Quakers Hill Water Resource Recovery Facility

Advanced Water Treatment Upgrade

Statement of heritage impact

Prepared for Sydney Water

May 2025

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Statement of heritage impact

Sydney Water

E240560 RP1

May 2025

Version	Date	Prepared by	Reviewed by	Comments
1	4 April 2025	Courtney Culley	Susan Lampard	Draft for Sydney Water review
2	6 May 2025	Susan Lampard	Joel Mason	2nd draft addressing Sydney Water comments
3	12 May 2025	Susan Lampard	Joel Mason	Final draft
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Approved by

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On behalf of
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Executive Summary

Upgrades to Sydney Water's Quakers Hill Water Resource Recovery Facility (WRRF) are required by 2028 to:

- service industry growth and housing policies as current treatment capacity at the plant of 38 ML/day is expected to be exceeded in late 2028
- meet Environment Protection Licence limits that require reduced nutrient loads to the Hawkesbury-Nepean River (Sackville 2 zone)
- provide high quality water treatment that enables a future Purified Recycled Water (PRW) scheme and its introduction into Prospect Reservoir.

The project is in the Blacktown Local Government Area, in largely urbanised areas with a mix of residential, industrial, and recreational land uses.

The key features of the project include:

- secondary treatment process upgrade from the current 28 ML/day to 48 ML/day
- a new advanced water treatment plant (AWTP), including reverse osmosis, ultrafiltration and stabilisation
- a range of ancillary infrastructure such as new buildings, tanks, pipes, services and chemical storage
- new brine pipeline to transfer the brine generated as a by-product of the reverse osmosis process into the existing wastewater network. The pipeline would:
  - have flow capacity of up to 12.5 ML/day
  - be about 8 km long and about 500 mm diameter
  - be installed largely along shared paths, public parkland, and road corridors
  - be mostly underground and built using open trench and trenchless methods
  - be connected into Sydney Water's existing Northern Suburbs Ocean Outfall Sewer.

The advanced water treatment plant is required to treat the wastewater to meet nutrient limits. However, it would also produce high quality water that could be further treated to produce PRW.

Sydney Water is preparing a Review of Environmental Factors (REF) for the project. This report has been prepared to support that REF. PRW is not part of the scope of this assessment. Sydney Water is separately assessing the potential introduction of PRW in an Environmental Impact Statement (EIS).

A review of primary and secondary historical sources, maps, plans and aerials indicates the impact assessment area has developed from an agricultural and pastoral region into low-density suburbia. A search of statutory heritage registers identified no World, National, Commonwealth or State Heritage Register listed items within 200 m of the impact assessment area. Within the same buffer, 11 sites listed on the *Blacktown Local Environmental Plan 2015* were identified. None of these items will be directly or indirectly impacted by the project.

Little to no impact to the heritage significance of the NSOOS has been identified, primarily as the tie in will be to fabric installed in 1963, which is considered to be not of heritage significance.

An archaeological assessment of the impact area did not identify areas of explicit archaeological potential. However, as archaeological resources can occur in areas that do not show signs in documentary evidence or environmental contexts, it is recommended that an unexpected finds protocol be included in the construction environmental management plan.

In conclusion, no direct impacts to fabric of heritage significance or indirect historical heritage impacts are anticipated, and the project may proceed with the implementation of the provided management measures.

It is recommended that:

- Unexpected finds protocol to be included in a Construction Environmental Management Plan (CEMP) or similar.

- Undertake a condition assessment of I17 (House at 5 Sarsfield Street) and the NSOOS. Confirm potential impacts to these two heritage items during detailed design. Where possible, develop a construction methodology that limits vibration to below the levels referenced in German Standard *DIN 4150 - Part 3 - Structural Vibration in Buildings – Effects on Structures* or other relevant standard as determined by Sydney Water. If vibration limits are expected to be exceeded and the construction methodology cannot be adjusted to below acceptable levels:

    - Undertake a property dilapidation survey.

    - Develop mitigation and management measures for each heritage item to be included in the CEMP.

- The CEMP will maintain the 20 m exclusion zone that is currently surrounding the grave site. Ensure signage is placed on the existing fencing around the perimeter of the grave site during construction. Any instances of breaches within this exclusion, including by construction vehicles, must be reported and impacts assessed.

TABLE OF CONTENTS

Tables

Figures

Plates

1 Introduction

1.1 Overview

Upgrades to Sydney Water's Quakers Hill Water Resource Recovery Facility (WRRF) (Figure 1.1) are required by 2028 to:

- service industry growth and housing policies as current treatment capacity at the plant of 38 ML/day is expected to be exceeded in late 2028
- meet Environment Protection Licence limits that require reduced nutrient loads to the Hawkesbury-Nepean River (Sackville 2 zone)
- provide high quality water treatment that enables a future Purified Recycled Water (PRW) scheme and its introduction into Prospect Reservoir.

The project is in the Blacktown Local Government Area, in largely urbanised areas with a mix of residential, industrial, and recreational land uses.

The key features of the project are shown in Figure 1.2 and include:

- secondary treatment process upgrade from the current 28 ML/day to 48 ML/day
- a new advanced water treatment plant (AWTP), including reverse osmosis, ultrafiltration and stabilisation
- a range of ancillary infrastructure such as new buildings, tanks, pipes, services and chemical storage
- new brine pipeline to transfer the brine generated as a by-product of the reverse osmosis process into the existing wastewater network. The pipeline would:
    - have flow capacity of up to 12.5 ML/day
    - be about 8 km long and about 500 mm diameter
    - be installed largely along shared paths, public parkland, and road corridors
    - be mostly underground and built using open trench and trenchless methods
    - be connected into Sydney Water's existing Northern Suburbs Ocean Outfall Sewer.

The advanced water treatment plant is required to treat the wastewater to meet nutrient limits. However, it would also produce high quality water that could be further treated to produce PRW.

Sydney Water is preparing a Review of Environmental Factors (REF) for the project. This report has been prepared to support that REF. PRW is not part of the scope of this assessment. Sydney Water is separately assessing the potential introduction of PRW in an Environmental Impact Statement (EIS). EMM Consulting Pty Limited (EMM) has been engaged by Sydney Water to prepare statements of heritage impact (SOHIs) to assess potential historical heritage constraints (both built and archaeological) associated with project.

1.2 Project boundary terms and definitions

The purpose of these definitions is to set expectations for what each of these terms mean as they are referenced throughout the report.

- The **impact area** refers to the location of construction activities (Figure 1.2). These include:
  - a new AWTP, including reverse osmosis, ultrafiltration and stabilisation to be located in the existing Quakers Hill WRRF site located on Lot 1 DP 1029672
  - new infrastructure for, and upgrades to, the secondary treatment process within the existing Quakers Hill WRRF
  - a range of ancillary infrastructure such as new buildings, tanks, pipes, services and chemical storage, also within the Quakers Hill WRRF
  - new brine pipeline to transfer the brine generated as a by-product of the reverse osmosis process into the existing wastewater network, connecting to Sydney Water's existing Northern Suburbs Ocean Outfall Sewer. The pipeline would be installed largely along shared paths, public parkland, and road corridors be mostly underground and built using open trench and trenchless methods
  - construction compounds and access roads.
- The **impact assessment area** refers to the maximum extent of land considered for the PRW project, which includes the Quakers Hill WRRF and the associated infrastructure while including flexibility to explore various options.

1.3 Impact assessment area

The impact assessment area is located within the Blacktown LGA and lies within the historical parish of Prospect, County of Cumberland. The project comprises one brine pipeline and associated upgrades at the Quakers Hill WRRF (Figure 1.2). Note that Figure 1.1 and Figure 1.2 provides the impact area for the EIS component as well for context. The ~8 km brine pipeline includes:

- connecting the Quakers Hill WRRF to Sydney Water's existing wastewater network at the existing Northern Suburbs Ocean Outfall Sewer
- inclusion of a barometric loop about 12 m high
- the alignment primarily follows existing public infrastructure corridors and avoids private land where possible
- maintenance holes
- valve pits and covers
- ventilation structures
- energy dissipation structures and headwalls as required.

The project also includes upgrades at the Quakers Hill WRRF to support advanced treatment processes and increased capacity, including:

- expansion of secondary treatment facilities

- installation of advanced treatment infrastructure to produce wastewater meeting nutrient limits.

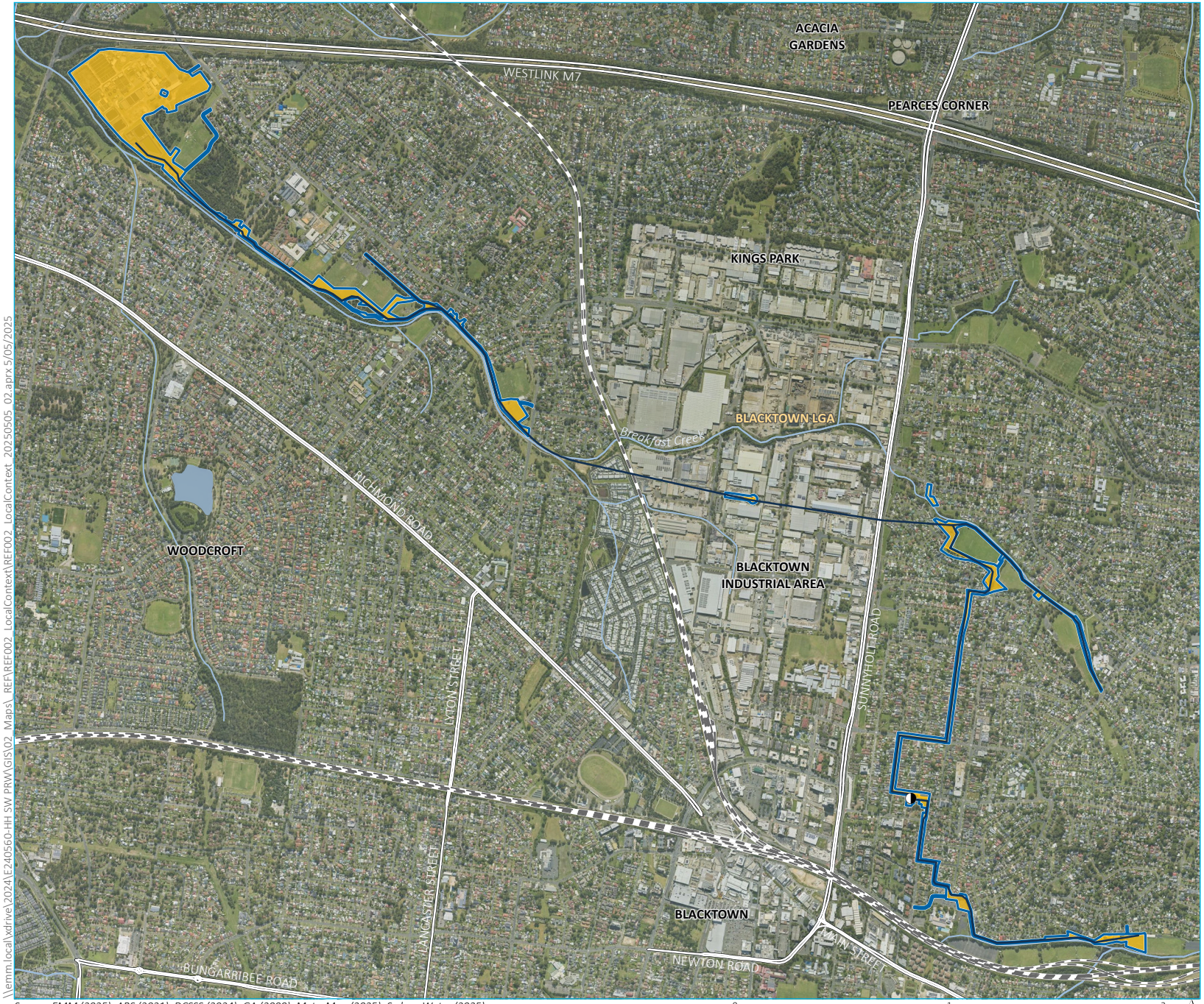
The landscape within the impact assessment area reflects a mix of urban, suburban, and transport zones. The pipeline alignment passes through residential neighbourhoods, open public spaces, and transport infrastructure, with careful planning to avoid significant impacts to private properties, bushland, and sensitive areas.

The brine pipeline will be fully underground, except for the barometric loop, valves (scour and isolation) and maintenance pits. It will be constructed mostly using trenching techniques, although about 2.3km will be installed using a trenchless technique (horizontal directional drilling (HDD)).

During construction, the following activity areas would be required:

- pipe stringing areas
- construction compounds (roughly 18)
- temporary access roads.

Construction compounds and laydown areas will be established throughout the impact assessment area to support pipeline construction activities. Utility connections such as electricity will be delivered under separate planning approvals.



KEY

- Impact assessment area
- Impact area
- Brine pipeline
- Barometric loop

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- Local government area

INSET KEY

- Brine pipeline
- Major road
- NPWS reserve
- State forest

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Source: EMM (2025); ABS (2021); DCSSS (2024); GA (2009); MetroMap (2025); Sydney Water (2025)

0 1 2 km

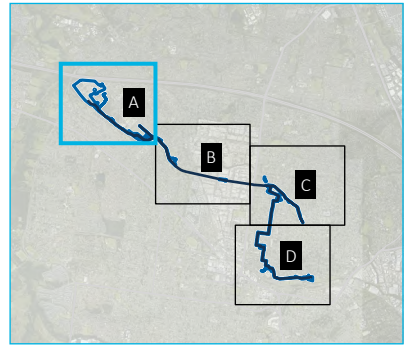
GDA2020 MGA Zone 56

N

Local context

Quakers Hill Water Resource Recovery Facility Advanced Treatment Upgrade
Figure 1.1

EMM
creating opportunities



KEY

- Impact assessment area
- Impact area
- Brine pipeline

Project element

- Construction access point
- Construction access route
- Construction compound

Existing environment

- Rail line
- Major road
- Minor road
- Named watercourse

Source: EMM (2025); DCSSS (2024); MetroMap (2025); Sydney Water (2025)

0 250 500 m

GDA2020 MGA Zone 56

N

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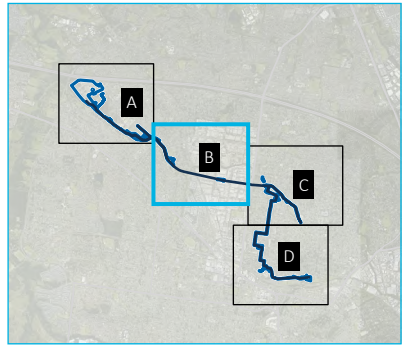
Project overview

Prospect Reservoir Water Pipeline Quakers Hill WRRF Advanced Treatment Upgrade
Figure 1.2 a

EMM
creating opportunities



KEY

- Impact assessment area
- Impact area
- Brine pipeline

Project element

- Construction access point
- Construction access route
- Construction compound

Existing environment

- Train station
- Rail line
- Major road
- Minor road
- Named watercourse

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Source: EMM (2025); DCSSS (2024); MetroMap (2025); Sydney Water (2025)

0 250 500 m

GDA2020 MGA Zone 56

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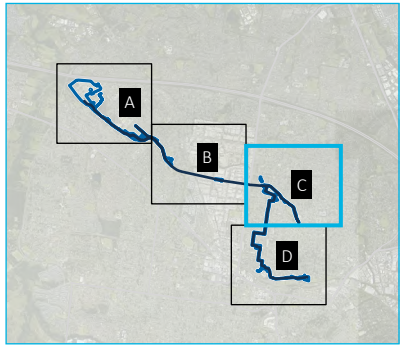
Project overview

Prospect Reservoir Water Pipeline Quakers Hill WRRF Advanced Treatment Upgrade
Figure 1.2 b

EMM
creating opportunities



KEY

- Impact assessment area
- Impact area
- Brine pipeline

Project element

- Construction access point
- Construction access route
- Construction compound

Existing environment

- Major road
- Minor road
- Named watercourse

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Source: EMM (2025); DCSSS (2024); MetroMap (2025); Sydney Water (2025)

0 250 500 m

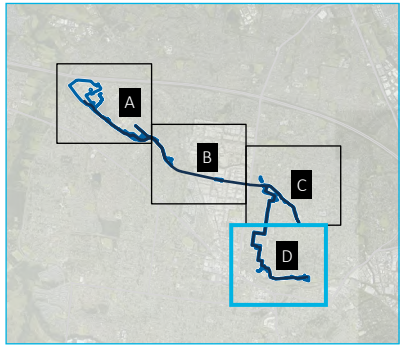
GDA2020 MGA Zone 56

N

Project overview

Prospect Reservoir Water Pipeline Quakers Hill WRRF Advanced Treatment Upgrade
Figure 1.2 c

EMM
creating opportunities



KEY

- Impact assessment area
- Impact area
- Brine pipeline
- Barometric loop

Project element

- Construction access point
- Construction access route
- Construction compound

Existing environment

- Rail line
- Major road
- Minor road
- Named watercourse

Source: EMM (2025); DCSSS (2024); MetroMap (2025); Sydney Water (2025)

0 250 500 m

GDA2020 MGA Zone 56

N

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Project overview

Prospect Reservoir Water Pipeline Quakers Hill WRRF Advanced Treatment Upgrade
Figure 1.2 d

EMM
creating opportunities

1.4 Report assessment methods

1.4.1 Heritage management guidelines

This SOHI has been prepared in accordance with the relevant government assessment requirements, guidelines and policies. The report was undertaken using the principles of *The Australian International Council on Monuments and Sites, Charter for Places of Cultural Significance* (also known as the *Burra Charter,* Australia ICOMOS 2013) and the New South Wales (NSW) *Heritage Manual* (Heritage Office 1996 with regular additions).

The Burra Charter: The Australian ICOMOS charter for places of cultural significance (ICOMOS (Australia) 2013) sets a standard of practice for those who provide advice, make decisions about, or undertake works to places of cultural significance including owners, managers and custodians. The Burra Charter consists of 34 articles, arranged into five sections: definitions, conservation principles, processes, and practice. The principal articles of the Burra Charter are:

- conservation is based on significance.
- a cautious approach is required – changing as much as necessary, but as little as possible.
- maintenance is fundamental to conservation.

Further articles relate to preservation (maintaining fabric in its current state), restoration and reconstruction, adaptation and the introduction of new structures or extensions.

The *Heritage Manual* comprises the following guidance documents:

- *Assessing Heritage Significance* (DPE 2023a)
- *Statements of Heritage Impact Guidelines* (DPE 2023b)
- *Investigating Heritage Significance* (Heritage Council NSW 2022)
- *Assessing Significance for Historical Archaeological Sites and 'Relics'* (NSW Heritage Branch 2009).
- *Archaeological Assessments: Archaeological Assessment Guidelines* (Heritage Office Department of Urban Affairs and Planning 1996).

1.4.2 The significance framework

In NSW, historical value is ascribed to buildings, places, archaeological sites and landscapes modified in the Australian historical period for purposes other than traditional Aboriginal use. The assessment of heritage significance in NSW is based on the *Burra Charter* (Australia ICOMOS 2013) and further expanded upon in *Assessing Heritage Significance* (Department of Planning and Environment (NSW) 2023a). The heritage manual lists seven criteria to identify and assess heritage values that apply when considering if an item is of State or local heritage significance, which are set out in Table 1.1. The result of the assessments of significance may determine that an individual component does not meet the threshold for local or State significance as an individual item, but that it does contribute to the significance of the larger item.

The criteria against which heritage significance has been assessed are reproduced in Table 1.1.

Table 1.1 NSW heritage assessment criteria

Criterion	Explanation
a)	An item is important in the course or pattern of NSW's (or the local area's) cultural or natural history (Historical Significance).
b)	An item has strong or special association with the life or works of a person, or group of persons of importance in NSW's (or the local area's) cultural or natural history (Associative Significance).
c)	An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area) (Aesthetic Significance).
d)	An item has a strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons (Social Significance).
e)	An item has the potential to yield information that will contribute to an understanding of NSW's (or the local area's) cultural or natural history (Research Significance).
f)	An item possesses uncommon, rare or endangered aspects of NSW's (or the local area's) cultural or natural history (Rarity).
g)	An item is important in demonstrating the principal characteristics of a class of NSW's (or the local area's) cultural or natural places or environments (Representativeness).

Source: *Assessing Heritage Significance* (DPE 2023a, p.21).

1.4.3 Research sources

Research for this report was conducted using primary sources such as maps, plans and gazettes etc, which were accessed through online portals such as:

- Land and Property Information (LPI)
- Historical Land Records Viewer (HLRV)
- National Library of Australia: Trove Online
- Historical aerial photographs.

1.4.4 Impacts

Impacts on heritage items can be divided into two main types: direct and indirect. Direct impacts occur if a heritage place or site is physically impacted by development with intent, such as the demolition or substantial alteration of a building, or the disturbance of an archaeological site.

Indirect impacts alter the surrounding physical environment in a way that affects a heritage place or site. As defined by ICOMOS (2011), these are secondary consequences of the construction or operation of the development and can result in physical loss or changes to the setting of an asset beyond the development footprint. This can include vibration from construction activities or vehicle movements outside a heritage item's curtilage that occur incidentally due to proximity.

The effects of direct or indirect impacts are measured by the extent to which they alter the heritage values of a heritage place (refer to Section 6.1).

It is acknowledged that a single item may be impacted both directly (mainly during construction activities) and indirectly (through multiple stages of the project beyond construction, such as where the project would have a detrimental effect on the setting of a place resulting from visual impacts) as a result of the project. This SoHI identified both direct and indirect impacts to any heritage items within or in proximity to the impact assessment area.

1.4.5 Levels of impact

Under the *Material Threshold Policy* (Heritage NSW 2020), the impact assessment must assess the proposed works against the listed criteria. The listed criteria are defined as the assessment against the heritage significance criteria in the SHR listing. For example, if a site is listed criteria a) historical, b) association, e) research potential and f) rarity, then the impact assessment needs to determine whether the project would erode (or impact) the ability of the item to demonstrate significance under those four criteria.

The impact definitions are reproduced from the policy (Heritage NSW 2020, p.4) in Table 1.2.The MTP was developed for application to SHR listed items. When applied to local items, the word 'State' is to be replaced with 'local'.

Table 1.2 Scale of impact to heritage significance

Impact	Definition
Total loss of significance	Major adverse impacts to the extent where the place would no longer meet the criteria for listing on the SHR.
Adverse impact	Major (that is, more than minor or moderate) adverse impacts to State heritage significance.
	Moderate adverse impacts to State heritage significance
	Minor adverse impacts to State heritage significance
Little to no impact*	An alteration to State heritage significance that is so minor that it is considered negligible. * Little to no impact (as opposed to no impact) acknowledges that any change will result in some level of impact/alteration to State heritage significance.
Positive impact	Alterations that enhance the ability to demonstrate the State heritage significance of an SHR listed place.

Source: Heritage NSW 2020, p.4

To assist in determining what is a major, moderate or minor impact, the following has been used as a guide.

- Major impact – Change to all or most significant aspects of the place, such that its heritage significance against the listed criteria are substantially reduced or destroyed.
- Moderate impact - Change to some significant aspects of the place, such that some of its heritage significance is partially reduced.
- Minor impact - Minor change to significant aspects of the place, such that some of its heritage significance is slightly reduced.

The attributes/significance criteria for each site are defined in Section 5.4.1.

1.5 Authorship

The report was prepared by Courtney Culley (Archaeologist EMM) with assistance from Amelia O'Donnell (Historian EMM). The figures were created by Eloise Oakley (GIS Analyst EMM). Quality assurance was provided by Susan Lampard (Associate archaeologist EMM).

1.6 Report limitations

Predictions have been made within this report about the probability of subsurface historical archaeological material occurring across the project area, based on the surface indications and environmental contexts. However, material may exist in areas across the impact assessment area that do not show signs in documentary evidence or environmental contexts.

A summary of statutory requirements regarding historical heritage is provided in Section 2. The summary is provided based on the experience of the authors with the heritage system in Australia and does not purport to be legal advice. It should be noted that legislation, regulations and guidelines change over time and users of the report should satisfy themselves that the statutory requirements have not changed since the report was written.

This report does not address Aboriginal cultural heritage; a separate Aboriginal cultural heritage assessment is being prepared.

2 Statutory framework

In NSW, historical heritage places, including archaeological sites assessed to be of local or State significance are protected by two main pieces of legislation: the EP&A Act and the NSW *Heritage Act 1977* (Heritage Act). Under certain circumstances an additional layer of protection is added by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

2.1 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is a Commonwealth Act that provides a legal framework for the protection of the environment. The EPBC Act definition of environment includes places of natural, Indigenous and historic heritage value. Under the EPBC Act, heritage places can be listed on:

- World Heritage List (WHL) – places inscribed on the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage List.
- National Heritage List (NHL) – places of significance to the nation.
- Commonwealth Heritage List (CHL) – items belonging to the Commonwealth or its agencies.

Actions that may impact on Matters of National Environmental Significance (MNES) must be assessed for impacts. MNES that relate to heritage include identification on the WHL or NHL. Under the EPBC Act, an action that may have a significant impact on a MNES is deemed to be a 'controlled action' and can only proceed with the approval of the Commonwealth Minister for the Environment. An action that may potentially have a significant impact on a MNES is to be referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) for determination as to whether or not it is a controlled action. If deemed a controlled action the Project is assessed under the EPBC Act for approval.

The project will not occur near any World heritage properties or places listed on the NHL and CHL. Therefore, the EPBC Act is not discussed further.

2.2 NSW Environmental Planning and Assessment Act 1979

A framework for formally assessing cultural heritage values as part of the development and assessment process is provided within the EP&A Act. It requires that environmental impacts are considered before development and that appropriate measures to avoid, mitigate or ameliorate impacts are developed; this includes impacts on cultural heritage items and places as well as archaeological sites and deposits.

In accordance with the EP&A Act, local governments are directed to prepare planning instruments that regulate land use and planning. Local environmental plans (LEPs) and development control plans (DCPs) are examples of these. These documents provide guidance on planning decisions, identify environmentally sensitive areas, and include the identification of heritage items. In addition, the State Government can prepare State Environmental Planning Policies (SEPPs) to assist State Government agencies deliver services and infrastructure. Division 5.1 of the EP&A Act allows public agencies, such as Sydney Water, to undertake certain activities as development without consent. The agency must prepare a REF to demonstrate that the works would not have a significant impact.

The project is being assessed under the *State Environmental Planning Policy (Transport and Infrastructure) 2021*, as outlined in Section 2.2.1.

2.2.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

The *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) establishes the framework in which government infrastructure projects are authorised under Division 5.1 of the EP&A Act. Under section 2.126(1)(a) of T&I SEPP, development is carried out in the prescribed circumstances if the development is carried out by or on behalf of a public authority.

Section 2.126(2) permits development for the purpose of sewage treatment plants or biosolids treatment facilities without consent on land in a prescribed zone in the prescribed circumstances. Prescribed zone (referred to in 2.125(g)) includes SP2 Infrastructure. The proposal is consistent with prescribed circumstances in section 2.126(a). Proposed work within the WRRF can be performed under this section.

Section 2.126(6) permits development for the purpose of sewage reticulation systems without consent on any land in the prescribed circumstances. The proposal is consistent with prescribed circumstances in section 2.126(a). Proposed work for the brine line can be performed under this section. The proposal is on land zoned:

- RE1 Public Recreation
- R2 Low Density Residential
- SP2 Infrastructure (including the WRRF)
- E3 Productivity Support
- R1 General Residential

The sections of the T&I SEPP relevant to heritage relate to local heritage items and include consultation provisions in Section 2.11, Chapter 2:

2.11 Consultation with councils—development with impacts on local heritage

(1) This section applies to development carried out by or on behalf of a public authority if the development—

a) is likely to affect the heritage significance of a local heritage item, or of a heritage conservation area, that is not also a State heritage item, in a way that is more than minor or inconsequential, and

b) is development that this Chapter provides may be carried out without consent.

(2) A public authority, or a person acting on behalf of a public authority, must not carry out development to which this section applies unless the authority or the person has—

c) had an assessment of the impact prepared, and

d) given written notice of the intention to carry out the development, with a copy of the assessment and a scope of works, to the council for the area in which the heritage item or heritage conservation area (or the relevant part of such an area) is located, and

c) taken into consideration any response to the notice that is received from the council within 21 days after the notice is given.

2.2.2 State Environmental Planning Policies (Precincts – Western Parkland City) 2021

The *State Environmental Planning Policy 2021 (Precincts – Western Parkland City* (SEPP 2021) is statutory legislation that guides land use planning and development to ensure environmental sustainability and protection. The aims of SEPP 2021 are:

a) to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant precincts for the benefit of the State,

b) to facilitate service delivery outcomes for a range of public services and to provide for the development of major sites for a public purpose or redevelopment of major sites no longer appropriate or suitable for public purposes.

The project will not occur near any places listed on the SEPP 2021. Therefore, the SEPP 2021 is not discussed further.

2.2.3 Blacktown Local Environmental Plan 2015

Part 5, Section 5.10 of the *Blacktown Local Environmental Plan* 2015 (BLEP 2015) addresses the conservation of heritage significance within the Blacktown LGA. The objectives of the BLEP 2015 in relation to heritage are:

a) to conserve the environmental heritage of Blacktown

b) to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views

c) to conserve archaeological sites

d) to conserve Aboriginal objects and Aboriginal places of heritage significance.

To achieve these objectives, development consent is required to demolish, move, alter, disturb or excavate a heritage item, an Aboriginal object or a building, work, relic or tree within a heritage conservation area. Schedule 5 of the BLEP 2015 provides a list of heritage items, conservation areas and archaeological sites within the Blacktown LGA. There are four listed items within a 200 m buffer of the impact area. Potential indirect impacts to these four items are addressed in subsequent sections of this report. Development consent is not required for this project as clause 3.28 of the EP&A Act means the T&I SEPP prevails over LEP.

2.3 NSW Heritage Act 1977

The Heritage Act is legislation for the promotion and conservation of the heritage places, items, and objects of NSW. The Heritage Act is administered by the Heritage Council of NSW whose role is to advise the Minister with responsibility for heritage on matters relating to the conservation of the State's heritage. In practice, this power is largely delegated to Heritage NSW.

2.3.1 State Heritage Register

Under the Heritage Act, items of significance to the State can be recognised on the State Heritage Register (SHR). Items on the SHR cannot be demolished, nor can they be damaged, developed, altered or excavation undertake without approval from the Heritage Council of NSW (or its delegate) under Section 59 of the Act. Section 59 extends to relics inside the item's curtilage. The project does not impact on any SHR listed items.

2.3.2 Archaeology and relics

The Heritage Act also protects 'relics', regardless of their listing status. It applies to all NSW land that is not listed on the SHR. Section 4(1) of the Heritage Act (as amended 2009) defines 'relic' as follows:

> A "relic" means any deposit, artefact, object or material evidence that:

(a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and

(b) is of State or local heritage significance.

Section 139(1) of the Heritage Act states that:

> A person must not disturb or excavate any land knowingly or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit.

Section 146 requires persons to notify the Heritage Council of NSW within a reasonable time if an unanticipated relic is discovered. The Heritage Act identifies the category of 'works', which refers to historical infrastructure, and is viewed as separate to that of archaeological 'relics' under the Heritage Act. 'Works' may be buried, and are therefore archaeological in nature, but exposing a 'work' does not trigger reporting obligations under the Heritage Act unless it is of demonstrable significance.

2.3.3 State Government Heritage and Conservation (s170) Registers

Section 170 (s170) of the Heritage Act requires State government agencies establish and maintain a register of heritage items, to be known as a Heritage and Conservation Register. State agencies are required to undertake due diligence with regard to the care, control and management of items listed on their Section 170 Heritage and Conservation Register. Additionally, State agencies must notify the Heritage Council of NSW 14 days in advance if they intend to remove an item from their register, transfer ownership, cease occupation, demolish. Section 170 does not place statutory requirements on individuals or non-State government entities. The project would impact on one item listed on Sydney Water's S170 Register, the NSOOS (#4570286). Impacts to the heritage significance of the NSOOS are addressed in subsequent sections of this report.

2.4 Heritage listings

The following heritage registers were searched:

- World Heritage List (WHL)
- National Heritage List (NHL)
- Commonwealth Heritage list (CHL)
- State Heritage Inventory, including the State Heritage Register (SHR), s170 registers, and local heritage items.
- Schedule 5 of the *Blacktown Local Environmental Plan 2015* (*BLEP* 2015)
- *State Environmental Planning Policy* (SEPP) (Precincts—Western Parkland City) 2021
- *S170 Heritage and Conservation Register* (Sydney Water)
- Non-statutory registers including the Register of the National Trust, Engineers Australia and the Register of the National Estate, which is now static but provides useful information.

This report assesses the heritage items within the impact area (one) and within 200 m of the impact assessment area as items within this buffer may represent the key historical heritage constraints for the project. The brine pipeline will connect directly to the NSOOS, which is listed on Sydney Water's Section 170 Heritage and Conservation Register.

The 200 m search buffer was adopted to account for indirect impacts, such as visual or vibrational impacts that could arise during the project construction or operation. Listed heritage items within 200 m of the impact assessment area are presented in Table 2.1 and Figure 2.1.

Table 2.1 Heritage register search within a 200 m buffer

Jurisdiction	Heritage Register	Place ID	Listing	Distance from impact assessment area
Federal	World Heritage List	-	-	-
	Commonwealth Heritage Register	-	-	-
	National Heritage Register	-	-	-
State	State Heritage Register	-	-	-
	State Environmental Planning Policy (Precincts—Western Parkland City) 2021	-	-	-
	Section 170 Heritage and Conservation Register (Sydney Water)	4570286	Northern Suburbs Ocean Outlet Sewer	Directly impacted – brine pipeline will connect into the NSOOS.
Local	Blacktown Local Environmental Plan 2015	I12	House	112 m east of the impact assessment area
		I16	House	85 m south-west of the impact assessment area
		I17	House	26 m west of the impact assessment area
		I34	Church	162 m north-east of the impact assessment area
Non-statutory	Register of the National Estate			
	Register of the National Trust (NSW)			
	Engineers Australia			

KEY

- Impact area
- 200m impact area buffer
- Brine pipeline
- Heritage item- general
- Northern Suburbs Ocean Outfall Sewer (NSOOS)

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody

\\emm.local\xdrive\2024\E240560-HH SW PRW\GIS\02_Maps_REF\REF004_ListedHeritageItems\REF004_ListedHeritageItems_20250320.aprx 5/05/2025

Source: EMM (2025); DCSSS (2024); MetroMap (2025); (Sydney Water (2025)

Listed heritage items

Quakers Hill Water Resource Recovery Facility Advanced Treatment Upgrade
Figure 2.1

EMM
creating opportunities

3 Historical Summary

3.1 Key findings

The project area is wholly contained in the parish of Prospect, County of Cumberland. The brine pipeline travels from the proposed advanced water treatment plant (AWTP) at Quakers Hill through the suburbs of Blacktown, and Marayong to the NSOOS in Seven Hills . The region was subject to European exploration and settlement from 1790 and much of the project area sits in the boundary of the Rooty Hill Government Farm established by Governor King in 1802. The Government Farm was subdivided into land grants that were awarded to ticket of leave convicts, free settlers, and Government and military personnel from 1819. The land grants were developed as farms and agro-pastoral estates, which were subdivided into smaller farm blocks from the late nineteenth century. Farming continued as the dominant industry of the Parish into the middle of the twentieth century. Following the Second World War, the region was subject to intensive suburban residential and industrial development, which has continued into the present day.

3.2 Historic themes

The Australian and NSW heritage systems employ a series of historic themes to guide the understanding of history and historical investigation in the nation and state. As part of any historic heritage assessment, it is important to review the historic themes when undertaking research on an area or place to provide proper context. The state and national themes are complementary to enable the historian to present a unified understanding of how an area fits into Australian history. The historic themes are also an important guide when assessing an item's heritage significance. They provide information on how an item may be historically significant at the local, state or national level.

Finally, historic themes help to develop interpretation and management strategies for items of heritage significance. A full list of these themes can be found on the Heritage NSW website. Historic themes in the study area were identified based on the historical background (as described below) and the results of the historical survey (Section 4). The Australian and NSW historic themes relevant to the project boundary listed in Table 3.1.

Table 3.1 Historic themes

Australian historic themes	NSW historic themes
1. Tracing the natural evolution of Australia	Environment – naturally evolved
2. Peopling Australia	Aboriginal cultures and interactions with other cultures; Convict; Ethnic influences;
3. Developing local, regional and national economies	Agriculture; Commerce; Communication; Environment – cultural landscape; Events; Exploration; Industry; Pastoralism; Technology; Transport
4. Building settlements, towns and cities	Towns, suburbs and villages; Land tenure; Utilities; Accommodation
5. Working	Labour
6. Educating	Education
7. Governing	Law and order
8. Developing Australia's cultural life	Domestic life; Leisure
9. Marking the phases of life	Persons

3.3 Historical Context

3.3.1 The environment of pre and early contact

Information about the socio-cultural structure of Aboriginal society prior to European contact primarily comes from ethno-historical accounts made by colonial settlers. However, these records focused more on early European expeditions rather than Aboriginal culture, often after significant social disruption due to disease and displacement. This makes such information contentious, especially regarding language group boundaries, which were likely more fluid and complex than the rigid demarcations drawn by colonial observers.

Over thirty separate Aboriginal groups are known to have populated the wider Sydney Basin in 1788, each with their own country, practices, diets, dress, and dialects. The impact area sits within Darug land (also Dharug, Daruk, Dharruk, Dharrook, Dhar'rook, Darrook), which covered 6,000 square kilometres from Parramatta in the east and the Blue Mountains in the west, and from the Hawkesbury River in the north to Appin in the south (Tindale 1974:193). The Darug language group was comprised of clans of between 50-250 men, women and children with the rivers and waterways of country acting as the boundaries between these groups (Kass 2005b). Six Darug clans are recorded in close proximity to the impact area including the Warmuli (near Prospect), the Wawaraway (around the Eastern Creek), the Toongagal (around Toongabbie), the Boolbainora and Gannemegal (west of the Prospect Reservoir), and Gomerigal (around the South Creek) (Attenbrow 2002; Karskens 2020; Kohen 1993).

Within months of the First Fleet landing at Port Jackson shrinking food supplies and unsuccessful attempts establishing agriculture compelled the British colonisers to look for land beyond Port Jackson (Kass, Liston, and McClymont 1996:9). (Kass et al. 1996, p.9). In April of 1788, Governor Phillip led an expedition west along the Parramatta River in search of arable ground and established the Rose Hill settlement, later Parramatta (Kass et al. 1996:9). During the expedition the party climbed Prospect Hill, which Phillip named Bellevue (Kass 2005a:10).

The Prospect parish region was subject to further exploration by Captain Watkin Tench between 1789 and 1791 (Heritage Concepts 2009:9; Tench 1793). In June 1789, Captain Tench with Thomas Arndell, assistant surgeon Mr Lowes, surgeon's mate, two marines and a convict travelled west from Prospect Hill, which was renamed by Tench, to the foot of the Blue Mountains resulting in the discovery of the Nepean River (Heritage Concepts 2009:9; Tench 1793). The following year, Tench led another expedition north-west of the Rose Hill settlement, passing through the present-day Parish of Prospect (Heritage Concepts 2009:9; Tench 1793). Then, in 1791, Tench led an unsuccessful expedition south of Rose Hill in search of a rumoured river (Heritage Concepts 2009:9; Tench 1793).

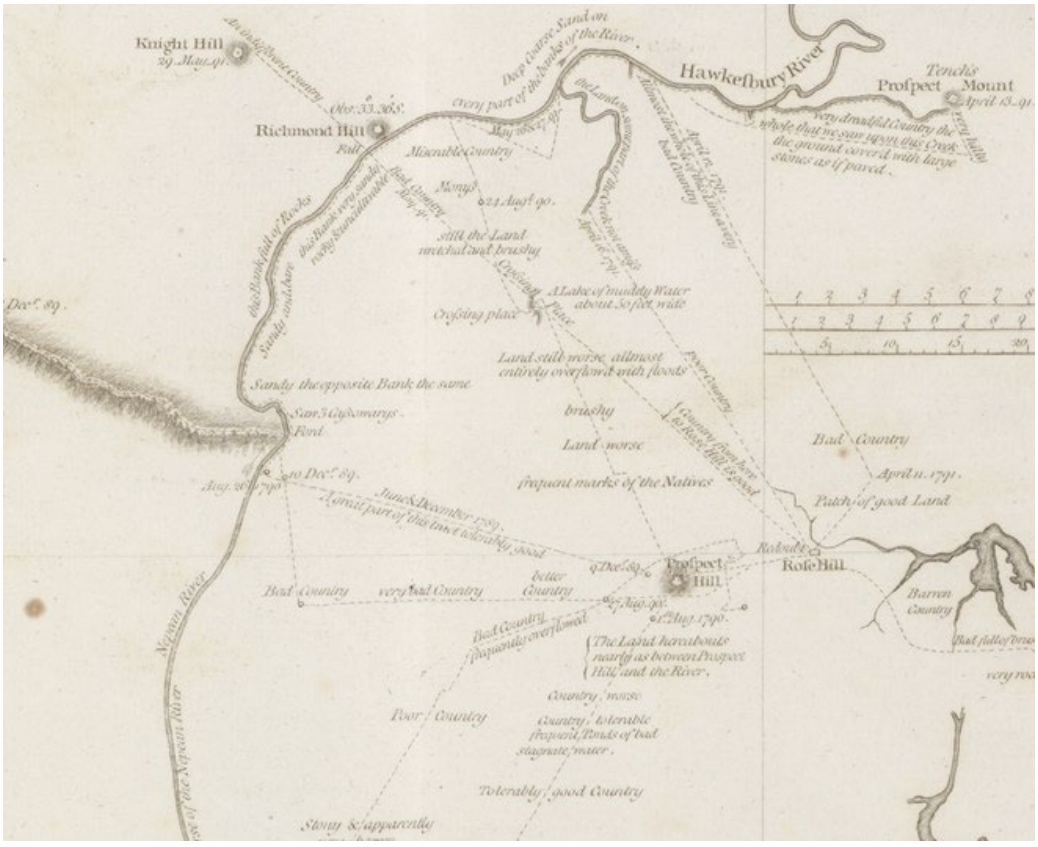
European settlement began to spread outward from Parramatta and grants were released in the vicinity of the project area from 1791 (Heritage Concepts 2009:10). Local Aboriginal groups of the Sydney basin began to express their dissatisfaction with the permanence of European settlement and colonial expansion from the middle of 1788 and, despite the social impacts of 1789 small-pox epidemic, intense frontier conflict occurred over the west Cumberland Plain over the 1790s (Connor 2002:38; Mear 2008; Tench 1793; Warren 2014:69–70). Displays of resistance, retaliations attacks, and raids were so fierce in the Hawkesbury region (near Richmond and Windsor) that Lieutenant Governor William Patterson feared new settlement would need to be abandoned (Collins 1798:347). Patterson sent the New South Wales Corps into the area with orders to kill and string up any “of the wood tribe”, i.e. the Darug, they came across (Collins 1798:347). The Corps did kill a number of Aboriginal people and took others as prisoners to Sydney, but the Darug continued to resist white settlement (Connor 2002:40–45).

Violence throughout the Cumberland Plain reached its peak in April of 1816 when Macquarie ordered three detachments of soldiers through the colony to capture or kill all Aboriginal people they came across (Karskens 2015). The order resulted in the massacre of 14 Aboriginal individuals and the capture of five others at Appin on 17 April 1816 *(Karskens 2015; The Sydney Gazette and New South Wales Advertiser*, 4 May 1816a:1). Further, Macquarie issued a set of regulations controlling free movement of Aboriginal people across NSW (*The Sydney Gazette and New South Wales Advertiser*, 18 May 1816b:1). At the same time, Governor Macquarie’s

proclamations of 1816 also encouraged Aboriginal groups to give up their traditional lifeways for the European way of life (*The Sydney Gazette and New South Wales Advertiser,* 4 May 1816a:1).

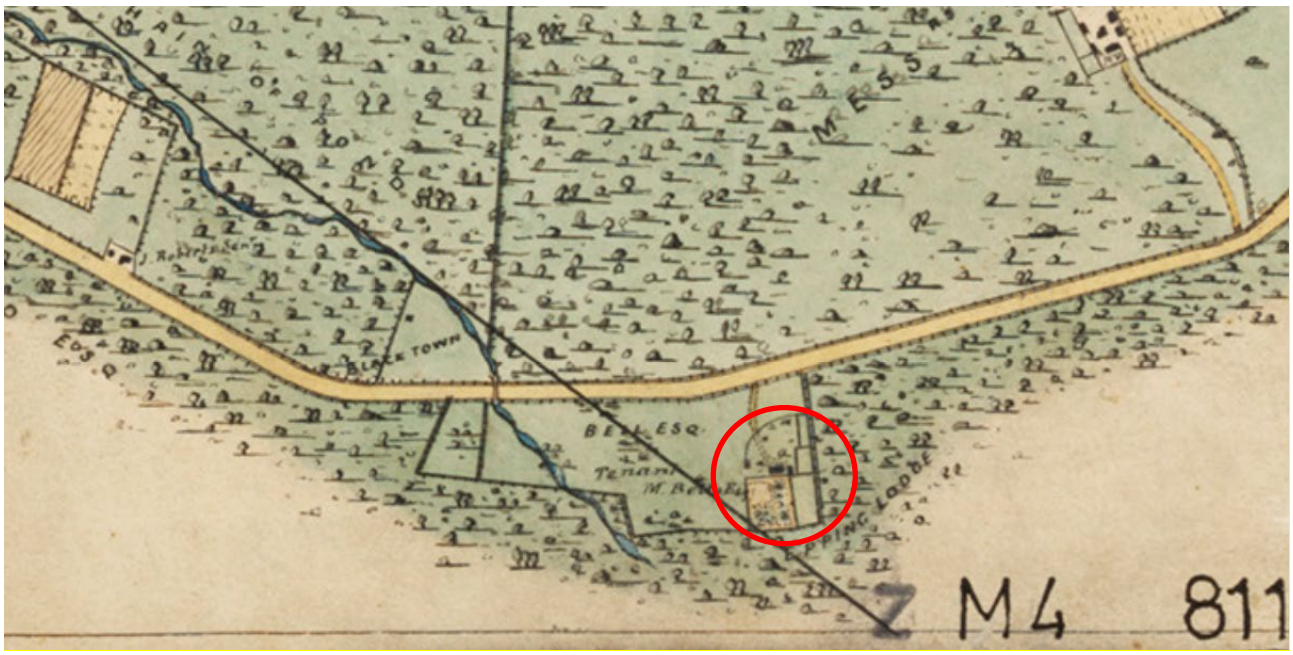
Governor Macquarie awarded two Aboriginal men, Colebee and Nurragingy, the first Aboriginal land grant in 1816 for their service to the Colony (Blacktown Native Institution Project 2015). The grant was originally proposed to be along Eastern Creek, but Nurragingy instead chose a 30 acre grant on the Richmond Road, north of the impact area, within his traditional land (Blacktown Native Institution Project 2015). In 1823, the Native Institution at Parramatta was transferred to a new institution on the Richmond Road, on the former property of William Bell known as "Black Town" (Blacktown Native Institution Project 2015; Karskens 2020). The Blacktown Native Institution was decommissioned in 1829 and abandoned in 1833 (Blacktown Native Institution Project 2015). Several local Aboriginal families camped on Colebee and Nurragingy's property 'Niahlingin', and the adjacent Black Town site, in the period between 1820 and 1890. In 1843, the land was granted to Maria Lock, where it remained in the family until it was resumed by the Aboriginal Protection Board in 1920 (Plate 3.2) (Kohen 1986:27).

European settlers claimed lands of importance to the Darug that were traditionally used for campsites, social gatherings, resource procurement, and burial practices (Collins 1798). From the 1790s small-pox and other European diseases, and violent conflicts resulted in catastrophic impacts to the social and physical worlds of the Darug (Connor 2002; Gapps 2018; Mear 2008:13). Nevertheless, the survivors drew on their existing webs of connection to form new bands and renegotiate country and their place in the colonial world (Irish 2014:71). Today, the contemporary traditional owners maintain their cultural links to Darug country, family and aspects of traditional life. They fulfil their cultural responsibilities to care for country and for their cultural heritage places across Western Sydney.



Source: State Library of NSW, Call no. 1793 Q79/64

Plate 3.1 A map of the hitherto explored country contiguous to Port Jackson lain down from actual survey (Walker and Tench 1793)



Source: State Library of NSW, Call no. Z/M4 811.1122/1842/1

Plate 3.2 Plan of part of the Windsor District contained between the Old Richmond Road and the Road from Windsor, J. Musgrave, 1842. The map erroneously marks Colebee and Nurragingy's grant as "Black Town"

3.3.2 Early settlement and land use

From the 1790s, European settlement began to spread outward from Parramatta. Governor Phillip awarded the first land grants north-west of Parramatta to convicts and emancipists on the east side of Prospect Hill in July and August of 1791 and January of 1792 (Coast History & Heritage 2023:18; Heritage Concepts 2009:10). The first grants in the vicinity of the impact area were located around the present-day Prospect Reservoir with small properties granted to James Dunlop, J Landren and Fergus Gallagher in 1800 and 1803 (Table 3.2) (NSW Land Registry Service n.d.:Parish of Prospect, County of Cumberland).

The effects of the Hawksbury Nepean frontier war between Aboriginal groups and settlers meant settler food sources were in a tenuous position. In response, Governor King established additional government farms to support the growing colony (Connor 2002). Much of the impact area sits in two portions of land, measuring 38,728 acres (15,672.7 ha) and 6,017 acres (2,435 ha), reserved by Governor King in March 1802 for the grazing and breeding of government-owned livestock (Heritage Concepts 2009:11; Kass 2005a:10). The Rooty Hill Government Farm/run sits in the boundary of the present-day Blacktown municipality (Imer 1996b:10). The Rooty Hill Government Farm depot and overseer's residence was constructed in the area around Dunmore Street, Rooty Hill, in late 1815, approximately 5 km south of the impact area (Godden Mackay Logan Pty Ltd 2013:15). Additional shepherd, labourer and overseer's huts were established over the farm property but the landscape outside of the depot area was left largely unaltered beyond timber clearance (Godden Mackay Logan Hertiage Consultants 2007).

As the limits of the colony grew and free settlers began establishing farms of their own in large numbers, Government Farms were no longer as necessary for the survival of the Sydney settlement. As a result, from 1810, Governor Macquarie began issuing portions of the Rooty Hill Government Farm as land grants for private settlers (Heritage Concepts 2009:11). The Rooty Hill Government Farm was more extensively subdivided over the 1820s with the final portion of 8,000 acres (3237.5 ha) given over the Church and School Corporation in 1829 (Godden Mackay Logan Hertiage Consultants 2007; Godden Mackay Logan Pty Ltd 2013:16). The Brine pipeline route and Quakers Hill WRRF site are located on portions of the Rooty Hill Government Farm that were subdivided and

granted to ticket of leave convicts, free settlers and government officers in 1819, 1821, and 1823 (NSW Land Registry Service n.d.).

The size of colonial land grants were based on the social status of the grantees with ticket of leave convicts and free settlers granted 30 acre (12 ha) small farms, which increased in acreage if the individual was married and had children (Heritage Concepts 2009:10–11). Government officials and military officers were granted large tracts of land with convicts billeted to the landholders under an assignment system and forming labour forces on these large agro-pastoral estates (Godden Mackay Logan Pty Ltd 2013:15).

Mixed farming for self-sufficiency was the primary focus of the first settlers in Parish of Prospect (Kass 2005a:17; Morris and Britton 2000). Farms and estates produced fruit, vegetables, wheat, and fodder crops with larger estates also grazing cattle and sheep and experimenting with other forms of cultivation, such as viticulture (Godden Mackay Logan Pty Ltd 2013:16–17; Morris and Britton 2000). Large estates developed as small self-sufficient communities to support their population of labourers to undertake farming activities.

Table 3.2 Land grants in the impact assessment area (all in the Parish of Prospect, County Cumberland)

Historical Lot	Grantee	Date of grant	Other notes	Pipeline route section
111	William Smith	05.04.1821	250 acres (101 ha)	Brine Pipeline
112	Samuel Garsides	05.04.1821	60 acres (24 ha)	Brine Pipeline
119	Richard Freeman	05.04.1821	60 acres (24 ha)	Brine Pipeline
118	John McManus	05.04.1821	60 acres (24 ha)	Brine Pipeline
117	Rowland Fairweather	05.04.1821	50 acres (20 ha)	Brine Pipeline
134	Fredrick Garling	31.08.1819	Easthampstead Park estate. 1200 acres (486 ha)	Brine Pipeline
135	William Bland	31.08.1819	100 acres (40 ha)	Brine Pipeline
141	Major West	31.08.1819	Quaker/s Hill Estate. 700 acres (283 ha)	Brine Pipeline

3.3.3 Development of the Parish of Prospect

Following Gregory Blaxland, William Charles Wentworth and William Lawson's crossing of the Blue Mountains in 1813, Prospect became a throughfare on the road from Sydney to the pastoral land of the New South Wales Western Plains (Kass 2005a). William Cox commenced the construction of the Great Western Road from Emu Plains the Bathurst in 1814 and the road was completed in 1816 (Coast History & Heritage 2023:19). The original alignment of the Road followed the present-day Reservoir Road (Coast History & Heritage 2023:19). By the 1820s, regular coach services travelled along the Great Western Road to Penrith (Kass 2005a:12). The first phase of Blacktown Road from Prospect to the Hawkesbury was constructed in 1819 and additional roads were constructed and/or formalised in Parish of Prospect following the implementation of the *Parish Roads Trust Act, 1840* (Kass 2005a:11, 13). While these roads facilitated the movement of settlers, the roadways were also targeted by bushrangers operating around Eastern Creek Seven Hills, and Blacktown throughout the nineteenth century (Horne 2020).

In 1848, the population of the Parish of Prospect numbered 714 inhabitants across 17 houses (Kass 2005a:15). The west railway extension from Parramatta was constructed to Blacktown Road in July 1860 and Blacktown became the junction of the Richmond line in 1864 (Imer 1996a:36; Kass 2005a:15). The increased accessibility afforded by the railway line drew people and businesses to the Blacktown area (Imer 1996a:36; Kass 2005a:15, 18–19). Large estates began to be subdivided into small farms from 1869 (Imer 1996a:36; Kass 2005a:15, 18–19). The construction of the Prospect Reservoir in the 1880s brought labourers and their families to the area (Kass 2005a:20). As a result, additional subdivision of large estates occurred over the late nineteenth century and

labourers settlements sprung up around the Reservoir (Kass 2005a:20–25). The depression of the 1890s, however, re-focused settlement north around Blacktown Station (Coast History & Heritage 2023:19).

The Shire of Blacktown was declared in 1906, but the Parish of Prospect retained a rural character into the middle of the twentieth century (Godden Mackay Logan Pty Ltd 2013:20; Heritage Concepts 2009:17–18; Kass 2005a:27, 30). From 1900, subdivision acreages were promoted as suitable for poultry farms and market gardens (Coast History & Heritage 2023). Surveys of the region over the early twentieth century noted dairies, poultry farms, stockyards, slaughter yards, and orchards were the dominant the local industries (Godden Mackay Logan Pty Ltd 2013:20). Remnant bushland survived through the region, which was exploited through hardwood cutting and sawmilling at Quakers Hill (French 1996:44).

The character of the region changed drastically as large portions of farmland and bushland were resumed for suburban housing and industrial development following the Second World War (Blacktown and District Historical Society 1996:1). The population of the Blacktown district rose from 14,500 in 1936 to over 100,000 in the 1960s (Heritage Concepts 2009:18).

Roads were also improved and realigned with the Great Western Highway deviation at Prospect constructed in 1968 (Kass 2005a:41). From the 1970s, land began to be re-zoned for industry as manufacturing and production moved into areas including Seven Hills (Kass 2005a:45). Electricity transmission lines were installed throughout the local area in the late 1970s as part of the construction of the Blacktown sub-station (Coast History & Heritage 2023:20). Large-scale development has continued into the present with the addition of suburban housing estates and industrial parks.

The development of the project area is shown through historical maps and aerials in Table 3.7.

3.3.4 Tenure of the impact assessment area

i Quakers Hill WRRF site

The Quakers Hill WRRF site covers five land grants (lots 141, 215, 218, 219, 220), four of which were granted on 31 August 1819 and the fifth, to William Bowman (in trust) was granted on 18 March 1842 (Plate 3.3; Table 3.3).

Irish surgeon Major West was granted Lot 141, which was named Muff Farm and later became known as the Quaker/s Hill Estate (*National Advocate*, 21 September 1928:1). The WRRF boundary only passes into a small portion of the property, as such, the Estate is discussed in relation to the brine pipeline in Section 3.4.4.ii.

Lot 215 was granted to George Wilson. Wilson is recorded as 'free by servitude' and a householder/ landholder in the Prospect District in 1827 but as George Wilson is a common name definitive information regarding his tenure could not be found (Riley 1827). It is likely Wilson is the individual who arrived in Australia on the *Salamander* in 1791, and was residing in the Prospect District from at least 1812 (Convict Records 2024; State Records NSW 2009).

Free settler John Riley, who was born to a convict mother on the crossing from England in 1792, was granted Lot 218 (Caldlan 2016). Riley was the constable and pound keeper for Parramatta, then the Prospect District and resided on the property with his family before moving to Kurrajong prior to his death in 1854 (Caldlan 2016).

Lot 218 was granted to Thomas Douglas but information of Douglas' tenure could not be found. Likewise, the granting and early tenure of Lot 220 is not clear in the historical record. In 1841, John Pearce claimed that he had been awarded the grant by Governor Macquarie and still owned the land, however, William Bowman claimed the land fell under the estate of the late John Chisholm (*New South Wales Government Gazette*, 17 September 1841:1258). The case was resolved the following year with John Pearce recognised as the original grantee and William Bowman was grated the land title in trust (New South Wales Government Gazette 1842:463)

The West, Riley, Wilson and Bowman grants were incorporated into the Chisolm families extensive land holdings over the second half of the nineteenth century (NSW Land Registry Service n.d.:Primary Appn. 11548). By 1883, the family held the majority of property between Eastern Creek, the Richmond Road, and the Richmond railway extension (NSW Land Registry Service n.d.:Primary Appn. 11548; Vol.1407 Fol.100). Portions of the holding were leased and the family sold their holdings to The State investment Company of NSW in 1904 (NSW Land Registry Service n.d.:Vol.1407 Fol.100). Similarly, the Thomas Douglas grant became part of Charles Ward Pye's land holdings by 1893 and the Pye holding was sold to The State investment Company of NSW in 1906 (NSW Land Registry Service n.d.:Primary Appn.10872; Vol.1297 Fol.110).

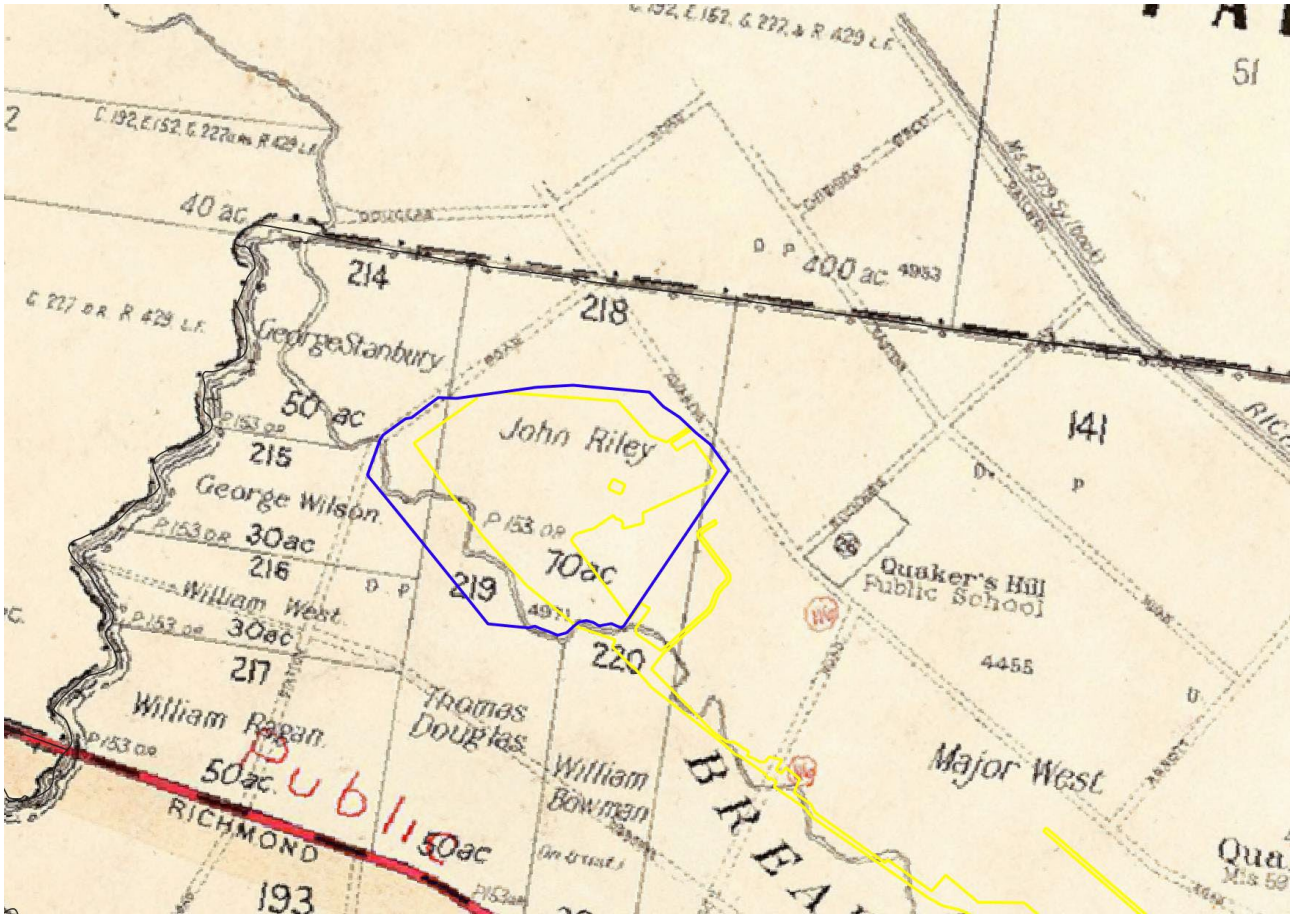
The State Investment Company of NSW divided the land into small farm holdings, which were sold as part of the Quakers Hill Estate Subdivision from 1908 (NSW Land Registry Service n.d.:Vol.1845 Fol.2; Vol.1968 Fol.75). The Quakers Hill WRRF site sits across Lots 4 to 8 and portions of Lots 11 to 16 in Section 3 of the subdivision (Plate 3.4). The lots were purchased from 1909, and farms were established on the properties (Table 3.4). The 1947 aerial photograph of the project area shows the majority of land had been at least partially cleared and farm houses were present on Lots 4, 6, and 7 with paddocks and farm structures visible in the WRRF area on Lots 8, 12, 14, and 15 (Table 3.3).

Occupants of note include Alfred Lee and wife Olive, who resided on Lot 7 with their family from 1911 to 1961 (NSW Land Registry Service n.d.:Vol.2230 Fol.249; The Aquarian 1985:7). The Lee family were the longest residents of the WRRF area. In addition, the family buried daughter Violet Emily Lee, who died in 1926 not long after birth, on the property (The Aquarian 1985). Violet was one of twins, her sister Olive survived into adulthood. The information on the grave was obtained from the surviving twin by Sydney Water Board employees, who knew of the grave and petitioned to discover who was buried there and to provide a grave stone. The date of death on the grave places Violet's death two days after she was born, however, the newspaper of the Sydney Water Board (The Aquarian) reports Violet died at two weeks. Given that the newspaper report also incorrectly identifies Violet as the surviving twin, not Olive, it is considered likely that the newspaper and not the grave inscription is in error. Violet Emily's grave site was restored by Sydney Water Board workers in 1985 (The Aquarian 1985).

Lots 4 to 8 and portions of Lots 11 to 16 were resumed for the purposes of The Metropolitan Sewage and Drainage Board in 1961 (NSW Land Registry Service n.d.:Vol.8314 Fol.221).

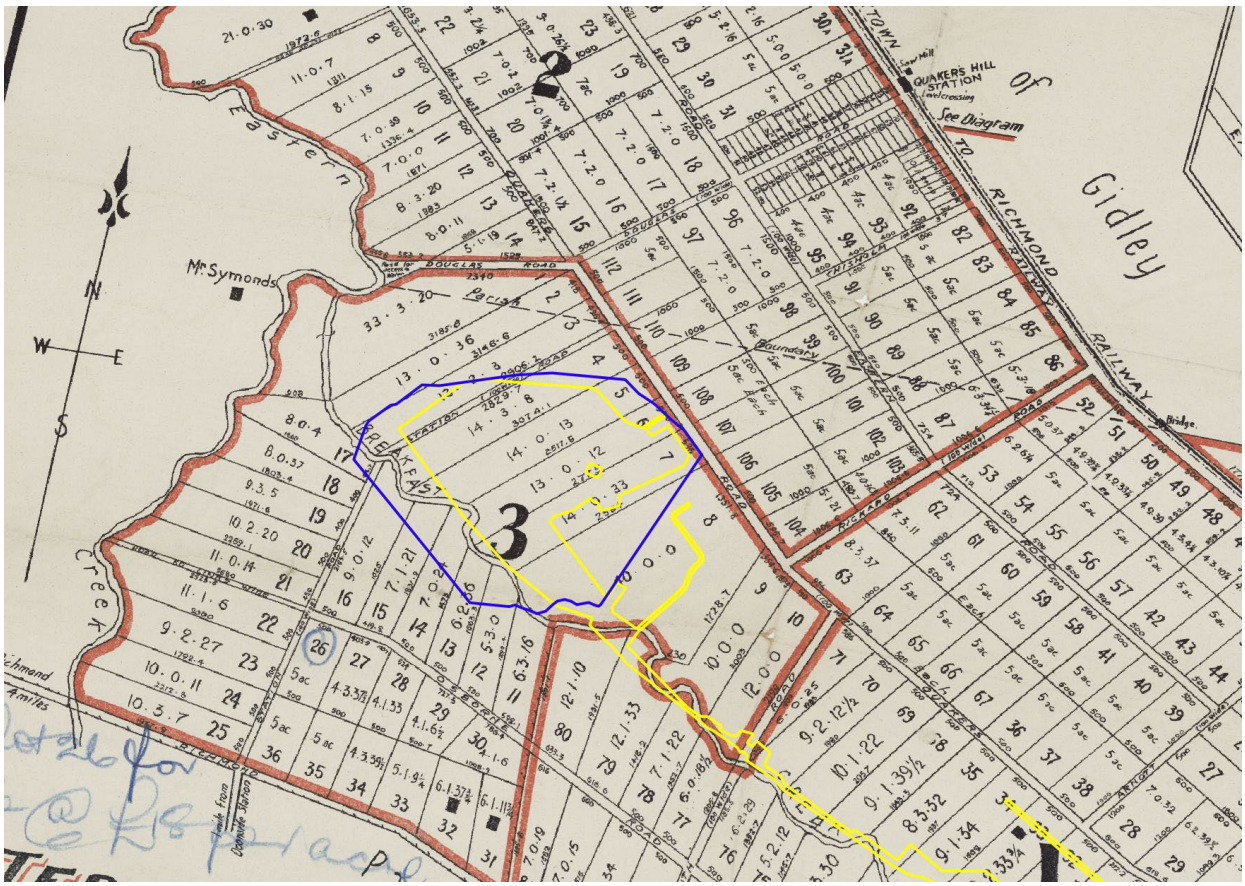
Table 3.3 Land grants Quakers Hill WRRF site (all in the Parish of Prospect, County Cumberland)

Historical Lot	Grantee	Date of grant	Other notes
141	Major West	31.08.1819	Muff Farm, later Quaker/s Hill Estate. 700 acres (283 ha)
215	George Wilson	31.08.1819	30 acres (12 ha)
218	John Riley	31.08.1819	20 acres (8 ha)
219	Thomas Douglas	31.08.1819	50 acres (20 ha)
220	William Bowman	18.03.1842	30 acres (12 ha)



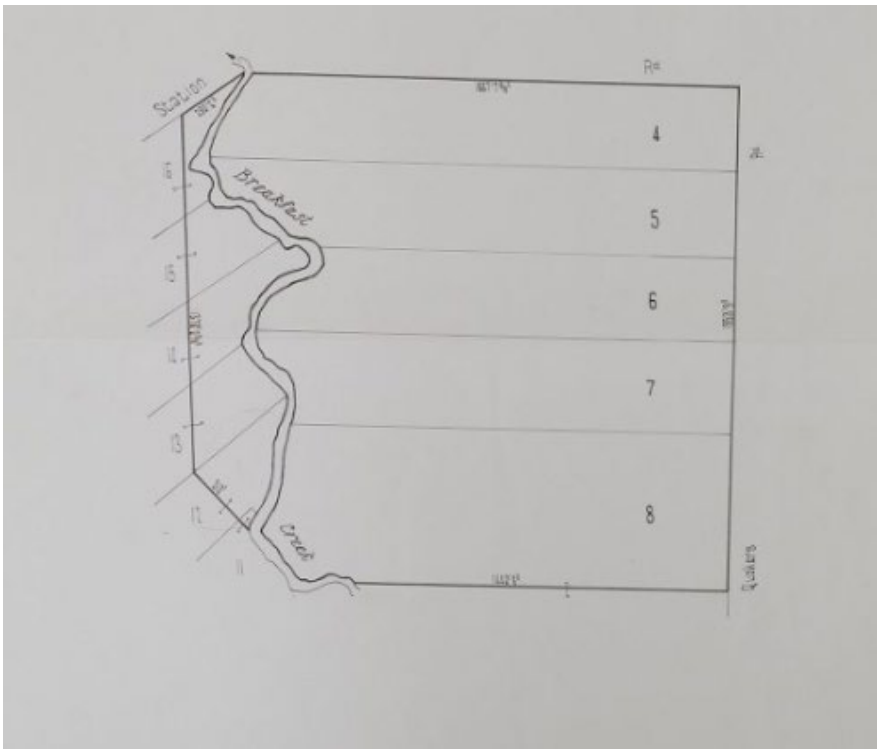
Source: HLRV

Plate 3.3 **Detail of the Quakers Hill WRRF area(blue) and project area (yellow) from the 1983 Parish of Prospect map**



Source: State Library NSW: 014 - Z/SP/Q1/15

Plate 3.4 **Detail of the Quakers Hill Estate subdivision showing the WRRF area (blue) and project area (yellow)**



Source: HLRV Vol.8314 Fol.221

Plate 3.5 **Land resumed for use by The Metropolitan Sewage and Drainage board, 1961**

Table 3.4 Land title holders in the Quakers Hill WRRF from subdivision to resumption (1961)

Subdivision Lot	Date	Title holder	Title Reference
4	1911	Samuel Thomas Booth	Vol.2166 Fol.166
	1918	William Drew	Vol.2166 Fol.166
	1922	Arthur Boot	Vol.2166 Fol.166
	1924	A small portion of the land is subdivided but ownership remains the same as the large portion of Lot 4	Vol.3648 Fol.158
	1928	Frank Vincent Wade Holmes	Vol.3303 Fol.25
	1930	Ernest Meyor Mitchell	Vol.3303 Fol.25
	1939	Harold Ashfield Mitchell	Vol.3303 Fol.25
	1946	Alexander Ronald Emslie and Norman David Fader	Vol.3303 Fol.25
	1954	Norman David Fader	Vol.6866 Fol.120
5	1925	Henry George Leader	Vol.3719 Fol.6
6	1910	Stephen Clooney	Vol.7286 Fol.243
	1918	Public trustee	Vol.7286 Fol.243
	1947	Philip Wood	Vol.7286 Fol.243
	1951	John Henry Sutton	Vol.7286 Fol.243
	1957	Lesley Wilfred Faff	Vol.7286 Fol.243
7	1911	Alfred Lee	Vol.2230 Fol.249
8	1910	Mary Ann Ratcliffe	Vol.2083 Fol.140
	1912	William Benjimin Masters	Vol.2083 Fol.140; Vol.306 Fol.32; Vol.3220 Fol.72
	1928	Laurence and Elizabeth Mooney	Vol.3220 Fol.72
	1936	Edgar Septimus Miller	Vol.3220 Fol.72
	1938	William Henry Brandt	Vol.3220 Fol.72
	1961	Remaining portion to Daisy Irene Brandt	Vol.3220 Fol.72
11 and 12	1910	William Frank Hadfield	Vol 2039 Fol.78
	1930	Robert John Hamilton Collins	Vol 2039 Fol.78
	1935	Harold Arthur Knight and Florence Annie Knight	Vol 2039 Fol.78
	1937	Henry and Mary (Margaret) Jane Bown	Vol 2039 Fol.78
	1942	Beatrice Elizabeth Grisman (wife of Maurice David Grisman)	Vol 2039 Fol.78
	1945	Louvain McClennand Sutton and Lorraine Particia Sutton (wife)	Vol 2039 Fol.78; Vol.7574 Fol.248
13	1909	Edward Edmonds	Vol.2005 Fol.116
	1934	Mary Edmonds	Vol.2005 Fol.116

Subdivision Lot	Date	Title holder	Title Reference
	1941	The Haymarket Land and Building Company	Vol.2005 Fol.116
	1950	Paul Arthur Selby Barnes and Rockley Roy Stuart Barnes	Vol.2005 Fol.116
	1951	1951 Salvatore Farrigia	Vol.2005 Fol.116
14	1918	Charles Ernest Potter	Vol.2825 Fol.217
	1956	Public Trustee	Vol.2825 Fol.217
	1956	Rudolf Jamsek	Vol.2825 Fol.217
	1956	Henry Thomas	Vol.2825 Fol.217
	1959	David Yelavich	Vol.2825 Fol.217
15	1911	John Robert Stuart	Vol.2131 Fol.2
	1919	Perpetual Trustee Company	Vol.2131 Fol.2
	1925	Henry George Leader	Vol.2131 Fol.2; Vol.3727 Fol.239
16	1911	John Robert Stuart	Vol.2131 Fol.2
	1929	Elda Anna Wilhelmine Sheldon, wife of Ernest George Sheldon	Vol. 4322 Fol.35
	1929	Frank Robert Butler and Margaret Blake Butler	Vol. 4322 Fol.35
	1932	George Savage and Pauline Wilhelmine Savage	Vol. 4322 Fol.35
	1952	Alfonso Giniotis and Ona Giniotiene	Vol. 4322 Fol.35

ii Brine pipeline

The brine pipeline travels from the Quakers Hill WRRF to the Northern Suburbs Ocean Outfall sewer. In doing so, itpasses through 10 historical land grants awarded between 1819 and 1823 (Table 3.5). Six land grants including Lots 111 to 115 and 118 were granted to ticket of leave convicts and free settlers in April 1821.

Lot 111 was granted to ticket of leave convict William Smith, who arrived in Australia on the *Charlotte* in 1788 (Magann 1997:48). Smith named his farm Ann's Place and the property passed to his wife and her son Thomas Burn Smith following his death in 1830 (Magann 1997). The property remained in the Smith family into the twentieth century, but portions were slowly subdivided and sold from 1897 (NSW Land Registry Service n.d.:Primary Appn. 8703; Vol.1074 Fol.52).

Moving west, Lot 112 was granted to Samuel Garsides, later known as Samuel Gearside (Magann 1997). It does not appear that Garsides resided on the property as he is consistently recorded in the Windsor/Richmond district (Australian Royalty n.d.).

Ticket of Leave convict William Carroll was granted Lot 113 (Convict Records 2023). Carroll arrived in Australia on the *Archduke Charles* in 1813 and, upon arrival, worked as a mason labourer for the Government at Parramatta (Convict Records 2023). Carroll and his family resided on the grant and by 1822 he had constructed a house on the property and 20 acres (8 ha) felled and 15 acres (6 ha) under cultivation (Convict Records 2023). Even so, it appears the family was struggling as Carroll applied to the Government Commissariat for support for his family and their assigned convict (Convict Records 2023). In 1828, Carroll was admitted to the Benevolent Asylum but wife Bridget and their two sons continued to reside on the farm (Convict Records 2023).

Lot 114 was granted to William James, Lot 115 to John Marsh, who was assistant to magistrate and road builder William Cox, and Lot 116 was granted to John McManus. Information could not be found regarding the tenure of these individuals. The Marsh and McManus grants came under the ownership of Charles Trimby Burfitt by 1885 (NSW Land Registry Service n.d.:Primary Appn. 6868). Charles Trimby Burfitt attempted to subdivide the land into farms for sale but went bankrupt before sales were finalised (Plate 3.6) (*Evening News*, 13 August 1891:6).

Moving north, George Allen was granted Lot 133 in 1823. Allen came to Australia as a free settler in 1816 and trained to be an attorney and solicitor for two years under Frederick Garling (Cowper and Parsons 1966). Lot 133 was one of a number of landholdings granted to Allen and it is not clear if Allen or his family resided on the grant, whether full time or part time as the family had a house at Glebe, known as Toxteth Park (Cowper and Parsons 1966; Magann 1997). The property was transferred to Charles Kern in September 1857 (NSW Land Registry Service n.d.:Primary Appn. 3450).

To the west, Crown Solicitor Fredrick Garling was granted Lot 134 by Governor Macquarie in 1819 (Magann 1997). The grant was known as East Hamstead Park and was likely developed as part of Garling's agricultural and horticultural experimentation though it is not clear if Garling resided on the property as his offices were in Sydney city (McIntyre 1966). George Bowman had purchased East Hamstead Park by June 1838 and the land retained by the Bowman family though the nineteenth century (NSW Land Registry Service n.d.:Primary Appn. 8128; *The Sydney Herald*, 18 June 1838:3). In 1878, the property was divided into six large portions and distributed among members of the Bowman family (NSW Land Registry Service n.d.). The development of the six portions varied, some were leased into the middle of twentieth century while other sections were subdivision into smaller portions for farming and industry from c.1911 (NSW Land Registry Service n.d.:Vol.4412 Fol177; Vol.996 Fol.84).

Likewise, surgeons William Bland and Major West were granted portions 135 and 141, respectively, in 1819. William Bland was a naval surgeon and was transported to Sydney in 1814 for mortally wounding the ship's purser in Bombay (Cobley 1966). The land portion appears to have been granted to Bland following 12 months in prison for publishing literature lampooning Governor Macquarie (Cobley 1966). It is not clear if Bland resided on the property and the land was noted among the Chisolm land holdings in 1883 (NSW Land Registry Service n.d.:Primary Appn. 11548).

By 1828, Major West's Muff Farm, later known as Quakers Hill, encompassed approximately 2000 acres on the Richmond Road and West was grazing Merino stock on the land (The Monitor, 10 January 1828a:2, 12 July 1828b:1). West sold the property in 1828 before returning home to Londonderry in 1832 (*National Advocate*, 21 September 1928:1). The estate was incorporated into the land holdings of James Chisholm, which were managed by George Bowman (*The Sydney Morning Herald*, 1 August 1836:4). Chisholm improved the property, and the estate was advertised for lease in 1836:

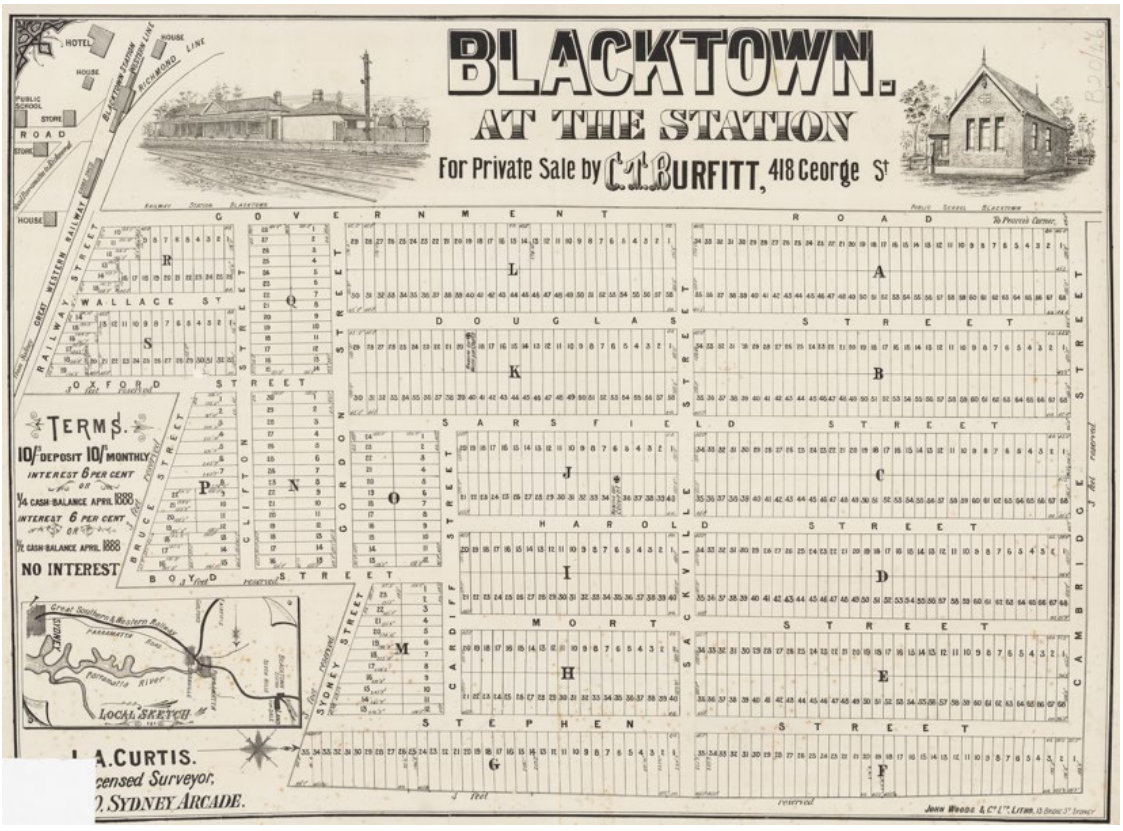
> containing one thousand and ninety acres, six hundred acres of which have been cleared and stumped, and about one hundred acres have been in cultivation ; the whole is fenced in, and divided into convenient paddocks ; the dwelling-house contains five rooms, there is also a good kitchen and servants' room detached, a store, four-stall stable, granary, coach-house, large cart shed, harness-room, men's house, stockyard, milking shed, cow house, dairy, a large garden well stocked with fruit trees, and every convenience for a genteel family; the whole of the buildings and fencing have been recently erected, and are now in thorough repair (*The Sydney Morning Herald*, 1 August 1836:4).

Convict huts were also present on the property (Hawkesbury Courier and Agricultural and General Advertiser 1844:3). Fredrick A Thomson resided on the estate by 1839 and James Blackett had established a horse stud and grazing facility on the property by 1841 (*New South Wales Government Gazette*, 23 January 1839:112; *Sydney Free Press*, 21 August 1841:1).

Both the Bland and West grants followed the pattern of ownership from the Chisholm family to Charles Pye, then to The State Investment Company of NSW where the properties were subdivided and sold as part of the 1908 Quakers Hill Estate Subdivision (NSW Land Registry Service n.d.:Vol.1845 Fol.2; Vol.1968 Fol.75).

Table 3.5 Land grants in the Brine pipeline area (all in the Parish of Prospect, County Cumberland)

Historical Lot	Grantee		
111	William Smith	05.04.1821	250 acres (101 ha)
112	Samuel Garsides	05.04.1821	60 acres (24 ha)
113	William Carroll	05.04.1821	50 acres (20 ha)
114	William James	05.04.1821	40 acres (16 ha)
115	John Marsh	05.04.1821	35 acres (14 ha)
118	John McManus	05.04.1821	60 acres (24 ha)
133	George Allen	30.06.1823	300 acres (121 ha)
134	Fredrick Garling	31.08.1819	Easthampstead Park estate. 1200 acres (486 ha)
135	William Bland	31.08.1819	100 acres (40 ha)
141	Major West	31.08.1819	Quaker/s Hill Estate. 700 acres (283 ha)



Source: Blacktown Memories M712

Plate 3.6 C.T Burfitt's Blacktown at the Station subdivision, c. 1888

iii Northern Suburbs Ocean Outfall sewer

The first official Sydney sewer system was built between 1854 and 1857 (Sydney Water Corporation 2005:17). The integrated sewage and stormwater system comprised stone and brick conduits that discharged directly into the harbour (Sydney Water Corporation 2005:17). At this time sewer construction and management came under the jurisdiction of local councils, with all systems discharged directly into local waterways (Sydney Water Corporation 2005:18).

Overwhelmed systems, protests over pollution in the harbour, and an outbreak of typhoid in the 1870s resulted in the appointment of the Sewerage and Health Board to oversee improvements in effluent management for Sydney and its suburbs (Sydney Water Corporation 2005:18). The board proposed the construction of a new sewer system whereby effluent would be treated and then carried away to an ocean outfall, away from public water supplies (Sydney Water Corporation 2005:18; Truman Zaniol & Associates 2009:9).

The first phase of the new sewer system was the Northern (Bondi) Sewer and Outfall, which was constructed through the Sydney suburbs in 1888 (Sydney Water Corporation 2005:18). As growing populations put pressure on existing sewage systems, a scheme was developed in 1914 to connect the suburbs west of Parramatta, to the North Bondi Sewer Outfall (Truman Zaniol & Associates 2009:9). The Northern Suburbs Ocean Outfall Sewer (NSOOS) scheme was approved by the NSW Parliamentary Standing Committee for Public Works in 1915 and works began in 1916 and were completed in September 1929 as far as the Camellia sewerage pumping station (SP0067) (Truman Zaniol & Associates 2009:10).

At present the NSOOS services as far west as Blacktown with construction of the extension from Parramatta to Blacktown occurring between 1933 and c.1970 (Sydney Water Corporation 2000). Documentation on the extension of the NSOOS to Blacktown is difficult to access, but the works in the vicinity of Seven Hills occurred during the 1960s based on Sydney Water's internal asset register. The section into which the project would tie was constructed in 1963 and included the installation of a series of conical maintenance holes and covers spaced along the NSOOS. The shafts of the maintenance holes were lined with concrete and the maintenance hole covers are likewise of concrete.

3.4 Chronology

The historic timeline for the impact assessment area is outlined in Table 3.6.

Table 3.6 Historical timeline of the impact assessment area — Brine pipeline and Quakers Hill WRRF

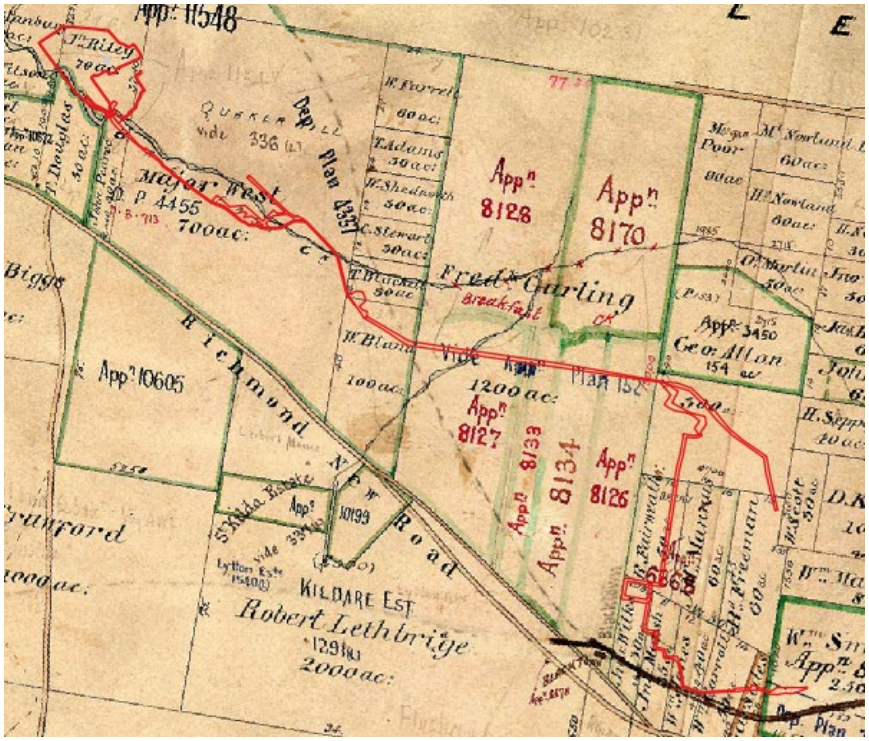
Year	Event
Pre-1788	The impact area is located in the traditional country of Darug language group.
April 1788	Governor Phillip leads an along the Parramatta River in search of arable ground Rose Hill settlement is established. The Party climb Prospect Hill, which they name Bellevue.
1789-1791	Captain Watkin leads three expeditions, which pass through the Prospect region. Tench renames Bellevue Hill to Prospect Hill.
1800-1803	The first land portions are granted to European settlers in the Prospect region.
1802	Governor King establishes the Rooty Hill Government Farm.
1810	Governor Macquarie subdivides portions of the Rooty Hill Government Farm for land grants.
1814-1816	The Great Western Road is constructed through the prospect district.
1816	Colebee and Nurragingy are granted 30 acres on Richmond Road.

Year	Event
1819	The first land grants in the impact area are awarded to ticket of leave convicts, free settlers and government officers. Blacktown Road is constructed between Prospect and Hawkesbury.
1823	The Native Institution at Parramatta is transferred to a new institution on the Richmond Road, on the former property of William Bell known as “Black Town”
1829	The Blacktown Native Institution is decommissioned.
1860	The west railway extension is built from Parramatta Blacktown Road.
1864	Blacktown becomes the junction for the Richmond Railway line.
1878	Fredrick Garling’s estate (Lot 134) is divided into six portions among members of the Bowman family.
1885	Charles Trimby Burfitt subdivides the Marsh and McManus grants (Lots 115 and 116) for sale as part of the Blacktown at the Station land sale.
1897	Portions of William Smith’s grant (Lot 111) begin to be subdivided and sold.
1908	The State Investment Company of NSW divides the West, Bland, Riley, Wilson, Douglas, and Bowman grants into small farm lots, which are sold as part of the Quakers Hill Estate Subdivision.
1911	Sections of the Bowman/Fredrick Garling’s estate (Lot 134) portions are subdivided for small farms and industry.
1916	Works begin on the Northern Suburbs Ocean Outfall Sewer
1929	The Northern Suburbs Ocean Outfall Sewer is completed.
Post 1945	Intensification of settlement and introduction of industry in the Blacktown, Seven Hills, and Quakers Hill area.
1961	Land is resumed for the purposes of The Metropolitan Sewage and Drainage Board and the Quakers Hill sewage works, later the WRRF, is established.

3.5 Land disturbance

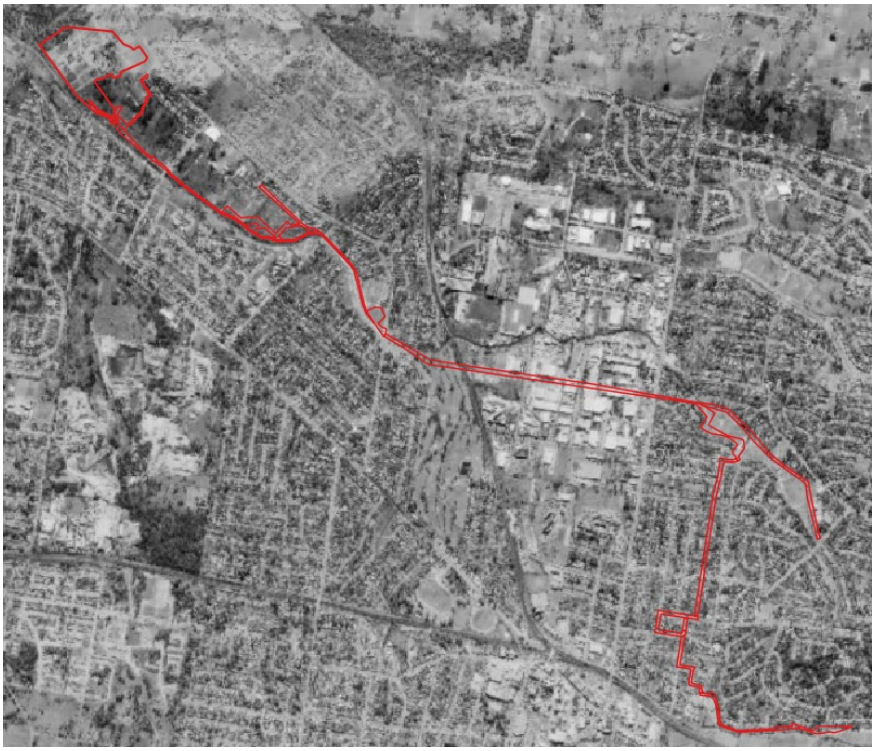
A review of the available historical imagery in Table 3.7 provides insights into the transformation of the impact assessment area and its surroundings. The earliest Parish maps outline the agricultural parcels, early road and rail alignments. Similarly, the historic aerials show the substantial expansion of residential and industrial developments throughout the general area, with the brine pipeline developed first, and Quakers Hill WRRF only visibly developed around from 1998. Extensive vegetation clearance was also visible through time, especially around extant waterways (e.g. Breakfast Creek). Overall, it is clear that all parts of the impact assessment area have been developed, with the earliest agricultural uses transitioning to industrial/suburban estates from 1970.

Table 3.7 Historical plans and aerials showing the impact assessment area

Historical plan/aerial photograph – indicative impact assessment area in red	Year of plan/photograph and description
	**Parish of Prospect undated (pre-1880)** • Land grants around Quakers Hill WRRF are bisected by Breakfast Creek. • The old alignment of Richmond Road is visible south-west of the impact assessment area. • The alignment of the Richmond Railway Line is marked out prior to construction. Source: HLRV
	**Parish of Prospect 1894** • No observable change around Quakers Hill WRRF. • The Richmond Railway Line intersects the impact assessment area (brine pipeline). The Blacktown Railway Line is visible orientated east to west. • The alignments of Richmond Road and the Great Western Road have been modified. • Several lots have changed ownership and expanded. Source: HLRV

Historical plan/aerial photograph – indicative impact assessment area in red	Year of plan/photograph and description
	**1947** • The general area is dominated by agricultural plots in the north-west, with more urbanised residential developments around present-day Blacktown and Seven Hills. • There are moderately dense remnant forest surviving in the south and west along Eastern Creek. • Most of the impact assessment area has been cleared of vegetation along Breakfast Creek. • Racecourses are visible around present-day Blacktown. • Two railway lines visible. Source: Historical Imagery Viewer
	**1950 (Quakers Hill WRRF only)** • Remnant vegetation surrounding rural farmlands. • Several agricultural fields present inside the impact assessment area. • Several dirt tracks running north-east to south-west through impact assessment area. • Original road alignments visible surrounding the impact assessment area, which are largely removed in entirety minus portions of Quakers Road. • Quakers Hill grave site not visible from aerial image. Location is indicated by the blue hatched square. Source: Historical Imagery Viewer

Historical plan/aerial photograph – indicative impact assessment area in red	Year of plan/photograph and description
	**1970** • Intensive expansion of residential suburban and industrial developments present surrounding most of the impact assessment area (barring the north-west portion around Quakers Hill WRRF which retains rural character). • Large pockets of remnant vegetation cleared. • Same major roads present, just clearer compared to previous 1947 aerial. Source: Historical Imagery Viewer
	**1975** • The residential and industrial expansion has continued toward the north-west part of the impact assessment area. • Large industrial estate continues to grow in the central portion of the aerial. • Quakers Hill WRRF seems largely unchanged, with vegetation and cleared land visible. • Alignment of Breakfast Creek beginning to be altered Source: Historical Imagery Viewer

Historical plan/aerial photograph – indicative impact assessment area in red	Year of plan/photograph and description
	**1984** • The residential expansion continues toward the north-west part of the impact assessment area. Starting to fill in the eastern side of Quakers Hill WRRF while the land north remains rural. • Industrial estate (present-day Kings Park/Marayong) largely filled out. • Little to no remnant vegetation remains, barring small areas outside the impact assessment area. • Winding curves of Breakfast Creek straightened south of Quakers Hill WRRF. Source: Historical Imagery Viewer
	**1998** • Substantial industrial infrastructure added inside Quakers Hill WRRF. Vegetation cleared inside that area. • Roads surrounding Quakers Hill WRRF realigned. • Suburban development expanded to surround Quakers Hill WRRF on all sides. • Alignment where the M7 will be constructed cleared. Source: Historical Imagery Viewer

Historical plan/aerial photograph – indicative impact assessment area in red	Year of plan/photograph and description
	**2014** • Suburban development continues to fill out throughout aerial image. • M7 constructed. • Additional industrial park south of the impact assessment area under construction (zoned general residential). • Infrastructure added to Quakers Hill WRRF. Source: Google Earth
	**2024** • Aerial largely unchanged from last image. • Additional industrial park south of the impact assessment area completed construction (zoned general residential). • Infrastructure added to Quakers Hill WRRF. Source: Google Earth

4 Site inspection

4.1 Landscape overview

The environmental characteristics of any area influence the way people used the landscape. In the past, the availability of resources such as water, flora, fauna, stone material and topography played a substantial role in the choice of camping, transitory movement and ceremonial areas used by Aboriginal people.

Migrants to the early colony looked for the same landscape characteristics but manipulated their environment in ways that left more obvious marks. Water, level or gently sloping ground, suitable soils to grow crops and animals were sought after. Therefore, understanding environmental factors assists with predicting where sites are likely to occur. Additionally, natural and cultural (human-made) site formation processes that occur after the deposition of archaeological material influence the way artefacts are distributed and/or preserved.

The impact assessment area is situated throughout the Blacktown LGA in Sydney's west. The surrounding landscape is characterised by the gentle undulating slopes typical of the Cumberland Plain, which covers approximately 600 km^2 and is largely developed, forming Sydney's western suburbs (see Section 3.5). The site is mainly formed by the Quakers Hill WRRF, then travels (often below ground) across residential and industrial estates.

4.2 Results

A physical site inspection of portions of the impact assessment area was undertaken by Courtney Culley (EMM Archaeologist) and Bianka Erdei (EMM Graduate Archaeologist) on 26 and 27 March 2025 (Figure 4.1). The primary aim of the survey was to identify risks and/or potential impacts to extant heritage items and to characterise the archaeological potential of the impact area. The pedestrian survey targeted the grave site inside Quakers Hill WRRF as well as the planned construction compounds along the brine pipeline. Construction compounds were targeted for inspection as the majority of the brine pipeline is located under roads and footpaths where there is no surface visibility and the identification of archaeological potential is therefore improbable. The construction compounds are generally located in open grassed areas where surface expressions of archaeological sites may be visible, noting that not all archaeological sites are visible from the surface. Similarly, the NSOOS was not inspected as it is located below ground level and is largely not visible at the surface.

The site inspection inside Quakers Hill WRRF involved a single survey transect through the impact area and immediate surrounds. All parts of the impact area had been subject to moderate to high levels of disturbance associated with the construction and operation of the existing wastewater infrastructure. Much of the impact area inside Quakers Hill WRRF comprised of industrial buildings and concrete surfaces associated with the operation of the WRRF. The grave of Violet Emily Lee is located within a 20 x 20 m fenced area south-east of the main access road into the WRRF (Plate 4.1 and Plate 4.2). The transcription on the grave reads, "Violet Emily Lee. Born: 28th May 1926 – Died 31st May 1926. Daughter of Alfred and Olive Francis Lee. Sister of Olive Francis Mavis and Twin Sister of Emma Florence Clarice Lee. IN GOD'S LOVING GRACE." This is a known item, but is not listed on Sydney Water's s170 register and has not previously been assessed as an item of heritage significance. A row of stones borders the red brick grave with exposed ground contrasting to the grass present throughout the site (Plate 4.3 and Plate 4.4). Sporadic trees are spotted within the fenced area, with a juvenile sapling to the right of the grave itself. Overall, the grave site has been continually upkept and is in good condition.

The four locally listed heritage items identified within 200 m of the impact assessment area were inspected (Section 2.4). The small buffer reflects heritage items that had the possibility of being directly impacted by the proposed project. The view from three heritage listed houses (I12, I16 and I17) were inspected for potential impacts of the barometric loop (including Compound 21) within the Billy Goat Hill Reserve, Blacktown (Plate 4.5). The location of the barometric loop is across the west end of the Reserve up a gentle, grassed hill (Plate 4.6). The Reserve is located on the south side of Cardiff Street and is surrounded to the west, south and east by low density

residential development. Within the Reserve itself is a war memorial plaque in front of a playground that details planting of a pine in the park as a World War I memorial (Plate 4.6 and Plate 4.7). The plaque is not located near a pine tree, but there is a pine located approximately 38 m south-west of the plaque and 29 m from Cardiff Street and 18 m from the west boundary (being 36 Cardiff Street) of the Reserve (Plate 4.6). This pine tree is assumed to be the one referenced on the plaque. The barometric loop would be located approximately 13 m from this pine tree. The pine tree is not listed as an item of heritage significance in Schedule 5 of the Blacktown LEP and is not identified on the *Blacktown City Council Register of Significant Trees and Vegetation* (Blacktown City Council 2012). The tree is therefore not considered to hold heritage significance.

Locally listed House I12 is located at 11 Harold Street and is situated on a small hill that, in conjunction with the intervening three houses, completely obscures the view south toward the Reserve (Plate 4.8 and Plate 4.9).

House I16 and I17 are located on Sarsfield Street, to the west of the Reserve. House I16 is located the west side of the Street number 2. House I16 is separated from the Reserve by Sarsfield Street, the houses on the east side of Sarsfield Street and 36 Cardiff Street. The view from House I16 towards the project area is obscured by large trees along the front of the property as well as the aforementioned residential development (Plate 4.10 and Plate 4.11). House I17 (Plate 4.12) is located at 5 Sarsfield Street, on the east side of the road. The lot is separated from the Reserve by one property (36 Cardiff Street), which contains a large tree in the rear yard. While the rear yard of 5 Sarsfield Street was not accessed, it is anticipated that the fencing and the aforementioned tree would obscure views to Billy Goat Reserve completely.

A church (I34), Our Lady of Czestochowa Queen of Poland, 116-132 Quakers Road was inspected for potential impacts and was surrounded by ongoing construction (Plate 4.13). No views towards the WRRF were identified, the intervening space being heavily vegetated with some low-density development in the adjacent lot. Similarly, no views between the church and the brine pipeline alignment to the south-west along Breakfast Creek were identified.

A total of 22 locations were visited as part of the site inspection that were concentrated along sections of the brine pipeline (e.g. Plate 4.14 to Plate 4.18). All inspected areas were either grassed (n=18) or covered in bitumen (n=4). Twelve of the locations were located along parklands bordering Breakfast Creek. Due to extensive development in all inspected locations, there was little remaining or identifiable landforms or potential heritage items. Ground surface visibility was low across the compound areas.

No previously unidentified historical sites or objects were identified during the site inspection. Four locally listed heritage items were visited as well as an unregistered but known heritage item within Quakers Hill WRRF. It was observed that almost all the impact area had been subjected to moderate to high levels of previous ground disturbance through landscape modification of associated with the construction of residential areas and a large industrial facility. The site inspection validated the desktop information and found no new evidence of historical materials and/or sites within the impact area.

Plate 4.1 Location of the fenced grave within Quakers Hill WRRF, view south-east

Plate 4.2 Grave of Violet Emily Lee, view south-east

Plate 4.3 Overview of grave, view south

Plate 4.4 Detail of grave, view east

Plate 4.5 Billy Goat Hill Reserve, view south-east

Plate 4.6 Location of the barometric loop and planted pine tree, view south-west

Plate 4.7 Memorial dedicated by the Blacktown City Council

Plate 4.8 Heritage item I12 House, view south-west

Plate 4.9 View from heritage item I12 toward the barometric loop, view south

Plate 4.10 Heritage item I16 House, view south-west

Plate 4.11 View from heritage item I16 toward the barometric loop, view south-west

Plate 4.12 Heritage item I17 House, view south-west

Plate 4.13 Heritage item I34, view south-east

Plate 4.14 Overview of location 1, view east

Plate 4.15 Overview of location 3, view east

Plate 4.16 Overview of location 12, view south

Plate 4.17 Overview of location 17, view north-east

Plate 4.18 Overview of location 22, view south-west

KEY

- Impact assessment area
- Brine pipeline
- Photo point

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody

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Source: EMM (2025); DCSSS (2024); MetroMap (2025); Sydney Water (2025)

0 0.5 1 km

GDA2020 MGA Zone 56

N

Site inspection results

Quakers Hill Water Resource Recovery Facility Advanced Treatment Upgrade
Figure 4.1

EMM creating opportunities

4.3 Northern Suburbs Ocean Outfall Sewer

The NSOOS is comprised of multiple components, including:

- West Middle Harbour Submain - extends from the main sewer at Cammeray Park to Rocky Creek, Gordon. Four aqueducts were constructed along the line of this sewer.
- East Lane Cove Submain - extends from Lane Cove River Syphon north to Stringy Bark Creek, Lane Cove.
- West Lane Cove Submain – Runs from the Lane Cove River Syphon extends to the intersection of Strand & Pittwater Road.
- Five aqueducts in the original section between Parramatta and the ocean outfall.
- Middle Harbour and Lane Cove inverted syphons.
- Sewer vent shafts.
- Later (1933-c.1970) extension from Blacktown to Parramatta (Sydney Water Corporation 2000).

For the purposes of this assessment, the later extension from Blacktown to Parramatta is of relevance as there will be no direct impacts to the original section completed by 1930. The extension between Blacktown and Parramatta is not visible at surface level, with a series of maintenance holes providing access to the NSOOS.

5 Evaluation of the impact area

5.1 Key findings

- The impact area demonstrates localised heritage values at a local level, reflecting its historical, and cultural significance.
- Archaeological potential varies across the impact area, from minimal in highly urbanised settings to moderate within proximity to known heritage items.
- No evidence of built heritage significance survives.

5.2 Comparative analysis

Comparative analysis assists in determining the representative and rarity significance of a structure or place by putting it in context with places of similar dates, function and style. The WRRF portion of the impact area is therefore comparable to other WRRFs and brine pipelines developed in the late 20th century to facilitate water and sewerage infrastructure.

A search for and examination of similar facilities throughout NSW indicates that there are at least 19 other treatment facilities that are comparable to the Quakers Hill WRRF (constructed since at least 1978 based on aerial imagery). These sites are comparable in size, purpose and location near fresh/ocean water.

Overall, the Quakers Hill WRRF shares location, heritage status (or lack of) and functional commonalities with other WRRFs throughout NSW. A comparative analysis of similar projects and/or facilities (secondary wastewater treatment levels only) is available in Table 5.1.

Table 5.1 Comparative analysis

Site name	Location to Quakers Hill WRRF	Description	Heritage Listings	Comparable to the current project
Secondary water resource recovery facilities				
Bombo	94 km south-east of the impact area	First opened in 1984, the Bombo WRRF treats wastewater while intermittently utilising decanted aeration lagoons. This facility disposes of treated wastewater to the South Pacific Ocean. Bombo WRRF also produces biosolids.	Adjacent west of the *Bombo Headland Quarry Geological Site* (A1), but the WRRF is not listed	• Earlier initial construction date • Located in a different region of NSW • Different method for water processing and disposal • In contrast to the current project the Bombo WRRF sits opposite a listed historical heritage item

Site name	Location to Quakers Hill WRRF	Description	Heritage Listings	Comparable to the current project
Glenfield	15.5 km south of the impact area	With construction starting in 1962 the Glenfield WRRF was opened in 1965. This facility processes wastewater and provides a crucial water source for Sydney. This facility is currently undergoing upgrades (due 2025) part of the same Malabar Systems Upgrade project as Liverpool WRRF.	Nil	• Earlier initial construction date • Similar upgrades taking place within the facility • Comparable location in western Sydney • The facility also does not contain or sit adjacent to any listed historical heritage items
Liverpool	10.9 km south-east of the impact area	Operational since 1980 this facility has been undergoing upgrades and is planned to be operational by late 2024 after the removal of excess odours, with more upgrades occurring until 2030.	Nil	• Similar initial construction timeline • Similar upgrades taking place within the facility • Comparable location in western Sydney • The facility also does not contain or sit adjacent to any listed historical heritage items
Shellharbour	82 km south-east of the impact area	The Shellharbour Resource and Recovery Centre (formerly the Dunmore Recycling and Waste Disposal Depot) was first established in 1945, with a focus on waste diversion occurring since 2009 and redeveloped in 2019 to diversify recycling and recovery opportunities.	Adjacent south-west to the *Eric Creary Park pine trees* (I317) but the WRRF is not listed	• Earlier initial construction date • Located in a different region of NSW • Redeveloped prior to the current project • In contrast to the current project the Shellharbour WRRF sits opposite a listed historical heritage item
Warriewood	38 km north-west of the impact area	Located in the northern beaches NSW, the Warriewood WRRF was first opened in 1995. The facility discharges treated wastewater into the ocean.	Nil	• Similar initial construction timeline • Different method for water processing and disposal • Located in a different region of NSW • The facility also does not contain or sit adjacent to any listed historical heritage items

5.3 Assessment of sites in the impact area

As outlined in Section 1.4.2 of this report, historical heritage significance in NSW is assessed based on criteria from the Burra Charter (Australia ICOMOS 2013) and the guidelines *Assessing heritage significance: Guidelines for assessing places and objects against the Heritage Council of NSW criteria* (Department of Planning and Environment (NSW) 2023a).

5.3.1 Water Resource Recovery Facility

Table 5.2 and Table 5.3 presents an assessment of heritage significance of the WRRF and the grave site. The grave site found within the WRRF facility is treated as a separate heritage item that is situated within the WRRF but not being part of the WRRF itself.

Table 5.2 Significance assessment of the WRRF

Criterion	Assessment
An item is important in the course or pattern of NSW's (or the local area's) cultural or natural history (Historical Significance).	The Quakers Hill WRRF site covers five land grants that were occupied by earlier settlers until sold as part of the Quakers Hill Estate Subdivision in 1908. This area was then occupied by small farm owners until the area was resumed for the purposes of The Metropolitan Sewage and Drainage Board in 1961. The WRRF does not contribute to the course or pattern of NSW or the local area's cultural or natural history. **Does not meet this criterion.**
An item has strong or special association with the life or works of a person, or group of persons of importance in NSW's (or the local area's) cultural or natural history (Associative Significance).	The WRRF is not associated with the life or works of a person, or group of persons of importance in NSW, or the local area's cultural or natural history. **Does not meet this criterion.**
An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area) (Aesthetic Significance).	The WRRF is not important in demonstrating aesthetic characteristics and/or high degree of creative or technical achievement in NSW (or the local area) **Does not meet this criterion.**
An item has a strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons (Social Significance).	The WRRF does not have a strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons. **Does not meet this criterion.**
An item has the potential to yield information that will contribute to an understanding of NSW's (or the local area's) cultural or natural history (Research Significance).	The WRRF facility does not contain the potential to yield information that will contribute to an understanding of NSW's or local area's cultural or natural history. **Does not meet this criterion.**
An item possesses uncommon, rare or endangered aspects of NSW's (or the local area's) cultural or natural history (Rarity).	Waste water recycling facilities are not an uncommon or rare item in NSW. They are becoming increasingly common as improvements in technology and manufacturing processes make these facilities are viable option to improve resource management for the local community. **Does not meet this criterion.**
An item is important in demonstrating the principal characteristics of a class of NSW's (or the local area's) cultural or natural places or environments (Representativeness).	The WRRF does not demonstrate or contain elements that are principal characteristics of Water management in NSW (or the local area's cultural or natural places or environments. **Does not meet this criterion.**

i Statement of Significance

The Quakers Hill WRRF is not historically, socially, aesthetically, or technically significant, nor is it rare, representative, or associated with any notable individuals or groups. As such, the site holds no cultural or natural heritage value at the local or State level.

Table 5.3 Significance assessment of the grave site

Criterion	Assessment
An item is important in the course or pattern of NSW's (or the local area's) cultural or natural history (Historical Significance).	Quakers Hill grave site belongs to Violet Emily Lee, who died in 1926 at the age of two days. The grave site is marked with an engraved brick headstone within the grounds of the Quakers Hill WRRF. Sydney Water Board employees restored and improved the gravestone with bricks, sandstone, pebble stone and an inscribed plaque in 1985. Violet Emily Lee was the daughter of Alfred and Olive Lee who were the land owners prior to 1961. **Does not meet this criterion**
An item has strong or special association with the life or works of a person, or group of persons of importance in NSW's (or the local area's) cultural or natural history (Associative Significance).	The Lee family were not known to be a prominent family that were important in NSW or the local area cultural or natural history. **Does not meet this criterion.**
An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area) (Aesthetic Significance).	The Quakers Hill grave site contains a modest gravestone with bricks, sandstone, pebble stone and inscribed plaque. It does not demonstrate aesthetic characteristics and/or a high degree of creative or technical achievement in NSW or the local area. **Does not meet this criterion.**
An item has a strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons (Social Significance).	The grave site has a strong association with Sydney Water Board employees. This is demonstrated as the site was restored by the employees in 1985. The nature of grave site also has spiritual and cultural value that is important to local community. **Does meet this criterion.**
An item has the potential to yield information that will contribute to an understanding of NSW's (or the local area's) cultural or natural history (Research Significance).	Grave sites are a common item in the landscape across NSW and in the local area. This item does not have the potential to yield information that would further contribute to the understanding of NSW's or the local area's cultural or natural history. **Does not meet this criterion.**
An item possesses uncommon, rare or endangered aspects of NSW's (or the local area's) cultural or natural history (Rarity).	Grave sites are a common item in the landscape across NSW and in the local area. This item does not have aspects that are significant contribution to NSW's or the local area's cultural or natural history. **Does not meet this criterion.**
An item is important in demonstrating the principal characteristics of a class of NSW's (or the local area's) cultural or natural places or environments (Representativeness).	This item is not important in demonstrating the principal characteristics of burial practices or other related classes of NSW or the local areas cultural practices. **Does not meet this criterion.**

ii Statement of Significance

The Quakers Hill grave site is considered to have social significance due to its strong association with the local Sydney Water employees, who restored the site in 1985. While modest in form and not historically or aesthetically significant, it holds spiritual and cultural value at a local level. As such, its heritage value is limited to community-based social significance.

5.4 Locally listed items

Table 5.4 reproduces the significance assessment provided in the BLEP listings, as provided on the State Heritage Inventory for the four items in the 200 m buffer of the impact area.

Table 5.4 Significance assessments of the locally listed items in 200 m buffer

Item	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F	Criterion G	Statement of significance
I12 House	11 Harold Street has historic significance to Blacktown as an early private hospital within the Blacktown Estate area, and as a remaining Edwardian [sic] home from the original subdivision of the Blacktown Estate [sic] in the early 1900's.	Not assessed against this criterion	Not assessed against this criterion	11 Harold Street has social significance as a private hospital operating throughout the mid twentieth century and as the place of birth of a number of Blacktown residents.	Not assessed against this criterion	Not assessed against this criterion	11 Harold Street is a representative example of Edwardian housing and also a House /Maternity Hospital typical of the early twentieth century and in particular of the Blacktown Estate Subdivision.	11 Harold Street has local historical significance as a remaining Edwardian house from the original Blacktown Estate Subdivision, which was the first transitional subdivision reflecting Blacktown's change from a semi-rural grouping of farmlets into an urban centre, around the turn of the 20th Century. The building also has historical significance as a private hospital in the mid-20th Century.
I16 House	Not assessed against this criterion	Not assessed against this criterion	Not assessed against this criterion	Not assessed against this criterion	Not assessed against this criterion	Not assessed against this criterion	Not assessed against this criterion	2 Sarsfield Street is a highly intact remaining Californian Bungalow building representing early development in the Blacktown Estate, and reflecting the transition of Blacktown from a semi-rural town to an urban centre in the early 20th Century.
I17 House	5 Sarsfield Street represents the late Victorian era of development in Blacktown and is a rare Victorian Brick Cottage in the Blacktown CBD.	Not assessed against this criterion	The building is an example of a substantial late Victorian cottage with features that demonstrate a moderate middle class wealth and aesthetic to the owner including French windows to the frontage, and sandstone sill (rendered), and a loft detail in the gable.	Not assessed against this criterion	The repair of the cottage may reveal significant former finishes and details. The site may contain archaeological remains of former structures.	The cottage is a rare remaining example of the Victorian era of development around Blacktown.	Not assessed against this criterion	5 Sarsfield Street is a significant brick building representing the Victorian development in the Blacktown area where the original larger land grants were divided into small 30 acre farm lots. This Victorian development pre-dated the Blacktown Estate, and the cottage represents this earlier layer of history.

Item	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F	Criterion G	Statement of significance
I34 Polish Memorial Roman Catholic Church	The Poliish [sic] Memorial Church is of historic Significance to the Blacktown Region as an expression of the migrant culture that developed in conjunction with urbanisation after the Second World War. The Polish War Memorial contained within the church is of historic significance to Sydney indicating the effects of World Warr Two and the sensitivities and War Trauma of Post War European immigrants to Sydney. The Chruch [sic] has landmark qualities as a piece of significant 20th century architecture.	The Polish Memorial Church has Associative significance with the post war Polish migrant community and with the particular form of Polish Catholic Worship honouring Our Lady of Czetochowa, the Black Madonna.	The Church is a significant twentieth century church buildign [sic] reflecting the early departure of churches from the traditional cruciform shape to a more modern multi purpose auditorium style that also refelceted [sic] a less traditional style of worship, in the catholic case resulting from Vatican II. The church was designed by significant 20th century architect Michael Dysaght, who was part of the "Sydney School", and the Australian government Architects Office in the 1960's.	The Church has high social significance to the Polish Community of Sydney as the location of the Polish War Memorial chapel.	Not assessed against this criterion	Not assessed against this criterion	The church is a representative example of the early modernist church designs of the post war era in Australia.	The Polish Memorial Church is a highly intact significant twentieth century architectural example of post war Modernist church design, which broke away from traditional church forms, also reflecting changes in church worship styles. The church reflects the strong post war European migrant history of the suburban settlement of Blacktown. The Church has high social significance to the Polish immigrant community of Sydney as the location of the Polish War Memorial Chapel.
4570286 Northern Suburbs Ocean Outfall Sewer (NSOOS)	The Northern Suburbs Ocean Outfall (NSOOS) was the third major sewerage system to be built to service Sydney's rapidly growing wastewater needs. It has been a major historical event in the development of the Northshore and inner and north western suburbs of Sydney	Not assessed against this criterion	The system is predominantly underground. However, the aesthetic significance is evident in the range of styles, design, details and materials used in its construction. The architectural styles and engineering qualities of the associated pumping stations, aqueducts, vent stacks, syphons and surface fittings make a contribution to Sydney suburban townscapes. In particular, the syphons at Middle Harbour and Lane Cove have aesthetic significance. The valvehouse structures attached to these items are of architectural interest, as early examples of the Art Deco style, displaying influence of Egyptian Architecture in civic industrial utility buildings. There are only a limited number of similar styled structures within the current Sydney Water system, for example, those associated with the Avon, Nepean and Woronora Dams. In the case of the Middle Harbour, these valvehouse structures are prominent well known foreshore landmarks. In addition, the design and detailing of the five aqueduct structures make an effective contribution to the parks in which they are situated.	Collectively the different components which make up NSOOS are culturally significant as evidence of the growth of Sydney's sewerage system, the rapid development of the northern suburbs, and the substantial improvement of sanitary conditions for Sydney's inhabitants for which it is likely to be held in high regard by the broad community.	Sewerage systems demonstrate a variety of construction techniques ranging from sandstone blocks, solid rock and reinforced concrete. The construction of these systems contributed to our understanding of the development and use of these materials in Australia and reflects the technological change in construction to meet the increasing population of Sydney. The Lane Cove Syphon is a fine example of the engineering tunnelling methods of the time. The passage under the river required considerable judgement and understanding of the nature and behaviour of the rock strata. The Middle Harbour Syphon is possibly the best example in the state of an inverted syphon on such a scale. Both syphons also provide an excellent example of major engineering public works techniques of the 1920's. Innovative engineering techniques were required so that the sewer line was able to cross Middle Harbour. The five aqueducts are significant examples of the superior use of reinforced concrete construction in the 1920's. They provide good examples of major public	The third major sewerage system built to service Sydney.	Representative of Sydney's sewerage system. Contains components which are excellent representations of public works engineering including; syphons, aqueducts, pumping stations and sewer vents.	The Northern Suburbs Ocean Outfall Sewer (NSOOS) is of considerable significance being the third major sewerage system built to service Sydney's growing wastewater needs. The primary significance of the system is embodied in the function it serves to the community of the northern and western areas of Sydney by channelling and managing its effluent, and in the careful and precise methods of achieving this. NSOOS is culturally significant as evidence of the growth of Sydney's sewerage system, the rapid development of the northern suburbs, and the substantial improvement in sanitary conditions for Sydney's inhabitants. Collectively the different components which make up NSOOS provide excellent examples of the major public works construction techniques of the early 1920's. The NSOOS system contains components which are in themselves highly significant items. The two major syphons associated with the system are fine examples of engineering methods. The Middle Harbour Syphon, in particular, is individually possibly the best example in

Item	Criterion A	Criterion B	Criterion C	Criterion D	Criterion E	Criterion F	Criterion G	Statement of significance
					works and bridge works of the time incorporating sophisticated construction detailing.			the State of an inverted syphon on such a scale. The Lane Cove Syphon is a good example of the engineering tunnelling methods of the time. The architectural styles and engineering qualities of the associated pumping stations, aqueducts, vent stacks, syphons and surface fittings make a contribution to the city's streetscape. In particular, the valvehouse structures attached to the syphons have aesthetic significance. These structures are of architectural interest as early examples of the Art Deco style, displaying influence of Egyptian Architecture in civic industrial utility buildings. The various aqueducts located in the system display superior utilitarian design & detailing. The scale, colour, texture and detail of these structures make an effective contribution to the parks and tree covered slopes in which they are situated. The boundary and curtilage of NSOOS is to include all original fabric from 1933 from Parramatta to North Head outfall with a 2 metre buffer zone parallel to the existing structures. The curtilage is to include all overpasses, access points and settings along the existing alignment of the NSOOS. (Sydney Water Corporation 2000)

5.4.1 Attributes

Section 1.4 outlines how impacts are graded against the Material Threshold Policy (Heritage NSW 2020) and ties the divisions between minor, moderate and major impacts to specific attributes associated with each heritage item.

The listing for the NSOOS indicates that the "boundary and curtilage of NSOOS is to include all original fabric from 1933 from Parramatta to North Head outfall with a 2 metre buffer zone parallel to the existing structures" (Sydney Water Corporation 2000). The project would occur to a section of the NSOOS constructed in 1963 in the extension from Parramatta to Blacktown. Based on the above description of the curtilage, the project would occur in a section that is not of heritage significance. As the project would not impact on original fabric (defined as dating to 1933 or earlier), it is considered that the material threshold impact of minor, moderate or major adverse impact would not be met.

5.5 Archaeological potential

5.5.1 Introduction

This section determines if archaeological resources and/or relics are likely to exist in the impact area that may be impacted by the proposed activity. The following assessment of archaeological potential is based on the definitions of 'relics' as outlined in Section 4(1) of the *Heritage Act* (as amended 2009), as they apply to the particular historical setting of the impact area, and applies the definitions of potential and disturbance presented in Table 5.5 and Table 5.6. Where there are high and moderate levels of archaeological potential in combination with nil, low or moderate levels of disturbance, the area holds archaeological sensitivity. These areas are presented in Table 5.7 and shown spatially in Figure 5.1. The significance assessment of the heritage items within the impact area, as outlined in Section 5.3, determines whether the potential archaeological resources in these areas are likely to be relics, as defined by the *Heritage Act*.

Table 5.5 Levels of archaeological potential applied to potential resources in the impact area

Level of Archaeological Potential	Explanation
High	Known, intensive activity has occurred (during the historical phase) that is likely to result in an archaeological resource. The activity is geographically constrained and is not likely to have been subject to subsequent disturbance.
Moderate	Known activity likely to result in an archaeological resource has occurred (during the historical phase). The activity is geographically constrained but may have been subject to subsequent disturbance.
Low	Known activity that may have resulted in an archaeological resource has occurred (during the historical phase). The activity is not geographically constrained and/or is likely to have been subject to substantial subsequent disturbance.
Unlikely	No known historical activity has been identified within a geographically constrained area that is likely to result in an archaeological resource and/or an area where subsequent subsurface impacts have been extensive.

Table 5.6 Definitions of disturbance levels informing assessment of archaeological potential

Level of Disturbance	Definition
High	The historical site or feature has been subject to subsequent development that clearly demonstrates subsurface disturbance has taken place that would have a major impact on any archaeological deposits or relics.
Moderate	The historical site or feature has been subject to subsequent development that clearly demonstrates subsurface disturbance that would have an impact on any archaeological deposits or relics, however, archaeological evidence may remain.
Low	The historical site or feature has been subject to subsequent development however known subsurface disturbance has not been identified.
Nil	The historical site or feature has been subject to no known subsequent development of subsurface impacts that would have a direct impact on any archaeological deposits or relics.

5.5.2 Assessment

The proposed alignment for the project primarily follows existing roadways, where archaeological findings are likely to be limited to historic road surfaces with low heritage significance as they are likely to have limited research potential. The brine pipeline that extends from the WRRF facility toward Blacktown and Lalor Park does not intersect any known historical heritage items. The Quakers Hill grave site is within the Quakers Hill WRRF but outside the impact area (Table 5.7).

A review of the historical maps, plans and aerials provided in Section 2.4 has not identified areas of archaeological potential in the impact area.

Table 5.7 Summary of archaeological potential in the impact area

Site	Archaeological potential	Possible resources	Disturbance levels
Quakers Hill grave site	High	Human remains	Low

KEY

- Impact assessment area
- Brine pipeline

Archaeological potential

- High potential

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody

0 1 2 km

GDA2020 MGA Zone 56

N

Source: EMM (2025); DCSSS (2024); MetroMap (2025); Sydney Water (2025)

\\emm.local\xdrive\2024\E240560-HH SW PRW\GIS\02_Maps_REF\REF005_ArchaeologicalPotential\REF005_ArchaeologicalPotential_20250325_01.aprx 5/05/2025

Archaeological potential

Quakers Hill Water Resource Recovery Facility Advanced Treatment Upgrade
Figure 5.1

EMM creating opportunities

6 Heritage impact assessment

6.1 Background to assessing impacts

The assessment of a project's impacts to the heritage significance of a place or an item is to understand change, if it is beneficial to the place or item, and how changes can be managed to best retain significance. The historical landscape in Australia, be it rural or urban, is by social agreement, a significant aspect of our identity (refer to Section 1.4.2). That agreement is codified in legislation, the intent of which is to encourage the conservation of cultural heritage by incorporating it into development where feasible. In many situations avoiding impacts is impossible, but the aim is to reduce those impacts by either project re-design or managing the loss of information through methods that reduce and/or record significance before it is removed.

The framework around assessing significance and therefore suitable levels of impact is to understand how the place or item came to be, how important it was (and may be still) in the development of the local area or the state (the colony at the time) and providing guidance on its management. This is what this report aims to do.

6.2 Types and sources of impact

Two main types of impacts have been predicted to occur as a result of the project: physical; and visual. These types are described below.

- physical impacts are those impacts that will materially affect the features and sites that are present within the development footprint whether they were found or if they are unanticipated; and
- visual impacts are those impacts that will affect the views and the setting of the cultural landscape and nearby built items within the development footprint and surrounds.

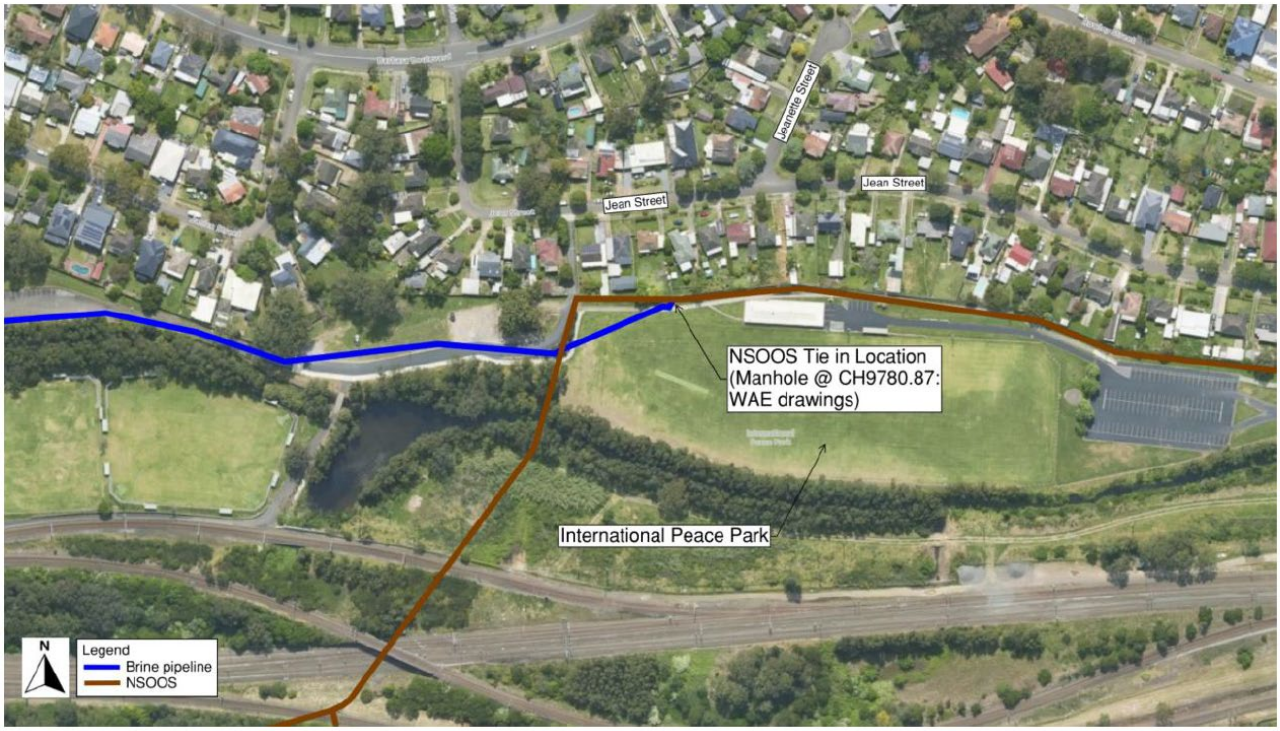
Table 6.1 Summary of project activities

Phase	Activity	Description
Construction	Trenching for brine pipeline	Connections integrated into Sydney Water's existing wastewater network. The pipeline (with impact areas between 10–15 m) traverses or runs adjacent to multiple landholdings and intersect significant infrastructure and natural features in the Blacktown LGA.
	Tie in to NSOOS	The brine pipeline will connect to a maintenance hole, approximately 1.33 m below the ground surface.
Operation	Above ground assets	Views towards above ground assets, being the barometric loop in the west side of Billy Goat Hill Reserve, Blacktown

6.3 Direct impacts

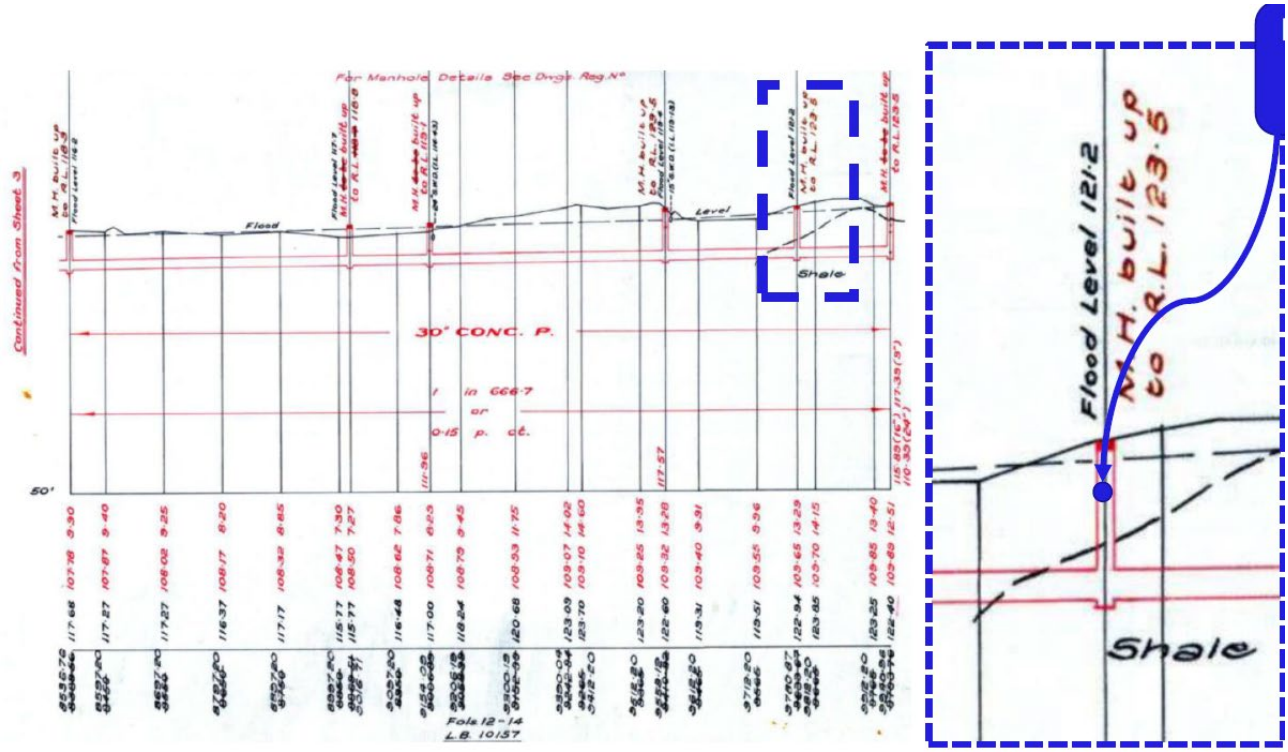
6.3.1 Northern Suburbs Ocean Outfall Sewer (NSOOS)

The project will directly tie into the NSOOS. The connection will be at chainage 9780.87, located in the International Peace Park, Seven Hills (Plate 6.1). The connection would be located 1.33 m below the ground level, tying into a vertical concrete maintenance hole shaft that provides access to the horizontal NSOOS (Plate 6.2), which at this point is approximately 4.05 m below ground level. As noted in Section 3.3.4iii, the maintenance holes were a 1963 modification to the NSOOS and is not original 1920s/1930s fabric. The detail of the tie in is provided in Plate 6.3.



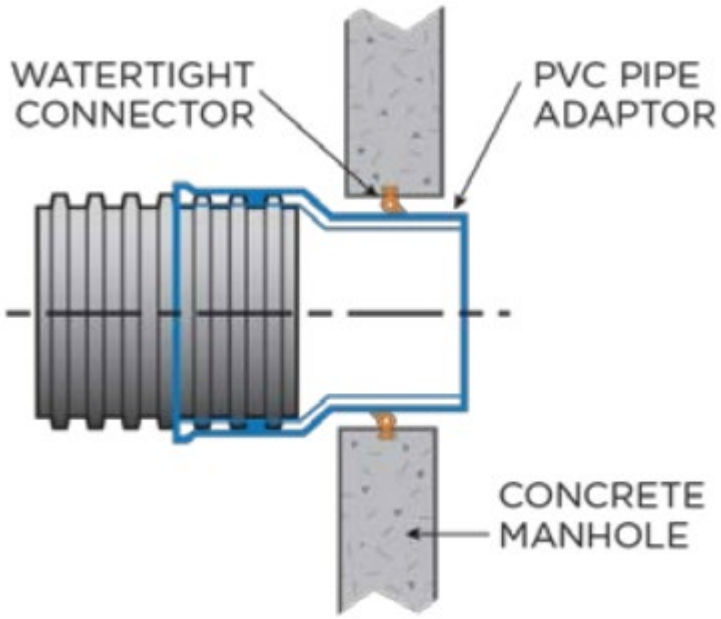
Source: Jacobs 2025

Plate 6.1 Location of NSOOS tie in location



Source: Jacobs 2025

Plate 6.2 Cross-section showing NSOOS tie in



Source: Sydney Water 2025

Plate 6.3 Cross section detail of NSOOS tie in

Table 6.2 assesses the proposed tie in to the NSOOS using the matters for consideration in the SoHI guidelines (Department of Planning and Environment (NSW) 2023b). In determining the level of impact, the Material Threshold Policy, as outlined in Section 1.4 and the attributes outlined in Section 5.4.1 have been used. In summary, little to no impact to the heritage significance of the NSOOS has been identified, primarily as the tie in will be to fabric installed in 1963, which is considered to be not of heritage significance.

Table 6.2 Northern Suburbs Ocean Outfall heritage impact assessment – Matters for consideration

	Matter	Discussion	Impact assessment
1	Fabric and spatial arrangements	The spatial layout of the NSOOS will not be altered. The fabric of the non-significant 1963 maintenance hole will be impacted through the removal of a 500 mm diameter core to allow for the tie in to be installed. As the maintenance hole is considered non-significant fabric, no heritage impact is identified.	Little to no impact
2	Setting, views and vistas	The tie in will not be visible from the surface, being located approximately 1.3 m below the ground level. There will be no impact to settings, views and vistas.	Little to no impact
3	Landscape	The NSOOS in this location is not listed for its landscape setting. There will be alterations to the International Peace Park in which the NSOOS is located, but the Park does not contribute to the significance of the NSOOS. No heritage impact is identified under this matter for consideration.	Little to no impact
4	Use	The use of the NSOOS will not be altered: it will still be used to transport wastewater. No heritage impact is identified under this matter for consideration.	Little to no impact
5	Demolition	No demolition of the NSOOS is proposed. No heritage impact is identified under this matter for consideration.	Little to no impact
6	Curtilage	No alteration to the curtilage of the NSOOS is proposed. No heritage impact is identified under this matter for consideration.	Little to no impact

	Matter	Discussion	Impact assessment
7	Moveable heritage	No movable heritage has been identified in the vicinity of the proposed tie in. No heritage impact is identified under this matter for consideration.	Little to no impact
8	Aboriginal cultural heritage	An Aboriginal cultural heritage assessment (ACHA) is being prepared. Please refer to the ACHA for potential impacts to Aboriginal cultural heritage in the vicinity of the NSOOS.	Refer to ACHA
9	Historical archaeology	A review of the historical maps, plans and aerials of the area did not identify areas of archaeological potential in the vicinity of the proposed tie in or elsewhere in the impact area. No heritage impact is identified under this matter for consideration.	Little to no impact
10	Natural heritage	The tie in location is located in a grassed park. No natural heritage values have been identified. No heritage impact is identified under this matter for consideration.	Not relevant
11	Conservation areas	The NSOOS tie in location is not located in a heritage conservation area. This matter of consideration is not relevant.	Not relevant
12	Cumulative impacts	As the tie in will be to non-significant fabric, no cumulative impacts are anticipated. Furthermore, the construction of the project will minimise cumulative impacts on the NSOOS. Without the project, the duplication or replacement of the NSOOS would be required to service the needs of western Sydney. The project secures the ongoing use of the NSOOS for its original purpose. No heritage impact is identified under this matter for consideration.	Little to no impact
13	The conservation management plan	The NSOOS tie in location is not located in a heritage conservation area. This matter of consideration is not relevant.	Not relevant
14	Other heritage items in the vicinity	The NSOOS tie in location is not located near other heritage items (Figure 2.1). This matter of consideration is not relevant.	Not relevant
15	Commonwealth/National heritage	The NSOOS tie in location is not located in or near a Commonwealth or Nationally listed heritage place. This matter of consideration is not relevant.	Not relevant
16	World Heritage	The NSOOS tie in location is not located in or near a World Heritage listed place. This matter of consideration is not relevant.	Not relevant

6.3.2 Archaeological impacts

While no specific areas of demonstratable archaeological potential were identified through the background research or site inspection, it is possible that archaeological resources exist in the impact area. Management measures are provided in Section 7 in the event that unexpected archaeological resources are uncovered during construction.

6.4 Indirect impacts

6.4.1 Visual

The Project will involve the construction of advanced wastewater treatment infrastructure within the Quakers Hill WRRF, an underground pipeline along the brine pipeline alignment and one barometric loop, about 12 m high, located in Billy Goat Hill Reserve, Blacktown.

The construction of the AWTP will alter the setting of the grave site to some degree. However, the setting has already been highly altered by the establishment of the WRRF. Further alterations are not an adverse impact as the construction works would not encroach on the approximate 20 m fenced buffer around the grave site and the site is not identified as holding aesthetic significance, that is, the WRRF would not impact on the social significance of the grave site.

There are no listed heritage items within view of the WRRF site. The closest heritage item is #I34 -Polish Memorial Roman Catholic Church located approximately 162 m to the south-east of the WRRF. The site inspection identified no view pathways between the sites due to existing low-density developments and dense vegetation. No indirect impacts to #I34 are expected.

Similarly, no view pathways between the locally listed houses I12 and I16 in Blacktown and the barometric loop proposed in Billy Goat Hill Reserve were identified. The views are completely obscured by the intervening low density residential development and existing vegetation.

The significance assessment indicates the locally listed House (I17) at 5 Sarsfield Street holds aesthetic significance. The barometric loop in Billy Goat Hill Reserve would not be visible when viewing the House from its street frontage as the house itself would block views. As such, the barometric loop would not impact the ability of passersby to appreciate the Victorian cottage. An assessment of the likely views of the about 12 m high barometric loop from the rear yard of the House indicates that it may be visible due to the height of the barometric loop. However, there is intervening fencing of the two rear yards a large tree in the rear yard of 36 Cardiff Street and a large tree in Billy Goat Reserve that are likely to obscure views of the barometric loop. The barometric loop may become visible should the tree/s be removed. However, views from the rear yard to the north-west are unlikely to contribute to the significance of the House as it is considered that the front façade and interiors are the elements that contribute to the aesthetic significance and therefore no impact is identified.

In summary, no indirect visual impacts are anticipated.

6.4.2 Vibrational

Vibratory equipment required during pipeline works, together with the recommended safe operating distances from heritage items are:

- Excavator with medium hammer: 19m for heritage structures.
- Vibratory roller 13-18t:54m for heritage structures.

Table 2.1 identified five items within the 200 m buffer of the impact area. Of these, I17 (House at 5 Sarsfield Street) and the NSOOS are close enough to the works (12 m and 0 m respectively) to potentially be indirectly impacted by vibration. Management measures are provided in Section 7.

6.5 Statement of heritage impact

Little to no impact to the heritage significance of the NSOOS has been identified, primarily as the tie in will be to fabric installed in 1963, which is considered to be not of heritage significance. In terms of indirect impacts, no visual impacts are anticipated. Indirect vibrational impacts may occur to I17 (House at 5 Sarsfield Street) and the NSOOS, which are close enough to the works (12 m and 0 m respectively) to potentially be indirectly. It is considered that the impacts can be managed through the implementation of management measures. While no specific areas of demonstratable archaeological potential were identified through the background research or site inspection, it is possible that archaeological resources exist in the impact area. Management measures are provided in Section 7 in the event that unexpected archaeological resources are uncovered during construction.

7 Management measures

As the tie in to the NSOOS will be to fabric installed in 1963, which is considered to be not of heritage significance, little to no impact using the Material Threshold Policy framework has been identified. As such, no management measures are required. No indirect impacts to heritage items have been identified. Furthermore, no areas of definitive archaeological potential have been identified, however, it is possible that archaeological resources exist in the impact area. The following management measures outlined in Table 7.1 are proposed to manage the residual risk.

Table 7.1 Proposed mitigation and management measures

Phase	Mitigation and management measures
Pre-construction	• Unexpected finds protocol to be included in a Construction Environmental Management Plan (CEMP) or similar.
Pre-construction	Undertake a condition assessment of I17 (House at 5 Sarsfield Street) and the NSOOS. Confirm potential impacts to these two heritage items during detailed design. Where possible, develop a construction methodology that limits vibration to below the levels referenced in German Standard *DIN 4150 - Part 3 - Structural Vibration in Buildings – Effects on Structures* or other relevant standard as determined by Sydney Water. If vibration limits are expected to be exceeded and the construction methodology cannot be adjusted to below acceptable levels: • Undertake a property dilapidation survey. • Develop mitigation and management measures for each heritage item to be included in the CEMP.
Pre-construction/ construction	• The CEMP will maintain the 20 m exclusion zone that is currently surrounding the grave site. Ensure signage is placed on the existing fencing around the perimeter of the grave site during construction. Any instances of breaches within this exclusion, including by construction vehicles, must be reported and impacts assessed.

8 Conclusion

Upgrades to Sydney Water's Quakers Hill Water Resource Recovery Facility (WRRF) are required by 2028 to:

- service industry growth and housing policies as current treatment capacity at the plant of 38 ML/day is expected to be exceeded in late 2028
- meet Environment Protection Licence limits that require reduced nutrient loads to the Hawkesbury-Nepean River (Sackville 2 zone)
- provide high quality water treatment that enables a future Purified Recycled Water (PRW) scheme and its introduction into Prospect Reservoir.

The project is in the Blacktown Local Government Area, in largely urbanised areas with a mix of residential, industrial, and recreational land uses.

The key features of the project are shown in Figure 1 and include:

- secondary treatment process upgrade from the current 28 ML/day to 48 ML/day
- a new advanced water treatment plant (AWTP), including reverse osmosis, ultrafiltration and stabilisation
- a range of ancillary infrastructure such as new buildings, tanks, pipes, services and chemical storage
- new brine pipeline to transfer the brine generated as a by-product of the reverse osmosis process into the existing wastewater network. The pipeline would:
  - have flow capacity of up to 12.5 ML/day
  - be about 8 km long and about 500 mm diameter
  - be installed largely along shared paths, public parkland, and road corridors
  - be mostly underground and built using open trench and trenchless methods
  - be connected into Sydney Water's existing Northern Suburbs Ocean Outfall Sewer.
  - The advanced water treatment plant is required to treat the wastewater to meet nutrient limits. However, it would also produce high quality water that could be further treated to produce PRW.

A review of primary and secondary historical sources, maps, plans and aerials indicates the impact area has developed from an agricultural and pastoral region into low-density suburbia. A search of statutory heritage registers identified no World, National, Commonwealth or State Heritage Register listed items within 200 m of the impact area. Within the same buffer, four sites listed on *the Blacktown Local Environmental Plan 2015* were identified. None of these items will be directly or indirect impacted by the project. As such, consultation with Blacktown City Council in relation to historical heritage under Section 2.11, Chapter 2 of the T&I SEPP is not required.

Little to no impact to the heritage significance of the NSOOS has been identified, primarily as the tie in will be to fabric installed in 1963, which is considered to be not of heritage significance. In terms of indirect impacts, no visual impacts are anticipated. Indirect vibrational impacts may occur to I17 (House at 5 Sarsfield Street) and the NSOOS, which are close enough to the works (12 m and 0 m respectively) to potentially be indirectly. It is considered that the impacts can be managed through the implementation of management measures.

An archaeological assessment of the impact area did not identify areas of explicit archaeological potential. However, as archaeological resources can occur in areas that do not show signs in documentary evidence or environmental contexts, it is recommended that an unexpected finds protocol be included in the construction environmental management plan.

It is recommended that:

- Unexpected finds protocol to be included in a Construction Environmental Management Plan (CEMP) or similar.

- Undertake a condition assessment of I17 (House at 5 Sarsfield Street) and the NSOOS. Confirm potential impacts to these two heritage items during detailed design. Where possible, develop a construction methodology that limits vibration to below the levels referenced in German Standard *DIN 4150 - Part 3 - Structural Vibration in Buildings – Effects on Structures* or other relevant standard as determined by Sydney Water. If vibration limits are expected to be exceeded and the construction methodology cannot be adjusted to below acceptable levels:

    - Undertake a property dilapidation survey.

    - Develop mitigation and management measures for each heritage item to be included in the CEMP.

- The CEMP will maintain the 20 m exclusion zone that is currently surrounding the grave site. Ensure signage is placed on the existing fencing around the perimeter of the grave site during construction. Any instances of breaches within this exclusion, including by construction vehicles, must be reported and impacts assessed.

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