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 (SSTOM ER003 29 April 2004) 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 concept design for the sewer main and assumed the sewer could be construction without removal of native vegetation. Construction of the sewer involves standard pipelaying methodology via open trenching along Lansdowne and Samuel Marsden Road, with 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 a separate Consistency Assessment (PLM CA001, initially endorsed in February 2026). It is noted that PLM CA001 is currently being updated in parallel with the preparation of this Consistency Assessment to capture the final underbore alignment as agreed with Sydney Water and a potential truck turnaround.

This Consistency Assessment (PLM CA005) supersedes the previously approved Environmental Review and assesses the construction of the open trenched portion of the sewer main. This Consistency Assessment includes an assessment of the potential biodiversity impacts of the removal of six trees from the road reserve which was not anticipated in the previously approved Environmental Review. Figure A1 illustrates the location of the open trenched (subject of this Consistency Assessment) and underbore scope of works (subject of Consistency Assessment PLM CA001).

The approved project 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:

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- 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) Noting this document is superseded by this Consistency Assessment
- SSTOM CA001 Consistency Assessment Samuel Marsden Road Sewer main – revised underbore alignment and tree removal.

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 and the Sydney Metro documents library https://www.sydneymetro.info/documents

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

A sewer main is required to provide a permanent wastewater connection for the Orchard Hills Station and precinct as well as to provide capacity for pumped discharge from the Stabling and Maintenance Facility. The design has been developed to meet Sydney Water Notice of Requirements (NOR), which have been issued to Parklife Metro via the approved Water Service Coordinator (WSC).

The work will be constructed within the road reserve of Lansdowne and Samuel Marsden roads with the exception of the underbore connection to the existing Sydney Water sewer submain which is subject to a separate Consistency Assessment (SSTOM CA001).

The proposal includes the following scope:

- Traffic control and barriers as per the Orchard Hills Construction Traffic Management Plan (CTMP) and detailed traffic guidance schemes (TGS) for each work period
- Removal of six trees (*Eucalyptus crebra* (Narrow Leaved Iron Bark), 2 x *Eucalyptus paniculata* (Grey Ironbark), *Casuarina cunninghamiana* (River She-Oak) and 2 x *Acacia spp* (Wattle)) as shown in Figure A2.

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- Excavation (open trench) to required depth and placement of bedding material.
- Excavation and installation of pre-cast maintenance holes
- Pipes will be lifted or placed (with excavator or similar)
- Pipe joining and fixtures to be installed
- Backfill and compaction
- Length of open trench to be minimised and backfilled on completion of section
- Testing and commissioning and final cutover in conjunction with Sydney Water

Figure A2 shows sewer main route and the vegetation impact areas.

A drawing of the proposed sewer main route is shown in Figure A3 in Appendix A. Detailed site survey of the approved sewer main route has identified six trees where excavation is required in the critical root zone (CRZ) and the trees will need to be removed.

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. This consistency assessment addresses this process in Section 7 below.

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)

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.

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This Consistency Assessment, once approved, would supersede Environmental Review (SSTOM ER003).

Need for the proposed change and environmental benefit

The sewer main is required to provide a permanent wastewater connection for the Orchard Hills Station and precinct as well as to provide capacity for pumped discharge from the Stabling and Maintenance Facility. The design has been developed to meet Sydney Water Notice of Requirements (NOR), which have been issued to Parklife Metro via the approved Water Service Coordinator (WSC). This utility work addresses an essential Project need and fulfils Sydney Water asset requirements.

3. Community and Stakeholder engagement

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. This would include notification of trenching within the road reserve that may temporarily impact access to residential properties.

4. Existing environment and background

The work will be constructed within the road reserve of Lansdowne and Samuel Marsden roads. Samuel Marsden and Landsdowne Roads are narrow rural local roads managed by Penrith City Council. The roads are sealed with no kerb or gutter. Large lot rural residential properties are located either side of the roads. The unsealed road verges are generally mown and grassed with the exception of the corner of Samuel Marsden and Lansdowne Roads where there is some native vegetation remaining within the road reserve.

5. Environmental Benefits

The sewermain provides the permanent wastewater connection for the both the Orchard Hills Station and precinct as well as the Stabling and Maintenance Facility. The sewermain is an essential component of the Project. The final design of the sewermain along Samuel Marsden Road has minimised environmental impacts while satisfying Sydney Water design and maintenance requirements.

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

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7. Conditions of approval / Environmental mitigation measures

Number	Condition of Approval/ Environmental mitigation measure	Discussion on relevance and consistency for proposed change
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 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) 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 six trees to be removed 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 report was carried out by the project ecologist to assess the site and biodiversity credit implications. The inspection report is included in Appendix B. Project performance outcomes (PO) will continue to be met (see discussion on relevant PO's below)

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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.	A detailed review of the sewer main alignment was undertaken to optimise the location of works in relation to the critical root zones of all trees. To satisfy Sydney Water design requirements for access and maintenance the sewer main alignment can not be moved further into the centre of Landsdowne or Samuel Marsden Roads. Alternate options for aligning the sewer main were reviewed however this conflicts with the existing watermain. Underboring has been considered however the size of the launch and receiving pits is not compatible with maintaining road access and there are also conflicts with the existing watermain infrastructure.

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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.	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) as threatened ecological communities under the Biodiversity Conservation Act 2016 (BC Act). Both Shale Gravel Transition Forest in the Sydney Basin Bioregion and River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions have been mapped along western road verge adjacent to the proposed sewer main alignment. Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion has also been mapped on the eastern road verge. Vegetation types along Lansdowne and Samuel Marsden roads are shown in Figure A4. The CPCP nominates 'Avoided land' which represent areas of high biodiversity value to be protected as part of future development. Lots 961 DP712220 and 962 DP712220, containing Shale Gravel Transition Forest in the Sydney Basin Bioregion, are mapped as Avoided land as shown in Figure A4. 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 construction footprint for Sydney Metro WSA project is mapped as 'Excluded Land', being assessed separately within the SM-WSA EIS and Submissions Report. A site survey was completed by the Project ecologist to investigate the biodiversity values of the trees to be removed within the road reserve. The area was confirmed as plant community type (PCT) 724 (Broad-leaved Ironbark – Grey Box – Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion) which accords with mapping of the location. Biodiversity offset credit calculations were conducted in accordance with the Biodiversity Assessment Methodology (BAM) for the six trees to be removed. The biodiversity offset calculation for the six trees is 1.2 credits, comprising 0.7 credits for four trees within PCT 724 'Thinned' and 0.5 credits for two trees within PCT 724 'Intact'. Canopy cover was generously estimated in deriving this figure, and it is considered representative or the impact area. Reductions in biodiversity impacts have been made by Sydney Metro and prior project contractors for the SM-WSA project during detailed design and construction planning. This has reduced the offset credit requirements and as such the additional of 1.2 ecosystem credits would not exceed the offset requirements identified in CoA E4. The remainder of the trenched sewer main will within the cleared road the cleared road reserve area which is dominated by mown grass and forbs which are predominately exotic and typical of disturbed road reserves. The proposed works may increase noise, dust, erosion and sedimentation, and cause the introduction of weeds. This is consistent with the indirect impacts described in the EIS and can be managed with existing measures. Trees in the road verge to be retained will be clearly marked to prevent inadvertent damage to sensitive vegetation. These will be indicated on the ECM and communicated to the workforce during site inductions and toolbox talks. There is no change to the Approved Project.

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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.
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 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.	Information reviewed from the Sydney Metro – Western Sydney Airport Revised Aboriginal Cultural Heritage Assessment Report (M2A, April 2021) identified four sites in the area south of and adjacent to the M4 Motorway. All sites are listed as destroyed. • 45-5-3565- Artefact [Destroyed] • 45-5-1071 Artefact [Destroyed] South Creek 2. • 45-5-4431 – Artefact [Destroyed] • 45-5-4430 - Artefact [Destroyed] Two Aboriginal heritage impact permits (AHIP) have been identified in the vicinity of the work area. AHIP No. C0000637 – issued for the Werrington Arterial Road Project, which included upgrades to Kent Road and Gipps Street and the M4 Motorway at Claremont Meadows. AHIP NO. C0002113 – Issued for management of the M4 Motorway between Lapstone and Parramatta. As the sewer main route falls outside the area investigated during the SM-WSA EIS and Submissions Report investigations an additional Aboriginal heritage due diligence investigation was completed along the sewer main route. 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). The assessment included background research into the landscape, environmental and archaeological context of the study area and included a site inspection on foot along the entire proposed route. The assessment identified that the sewer main works, based on local predictive models, are located in an area of potential archaeological sensitivity due to proximity to, and location between, two second order creeks and evidence of a water hole in Lot 19 DP 238495, observed on 1965 aerial photography. However, the whole of the road reserve of both Lansdowne and Samuel Marsden roads was observed to be highly disturbed by drainage, services and road construction The assessment 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. No further archaeological investigation in respect of Aboriginal archaeology is therefore proposed. The Aboriginal Due Diligence Assessment report (Unearthed Archaeology 2024) and Aboriginal Heritage Information Management System (AHIMS) search is included in Appendix C. The Unexpected Heritage Finds Procedure would be implemented during work.

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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.
CoA E36	The Unexpected Heritage Finds and Human Remains Procedure, as submitted to the Planning Secretary, must be implemented for the duration of construction.	The proposed works will be subject to the Sydney Metro Unexpected Heritage Finds and Human Remains Procedure.
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.	The Contamination and Asbestos Unexpected Find Procedure has been prepared as part of the approved Soil and Water Management Sub-plan SMWSASSMPLD-1NL-PC-PLN-0000. The Procedure will be implemented throughout construction.

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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.	A Heavy Vehicle Local Road Report for Use of Local Roads (HVLR) – Orchard Hills was approved by the Planning Secretary on the 09/01/2025 and will be implemented in conjunction with the approved CTMP – Orchard Hills Station (SMWSASSM-PLD-OHE-TF-PLN-000001 Rev 3). Any change to heavy vehicle movements would be assessed and the HVLR would be updated as required.
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. Parklife Metro's 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.
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.	A work-specific Erosion and Sediment Control Plans (ESCPs) will be developed for the work in accordance with the approved Soil and Water Management Sub plan - SMWSASSM-PLD-1NL-PC-PLN-000020. All ESCPs are prepared and implemented in a manner consistent with currently accepted Best Management Practice (i.e. Managing Urban Stormwater: Soils and Construction 4th Edition Landcom, 2004 (Blue Book))
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)	While six trees require removal this has been minimised as far as possible through design review and optimisation. The proposed change is consistent with this Performance Outcome.
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 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 will impact on any Aboriginal objects or sites. The proposed change is consistent with this Performance Outcome

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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 proposal requires the removal of six trees along the sewer main alignment. The trees are identified as • *Eucalyptus crebra* (Narrow Leaved Iron Bark) • 2 x *Eucalyptus paniculata* (Grey Ironbark) • *Casuarina cunninghamiana* (River She-Oak) • 2 x *Acacia spp* (Wattle) The vegetation is described as consistent with Plant Community Type (PCT) 724 'Thinned' Broad-leaved Ironbark – Grey Box – Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion. The patch of PCT 724 is calculated to generate an additional 1.2 ecosystem credits under the BAM. The biodiversity assessment and credit calculations are included in Appendix B. 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 1.2 ecosystem credits are able to be managed within the existing credit allocation and would not exceed the offset requirements identified in CoA E4.	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
	The Department of Planning, Housing and Infrastructure (DPHI) would be notified as necessary of the proposed change in vegetation clearing areas. 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. Overall, there is no change to the Approved Project.					
Water	The proposed works are approximately 250m west of South Creek at the closest point. 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.	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
	As the works are predominately in the road reserve the likelihood of encountering contaminated materials is considered low. The Contamination and Asbestos Unexpected Finds Procedure will be implemented during the construction works as outlined in the approved Soil and Water Management Sub-plan - SMWSASSM-PLD-1NL-PC-PLN 000020.					
Air quality	Possible localised temporary air quality impacts include dust and particulates generated from plant and equipment as well as excavation activities. Sensitive receivers along the northern end of Samuel Marsden are outside of the air quality study area as assessed in the WSA-EIS and localised air quality impacts were not anticipated at these residences. However, with the implementation of mitigation measures included in the Air Quality Management Sub-Plan SMWSASSM-PLD-1NL-PC-PLN-000028 impacts would be managed and consistent with the assessment in the Approved project.	No additional measures required	Y	N	Y	N/A
Noise and vibration	There are approximately 20 residential properties located along Lansdowne and Samuel Marsden Roads, with the majority of these properties being within 20 to 30m of the road. The proposed works are anticipated to take place during standard construction hours. A Detailed Noise and Vibration Impact Statement (DNVIS) was prepared to address all utility construction works associated with the Orchard Hills Station site.	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
	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					
Aboriginal Culture and Heritage	An Aboriginal Heritage Due Diligence Assessment and addendum assessment and AHIMS search is included in Appendix C. 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 three Aboriginal heritage sites identified in the AHIMS search are all located to the east of South Creek and would not be impacted by the work. 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	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
	workforce to communicate the requirements of the Unexpected Finds Procedure.					
Community and socio-economic	Four baseball diamonds are located within Samuel Marsden Reserve and used by local baseball clubs. Access to the reserve would not be impacted by the work. No additional impacts or changes.	No additional measures required	Y	N	Y	N/A
Traffic and transport	Works will be 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. Local residents would be consulted regarding the upcoming works in accordance with the approved Community Communications Strategy – Delivery SMWSASSM PLD-1NL-PC-PLN-000065. Further community notification and mitigation measures would also be completed if OOHW are required. A Traffic Management Plan has been prepared to include the work along Samuel Marsden Road as required by Condition E105. Consultation with affected residents will be undertaken prior to works commencing.	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
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 for the installation of the sewer pipe and maintenance pits will be visible on Samuel Marsden Road. As the sewer pipe is installed progressively impact is any one location is only anticipated for approximately 7-10 days. On completion of the work all permanent works will be underground. Maintenance hole lids will be visible at grade. No permanent adverse 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. 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.	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
	Access to private properties would be maintained.					
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 operation (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	Maintenance hole lids will be visible at grade within the existing roadway or road reserve, however this is not considered an adverse visual impact. 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	No additional measures required.	Y	N	Y	N/A

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Aspect	Nature and extent of impacts (negative and positive) during operation (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
	stage sewer main will be managed in accordance with Sydney Water standard procedures					
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 six trees will require the retirement 1.2 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 six trees would be required to be removed to complete this work the impact of this clearing has been assessed and the required retirement of 1.2 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	n/a

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:	27/10/2026

Assessment Supporting Signature

Application supported and submitted by			
Name:	[redacted]	Date:	2/11/2026
Title:	Senior Manager Planning Approvals	Comments:	1. Biodiversity offsets and notification to DPHI must be in place before clearing can proceed. 2. SSTOM ER003 Environmental Review - Orchard Hills Station Sewer Main Lansdowne and Samuel Marsden Roads (dated 29 April 2024) is superseded upon endorsement of this Consistency Assessment
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:	3/11/2026
Title:	Director ESP Partnering – Projects & Operations	Comments:	1. Biodiversity offsets and notification to DPHI must be in place before clearing can proceed. 2. SSTOM ER003 Environmental Review - Orchard Hills Station Sewer Main Lansdowne and Samuel Marsden Roads (dated 29 April 2024) is superseded upon endorsement of this Consistency Assessment
Signature:	[redacted]		

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Appendix A – Figures

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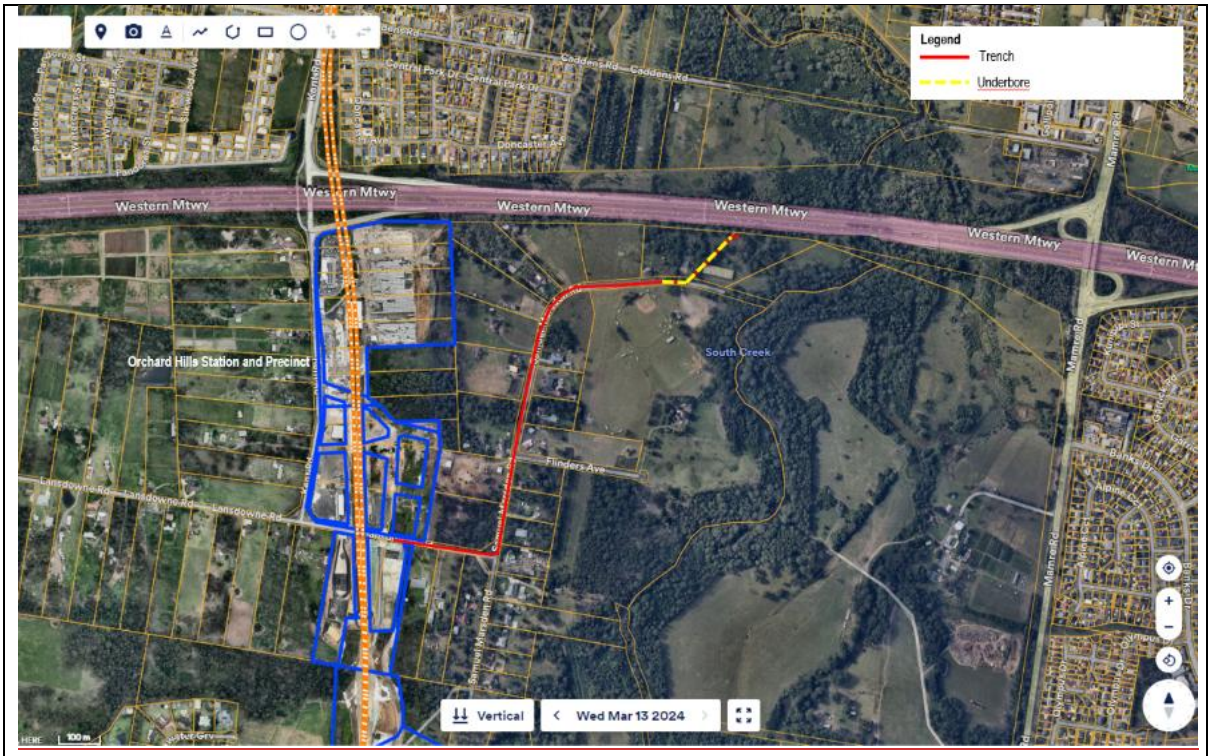

Figure A1 Location of works area and construction method (Red trenched sewer main subject of this assessment. Yellow dashed line underbore alignment subject of separate assessment (CA001 Samuel Marsden Sewer main – revised underbore alignment and tree removal)



Figure A2 Trees to be removed.

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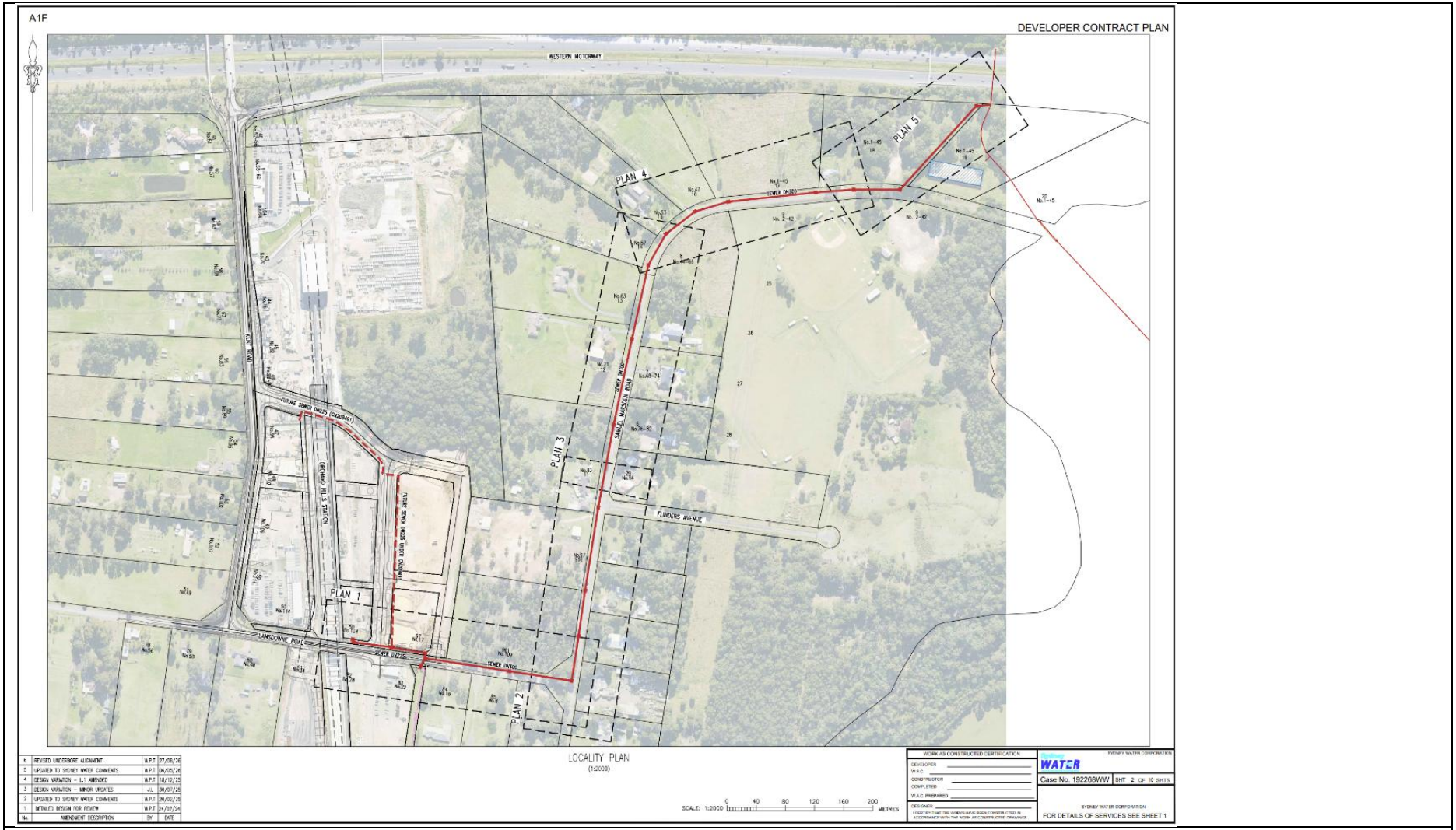

Figure A3 Sewer main alignment - Design Overview

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Figure A4 Samuel Marsden Road – Mapped vegetation types

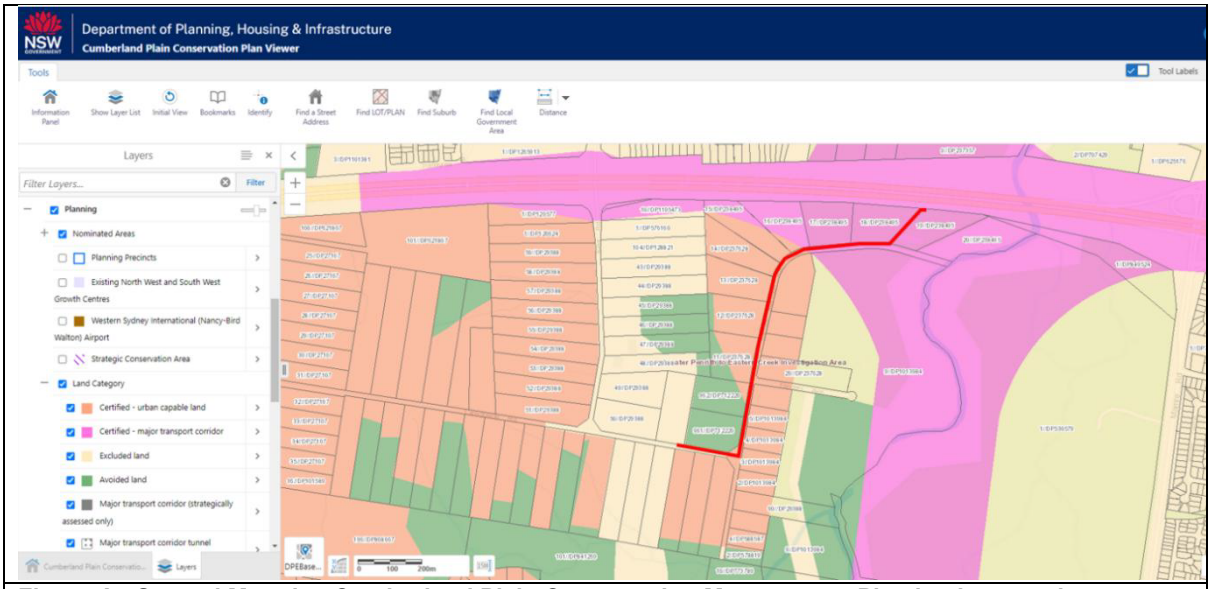

Figure A5 Samuel Marsden Cumberland Plain Conservation Management Plan land categories

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Tree 57 *Eucalyptus crebra* (Narrow Leaved Iron Bark)


Tree 58 *Eucalyptus paniculata (Grey Ironbark*)



Tree 68 *Eucalyptus paniculata* (Grey Ironbark)



Tree 35 *Casuarina cunninghamiana* (River She-Oak)



Tree 36 & 37 *Acacia spp* (Wattle)

Figure A6 Trees to be removed

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Appendix B – Biodiversity & Pre-clearing Report

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PRE-CLEARING TREE INSPECTION REPORT – ORCHARD HILLS SEWER MAIN TREE REMOVAL

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

OCTOBER 2026

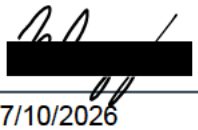
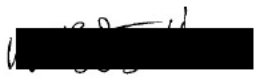
Document Details

Property	Details
Report Name	PRE-CLEARING TREE INSPECTION REPORT – ORCHARD HILLS SEWER MAIN TREE REMOVAL
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	03/10/2026	Final Report
2	22/10/2026	Final Report – updated following site inspection (20/10/2026)
3	27/10/2026	Final Report – updated to address client comments

Authorisation

Author name	[redacted]	Reviewer / approver name	[redacted]
Author position	Ecologist	Review position	Principal Ecologist
Author signature		Reviewer/approver signature	
Date	27/10/2026	Date	22/10/2026

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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

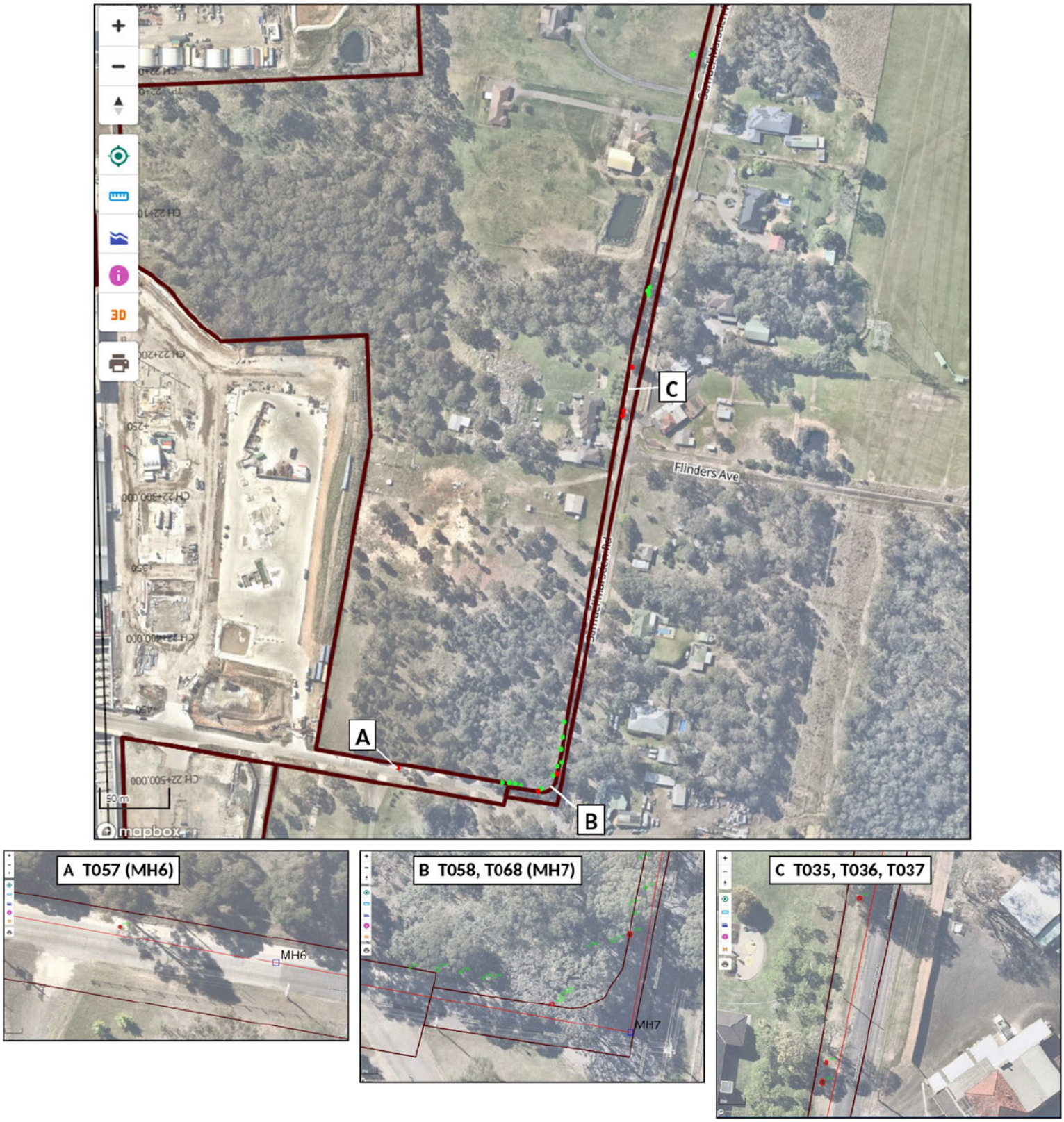
The purpose of this report is to provide information on six trees which have been earmarked for removal to facilitate the installation of a gravity sewer main servicing Orchard Hills Station. The works comprise the installation of approximately 1,500 metres (m) of a 375 millimetre (mm) diameter gravity sewer main between Orchard Hills Station and the existing Sydney Water DN1350 South Creek submain. The gravity main, once constructed, will be operated and maintained as part of the Sydney Water wastewater system. The six trees were assessed by the project arborist as unviable to retain due to sewer main trench impacts on their structural roots. 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.

1.3 Site and Tree Inspection

WolfPeak ecologist [redacted] undertook an onsite pre-clearing inspection of the trees marked for removal on 20 October 2026. The inspection was informed by the tree survey pickup and tree retention assessment prepared by the project arborist, and PCT condition information supplied by the client. The six trees marked for removal are located along the sewer main alignment within the road reserves of Samuel Marsden Road and Lansdowne Road, Orchard Hills (arborist tree IDs T035, T036, T037, T057, T058 and T068; see Figure 1).

The study area is within the footprint required for the construction of the sewer main which connects to the SSTOM Orchard Hills Station site.

The site inspection consisted of walking transects around the trees marked for removal, recording vegetation and fauna habitat types, and searches for threatened plants and threatened fauna. Details of each tree within the study area were recorded and each tree was inspected for hollows.



Data Sources: Project arborist tree survey pickup and tree retention assessment (supplied by client, September 2026). Imagery © Mapbox.
Panels A–C show detail of trees marked for removal along the sewer main alignment (Lansdowne Road and Samuel Marsden Road, Orchard Hills).

Legend

- Tree to be removed (assessed as unviable to retain)
- Tree to be retained (assessed as viable to retain)

Figure 1 | Trees marked for removal

2. RESULTS

2.1 Existing Mapping and Data

Existing information on the study area is as follows:

The study area is mapped as PCT 724: Broad-leaved Ironbark – Grey Box – *Melaleuca decora* grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion (WSP, 2021). Of the six trees marked for removal, four occur within PCT 724 in 'Thinned' condition and two occur within PCT 724 in 'Intact' condition, as mapped by Biosis (2018).

2.2 Vegetation Communities on site

The study area was inspected and found to comprise the following:

The six trees occur within road reserve vegetation along the sewer main alignment. Trees T035, T036 and T037 are located along the western verge of Samuel Marsden Road, a mown grassy verge adjoining rural-residential lots with scattered remnant and planted trees. Trees T057, T058 and T068 are located near the intersection of Samuel Marsden Road and Lansdowne Road, at the margin of a more continuous patch of remnant eucalypt woodland on the northern side of Lansdowne Road.

The understorey along the road verges is dominated by mown grasses and forbs, which are predominantly exotic, typical of disturbed road reserves. Within the woodland margin at the Lansdowne Road intersection, the understorey comprised mown grassland with principally introduced pastoral forbs and grasses.

2.3 Tree Details

Details of the six trees marked for removal are provided in Table 1. Species, diameter at breast height (DBH, measured at 1.4 m) and height are taken from the project arborist's tree assessment schedule (Arboricultural Impact Assessment, Landsdowne Road and Samuel Marsden Road, Orchard Hills), with tree condition summarised from the same source. No hollows were recorded in any of the six trees during the ecological site inspection.

Table 1: Trees marked for removal

Tree ID	Species	DBH (cm)	Height (m)	Comments
T035	*Casuarina cunninghamiana* (River She-Oak)	58	15	Mature. Condition Fair, vigour Good. Fork at 1.2 m, union appears sound; suckers at base. No hollows.

Tree ID	Species	DBH (cm)	Height (m)	Comments
T036	*Acacia* sp. (Wattle)	41.5	6	Over-mature. Condition Poor, vigour Poor. Deadwood and dead branch stubs, sparse foliage; active termites at base. No hollows.
T037	*Acacia* sp. (Wattle)	38	7	Over-mature. Condition Poor, vigour Poor. Wound at base with decay; moderate to severe lean (30–45°); deadwood; exposed roots. No hollows.
T057	*Eucalyptus crebra* (Narrow-leaved Ironbark)	41	15	Mature. Condition Poor, vigour Fair. Fork at 6 m with bifurcated union and internal crack; high probability of failure. No hollows.
T058	*Eucalyptus paniculata* (Grey Ironbark)	73	18	Mature. Condition Fair, vigour Good. Multi-trunked, fork at base; union appears sound. No hollows.
T068	*Eucalyptus paniculata* (Grey Ironbark)	65	18	Mature. Condition Fair, vigour Good. Crown bias to east; fork at 3 m, union appears sound. No hollows.

2.4 Fauna Habitats

The study area has habitat values for fauna. The six trees and adjoining woodland may provide foraging habitat for common species such as nectar and foliage resources, and contribute to habitat connectivity with the remnant woodland at the Samuel Marsden Road and Lansdowne Road intersection.

No hollows were found upon inspection of the trees.

2.5 Threatened Species and Ecological Communities

PCT 724 is Listed as ‘Endangered’ under BC Act wholly as a subset of ‘Shale Gravel Transition Forest in the Sydney Basin Bioregion’. It is also listed as ‘Critically Endangered’ under the EPBC Act as ‘Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest’. Two of the six trees occur within PCT 724 in ‘Intact’ condition. Biodiversity credit offsets are required for removal of these trees and credit calculations are shown in Table 2.

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

2.6 Credit Calculations

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 calculation presented in Table 2 reflect the approved modifications of the E4 Condition report of the CSSI Approval (2022) and incorporate all relevant supporting documentation (WSP, 2021).

The table of credit calculations used to generate the offset calculations cited (WSP, 2021) is provided in Appendix 1.

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

WolfPeak have determined that the biodiversity offset calculation for the Study Area is 1.2 credits, comprising 0.7 credits for four trees within PCT 724 ‘Thinned’ and 0.5 credits for two trees within PCT 724 ‘Intact’ (Table 2).

Table 2: Breakdown of total credits into associated PCTs and Species

PCT/Species	Offset Credit
PCT 724 'Thinned' (4 trees)	0.7
PCT 724 'Intact' (2 trees)	0.5
Total	**1.2**

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 Tables 3 in Appendix 2.

3. CONCLUSION AND RECOMMENDATIONS

The assessment of this report has determined the environmental impact of removal of six trees for the installation of the Orchard Hills Station gravity sewer main along Samuel Marsden Road and Lansdowne Road. The Biodiversity Offset credits required for PCT vegetation marked to be removed (1.2 credits) are provided in Table 2.

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

- Vegetation removal is to be supervised by an ecologist as per standard procedures.
- Weed management as required.
- A post-clearance inspection of the felled trees 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 nestboxes 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]

Ecologist

[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

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)

Biosis (2018): 'Greater Penrith to Eastern Creek Urban Release Investigation Area' provided as electronic data from SSTOM via Civillo mapping system

Appendix 1. Offset obligations for airport

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 2. - Pre-clearing Inpection Checklists

Table 3: 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
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

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 C – Aboriginal Heritage Assessment and AHIMS search results

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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.:	

Unearthed
Archaeology & Heritage

Version:	Project Number: UA/1108.PL	
A.2024	Author(s):	[redacted]
	Date:	6th March 2024
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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.

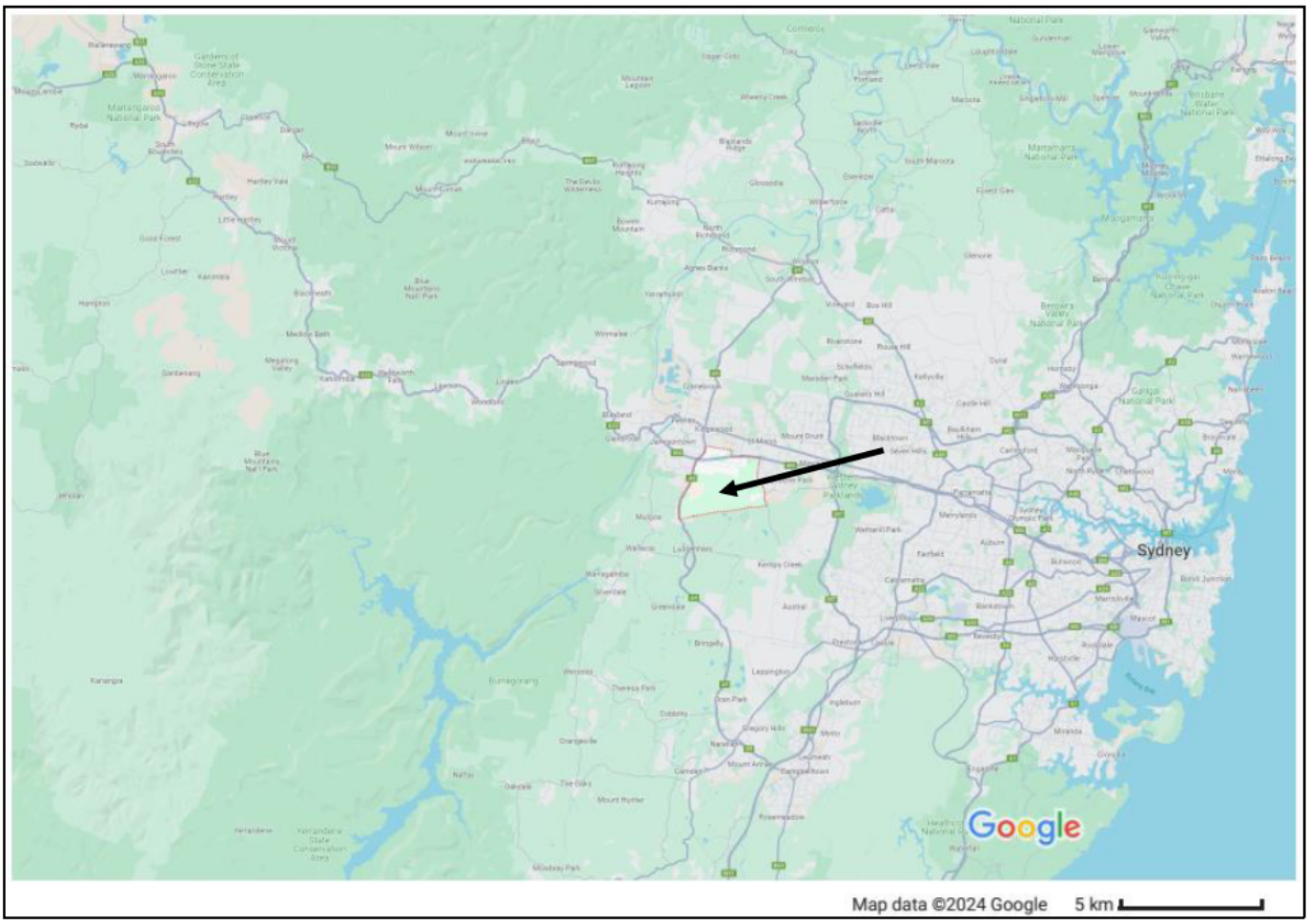

Figure 1: Showing the location of Orchard Hills outlined in red and indicated by the black arrow (map courtesy of Google Maps).

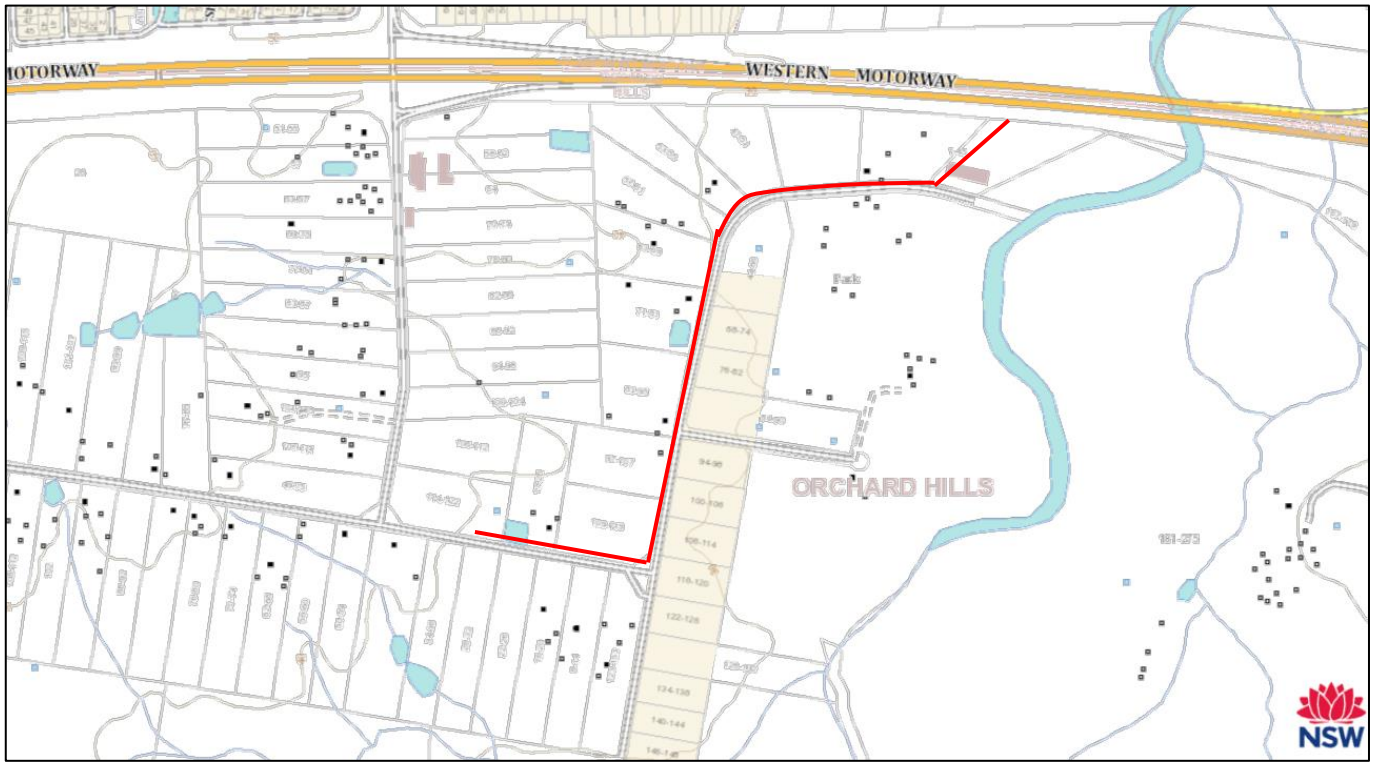

Figure 2: Showing the approximate proposed route of the sewer main indicated by the red line on the NSW Map (map courtesy of Six Maps).



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.

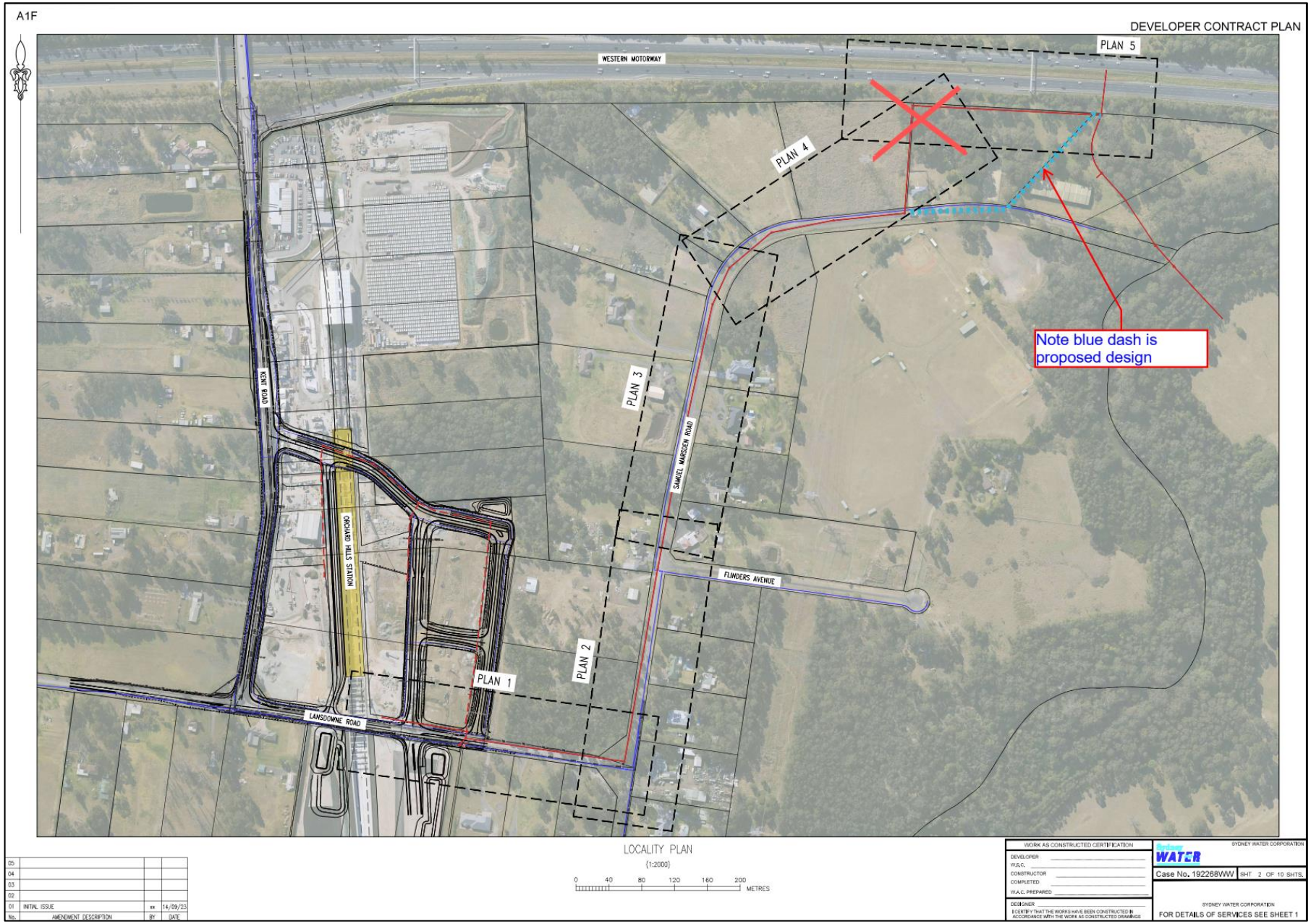

Figure 4: Showing the proposed route of the gravity sewer main indicated by the solid red line and the dashed blue line.

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.

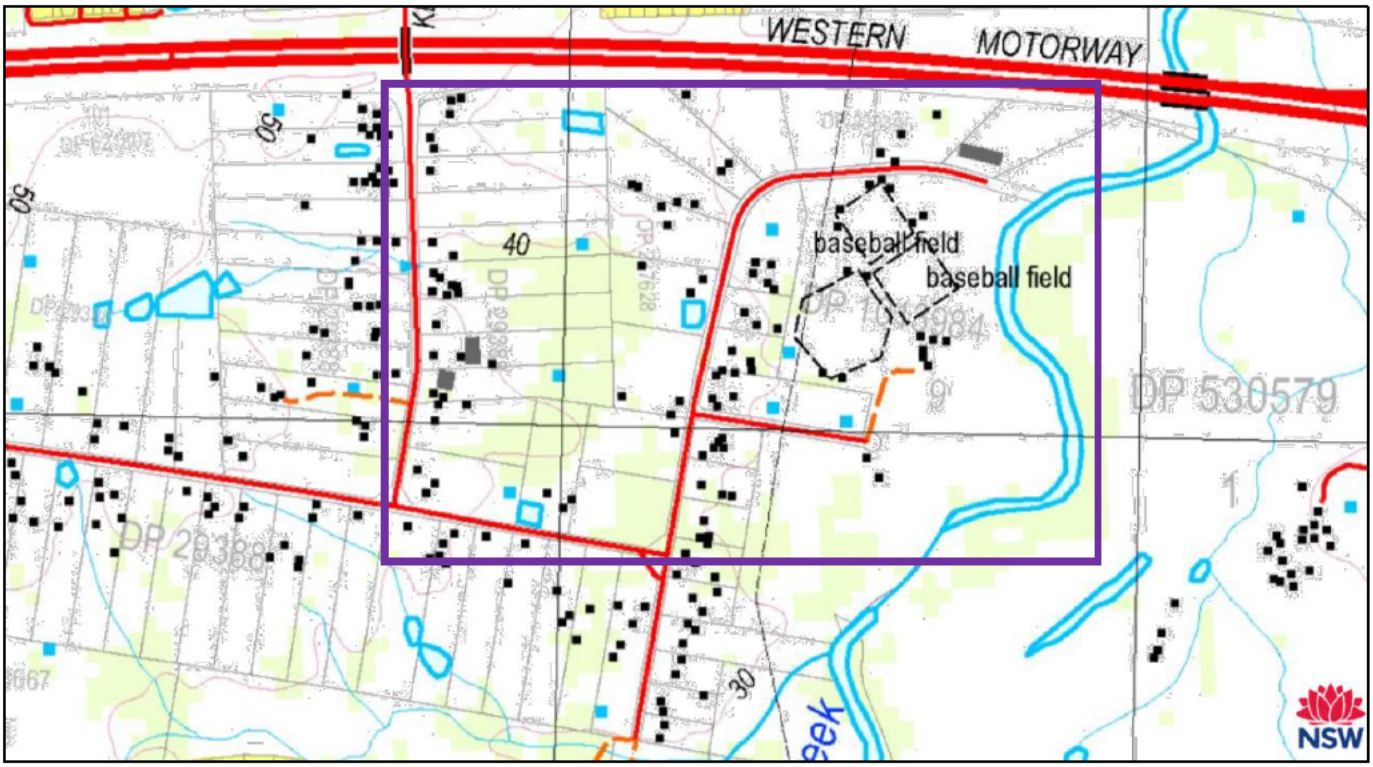

Figure 5: Showing the approximate location of the study area on the topographic map indicated by the purple rectangle (map courtesy of Six Maps).

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.

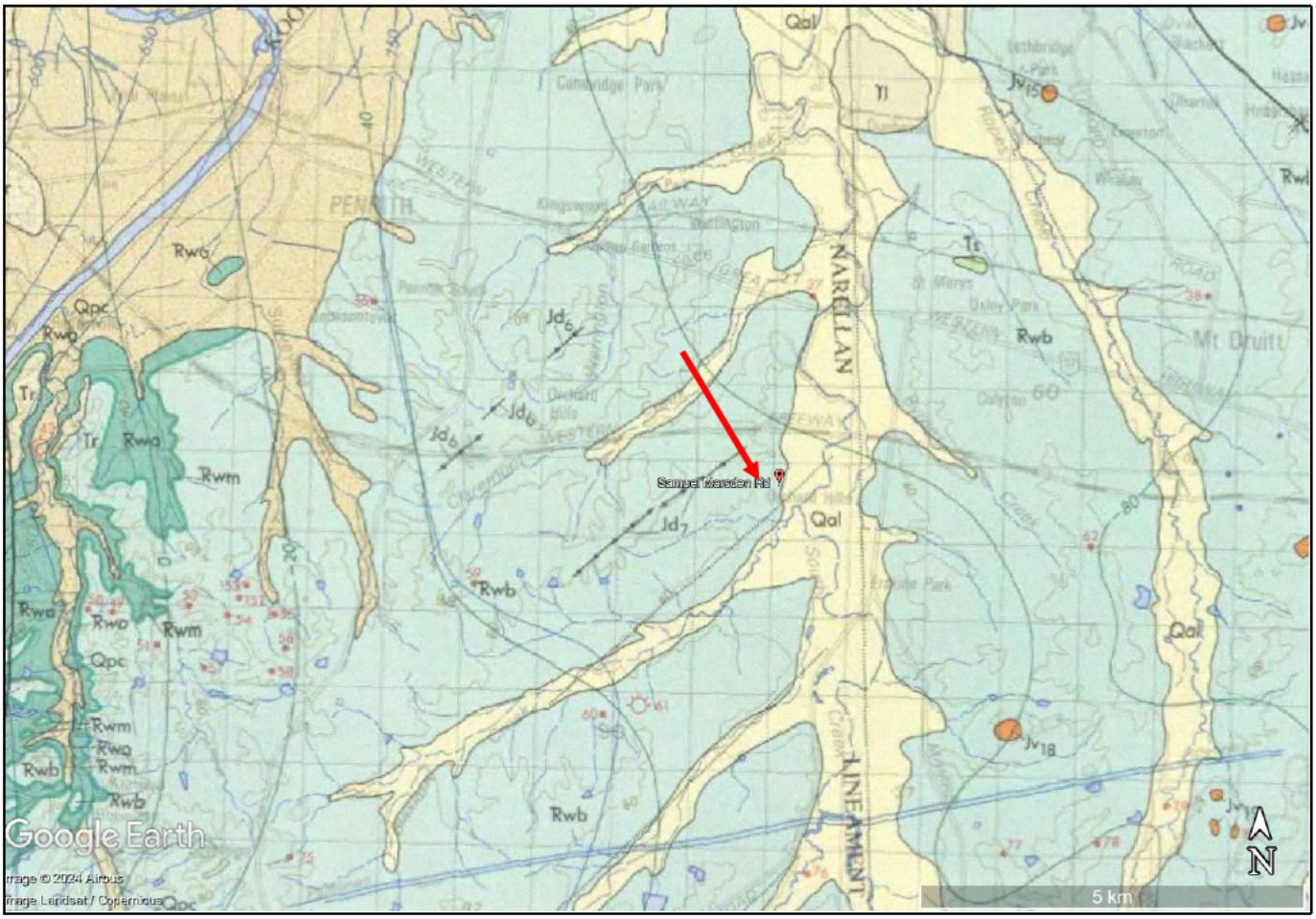

Figure 6: Showing the location of the study area indicated by the red arrow on the Penrith 1:100,000 Geological Map (map courtesy of Google Earth Pro).

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.

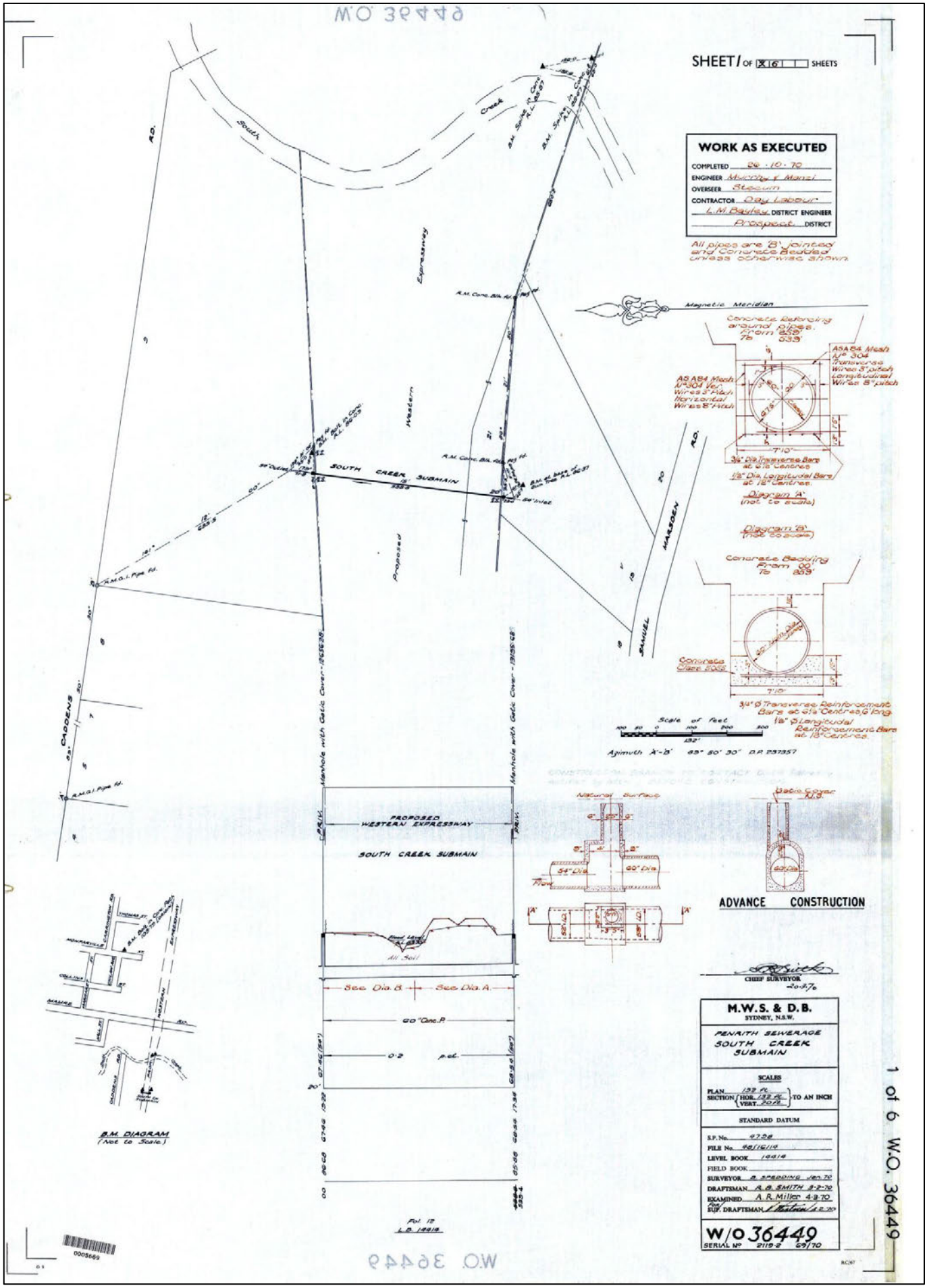

Figure 7: Sydney Water plan dated 1970 showing Lot 19 DP238495outlined in red and showing the extensive infrastructure through Lot 19 DP238495 (plan courtesy of Sydney Water).

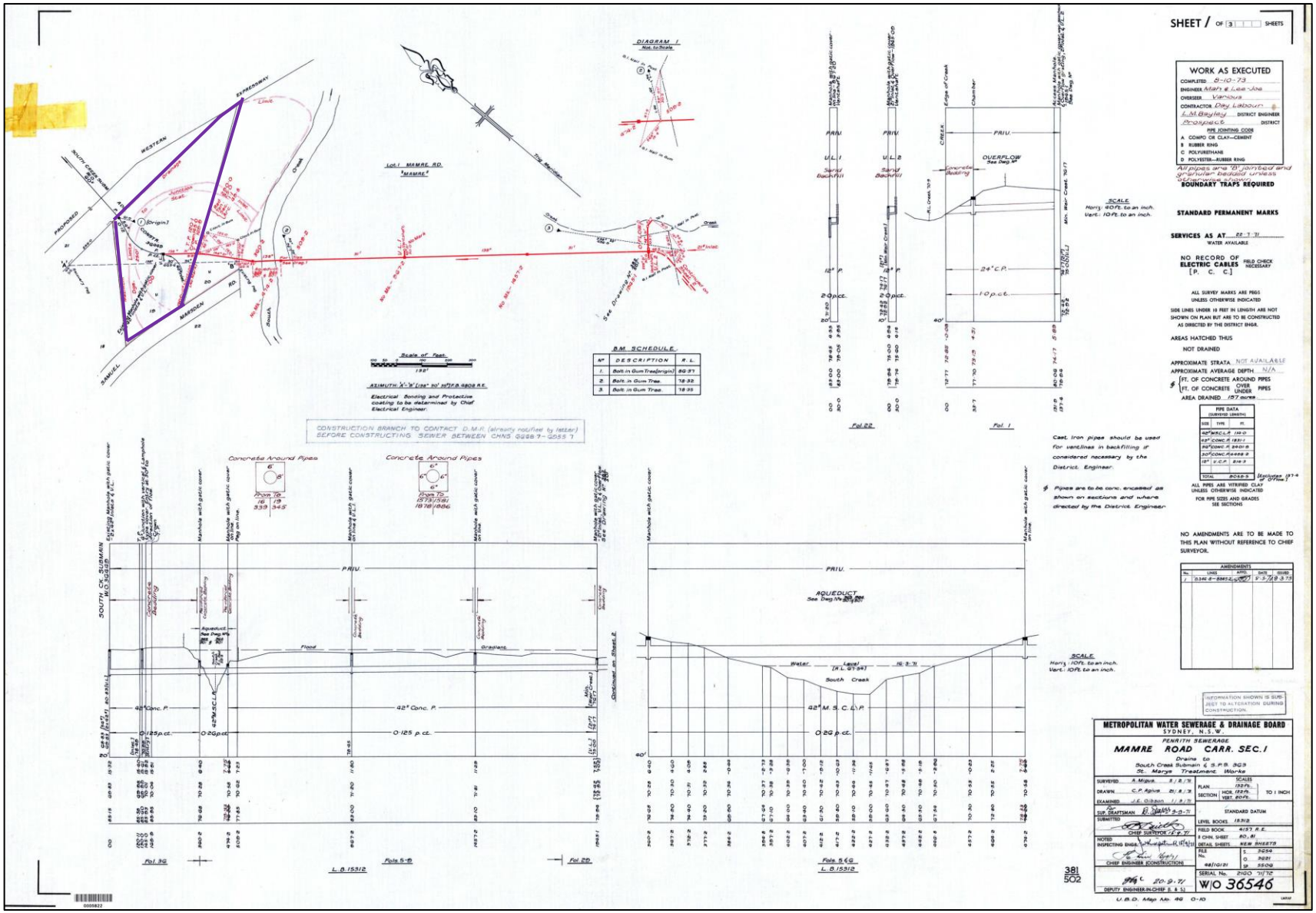

Figure 8: Sydney Water plans from 1971 showing Lot 19 DP238495n outlined in purple and showing the extensive Sydney Water infrastructure through this area (plans courtesy of Sydney Water). A close up of the plan is provided in Figure 9 below.

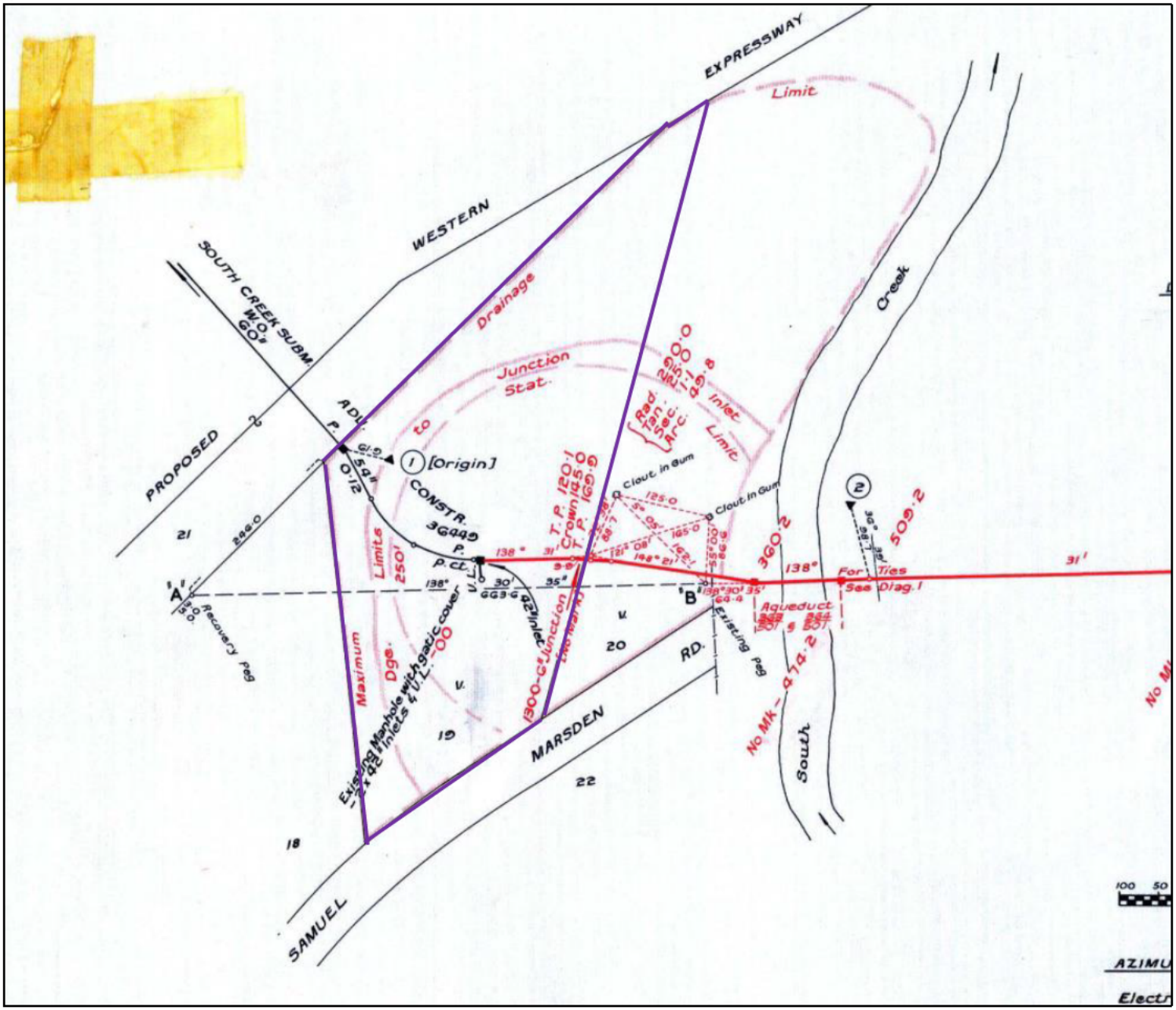

Figure 9: Showing a close up of the Sydney Water plan from 1971 shown in Figure 8 above. Lot 19 DP238495 is outlined in purple (plan courtesy of Sydney Water).

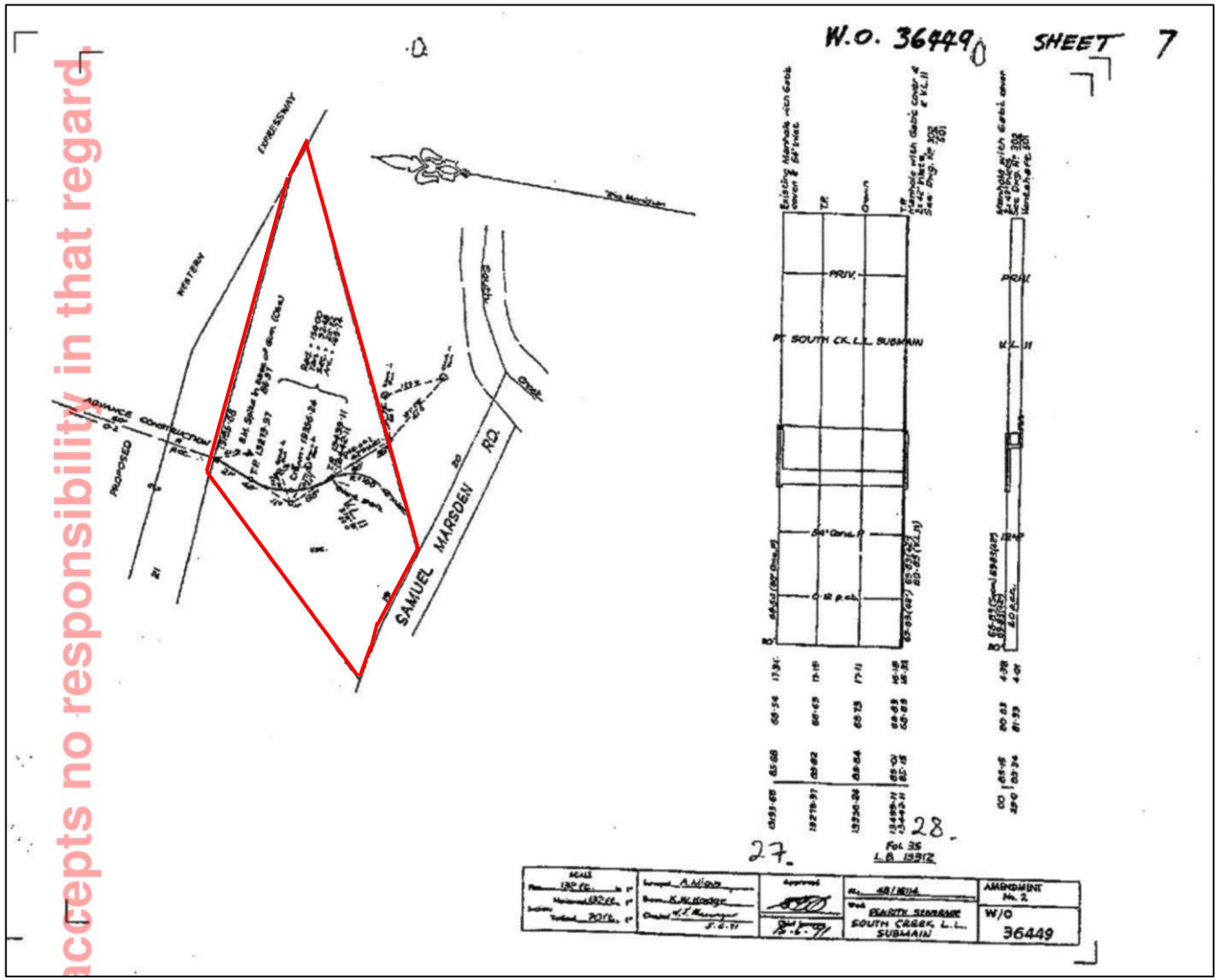

Figure 10: Showing the Sydney Water plans from 1991. Lot 19 DP238495 is outlined in red and the Sydney Water Infrastructure through the Lot 19 DP238495 is extensive (plans courtesy of Sydney Water).

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.

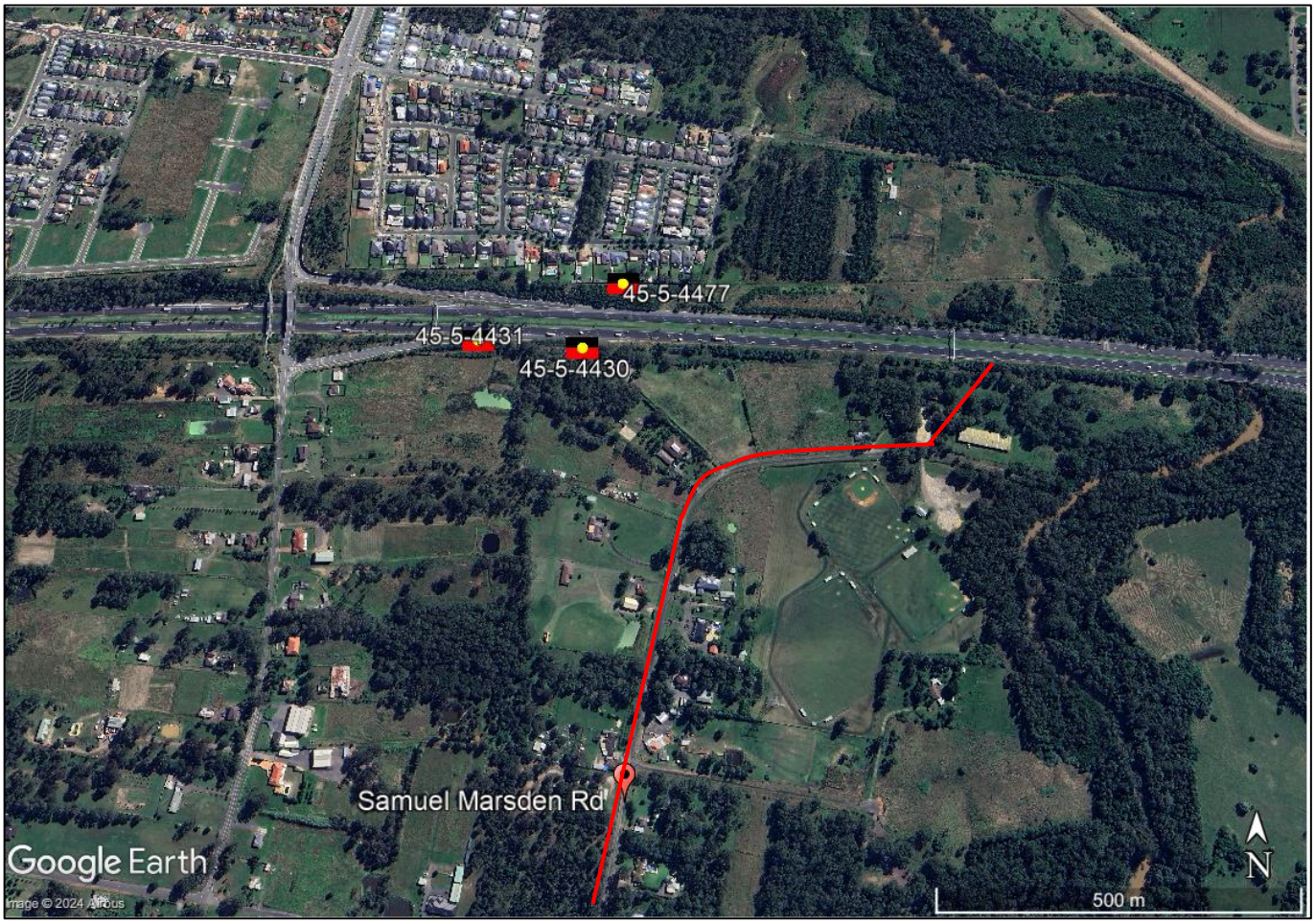

Figure 11: Showing the location of registered AHIMS sites, indicated by the Aboriginal flags, in the vicinity of the study area, indicated by the red line (map courtesy of Google Earth Pro).

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 [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

Report generated by AHIMS Web Service on 05/03/2024 for Tory Stening for the following area at Lat, Long From : -33.7913, 150.7476 - Lat, Long To : -33.7824, 150.7631. Number of Aboriginal sites and Aboriginal objects found is 3

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Page 1 of 1

AHIMS Web Services (AWS)

Search Result

Your Ref/PO Number : SM&L
Client Service ID : 1201293

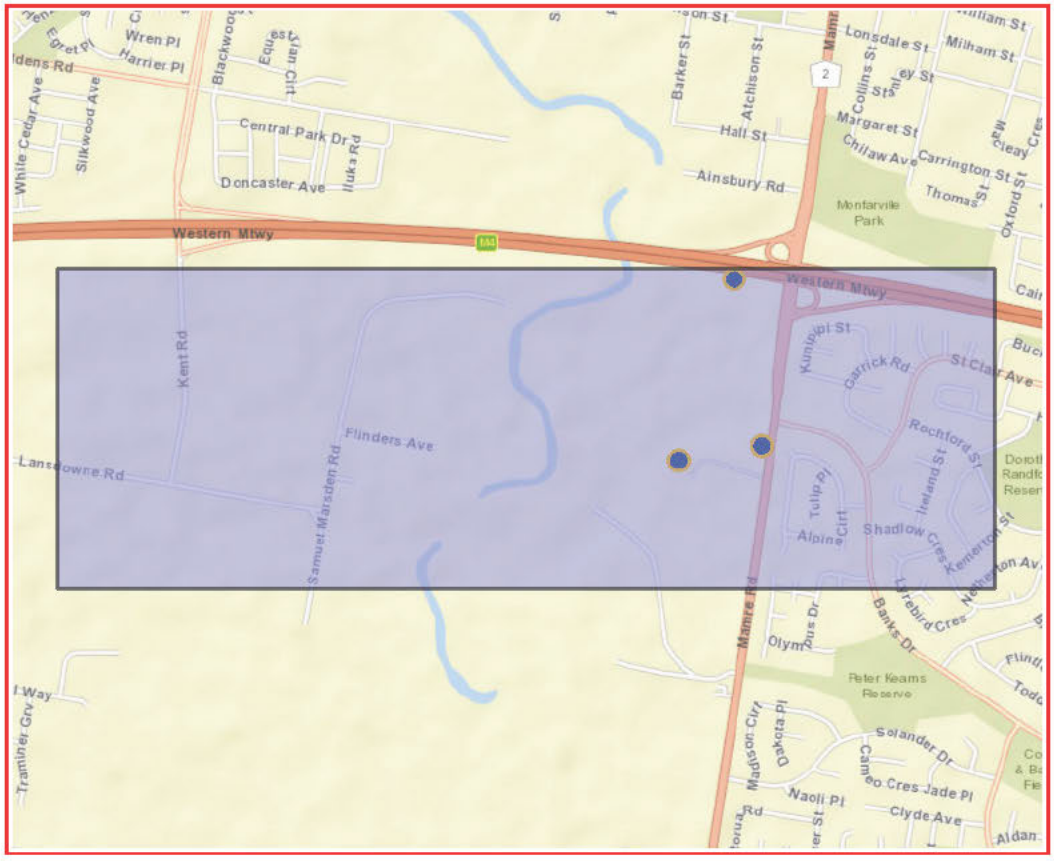
Date: 21 October 2026

Bradford Environmental Consulting
20 Hampstead Road
Dulwich Hill New South Wales 2203
Attention: Jenny Bradford
Email: jenny.bradford.enviro@gmail.com

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -33.7929, 150.7465 - Lat, Long To : -33.784, 150.7777, conducted by [redacted] n 21 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:

3	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.