com

Attention: Russell Hogan

Dear Russell

**RE: MIRVAC ASPECT INDUSTRIAL ESTATE -
788-904 MAMRE ROAD, KEMPS CREEK
CONSTRUCTION - SALINTY MANAGEMENT PLAN**

1. Introduction

This letter presents Construction Salinity Management Plan for the proposed Aspect Industrial Estate (AIE) development located at 788-904 Mamre Road, Kemps Creek NSW (the Site). This work has been undertaken following Mirvac's request in a meeting on 23 May 2022.

The plan has been prepared to address the requirements in NSW Government Department of Planning and Environment for Aspect Industrial Estate (SSD-10448).

This plan is prepared for the whole AIE and generally adheres to the requirements stipulated in the overarching Construction Environmental Management Plan (CEMP).

1.1 Development Overview

The site is located within the suburb of Kemps Creek, which falls within the Penrith LGA. It is in the Mamre Road Precinct within the broader Western Sydney Employment Area (WSEA) and is currently surrounded by rural land uses.

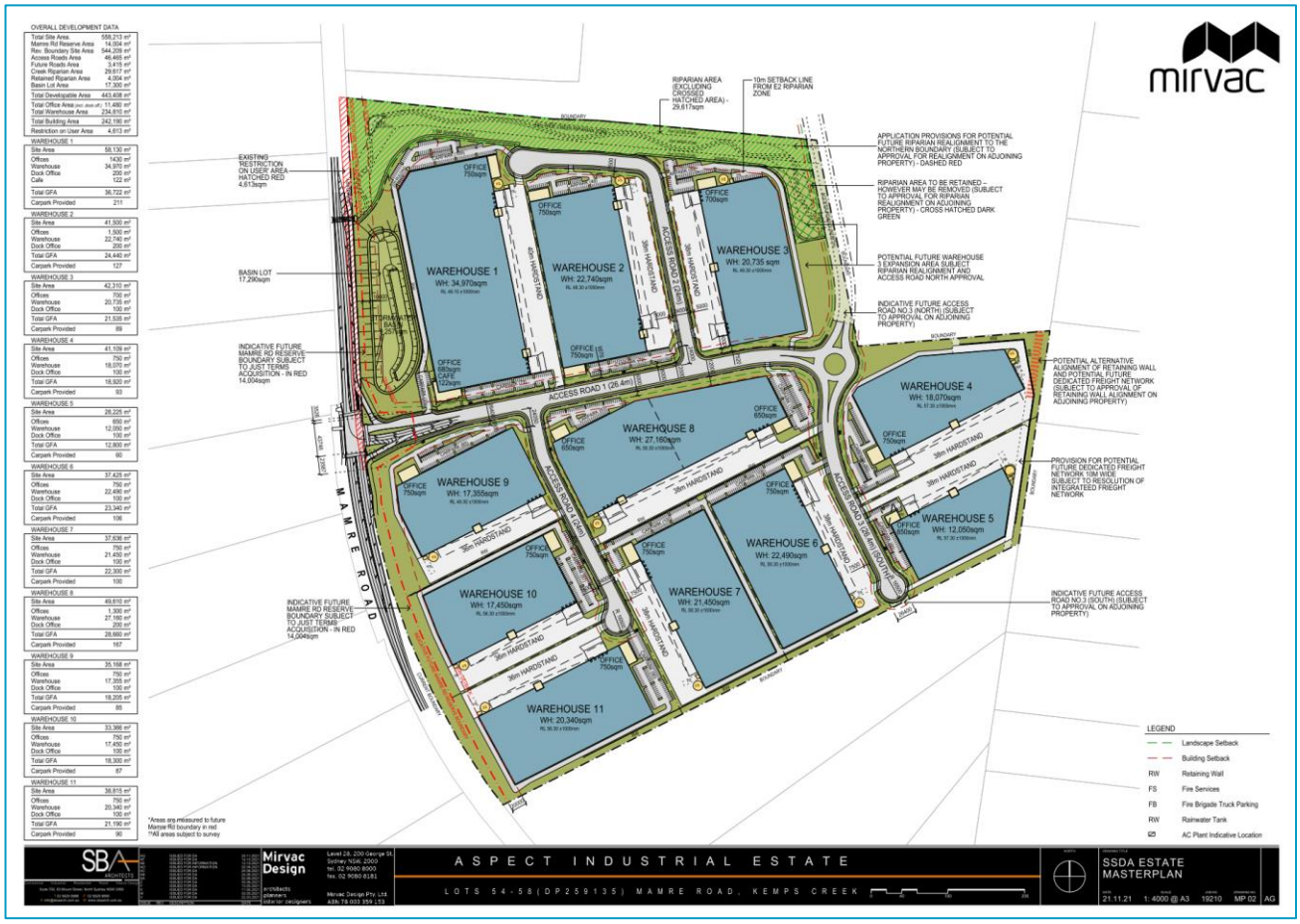
The site is bounded by Mamre Road to the west and agricultural uses to the north, south and east. The historic land uses on the site include rural residential, grazing, dairy farming, poultry farming and horticulture. This land is identified for future employment land, as this site and the broader Mamre Road Precinct has recently been rezoned to, primarily, IN1 General Industrial under the WSEA State Environmental Planning Policy (SEPP).

The Development Consent for the AIE was granted for the AIE 'Concept Proposal', 'Stage 1 Development' and all subsequent development stages. The Concept Proposal essentially comprises a 'Master Plan' to guide the staged development of AIE and core development controls that will form the basis for design and assessment of future development applications for the site. It includes:

- Buildings, internal road network layout, building locations, gross floor area (GFA), car parking, concept landscaping, building heights, setbacks and built form parameters

- Detailed Stage 1 Development of the AIE including:
  - Pre-commencement works including demolition and removal of existing rural structures, site remediation works as defined within the Remediation Action Plan, and heritage salvage works (if applicable)
  - Subdivision construction works including creation of roads and access infrastructure, clearing of existing vegetation, realignment of existing creek and planting, on-site bulk earthworks, construction of boundary retaining wall, delivery of stormwater infrastructure, trunk service connections, utility infrastructure, boundary stormwater management, fencing and landscaping, construction and dedication of internal road network to Penrith City Council, and construction and operation of signalised intersection with Mamre Road
  - Building works including construction and fit out of two warehouse and distribution buildings in Stage 1 on Warehouses 1 and 3 which will operate 24 hours/day, seven days/week and construction and fit out of a café, which will operate 12 hours/day, seven days/week
  - Subdivision of Stage 1, and Signage.

This plan has been prepared to cover the construction of AIE (Inset 1) by Construction Contractor.



Inset 1: Aspect Industrial Estate Masterplan.

1.2 Objective of the Construction – Salinity Management Plan

The objective of the Construction Salinity Management Plan (CSMP) is to effectively manage site salinity, to minimise the effect of the proposed development on the salinity processes and to protect the proposed development from salinity damage. All works are to conform with the Western Sydney Salinity Code of Practice June 2003.

2. Statutory Requirements

The Development Consent (SSD 10448) requirements stipulated for the construction of AIE, and where they have been addressed in this plan, are shown in Table 1.

Table 1 – Assessment against SSD 10448 Conditions

Conditions	PSM Response
Salinity Management *D36. The Applicant must prepare a Salinity Management Plan, which must form part of the CEMP in accordance with Condition E2, that addresses all aspects of the Stage 1 development. The Applicant must implement the most recent revision of the Salinity Management Plan for the duration of construction.*	This document is the Construction Salinity Management Plan prepared to address the Condition.

3. Project Overview

3.1 Surrounding Land Uses

The AIE Site is located within the Mamre Road Precinct, which is a part of the wider Western Sydney Employment Area (WSEA). AIE is surrounded by other rural properties with multiple existing residences located within 100 m of the nearest Site boundary, Inset 2.

Inset 2: Nearmap Aerial Photograph of the Site.

3.2 Construction Activities

Based on information provided by Mirvac, construction at AIE is scheduled to commence in mid-2022 (tbc) and be completed over a duration between 2-3 years, subject to authority approvals and inclement weather delays. The construction activities will be staged and are summarised in Table 2.

Table 2 – Construction Staging and Activities

Stage	Stage Length	Activities
Phase 1	8-12 weeks	Demolition
Phase 2	12-18 months	Excavation
Phase 3	12-24 months	General Construction

4. Relevant Guidelines

Department of Land and Water Conservation 2002 – Site Investigation for Urban Salinity provides the following salinity assessment guide for soil types and soil salinity classes.

TABLE 6.1 FACTORS FOR CONVERTING EC (1:5) TO ECe

Soil Texture Group[8]	Multiplication Factors[9]
Sands have very little or no coherence and cannot be rolled into a stable ball. Individual sand grains adhere to the fingers.	17[10]
Sandy loams have some coherence and can be rolled into a stable ball but not to a thread. Sand grains can be felt during manipulation.	14
Loams can be rolled into a thick thread, but this will break up before it is 3-4 mm thick. The soil ball is easy to manipulate and has a smooth spongy feel with no obvious sandiness.	10
Clay Loam can be easily rolled to a thread 3-4 mm thick but will have a number of fractures along its length. The soil is becoming plastic, capable of being moulded into a stable shape.	9
Light clays can be rolled to a thread 3-4 mm thick without fracture. Plastic behaviour evident, smooth feel with some resistance to rolling out.	8.5
Light medium clay is plastic and smooth to the touch and will form a ribbon of 7.5cm.	8
Medium clay handles like plasticine, forms rods without fracture, has some resistance to ribboning shear, ribbons to 7.5cm or more.	7
Heavy clays can be rolled to a thread 3-4 mm thick and formed into a ring in the palm of the hand without fracture. They are smooth and very plastic with a moderate to strong resistance to rolling out.	6

Source: Multiple sources (see below)

TABLE 6.2: ECe VALUES OF SOIL SALINITY CLASSES

Class	ECe (dS/m)	Comments
Non – saline	<2	Salinity effects mostly negligible
Slightly saline	2-4	Yields of very sensitive crops may be affected
Moderately saline	4-8	Yields of many crops affected
Very Saline	8-16	Only tolerant crops yield satisfactorily
Highly saline	>16	Only a few very tolerant crops yield satisfactorily

Source: Richards, (1954)

Separately, Department of Infrastructure, Planning and Natural Resources "Western Sydney Salinity Code of Practice" (March 2003) provides the development management guidelines and recommendations for salinity management in Western Sydney.

5. Existing Site Conditions

5.1 Salinity Mapping

Department of Infrastructure, Planning and Natural Resources (DIPNR) map of Salinity Potential in Western Sydney (2002) shows moderately salinity potential within the AIE site.

5.2 Salinity Investigation in 2018 (Ref. PSM3739-004L Rev6)

PSM have previously undertaken a salinity and sodicity investigation at the Site in 2018 (ref: PSM3739-004L REV6, dated 29 May 2020).

A total of twenty-one (21) disturbed soil samples were collected by a PSM Geotechnical Engineer for testing in an environmental laboratory. Inset 3 present the soil sample locations.

No groundwater was encountered during the investigation.

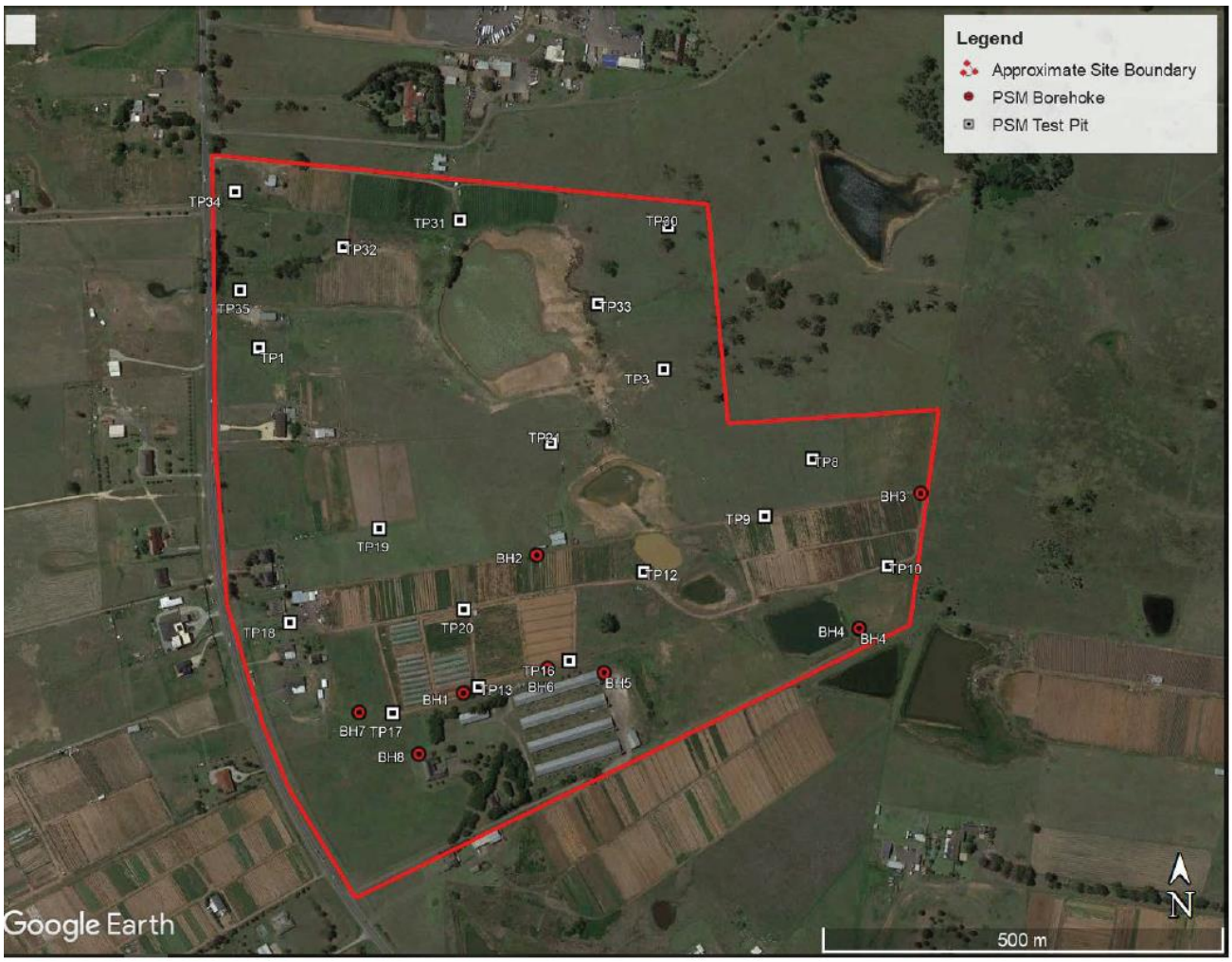
The disturbed soil samples were sent to a NATA accredited environmental laboratory and the following tests were undertaken:

- Cation Exchange Capacity (CEC) of calcium, magnesium, potassium and sodium
- Exchange sodium percentage
- Salinity (EC 1:5, one-part soil to five parts water)
- Soil pH
- Chlorides
- Sulphates
- Resistivity.

Table 3 presents a summary of the results.

Table 3 - Laboratory Testing Results

Sample ID	pH	Electrical Conductivity [µS/cm]	Moisture Content [%]	Chloride by Discrete Analyser [mg/kg]	Soluble Sulfate by ICPAES [mg/kg]	Exchangeable Cations [meq/100g]					ESP [%]
						Ca	Mg	K	Na	CEC	
BH5_4.2m	7.4	106	22.6	690	240	0.6	3.7	0.3	5.3	9.9	53.4
BH5_10.5m	7.4	227	22	280	560	1.1	17.1	0.6	7.8	26.6	29.2
BH4_1.0m	6.0	582	17.3	1200	580	0.9	9	0.1	3.4	13.4	25.2
BH4_5.0m	9.0	245	7.2	430	<100	<0.2	<0.2	<0.2	<0.2	<0.2	-
BH1_4.5m	5.3	594	13.4	820	900	0.2	6.6	0.2	2.8	9.8	28.9
TP16_1.5m	5.0	519	20.5	740	440	<0.1	5.9	0.1	2.1	8.2	25.8
TP17_1.0m	7.0	156	20.1	1060	450	5.4	14.6	0.4	3.3	23.7	14.1
TP10_1.5m	7.0	870	11.0	1410	490	0.6	8.4	0.1	2.0	11.1	17.8
TP18_0.4m	7.2	172	24.0	370	930	9.2	10.8	0.4	1.6	22.0	7.5
TP13_2.8m	5.4	361	13.3	460	320	<0.1	7.6	0.2	3.2	11.0	28.8
TP1_1.5m	8.0	1010	15.0	1730	700	0.3	9.3	0.3	7.1	17.0	41.8
TP21_0.3m	6.0	51	18.4	880	460	4.3	9.8	0.6	0.9	15.6	5.6
TP8_0.3m	8.8	1400	11.8	2460	400	2.0	3.5	<0.2	2.6	8.3	31.6
TP8_2.5m	6.7	41	18.7	960	230	4.2	9.7	0.2	1.1	15.2	7.0
TP3_0.3m	6.6	29	16.8	290	240	3.0	3.7	0.2	0.5	7.4	6.9
TP30_0.1m	6.6	27	9.0	130	30	2.2	6.2	0.2	0.8	9.4	8.6
TP31_1.0m	5.1	601	19.9	1080	200	<0.1	14.8	0.3	9.7	24.8	39.1
TP34_0.1m	7.1	81	13.6	510	70	4.7	10.1	0.6	1.0	16.4	6.2
TP33_0.3m	5.4	774	19.2	1540	<10	1.5	8.0	0.1	4.6	14.2	32.1
TP35_0.7m	5.6	909	14.7	1570	280	1.3	7.3	0.1	7.7	16.5	47.0



Inset 3: Location of sampling.

The salinity test results, summarised in Table 4 indicate the following:

- pH of the soil samples analysed was in the range of 5.0 to 9.0, with an average of 6.5
- The 1:5 soil to water extraction and subsequent electrical conductivity ($EC_{1:5}$) of the soil samples analysed to be in the range of 27 µS/cm to 1400 µS/cm
- Concentrations of chlorides in samples analysed was in the range of 30 mg/kg to 2460 mg/kg
- Concentrations of soluble sulphate in samples analysed was in the range of less than 20 mg/kg to 930 mg/kg
- Cation Exchange Capacity (CEC) in samples analysed was in the range less than 0.2 meq/100g to 29.4 meq/100g
- Exchange Sodium Percentage (ESP) in samples analysed was in the range of 5.2% to 53.4%.

5.2.1 Salinity Assessment

Site Investigations for Urban Salinity (DLWC 2002) classify soil salinity based on electrical conductivity (ECe). The method of conversion from EC1:5 to Ece (electrical conductivity of saturated extract) is based on DLWC (2002) and given by Ece = EC1:5 x M, where M is the multiplication factor based on “Soil Texture Group”.

The “Soil Texture Group” of the samples tested were assessed during our investigation. The salinity classification for the soil samples that were tested are presented in Table 4.

Table 4 - Salinity Classification

Sample ID	EC1:5 (dS/m)	Soil Type	M	ECe (dS/m)	Salinity Class
BH5_4.2m	0.106	Light Medium Clay	8	0.848	Non-saline
BH5_10.5m	0.227	Light Medium Clay	8	1.816	Non-saline
BH4_1.0m	0.582	Heavy Clay	6	3.492	Slightly Saline
BH4_5.0m	0.245	Light Medium Clay	8	1.96	Non-saline
BH1_4.5m	0.594	Light Medium Clay	8	4.752	Moderately Saline
TP16_1.5m	0.519	Heavy Clay	6	3.114	Slightly Saline
TP17_1.0m	0.156	Heavy Clay	6	0.936	Non-saline
TP10_1.5m	0.870	Heavy Clay	6	5.22	Moderately Saline
TP18_0.4m	0.172	Light Medium Clay	8	1.376	Non-saline
TP13_2.8m	0.361	Heavy Clay	6	2.166	Slightly Saline
TP1_1.5m	1.010	Heavy Clay	6	6.06	Moderately Saline
TP21_0.3m	0.051	Light Medium Clay	8	0.408	Non-saline
TP8_0.3m	1.400	Light Medium Clay	8	11.2	Very Saline
TP8_2.5m	0.041	Heavy Clay	6	0.246	Non-saline
TP3_0.3m	0.029	Light Medium Clay	8	0.232	Non-saline
TP30_0.1m	0.027	Light Medium Clay	8	0.216	Non-saline
TP31_1.0m	0.601	Light Medium Clay	8	4.808	Moderately Saline
TP34_0.1m	0.081	Light Medium Clay	8	0.648	Non-saline
TP33_0.3m	0.774	Light Medium Clay	8	6.192	Moderately Saline
TP35_0.7m	0.909	Light Medium Clay	8	7.272	Moderately Saline

It is assessed that the majority of the soils on site are classified as “non-saline to moderately saline”, except for the one sample from TP8 that is very saline. We note that TP8 is located in the proposed fill area.

We have referred to Clause 4.8.2 of Australian Standard AS3600-2009 “Concrete Structures” and note that the assessed soil electrical conductivity (ECe) is less than the upper limit of the “B1” exposure classification.

5.2.2 Sodicity

Sodicity provides a measure of the likely dispersion on wetting and to shrink/swell properties of a soil. Soil sodicity is classified based on the Exchangeable Sodium Percentage (ESP) which is the amount of exchangeable sodium as a percentage of the Cation Exchange Capacity (DLWC, 2002).

The Exchangeable Sodium Percentages calculated from these laboratory results, ranging from 5.6% to 53.4%, indicates that the soils on site range from sodic to highly sodic when compared to criteria listed in “Site Investigations for Urban Salinity”, DLWC (2002).

6. Construction Salinity Management Strategies – Mitigation Measures

6.1 Development Components

This SMP addresses the components of the proposed development at construction stage for the permanent works. Salinity management regarding the following development components are provided in the following sections:

- Earthworks
- Imported soils
- Gardens and landscaped areas
- Roads, footpaths and hardstand areas
- Surface water, stormwater and drainage
- Durability of concrete structures in contact with the ground
- Durability of steel structures in contact with the ground.

6.2 Earthworks

We understand the proposed earthworks will comprise up to approximately 15 m deep cut and 9 m deep fill in some areas. The construction of the earthworks should consider the following strategies:

- Importation of soil as per Section 6.3 of this letter
- Vegetation cover should be estimated and maintained on permanent batters upon completion to control erosion
- The final surface of all areas of the development should be graded to prevent the ponding of surface water
- Erosion control of temporary batters, stockpiles and disturbed areas should be planned prior to undertaking the earthworks and implemented during the earthworks. Consideration should be given to:
  - Grading and sealing partially completed surfaces
  - Installation of clearly visible fencing and traffic control measures to prevent unnecessary trafficking of areas and ensuring site disturbance
  - Establishing set vehicular access points and roads
  - Protecting stockpiles (temporary vegetation or mulching) where these are to be left in place for long durations.
- Sediment control shall be implemented by means of sediment traps and silt fencing where considered necessary
- Dust suppression using water carts will avoid over-watering and only use sufficient water to manage dust rise. Surface ponding will be avoided during dust suppression
- Water used for construction purposes (e.g. to achieve adequate compaction rates) will be applied sparingly.

6.3 Importation of Soil

It may be required to import soil onto site. Materials to be imported to site should be assessed for suitability for the intended use. Very to high saline soils shall not be imported to site.

6.3.1 Salinity Testing

Salinity testing shall be undertaken on imported soil and in accordance with “Site Investigations for Urban Salinity”, Department of Land and Water Conservation (2002) – Refer to Section 4. Material with ECe > 8 dS/m; i.e. very to high saline shall not be imported.

6.4 Gardens and Landscaped Areas

The proposed development will result in the majority of the site comprising roads, footpaths, and hardstand areas. Garden and landscaped areas are likely to be of limited extent. The construction of the gardens and landscaped areas should consider the following:

- Irrigation of rehabilitated or landscaped areas will utilize low-water-use fixtures such as drippers, sub-surface irrigation or similar. Water will be applied sparingly and only in quantities sufficient to promote plant growth. Subsoil moisture will be physically checked (through visual observation) regularly during irrigation to ensure watering rates are not excessive
- Selection of plant species should consider the soil conditions, including moderate salinity, relatively poor fertility and clayey low permeability soil profiles. Promotion of successful revegetation is likely to require use of nutrient rich topsoil. Saline topsoils should not be imported to site
- Potential for water logging should be minimised by:
  - Adopting plant species with minimal watering requirements
  - Adopting 'waterwise' gardening principles
  - Minimising use of potable water in landscaped areas
  - Properly designed and implemented irrigation systems
  - Establishment of perennial species and deep rooted trees.

6.5 Roads, Footpaths and Hardstand Areas

The construction of roads, footpaths and hardstand areas should consider the following measures:

- Roads, footpath and hardstand surfaces should be graded, and the grades maintained at all times to prevent ponding of surface water at locations where this can result in infiltration into the underlying soils (e.g. pavement joints)
- Connections between the roads, footpath and hardstand surfaces and the surface water and stormwater drainage infrastructure should be designed, constructed and maintained to restrict infiltration into underlying soils
- Services that are to be located below the roads, footpath and hardstand surfaces should be installed, where practical, at the time of construction
- Provision for a damp-proof course or membrane beneath slabs should be considered by the slab designer.

6.6 Surface Water, Stormwater and Drainage

The design and construction of surface water, stormwater and drainage measures should consider the following:

- Disturbance of natural drainage patterns should be reduced. Where these are disturbed or altered appropriate artificial drainage should be installed
- Stormwater and surface water should be managed to restrict infiltration
- Temporary water retaining structures used during construction should be managed to restrict infiltration
- Stormwater and surface water infrastructure should be designed and constructed to minimise the likelihood of leakage
- Guttering and down pipes should be connected and maintained
- Surface water runoff should be directed around all exposed surfaces, temporary stockpiles and landscaped areas
- Disturbance to the natural hydrological system shall be minimised by maintaining good surface drainage and reducing water logging on the site

- Groundwater recharge is to be minimised to the extent it does not adversely impact groundwater dependent ecosystems downstream.

6.7 Durability of Concrete Structures in Contact with The Ground

In designing structural concrete elements in contact with the ground the design should consider the results of the salinity assessment and the durability requirements in AS2159:2009 Piling “Design and Installation” and AS3600:2018 “Concrete Structures”.

Both these standards provide guidance on minimum concrete grade/strength and minimum cover requirements.

Based on the salinity and aggressivity test results (ref. PSM3739-004L REV6, dated 29 May 2020), it is recommended that:

- The design of structural concrete members in contact with the ground (excluding piles) adopt a “B1” exposure classification as defined in AS3600:2009
- The design of concrete cast in situ piles adopt a “mild” classification as defined in AS2159:2009.

6.8 Durability of Steel Structures in Contact with The Ground

Table 6.5.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for steel piles based on resistivity, soil and groundwater pH, and chlorides in soil and groundwater. On the basis of soil chlorides, resistivity and pH testing completed we assess the exposure classification for steel piles in the soil to be “Non-aggressive”.

Yours Sincerely

AGUSTRIA SALIM
PRINCIPAL

References

1. DIPNR (2003c). Salinity Potential in Western Sydney. NSW Department of Infrastructure, Planning and Natural Resources, Sydney.
2. WSROC (2003). Western Sydney Salinity Code of Practice. Western Sydney Regional Organisation of Councils Ltd.
3. DIPNR, 2002, Site Investigation for Urban Salinity

APPENDIX L

Groundwater Management Plan

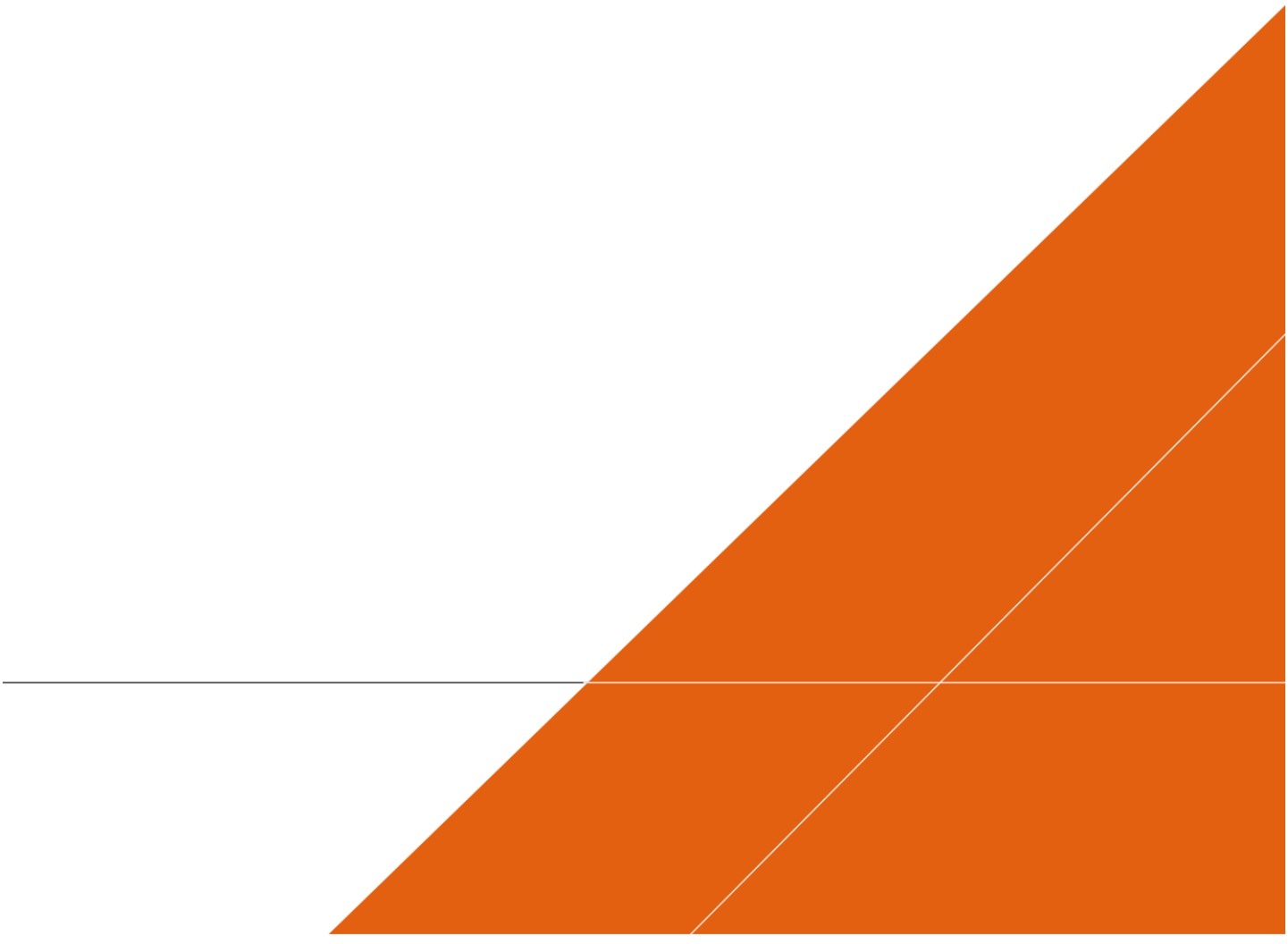
ARCADIS Design & Consultancy for natural and built assets

GROUNDWATER MANAGEMENT PLAN – REV 4

Aspect Industrial Estate, Mamre Road, Kemps Creek, NSW

Prepared for Mirvac Projects Pty Ltd

02 MAY 2022



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SYDNEY NSW

GROUNDWATER MANAGEMENT PLAN

Aspect Industrial Estate, Mamre Road, Kemps Creek, NSW

Rev 4

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This report has been prepared for Mirvac Office and Industrial Pty Ltd in accordance with the terms and conditions of appointment in the Consultant Agreement for Lots 54-58 (DP 259135) Mamre Road, Kemps Creek – Phase 2 DSI, FIP, UFP, Dam Decommissioning Strategy, Groundwater Management Plan dated 24 September 2019. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

REVISIONS

Revision	Date	Description	Prepared by	Approved by
A	1/11/2019	Draft for client review	PM	DT
B	12/05/2020	Draft for client review	CL	CL
C	9/10/2020	Review of Legislation Amendment	BK	BV
Rev 4	02/05/2022	Updated with revised bulk earthworks levels and PSM 2021 data	MP	SS

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APPENDICES

1 INTRODUCTION

Arcadis Australia Pacific (Arcadis) was engaged by Mirvac Office and Industrial (Mirvac) to prepare a Groundwater Management Plan (GMP) to support the proposed Aspect Industrial Estate development located at Lots 54-58 DP259135 Mamre Road, Kemps Creek, NSW 2178 (the site). The location of the site is illustrated in Figure 1, Appendix A.

The site comprises an approximate area of 56.3 ha and is located within the Penrith City Council Local Government Area (LGA). The site is currently zoned as RU2 Rural residential land under Penrith City Council Local Environmental Plan (LEP) 2010.

The site is currently unzoned within the Broader Western Sydney Employment Area stipulated within State Environmental Planning Policy (Western Sydney Employment Area) 2009 (SEPP WSEA). Arcadis is anecdotally aware that the strategic intent is for this land to be zoned for employment purposes.

Mirvac require the following documentation to support a State Significant Development (SSD) application relevant to the site:

- Detailed Site Investigation (DSI).
- Fill Importation Protocol (FIP).
- Unexpected Finds Protocol (UFP).
- Dam Decommissioning Strategy (DDS).
- Groundwater Management Plan (GMP).

This GMP is one of five reports that Arcadis has prepared for submission to Mirvac to support the industrial redevelopment.

A remediation action plan (RAP) may also be required under the Secretary's Environmental Assessment Requirements (SEARs).

1.1 Background

The site has approx. 950 m of frontage to Mamre Road, with a proposed signalised intersection providing vehicular access via Mamre Road to the M4 Motorway and the Great Western Highway to the north and Elizabeth Drive to the south. Known historical land uses at the site include: rural residential, grazing, dairy farming, poultry farming and horticulture.

Ministerial Local Planning Direction 3.5 precludes future residential development of the site due to its proximity to the Western Sydney Airport ANEF 20 noise contour. However, future land uses relevant to employment generating purposes are consistent with the approved 2020 amendment to the SEPP WSEA and the 2018 Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan (LUIIP) Stage 1: Initial Precincts.

The proposed redevelopment of the site will facilitate land uses consistent with commercial and industrial use, as prescribed in the National Environmental Protection Measure as amended in 2013 (NEPC, 2013) and will involve the following activities:

- Demolition and removal of existing rural structures.
- Heritage salvage works (if applicable).
- Clearing of existing vegetation on the subject site and associated dam dewatering and decommissioning.
- Realignment of existing creek.
- On-site bulk earthworks including any required ground dewatering.
- Importation, placement and compaction of soil material, consisting of;
  - Virgin Excavated Natural Material (VENM) within the meaning of the POEO Act; and/or

  - Excavated Natural Material (ENM) within the meaning of the NSW Environmental Protection Agency's (EPA) Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the POEO (Waste) Regulation 2014 – The Excavated Natural Material Order 2014; and/or
  - Materials covered by a specific NSW EPA Resource Recovery Order and Exemption which are suitable for their proposed use.
- Boundary retaining walls.
- Catchment level stormwater infrastructure, trunk services connections, utility infrastructure, roads and access infrastructure (signalised intersection with Mamre Road) associated with Stage 1.
- Construction fit out and 24 hours a day / 7 day per week use of industrial warehouse and distribution buildings within Stage 1.
- Detailed earthworks, stormwater, services and utility infrastructure associated with the construction of industrial logistics and warehouse buildings within Stage 1.
- Boundary stormwater management, fencing and landscaping.
- Staged subdivision of Stage 1.

Information provided to Arcadis by Orion Consulting (Orion), on behalf of Mirvac, indicates that earthworks undertaken as part of site redevelopment works will not require importation of significant volumes of fill material, as the bulk earthworks plan has been designed to achieve an overall cut/fill net balance for the development, whilst taking into consideration possible future planning modifications.

1.2 Purpose of this document

The purpose of this GMP is to describe the requirements for ongoing management at the Site which is proposed to undergo development for industrial and/or commercial land uses. It is expected that this GMP will form part of an overarching Construction Environmental Management Plan (CEMP) that will manage environmental considerations during the construction phase.

This GMP has been prepared with due consideration of the results from a site investigation undertaken at the site in October 2019 (Arcadis 2019).

1.3 Objectives

The objectives of the GMP are to document a procedure that ensures that exposure of identified receptors to impacted groundwater is minimised, and to comply with regulatory requirements. Specifically, the objectives are:

- Outline the geology and hydrogeology of the site;
- Assess if groundwater dewatering will be required during the re-development;
- If dewatering is to occur develop a dewatering strategy that meets the requirements of relevant policy and legislation;
- Outline any licensing requirements;
- Estimate the volume of groundwater that may be extracted during the redevelopment; and
- Assess whether there are any further investigations required to assess potential groundwater impacts.

1.4 Scope of Work

To complete the objectives, Arcadis undertook the following scope to develop the GMP:

- Reviewed relevant reports to establish site characteristics relevant to groundwater considerations, reviewed the baseline groundwater analytical data and determined the likely groundwater flow direction;
- Reviewed concept architectural drawings and preliminary design plans;

- Review geotechnical investigation letter report (PCM, 2019);
- Reviewed the groundwater results from the DSI (Arcadis, 2019);
- Prepared a site-specific Groundwater Management Plan (GMP) detailing the following:
  - Entity responsible for ensuring the GMP is implemented;
  - The location and frequency of monitoring;
  - The Chemicals of Potential Concern (CoPC) which require ongoing analysis; and
  - The triggers and contingency plans for additional monitoring/remediation.
- Development of this GMP.

1.5 Proposed Redevelopment

The proposed site development will change the land-use from rural residential and farming to commercial and industrial use. Arcadis understands that the redevelopment will involve demolition of all infrastructure at the site including buildings, sheds, chicken coups, fencing and farm dams.

The new buildings to be constructed are understood to be single storey industrial warehouses built on a concrete slab. It is further understood that the slabs are to be elevated above the existing ground level founded on reworked soil from the site, negating the requirement to excavate for building foundations. Orion, on behalf of Mirvac, has indicated that significant volumes of imported fill will not be required for the earthworks undertaken as part of the site redevelopment works. No basements are to be excavated.

2 SITE IDENTIFICATION

The location and layout of the site are shown in Figures 1 and 2, Appendix A. The site details are provided in Table 2-1 below and described in detail in the following sections.

Table 2-1 Site Detail Summary

Item	Details
Address	804-882 Mamre Road, Kemps Creek, NSW, 2178
Lot and plan	Lots 54 to 58 DP259135
Local government area	Penrith City Council
Current land use	Rural residential properties
Current zoning	IN2: General Industrial
Proposed land use	Site is proposed to be redeveloped to an industrial and/or commercial land use (employment purposes)
Site coordinates Approx. centre of site (GDA 2020 UTM 56 H)	293603 m E 6250023 m S
Land area (m^2)	Approx. 563,000 m^2 (57 ha)

An overview of the site condition and surrounding environment is provided in Section 4. Site history information is provided in Section 5.

2.1 Current Site Use

The site was historically used for light agricultural purposes (i.e. grazing, historical dairy farming, poultry farming and horticulture). Arcadis understands, the site was purchased by Mirvac Projects Pty Ltd to be redeveloped into an industrial/commercial property for employment purposes.

2.2 Proposed Site Use

The site is proposed to be redeveloped into a warehouse and distribution centres, including 11 warehouse and office combined compounds.

Bulk earthworks, including both cutting and filling of the site, will be required as part of the proposed industrial development.

2.3 Surrounding Land Use

The following current land uses have been identified immediately surrounding the site:

- North – rural residential properties,
- South – rural residential properties, market gardens
- East – rural residential properties
- West – Mamre road, with rural residential properties located immediately west of Mamre Road

3 SITE CONDITION AND SURROUNDING ENVIRONMENT

3.1 Topography

The site slopes down to the south west and has an elevation of approx. 37 to 50 m relative level to the Australian Height Datum (RL mAHD). The site exists within a generally flat alluvial plain with localised undulating rises/falls, generally sloping toward Kemps Creek/South Creek to the west.

3.2 Geology

The 1:100,000 Geological Survey of NSW map of Sydney indicates the site is underlain by Bringelly Shale of the Wianamatta Group. This is described as comprising shales, carbonaceous clay, laminate and coal.

The eSPADE NSW Soil and Land Information database indicates that the site is underlain by Blacktown and Luddenham Soil Landscapes.

The soils encountered during fieldwork conducted by Arcadis in October 2019 aligned with the above descriptions and were described as:

- Fill material generally comprising topsoil and brown silty clay to a typical depth of 0.2m below ground level (m bgl) and a maximum depth of 1.2m bgl (in TP110 and MW01); and
- Natural material generally comprising slightly stiff, orange to brown clay with grey mottling turning into grey to brown weathered shale.

3.3 Hydrogeology

Groundwater is present within the Bringelly Shale. Typically, the Bringelly yields low volumes of saline groundwater. Shale generally has low water transmitting properties, displaying a very low primary porosity with most of the flow being via saturated structural features such as fractures, joints and laminations. Groundwater can be perched at the base of the weathered soil profile along the interface with fresh bedrock. The regional aquifer within the shale is often confined or partially confined and rises once intersected in a borehole.

A review of NSW Department of Primary Industries Office of Water records for groundwater bores within a 2,000 m radius of the site did not identify groundwater boreholes around the site. This is consistent with the groundwater within the shale being of moderate salinity, low yielding and a general abundance of surface water.

3.4 Hydrology

A generally north south oriented drainage line bisects the site along which the five dams have been constructed.

Observations were made during field work conducted in October 2019. The five dams were being used for stock watering and irrigation of crops and chicken sheds.

The site is predominately surfaced with grass cover, and as such, it is anticipated surface water generated during periods of rainfall will likely infiltrate at a rate reflective of the silty clay topsoil permeability. During periods of heavy or prolonged rainfall, excess water is likely to result in overland flow and traverse south-west towards Kemps Creek, following the topographic gradient. A portion of the overland flow is also likely to be captured by the existing on-site dams.

The nearest surface water bodies include several small dams on neighbouring properties and Kemps Creek, which is located approx. 600 m to the west of the site. Kemps Creek drains into South Creek approx. 900 m west of the site, before ultimately discharging into the Hawksbury River located approx. 26 km north of the site.

3.5 Acid Sulfate Soil Risk

Acid sulfate soils (ASS) are generally associated with low-lying coastal areas, including estuarine flood plains, rivers and creeks.

JBS&G, 2019 stated that since the site is not located near the coast and the elevation is in excess of 40 m AHD the likelihood of ASS within the study area is low.

Salts are naturally present in soil, bedrock and groundwater. In western Sydney salts naturally occur within the Ashfield Shale and are mobilised in the subsurface by the movement of groundwater. When saline groundwater is present close to the surface the salts can precipitate on the ground as the saline groundwater is drawn to the surface by fluctuating water tables combined with capillary action. Seepage of saline groundwater can cause corrosion of building materials, inhibit growth of most plant species except for highly salt tolerant vegetation, contributing to increased soil erosion. Salinity hazard mapping indicates the site is of moderate salinity potential due to the site being located on Ashfield Shale (DIPNR, 2012). Off site adjacent to drainage lines the salinity potential is considered high as the saline groundwater becomes shallower with an increased potential of the water table intersecting the ground surface.

3.6 Summary of Previous Investigations and Design Information

3.6.1 Preliminary Site Investigation (JBS&G 2019)

In January 2019, JBS&G conducted a Preliminary Site Investigation (PSI) with limited soil sampling at the site.

The JBS&G review of the site history indicated that the site was historically used for light agricultural purposes (i.e. grazing, historical dairy farming, poultry farming and horticulture).

The findings of the desktop study (confirmed by detailed site inspections completed by JBS&G on 30 November 2018 and 16 January 2019) identified current and potential historical sources of on-site contamination. The sources of potential contamination were associated with the following storage, handling and uses on the site:

- Pesticides/herbicides used in former and current market gardens;
- Potential biological impacts from livestock/poultry farming;
- Potential use of hazardous building materials (asbestos, lead based paints, PCBs) in historic and current site structures resulting in localised impacts to soils in proximity to the location of site structures;
- Potential hydrocarbon and pesticide contamination from the storage of materials and consumables at various locations across the site area (former and current sheds).
- Fill materials of unknown origin; and
- Potential asbestos containing materials (ACM) in irrigation lines (conduits).

JBS&G collected soil samples from a total of 38 locations across the site (29 soil boreholes, two test pits and seven stockpiles). The results from the samples collected by JBS&G have been summarised below:

- Elevated Total Recoverable Hydrocarbon (TRH) concentrations were identified in stained soils below a fuel drum (sample BH10 at 0.1m). This impact was limited in lateral extent and did not appear to migrate vertically, based on visual observations of stained soil;
- A small number of heavy metal impacts to surface soils were also identified but were not considered to pose unacceptable ecological health risks under the proposed land use;
- Anthropogenic materials at some locations were present in quantities that may pose an aesthetic concern for sensitive land uses. JBS&G however noted that with the proposed land use (commercial/industrial), these materials may be retained beneath hardstand without any further management. The impacts identified were typical of historical land uses; and

- Trace level friable asbestos was identified at one location (HA13) adjacent to historical structures, which were observed to contain possible ACM sheet board. JBS&G noted that there was the potential for ACM to be present within site structures and in soil in the vicinity of the structures.

JBS&G concluded that whilst the investigation identified localised surficial soil impacts at the site, the investigation did not identify widespread contamination which may preclude future redevelopment of the site. Identified soil impacts are considered representative of common contaminants and historical land use activities which can be readily dealt with during the DA stage for redevelopment and assessment for site suitability. JBS&G also recommended that a Hazardous Building Material Survey (HBMS) be undertaken prior to any demolition of existing site structures.

3.6.2 Detailed Site Investigation (Arcadis 2019)

During October 2019, Arcadis undertook a Detailed Site Investigation (DSI) which involved intrusive works to assess soil, groundwater and surface water on site for contaminants of potential concern (CoPC) identified in the PSI.

Review of previous site reports, observations from site walk overs on 8th, 9th, 16th and 23rd October 2019 and analytical results from soil, surface water, groundwater and potentially asbestos containing material (PACM) indicated that impact at the site is unlikely to be wide-spread. Observations were consistent with the JBS&G findings.

The results from the samples collected by Arcadis have been summarised below:

- Soil samples were taken from 15 test pits and six monitoring wells. One sample reported an outlier exceedance of benzo(a)pyrene at MW02_2.0, however this exceedance was considered an anomaly and does not represent the concentration of benzo(a)pyrene in natural soil materials, nor does it present a risk when compared to ecological screening levels.
- Three soil samples collected from areas adjacent to treated timber posts were assessed, with one sample (SO01) which exceed the NSW EPA General Solid Waste CT1 criteria for nickel.
- Groundwater was encountered in groundwater well at depths ranging from 37.9 m AHD to 57.2 m AHD across the site. Is it anticipated that the higher groundwater table is perched and localised.
- All surface waters reported analytes below the adopted criteria.
- Surface waters reported elevated pH and electrical conductivity when compared to the adopted criteria.
- A small number of heavy metal impacts to groundwater were observed and these were attributed to the elevated background concentrations of metals in on-site clay soils.
- Potential asbestos containing material (PACM) reported positive identification of asbestos at three out of four samples locations. No PACM was observed on roads or access tracks, with identified material adjacent current or former structures.

Based on the findings of the DSI, the site was deemed suitable from a contamination perspective for the proposed development as an industrial estate, pending the removal of identified asbestos containing material and the issuing of a clearance certificate to soil surfaces. Arcadis recommended that a HAZMAT survey and an asbestos register should be developed for the site prior to demolition works, asbestos removal works should be undertaken and a clearance certificate issued post demolition and that a site unexpected finds protocol should be implemented prior to any intrusive works. Arcadis also recommended that on-site surface water should be measured after a significant rainfall event and compared to previously recorded the observations to observed water quality prior to dam de-watering. Accordingly, there is potential for unexpected finds, including contamination or waste, which may be encountered during demolition or earthworks at the site.

3.6.3 Geotechnical Investigation (PSM, 2020)

Pells Sullivan Meynink (PSM) prepared a Geotechnical Investigation Letter Report (PSM, 2020), which included an additional three geotechnical investigations undertaken 30 November 2018, 04 December 2018 and 16 January 2019.

- The geotechnical investigations comprised an inspection of site conditions including:
  - Geology
  - Surface conditions
  - Subsurface conditions
  - Groundwater
- Excavation of 19 test pits to depths of between 1.6 m and 3.5 m.
- Drilling of eight boreholes to depths of between 3.7 m and 15.0 m.
- Five bulk soil samples were recovered for California Bearing Ratio (CBR)
- Twenty-one samples were analysed for:
  - Cation Exchange Capacity (CEC) of calcium, magnesium, potassium and sodium
  - Exchange sodium percentage (ESP)
  - Salinity
  - Soil pH
  - Chlorides
  - Sulphates
  - Resistivity

A summary of results from the investigation indicate the following:

- pH of the soil samples ranged from 5.0 to 9.0, with an average of 6.6
- The electrical conductivity ($EC_{1.5}$) of the soil samples was in the range of 27 µS/cm to 1,400 µS/cm.
- Concentrations of chlorides in samples were in the range of 130 mg/kg to 2,460 mg/kg.
- Concentrations of soluble sulfate in samples were in the range of <100 mg/kg to 930 mg/kg.
- CEC in samples was in the range of <0.2 meq/100g to 26.6 meq/100g.
- ESP was in the range of 5.6% to 53.4 %.
- The majority of soils on site were classified as “on-saline to moderately saline” except for one sample from TP8 that is very saline. TP8 is located within a fill area.
- Groundwater was observed a 3.0 m bgl in BH5 and at 3.0 m in TP1, TP32 and TP35. It is considered that there may possibly be perched water tables. Groundwater was not observed at any other location.

3.6.4 Additional Geotechnical Investigation (PSM, 2021)

PSM prepared an Additional Geotechnical Investigation Letter Report (PSM, 2021) which included advancement of 11 boreholes (**BHs**) to a maximum depth of 17.0 mbgl undertaken between 10 and 15 November 2021.

A summary of results from the additional geotechnical investigation include:

- Water seepage observed at BH06 at 3.5 mbgl (prior to rock coring).
- Water seepage observed at BH11 at 9.0 mbgl.

Arcadis notes that BH06 and BH11 are located in future Lots 7 and 4 respectively, in areas where between 8.0 and 10.0 m of cut is required.

The remaining nine (9) BHs advanced by PSM did not encounter groundwater and were located in the area of future Lots 4, 5, 6, 7, 8 and 11.

3.6.5 Civil Infrastructure Drawings

The Aspect Industrial Estate stage 1 Civil Works Package drawings were initially reviewed to assess proposed cut and fill locations against groundwater depths to determine potential groundwater interference.

Arcadis understands bulk earthworks levels were revised to achieve a balanced cut to fill development, whilst taking into consideration possible future planning modifications. Revised bulk earthworks levels are shown in the following drawings provided to Arcadis by Orion Consulting, on behalf of Mirvac, on 22 March 2022:

- AT&L, *Mirvac-Aspect Industrial Estate-Mamre Road, Kemps Creek Stage 1-Comparison Bulk Earthworks Cut/Fill Plan – Drawing No. 18-596-SKC121,*16 February 2022.
- AT&L, *Mirvac-Aspect Industrial Estate-Mamre Road, Kemps Creek Stage 1-Bulk Earthworks Contour Plan – Drawing No. 18-596-C1020,* 10 February 2022.
- AT&L, *Mirvac-Aspect Industrial Estate-Mamre Road, Kemps Creek Stage 1-Bulk Earthworks Cut/Fill Plan – Drawing No. 18-596-C1025,* 10 February 2022.

Copies of these drawings showing the revised bulk earthworks levels are provided as **Appendix A**.

A summary review of the design plans indicates proposed cutting beneath existing ground level at the following locations:

- Typical Road Sections Sheet 2: Utility footing excavations to 1200mm
- Typical Sections Sheet 1: Section 3 – cut beneath existing surface.
- Typical Sections Sheet 2: Future Lot 4 – Section 8
- Typical Sections Sheet 3: Future Lot 4 – Section 9
- Typical Sections Sheet 3: Future Lot 5 – Sections 10, 11 and 12
- Typical Sections Sheet 4: Future Lot 7 – Section 13
- Typical Sections Sheet 4: Future Lot 5 – Section 14
- Typical Sections Sheet 4: Future Lot 9 – Section 16
- Bulk Earthworks Cut/Fill Plan – Cut on Lots 3, 4, 6, 7, 8, 9, 10 and 11[1]

The finished level for the proposed future lots ranges from approx. RL 47.80 to 52.60 m AHD. Table 3-1 below presents the bulk earthworks level at each lot (Bulk Earthworks Cut/Fill Plan) along with the highest groundwater contour level available (Figure 2, Appendix A).

Table 3-1 Bulk Earthworks Level compared to highest recorded groundwater depth (mAHD)

Future Lot	Finish Level (m AHD)	Highest Groundwater Contour Level (m AHD)	Groundwater Interception Risk (<2.0 m)
1	47.80	44.00	No
2	48.20	46.00	No
3	49.00	49.00*	Yes
4**	57.00	56.00	Yes

[1] Arcadis notes that the revised Bulk Earthworks Cut/Fill Plan show an overall Cut/Fill balance of -5,614 m^3 for the development of the Site.

Future Lot	Finish Level (m AHD)	Highest Groundwater Contour Level (m AHD)	Groundwater Interception Risk (<2.0 m)
5	57.00	56.00	Yes
6	56.00	53.00	No
7**	52.60	53.00*	Yes
8	50.00	51.00*	Yes
9	51.60	46.00	No
10	52.30	49.00	No
11	52.60	52.00	Yes

Notes

Groundwater levels were obtained from groundwater contouring undertaken as part of the DSI. Groundwater levels area therefore indicative only.

* Indicates groundwater levels are within 0.2 m of the finish level or above the finish level.

** Indicates groundwater (perched water and/or contiguous aquifer) was encountered during PSM 2021 Additional Geotechnical Investigation within this Future Lot.

The groundwater data set used during this assessment was that from Arcadis (2019) and PSM (2019). It should be noted that these investigations were not comprehensive hydrogeological studies.

4 CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) describes the potential environmental and human health risks of identified areas of possible soil and groundwater contamination. The CSM outlines the complete and/or potential pathways between the known or potential source(s) and the receptor(s).

Based on the information available for the site from the JBS&G PSI (January 2019) and the Arcadis DSI (October 2019), the following preliminary CSM has been prepared.

4.1 Source

Potential sources of contamination at the site and the associated contaminants of potential concern (CoPC) are listed below in Table 3-1.

Table 4-1 Potential On-Site Contaminant Sources

Source	Associated Chemicals	CoPC
Historic and current market gardens and livestock/poultry farming	Pesticides, herbicides	Pesticides, herbicides
Hazardous building materials in historic and current site structures and in the irrigation lines (conduits)	Asbestos containing materials (ACM), lead based paints, electrical components containing Polychlorinated Biphenyls (PCBs)	Asbestos, lead, PCBs
Storage of various materials (such as fuel drums) and consumables in historic and current sheds across the site	Total Recoverable Hydrocarbons (TRHs), pesticides, herbicides	TRHs, pesticides, herbicides
Fill materials of unknown origin	Asbestos, ash, slag, construction waste, demolition waste	Heavy metals, TRH, BTEX, PAHs, organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs), phenols and asbestos

Note

* From the results of the groundwater samples collected in October 2019, it was found that some wells exceeded the ANZG (2018) (95% protection for Fresh Water) and the NEPC (2013) (GILs for Fresh Waters) for some metals. These metals were determined to be of background origin and are not considered a potential contaminant source.

4.2 Potentially Affected Media

The potentially affected media at the site includes:

- Soil;
- Groundwater; and
- Surface water (in the dams).

4.3 Pathways

Pathways or transport mechanisms by which receptors may be exposed to contamination on and off-site include:

- Direct contact with contaminated soil/groundwater;
- Ingestion of dust/abstracted groundwater;
- Inhalation of asbestos fibres; and
- Groundwater flow off-site.

4.4 Receptors

Potential receptors to contamination include:

- Demolition/construction workers;
- Future site users;
- Surrounding residents;
- Environmental receptors (Kemps Creek and South Creek); and
- Groundwater use (off-site).

4.5 Exposure Assessment

Based on the preliminary CSM discussed in Section 3.1 to Section 3.4, the potential for contamination to be present at the site is considered to be **Moderate**. This level of contamination risk can be minimised or removed if precautionary measures are taken. The potentially complete and incomplete pathways are discussed in more detail in the Table 3-2 below.

Table 4-2 Exposure Assessment

Source	Pathway	Receptor	Exposure Assessment	Pathway completeness
Market gardens and livestock/poultry farming	Direct contact	Demolition/ construction workers, future site users	Demolition and construction workers developing the site will come into contact with potentially contaminated soil. Workers in service trenches may also encounter groundwater. Depending on the landscaping of the proposed developed on the site, future site workers may be directly exposed to potentially contaminated soil via open grass areas.	**Based on the DSI results presented herein, this pathway is incomplete. An UFP Is required during construction works.**
		Surrounding residents	Surrounding residents will not come into direct contact with any potentially contaminated soil or groundwater. No groundwater abstraction wells were noted around the site.	**The pathway is incomplete.**
	Ingestion	Demolition/ construction workers, surrounding residents, future site user	Demolition/construction workers and surrounding residents have the potential to be exposed to dust and/or groundwater during the construction phase of the proposed development. Depending on the landscaping of the proposed developed on the site, future site workers may also be directly exposed to potentially contaminated dust via open grass areas.	**The pathway is potentially complete and should be managed during construction works with a CEMP and UFP.**
Hazardous building materials	Direct contact, inhalation of asbestos fibres	Demolition/ construction workers	If any hazardous building materials are present in the currently existing structures, demolition/construction workers may be exposed during demolition works.	**The pathway is potentially complete and should be managed through a CEMP during construction works as well as a HAZMAT Assessment**.
		Surrounding residents, future site residents	Surrounding residents will not be allowed access onto the site and therefore will not come into contact with any hazardous building materials. Additionally, hazardous materials should be removed from the site before the construction of the proposed boarding home, therefore future residents will not be exposed.	**The pathway is incomplete.**
	Ingestion	Demolition/ construction workers	Demolition/construction workers may be at risk of ingesting hazardous materials during intrusive site construction works.	**Based on the DSI results presented herein, this pathway is incomplete.**
		Surrounding residents, future site residents	These receptors will not come into contact with any hazardous building materials during or after construction.	**The pathway is incomplete.**

Source	Pathway	Receptor	Exposure Assessment	Pathway completeness
Storage of various materials (such as fuel drums) and consumables	Direct contact, ingestion	Demolition/ construction workers, future site users	Demolition and construction workers developing the site will come into contact with potentially contaminated soil. Additionally, future site workers may be directly exposed to potentially contaminated soil via open grass areas.	**The pathway is potentially complete and should be managed through a CEMP during construction works.**
		Surrounding residents	Surrounding residents will not come into direct contact with any potentially contaminated soil or groundwater. No groundwater abstraction wells were noted around the site.	**The pathway is incomplete.**
Fill materials	Direct contact, ingestion	Demolition/ construction workers, future site users, surrounding residents	Demolition and construction workers developing the site will come into contact with underlying fill during the construction phase. Depending on the landscaping of the proposed developed on the site, future site workers may be directly exposed to potentially contaminated soil via open grass areas. Surrounding residents have the potential to be exposed to dust during the construction phase.	**Based on the results presented herein, this pathway is incomplete.**
	Inhalation of asbestos fibres	Demolition/ construction workers	Demolition/construction workers may be exposed to fragments of asbestos in the fill material during demolition works. If the fill is still present and/or exposed on the site after completion of the proposed development, future site workers may also be exposed via open grassed areas.	**The pathway is potentially complete and should be managed during construction works through an UFP and a CEMP. HAZMAT assessment prior to demolition is recommended.**
		Surrounding residents	Surrounding residents will not come into contact with any fill material during or after construction.	**The pathway is incomplete.**
Contaminated groundwater	Direct contact	Demolition/ construction workers	Demolition and construction workers developing the site may come into contact with potentially contaminated groundwater during excavation of service trenches and/or during earthworks.	**The pathway is potentially complete**.
	Ingestion	Future site users, surrounding residents	Future site users and surrounding residents will not come into contact with any groundwater during or after construction, as groundwater is not to be extracted on-site.	**The pathway is incomplete.**

Source	Pathway	Receptor	Exposure Assessment	Pathway completeness
	Groundwater flow	Environmental receptors (e.g. Kemps Creek and South Creek)	Kemps Creek and South Creek are located down gradient of the site and therefore are potential receptors to contaminated groundwater.	**The pathway is potentially complete.**
		Off-site groundwater users	No groundwater boreholes were present within a 2000m radius of the site; therefore, it is unlikely that off-site receptors will come into contact with any potentially contaminated groundwater.	**The pathway is incomplete.**

5 LEGISLATION AND POLICY

5.1 Legislative Framework

Groundwater in NSW is regulated by DPIE-Water under the *Water Act 1912* (NSW) (Water Act), the *Water Management Act 2000* (NSW) (WMA, 2000) and Water Management (General) Regulation, 2011. The WMA, 2000 is gradually replacing the planning and management frameworks in the Water Act, although some provisions of the Water Act remain in operation. The WMA, 2000 regulates groundwater extraction under the NSW Aquifer Interference Policy (AIP), 2012.

- A water access licence to take water.
- A water supply works approval to construct a work.
- A water use approval to use the water.

The AIP (NSW DPI, 2012 and NoW 2012) explains the process of administering water policy under the WM Act for activities that interfere with the aquifer. In accordance with the AIP an activity that results in the loss of water from the environment, a water access licence (WAL) is required, unless the activities are considered to be of 'minimal impact'.

Under the AIP groundwater inflows are considered as a minimal impact activity in the construction of trenching and costeaning. In addition, very small water takes up to 3 ML/year are also considered minimal impact activities as long as the water volume can be substantiated (Dent, et al., 2015).

The project is located in the *Greater Metropolitan Region Groundwater Source Water Sharing Plan* (the Plan) (NoW 2011) which commenced on 1 July 2011. Within the Plan, the project footprint is subject to the rules of the Sydney Basin Central Groundwater Source which outline the recommended management approaches of surface and groundwater connectivity and protection of water quality.

5.2 Assessment Criteria

Groundwater quality is screened against the following guidelines:

- ANZG (2018) Guidelines for Fresh and Marine Water Quality - 95% protection for Fresh Water;
- NEPC (2013) Guideline on Investigation Levels for Soil and Groundwater – Groundwater Investigation Level for Fresh Waters; and
- NHMRC (2008) Guidelines for Managing Risks in Recreational Water – Primary Contact Recreation.

6 2019 GROUNDWATER MONITORING EVENT

A summary of the information collected during the groundwater monitoring event conducted by Arcadis in October 2019 is provided in this section.

6.1 Groundwater Levels and Flow Direction

Groundwater standing water levels were measured in newly installed wells (monitoring wells MW01 to MW06) constructed across the site (Arcadis, 2019). Groundwater levels measured in October 2019 ranged between 2.52 and 8.31 metres below ground level. Review of this data indicates that the standing water levels are shallowest along the central drainage line and as expected becomes deeper higher in the catchment to the east and west. During the drilling program groundwater was intersected at depths deeper than the measured standing water levels (ranging between 2.3 and 6.8 metres). The difference between the standing water level and water strike indicates the groundwater within the shale is partially confined. Consequently, excavations across the site are likely to intersect groundwater at depths deeper than the measured standing water levels.

Reduced standing water levels ranged from 37.98 and 57.18 mAHD. These groundwater elevations indicate groundwater flow is towards the northwest, in the direction of Kemps Creek. Groundwater contours and flow direction are presented in Figure 2, Appendix A.

Groundwater level observations are summarised in Table 6-1. The monitoring wells are screened within the shale and weathered shale.

Table 6-1 Groundwater Monitoring Well Observations

Well	Date	X (UTM 56 – GDA94)	Y (UTM 56 - GDA94)	Elevation (m TOC-AHD)	Depth to water (m TOC)	DTB (TOC)	Standing Water Level (m AHD)
MW01	16.10.19	6253425	294732.3	42.198	4.220	9.057	37.978
MW02	16.10.19	6253413	295305.1	51.525	3.249	11.795	48.276
MW03	23.10.19	6252758	294943.7	61.429	8.310	11.100	53.119
MW04	16.10.19	6252998	295177.3	51.168	3.636	9.045	47.532
MW05	16.10.19	6253089	295271.7	49.925	2.527	9.458	47.398
MW06	16.10.19	6253158	295551.8	62.123	4.946	11.390	57.177

Notes
Top of casing (TOC)
Australian Height Datum (AHD)
Geocentric Datum of Australia 1994 (GDA94)
Universal Transverse Mercator (UTM) [Zone 56]

6.1.1 Groundwater Level Fluctuations

Fluctuations in groundwater must also be considered as a rise in groundwater level will increase the risk of groundwater being encountered during the site redevelopment works. It is noted Western Sydney is experiencing drought conditions and consequently groundwater levels would be expected to be lower than usual. No historical groundwater level monitoring is known to have been undertaken at the site.

Groundwater level fluctuations within the Bringelly Shale would be expected to naturally fluctuate between 0.5 and 1 metre. Thus, following prologued heavy rainfall groundwater levels would be expected to rise. However due to the clayey hard pan nature of the weathered shale soil profile and the low water transmitting properties of the shale groundwater infiltration will be limited, restricting groundwater level rises.

6.2 Groundwater Quality

Groundwater extracted during sampling was observed to be of moderate to low turbidity at most locations. One exception was MW06, which displayed very low turbidity.

No sheens or odours were observed in purged groundwater except MW01 which held a biogenic sheen. These sheens are often naturally associated with groundwater derived from shale and rare due to the organic content within the shale, rather than being indicative of hydrocarbon contamination. No wells were purged dry and well recharge was observed to be adequate for peristaltic pump sampling.

6.2.1 Physico-Chemical Parameters

Water quality parameters recorded during the groundwater sampling are provided in the following table.

Table 6-2 Groundwater Monitoring Well Field Quality Parameters

Well	pH	Temperature (ºC)	Electrical Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mV)*	Comments
MW01	6.921	15.5	14,068	1.22	346.1	Biogenic sheen, no odour
MW02	6.81	17.8	19,646	1.06	328.6	No sheen, no odour
MW03	6.68	21.1	21,256	7.48	364.6	No sheen, no odour
MW04	6.44	19.2	18,636	1.58	347.1	No sheen, no odour
MW05	6.55	19.2	19,783	0.64	357.1	No sheen, no odour
MW06	6.96	20.3	16,288	3.2	324.1	Clear, no sheen, no odour

Notes
*199mV has been added to all redox field measurements to convert to standard hydrogen electrode (SHE)

Based on the physico-chemical data collected during groundwater sampling, the following conclusions have been made:

- pH values indicate that the groundwater is neutral;
- Electrical conductivity ranged from 14,068–21,256 µS/cm, indicating brackish water;
- Dissolved oxygen ranges from 0.64 to 7.48 mg/L, indicating a low level of dissolved oxygen within the groundwater aquifer.
- Oxygen reduction potential (ORP) ranged between 324.1 mV and 364.6 mV, indicating a moderate to high (positive) ORP, suggesting an oxidative environment.

6.2.2 Analytical Results

The groundwater analytical results are provided in Table 6-3.

Table 6-3 Groundwater Exceedance Analytical Results

Analyte	Guideline Value (mg/kg)	Min (µg/L)	Max (µg/L	Locations Exceeding Adopted Criteria
Cadmium	0.2 (DGVs, GILs)	<0.2	0.3	MW03, MW04
Copper	1.4 (DGVs, GILs)	<1	2	MW03
Zinc	8 (DGVs, GILs)	<5	47	MW02, MW03, MW04, MW06

Exceedances of the adopted groundwater quality criteria (as specified in Section 5.2) were identified for cadmium, copper and zinc. Total recoverable hydrocarbons C_{10}-C_{16} and >C_{10}-C_{16} less naphthalene (F2) reported 70 µg/L, above the Limits of Reporting (LOR) of 50 µg/L. All other analytes (filtered metals, TRHs, BTEX, PAHs, PCBs and OC & OP pesticides) reported less than LOR.

The minor exceedances for dissolved metals is typical of natural background levels and consistent with previous groundwater monitoring from the Bringelly Shale conducted at Badgerys Creek (PPK, 1998).

Summary tables displaying reported analyte concentrations screened against the adopted criteria are provided in Error! Reference source not found.**.** Laboratory reports are provided in **Appendix C.**

6.3 Measurement of Hydraulic Conductivity

Rising head slug tests were conducted as part of the DSI (Arcadis, 2019) to measure the hydraulic conductivity of the shale. The tests were conducted in monitoring wells MW01 and MW02, located in the north of the site. The results are presented in **Error! Reference source not found.** and confirm t he Bringelly Shale has low water transmitting properties. These low values of hydraulic conductivity are consistent with other measurements within the Bringelly Shale (PPK, 1998).

The slug test methodology, analysis and results are provided in the DSI (Arcadis, 2019).

Table 6-4 Aquifer Hydraulic Conductivity

Well	Hydraulic Conductivity using Bouwer & Rice (m/d)	Hydraulic Conductivity using Hvorslev (m/d)
MW01	2.03×10^{-1}	2.60×10^{-1}
MW02	7.16×10^{-2}	9.02×10^{-2}

6.4 Expected Volume of Groundwater to be Extracted

With a knowledge of the local hydrogeology (Sections 6.1 and 6.2) and the general building construction plans the volume of groundwater to be extracted can be estimated.

Standing groundwater levels measured at the site in October 2019 are known to range between 2.52 and 8.31 metres below ground level (mbgl). Once details of the buildings design are known, standing water levels beneath the buildings can be estimated with more confidence. During the drilling program groundwater was intersected at depths deeper than the measured standing water levels (ranging between 2.3 and 6.8 metres).

The only other known intrusive works likely to be conducted at the site are the installation of service trenches to install utilities such as stormwater, sewer, electricity, power, gas and telecommunications. Typically, these service trenches are excavated no deeper than two metres.

Based on the revised bulk earthworks levels, the inferred groundwater contours and the PSM 2021 geotechnical investigation, Lots 3, 4, 5, 7, 8, and 11 have the potential to encounter groundwater (either perched or contiguous aquifer) during site development (based on final site level and/or presence of service trenches/footings, which may extend up to 2.0 m below final bulk earthworks level).

In the event that groundwater is encountered the groundwater inflow is dependent upon a number of factors including the depth of the water table intersected, the hydraulic conductivity of the shale, length of the trench/excavation and the duration the excavation is open. Given that the water table is known to be low compared to the base of the trenches and the hydraulic conductivity of the shale is low groundwater inflows would be expected to be low. The length of the trenches is currently unknown but wouldn't be expected to be more than two kilometres. Similarly, the duration that the trench is open is dependent upon the speed of the construction workers but wouldn't be expected to be open for more than 4 weeks.

In the event that groundwater is encountered the extracted groundwater volume would be required to be measured with a flow meter. The groundwater would be collected and directed to a water storage pond where upon on-site reuse options would be considered as outlined in Section 8.1.1.

As outlined in Section 4.1, a WAL will only be required if groundwater is intersected and exceeds the inflow criteria of 3ML/year.

7 ROLES AND RESPONSIBILITIES

The roles and responsibilities regarding the implementation of this GMP on the site is summarised in the table below.

Table 7-1 Roles and Responsibilities

Entity	Role	Responsibility
NSW Department of Natural Resources	Approves the development of the site.	• Provide approval for the GMP • Undertake the steps outlined in this GMP
Mirvac (and Mirvac sub-contractors)	Land developer	• Developer of the site • Ensure that the requirements outlined within this GMP for the ongoing management of the Site are complied with
Nominated Environmental Consultant (if required)	Provision of environmental expertise.	• Carry out groundwater scope of works • Provision of report to Mirvac and Department of Natural Resources
DPIE Water*	To provide water obstruction licensing.	• To provide water obstruction licensing if greater than 3ML/year of groundwater is intersected and removed from the site.

Note

*This entity will only need to undertake their roles and responsibilities if groundwater is encountered at the site in excess of 3ML/year.

8 GROUNDWATER MANAGEMENT

Based on the outcomes of the DSI (Arcadis, 2019) and Arcadis' understanding of the redevelopment works groundwater has the potential to be intersected for certain lots as outlined in Table 3-1.

In event that groundwater is intersected during Stage 1 of the redevelopment works, the following management measures should be applied.

8.1 During Construction

A review of the known redevelopment construction strategy indicates that groundwater has the potential to be encountered based on revised bulk earthworks levels and the construction of service trenches. In this event the following management measures as outlined in Table 8-1 are recommended.

Table 8-1 Management Measures for Intersected Groundwater During Construction

Management Measure	Description
Pump groundwater from the excavated area	Intersected groundwater should be pumped from the excavated service trenches and stored in a discharge basin on-site.
Monitor volume of extracted groundwater	The volume of groundwater extracted should be monitored and recorded to assess if the volume extracted does not exceed the 3 ML/year where a WAL is required. If groundwater volumes are higher than expected and it appears that the 3ML/year criteria may be exceeded a WAL application should be completed and submitted to DPIE Water.
Monitor groundwater quality of the extracted groundwater	To assess if the removed groundwater is suitable for on-site re-use, groundwater quality should be monitored for the following parameters: • pH; • Salinity; and • Metals. Groundwater will be screened against the adopted guidelines which are outlined in Section 4 of this report. Groundwater treatment may be required before re-using on site to reduce the pH or salinity. The pH is likely to approach neutral due to aeration caused by pumping. Salinity can be lowered by mixing with dam water. Alternatively, the groundwater could be discharged to stormwater or sewer once this infrastructure is installed with appropriate authorisation from Council or Sydney Water respectively.
Monitor groundwater in the existing groundwater wells around the site	If groundwater is intersected during construction works, a round of groundwater level monitoring of the groundwater wells on-site should be triggered to assess any impacts on the water table.

8.1.1 Intersected Groundwater Re-Use

Groundwater re-use options, subject to meeting the adopted groundwater quality guidelines are presented in Table 8-2. These re-use options are consistent with the surface water re-use options as outlined in the Dam Decommissioning Strategy report.

Table 8-2 Intersected Groundwater Re-Use Options

Option	Name	Option Description
1	Dust suppression	The intersected groundwater can be used to spray water across the site for dust suppression during the earthworks and construction phases.
2	On-site irrigation	The groundwater can be circulated around the site for irrigation purposes.
3	Wheel washing	The groundwater can be utilised to spray trucks down before they leave the site to reduce tracking of mud and dirt off-site.
4	Topping up neighbouring dams	The groundwater from the on-site dams can be pumped into off-site neighbouring dams, subject to the dam owner's approval.
5	Discharge to the on-site sediment basin	As a contingency, if there is excess groundwater, an option is to discharge to the on-site sediment basin. The water will have to be flocculated and the water quality monitored. If the water is in accordance with the Australian and New Zealand Guidelines for Fresh Water Quality 95% species protection (ANZG 2018), then the water can be discharged to South Creek via Kemps Creek.

Note
These re-use options are viable only if the groundwater meets the adopted criteria.

8.1.2 Intersected Groundwater Treatment or Disposal

If, however, the intersected groundwater does not meet the water quality adopted criteria it must be managed appropriately. Groundwater treatment or disposal options are outlined in Table 8-3.

It should also be noted that groundwater will not be extracted for water management purposes during or after construction.

Table 8-3 Intersected Groundwater Treatment or Disposal Options

	Option	Option Description
1	Treatment (for turbidity)	For excess turbidity issues, the groundwater should be treated by allowing it to settle in the sedimentation pond and then flocculating if the suspended solids do not precipitate out.
2	Treatment (for pH)	If the intersected groundwater has an acidic pH value, lime should be added as a treatment. For alkaline pH aerating the water is likely to reduce the pH.
3	Treatment (for saline groundwater)	If the intersected groundwater is saline, then it can be mixed with onsite surface water from the dams in order to dilute the salinity.
4	Disposal	If treatment options are not suitable, the intersected groundwater (likely to be of low volume) could be tanked offsite for disposal. Alternatively, the groundwater could be detained onsite for discharge to either stormwater or sewer once this infrastructure has been installed on-site and authorisation from Council or Sydney Water respectively is provided.

8.1.3 Records

The following records relating to groundwater management and monitoring are to be maintained by Mirvac or their on-site representative:

- Spill or incident reports;
- Groundwater inflows into excavations;
- Intersected groundwater quality;
- Groundwater treatment (if necessary);
- Groundwater disposal (if necessary); and

- Groundwater level monitoring if triggered.

All records are to be maintained in compliance with record keeping requirements as outlined in the CEMP.

8.2 Post Construction

Based on revised bulk earthworks levels, the inferred groundwater contours, and the PSM 2021 geotechnical investigation, Lots 3, 4, 5, 7, 8 and 11 have the potential to encounter groundwater (either perched or contiguous aquifer) during site development (based on final site level and/or presence of service trenches/footings, which may extend up to 2.0 m below final bulk earthworks levels). In light of this, consideration should be given to permanent/ongoing groundwater management approaches including civil engineering (drainage, groundwater management system, etc.) and building and foundation design including subsurface infrastructure.

Consideration should be given to ongoing impacts to the local hydrogeological regime which may need to be managed in accordance with the requirements set out by Water NSW and relevant NSW regulations, including but not limited to *Water Act 1912* (NSW) (Water Act), the *Water Management Act 2000* (NSW) (WMA, 2000) and Water Management (General) Regulation, 2011.

Further assessment of groundwater and/or hydrogeological modelling should be considered to provide a better understanding on likelihood of encountering groundwater and volume of water ingress.

9 REFERENCES

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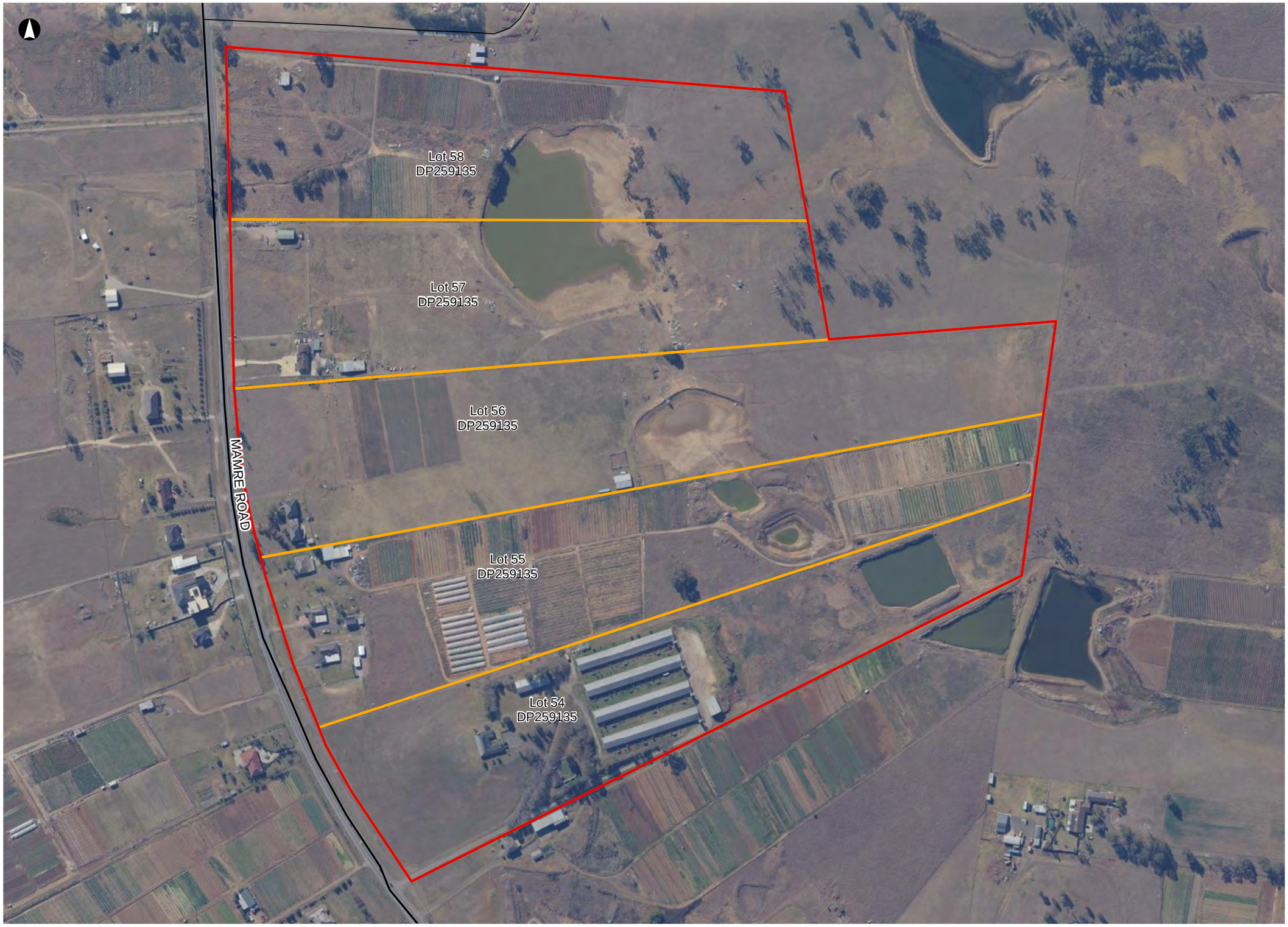
PSM (2022), *Mirvac Aspect Industrial Estate – 788-904 Mamre Road, Kemps Creek Results of Additional Geotechnical Investigation – Southern PAD, RW21 and RW22 (Factual Report)*

APPENDIX A FIGURES

10035157 - Aspect Industrial Estate - Groundwater Management Plan



Legend

- Site Boundary
- Lot Boundaries

1:4,130 at A3

ARCADIS AUSTRALIA PACIFIC PTY LTD
ABN 76 104 485 289
Level 16, 580 George St | Sydney NSW 2000
P: +61 (0) 2 8907 9000 | F: +61 (0) 2 8907 9001

Coordinate System: GDA 1994 MGA Zone 56
Date issued: October 24, 2019

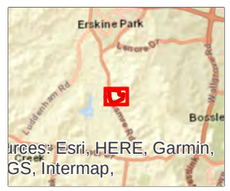
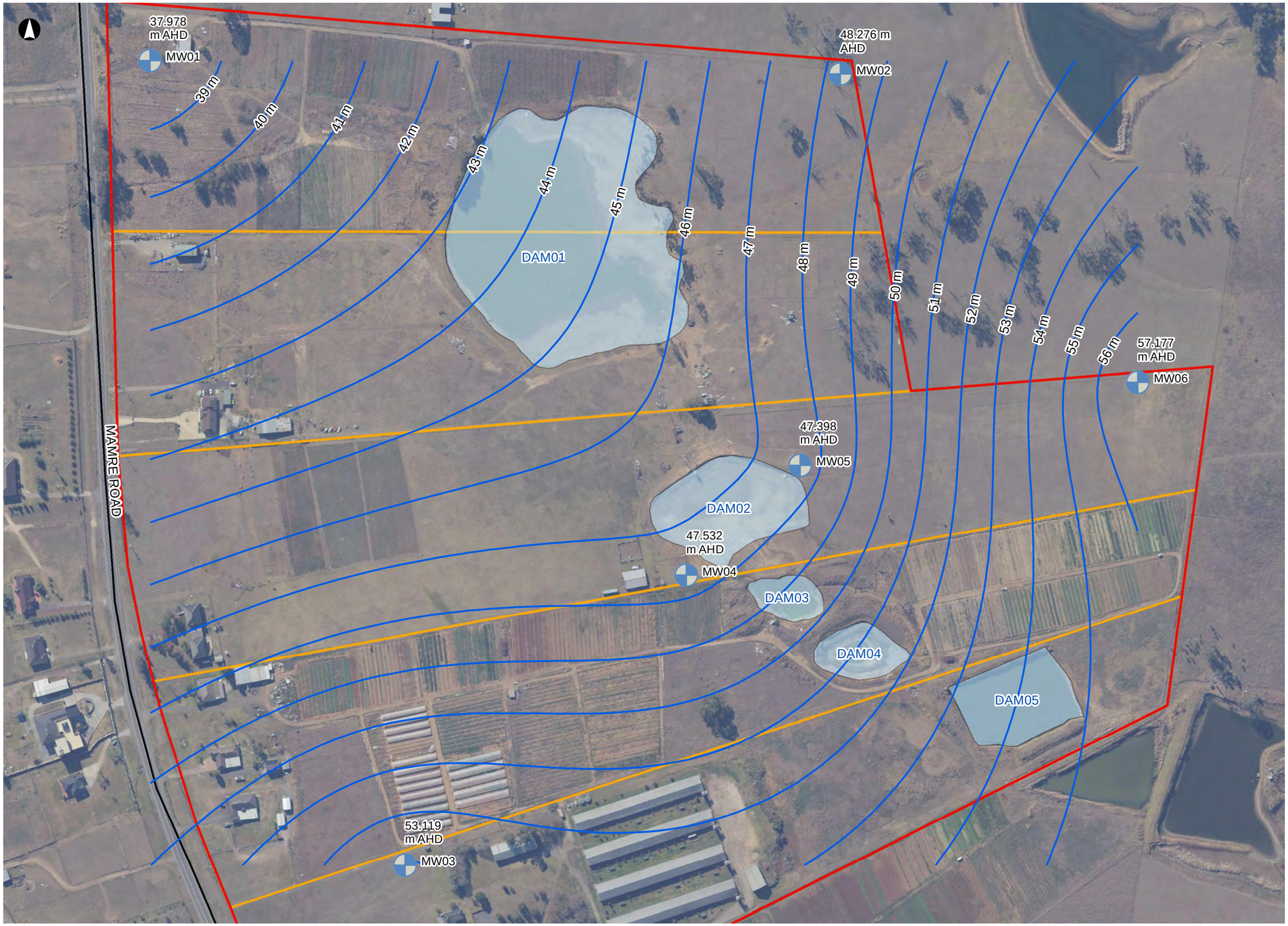


Figure 1 - Site Overview

0 40 80 160 240 320
m

Date: 24/10/2019 Path: H:\AAP_ER_GIS\Projects\10035157\DS\Figure 1 - Site Overview.mxd
Created by : Environmental Restoration
QA by : Environmental Restoration



Legend

- Groundwater Wells
- Groundwater Contours (m AHD)
- Dams
- Site Boundary
- Lot Boundaries

1:3,100 at A3

ARCADIS AUSTRALIA PACIFIC PTY LTD
ABN 76 104 485 289
Level 16, 580 George St | Sydney NSW 2000
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Coordinate System: GDA 1994 MGA Zone 56
Date issued: October 24, 2019

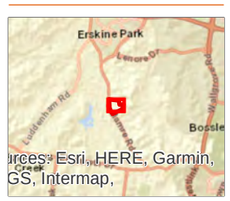
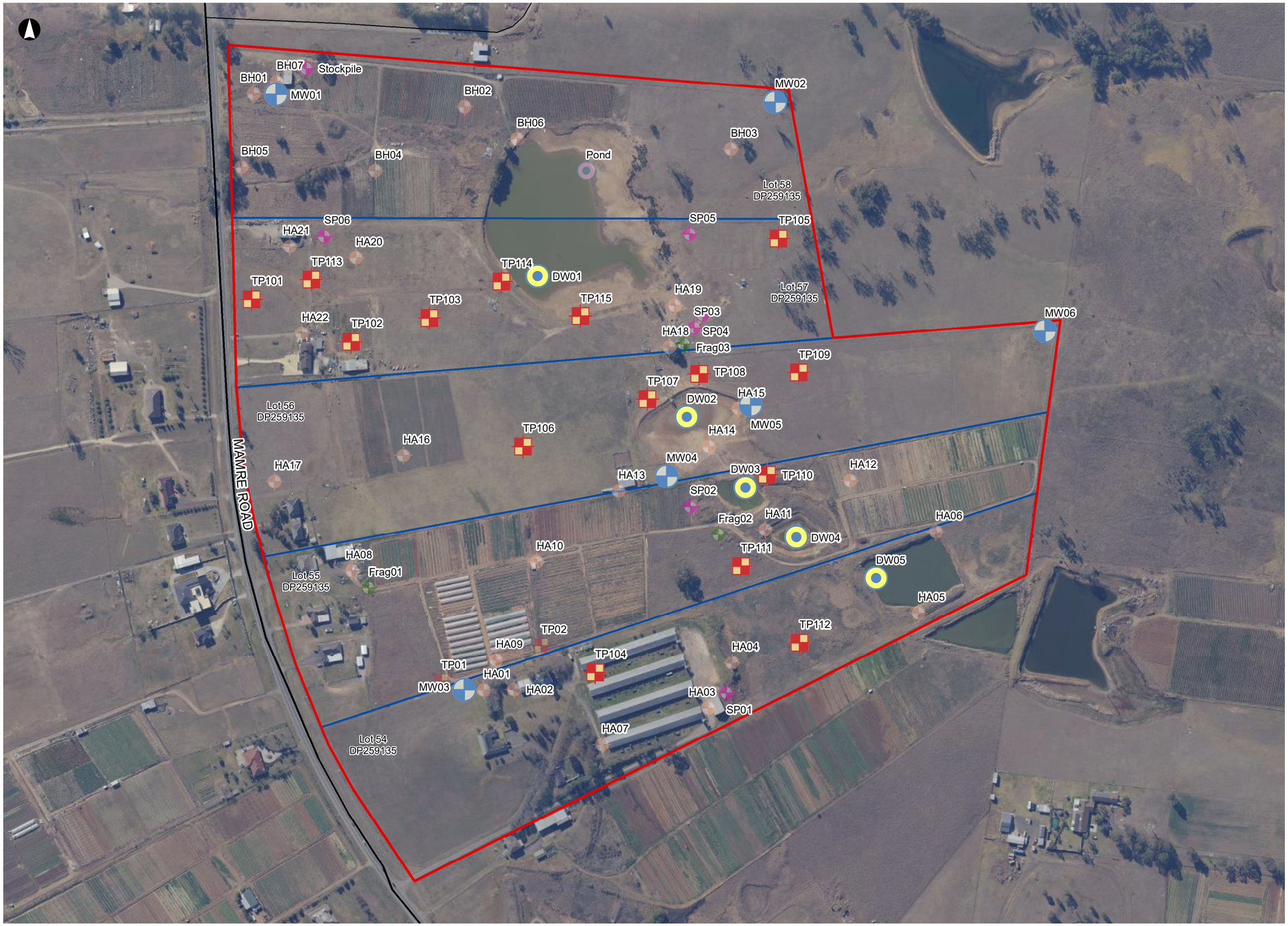


Figure 2 - Groundwater Contours

0 30 60 120 180 240
m

Date: 24/10/2019 Path: H:\AAP_ER_GIS\Projects\10035157\DSI\Figure 4 - Groundwater Contours.mxd
Created by : Environmental Restoration
QA by : Environmental Restoration

10035157 - Aspect Industrial Estate - Groundwater Management Plan



Legend

Current Sample Locations

Type

- Monitoring Well
- Surface Water Sample
- Test Pit

Previous Sample Locations

Type

- Borehole
- Fragment
- Hand Auger
- Stockpile
- Surface Water
- Test Pit
- Lots
- Site Boundary

1:4,128 at A3

mirvac

ARCADIS Design & Consultancy for natural and built assets

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Coordinate System: GDA 1994 MGA Zone 56
Date issued: October 2, 2019

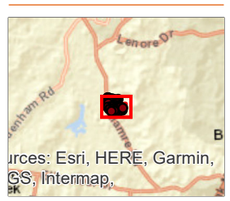
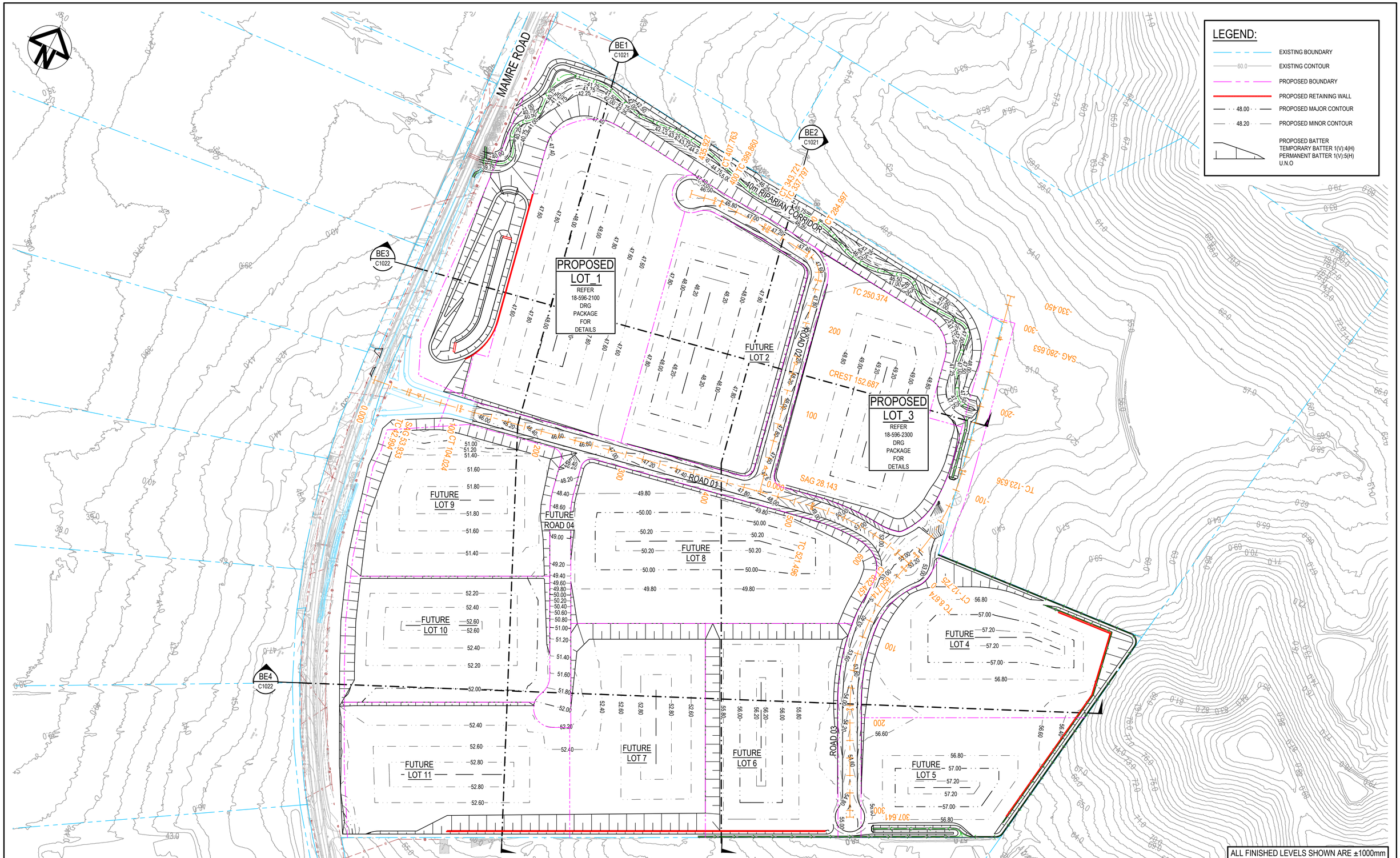


Figure 3 - Previous and Current Sample Locations

0 40 80 160 240 320
m

Date: 2/10/2019 Path: C:\Arc Templates\Temporary Projects\Proposals\Mirvac Kemps Creek\Previous Sample Locations.mxd
Created by : Environmental Restoration
QA by : Environmental Restoration



Issue	Description	Date
F	ISSUED FOR DEVELOPMENT APPLICATION	10-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	08-10-21
C	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

100mm on Original

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

Client

mirvac

Scales		Drawn	PDK
	1:2000	Designed	PDK
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

BULK EARTHWORKS
CONTOUR PLAN

Civil Engineers and Project Managers

at&l

Level 7, 153 Walker Street
North Sydney NSW 20060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9923 1055
www.atl.net.au
info@atl.net.au

Status

FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.

18-596-C1020

Issue

F

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD\18-596-C1020.dwg

EARTHWORKS VOLUMES

A	B	C	D	E = A+B+C+D	F
EXISTING TOPSOIL STRIPPING VOLUME (cu.m) REFER NOTE No.1	EXCAVATION OF EXISTING CREEKS AND DAMS (cu.m) REFER NOTE No.3	NET CUT (cu.m)	NET FILL (cu.m)	BALANCE (cu.m)	APPROXIMATE VOLUME OF SELECT MATERIAL IMPORT FOR RETAINING WALLS
-107,567	-29,947	-998,571	1,130,471	-5,614	28,008

CUT/FILL DEPTH RANGE LEGEND

Lower_value		Upper_value		Colour
-10.0	to	-8.0	m	
-8.0	to	-7.0	m	
-7.0	to	-6.0	m	
-6.0	to	-5.0	m	
-5.0	to	-4.0	m	
-4.0	to	-3.0	m	
-3.0	to	-2.0	m	
-2.0	to	-1.0	m	
-1.0	to	0.0	m	
0.0	to	1.0	m	
1.0	to	2.0	m	
2.0	to	3.0	m	
3.0	to	4.0	m	
4.0	to	5.0	m	
5.0	to	6.0	m	
6.0	to	7.0	m	
7.0	to	8.0	m	
8.0	to	10.0	m	

EARTHWORKS AREAS

CUT (ha)	17.8
FILL (ha)	38.0
FARM DAMS (ha)	3.0
TOTAL (ha)	58.8

MAMRE ROAD

40m RIPARIAN CORRIDOR

ROAD 02

ROAD 01

ROAD 03

FUTURE ROAD 04

BEL 47.80 (±1000mm)
PROPOSED LOT_1
REFER 18-596-2100 DRG PACKAGE FOR DETAILS

BEL 48.20 (±1000mm)
FUTURE LOT 2

BEL 49.00 (±1000mm)
PROPOSED LOT_3
REFER 18-596-2300 DRG PACKAGE FOR DETAILS

BEL 51.60 (±1000mm)
FUTURE LOT 9

FUTURE LOT 8
BEL 50.00 (±1000mm)

FUTURE LOT 10
BEL 52.30 (±1000mm)

FUTURE LOT 11
BEL 52.60 (±1000mm)

FUTURE LOT 7
BEL 52.60 (±1000mm)

FUTURE LOT 6
BEL 56.00 (±1000mm)

FUTURE LOT 4
BEL 57.00 (±1000mm)

FUTURE LOT 5
BEL 57.00 (±1000mm)

LEGEND:

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- PROPOSED RETAINING WALL
- PROPOSED BATTER
  TEMPORARY BATTER 1(V):4(H)
  PERMANENT BATTER 1(V):5(H)
  U.N.O
- EXTENT OF EXCAVATION OF EXISTING CREEKS AND DAMS (REFER NOTE No.3)

NOTES

1. EXISTING TOPSOIL STRIPPED 150mm SITEWIDE. IT IS ASSUMED THAT ALL TOPSOIL FROM THE SITE WILL BE RE-USED ON SITE AS PER THE SPECIFICATION OF THE GEOTECHNICAL ENGINEER. EXCESS TOPSOIL WILL BE EXPORTED AS REQUIRED.
2. ALLOWANCE HAS BEEN MADE FOR RETAINING WALL BACKFILL MATERIAL (IMPORT).
3. ADDITIONAL EXCAVATION OF EXISTING CREEKS AND DAMS WITHIN SITE AREA TO A DEPTH 1m BELOW EXISTING INVERT AND WIDTH OF EXISTING CREEK/DAM EXTENT. VOLUMES ARE APPROXIMATE.
   DEPTH OF DAMS HAS BEEN ASSUMED AT 2.5m DEEP. EXCAVATED MATERIAL TO BE FARMED AND USED AS GENERAL FILL WITHIN FILL ZONES 1m BELOW FINAL SURFACE (GEOTECHNICAL ENGINEER TO CONFIRM SUITABILITY OF MATERIAL).
4. NEGATIVE BALANCE VOLUMES INDICATE EXCESS OF MATERIAL REQUIRED (EXPORT).
5. THE VOLUMES DO NOT TAKE INTO ACCOUNT THE FOLLOWING :-
   - BULKING FACTORS OF REMOVED CUT
   - REMOVAL OF EXISTING BUILDING SLABS AND PAVEMENTS
   - REMOVAL AND\OR REMEDIATION OF ANY EXISTING UNCONTROLLED FILL
   - PROPOSED LANDSCAPING
   - STORMWATER AND UTILITY TRENCHING
   - EROSION AND SEDIMENTATION CONTROL SWALES AND BASINS
6. BUILDING PADS HAVE BEEN GRADED AT MINIMUM 0.5% GRADE
7. PROPOSED PAVEMENT BOX OUT HAS BEEN SHOWN AT 700mm DEPTH. PAVEMENT DEPTH TO CONFIRMED DURING DETAILED DESIGN.

Issue	Description	Date
F	ISSUED FOR DEVELOPMENT APPLICATION	10-02-22
E	ISSUED FOR DEVELOPMENT APPLICATION	03-02-22
D	ISSUED FOR DEVELOPMENT APPLICATION	15-10-20
C	ISSUED FOR DEVELOPMENT APPLICATION	12-10-20
B	ISSUED FOR DEVELOPMENT APPLICATION	22-05-20
A	ISSUED FOR DEVELOPMENT APPLICATION	15-05-20

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

Client: mirvac

Scales	1:2000	Drawn	PDK
		Designed	PDK
Grid	MGA	Checked	AT
Height Datum	AHD	Approved	AM

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
BULK EARTHWORKS
CUT/FILL PLAN

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9923 1055
www.atl.net.au
info@atl.net.au

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION
A1

Project - Drawing No.: 18-596-C1025
Issue: F

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Final\SSD\1000_STAGE 1 SSD\18-596-C1025.dwg

EARTHWORKS VOLUMES

A	B	C = A+B
NET CUT (cu.m)	NET FILL (cu.m)	BALANCE (cu.m)
-283,907	92,088	-191,918

CUT/FILL DEPTH RANGE LEGEND

Lower_value		Upper_value		Colour
-10.0	to	-8.0	m	
-8.0	to	-7.0	m	
-7.0	to	-6.0	m	
-6.0	to	-5.0	m	
-5.0	to	-4.0	m	
-4.0	to	-3.0	m	
-3.0	to	-2.0	m	
-2.0	to	-1.0	m	
-1.0	to	0.0	m	
0.0	to	1.0	m	
1.0	to	2.0	m	
2.0	to	3.0	m	
3.0	to	4.0	m	
4.0	to	5.0	m	
5.0	to	6.0	m	
6.0	to	7.0	m	
7.0	to	8.0	m	
8.0	to	10.0	m	

MAMRE ROAD

40m RIPARIAN CORRIDOR

ROAD 01

ROAD 02

ROAD 03

FUTURE ROAD 04

BEL 47.80 (±1000mm)

PROPOSED LOT_1
REFER 18-596-2100 DRG PACKAGE FOR DETAILS

BEL 48.20 (±1000mm)
FUTURE LOT 2

BEL 49.00 (±1000mm)

PROPOSED LOT_3
REFER 18-596-2300 DRG PACKAGE FOR DETAILS

PREVIOUS SSDA BEL 49.00

BEL 51.60 (±1000mm)
FUTURE LOT 9

FUTURE LOT 8
BEL 50.00 (±1000mm)

FUTURE LOT 10
BEL 52.30 (±1000mm)

PREVIOUS SSDA BEL 54.00

FUTURE LOT 11
BEL 52.60 (±1000mm)

PREVIOUS SSDA BEL 56.00

FUTURE LOT 7
BEL 52.60 (±1000mm)

PREVIOUS SSDA BEL 56.00

FUTURE LOT 6
BEL 56.00 (±1000mm)

FUTURE LOT 4
BEL 57.00 (±1000mm)

FUTURE LOT 5
BEL 57.00 (±1000mm)

LEGEND:

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- PROPOSED RETAINING WALL
- PROPOSED BATTER TEMPORARY BATTER 1(V):4(H) PERMANENT BATTER 1(V):5(H) U.N.O
- EXTENT OF EXCAVATION OF EXISTING CREEKS AND DAMS (REFER NOTE No.3)

NOTES

1. VOLUMES ARE CALCULATED FROM ORIGINAL SSDA SURFACE DATING 15-10-20 TO THE UPDATED SSDA SURFACE
2. EXISTING TOPSOIL STRIPPED 150mm SITEWIDE. IT IS ASSUMED THAT ALL TOPSOIL FROM THE SITE WILL BE RE-USED ON SITE AS PER THE SPECIFICATION OF THE GEOTECHNICAL ENGINEER. EXCESS TOPSOIL WILL BE EXPORTED AS REQUIRED.
3. ALLOWANCE HAS BEEN MADE FOR RETAINING WALL BACKFILL MATERIAL (IMPORT).
4. NEGATIVE BALANCE VOLUMES INDICATE EXCESS OF MATERIAL REQUIRED (EXPORT).
5. THE VOLUMES DO NOT TAKE INTO ACCOUNT THE FOLLOWING :-
   - BULKING FACTORS OF REMOVED CUT
   - REMOVAL OF EXISTING BUILDING SLABS AND PAVEMENTS
   - REMOVAL AND\OR REMEDIATION OF ANY EXISTING UNCONTROLLED FILL
   - PROPOSED LANDSCAPING
   - STORMWATER AND UTILITY TRENCHING
   - EROSION AND SEDIMENTATION CONTROL SWALES AND BASINS
6. BUILDING PADS HAVE BEEN GRADED AT MINIMUM 0.5% GRADE
7. PROPOSED PAVEMENT BOX OUT HAS BEEN SHOWN AT 700mm DEPTH. PAVEMENT DEPTH TO CONFIRMED DURING DETAILED DESIGN.

Issue	Description	Date
P1	ISSUED FOR INFORMATION	16-02-22

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

Client: mirvac

Scales	1:2000	Drawn	KR
		Designed	KR
Grid	MGA	Checked	DS
Height Datum	AHD	Approved	AM

Project
ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title
COMPARISION
BULK EARTHWORKS
CUT/FILL PLAN

Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
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Fax: 02 9923 1055
www.atl.net.au
info@atl.net.au

Status: FOR AINFORMATION
NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 18-596-SKC121

Issue: P1

100mm on Original

F:\18-596 Mamre Road\6.0 Drgs\Civil\Sketches\18-596-SKC121-SSD COMPARISION EW VOLUMES.dwg

APPENDIX B ANALYTICAL TABLES

Aspect Industrial Estate
10035157

Summary of Analytical Results - Groundwater

ARCADIS Design & Consultancy for natural and built assets

		Metals																TPH					TRH						
		Arsenic	Arsenic (Filtered)	Cadmium	Cadmium (Filtered)	Chromium (III+VI)	Chromium (III+VI) (Filtered)	Copper	Copper (Filtered)	Lead	Lead (Filtered)	Mercury	Mercury (Filtered)	Nickel	Nickel (Filtered)	Zinc	Zinc (Filtered)	C6-C9	C10-C14	C15-C28	C29-C36	C10-C36 (Sum of total)	C6-C10	>C6-C10 less BTEX (F1)	C10-C16	>C10-C16 less Naphthalene (F2)	C16-C34	C34-C40	>C10 - C40 (Sum of total)
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL		1	1	0.2	0.2	1	1	1	1	1	1	0.1	0.1	1	1	5	5	20	50	100	100	100	20	20	50	50	100	100	100
ANZG (2018) Freshwater 95% toxicant DGVs				0.2[#1]	0.2[#1]			1.4[#1]	1.4[#1]	3.4[#2]	3.4[#2]	0.6[#3]	0.06[#3 #7]	11[#3]	11[#3]	8[#4]	8[#4]													
NHMRC 2008 Primary Contact Recreation		100[#5]	100[#5]	20[#5]	20[#5]	500[#6]	500[#6]	20000[#5]	20000[#5]	100[#5]	100[#5]	10[#5]	10[#5]	200[#5]	200[#5]															
NEPM 2013 Table 1C GILs, Fresh Waters				0.2[#8]	0.2[#8]			1.4[#8]	1.4[#8]	3.4[#8]	3.4[#8]	0.06[#9]	0.06[#9]	11[#8]	11[#8]	8[#8]	8[#8]													
Field_ID	**Sampled_Date_Time**																													
MW01	16-Oct-19	-	<1	-	<0.2	-	<1	-	<1	-	<1	-	<0.1	-	<1	-	<5	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100
MW02	16-Oct-19	-	<1	-	<0.2	-	<1	-	<1	-	<1	-	<0.1	-	9	-	10	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100
MW03	23-Oct-19	-	<1	-	0.3	-	<1	-	2	-	<1	-	<0.1	-	4	-	12	<20	<50	<100	<100	<100	<20	<20	70	70	<100	<100	<100
MW04	16-Oct-19	-	<1	-	0.3	-	<1	-	<1	-	<1	-	<0.1	-	3	-	9	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100
MW05	16-Oct-19	-	<1	-	<0.2	-	<1	-	<1	-	<1	-	<0.1	-	<1	-	<5	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100
MW06	16-Oct-19	-	3	-	<0.2	-	<1	-	<1	-	<1	-	<0.1	-	2	-	47	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100
Statistical Summary																													
Number of Results		0	6	0	6	0	6	0	6	0	6	0	6	0	6	0	6	6	6	6	6	6	6	6	6	6	6	6	6
Number of Detects		0	1	0	2	0	0	0	1	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	1	1	0	0	0
Minimum Concentration		ND	<1	ND	<0.2	ND	<1	ND	<1	ND	<1	ND	<0.1	ND	<1	ND	<5	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100
Minimum Detect		ND	3	ND	0.3	ND	ND	ND	2	ND	ND	ND	ND	ND	2	ND	9	ND	ND	ND	ND	ND	ND	ND	70	70	ND	ND	ND
Maximum Concentration		0	3	0	0.3	0	<1	0	2	0	<1	0	<0.1	0	9	0	47	<20	<50	<100	<100	<100	<20	<20	70	70	<100	<100	<100
Maximum Detect		ND	3	ND	0.3	ND	ND	ND	2	ND	ND	ND	ND	ND	9	ND	47	ND	ND	ND	ND	ND	ND	ND	70	70	ND	ND	ND
Average Concentration			0.92		0.17		0.5		0.75		0.5		0.05		3.2		14	10	25	50	50	50	10	10	33	33	50	50	50
Median Concentration			0.5		0.1		0.5		0.5		0.5		0.05		2.5		9.5	10	25	50	50	50	10	10	25	25	50	50	50
Standard Deviation			1		0.1		0		0.61		0		0		3.2		17	0	0	0	0	0	0	0	18	18	0	0	0
Number of Guideline Exceedances		0	0	0	6	0	0	0	1	0	0	0	6	0	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)		0	0	0	2	0	0	0	1	0	0	0	0	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Description

NEPM 2013 Table 1C GILs, Fresh Waters:A Apply to typical slightly-moderately disturbed systems
B From ADWG
C May not protect key species from chronic toxicity

Env Stds Comments

#1:Very high reliability
#2:Moderate reliability
#3:Low reliability
#4:High reliability
#5:ADWG 2015 Health
#6:NHMRC 2008 Risk in Recreational Water
#7: ANZG (2018) Freshwater 99% toxicant DGVs
#8:Values calculated using hardness of 30 mg/L CaCO3. Refer ANZECC & ARMCANZ (2000) for site specific hardness guidance
#9:Chemical for which possible bioaccumulation and secondary poisoning effects should be considered, refer to ANZECC & ARMCANZ (2000) for further guidance.
#10:Figure may not protect key species from chronic toxicity, refer to ANZECC & ARMCANZ (2000) for further guidance.

Summary of Analytical Results - Groundwater

	BTEX						PAH																	Phenols
	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	Phenolics Total
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	1	1	1	2	1	3	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	50
ANZG (2018) Freshwater 95% toxicant DGVs	950[#2]				350[#3]															16[#3]				
NHMRC 2008 Primary Contact Recreation	10[#5]	8000[#5]	3000[#5]			6000[#5]				0.12[#7]	0.1[#6]													
NEPM 2013 Table 1C GILs, Fresh Waters	950				350															16				
Field_ID **Sampled_Date_Time**																								
MW01 16-Oct-19	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
MW02 16-Oct-19	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
MW03 23-Oct-19	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
MW04 16-Oct-19	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
MW05 16-Oct-19	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
MW06 16-Oct-19	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Statistical Summary																								
Number of Results	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	0
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ND
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<1	<1	<1	<2	<1	<3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.5	0.5	0.5	1	0.5	1.5	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Median Concentration	0.5	0.5	0.5	1	0.5	1.5	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Description

NEPM 2013 Table 1C GILs, Fresh Waters:A Apply to typ
B From ADWG
C May not protect key species from chronic toxicity

Env Stds Comments

#1:Very high reliability
#2:Moderate reliability
#3:Low reliability
#4:High reliability
#5:ADWG 2015 Health
#6:NHMRC 2008 Risk in Recreational Water
#7: ANZG (2018) Freshwater 99% toxicant DGVs
#8:Values calculated using hardness of 30 mg/L CaCO3
#9:Chemical for which possible bioaccumulation and se
#10:Figure may not protect key species from chronic to

Aspect Industrial Estate
10035157

Summary of Analytical Results - Groundwater

ARCADIS Design & Consultancy for natural and built assets

		PCBs								Organochlorine Pesticides																								
		Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	a-BHC	Aldrin	Dieldrin	Aldrin + Dieldrin	b-BHC	chlordane	d-BHC	DDD	4,4-DDE	DDT	DDT+DDE+DDD	Endrin ketone	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	ug/L	ug/L	ug/L
EQL		1	1	1	1	1	1	1	1	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	10	1	1
ANZG (2018) Freshwater 95% toxicant DGVs					0.6[#3]		0.03[#2]								0.08[#2]				0.01[#2]						0.02[#2]		0.2[#2]	0.09[#2]			0.2[#2]		
NHMRC 2008 Primary Contact Recreation													3[#5]		20[#5]				90[#5]								100[#5]	3[#5]					
NEPM 2013 Table 1C GILs, Fresh Waters					0.3[#9]		0.01[#9]								0.03[#9]				0.006[#9]						0.01[#9]		0.2	0.01[#9]			0.1[#9]		
Field_ID	**Sampled_Date_Time**																																	
MW01	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW02	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	23-Oct-19	<5	<1	<5	<5	<5	<5	<5	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<1	<1
MW04	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW05	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Statistical Summary																																		
Number of Results		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Number of Detects		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration		<5	<1	<5	<5	<5	<5	<5	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<1	<1
Minimum Detect		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration		<5	<1	<5	<5	<5	<5	<5	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<10	<1	<1
Maximum Detect		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration																																		
Median Concentration		2.5	0.5	2.5	2.5	2.5	2.5	2.5	0.5	0.05	0.05	0.05	0.05	0.05	0.5	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	5	0.5	0.5
Standard Deviation																																		
Number of Guideline Exceedances		1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	1	1	0	1	0	0
Number of Guideline Exceedances(Detects Only)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Description

NEPM 2013 Table 1C GILs, Fresh Waters:A Apply to typ
B From ADWG
C May not protect key species from chronic toxicity

Env Stds Comments

#1:Very high reliability
#2:Moderate reliability
#3:Low reliability
#4:High reliability
#5:ADWG 2015 Health
#6:NHMRC 2008 Risk in Recreational Water
#7: ANZG (2018) Freshwater 99% toxicant DGVs
#8:Values calculated using hardness of 30 mg/L CaCO3.
#9:Chemical for which possible bioaccumulation and se
#10:Figure may not protect key species from chronic to

Aspect Industrial Estate
10035157

Summary of Analytical Results - Groundwater

ARCADIS Design & Consultancy for natural and built assets

	Organophosphorous Pesticides																														Pesticides	Herbicides	Halogenated Benzenes
	Azinophos methyl	Bolstar (Sulprofos)	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethoprop	Ethion	Fensulfothion	Fenitrothion	Fenthion	EPN	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)	Naled (Dibrom)	Monocrotophos	Omethoate	Parathion	Phorate	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos	Pirimiphos-methyl	Tokuthion	Hexachlorobenzene
	µg/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	ug/L	mg/L	µg/L
EQL	2	2	2	20	2	20	2	20	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20	0.002	0.1
ANZG (2018) Freshwater 95% toxicant DGVs	0.02[#2]			0.01[#3]					0.01[#2]		0.15[#3]					0.2[#2]			0.05[#2]						0.004[#2]									
NHMRC 2008 Primary Contact Recreation	300[#5]	100[#5]	20[#5]	100[#5]					40[#5]	50[#5]	70[#5]	40[#5]	10[#5]	40[#5]	100[#5]	70[#5]	70[#5]		700[#5]		7[#5]	50[#5]		20[#5]	10[#5]	200[#5]		200[#5]		9[#5]		1000[#5]	900[#5]		
NEPM 2013 Table 1C GILs, Fresh Waters				0.01[#9]					0.01		0.15					0.2			0.05							0.004[#10]								
Field_ID	**Sampled_Date_Time**																																		
MW01	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW02	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	23-Oct-19	<2	<2	<2	<20	<2	<20	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<20	<0.002	<0.1
MW04	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW05	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	16-Oct-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Statistical Summary																																			
Number of Results	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<2	<2	<2	<20	<2	<20	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<20	<0.002	<0.1
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<2	<2	<2	<20	<2	<20	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<20	<0.002	<0.1
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration																																			
Median Concentration	1	1	1	10	1	10	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	0.001	0.05	
Standard Deviation																																			
Number of Guideline Exceedances	1	0	0	1	0	0	0	0	1	0	1	0	1	0	0	1	0	1	1	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	1
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Description
NEPM 2013 Table 1C GILs, Fresh Waters:A Apply to typ
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C May not protect key species from chronic toxicity

Env Stds Comments
#1:Very high reliability
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#5:ADWG 2015 Health
#6:NHMRC 2008 Risk in Recreational Water
#7: ANZG (2018) Freshwater 99% toxicant DGVs
#8:Values calculated using hardness of 30 mg/L CaCO3.
#9:Chemical for which possible bioaccumulation and se
#10:Figure may not protect key species from chronic to

APPENDIX C LABORATORY REPORTS

Arcadis Australia
Lvl 16/580 George Street
Sydney
NSW 2000

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Jack Palma**

Report **683212-W**
Project name MIRVAC - KEMPS CREEK
Project ID 10035157
Received Date Oct 17, 2019

Client Sample ID			**MW01**	**MW02**	**MW04**	**MW05**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**S19-Oc26968**	**S19-Oc26969**	**S19-Oc26970**	**S19-Oc26971**
Date Sampled			**Oct 16, 2019**	**Oct 16, 2019**	**Oct 16, 2019**	**Oct 16, 2019**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	82	87	89	89
Polycyclic Aromatic Hydrocarbons (Trace level)						
Acenaphthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Acenaphthylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benz(a)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(a)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(g.h.i)perylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Chrysene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Dibenz(a.h)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluorene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Client Sample ID			MW01	MW02	MW04	MW05
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26968	S19-Oc26969	S19-Oc26970	S19-Oc26971
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (Trace level)						
Indeno(1.2.3-cd)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Naphthalene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Phenanthrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Total PAH*	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
2-Fluorobiphenyl (surr.)	1	%	63	63	68	67
p-Terphenyl-d14 (surr.)	1	%	75	54	86	60
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	0.0003	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	0.009	0.003	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005	0.010	0.009	< 0.005

Client Sample ID			MW06	DW01	DW02	DW03
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26972	S19-Oc26973	S19-Oc26974	S19-Oc26975
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	97	94	93	96

Client Sample ID			MW06	DW01	DW02	DW03
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26972	S19-Oc26973	S19-Oc26974	S19-Oc26975
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Chlordanes - Total	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
4.4'-DDD	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
4.4'-DDE	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
4.4'-DDT	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
a-BHC	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Aldrin	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
b-BHC	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
d-BHC	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Dieldrin	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Endosulfan I	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Endosulfan II	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Endosulfan sulphate	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Endrin	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Endrin aldehyde	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Endrin ketone	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
g-BHC (Lindane)	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Heptachlor	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Heptachlor epoxide	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Hexachlorobenzene	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Methoxychlor	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Toxaphene	0.01	mg/L	-	< 0.01	< 0.01	< 0.01
Aldrin and Dieldrin (Total)*	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
DDT + DDE + DDD (Total)*	0.0001	mg/L	-	< 0.0001	< 0.0001	< 0.0001
Vic EPA IWRG 621 OCP (Total)*	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Vic EPA IWRG 621 Other OCP (Total)*	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Dibutylchlorendate (surr.)	1	%	-	83	67	54
Tetrachloro-m-xylene (surr.)	1	%	-	58	94	82
Organophosphorus Pesticides						
Azinphos-methyl	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Bolstar	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Chlorfenvinphos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Chlorpyrifos	0.02	mg/L	-	< 0.02	< 0.02	< 0.02
Chlorpyrifos-methyl	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Coumaphos	0.02	mg/L	-	< 0.02	< 0.02	< 0.02
Demeton-S	0.02	mg/L	-	< 0.02	< 0.02	< 0.02
Demeton-O	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Diazinon	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Dichlorvos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Dimethoate	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Disulfoton	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
EPN	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Ethion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Ethoprop	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Ethyl parathion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Fenitrothion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Fensulfothion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Fenthion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Malathion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Merphos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002

Client Sample ID			MW06	DW01	DW02	DW03
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26972	S19-Oc26973	S19-Oc26974	S19-Oc26975
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Methyl parathion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Mevinphos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Monocrotophos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Naled	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Omethoate	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Phorate	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Pirimiphos-methyl	0.02	mg/L	-	< 0.02	< 0.02	< 0.02
Pyrazophos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Ronnel	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Terbufos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Tetrachlorvinphos	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Tokuthion	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Trichloronate	0.002	mg/L	-	< 0.002	< 0.002	< 0.002
Triphenylphosphate (surr.)	1	%	-	69	77	81
Polychlorinated Biphenyls						
Aroclor-1016	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Aroclor-1221	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Aroclor-1232	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Aroclor-1242	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Aroclor-1248	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Aroclor-1254	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Aroclor-1260	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Total PCB*	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Dibutylchlorendate (surr.)	1	%	-	83	67	54
Tetrachloro-m-xylene (surr.)	1	%	-	58	94	82
Polycyclic Aromatic Hydrocarbons (Trace level)						
Acenaphthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Acenaphthylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benz(a)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(a)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(g.h.i)perylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Chrysene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Dibenz(a.h)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Fluorene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Indeno(1.2.3-cd)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Naphthalene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Phenanthrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Total PAH*	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	< 0.00001
2-Fluorobiphenyl (surr.)	1	%	78	93	78	66
p-Terphenyl-d14 (surr.)	1	%	64	90	73	74
Phenolics (total)	0.05	mg/L	-	< 0.05	< 0.05	< 0.05

Client Sample ID			MW06	DW01	DW02	DW03
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26972	S19-Oc26973	S19-Oc26974	S19-Oc26975
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	0.003	0.001	0.002	0.002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.002	< 0.001	0.002	0.002
Zinc (filtered)	0.005	mg/L	0.047	< 0.005	< 0.005	< 0.005

Client Sample ID			DW04	DW05	QA1	RINSATE
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26976	S19-Oc26977	S19-Oc26978	S19-Oc26979
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	-
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Xylenes - Total	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
4-Bromofluorobenzene (surr.)	1	%	95	81	87	-
Organochlorine Pesticides						
Chlordanes - Total	0.001	mg/L	< 0.001	< 0.001	-	-
4.4'-DDD	0.0001	mg/L	< 0.0001	< 0.0001	-	-
4.4'-DDE	0.0001	mg/L	< 0.0001	< 0.0001	-	-
4.4'-DDT	0.0001	mg/L	< 0.0001	< 0.0001	-	-
a-BHC	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Aldrin	0.0001	mg/L	< 0.0001	< 0.0001	-	-
b-BHC	0.0001	mg/L	< 0.0001	< 0.0001	-	-
d-BHC	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Dieldrin	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Endosulfan I	0.0001	mg/L	< 0.0001	< 0.0001	-	-

Client Sample ID			DW04	DW05	QA1	RINSATE
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26976	S19-Oc26977	S19-Oc26978	S19-Oc26979
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Endosulfan II	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Endosulfan sulphate	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Endrin	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Endrin aldehyde	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Endrin ketone	0.0001	mg/L	< 0.0001	< 0.0001	-	-
g-BHC (Lindane)	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Heptachlor	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Heptachlor epoxide	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Hexachlorobenzene	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Methoxychlor	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Toxaphene	0.01	mg/L	< 0.01	< 0.01	-	-
Aldrin and Dieldrin (Total)*	0.0001	mg/L	< 0.0001	< 0.0001	-	-
DDT + DDE + DDD (Total)*	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Vic EPA IWRG 621 OCP (Total)*	0.001	mg/L	< 0.001	< 0.001	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.001	mg/L	< 0.001	< 0.001	-	-
Dibutylchlorendate (surr.)	1	%	114	58	-	-
Tetrachloro-m-xylene (surr.)	1	%	78	82	-	-
Organophosphorus Pesticides						
Azinphos-methyl	0.002	mg/L	< 0.002	< 0.002	-	-
Bolstar	0.002	mg/L	< 0.002	< 0.002	-	-
Chlorfenvinphos	0.002	mg/L	< 0.002	< 0.002	-	-
Chlorpyrifos	0.02	mg/L	< 0.02	< 0.02	-	-
Chlorpyrifos-methyl	0.002	mg/L	< 0.002	< 0.002	-	-
Coumaphos	0.02	mg/L	< 0.02	< 0.02	-	-
Demeton-S	0.02	mg/L	< 0.02	< 0.02	-	-
Demeton-O	0.002	mg/L	< 0.002	< 0.002	-	-
Diazinon	0.002	mg/L	< 0.002	< 0.002	-	-
Dichlorvos	0.002	mg/L	< 0.002	< 0.002	-	-
Dimethoate	0.002	mg/L	< 0.002	< 0.002	-	-
Disulfoton	0.002	mg/L	< 0.002	< 0.002	-	-
EPN	0.002	mg/L	< 0.002	< 0.002	-	-
Ethion	0.002	mg/L	< 0.002	< 0.002	-	-
Ethoprop	0.002	mg/L	< 0.002	< 0.002	-	-
Ethyl parathion	0.002	mg/L	< 0.002	< 0.002	-	-
Fenitrothion	0.002	mg/L	< 0.002	< 0.002	-	-
Fensulfothion	0.002	mg/L	< 0.002	< 0.002	-	-
Fenthion	0.002	mg/L	< 0.002	< 0.002	-	-
Malathion	0.002	mg/L	< 0.002	< 0.002	-	-
Merphos	0.002	mg/L	< 0.002	< 0.002	-	-
Methyl parathion	0.002	mg/L	< 0.002	< 0.002	-	-
Mevinphos	0.002	mg/L	< 0.002	< 0.002	-	-
Monocrotophos	0.002	mg/L	< 0.002	< 0.002	-	-
Naled	0.002	mg/L	< 0.002	< 0.002	-	-
Omethoate	0.002	mg/L	< 0.002	< 0.002	-	-
Phorate	0.002	mg/L	< 0.002	< 0.002	-	-
Pirimiphos-methyl	0.02	mg/L	< 0.02	< 0.02	-	-
Pyrazophos	0.002	mg/L	< 0.002	< 0.002	-	-
Ronnel	0.002	mg/L	< 0.002	< 0.002	-	-
Terbufos	0.002	mg/L	< 0.002	< 0.002	-	-

Client Sample ID			DW04	DW05	QA1	RINSATE
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26976	S19-Oc26977	S19-Oc26978	S19-Oc26979
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Tetrachlorvinphos	0.002	mg/L	< 0.002	< 0.002	-	-
Tokuthion	0.002	mg/L	< 0.002	< 0.002	-	-
Trichloronate	0.002	mg/L	< 0.002	< 0.002	-	-
Triphenylphosphate (surr.)	1	%	88	60	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1221	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1232	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1242	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1248	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1254	0.001	mg/L	< 0.001	< 0.001	-	-
Aroclor-1260	0.001	mg/L	< 0.001	< 0.001	-	-
Total PCB*	0.001	mg/L	< 0.001	< 0.001	-	-
Dibutylchlorendate (surr.)	1	%	114	58	-	-
Tetrachloro-m-xylene (surr.)	1	%	78	82	-	-
Polycyclic Aromatic Hydrocarbons (Trace level)						
Acenaphthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Acenaphthylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benz(a)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benzo(a)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benzo(g.h.i)perylene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Chrysene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Dibenz(a.h)anthracene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Fluoranthene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Fluorene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Indeno(1.2.3-cd)pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Naphthalene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Phenanthrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Pyrene	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
Total PAH*	0.00001	mg/L	< 0.00001	< 0.00001	< 0.00001	-
2-Fluorobiphenyl (surr.)	1	%	67	66	89	-
p-Terphenyl-d14 (surr.)	1	%	56	61	70	-
Phenolics (total)	0.05	mg/L	< 0.05	< 0.05	-	-
Heavy Metals						
Arsenic	0.001	mg/L	-	-	0.004	< 0.001
Arsenic (filtered)	0.001	mg/L	0.001	0.002	-	-
Cadmium	0.0002	mg/L	-	-	< 0.0002	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	-	-
Chromium	0.001	mg/L	-	-	< 0.001	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	-	-
Copper	0.001	mg/L	-	-	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	-	-
Lead	0.001	mg/L	-	-	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	-	-
Mercury	0.0001	mg/L	-	-	< 0.0001	< 0.0001

Client Sample ID			DW04	DW05	QA1	RINSATE
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S19-Oc26976	S19-Oc26977	S19-Oc26978	S19-Oc26979
Date Sampled			Oct 16, 2019	Oct 16, 2019	Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	-	-
Nickel	0.001	mg/L	-	-	0.004	< 0.001
Nickel (filtered)	0.001	mg/L	0.001	0.002	-	-
Zinc	0.005	mg/L	-	-	0.032	< 0.005
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	-	-

Client Sample ID			[R20]TS	TB
Sample Matrix			Water	Water
Eurofins Sample No.			S19-Oc26980	S19-Oc26981
Date Sampled			Oct 16, 2019	Oct 16, 2019
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene[N02]	0.01	mg/L	88	< 0.01
TRH C6-C10	0.02	mg/L	72	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	-	< 0.02
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	0.02	mg/L	71	< 0.02
BTEX				
Benzene	0.001	mg/L	93	< 0.001
Toluene	0.001	mg/L	95	< 0.001
Ethylbenzene	0.001	mg/L	91	< 0.001
m&p-Xylenes	0.002	mg/L	88	< 0.002
o-Xylene	0.001	mg/L	95	< 0.001
Xylenes - Total	0.003	mg/L	90	< 0.003
4-Bromofluorobenzene (surr.)	1	%	98	87

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Eurofins | mgt Suite B7 (filtered metals/PAH trace level)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 21, 2019	
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Oct 21, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons (Trace level)	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water (trace)			
Metals M8 filtered	Melbourne	Oct 21, 2019	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins | mgt Suite B15			
Organochlorine Pesticides	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)			
Organophosphorus Pesticides	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS (USEPA 8081)			
Polychlorinated Biphenyls	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Phenolics (total)	Melbourne	Oct 21, 2019	7 Days
- Method: LTM-INO-4050 Total Phenolics in Waters and solids by CFA			
Eurofins | mgt Suite B7 (PAH trace level)			
Metals M8	Melbourne	Oct 21, 2019	180 Days
- Method:			

eurofins | Environment Testing

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Project Name: MIRVAC - KEMPS CREEK
Project ID: 10035157

Order No.:
Report #: 683212
Phone: 02 8907 9000
Fax:

Received: Oct 17, 2019 4:33 PM
Due: Oct 24, 2019
Priority: 5 Day
Contact Name: Jack Palma

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Asbestos Absence /Presence	HOLD	Phenolics (total)	Metals M7	Metals M8	Eurofins | mgt Suite B15	Moisture Set	BTEXN and Volatile TRH	Eurofins | mgt Suite B7 (PAH trace level)	Eurofins | mgt Suite B7 (filtered metals/PAH trace level)
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X									
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	MW01	Oct 16, 2019		Water	S19-Oc26968										X
2	MW02	Oct 16, 2019		Water	S19-Oc26969										X
3	MW04	Oct 16, 2019		Water	S19-Oc26970										X
4	MW05	Oct 16, 2019		Water	S19-Oc26971										X
5	MW06	Oct 16, 2019		Water	S19-Oc26972										X
6	DW01	Oct 16, 2019		Water	S19-Oc26973			X			X				X
7	DW02	Oct 16, 2019		Water	S19-Oc26974			X			X				X
8	DW03	Oct 16, 2019		Water	S19-Oc26975			X			X				X
9	DW04	Oct 16, 2019		Water	S19-Oc26976			X			X				X

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Company Name: Arcadis Australia
Address: Lvl 16/580 George Street
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Project Name: MIRVAC - KEMPS CREEK
Project ID: 10035157

Order No.:
Report #: 683212
Phone: 02 8907 9000
Fax:

Received: Oct 17, 2019 4:33 PM
Due: Oct 24, 2019
Priority: 5 Day
Contact Name: Jack Palma

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Asbestos Absence /Presence	HOLD	Phenolics (total)	Metals M7	Metals M8	Eurofins | mgt Suite B15	Moisture Set	BTEXN and Volatile TRH	Eurofins | mgt Suite B7 (PAH trace level)	Eurofins | mgt Suite B7 (filtered metals/PAH trace level)
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X									
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
10	DW05	Oct 16, 2019		Water	S19-Oc26977			X			X				X
11	QA1	Oct 16, 2019		Water	S19-Oc26978									X	
12	RINSATE	Oct 16, 2019		Water	S19-Oc26979					X					
13	TS	Oct 16, 2019		Water	S19-Oc26980								X		
14	TB	Oct 16, 2019		Water	S19-Oc26981								X		
15	SO01	Oct 16, 2019		Soil	S19-Oc26982				X			X			
16	SO02	Oct 16, 2019		Soil	S19-Oc26983		X								
17	SO03	Oct 16, 2019		Soil	S19-Oc26984				X			X			
18	SO04	Oct 16, 2019		Soil	S19-Oc26985				X			X			
19	SO05	Oct 16, 2019		Soil	S19-Oc26986		X								
20	ASB01	Oct 16, 2019		Building Materials	S19-Oc26987	X									

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Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217						X									
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
21	ASB02	Oct 16, 2019		Building Materials	S19-Oc26988	X									
22	ASB03	Oct 16, 2019		Building Materials	S19-Oc26989	X									
23	ASB04	Oct 16, 2019		Building Materials	S19-Oc26990	X									
Test Counts						4	2	5	3	1	5	3	2	1	10

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/L	< 0.001			0.001	Pass	
4.4'-DDD	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDE	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDT	mg/L	< 0.0001			0.0001	Pass	
a-BHC	mg/L	< 0.0001			0.0001	Pass	
Aldrin	mg/L	< 0.0001			0.0001	Pass	
b-BHC	mg/L	< 0.0001			0.0001	Pass	
d-BHC	mg/L	< 0.0001			0.0001	Pass	
Dieldrin	mg/L	< 0.0001			0.0001	Pass	
Endosulfan I	mg/L	< 0.0001			0.0001	Pass	
Endosulfan II	mg/L	< 0.0001			0.0001	Pass	
Endosulfan sulphate	mg/L	< 0.0001			0.0001	Pass	
Endrin	mg/L	< 0.0001			0.0001	Pass	
Endrin aldehyde	mg/L	< 0.0001			0.0001	Pass	
Endrin ketone	mg/L	< 0.0001			0.0001	Pass	
g-BHC (Lindane)	mg/L	< 0.0001			0.0001	Pass	
Heptachlor	mg/L	< 0.0001			0.0001	Pass	
Heptachlor epoxide	mg/L	< 0.0001			0.0001	Pass	
Hexachlorobenzene	mg/L	< 0.0001			0.0001	Pass	
Methoxychlor	mg/L	< 0.0001			0.0001	Pass	
Toxaphene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/L	< 0.002			0.002	Pass	
Bolstar	mg/L	< 0.002			0.002	Pass	
Chlorfenvinphos	mg/L	< 0.002			0.002	Pass	
Chlorpyrifos	mg/L	< 0.02			0.02	Pass	
Chlorpyrifos-methyl	mg/L	< 0.002			0.002	Pass	
Coumaphos	mg/L	< 0.02			0.02	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Demeton-S	mg/L	< 0.02			0.02	Pass	
Demeton-O	mg/L	< 0.002			0.002	Pass	
Diazinon	mg/L	< 0.002			0.002	Pass	
Dichlorvos	mg/L	< 0.002			0.002	Pass	
Dimethoate	mg/L	< 0.002			0.002	Pass	
Disulfoton	mg/L	< 0.002			0.002	Pass	
EPN	mg/L	< 0.002			0.002	Pass	
Ethion	mg/L	< 0.002			0.002	Pass	
Ethoprop	mg/L	< 0.002			0.002	Pass	
Ethyl parathion	mg/L	< 0.002			0.002	Pass	
Fenitrothion	mg/L	< 0.002			0.002	Pass	
Fensulfothion	mg/L	< 0.002			0.002	Pass	
Fenthion	mg/L	< 0.002			0.002	Pass	
Malathion	mg/L	< 0.002			0.002	Pass	
Merphos	mg/L	< 0.002			0.002	Pass	
Methyl parathion	mg/L	< 0.002			0.002	Pass	
Mevinphos	mg/L	< 0.002			0.002	Pass	
Monocrotophos	mg/L	< 0.002			0.002	Pass	
Naled	mg/L	< 0.002			0.002	Pass	
Omethoate	mg/L	< 0.002			0.002	Pass	
Phorate	mg/L	< 0.002			0.002	Pass	
Pirimiphos-methyl	mg/L	< 0.02			0.02	Pass	
Pyrazophos	mg/L	< 0.002			0.002	Pass	
Ronnel	mg/L	< 0.002			0.002	Pass	
Terbufos	mg/L	< 0.002			0.002	Pass	
Tetrachlorvinphos	mg/L	< 0.002			0.002	Pass	
Tokuthion	mg/L	< 0.002			0.002	Pass	
Trichloronate	mg/L	< 0.002			0.002	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.001			0.001	Pass	
Aroclor-1221	mg/L	< 0.001			0.001	Pass	
Aroclor-1232	mg/L	< 0.001			0.001	Pass	
Aroclor-1242	mg/L	< 0.001			0.001	Pass	
Aroclor-1248	mg/L	< 0.001			0.001	Pass	
Aroclor-1254	mg/L	< 0.001			0.001	Pass	
Aroclor-1260	mg/L	< 0.001			0.001	Pass	
Total PCB*	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons (Trace level)							
Acenaphthene	mg/L	< 0.00001			0.00001	Pass	
Acenaphthylene	mg/L	< 0.00001			0.00001	Pass	
Anthracene	mg/L	< 0.00001			0.00001	Pass	
Benz(a)anthracene	mg/L	< 0.00001			0.00001	Pass	
Benzo(a)pyrene	mg/L	< 0.00001			0.00001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.00001			0.00001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Chrysene	mg/L	< 0.00001			0.00001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.00001			0.00001	Pass	
Fluoranthene	mg/L	< 0.00001			0.00001	Pass	
Fluorene	mg/L	< 0.00001			0.00001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.00001			0.00001	Pass	
Naphthalene	mg/L	< 0.00001			0.00001	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Phenanthrene	mg/L	< 0.00001			0.00001	Pass	
Pyrene	mg/L	< 0.00001			0.00001	Pass	
Total PAH*	mg/L	< 0			0.00001	Pass	
Method Blank							
Phenolics (total)	mg/L	< 0.05			0.05	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	85			70-130	Pass	
TRH C6-C10	%	98			70-130	Pass	
TRH >C10-C16	%	76			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	95			70-130	Pass	
TRH C10-C14	%	79			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	92			70-130	Pass	
Toluene	%	89			70-130	Pass	
Ethylbenzene	%	82			70-130	Pass	
m&p-Xylenes	%	81			70-130	Pass	
Xylenes - Total	%	82			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	114			70-130	Pass	
4.4'-DDD	%	104			70-130	Pass	
4.4'-DDE	%	105			70-130	Pass	
4.4'-DDT	%	97			70-130	Pass	
a-BHC	%	113			70-130	Pass	
Aldrin	%	94			70-130	Pass	
b-BHC	%	110			70-130	Pass	
d-BHC	%	112			70-130	Pass	
Dieldrin	%	90			70-130	Pass	
Endosulfan I	%	93			70-130	Pass	
Endosulfan II	%	104			70-130	Pass	
Endosulfan sulphate	%	94			70-130	Pass	
Endrin	%	94			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin aldehyde	%	126			70-130	Pass	
Endrin ketone	%	104			70-130	Pass	
g-BHC (Lindane)	%	124			70-130	Pass	
Heptachlor	%	95			70-130	Pass	
Heptachlor epoxide	%	97			70-130	Pass	
Hexachlorobenzene	%	114			70-130	Pass	
Methoxychlor	%	86			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	115			70-130	Pass	
Dimethoate	%	80			70-130	Pass	
Ethion	%	110			70-130	Pass	
Fenitrothion	%	103			70-130	Pass	
Methyl parathion	%	102			70-130	Pass	
Mevinphos	%	98			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	120			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons (Trace level)							
Acenaphthene	%	79			70-130	Pass	
Acenaphthylene	%	77			70-130	Pass	
Anthracene	%	72			70-130	Pass	
Benz(a)anthracene	%	99			70-130	Pass	
Benzo(a)pyrene	%	101			70-130	Pass	
Benzo(b&j)fluoranthene	%	77			70-130	Pass	
Benzo(g.h.i)perylene	%	78			70-130	Pass	
Benzo(k)fluoranthene	%	89			70-130	Pass	
Chrysene	%	82			70-130	Pass	
Dibenz(a.h)anthracene	%	93			70-130	Pass	
Fluoranthene	%	77			70-130	Pass	
Fluorene	%	83			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	72			70-130	Pass	
Naphthalene	%	86			70-130	Pass	
Phenanthrene	%	83			70-130	Pass	
Pyrene	%	82			70-130	Pass	
LCS - % Recovery							
Phenolics (total)	%	100			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	95			80-120	Pass	
Cadmium	%	97			80-120	Pass	
Chromium	%	97			80-120	Pass	
Copper	%	96			80-120	Pass	
Lead	%	95			80-120	Pass	
Mercury	%	95			75-125	Pass	
Nickel	%	95			80-120	Pass	
Zinc	%	97			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	W19-Oc25712	NCP	%	90			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C10-C14	W19-Oc25712	NCP	%	95			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S19-Oc26969	CP	%	72			70-130	Pass	
TRH C6-C10	S19-Oc26969	CP	%	94			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S19-Oc26969	CP	%	95			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S19-Oc26969	CP	%	98			70-130	Pass	
Toluene	S19-Oc26969	CP	%	97			70-130	Pass	
Ethylbenzene	S19-Oc26969	CP	%	94			70-130	Pass	
m&p-Xylenes	S19-Oc26969	CP	%	90			70-130	Pass	
o-Xylene	S19-Oc26969	CP	%	92			70-130	Pass	
Xylenes - Total	S19-Oc26969	CP	%	91			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (Trace level)				Result 1					
Acenaphthene	B19-Oc28739	NCP	%	85			70-130	Pass	
Acenaphthylene	B19-Oc28739	NCP	%	91			70-130	Pass	
Anthracene	B19-Oc28739	NCP	%	81			70-130	Pass	
Benz(a)anthracene	B19-Oc28739	NCP	%	77			70-130	Pass	
Benzo(a)pyrene	B19-Oc28739	NCP	%	84			70-130	Pass	
Benzo(b&j)fluoranthene	B19-Oc28739	NCP	%	76			70-130	Pass	
Benzo(g.h.i)perylene	B19-Oc28739	NCP	%	87			70-130	Pass	
Benzo(k)fluoranthene	B19-Oc28739	NCP	%	106			70-130	Pass	
Chrysene	B19-Oc28739	NCP	%	100			70-130	Pass	
Dibenz(a.h)anthracene	B19-Oc28739	NCP	%	73			70-130	Pass	
Fluoranthene	B19-Oc28739	NCP	%	92			70-130	Pass	
Fluorene	B19-Oc28739	NCP	%	98			70-130	Pass	
Indeno(1.2.3-cd)pyrene	B19-Oc28739	NCP	%	121			70-130	Pass	
Naphthalene	B19-Oc28739	NCP	%	73			70-130	Pass	
Phenanthrene	B19-Oc28739	NCP	%	84			70-130	Pass	
Pyrene	B19-Oc28739	NCP	%	87			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
4.4'-DDE	M19-Oc18417	NCP	%	90			70-130	Pass	
a-BHC	M19-Oc18417	NCP	%	111			70-130	Pass	
Aldrin	M19-Oc18417	NCP	%	75			70-130	Pass	
b-BHC	M19-Oc18417	NCP	%	94			70-130	Pass	
d-BHC	M19-Oc18417	NCP	%	99			70-130	Pass	
Dieldrin	M19-Oc18417	NCP	%	85			70-130	Pass	
Endosulfan I	M19-Oc18417	NCP	%	83			70-130	Pass	
Endosulfan II	M19-Oc18417	NCP	%	88			70-130	Pass	
Endrin	M19-Oc18417	NCP	%	87			70-130	Pass	
Endrin aldehyde	M19-Oc18417	NCP	%	82			70-130	Pass	
g-BHC (Lindane)	M19-Oc18417	NCP	%	122			70-130	Pass	
Heptachlor	M19-Oc18417	NCP	%	71			70-130	Pass	
Heptachlor epoxide	M19-Oc18417	NCP	%	74			70-130	Pass	
Hexachlorobenzene	M19-Oc18417	NCP	%	124			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	B19-Oc28018	NCP	%	99			70-130	Pass	
Dimethoate	B19-Oc28018	NCP	%	75			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Ethion	B19-Oc28018	NCP	%	90			70-130	Pass	
Fenitrothion	B19-Oc28018	NCP	%	108			70-130	Pass	
Methyl parathion	B19-Oc28018	NCP	%	91			70-130	Pass	
Mevinphos	B19-Oc28018	NCP	%	103			70-130	Pass	
Spike - % Recovery									
				Result 1					
Phenolics (total)	S19-Oc26973	CP	%	106			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S19-Oc26975	CP	%	92			70-130	Pass	
Cadmium (filtered)	S19-Oc26975	CP	%	88			70-130	Pass	
Chromium (filtered)	S19-Oc26975	CP	%	93			70-130	Pass	
Copper (filtered)	S19-Oc26975	CP	%	90			70-130	Pass	
Lead (filtered)	S19-Oc26975	CP	%	88			70-130	Pass	
Mercury (filtered)	S19-Oc26975	CP	%	80			70-130	Pass	
Nickel (filtered)	S19-Oc26975	CP	%	88			70-130	Pass	
Zinc (filtered)	S19-Oc26975	CP	%	90			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S19-Oc26968	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	S19-Oc26968	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	S19-Oc28806	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S19-Oc26968	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	S19-Oc28806	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	S19-Oc28806	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	S19-Oc28806	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S19-Oc26968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	S19-Oc26968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	S19-Oc26968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	S19-Oc26968	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	S19-Oc26968	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total	S19-Oc26968	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons (Trace level)				Result 1	Result 2	RPD			
Acenaphthene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Acenaphthylene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Anthracene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Benz(a)anthracene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Benzo(a)pyrene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Benzo(b&j)fluoranthene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Benzo(g.h.i)perylene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Benzo(k)fluoranthene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Chrysene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Dibenz(a.h)anthracene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Fluoranthene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Fluorene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Naphthalene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Phenanthrene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	
Pyrene	B19-Oc28738	NCP	mg/L	< 0.00001	< 0.00001	<1	30%	Pass	

Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
4.4'-DDD	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
4.4'-DDE	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
4.4'-DDT	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
a-BHC	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Aldrin	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
b-BHC	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
d-BHC	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Dieldrin	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endosulfan I	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endosulfan II	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endosulfan sulphate	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endrin	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endrin aldehyde	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Endrin ketone	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
g-BHC (Lindane)	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Heptachlor	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Heptachlor epoxide	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Hexachlorobenzene	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Methoxychlor	M19-Oc24938	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Bolstar	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Chlorfenvinphos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Chlorpyrifos	M19-Oc24938	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Chlorpyrifos-methyl	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Coumaphos	M19-Oc24938	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Demeton-S	M19-Oc24938	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Demeton-O	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Diazinon	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Dichlorvos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Dimethoate	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Disulfoton	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
EPN	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ethion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ethoprop	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ethyl parathion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Fenitrothion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Fensulfothion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Fenthion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Malathion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Merphos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Methyl parathion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Mevinphos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Monocrotophos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Naled	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Omethoate	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Phorate	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Pirimiphos-methyl	M19-Oc24938	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Pyrazophos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Ronnel	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Terbufos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Tetrachlorvinphos	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Tokuthion	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Trichloronate	M19-Oc24938	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Aroclor-1221	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Aroclor-1232	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Aroclor-1242	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Aroclor-1248	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Aroclor-1254	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Aroclor-1260	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Total PCB*	M19-Oc24938	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Phenolics (total)	S19-Oc26973	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S19-Oc26975	CP	mg/L	0.002	0.002	1.0	30%	Pass	
Cadmium (filtered)	S19-Oc26975	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S19-Oc26975	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S19-Oc26975	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead (filtered)	S19-Oc26975	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S19-Oc26975	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S19-Oc26975	CP	mg/L	0.002	0.002	4.0	30%	Pass	
Zinc (filtered)	S19-Oc26975	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
R20	This sample is a Trip Spike and therefore all results are reported as a percentage

Authorised By

Ursula Long	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Julie Kay	Senior Analyst-Inorganic (VIC)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Arcadis Australia
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Sydney
NSW 2000

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Jack Palma**

Report **684323-W**
Project name MIRVAC - KEMPS CREEK
Project ID 10035157
Received Date Oct 24, 2019

Client Sample ID			**MW03**
Sample Matrix			**Water**
Eurofins Sample No.			**S19-Oc37310**
Date Sampled			**Oct 23, 2019**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	83
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.01	mg/L	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02
TRH >C10-C16	0.05	mg/L	0.07
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	0.07
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
Organochlorine Pesticides			
Chlordanes - Total	0.001	mg/L	< 0.001
4.4'-DDD	0.0001	mg/L	< 0.0001
4.4'-DDE	0.0001	mg/L	< 0.0001
4.4'-DDT	0.0001	mg/L	< 0.0001
a-BHC	0.0001	mg/L	< 0.0001
Aldrin	0.0001	mg/L	< 0.0001
b-BHC	0.0001	mg/L	< 0.0001
d-BHC	0.0001	mg/L	< 0.0001
Dieldrin	0.0001	mg/L	< 0.0001
Endosulfan I	0.0001	mg/L	< 0.0001
Endosulfan II	0.0001	mg/L	< 0.0001
Endosulfan sulphate	0.0001	mg/L	< 0.0001

Client Sample ID			MW03
Sample Matrix			Water
Eurofins Sample No.			S19-Oc37310
Date Sampled			Oct 23, 2019
Test/Reference	LOR	Unit	
Organochlorine Pesticides			
Endrin	0.0001	mg/L	< 0.0001
Endrin aldehyde	0.0001	mg/L	< 0.0001
Endrin ketone	0.0001	mg/L	< 0.0001
g-BHC (Lindane)	0.0001	mg/L	< 0.0001
Heptachlor	0.0001	mg/L	< 0.0001
Heptachlor epoxide	0.0001	mg/L	< 0.0001
Hexachlorobenzene	0.0001	mg/L	< 0.0001
Methoxychlor	0.0001	mg/L	< 0.0001
Toxaphene	0.01	mg/L	< 0.01
Aldrin and Dieldrin (Total)*	0.0001	mg/L	< 0.0001
DDT + DDE + DDD (Total)*	0.0001	mg/L	< 0.0001
Vic EPA IWRG 621 OCP (Total)*	0.001	mg/L	< 0.001
Vic EPA IWRG 621 Other OCP (Total)*	0.001	mg/L	< 0.001
Dibutylchlorendate (surr.)	1	%	140
Tetrachloro-m-xylene (surr.)	1	%	135
Organophosphorus Pesticides			
Azinphos-methyl	0.002	mg/L	< 0.002
Bolstar	0.002	mg/L	< 0.002
Chlorfenvinphos	0.002	mg/L	< 0.002
Chlorpyrifos	0.02	mg/L	< 0.02
Chlorpyrifos-methyl	0.002	mg/L	< 0.002
Coumaphos	0.02	mg/L	< 0.02
Demeton-S	0.02	mg/L	< 0.02
Demeton-O	0.002	mg/L	< 0.002
Diazinon	0.002	mg/L	< 0.002
Dichlorvos	0.002	mg/L	< 0.002
Dimethoate	0.002	mg/L	< 0.002
Disulfoton	0.002	mg/L	< 0.002
EPN	0.002	mg/L	< 0.002
Ethion	0.002	mg/L	< 0.002
Ethoprop	0.002	mg/L	< 0.002
Ethyl parathion	0.002	mg/L	< 0.002
Fenitrothion	0.002	mg/L	< 0.002
Fensulfothion	0.002	mg/L	< 0.002
Fenthion	0.002	mg/L	< 0.002
Malathion	0.002	mg/L	< 0.002
Merphos	0.002	mg/L	< 0.002
Methyl parathion	0.002	mg/L	< 0.002
Mevinphos	0.002	mg/L	< 0.002
Monocrotophos	0.002	mg/L	< 0.002
Naled	0.002	mg/L	< 0.002
Omethoate	0.002	mg/L	< 0.002
Phorate	0.002	mg/L	< 0.002
Pirimiphos-methyl	0.02	mg/L	< 0.02
Pyrazophos	0.002	mg/L	< 0.002
Ronnel	0.002	mg/L	< 0.002
Terbufos	0.002	mg/L	< 0.002
Tetrachlorvinphos	0.002	mg/L	< 0.002
Tokuthion	0.002	mg/L	< 0.002

Client Sample ID			MW03
Sample Matrix			Water
Eurofins Sample No.			S19-Oc37310
Date Sampled			Oct 23, 2019
Test/Reference	LOR	Unit	
Organophosphorus Pesticides			
Trichloronate	0.002	mg/L	< 0.002
Triphenylphosphate (surr.)	1	%	20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.001	mg/L	< 0.001
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.001	mg/L	< 0.001
Dibutylchlorendate (surr.)	1	%	140
Tetrachloro-m-xylene (surr.)	1	%	135
Polycyclic Aromatic Hydrocarbons (Trace level)			
Acenaphthene	0.00001	mg/L	< 0.00001
Acenaphthylene	0.00001	mg/L	< 0.00001
Anthracene	0.00001	mg/L	< 0.00001
Benz(a)anthracene	0.00001	mg/L	< 0.00001
Benzo(a)pyrene	0.00001	mg/L	< 0.00001
Benzo(b&j)fluoranthene	0.00001	mg/L	< 0.00001
Benzo(g.h.i)perylene	0.00001	mg/L	< 0.00001
Benzo(k)fluoranthene	0.00001	mg/L	< 0.00001
Chrysene	0.00001	mg/L	< 0.00001
Dibenz(a.h)anthracene	0.00001	mg/L	< 0.00001
Fluoranthene	0.00001	mg/L	< 0.00001
Fluorene	0.00001	mg/L	< 0.00001
Indeno(1.2.3-cd)pyrene	0.00001	mg/L	< 0.00001
Naphthalene	0.00001	mg/L	< 0.00001
Phenanthrene	0.00001	mg/L	< 0.00001
Pyrene	0.00001	mg/L	< 0.00001
Total PAH*	0.00001	mg/L	< 0.00001
2-Fluorobiphenyl (surr.)	1	%	71
p-Terphenyl-d14 (surr.)	1	%	66
Heavy Metals			
Arsenic (filtered)	0.001	mg/L	< 0.001
Cadmium (filtered)	0.0002	mg/L	0.0003
Chromium (filtered)	0.001	mg/L	< 0.001
Copper (filtered)	0.001	mg/L	0.002
Lead (filtered)	0.001	mg/L	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel (filtered)	0.001	mg/L	0.004
Zinc (filtered)	0.005	mg/L	0.012

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Oct 24, 2019	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Oct 24, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Oct 24, 2019	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Oct 24, 2019	
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons (Trace level)	Melbourne	Oct 25, 2019	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water (trace)			
Metals M8 filtered	Sydney	Oct 24, 2019	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Organochlorine Pesticides	Sydney	Oct 24, 2019	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Organophosphorus Pesticides	Sydney	Oct 24, 2019	7 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
Polychlorinated Biphenyls	Sydney	Oct 24, 2019	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			

eurofins | Environment Testing

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NATA # 1261 Site # 20794

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NATA # 1261
Site # 23736

Company Name:	Arcadis Australia	**Order No.:**		**Received:**	Oct 24, 2019 9:26 AM
Address:	Lvl 16/580 George Street Sydney NSW 2000	**Report #:**	684323	**Due:**	Oct 25, 2019
		Phone:	02 8907 9000	**Priority:**	1 Day
		Fax:		**Contact Name:**	Jack Palma
Project Name:	MIRVAC - KEMPS CREEK				
Project ID:	10035157				

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Eurofins | mgt Suite B15	Eurofins | mgt Suite B7 (filtered metals/PAH trace level)
Melbourne Laboratory - NATA Site # 1254 & 14271							X
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MW03	Oct 23, 2019		Water	S19-Oc37310	X	X
Test Counts						1	1

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram | **mg/L:** milligrams per litre | **ug/L:** micrograms per litre

ppm: Parts per million | **ppb:** Parts per billion | **%:** Percentage

org/100mL: Organisms per 100 millilitres | **NTU:** Nephelometric Turbidity Units | **MPN/100mL:** Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/L	< 0.001			0.001	Pass	
4.4'-DDD	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDE	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDT	mg/L	< 0.0001			0.0001	Pass	
a-BHC	mg/L	< 0.0001			0.0001	Pass	
Aldrin	mg/L	< 0.0001			0.0001	Pass	
b-BHC	mg/L	< 0.0001			0.0001	Pass	
d-BHC	mg/L	< 0.0001			0.0001	Pass	
Dieldrin	mg/L	< 0.0001			0.0001	Pass	
Endosulfan I	mg/L	< 0.0001			0.0001	Pass	
Endosulfan II	mg/L	< 0.0001			0.0001	Pass	
Endosulfan sulphate	mg/L	< 0.0001			0.0001	Pass	
Endrin	mg/L	< 0.0001			0.0001	Pass	
Endrin aldehyde	mg/L	< 0.0001			0.0001	Pass	
Endrin ketone	mg/L	< 0.0001			0.0001	Pass	
g-BHC (Lindane)	mg/L	< 0.0001			0.0001	Pass	
Heptachlor	mg/L	< 0.0001			0.0001	Pass	
Heptachlor epoxide	mg/L	< 0.0001			0.0001	Pass	
Hexachlorobenzene	mg/L	< 0.0001			0.0001	Pass	
Methoxychlor	mg/L	< 0.0001			0.0001	Pass	
Toxaphene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/L	< 0.002			0.002	Pass	
Bolstar	mg/L	< 0.002			0.002	Pass	
Chlorfenvinphos	mg/L	< 0.002			0.002	Pass	
Chlorpyrifos	mg/L	< 0.02			0.02	Pass	
Chlorpyrifos-methyl	mg/L	< 0.002			0.002	Pass	
Coumaphos	mg/L	< 0.02			0.02	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Demeton-S	mg/L	< 0.02			0.02	Pass	
Demeton-O	mg/L	< 0.002			0.002	Pass	
Diazinon	mg/L	< 0.002			0.002	Pass	
Dichlorvos	mg/L	< 0.002			0.002	Pass	
Dimethoate	mg/L	< 0.002			0.002	Pass	
Disulfoton	mg/L	< 0.002			0.002	Pass	
EPN	mg/L	< 0.002			0.002	Pass	
Ethion	mg/L	< 0.002			0.002	Pass	
Ethoprop	mg/L	< 0.002			0.002	Pass	
Ethyl parathion	mg/L	< 0.002			0.002	Pass	
Fenitrothion	mg/L	< 0.002			0.002	Pass	
Fensulfothion	mg/L	< 0.002			0.002	Pass	
Fenthion	mg/L	< 0.002			0.002	Pass	
Malathion	mg/L	< 0.002			0.002	Pass	
Merphos	mg/L	< 0.002			0.002	Pass	
Methyl parathion	mg/L	< 0.002			0.002	Pass	
Mevinphos	mg/L	< 0.002			0.002	Pass	
Monocrotophos	mg/L	< 0.002			0.002	Pass	
Naled	mg/L	< 0.002			0.002	Pass	
Omethoate	mg/L	< 0.002			0.002	Pass	
Phorate	mg/L	< 0.002			0.002	Pass	
Pirimiphos-methyl	mg/L	< 0.02			0.02	Pass	
Pyrazophos	mg/L	< 0.002			0.002	Pass	
Ronnel	mg/L	< 0.002			0.002	Pass	
Terbufos	mg/L	< 0.002			0.002	Pass	
Tetrachlorvinphos	mg/L	< 0.002			0.002	Pass	
Tokuthion	mg/L	< 0.002			0.002	Pass	
Trichloronate	mg/L	< 0.002			0.002	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.001			0.001	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons (Trace level)							
Total PAH*	mg/L	< 0			0.00001	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	100			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C10-C14	%	78			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	95			70-130	Pass	
Toluene	%	92			70-130	Pass	
Ethylbenzene	%	90			70-130	Pass	
m&p-Xylenes	%	89			70-130	Pass	
o-Xylene	%	93			70-130	Pass	
Xylenes - Total	%	90			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	86			70-130	Pass	
TRH C6-C10	%	102			70-130	Pass	
TRH >C10-C16	%	84			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	99			70-130	Pass	
4.4'-DDD	%	103			70-130	Pass	
4.4'-DDE	%	104			70-130	Pass	
4.4'-DDT	%	92			70-130	Pass	
a-BHC	%	88			70-130	Pass	
Aldrin	%	97			70-130	Pass	
b-BHC	%	101			70-130	Pass	
d-BHC	%	93			70-130	Pass	
Dieldrin	%	103			70-130	Pass	
Endosulfan I	%	105			70-130	Pass	
Endosulfan II	%	102			70-130	Pass	
Endosulfan sulphate	%	95			70-130	Pass	
Endrin	%	106			70-130	Pass	
Endrin aldehyde	%	91			70-130	Pass	
Endrin ketone	%	101			70-130	Pass	
g-BHC (Lindane)	%	94			70-130	Pass	
Heptachlor	%	91			70-130	Pass	
Heptachlor epoxide	%	104			70-130	Pass	
Hexachlorobenzene	%	83			70-130	Pass	
Methoxychlor	%	95			70-130	Pass	
Toxaphene	%	101			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	90			70-130	Pass	
Dimethoate	%	87			70-130	Pass	
Ethion	%	115			70-130	Pass	
Fenitrothion	%	90			70-130	Pass	
Methyl parathion	%	90			70-130	Pass	
Mevinphos	%	116			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	86			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	100			70-130	Pass	
Cadmium (filtered)	%	100			70-130	Pass	
Chromium (filtered)	%	101			70-130	Pass	
Copper (filtered)	%	100			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Lead (filtered)			%	100			70-130	Pass	
Mercury (filtered)			%	93			70-130	Pass	
Nickel (filtered)			%	100			70-130	Pass	
Zinc (filtered)			%	97			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S19-Oc38762	NCP	%	116			70-130	Pass	
Cadmium (filtered)	S19-Oc38762	NCP	%	97			70-130	Pass	
Chromium (filtered)	S19-Oc38762	NCP	%	95			70-130	Pass	
Copper (filtered)	S19-Oc38762	NCP	%	86			70-130	Pass	
Lead (filtered)	S19-Oc38762	NCP	%	92			70-130	Pass	
Mercury (filtered)	S19-Oc38762	NCP	%	100			70-130	Pass	
Nickel (filtered)	S19-Oc38762	NCP	%	83			70-130	Pass	
Zinc (filtered)	S19-Oc38762	NCP	%	84			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S19-Oc37310	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	S19-Oc37310	CP	mg/L	0.0003	0.0003	13	30%	Pass	
Chromium (filtered)	S19-Oc37310	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S19-Oc37310	CP	mg/L	0.002	0.002	11	30%	Pass	
Lead (filtered)	S19-Oc37310	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S19-Oc37310	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S19-Oc37310	CP	mg/L	0.004	0.004	3.0	30%	Pass	
Zinc (filtered)	S19-Oc37310	CP	mg/L	0.012	0.011	13	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.

Authorised By

Ursula Long	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)
Joseph Edouard	Senior Analyst-Organic (VIC)

Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

ARCADIS Design & Consultancy for natural and built assets

APPENDIX M

Waste Management Plan

Aspect Industrial Estate, Mamre Rd Kemps Creek – Stage 1: Waste Management Plan

A submission to Mirvac Pty Ltd

30th September, 2020

Mike Ritchie & Associates Pty Ltd trading as MRA Consulting Group (MRA)
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Aspect Industrial Estate, Mamre Rd Kemps Creek – Stage 1: Waste Management Plan	4	Final	30/09/2020

Disclaimer

Glossary

Terminology	Description
AS	Australian Standard
C&D	Construction and Demolition
DCP	Development Control Plan
ENM	Excavated Natural Material
EPA	Environment Protection Authority
LGA	Local Government Area
MGB	Mobile Garbage Bin
MRP	Mamre Road Precinct
MSW	Municipal Solid Waste
PCC	Penrith City Council
PDCP	Penrith Development Control Plan 2014
PLEP	Penrith Local Environmental Plan 2010
SEPP	State Environmental Planning Policy
WMP	Waste Management Plan
WSA	Western Sydney Aerotropolis
WSEA	Western Sydney Employment Area
WSP	Waste Service Provider
WSRA	Waste Storage and Recycling Area

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1 Introduction

MRA Consulting Group (MRA) was engaged by Mirvac Pty Ltd, to prepare a Waste Management Plan (WMP) for the first stage of a proposed Aspect Industrial Estate (the site) development consisting of industrial units and cafe, located at 788-864 Mamre Road, Kemps Creek and situated in the Penrith City Council Local Government Area (LGA).

The Site is legally described as Lots 54 – 58 in DP 259135, with an area of approximately 56.3 hectares (ha). The site is located east of Mamre Road, Kemps Creek within the Penrith Local Government Area (LGA), providing direct vehicular access via Mamre Road to the M4 Motorway and Great Western Highway to the north and Elizabeth Drive to the south.

The site is located approximately 4km north-west of the future Western Sydney Nancy-Bird Walton Airport, 13km south-east of the Penrith CBD and 40km west of the Sydney CBD.

The Department of Planning, Industry and Environment (DPIE) rezoned Mamre Road Precinct, including the site, in June 2020 under the State Environmental Planning Policy (Western Sydney Employment Area) 2009 (WSEA SEPP). The rezoning of this precinct responds to the demand for industrial land in Western Sydney. The site primarily zoned IN1 General Industrial with a small sliver of land zoned E2 Environmental Conservation.

The Aspect Industrial Estate is governed by Secretary's Environment Assessment Requirements (SEARs) number SSD-10448. The SEARs outlines specific requirements for Waste Management at the site – *Including details of the quantities and classification of waste streams generated during construction and operation and proposed storage, handling and disposal requirements.*

The Penrith Development Control Plan 2014 (PDCP) lists the following objectives related to waste management, which have each been addressed in this WMP:

- To facilitate sustainable waste management within the City of Penrith in accordance with the principles of Ecologically Sustainable Development (ESD);
- To manage waste in accordance with the 'Waste Hierarchy' to:
    - Avoid producing waste in the first place;
    - Minimise the amount of waste produced;
    - Re-use items as many times as possible to minimise waste;
    - Recycle once re-use options have been exhausted; and
    - Dispose of what is left, as a last resort, in a responsible way to appropriate waste disposal facilities;
- To assist in achieving Federal and State Government waste minimisation targets as set out in the Waste Avoidance and Resource Recovery Act 2001 and NSW Waste Avoidance and Resource Recovery Strategy 2007;
- To minimise the overall environmental impacts of waste by:
    - Encouraging development that facilitates ongoing waste avoidance and complements waste services offered by both Council and/or private contractors;
    - Requiring on-site source separation and other design and siting standards which assist waste collection and management services offered by Council and/or the private sector;
    - Encouraging building designs and construction techniques that minimise waste generation;
    - Maximising opportunities to reuse and recycle building and construction materials as well as other wastes in the ongoing use of a premise; and
    - Reducing the demand for waste disposal.

2 Background

2.1 Description of Proposed Development

The proposed stage 1 development is an industrial development of two industrial sheds and a café. The proposed units located on a site of are 35,060m^2 for Warehouse 1 and 20,735m^2 for Warehouse 3, not including additional office space for each industrial unit (2,160m^2 office space in total).

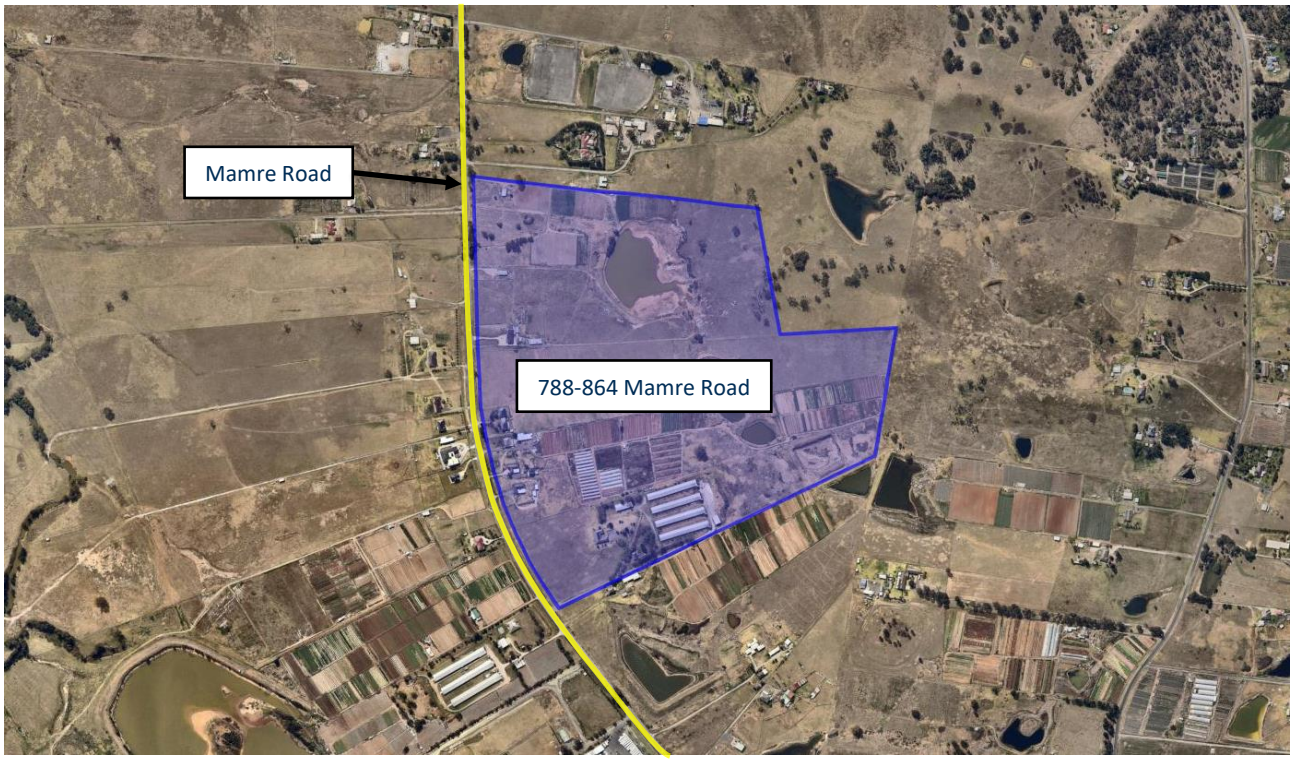
Consistent with the above, this report has been prepared to support a Development Application under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) for the purpose of:

- A Concept Masterplan for the site comprising 11 industrial buildings, internal road network layout, building locations, gross floor area (GFA), car parking, concept landscaping, building heights, setbacks and built form parameters.
- Stage 1 development of the site including:
  - The demolition, removal of existing rural structures and remediation works;
  - Heritage salvage works (if applicable);
  - Clearing of existing vegetation on the subject site and associated dam dewatering and decommissioning;
  - Realignment of existing creek and E2 Environmental Conservation zone;
  - Onsite bulk earthworks including any required ground dewatering;
  - The importation, placement and compaction of spoil material, consisting of:
    - Virgin Excavated Natural material (VENM) within the meaning of the POEO Act; and/or
    - Excavated Natural material (ENM) within the meaning of the NSW Environmental Protection Authority's (EPA) Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the POEO (Waste) Regulation 2014 – The Excavated Natural Material Order 2014; and/or
    - Materials covered by a specific NSW EPA Resource Recovery Order and Exemption which are suitable for their proposed use.
  - Boundary retaining walls;
  - Catchment level stormwater infrastructure, trunk services connections, utility infrastructure, roads and access infrastructure (signalised intersection with Mamre Road) associated with Stage 1;
  - Construction, fit out and 24 hours a day/ 7 days per week use of warehouse and distribution centre within Stage 1;
  - Detailed on lot earthworks, stormwater, services and utility infrastructure associated with the construction of warehouse and distribution centre within Stage 1;
  - Boundary stormwater management, fencing and landscaping; and
  - Staged subdivision of Stage 1.

2.2 Location

The development site is located in the suburb of Kemps Creek, situated in the Penrith City Council area, at 788-864 Mamre Road (Figure 1).

Figure 1: Proposed Development site at 788-864 Mamre Road and surrounds



Source: Nearmap, 2019.

2.3 Zoning and Land Use

The Department of Planning, Industry and Environment (DPIE) rezoned Mamre Road Precinct, including the site, in June 2020 under the *State Environmental Planning Policy (Western Sydney Employment Area) 2009* (WSEA SEPP). The rezoning of this precinct responds to the demand for industrial land in Western Sydney. The site primarily zoned IN1 General Industrial with a small sliver of land zoned E2 Environmental Conservation.

The site is identified as Lot 54, 55, 56, 57, and 58 of DP 259135. The site was recently rezoned on the 12th June 2020, from RU2 (according to PLEP) to IN1 (General Industrial) with a small sliver of land zoned E2 (Environmental Conservation) under the SEPP WSEA 2009. The site is surrounded by similarly zoned land uses (see Figure 2 for the Mamre Road precinct map). Previous land use of the site was agricultural and residential in nature.

The IN1 zone is defined by the following objectives:

- To facilitate a wide range of employment-generating development including industrial, manufacturing, warehousing, storage and research uses and ancillary office space.
- To encourage employment opportunities along motorway corridors, including the M7 and M4.
- To minimise any adverse effect of industry on other land uses.
- To facilitate road network links to the M7 and M4 Motorways.
- To encourage a high standard of development that does not prejudice the sustainability of other enterprises or the environment.
- To provide for small-scale local services such as commercial, retail and community facilities (including child care facilities) that service or support the needs of employment-generating uses in the zone.

The E2 Environmental Conservation zone if defined by the following objectives:

- To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.
- To prevent development that could destroy, damage or otherwise have an adverse effect on those values.

Surrounding land zoning is largely IN1 with some smaller areas of E2 (Environmental Conservation) zoning.

2.4 Strategies

Waste management for the site considers better practice, necessary equipment, and integration with other guidance documents including the NSW Waste and Avoidance and Resource Recovery Strategy (NSW EPA 2014), and National Waste Policy: Less Waste, More Resources (EPHC 2009). The key policy aims that are considered are:

- Avoidance (to prevent the generation of waste);
- Reduce the amount of waste (including hazardous waste) for disposal;
- Manage waste as a resource; and
- Ensure that waste treatment, disposal, recovery and re-use are undertaken in a safe, scientific and environmentally sound manner.

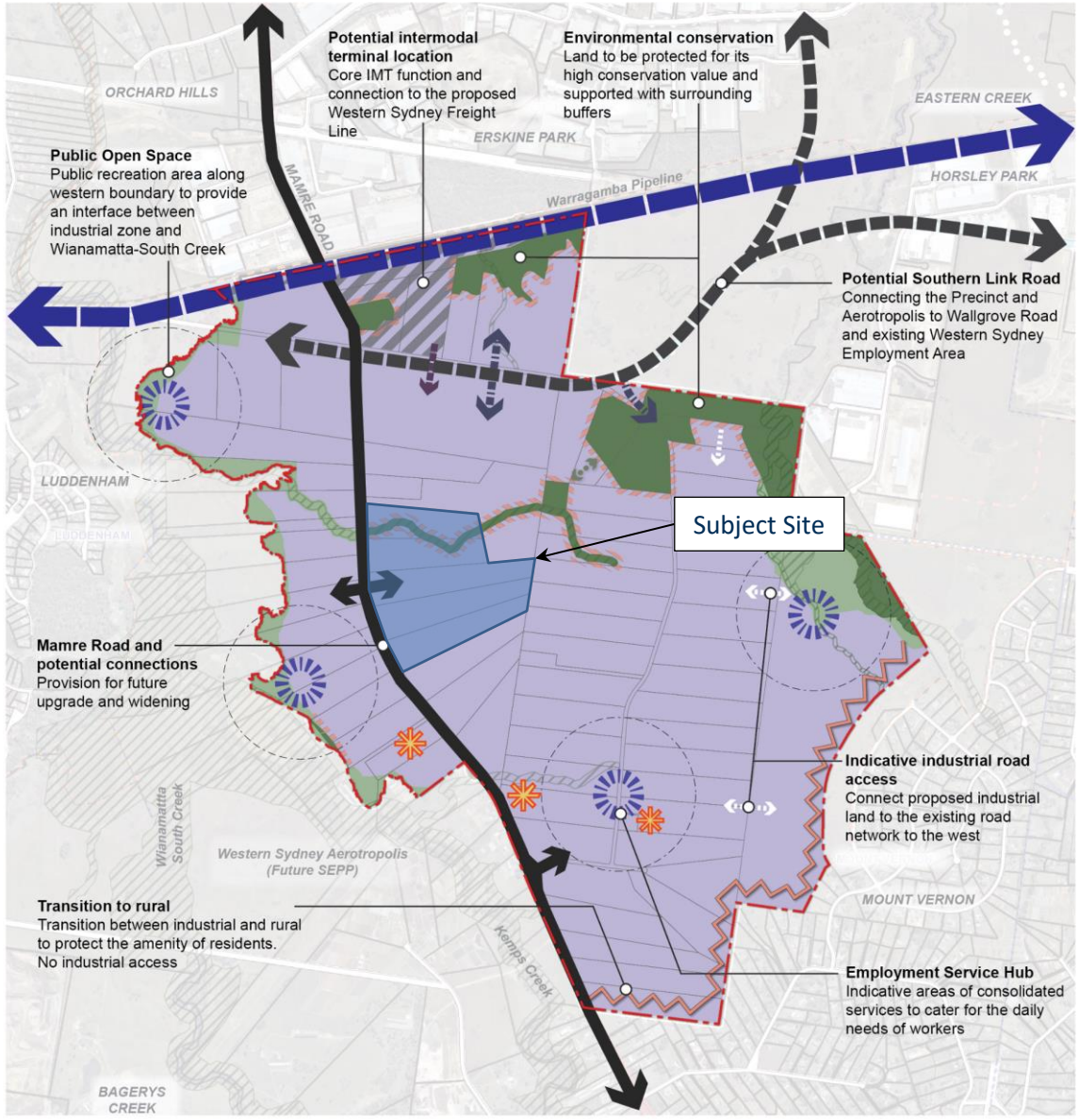
The site is subject to the Penrith Development Control Plan (PDCP), including objectives and principles outlined in Section 1.

2.5 Assumptions

This report is a WMP, forming part of the development documentation and assumes:

- Drawings and information that have been used in waste management planning for this WMP are the final design set for the demolition plan and development plan from the project architect, SBA Architects (September, 2020);
- Waste generation volumes are based on waste generation rates outlined in NSW EPA *Better Practice Guidelines for Resource Recovery in Residential Dwellings*, and waste management equipment and infrastructure recommendations have been made according to estimated waste generation and PDCP waste guideline suggestions;
- This WMP is a living document and therefore, waste management equipment and systems described in this report are subject to change based on future operations and available technology.

Figure 2: Mamre Road Precinct Map



3 Construction and Demolition

Construction and demolition activities at the site will generate a range of wastes, commonly referred to as Construction and Demolition (C&D) waste. Throughout the development process, all materials generated on site will be reused and recycled where possible, minimising the disposal (landfilling) of materials other than those that are contaminated or unsuitable for reuse or resource recovery.

Waste storage of C&D waste during construction and demolition operations will involve stockpiling of excavated and reusable material, and placement of skip bins for separation of mixed C&D materials for recycling. A skip bin for residual waste or contaminated material will also be made available at the site for disposal where necessary. Skip bins may require alternative placement during construction operations as space becomes restricted, to facilitate safe and efficient storage of materials. Skip bins and stockpiles should be placed within property boundaries to avoid illegal dumping.

The quantities, densities and bulking factors for waste and recyclables will differ on site based on actual materials and handling practices employed. Demolition and excavation waste estimations have been addressed separately to construction waste estimations for the proposed development, to better inform resource recovery opportunities for waste material generated during each stage of the development.

C&D waste storage areas will be kept clear and tidy to maintain vehicular access, encourage separation of waste materials and for WHS reasons. Site waste management principles and facilities will be a focus for the induction of all construction or other contractors working at the site.

3.1 Demolition Waste

This section details the demolition waste materials expected for the proposed development, including their quantities and management options, and was designed with consideration of the requirements in the PDCP. The information below presents options for materials reuse, recycling and disposal where applicable (e.g. excavation material may be reused as a construction fill or disposed to landfill if contaminated). All materials are intended to be sent to a suitable, licensed landfill or resource recovery facility.

Table 1 below describes the expected demolition material quantities and appropriate management methods for the proposed development, related to the demolition or deconstruction of:

- Demolition or deconstruction of:
    - Five single-storey residential dwellings;
    - Eleven sheds; and
    - Associated ancillary structures.
- Removal of vegetation and earthworks; and
- Dam dewatering and decommission.

Table 1: Estimation of demolition materials for reuse, recycling and landfill

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Concrete	2,600m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: on-site for filling or under gravel carpark.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
					C&D Processor: crushing and recycling for recovered products.
Bricks/pavers	560m^3	✓	✓	-	On site: cleaned and separated wherever possible for reuse or to enhance resource recovery. C&D Processor: recovery for reuse where possible, crushing and recycling for recovered aggregate products.
Timber	N/A	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D Processor: recovery and recycling for recovered product (e.g. mulch) or organics processing.
Insulation material	400m^3	✓	-	-	Reuse: retuned to supplier or manufacturer for reuse.
Metal (ferrous and non-ferrous)	<5m^3	-	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D Processor: metals recovery and recycling.
Plasterboard	80m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: surplus and offcut material returned to manufacturer for reuse where possible or replacement for gypsum in landscaping.
Glass	<5m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: surplus and offcut material returned to manufacturer for reuse where possible. Aggregate for concrete production.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
					Glass recycler: recovery and recycling.
Fixtures and fittings	5m^3	✓	✓	-	Reuse: secondhand building materials. C&D Processor: recovery and recycling.
Floor coverings	30m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D Processor: recovery and recycling.
Garden organics	10m^2	✓	✓	-	Garden organics resulting from the removal of vegetation and trees. Onsite: Woodchipped for use in landscaping. Organics Processor: storage on-site (from minor excavations) processing for recovered product.
Mixed Recyclables	<2m^3	-	✓	-	Commercial contractor: recycling of paper, cardboard and mixed material containers (plastic, metal, glass).
Residual waste	15m^3	-	-	✓	Separate recyclables where possible and disposal at principal licensed waste facility.
Hazardous/special waste (e.g. spills and contaminated wastes)	Unknown	-	-	✓	It is possible that asbestos bearing material may be disturbed or removed during demolition works. Appropriate management methods specified by a licensed asbestos and site hygienist should hazardous be found at the site.

3.2 Construction Waste

Works would include the construction of:

- Construction of 2 industrial warehouses including ancillary office space;
- One café near the site entrance;
- Internal access, parking and roadways; and
- Sitewide landscaping.

Table 2 below describes the estimated waste quantities through the construction and excavation phases of the proposed development. The following table also highlights appropriate management methods for material types expected to be generated throughout construction.

The information below presents multiple options for materials reuse, recycling and disposal where applicable (e.g. return to manufacturer, recycled at construction and demolition (C&D) processor, or disposed to landfill if contaminated).

Table 2: Construction waste generation estimate.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Excavated material	Approx. 500,000m^3	✓	✓	-	On site: stockpiled at the site for later use in back filling activities. Reuse: It is expected that over 150,000m^3 will be required for backfilling at the site. Excess material can be taken offsite for use as fill material if it meets the relevant Resource Recovery orders/exemptions. Recycling: excess material can be taken to a suitably qualified facility for processing and blending with compost products. Any contaminated material will require remediation either on or offsite, treatment or disposal at a suitably qualified landfill.
Concrete	1,200m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D Processor: crushing and recycling for recovered products.
Bricks/pavers	<20m^3	✓	✓	-	On site: cleaned and separated wherever possible for reuse or to enhance resource recovery. C&D Processor: recovery for reuse where possible, crushing and recycling for recovered aggregate products.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Timber	<10m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: Surplus and offcut material returned to manufacturer for reuse. C&D Processor: recovery and recycling for recovered product (e.g. mulch) or organics processing.
Metal (ferrous and non-ferrous)	50m^3	-	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: Surplus and offcut material returned to manufacturer for reuse. C&D Processor: metals recovery and recycling.
Plasterboard	120m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: Surplus and offcut material returned to manufacturer for reuse where possible or replacement for gypsum in landscaping.
Glass	<10m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: Surplus and offcut material returned to manufacturer for reuse where possible. Glass recycler: recovery and recycling.
Fixtures and fittings	<5m^3	✓	✓	-	On site: reuse wherever possible or return to manufacturer. Reuse: Surplus and offcut material returned to manufacturer for reuse where possible. C&D Processor: recovery and recycling.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Floor coverings	<10m^3	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: Surplus and offcut material returned to manufacturer for reuse where possible. C&D Processor: recovery and recycling.
Packaging (used pallets, pallet wrap)	4,000m^3	✓	✓	-	Reuse: returned to manufacturer for reuse where possible. On site: to be separated wherever possible to enhance resource recovery. C&D processor: recycling of timbers and plastic.
Garden organics	20m^3	✓	✓	-	Minimal garden organic waste from landscaping. Organics Processor: Storage on-site (from minor excavations) processing for recovered product (e.g. mulch or other blended recovered fines) or organics treatment.
Recyclable Containers	<5m^3	-	✓	-	Commercial contractor: recycling.
Paper/ cardboard	50m^3	-	✓	-	Commercial contractor: recycling of fibres with segregation of paper, cardboard or other streams.
Residual waste	50m^3	-	-	✓	Separate recyclables where possible and disposal at principal licensed waste facility.
Hazardous/ special waste (e.g. spills and contaminated wastes)	Unknown	-	-	✓	Appropriate management methods specified by a licensed asbestos and site hygienist should hazardous or special waste be found at the site.

3.3 Waste Contractors and Facilities

To ensure best practice waste management, appropriate contractors and facilities have been proposed based on their location and service offerings (Table 3).

Table 3: Waste service contractors and facilities

Role	Details
Recommended Waste Collection Contractor	The following are local skip bin operators for consideration in the management of excavation and construction waste for the site: • Transwaste Skips; • Orange Skip Bins; • Phillips Skip Bins; • BinsExpress Skip Bins; • Bingo Bins; or Or another supplier as elected by the building contractor.
Principal Off-Site Recycler	The following are local C&D processing facilities for consideration in the management of C&D waste generated at the site: • Brandown Quarries Kemps Creek; • SUEZ Kemps Creek Resource Recovery Centre; • Bingo St Marys; • DADI Genesis Recycling Facility; or another appropriate facility as elected by the waste management contractor.
Principal Licensed Landfill Site	Dial a Dump Genesis Xero (Eastern Creek), or other appropriate facility as elected by the waste management contractor.

3.4 Site documentation

This WMP will be retained on-site during the demolition, excavation and construction phases of the development, along with other waste management documentation (e.g. contracts with waste service providers).

Responsibility for the WMP, waste documentation and processes during the excavation and construction phases will be with the site manager or builder.

A logbook that records waste management and collection will be maintained on site, with entries including:

- Time and date;
- Description of waste and quantity;
- Waste/processing facility that will receive the waste; and
- Vehicle registration and company name.

Waste management documentation, the logbook and associated dockets and receipts must be made available for inspection by an authorised Council Officer at any time during site works.

4 Operational Waste Management

Ongoing waste management requirements for the site will result of the daily operation of industrial units, ancillary offices and a café. Waste storage and management areas will be separate for each building as identified in attached plans (see Appendix A). Centralised waste storage areas for each building will be maintained outside each building, in a location that is easily accessible by building tenants and waste collection vehicles for servicing.

Stage 1 of the proposed development comprises of two lots of industrial units each with ancillary office space. There will also be a café which will service the entire site.

Waste generation rates have been sourced from the NSW EPA *Better Practice Guidelines for Resource Recovery in Residential Dwellings* (Appendix F).

4.1 Estimated Waste and Recycling Generation

The waste volume calculation for both waste and recycling for the proposed development is shown below. Table 4 Below outlines waste generation rates applicable for the proposed uses at the site, as derived from the PDCP and NSW EPA guidelines where the PDCP does not provide specific reference to a use.

Table 4: Model waste generation rates according to PDCP

Premises type/use	Waste generation ($L/100m^2/day$)	Recycling Generation ($L/100m^2/day$)
Cafe	300	200
Office	10	10
Warehouse	10	10

With consideration to the above model waste generation rates, Table 5 below outlines the expected waste generation rates for the proposed development. Waste generation has been calculated based on site specific breakdown of commercial and industrial uses proposed. The Café has been included for consideration in this proposal (despite being part of future stages) to allow for groundwork to accommodate for waste generation and storage requirements.

Table 5: Site Waste and Recycling Generation

Area	Use	Area (m^2)	Daily Waste generation (L)		Weekly Waste generation (L)	
			General Waste	Recycling	General Waste	Recycling
Warehouse 1	Warehouse	35,060	3,506	3,506	24,542	24,542
	Office	1,460	146	146	1,022	1,022
Warehouse 3	Warehouse	20,735	2,074	2,074	14,518	14,518
	Office	700	70	70	500	500
Café	Café	122	366	244	2,562	1,708
		Total	**7,242**	**7,182**	**43,144**	**42,290**

**Recycling waste may be able to be reduced with the use of a commercial paper/cardboard baler or other recycling waste diversion methods. This should be done per building or individual industrial tenancy with uses which generate a substantial proportion of paper/cardboard compared to other recyclable material.*

Greater resource recovery can be achieved by further diverting paper and cardboard materials from the above recycling volumes. This stream is cleaner and means the materials collected are less contaminated and much more likely able to be converted into recycled paper and fibre products. Service costs for waste collection may also be able to be reduced as typically paper and cardboard bin lifts are cheaper than that of comingled recycling.

4.2 Waste Storage Requirements

With consideration to the scale of the development and number of individual site uses, a separate waste management and storage area will be allocated for each building. Site waste storage areas for each building will be sized and located to accommodate necessary waste storage bins and other associated waste management equipment according to estimated site waste generation rates outlined in Section 4.1.

Individual tenancies will be responsible for retaining smaller internal bins for each relevant waste stream which can then be emptied into larger bins for collection as necessary. Internal bins should be retained in the café, offices, industrial units (on the industrial floor) and any other areas where waste will be generated in large quantities without direct access to the building waste storage area. Staff at each tenancy will be responsible for transferring waste from each unit to the recycling collection bins and general waste bins or compactor for each warehouse.

4.2.1 Café waste

The café has a relatively low rate of waste generation compared to proposed industrial units. Mobile garbage bins will be sufficient to manage general waste and recycling from the café. Table 6 below summarises the bin infrastructure and collection frequency options for these site uses.

Table 6: Cafe Bin Infrastructure and Collection Frequency

Waste Stream	L/Week	Option 1	Option 2
General Waste	2,562	3 x 1,100L bins / collected weekly	2 x 1,100L bins / collected twice per week
Commingled Recycling	854	1 x 1,100L bins collected weekly	1 x 660L bin / collected twice per week
Paper and Cardboard	854	1 x 1,100L bins collected weekly	1 x 660L bin / collected twice per week

It is expected that of the general waste stream for the proposed café use, a substantial proportion of this waste is likely to be food. Should a significant amount of food waste be produced by the proposed café, it may be suitable for a separate waste collection for food on a regular basis. Should the café tenancy choose to manage food waste, collections should occur 2-3 times a week to avoid the generation of odour.

4.2.2 Industrial Units

Given the large volumes of general waste predicted to be generated onsite, there are several options that site management can use for stage 1 of the industrial estate. Table 7 below outlines the number and type of waste management containers that may be suitable for the proposed industrial uses, including frequency of waste collection.

Table 7: Industrial unit waste storage and collection options

Area	Waste Stream	L/Week	Option 1	Option 2	Option 3
Warehouse 1	General Waste	25,564	1 x 6m^3 / collected five days per week	1 x 4.5m^3 / collected six days per week	10,000L compactor (5:1) / collected as required
	Commingled Recycling	12,782	1 x 4.5m^3 / three days per week	1 x 3m^3 / five days per week	10,000L compactor (5:1) / collected as required
	Paper and Cardboard	12,782	1 x 4.5m^3 / three days per week	1 x 3m^3 / five days per week	Carboard Baler / bales collected as required
Warehouse 3	General Waste	15,018	1 x 6m^3 / collected three days per week	1 x 4.5m^3 / collected four days per week	10,000L compactor (5:1) / collected as required
	Commingled Recycling	7,509	1 x 3m^3 / collected three times per week	1 x 4.5m^3 / two days per week	10,000L compactor (5:1) / collected as required
	Paper and Cardboard	7,509	1 x 3m^3 / collected three times per week	1 x 4.5m^3 / two days per week	Carboard Baler / bales collected as required

Front-Lift Bins collected on a regular basis

Site management may elect to incorporate regular collection of bulk waste (front lift) bins for the management of general waste and recycling onsite.

These are calculated assumptions and actual requirements will be dependent on the waste generated by the associated industrial tenancies once operation has commenced. With the presence of food in the waste, more frequent collections may be required to prevent odour.

Waste Compaction Units

Space may be provisioned for the storage of a waste compactor in each warehouse. The waste compactor will be a hook-lift or Roll-On Roll-Off (RORO) unit which is collected at a schedule agreed with the elected private waste contractor. This type of compactor has a capacity of 10,000L and a compaction ratio of 5:1. A fully loaded and compacted unit would therefore have a capacity of 50,000L. A compactor of this size typically has a footprint of 9.2m^2. Compactor units can also be fitted with keycard and weighing to record disposal by multiple tenancies or users (see Appendix C for further details).

Each warehouse as part of stage 1 of the development can have its own waste compactor to service industrial units. General waste from café activities can also be disposed of using the warehouse 1 compactor if sited for easy access.

Large volumes of recycling waste are expected to be generated as a result of onsite warehouse activity. Equipment to reduce volumes of cardboard and plastic waste will allow the number of bins required onsite to be reduced.

Cardboard Baler

A paper and cardboard baler may be appropriate for use in each of the industrial units as this material is typically bulky and easily separated from other recycling streams. Paper and cardboard is also valuable as a separated commodity and may be able to be collected for free or sold for a profit, rather than incurring a fee for collection. Further information and examples of commercial cardboard balers is included in Appendix C.

Each warehouse as part of the Stage 1 development can have its own baler to service industrial units.

4.3 Waste Management Equipment

A range of bins will be utilised at the site for the management of different waste streams. It is expected that the site will make use of mobile bins and bulk bins (see Appendix B for bin specification), the dimensions of which are outlined as follows (Table 8 and

Table 9), according to the NSW EPA (2019) *Guidelines for Waste Management in New Developments.*

Table 8: Mobile garbage bin specifications

Bin Capacity	140L	240L	360L	660L	1,100L
Height (mm)	1,065	1,080	1,100	1,250	1,470
Depth (mm)	540	735	885	850	1,245
Width (mm)	500	580	600	1,370	1,370
Footprint (m^2)	0.27	0.43	0.53	1.16	1.71

Table 9: Bulk bin dimensions

Bin Capacity	1.5m^3	2m^3	3m^3	4.5m^3	6m^3
Height (mm)	910	1,250	1,225	1,570	1,650
Depth (mm)	905	935	1,505	1,605	1,850
Width (mm)	1,800	1,800	1,800	1,800	2,000
Footprint (m^2)	1.63	1.68	2.71	2.89	3.70

All bins will be in accordance with AS4123.7-2006 mobile waste containers – colour, markings, and designation requirements. Private bins shall be labelled to identify the waste generator and site address.

Bins will be serviced by the contracted WSP according to the agreed collection schedule upon commencement of operation.

4.4 Bulky Waste Management

Site tenancies are expected to generate some bulky waste items (fit-out, whitegoods, etc), including items that would be returned to suppliers from deliveries (such as pallets, crates, etc). Additional space for the storage of bulky waste items will be available for each tenancy, nearby the bin storage areas.

Bulky waste will be serviced as required and can be organised between individual tenancies and their waste contractor(s). Bulky waste collection vehicles will be similar in size to those that will provide waste collection for general waste and recycling and therefore, no additional access considerations are likely to be necessary for bulky waste collection access.

5 Site Waste Management Systems

5.1 Waste Management System Summary

The various waste streams generated on-site are summarised as follows:

- **Waste:** General waste shall be placed within a tied plastic bag prior to transferring into the general waste bin or waste compactor. Receptacles will be situated in each designated waste management and storage area for individual industrial units;
- **Commingled recyclables:** All recyclables will be stored in commingled bins (including paper, cardboard, mixed plastic, glass, aluminium, steel). All recyclables should be decanted loose (not bagged) with containers un-capped, drained and rinsed prior to disposal into the recycling bin.
- **Paper and cardboard:** Based on *BinTrim: Reducing business waste (NSW EPA, 2017),* Paper and cardboard can represent more than 75% of all recyclables generated by various commercial and industrial uses. It may be suitable for industrial unit tenancies to incorporate a separate paper and cardboard collection or cardboard baler to reduce waste collection costs and improve resource recovery potential. All cardboard should be flattened prior to placement into a cardboard bin or baler.
- **Film Plastic:** Some industrial tenancy uses may produce a significant amount of plastic film waste which can be managed with a separate collection. A $1m^3$ bag and frame setups are considered appropriate for film plastic and can be collected by a range of major waste contractors and specialist service providers.
- **Garden Waste:** Minimal garden waste is expected to be generated on site. Any garden waste generated through the maintenance of landscaped areas around the site would be managed and removed by the landscape management contractor.
- **Food Waste:** A substantial proportion of waste generated from the café is likely to be food waste. Management methods such as composting or vermiculture are considered impractical due to the nature of the site. Alternative methods such as the following are proposed for the site, space permitting (specific application to be determined):
    - Sustainable ordering practices and return of damaged, expired or surplus foodstuffs to suppliers (where possible),
    - Separate food waste collection and depackaging / composting service,
    - Food donation service, and
    - On-site food waste macerator, dehydrator or digester.
- **Other (Problem) Waste:** The disposal of hard, bulky, liquid or potentially hazardous wastes shall be organised between industrial tenants and their respective waste contractors as necessary. Grease traps are present on-site and are mainly expected to be used by the café. Collection would need to be coordinated between tenancies and their contracted WSP.

5.2 Collection Method and Loading Areas

Based on the anticipated waste generation rates for the site, a private contractor will be required to collect waste generated at the site. Tenants will be responsible for engaging and maintaining a waste collection contract for the regular servicing of waste generated at each industrial unit and other relevant uses. Mirvac will include general waste management details in lease agreements according to this waste management plan.

The recommended arrangements access and collection servicing for the site are as follows (see Appendix A for indicative travel path for waste collection vehicles):

- Entrance to the site via Mamre Road;
- Collection of general waste (for general waste option 1) and recycling front lift bins will occur directly from each building waste storage area;
- Collection and replacement of waste compactors (for general waste option 2):
    - Drop off and collection of waste compactors will occur outside of regular business hours to minimise impact on staff and visitors to the site, as well as local residents (timings to be determined in service contract);
    - The contractor will initially drop off an empty waste compactor to replace the full one (one for each industrial unit);
    - Site management is to indicate the correct waste compactor receiving general waste, through the form of temporary signage and restriction of access to full compactor);
    - The contractor will return to collect the full waste compactors in a timely manner.
- Steel front lift bins shall be collected by a front-lift vehicle. Due to their weight, steel bin will be stored in a position that minimises the need to shift bins to/from the collection vehicle. Typical front-lift vehicle dimensions are as follows:
    - 11.5m length,
    - 6m operational height, and
    - 30 tonne gross vehicle mass.
- Any plastic wheelie bins (240L - 1100L) shall be collected by a rear-lift vehicle (similar vehicle to collect cardboard, e-waste and film plastic bales) with typical dimensions as follows:
    - 8.8m length,
    - 4m operational height, and
    - 24 tonne gross vehicle mass.
- Identifiable areas will be required where users, visitors and WSP staff can recognise and avoid any risk associated with moving vehicles, and bin moving and handling;
- Exit from the site will be via the exit point back onto Mamre Road.

Note: *Compaction of refuse and the breaking up of bottles will not occur in the vehicle while the collection vehicle is standing stationary at or near the site.*

Table 10 below outlines relevant requirements and specifications related to the use of collection points and loading areas.

Table 10: Collection points and loading areas requirements and specifications

Component	Requirement	Specification
Collection point	Allow safe waste collection and loading operations	- Adequate clearance and manoeuvring space; - Sufficient clearance for the safe handling of materials and equipment; and - Loading bays do not impede upon traffic and pedestrian safety.
Vehicle loading space	Space for adequate lift clearance	- Adequate operational clearance for bin lifting mechanisms.
Operating times	Appropriate collection times to limit noise and traffic disturbance	- Collection times will be arranged during off-peak traffic times to ensure minimal disturbance to site users and general traffic flows associated with the use of the site.

5.3 Site Waste Management Responsibilities

Site tenancy users will be responsible for general operation of waste management systems, maintaining waste management contracts, maintaining waste storage areas and associated waste contamination reduction.

Should any issues impacting on the operational efficiency, safety and suitability of waste management be identified, site users should inform their waste contractor to revise waste management procedures as necessary.

Site tenants will be responsible for the following with regards to waste management:

- Using this WMP to inform waste management operations, design and infrastructure;
- Providing educational materials and information to users outlining:
  - Waste management system and use/location of associated equipment,
  - Sorting methods for recycled waste, awareness of waste management procedures for waste minimisation, maximising recovery and reducing contamination of recyclables,
  - Improving facility management results (lessen equipment damage, reduce littering, and achieve cleanliness).
- Making information available to users, site staff and visitors about waste management procedures;
- Ensuring correct signage is installed and maintained in waste storage and service areas;
- Encouraging waste avoidance and achievement of resource recovery targets;
- Providing operational management for delivery of waste objectives;
- Holding a valid and current contract with licensed collector(s) for waste and recycling collection;
- Ensuring waste service providers access the site appropriately;
- Ensuring timing of waste collections does not clash with peak traffic periods in relation to general operation of the site tenancies;
- Organising waste, recycling and bulky pick-ups by elected contractor for the site (if not directly managed by site users);
- Organising, maintaining and cleaning the waste storage and service areas;
- Using contracts to define the allocation of responsibilities with cleaners and users;
- Monitoring any vermin and pest issues and arranging appropriate controls (traps or fumigating) and maintenance of doors or other points of potential entry; and

- Ensuring all tenants do not prevent or impede correct access of the site for waste collection.
- Holding a valid and current contract with a licensed collector for any specialty waste collections and disposal;
- Allocating space for a dedicated and enclosed waste and recycling storage area for intermediate storage before disposal to designated waste storage areas;
- Disposing of waste and recycling at their designated building's waste storage area;
- Maintaining general cleanliness when using waste storage areas to prevent the occurrence of odour, vermin or amenity issues;
- Notify site management of waste storage use and efficiency should additional bins or services be required (that are covered under general waste arrangement as outlined in lease agreements);
- Notify site management hazards or damages related to the building waste storage areas, including but not limited to:
    - Damaged bins,
    - Illegally dumped items,
    - Apparent miss-use of waste storage areas (such as vandalism, contamination, etc), and
    - Odour, vermin or amenity issues.

5.4 Waste Storage and Recycling Areas

The waste storage areas provide centralised storage that has adequate capacity to receive and store the maximum likely generation of waste and recycling between collection times. Waste storage areas must be sited and constructed to improve amenity, minimise odour, protect surrounding areas and promote user safety. Construction must conform to Building Code of Australia, Australian Standards and local laws. Specifications include:

- Sited away from areas of high pedestrian traffic to minimise odour and amenity impacts;
- Enclosed to minimise exposure and reduce risk of odour and amenity impacts;
- Signage for safety and waste bin identification;
- Safety precautions, staff training and signage for plant;
- Noise attenuation for waste management and waste storage areas that limits effects to residents from compactor, bin transfer and collection vehicle noise;
- Floors constructed of concrete or other approved solid, impervious material that can be cleaned easily;
- Adequate supply of water with hose cock as close as practicable to the doorway or storage area;
- Ventilation in accordance with Australian Standards AS1668; and
- Security and lighting.

Additional measures shall be put in place for the wash bay, and Area B which will be entirely enclosed:

- Light colour finish for all room surfaces;
- Smooth, even surface covered with vertical wall and plinth faces;
- Grading and draining to an approved drainage fitting located in the room;
- Doorway ramp (if not level);
- Close fitting and self-closing door; and
- Suitable construction including limited entry paths to prevent vermin.

5.5 Signage

Signage that promotes resource recovery, waste minimisation, safety and amenity follows the Australian Standard for safety signs for the occupational environment (Standards Australia 1994).

Signage will be designed to consider language and non-English speaking backgrounds, vision impairment and accessibility (see Appendix C, Figure 9 to Figure 10). Illustrative graphics must form a minimum 50% of the area of the signage. Signage is to be prominently posted in each waste storage area indicating:

- Garbage is to be bagged and placed into waste bins;
- Details regarding acceptable recyclables and the location of their respective receptacles;
- Commingled recyclables are to be disposed of loose (not bagged);
- *No standing* and *danger* warnings applying to the area surrounding waste storage and collection areas;
- Contact details for arranging the disposal of bulky items;
- Information on keeping the areas tidy.

5.6 Prevention of Pollution and Litter Reduction

To minimise dispersion of litter and prevent pollution (to water and land via contamination of runoff, dust and hazardous materials), site tenants shall be responsible for the following:

- Maintenance of open and common site areas;
- Ensuring waste storage areas are well maintained and kept clean, including:
  - Prevention of overflow,
  - Keeping lids closed, and
  - Checking for bung leaks and damage bins.
- Securing the waste storage area from vandalism and the escape of litter;
- Identification and appropriate disposal of goods with hazardous material content (paints, fluorescent tubes, smoke detectors);
- Acting to prevent dumping and unauthorised use of waste areas; and
- Requiring contractors to clean up any spillage that may occur during waste servicing or other work.

The above will minimise the dispersion of site litter, prevent stormwater pollution and thus, reduce the risk of impact to local amenity and the environment.

5.7 Waste Management Plan Revisions

For any relevant future Council requests, changes in legal requirements, changes in the development's needs and/or waste patterns (waste composition, volume, or distribution), or to address unforeseen operational issues, the operator shall be responsible for coordinating the necessary Waste Management Plan revisions, including (if required):

- A waste audit and new waste strategy;
- Revision of the waste system (bin size/quantity/streams/collection frequency);
- Re-education of users/staff;
- Revision of the services provided by the waste collector(s); and
- Any necessary statutory approval(s).

6 Access Requirements and Limitations

6.1 Best practice requirements

The following best practice methods shall be incorporated where relevant/practicable to ensure site waste management is completed safely and effectively:

- Tenancies shall ensure that bins are not overfilled or overloaded.
- Waste incineration devices are not permitted, and any offsite waste treatment and disposal shall be carried-out in accordance with regulatory requirements.
- For bin traffic areas, should any ramp gradients be present, bin weight, and/or distance can affect the ease/safety of bin transfers. In the case of a potential safety concern, use of a suitable tug or cart will be considered.
- Site tenants and contracted WSPs shall observe all relevant WHS legislation, regulations, and guidelines. The relevant entity shall define their tasks.
- All staff/contractors should be provided with equipment manuals, training, health and safety procedures, risk assessments, and adequate personal protective equipment (PPE) to control/minimise risks/hazards associated with all waste management activities.

6.2 Limitations

This report is based on the following conditions:

- Waste generation figures outlined in the demolition and construction sections are approximate only and should be confirmed by building and demolition contractors through demolition and construction operations.
- Excavation figures are high level estimates and require confirmation by volumetric survey against proposed levels.
- The figures presented in this report are estimates only. The actual amount of waste will depend on the development's occupancy type, occupancy rate, waste generation profile, the user's disposition toward waste and recycling and the overall approach to waste management maintained at the site. Tenancies will adjust their waste management needs based on actual waste and recycling volumes experienced through regular operation (if the actual volumes of the streams are greater than estimated, then the number of bins and/or the number of collections per week shall be increased).
- This report shall not be used to determine/forecast operational costs, or to prepare feasibility studies, or to document operational/safety procedures.

7 References

Australian Building Codes Board (2016) National Construction Code (NCC).

Australian Government (2017) National Food Waste Strategy: Halving Australia's Food Waste by 2030, Minister for the Environment and Energy.

Environment Protection and Heritage Council (2009) National Waste Policy: Less Waste, More Resources. Available at: http://www.nepc.gov.au/system/files/resources/906a04da-bad6-c554-1d0d-45216011370d/files/wastemgt-rpt-national-waste-policy-framework-less-waste-more-resources-print-ver-200911.pdf.

Environment Protection Authority (EPA) (2017) BinTrim: Reducing Business Waste, NSW Government.

NSW EPA (1997) Protection of the Environment Operations Act.

NSW EPA (2012) Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities.

NSW EPA (2014) NSW Waste Avoidance and Resource Recovery Strategy 2014-21.

NSW EPA (2016) Recycling Signs, Posters and Symbols. Available at: http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm.

NSW EPA (2019) Better practice guidelines for resource recovery in residential developments.

NSW Government (1979) Environmental Planning and Assessment Act.

NSW Government (2000) Environmental Planning and Assessment Regulation.

NSW Government (2009) State Environmental Planning Policy (Western Sydney Employment Area)

Penrith Council (2014) Penrith Development Control Plan.

Penrith Council (2010) Penrith Local Environmental Plan.

Standards Australia (1994) AS 1319: Safety signs for the occupational environment, Homebush, NSW: Standards Australia.

Standards Australia (2008) AS 4123 Mobile waste containers.

WorkCover (2011) Managing Work Environment Facilities Code of Practice.

Appendix A Site Plans and Waste Collection Vehicle Access

Figure 3: AIE Concept Plan

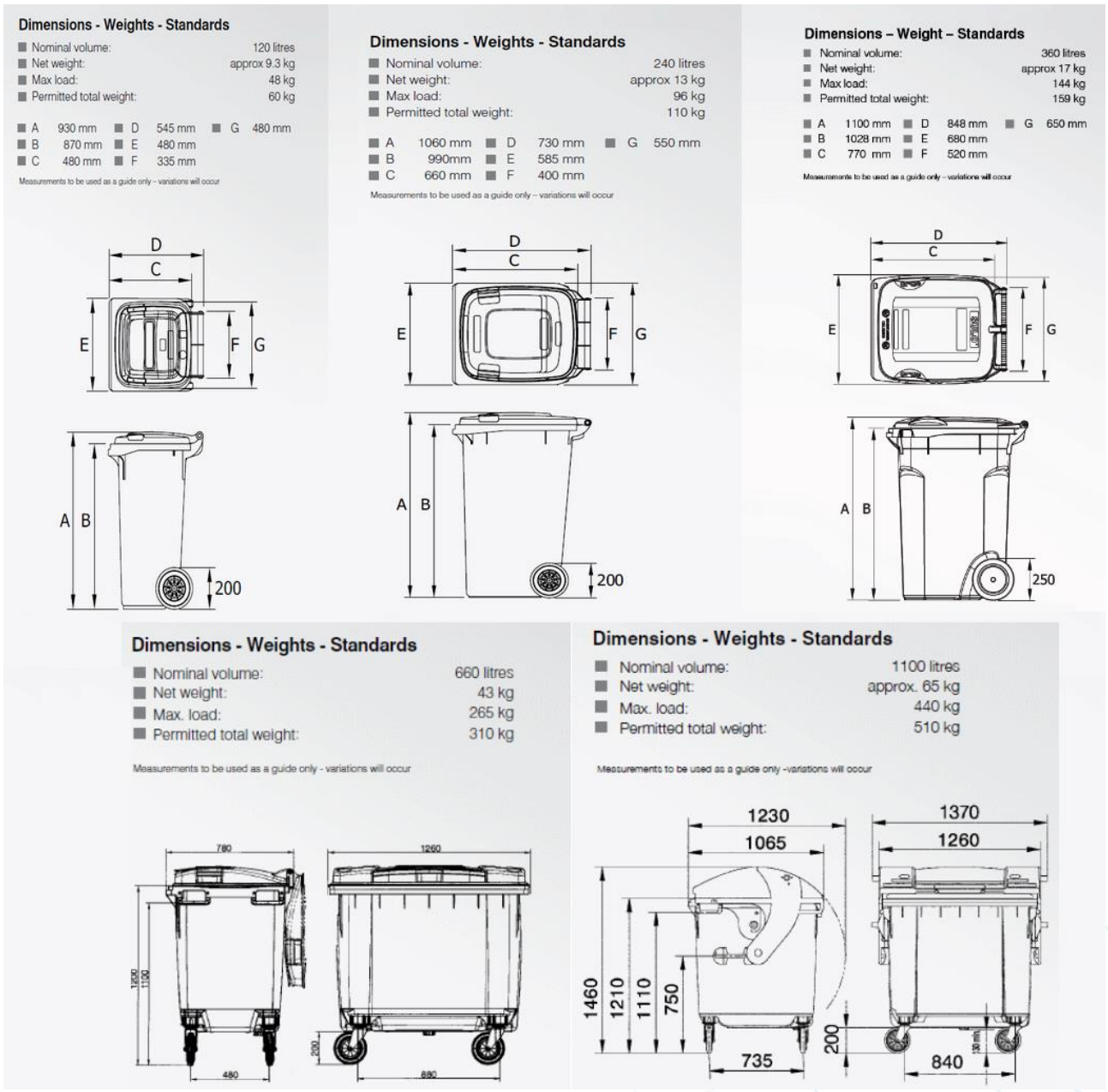
Figure 4: Site Plans with Bin Storage Areas Mark-up

Appendix B Bin Types

This WMP proposes the use of small (rear-lift) bins, and medium (front-lift) bins. Each bin type is specific to each store as the bin size will impact on the vehicle access requirements. This section outlines the dimensions of each bin type. Some bin types below are not in the recommended bin types throughout the WMP, but may be useful for planning purposes should other options be preferred.

Rear-lift wheelie bins are ideal for sites with limited restrictions like specialty retail and small offices. Lightweight and easy to manoeuvre, these small-sized containers are easy to use and can be secured with lockable lids.

Figure 5: Rear-lift mobile bins (120L, 240L, 360L, 660L & 1,110L)



Reference: www.sulo.com.au. Sizes may vary with manufacturer or supplier.

Figure 6: Front-lift steel bulk bin sizes and dimensions

Bin Size/Waste Stream	Height (h)	Width (w)	Depth (d)	
1.5 cubic metre	900 mm	1800 mm	900 mm	
3.0 cubic metre	1200 mm	1800 mm	1325 mm	
4.5 cubic metre	1500 mm	1800 mm	1600 mm	

Source: KS Environmental

Note: figures are indicative only and may vary depending on manufacturer and supplier.

Appendix C Waste Compaction and Baling Equipment Examples

Hook-Lift Compactor

A compactor unit will need to be supplied with 3 phase power. Please refer to the below specifications for a compactor unit suitable for this site:

DIMENSIONS	
Width	1665mm
Length	5320mm
Weight	4.5T
Feed Opening	1500 x 2100
Swept Volume	2.3m3

PERFORMANCE	
Power Supply	415V 3-phase
Motor	11kW
Cycle Time	55-86 secs
Compaction Force	38T

Baling Equipment

The table below outlines some equipment suppliers that can offer balers. Please not the list is not exhaustive.

Table 11: Baling Equipment Details

Brand	Model	Dimensions	Cost
Autobaler	LS 150 (single chamber)	H: 3100mm W: 1000mm D: 1250mm Bale weight: <100kg	<$20,000
	Ti 350 - Ti 500	H: 2025mm to 2030mm W: 2250mm D: 1470mm to 1850mm Bale weight: between 300kg to 550kg	$30,000 to $50,000
Miltek	H500 - H600	H: 3100mm to 2170mm W: 1600mm to 1890mm D: 1300mm to 1400mm Bale weight: between 350kg to 500kg	N/A
WasTech	B50	H: 3180mm W: 1860mm D: 1055mm Bale weight: between 400kg to 500kg	between $40,000 - $50,000

***Note:** Pricing is based on previous experience and estimates from equipment suppliers. All figures shall be treated as approximate and may require re-quoting for an accurate representation of actual unit cost and additional fees associated with delivery or otherwise.*

Appendix D Standard Signage

Waste Signage

Signs for garbage, recycling and organics bins should comply with the standard signs promoted by the NSW Office of Environment and Heritage (NSW OEH 2008b) and as stated in the Penrith DCP.

Standard symbols for use in signage, bin facade and educational materials are promoted through the NSW Environment Protection Authority. They are available for download from the NSW EPA website (NSW EPA 2016b), in black and white and colour versions. The Australian Standard series AS 4123 (Part 7) details colours for mobile waste containers (Standards Australia 2008).

Figure 7: Examples of standard signage for bin uses

Safety Signs

The design and use of safety signs for waste and recycling rooms and enclosures should comply with AS 1319 (Standards Australia 1994). Safety signs should be used to regulate, and control safety related to behaviour, warn of hazards and provide emergency information, including fire protection information. Below are some examples. Clear and easy to read 'NO STANDING' and 'DANGER' warning signs must be fixed to the external face of each waste and recycling room where appropriate.

Figure 8: Example and layout of safety signage

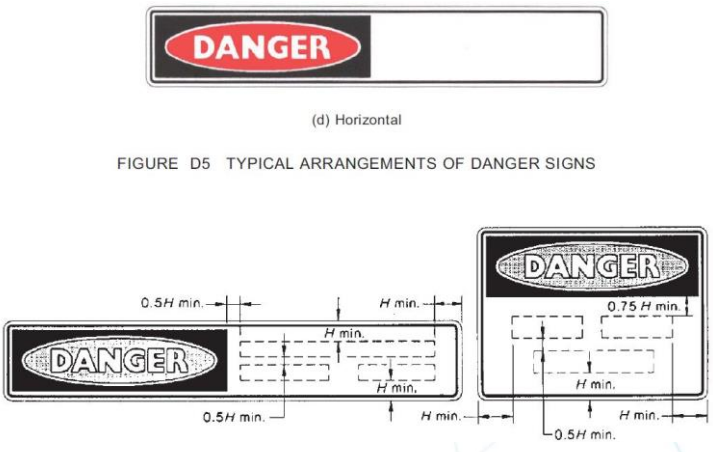


Figure 9: Example waste and recycling signage

Figure 10: Example recycling information signage

APPENDIX N

Vegetation Management Plan

Aspect Industrial Estate - Vegetation Management Plan

Mirvac Projects Pty Ltd

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DOCUMENT TRACKING

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Template 2.8.1

Contents

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Abbreviations

Abbreviation	Description
BC Act	*Biodiversity Conservation Act 2016*
DA	Development Application
ELA	Eco Logical Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
MZ	Management Zone
NRAR	Natural Resources Access Regulator
NVR	Native Vegetation Retention
PCT	Plant Community Type
RFEF	River-flat Eucalypt-forest
VMP	Vegetation Management Plan
WM Act	*Water Management Act 2000* (NSW)
WoNS	Weed of National Significance

1. Introduction

This vegetation management plan (VMP) has been prepared by Eco Logical Australia Pty Ltd (ELA) on behalf of Mirvac Projects Pty Ltd (Mirvac) for the proposed Aspect Industrial Estate development at Mamre Road, Kemps Creek (Lots 54-58 DP 259135) (Figure 1). This site is located within the Penrith City Council Local Government Area (LGA).

1.1 Background

The site is to be redeveloped for offices, warehouses, carparks and associated infrastructure including access roads and stormwater infrastructure. The site will also contain landscaped areas and a conservation riparian corridor.

There are two mapped unnamed waterways within the Aspect Industrial Estate development area. The first order watercourse mapped within the south east and centre of the development area did not meet the definition of a watercourse (Figure 2). A defined channel was observed within the north western section of the development area, where the second order watercourse was mapped (Figure 2).

As part of the proposed Aspect Industrial Estate development, Mirvac wish to realign the validated second order watercourse through the construction of a swale. The civil designs can be found in Appendix A.

This VMP has been prepared in accordance with the *Guidelines for Vegetation Management Plans on Waterfront Land* (Office of Water, 2012) and has been prepared in consideration of Penrith City Council's Development Control Plan 2014. This VMP has also been prepared based on current best practice and is consistent with the Natural Resources Access Regulator (NRAR) Guidelines, including provision of indicative costs for management actions.

1.2 Objectives of the Vegetation Management Plan

The overall objectives of the VMP are to establish native species cover and density along the realigned riparian corridor by revegetation works. The maintenance period will run for five years or until the objectives and performance criteria outlined in this VMP are met. The objectives for the VMP are summarised in Table 1.

Table 1: VMP Objectives

Objectives	Approach
Reinstate native vegetation along the realigned watercourse and maintain ecological health (species composition and structure) within 5 years.	• Rehabilitate and revegetate riparian corridor using appropriate native species • Maintenance weed control • Control of priority and environmental weeds and prevent new outbreaks • Assist in the natural regeneration of species across the VMP area • Addition of logs and artificial hollows
Stabilise bed and bank along 800 m of realigned creek.	• Sandstone boulders or blocks used to protect the outside of the channel meander in the north west area of the site • 'Soft engineering' approach with a focus on planting locally native species

1.3 Key Terms

For the purpose of this VMP, the following terminology has been adopted:

- Subject site: Lots 54 – 58 DP 259135
- Development area: The proportion of the study area to be developed, specifically the proposed lots and roads. This area is outside the scope of the VMP area.
- VMP area: The proportion of the study area to be rehabilitated and conserved by this VMP specifically.

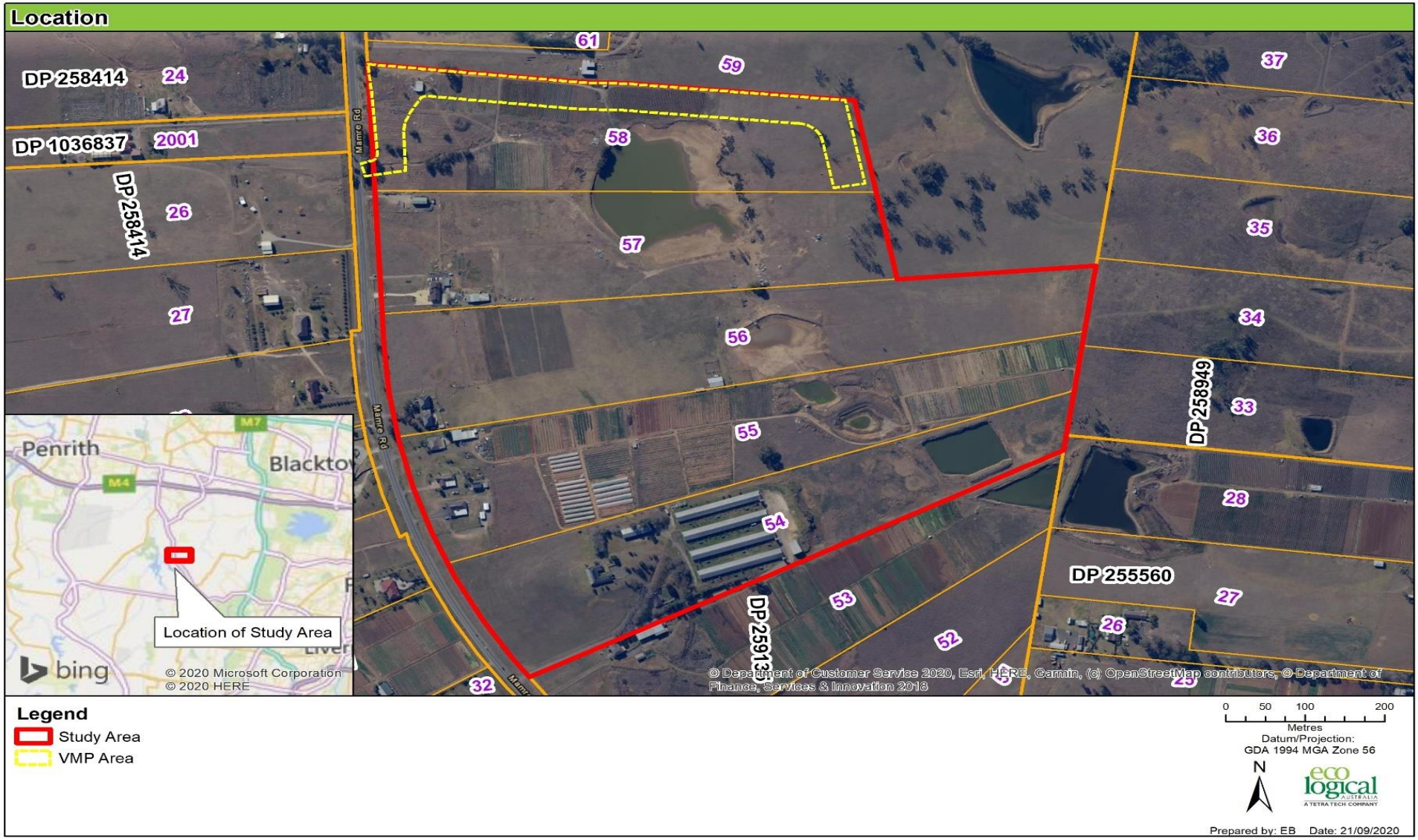

Figure 1: Location of development and VMP areas

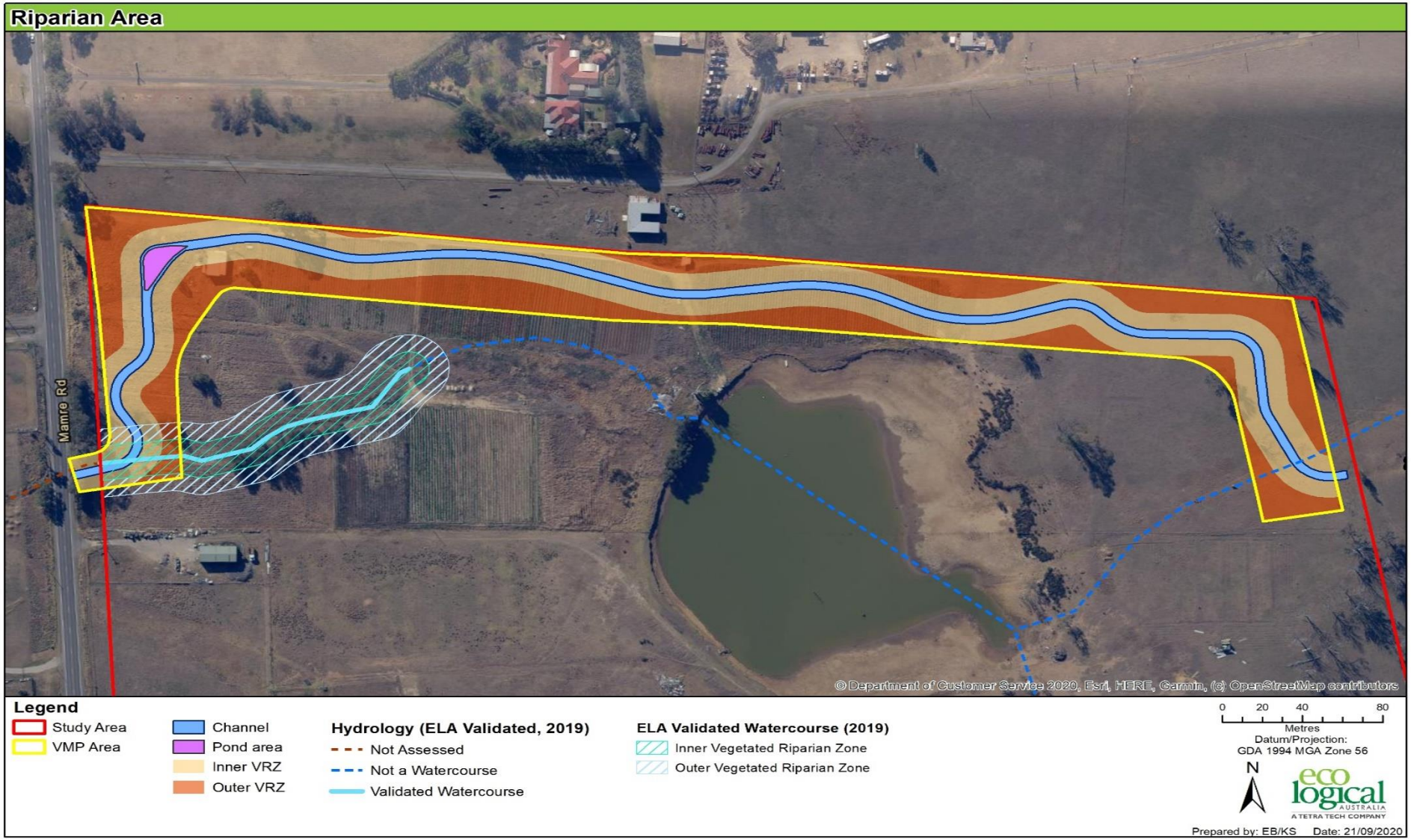

Figure 2: Validated watercourses within the VMP area

2. Description of the Environment

2.1 Location

The study area is located within the Penrith City Council LGA. It is bound by Mamre Road to the west and rural land to the east, north and south. The site is currently zoned IN1 (General Industrial), E2 (Environmental Conservation) with a small part zoned as SP2 (Infrastructure) in accordance with the *State Environmental Planning Policy (Western Sydney Employment Area) 2009* (WSA SEPP).

2.2 Soils and Topography

The topography of the study area gently slopes to the west to South Creek. The VMP area is located on both the Blacktown and South Creek residual soil landscapes. The Blacktown soil landscape is characterised by undulating slopes on soils derived from Wianamatta Group shales. The South Creek soil landscape is characterised by floodplains, valley flats and drainage depressions, which are usually flat with incised channels.

2.3 Drainage and Hydrology

There are two mapped unnamed waterways within the Aspect Industrial Estate development area, which are tributaries of South Creek. Within the development area there are also six farm dams, most of which have limited adjoining riparian and / or fringing vegetation and poor aquatic habitat values.

The first order watercourse mapped within the south east and centre of the development area had no indicative features of a waterway. A defined channel was observed along the mapped second order watercourse within the north western section of the development area (Figure 2). The defined watercourse started downstream of the sixth dam, starting at a patch of *Phragmites australis* (Common Reed) and flowing through the site in a westerly direction towards Mamre Road.

Downstream of the area of *P. australis*, the channel passed through an area of dense *Cenchrus clandestinus* (Kikuyu Grass) and scattered *Casuarina glauca* (Swamp She-oak) trees at the top of the creek bank. Roughly 20 m upstream of the Lot 58 boundary fence, the channel widens to approximately 2.5 m and there was a small amount of standing water in the creek line. There was a break in the riparian vegetation in this section of the watercourse, with no *C. glauca* present at the top of bank. However, there was more instream vegetation including the native species *Persicaria decipiens* (Slender Knot weed), *Alternanthera* sp. and the exotic species *Rumex crispus* (Curled Dock).

At the western extent of Lot 58, the creek flows under Mamre Road through three box culverts, each approximately 0.8 m high and 1.5 m wide. Each culvert has a brick wingwall extending out to the northern and southern end. This area also appeared to collect roadside drainage from the north and south of Lot 58 along Mamre Road.

Further information can be found in the Aspect Industrial Estate Riparian Assessment (ELA, 2020).

2.4 Vegetation Communities

2.4.1 River-Flat Eucalypt Forest

The remnant native vegetation community *PCT 835: Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion* was present along the validated second order watercourse in poor condition. PCT 835 is listed as *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* Endangered Ecological Community (EEC) under the BC Act 2016. River-flat Eucalypt Forest on site consisted of a canopy dominated by *C. glauca,* an absent midstorey and an understorey comprised of predominately exotic species including *Plantago lanceolata* (Plantain), *Senecio madagascariensis* (Fireweed)*, Paspalum dilatatum* (Common paspalum) and *Cirsium vulgare* (Spear thistle).

2.4.2 Cleared/Exotic

The cleared land within the VMP area was dominated by exotic species including *P.lanceolata*, *S. madagascariensis, P. dilatatum* and *C. vulgare.*

2.5 Flora Species

A total of 17 flora species were identified within the VMP area during the site inspection, of which one was a native species and 16 were exotic species (Appendix B).

No threatened flora species were recorded within the VMP area during the field inspection**.**

2.6 Priority Weeds

Sixteen exotic species were recorded in the VMP area. One of these is a listed priority weed in the Greater Sydney region under the *Biosecurity Act 2015* and one of these is listed as a Weed of National Significance (WoNS). WoNS and priority weeds including their required duties under the *Biosecurity Act 2015* are shown in Table 2.

Appropriate control measures for priority and environmental weeds are provided in Appendix D.

Table 2: Priority weed species recorded in the study area

Scientific Name	Common Name	WoNS	Priority Level	Priority Weed Objective
Senecio madagascariensis	Fireweed	Yes	State	Asset Protection

3. Management Zones

The VMP area of approximately 3.34 ha, will be entirely managed. The management works for this VMP are focused on weed control and revegetation. The VMP area consists of four management zones as identified below and in Figure 3.

- Zone 1: Low Flow Channel with Aquatic Macrophytes – Weed Control and Aquatic Macrophyte Revegetation
- Zone 2: High Flow Channel with Low Density Plantings
- Zone 3: Embankment with High Density Plantings
- Zone 4: Pond Area with Aquatic Macrophytes

3.1 Management Overview

An assessment of the native resilience and weed densities was conducted during field surveys. The vegetation within the VMP area is in poor condition. Weed densities are high in the ground layer and no mid-storey or canopy exists.

Weeds within the landscaped area adjacent to the VMP area will require maintenance to prevent the continued incursion of weeds into the VMP area. This will best be achieved by regular mowing or ongoing weed control along the interface of the VMP area and the landscape area.

3.2 Management Zones

For the management zones, specific weed control measures and revegetation methods are detailed in Appendix D. Monitoring will be conducted across all zones and will be used to adaptively manage the type and intensity of follow-up treatments.

3.2.1 Management zone 1 (MZ1) – Low Flow Channel with Aquatic Macrophytes - Weed Control and Aquatic Macrophyte Revegetation

3.2.1.1 General Description

This management zone encompasses 1.18 ha of exotic grassland. After the construction of the channel, this zone will be revegetated with native aquatic macrophyte species.

The low flow channel may be used as a detention basin for sediment during the construction works onsite and be converted into a channel after construction works are finished. All accumulated sediment would need to be removed prior to revegetation. No jute matting is to be installed as this will impact on the filtration of the channel.

Once the low flow channel is constructed, approximately 80% of this zone is expected to require revegetation to reinstate native sedge and rush species. Species selection and placement will be dependent on the final design of the channel. Sedges and rushes will be planted into areas prone to prolonged inundation.

The key management priorities and required management actions are:

- Tubestock planting across the majority of the zone.

- Control of exotic grasses and other exotic species.
- Monitor native vegetation and weed densities.

3.2.2 Management Zone 2 (MZ2) – High Flow Channel with Low Density Plantings - Weed Control and River-flat Eucalypt-forest Revegetation

3.2.2.1 General description

This management zone encompasses 0.39 ha of exotic grassland. After the construction of the channel, this zone will be predominantly revegetated with ground cover and mid-storey species consistent with the vegetation community River-flat Eucalypt-forest to compensate for the impact to this community during development. The majority of this zone is expected to require revegetation to reinstate the River-flat Eucalypt-forest vegetation community.

The key management priorities and required management actions are:

- Tubestock planting across entire zone.
- Control of exotic grasses and other exotic species.
- Monitor native vegetation and weed densities.

3.2.3 Management Zone 3 (MZ3) – Embankment with High Density Plantings - Weed Control and River-flat Eucalypt-forest Revegetation

3.2.3.1 General description

This management zone encompasses 1.74 ha of exotic grassland. After the construction of the channel, this zone will be entirely revegetated with species consistent with the vegetation community River-flat Eucalypt-forest to compensate for the impact to this community during development. The entirety of this zone is expected to require revegetation to reinstate the River-flat Eucalypt-forest vegetation community, including canopy species.

The key management priorities and required management actions are:

- Tubestock planting across entire zone.
- Control of exotic grasses and other exotic species
- Monitor native vegetation and weed densities

3.2.4 Management Zone 4 (MZ4) – Pond Area with Aquatic Macrophytes

3.2.4.1 General description

This zone currently encompasses 0.03 ha of exotic grassland. After construction of the pond area, this zone will be revegetated with native emergent macrophytes.

The construction of the pond will allow for treatment of stormwater quality before it leaves the site.

The key management priorities and required management actions are:

- Tubestock planting across the majority of the zone.
- Control of noxious aquatic species.
- Monitor sediment accumulation within the pond.

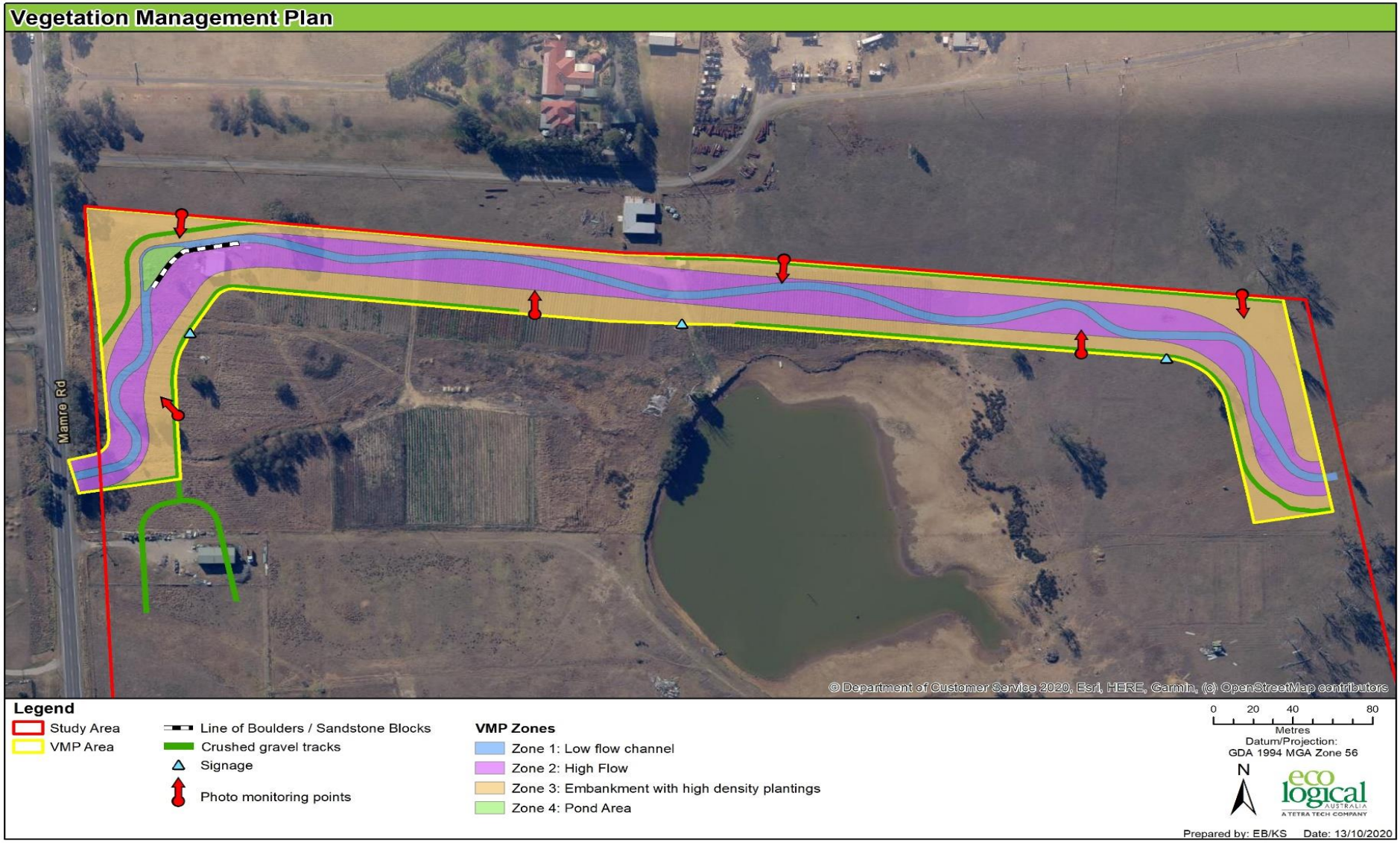

Figure 3: VMP Management Zones

4. Construction and Management Works

Preliminary works relating to the VMP are to occur either before or whilst development is occurring onsite. All works are assumed to be undertaken by the developer or the civil construction company.

4.1 Earthworks and Construction of the Riparian Channel

During construction activities, all timber from native trees within the development area should be retained onsite, with mulch stockpiled for use within the VMP area, all viable seed and genetic material to be collected and all timber cut into logs to be utilised as habitat for native fauna.

4.2 Fencing and Interpretive Signage

After completion of the construction of the riparian corridor, fencing must be installed to prevent encroachment of civil machinery and compaction of soil during the revegetation period. Temporary construction fencing should consist of star pickets with highly visible plastic mesh or similar. Temporary fencing must not be placed outside of the clearing limits.

Temporary informational signage must be installed around the site as needed to convey the works that are being undertaken and the final strategy for the site. The exact information and location of these signs will be determined during implementation works. At a minimum this signage should identify, at all access points to the site and that the riparian area is being managed for conservation purposes. Further signage may include permanent signs describing the natural values of the site and surrounding area.

Permanent fencing should be installed around the northern boundary of the VMP area to delineate the site boundary. It is recommended that a permanent rural-style fence is erected around the remainder of the VMP area to delineate the conservation area.

4.3 Installation of Fauna Habitat in the VMP Area

It is recommended that an ecologist undertakes a pre-clearance survey within the proposed development area to supervise the felling of the ten hollow-bearing trees proposed to be removed to ensure the protection of native fauna. It is recommended that the removed hollows are relocated to the VMP area for on-ground fauna habitat.

4.4 Vegetation management works

The total VMP area is 3.34 ha and encompasses the area shown in Figure 1. Maintenance weed control and revegetation are to be carried out by a bush regeneration contractor.

4.4.1 Primary and Secondary Weed Control

Depending on the timeframe between the construction of the channel and revegetation works, primary weed removal may be required, prior to revegetation. Secondary and maintenance weed control will be required following revegetation. During these weed control activities, care must be taken to avoid natural regeneration of native species.

4.4.2 Maintenance

Following secondary weed removal and revegetation, all areas will require ongoing maintenance to control weed regrowth from the soil seed bank. Maintenance work is to be undertaken by qualified bush regeneration contractor(s).

Maintenance will be undertaken on a regular basis in the peak growing seasons (spring and summer), with less frequent visits in cooler periods (autumn and winter). Maintenance work will include herbicide spot spraying of emergent weed species. Herbicides must be suitable for use adjacent to a waterway (e.g. Glyphosate Bi-Active).

4.4.3 Revegetation

Revegetation should be undertaken with tube stock at the densities in Table 3. Revegetation should use appropriate native aquatic macrophyte and River-flat Eucalypt-forest species within the VMP area including trees, shrubs and groundcover species as identified in Appendix C and to the specifications included in Appendix D.

All management zones will require revegetation at different densities over the zone. Aquatic macrophytes will be planted in Management Zones 1, 2 and 4, where areas are likely to be regularly inundated. Species from all strata will be planted within Management Zone 3 to increase densities and prevent the incursion of exotic species. Canopy species will be planted in Management Zone 3 where canopy species are currently not present.

Management Zones 3 and 4 will require the installation of jute matting following construction of the channel and prior to revegetation to help stabilise the banks of the channel.

Table 3: Planting guidelines for Management Zones

Management Zone	Revegetation Area (m^2)	Mulch / Jute Matting	Planting Densities				Total Planting Numbers
			Trees (1/15 m^2)	Shrubs (1/5 m^2)	Herbs/ Scramblers (1/ m^2)	Grasses/Sedges /Rushes (5/ m^2)	
MZ1	3,120	-	0	0	0	15,600	15,600
MZ2	9,440			1,888	18,800	47,200	67,968
MZ3	17,400	Jute matting	1,160	3,480	17,400	87,000	109,040
MZ4	150					750	750
TOTALS	**30,110**	**-**	**1,160**	**5,368**	**36,280**	**150,550**	**193,358**

5. Monitoring and Reporting

The bush regeneration contractor will monitor the vegetation for changes over time. The objective of the monitoring and reporting program is to record changes to the vegetation because of vegetation management works. Monitoring works will require liaison with the land holders, the bush regeneration contractor and the approval agency.

The bush regeneration contractor will establish photo monitoring points and prepare reports to record the progress of their work and demonstrate compliance with the VMP. Photo monitoring points are identified in Figure 3**.** During the maintenance phase the land manager will complete the reports in consultation with the approval agency. Reports will include a brief work report and an annual audit and assessment of compliance with the performance criteria in Table 4. The requirements of monitoring and reporting are described in detail in the sections below.

5.1 Photo Monitoring Points

Photo monitoring points will be established across the VMP area to highlight changes in the vegetation through time. The initial photos must be taken prior to revegetation works commencing, with subsequent photos taken after major management actions are implemented (e.g. tubestock planting) and annually in Spring/Summer. To do this, the bush regeneration contractor needs to establish photo monitoring points as indicated in Figure 3**.** Installation of photo points should follow the below process:

- place two six-foot star pickets 10 m apart;
- record the location (eastings and northings) of the first star picket with a GPS;
- record the bearing to the second star picket;
- take a digital photo from the first star picket looking towards the second star picket, with the entire length of the second star picket visible in the photo to act as a reference point; and
- label each digital image with a unique reference number that indicates where the photo was taken (i.e. the photo monitoring point) and date it was taken (e.g. 01_180315 for a photo taken at photo monitoring point 1 on the 15th March 2018).

5.2 VMP Implementation Reporting

A brief report outlining work undertaken by the bush regeneration contractor will be prepared every six months during the revegetation and primary weed control phases, then yearly throughout the maintenance phase. These reports will be submitted to the land holders committee and Penrith City Council. Reports will include:

- the time period for which the report relates to;
- a summary of works carried out within the period, including the dates and times spent on site doing works;
- an approximation of the time spent on each task;
- a table totalling man hour for each task undertaken on site;
- the qualifications and experience of contractors;
- certification of seed and local provenance stock;
- methods of weed control undertaken, and chemicals used;

- numbers of local provenance tubestock planted or methods;
- photo monitoring results of each of the scheduled stages of the vegetation progress;
- a description of any problems encountered in implementing the works recommended in the VMP and how they were overcome;
- any observations made, including new plant species recorded (native and weed species), comments on rates of regeneration and any problems which impact on the implementation of the VMP; and
- the results of the implementation work, in relation to the relevant performance criteria.

5.3 Review of the Vegetation Management Plan

The implementation of this VMP will be reviewed at the end of each year following the completion of the annual monitoring report for the life of this VMP. A review of this VMP should evaluate the effectiveness of the current management strategy and consider appropriate recommendations to achieve the performance criteria for each zone.

5.4 Performance Criteria

The progress and compliance with the VMP will be monitored and reviewed annually. This process will involve the bush regeneration contractor and the land holders. As identified in Section 5.2, a report will be prepared commenting on the success of the performance criteria. The performance criteria listed in Table 4 are best practice and are not linked with any specific legislation. Planting guidelines are outlined in Table 3 and recommended species for each vegetation community provided in Appendix C. An adaptive management approach to this site is recommended since techniques may need to be changed or be modified to suit site conditions. This approach allows the contractor to develop and build on site knowledge whilst implementing this VMP. Monitoring will assist in refining VMP actions in subsequent years.

Table 4: Performance criteria

MZ	Year 1	Year 2	Year 3 – 4	Year 5
1	• Weed control of all weeds including priority and environmental weeds. Weed cover no greater than 15% across entire zone. • Revegetation of native species completed across the entire zone as per Table 3. 90% survival rate of all plantings at end of Year 1. • All rubbish removed.	• Treatment of new weed breakouts • Weed control of all weeds. Weed cover no greater than 10% across entire zone. • Survival of revegetation plantings maintained at 90%. Replacement plantings* with all strata to meet densities in Table 3, if required.	• Treatment of new weed breakouts • Weed control of all weeds. Weed cover no greater than 5% across entire zone. • Survival of revegetation plantings maintained at 90%. Replacement plantings with all strata to meet densities in Table 3, if required.	• Weed control of all weeds. Weed cover less than 5% across entire zone. • Survival of revegetation plantings maintained at 90%.
2	• Weed control of all weeds including priority and environmental weeds. Weed cover no greater than 10% across entire zone. • Revegetation of native species completed across the entire zone as per Table 3. 80% survival rate of all plantings at end of Year 1. • All rubbish removed	• Weed control of all weeds. Weed cover no greater than 5% across entire zone. • 90% survival rate of all plantings at end of Year 2. Replacement plantings* with all strata to meet densities in Table 3, if required.	• Weed control of all weeds. Weed cover no greater than 5% across entire zone. • 90% survival rate of all plantings at end of Year 4. Replacement plantings with all strata to meet densities in Table 3, if required.	• Weed control of all weeds. Weed cover less than 5% across entire zone. • 90% survival rate of all plantings at end of Year 5.
3	• Weed control of all weeds including priority and environmental weeds. Weed cover no greater than 30% across entire zone. • Revegetation of native species completed across the entire zone as per Table 3. 80% survival rate of all plantings at end of Year 1. • Jute matt installed across entire zone. • All rubbish removed	• Weed control of all weeds. Weed cover no greater than 20% across entire zone. • 90% survival rate of all plantings at end of Year 2. Replacement plantings* with all strata to meet densities in Table 3, if required.	• Weed control of all weeds. Weed cover no greater than 10% across entire zone. • 90% survival rate of all plantings at end of Year 4. Replacement plantings with all strata to meet densities in Table 3, if required.	• Weed control of all weeds. Weed cover less than 5% across entire zone. • 90% survival rate of all plantings at end of Year 5.

MZ	Year 1	Year 2	Year 3 – 4	Year 5
4	• Weed control of all weeds including priority and environmental weeds. Weed cover no greater than 30% across entire zone. • Revegetation of native species completed across the entire zone as per Table 3. 80% survival rate of all plantings at end of Year 1. • All rubbish removed	• Weed control of all weeds. Weed cover no greater than 20% across entire zone. • 90% survival rate of all plantings at end of Year 2. Replacement plantings* with all strata to meet densities in Table 3, if required.	• Weed control of all weeds. Weed cover no greater than 10% across entire zone. • 90% survival rate of all plantings at end of Year 4. Replacement plantings with all strata to meet densities in Table 3, if required.	• Weed control of all weeds. Weed cover less than 5% across entire zone. • 90% survival rate of all plantings at end of Year 5.

*Maintenance replanting is to replace plants by the same species, or where that species is not available, with the same growth form (i.e. tree for tree, etc.) and must not decrease species diversity. Any new species must be from the community being emulated and of local provenance.

6. Implementation Schedule and Cost

The estimated cost of implementing this VMP over a five-year period is approximately **$1,070, 176** (ex GST) (Table 5). Costs may vary significantly over consecutive years of management according to the response to the weed control techniques. Rates and costs are based on estimates of current standard commercial rates and there is potential for variation across the sector. On-going maintenance costs (labour and materials) may also increase over time with inflation. Other assumptions that have been made regarding estimation of costs have been outlined below.

A minimum standard for the implementation of the VMP for the first 5 years is provided below in Table **5**. This schedule is indicative but sets out the minimum number and timing of visits. This may be amended according to timing of when the VMP works start, however, the performance criteria must be met, and any changes should aim to meet these targets. It should be noted that specific activities must occur during the correct seasons, i.e. planting should only occur during the colder months when temperatures are mild as.

Monitoring reports are required every six months and annually (see Section 5).

6.1 Weed control treatments

Bush regeneration contractors will implement this VMP, including the weed management treatments. These works have been estimated to cost **$2,000** for a team of four bush regenerators, including a supervisor, per day. The cost of bush regeneration works includes the costs of herbicide, vehicles and equipment which are required to implement the VMP.

6.2 Revegetation treatments

Bush regeneration contractors will implement this VMP, including the planting treatments. These costs have been budgeted at an estimated **$3.50 per tree and shrub** including planting, tree guards, water crystals and initial watering, and an estimated **$2.50 per grass, sedge and groundcover** including planting, water crystals and initial watering. Initially 193,358 plants will be required at an estimated cost of **$489,923**. An attrition rate of 10% has been assumed, with replacement estimated at a cost of **$48,992**.

6.3 Site Preparation

Site preparation works are necessary for the successful establishment of revegetation works in areas of low resilience. The extent of preparation will depend on the site condition.

Preparation works should be undertaken prior to revegetation. The area to be revegetated will undergo major disturbance prior to revegetation, hence will require major site preparation works (e.g. topsoil application) to make suitable for revegetation. The application of topsoil has not been costed as part of this VMP. Topsoil importation will be at the cost of the developer or civil construction company.

6.4 Planting

Revegetation should be conducted in the colder months (early spring or early autumn) to prevent shock to young saplings and reduce exposure to frost or drought conditions. Water crystals or wetting agents

should be added to each plant hole. This will increase the water holding capacity of the soil and reduce watering schedules especially in difficult to access locations. All plants will be irrigated when installed to increase survival rates of revegetation. Depending on the weather, irrigation needs to be undertaken for at least 4 - 6 weeks following planting to aid establishment of the plants.

Tree guards will need to be installed on tubestock plantings in Management Zone 3 to protect tree and shrub seedlings from extreme weather (frosts and heat), herbivorous grazing and herbicide drift during maintenance. The requirement for tree guards will be determined by the bush regeneration contractor during the establishment phase. If used, bio-degradable tree guards are recommended to protect the seedlings, especially those in the more exposed restoration zones. Tree guards have been included in the costings.

Planting of tube-stock for trees and shrubs species and Hiko or Viro cells for grasses and other groundcover species are the preferred methods for revegetation works. Planting densities are provided in Table 3. Herbaceous species will be planted in clumps rather than scattered individuals. The recommended species planting list is available in Appendix C.

Table 5: Indicative implementation costs

Treatment	Preliminary	Establishment	Maintenance					TOTALS
			Year 1	Year 2	Year 3	Year 4	Year 5	
Revegetation								
Seed collection, cleaning, storage	$16,864							**$16,864**
Site Preparation		$8,425						**$8,425**
Jute Matting / Mulch		$116,100						**$489,923**
Tubestock, supply and install		$489,923						**$398,240**
Replacement tubestock, supply and install			$24,496	$24,496				**$48,992**
Irrigation		$37,638						**$37,638**
Weed control								
Preliminary / primary	$25,850							**$25,850**
Establishment / secondary		$113,975						**$113,975**
Maintenance			$33,280	$33,280	$33,280	$33,280	$33,280	**$166,400**
Associated costs								
Supervision of Earthworks		$16,610						**$9,530**
Monitoring & Reporting	$4,200	$4,200	$4,200	$4,200	$4,200	$4,200	$4,200	**$29,400**
TOTALS	**$46,914**	**$786,871**	**$61,976**	**$37,480**	**$37,480**	**$37,480**	**$37,480**	**$1,070,176**

Table 6: Implementation schedule

Treatment	Year 1				Year 2				Year 3				Year 4				Year 5			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Civil Works																				
Bulk earthworks and channel construction																				
Install fencing informational signage																				
Revegetation																				
Seed collection, cleaning, storage																				
Site preparation																				
Install jute matting within management zones one, three and four																				
Tubestock, supply and install																				
Replacement tubestock, supply and install																				
Irrigation																				
Weed control																				
Primary																				
Secondary																				
Maintenance																				
Other works																				
Monitoring and reporting																				

7. References

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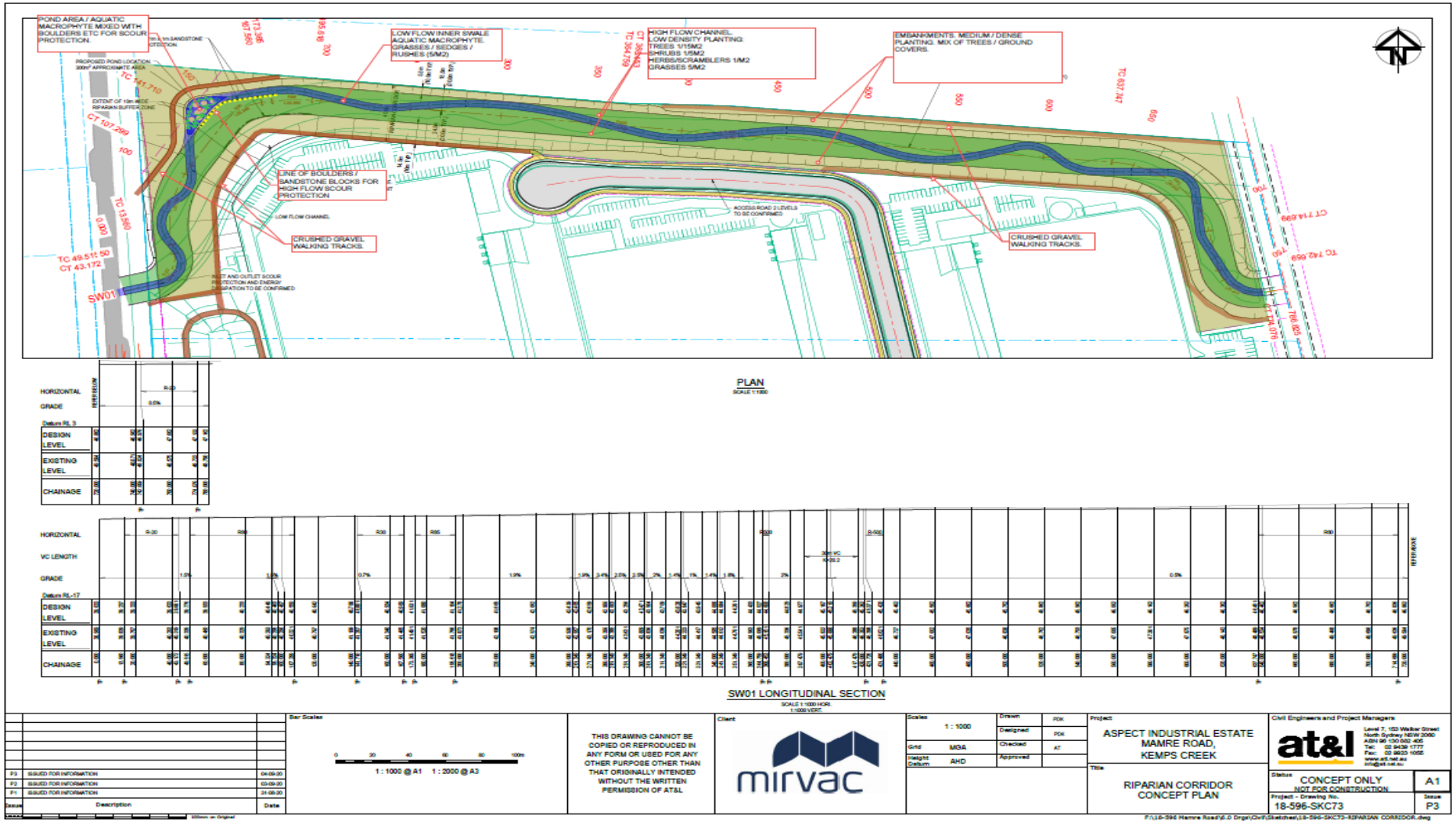
Appendix A Riparian Channel Civil Designs



Appendix B Flora Species

Table 7: Flora species recorded in the VMP area

Scientific Name	Common Name	Exotic (*)	Priority Weed	WoNS
Araujia sericifera	Moth Vine	*	PW	
Bromus catharticus	-	*		
Casuarina glauca	Swamp Oak			
Cirsium vulgare	Spear-thistle	*	PW	
Chloris gayana	Rhodes Grass	*		
Cyperus gracilis	Slender Flat Sedge	*		
Hypochaeris glabra	Smooth Cat's Ear	*		
Lepidium bonariense	-	*		
Oxalis perennans	-	*		
Paspalum dilatatum	Dallas Grass	*	PW	
Pennisetum spp.	-	*		
Plantago lanceolata	Plantain	*		
Rumex crispus	Curly Dock	*		
Senecio madagascariensis	Fireweed	*	PW	WoNS
Solanum nigrum	Blackberry Nightshade	*		
Trifolium repens	White Clover	*		
Verbena bonariensis	Verbena	*		

Appendix C Recommended Planting List

Table 8: Recommended planting list

Life form	Scientific Name	Common Name	MZ1 – Low Flow Channel	MZ2 – Pond area	MZ3 – High Flow Channel	MZ4 - Embankment
Tree/Canopy Species	*Angophora floribunda*	Rough-barked Apple			X	X
	Angophora subvelutina	Broad-leaved Apple			X	X
	Casuarina cunninghamiana subsp. cunninghamiana	River Oak			X	X
	Casuarina glauca	Swamp Oak			X	X
	Eucalyptus amplifolia	Cabbage Gum			X	X
	Eucalyptus moluccana	Grey Box			X	X
	Eucalyptus tereticornis	Forest Red Gum			X	X
Shrub Species	*Acacia floribunda*	White Sally			X	X
	Acacia parramattensis	Parramatta Wattle			X	X
	Breynia oblongifolia	Coffee Bush			X	X
	Bursaria spinosa	Blackthorn			X	X
	Melaleuca decora	-			X	X
	Melaleuca styphelioides	Prickly-leaved Tea Tree			X	X
	Ozothamnus diosmifolius	Rice Flower			X	X
	Trema aspera	Native Peach			X	X
Sedges, Rushes, Reeds and Grasses	*Carex appressa*	Tall Sedge	X	X	X	X
	Cyperus gracilis	Slender Flat sedge	X	X	X	X
	Dichelachne micrantha	Shorthair Plumegrass			X	X

Life form	Scientific Name	Common Name	MZ1 – Low Flow Channel	MZ2 – Pond area	MZ3 – High Flow Channel	MZ4 - Embankment
	Echinopogon caespitosus var. caespitosus	Tufted Hedgehog Grass			X	X
	Echinopogon ovatus	Forest Hedgehog Grass			X	X
	Eleocharis sphacelata	Tall Spike-rush	X	X	X	X
	Entolasia marginata	Bordered Panic			X	X
	Entolasia stricta	Wiry Panic			X	X
	Gahnia clarkei	Tall Saw-sedge	X	X	X	X
	Imperata cylindrica var. major	Blady Grass	X		X	X
	Isolepis inundata	Swamp Club-sedge	X	X	X	X
	Juncus kraussii subsp. australiensis	Sea Rush	X	X	X	X
	Juncus usitatus	Common Rush	X	X	X	X
	Lomandra filiformis	-			X	X
	Lomandra longifolia	Spiny-head Mat-rush			X	X
	Lomandra multiflora subsp. multiflora	-			X	X
	Microlaena stipoides var. stipoides	Weeping Meadow Grass			X	X
	Oplismenus imbecillis	Basket Grass			X	X
	Paspalidium distans	-			X	X
	Schoenoplectus mucronatus	Club Sedge	X	X	X	X
	Schoenoplectus validus	River Club-sedge	X	X	X	X
	Themeda australis	Kangaroo Grass			X	X
Groundcover Species (~0-	*Centella asiatica*	Indian Pennywort			X	X
	Cheilanthes sieberi subsp. sieberi	Poison Rock Fern			X	X
	Commelina cyanea	Creeping Christian			X	X

Life form	Scientific Name	Common Name	MZ1 – Low Flow Channel	MZ2 – Pond area	MZ3 – High Flow Channel	MZ4 - Embankment
1.5 m) & Vines/Scramblers	*Desmodium varians*	Slender Tick-trefoil			X	X
	Dichondra repens	Kidney Weed			X	X
	Geranium solanderi	Native Geranium			X	X
	Glycine clandestina	Twining Glycine			X	X
	Glycine microphylla	Small-leaf Glycine			X	X
	Glycine tabacina	-			X	X
	Hardenbergia violacea	Purple Coral Pea			X	X
	Plectranthus parviflorus	Cockspur Flower			X	X
	Solanum prinophyllum	Forest Nightshade			X	X

Appendix D Techniques and Specifications

Various weed control techniques are required to control weed infestations in natural areas. Weed infestations usually consists of a number of different weed species, densities and weed forms.

Weed control techniques are summarised below. These techniques are guidelines only. An adaptive weed management program should include a combination of different weed control techniques and involves consideration of monitoring and reporting outcomes and potential changes to the weed management program based on those result.

Depending on the area, density and priority, objectives of weed control may change. For example, it may be more cost-effective to contain zones with a high weed infestation but with a low risk of spreading into adjacent habitats or impacting on threatened species or communities, rather than attempting to eradicate all weeds. Alternatively, it is cost effective in the long-term to eradicate weeds in small infestations before they become larger and more widespread.

To effectively manage the issue of weed invasion an understanding of the types of vectors responsible is important. The movement of wind and water is often considered the greatest mode of weed dispersal into new habitats. Water is commonly responsible for the transport of weed propagules along the riparian corridors and contributes to weeds establishing downstream watercourses. However, there are many options for weed dispersal by vectors other than wind or water. A list of some of the potential weed vectors and examples of weeds species is shown the table below.

Table 9: Weed vectors table

Vector	Weed Examples	Description	Ecological Implications
Watercourse	Trad	Fleshy stems can be transported along watercourse	Widely dispersed into native and disturbed environments
Drain	Moth Vine	Light feathery capsules float on water	Widely distributed along creek lines and into downstream habitats
Wind	Pampas Grass	Very light seeds are windborne over long distances	Readily invades disturbed open habitats, particularly along road verges
Track	Cobblers Pegs	Burrs stick to animals and humans	Invades disturbed bushland along tracks and is carried into adjacent habitats
Birds	Privet, Blackberry, Lantana	Edible fruits are dispersed over large areas	Birds increase weed dispersal into new habitats
Mammals	Blackberry, Prickly Pear	Eat fruit or transport burrs on fur	Mammals spread seeds or burrs into new habitats
Humans	Cobblers Peg, African Lovegrass	Transport propagules on clothes and shoes	Humans spread seeds or burrs into new habitats

Hygiene protocols

A strict hygiene protocol must be implemented to control the spread of weed propagules between habitats and the accidental introduction of invasive species into sensitive areas. Best management practices recommend work from should target areas of high native resilience to areas then move towards high weed infestation. Weed propagules may be spread on the clothes or boots of humans or in the soil on vehicles. It is important that all vehicles, especially earth movement, are thoroughly washed down before moving to a new site. This also applies to humans. Clothes must be free of weed propagules before entering a new site.

Principles of weed control within natural areas

Weed control programmes within natural areas follow the principles of bush regeneration including the Bradley Method and other techniques to promote natural regeneration as described in Buchanan (2000). These are summarised below:

- Where available, refer to best practice guidelines for individual weed species which may need to be adapted to a natural setting and ecological outcome
- Ensure correct plant identification – many weed species are difficult to identify because they resemble native species or typically occur in a vegetative (i.e. non-flowering) form.
- Limit the creation of bare patches of soil and soil disturbance in general, since this will encourage weeds to establish and grow – do not create unnecessary tracks with vehicles or other machinery;
- As a first option for weed control, consider methods that do not use herbicide (e.g. hand pulling and crowning) and which create very little soil disturbance;
- When using herbicides, use the least toxic chemical whenever possible and always follow the instructions;
- When working on or near drainage lines, use an approved herbicide for this environment;
- Refer to Australian Pesticides and Veterinary Medicines Authority (APVMA) website (www.apvma.gov.au) for information on off-label permits;
- Apply herbicides when the plants are actively growing and prior to seed set to achieve the best results;
- Regularly monitor for new infestations; and
- Where woody weeds are providing habitat for native birds and animals, use the drill and fill technique to enable the same structure to remain in situ while the tree or shrub dies – this will enable the plant to provide shelter for a period of time, while giving the birds and animals a chance to move on of their own accord. Where this is not practical considering the size of an infestation consider a mosaic approach to control.

Integrated Weed Management

Integrated weed management may use a combination of any of the following techniques; mechanical, chemical, manual handling and biological methods. According to the Department of Primary Industries" (DPI) *Noxious and environmental weed control handbook* the best management practices considers a long-term perspective and does not rely solely on herbicide application (DPI 2010).

Weed control can be broken down into three main categories:

- **Primary Treatment:** the first weeding of the site.
- **Secondary Treatment:** the second weeding of the site which may be very intensive as all regrowing/germinating weeds should be removed before they seed and out-compete native plants.
- **Maintenance/Follow-up Treatment:** every re-weeding of the site after the secondary phase.

The first time an area is weeded (primary treatment) can be labour intensive and time consuming and depending on the target species and site conditions. It may take over several months to complete for one species (Buchanan 2009). In areas of high weed infestation and with no native resilience and/or native plants present, primary weeding may be accelerated as preparatory works for revegetation. However, in areas where native plants may occur, primary weeding should be undertaken at a pace that assists with the natural regeneration of the site.

Secondary treatment of an areas can take longer than primary treatment as new species can be present that more difficult to treat than the original weed (Buchanan 2009). Secondary treatment needs to be carefully timed to:

- Prevent weeds from setting seed;
- Suppress vegetative regrowth while plants are still small; and
- Allow native plants to recruit without being smothered or out-competed by weeds.

However, secondary treatment should allow enough time for the soil profile to recover following primary treatment and the establishment of weed growth from the soil seed bank.

Maintenance treatment refers to weed control that is carried out after the secondary treatment (Buchanan 2009). The goal of follow-up treatments is to remove weedy recruits so that native species can re-colonise the area; frequent visits are likely to be needed at first, although the amount of time and resources used should gradually decrease through time.

Chemical Weed Control – Herbicide Application

Herbicide Selection

Any herbicide used in weed management activities must be registered for use in the appropriate situation for the species being treated. It is the responsibility of the weed control operator to check that the herbicide intended for use is registered at the time of control. Where herbicide application is used, many hardy species may require re-treatment between six and twelve months after the initial treatment to ensure mortality of individual plants.

Spot Spray Application

Hand operated spray gun connected to a knap-sack or vehicle (e.g. truck, ATV, etc.) mounted herbicide storage tank is used to direct diluted herbicide spray to defined areas. When applied under correct conditions, individual plants or parts of plants may be treated using this method with minimal risk of overspray and non-target damage. Spot spraying is an effective and targeted way of treating weeds on a landscape level, though non-target damage is possible on an individual plant level. This can be mitigated in some situations through the use of selective herbicides.

This method is most suitable for low growing or juvenile grasses, herbs, and woody weeds that have copious, but compact, foliage. In most cases, spot spraying should be undertaken after new growth is produced but before flowering. Because the plant is left *in situ* after spraying, there is potential of seed to mature on the plant if spraying is left to late. In some cases the target plant may also take weeks or months to die off.

Boom Spray Application

A nozzle spray apparatus is connected to the rear of a vehicle-mounted herbicide storage tank to apply a diluted herbicide application. Where terrain is suitable for vehicle access, large areas are typically treated using this technique (e.g. open paddock situation). Boom spraying is a fast and economical way of treating large areas of weeds on a landscape scale. However, boom spraying does not allow the operator to avoid individual plants and so has a high potential for non-target damage. This can be mitigated in some situations through the use of selective herbicides. This method is most suitable for large areas of weed infestation without any native regeneration potential.

Figure 4: Boomless spray nozzle attached to a truck

Splatter Gun Application

Individually operated splatter or gas guns are connected to a 5L backpack which may be equipped with a canister of LPG. The handgun applicator is charged with a dose of herbicide and a splatter of low volume-high concentration herbicide solution is applied. The LPG forces the herbicide out of the pack up to several meters distance; however, instead of a fine spray mist, as in the case of spot spray application, the herbicide is applied in a large droplet form leaving a line of herbicide on the plant.

"Stripes" of herbicide are applied across large plants instead of coating all parts of the plant in a fine mist.

Splatter guns are very effective as the application of the herbicide is more directed and produces limited off target damage. This treatment provides a good alternative to spot-spraying where access is difficult or materials have to be carried in, as they use much less water. Splatter guns can also provide an alternative to mechanical removal or herbicide treatments requiring access to the stem of the plant (e.g. cut and paint, drill and frill, etc.) amongst dense, low growing woody weeds such as Bitou and Lantana. This treatment is not effective on vegetation with sparse foliage cover.

Cut and Paint

In the cut and paint treatment, the stem of the plant is cut all the way through and herbicide applied to the stump. The plant should be cut as close to the base as possible, below any branches and the cut should be horizontal. The remaining stump should not exceed 10mm in height. The tools required to make the cut may be a handsaw, secateurs or chainsaw. Any dirt on the stump needs to be removed and the herbicide needs to be directly applied within 30seconds to the stump using a dabber bottle. Some plant species re-sprout after this treatment and follow up work may be required to kill the plant effectively. A non-specific herbicide should be used for the cut and paint method.

The cut and paint method is suitable for the control of woody weeds, large herbaceous weeds and vines/climbers. When done with vines/climbers it is referred to as „skirting". This treatment is commonly used when the biomass is to be removed from the site following the primary weed control. It is most suitable for plants with a small diameter at the base and a single stem or trunk. Given that to be effective the herbicide has to be applied as soon as possible after cutting, this method is not effective where extensive cutting is required.

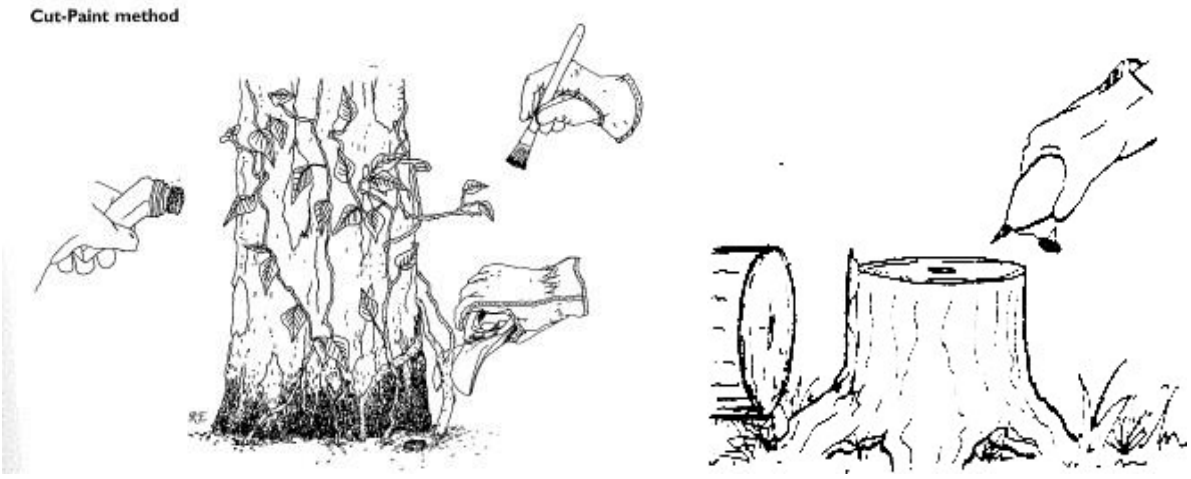


Figure 5: The cut and paint method (Muyt 2001, Sydney Weeds Committee 2013)

Drill and Fill

The drill and fill method involves drilling a hole into the base of a tree below any branches with a hand drill using a 9 or 10mm drill bit at an angle of 40-60^0. The hole should only penetrate through the sap wood and not through to the heart wood. The hole should then be filled immediately with the appropriate herbicide. An eye dropper or a squeeze bottle with a narrow nozzle can be used to fill the hole. If the plant re-sprouts follow up work will be required to kill the plant. A non-specific herbicide should be used for this treatment method.

The drill and fill method is suitable for woody weeds with a large diameter at ground height or for plants with multiple stems at the base. This control method is useful where dead trees are intended to be left standing as habitat trees and would be a suitable method for the eradication of large Camphor Laurels or Broad-leaved Privet trees, providing the dead trees do not present a hazard to the public at a later stage.

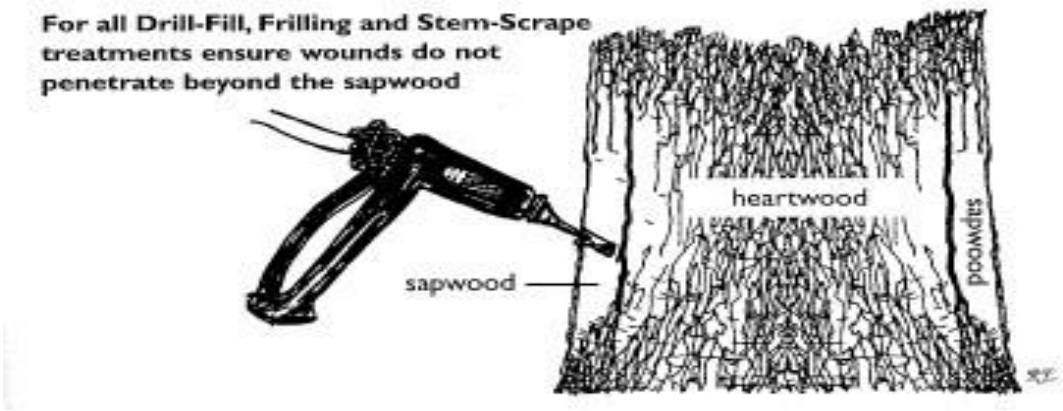
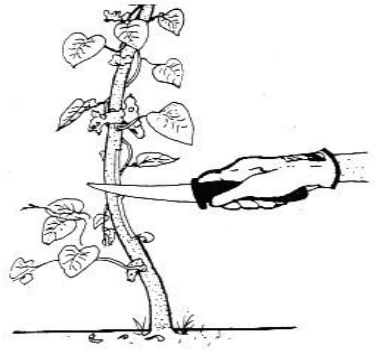


Figure 6: Drill and fill method for large woody trees (Muyt 2001)

Stem Scrape

The stem scrape method involves using a sharp knife to scrape back the top layer of bark from the vine 20-30cm long. An appropriately mixed herbicide needs to be applied immediately (within 30 seconds) using a dabber bottle. The root system of the plant should not be disturbed until the plant has died as this may reduce the effectiveness of the herbicide. Skirting method may be used in conjunction with stem scrape. This method is especially important to remove large infestations of vines within the canopy layer. Skirting involves cutting the vines within the canopy at chest height. This will allow an increase in the amount of light and resources to the canopy trees through the reduction of vine biomass



The stem scrape method is most useful when used to treat species that need greater herbicide coverage than can be provided by the cut and pain method (e.g. Green Cestrum, Ochna), or a species that has reproductive material (e.g. tubers) that must be poisoned as well (e.g. Madeira Vine). For the latter, this is especially important if it is not possible to collect the reproductive material. However, for most woody weeds and vines, this method is not necessary.

Figure 7: Stem scrape (Sydney Weeds Committee, 2013)

Manual and Mechanical Weed Control

This technique physically removes plants from the soil and depending on the weed species may require special conditions for disposal (e.g. some noxious weeds must not be transported off-site and must be disposed of by deep burial). Manual treatment effectively removes the entire plant using hand tools such as shovels or the use of heavy machinery. This technique is most productive when treating small area infestations and successfully removes the entire plant effectively preventing future seed set.

Certain parts of plants may also be targeted for removal to prevent flowering or seed set (i.e. post flowering but prior to mature seed being released from the fruit or seed head). Re-treatment may be required if mature plants have previously released viable seed into the soil which may germinate post soil disturbance.

To reduce the risk of localised increased fuel load no debris should stockpiled on site.

Hand Removal / manual methods

Hand removal of weeds involves pulling the plant as close to the base as possible and ensuring the entire tap root is pulled out of the soil. This usually results in soil disturbance and the soil should be replaced and compressed to prevent further weed invasion.

The successful hand removal of some other weeds may require the removal of the plant's roots, bulbs or tubers. This method includes digging and crowning with the use of a hand mattock, knife or trowel. Crowning involves using a knife to cut the roots around the crown of the plant.

The hand removal or pulling of weeds is suitable for many species of weeds as long as they have a shallow root system. This includes woody weeds, grasses and herbaceous species. It is useful for follow up work on woody weeds to control seedlings

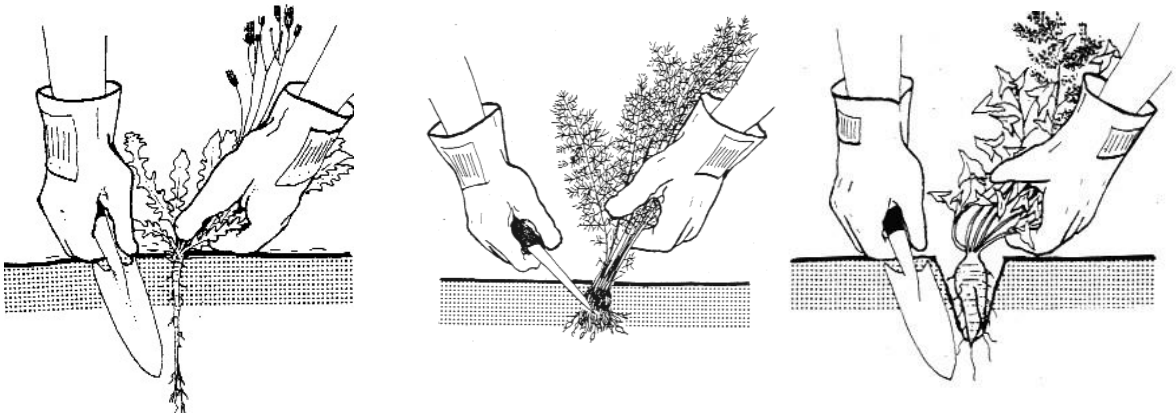


Figure 8: Hand pull (left), crown cut (middle) and rhizome / tuber trace (right) (Sydney Weeds Committee 2013)

Mechanical Removal

This technique physically removes or destroys individual plants via a process utilising large machinery or chainsaws. The use of large-scale machinery can be extremely successful for the localised eradication of dense infestations of woody weed species such as African Olive and Blackberry.

Weeds may be grubbed or raked out, and then removed from site or mulched *in situ*. Species such as African Olive will resprout and will require follow up treatment with herbicide.

Mechanical removal is most effective with areas of high weed density, especially with woody weeds where herbicide spray is not practical. Where machinery access is possible, this is preferred as it has the added benefit of being able to mulch the woody weeds *in situ*. However, in creek lines or other steep sites chainsaws can be used to cut down woody weeds. When using chainsaws in this way it is recommended that only the outer layer of woody weeds and the smaller woody weeds in the interior be completely cut down. This will provide access into the interior. The larger woody weeds in the interior of the area should be treated by drill and frill and left standing. This allows for access through the creek line for follow up treatments. It is recommended to leave woody debris *in situ* or spread out loosely. The creation of large piles of woody debris is not recommended as it can impede follow up.

Generally, work sites where this technique is used requires a maintenance component to monitor and control the potential reshooting root material, the germination of residual seed of the weed species and the colonisation of the site by other weed species. In some circumstances the control program requires follow up erosion, weed control, and revegetation programs to mitigate the risk of the aforementioned issues.

Figure 9: Tritter machine mulching African Olive

Slashing

Slashing involves removing some or all of the vegetative portion of a plant using mechanical blades. The use of machine drawn slashers or on a smaller scale individually operated brush cutters can prove extremely successful in reducing the seed load of key species.

The success of this technique is dependent on the timing of the slashing coinciding with the early flowering of the key species, in turn removing the flower heads prior to seed set. The timely use of slashing when combined with the use of herbicide application can provide an extremely cost effective and environmental favourable program of weed control. Slashing reduces the vegetative material of a plant, encourages new growth and removes dead thatch. All these factors make herbicide spraying after slashing more efficient, effective and economical. It should be noted that as slashing is indiscriminate it

can result in non-target damage. However, unlike herbicide which kills the entire plant slashing only removes the top portion and so can be used around native grasses especially with less risk. This can be further mitigated through setting of the slashing height and timing of the slashing to avoid native seed set.

Figure 10: Slashing Paspalum amongst native grasses

Biological Control

Biological control agents may be used for the management of some weed species. These control agents may have limited effectiveness due to their sensitivity to environmental conditions, and so the efficacy of this control technique depends on the ability of the control agent to establish self-perpetuating populations.

Biological control agents are generally best applied to high density weed infestations and the control agents (eg, Blackberry Rust) may need to be actively bred and reapplied regularly to counter natural mortality and periods of dormancy in target species.

Release of biological controls is particularly effective in treating weed populations in areas of high environmental sensitivity or to assist in the management of the identified weeds as part of a larger scale control program. These agents need to demonstrate high host specificity and pose little or no threat to other desirable plant species. If so, this is an ideal option for use in areas of threatened species or within sensitive habitats such as along water courses. The use of biological controls is strongly regulated to prevent the introduction of pests or diseases which impact on non-target species.

Herbicide Information

Herbicides

Herbicide application often forms an important component of an integrated weed management approach and can be the most appropriate method to control some weed species. Many herbicides are harmful not only to plants, but also fauna, particularly fish and amphibians.

Any herbicide used in weed management activities must be registered for use in the appropriate situation for the species being treated. These registration requirements are provided on the product label or an „Off-label Permit". Some species which are known to be difficult to control may be treated using combinations of herbicides registered for use in „Off-label Permits" which are issued by the Australian Pesticides and Veterinary Medicines Authority (APVMA). It is the responsibility of the weed control operator to check that the herbicide intended for use is registered at the time of control.

The situation of control should be carefully considered to ensure correct herbicide usage. In all cases the application technique must be aligned to the registration requirements of the individual herbicides selected for the weed control program. Where a sensitive environment coincides with weed infestation only herbicides suitable for use in sensitive areas (as dictated by the product registration) should be used. For example, to target a weed infestation in close proximity to water courses such as a creek line, a product such as Roundup® Biactive® could be used as it is registered for use in this type of situation.

Residual herbicides can be present in the soil profile for several months post application to reduce the incidence of regrowth of the target weed species. A residual selective herbicide would not, however, be appropriate if plans for the area involved revegetation, particularly with species intolerant to the herbicide. This would pose a serious threat to rehabilitation maintenance works where the area was to be revegetated with species which are susceptible to herbicide impact. Application of a residual herbicide may reduce recruitment of these species, further compounding the maintenance issues. In this situation a non-residual herbicide would be recommended to reduce the impact on establishing vegetation.

Herbicides fall into two main categories with regard to their impact on particular plants

- Non-selective herbicides which will, at appropriate rates, kill all plants. Glyphosate is a non-selective herbicide.
- Selective herbicides which will target either grass (monocot) species or broad-leaf (dicot) species.

Herbicide use should occur during the active growing season for plants to encourage the chemical uptake into the plant. Where herbicide application is used, many hardy species may require retreatment between six and twelve months after the initial treatment to ensure mortality of individual plants. Off target damage is common with herbicide use and consideration should be given to the following factors to avoid this damage.

- Correct identification of target species
- Spray drift in high winds
- Environmental conditions at time of application

A number of selective herbicides have been approved for grasses and for broad-leaf species in the NSW Department of Primary Industries (DPI) *Noxious and environmental weed control handbook.*

These selective herbicides represent a range of environmental toxicities and the Material Safety Data Sheets (MSDS) should be referred to in each instance. For instance, Metsulfuron-methyl poses a low risk to the environment, while Triclopyr is considered to be relatively toxic and has the potential to pose

a moderate risk to the environment. Dimethylamine salt is in the same category as triclopyr, but is moderated by mixing it with metsulfuron-methyl.

Registration and records of any herbicide use must be kept in accordance with the NSW *Pesticide Regulation 2009*.

Herbicides impact on ecosystem

The correct training and appropriate application of herbicides must be followed at all times. There is a high risk of ecological impacts associated with use of herbicides. These risks include accidental death of plants due to spray-drift or due to incorrect handling technique or sensitive plants. There is also evidence that there are indirect impacts on microbats due to herbicide poisoning and reduced numbers of prey items for microbat species. Where possible consider alternative methods to herbicide use.

Staff Training

All weed control operators must be properly trained and hold required certification e.g. ChemCERT® and comply with requirements of the Pesticides Regulation 2009 (NSW) and Pesticides Act 1999 (NSW).

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APPENDIX O

Flora and Fauna Management Plan

Aspect Industrial Estate- Flora and Fauna Management Plan

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DOCUMENT TRACKING

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Template 2.8.1

Contents

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Abbreviations

Abbreviation	Description
All	All Site Personnel
BC Act	*Biodiversity Conservation Act 2016*
DPIE	Department of Planning, Industry and Environment
EP&A Act	*Environmental Planning and Assessment Act 1979*
FFMP	Flora and Fauna Management Plan
PM	Project Manager
SE	Site Ecologist
SS	Site Supervisor
SSD	State Significant Development

1. Introduction

1.1 Consent

SSD-10448 has received the Response to Submissions (RTS) from the Department of Planning, Industry and Environment (DPIE) for the development of the Aspect Industrial Estate (Lots 54 to 58 DP 259135) (Figure 1).

The preparation of a Flora and Fauna Management Plan (FFMP) has been requested by Penrith City Council. This FFMP has been prepared for the associated construction works for the proposed development, such that it:

- identifies measures to protect the environment
- defines roles and responsibilities during proposed works
- identifies any external approvals needed
- identifies consultation and communication needs
- describes the monitoring and reporting regime.

The FFMP has been prepared based on the findings of the Biodiversity Development Assessment Report (BDAR) (ELA 2020) and in accordance with the NSW Department of Planning, Industry and Environment (DPIE) *Code of Practice for Injured, Sick and Orphaned Protected Fauna 2011.* The FFMP will be revised and necessary approvals sought if the scope of works change.

1.2 Project Background

1.2.1 Biodiversity Values

1.2.1.1 Vegetation Communities

Two vegetation communities have been identified within the development site, which are both listed Threatened Ecological Communities (TECs) under both the *Biodiversity Conservation Act 2016* (BC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The vegetation communities present, associated Plant Community Type (PCT) and conservation listing are outlined in Table 1 below and shown in Figure 1.

Table 1: Vegetation communities within the development site

Vegetation Community	PCT ID	PCT Name	BC Act Listing	EPBC Act Listing	Area (ha)
River-flat Eucalypt Forest	835	Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats	Endangered	Critically Endangered	0.29
Cumberland Plain Woodland	849	Grey Box – Forest Red Gum grassy woodland on flats	Critically Endangered	Critically Endangered	0.84

1.2.1.2 Threatened Species

Potential habitat for a range of threatened species was identified within the development site, as outlined in Table 2.

Table 2: Potential threatened species habitat within the development site

Species	Common Name	BC listing	EPBC Listing	Potential Habitat within Development Site
Artamus cyanopterus cyanopterus	Dusky Woodswallow	E	E	Marginal foraging habitat present within the development site.
Circus assimilis	Spotted Harrier	V	-	Marginal foraging habitat present within the development site.
Daphoenositta chrysoptera	Varied Sittella	V	E	Marginal foraging habitat present within the development site.
Glossopsitta pusilla	Little Lorikeet	V	V	Marginal foraging habitat present within the development site.
Grevillea juniperina subsp. *juniperina*	Juniper-leaved Grevillea	V	-	Marginal habitat present within the development site.
Haliaeetus leucogaster	White-bellied Sea Eagle (Foraging)	V	-	Dams present within development site, which may present foraging habitat
Hieraaetus morphnoides	Little Eagle (Foraging)	V	-	Marginal foraging habitat present within the development site.
Ixobrychus flavicollis	Black Bittern	E	CE	One record within a 5 km radius of the development site, and dams present which represent marginal foraging habitat

Species	Common Name	BC listing	EPBC Listing	Potential Habitat within Development Site
Lathamus discolor	Swift Parrot (Foraging)	V	-	Marginal foraging habitat present within the development site.
Lophoictinia isura	Square-tailed Kite (Foraging)	V	-	Marginal foraging habitat present within the development site.
Marsdenia viridiflora subsp. *viridiflora - endangered population*	-	E2	-	Marginal habitat present within the development site.
Marsdenia viridiflora R. Br. subsp. *viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas*	-	E	-	Marginal habitat present within the development site.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	-	Marginal foraging habitat present within the development site.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat (foraging)	V	-	Marginal foraging habitat present within the development site.
Miniopterus australis	Little Bent-winged Bat (Foraging)	V	-	Marginal foraging habitat present within the development site.
Miniopterus orianae oceanensis	Large Bent-winged Bat (Foraging)	V	-	Marginal foraging habitat present within the development site.
Myotis macropus	Southern Myotis	V	-	Potential roosting habitat present within the development site. (hollow-bearing trees).
Neophema pulchella	Turquoise Parrot	V	-	Marginal foraging habitat present within the development site.
Ninox strenua	Powerful Owl (Foraging)	V	-	Marginal foraging habitat present within the development site.
Persicaria elatior	Tall Knotweed	E	V	Marginal habitat present within the development site.
Petroica boodang	Scarlet Robin	V	-	Marginal foraging habitat present within the development site.
Petroica phoenicea	Flame Robin	V	-	Marginal foraging habitat present within the development site.
Pimelea spicata	Spiked Rice-flower	E	V	Suitable habitat not present due to the highly degraded nature and maintained understorey of the development site. However, a conservative approach was taken and this species was included in the targeted survey for the BDAR. No individuals were recorded.

Species	Common Name	BC listing	EPBC Listing	Potential Habitat within Development Site
Pteropus poliocephalus	Grey-headed Flying-fox (Foraging)	V	V	Marginal foraging habitat present within the development site.
Pultenaea pedunculata	Matted Bush-pea	V	V	Suitable habitat not present due to the highly degraded nature and maintained understorey of the development site. However, a conservative approach was taken and this species was included in the targeted survey for the BDAR. No individuals were recorded.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Marginal foraging habitat present within the development site.
Stagonopleura guttata	Diamond Firetail	V	-	Marginal foraging habitat present within the development site.
Tyto novaehollandiae	Masked Owl (Foraging)	V	-	Marginal foraging habitat present within the development site.

Only one threatened fauna species, *Myotis macropus* (Southern Myotis) was identified within the development site.

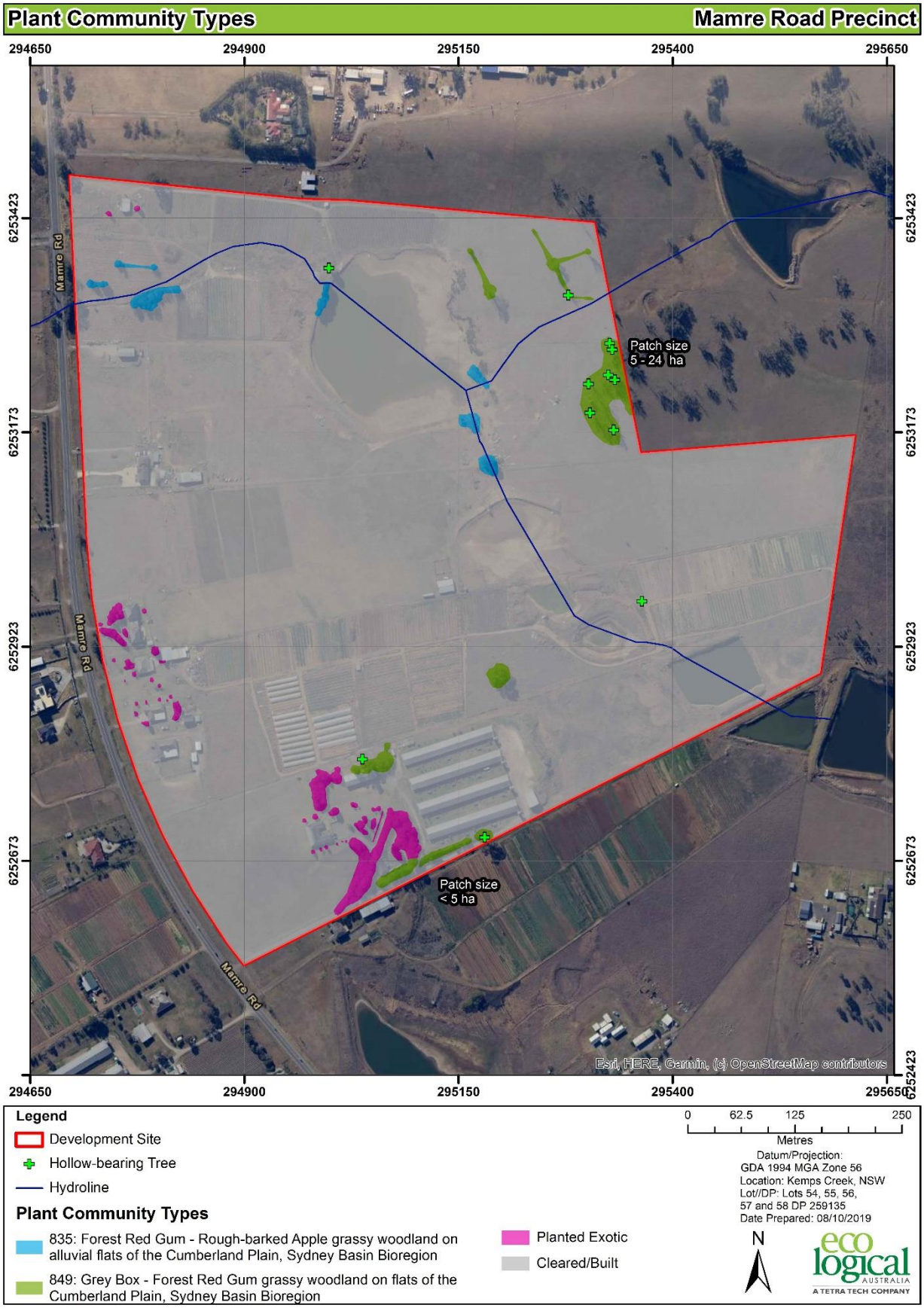

Figure 1: Plant Community Types within the development site

2. Implementation and Operation

2.1 Flora and Fauna Management Program

Safeguards to manage potential flora and fauna impacts are detailed in Table 3**,** together with who is responsible for their implementation and at what stage of works.

Person responsible for implementation: PM – Project Manager; SS – Site Supervisor; SE – Site Ecologist; SAE – Site Aquatic Ecologist; All – All Site Personnel

Table 3: Flora and Fauna Management Plan

Environmental Action	Timeframe	Monitoring	Responsible Person
OBJECTIVE: GENERAL			
All project staff and contractors will be inducted on the biodiversity sensitivities of the work site(s) and relevant safeguards prior to commencement.	Prior to works	Induction Records	PM
Work site will be delineated and 'no go' zones around the perimeter of the project site will be marked prior to commencement of works.	Prior to works	Weekly checklist, after rainfall or changed in site conditions	PM, SS
If required, Penrith City Council will be notified immediately of any complaints in relation to management of biodiversity issues.	As required	Complaint Register	SS
OBJECTIVE: REDUCE HARM TO BIODIVERSITY			
Future landscaping contractors to undertake an environmental awareness induction prior to commencement of works within the study area.	Prior to works	Induction records, weekly checklist	SS, SE
Prior to clearance of the vegetation in the development area, collectable floristic material such as native species seed stock and woody fruit of all native species will be collected for use in landscaping works within the development site. Refer to Appendix H for further information.	Prior to works	Weekly checklist	PM, SS, SE
Survey efforts identified 12 hollow-bearing trees within the development site (Figure 1). The site ecologist it to be present during removal of identified hollow-bearing trees. Hollow-bearing trees should be removed in the following manner: • Check for fauna in the zone of disturbance before clearing • Remove all non-hollow bearing vegetation prior to the removal of the habitat trees	Prior to works	Weekly checklist	PM, SS, SE

Environmental Action	Timeframe	Monitoring	Responsible Person
• After clearing, re-check to ensure no fauna have become trapped or injured during clearing operations. Any fauna found should be safely located to nearby habitat. • Leave habitat tree standing for at least one night after clearing of non-hollow bearing trees to allow any fauna the opportunity to remove themselves after site disturbance. • Before felling the habitat tree, engage a climbing arborist to sectionally lop and lower branches one at a time. • Re-check after felling the habitat tree to ensure no fauna have become trapped or injured during clearing operations. Any fauna found should be safely located to nearby habitat. • If taking the habitat tree down in stages, the non-hollow-bearing branches should be removed before the hollow-bearing branches are removed. • Take care when moving equipment near vegetation to be retained. • Rather than mulching or burning cleared vegetation, logs from the felled trees should be retained and distributed into the proposed Vegetation Management Plan area where it would not be considered a fire hazard. This would provide additional potential habitat for ground dwelling fauna such as reptiles and small mammals. If native fauna is identified during clearance surveys within the project site, the Fauna Rescue and Release Procedure found in Appendix E must be adhered to.			
A short report detailing the pre-clearance and clearance works is to be provided to Penrith City Council within 10 days of completion.	During construction	Weekly checklist	PM, SE
The identified hollow-bearing trees should be replaced with an artificial hollow or nest box after removal or removed hollows should be placed within the Vegetation Management Plan area or nearby Council reserves (if requested by Penrith City Council). This is to be done under the direction of the Site Ecologist. If further hollows are identified during pre-clearance or clearance surveys and are proposed to be removed, the replacement with artificial hollows or nest boxes will be required. Three nest boxes for every tree hollow will be required.	During construction, completion of works	Weekly checklist	SS, SE
Ensure that no plant, equipment or stockpiles are positioned under the drip line of retained along the boundary of the development site trees.	During construction	Weekly checklist	SS, All
During any hollow-bearing tree removal, an experienced wildlife handler is to be present to re-locate any displaced fauna that may be disturbed during this activity. Any injured fauna is to be appropriately cared for and released on site where appropriate. Refer to Appendix E for further details.	During construction	Weekly checklist	SS, SE

Environmental Action	Timeframe	Monitoring	Responsible Person
The site ecologist is to be present during removal of identified hollow-bearing trees to relocate any identified fauna. If fauna is found on the construction site during construction works, stop work – all native fauna is protected. Do not touch animal but wait for it to leave. If injured fauna is found, the site ecologist is to relocate to the nearest local vet or call WIRES or a rescue agency. If a threatened fauna species is identified, stop works and notify Penrith City Council. Refer to Appendix F for further guidance.	During construction	Weekly checklist	All
To reduce the spread of pathogens and diseases, ensure Arrive Clean, Leave Clean Guidelines (Department of the Environment, 2015) are adhered to: • Ensure all clothing, hats, footwear, tools, equipment, machinery and vehicles are free of mud, soil and organic matter before entering and exiting bushland • Ensure any soil, plants or other materials entering the site are certified free of weeds and pathogens. A dedicated washdown location, at the entry/exit of the site is to be determined prior to construction works. If weeds or pathogens are known to be present within the development site, Appendix G must be adhered to.	During construction	Weekly checklist	SS, All
OBJECTIVE: REDUCE HARM TO AQUATIC BIODIVERSITY			
As part of the dam dewatering process, a number of steps are required to minimise harm to aquatic biodiversity. The aquatic fauna relocation must only be performed by a person with one of the following licenses/approvals: • Section 37 *Fisheries Management Act 1994* (for fish) • Biodiversity Conservation Licence – *Biodiversity Conservation Act 2016* (for turtles, frogs, wetland birds) • Animal Research Authority (issued by the Secretary's Animal Care & Ethics Committee). The Aquatic Ecologist undertaking the aquatic fauna relocation is to notify NSW Fisheries of the activity 48 hours prior to fish relocation (unless an agreement is in place), including locations of dewatered and relocation sites (see regional office contacts https://www.dpi.nsw.gov.au/contact-us/local-office). Fisheries require permits to be carried by the licensed ecologist, who should also display a sign clearly showing licence number (if working in public areas, especially when releasing fauna to local creek). Detailed aquatic fauna handling procedures are included in Appendix F.	Prior to dewatering commencing and during works	Weekly checklist	SS, SAE
OBJECTIVE: REDUCE SPREAD OF PRIORITY WEEDS			

Environmental Action	Timeframe	Monitoring	Responsible Person
Wash down equipment and vehicles prior to and after use, to manage the introduction and spread of weed propagules.	Prior to works, during construction	Weekly checklist	All
All weeds are to be treated prior to becoming an environmental threat according to best management practices.	During construction, completion of works	Weekly checklist	SS
OBJECTIVE: REDUCE POTENTIAL NOISE IMPACTS TO NATIVE FAUNA			
If practical, avoid simultaneous operation of noisy plant within discernible range of vegetation outside of the development site.	During construction	Weekly checklist	All
Works will only occur during the following times: Monday to Friday 7:00 am to 5:00 pm, Saturday 8:00 am to 1:00 pm. Works will not operate after sunset to minimise indirect impacts to threatened fauna species in proximity.	During construction	Weekly checklist	SS
Maximise the distance between noisy plant items and nearby residential receivers and potential fauna habitat.	During construction	Weekly checklist	All
Orient equipment such as offensive noise carriers away from residential receivers and potential fauna habitat.	During construction	Weekly checklist	All
Plant used intermittently is to be throttled or shut down when not required.	During construction	Weekly checklist	All

2.2 Structure and Responsibility

The organisation chart outlined in Figure 2 identifies the reporting lines for the key contractor and sub-contractor personnel responsible for environmental management, as well as the Penrith City Council interface. Details of personnel responsibilities are outlined in Table 4. Contact details for these personnel are included in Appendix C.

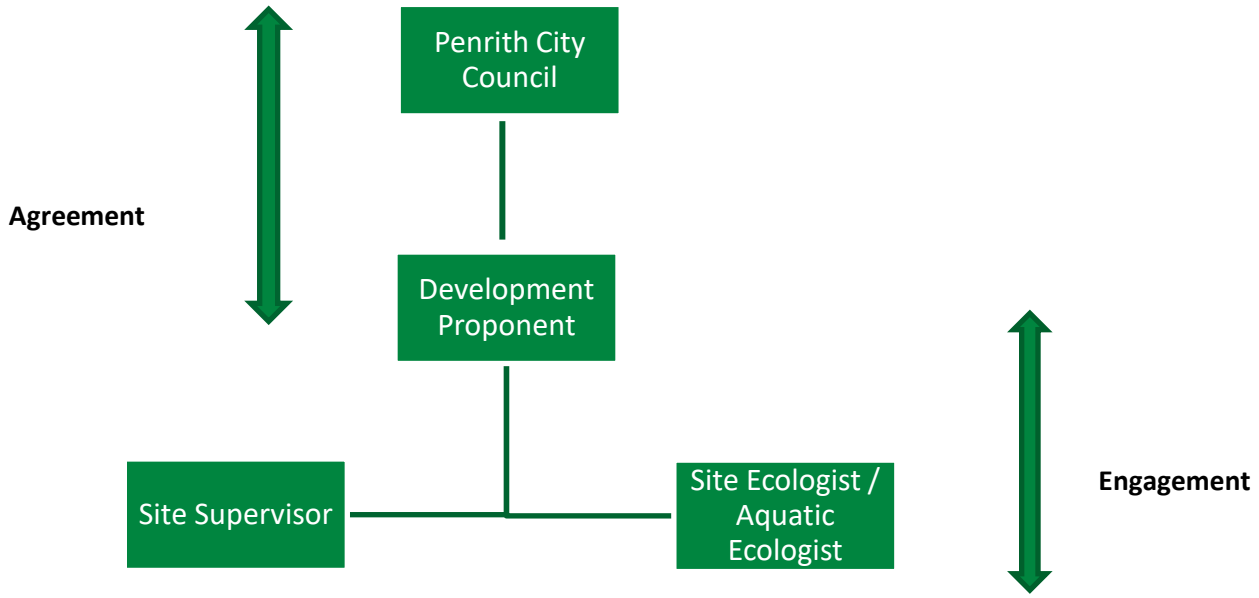

Figure 2 Project organisation chart

Table 4 Responsibilities of personnel

Role	Name, Position and Company	Responsibility
Project Manager	XXX **XXX**	• Reviews DA Conditions of Consent and FFMP. • Notifies Penrith City Council of changes to the project scope of works and updates the FFMP, if required. • Requires the contractor to adhere to the approved works. • Accountable for contractor's and subcontractor's environmental performance. • Reports any non-compliance to Penrith City Council.
Site Supervisor	XXX **Construction Contractor**	• Issues stop work orders, if required. • Records any community complaints (Appendix B) and notifies Project Manager. • Responsible for site management, FFMP compliance, including subcontractors. • Facilitates environmental induction and toolbox talks for site personnel. • Undertakes minimum of weekly environmental inspections (or after environmental conditions change). • Ensures proponent, Penrith City Council and community are notified of commencement of works. • Initiates corrective actions. • Reports FFMP non-conformances to the Project Manager. • Reports incidents. • Notifies the Project Manager if the FFMP needs revising.
Staff	**Construction Contractor** & **Ecologist Contractor**	• Comply with the FFMP. • Monitor and maintain controls. • Report breaches of the FFMP and potential / actual incidents to Site Supervisor • Report incidents. • Stop work and reports to Site Supervisor in the event of unexpected finds (e.g. native fauna). • Record any community complaints and notify the Site Supervisor (Appendix B).

Appendix A Team Induction Sign-Off Sheet

The following personnel certify the works will be carried out in accordance with the FFMP.

Name	Position / Company	Signature	Date
	Project Manager **TBC**		
	Site Supervisor / Contractor **TBC**		
	Staff **TBC**		
	Staff **TBC**		
	Staff **TBC**		
	Staff **TBC**		
	Staff **TBC**		
	Staff **TBC**		
	Staff **TBC**		
	Staff **TBC**		
	Staff **TBC**		
	Staff **TBC**		
	Staff **TBC**		
	Site Ecologist **TBC**		

Appendix B Complaints Recording Template

Date	Received by phone / email / letter	Complaint	Name	Address	Contact	Follow-up Actions	Date Complete

Appendix C Phone and Emergency Contact List

Organisation	Name	Position	Contact Number
Project Contacts			
TBC	TBC	Project Manager	XX
TBC	TBC	Site Supervisor	XX
TBC	TBC	Site Ecologist	XX
Penrith City Council		Natural Resources Department	02 4732 7777
Emergency Contacts			
Emergency Services	-	-	000
Mount Druitt Hospital	-	-	02 9881 1555
Environment Protection Authority	-	-	131 555
SafeWork NSW	-	-	131 050
Fire and Rescue NSW	-	-	02 9265 2999
State Emergency Services (SES)			132 500
WIRES	-	-	1300 094 737
Origin Energy			132 461
Energy Australia			133 466
Transgrid System Operations			1800 027 253 / 9284 300
Police Assistance Line (PAL)			131 444
Gas – Agility			131 909
Poisons Information			131 126
Telstra			132 200
RMS			132 213

Appendix D Site Biodiversity Inspection Checklist (Weekly)

Constructor Details	Site Supervisor - Environmental Checklist	
Project Title: Aspect Industrial Estate Site Inspected: Mamre Road, Kemps Creek		
Time & Date:	Weather:	
Biodiversity		
• All collectable floristic material such as native vegetation seed stock, woody debris and bush rock has been collected for use in landscaping or relocation to nearby Council reserves.		☐
• No plant, equipment or stockpiles are positioned under the drip line of retained trees.		☐
• The Site Ecologist was present during tree removal and displaced fauna has been relocated.		☐
Aquatic Biodiversity		
• Aquatic ecologist has been notified of intention to commence dam dewatering, DPI Fisheries notified of intended dewatering works and aquatic fauna relocation location has been chosen		☐
• Erosion and sediment controls downstream of dam water irrigation areas are installed correctly		☐
• Aquatic Ecologist completed capture and relocation of aquatic fauna		☐
Priority Weeds		
• Equipment and vehicles have been washed down prior to and after use, to manage the introduction and spread of weed propagules and pathogens in accordance with Appendix G.		☐
Noise		
• Simultaneous operation of noisy plants within discernible range of a sensitive receiver has been avoided.		☐
• The distance between noisy plant items and nearby residential receivers and potential fauna habitat has been maximised.		☐
• Equipment such as offensive noise carriers have been oriented away from residential receivers and potential fauna habitat.		☐
• Plants used intermittently have been throttled or shut down when not required.		☐
Inspected by:	Signature:	
Actions:	By Who:	Date Completed:

Appendix E Fauna Rescue and Release Procedure

The following Fauna Rescue and Release Procedure has been prepared in accordance with the NSW Department of Planning, Industry and Environment *Code of Practice for Injured, Sick and Orphaned Protected Fauna 2011.*

NATIVE FAUNA ENCOUNTER

If native fauna (including threatened fauna) is encountered during pre-clearance or clearance surveys, the decision tree outlined in Table 5 should be adhered to.

Table 5: Decision tree on how to respond to a native fauna encounter

Is the animal sick, injured, likely to have been injured or an orphan?			
YES		**NO**	
Is death imminent or highly likely regardless of the care available?		Is the animal creating a nuisance for the public or in a dangerous location?	
YES	**NO**	**YES**	**NO**
Arrange for the animal to be humanely euthanised by a suitably qualified person.	Rescue the animal and arrange for a vet or experienced fauna rehabilitator to assess it.	Advise people to avoid the animal or relocate it to a suitable nearby location.	Do not intervene.

RESCUING OF NATIVE FAUNA

If rescuing of the animal is chosen to be the most suitable option, the following must be adhered to:

- Assessment of all risk to fauna from environmental hazards and from capture.
- Confirmation that the correct rescue equipment for the type and size of fauna is at hand.
- Confirmation that a sufficient number of trained personnel for that species and size are present.

TRANSPORTATION OF RESCUED NATIVE FAUNA

When transporting the rescued native fauna to a veterinary surgery or rehabilitation facility such as WIRES, the following must be adhered to:

- Ensure transport methods and container sizes are appropriate for the species, size, strength and temperament of fauna. This may include incorporating padding walls and ensuring no ingestible surfaces are present. Containers must also be designed and positioned so breathing is not restricted.
- Transportation containers are kept as an appropriate temperature for the species (note a range of 25 – 27◦C is appropriate for most species and ages;31◦C is appropriate for unfurred joeys and 21◦C is appropriate for echidnas, platypuses and frogs).
- Transportation containers are well ventilated.
- Ensure containers holding snakes and bats include a visible warning label outlining the danger.

- Ensure transportation containers are not left in the back of uncovered utility vehicles or car boots.
- During transportation, adult fauna should not be fed or watered during trips lasting less than a few hours. Dependent young may require feeding during shorter trips.
- Attain approval by a veterinarian before use of medication to facilitate transport.
- Ensure fauna transport is the sole purpose of the trip.

RELOCATION OF NATIVE FAUNA

If the encountered native fauna does not require rescuing however, is required to be located outside of the construction site, the following must be adhered to:

- A suitable environment must be identified prior to relocation, this is one that:
  - Contains appropriate habitat and adequate good resources.
  - Is occupied by members of the same species.
  - Does not place the animal at a high risk of injury.
  - Is not outside of an area which the fauna would not normally cross (i.e. brush-tail possums rarely move more than 50 m however; wombats have a radius of approximately 50 km).

Appendix F Aquatic Fauna Handling Procedures

During dam dewatering, an aquatic ecologist should be on site to handle aquatic fauna in line with the following procedures.

CAPTURE

Fish are to be collected by hand nets during the dewatering process. This is most effective when the water is <0.3 m deep. Dissolved oxygen concentration will drop rapidly as water volume decreases, especially in warm water or if lots of fish are present. Larger bodied fish should be targeted first. Wetland birds will scavenge for small fish in the shallows (e.g. Gambusia). Most small fauna will likely remain uncaptured in the dam until the water becomes very shallow (especially eels and turtles). Eels are best captured by large hand nets in water <0.3 m deep, although they burrow into mud. When the water is extremely low, turtles and fish may head towards the intake pump (placed in deepest part). This area should be monitored to intercept fauna (e.g. stand in water next to intake). Turtles will burrow into mud and may require observation and rescue the following morning but can also move themselves to suitable nearby habitat if an escape ramp is graded. For safety, at least two people are required when wading and handling heavy tubs of water/fish up banks (excavator can dig access steps/ramp).

RELOCATE

Native fish healthy enough for relocation are to be contained and transported in an aerated tub/bucket/tank to an appropriate dam/lake/waterhole/creek. NSW Fisheries advise that the host location should be large enough to accommodate additional fish, especially predatory eels. If a large number of predatory fish such as Longfin Eels are captured during the aquatic fauna relocation process, an additional release point may be required. Tubs should not be overstocked or left in direct sun for extended periods. Aeration can be provided by battery aquarium pumps or manual turbulence if only stored for a short period. Turtles can be transported in a shaded tub with a wet hessian bag placed inside for moisture and support during transport. Tadpoles and frogs can be transported in small buckets.

RELEASE

Water from the receiving waterbody should be mixed slowly over 5 - 10 minutes with the tank water to allow fish to acclimatise to the new water quality. Care should be taken when releasing fauna not to also transfer weeds or invasive species (e.g. Carp eggs and Gambusia). Animals should be transferred via hand nets, rather than directly pouring them from the tub. Eels can be released on land a few metres from edge and pointed towards the water. The number of each species are to be counted upon release and later incorporated into the summary report.

PESTS

Exotic fish (e.g. Carp, Gambusia, Goldfish, Redfin Perch, Spotted Livebearer) are to be intercepted, euthanised and disposed of in accordance with the ecologist's Animal Research Authority (issued by the Secretary's Animal Care & Ethics Committee). Exotic *Trachemys scripta* (Red-eared Slider Turtle) are to be contained humanly and Department of Planning, Industry and Environment (DPIE) immediately notified (Environment Line - 131 555). They will collect the live turtle from the ecologist. A tally of the number and species of animals euthanised would be recorded and later incorporated into the summary report.

POST-DEWATERING

An escape ramp should be graded to allow trapped fauna to escape overnight. Sediment should be left overnight to allow hidden fauna to emerge unless the ecologist confirms there are no fauna remaining (site-specific assessment). Earthworks staff should notify the appointed aquatic ecologist if stranded fish or turtles are observed post-dewatering.

REPORTING

The Aquatic Ecologist should prepare a summary report suitable for submission to Penrith Council within seven days of completing the aquatic fauna relocation works. The report would detail that the works have been completed in accordance with the Dam Dewatering Plan and would include information relating to the location of the dam dewatering works, the licences held by the staff involved in the works, the number and type of native species relocated, location of release point/s for native fauna and the number and type of exotic species dispatched.

Appendix G Introduction and Spread of Weed and Pathogens Procedure

Construction works on development sites have the potential to introduce and promote the spread of weed species. This procedure is intended to prevent or minimise the spread of priority weed species. During construction, the Project Manager and Site Supervisor should adhere to best practice methods for weed management, which include:

- Mowing or slashing areas infested with weeds before they seed. This may reduce the propagation of new plants.
- Program works from least to most weed infested areas.
- Clean machinery, vehicles and footwear before moving to a new location.
- Securely cover loads of weed-contaminated material to prevent weed plant material falling or blowing off vehicles.
- Dispose of weed-contaminated soil at an appropriate waste management facility.
- Remove weeds immediately onto suitable trucks and dispose of without stockpiling.

WEED MANAGEMENT PLAN

If the development site is highly infested, a Weed Management Plan may be warranted as a sub-plan to the Construction Environmental Management Plan, which may include:

- Identification and description of weed infested areas within the site.
- Recommendations for managing weeds.
- Weed control methods.
- Measures to prevent the spread of weeds.
- A monitoring program to measure the success of weed management.
- Communication strategies to improve contractor awareness of weeds and weed management.

Pathogens are agents such as bacterium, virus or fungus that cause disease in flora and fauna, which are be spread on footwear, vehicles or machinery. The four most common pathogens found in NSW include:

- **Phytophthora (*Phytophthora cinnamomi*):** A soil-borne fungus that attacks the roots of native plant species, causing them to rot and eventually die.
- **Chytrid fungus (*Batrachochytrium dendrobatdis*):** A waterborne fungus that affects native frog species.
- **Myrtle rust (*Uredo rangelli*):** An introduced fungus that attacks young leaves, shoot tips and stems of Myrtaceous plants (such as Bottle Brush, Tea Tree, Lilly Pilly and Turpentine), eventually killing the plant.

Construction works on development sites have the potential to promote the spread of pathogens. This procedure is intended to prevent or minimise the spread of pathogens if they have been identified within the development site. If the occurrence of pathogens is known within the locality, a test for presence through soil or water tests should fire be undertaken. If pathogens are present, during construction, the Project Manager and Site Supervisor should adhere to best practice methods for pathogens (Table 6).

Table 6: Best practice hygiene protocols to prevent the spread of pathogens

Pathogen	Best Practice Hygiene Protocols
Phytophthora	• Minimise work during excessively wet or muddy conditions. • Programming of works should always move from uninfected areas to infected areas. • Set up exclusion zones with fencing and signage to restrict access into contaminated areas. • All personnel (including visitors) to be inducted on Phytophthora management measures for the site. Provide vehicle wash down facility. • Restrict vehicles to designated tracks, trails and parking areas. • Provide parking and turn-around points on hard, well-drained surfaces. • Provide boot wash down facility. • Restrict personnel to designated tracks and trails. • Use a certified supply of plants and soil that is disease-free. • Retain all potentially affected materials within the contaminated area. • Ensure stockpiles of mulch, topsoil and fill material are separated to avoid potential contamination and spread.
Chytrid Fungus	• Minimise work during excessively wet or muddy conditions. • Programming of works should always move from uninfected areas to infected areas. • Set up exclusion zones with fencing and signage to restrict access into contaminated areas. • All personnel (including visitors) to be inducted on chytrid management measures for the site. • Provide vehicle wash down facility. • Restrict vehicles to designated tracks, trails and parking areas. • Provide parking and turn-around points on hard, well-drained surfaces. • Provide boot wash down facility. • Disinfect with cleaning products containing benzalkonium chloride or 70% methylated spirits in 30% water. • Disinfect hands or change gloves between the handling of individual frogs and between each site. • Only handle frogs when necessary. Use the 'one bag-one frog' approach. • To avoid cross contamination, generally avoid transferring water between two or more separate waterbodies.

Myrtle Rust	• To determine if Myrtle Rust is known within the locality of the development site, the following should be undertaken:
	  ○ Use of The DPI Myrtle Rust Management Zone map (www.dpi.nsw.gov.au/biosecurity/plant/myrtle-rust/zones)
	  ○ Consultation with Penrith City Council for additional rust records and risk assessments.
	  ○ Photograph potentially infected plants and send to: biosecurity@industry.nsw.gov.au for confirmation.
	• Programming of works should always move from uninfected areas to infected areas.
	• Set up exclusion zones with fencing and signage to restrict access into contaminated areas.
	• All personnel (including visitors) to be inducted on Myrtle rust management measures for the site.
	• Provide vehicle wash down facility.
	• All vehicles and machinery to be washed with Truckwash®(or equivalent).
	• Restrict vehicles to designated tracks, trails and parking areas.
	• For medium-long term projects, install a concrete wash down bay which will capture the water in a trench or bunded area.
	• Water used for wash downs must not be used for dust control.
	• Personnel working in an infected site should shower and launder clothes (especially hats) before moving to another bushland site.
	• Provide boot wash down facility.

Pathogen	Best Practice Hygiene Protocols
	• Footwear and equipment to be cleaned of soil/mud then sprayed with 70% methylated spirits in 30% water. • Use a certified supply of plants and soil that is disease-free (the Australian Nursery Industry *Myrtle Rust Management Plan* (McDonald 2011) provides best practice Myrtle rust management that is to be expected from suppliers). • Plant material should be buried on site if possible. • Do not dispose of waste at another bushland site. • Buried material sites must be mapped to prevent re-exposure, especially if located near utility easements. • If material cannot be buried advice should be sought from Penrith City Council.

Appendix H Re-Use of Floristic Material and Native Habitat Features Strategy

COLLECTION OF FLORISTIC MATERIAL

The vegetation within the development site conforms to two TECs (Cumberland Plain Woodland and River-flat Eucalypt Forest). Therefore, if requested by Penrith City Council, native seed collection may be required prior to construction to later be used in the Vegetation Management Plan area or a nearby Council reserve. If this is the case, the following should be adhered to:

- Seed should first be collected from all areas that are to be cleared as part of the project. By selecting a seed source that is from plants growing in similar environmental conditions nearby, the plants should be naturally adapted to local conditions and more likely to survive and prosper in proposed re-use areas.
- Carry out all seed collection in accordance with the Florabank Guidelines (Florabank, 2000) and Model Code of Practice (Mortlock, 1998). Experienced and licensed seed collectors should carry out the seed collection.

RELOCATION OF WOODY DEBRIS AND BUSH ROCK

Many native fauna species utilise woody debris and bush rock for shelter, basking to hide from predators, find food and avoid extreme weather. When woody debris and bush rock are required to be removed from a development site, consideration should be given to finding suitable locations for re-use of these important habitat features.

Term	Definition
Woody Debris	Trees and wood, whether living or dead, at least 100 mm in diameter and 500 mm long, including hollows.
Bush Rock	Loose rock occurring on rock or soil surfaces.

Prior to relocation of woody debris found within the development site, consultation should be undertaken with Penrith City Council and the site ecologist to determine a suitable location for re-use to ensure it does not have a negative impact on the receiving environment. For example, in areas of high-quality bushland, there may already be enough suitable hollows, fallen logs or bush rock and adding more may cause unnecessary disturbance e or create a fire hazard.

If a suitable relocation area (such as the Vegetation Management Plan area) has been agreed upon by Penrith City Council and the proponent, the Project Manager and Site Supervisor should ensure the following best practice methods are undertaken during relocation:

- Removal, stockpiling, transportation and relocation of woody debris and/or bush rock is carried out in a manner that minimises disturbance to native vegetation (including the canopy, shrubs, dead trees, fallen timber and groundcover species) or bush rock.
- The spread of any weeds or pathogens that may be in the soil is avoided when relocating woody debris and bush rock from stockpiles.

- The Site Ecologist is consulted with to provide advice on positioning woody debris and bush rock in designated relocation areas.
- Topsoil disturbance is kept to a minimum and is not heaped up against woody debris or bush rock because of the potential to provide habitat for rabbits.
- Woody debris is placed evenly across the site.
- Where woody debris is to be mulched the Project Manager and/or Site Supervisor should ensure that weeds are separated from native vegetation.

USE OF NEST BOXES

Nest boxes can be used to provide supplementary breeding habitat and shelter for hollow-dependant fauna where hollows have been removed. If requested by Penrith City Council, nest boxes may be required to be installed as a replacement for the removal of the identified hollow-bearing trees. Generally, it is recommended that three nest boxes are installed for every hollow-bearing tree removed.

If the installation of nest boxes is required, the following must be considered in consultation with the Site Ecologist:

- The target species.
- The tree hollow preferences of native hollow-dependant fauna known or likely to occur in the locality.
- The sizes, types and quantities of potential tree hollows to be removed.
- The sizes, types and quantities of tree hollows existing in adjacent areas.
- The design, materials and quantity of nest boxes required.
- Whether the nest boxes are required to fill a short-term gap in the availability of hollows (e.g. during construction) or to compensate for the long term reduced availability of hollows.
- Monitoring and maintenance of the nest boxes.

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APPENDIX P

Unexpected Finds Protocol - Heritage

Aspect Industrial Estate

Unexpected finds procedure – Aboriginal heritage

If unanticipated suspected Aboriginal heritage items are uncovered at any time throughout the life of the project the following steps would be undertaken.

- Cease all activity in the vicinity of the find
- Leave the material in place and protect it from harm
- Erect a 10 m exclusion zone (temporary fencing/signage)
- Take note of the details of the material and its location, take a photograph of the find *in situ*
- Inform the site manager/area supervisor, who would then inform the superintendent / principal

Once the find has been secured the project archaeologist/ heritage consultant should be contacted to assess the significance of the find and determine management requirements.

If the find is identified as a genuine Aboriginal object:

- Heritage NSW and Deerubbin LALC must be notified and the RAPs for the project consulted.
- A methodology for salvage and long term storage of the find in accordance with its identified significance must be developed in consultation with the RAPs.
- Salvage works in accordance with the methodology should be undertaken.
- The Aboriginal object should be registered on AHIMS.

Works would not recommence until written consent is received from the project archaeologist/heritage consultant.

Skeletal remains

Suspected human remains would be managed in accordance with the projects unexpected finds procedure. Where suspected human remains are identified during salvage excavation or construction works, all work in that area would cease and the area be cordoned off. Where it is unclear whether the remains are human, a specialist, such as a Physical Anthropologist, would be called to site to confirm.

Where it is either clear that the remains or human, or it has been confirmed by a specialist, the NSW Police and Heritage NSW Environment Line (131 555) will then be notified.

Work will not recommence in the area where skeletal remains have been identified until such time as the relevant approval has been granted.

APPENDIX Q

Unexpected Finds Protocol – Contamination

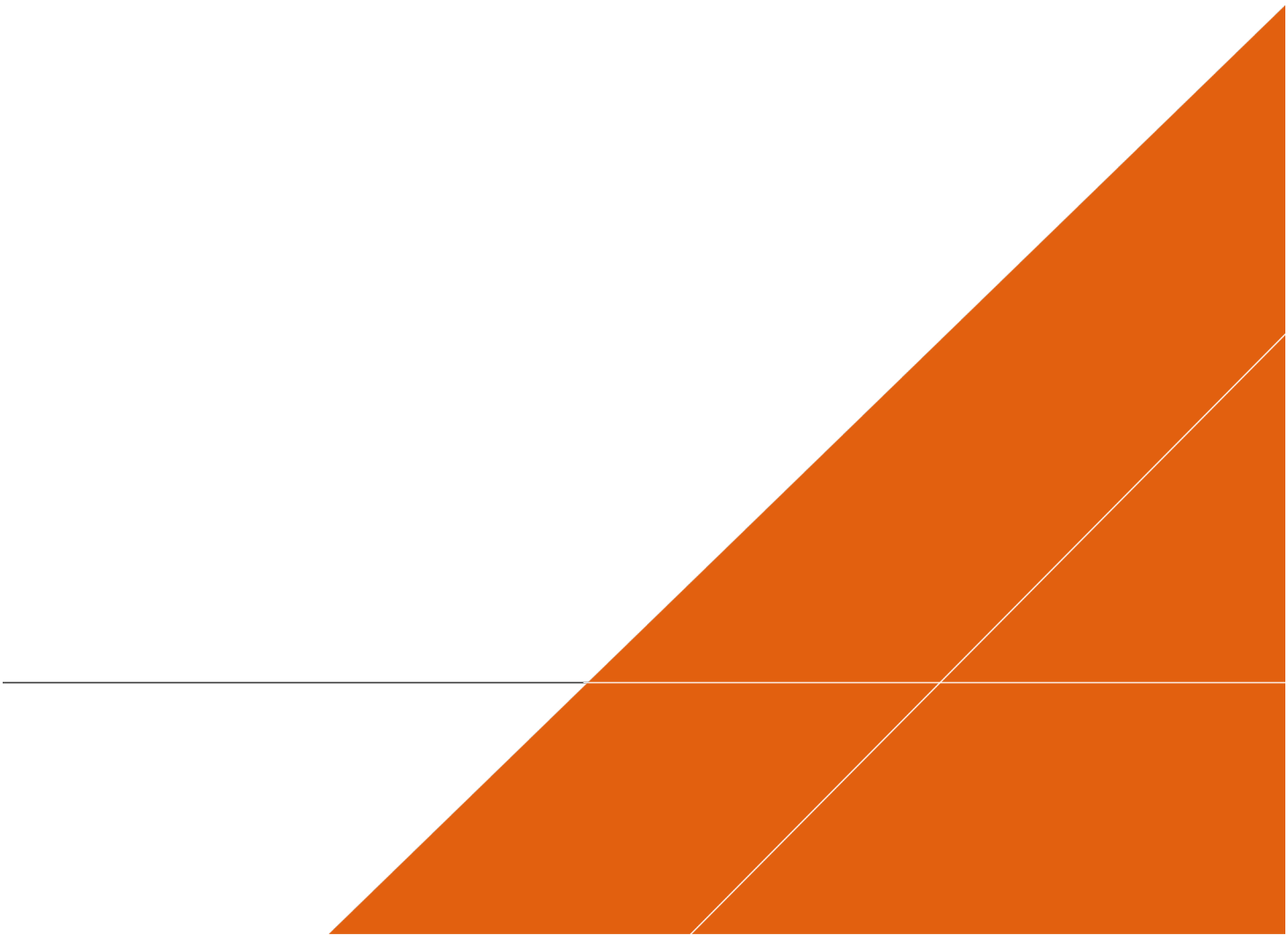
ARCADIS Design & Consultancy for natural and built assets

UNEXPECTED FINDS PROTOCOL – REV C

Aspect Industrial Estate, Mamre Road, Kemps Creek, NSW

Prepared for Mirvac Office and Industrial Pty Ltd

09 OCTOBER 2020



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UNEXPECTED FINDS PROTOCOL

Aspect Industrial Estate, Mamre Road, Kemps Creek, NSW

Revision C

Author Dr Danielle Toase

Checker Mr Ciaran Lavery

Approver Mr Loek Munnichs

Report No 10035157_UFP

Date 9/10/2020

Revision Text Rev C

REVISIONS

Revision	Date	Description	Prepared by	Approved by
A	1/11/2019	Draft for Client Review	D.T.	L.M.
B	22/11/2019	Revised UFP based on Auditor Feedback	D.T.	C.L.
C	9/10/2020	Revised UFP based on 2020 legislation amendment	B.K.	B.V

CONTENTS

APPENDICES

1 INTRODUCTION

Arcadis Australia Pacific (Arcadis) was engaged by Mirvac Office and Industrial (Mirvac) to prepare an Unexpected Finds Protocol (UFP) to support the proposed Aspect Industrial Estate development located at Lots 54-58 DP259135 Mamre Road, Kemps Creek, NSW 2178. The location of the site is illustrated in Figure 1, **Appendix A**, and site features are depicted in Figure 2, **Appendix A**.

In order to obtain a construction certificate and commence construction work, all consent conditions of the Development Approval (DA) must be satisfied. The preparation and implementation of an Unexpected Finds Protocol (UFP) is expected to be required under the DA consent conditions to manage any unexpected finds, including contamination, that may be encountered during bulk earthworks.

1.1 Purpose

This protocol outlines the actions which must be implemented in the event that potentially contaminated materials, waste or asbestos is unexpectedly encountered during bulk earthworks and material importation at the site.

1.2 Background

The site comprises an approximate area of 56.3 ha and is located within the Penrith City Council Local Government Area (LGA). Known historical land uses at the site include rural residential, grazing, dairy farming, poultry farming and horticulture. The proposed redevelopment of the site will facilitate land uses consistent with commercial and industrial use, as prescribed in the National Environmental Protection Measure as amended in 2013 (NEPC, 2013) and will involve the following activities:

- The demolition and removal of existing rural structures.
- Heritage salvage works (if applicable).
- Clearing of existing vegetation and associated dam dewatering and decommissioning.
- Realignment of existing creek.
- On-site bulk earthworks including any required ground dewatering.
- The importation, placement and compaction of spoil material, consisting of;
  - Virgin Excavated Natural Material (VENM) within the meaning of the Protection of the Environment Operations (POEO) Act; and/or
  - Excavated Natural Material (ENM) within the meaning of the NSW Environmental Protection Agency (EPA) Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the POEO (Waste) Regulation 2014 – The Excavated Natural Material Order 2014; and/or
  - Materials covered by a specific NSW EPA Resource Recovery Order and Exemption which are suitable for their proposed use.
- Boundary retaining walls.
- Catchment level stormwater infrastructure, trunk service connections, utility infrastructure, roads and access infrastructure.
- Stormwater, service and utility infrastructure associated with the construction of industrial logistics and warehouse buildings within Stage 1 of the development.
- Boundary stormwater management, fencing and landscaping.

Information provided to Arcadis by Mirvac indicates that approximately 200,000 m^3 of VENM and/or ENM will be imported onto the site to support earthworks undertaken as part of the site redevelopment works.

1.2.1 Preliminary Site Investigation

In January 2019, JBS&G conducted a Preliminary Site Investigation (PSI) with limited soil sampling at the site.

The JBS&G review of the site history indicated that the site was historically used for light agricultural purposes (i.e. grazing, historical dairy farming, poultry farming and horticulture).

The findings of the desktop study (confirmed by detailed site inspections completed by JBS&G on 30 November 2018 and 16 January 2019) identified current and potential historical sources of on-site contamination. The sources of potential contamination were associated with the following storage, handling and uses on the site:

- Pesticides/herbicides used in former and current market gardens.
- Potential biological impacts from livestock/poultry farming.
- Potential use of hazardous building materials (asbestos, lead based paints, PCBs) in historic and current site structures resulting in localised impacts to soils in proximity to the location of site structures.
- Potential hydrocarbon and pesticide contamination from the storage of materials and consumables at various locations across the site area (former and current sheds).
- Fill materials of unknown origin.
- Potential asbestos containing materials (ACM) in irrigation lines (conduits).

JBS&G collected soil samples from a total of 38 locations across the site (29 soil boreholes, two test pits and seven stockpiles). The results from the samples collected by JBS&G have been summarised below:

- Elevated Total Recoverable Hydrocarbon (TRH) concentrations were identified in stained soils below a fuel drum (sample BH10 at 0.1 m). This impact was limited in lateral extent and did not appear to migrate vertically, based on visual observations of stained soil.
- A small number of heavy metal impacts to surface soils were also identified but were not considered to pose unacceptable ecological health risks under the proposed land use.
- Anthropogenic materials at some locations were present in quantities that may pose an aesthetic concern for sensitive land uses. JBS&G however noted that with the proposed land use (commercial/industrial), these materials may be retained beneath hardstand without any further management. The impacts identified were typical of historical land uses.
- Trace level friable asbestos was identified at one location (HA13) adjacent to historical structures, which were observed to contain possible ACM sheet board. JBS&G noted that there was the potential for ACM to be present within site structures and in soil in the vicinity of the structures.

JBS&G concluded that whilst the investigation identified localised surficial soil impacts at the site, the investigation did not identify widespread contamination which may preclude future redevelopment of the site. Identified soil impacts are considered representative of common contaminants and historical land use activities which can be readily dealt with during the DA stage for redevelopment and assessment for site suitability. JBS&G also recommended that a Hazardous Building Material Survey (HBMS) should be undertaken prior to any demolition of existing site structures.

1.2.2 Detailed Site Investigation

During October 2019, Arcadis undertook a Detailed Site Investigation (DSI) which involved intrusive works to assess soil, groundwater and surface water on site for contaminants of potential concern (CoPC) identified in the PSI (Arcadis, 2019a).

Review of previous site reports, observations from site walk overs on 8th, 9th, 16th and 23rd October 2019 and analytical results from soil, surface water, groundwater and potentially asbestos containing material (PACM) indicated that impact at the site is unlikely to be widespread. These observations were consistent with the JBS&G findings.

The results from the samples collected by Arcadis have been summarised below:

- Soil samples were taken from fifteen (15) test pits and six (6) monitoring wells. One sample reported an outlier exceedance of benzo(a)pyrene at MW02_2.0. However, this exceedance was

considered an anomaly and does not represent the concentration of benzo(a)pyrene in natural soil materials, nor does it exceed the adopted assessment ecological screening criteria.

- Three (3) soil samples collected from areas adjacent to treated timber posts were assessed, with one sample (SO01) which exceed the NSW EPA General Solid Waste CT1 criteria for nickel (Ni).
- All surface waters reported analytes below the adopted criteria.
- Surface waters reported elevated pH and electrical conductivity when compared to the adopted criteria.
- A small number of heavy metal impacts to groundwater were observed and these were attributed to the elevated background concentrations of metals in on-site clay soils.
- Potential asbestos containing material (PACM) reported positive identification of asbestos at three out of four samples locations. No PACM was observed on roads or access tracks, with identified material adjacent current or former structures.

Based on the findings of the DSI, the site was deemed suitable from a contamination perspective for the proposed development as an industrial estate, pending the removal of identified asbestos containing material and the issuing of a clearance certificate to soil surfaces. Arcadis recommended that a HAZMAT survey and an asbestos register should be developed for the site prior to demolition works, asbestos removal works should be undertaken, and a clearance certificate issued post demolition and that a site unexpected finds protocol should be implemented prior to any intrusive works. Arcadis also recommended that on-site surface water should be measured after a significant rainfall event and compared to previously recorded the observations to observe water quality prior to dam de-watering. Accordingly, there is potential for unexpected finds, including contamination or waste, which may be encountered during demolition or earthworks at the site.

Arcadis recommended the following:

- Completion of a HAZMAT survey and preparation of an asbestos register for the site prior to demolition works. Asbestos removal works should be undertaken, and a clearance certificate issued following demolition.
- Completion of on-site surface water sampling following a significant rainfall event and comparison of data to previously recorded observations to assess for changes in water quality prior to dam de-watering.
- Preparation of an unexpected finds protocol prior to demolition or earthworks commencing at the site.

2 SCOPE

This protocol applies to the following activities:

- The demolition and removal of existing structures on-site.
- Clearing of existing vegetation.
- Dam dewatering and decommissioning.
- Importation of fill material to support earthworks undertaken as part of the site redevelopment works.
- Installation of site infrastructure including stormwater, service connections, utilities, roads and access infrastructure.
- Any other activities that have the potential to uncover or encounter contaminated materials, waste or asbestos.

3 TRAINING AND INDUCTION REQUIREMENTS

All site-based Mirvac personnel and sub-contractors operating at the site should be inducted and review this protocol.

All site-based personal should understand the potential for unexpected finds, how to identify potentially contaminated materials, waste and asbestos and the procedures for management of unexpected finds.

A hardcopy of this UFP should be retained on-site at all times. Electronic copies of this UFP should be provided to site personnel and sub-contractors, as required.

The site unexpected finds register, and hazardous material register should be updated each time an observation of potentially hazardous or contaminating materials is made.

4 PERSONAL PROTECTIVE EQUIPMENT (PPE)

When an unexpected potentially contaminated or hazardous material is found on site, appropriate personal protective equipment (PPE) is to be worn prior to any contamination investigation/management. This may include, but should not be limited to:

- Eye protection e.g. safety glasses or goggles.
- Face mask.
- Steel-toe boots.
- Safety gloves.
- High visibility long-sleeve shirt.
- Long trousers.
- Hard hat if overhead hazards are present.
- P2 respirator if fine materials and dust is present.

5 ASSESSMENT GUIDELINES FOR UNEXPECTED FINDS

The site is proposed to be redeveloped for land uses consistent with commercial and industrial uses, as prescribed in the National Environmental Protection (Assessment of Site Contamination) Measure (NEPM) as amended in 2013 (NEPM, 2013). Unexpected finds at the site should be assessed and managed in accordance with the criteria contained within following guidelines:

- Heads of EPA Australia and New Zealand (HEPA) (2018) PFAS National Environmental Management Plan.
- National Environmental Protection Council (ASC NEPC) NEPM (2013) HIL-D and HSL-D (Commercial/Industrial) criteria.
- NSW EPA (2014) Waste Classification Guidelines: Parts 1-3.
- NSW EPA Resource Recovery Framework, including current Orders and Exemptions.
- NSW EPA (1995) Sampling Design Guidelines.
- NSW EPA (2015) Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997.
- NSW EPA (2019a) Standards for Managing Construction Waste in NSW.
- NSW EPA (2019b) Construction and Demolition Waste: A Management Toolkit.
- NSW OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites.
- Safe Work NSW (2011) How to Safely Remove Asbestos Code of Practice.
- Safe Work NSW (2014) Managing Asbestos in or on Soil.
- WA Health (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia.

6 PROCEDURE

6.1 Identification of Unexpected Finds

Previous environmental investigations completed at the site identified ACM on soil surfaces and trace level asbestos fibres in soils, building materials, stockpiled soil on-site and elevated hydrocarbon concentrations in stained soils (refer to JBS&G, 2019; Arcadis, 2019a). Similar impacts may be observed at other areas of the site during demolition or earthworks at the site.

Unexpected finds may be detected visually, by odour or through chemical testing. Unexpected finds at the site may include (but are not limited to):

- ACM and/or asbestos in soils. Identified by the presence of suspected ACM e.g. irrigation pipes or building materials, asbestos fines (AF) or free asbestos (FA).
- Dangerous Goods, chemical containers, drums or liquid waste including legacy firefighting foams or chemicals used for dust suppression.
- Construction, building and demolition waste.
- Stockpiled soil.
- Ash and slag.
- Historical imported fill material.
- Stained and/or odorous soils impacted by hydrocarbons and/or Volatile Organic Compounds (VOCs).
- Illegally dumped materials.

In situations where any of the above or additional unexpected finds are identified on-site, an exclusion zone should be immediately established, and the unexpected find should be documented and managed in accordance with the procedures outlined below and summarised in **Appendix B**.

6.2 Unexpected Finds Register

All unexpected finds identified on-site must be recorded in the Unexpected Finds Register provided in **Appendix B**. The Unexpected Finds Register records initial information inclusive of the following:

- Identification number.
- Date.
- GPS location.
- Name of person who identified the unexpected find.
- Material type.
- Approximate area of impacted area or unexpected find.
- Approximate depth of impact.
- Approximate volume.
- Sample identification (if samples were collected).
- Photograph log.
- Notification actions.
- Remedial actions.
- Validation action.
- Laboratory report reference numbers.
- Clearance.

- Comments.
- Status of unexpected find.

An electronic copy of this document should be made available to all site-based personnel and must be maintained during demolition and earthworks. The Unexpected Finds Register should be maintained and regularly backed-up to demonstrate identification, assessment, compliance and validation of all unexpected finds identified at the site.

6.3 Assessment of Unexpected Finds

Following documentation of the unexpected find, an assessment of the find should be completed. Depending on the nature, character and suspected source of the unexpected find, further testing may be required to assess the potential risk to human and ecological receptors.

All testing requirements should be identified, developed and implemented by a suitably qualified environmental consultant in accordance with NSW EPA endorsed guidelines. The NSW EPA Accredited Site Auditor should also be consulted on the investigation and remediation of unexpected finds.

Matrix specific procedures for the management of unexpected finds is provided in Sections 6.3.1 – 6.3.5 below. The general, overarching process for managing unexpected finds is summarised in **Appendix C**.

6.3.1 Potentially Contaminated Soil and Stockpiled Materials

If potentially contaminated soil or stockpiled soil of unknown origin is encountered on-site, an exclusion zone should be immediately established, and the Site Manager and Environmental Consultant should be notified. Following establishment of a clearly marked exclusion zone, the Unexpected Finds Register should be completed, and the NSW EPA Accredited Site Auditor should be notified.

For non-PACM, an Environmental Consultant should be engaged to sample the stockpile in accordance with the minimum sample frequencies outlined in Table 1. These minimum sampling frequencies have been adopted from the NEPM (2013) and VIC EPA (2009) guidance documents. Following sampling, waste classification in accordance with the NSW EPA (2014) Waste Classification Guidelines and associated addendums is required prior to off-site disposal.

Table 1 – Minimum Stockpile Sampling Frequency for non-PACM (VIC EPA, 2009) and Schedule B2 (NEPM, 2013).

Soil volume (m^3)	No. of samples
25 or <25	3
50	3
75	3
100	4
125	5
150	6
175	7
200	8
>200	1:25

If in-situ contaminated soil is likely due to the presence of staining, odours or other visual signs of contamination, sampling and analysis should be conducted by an Environmental Consultant in accordance with the minimum sampling frequencies outlined in Table 2. If a smaller suspected point source of contamination is identified, an Environmental Consultant should be consulted to complete appropriate sampling to assess the vertical and lateral extent of impact. The Environmental Consultant will also provide advice regarding an appropriate testing regime for contaminants of potential concern (CoPC) in the suspected contaminated soil.

Table 2 – Sampling Frequency for Suspected Contaminated Soil (in-situ) (NSW EPA, 1995).

Size of site (ha)	No. of sampling points	Size of site (ha)	No. of sampling points
0.05	5	**0.9**	20
0.1	6	**1.0**	21
0.2	7	**1.5**	25
0.3	9	**2.0**	30
0.4	11	**2.5**	35
0.5	13	**3.0**	40
0.6	15	**3.5**	45
0.7	17	**4.0**	50
0.8	19	**4.5**	52
0.9	20	**5.0**	55

If test results indicate that the material presents concentrations of contaminants below the criteria outlined in the relevant guideline (Table 3), the material may be re-used on-site, subject to compliance with NSW regulatory requirements.

If contaminated soil is identified on-site, works should not recommence without inspection by a suitably qualified Environmental Consultant and the consent of the NSW EPA Accredited Site Auditor.

Following management of the unexpected find, validation of clearance should be completed in accordance with **Section 6.4.**

6.3.2 Potential Asbestos Containing Materials

If PACM is unexpectedly identified on-site, the Site Manager, Environmental Consultant and NSW EPA Accredited Site Auditor should be notified. Following notification, an exclusion zone should be immediately established, and the area should be secured by installing warning signs and a temporary barricade (e.g. marker tape) around the affected area to prevent anyone from accidentally disturbing the materials and generating airborne asbestos fibres. To minimise the potential release of fibres into the air, the soil should be kept dam (but not wet) and the area should be covered with plastic sheeting if it is safe to do so (WA Health, 2009). Air quality monitoring for asbestos fibre, dust and other contaminant emissions should be implemented during asbestos remediation works. Additional guidance on air quality monitoring is provided in WA Health (2009) and the site-specific Remediation Action Plan (RAP).

The material should be assessed in accordance with the Safe Work NSW (2014) Guidelines for Managing Asbestos in or on soil, including the SafeWork NSW (2014) *Managing Asbestos in or on Soil* management process flow chart that has been reproduced in **Appendix D**.

A suitably qualified environmental consultant or occupational hygienist should also be engaged to complete an assessment and development of a site-specific Asbestos Management Plan (AMP). An AMP should be prepared in accordance with the ASC NEPM (2013) requirements and best practice guidance provided by the WA Department of Health (WA Health, 2009). In addition, the following guidelines apply to the management of asbestos in NSW:

- Safe Work NSW (2011) How to Safely Remove Asbestos Code of Practice.
- Safe Work NSW (2014) Managing Asbestos in or on Soil.

The following additional requirements also must be considered if asbestos is encountered on-site:

- Removal of non-friable asbestos materials greater than 10 m^2 must be undertaken by a Class B Licenced Asbestos Assessor.
- Friable materials identified on-site must be removed by a Class A Licenced Asbestos Contractor following clearance by a Licenced Asbestos Assessor (LAA).
- Air monitoring for asbestos is required during asbestos management works at the site. Air monitoring for friable asbestos should be supervised by an LAA.

If asbestos is identified on-site, works should not recommence without inspection by a suitably qualified person and liaison with both the Environmental Consultant and NSW EPA Accredited Site Auditor.

Following management of the unexpected find, validation of clearance should be completed in accordance with **Section 6.4** and guidance provided in the RAP.

6.3.3 Waste, Slag, Demolition Waste or Fill Material

If waste, slag or unknown fill material is encountered on-site, an exclusion zone should be immediately established, and the Site Manager, Environmental Consultant and NSW EPA Accredited Site Auditor should be notified. Following establishment of a clearly marked exclusion zone, the Unexpected Finds Register should be updated to include all relevant information.

The identified material should be subsequently inspected and assessed by a suitably qualified environmental consultant. If the material is being disposed off-site, the material should be sampled in accordance with the sample frequencies outlined in Table 1 or Table 2 and assessed in accordance with the NSW EPA (2014) Waste Classification Guidelines and associated addendums.

Alternatively, depending on the nature of the material, a Resource Recovery Order and Exemption may apply and may be used to facilitate off-site reuse of the material. Following assessment, the Environmental Consultant will be able to advise if a Resource Recovery Order and Exemption is applicable.

If waste, slag or unknown fill material is identified on-site, works should not recommence without inspection by a suitably qualified person and liaison with both the Environmental Consultant and NSW EPA Accredited Site Auditor.

Following management of the unexpected find, validation of clearance should be completed in accordance with **Section 6.4.**

6.3.4 Hazardous Materials, Dangerous Goods or Drums

If suspected hazardous materials, dangerous goods, chemical storage containers or drums be identified on-site, the Site Manage, Environmental Consultant and the NSW EPA Accredited Site Auditor should be immediately notified, and the unexpected find should be recorded in the Unexpected Finds Register.

The nature of the chemical should be identified where practicable and an assessment of the material and surrounding area including underlying soils should be conducted by an appropriately qualified Environmental Consultant.

If aqueous film forming foams (AFFF) used for firefighting or dust suppression are identified on-site, the Environmental Consultant and NSW EPA Accredited Site Auditor should be notified immediately. The material should subsequently be tested for the presence of per- and polyfluoroalkyl substances (PFAS).

An assessment of the surrounding soils should also be conducted in accordance with guidance provided in NSW EPA endorsed guidelines, including the NEPC (2013), the NSW EPA (1995) Sampling Design Guidelines, OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites and NSW EPA (2015) Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997. Any impacted solid material intended for off-site disposal will require assessment in accordance with the NSW EPA (2014) Waste Classification Guidelines and associated addendums prior to off-site disposal at an NSW EPA licenced landfill facility. If PFAS is suspected on-site, the material should also be assessed in accordance with the HEPA (2018) PFAS National Environmental Management Plan.

Following recording in the Unexpected Finds Register, testing of the unexpected find should be arranged in consultation with the Environmental Consultant. The material should be subsequently disposed at an NSW EPA licenced treatment or disposal facility and transported in accordance with the NSW EPA waste tracking requirements.

Following management of the unexpected find, validation of clearance should be completed in accordance with **Section 6.4.**

6.3.5 Suspected Illegal Dumping

If suspected illegal dumping is encountered on-site, an exclusion zone should be established, and the Site Manager, Environmental Consultant and NSW EPA Accredited Site Auditor should be notified. Following establishment of a clearly marked exclusion zone, the Unexpected Finds Register should be updated to include all relevant information.

The illegal dumping incident should also be reported via RIDonline (https://ridonline.epa.nsw.gov.au/#/home). When reporting online, the following information will be required:

- Address.
- GPS location.
- Type of waste dumped.
- Photographic evidence.

The NSW EPA should also be contacted to seek clarification on the process to follow prior to the dumped material being inspected and assessed by a suitably qualified environmental consultant. Illegally dumped material will likely be disposed off-site. As such, the material should be sampled in accordance with the sample frequencies outlined in Table 1 and assessed in accordance with the NSW EPA (2014) Waste Classification Guidelines and associated addendums.

6.4 Validation of Unexpected Finds

Unexpected finds identified at the site should be managed and documented in accordance with the procedures outlined in Section 6.3.1-6.3.5. Following documentation and management, the unexpected find should be further inspected, photographed and sampled (if necessary) to demonstrate compliance with this UFP and the guidelines listed in Table 3.

Where analytical sampling is required, the Sampling and Analytical Program (SAQP) presented in Table 3 should be followed:

Table 3 – Sampling and Analytical Program for Validation.

Unexpected Find	Validation Area	Sampling frequency	Analytes	Relevant regulatory guidelines
Asbestos	Residual soil underneath area where asbestos was found	Refer to Section 6.4.1	Analysed as per the NEPM (2013) and WA (2009) guidelines for ACM (10 L sample) and asbestos fines/fibrous asbestos (AF/FA)	WA Health (2009) and NEPM (2013), Schedules B1 and B2.
Construction and demolition (C&D) waste	Applies directly to C&D waste	Sampling frequency as per NSW EPA (1995) Sampling Design Guidelines and NSW EPA (2014) Waste Classification Guidelines.	Determined in consultation with a suitably qualified Environmental Consultant following identification	NSW EPA (2019 a,b).
Stockpiled soil	Stockpiled soil	Refer to Table 1.	Determined in consultation with a suitably qualified Environmental Consultant following identification	NSW EPA (2014) Waste Classification Guidelines, with sampling frequencies for stockpiled soil determined in accordance with the sampling frequencies stipulated in Table 1.

Unexpected Find	Validation Area	Sampling frequency	Analytes	Relevant regulatory guidelines
Residual soil beneath stockpiled soil	Area beneath stockpiled soil, including an additional 5 m buffer	Refer to Table 2.	Determined in consultation with a suitably qualified Environmental Consultant following identification	NSW EPA (1995) Sampling Design Guidelines.
Contaminated soil (in-situ)	Suspected area/footprint of contaminated soil or excavation area.	Refer to Table 2.	Determined in consultation with a suitably qualified Environmental Consultant following identification	NSW EPA (1995) Sampling Design Guidelines.
Stained material and/or soil suspected of being impacted by a chemical spill	Suspected area/footprint of contaminated soil or excavation area.	Refer to Table 2.	Determined in consultation with a suitably qualified Environmental Consultant following identification	NSW EPA (1995) Sampling Design Guidelines.
Bulk agricultural crop waste	Applies directly to bulk agricultural crop waste	N/A	N/A	Material should be assessed and managed in accordance with NSW EPA (2014) Bulk Agricultural Crop Waste Exemption
Fill material not imported under associated site-specific Imported Fill Protocol (IFP)	Suspected area/footprint of contaminated soil or excavation area.	Refer to Table 1 or 2, whichever applies.	Determined in consultation with a suitably qualified Environmental Consultant following identification	NSW EPA (1995) Sampling Design Guidelines (in-situ/spread fill) and NSW EPA (2014) Waste Classification Guidelines (ex-situ/stockpiled fill)
Suspected contaminated water or liquid waste	Sediment contained in surface water body or drainage line, or storage area where liquid waste was stored.	A minimum of each of one (1) sample per IBC of liquid waste and/or suspected contaminated water.	Determined in consultation with a suitably qualified Environmental Consultant following identification.	NSW EPA (1995) Sampling Design Guidelines and NSW EPA (2014) Waste Classification Guidelines

6.4.1 Validation of Asbestos

Validation will be necessary for where asbestos remediation works related to excavations and large-scale soil screening has occurred using a mesh size is greater than 7 mm (WA Health, 2009). In situations where asbestos remediation has involved hand-picking, tilling and fine screening (< 7 mm mesh) strategies, validation of ACM should not be required, if the works have been conducted in accordance with the WA Health (2009) and NEPM (2013) Guidelines.

In situations where validation is required within an excavation area, validation may be achieved by collecting at least 1 sample per 5 m length from each wall of the excavated area, or per 1 m depth (WA Health, 2009). Additional discretionary samples should also be collected for QA/QC purposes and in situations where there is analytical uncertainty regarding whether fibres in a sample are asbestos. The floor of the excavation area should also be visually inspected. If suspected ACM is identified, this area should be sampled at twice the minimum density outlined in the WA DEC Contaminated Sites Management Series (CSMS).

In situations where screened material requires validation, samples should be collected from the stockpile at a minimum rate of 14 locations per 1000 m^3 (WA Health, 2009). If the soil is subject to a feeding or conveyer belt process, a minimum of 1 sample per 70 m^3 is required (WA Health, 2009).

The validation process for asbestos should also include the collection of documentation and evidence of the safe removal and disposal of the ACM at an appropriately licenced landfill, including photographs.

Validation is discussed in further detail in the site-specific RAP.

6.5 Imported Fill Material

Validation of imported material, including VENM, ENM or material subject to a Resource Recovery Order and Exemption should also be undertaken to confirm that contamination has not been introduced to the site during earthworks. Guidance on the import, management and validation of imported fill material is provided in the site-specific Imported Fill Protocol (IFP) (Arcadis, 2019b).

6.5.1 Reporting

Following clearance and confirmation that the unexpected find has been appropriately managed. A clearance or validation report should be prepared. This report should include, but not be limited to the following:

- Details of the unexpected find and supporting documentation contained within the Unexpected Finds Register.
- Information regarding the management processes that have been implemented to manage the unexpected find.
- An assessment of any validation testing results against the relevant assessment criteria.
- Information demonstrating that the management of the unexpected find was effective (including test results, statistical analyses and QA/QC).
- Where the requirements of this UFP are not achieved, an explanation for why those requirements were not achieved should be documented and additional site work proposed to achieve the original management objectives (if necessary).

7 LIMITATIONS

This Unexpected Finds Protocol has been prepared for use by Mirvac in accordance with the agreed scope of work. Arcadis performed its services in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession. No warranties expressed or implied are made.

Subject to the scope of work, Arcadis' assessment was limited strictly to the subject site and environmental conditions associated with the subject property and does not include evaluation of any other issues. The absence of any identified hazardous or toxic materials should not be interpreted as a guarantee that such materials do not exist on the subject property.

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 undertaken for the Client. It is a report based on the results and conclusions for the site that were made available to the consultant at the time of writing. These conditions may change with time and space.

All recommendations regarding the property are the professional opinions of the Arcadis personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, Arcadis assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements or sources outside of Arcadis, or developments resulting from situations outside the scope of this project.

Arcadis 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 the exclusive use of the client.

8 REFERENCES

Arcadis (2019a) *Detailed Site Investigation - Aspect Industrial Estate, Mamre Road, Kemps Creek*, 31 October 2019.

Arcadis (2019b). Imported Fill Protocol (IFP), Aspect Industrial Estate, Mamre Road, Kemps Creek, NSW

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National Environment Protection Council (NEPC) (2013) *National Environment Protection Measure* (NEPM) 1999, as amended 2013 – *Assessment of Site Contamination Schedule B (1) and B (2)*.

NSW Environment Protection Authority (1995a) *Sampling Design Guidelines*.

NSW Environment Protection Authority (1995b) *Sampling Frequency for Suspected Contaminated Soil (in-situ).*

NSW Environment Protection Authority (2014a) *Waste Classification Guidelines* (2014).

NSW Environment Protection Authority (2014b) *Resource Recovery Framework.*

NSW Environment Protection Authority (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*.

NSW Environment Protection Authority (2019a) *Standards for Managing Construction Waste in NSW.*

NSW Environment Protection Authority (2019b) *Construction and Demolition Waste: A Management Toolkit.*

Protection of the Environment Operations (POEO) Act 1997 (Waste) Regulation (2014) *Excavated Natural Material Order 2014*;

Safe Work NSW (2011a) *How to Safely Remove Asbestos Code of Practice.*

Safe Work NSW (2011b) *How to Safely Remove Asbestos Code of Practice.*

Safe Work NSW (2014) *Managing Asbestos in or on Soil.*

Victorian Environment Protection Authority (2009) Industrial Waste Resource Guidelines: Soil Sampling. Accessed online: https://ref.epa.vic.gov.au/~/media/Publications/IWRG702.pdf on 21 November 2019.

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

APPENDIX A FIGURES

Figure 1: Site Location

Figure 2: Site Layout

10035157 - Aspect Industrial Estate - Detailed Site Investigation

Legend

- Site Boundary
- Lot Boundaries

1:4,130 at A3

[redacted]

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Coordinate System: GDA 1994 MGA Zone 56
Date issued: October 24, 2019

urces: Esri, HERE, Garmin,
GS, Intermap,

Figure 1 - Site Overview

0 40 80 160 240 320
m

Date: 24/10/2019 Path: H:\AAP_ER_GIS\Projects\10035157\DSI\Figure 1 - Site Overview.mxd
Created by : Environmental Restoration
QA by : Environmental Restoration

10035157 - Aspect Industrial Estate - Detailed Site Investigation

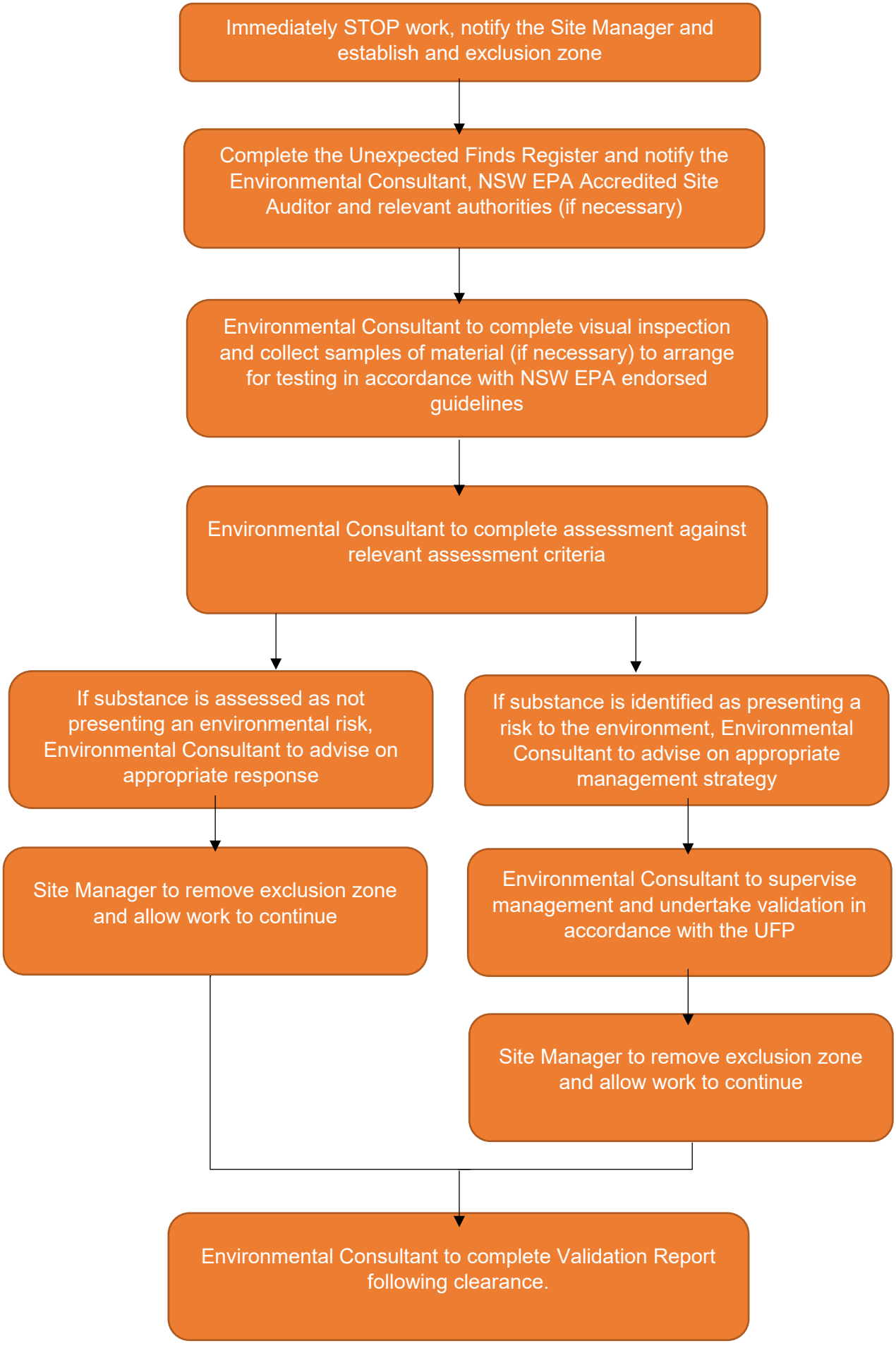
Figure 2 - Site Layout

Date: 24/10/2019 Path: H:\AAP_ER_GIS\Projects\10035157\DSI\Figure 2 - Site Layout.mxd
Created by : Environmental Restoration
QA by : Environmental Restoration

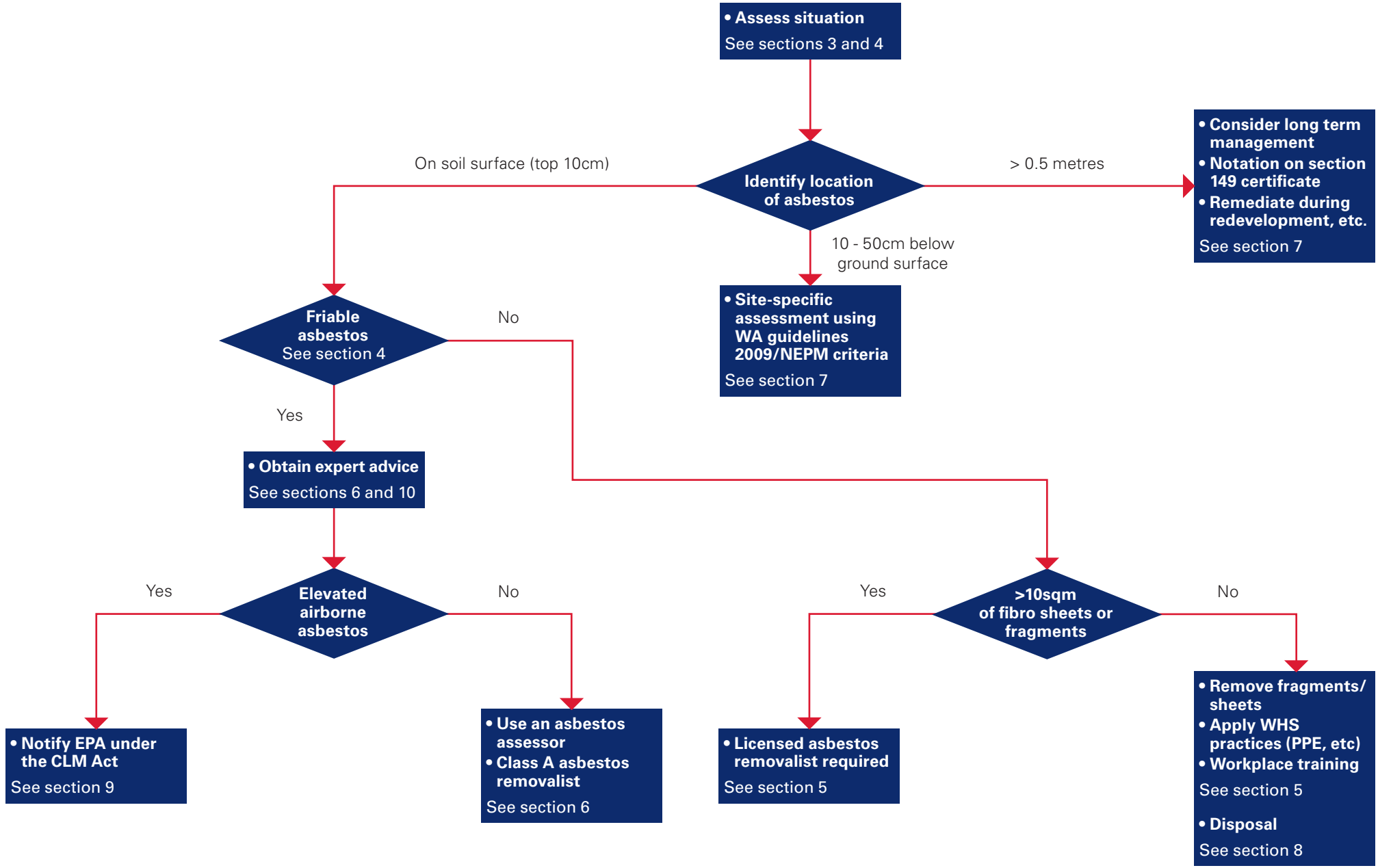
APPENDIX B UNEXPECTED FINDS REGISTER

Unexpected Find Information							Assessment			Management Action			Validation					Clearance	Status
ID	Date	GPS	Person who identified UF	Material Type	Approximate area or volume of UF	Approximate depth	Photo No.	Sample ID	Laboratory Report	Notification Actions	Remedial/ Management Action	Validation action	Date	GPS	Person	Sample ID	Laboratory Report	Comments	Closed or ongoing
001																			
002																			
003																			
004																			
005																			
006																			
007																			
008																			
009																			
010																			
011																			
012																			
013																			
014																			

APPENDIX C UNEXPECTED FINDS PROTOCOL PROCESS FLOWCHART


Immediately STOP work, notify the Site Manager and establish and exclusion zone
Complete the Unexpected Finds Register and notify the Environmental Consultant, NSW EPA Accredited Site Auditor and relevant authorities (if necessary)
Environmental Consultant to complete visual inspection and collect samples of material (if necessary) to arrange for testing in accordance with NSW EPA endorsed guidelines
Environmental Consultant to complete assessment against relevant assessment criteria
If substance is assessed as not presenting an environmental risk, Environmental Consultant to advise on appropriate response
If substance is identified as presenting a risk to the environment, Environmental Consultant to advise on appropriate management strategy
Site Manager to remove exclusion zone and allow work to continue
Environmental Consultant to supervise management and undertake validation in accordance with the UFP
Site Manager to remove exclusion zone and allow work to continue
Environmental Consultant to complete Validation Report following clearance.

APPENDIX D MANAGING ASBESTOS IN OR ON SOIL FLOWCHART


• Assess situation
See sections 3 and 4
Identify location of asbestos
On soil surface (top 10cm)
> 0.5 metres
10 - 50cm below ground surface
• Consider long term management
• Notation on section 149 certificate
• Remediate during redevelopment, etc.
See section 7
• Site-specific assessment using WA guidelines 2009/NEPM criteria
See section 7
Friable asbestos
See section 4
No
Yes
• Obtain expert advice
See sections 6 and 10
Elevated airborne asbestos
Yes
No
• Notify EPA under the CLM Act
See section 9
• Use an asbestos assessor
• Class A asbestos removalist
See section 6
>10sqm of fibro sheets or fragments
Yes
No
• Licensed asbestos removalist required
See section 5
• Remove fragments/ sheets
• Apply WHS practices (PPE, etc)
• Workplace training
See section 5
• Disposal
See section 8
Higher Risk
Lower Risk

NSW GOVERNMENT | SafeWork NSW

Work Health and Safety Act 2011 (WHS Act) –
Work Health and Safety Regulation 2017(WHS Regulation)

ASBESTOS AND DEMOLITION CHECKLIST

OCTOBER 2016

Completed by

Date

Time

Company name

Nominated supervisor

Site address

Contact number

Checklist	WHS Regulation	Yes	No	N/A	Notes/comments
Is the workplace secured from unauthorised access?	298	☐	☐	☐	
Are barricades erected to delineate the asbestos removal area?	469	☐	☐	☐	
Is there adequate signage for asbestos removal work?	469	☐	☐	☐	
Are adequate facilities available for workers (toilets, meal area, drinking water, means to wash hands)?	41	☐	☐	☐	
Is there an adequate first aid kit available?	42	☐	☐	☐	
Is someone trained in first aid?	42	☐	☐	☐	
Is there an emergency plan for the workplace?	43	☐	☐	☐	
Is the designated asbestos supervisor present for friable work?	459 and 529	☐	☐	☐	
Is the designated asbestos supervisor present for non friable work (ie able to arrive at the workplace within 20 minutes)?	459 and 529	☐	☐	☐	
Does the contractor hold the correct licence for the work being undertaken?	485 and 487	☐	☐	☐	

Checklist	WHS Regulation	Yes	No	N/A	Notes/comments
Has licensed asbestos removal work been notified to SafeWork NSW?	142 and 466	☐	☐	☐	
Are work surfaces and access ways clear of debris and trip hazards?	40	☐	☐	☐	
Is there an asbestos removal control plan prepared?	464	☐	☐	☐	
Is the Asbestos Removal Control Plan readily accessible?	465	☐	☐	☐	
Are there arrangements (eg health and safety representative, health and safety committee or other agreed arrangements) to consult with workers on safety matters?	Sections 47 – 49 of the WHS Act	☐	☐	☐	
Have safe work method statements been prepared for high risk construction work?	299	☐	☐	☐	
Is there an asbestos register?	450 and 463	☐	☐	☐	
Has the structure been inspected to determine whether asbestos is present?	451–453	☐	☐	☐	
Do all persons working with asbestos have correct training?	460	☐	☐	☐	
Do all workers have construction induction cards?	316	☐	☐	☐	
Is plant inspected on a regular basis?	213	☐	☐	☐	
Do workers have high risk work licences (if required)?	81	☐	☐	☐	
Is correct personal protective equipment provided, fit tested, and used?	44	☐	☐	☐	
Have all services been disconnected (ie electrical, gas, water, fire)?	163	☐	☐	☐	
Is dust generated by demolition activity being controlled?	35	☐	☐	☐	
If air monitoring is undertaken, is it done by a competent person?	475 and 482	☐	☐	☐	
Are workers prevented from falling through open penetrations and unprotected edges?	78	☐	☐	☐	
Are exclusion zones or overhead protection in place to stop building debris from falling on workers below?	54	☐	☐	☐	
Is a compliant scaffold provided?	225	☐	☐	☐	
Has the handover certificate been provided for the scaffold?	225	☐	☐	☐	

Checklist	WHS Regulation	Yes	No	N/A	Notes/comments
For a Class A Friable Asbestos Removal License holder, is there a current certified safety management system in place?	493	☐	☐	☐	
Are arrangements in place for a clearance inspection to be carried out, after asbestos is removed, by an independent licensed assessor or competent person?	473	☐	☐	☐	
Is asbestos waste and contaminated PPE planned to be disposed of as soon as practicable at a site authorised to accept asbestos waste?	472	☐	☐	☐	
Has notification of asbestos removal been given to the neighbours?	467	☐	☐	☐	
Are there facilities available to decontaminate the following: asbestos removal area, plant used in the asbestos removal area, workers carrying out asbestos removal work, other persons who have access to the asbestos removal area?	471	☐	☐	☐	
Does the licence holder have systems in place for decontamination and annual maintenance of Class H asbestos vacuum cleaners?	35	☐	☐	☐	
Has health monitoring for workers been undertaken by a licensed medical practitioner?	435–444	☐	☐	☐	

Notes

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APPENDIX R

Mamre Road Precinct Working Group Protocol (MRPWG Protocol)

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