Metro Body of Knowledge

Planning Approval Consistency Assessment Form

SM-17-00000111

Sydney Metro – Metro Body of Knowledge (MBoK)

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Prepared by:	Parklife Metro (PLM)
Prepared for:	Stations, Systems, Trains, Operations and Maintenance (SSTOM) contractors
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1. Existing Approved Project

Planning approval reference details (Application/Document No. (including modifications)):	
• SSI_10051 Infrastructure approval applies to this assessment • EPBC 2020/8687- covers the area between St Marys and Elizabeth Drive however the proposed works do not impact protected matters or impact Commonwealth land, so this approval is not considered further. • Western Sydney Airport: Airport Plan (as varied September 2021) does not apply to this assessment as the proposal would be undertaken outside of the Western Sydney Airport Site	
Date of determination:	• SSI_10051 Infrastructure approval dated 23 July 2021 and modified 14 April 2022, and on 20 December 2024 • EPBC 2020/8687 Approval dated 3 June 2021- not considered further • Western Sydney Airport: Airport Plan as varied 15 September 2021- does not apply to this assessment

Introduction

An Environmental Review was endorsed in April 2024 (OHE – Lansdowne and Samuel Marsden Roads Sewer Main SSTOM ER003) for the construction of a new sewer main between Orchard Hills Station and an existing Sydney Water submain near the end of Samuel Marsden Road in Lot 18 DP 238495. The Environmental Review was prepared based on the initial Sydney Water notice of requirements and preliminary sewer main concept design and it was assumed the sewer could be constructed without removal of native vegetation. Construction of the sewer (subject of ER003) involves standard pipelaying methodology via open trenching along Lansdowne and Samuel Marsden Road, and a proposed underbore between Samuel Marsden Road and the connection point with the existing Sydney Water South Creek submain.

Following further detailed design, impacts to native vegetation were identified at the point of connection of the underbore with the existing Sydney Water submain. This impact was assessed in Revision 1 of this Consistency Assessment (PLM CA001 Rev 1, initially endorsed in February 2026). This Consistency Assessment (PLM CA001 Rev 2) assesses a minor design change to the underbore alignment which was made following Sydney Water consultation with Department of Planning, Housing and Infrastructure (DPHI). This assessment also assesses a proposed truck turnaround at the underbore connection point. The turnaround would be suitable for heavy vehicles up to 19m long and would eliminate long reversing manoeuvres that are currently approved under the exiting Heavy Vehicle Local Road Report (HVLR) (HVLR – Orchard Hills Revision C, initially approved 19 November 2024)

In parallel with this Consistency Assessment a separate Consistency Assessment (Samuel Marsden Road Sewer main - trenched scope of work and tree removal PLM CA005) is being prepared to assess the open trenched portion of the sewer main. Consistency Assessment CA005 assesses the trenched sewer main scope contained in ER003 and includes new biodiversity impacts of the removal of six trees from the road reserve on Samuel Marsden and Lansdowne Roads. Consistency Assessment PLM CA005, when approved, would supersede Environmental Review SSTOM ER003. Figure A1 illustrates the location of the open trenched and underbore scope of works.

The Samuel Marsden Road sewer main scope has been separated into two Consistency Assessments (CAs) following consultation with Sydney Metro. This approach was adopted to reflect the differing approval status and subject matter of the proposed changes. The separation of the assessments was agreed between Parklife Metro and Sydney Metro as the underbore and open trench components had progressed through different stages of design development and approval. Combining both scopes into a single assessment would have reduced clarity regarding the specific changes being assessed and risked delaying approval of the underbore works while biodiversity investigations and impact assessments for the open trench scope were being finalised.

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The approved project at is located within the Penrith City Council Local Government Area in the suburb of Orchard Hills, and has been cared for by the Dharug, Dharawal,and Gundungurra peoples.

Relevant background information

Sydney Metro completed an environmental impact statement for the project (the project EIS) in October 2020. The project EIS identified a range of environmental, social and planning issues associated with the construction and operation of the project and proposed measures to mitigate and manage potential impacts.

The project EIS was publicly exhibited from 21 October 2020 to 2 December 2020. Following public exhibition, submissions from stakeholders and the community were received and addressed by Sydney Metro in the submissions report, which was lodged with the Planning Secretary in May 2021.

The Minister for Planning approved the project under Part 5, Division 5.2 of the EP&A Act on 23 July 2021, on conditions. The approval has been modified twice:

- SSI 10051 Modification 1 (dated 14 April 2022)
- SSI 10051 Modification 2 (dated 20 December 2024)

For the purposes of this consistency assessment, the approval issued by the Minister for Planning and approved modifications of it is referred to as the Division 5.2 Approval. The Ministers approval for a modification is not required where the project as modified would be consistent with the Division 5.2 Approval. The consistency assessment is used to determine if a change can be considered to be consistent, or if Ministerial approval of a modification of the Division 5.2 Approval is required.

All proposed works identified in the assessment would be undertaken in accordance with the mitigation measures identified in the EIS, submissions report and the conditions of approval.

The following are relevant to the Approved Project and have been considered in this consistency assessment:

- Sydney Metro- Western Sydney Airport Environmental Impact Statement, including accompanying technical papers (SM-WSA EIS) (October 2020)
- Sydney Metro- Western Sydney Airport Submissions Report (April 2021)
- Instrument of Approval (SSI_10051) (dated 23 July 2021)
- SSI 10051 Modification 1 (dated 14 April 2022) – Conditions of Approval A1 and E4 were modified
- SSI 10051 Modification 2 (dated 20 December 2024) – Conditions of Approval A1, E13 and E57 were modified
- SSTOM ER003 Environmental Review. Orchard Hills Station Sewer Main Lansdowne and Samuel Marsden Roads (dated 29 April 2024)
- PLM CA 001 – Samuel Marsden Road Sewer main – revised underbore alignment and tree removal - Rev 1 (dated February 2026) (PLM CA001 Rev 1)

The above documents are mostly available on the NSW Major Projects portal here: https://www.planningportal.nsw.gov.au/major-projects/projects/sydney-metro-western-sydney-airport

The proposal identified in this assessment would be undertaken in accordance with the Performance Outcomes (POs) and Revised Environmental Mitigation Measures (REMMs) identified in the EIS, Submissions Report, and the relevant Conditions of Approval (CoA).

2. Description of proposed change which is the subject of this assessment

The underbore alignment described in Consistency Assessment PLM CA001 Rev 1 included the following scope:

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- Removal of one maintenance hole on Samuel Marsden Road
- Relocate underbore entry pit, reducing the length of trenching along Samuel Marsden Road by approximately 55m.
- Removal of two trees to allow connection to the existing Sydney Water sewer sub-main.
- Allowance for an intermediate pit/s along the underbore alignment in locations where vegetation removal is not required.
- Geotechnical testing prior to construction to confirm subsurface conditions and detailed construction methodology.

This revised Consistency Assessment (Rev 2) assesses a minor amendment to the underbore alignment. The proposed scope now includes the following:

- Underbore construction between MH18 and MH19 to avoid impacts to trees along Samuel Marsden Road.
- Minor realignment of underbore alignment to follow property boundary between Lots 18 and 19 DP 238495
- Construction of a maintenance hole and connection to the existing Sydney Water South Creek submain.
- Provision for intermediate pit(s) along the underbore alignment, in locations where vegetation removal is not required.
- Geotechnical investigations and testing prior to construction to confirm subsurface conditions and inform the detailed construction methodology.
- Construction of a truck turnaround which is anticipated to be used by articulated vehicles up to 19 metres in length.

Drawings of the proposed changes are shown in Figures A3 in Appendix A. Figure A4 and A5 shows potential vegetation impact areas at the underbore entry pit (at the end of Samuel Marsden Road) and exit pit (adjacent to the existing Sydney Water sewer submain main at the M4). A drawing of the proposed change is shown in Figure A6.

A drawing of the turnaround is shown in Figure A7.

As part of the revised alignment, the removal of MH19 assessed in Consistency Assessment PLM CA001 Rev 1 is no longer required and MH19 has been retained in the design.

Division 5.2 Approval

Construction of additional utilities outside of the approved construction boundary has been anticipated and a process for assessment provided in the Sydney Metro - Western Sydney Airport Environmental Impact Statement (EIS) and Submissions Report.

Section 8.11.5 of the EIS and Section 2.11.5 of the Submission Report Appendix B allows for additional utility works that are required outside of the construction footprint for the project provided the works are consistent with the following performance criteria:

- the works connect to the construction footprint or to a point adjacent to the construction footprint
- the works have no direct impact on heritage items (including areas of archaeological sensitivity), threatened species, populations or ecological communities beyond the impacts assessed in the Environmental Impact Statement
- the works can be carried out and managed consistent with the performance outcomes identified in Chapter 27 (Synthesis) or as revised

SSTOM ER003 Environmental Review. Orchard Hills Station Sewer Main Lansdowne and Samuel Marsden Roads (dated 29 April 2024)

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The Environmental Review concluded that the sewer main utility work would meet the criteria for construction as outlined in the EIS, specifically:

- The works connect to the construction footprint from Orchard Hills Station as shown in Figure 1 (see Appendix A Figure A1)
- There would be no impacts to non-Aboriginal heritage and the Unexpected Heritage Finds Procedure would be implemented during work
- An Aboriginal heritage due diligence investigation concluded it is considered highly unlikely that in situ Aboriginal archaeological deposits remain within the study area due to the extensive disturbance caused by the construction of Sydney Water infrastructure, drainage, roads, and above and underground services. It is not expected that the proposed works will impact on any Aboriginal objects or sites
- Areas of vegetation along the route were mapped by Biosis (2018) as part of the Western Sydney Strategic Assessment for the Cumberland Plain Conservation Plan (CPCP). Samuel Marsden Road reserve is assessed as "Certified – urban capable land" while the property owned by Department of Planning, Housing and Infrastructure is "Certified – major transport corridor". The original design as assessed by SSTOM ER003 did not require vegetation removal.

Need for the proposed change and environmental benefit

The underbore alignment assessed in this revised Consistency Assessment (Rev 2) minimises segmentation of property lots, preserving future land use options. The use of underbore construction methodology between MH 18 and MH19 would continue to protect the stand of trees along the northern verge of Samuel Marsden Road. The truck turnaround addresses road safety concerns around truck reversing manoeuvres and provides a traffic solution that would allow trucks to enter and exit the work area in a forward direction. This would eliminate the need for reversing movements of up to approximately 900 m between the intersection of Samuel Marsden Road and Lansdowne Road and the northern end of Samuel Marsden Road, resulting in improved safety outcomes for road users, construction personnel and the local community. The truck turnaround therefore provides a traffic solution that delivers local community benefits through improved safety.

3. Community and Stakeholder engagement

Stakeholder Consultation

Further discussions between Sydney Water, DPHI, Sydney Metro and Parklife Metro Design & Construction (PLM) have been undertaken since endorsement of the initial Consistency Assessment (Rev 1, February 2026) to address DPHI concerns around property access and potential impact of Sydney Water infrastructure on future use of DPHI property. Options for alternate underbore routes were prepared by PLMs accredited Water Servicing Coordinator (WSC) and presented to Sydney Water, DPHI and Sydney Metro on the 10 June 2026. The options investigated are included in Appendix D. The preferred option, Option 1C, was agreed and is the basis for the final design submission assessed in this Consistency Assessment (Rev 2) and is presented in Figure A6.

4. Existing environment and background

The proposed work is located within a rural residential property (1-45 Samuel Marsden Road). It is bounded by Samuel Marsden Road to the south and the M4 Western Motorway to the north. The property, owned by the NSW Government and managed by DPHI Office of Strategic Lands, includes horse riding infrastructure and is currently leased to an occupational therapy riding provider. The nearest occupied residential property is located 300m from the site at 53 Samuel Marsden Road. Baseball diamonds are located on the south side of Samuel Marsden Road opposite the site. South Creek is approximately 250m east of the site. Large lot rural residential properties are located along both sides of Samuel Marsden Road.

The proposed underbore pits are located in Samuel Marsden road reserve. The underbore alignment passes under Lot 18 and 19 in Deposited Plan (DP) 238495. The tree removals are located on Lot 19 DP 238495.

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The area includes vegetation described as PCT 4025: Cumberland Redgum - Cabbage Gum Riverflat Forest in the NSW, which corresponds to the threatened ecological community River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (PCT 835), listed as Endangered under the *NSW Biodiversity Conservation Act 2016* (BC Act). No listed threatened flora species were recorded within the area. A pre-clearing inspection and biodiversity memo has been completed including biodiversity credit calculations for the removal of the two trees and is discussed further below.

An addendum to the Aboriginal Due Diligence Assessment, including an additional site walk, was completed to assess the intermediate pits. No Aboriginal objects were identified or considered likely in the location given extensive prior disturbance of the site. Aboriginal Heritage is discussed further below.

5. Environmental Benefits

This revised Consistency Assessment (Rev 2) assesses a minor amendment to the underbore alignment. The proposed change minimises any potential segmentation of Lots 18 and 19 DP 238495 and preserves future land use options compared to the underbore alignment proposed in Revision 1 of this Consistency Assessment. The truck turnaround addresses road safety concerns around truck reversing manoeuvres and provides a traffic solution that would provide local community benefits through improved safety.

6. Justification for the proposed change

On-site survey of the underbore route approved in Environmental Review (SSTOM ER003) identified impacts to vegetation which were not anticipated or assessed at the following two locations.

1. Trees in the road reserve at the proposed underbore entry pit and along the sewer main route along Samuel Marsden Road
2. At the connection between the new maintenance hole (underbore exit pit) and the existing Sydney Water sub-main

Design review and change was carried out by the approved Water Service Coordinator (WSC)

The following design change was made to minimise vegetation impacts:

- The final maintenance hole on Samuel Marsden Road was removed and the trenched portion of sewer main shortened by approximately 55m to commence the underbore at the previous maintenance hole. This design change eliminates potential tree removals along Samuel Marsden Road and situates the underbore entry pit in an area which avoids tree removals. Damage and impact to trees along Samuel Marsden Road have been avoided by this proposed change.

The following design change was investigated however was discounted as the option was not technically viable

- A design option was proposed to connect the new sewer main directly to the Sydney Water sub-main. This option involved adjusting the connecting directly to the existing 1350mm sewer sub-main by constructing the maintenance hole directly over the sub-main. This option was found to present significant complexity for both design and construction. Direct connection to the active sewer main would require a detailed flow management strategy to initially inform design and then a high level of flow management during construction in comparison to a breakthrough connection to an existing maintenance hole. In addition, the size of the existing carrier main would require a custom maintenance hole design, requiring specialist engineering input and multiple non-standard review stages with Sydney Water. The WSC has advised this options would be unacceptable to Sydney Water and progressing this options would also create a risk to the construction program. This option has been discounted. The location of the maintenance hole has been retained. Tree removal at MH19 is required.

Allowance for excavation of an intermediate pit/s along the underbore alignment was also made in the original Consistency Assessment (Rev 1). The provision allows flexibility for the specialist construction contractor to adapt to site conditions. Specifically, the underbored portion may be constructed using either horizontal directional drilling

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(HDD) or thrust boring equipment. While runs of 200m and longer are possible using HDD construction a large drill rig is required. The space needed for site establishment for this equipment varies between contractors. Smaller HDD drill rigs and thrust boring equipment can be established on a smaller footprint however the feasible maximum drill distance is generally less than 100m. Providing allowance for an intermediate entry/exit pit will allow the specialist drill contractor to respond to the site conditions with appropriate equipment.

This revised Consistency Assessment (Rev 2) has been prepared following further option investigation for alternate underbore routes to address concerns raised by DPHI about segmentation of property lots. The options investigated are included in Appendix D. The preferred option, Option 1C, was agreed as being feasible from a construction and operation perspective while also preserving future land use options. The preferred alignment is more closely aligned with the underbore route originally assessed in SSTOM Environmental Review ER003 – Orchard Hills Station Sewer Main Lansdowne and Samuel Marsden Roads (dated 29 April 2024), while incorporating design refinements developed through detailed design and stakeholder consultation. To protect trees along Samuel Marsden Road, underbore construction methodology is also proposed between MH 18 and MH 19.

A truck turn around is also a new scope assessed in this Consistency Assessment (PLM CA001 Rev2). The truck turnaround would be suitable for heavy vehicles up to 19m in length and would improve safety by eliminating long reversing manoeuvres up to 900m that are currently approved under the exiting Heavy Vehicle Local Road Report (HVLR) (HVLR – Orchard Hills Revision C, initially approved 19 November 2024).

6. Control Measures

Will a project and site specific EMP be prepared?	☐ Yes	Are appropriate control measures already identified in an existing EMP?	☒ Yes
	☒ No		☐ No

7. Conditions of approval / Environmental mitigation measures

Number	Condition of Approval/ Environmental mitigation measure	Discussion on relevance and consistency for proposed change

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CoA A1	The Proponent must carry out the CSSI in accordance with the terms of this approval and generally in accordance with the: (a) Sydney Metro – Western Sydney Airport Environmental Impact Statement dated 21 October 2020; (b) Sydney Metro – Western Sydney Airport Submissions Report submitted April 2021;	Section 8.11.5 of the SM-WSA EIS allows for additional utility works outside of the approved construction footprint for the project provided the works are consistent with the following performance criteria: - the works connect to the construction footprint or to a point adjacent to the construction footprint - the works have no direct impact on heritage items (including areas of archaeological sensitivity), threatened species, populations or ecological communities beyond the impacts assessed in the Environmental Impact Statement - The works can be carried out and managed consistent with the performance outcomes identified in Chapter 27 (Synthesis) or as revised The proposed works remain consistent with these criteria specifically: - The works connect to the construction footprint from Orchard Hills Station and Precinct as shown in Figure A1. - There are no direct or indirect impacts to non-Aboriginal heritage items (see discussion on CoA E19 below) - The Aboriginal Due Diligence Assessment report (Unearthed Archaeology, 2024) and additional site walk and assessment letter memo (Unearthed Archaeology, December 2025, see Appendix B) concluded it is not expected that the proposed works will impact on any Aboriginal objects or sites and no further archaeological investigations are required. (see discussion on CoA E28 below). - There is no increase in biodiversity impacts. Sydney Metro and contractors have reduced offset credit requirements for the SM-WSA project during detailed design and construction planning. While the tree removals on Lot 19 DP 238495 attracts biodiversity offset liability and credit retirement, the credit calculations made under the NSW Biodiversity Assessment Method (BAM), would not exceed the offset requirements as identified in Condition E4 of SSI 10051. As such there is not change from the approved project (see discussion on CoA E3 below). - A pre-clearing inspection was carried out by the project ecologist to assess the site. The inspection confirmed no significant vegetation on site. Fireweed (*Senecio madagascariensis*) a Weed National Significance (WoNS), was identified in patches within the footprint of the construction pad. The inspection report is included in Appendix C.

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		Project performance outcomes (PO) will continue to be met (see discussion on relevant PO's below)
CoA E2	The clearing of native vegetation must be minimised to the greatest extent practicable with the objective of reducing impacts to threatened ecological communities and threatened species habitat.	The connection of the sewer main to the existing Sydney Water sub main was investigated in detail and it was determined that there is no viable alternative to removing two trees adjacent at this location. The tree removals are consistent with condition CoA E2. The intermediate pit/s, if required, will only be excavated in areas along the underbore alignment where there is adequate clearance from vegetation to ensure no damage to trees or tree root zones. Tree protection zones will be established in accordance with the Project Ecologists and Arborists advice. Any excavation within the tree protection zone would only be in consultation with the Project Ecologist and Arborist to ensure any impacts to tree roots are managed to prevent impact to tree health. The realignment of the underbore and the addition of a truck turning circle proposed in this Consistency Assessment (Rev 2) does not require any further clearing of native vegetation to what was assessed in Revision 1.

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CoA E3	Impacts to plant community types must not exceed those identified in the documents listed in Conditions A1, unless otherwise approved by the Planning Secretary.	A site survey has been completed by the Project ecologist to investigate the biodiversity values of the proposal. The area comprises a canopy consisting of Cabbage Gum (*Eucalyptus amplifolia*) with a midstorey of various Wattle species (*Acacia spp*.). The understorey is dominated by a range of grasses and forbs which are predominantly exotic. The vegetation community recorded within the study area correlates with the mapped PCT 4025: Cumberland Redgum - Cabbage Gum Riverflat Forest, as evidenced by the canopy dominance of Cabbage Gum (*Eucalyptus amplifolia*) and the characteristic presence of Acacia species in the midstorey stratum. The ground storey of this PCT type is largely absent. PCT 4025 is the contemporary equivalent of the legacy PCT 835: Forest Red Gum – Rough-barked Apple Grassy Woodland on Alluvial Flats of the Cumberland Plain. Biodiversity offset credit calculations were conducted in accordance with the Biodiversity Assessment Methodology (BAM) for the two trees to be removed (Cabbage Gums (*Eucalyptus amplifolia*)). Excavation of an intermediate pit or pits in the areas along the underbore alignment would disturb understorey only, primarily the exotic grasses and forbs listed, and no further credit calculation is required for these areas. The patch of PCT 835 is calculated to generate an additional 1.37 ecosystem credits under the BAM. The offset credit requirements have been progressively reviewed and tracked through the detailed design and construction planning stages for the WSA-SM project. Reductions in biodiversity impacts have reduced the offset credit requirements and as such the additional of 1.37 ecosystem credits would not exceed the offset requirements identified in CoA E4. The Department of Planning, Housing and Infrastructure (DPHI) will be notified of the proposed change in vegetation clearing areas and associated biodiversity offset requirements prior to clearing. No threatened flora or fauna species were observed during the field survey. The two trees to be removed were not found to provide a significant resource for any fauna species. The pre-clearing and biodiversity assessment report is included in Appendix C. The revised underbore alignment and the addition of a truck turning circle proposed in this Consistency Assessment (Rev 2) does not change the impact to plant community types already assessed and there is no change to the Approved Project.
CoA E4	Prior to impacts on the biodiversity values set our in Table 3 and Table 4, the number and classes of ecosystem credits and species credits (like-for like) must be retired.	As described above the calculated credits would not exceed the offset requirements identified in the SSI 10051 approval. There is no change to the Approved Project.

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CoA E7	Evidence of the retirement of credits in satisfaction of Condition E4 or payment to the Biodiversity Conservation Fund in satisfaction of Condition E5 must be provided to the Planning Secretary prior to impacts on the biodiversity values	As described above the calculated credits would not exceed the offset requirements identified in the SSI 10051 approval. The Department of Environment Planning, Housing and Infrastructure (DPHI) would be notified as necessary of the proposed change in vegetation clearing areas. There is no change to the Approved Project.
CoA E13	Revegetation and the provision of replacement trees must be informed by a Tree Survey undertaken during detailed design. The Tree Survey must identify the number, type and location of any trees to be removed, except for trees that are offset under Condition E4.	As the trees to be removed are subject to biodiversity credit retirement under Condition E4 they are not required to be recorded in the Tree Survey and are not subject to replacement tree requirements. There is no change to the Approved Project.
CoA E19	The Proponent must not destroy, modify or otherwise physically affect any Heritage item not identified in documents referred to in Condition A1. Unexpected heritage finds identified by the CSSI must be managed in accordance with the Unexpected Heritage Finds and Human Remains Procedure outlined in Conditions E34 to E36. Consideration of avoidance and redesign to protect unexpected finds of state heritage significance must be addressed where this condition applies.	There is no direct or indirect impact to any recorded heritage item from the proposed utility works. Due to the extent of disturbance in the work areas from existing roads, infrastructure and utilities unknown non-Aboriginal heritage items or archaeology are highly unlikely to be in the vicinity of the work areas. The project has an existing Unexpected Heritage Finds and Human Remains Procedure. This procedure will be implemented for the duration of construction. The works would have no impact on heritage items (including areas of archaeological sensitivity), beyond the impacts assessed in the Approved Project.

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CoA E28	All reasonable steps must be taken so as not to harm, modify or otherwise impact Aboriginal objects or places of cultural significance except as authorised by this approval.	A Due Diligence assessment and supplementary site inspection was carried out by the Project Archaeologist. A search of the Aboriginal Heritage Information Management System (AHIMS) on 29 January 2026 (see Appendix B) identified one site in the vicinity of the works. Additional site card information was requested which confirmed the site was located on the northern side of the M4 Motorway and was destroyed in accordance with the conditions of Aboriginal Heritage Impact Permit (AHIP # C0002113) during upgrade of the M4 Motorway. An Aboriginal heritage due diligence investigation was completed along the entire length of the sewer main route in April 2024. The assessment was undertaken by Unearthed Archaeology and Heritage in accordance with the *Due diligence code of practice for the protection of Aboriginal objects in NSW* (DECCW 2010) and *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (Office of Environment & Heritage 2011). An additional addendum assessment and site walk was completed in December 2025 to review the proposed alignment changes and potential intermediate pits. The assessments concluded it is considered highly unlikely that in situ Aboriginal archaeological deposits remain within the study area due to the extensive disturbance caused by the construction of existing roads and utilities. It is not expected that the proposed works will impact on any Aboriginal objects or sites. The Aboriginal Due Diligence Assessment report (Unearthed Archaeology April 2024), additional addendum assessment (Unearthed Archaeology December 2025) and AHIMS search results are included in Appendix B. The assessments remain applicable to the works including the revised underbore alignment and the addition of a truck turnaround assessed in this Consistency Assessment (Rev 2). The Unexpected Heritage Finds Procedure would be implemented during work.
CoA E33	Where previously unidentified Aboriginal objects or places of cultural significance are discovered, all work must immediately stop in the vicinity of the affected area. Works potentially affecting the previously unidentified objects or places must not recommence until Heritage NSW has been informed. The measures to consider and manage this process must be specified in the Unexpected Heritage Finds and Human Remains Procedure required by Condition E34 and include registration in the Aboriginal Heritage Information Management System (AHIMS), where required.	The project has an existing Unexpected Heritage Finds and Human Remains Procedure. This procedure will be implemented for the duration of construction.

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CoA E38	Work must only be undertaken during the following hours: (a) 7:00am to 6:00pm Mondays to Fridays, inclusive; (b) 8:00am to 1:00pm Saturdays; and (c) at no time on Sundays or public holidays.	Works are anticipated to take place during standard construction hours. OOHW may be required for oversized, overmass deliveries and potentially by any road occupancy conditions. Any OOHW would be carried out under the SSTOM package Environmental Protection Licence (EPL) (no. 21807) and in accordance with CoA E41(c)(i) which permits different construction hours where an EPL is in force.
CoA E64	The CSSI must be constructed and operated with the objective of minimising light spill to surrounding properties.	Any night lighting required during OOHW (if applicable) will be managed in accordance with the appropriate guidelines to minimise light spill and impacts to sensitive receivers as outlined in the approved Visual Amenity Management Sub-plan SMWSASSM-PLD-1NL-PC-PLN-000027
CoA E99	The Unexpected Contaminated Land and Asbestos Finds Procedure must be implemented throughout construction.	No change to the Approved Project.
CoA E105	Local roads proposed to be used by Heavy Vehicles to directly access ancillary facilities / construction sites that are not identified in the documents listed in Condition A1 must be approved by the Planning Secretary and be included in the CTMP.	An updated Heavy Vehicle Local Road (HVLR) Report will be to address the proposed truck turn around and change to heavy vehicle access along Lansdowne and Samuel Marsden Roads. The currently approved HVLR requires 19m long articulated vehicles to turn right from Lansdowne Road into Samuel Marsden Road, before reversing into the northern section of Samuel Marsden Road. For trucks up to the dimensions of a 14m articulated vehicle, a right turn from Samuel Marsden Road onto Flinders Avenue is possible before reversing onto Samuel Marsden Road to access the northern portion of sewerage works. The proposed truck turn around provides a suitable location for vehicles up to 19m length to turn at the end of Samuel Marsden Road. This option eliminates the need for lengthy reversing manoeuvres and improves safety and local traffic impacts. The turn around also functions as appropriate access to the underbore pit locations. Figure A7 shows the location of the truck turn around and the swept path analysis. An updated HVLR would be submitted to the Planning Secretary for approval and included in the CTMP prior to these works commencing.

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CoA E110	Access to all utilities and properties must be maintained during works, unless otherwise agreed with the relevant utility owner, landowner or occupier.	All work to deliver the sewer main work and connections will be carried out in conjunction with Sydney Water through the project Accredited Services Provider. Consultation with the Department of Planning, Housing and Infrastructure has been managed in accordance with Sydney Water Entry onto third party property guidelines and following the Permission to Enter processes. A Memorandum of Understanding (MoU) has been made (dated 11 Sept 2026) between the Planning Ministerial Corporation (PMC) and Sydney Metro to record the intention of both parties in relation to the sewer main Project. Parklife Metro's community consultation team will consult with residential landholders along the sewer main route, the occupational therapy riding provider and Penrith City Council, in accordance with the approved Community Communications Strategy – Delivery SMWSASSM-PLD-1NL-PC-PLN-000065.
CoA E120	Minimising impacts to utilities infrastructure and disruptions of services.	Construction works with the potential to cause disruption to supply may occur during the testing and commissioning phase and during final cutover. These works will be undertaken in conjunction with specialised Sydney Water crews. Parklife Metro will work with Sydney Water during these phases and implement standard Sydney Water process and procedures to minimise the potential for any unplanned service disruption.
CoA E128	Erosion and Sediment controls must be implemented and maintained consistent with the blue book.	No change from the Approved Project.
Revised Performance Outcome (Biodiversity)	Minimise or where possible avoid impacts on threatened flora and fauna species, and ecological communities listed under the *Biodiversity Conservation Act 2016* (NSW) and *Environment Protection and Biodiversity Conservation Act 1999* (Cth)	The tree removals have been minimised as far as possible through design review and optimisation. Alternative design options were investigated, including direct connection to the existing 1350 mm Sydney Water sub-main, however, this option was determined to be technically unfeasible due to the complexity of constructing a maintenance hole directly on the active carrier main, the associated flow management requirements, and Sydney Water's advice that the arrangement would not be acceptable. Consequently, the removal of two trees at the connection point could not be reasonably avoided while maintaining a constructible and operable sewer main design. The proposed change in this Consistency Assessment (Rev 2) is consistent with this Performance Outcome.

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Revised Performance Outcome (Aboriginal Heritage)	The heritage significance of Aboriginal objects and places are protected, conserved and/or managed in order to ensure the project does not diminish the story and cultural understanding associated with the objects and places of Aboriginal people in New South Wales	The Aboriginal heritage due diligence investigation and addendum investigation carried out by the Project Archaeologist concluded it is highly unlikely that in situ Aboriginal archaeological deposits remain within the study area due to the extensive disturbance caused by the construction of Sydney Water infrastructure, drainage, roads, and above and underground services. It is not expected that the proposed works in this Consistency Assessment (Rev 2) will impact on any Aboriginal objects or sites. The proposed change is consistent with this Performance Outcome
Revised Performance Outcome (Aboriginal Heritage)	Impacts on areas of archaeological sensitivity and significance are avoided or minimised, where practical	It is not expected that the proposed works in this Consistency Assessment (Rev 2) will impact on any Aboriginal objects or sites and the proposed change is consistent with this Performance Outcome.
REMM AH2	Areas of unverified Aboriginal archaeological sensitivity would be subject to archaeological survey, if required, and test excavation prior to construction in accordance with the Aboriginal Cultural Heritage Management Plan	The project Excavation Director prepared a due diligence assessment and addendum assessment for the work. No further archaeological survey or test excavation is recommended.

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8. Impact Assessment – Construction

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project CoA and REMMs	Consistent Impact Y/N	Do any CoA need to be changed? Y/N	Endorsed	
					Y/N	Comments
Biodiversity	The proposed change requires the removal of two trees at the exit pit for the construction of a maintenance hole and connection to the existing Sydney Water sewer sub-main. The two trees are identified as Cabbage Gums (*Eucalyptus amplifolia*), and the vegetation is described as consistent with Plant Community Type (PCT) 835 'Thinned' River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions. Less than 0.01ha of PCT 835 Thinned will be removed in this area. The patch of PCT 835 is calculated to generate an additional 1.37 ecosystem credits under the BAM. The biodiversity assessment and credit calculations are included in Appendix C. Reductions in biodiversity impacts have been made through the detailed design and construction planning stages for the WSA-SM project, which has reduced the offset credits required by the project. As such the additional of 1.37 ecosystem credits are able to be managed within the existing credit allocation and would not exceed the offset requirements identified in CoA E4. The Department of Planning, Housing and Infrastructure (DPHI) would be notified as necessary of the proposed change in vegetation clearing areas.	No additional measures required	Y	N	Y	N/A

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Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project CoA and REMMs	Consistent Impact Y/N	Do any CoA need to be changed? Y/N	Endorsed	
					Y/N	Comments
	All the works will be managed in accordance with the approved Flora and Fauna Management Sub-plan - SMWSASSM-PLD-1NL-PC-PLN 000023. This includes implementing the Clearing and Grubbing Procedure and Weed Management Procedure. The revised underbore alignment and the addition of a truck turning circle assessed in this Consistency Assessment (Rev 2) does not change this biodiversity assessment. There is no change to the Approved Project.					
Water	The proposed works are approximately 250m west of South Creek. Erosion and Sediment Control Plans (ESCPs) will be developed for all the worksite in accordance with the approved Soil and Water Management Sub-plan - SMWSASSM-PLD-1NL-PC-PLN-000020. Surfaces will be re-instated and fully stabilised following the completion of the proposed works.	No additional measures required	Y	N	Y	N/A
Soils and contamination	A search of the contaminated sites register https://app.epa.nsw.gov.au/prclmapp/searchregister.aspx did not identify any sites listed in the work areas along the sewer main route. The rural history of the area may indicate the presence of potential contaminated areas from activities such as historical use and storage or herbicides and pesticides or hazardous building materials. The Contamination and Asbestos Unexpected Finds Procedure will be implemented during the construction works as outlined in the approved	No additional measures required	Y	N	Y	N/A

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Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project CoA and REMMs	Consistent Impact Y/N	Do any CoA need to be changed? Y/N	Endorsed	
					Y/N	Comments
	Soil and Water Management Sub-plan - SMWSASSM-PLD-1NL-PC-PLN 000020.					
Air quality	Possible air quality impacts include dust and particulates generated from plant and equipment as well as excavation activities. With the implementation of mitigation measures included in the Air Quality Management Sub-Plan SMWSASSM-PLD-1NL-PC-PLN-000028 impacts would be managed.	No additional measures required	Y	N	Y	N/A
Noise and vibration	There are low density rural residential properties located along Samuel Marsden Road with the nearest residential receiver approximately 300 metres west of works. Urban residential receivers, in the suburb of Claremont Meadows, are approximately 450m to the north west of the proposal, separated from the work area by the M4 Motorway. A Detailed Noise and Vibration Impact Statement (DNVIS) was prepared to address all utility construction works associated with the Orchard Hills Station site. The DNVIS did not predict any receivers to be highly noise affected (HNA) for the proposed works during standard work hours. The DNVIS can be accessed here (parklifemetro.com.au). There would be no change from the approved project and all works would be managed in accordance with the approved Parklife Metro Noise and Vibration Management Sub-plan - SMWSASSM-PLD-1NL-PC-PLN 000024, including any OOHW if required	No additional measures required	Y	N	Y	N/A

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Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project CoA and REMMs	Consistent Impact Y/N	Do any CoA need to be changed? Y/N	Endorsed	
					Y/N	Comments
Aboriginal Culture and Heritage	An Aboriginal Heritage Due Diligence Assessment and addendum assessment is included in Appendix B. An updated search of the Heritage NSW Aboriginal Heritage Information Management System (AHIMS) was completed on 16 October 2026 with a 50 m search buffer. The assessment concluded it is highly unlikely that in situ Aboriginal archaeological deposits remain within the study area and it is not expected that the proposed works will impact on any Aboriginal objects or sites. The truck turn around will make use of the existing gate and track into the site and the road will be formed using geogrid, geofabric and suitable road base material. The road will be formed on the existing ground surface with no excavation. The Unexpected Heritage Finds Procedure will be implemented for the works. Prior to works commencing, a toolbox will be delivered to the workforce to communicate the requirements of the Unexpected Finds Procedure.	No additional measures required	Y	N	Y	N/A
Historic Heritage	No known non-Aboriginal heritage sites would be impacted due to the distance between the proposed works and existing heritage sites. The Unexpected Heritage Finds Procedure will be implemented for the works. Prior to works commencing, a toolbox will be delivered to the workforce to communicate the requirements of the Unexpected Finds Procedure.	No additional measures required	Y	N	Y	N/A

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Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project CoA and REMMs	Consistent Impact Y/N	Do any CoA need to be changed? Y/N	Endorsed	
					Y/N	Comments
Community and socio-economic	No additional impacts or changes.	No additional measures required	Y	N	Y	N/A
Traffic and transport	The underbore pits will be located within the public road reserve. Temporary traffic impacts are expected to be caused by lane disruption to create safe work spaces within the active road lanes and road reserve area. There are no anticipated long-term traffic impacts and access to properties would be maintained at all times. Temporary impacts would be localised and managed appropriately by the existing conditions of approval, REMMs and performance outcomes. Appropriate traffic management planning will include ongoing consultation with the TTLG and through the road occupancy licence process. The proposed truck turn around provides a suitable location for vehicles up to 19m length to turn at the end of Samuel Marsden Road. This option eliminates the need for lengthy reversing manoeuvres and improves safety and local traffic impacts. The turn around also functions as appropriate access to the underbore pit locations. The swept path assessment is included in Figure A7. In accordance with the CoA, the updated HVLR would be submitted to the Planning Secretary for approval and included in the CTMP prior to these works commencing. An updated Traffic Management Plan would be prepared to include the work along Samuel Marsden Road as required by Condition E105, and would include the updated HVLR once	No additional measures required	Y	N	Y	N/A

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Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project CoA and REMMs	Consistent Impact Y/N	Do any CoA need to be changed? Y/N	Endorsed	
					Y/N	Comments
	approved. Consultation with affected residents will be undertaken prior to works commencing.					
Waste and resource management	Waste generated by the works including green waste would be managed as per the Approved Project.	No additional measures required	Y	N	Y	N/A
Visual	Temporary visual impacts are expected for those nearest residential receivers as well as recreational users of the nearby Samuel Marsden baseball diamond. Construction equipment including underbore machinery will visible, particularly at the underbore pits on Samuel Marsden Road, for approximately 1 month. On completion of the work all permanent works will be underground. Maintenance hole lids will be visible at grade and generally within the existing roadway or road reserve. The truck turn around will be removed on completion of the work and the area returned to pre-existing condition. No permanent visual impact is expected. Any night lighting required during OOHW (if applicable) will be managed in accordance with the appropriate guidelines to minimise light spill and impacts to sensitive receivers	No additional measures required	Y	N	Y	N/A
Land use and property	There would be no change to land use. The design has been determined in accordance with Sydney Water requirements through an approved Water Service Coordinator. Consultation with the Department of Planning, Housing and Infrastructure has been managed in accordance with Sydney Water Entry onto third party property guidelines and following the Permission to Enter	No additional measures required	Y	N	Y	N/A

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Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project CoA and REMMs	Consistent Impact Y/N	Do any CoA need to be changed? Y/N	Endorsed	
					Y/N	Comments
	processes. A Memorandum of Understanding (MoU) has been made (dated 11 Sept 2026) between the Planning Ministerial Corporation (PMC) and Sydney Metro to record the intention of both parties in relation to the sewer main Project. This revised Consistency Assessment (Rev 2) assesses a minor amendment to the underbore alignment. The proposed change minimises any potential segmentation of Lots 18 and 19 DP 238495 and preserves future land use options, addressing concerns raised by DPHI. Parklife Metro community consultation team will consult with residential landholders along the sewer main route in accordance with the approved Community Communications Strategy – Delivery SMWSASSM PLD-1NL-PC-PLN-000065					
Hazard and risk	Work with live sewer will be carried out in accordance Sydney Water requirements through an approved Water Service Coordinator.	No additional measures required	Y	N	Y	N/A
Other	Construction works with the potential to cause disruption to wastewater may occur during the testing and commissioning phase and during final cutover. These works will be undertaken in conjunction with specialised Sydney Water crews. Parklife Metro will work with Sydney Water during these phases and implement standard Sydney Water process and procedures to minimise the potential for any unplanned service disruption.	No additional measures	Y	N	Y	N/A

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9. Impact Assessment – Operation

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project CoA and REMMs	Consistent Impact Y/N	Do any CoA need to be changed? Y/N	Endorsed	
					Y/N	Comments
Biodiversity	No change to overall impacts assessed by the Division 5.2 Approval.	No additional measures required.	Y	N	Y	N/A
Water	No change from the Division 5.2 Approval.	No additional measures required.	Y	N	Y	N/A
Soils and contamination	No change from the Division 5.2 Approval.	No additional measures required.	Y	N	Y	N/A
Air quality	No change from the Division 5.2 Approval.	No additional measures required.	Y	N	Y	N/A
Noise and vibration	No change from the Division 5.2 Approval.	No additional measures required.	Y	N	Y	N/A
Aboriginal Culture and Heritage	No change from the Division 5.2 Approval.	No additional measures required.	Y	N	Y	N/A
Historic Heritage	No change from the Division 5.2 Approval.	No additional measures required.	Y	N	Y	N/A
Community and socio-economic	No change from the Division 5.2 Approval.	No additional measures required.	Y	N	Y	N/A
Traffic and transport	No change from the Division 5.2 Approval.	No additional measures required.	Y	N	Y	N/A
Waste and resource management	No change from the Division 5.2 Approval.	No additional measures required.	Y	N	Y	N/A
Visual	No change from the Division 5.2 Approval.	No additional measures required.	Y	N	Y	N/A
Land use and property	No change from the Division 5.2 Approval.	No additional measures required.	Y	N	Y	N/A
Hazard and risk	The completed sewer main will be handed to Sydney Water for ongoing operation and maintenance. Hazard and risks of the operational stage sewer main will be managed in accordance with Sydney Water standard procedures	No additional measures required.	Y	N	Y	N/A
Other	N/A	n/a	Y	N	Y	N/A

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12. Consistency with the Approved Project

Question	Response	Answer	
Division 5.2 Approval			
Is the proposed change within the scope of the project as described in the Ministerial Order or SEPP declaration for the project?	The proposed change would be consistent with the CSSI Declaration for the Division 5.2 Approval	☒ Yes	☐ No
Is the project as a whole (including with the proposed changes) consistent with the objectives of the Approved Project?	Yes. The proposal would be consistent with the objectives and functions of the Approved Project. In particular Section 8.11.5 allows for additional utility works that are required outside of the construction footprint for the project provided the works are consistent with the following performance criteria including that the works have no direct impact on heritage items (including areas of archaeological sensitivity), threatened species, populations or ecological communities beyond the impacts assessed in the Environmental Impact Statement. This assessment has concluded that there are no likely impacts to any heritage items including archaeology. The proposed clearing of two trees will require the retirement 1.35 biodiversity credits (across ecosystem and species credits). The addition of these credits would not exceed the offset requirements identified in Condition E4 and no further species credits would be required for the Project. The proposed works remain consistent with the Approved Project.	☒ Yes	☐ No
Would any conditions of approval need to be amended in light of the proposed changes?	No. The conditions of approval would not need to be amended.	☐ Yes	☒ No
Can the project mitigation measures be implemented without change, or implemented without changing the intent and overall outcome?	Yes. Mitigation measures of the Division 5.2 Approval can be implemented without change.	☒ Yes	☐ No

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Question	Response	Answer	
Would the proposed change be in accordance with the outer parameters of the approved project as defined by the conditions of approval?	Yes. The proposed change is in accordance with the conditions of approval for the Approved Project.	☒ Yes	☐ No
Would any environmental impacts of the project be altered by the proposed change and if so, to what extent?	While two trees would be required to be removed to complete this work the impact of this clearing has been assessed and the required retirement 1.35 biodiversity credits would not exceed the offset requirements identified in Condition E4 and no further species credits would be required for the Project.	☐ Yes	☒ No

13. Other Environmental Approvals

Identify all other approvals, authorisations, permits, consents, licences, etc that may be affected by or required for the proposed works	Approval of HVLR by Planning Secretary (in accordance with CoA)

14. Recommendation

Based on the above impact assessment, and with reference to the SM-WSA EIS and Submission Report including the conditions of approval, it is recommended that:

	Tick relevant box
The proposed change has negligible or more than negligible impacts on the environment or community however is consistent with the Division 5.2 Approval, including the conditions of approval. The proposed impacts are consistent with those assessed for the Approved Project (i.e., does not trigger a change to the conditions of approval).	✓
The proposed change is not consistent with the Division 5.2 Approval including the conditions of approval and requires reconsideration, or a separate modification request.	

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Author certification

This consistency assessment provides a true and fair review of the proposed change for the SM-WSA project. Based on an overall consideration and assessment of all the information in this form, the proposed change is considered: ☒ Consistent with the Division 5.2 Approval. ☐ Not consistent with the Division 5.2 Approval. A modification application and modification report is likely to be required, advice should be sought from the Planning team to determine further requirements.			
Name:	[redacted]	Signature:	[redacted]
Title:	Environment Approvals Manager		
Company:	Parklife Metro D &C	Date:	19/10/2026

Assessment Supporting Signature

Application supported and submitted by			
Name:	[redacted]	Date:	19/10/2026
Title:	A/Senior Manager Planning Approvals	Comments:	1. Biodiversity offsets and notification to DPHI must be in place before clearing can proceed.
Signature:	[redacted]		

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Assessment Endorsement

The proposed change, subject to the implementation of all the environmental requirements of the project:

☑ is consistent with the Division 5.2 Approval

☐ is not consistent with the Division 5.2 Approval and a modification is required/no further assessment is required.

I have examined the information contained within this consistency assessment and based on the information provided I agree that the proposed change is consistent with the Division 5.2 Approval.

Endorsed by			
Name:	[redacted]	Date:	21/10/2026
Title:	Director, Project ESP partnering (WSA, C&SW, and operations)	Comments:	1.Note additional mitigation measures. 2. Biodiversity offsets and notification to DPHI must be in place before clearing can proceed.
Signature:	[redacted]		

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Appendix A – Figures

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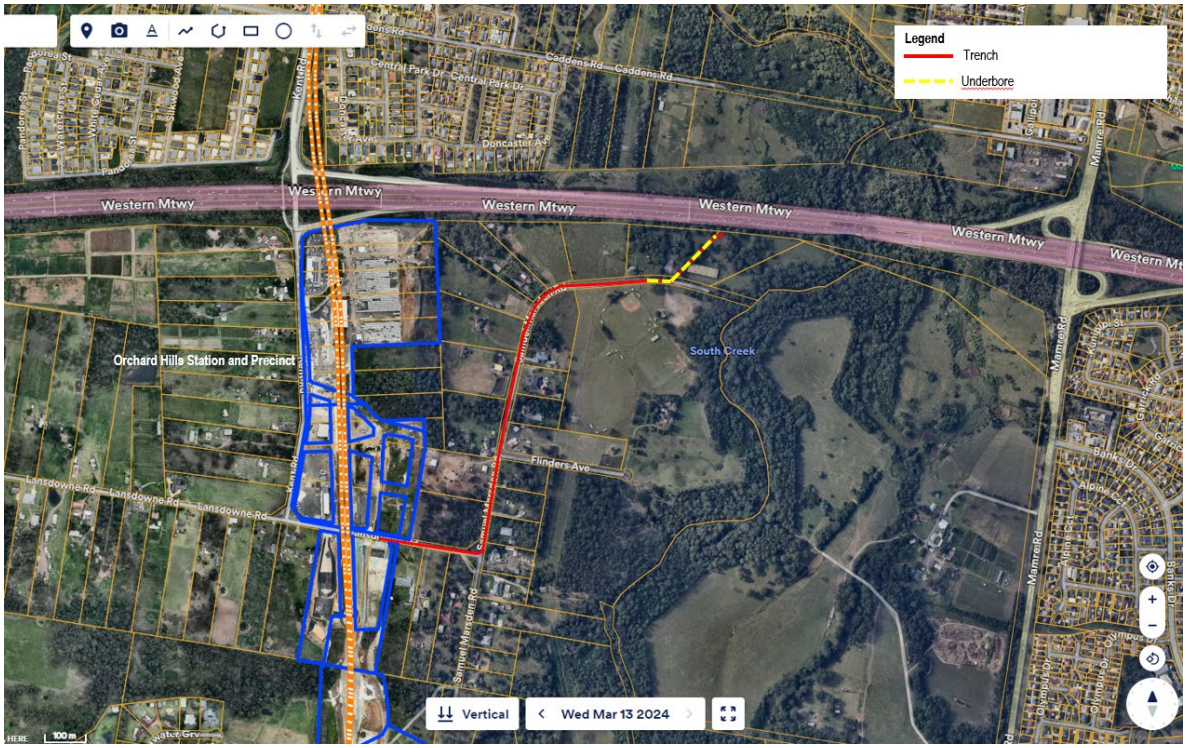


Figure A1 Location of works area and construction method (As approved under SSTOM ER003 Environmental Review - Orchard Hills Station Sewer Main Lansdowne and Samuel Marsden Roads (dated 29 April 2024)).

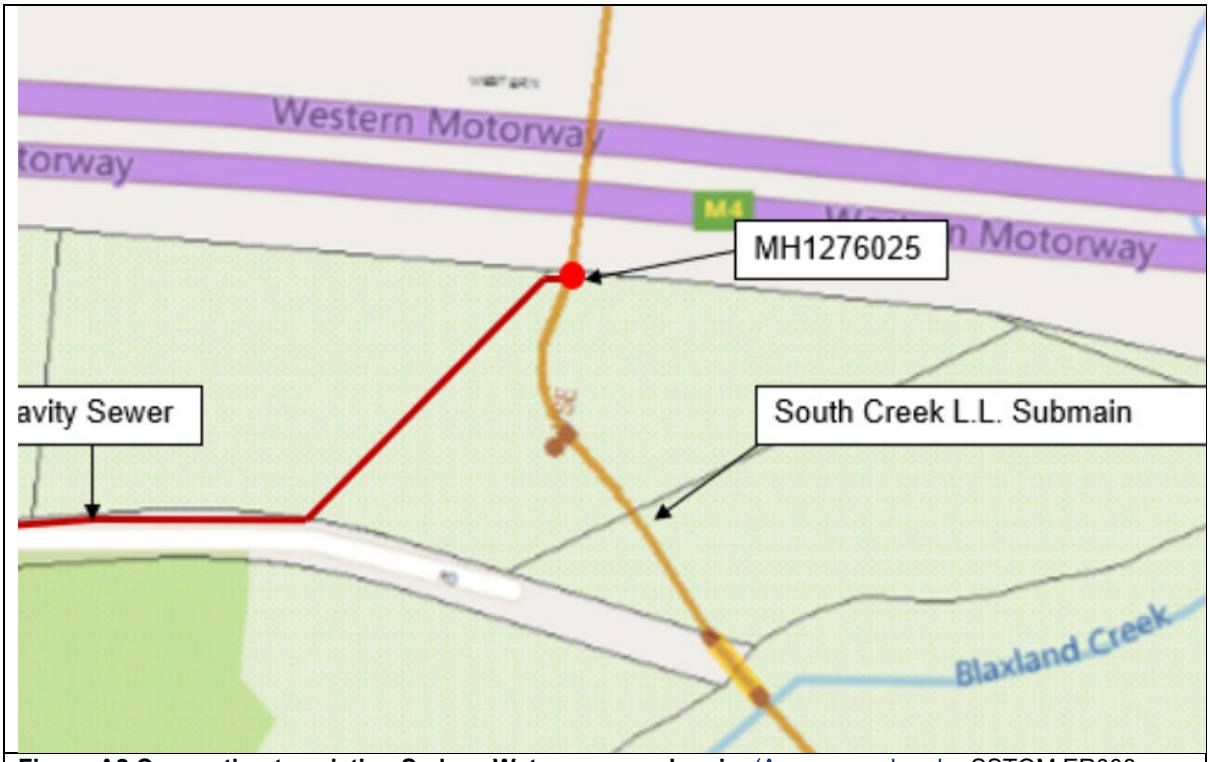


Figure A2 Connection to existing Sydney Water sewer submain. (As approved under SSTOM ER003 Environmental Review - Orchard Hills Station Sewer Main Lansdowne and Samuel Marsden Roads (dated 29 April 2024))

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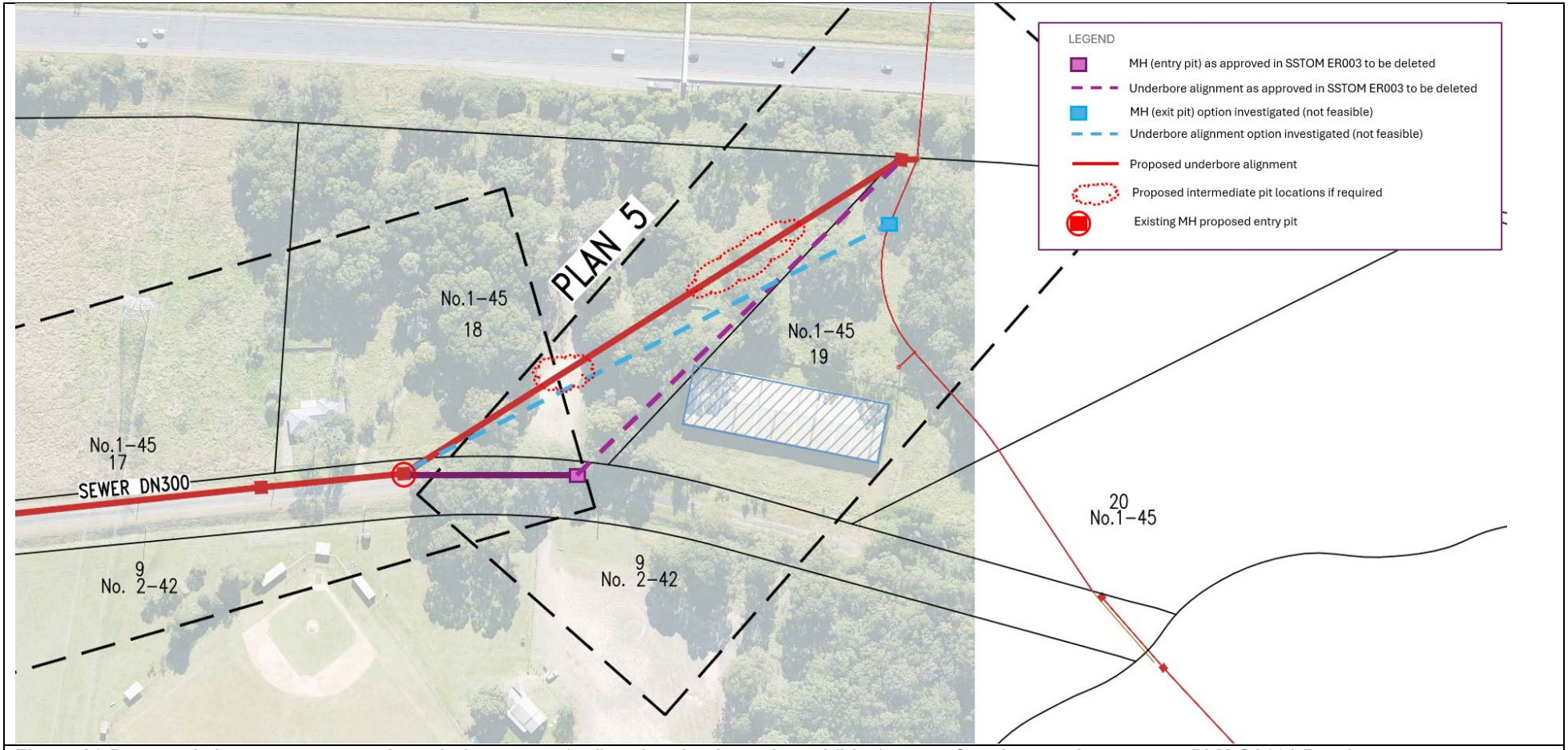


Figure A3 Proposed change to sewer main underbore route (red) and option investigated (blue) as per Consistency Assessment PLM CA001 Rev 1

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Figure A4 Samuel Marsden Road – Cabbage Gums (vegetation avoided by underbore construction methodology)



Figure A5 Cabbage Gums (vegetation avoided to be removed)

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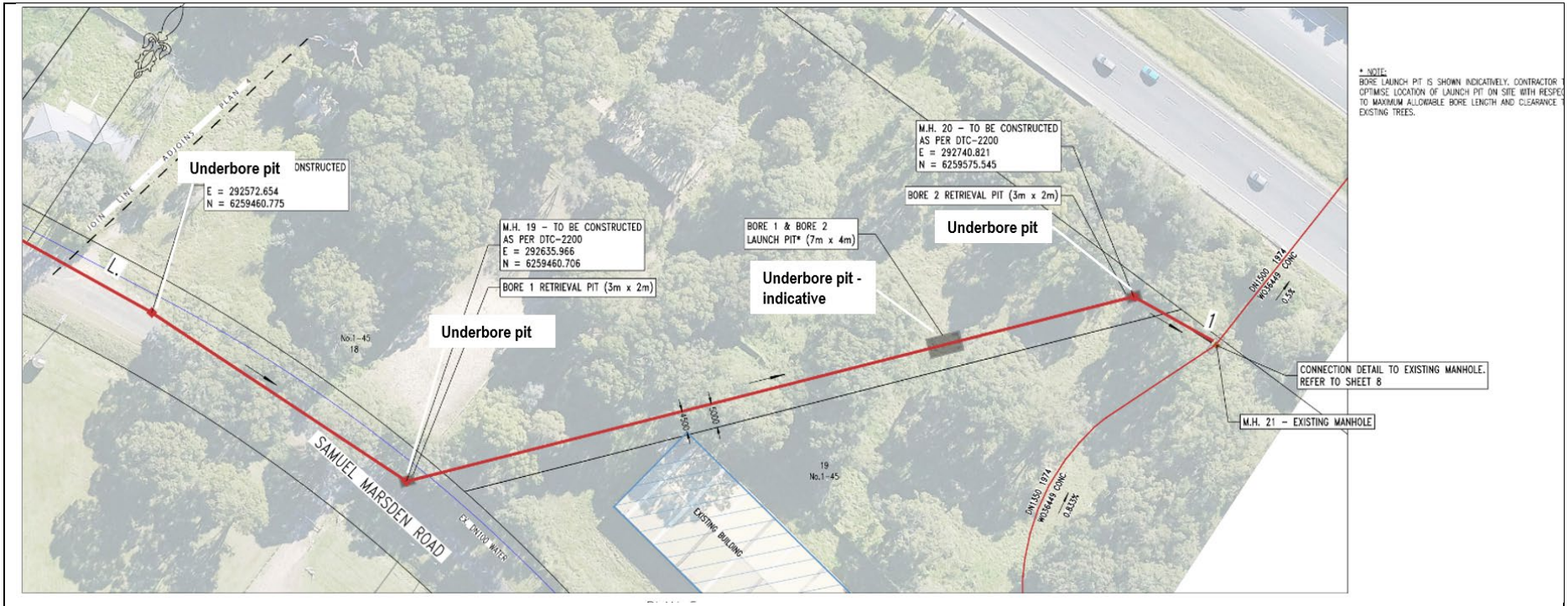


Figure A6 – **Proposed underbore alignment subject of this Consistency Assessment PLM CA001 Rev 2**

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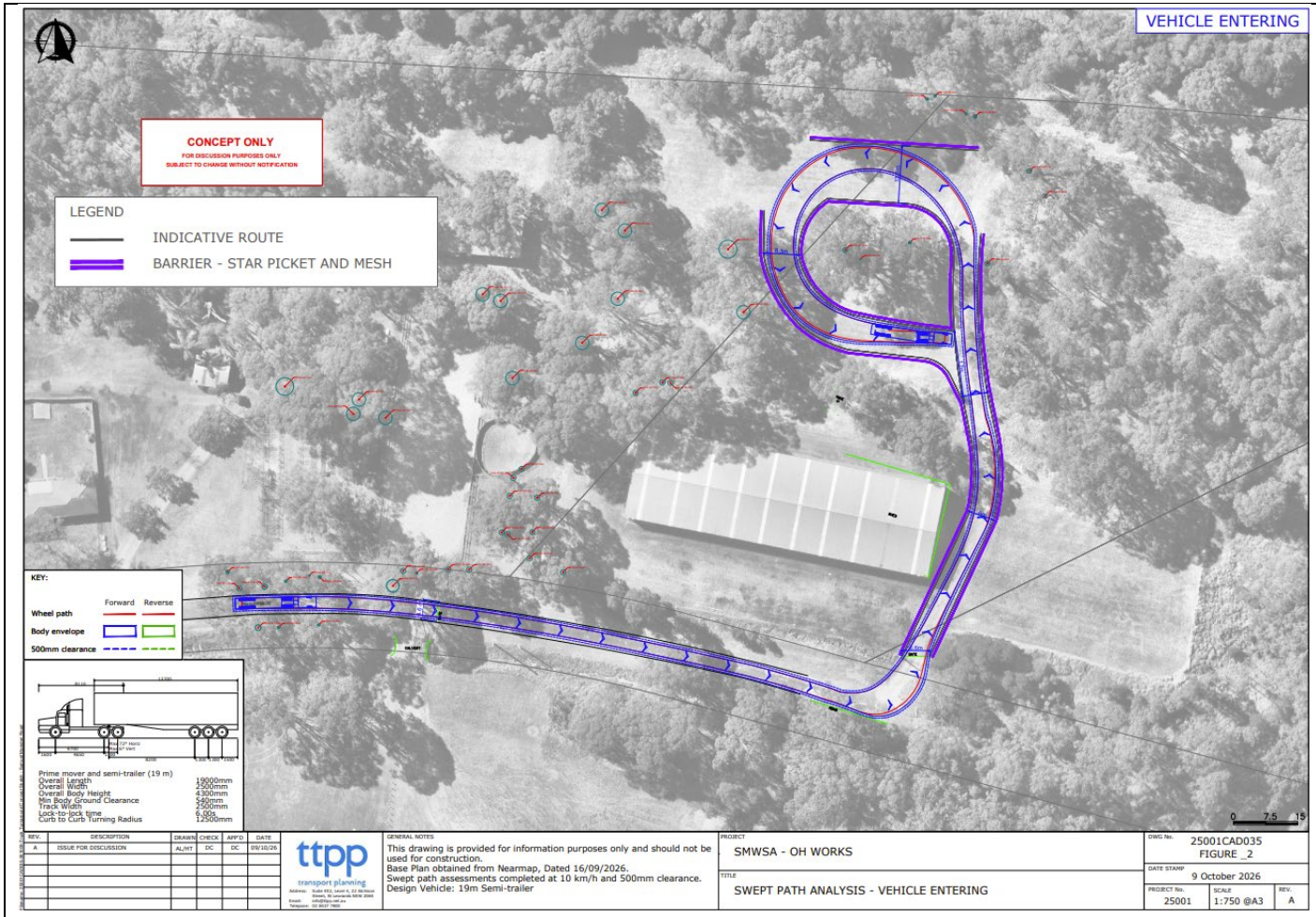


Figure A7 – Proposed truck turn around subject of this Consistency Assessment PLM CA001 Rev 2

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Appendix B – Aboriginal Heritage Assessments

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Unearthed

Archaeology & Heritage



Samuel Marsden Road Sewer Main, Orchard Hills

Aboriginal Due Diligence Assessment

Prepared by:	[redacted]
Report to:	Parklife
LGA:	Penrith City Council
Date:	April 2024
Version:	D.2024.1108
AHIMS No.:	

Version:	Project Number: UA/1108.PL	
A.2024	Author(s):	[redacted]
	Date:	6th March 2024
	Status:	Draft
B.2024	Author(s):	[redacted]
	Date:	4th April 2024
	Status:	Final
C.2024	Author(s):	[redacted]
	Date:	4th April 2024
	Status:	Final
D.2024	Author(s):	[redacted]
	Date:	23rd April 2024
	Status:	Final

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Executive Summary

Parklife proposes the construction of a new gravity sewer main between the Orchard Hills Metro Station site and the existing Sydney Water DN1350 South Creek submain. As such, Unearthed Archaeology & Heritage were commissioned by Parklife to undertake this Aboriginal due diligence assessment. This Aboriginal due diligence assessment has been prepared in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (Office of Environment & Heritage 2011) and the *Due diligence code of practice for the protection of Aboriginal Objects in NSW* (DECCW 2010).

The proposed gravity sewer main will be constructed in the road reserve from the Orchard Hills Metro Station along Lansdowne Road, up Samuel Marsden Road and intersect with the existing Sydney Water DN1350 South Creek submain on the northern boundary of the property at the end of Samuel Marsden Road. Proposed construction is via open trenching and underboring where required, e.g. where space in the road verge is limited. Maintenance holes are proposed along the route with a maximum interval of approximately 250m.

The predictive model indicates that archaeological deposits could be expected within the study area due to the location of Lot 19 DP238495 adjacent to Blaxland Creek and the presence of a water hole within the property on the 1965 aerial photograph which indicates that this could have been a resource or camping area for the Aboriginal people of the area. However, the whole of the road reserve of both Lansdowne and Samuel Marsden Roads is highly disturbed by drainage, services and road construction. The property at the end of Samuel Marsden Road (Lot 19 DP238495) has been subjected to significant disturbance in the form of the construction of the Sydney Water infrastructure in the early 1970s. however appears to have been utilised as cleared farmland and remained undeveloped until the 1990s when the existing farm building was constructed. Therefore, it is considered highly unlikely that *in situ* Aboriginal archaeological deposits remain within the study area due to the extensive disturbance caused by the construction of Sydney Water infrastructure, drainage, roads, and above and underground services. It is not expected that the proposed works will impact on any Aboriginal objects or sites.

Therefore, it is recommended that:

1. No Aboriginal objects were recorded during the site inspection and it is not expected that any sites or subsurface deposits will be harmed during the proposed works. There is no objection to the construction of the proposed sewer main on Aboriginal archaeological grounds and no further archaeological investigation is required.

2. If during the proposed works any unexpected Aboriginal objects, or any other evidence of Aboriginal occupation is uncovered, all work must cease in the vicinity of the suspected Aboriginal objects or evidence of occupation, and further advice should be sought from a qualified archaeologist.

3. If, in the unlikely event, any skeletal material is uncovered during the proposed works, all work must cease and the following steps be immediately undertaken:

    a) You must not further disturb or move these remains.

    b) You must immediately cease all work at the particular location.

    c) You must notify NSW Police.

    d) You must notify Heritage NSW's Environment Line on 131 555 as soon as practicable and provide available details of the remains and their location.

    e) You must not recommence any work at the particular location unless authorised in writing by Heritage NSW.

    f) Any Aboriginal skeletal remains must be recorded and reported under the direct supervision of a specialist physical anthropologist.

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1.0 Background Information

1.1 Introduction

Parklife proposes the construction of a new gravity sewer main between the Orchard Hills Metro Station site and the existing Sydney Water DN1350 South Creek submain.

As such, Unearthed Archaeology & Heritage were commissioned by Parklife to undertake this Aboriginal due diligence assessment. This Aboriginal due diligence assessment has been prepared in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (Office of Environment & Heritage 2011) and the *Due diligence code of practice for the protection of Aboriginal Objects in NSW* (DECCW 2010).

1.2 Study Area Location

The proposed new gravity sewer main will run between the new Orchard Hills Metro Station, located on the eastern side of Kent Road, north of Lansdowne Road, to the existing Sydney Water DN1350 South Creek submain on the northern boundary of Lot 19 DP238495. The proposed gravity sewer main would run along the northern verge of Lansdowne Road and, along the western and northern verge of Samuel Marsden Road.

The study area is located within the Penrith City Council Local Government Area (LGA), approximately 50km to the west of the Sydney Central Business District (CBD). Figure 1 below shows the location of Orchard Hills. Figure 2 shows the location of the study area on the NSW Map. Figure 3 shows the location of the study area on the aerial photograph.

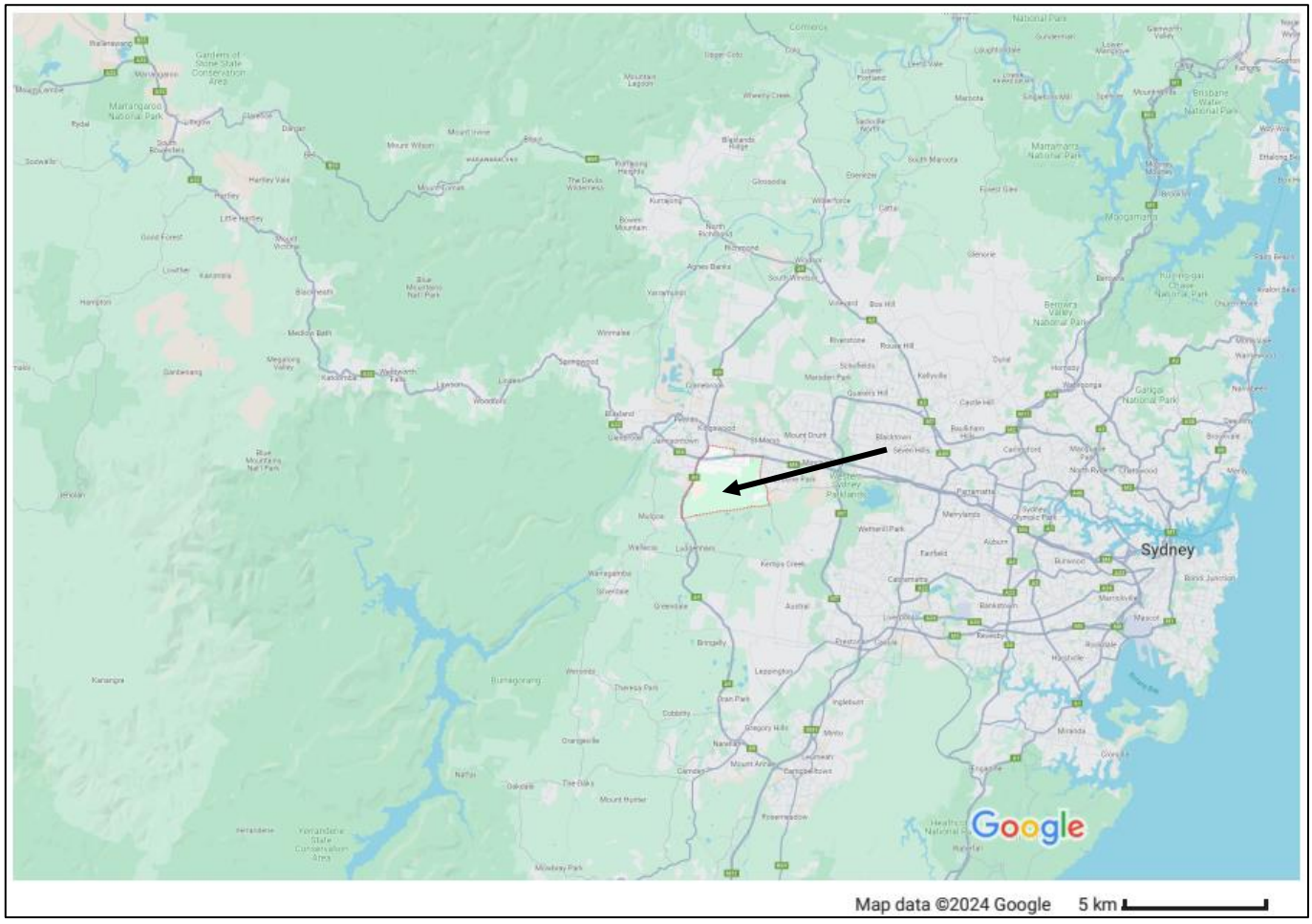


Figure 1: Showing the location of Orchard Hills outlined in red and indicated by the black arrow (map courtesy of Google Maps).

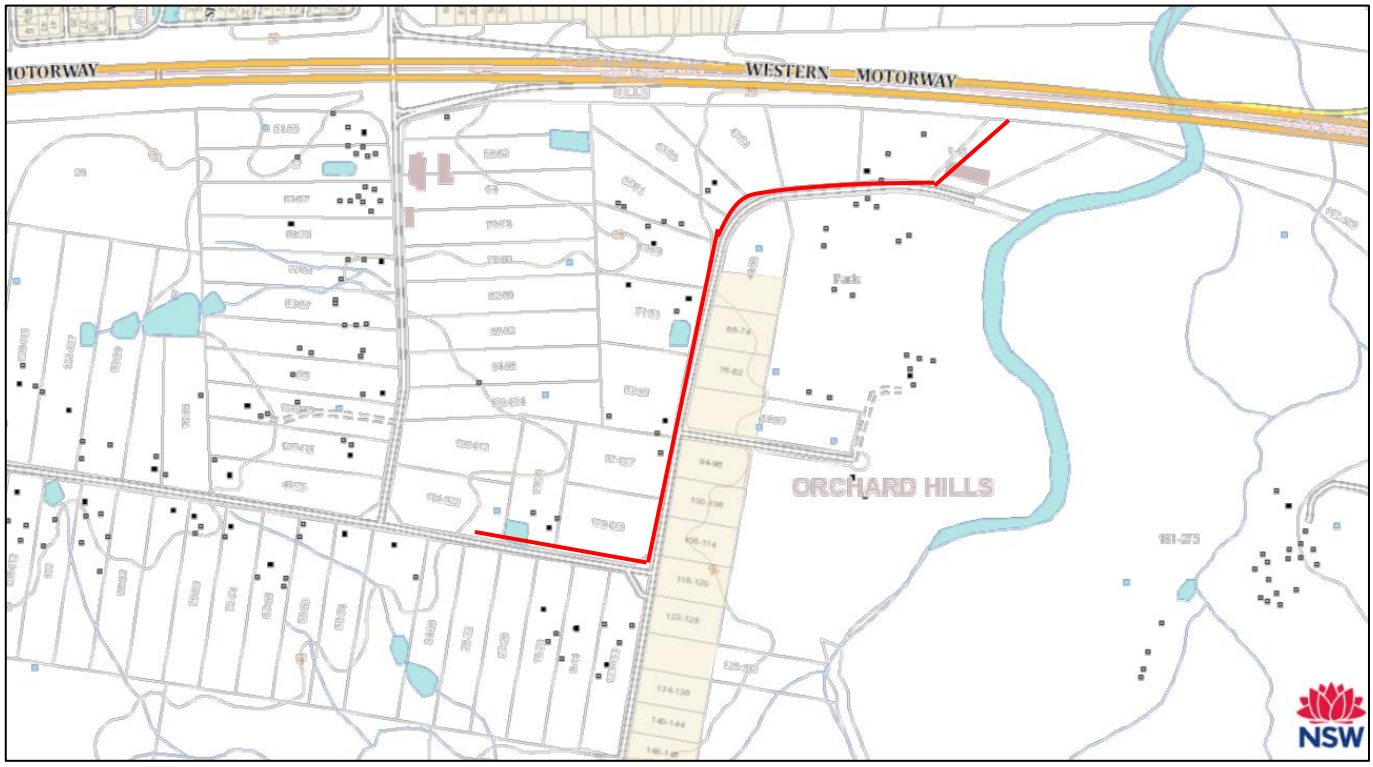


Figure 2: Showing the approximate proposed route of the sewer main indicated by the red line on the NSW Map (map courtesy of Six Maps).

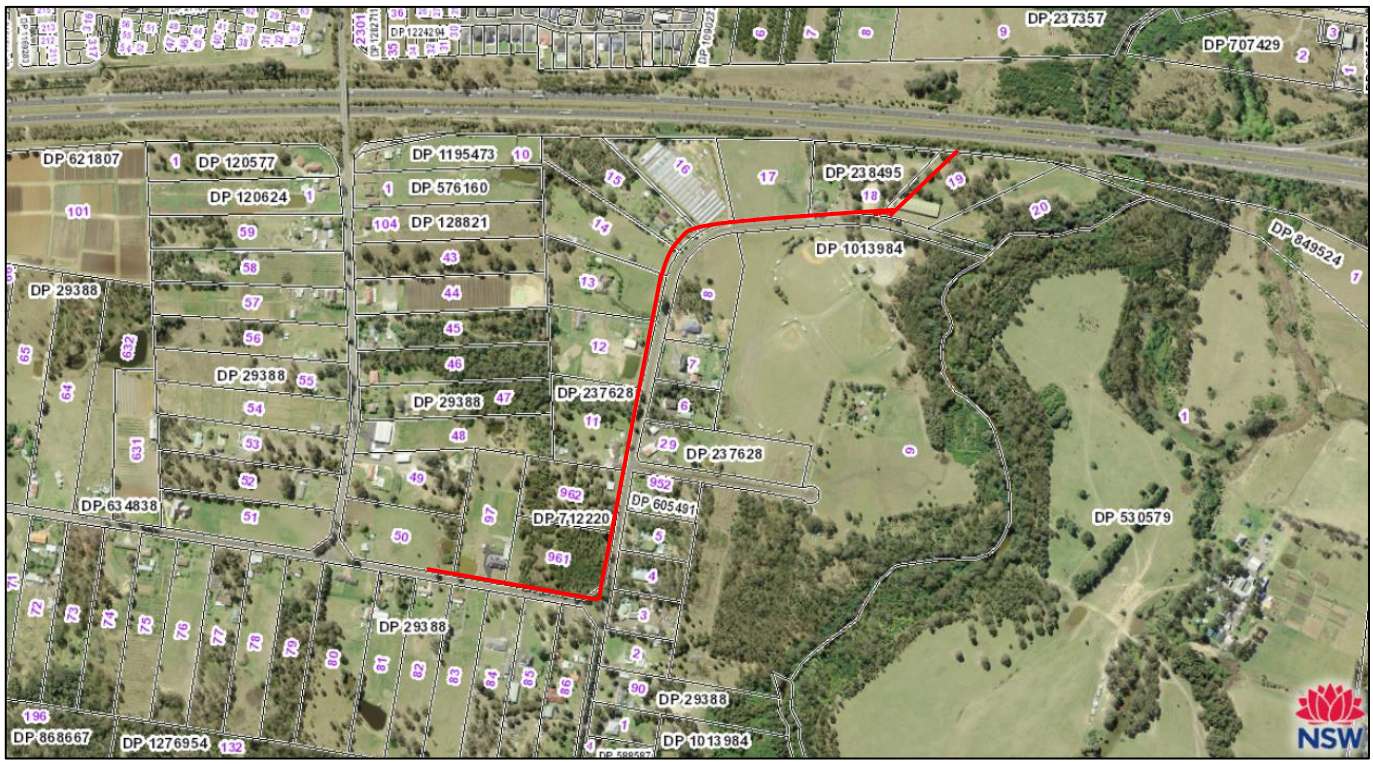


Figure 3: Showing the approximate proposed route of the sewer main indicated by the red line on the aerial photograph (aerial courtesy of Six Maps).

1.3 Proposed Works

The proposed works include the construction of a new approximately 1400m long sewer main predominantly in the road verge. Proposed construction is via open trenching and underboring where required, e.g. where space in the road verge is limited. Maintenance holes are proposed along the route with a maximum interval of approximately 250m.

Figure 4 below shows the proposed route of the sewer main.

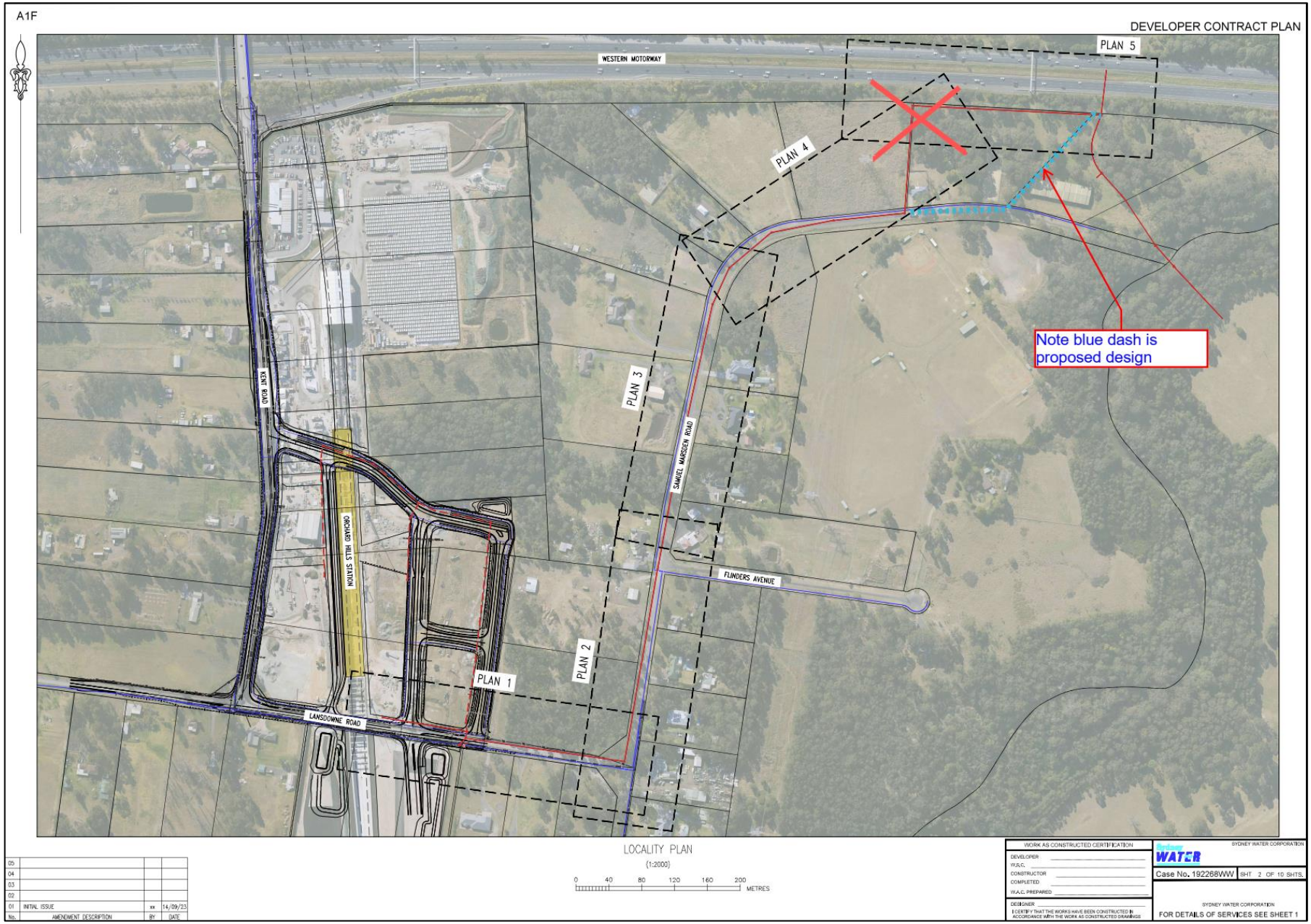


Figure 4: Showing the proposed route of the gravity sewer main indicated by the solid red line and the dashed blue line.

2.0 Landscape and Environmental Context

2.1 Topography

The study area is located within the central portion of the Sydney Basin. The Sydney Basin is a geological basin of the Permian-Triassic era that covers an area of 64,000km^2 on the central eastern coast of Australia (Stening 2018:6). The Sydney Basin is comprised of sandstone and shales which have been subjected to erosion, creating a landscape of steep sandstone cliffs and escarpments and plateaus over areas of shale (Herbert 1980:21).

Orchard Hills is located within the southern edge of the Cumberland Plain, the low lying gently undulating plain which covers approximately 2750km^2 and extends from Windsor in the northwest to Picton in the south, the Nepean-Hawkesbury River in the west, to the headwaters of the Georges and Parramatta Rivers in the east and to the Hornsby Plateau in the north (Stening 2018:6).

The present study area is the relatively flat road reserve in a semi rural setting located between Blaxland Creek; which is located approximately 160m to the east of where the proposed gravity sewer main connects into the existing Sydney Water DN1350 South Creek submain; and Claremont Creek; which is located approximately 200m north of the Orchard Hills Metro Station.

Figure 5 below shows the study area on the topographic map.

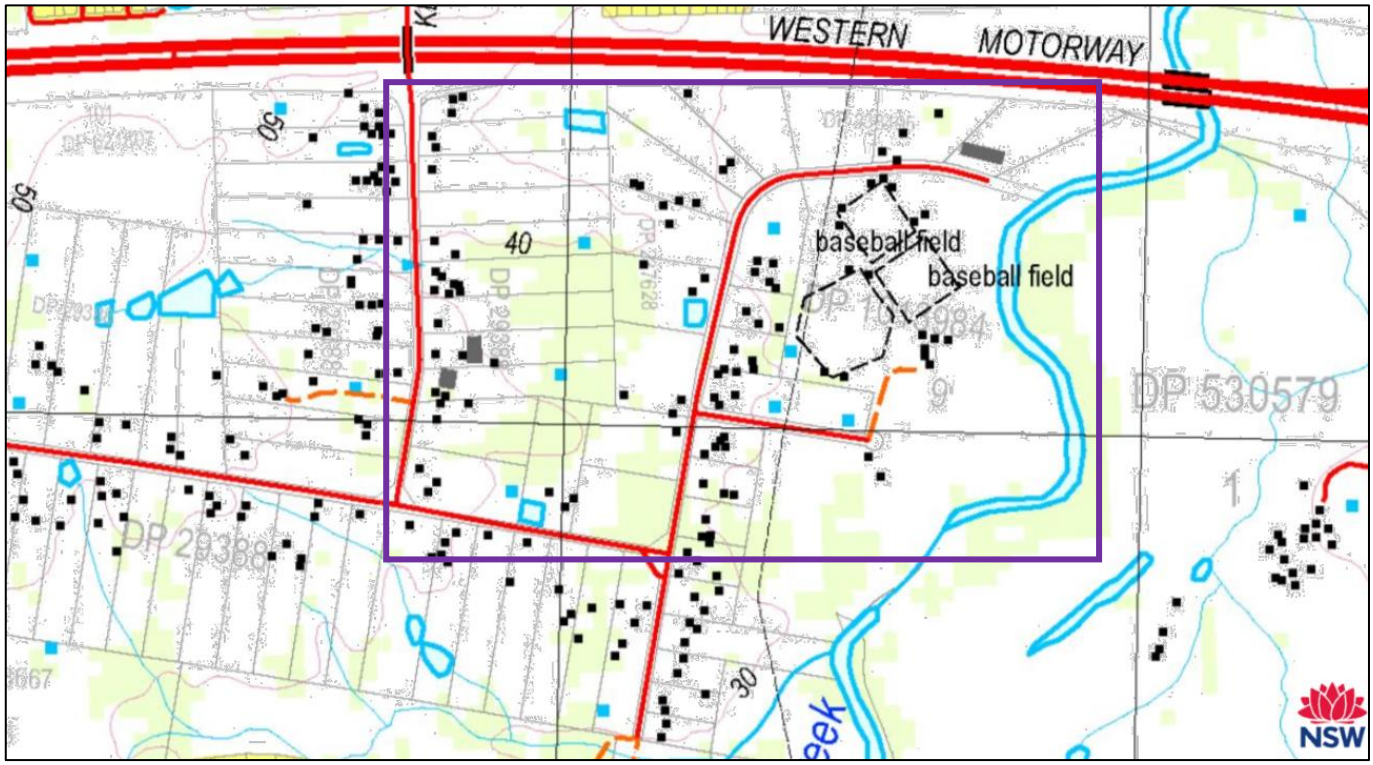


Figure 5: Showing the approximate location of the study area on the topographic map indicated by the purple rectangle (map courtesy of Six Maps).

2.2 Stream Order Modelling

Stream order can be used to facilitate a predictive model of Aboriginal land use patterns. A creek or small tributary that generally does not have any water flowing into it, but feeds into a larger stream is classified as a first order stream. A first order stream can have intermittent flow. When two first order streams join, it creates a second order stream, and the joining of two second order streams creates a third order stream and so forth (Strahler 1957).

McDonald and Mitchell (1994) developed a predictive model within the Cumberland Plain which demonstrates that stream order can be used to predict areas of archaeological potential. Their hypothesis is that in order to allow permanent stream flow or to allow the formation of waterholes with extended longevity over months and years, it is necessary to have a threshold catchment area. The critical point at where the necessary conditions are met is at the junction of two second or third order streams. Locations such as these areas likely to contain larger, more complex sites with higher densities of artefacts, whilst locations within 100 metres of second and third order streams are likely to contain large sites (Stening 2016: 8).

The study area is located between Blaxland Creek and Claremont Creek, both second order streams. As the study area is located between two second order streams, it could be predicted to contain archaeological potential.

2.3 Geology

The Cumberland Plain generally overlies the Wianamatta Group of Shales. The geology of the study area is comprised of the Bringelly Shale sub-group of the Wianamatta Shales.

The Bringelly Shales do not provide significant raw material resources for the production of stone tools. Raw material outcrops which contain material that is suitable for the manufacture of stone tools, such as silcrete, are located at Luddenham to the south; Erskine Park approximately 14km to the north; St Clair approximately 15km to the north; and Plumpton approximately 20km to the east. Other material used in the manufacture of stone tools on the Cumberland Plain, includes chert, mudstone, quartz, basalt and quartzite, which are located with the Rickabys Creek Formation, 30km north of the survey area (Central Mapping Authority of NSW, Department of Lands 1991) and which weather out of the Hawkesbury Sandstone of the Sydney Basin.

Figure 6 below shows the study area on the Penrith 1:100,000 geological map.

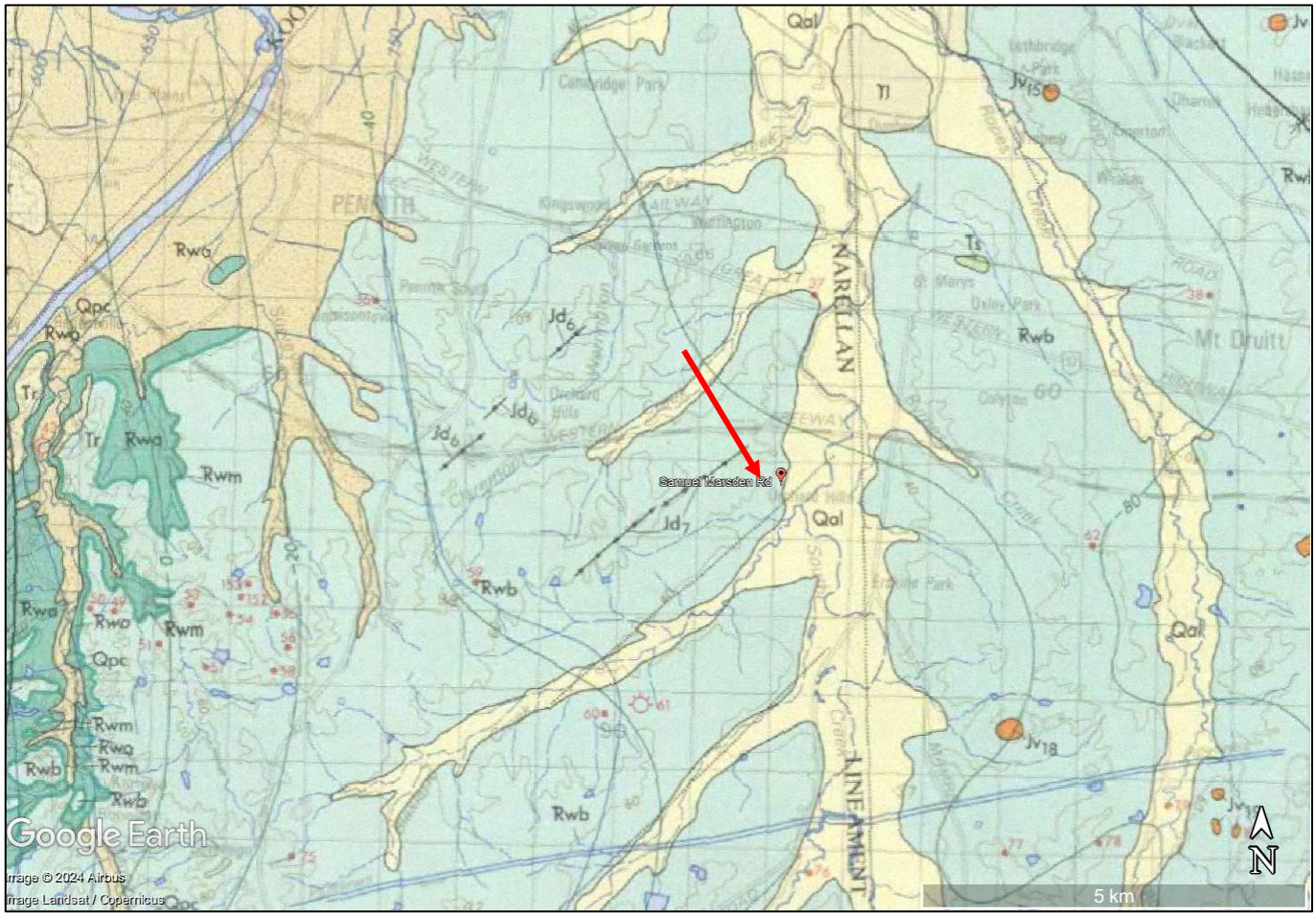


Figure 6: Showing the location of the study area indicated by the red arrow on the Penrith 1:100,000 Geological Map (map courtesy of Google Earth Pro).

2.4 Soils

The study area crosses through the Blacktown Residual Soil Landscape (9130bt) into the South Creek Alluvial Soil Landscape (9130sc).

Those soil landscapes are characterised by the following soil profiles as taken from *Soil Landscapes of the Penrith 1:100,000 Sheet* (Bannerman and Hazelton 2011:39–41; 100–101):

Blacktown Residual Soil Landscape (9130bt)

A horizon (topsoil): brownish black loam (10YR 2/2, 5YR 3/2, 10YR 3/45). Rounded iron indurated fine gravel sized shale fragments and charcoal fragments may be present and roots are common.

A2 horizon (topsoil): hardsetting brown clay loam (7.5YR 4/3, 2.5YR 3/3, 10YR 3/3). Iron indurated gravel sized shale fragments are common, but charcoal fragments and roots are rare.

B horizon (subsoil): mottled brown light clay (2.5YR 4/6, 10YR 4/6). Gravel sized shale fragments are common, but roots and charcoal fragments are rare.

B3 or C horizon (deep subsoil): light grey plastic mottled clay (10YR 7/1, 2.5YR 6/2). Gravel sized shale fragments and roots are occasionally present. Charcoal fragments are rare.

South Creek Alluvial Soil Landscape (9130sc)

A horizon (topsoil): brown loam (5YR 4/3 – 10YR 4/3). Roots are abundant in surface layers, charcoal and other inclusions do not occur.

A horizon (topsoil): hardsetting, dull brown clay loam (7.5YR 5/4, 5YR 4/2, 10YR 5/6). Stones and other inclusions do not occur, and roots are rarely found.

B horizon (subsoil): bright brown clay (5YR 4/8 – 10YR 5/1). Roots are only present when this material occurs as topsoil. There is no charcoal present, but small gravels may make up to 50% of the volume.

2.5 Vegetation

Historically the study area would have been located within an area of the Alluvial Woodland vegetation community. The upper storey is dominated by Cabbage Gum (*Eucalyptus amplifolia)* and red iron gum (*Eucalyptus tereticornis)* and, less frequently rough barked apple (*Angophora floribunda)*. This upper storey sits above a stratum comprised of smaller trees including Parramatta Wattle (*Acacia parramattensi*s subsp. *Parramattensis*); swamp she-oak (*Casuarina glauca*); *and* the narrow leaved paperbark (*Melaleuca linariifolia*).

The understorey is comprised of shrubs and smaller plants dominated by sparse Sweet Bursaria (*Bursaria spinosa*); and a dense ground cover dominated by grasses such as Australian basket grass (*Oplismenus aemulus*); weeping grass,(*Microlaena stipoides var. stipoides*); bordered panic grass (*Entolasia marginate*); and hedgehog grass (*Echinopogon ovatus*) (Stening 2017:11).

In pre-colonial times, the vegetation of the Cumberland Plain would have provided significant resources for Aboriginal people. Vegetation communities can provide food, medicine and raw material for making objects. The vegetation communities support a variety of fauna such as possums, wallabies and other small mammals, birds and lizards which were all a part of the Aboriginal diet. The river and creek systems provided fresh water for Aboriginal people and provided further animal and plant resources.

2.6 Land Use History and Current Land Use

The study area is comprised of the road verge of Landsdowne and Samuel Marsden Roads and the property at the end of Samuel Marsden Road. The roads of Landsdowne and Samuel Marsden Roads are bitumen without concrete gutters or formalised footpaths. Evidence of drainage channels and creek crossings were observed along the length of the road reserve. The property at the end of Samuel Marsden Road is comprised of a semi rural block that contains a large single storey farm building surrounded by overgrown vegetation , grass and weeds.

The 1965 aerial photograph shows the study area being cleared farmland with a waterhole located just in front of the location of the existing farm building.

Sydney Water plans from 1970 (Figure 7) and 1971 (Figure 8 and Figure 9) show extensive Sydney Water infrastructure being constructed through Lot 19 DP238495 at this time. The plans show Sydney Water constructed pipes throughout the study area. The 1975 and 1986 aerial photographs show the study area remaining undeveloped and the Western Motorway being formed. There is no evidence to indicate that any structures have previously been built within the property at the end of Samuel Marsden Road where the sewer main will connect into the existing Sydney Water DN1350 submain, prior to the construction of the existing farm building which appears to have been constructed between 1991 and 1998. Sydney Water plans from 1991 (Figure 10) appear to show similar infrastructure to that shown in the 1971 plans.

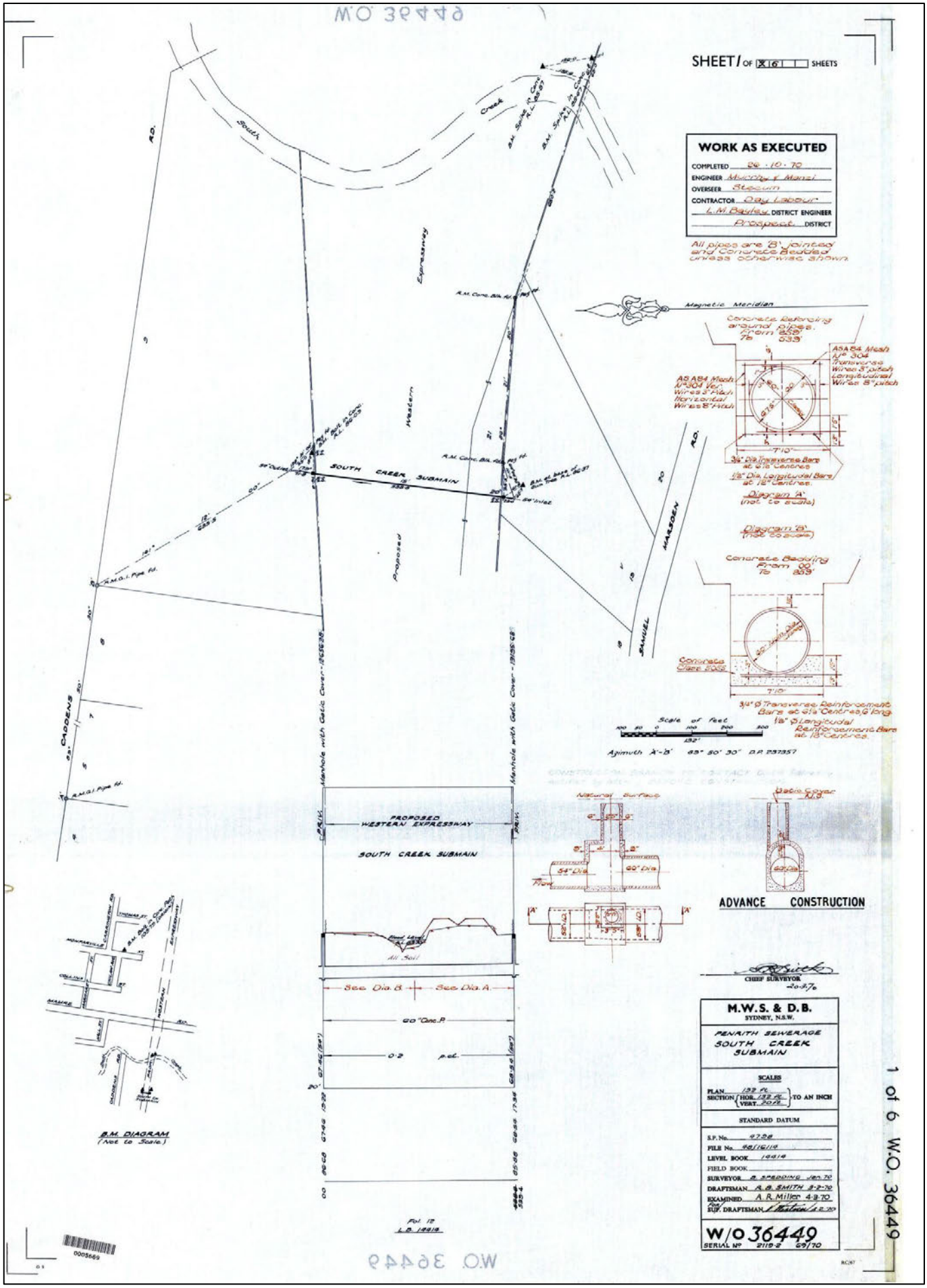


Figure 7: Sydney Water plan dated 1970 showing Lot 19 DP238495outlined in red and showing the extensive infrastructure through Lot 19 DP238495 (plan courtesy of Sydney Water).

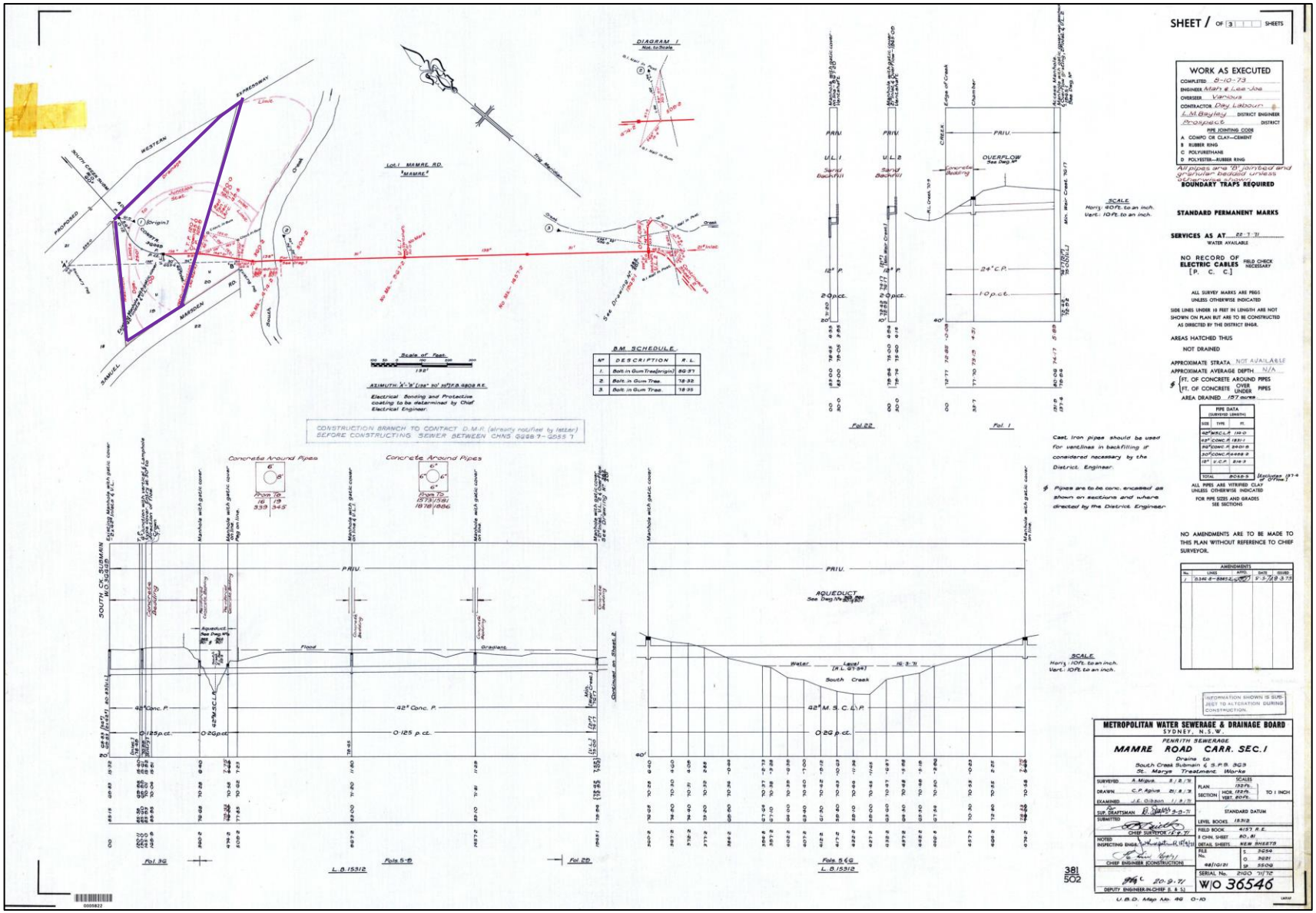


Figure 8: Sydney Water plans from 1971 showing Lot 19 DP238495n outlined in purple and showing the extensive Sydney Water infrastructure through this area (plans courtesy of Sydney Water). A close up of the plan is provided in Figure 9 below.

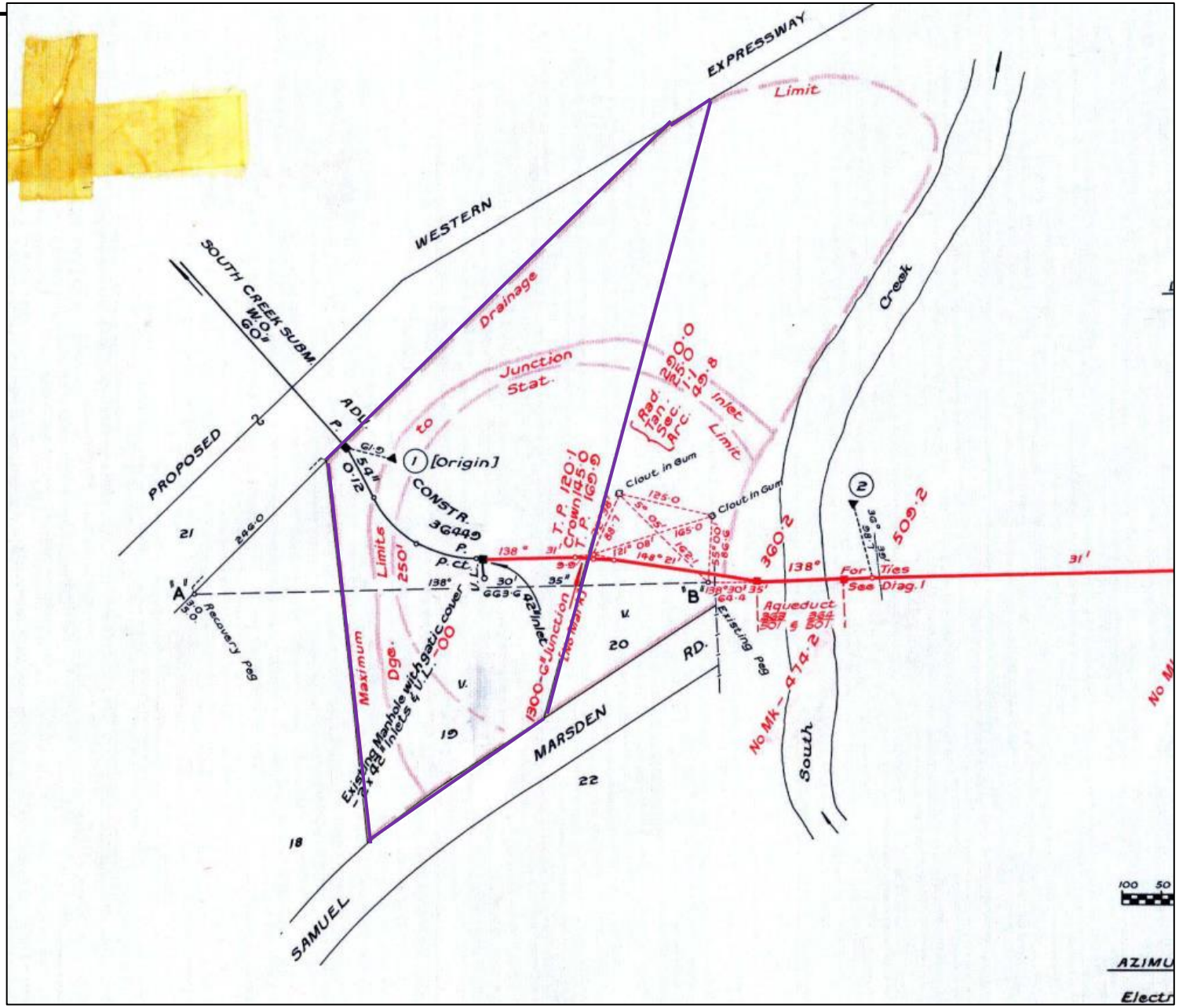


Figure 9: Showing a close up of the Sydney Water plan from 1971 shown in Figure 8 above. Lot 19 DP238495 is outlined in purple (plan courtesy of Sydney Water).

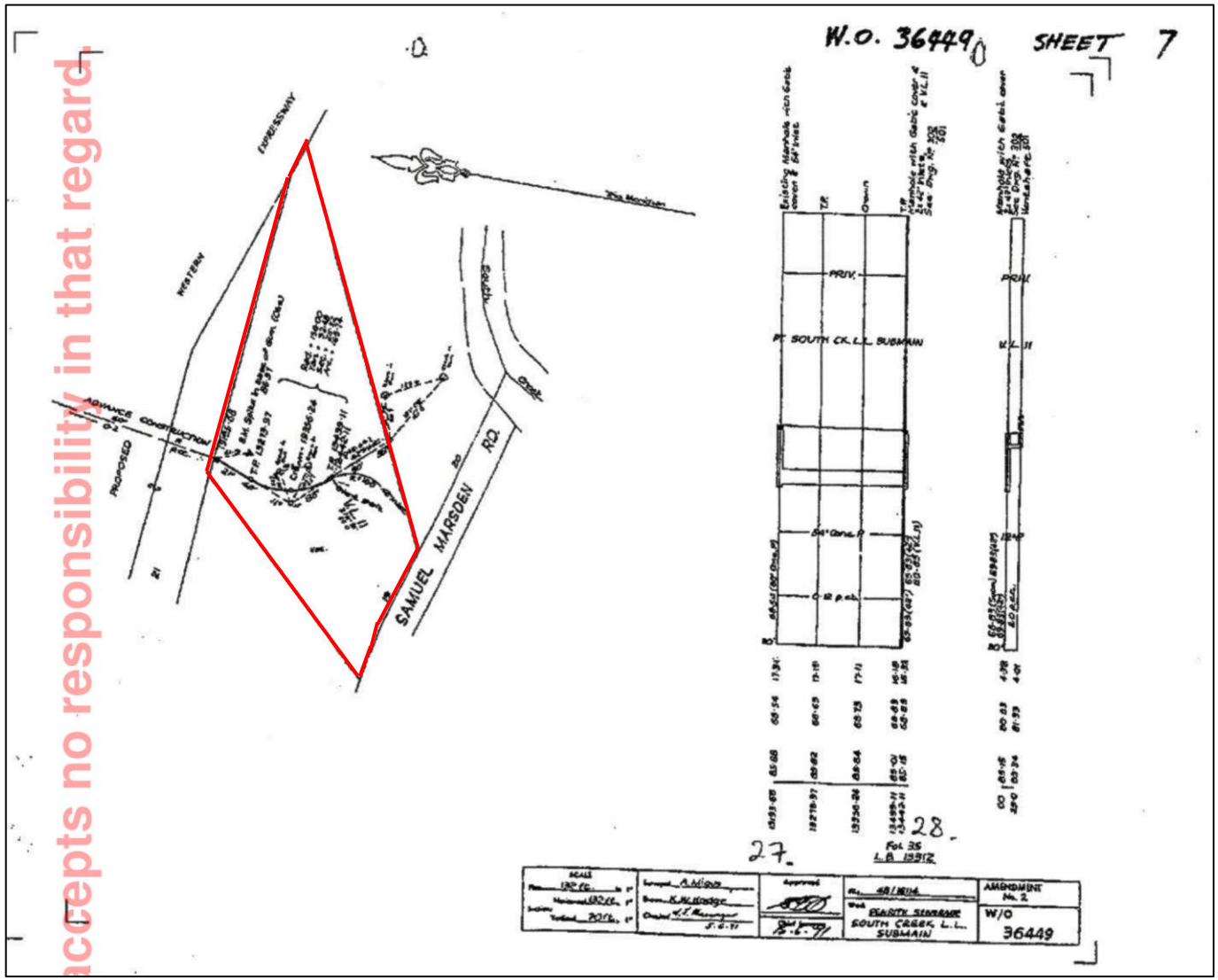


Figure 10: Showing the Sydney Water plans from 1991. Lot 19 DP238495 is outlined in red and the Sydney Water Infrastructure through the Lot 19 DP238495 is extensive (plans courtesy of Sydney Water).

3.0 Archaeological Context

3.1 Cumberland Plain

Research into the regional and local archaeological context of the study area can be used to develop an understanding of the patterning of Aboriginal land use and enable the preparation of a predictive model to determine the likelihood of particular site types being located within the study area.

The Last Glacial Maximum (LGM), the last period when Earth's ice sheets were at their maximum glaciation, occurred between 15,000 – 18,000 years ago. Sea levels were up to 130m below current sea levels during this period (Nutley 2006:1). As temperatures started to rise at the end of the LGM, the polar ice caps started to melt and sea levels began to rise, and in doing so helped to form the present day Sydney landscape.

As sea levels rose, people were forced to move inland, abandoning formerly coastal sites which were now being inundated by the sea (Nutley 2006). Sea levels began to stabilise about 6,000 years ago and the majority of sites around the Sydney region date to the last 5,000 years after sea levels had stabilised. Research into submerged Aboriginal sites has demonstrated that several submerged sites in the Sydney region date to more than 10,000 years BP.

In 1989 the National Parks and Wildlife Service engaged Smith to undertake an Aboriginal Site Planning Study to assist in the management of Aboriginal sites on the Cumberland Plain (Smith 1989), as the number of archaeological investigations being undertaken in the region was increasing due to increasing development.

Smith's study indicated that site location and site densities were heavily influenced by the availability of water and of raw materials to manufacture tools, however other environmental factors including topography, soil type and vegetation had significantly less influence on site location and densities (1989:3). She states that sites "will most likely occur along permanent creeks and within and around swamp margins" (1989: 2). When discussing the Liverpool Local Government Area where the present study area is located, Smith notes that in this area, factors such as soils, topography and vegetation do not influence site location but rather that the vast majority of artefacts within the area are located within 100m of water and that artefacts scatters were most likely to be found in association with permanent water sources (Smith 1989).

The burgeoning expansion of development into southern, northern and western Sydney has increased since Smith's (1989) study, resulting in a significant increase in the archaeological investigation of the Cumberland Plain. The results of these archaeological assessments and excavations has demonstrated the complexity of the archaeological record across the region. In particular, ongoing research and investigation has indicated that the presence of surface artefact scatters does not indicate the full nature and extent of the archaeological deposit. Archaeological deposits can be located despite historical disturbance and in locations with a lack of surface artefacts. The research has indicated that more complex sites with higher artefact densities are generally located on permanent water sources and areas with major confluences present are prime site locations (Stening 2016:11).

Kohen's (1997) studies around Penrith determined that sites such as surface artefact scatters, rock shelters and grinding grooves "are particularly likely to occur adjacent to the rivers and creeks", such as the Nepean River, a fifth order stream.

In 2005, the results of McDonald's excavations in the Rouse Hill Development Area refined the model of occupation for the Cumberland Plain (2005). She examined site location, mobility and change over time, in relation to stream order. Her study determined that confluences of second and third order streams with other watercourses are more likely to contain major, complex sites.

She examined the dynamic nature of lithic, or stone tool, technologies across the Cumberland Plain. She analysed the manner in which "stone technologies were organised in relation to landscape" and the way in

which technologies and the model of occupation across the Cumberland Plain changed over time in response to environmental factors (McDonald 2005: np). As sea levels rose and population levels increased in the region, sites become more intensively occupied and some groups live permanently in the Cumberland Plain. As such, emphasis is placed on locally sourced raw materials for the manufacture of stone tools and lithic technology changes accordingly (McDonald 2005: np).

McDonald's excavation methodology demonstrated that a lack of artefacts on the surface does not reflect the actual archaeological potential of a site. She states that "despite artefacts being rare or completely absent on the surface of each of the sites investigated, all six sites were found to contain intact archaeological deposit" (McDonald 2005: np). Sites were selected for investigation based on their assessed archaeological potential.

McDonald's extensive studies across the Cumberland Plain have resulted in a predictive model for the region. She determined that sites located on fourth or fifth order streams are likely to be more complex and possibly stratified indicating ongoing, repeated, lengthy occupation at these locations. Sites with evidence of frequent occupation are likely to be located within third order stream catchment areas. Second order streams have the potential to contain sites which reflect occasional occupation.

Comber's excavations at Penrith Lakes (2010) confirmed the model of occupation presented by Kohen (1997) and McDonald (2005). Excavations were undertaken in two locations, adjacent to the Nepean River, a fifth order stream. Her excavations revealed that despite only a low density artefact scatter being present on the surface at each location, more than 1,000 artefacts were collected from a highly stratified, intensively occupied site.

Excavations undertaken at a highly disturbed location adjacent to Eastern Creek, a third order stream, at Doonside (Stening 2011). These excavations demonstrated that despite no surface artefacts being recorded, more than 1,000 artefacts were uncovered. Analysis showed that the site had been occupied by a larger, more complex group over more extensive periods of time.

Smith (1989), Kohen (1997) and McDonald's (2005) model of occupation for the Cumberland Plain indicates that larger, more complex sites are more likely to be located at the confluence of several watercourses, especially higher order streams. Evidence of frequent occupation is likely to be located within third order stream catchment areas, despite a lack or a low density of surface artefacts. First and second order creeks are likely to contain evidence of less complex and lower density sites. Therefore, given the present study area is located in the catchment between a second and third order stream, evidence of Aboriginal occupation could be predicted.

3.2 Orchard Hills

A search of the Aboriginal Heritage Information Management System (AHIMS) database on 5th March 2024 indicates that there are three registered Aboriginal sites in the vicinity of the study area. Table 1 below shows the details of the three registered Aboriginal sites within the vicinity of the study area.

AHIMS No.	Site Name and Location	Site Type
45-5-4430	"Kent Road South 12A", located on the southern side of the M4 Western Motorway, approximately 420m east of the Kent Road overpass and 270m north west of Samuel Marsden	Two silcrete flake fragments located 5m apart on a 3m wide fire break track. The site was completely destroyed under an AHIP by the upgrade of the M4 Western

	Road. It is located approximately 670m from South Creek. The site is located on a ridge bisected by the M4 Motorway.	Motorway and was assessed as retaining no archaeological significance.
45-5-4431	"Kent Road South 12B", located on the southern side of the M4 Western Motorway, approximately 265m east of the Kent Road overpass and 370m north west of Samuel Marsden Road. It is located approximately 800m. The site is located in a swampy low lying area on a ridge slope south of the westbound carriageway of the M4 Motorway.	A single silcrete flaked piece identified in a swampy low lying area on a ridge slope. The site was completely destroyed under an AHIP by the upgrade of the M4 Western Motorway and was assessed as retaining no archaeological significance.
45-5-4477	"South Creek 4", located on the eastern side of Kent Road, approximately 40m north of the M4 Western Motorway and 80m south east of the intersection of Coachwood Drive and Doncaster Avenue. It is located approximately 670m south west of South Creek. The site is located on a hill crest on the northern side of the M4 Motorway.	A quartz flake and a chert flake located on a track. The site was completely destroyed under an AHIP by the upgrade of the M4 Western Motorway and was assessed as having no intact archaeological deposit.

Table 1: Showing the details of the registered AHIMS sites in the vicinity of the study area.

3.3 The Study Area

A search of the Aboriginal Heritage Information Management System (AHIMS) on 5th March 2024 indicates that there are no registered Aboriginal sites within the study area.



Figure 11: Showing the location of registered AHIMS sites, indicated by the Aboriginal flags, in the vicinity of the study area, indicated by the red line (map courtesy of Google Earth Pro).

3.4 Predictive Model

The above environmental and archaeological research indicates that the Cumberland Plain and Orchard Hills were significant landscapes for Aboriginal people. Based on that environmental and archaeological information, the following site types could be expected within the study area:

1. Open artefacts scatters: characterised by surface scatters of Aboriginal objects or artefacts embedded in deposits. Types and densities of raw materials used reflect proximity to the source.

2. Isolated finds: comprising a single artefact which may be the result of tool loss, maintenance or discard, or may be evidence of larger buried or heavily disturbed sites.

4.0 Methodology

4.1 Background Research

A search of the Heritage NSW's AHIMS database was undertaken on 5th March 2024. Research was undertaken into the environmental background of the study area, outlining the topographic, geological and vegetation context of the study area. An analysis of the archaeological background of the Sydney Basin and Orchard Hills was undertaken. This background research facilitated an understanding of Aboriginal land use patterns within the region and the preparation of a predictive model of occupation.

A review of plans for the proposed development of the study area enabled an understanding of the impact of the proposed works on any potential archaeological deposit.

4.2 Site Inspection

A site inspection was undertaken on 15th February 2024 by [redacted].

The entire study area was inspected on foot to develop an understanding of the environmental and potential archaeological context and to record any evidence of Aboriginal occupation.

The surrounding landscape was also examined to facilitate an understanding of the environmental context of the study area and to attempt to locate previously recorded Aboriginal sites within the vicinity of the study area.

4.3 Report

This Aboriginal due diligence assessment report was prepared in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in New South Wales* (Office of Environment & Heritage 2011) and *Due diligence code of practice for the protection of Aboriginal objects in NSW* (DECCW 2010).

5.0 Results and Mitigation

5.1 Results

The site inspection was undertaken on the 15th February 2024 and the whole of the study area was inspected on foot with particular attention being paid to the historic topography and the disturbance from European development. No Aboriginal objects or sites were recorded during the site inspection. An AHIMS search dated 5th March 2024 indicates that no Aboriginal sites had previously been recorded within the study area.

The proposed gravity sewer main will be constructed in the road reserve from the Orchard Hills Metro Station along Lansdowne Road, up Samuel Marsden Road and intersect with the existing Sydney Water DN1350 South Creek submain on the northern boundary of the property at the end of Samuel Marsden Road. Proposed construction is via open trenching and underboring where required, e.g. where space in the road verge is limited. Maintenance holes are proposed along the route with a maximum interval of approximately 250m.

The proposed sewer main is located within an area of potential archaeological sensitivity due to its proximity to and location between two second order creeks. The predictive model developed by McDonald and Mitchell (1994) for the Cumberland Plain indicates that archaeological deposits could be present within the present study area.

During the site inspection, the ground surface of the entire length of the proposed sewer main was inspected carefully to understand the level of disturbance and to identify any Aboriginal objects. The road reserve along Lansdowne and Samuel Marsden Roads was highly disturbed during the construction and ongoing maintenance of the roads and properties along the roads and the installation of above and underground services and drainage channels. No Aboriginal objects were located during the site inspection.

The property at the end of Samuel Marsden Road where the new proposed sewer main will connect into the existing Sydney Waster DN1350 submain appears from the historical aerial photograph to have been utilised as cleared farmland and remained without above ground structures until the 1990s when the existing farm building was constructed between 1991 and 1998. The 1965 aerial photograph shows a water hole present just to the north of the existing farm building. Evidence of this water hole is no longer visible in the 1975 aerial photograph. Sydney Water plans from 1970 and 1971 show that Sydney Water constructed extensive infrastructure across Lot 19 DP238495. It is likely that the construction of this infrastructure included drainage for the water hole in the centre of the property. Sydney Water pans from 1991 show similar infrastructure to that shown in the 1971 plans.

The predictive model indicates that archaeological deposits could be expected within the study area due to the location of Lot 19 DP238495 adjacent to Blaxland Creek and the presence of a water hole within the property on the 1965 aerial photograph which indicates that this could have been a resource or camping area for the Aboriginal people of the area. However, the whole of the road reserve of both Lansdowne and Samuel Marsden Roads is highly disturbed by drainage, services and road construction. The property at the end of Samuel Marsden Road (Lot 19 DP238495) has been subjected to significant disturbance in the form of the construction of the Sydney Water infrastructure in the early 1970s. however appears to have been utilised as cleared farmland and remained undeveloped until the 1990s when the existing farm building was constructed. Therefore, it is considered highly unlikely that *in situ* Aboriginal archaeological deposits remain within the study area due to the extensive disturbance caused by the construction of Sydney Water infrastructure, drainage, roads, and above and underground services. It is not expected that the proposed works will impact on any Aboriginal objects or sites.

5.2 Impact and Mitigation

As it is not anticipated that any evidence of Aboriginal occupation or any Aboriginal objects will be impacted upon by the proposed works, there will not be any impacts on any Aboriginal cultural heritage. Therefore, no further archaeological investigation in respect of Aboriginal archaeology is required for the proposed alterations and additions. An Aboriginal Heritage Impact Permit (AHIP) will not be required.

If during the proposed works, any unexpected Aboriginal objects or evidence of Aboriginal occupation: such as Aboriginal objects; is uncovered, all work must cease in the vicinity of the suspected Aboriginal objects or evidence of Aboriginal occupation, and further advice should be sought from a qualified archaeologist.

In the unlikely event that any skeletal material is uncovered during the proposed works, all work must cease immediately on site and the following steps must be undertaken:

1. Not further disturb or move these remains.
2. Immediately cease all work at the particular location.
3. Notify NSW Police.
4. Notify Heritage NSW's Environment Line on 131 555 as soon as practicable and provide available details of the remains and their location.
5. Not recommence any work at the particular location unless authorised in writing by Heritage NSW.
6. Any Aboriginal ancestral remains must be recorded and reported under the direct supervision of a specialist physical anthropologist, such as Dr Denise Donlon at the University of Sydney.

6.0 Legislation

6.1 The National Parks & Wildlife Act 1974 (as amended)

The *National Parks & Wildlife Act 1974* (NPW Act) provides statutory protection to all Aboriginal objects and Aboriginal places within New South Wales. Heritage NSW within the Department of Planning and Environment is the State Government agency responsible for the implementation and management of this Act.

Part 6 of the *National Parks & Wildlife Act* provides provision for the protection of all Aboriginal "objects" which are defined as "any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains". Part 6 of the Act states that it is an offence to harm or desecrate an Aboriginal object or Aboriginal place, without an Aboriginal Heritage Impact Permit (AHIP).

This assessment was undertaken in accordance with the *Due diligence code of practice for the protection of Aboriginal objects in NSW* (DECCW 2010) and *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (Office of Environment & Heritage 2011).

This assessment has concluded that it is highly unlikely that Aboriginal objects remain within the study area and will be impacted by the proposed works. Therefore, no further archaeological investigation is required in respect of these works.

7.0 Recommendations

The following recommendations are made in accordance with:

- The legal requirements of the *National Parks & Wildlife Act 1974* (as amended) which states that it is an offence to harm or desecrate an Aboriginal object without gaining prior consent of the Director General of the Department of Planning and Environment.

- Research into the environmental and archaeological record of the study area.

- The results of this Aboriginal archaeological assessment which concludes that it is highly unlikely that subsurface archaeological deposits remain within the study area.

Therefore, it is recommended that:

1. No Aboriginal objects were recorded during the site inspection and it is not expected that any sites or subsurface deposits will be harmed during the proposed works. There is no objection to the construction of the proposed sewer main on Aboriginal archaeological grounds and no further archaeological investigation is required.

2. If during the proposed works any unexpected Aboriginal objects, or any other evidence of Aboriginal occupation is uncovered, all work must cease in the vicinity of the suspected Aboriginal objects or evidence of occupation, and further advice should be sought from a qualified archaeologist.

3. If, in the unlikely event, any skeletal material is uncovered during the proposed works, all work must cease and the following steps be immediately undertaken:

    a) You must not further disturb or move these remains.

    b) You must immediately cease all work at the particular location.

    c) You must notify NSW Police.

    d) You must notify Heritage NSW's Environment Line on 131 555 as soon as practicable and provide available details of the remains and their location.

    e) You must not recommence any work at the particular location unless authorised in writing by Heritage NSW.

    f) Any Aboriginal skeletal remains must be recorded and reported under the direct supervision of a specialist physical anthropologist.

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Photographs



Photograph 1: Showing the property at the end of Samuel Marsden Road where the proposed sewer main will connect to the existing Sydney Water DN1350 submain. The existing farm building is visible on the right of the photo.



Photograph 2: Showing the area to the north of the existing farm building where a small waterhole was present in the 1965 aerial photograph.



Photograph 3: Looking toward the M4 Motorway with the existing farm building to the left of the photo.



Photograph 4: Showing the overgrown vegetation at the end of Samuel Marsden Road.



Photograph 5: Facing west and looking along Samuel Marsden Road. The proposed sewer main will be constructed in the road reserve to the right of the photo.



Photograph 6: Facing west and looking along the road reserve of Samuel Marsden Road where the proposed sewer main will be constructed.



Photograph 7: Showing evidence of drainage channels within the road reserve.



Photograph 8: Showing evidence of drainage pipes installed beneath driveways along Samuel Marsden Road.



Photograph 9: Showing evidence of a creek within the road reserve of Samuel Marsden Road.



Photograph 10: Showing evidence of underground services within the road reserve of Lansdowne Road.



Photograph 11: Showing evidence of drainage channels within the road reserve.



Photograph 12: Showing the imported gravels and disturbance of the Lansdowne Road road reserve.

Appendix A: AHIMS Search Results

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Orchard Hills
Client Service ID : 870188

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
45-5-4430	Kent Road South 12A	GDA	56	292142	6259600	Open site	Destroyed	Artefact : -		
	Contact	Recorders	Matthew Kelleher,Matthew Kelleher					Permits	3762	
45-5-4431	Kent Road South 12B	GDA	56	291991	6259609	Open site	Destroyed	Artefact : -		
	Contact	Recorders	Matthew Kelleher,Matthew Kelleher					Permits	3762	
45-5-4477	South Creek 4	GDA	56	292197	6259703	Open site	Destroyed	Artefact : -		
	Contact	Recorders	Helen Brayshaw,Kelleher Nightingale Consulting Pty Ltd,Miss.Kristen Taylor					Permits	4001	

** Site Status
Valid - The site has been recorded and accepted onto the system as valid
Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.
Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground
Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

[redacted]

Unearthed
Archaeology & Heritage

B.2025

Parklife
c/o: [redacted]
Environmental Approvals
By email: [redacted]

4th December 2025

Dear [redacted]

Samuel Marsden Road, Orchard Hills – Underbore Pit
Aboriginal Archaeology and Cultural Heritage

Parklife are proposing the construction of a new gravity sewer main between the Orchard Hills Metro Station site and the existing Sydney Water DN1350 South Creek submain. Unearthed Archaeology & Heritage undertook an Aboriginal due diligence assessment of the proposed works in April 2024. That assessment determined that due to the extensive disturbance throughout the study area as a result of the construction of Sydney Water infrastructure in the 1970s, it is highly unlikely that Aboriginal objects remain within the study area. Parklife are now tendering for the proposed works and the tenderers have indicated that they will require an intermediate pit for underboring works within Lot 19 DP238495 which was not previously assessed as part of the scope of works. The proposed underboring pit is to be located along the proposed underboring route within Lot 19 DP238495. A site inspection was undertaken on 27th November 2025 and the area of proposed underboring pits was inspected. No Aboriginal objects were identified during the site inspection.

Given the extensive disturbance as a result of the construction of Sydney Water infrastructure throughout Lot 19 DP238495 in the 1970s, it is not expected that any Aboriginal objects remain within the study area. Therefore, no further archaeological investigation in respect of Aboriginal archaeology is required for the inclusion of the underboring pit in the proposed works area.

If during the proposed works, any unexpected Aboriginal objects or evidence of Aboriginal occupation: such as Aboriginal objects; is uncovered, all work must cease in the vicinity of the suspected Aboriginal objects or evidence of Aboriginal occupation, and further advice should be sought from a qualified archaeologist.

In the unlikely event that any skeletal material is uncovered during the proposed works, all work must cease immediately on site and the following steps must be undertaken:

1. Not further disturb or move these remains.
2. Immediately cease all work at the particular location.
3. Notify NSW Police.
4. Notify Heritage NSW's Environment Line on 131 555 as soon as practicable and provide available details of the remains and their location.
5. Not recommence any work at the particular location unless authorised in writing by Heritage NSW.
6. Any Aboriginal ancestral remains must be recorded and reported under the direct supervision of a specialist physical anthropologist, such as Dr Denise Donlon at the University of Sydney.

[redacted]
Director/~~Archaeologist~~/Heritage Specialist/Project Director

AHIMS Web Services (AWS)

Search Result

Your Ref/PO Number : AM additional assessment
Client Service ID : 1199475

Date: 16 October 2026

[redacted]

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 18, DP:DP238495, Section : - with a Buffer of 50 meters, conducted by [redacted] on 16 October 2026.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://gazette.nsw.gov.au/) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW's Aboriginal Heritage Information Unit upon request https://gazette.nsw.gov.au/

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not to be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Appendix C – Biodiversity & Pre-clearing Report

© Sydney Metro 2026

PRE- CLEARING TREE INSPECTION REPORT – SAMUEL MARSDEN ROAD

SYDNEY METRO WESTERN SYDNEY AIRPORT, STATIONS, SYSTEMS, TRAINS, OPERATIONS AND MAINTENANCE (SSTOM)

FEBRUARY 2026

Document Details

Property	Details
Report Name	PRE- CLEARING TREE INSPECTION REPORT – Samuel Marsden
Project No.	1350
Prepared for	SSTOM
Prepared by	WolfPeak Pty Ltd **T:** 1800 979 716 **W**: www.wolfpeak.com.au

Revision History

Revision	Date	Details
1	04/02/2026	Final Report
2	11/02/2026	Revised Report
3	12/02/2026	Revised Report

Authorisation

Author name	[redacted]	Reviewer / approver name	[redacted]
Author position	Ecologist	Review position	Principal Ecologist
Author signature	[redacted]	Reviewer/approver signature	[redacted]
Date	12/02/2026	Date	12/02/2026

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This disclaimer, together with any limitations specified in this report, apply to use of this report. This report was prepared in accordance with the contracted scope of works for the specific purpose stated in the contract and subject to the applicable cost, time and other constraints. In preparing this report, WolfPeak Pty Ltd (WolfPeak) relied on client/third party information which was not verified by WolfPeak except to the extent required by the scope of works, and WolfPeak does not accept responsibility for omissions or inaccuracies in the client/third party information; and information taken at or under the particular times and conditions specified, and WolfPeak does not accept responsibility for any subsequent changes. This report has been prepared solely for the use by, and is confidential to, the client and WolfPeak accepts no responsibility for its use by any other parties. This report does not constitute legal advice. This report is subject to copyright protection and the copyright owner reserves its rights.

1. INTRODUCTION

1.1 Background Information

WolfPeak has been engaged by Stations, Systems, Trains, Operations and Maintenance, hereby referred to in this report as 'SSTOM' or the 'client' to undertake site inspections in areas of proposed tree removal within the development corridor of the SSTOM project (the Project) in western Sydney. A qualified ecologist is required to undertake a pre-clearing assessment of trees approved for removal during construction activities for the Project. Inspection and reporting on all trees earmarked for removal is required prior to removal taking place.

1.2 Purpose

The purpose of this report is to provide information on trees which have been earmarked to be removed following an onsite assessment by an ecologist. Namely, this report provides credit offset calculations for all proposed clearing of Plant Community Types (PCTs) and specific listed species. The report also provides recommendations for the installation of nestboxes where appropriate. This report also assesses the potential for an intermediate pit or pits along the underbore alignment that is proposed for construction.

1.3 Site and Tree Inspection

WolfPeak ecologist [redacted] undertook an onsite pre-clearing inspection on 18th December 2025 for areas marked for tree removal at Samuel Marsden Road (see Figure 1). The two trees are both represented by the single X symbol in the figure, given their immediate proximity to each other. The site inspection consisted of walking transects around the marked trees for removal, recording vegetation and fauna habitat types, and searches for threatened plants and threatened fauna. Details of the trees within the study areas were recorded and inspected for hollows and other fauna habitat features.



Data Sources: Wolfpeak 2024, Imagery Source: Esri, Vantor, Earthstar Geographics, and the GIS User Community, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Earthstar Geographics, Vantor

1:950@A4 GDA2020 MGA Zone 56

Legend

- To be removed
- Proposed Intermediate Pit Locations
- Underbore Alignment

0 10 20 Meters

Figure 1 | Samuel Marsden Road Trees to be Removed

wolfpeak

2. RESULTS

2.1 Desktop Analysis

A desktop review of the BioNet Atlas database was undertaken to identify mapped Plant Community Types (PCTs) within the study area. The review indicated that the study area is mapped as PCT 4025: Cumberland Redgum - Cabbage Gum Riverflat Forest in the NSW (Mitchell) Landscape. PCT 4025 is the contemporary equivalent of legacy PCT 835: Forest Red Gum – Rough-barked Apple Grassy Woodland on Alluvial Flats of the Cumberland Plain, Sydney Basin Bioregion, which is identified and used in the BDAR relevant to this assessment. These PCTs are considered comparable, with the vegetation community mapped as being in 'thinned' condition based on mapping analysis.

2.2 Vegetation Communities on site

The study areas were inspected and found to have the following vegetation community:

The Samuel Marsden Road site contains a canopy consisting of Cabbage Gum (*Eucalyptus amplifolia*) with a midstorey of various Wattle species (*Acacia* spp.). The understorey is dominated by a range of grasses and forbs which are predominantly exotic, including Paddy's lucerne (*Sida rhombifolia*), Perennial ryegrass (*Lolium perenne*), Spear Thistle (*Cirsium vulgare*), Clover (*Trifolium* spp.), Rhodes Grass (*Chloris gayana*), Cobbler's peg (*Bidens pilosa*) and Fireweed (*Senecio madagascariensis*). Sparse native Couch grass (*Cynodon dactylon*) was also observed throughout the study area.

As part of design planning by the client, the clearing of six Cabbage gums has been avoided by decision to bore a tunnel and only affect a trenched drainage line adjacent to the roadside. Cleared areas along the underbore alignment were inspected. Excavation of an intermediate pit or pits in these areas would disturb understorey only, primarily the exotic grasses and forbs listed above.

The vegetation community recorded within the study area correlates with the mapped PCT 4025: Cumberland Redgum - Cabbage Gum Riverflat Forest, as evidenced by the canopy dominance of Cabbage Gum (*Eucalyptus amplifolia*) and the characteristic presence of Acacia species in the midstorey stratum. The ground storey of this PCT type is largely absent. PCT 4025 strongly correlates to the legacy PCT 835.

2.3 Fauna Habitats

The study area at Samuel Marsden Road has habitat values for fauna. The trees present within the study area may provide some foraging habitat for common species such as nectar resources.

No hollows were found upon inspection of the trees.

2.4 Tree Details

A total of two trees marked for removal were assessed by the ecologist. The details of all trees can be found in Table 1 of Appendix 2.

2.5 Threatened Species and Ecological communities

PCT 835 and PCT 4025 are recognised as equivlanet to a Threeatened Ecological Community. The equivalent TECs are 'River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria' lsited under the EPBC Act and 'River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions' listed under the NSW *Biodiversity Conservation Act 2016* (BC Act).

The area of PCT 835 'Thinned' does not meet the condition thresholds to comprise a TEC under the Commonwealth *Environment Protection and Biodiversity Conservation Act* (1999).

No threatened species were identified during the site assessment of this Study Area.

2.6 Credit Calculations for Study Area

To calculate biodiversity offset credits, WolfPeak was provided by the client the following documents for analysis:

- Appendix G Revised Biodiversity Development Assessment Report
- Sydney Metro – Western Sydney Airport NSW Infrastructure Approval (SSI_10051) – Request for modification of Condition E4
- Western Sydney Airport Metro SCAW Project - Revised Biodiversity Offset Credit Requirements
- Sydney Metro Western Sydney Airport – Conditions of Approval
- Sydney Metro – Western Sydney Airport Modification 1

Biodiversity offset credit calculations were conducted in accordance with the approved Biodiversity Development Assessment Report (BDAR). Following the BDAR's publication, client-requested modifications were subsequently approved by the NSW Government. The offset calculations presented in Table 1 reflect the approved modifications of the E4 Condition report of the CSSI Approval (2022) and incorporate all relevant supporting documentation (WSP, 2021).

The different Study Areas have distinct calculations for Biodiversity offset credits, given the varied PCTs and their conditions as well as the presence or absence of listed species and assumed fauna habitats. The table of credit calculations used to generate the offset calculations cited (WSP, 2021) is provided in Appendix 4.

The total number of offset credits for each PCT Vegetation class and listed species can be found in Table 1 and Table 2.

Table 1: Breakdown of total credits into associated PCT

PCT	Offset Credit *
PCT 835 'Thinned'	0.36

Table 2: Breakdown of total species credits

Species	Offset Credit *
Southern Myotis (*Myotis Macropus*) PCT 835 'Thinned'	0.36
Meridolum corneovirens PCT 835 'Thinned'	0.36
Juniper-leaved Grevillea *(Grevillea juniperina subsp. Juniperina*) PCT 835 'Thinned'	0.27

2.7 Pre-clearing Inspection Checklist

As part of the pre-clearance assessment of the study area, a series of questions around environmental factors were posed. Based on the answers provided by the WolfPeak ecologist, corrective actions or comments are provided to address any requirements apparent. The item answers and corrective actions to be observed are provided in Appendix 3.

3. CONCLUSION AND RECOMMENDATIONS

The assessment of this report has determined the environmental impact of removal of trees at Samuel Marsden road. Biodiversity Offset credits were calculated for PCT vegetation or specific species in Table 1 of section 2.6 of this report.

Impacts will be mitigated provided the recommendations are followed. The recommendations are:

- A pre-clearing inspection is to be undertaken prior to vegetation removal and vegetation removal is to be supervised by an ecologist as per standard procedures.
- Excavation of any intermediate pit or pits along the underbore alignment should be limited to areas outside the drip zone of trees.
- Weed management as required.
- Intermediate pits, if installed, are constrained to the highlighted areas in Figure 1. Pits must not be installed under the drip lines of remaining canopy trees in the area.
- A post-clearance inspection of the felled tree is required to determine number and size of hollows if any are found. In the event that hollows are found after felling the trees, installation of nest boxes of corresponding dimensions will be warranted to mitigate habitat loss.

Should you have any queries or require further information please do not hesitate to contact the undersigned.

Kind regards,

[redacted]

[redacted]

Ecologist
Mobile: [redacted]
Email: [redacted]

References

Sydney Metro (2021): Sydney Metro – Western Sydney Airport Revised Biodiversity Development Assessment Report

Sydney Metro (2022): Western Sydney Airport NSW Infrastructure Approval (SSI_10051) – Request for modification of Condition E4

AMBS (2022): Western Sydney Airport Metro SCAW Project - Revised Biodiversity Offset Credit Requirements

Transport for NSW (2022): Cumberland Plain Conservation Plan - Appendix E Table 20-27 Mitigation Measures for Major Transport Corridors

NSW Government (2022): Sydney Metro Western Sydney Airport – Conditions of Approval

NSW Government (2022): Sydney Metro – Western Sydney Airport Modification 1 (SSI 10051 MOD 1)

Appendix 1. - Tree photos collected during site assessment.

Photo 1: Samuel Marsden Road. Site where tunnel development will emerge. North end of development, proximate to M4.



Photo 2: Samuel Marsden Road. Six Cabbage gums which will be retained due to revised design plans by SSTOM.



Photo 3: Samuel Marsden Road. Two Cabbage gums marked for removal.



Appendix 2. – Tree Details

Table 1: Trees of Study Area

Tree Number	Species	Common Name	DBH cm	Height approx. in m	Hollow Bearing Y/N	Koala Food Tree Y/N	Coordinates	Comments
1	*Eucalyptus amplifolia*	Cabbage Gum	63	12	N	Y	-33.7837 150.7617	Samuel Marsden Road
2	*Eucalyptus amplifolia*	Cabbage Gum	57	14	N	Y	-33.7837 150.7617	Samuel Marsden Road

Appendix 3. - Pre-clearing Inspection Checklists

Table 2: Pre-clearing Inspection Checklist

Item to be addressed	Statement requiring response	Response Y/N	Actions required following response	Corrective Action needed/ Comments
Habitat Exclusion Zone/s	Have all trees/vegetation to be retained been marked with “Tree Protection Zone-No Access” signs and fenced off?	No	No	NA
Hollow Bearing Trees	Have habitat trees/nests been identified?	No	No	NA
Nest Boxes	Are nest boxes required to offset habitat tree removal?	No (Pending Post-clearance inspection)	No	NA
Vegetation Salvage for Reuse	Have habitat trees for reuse been identified?	No	No	NA
Fauna Rescue and Relocation	Was a nearby release site determined for fauna relocation?	No	No	NA
Fauna Rescue and Relocation	Have any Threatened Species been found?	No	No	NA
Weed and Pathogen Hygiene	Priority Weeds found?	No	No	NA
Weed and Pathogen Hygiene	Is there a risk of pathogens disturbance as a result of clearing works?	No	No	NA

Item to be addressed	Statement requiring response	Response Y/N	Actions required following response	Corrective Action needed/ Comments
Waterways or Riparian Corridors	Will any waterways or riparian corridors be impacted?	No	No	NA
Seed Collection	Are there any seed collection recommendations?	No	No	NA
Pre-clearing of Vegetation	Has the vegetation to be removed been clearly marked?	No	No	NA
Pre-clearing of Vegetation	Are there any unexpected PCTs in the area being removed?	No	No	NA
Pre-clearing of Vegetation	Is the ecologist and/or fauna rescue personnel required to be present during clearing for this area?	Yes	No	Ecologist to be present during clearing of Study Area at Samuel Marsden drive.
Staged Clearing	Will this require stage 1 or stage 2 clearing procedures?	No	No	Staged clearing not required.
Drainage Lines	Are there drainage lines within this site	No	No	NA
Drainage Lines	Have drainage lines been checked and marked out	No	No	NA
Erosion and Sediment Control	Have erosion and sediment controls been installed prior to grubbing works?	Unknown	Yes	Ensure all necessary controls are installed if grubbing is to occur at Samuel Marsden site.

Item to be addressed	Statement requiring response	Response Y/N	Actions required following response	Corrective Action needed/ Comments
Erosion and Sediment Control	Staff have been informed of controls as per clearing and grubbing plan	Uknown	Yes	Inform staff of all necessary controls prior to grubbing works.
Boundary Fencing	Boundary of clearing zone fenced/demarcated?	No	Yes	Clear demarcation of boundary line of area marked for clearance.
Briefing Site Workers	Has an unexpected finds procedure for threatened or endangered species been communicated to site personnel, including stop works, notification and revised approval requirements	Unknown	Yes	Communicate procedure to all staff where relevant.
Briefing Site Workers	Has the weed management strategy been communicated to site personnel	Unknown	Yes	Communicate Weed MGMT Strategy to all site personnel.

Appendix 4. – Offset obligations from BDAR

Ecosystem credit offset obligation (off-airport)

Table 12.7 Ecosystem credit offset obligation (off-airport)

Vegetation type	Condition	Threatened ecological community (BC Act)	Vegetation integrity loss	Biodiversity Risk Weighting	Extent off-airport land (hectares)	Ecosystem credits required
PCT 724 - Broad-leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion	Intact	Shale Gravel Transition Forest (Endangered)	-61.7	2	2.10	65
	Thinned		-44.3	2	6.91	153
	Scattered Trees		-39.7	2	1.41	28
PCT 835 - Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Intact	River-Flat Eucalypt Forest (Endangered	-76.6	2	1.34	51
	Thinned		-71.2	2	4.40	157
	Scattered Trees		-36.7	2	0.49	9
PCT 849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	Thinned	Cumberland Plain Woodland (Critically Endangered)	-62.4	2.5	4.66	182
	Scattered Trees		-20.3	2.5	1.73	22
PCT 1800 - Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley	Intact	Swamp Oak Floodplain Forest (Endangered)	-66.4	2	1.07	36
	Thinned		-67.5	2	4.31	145
Total					**28.42**	**848**

Species credit offset obligation (off-airport)

Table 12.9 Species credit offset obligation (off-airport)

Vegetation zone	Habitat condition loss	Area/count	SAII	Species credits
***Acacia bynoeana* (Bynoe's Wattle) – Flora**				
PCT 724_Intact	-61.7	0.43 hectares	No	13
PCT 724_thinned	-44.3	0.82 hectares	No	18
Total		**1.25 hectares**	**-**	**31**
***Acacia pubescens* (Downy Wattle) – Flora**				
PCT 724_Intact	-61.7	0.43 hectares	No	13
PCT 724_thinned	-44.3	0.82 hectares	No	18
PCT 724_Scattered Trees	-39.6	0.03 hectares	No	1
PCT 849_thinned	-62.4	0.57 hectares	No	18
PCT 849_Scattered Trees	-20.3	0.39 hectares	No	4
Total		**2.24 hectares**	**-**	**54**
***Allocasuarina glareicola* – Flora**				
PCT 724_Intact	-61.7	0.43 hectares	Yes	20
PCT 724_thinned	-44.3	0.82 hectares	Yes	27
Total		**1.25 hectares**	**-**	**47**
***Cynanchum elegans* (White-flowered Wax Plant) – Flora**				
PCT 849_thinned	-62.4	0.57 hectares	No	18
Total		**0.57 hectares**	**-**	**18**
***Dillwynia tenuifolia* – Flora**				
PCT 724_Intact	-61.7	0.43 hectares	No	13
PCT 724_thinned	-44.3	1.6 hectares	No	36
PCT 724_Scattered Trees	-39.7	0.02 hectares	No	1
PCT 849_thinned	-62.4	0.57 hectares	No	18
PCT 849_Scattered Trees	-20.3	0.39 hectares	No	4
Total		**3.05 hectares**	**-**	**72**
***Grevillea juniperina subsp. juniperina* (Juniper-leaved Grevillea) – Flora**				
PCT 724_Intact	-61.7	0.43 hectares	No	10
PCT 724_thinned	-44.3	0.82 hectares	No	14
PCT 724_Scattered Trees	-39.6	0.02 hectares	No	1
PCT 835_Intact	-76.6	0.81 hectares	No	23
PCT 835_thinned	-71.2	3.30 hectares	No	88
PCT 835_Scattered Trees	-36.7	0.04 hectares	No	1

Vegetation zone	Habitat condition loss	Area/count	SAII	Species credits
PCT 849_thinned	-62.4	0.57 hectares	No	13
PCT 849_Scattered Trees	-20.3	0.39 hectares	No	3
Total		**6.38 hectares**	**-**	**153**
***Grevillea parviflora subsp. parviflora* (Small-flower Grevillea) - Flora**				
PCT 724_Intact	-61.7	0.43 hectares	No	13
PCT 724_thinned	-44.3	0.82 hectares	No	18
PCT 724_Scattered Trees	-39.6	0.02 hectares	No	1
Total		**1.27hectares**	**-**	**32**
***Marsdenia viridiflora subsp. viridiflora* – (Endangered population *Marsdenia viridiflora* R. Br. subsp. *viridiflora*) – Flora**				
PCT 724_Intact	-61.7	0.43 hectares	No	13
PCT 724_thinned	-44.3	0.82 hectares	No	18
PCT 835_Intact	-76.6	0.81 hectares	No	31
PCT 835_thinned	-71.2	31.6 hectares	No	57
PCT 849_thinned	-62.4	0.57 hectares	No	18
Total		**4.23 hectares**	**-**	**137**
***Micromyrtus minutiflora* – Flora**				
PCT 724_Intact	-61.7	0.43 hectares	No	20
PCT 724_thinned	-44.3	0.82 hectares	No	27
Total		**1.25 hectares**	**-**	**47**
***Pimelea curviflora var. curviflora* – Flora**				
PCT 849_thinned	-62.4	0.57hectares	No	18
Total		**0.57 hectares**	**-**	**18**
***Pimelea spicata* (Spiked Rice-flower) – Flora**				
PCT 849_thinned	-62.4	0.577 hectares	No	18
PCT 849_Scattered Trees	-20.3	0.39 hectares	No	4
Total		**3.66hectares**	**-**	**22**
***Pultenaea parviflora* – Flora**				
PCT 724_Intact	-61.7	0.43 hectares	No	13
PCT 724_thinned	-44.3	0.82 hectares	No	18
Total		**1.25 hectares**	**-**	**31**
***Meridolum corneovirens* (Cumberland Plain Land Snail) - Fauna**				
PCT 724_Intact	-61.7	0.57 hectares	No	18
PCT 724_thinned	-44.3	2.10 hectares	No	47
PCT 835_Intact	-76.6	0.53 hectares	No	20
PCT 835_thinned	-71.2	2 hectares	No	71
PCT 849_thinned	-62.4	0.11 hectares	No	3

Vegetation zone	Habitat condition loss	Area/count	SAII	Species credits
Total		**5.31 hectares**	**-**	**159**
***Myotis macropus* (Southern Myotis) - Fauna**				
PCT 835_Intact	-76.6	0.81 hectares	No	31
PCT 835_thinned	-71.2	1.52 hectares	No	54
PCT 835_Scattered Trees	-36.7	0.05 hectares	No	1
PCT 849_thinned	-62.4	1.2 hectares	No	38
PCT 849_Scattered Trees	-20.3	0.03 hectares	No	1
PCT 849_low	-7.8	2.4 hectares	No	9
PCT 1800_Intact	-66.4	1.07 hectares	No	36
PCT 1800_thinned	-67.5	3.6 hectares	No	122
Total		**10.68 hectares**	**-**	**292**
Total combined species credit offset (off-airport)				**1,113**

Source: Sydney Metro, 2021

Revised species credit obligations - Modification 1

Table 3: Ecosystem credits

Plant Community Type (PCT) ID and name	Number of Credits
724: Broad-leaved Ironbark – Grey Box – Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion	246
835: Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	217
849: Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	202
1800: Swamp Oak open forest on riverflats of Cumberland Plain and Hunter Valley	181
TOTAL	**846**

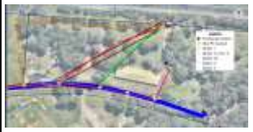
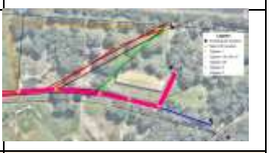
Table 4: Species credits required

Species	Number of Credits
Dillwynia tenuifolia	21
Grevillea juniperina subsp. juniperina (Juniper-leaved Grevillea)	57
Pultenaea parviflora	10
Meridolum corneovirens Cumberland Plain Land Snail	159
Myotis Macropus (Southern Myotis)	292
TOTAL SPECIES CREDITS	**539**

Appendix D – Options Assessment

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Deviation from Standards - Options Assessment	
Project Number	C192268WW
Project Name	OHE Day 1 Sewer
Deviation Requestor	FJA / PLM

Option Number	Option Description	Functional Performance	Structural Performance (e.g. strength, durability, service life)	Operations and Maintenance	Safety	Environment and Sustainability	Commercial	Impacts to Landowner	*Additional criteria / notes*	*Option Overview*
Option 1A (Current Rev 5)	Undetrbore commencing at MH 18 going to MH20, with an intermediate permanent MH19	Design solution is acceptable.		MHs to inspect / maintain - 2 additional MHs within Lot 18/19.	Impact on the current tenant will be minimized, as the entire line will be under-bored. Furthermore, the intermediate pit and shaft will be constructed behind the existing fence line in an area not currently utilized by the tenant.	No futher trees would be required to be cut. Intermediate pit located at an area where no trees are located.	PLM SW Contractor has been engaged and package awarded based on this design, with the exception of an additional intermediate permanent MH.	Construction works will interface with the current tenant and access for the works will have to be coordinated. This has been agreed in principal with a License agreement between DPHI & PLM. New pit still needed at NE corner of Lot 18, in order to tie into existing MH 21. License agreement needed between DHPI & PLM.		
Option 1B	Proposed route of bore along Lots 18 & 19 boundary with intermediate pit	Design solution is understood to be acceptable - only a slight deviation from Option 1A (current Rev 5)	To minimize the impact on surrounding structures and future development, the intermediate pit and Pit 19 will be constructed on or near the boundary line between Lots 18 and 19	MHs to inspect / maintain - 2 additional MHs within Lot 18/19.	Impact on the current tenant will be minimized, as the entire line will be under-bored. Furthermore, the intermediate pit and shaft will be constructed behind the existing fence line in an area not currently utilized by the tenant.	No futher trees would be required to be cut. Intermediate pit located at an area where no trees are located.	Construction costs considered to be comparable to Option 1A.	This route aims to minimise the impact to each lot 18 and 19, proposing the route of the bore along the boundary of the lots. Construction works will interface with the current tenant and access for the works will have to be coordinated. This has been agreed in principal with a License agreement to be prepared with PLM. New pit still needed at NE corner of Lot 18, in order to tie into existing MH 21. License agreement needed between DPHI & PLM.	Minor redesign. Slight change only form approved Rev 5.	
Option 1C	Proposed route of underbore as per Rev 1 / Rev 2 design.	Design solution is understood to be acceptable - slight change from Option 1B (excluding the permanent intermediate pit)	To minimize the impact on surrounding structures and the lot, there will be no permanent intermediate pit.	Lower maintenance option as there's will be only one pit (next to the main sewer MH)	Impact on the current tenant will be minimized, as the entire line will be under-bored. Furthermore, the intermediate pit and shaft will be constructed behind the existing fence line in an area not currently utilized by the tenant. Solution will require more traffic management as route encroches further into the road. However there is expected to b e ittle traffic.	No futher trees would be required to be cut. Also no intermediate pit is needed.	PLM SW Contractor has been engaged and package awarded based on this design. No further design costs expected with this option.	This route aims to minimise the impact to each lot 18 and 19, proposing the route of the bore along the boundary of the lots. Construction works will interface with the current tenant and access for the works will have to be coordinated. This has been agreed in principal with a License agreement to be prepared with PLM. No permanent pit is proposed. Only a temporary excavation launch / receive pit to facilitate boring in two sections. License agreement needed between DPHI & PLM.	Minor redesign. Option similar to Revision 1. Approval required from SW to revert to the previously approved 170m distance between MHs. Last MH permanent to existing required to be moved slightly.	
Option 2	Tie into existing 1350mm carrier main adjacent to South Creek	Design solution is generally considered to be fesable - It is understood the RLs will work with the gravity sewer, however 2 new pits are expected to be required for (1) the change in direction and (2) tie-in to the existing line	Possible structural damage of carrier main pipes due to asset age and unknown condition	MHs to inspect / maintain - 1 additional MH on SMR and 1 additional MH in Lot 20. Possible maintanance of vegetation required around proposed MHs.	Current flow levels in the 1350mm carrier main are unknown. FIFM procedures TBC. SW concerns over the viability of constructing a new MH over the existing carrier main. Considerable pump around / bypass setup needed during construction.	Area is classified as Wianamatta Bushcare Site home to critically endangered ecological community Area is densely vegetated and was not captured in the EIS previously for the potential removal of any vegetation. This existing MH itself was not sighted and is understood to be covered over with vegetation. It is expected that approval for additional clearing will not be possible.	Increased costs expected for additional design, MH construction, FIFM, existing sewer diversion costs	Minimal impact to Landowner (DPHI). 2 new pits required in Lot 20 (1 new pit to achieve the 90 deg requirements, and another new pit to be constructed over the existing 1350mm dia carrier main) Minimal impact to tenant / current lease. License agreement needed between DPHI & PLM.	Additional time required for design. This could potentially be constructed using conventional trenching methodology instead of boring. However conventional trenching would require additional clearing which is unlikely to be approved.	
Option 3	Installation of new pit over Sewer main, North East of Lot 19 shed	Design solution is generally considered to be feasible. A new pit construction over the main line will allow for the new proposed line tap-in	Possible structural damage of carrier main pipes due to asset agane and unknown condition	MHs to inspect / maintain - additional MH over existing 1350mm carrier main. Maintanance of vegetation required around proposed MHs.	Current flow levels in the 1350mm carrier main are unknown. FIFM procedures TBC. SW concerns over the viability of constructing a new MH over the existing carrier main. Considerable pump around / bypass setup needed during construction.	Area is classified as Wianamatta Bushcare Site home to critically endangered ecological community It is expected that this soultion is possible without the need for additional clearing.	Increased costs expected for additional design, MH construction, FIFM, existing sewer diversion costs	Propoesd route is along the access road extending into Lot 19. Construction works may interface minimally with the current tenant's operations. License agreement needed between DPHI & PLM.	Additional timerequired for design. This could potentially be constructed using conventional trenching methodology instead of boring.	
Option 4	Installation of Sewer line West of Lot 17 boundary and South of Lot 18 northern boundary (adjacent to M4 motorway)	Design solution is generally considerde feasible. It is understood the RLs will work with the gravity sewer, however new pits are expected to be required for maintenance the direction of flow to be into existing MH20		Adidtional MH to inspect / maintain. Maintanance of vegetation required around proposed MHs.	Possible construction challenges with constructing pits in this area due to the stormwater run off from M4.	Along the boundary of Lot 17 and Lot 18 are many trees, therefore moving to the West (of Lot 17) and South (of Lot 18) is proposed to avoid trees. MHs to be located so that trees are avoided.	Increased costs expected due to longer lengths of bore.	Sewer line largely avoids Lot 18, however encroaches into DPHI's Lot 17 land. Minimal impact to tenant / current lease. Working areas would be fenced off during construction. License agreement needed between DPHI & PLM.	Further design costs and additional time required. Exact route could potentially be adusted slightly, however there are many large trees along the northern boundary of Lot 18. The proposed route can potentially be considered to go North of Lot 18, however it is unknown whether TfNSW / M4 Motorway will have any issues with the sewer line being located in this stormwater run off area that is maintained. Pits would have to be high enough to allow for stormwater run off and not allow stormwater ingress.	

Preferred Option	Reasoning
Option 1C	Option 1C is preferred for the following reasons: - It is the most environmentally friendly option - PLM have based their procurement on this design (Contract has awarded for the works) - Discussions have been held with DPHI and tenant regarding interface during construction - The re will be no permanent structures within the DPHI land, besides the tie in MH at the NE corner. A temporary intermediate

General Notes:
Additional removal of trees is generally not considered to be possible on the SSTOM project. Option 2 would require considerable tree removal and therefore is not considered to be a viable option.
All options (excluding Options 2 & 3) are required to tie into the existing MH at the NE corner of Lot 18.