Transport for NSW

Henry Lawson Drive site investigations

Minor works review of environmental factors

December 2024

Acknowledgement of Country

Transport for NSW acknowledges the Dharug People, the traditional custodians of the land on which the Henry Lawson Drive site investigations is proposed.

We pay our respects to their Elders past and present and celebrate the diversity of Aboriginal people and their ongoing cultures and connections to the lands and waters of NSW.

Many of the transport routes we use today – from rail lines, to roads, to water crossings – follow the traditional Songlines, trade routes and ceremonial paths in Country that our nation's First Peoples followed for tens of thousands of years.

Transport for NSW is committed to honouring Aboriginal peoples' cultural and spiritual connections to the land, waters and seas and their rich contribution to society.

Approval and authorisation

Approved by	Justin Hyde
Signed	
Date	04/12/2024

Review of environmental factors (REF) publication checklist

Part A

If the answer is **'no'**, continue to **Part B**.

If the answer is **'yes'**, the minor works REF does **not** need to be published. Do not continue to Part B.

1. **Does the work involve either of the following?:** • Sensitive government infrastructure (critical infrastructure asset) • Sensitive government information (early works for projects that are confidential).	Yes ☐	No ☒

Part B

If the answer is **'no'** to **all** questions, the minor works REF does not need to be published.

If the answer is **'yes'** to **any** question, the minor works REF must be published. Instructions for how to publish are provided in EMF-PA-FS-0141 REF publishing factsheet.

1.	**Is the value of the work more than $5 million?** For guidance on calculating the CIV see link: Calculation of capital investment value	Yes ☒	No ☐
2.	**Is the work likely to need any of the following permits or approvals before it may be carried out?** [i]		
	Aquaculture permit (s144 *Fisheries Management Act 1994*)	Yes ☐	No ☒
	Permit to harm marine vegetation (s205 *Fisheries Management Act 1994*)	Yes ☐	No ☒
	Permit to block fish passage (s219 *Fisheries Management Act 1994*)	Yes ☐	No ☒
	Approval for work on a state heritage listing or interim heritage order (s57 *Heritage Act 1977* (where an application for approval is to be made under s60))	Yes ☐	No ☒
	Aboriginal heritage impact permit (s90 *National Parks and Wildlife Act 1974*)	Yes ☐	No ☒
	Environment protection licence for scheduled activity (premises or non-premises based) (s48 and s49 *Protection of the Environment Operations Act 1997*)	Yes ☐	No ☒
	Environment protection licence for non-scheduled activities to regulate water pollution (s122 *Protection of the Environment Operations Act 1997*)	Yes ☐	No ☒

3.	**Would the public have an interest in the work? (s171(4)(c) of EP&A Regulation)** Note 1: The following questions are provided as a guide to help decide whether it is in the public interest to publish the REF. Note 2: If needed, seek guidance from the Communications and Engagement team.		
	a) Has the work, issue or project been reported in the media? b) Is the work part of a political announcement, project or initiative? c) Could the work change the landscape character or visual amenity of a place permanently? (more than a minor change) d) Does the work change access, traffic movements or parking for residents, businesses or a community facility? (more than a minor change) e) Does the work change the visibility of a business or a community facility? (more than a minor change) f) For rail activities, does the work involve a change in the listing of an item of local environmental heritage? Or for all other activities, does the work involve permanent and more than a minor change to an item of local environmental heritage?	Yes ☒	No ☐

[i] Additional approvals or permits listed in s171(4) that do not generally apply to Transport for NSW (for which publication of an REF would be required):

- Permit to carry out dredging or reclamation by a local government authority (s200 *Fisheries Management Act 1994*)
- Environment protection licence for scheduled development work (s47 *Protection of the Environment Operations Act 1997*)
- Forestry operation carried out in accordance with an integrated forestry operations approval or authorised private native forestry plan (s122 *Protection of the Environment Operations Act 1997*)

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1. Introduction

The purpose of the minor works review of environmental factors (REF) is to describe the proposal, to document the likely impacts of the proposal on the environment, to detail mitigation measures to be implemented and to determine whether or not the proposal can proceed. For the purposes of this work Transport for NSW (Transport) is the proponent and determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The description of the proposed works and assessment of associated environmental impacts has been undertaken in the context of section 171 of the Environmental Planning and Assessment Regulation 2021, Guidelines for Division 5.1 Assessments (DPE, 2022), the *Biodiversity Conservation Act 2016* (BC Act), the *Fisheries Management Act 1994* (FM Act) and the *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)* (EPBC Act).

In doing so the REF helps to fulfil the requirements of section 5.5 of the EP&A Act including that Transport examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Public Spaces under Division 5.2 of the EP&A Act.
- The significance of any impact on threatened species as defined by the BC Act and/or FM Act, in section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement or a Biodiversity Development Assessment Report
- The potential for the proposal to significantly impact a matter of national environmental significance, including nationally listed threatened biodiversity matters, or the environment of Commonwealth land. Where a significant impact is considered likely on nationally listed biodiversity matters, either the proposal must be reconsidered or a project REF must be prepared.

2. The proposal

2.1 Description

2.1.1 Proposal location

Table 2-1: Proposal location details

Location details	
Title	Henry Lawson Drive Upgrade Stage 1B Site Investigations
File number	
Road name and number	Henry Lawson Drive (State Road MR508)
Closest crossroad(s)	From Auld Avenue to M5 South Western Motorway
Chainage of works	1.8 kilometres between Auld Avenue and north of M5 Motorway
Local government area	Canterbury-Bankstown Council
Transport for NSW region	Central River City

2.1.2 Proposal description

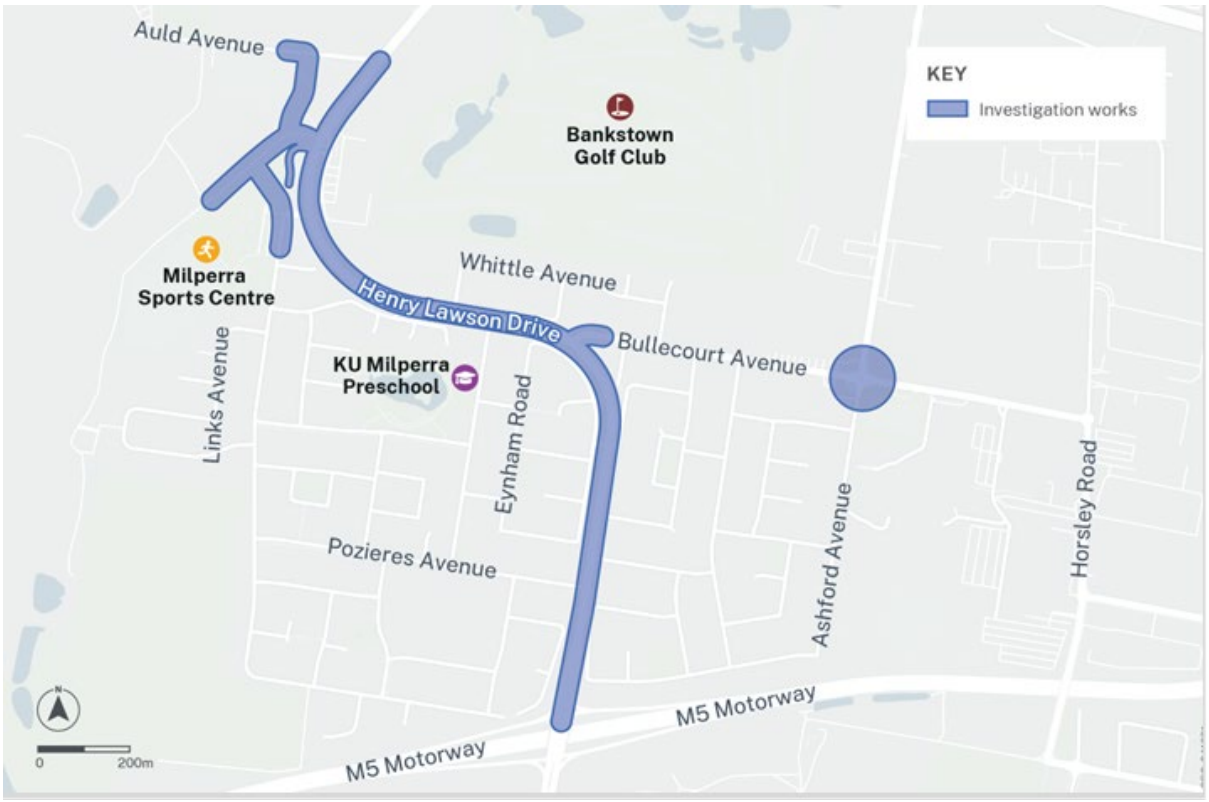
Transport proposes to conduct site investigations within the proposal area of Henry Lawson Drive 1B in Milperra between Auld Avenue and the M5 South Western Motorway, within the Canterbury-Bankstown Local Government Area. The investigations are required to inform the detailed design of the approved Henry Lawson Drive Upgrade Stage 1B project (HLD-1B), and would include topographic surveys, utility investigations, and geotechnical investigations. Figure 2-1 shows the extent of the proposal. Details of the proposal including the specific locations are given in Appendix C.

The key features of the proposal are as follows:

- Topographic survey – non-intrusive
- Utility survey and investigations
- Geotechnical investigations

Investigation will be taken across the whole project area with details locations shown in Appendix C

Figure 2-1 Map of the proposal with investigation locations



Methodology

The proposal is anticipated to involve the following work methodologies:

Topographic survey

- Access to survey locations from Henry Lawson Drive would involve driving a light vehicle and walking through survey area. No access tracks would not be required.
- Establishment of traffic control in situations where survey staff are working near traffic. This would be in accordance with Transport's *Traffic control at work sites manual* (version 6.1, 2022) and Australian Standard 1742.3 *Manual of uniform control devices*.
- Tree trimming in vegetated areas using garden hand-held clippers if required to gain access by foot to set up survey control marks.
- Terrestrial Laser Scanning (TLS) – A laser scanning instrument is mounted on tripod and operated at numerous coordinated control points along the project extents to capture sufficient information to extract key road features.
- Use of traditional ground survey methods to increase the accuracy of the point cloud and to capture areas behind physical barriers such as thick vegetation. Traditional survey involves of a surveyor walking around with a range pole taking measurements to points of interest. These measurements will be taken from a total station instrument mounted on a tripod and setup over a co-ordinated survey mark, within a distance less than 100 metres from the range pole.
- GPS survey – May be used to survey natural surface strings outside the road corridor. No hard surfaces will be surveyed using GPS methods.
- Control traversing – The Survey Control Network will be connected via the traversing method where measurements are taken from a total station set up over a survey control mark to targets also setup over surrounding survey control marks. The control network will be coordinated by connecting existing TfNSW project survey control and/or State Survey Marks in the area to each other to form a braced network to eliminate any discrepancies between marks. At locations where current state survey marks are not inter-visible or not sufficient to carry out the survey, new marks will need to be placed (refer below).
- Placement of survey marks to provide a survey control framework for survey activities. The survey marks would primarily be in the form of small wooden pegs that are placed in the ground (generally 100-150 millimetres deep and flush with the ground). Star pickets and small 'Hilti'-style nails may be used in existing concrete structures (e.g. bridges or culverts) as survey marks. No pegs, pins, star pickets or paint would be placed in natural rock formations or potential Aboriginal sites
- Digging holes using hand tools to uncover and place sub surface survey marks. Holes would be about a maximum of 500 millimetres diameter and 500 millimetres deep (1000 millimetres for star pickets).
- Digital Levelling – Secondary survey control marks would be levelled in a two-way level run, with a digital level and barcode staff. Level runs would be carried out by two surveyors, one operating the digital level and the other holding the barcode staff.

Utility survey

- Access to survey locations from Henry Lawson Drive would involve driving a light vehicle and walking through survey area. New access tracks would not be required.
- Establishment of traffic control in situations where survey staff are working near traffic. This would be in accordance with Transport's *Traffic control at work sites manual* (version 6.1, 2022) and Australian Standard 1742.3 *Manual of uniform control devices.*

Non-intrusive utility survey

- Locating of underground services using Electromagnetic Service Locating equipment.

- Conduct site walkovers to identify visible utility features such as manholes, valve covers, and electrical boxes.
- Detailed survey of all drainage assets (drainage pits and inverts). Drainage assets which have pit lids may require heavy lifting mechanisms.
- Detailed survey of all sewer assets (sewer pits and inverts). Sewer assets which have pit lids may require heavy lifting mechanisms.
- Surveying of all marked up underground utilities with conventional survey techniques (total station and ranging pole).
- Marking of all underground utilities in scope of works area with water-based spray paint.
- Using a vacuum truck to clean pits (as necessary) during the above survey works.

Potholing and slit trenching

- Undertaking potholing and slit trenching using a vacuum truck in existing road corridors to confirm clearances from existing and future utilities and proposed pavement (i.e. water, stormwater, gas, electricity, sewer lines).
- The disturbance footprint for potholes would typically be 600 millimetres wide and long, and for slit trenches would typically be between 300 to 400 millimetres wide and extend from the kerb to road boundary. Potholes and slit trenches would be excavated to a maximum depth of around two metres, depending on the soil type.
- Back-filling of excavated holes with removed material

Geotechnical investigations

- Access to investigation locations directly from the nearest public road. This would involve transport to site and use of a truck or track mounted drill rig (for boreholes), a five (or eight)-tonne tracked excavator or backhoe, and support vehicles. Where investigation locations are not accessible directly off a public road, access would occur through existing paths or on previously cleared or disturbed areas (such as grassed areas), where possible. Where investigations fall within mapped TEC only weeds would be removed. Should any tree trimming be required it would be contained to less than 10% of the canopy cover. No Habitat Trees would be impacted.
- For the proposed bridge boreholes access may be required in vegetated areas. WSP shall construct access tracks and drill pads within approved designated areas. The construction of access tracks may require minor vegetation removal, controlled pruning, rock, and soil excavation. All works shall be carried out using select, and pre-approved, mobile plant. Access tracks shall have a nominal width of 3 m and drill pad size shall be minimised where possible. Where possible track pads would be placed on site to minimise any ground disturbance.
- Establishment of traffic control in situations where personnel are working near traffic. Transport's *Traffic control at work sites manual* (version 6.1, 2022) and Australian Standard 1742.3 *Manual of uniform control devices.*

Test pits

- Dig test pits with an excavator or backhoe. Test pits would be typically 2 - 3 metres long, by 0.5 metres wide, by about three metres deep. The total disturbance area including track marks from the excavator would be up to three metres by five metres.
- Log, photograph, and test each pit to record in-situ conditions.
- Perform dynamic cone penetration (DCP) tests within the test pit footprint prior to test pit excavation to a depth of about 2 metres and collect soil samples for later laboratory analysis
- Hand penetrometer tests are to be conducted on all cohesive soil layers. At depth, hand penetrometer tests will be carried out on relatively undisturbed samples of excavated material.
- Restore site to condition suitable for safe pedestrian and vehicle access, including backfilling the test pit with material (including topsoil and layers) and compacting in layers no more than 300mm thick. The

backfilled pits would be left slightly mounded to allow for any settlement and where necessary sown with a suitable cover-crop.

Pavement cores

- A 300mm diameter diatube will be used to core through the pavement and recover the full depth of the pavement, including asphalt, concrete and bound pavement layers.
- Dynamic Cone Penetration (DCP) test will be completed from subgrade level to a depth of 1.5m (or prior refusal) to assess the strength of the subsurface soils.
- A 250mm diameter auger will be used to advance the hole to a target depth of 1.5m below the top of the existing pavement level to investigate subgrade conditions and allow for samples to be collected.
- Backfill with hand-mix sand(95%)/cement(5%) and will be capped by cold mix asphalt to match existing surface. Excess waste (if any) will be removed from site by the subcontractor

Boreholes

- Auger boreholes with a diameter of about 125 millimetres to a depth of up to 15 metres or until refusal on bedrock encountered. The disturbance area from the drilling component of the activity would be about 0.25 metres by 0.25 metres. Borehole drilling will continue with conventional rotary core drilling termination depth.
- Ground disturbance from manoeuvring the truck mounted drill rig would be up to three metres by five metres.
- Log, colour photograph, and test each borehole to record in-situ conditions, including standard penetration testing, pocket penetrometer tests, undisturbed push tubes and hand shear vanes.
- Upon completion, boreholes would be backfilled with cement grout.
- Excess biodegradable drilling mud used in the drilling process may be removed daily by the drilling subcontractor to a licenced facility or would be removed by a vacuum truck or portable vacuum system and legally disposed of off-site at an authorised waste disposal facility.

Equipment and plant

- Non-intrusive survey tools and equipment
- Survey vehicles
- Vacuum truck
- Excavator / backhoe (under 20 tonnes)
- Truck mounted drilling rigs for boreholes and pavement cores
- Diatube concrete corer
- Tipper truck (if required)
- Pozzie track / bobcat / skid steer
- Drilling support vehicles, including a minimum of 1,000L in water storage
- Dynamic cone penetration test equipment
- Traffic control vehicles and plant
- Site support vehicles

2.1.3 Proposal objectives

The objectives of the site investigations are to:

- Provide data required to inform the detailed design of Henry Lawson Drive Upgrade Stage 1B (HLD-1B)

- Minimise the environmental impacts of the proposal and HLD-1B
- Support the delivery of the objectives of HLD-1B, which are to:
  - Improve travel times, journey time reliability and road safety outcomes for all road users
  - Improve freight efficiency and reduce vehicle operating costs on the road network
  - Support new development in the precinct by improving traffic flow and connectivity to Bankstown Airport, Milperra Industrial Estate and proposed residential development in the area and the surrounding road network
  - Improve connectivity and safety for pedestrians and cyclists.

2.1.4 Ancillary facilities

Table 2-2: Ancillary facilities

Ancillary facilities		
Will the proposal require the use or installation of a compound site?	Yes ☐	No ☒
Will the proposal require the use or installation of a stockpile site?	Yes ☐	No ☒
Are any other ancillary facilities required (e.g. temporary plants, parking areas, access tracks)? Provide details including location, size and nature of required access tracks, amount of clearing required and site photographs. For the proposed bridge boreholes access will be required in the vegetated areas. WSP shall construct access tracks and drill pads within approved designated areas. The construction of access tracks may require minor vegetation removal (no trees to be removed), controlled pruning, rock, and soil excavation. All works shall be carried out using select, and pre-approved, mobile plant. Access tracks shall have a nominal width of 3 m (plus cut/ fill batters, where required) and drill pads size shall be minimised where possible. **Typical Drill Site Set-up (note dimensions are approximate and will depend on footprint of cleared area)** The alignment of proposed new access tracks and drill pad locations shall either be marked out on-site by Differential GPS and / or the design data uploaded to the earthworks' GPS equipment. As part of the works, minor vegetation clearance and topsoil removal shall be required and is discussed in the following sections. The access tracks for (assumed) 'bridge' borehole locations will be approximately 3m wide. Access track length and alignment pending LiDAR information and environmental constraints. Excavation to primarily involve a small/medium tracked excavator for clearance of oversized vegetation with specific attachments used as required. No trees will be removed. A compact loader will be used to shift material and level the access track as required. Drill pads will be constructed from site-won material (i.e., cut material) produced during the new access track construction.	Yes ☒	No ☐

2.1.5 Proposed date of commencement

The investigations are proposed to commence in December 2024, subject to project management and weather considerations.

2.1.6 Estimated length of construction period

The investigations are expected to require approximately twelve weeks to complete, weather permitting, taking into account two week shut down period over Christmas. It is expected that the geotechnical investigation will require about 6 weeks to complete with 2-3 crews.

The majority of works are located in the road verge and would be undertaken during Transport's standard construction hours (7am – 6pm Monday to Friday, and 8am – 1pm Saturday). Pavement coring and some utility investigations located on or directly adjacent to the road pavement would need to be undertaken outside of standard working hours, subject to Road Occupancy Licences (ROLs), to minimise traffic disruption and reduce safety risks for the work crews and public. Proposed out of hours shifts are between 8.00pm and 5.00am Sunday to Thursday. No works would be undertaken on Public Holidays or during standard hours on Sundays.

2.2 Need and options

2.2.1 Options considered

The options considered for the proposal included:

- Option 1: Do nothing.
- Option 2: Conduct site investigations.

An assessment of how the options considered would meet the proposal objectives is provided in Table 2-3.

Table 2-3 Options analysis against the proposal objectives

Objective	Option 1 – Do nothing	Option 2 – Conduct site investigations
Provide data required to inform the detailed design of HLD-1B	• Does not enable the collection of data needed for HLD-1B detailed design ☒ **Does not meet the objective**	• Enables the collection of data needed for HLD-1B detailed design ☑ **Meets the objective**
Support the delivery of the objectives of HLD-1B (see Section 2.1.3 for full list)	• Does not allow the detailed design of HLD-1B to take into account relevant site conditions. Could result in the need to redesign during construction as a result of unexpected site conditons. • Does not support the delivery of infrastructure in HLD-1B that is safe to use and meets engineering requirements, due to uncertainty regarding site conditions ☒ **Does not meet the objective**	• Allows the detailed design of HLD-1B to take into account relevant site conditions, minimising the need for redesign during construction due to the discovery of unexpected site conditions. • Supports the delivery of infrastructure in HLD-1B that is safe to use and meets engineering requirements by designing to reflect site conditions ☑ **Meets the objective**
Minimise the environmental impacts of the proposal and HLD-1B	• Would have no environmental impacts as a result of the proposal itself • Not conducting the investigations would increase the potential need for remedial works, with associated environmental impacts, due to the design not reflecting site conditions ☒ **Does not meet the objective**	• The investigations would be located and carried out in order to minimise environmental impacts • Conducting the investigations would reduce the potential need for remedial works, with associated environmental impacts, due to the design not reflecting site conditions ☑ **Meets the objective**

As a result of the option analysis, the preferred option is:

- Option 2: Conduct site investigations.

2.2.2 Justification for the proposal

The proposal is required to ensure that detailed design of HLD-1B can proceed through the provision of information on site conditions. This information is required to allow the infrastructure delivered as part of HLD-1B to be designed to reflect the relevant site conditions, so that it is safe to use, meets engineering requirements, and avoids the need for redesign during construction or remedial works following construction.

2.3 Statutory and planning framework

2.3.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

The State Environmental Planning Policy (Transport and Infrastructure) 2021 (TI SEPP) aims to facilitate the effective delivery of infrastructure across the state. This includes roads and road infrastructure facilities, and port, wharf or boating facilities.

Section 2.109 of the TI SEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent. As the proposal is appropriately characterised as development for the purposes of a road or road infrastructure facilities and is to be carried out by or on behalf of Transport, it can be assessed under Division 5.1 of the EP&A Act. Development consent from council is not required.

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* and does not require development consent or approval under:

- State Environmental Planning Policy (Resilience and Hazards) 2021
- State Environmental Planning Policy (Precincts – Central River City) 2021
- State Environmental Planning Policy (Planning Systems) 2021.

2.3.2 State Environmental Planning Policy (Biodiversity and Conservation) 2021

Chapter 6 (Water Catchments) of the State Environmental Planning Policy (Biodiversity and Conservation) 2021 relates to the use of land within four regulated catchments as defined in the SEPP:

- the Sydney Drinking Water Catchment
- the Sydney Harbour Catchment
- the Georges River Catchment
- the Hawkesbury-Nepean Catchment.

The proposal is located in the Georges River Catchment. Transport has assessed the proposals impact to water quality and quantity, aquatic ecology, flooding, and recreation and public access. An assessment of these factors is provided in Appendix B.

2.3.3 Other relevant legislation and environmental planning instruments

State Environmental Planning Policy (Resilience and Hazards) 2021

While the proposal does not require development consent or approval under the State Environmental Planning Policy (Resilience and Hazards) 2021 (RH SEPP) as noted above, Chapter 2 (Coastal Management) does relate to the proposal as it located near to areas mapped as Coastal Wetlands, and part of the proposal is within the area mapped as Proximity Area for Coastal Wetlands. Proximity Areas are not considered part of the Coastal Zone or a Coastal Management Area. Section 2.8 of the RH SEPP requires the consent authority to be satisfied that there would be no significant impacts on both the biophysical, hydrological or ecological integrity of the adjacent coastal wetland, and on the quantity and quality of surface and ground water flows to and from the adjacent

coastal wetland. An assessment of these factors is provided in Section 3.7, which concludes there would be no significant impacts.

2.4 Community engagement and agency consultation

2.4.1 SEPP (Transport and Infrastructure) consultation

Part 2.2 of the SEPP (Transport and Infrastructure) contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. This is detailed below:

Table 2-4: Consultation required with Council

Is consultation with Council required under sections 2.10 - 2.12 and 2.14 of the SEPP (Transport and Infrastructure)?		
Are the works likely to have a substantial impact on the stormwater management services which are provided by council?	Yes ☐	No ☒
Are the works likely to generate traffic to an extent that will strain the capacity of the existing road system in a local government area?	Yes ☐	No ☒
Will the works involve connection to a council owned sewerage system? If so, will this connection have a substantial impact on the capacity of the system?	Yes ☐	No ☒
Will the works involve connection to a council owned water supply system? If so, will this require the use of a substantial volume of water?	Yes ☐	No ☒
Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a minor or inconsequential disruption to pedestrian or vehicular flow?	Yes ☐	No ☒
Will the works involve more than a minor or inconsequential excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance? While the proposal involves the excavation of test pits and the drilling of boreholes and pavement cores, some of which are on roads for which Canterbury-Bankstown Council is the roads authority, these investigations are not more than minor or inconsequential, and ground levels would be restored following the investigations.	Yes ☐	No ☒
Is there a local heritage item (that is not also a state heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the heritage significance of the item/area are more than minor or inconsequential?	Yes ☐	No ☒
Is the proposal within the coastal vulnerability area and inconsistent with a certified coastal management program applying to that land?	Yes ☐	No ☒
Are the works located on flood liable land? If so, will the works change flooding patterns to more than a minor extent? *Note: Flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the Floodplain Development Manual: the management of flood liable land (nsw.gov.au).* The proposed investigations are within the probable maximum flood extents of the Georges River and Milperra Creek catchments as identified by the Henry Lawson Drive Upgrade Stage 1B Hydrology and Flooding Assessment (Aurecon, 2023). However, the work would not change flooding patterns to more than a minor extent. Consultation with Council is not required.	Yes ☐	No ☒

Table 2-5: Consultation with other public authorities

Is consultation with a public authority (other than Council) required under sections 2.13, 2.15 and 2.16 of the SEPP (Transport and Infrastructure)?		
Are the works located on flood liable land? (to any extent) If so, do the works comprise more than minor alterations or additions to, or the demolition of, a building, emergency works or routine maintenance? *Note: Flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the Floodplain Development Manual: the management of flood liable land (nsw.gov.au).* The proposed investigations are within the probable maximum flood extents of the Georges River and Milperra Creek catchments as identified by the Henry Lawson Drive Upgrade Stage 1B Hydrology and Flooding Assessment (Aurecon, 2023). However, the works are temporary investigations and would not change flooding patterns. Consultation with the SES is not required.	Yes ☐	No ☒
Are the works adjacent to a national park, nature reserve or other area reserved under the *National Parks and Wildlife Act 1974*, or on land acquired under that Act?	Yes ☐	No ☒
Are the works on land in Zone C1 National Parks and Nature Reserves or in a land use zone equivalent to that zone?	Yes ☐	No ☒
Do the works include a fixed or floating structure in or over navigable waters?	Yes ☐	No ☒
Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional facility or group home in bush fire prone land?	Yes ☐	No ☒
Would the works increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map? *(Note: the dark sky region is within 200 kilometres of the Siding Spring Observatory)*	Yes ☐	No ☒
Are the works on buffer land around the defence communications facility near Morundah? *(Note: refer to Defence Communications Facility Buffer Map referred to in clause 5.15 of Lockhart LEP 2012, Narrandera LEP 2013 and Urana LEP 2011).*	Yes ☐	No ☒
Are the works on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*?	Yes ☐	No ☒
Are the works on, or reasonably likely to have an impact on, a part of the Willandra Lakes Region World Heritage Property?	Yes ☐	No ☒
Are the works within a Western City operational area specified in Schedule 2 of the *Western Parkland City Authority Act 2018* with a capital value of $30 million or more?	Yes ☐	No ☒

Table 2-6: Notification of council and occupiers of adjoining land

Do Council and occupiers of adjoining land need to be notified under section 2.111 of the SEPP (Transport and Infrastructure)?		
Does the proposal include a car park intended for the use by commuters using regular bus services?	Yes ☐	No ☒
Does the proposal include a bus depot?	Yes ☐	No ☒

Does the proposal include a permanent road maintenance depot or associated infrastructure, such as garages, sheds, tool houses, storage yards, training facilities and workers amenities?	Yes ☐	No ☒

2.4.2 Other agency and community engagement

As the investigations would be short term, are of a routine nature and would have minimal environmental impacts, broader pre-work consultation is not proposed.

A letterbox drop notification for residential receivers as outlined in Section 3.3 will occur at least five business days prior to works starting. The extent of the notification will be confirmed with reference to the noise assessment and the specific types of activities proposed. The notification will detail work activities, dates and hours, impacts and mitigation measures. It will also include a contact number for enquiries and complaints.

Any private property access required for the investigations would occur by written agreement with the relevant landowner.

3. Environmental assessment

This chapter provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of the factors specified in s171 of the Environmental Planning and Assessment Regulation 2021.

The matters of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) are also considered in Appendix A. Site-specific safeguards are provided to ameliorate the identified potential impacts.

3.1 Soil

Table 3-1: Soil

Description of existing environmental and potential impacts		
Are there any known occurrences of salinity or acid sulfate soils in the area? *Salinity* A search of the eSPADE Soil and Land Information site (refer to Figure 3-2) demonstrates the overall salinity hazard near the proposed investigations comprises: • Very high overall salinity hazard to the south and east of the Amiens Avenue intersection with Henry Lawson Drive • Very low overall salinity hazard along Henry Lawson Drive between Raleigh Avenue and Amiens Avenue • Moderate overall salinity hazard to the north of the Raleigh Road intersection with Henry Lawson Drive. While parts of the proposal are in areas identified as having a very high overall salinity hazard, due to the temporary and spatially restricted nature of the investigations no impact is expected to salinity levels. *Acid sulfate soils* The proposal area is located on land classified as Class 3, 4 and 5 acid sulfate soils under the Canterbury-Bankstown LEP 2023 (refer to Figure 3-1). The definition of the classes and the investigations involving ground penetration proposed in each class are given below: • **Class 3**: Acid sulfate soils are likely to be found beyond one metre below the natural ground surface. • **Class 4**: Acid sulfate soils are likely to be found beyond two metres below the natural ground surface. • **Class 5**: Acid sulfate soils are not typically found in Class 5 areas. These areas are located within 500 metres of land classified as Class 1 – 4. The proposed test pits and boreholes in the Class 3 area may intercept with acid sulfate soils as they would penetrate greater than one metre below the natural ground surface. Safeguards will be implemented to manage impacts due to exposure of acid sulfate soils. It is noted that the areas that would be disturbed are spatially very restricted, and the disturbance period would be short.	Yes ☒	No ☐
Does the proposal involve the disturbance of large areas (e.g., >2ha) for earthworks? While some excavation would be required as part of the investigation works, it would not involve disturbance to large areas.	Yes ☐	No ☒
Does the site have constraints for erosion and sedimentation controls such as steep gradients or narrow corridors?	Yes ☐	No ☒
Are there any sensitive receiving environments that are located in or nearby the likely proposal area or that would likely receive stormwater discharge from the proposal?	Yes ☒	No ☐

Sensitive receiving environments include (but are not limited to) wetlands, state forests, national parks, nature reserves, rainforests, drinking water catchments). A number of areas mapped as coastal wetlands are located in the vicinity of the proposal (refer to Figure 3-10). The closest wetlands are located upstream of the proposal on Milperra Drain, but wetlands are also located downstream of Milperra Drain on the Georges River. Safeguards will be implemented to minimise impacts of sediment from any stormwater discharge. Additionally, due to the nature and timing of the works, any stormwater discharge is expected to be negligible. Further assessment of impacts to coastal wetlands is given in Section 3.7.		
Is there any evidence within or nearby the likely footprint of potential contamination? Potential sources of contamination and key areas of environmental concern have been identified from a review of previous investigations and background information and include: • Presumed presence of fill materials imported during construction of the Henry Lawson Drive and associated infrastructure during the 1960s • Former landfills in the surround area with potential for exposure to volatile landfill gases, contaminated groundwater and waste material • Potential fuel contamination from surface spills and underground storage tank leaks at the BP Service Station on Bullecourt Avenue. Based on supplied information, the state of underground infrastructure and subsurface material (ie soil and groundwater) is unknown A search of the NSW Environment Protection Authority contaminated land record of notices for the suburbs of Milperra, Panania and Revesby conducted on 19 November 2024 returned no records of notices in the area. A search of the List of NSW contaminated sites notified to EPA (as at 8 November 2024) identified two contaminated sites notified to the EPA within 500 metres of the proposed investigations: • 479 Henry Lawson Drive, Milperra – Former landfill on the Flower Power site adjacent to the Milperra Drain and Henry Lawson Drive northern investigation areas • 54 Auld Avenue, Milperra – Former landfill in the Vale of Ah Reserve to the northwest of the Milperra Drain investigation area For both of these sites, the EPA has determined that regulation under the *Contaminated Land Management Act 1997* is not required. Excavation of the soil therefore has potential to expose contaminated materials. The proposed investigations may generate sediment during rainfall events due to ground disturbance as a result of excavation. These impacts would be minimised through implementation of soil and erosion control safeguards.	Yes ☒	No ☐
Is the likely proposal footprint in or nearby highly sloping landform?	Yes ☐	No ☒
Is the proposal likely to result in more than 2.5ha (area) of exposed soil?	Yes ☐	No ☒

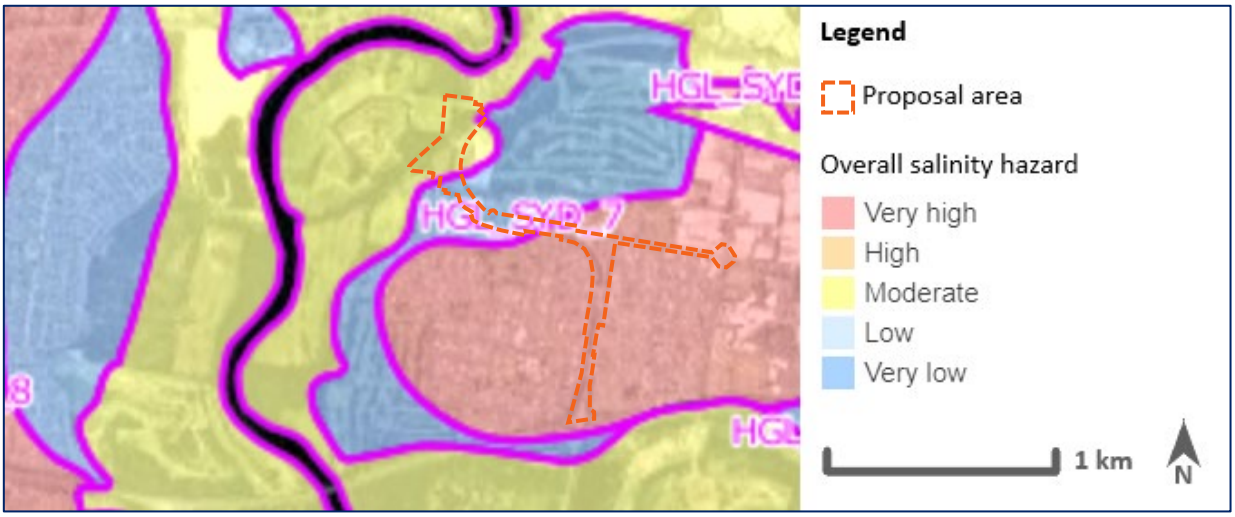


Figure 3-1 Overall salinity hazard in the vicinity of the proposal

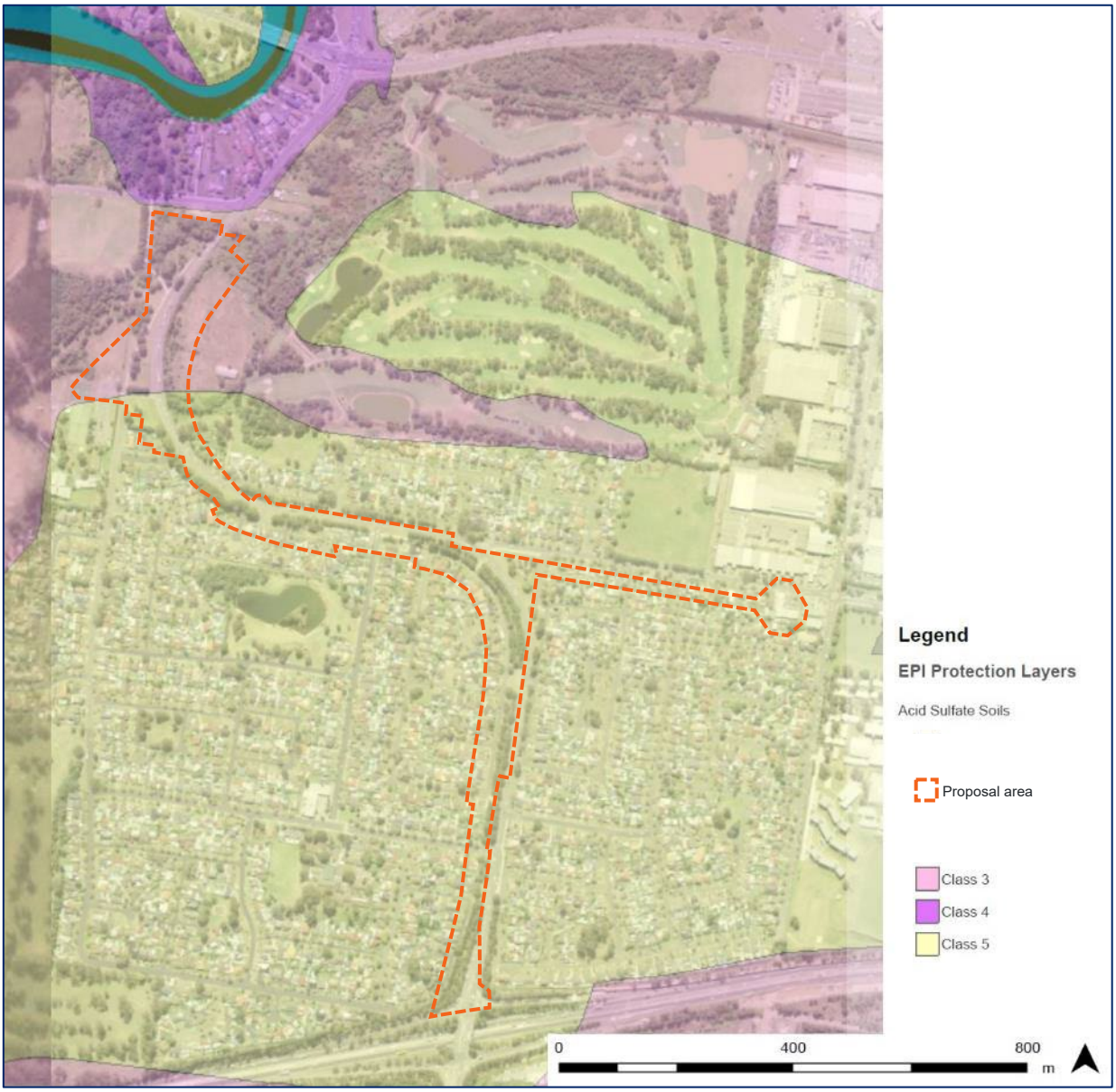


Figure 3-2 Acid sulfate soils classification areas and ground-penetrating investigations proposed for sub-Class 5 areas

Safeguards

Safeguards to be implemented are:

E1	Erosion and sediment control measures will be implemented and maintained to: • minimise sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets • reduce water velocity and capture sediment on site • minimise the amount of material transported from site to surrounding pavement surfaces • divert clean water around the site. (in accordance with the Landcom/Department of Housing *Managing Urban Stormwater, Soils and Construction Guidelines* (the Blue Book)).
E2	Erosion and sedimentation controls will be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request.
E3	Erosion and sediment control measures will not be removed until the works are complete and areas stabilised.
E4	Potential or actual acid sulfate soils will be managed in accordance with the Transport *Guidelines for the Management of Acid Sulfate Materials (2005)*.
E5	If contaminated areas are encountered during investigations, appropriate control measures will be implemented to manage the immediate risks of contamination, and all works that may impact on the contaminated area must cease. The steps in Transport *Environmental Incident Procedure* (EMF-EM-PR-0001) must be followed, with the Transport Environment & Sustainability Officer and Project Management Team notified immediately.
E6	Ground disturbance from vehicle use will be minimised via access route selection, with vehicle access via the nearest public road or existing paths or previously cleared or disturbed areas (where investigation locations are not accessible directly off a public road), where possible. Where no public roads are available, track pads would be placed on site to minimise any ground disturbance.

3.2 Waterways and water quality

Table 3-2: Waterways and water quality

Description of existing environmental and potential impacts		
Is the proposal located within, adjacent to or near a waterway? Henry Lawson Drive is located to the east of the Georges River. The topographic survey on Auld Ave in the Milperra Drain area is the closest investigation site to the river, located approximately 125 metres to the south of the river.. There is a waterway (Milperra Drain) between Auld Avenue and Keys Parade with direct hydrological connection to the Georges River. Some investigation locations are within 100 metres of this waterway. Investigation locations near Milperra Drain, if not managed correctly could result in water quality impacts. This could include increased nutrients, increased turbidity, lower dissolved oxygen levels and altered pH. Safeguards will be implemented to minimise the potential for adverse impacts to aquatic health. Fuels and chemicals would be required to operate plant and equipment for the duration of works. There is potential for leaks and spills which could impact soil and nearby waterways. The refuelling of plant and equipment would occur off-site and chemicals would be secured within vehicles.	Yes ☒	No ☐
Is the location known to flood or be prone to water logging? The proposed investigations are within the probable maximum flood extents of the Georges River and Milperra Creek catchments as identified by the Henry Lawson Drive	Yes ☒	No ☐

Upgrade Stage 1B Hydrology and Flooding Assessment (Aurecon, 2023). However, the works are temporary investigations and would not change flooding patterns.		
Is the proposal located within a regulated catchments covered by chapter 6 of State Environmental Planning Policy (Biodiversity and Conservation) 2021 (BC SEPP)? The proposal is located in the Georges River Catchment. This MWREF has assessed the proposal's impact to water quality and quantity, aquatic ecology, flooding, and recreation and public access. An assessment of these factors is provided in Appendix B.	Yes ☒	No ☐
Would the proposal be undertaken on a bridge or ferry?	Yes ☐	No ☒
Is the proposal likely to require the extraction of water from a local water course (not mains)?	Yes ☐	No ☒

Figure 3-3 Milperra drain location

Safeguards

Safeguards to be implemented are:

W1	No dirty water will be released into drainage lines and/or waterways.
W2	Water quality control measures will be used to prevent any materials (e.g., concrete, grout, sediment etc.) entering drain inlets or waterways.
W3	Refuelling of plant and equipment is not to occur on site.
W4	Vehicles and plant will be properly maintained and regularly inspected for fluid leaks.

W5	An emergency spill kit will be kept on site at all times and maintained throughout the construction work. The spill kit must be appropriately sized for the volume of substances at the work site and personnel inducted in its use.
W6	All workers will be advised of the location of the spill kit and trained in its use.
W7	If an incident (e.g., spill) occurs, the Transport *Environmental Incident Procedure* (EMF-EM-PR-0001) will be followed and the Transport Environment & Sustainability Officer and Project Manager notified immediately.
W8	Emergency contacts will be kept in an easily accessible location on vehicles and plant. All workers will be advised of these contact details and procedures.
W9	Weather monitoring will be undertaken for the possible inundation of the work area during storm events or prolonged periods of wet weather. If significant rain events are predicted, equipment and materials with the potential to be affected by flood water will be moved out of the flood event.

3.3 Noise and vibration

Table 3-3: Noise and vibration

Description of existing environmental and potential impacts		
Are there any residential properties or other noise sensitive areas near the location of the proposal that may be affected by the work (i.e., church, school, hospital)? The surrounding noise environment is predominately low density residential (refer Figure 3-4), especially within the Henry Lawson Drive northern, central and southern areas. There are few noise sensitive receivers surrounding the Milperra Drain area, which is surrounded predominately by recreational uses. The Bullecourt Avenue/Ashford Avenue intersection is lined with industrial and commercial land uses, although low density residential is located behind the commercial properties to the southwest.	Yes ☒	No ☐
Is the proposal going to be undertaken only during standard working hours? *Standard working hours* • *Monday-Friday: 7:00am to 6.00pm* • *Saturday: 8.00am to 1.00pm* • *Sunday and Public Holidays: no work* The majority of works are located in the road verge and would be undertaken during standard construction hours (7am – 6pm Monday to Friday, and 8am – 1pm Saturday). Pavement coring and some utility investigations located on or directly adjacent to the road pavement would need to be undertaken outside of standard working hours, subject to Road Occupancy Licences (ROLs), to minimise traffic disruption and reduce safety risks for the work crews and public. Proposed out of hours shifts are between 8.00pm and 5.00am Sunday to Thursday. No works would be undertaken on Public Holidays or during standard hours on Sundays..	Yes ☐	No ☒
Is any explosive blasting required for the proposal?	Yes ☐	No ☒
Would construction noise or vibration from the proposal affect sensitive receivers?	Yes ☒	No ☐

Noise impacts

The topographic surveys would generate minimal noise (limited to periodic light vehicle use and people talking) and is not expected to result in noise impacts. The non-intrusive utility investigations would generate some noise for limited periods.

Sensitive receivers would be most affected by potholing, slit trenching and geotechnical investigations.

A noise assessment has been prepared using Transport *Construction and Maintenance Noise Estimator (Roads)* (EMF-NV-TT-0067) (refer Appendix D). The noisiest plant for each activity has been selected to calculate using the 'Distance Based (Noisiest plant)' worksheet to determine the potential noise impacts associated with the proposal:

- Potholing and slit trenching – vacuum truck
- Pavement cores and boreholes – bored piling rig
- Test pits – 13.5T excavator

The 'R2' background noise environment was selected based on the location of the proposal in an low density suburban environment, adjacent to Henry Lawson Drive which had an AADT of 25,000 in 2022.

The noise estimator tool produces predicted noise levels above the background at different distances for various receivers. To assist with the assessment, common residential receivers were grouped into noise catchment areas (NCAs). NCAs are the areas that are affected by the same works and located at similar distances from the noise generating activity. Mitigation distances are the distances up to which noise levels are expected to exceed the noise management level (NML), depending on whether there is line of sight to the noise source. The tables below summarise the outcome of the assessment for each activity, with each mitigation distance which contained residential receivers assigned an NCA.

Potholing and slit trenching – vacuum truck

Noise level above background (35 dB(A))	Additional mitigation measures for consideration	Mitigation distance: line of sight	Mitigation distance: behind substantial solid barrier
Highly intrusive >65 dB(A)	AA, N, PC, SN, R2, DR	35 metres **NCA1**	15 metres
Moderately intrusive 55-65 dB(A)	N, PC, SN, R2, DR	105 metres **NCA2**	35 metres **NCA2**
Clearly audible 45-55 dB(A)	N, R2, DR	240 metres	105 metres **NCA3**
Noticeable 40-45 dB(A)	N	360 metres	155 metres **NCA4**

Pavement cores and boreholes – bored piling rig

Noise level above background (35 dB(A))	Additional mitigation measures for consideration	Mitigation distance: line of sight	Mitigation distance: behind substantial solid barrier
Highly intrusive >65 dB(A)	AA, N, PC, SN, R2, DR	85 metres **NCA1**	30 metres
Moderately intrusive 55-65 dB(A)	N, PC, SN, R2, DR	200 metres **NCA2**	85 metres **NCA2**
Clearly audible 45-55 dB(A)	N, R2, DR	460 metres **NCA3**	200 metres **NCA3**
Noticeable	N	690 metres	305 metres

40-45 dB(A)			**NCA4**

Test pits – 13.5T excavator

Noise level above background (35 dB(A))	Additional mitigation measures for consideration	Mitigation distance: line of sight	Mitigation distance: behind substantial solid barrier
Highly intrusive >65 dB(A)	AA, N, PC, SN, R2, DR	30 metres	15 metres
Moderately intrusive 55-65 dB(A)	N, PC, SN, R2, DR	85 metres **NCA2**	30 metres
Clearly audible 45-55 dB(A)	N, R2, DR	200 metres **NCA3**	85 metres **NCA3**
Noticeable 40-45 dB(A)	N	305 metres **NCA4**	135 metres **NCA4**

The noise assessment determined that the investigations are likely to have some noise impacts due to their proximity to sensitive receivers.

Based on a review of additional mitigation measures recommended for consideration, the following measures are considered feasible and reasonable to implement to the proposal in addition to standard mitigation measures:

- Letterbox drop (**N**) for receivers within any NCA for one of the above activity locations, as required by the impact radius. Notifications shall detail work activities, dates and hours, number of shifts, impacts and mitigation measures, indication of work schedule over the night time period and contact telephone number. A notification would be sent a minimum of five working days prior to the start of works for that activity location.
- Works would also implement Respite Period 2 (**R2**) to minimise impacts to the same receiver to two consecutive nights and six over a calendar month where R2 is triggered.

Vibration impacts

Operation of plant and equipment would comply with the recommended minimum working distances for vibration intensive plant specified in Transport *Construction noise and vibration guidelines (for roads and maritime) 2022* (EMF-NV-GD-0056). Vibration impacts are therefore not expected at sensitive receivers.

Would operation of the proposal alter the noise environment for sensitive receivers? There is no operational component to this proposal.	Yes ☐	No ☒
Would the proposal result in vibration being experienced by any surrounding properties or infrastructure during operation? There is no operational component to this proposal	Yes ☐	No ☒

Figure 3-4 Land zoning of the surrounding area. Land use not reflective of zoning is noted on map

Safeguards

Safeguards to be implemented are:

N1	Works will be carried out during normal work hours (i.e. 7am to 6pm Monday to Friday; 8am to 1pm Saturdays) where possible. Any work that is performed outside normal work hours or on Sundays or public holidays must have measures in place to minimise noise impacts.
N2	Noise impacts will be minimised in accordance with Transport *Construction and Maintenance Noise Estimator* (EMF-NV-TT-0067) and Transport *Construction noise and vibration guidelines (for roads and maritime) 2022* (EMF-NV-GD-0056).

3.4 Air quality

Table 3-4: Air quality

Description of existing environmental and potential impacts		
Is the proposal likely to result in large areas (>2ha) of exposed soils?	Yes ☐	No ☒
Are there any dust-sensitive receivers located within the vicinity of the proposal during the construction period? While there are dust-sensitive receivers close to the proposal area, dust emissions from the works are likely to be very low. Minor temporary localised dust impacts may occur during the investigations, with potential impacts to be minimised with the implementation of the proposed safeguards.	Yes ☒	No ☐
Is there likely to be an emission to air during construction? A minor increase in vehicle exhaust emissions would occur during construction activities, however, this would be insignificant in comparison to background emissions from regular vehicle movements.	Yes ☒	No ☐

Safeguards

Safeguards to be implemented are:

A1	Measures (including watering or covering exposed areas) will be used to minimise or prevent air pollution and dust.
A2	Works will not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely.
A3	Vehicles transporting waste or other materials that may produce odours or dust will be covered during transportation.
A4	Vehicles and plant on site are to have engines switched off and not idling when not in use.

3.5 Aboriginal cultural heritage

Table 3-5: Aboriginal cultural heritage

Description of existing environmental and potential impacts		
Would the proposal involve disturbance in any area that has not been subject to previous ground disturbances?	Yes ☐	No ☒
Has an online Aboriginal Heritage Information Management System (AHIMS) search been completed? A basic AHIMS search was conducted on 20 November 2024. The results indicate there are no Aboriginal heritage sites or places located within 100 metres of the proposed works (refer Appendix E). The REF proposal was assessed in under a Cultural Heritage Assessment Report carried out in September 2020 for the overall Henry Lawson Drive corridor upgrade. All sections of the proposal are that were not captured in the CHAR were assessed by a separate Stage 1 assessment contained within the REF. All site identified as having potential for Aboriginal archaeological objects were deemed to be located outside of the proposal area. As such there would be no known impact to Aboriginal heritage items during the investigation works.	Yes ☒	No ☐

Is there potential for the proposal to impact on any items of Aboriginal cultural heritage?	Yes ☐	No ☒
Would the proposal involve the removal of mature native trees? While some clearing of vegetation may be required to conduct the investigations, no mature native trees would be removed.	Yes ☐	No ☒
Is the proposal consistent with the requirements of Transport's *Procedure for Aboriginal cultural heritage consultation and investigation* (PACHCI)? As the proposal would disturb the ground surface, Stage 1 of the PACHCI has been followed, with a basic AHIMS search conducted and the regional Aboriginal cultural heritage adviser consulted. The proposed works at this location were assessed as being unlikely to have an impact on Aboriginal cultural heritage. Refer to REF.	Yes ☒	No ☐

Safeguards

Safeguards to be implemented are:

B1	If Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Transport Aboriginal cultural heritage officer and Senior Manager Environment and Sustainability contacted immediately. Refer to steps in the Transport *Unexpected heritage items procedure* (EMF-HE-PR-0076) which must be followed.

3.6 Non-Aboriginal heritage

Table 3-6: Non-Aboriginal heritage

Description of existing environmental and potential impacts		
Have online heritage database searches been completed? • *Transport (including legacy Roads and Maritime) section 170 register* • *NSW Heritage database* • *Commonwealth Heritage List, established under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* • *Maritime heritage database* • *Australian Heritage Places Inventory* • *Local Environmental Plan(s) heritage items.* Searches of the above databases were completed on 19 November 2024. No National, Commonwealth, State or s170 heritage items were identified in the vicinity of the proposal. One local item was identified, discussed below.	Yes ☒	No ☐
Are there any items of non-Aboriginal heritage or heritage conservation areas listed on relevant heritage databases/registers that are located within the vicinity of the proposal? The 'Milperra Soldier Settlement (Roads)' is listed as an item of Local significance (I128) in the Canterbury–Bankstown Local Environment Plan 2023 (refer Figure 3-4). The item is listed to protect the road layout of the principal streets of the former Milperra Soldier Settlement. No other evidence of the settlement remains, including the original road infrastructure, which would have been unsealed and un-kerbed at the time of the Settlement's founding. The proposal would take place within the curtilage of the heritage item. The sections of this item which would be impacted by the proposed investigations are: • The Henry Lawson Drive road corridor east of Amiens Avenue until the M5 Motorway, including Fleurbaix Avenue • Bullecourt Avenue and Ashford Avenue road corridors at their intersection	Yes ☒	No ☐

The proposed investigations would result in potholes, slit trenches, pavement cores and test pits within the curtilage of the heritage item. Pavement cores would be drilled to a maximum depth of about 0.3 metres and so are unlikely to intercept any archaeological material. Potholing and slit trenching would be conducted to identify existing utilities, so would be excavated through previously disturbed material. Test pits would be up to 3 metres deep, but are not expected to impact on the heritage item as they would not affect the road layout. Boreholes are likely to be conducted outside the conservation area. As this item is the existing road corridor and has been subject to moderate to high levels of disturbance due to road work and residential development over time, the proposed investigations would have minimal impact on the heritage significance of the item. In addition, while there is potential for historical subsurface archaeology near the proposed investigations, the proposed investigations are also not expected to disturb any locally or State significant relics. Safeguards are in place should any unexpected finds occur.		
Is the proposal likely to impact trees that form part of a heritage listing or have other heritage value? Refer to Section 3.9 regarding a tree with a plaque at its base (Soldiers Tree) located between Henry Lawson Drive and Ingram Avenue to the north of the Ruthven Avenue intersection, which was planted by an early settler of Milperra in 1917. No impact to the tree as a result of the investigations is expected.	Yes ☐	No ☒
Is the proposal likely to occur in or near features that indicate potential archaeological remains?	Yes ☐	No ☒

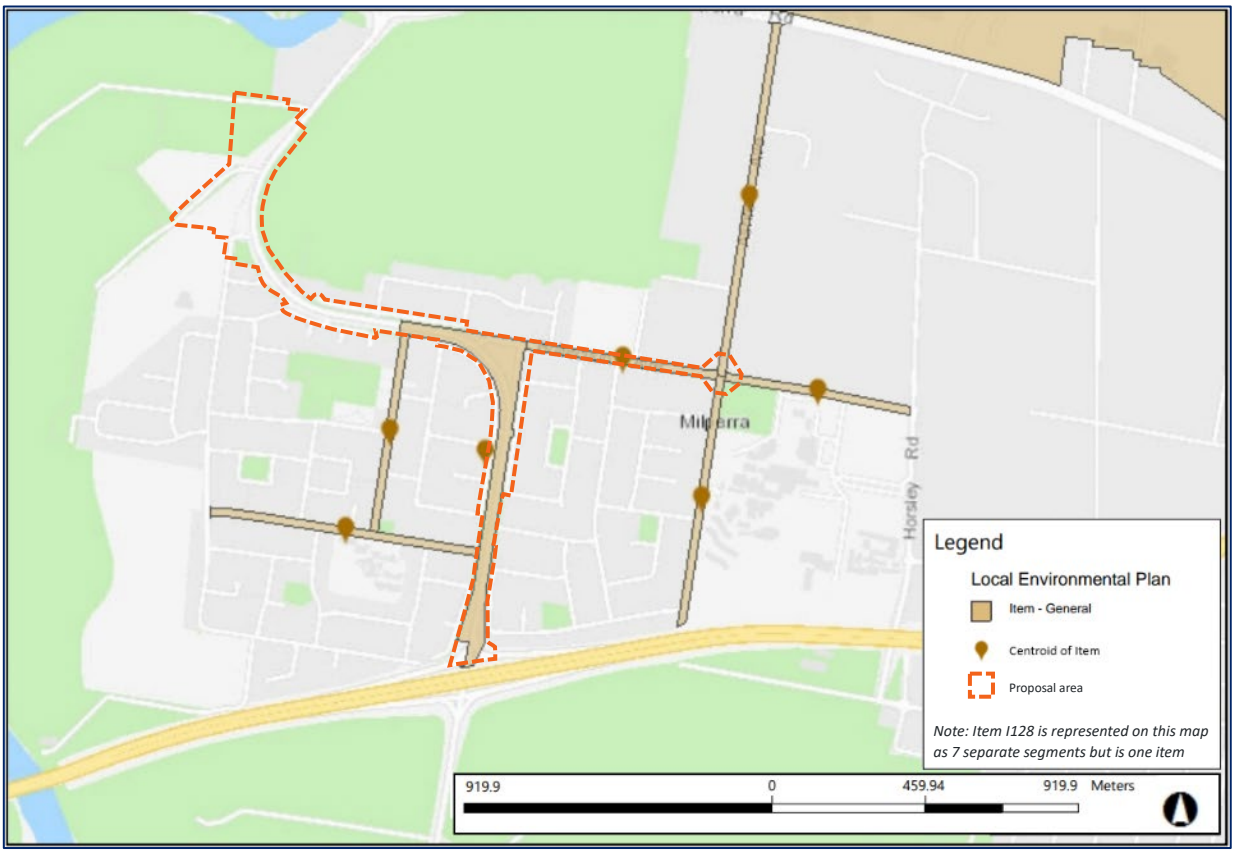


Figure 3-5 Milperra Soldier Settlement (Roads) local heritage item in relation to the proposal

Safeguards

Safeguards to be implemented are:

H1	If unexpected heritage items are uncovered during the works, all works must cease in the vicinity of the material/find and the steps in the Transport *Unexpected heritage items procedure* (EMF-HE-PR-0076) must be followed.
H2	Any investigations undertaken within proximity to the tree and plaque will minimise impacts and ensure an arborist is on site should intrusive investigations be required within the drip line of the tree

3.7 Biodiversity

Table 3-7: Biodiversity

Description of existing environmental and potential impacts		
Have relevant database searches been carried out? A review of relevant literature, databases and existing vegetation mapping was carried out to identify vegetation, threatened flora and fauna and Threatened Ecological Communities (TECs) that are listed under both NSW and Commonwealth legislation with potential to occur within a one kilometre radius of the proposed investigations. This included review of the following databases and sources: • Bionet Wildlife Atlas • EPBC Act Protected Matters Search Tool • NSW Threatened species profiles • Threatened Ecological Communities Greater Sydney (DCCEEW, 2024) • State Vegetation Type Map (DCCEEW, 2024) • SEPP (Resilience and Hazards) • Henry Lawson Drive Upgrade Stage 1B Biodiversity Assessment Report (2023) Relevant database searches are as per the REF.	Yes ☒	No ☐
Did the database searches identify any endangered ecological communities, threatened flora and/or threatened or protected fauna, or migratory species in or within the vicinity of the proposed works? Both Commonwealth and State listed matters must be considered. There was limited potential fauna habitat or threatened flora identified near proposed investigation locations in the Henry Lawson Drive northern, central and southern areas, and the Bullecourt Avenue/Ashford Avenue intersection. The REF did identify potential habitat for the Cumberland Plains Land Snail (CPLS) within mapped PCT 835. As such a survey for the CPLS would be required and any relocation of the snails to take place prior to investigations taking place within areas of mapped PCT 835. Investigations in the Milperra Drain area are within or adjacent to threatened ecological communities (TECs). Five TECs were identified as outlined in the following table:	Yes ☒	No ☐

Scientific and common name	Status *	Type of listing (BC Act or EPBC Act)	Distance from works	Closest activity
River-flat Eucalypt Forest on Coastal Floodplain	EEC / CEEC	BC Act / EPBC Act	Works proposed within EEC	Auld Ave, Keys Parade and HLD north of Milperra Drain (topographic surveys)
Swamp Oak Floodplain Forest / Coastal Swamp Oak Forest	EEC / EEC	BC Act / EPBC Act	40 metres	HLD south of Milperra Drain (topographic survey)

Cooks River/ Castlereagh Ironbark Forest	EEC	BC Act	70 metres	Pothole south of Ingram Ave cul-de-sac
Cumberland Plain Woodland	CEEC / CEEC	BC Act / EPBC Act	110 metres	PC105
Castlereagh Swamp Woodland	EEC	BC Act	450 metres	HLD north of Milperra Drain (utility survey)

**V= vulnerable, E = endangered, CE = critically endangered, VEC = vulnerable ecological community EEC = endangered ecological community, CEEC = critically endangered ecological community M = Migratory*

A map of the TECs is given in Figure 3-9a and b.

Does the proposal involve pruning, trimming or removal of any tree/s? No trees are to be removed. Should trimming occur it is to be kept to less than 10% of the canopy cover. No identified habitat trees are to be trimmed.	Yes ☒	No ☐
Is the proposal likely to impact nationally listed threatened species, ecological communities or migratory species? As identified above, some of the proposed investigation locations would be within or adjacent to River-flat Eucalypt Forest on Coastal Floodplains of southern NSW and eastern Victoria, which is a nationally listed Critically Endangered Ecological Community. Mitigation measures, including that work would be limited to previously disturbed areas where possible, no clearing of trees/understorey would occur and to limit the spread of priority weeds into and out of the TEC, would ensure that impacts are minimised and limited to the ground storey layer of the community (i.e. grasses). As such, impacts are expected to be negligible and no additional assessment is required. A checklist of matters of national environmental significance has been completed in Section 4.2 to ensure all matters covered under the EPBC Act have been considered.	Yes ☐	No ☒
Would the proposal require the removal of any other vegetation? Weeds and ground cover may be required to be removed in areas close to Milperra Drain. This would be kept to a minimum.	Yes ☒	No ☐
Would the proposal require the removal of any tree hollows?	Yes ☐	No ☒
Are there any known areas of outstanding biodiversity value or areas mapped as 'littoral rainforest' or 'coastal wetland' under chapter 2 of SEPP (Resilience and Hazards) in or within the vicinity of the proposed work? While the proposal does not require development consent or approval under the SEPP (Resilience and Hazards) as noted in Section 2.3.1, Chapter 2 (Coastal Management) of the SEPP does relate to the proposal as it located near to areas mapped as Coastal Wetlands. No investigations will however be undertaken within mapped coastal wetlands Section 2.8 of the SEPP (Resilience and Hazards) requires the consent authority to be satisfied that there would be no significant impacts on both the biophysical, hydrological or ecological integrity of the adjacent coastal wetland, and on the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland. An assessment of these factors is given below, which concludes there would be no significant impacts. *Any significant impact on the biophysical, hydrological or ecological integrity of the adjacent coastal wetland?* The proposed topographic surveys are non-intrusive, would not require any plant and would be accessed on foot with handheld equipment. Additionally, the proposed topographic surveys are located downstream of the mapped Coastal Wetlands. As such, any impact is expected to be negligible and able to be managed with the implementation of safeguards. *Any significant impact on the quantity and quality of surface and groundwater flows to and from the adjacent coastal wetland?*	Yes ☒	No ☐

There will be no impacts on surface and groundwater flows to the coastal wetland, as the investigations would be conducted downstream. Any impact from the extremely limited disturbance caused by the topographic surveys on the downstream flows from the coastal wetland is expected to be negligible and able to be managed with the implementation of safeguards.		
Would the proposal provide any additional barriers to the movement of wildlife?	Yes ☐	No ☒
Would the proposal disturb any natural waterways or aquatic habitat? While the proposed investigations will be undertaken in close proximity to Milperra Drain the impacts on natural waterways or aquatic habitat are expected to be minimal.	Yes ☐	No ☒
Would the proposal impact (directly or indirectly) any potential microbat roosting or breeding habitat such as on bridges and culverts? Investigations will be undertaken adjacent to the underside of the bridge over the Milperra Drain. While the impact would be minimal, safeguards would be in place to ensure no disruption to potential microbat roosting or breeding habitat.	Yes ☒	No ☐

Figure 3-6a Threatened Ecological Communities (TECs) in the vicinity of the proposal including PCT 835

Figure 3-7b Threatened Ecological Communities (TECs) in the vicinity of the proposal including PCT 835

Figure 3-8 Coastal Wetlands and Proximity Areas in the vicinity of the proposal

Safeguards

Safeguards to be implemented are:

F1	No trees are to be removed. Should trimming of trees occur it is to be kept to less than 10% of the canopy cover. No identified habitat trees are to be trimmed. Where investigations are required within mapped (TECs), these are to be relocated if possible to avoid impacts to vegetation.
F2	Proposed investigations will occur within previously disturbed areas of land where possible.
F3	If threatened fauna or flora species are discovered unexpectedly, stop works immediately and follow the Transport *Unexpected Threatened Species Find Procedure* contained in the Transport *Biodiversity Guidelines – Guide 1 (Pre-clearing process)* (EMF-BD-GD-0032).
F4	Priority weeds will be managed according to requirements under the *Biosecurity Act, 2015* and Transport *Biodiversity Guidelines – Guide 6 (Weed Management)* (EMF-BD-GD-0032).
F5	Works with the potential to directly or indirectly impact potential microbat roosting or breeding habitat such as on bridges and culverts will be carried out in accordance with Transport *Microbat Management Guidelines* (EMF-BD-GD-0012).
F6	Pruning of mature trees will be in accordance with Part 5 of the Australian Standard 4373-2007 *Pruning of amenity trees*.

F7	Surveys for Cumberland Plains Land Snail is to occur prior to any investigation works being undertaken within mapped PCT835. Should any snails be found they are to be relocated to appropriate habitat nearby,

3.8 Traffic and transport

Table 3-8: Traffic and transport

Description of existing environmental and potential impacts		
Is the proposal likely to result in detours or disruptions to traffic flow (vehicular, cycle and pedestrian) or access during construction? Access to proposed investigation sites would be from Auld Avenue, Keys Parade, Henry Lawson Drive, Bullecourt Avenue and other local roads. Lane closures and work outside standard working hours would be required on Henry Lawson Drive and Bullecourt Avenue for pavement core drilling and some utility investigations, to minimise traffic disruption and reduce safety risks for the work crews and public. Temporary disruptions to property access are addressed in Section 3.9.	Yes ☒	No ☐
Is the proposal likely to result in detours or disruptions to traffic flow (vehicular, cycle and pedestrian) or access during operation? There is no operational component to this proposal.	Yes ☐	No ☒
Is the proposal likely to affect any other transport nodes or transport infrastructure (e.g., bus stops, bus routes) in the surrounding area? Or result in detours or disruptions to traffic flow (vehicular, cycle and pedestrian) or access during operation? There are four bus stops on Henry Lawson Drive and two bus stops on Bullecourt Avenue near the proposed investigations. Proposed investigation locations would be adjusted if required to avoid direct impacts to bus stops or their surrounds. Bus operators would be notified of any lane closures during out of hours work to minimise impacts on bus services. Pedestrian access to pathways along Henry Lawson Drive, Bullecourt Avenue, other local roads and between Raleigh Road, Keys Parade and Auld Avenue may be temporarily limited due to rig placement. Appropriate traffic control and safety measures would be implemented during works to mitigate any potential impacts resulting from restricted access.	Yes ☐	No ☒

Safeguards

Safeguards to be implemented are:

T1	Where possible, current traffic movements and property accesses will be maintained during the works. Any disturbance will be minimised to prevent unnecessary traffic delays.
T2	A traffic guidance scheme will be prepared in accordance with Transport *Traffic control at work sites manual* (version 6.1, 2022) and Australian Standard 1742.3 *Manual of uniform control devices.*
T3	Proposed investigation locations will be adjusted if required to avoid direct impacts to bus stops or their surrounds. Bus operations will be notified of any lane closures during works outside of standard construction hours to minimise impacts on bus services.
T4	Where possible, temporary diversions will be provided if any pedestrian or shared paths are required to be temporarily closed due to the investigations.

3.9 Socio-economic

Table 3-9: Socio-economic

Description of existing environmental and potential impacts		
Is the proposal likely to impact on local business? Investigations are proposed near the BP petrol station on the northwest corner at 116 Ashford Avenue, Milperra. This is not expected to result in any impacts to the business as work would only be carried out at this location once the petrol station has closed for the night.	Yes ☐	No ☒
Is the proposal likely to require any property acquisition?	Yes ☐	No ☒
Is the proposal likely to alter any access for properties (either temporarily or permanently)? Temporary disruptions to property access would be avoided where possible. Safeguards are in place to require agreement from any affected property owners prior to disruption of driveway access to these properties.	Yes ☒	No ☐
Is the proposal likely to alter any on-street parking arrangements (either temporarily or permanently)?	Yes ☐	No ☒
Is the proposal likely to change pedestrian movements or pedestrian access (either temporarily or permanently)? Refer to Section 3.8. Some footpaths or shared paths may require short-term closure due to the investigations. Diversions would be provided where possible.	Yes ☒	No ☐
Is the proposal likely to impact on any items or places of social value to the community (either temporarily or permanently)?	Yes ☐	No ☒
Is the proposal likely to reduce or change visibility of any businesses, farms, tourist attractions or the like (either temporarily or permanently)?	Yes ☐	No ☒
Is the proposal likely to impact trees planted by a community group, Landcare group or by council or a tree that is a memorial or part of a memorial group e.g., has a plaque? There is a tree with a plaque at its base located between Henry Lawson Drive and Ingram Avenue to the north of the Ruthven Avenue intersection, which was planted by an early settler of Milperra in 1917 (refer to Figure 3-5). Any investigations undertaken within proximity to the tree and plaque will minimise impacts and ensure an arborist is on site should intrusive investigations be required within the drip line of the tree.	Yes ☐	No ☒
Is the proposal likely to impact trees that form part of a streetscape, an avenue or roadside planting?	Yes ☐	No ☒

Figure 3-9 February 2022 Streetview image of tree with plaque (Soldier's tree) between Ingram Ave and Henry Lawson Dr

Safeguards

Safeguards to be implemented are:

S1	Existing access for nearby and adjoining properties is to be maintained at all times during the works unless otherwise agreed to by the affected property owner.
S2	All complaints will be recorded on a complaints register and attended to promptly.
H2 (copy of safeguard)	Any investigations undertaken within proximity to the tree and plaque will minimise impacts and ensure an arborist is on site should intrusive investigations be required within the drip line of the tree
S4	Notification will be given to affected community members prior to the works taking place. The notification is to include: • details of the proposal • duration of works and working hours • changed traffic or access arrangements • how to lodge a complaint or obtain more information • contact name and details. Notification should be a minimum of five working days prior to the start of works.

3.10 Landscape character and visual amenity

Table 3-10: Landscape character and visual amenity

Description of existing environmental and potential impacts		
Is the proposed work over or near an important physical or cultural element or landscape? (For example, heritage items and areas, distinctive or historic built form, National Parks, conservation areas, scenic highways etc.) As noted in Section 3.6, some of the investigations would occur within the curtilage of the Milperra Soldier Settlement (former) heritage item. As this item has been highly disturbed historically and relates to the road layout only, the proposed investigations would not impact on the views, landscape character and visual amenity of this item. Work areas would be cleaned during and at the end of each shift to minimise any potential visual impacts from rubbish on the broader Henry Lawson Drive road corridor.	Yes ☒	No ☐
Would the proposal obstruct or intrude upon the character or views of a valued landscape or urban area? (For example, locally significant topography, a rural landscape or a park, a river, lake or the ocean or a historic or distinctive townscape or landmark)	Yes ☐	No ☒
Would the proposal require the removal of mature trees or stands of vegetation, either native or introduced?	Yes ☐	No ☒
Would the proposal result in large areas of shotcrete visible from the road or adjacent properties?	Yes ☐	No ☒
Would the proposal involve new noise walls or visible changes to existing noise walls?	Yes ☐	No ☒
Would the proposal involve the removal or reuse of large areas of road corridor, landscape, either verges or medians?	Yes ☐	No ☒
Would the proposal involve substantial changes to the appearance of a bridge (including piers, girders, abutments and parapets) that are visible from the road or residential areas?	Yes ☐	No ☒
If involving lighting, would the proposal create unwanted light spillage on residential properties at night (in construction or operation)? Light spill may occur into nearby residential properties during night works. These impacts would be minimised by ensuring lighting is directed only towards the work area and is not in use for longer than required. Lighting impacts would be short term and any single receiver would not experience continuous highly intrusive light spill for an extended period.	Yes ☒	No ☐
Would any new structures or features to be constructed, result in over shadowing to adjoining properties or areas?	Yes ☐	No ☒

Safeguards

Safeguards to be implemented are:

V1	Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.

3.11 Waste

Table 3-11: Waste

Description of existing environmental and potential impacts		
Is the proposal likely to generate >200 tonnes of waste material (contaminated and /or non-contaminated material)?	Yes ☐	No ☒
Is the proposal likely to require a licence from EPA?	Yes ☐	No ☒
Is the proposal likely to require the removal of asbestos?	Yes ☐	No ☒
The following waste sources are likely to be generated during the works: • domestic refuse (litter) generated by onsite personnel and construction workers • green waste (e.g. weed species or grasses) • excavated material (e.g. spoil) which is unsuitable and/or not required for backfilling and restoration • maintenance waste – waste generated from site plant and vehicle maintenance such as oil, wastewater and drilling fluids and fuel (to be transported off site daily with workers). Spoil generated during excavations would be used as backfill, where suitable. Prior to any off site disposal of waste material, it would be classified in accordance with Waste Classification Guidelines (Environment Protection Authority, 2014) and disposed of at a suitably licenced facility.		

Safeguards

Safeguards to be implemented are:

M1	Resource management hierarchy principles will be followed: • avoid unnecessary resource consumption as a priority • avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery) • disposal is undertaken as a last resort. (in accordance with the *Waste Avoidance and Resource Recovery Act 2001*).
M2	If vegetation is to be mulched and transported off site for beneficial reuse, it will be assessed for the presence of weeds, pest, and other disease and a Mulch Management Plan prepared in accordance with the NSW EPA *Mulch Order and Exemption*.
M3	There is to be no disposal or re-use of construction waste on to other land.
M4	Waste material, other than vegetation and tree mulch, is not to be left on site once the works have been completed.

3.12 Climate change and greenhouse gas emissions

Table 3-12: Climate change and greenhouse gas emissions

Description of existing environmental and potential impacts		
Is the proposal located in an area likely to be permanently or tidally inundated in the future or subject to increased duration and intensity of flooding? While the area of the proposal may be subject to increased duration and intensity of flooding in the future, given the temporary and limited area of disturbance of the investigations, no impacts are expected.	Yes ☒	No ☐

Have opportunities for reduced energy consumption during construction and operation been considered?	Yes ☐	No ☒
Greenhouse gas emissions sources during construction are likely to be largest from: • Transporting materials to site. • Operation of plant and equipment. There is not operational component to the proposal and therefore no operational sources to consider.		

Safeguards

There are no safeguards proposed.

3.13 Cumulative impact

Table 3-13: Cumulative impact

Description of existing environmental and potential impacts		
Are there other projects and developments in the study area which could add to potential impacts in both construction and operation? The investigations proposed are part of the detailed design of the HLD-1B project, which is itself part of a broader program of work to widen the road surface of Henry Lawson Drive between Hume Highway, Villawood and the M5 Motorway, Milperra. The Henry Lawson Drive Upgrade project has been divided into four stages, with stage 1A in delivery. Other projects which have been identified as relevant when considering cumulative impacts are: • Riverlands subdivision, Milperra (in delivery) • Anglicare Seniors Living Development, 27 Bullecourt Avenue, Milperra (DA approved) • Gordon Parker Reserve amenities upgrade (completed 2022) • Widening of Milperra Drain within Bankstown Golf Course (completed 2021) Given the temporary and limited area of disturbance of the investigations however, no impacts are expected.	Yes ☒	No ☐

Safeguards

There are no safeguards proposed.

4. Summary of safeguards and environmental management measures

4.1 Safeguards and environmental management measures

This section provides a summary of the site-specific environmental safeguards and management measures identified in described in chapter 3 of this minor works REF. These safeguards will be implemented to reduce potential environmental impacts throughout construction and operation. A framework for managing the potential impacts is provided with reference to environmental management plans and relevant Transport QA specifications. Any potential licence and/or approval requirements required prior to construction are also listed.

Table 4-1: Summary of site-specific safeguards for proposed work

Factor	Safeguards
Soil	
E1	Erosion and sediment control measures will be implemented and maintained to: • minimise sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets • reduce water velocity and capture sediment on site • minimise the amount of material transported from site to surrounding pavement surfaces • divert clean water around the site. (in accordance with the Landcom/Department of Housing *Managing Urban Stormwater, Soils and Construction Guidelines* (the Blue Book)).
E2	Erosion and sedimentation controls will be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request.
E3	Erosion and sediment control measures will not be removed until the works are complete and areas stabilised.
E4	Potential or actual acid sulfate soils will be managed in accordance with the Transport *Guidelines for the Management of Acid Sulfate Materials (2005)*.
E5	If contaminated areas are encountered during investigations, appropriate control measures will be implemented to manage the immediate risks of contamination, and all works that may impact on the contaminated area must cease. The steps in Transport *Environmental Incident Procedure* (EMF-EM-PR-0001) must be followed, with the Transport Environment & Sustainability Officer and Project Management Team notified immediately.
E6	Ground disturbance from vehicle use will be minimised via access route selection, with vehicle access via the nearest public road or existing paths or previously cleared or disturbed areas (where investigation locations are not accessible directly off a public road), where possible. Where no public roads are available, track pads would be placed on site to minimise any ground disturbance.
Waterways and water quality	
W1	No dirty water will be released into drainage lines and/or waterways.
W2	Water quality control measures will be used to prevent any materials (e.g., concrete, grout, sediment etc.) entering drain inlets or waterways.

W3	Refuelling of plant and equipment is not to occur on site.
W4	Vehicles and plant will be properly maintained and regularly inspected for fluid leaks.
W5	An emergency spill kit will be kept on site at all times and maintained throughout the construction work. The spill kit must be appropriately sized for the volume of substances at the work site and personnel inducted in its use.
W6	All workers will be advised of the location of the spill kit and trained in its use.
W7	If an incident (e.g., spill) occurs, the Transport *Environmental Incident Procedure* (EMF-EM-PR-0001) will be followed and the Transport Environment & Sustainability Officer and Project Manager notified immediately.
W8	Emergency contacts will be kept in an easily accessible location on vehicles and plant. All workers will be advised of these contact details and procedures.
W9	Weather monitoring will be undertaken for the possible inundation of the work area during storm events or prolonged periods of wet weather. If significant rain events are predicted, equipment and materials with the potential to be affected by flood water will be moved out of the flood event.
Noise and vibration	
N1	Works will be carried out during normal work hours (i.e. 7am to 6pm Monday to Friday; 8am to 1pm Saturdays) where possible. Any work that is performed outside normal work hours or on Sundays or public holidays must have measures in place to minimise noise impacts.
N2	Noise impacts will be minimised in accordance with Transport *Construction and Maintenance Noise Estimator* (EMF-NV-TT-0067) and Transport *Construction noise and vibration guidelines (for roads and maritime) 2022* (EMF-NV-GD-0056).
Air quality	
A1	Measures (including watering or covering exposed areas) will be used to minimise or prevent air pollution and dust.
A2	Works will not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely.
A3	Vehicles transporting waste or other materials that may produce odours or dust will be covered during transportation.
A4	Vehicles and plant on site are to have engines switched off and not idling when not in use.
Non-Aboriginal heritage	
H1	If unexpected heritage items are uncovered during the works, all works must cease in the vicinity of the material/find and the steps in the Transport *Unexpected heritage items procedure* (EMF-HE-PR-0076) must be followed.
H2	Any investigations undertaken within proximity to the tree and plaque will minimise impacts and ensure an arborist is on site should intrusive investigations be required within the drip line of the tree
Aboriginal cultural heritage	
B1	If Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Transport Aboriginal cultural heritage officer and Senior Manager Environment and Sustainability contacted immediately. Refer to steps in the Transport *Unexpected heritage items procedure* (EMF-HE-PR-0076) which must be followed.

Biodiversity	
F1	No trees are to be removed. Should trimming of trees occur it is to be kept to less than 10% of the canopy cover. No identified habitat trees are to be trimmed. Where investigations are required within mapped (TECs), these are to be relocated if possible to avoid impacts to vegetation.
F2	Proposed investigations will occur within previously disturbed areas of land where possible.
F3	If threatened fauna or flora species are discovered unexpectedly, stop works immediately and follow the Transport *Unexpected Threatened Species Find Procedure* contained in the Transport *Biodiversity Guidelines – Guide 1 (Pre-clearing process)* (EMF-BD-GD-0032).
F4	Priority weeds will be managed according to requirements under the *Biosecurity Act, 2015* and Transport *Biodiversity Guidelines – Guide 6 (Weed Management)* (EMF-BD-GD-0032).
F5	Works with the potential to directly or indirectly impact potential microbat roosting or breeding habitat such as on bridges and culverts will be carried out in accordance with Transport *Microbat Management Guidelines* (EMF-BD-GD-0012).
F6	Pruning of mature trees will be in accordance with Part 5 of the Australian Standard 4373-2007 *Pruning of amenity trees*.
F7	Surveys for Cumberland Plains Land Snail is to occur prior to any investigation works being undertaken within mapped PCT835. Should any snails be found they are to be relocated to appropriate habitat nearby,
Traffic and transport	
T1	Where possible, current traffic movements and property accesses will be maintained during the works. Any disturbance will be minimised to prevent unnecessary traffic delays.
T2	A traffic guidance scheme will be prepared in accordance with Transport *Traffic control at work sites manual* (version 6.1, 2022) and Australian Standard 1742.3 *Manual of uniform control devices.*
T3	Proposed investigation locations will be adjusted if required to avoid direct impacts to bus stops or their surrounds. Bus operations will be notified of any lane closures during works outside of standard construction hours to minimise impacts on bus services.
T4	Where possible, temporary diversions will be provided if any pedestrian or shared paths are required to be temporarily closed due to the investigations.
Socio-economic	
S1	Existing access for nearby and adjoining properties is to be maintained at all times during the works unless otherwise agreed to by the affected property owner.
S2	All complaints will be recorded on a complaints register and attended to promptly.
S3	Notification will be given to affected community members prior to the works taking place. The notification is to include: • details of the proposal • duration of works and working hours • changed traffic or access arrangements • how to lodge a complaint or obtain more information • contact name and details. Notification should be a minimum of five working days prior to the start of works.

Landscape character and visual amenity	
V1	Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.
Waste	
M1	Resource management hierarchy principles will be followed: • avoid unnecessary resource consumption as a priority • avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery) • disposal is undertaken as a last resort. (in accordance with the *Waste Avoidance and Resource Recovery Act 2001*).
M2	If vegetation is to be mulched and transported off site for beneficial reuse, it will be assessed for the presence of weeds, pest, and other disease and a Mulch Management Plan prepared in accordance with the NSW EPA *Mulch Order and Exemption*.
M3	There is to be no disposal or re-use of construction waste on to other land.
M4	Waste material, other than vegetation and tree mulch, is not to be left on site once the works have been completed.
Climate change and greenhouse gas emissions	There are no safeguards proposed.
Cumulative impacts	There are no safeguards proposed.

4.2 Licensing and approvals

No external licensing or approvals are required for the proposal.

5. Certification, review and determination

5.1 Certification

This minor works REF provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses, to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the proposal.

Prepared by:

Signature

Name:	Tavis Cunningham
Position:	Graduate
Company name:	TfNSW
Date:	28/11/2024

Minor works REF reviewed by:

Signature 

Name:	Rebecca Murray
Position:	Senior Environment & Sustainability Officer
Company name:	TfNSW
Date:	03/12/2024

5.2 Environment and sustainability staff review

The minor works REF has been reviewed and considered against the requirements of sections 5.5 and 5.7 of the EP&A Act.

In considering the proposal this assessment has examined and taken into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of that activity as addressed in the minor works REF and associated information. This assessment is considered to be in accordance with the factors required to be considered under section 171 of the Environmental Planning and Assessment Regulation 2021.

The proposal described in this minor works REF will have some environmental impacts which can be ameliorated satisfactorily. Having regard to the safeguards and management measures proposed, this assessment has considered that these impacts are unlikely to be significant and therefore an approval for the proposal does not need to be sought under Division 5.2 of the EP&A Act.

The assessment has considered the potential impacts of the activity on areas of outstanding value and on threatened species, ecological communities or their habitats for both terrestrial and aquatic species as defined by the *Biodiversity Conservation Act 2016* and the *Fisheries Management Act 1994*.

The proposal described in the minor works REF will not affect areas of outstanding value. The activity described in the minor works REF will not significantly affect threatened species ecological communities or their habitats. Therefore, a species impact statement is not required.

The assessment has also addressed the potential impacts of the activity on matters of national environmental significance and any impacts on the environment of Commonwealth land and concluded that there will be no significant impacts. Therefore, there is no need for a referral to be made to the Australian Government Department of Climate Change, Energy, the Environment and Water for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the *Environment Protection and Biodiversity Conservation Act 1999*.

The minor works REF is considered to meet all relevant requirements.

5.3 Environment and Sustainability staff recommendation

It is recommended that the proposal to undertake investigations works along Henry Lawson Drive between Auld Avenu and the approach to the M5 as described in this minor works REF proceed subject to the implementation of all safeguards identified in the minor works REF and compliance with all other relevant statutory approvals, licences, permits and authorisations.

The minor works REF has examined and taken into account to the fullest extent possible all matters likely to affect the environment by reason of the activity in accordance with the EP&A Act, EP&A Regulation and the Guidelines approved under clause 170 of the EP&A Regulation. The minor works REF has established that the activity is not likely to significantly affect the environment or threatened species, ecological communities or their habitats.

The minor works REF has concluded that there will be no significant impacts on matters of national environmental significance or any impacts on the environment of Commonwealth land.

If the proposal has not commenced within two years of the determination date the SMES must be consulted to identify any new or updated assessment or approval requirements.

Recommended by:		**Noted by:**	
Signature		Signature	
Name:	Con Lambous	Name:	Justin Hyde
Position:	Senior Manager Environment and Sustainability	Position:	Project Manager, I&P
Date:	05/12/2024	Date:	04/12/2024

5.4 Decision statement

In accordance with the above recommendation, I certify that I have reviewed and endorsed the contents of this minor works REF, and to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under Section 170 of the EP&A Regulation, and the information is neither false nor misleading.

I determine that Transport for NSW may:

- proceed with the activity

Signature 

Name: Panduka Manamperi

Position: Senior Project Manager, I&P

Date: 05/12/2024

5.5 EP&A Regulation publication requirement

Table 5-1: EP&A Regulation publication requirement

Requirement		
Does this minor works REF need to be published under section 171(4) of the EP&A Regulation?	Yes ☒	No ☐

Appendix A Consideration of State and Commonwealth environmental factors

Environmental Planning and Assessment Regulation 2021 section 171(2) factors

The following factors, listed in section 171(2) of the Environmental Planning and Assessment Regulation 2021, have been considered to assess the likely impacts of the proposal on the natural and built environment. This consideration is required to comply with sections 5.5 and 5.7 of the EP&A Act.

Table A1: Consideration of section 171 of the EP&A Regulation factors

Factor	Description of impact	Duration and extent
a) Environmental impact on the community.	• Minor noise impacts are anticipated	Short term negative
b) The transformation of the locality.	• No impact anticipated	Nil
c) Any environmental impact on the ecosystems of the locality.	• Potential minor impact due to vegetation trimming required to provide access to investigation locations	Minor short term
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality.	• Minor impacts are anticipated due to the use of machinery and equipment to undertake investigation works,	Minor short term
e) Any effect on any locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.	• No impacts anticipated	Nil
f) Any impact on the habitat of protected fauna (within the meaning of the Biodiversity and Conservation Act 2016).	• .There is potential for a minor impact to the habitat of Cumberland Plains Land Snail due to the investigations being undertaken within mapped potential habitat and minor vegetation removal.	Minor short term
g) Any endangering of a species of animal, plant or other form of life, whether	• No impacts anticipated	Nil

Factor	Description of impact	Duration and extent
living on land, in water or in the air.		
h) Any long-term effects on the environment	No impacts anticipated	Nil
i) Any degradation of the quality of the environment.	Minor short term impacts are anticipated due to minor excavation works for investigations	Minor short term
j) Any risk to the safety of the environment.	No impacts anticipated	Nil
k) Any reduction in the range of beneficial uses of the environment.	No impacts anticipated	Nil
l) Any pollution of the environment.	Minor impacts are anticipated due to use of machinery and equipment	Minor short term
m) Any environmental problems associated with the disposal of waste	Potential for minor vegetation waste to the generated	Minor short term
n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply.	None anticipated	Nil
o) The cumulative environmental effect with other existing or likely future activities.	No cumulative impacts are anticipated	Nil
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions.	No impacts anticipated	Nil
q) Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1	All applicable plans or strategies have been considered in the document	
r) Other relevant environmental factors		In considering the potential impacts of this proposal all relevant environmental factors

Factor	Description of impact	Duration and extent
		have been considered, as documented throughout this assessment.

Matters of National Environmental Significance

Table A2: Matters of national environmental significance

Environmental factor	Impact
a) Any impact on a World Heritage property?	Nil
b) Any impact on a National Heritage place?	Nil
c) Any impact on a wetland of international importance (often called 'Ramsar' wetlands)?	Nil
d) Any impact on nationally threatened species, ecological communities or migratory species?	Nil
e) Any impact on a Commonwealth marine area?	Nil
f) Does the proposal involve a nuclear action (including uranium mining)?	Nil
Additionally, any impact (direct or indirect) on the environment of Commonwealth land?	Nil

Appendix B Environmental Planning and Assessment Regulation 2021 section 171(A) factors – activities in catchments

SEPP (Biodiversity and Conservation) – Chapter 6 (Water Catchments)

Chapter 6 of SEPP (Biodiversity and Conservation) relates to the use of land within regulated catchments. In these catchments, Transport is required to consider the environmental impact of activities to which Division 5.1 of the EP&A Act applies before carrying out the activity.

The four regulated catchments are:

a) Sydney Drinking Water Catchment

b) Sydney Harbour Catchment

c) Georges River Catchment

d) Hawkesbury-Nepean Catchment.

In undertaking an activity in a regulated catchment Transport must satisfy sections 6.6(2), 6.7(2), 6.8(2) and 6.9(2) and consider environmental impacts listed in sections 6.6(1), 6.7(1), 6.8(1) and 6.9(1) of State Environmental Planning Policy (Biodiversity and Conservation) 2021. This includes specific consideration of water quality and quantity, aquatic ecology, flooding, and recreation and public access.

The proposal is located in Georges River Catchment, the below tables consider the impacts of the proposal on each of the identified factors.

Water quality and quantity

Table C1: Water quality and quantity considerations SEPP (Biodiversity and Conservation)

Section	Factor	Impact/comment
The project must be satisfied of the below before undertaking the activity:		
6.6(2)(a)	The effect on the quality of water entering a natural waterbody will be as close as possible to neutral or beneficial.	No impacts are anticipated noting appropriate safeguards will be in place
6.6(2)(b)	The impact on water flow in a natural waterbody will be minimised.	No impacts anticipated
The project must consider the below before undertaking the activity:		
6.6(1)(a)	Consider whether the development will have a neutral or beneficial effect on the quality of water entering a waterway.	No impacts are anticipated noting appropriate safeguards will be in place
6.6(1)(b)	Consider whether the development will have an adverse impact on water flow in a natural waterbody.	No impacts are anticipated noting appropriate safeguards will be in place
6.6(1)(c)	Consider whether the development will increase the amount of stormwater run-off from a site.	No impacts anticipated
6.6(1)(d)	Consider whether the development will incorporate on-site stormwater retention, infiltration or reuse.	Not applicable
6.6(1)(e)	Consider the impact of the development on the level and quality of the water table.	No impacts anticipated

6.6(1)(f)	Consider the cumulative environmental impact of the development on the regulated catchment.	No impacts are anticipated noting appropriate safeguards will be in place
6.6(1)(g)	Consider whether the development makes adequate provision to protect the quality and quantity of ground water.	No impacts are anticipated noting appropriate safeguards will be in place

Aquatic ecology

Table C2: Aquatic ecology considerations SEPP (Biodiversity and Conservation)

Section	Factor	Impact/comment
The project must be satisfied of the below before undertaking the activity:		
6.7(2)(a)	The direct, indirect or cumulative adverse impact on terrestrial, aquatic or migratory animals or vegetation will be kept to the minimum necessary for the carrying out of the development.	Minimal impacts are anticipated noting the implementation of relevant safeguards. Refer to body of MWREF for assessment
6.7(2)(b)	The development will not have a direct, indirect or cumulative adverse impact on aquatic reserves	No impacts are anticipated
6.7(2)(c)	If a controlled activity approval under the *Water Management Act 2000* or a permit under the *Fisheries Management Act 1994* is required in relation to the clearing of riparian vegetation — the approval or permit has been obtained.	Not applicable
6.7(2)(d)	The erosion of land abutting a natural waterbody or the sedimentation of a natural waterbody will be minimised.	Minimal impacts are anticipated noting the implementation of relevant safeguards. Refer to body of MWREF for assessment
6.7(2)(e)	The adverse impact on wetlands that are not in the coastal wetlands and littoral rainforests area will be minimised.	No impacts are anticipated
The project must consider the below before undertaking the activity:		
6.7(1)(a)	Consider whether the development will have a direct, indirect or cumulative adverse impact on terrestrial, aquatic or migratory animals or vegetation.	Minimal impacts are anticipated noting the implementation of relevant safeguards. Refer to body of MWREF for assessment
6.7(1)(b)	Consider whether the development involves the clearing of riparian vegetation and, if so, whether the development will require — (i) a controlled activity approval under the *Water Management Act 2000*, or (ii) a permit under the *Fisheries Management Act 1994.*	No impacts anticipated
6.7(1)(c)	Consider whether the development will minimise or avoid — (i) the erosion of land abutting a natural waterbody; or (ii) the sedimentation of a natural waterbody.	Minimal impacts are anticipated noting the implementation of relevant safeguards. Refer to body of MWREF for assessment
6.7(1)(d)	Consider whether the development will have an adverse impact on wetlands that are not in the coastal wetlands and littoral rainforests area.	No impacts anticipated

Section	Factor	Impact/comment
6.7(1)(e)	Consider whether the development includes adequate safeguards and rehabilitation measures to protect aquatic ecology.	No impacts anticipated
6.7(1)(f)	Consider if the development site adjoins a natural waterbody — whether additional measures are required to ensure a neutral or beneficial effect on the water quality of the waterbody. Example — Additional measures may include the incorporation of a vegetated buffer between the waterbody and the site.	Minimal impacts are anticipated noting the implementation of relevant safeguards. Refer to body of MWREF for assessment

Flooding

Table C3: Flooding considerations SEPP (Biodiversity and Conservation)

Section	Factor	Impact/comment
The project must be satisfied of the below before undertaking the activity:		
6.8(2)(a)	On flood liable land in a regulated catchment, the development will not — If there is a flood, result in a release of pollutants that may have an adverse impact on the water quality of a natural waterbody; or	Minimal impacts are anticipated noting the implementation of relevant safeguards. Refer to body of MWREF for assessment
6.8(2)(b)	On flood liable land in a regulated catchment, the development will not have an adverse impact on the natural recession of floodwaters into wetlands and other riverine ecosystems.	Minimal impacts are anticipated noting the implementation of relevant safeguards. Refer to body of MWREF for assessment
The project must consider the below:		
6.8(1)	Consider the likely impact of the development on periodic flooding that benefits wetlands and other riverine ecosystems.	No impacts are anticipated

Recreation and public space

Table C4: Flooding considerations SEPP (Biodiversity and Conservation)

Section	Factor	Impact/comment
The project must be satisfied of the below before undertaking the activity:		
6.9(2)(a)	The development will maintain or improve public access to and from natural waterbodies for recreational purposes, including fishing, swimming and boating, without adverse impact on natural waterbodies, watercourses, wetlands or riparian vegetation.	No changes are anticipated
6.9(2)(b)	New or existing points of public access between natural waterbodies and the site of the development will be stable and safe.	No changes are anticipated
6.9(2)(c)	If land forming part of the foreshore of a natural waterbody will be made available for public access as a result of the development but is not in public ownership — public access to and use of the land will be safeguarded.	No changes are anticipated
The project must consider the below before undertaking the activity:		

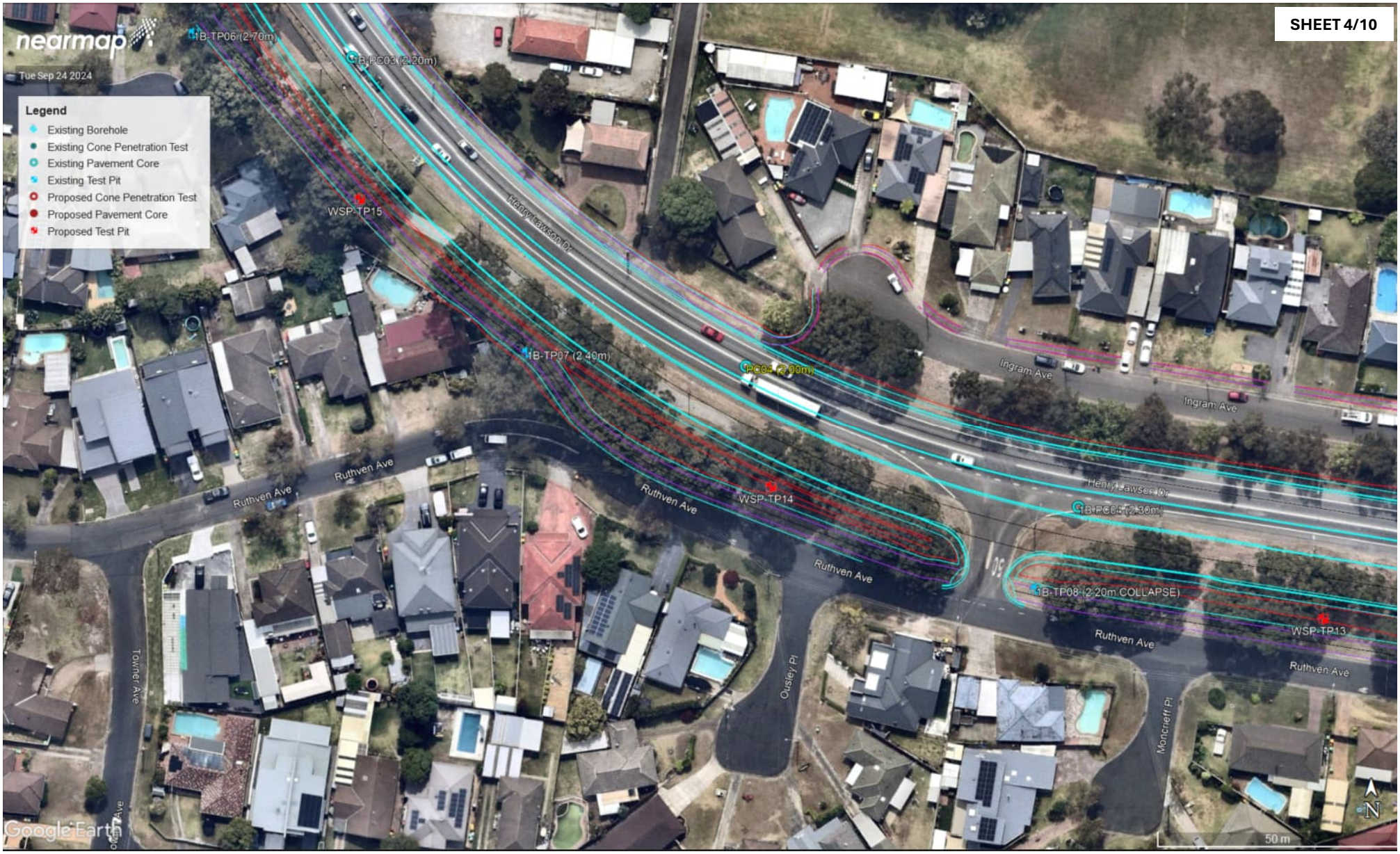
6.9(1)(a)	Consider the likely impact of the development on recreational land uses in the regulated catchment.	No changes or impacts are anticipated
6.9(1)(b)	Consider whether the development will maintain or improve public access to and around foreshores without adverse impact on natural waterbodies, watercourses, wetlands or riparian vegetation.	No changes are anticipated

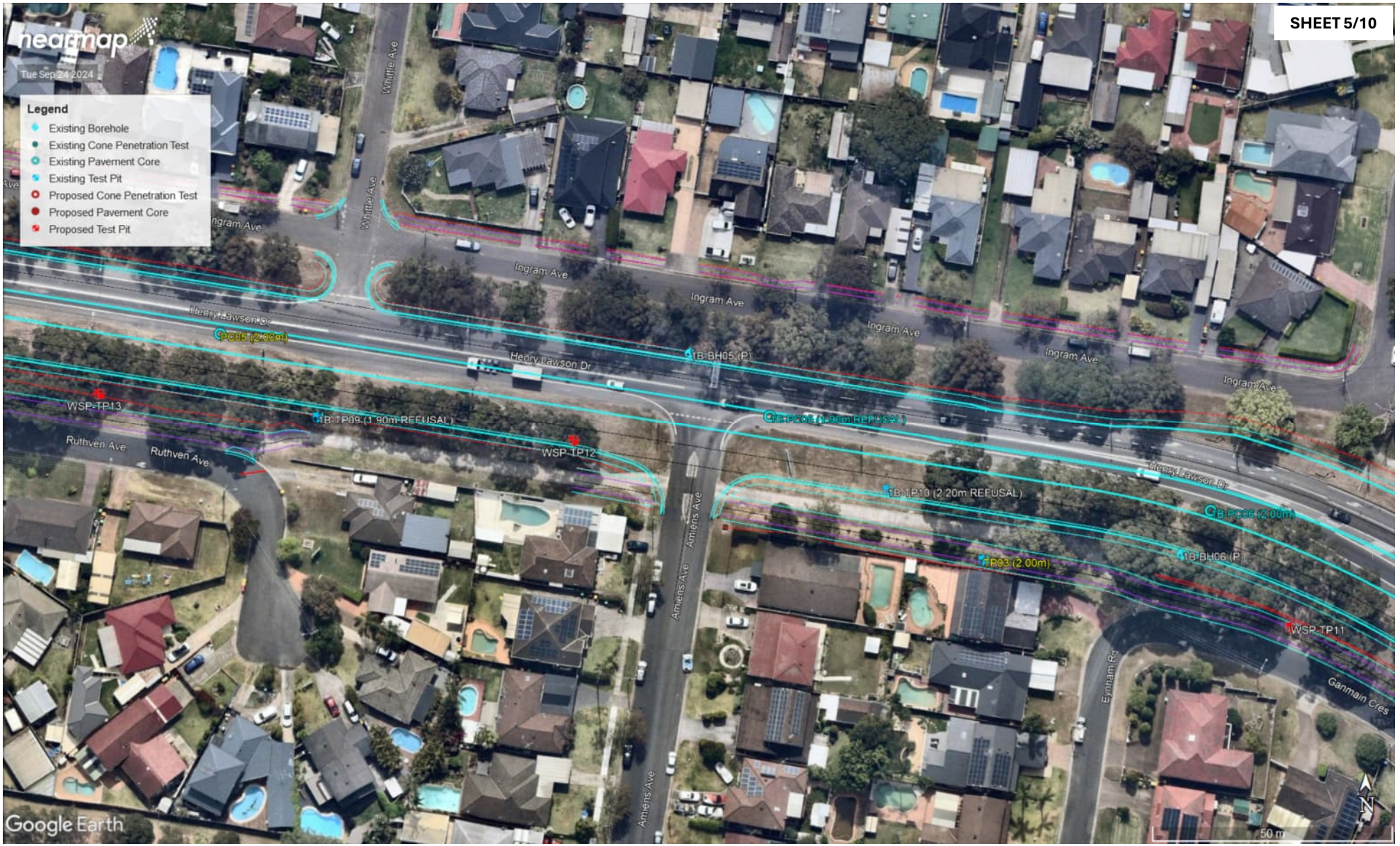
Appendix C Proposed investigation locations


SHEET 1/10
nearmap
Tue Sep 24 2024
Legend
Existing Cone Penetration Test
Existing Pavement Core
Existing Test Pit
Proposed Borehole
Proposed Pavement Core
Proposed Test Pit
Auld Ave
Henry Lawson Dr
Keys Parade
B-CPT01
B-CPT02
B-CPT03
B-CPT04
B-CPT05
B-CPT06
1B-TP01 (1.50m COLLAPSE)
1B-TP02 (1.80m COLLAPSE)
1B-TP03 (1.60m COLLAPSE)
WSP-TP24
WSP-TP23
WSP-TP22
WSP-BH01
WSP-BH02
WSP-BH03
WSP-BH04
WSP-BH05
WSP-BH06
WSP-BH07
WSP-BH08
WSP-BH09
WSP-BH10
WSP-BH11
WSP-BH12
WSP-BH13
1B-BH01 (P)
1B-BH02
BH01 (25.50m)
WSP-PC03
PC03 (2.00m)
Google Earth
50 m
N


SHEET 2/10
nearmap
Tue Sep 24 2024
Legend
Existing Cone Penetration Test
Existing Pavement Core
Existing Test Pit
Proposed Borehole
Proposed Pavement Core
Proposed Test Pit
1B-BH01 (P)
1B-CPT05
WSP-BH03
WSP-BH04
1B-BH02
WSP-BH05
WSP-BH02
1B-CPT06
WSP-FC03
WSP-TP22
Keys Parade
1B-CPT07
1B-CPT08
1B-TP04 (1.75m)
WSP-BH01
1B-CPT09
WSP-TP18
WSP-TP21
1B-RC01 (2.10m)
1B-BH07
Henry Lawson Dr
1B-BH03 (P)
WSP-TP19
TP02 (1.70m REFUSAL)
1B-CPT10
WSP-TP20
1B-TP16 (3.30m)
1B-TP05 (1.10m REFUSAL CONCRETE)
Google Earth
50 m
N


SHEET 3/10
nearmap
Tue Sep 24 2024
Legend
Existing Borehole
Existing Cone Penetration Test
Existing Pavement Core
Existing Test Pit
Proposed Cone Penetration Test
Proposed Pavement Core
Proposed Test Pit
WSP-TP20
TP02 (1.10m REFUSAL)
B-CPT10
B-TP16 (3.30m)
B-TP05 (1.10m REFUSAL CONCRETE)
Henry Lawson Dr
B-BH04
WSP-CPT01
WSP-TP17
B-BH08
Raleigh Rd
B-PC02 (2.10m)
B-CPT11
WSP-PC02
WSP-TP16
B-TP06 (2.70m)
B-PC03 (2.20m)
Borella Rd
Google Earth
50 m
N


SHEET 4/10
nearmap
Tue Sep 24 2024
Legend
Existing Borehole
Existing Cone Penetration Test
Existing Pavement Core
Existing Test Pit
Proposed Cone Penetration Test
Proposed Pavement Core
Proposed Test Pit
TB-TP06 (2.70m)
TB-PC03 (2.20m)
WSP-TP15
Henry Lawson Dr
TB-TP07 (2.40m)
PC04 (2.00m)
Ingram Ave
Ingram Ave
Ruthven Ave
Ruthven Ave
Ruthven Ave
WSP-TP14
Henry Lawson Dr
TB-PC04 (2.30m)
Ruthven Ave
TB-TP08 (2.20m COLLAPSE)
WSP-TP13
Ruthven Ave
Ruthven Ave
Towner Ave
Ousley Pl
Moncrieff Pl
50
N
50 m
Google Earth


SHEET 5/10
nearmap
Tue Sep 24 2024
Legend
Existing Borehole
Existing Cone Penetration Test
Existing Pavement Core
Existing Test Pit
Proposed Cone Penetration Test
Proposed Pavement Core
Proposed Test Pit
Whittle Ave
Ingram Ave
Henry Lawson Dr
PCB5 (2.90m)
1B-BH05 (P)
WSP-TP13
1B-TP09 (1.90m REFUSAL)
1B-PCB6 (1.90m REFUSAL)
Ruthven Ave
WSP-TP12
Amiens Ave
1B-TP10 (2.20m REFUSAL)
1B-PCB4 (2.00m)
P03 (2.00m)
1B-BH06 (P)
WSP-TP11
Eynhallow Rd
Ganmain Cres
Google Earth
50 m
N


SHEET 6/10
nearmap
Tue Sep 24 2024
Legend
Existing Borehole
Existing Cone Penetration Test
Existing Pavement Core
Existing Test Pit
Proposed Cone Penetration Test
Proposed Pavement Core
Proposed Test Pit
B-PC14 (2.10m)
B-PC07 (2.10m)
HB1
Bullecourt Ave
B-BH06 (P)
WSP-TP11
Ganmain Cres
B-TP11 (2.20m)
HB3
HB2
WSP-TP10
B-PC15 (2.10m)
Fleurbaix Ave
PC06 (2.06m)
Henry Lawson Dr
WSP-TP09
Eynham Rd
HB5
HB4
HB6
B-TP12 (2.10m)
Fromelles Ave
Cowper Ct
B-PC08 (2.50m)
Google Earth
50 m
N


SHEET 7/10
nearmap
Tue Sep 24 2024
Legend
Existing Borehole
Existing Cone Penetration Test
Existing Pavement Core
Existing Test Pit
Proposed Cone Penetration Test
Proposed Pavement Core
Proposed Test Pit
WSP-TP08
WSP-TP07
WSP-PC01
TB-TP13 (2.10m REFUSAL)
WSP-TP06
PC07 (2.00m)
TB-TP14 (1.40m STOPPED)
Gannain Cres
Henry Lawson Dr
Treadgold St
Beatham Pl
Fromelles Ave
Armentieres Ave
50 m
N
Google Earth


SHEET 8/10
nearmap
Tue Sep 24 2024
Legend
Existing Borehole
Existing Cone Penetration Test
Existing Pavement Core
Existing Test Pit
Proposed Cone Penetration Test
Proposed Pavement Core
Proposed Test Pit
1B-TP14 (1.40m STOPPED)
Henry Lawson Dr
Beatham Pl
Fromelles Ave
Goolagong Ct
Cannain Cres
WSP-TP05
1B-PC09 (2.30m)
Armentieres Ave
Armentieres Ave
Armentieres Ave
Eynham Rd
WSP-TP04
Henry Lawson Dr
1B-PC10 (2.30m)
Hermies Ave
Hermies Ave
Google Earth
50 m
N


SHEET 9/10
nearmap
Tue Sep 24 2024
Legend
Existing Borehole
Existing Cone Penetration Test
Existing Pavement Core
Existing Test Pit
Proposed Cone Penetration Test
Proposed Pavement Core
Proposed Test Pit
Hermies Ave
Hermies Ave
Hermies Ave
Hermies Ave
Pozieres Ave
Pozieres Ave
Glencorse Ave
Glencorse Ave
Glencorse Ave
Glencorse Ave
Glencorse Ave
Mactier Ave
Mactier Ave
WSP-TP03
WSP-TP02
B-PC10 (2.30m)
B-PC11 (2.30m)
PC08 (2.00m)
B-TP15 (1.25m ROCK REFUSAL)
B-PC12 (2.70m REFUSAL)
Google Earth
50 m
N


SHEET 10/10
nearmap
Tue Sep 24 2024
Legend
Existing Borehole
Existing Cone Penetration Test
Existing Pavement Core
Existing Test Pit
Proposed Cone Penetration Test
Proposed Pavement Core
Proposed Test Pit
CB-PC12 (1.70m REFUSAL)
TP04 (2.00m)
WSP-TP01
CB-PC13 (1.60m REFUSAL)
Macher Ave
Glencorse Ave
Henry Lawson Dr
Flanders Ave
Flanders Ave
Flanders Ave
Menin Pl
Macher Ave
Google Earth
50 m
N