

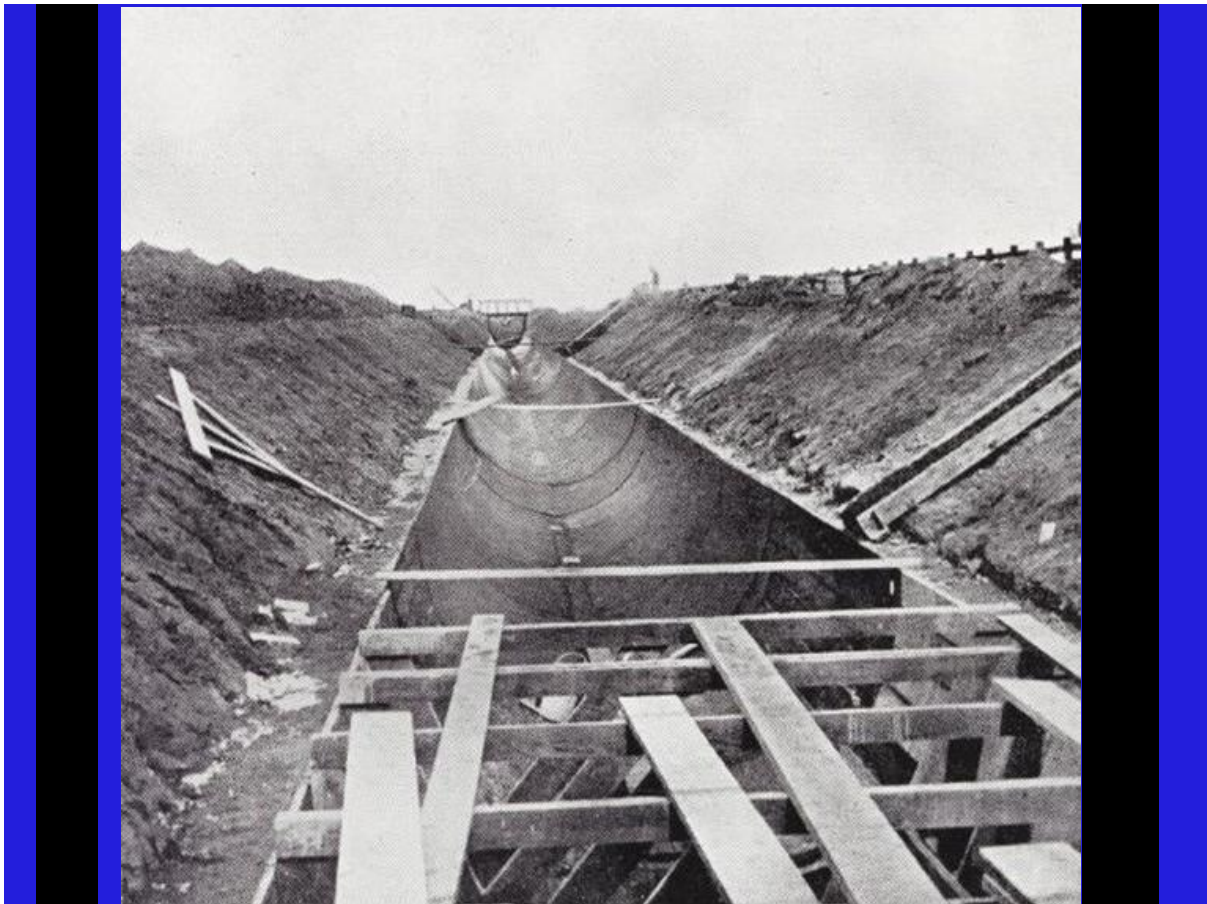


# Main Outfall Sewer (H1932) Heritage Impact Statement

Document no: IA5000TY-0000-NP-RPT-0005  
Revision: B

Melbourne Water  
IA5000TY

Western Trunk Sewer Rehabilitation Project  
28 November 2025



## Main Outfall Sewer (H1932) Heritage Impact Statement

**Client name:** Melbourne Water  
**Project name:** Western Trunk Sewer Rehabilitation Project  
**Client reference:** IA5000TY **Project no:** IA5000TY  
**Document no:** IA5000TY-0000-NP-RPT-0005 **Project manager:** Maha Rwaished  
**Revision:** B **Prepared by:** Martin Zweep and Karen Murphy  
**Date:** 28 November 2025 **File name:** IA5000TY-0000-NP-RPT-0005

### Document history and status

Revision	Date	Description	Author	Reviewed	Approved
A	8/10/2025	Draft for client review	Karen Murphy	Felicity Strong	Maha Rwaished
B	28/11/2025	Final – MW comments incorporated.	Karen Murphy	Maha Rwaished	Maha Rwaished

### Distribution of copies

Revision	Issue approved	Date issued	Issued to	Comments
A	Maha Rwaished	8/10/2025	MW	
B	Maha Rwaished	20/11/2025	MW	
C	Maha Rwaished	20/11/2025	MW	

---

#### Jacobs Group (Australia) Pty Ltd

Floor 13, 452 Flinders Street  
 Melbourne, VIC 3000  
 PO Box 312, Flinders Lane  
 Melbourne, VIC 8009  
 Australia

T +61 3 8668 3000  
 F +61 3 8668 3001  
[www.jacobs.com](http://www.jacobs.com)

---

© Copyright 2025 Jacobs Group (Australia) Pty Ltd. All rights reserved. The content and information contained in this document are the property of the Jacobs group of companies ("Jacobs Group"). Publication, distribution, or reproduction of this document in whole or in part without the written permission of Jacobs Group constitutes an infringement of copyright. Jacobs, the Jacobs logo, and all other Jacobs Group trademarks are the property of Jacobs Group.

NOTICE: This document has been prepared exclusively for the use and benefit of Jacobs Group client. Jacobs Group accepts no liability or responsibility for any use or reliance upon this document by any third party.

## Contents

<b>Acronyms and abbreviations.....</b>	<b>vii</b>
<b>1. Project Details.....</b>	<b>1</b>
1.1 Place.....	1
1.2 Proposal.....	1
1.2.1 Description.....	1
1.2.2 Timeline.....	1
1.2.3 Location.....	2
1.3 Pre-application meetings.....	2
1.3.1 June 2025.....	2
1.3.2 September 2025.....	2
1.4 Prepared by.....	5
1.5 Prepared for.....	5
<b>2. The Place.....</b>	<b>6</b>
2.1 VHR statement of significance.....	6
2.2 VHR extent of registration.....	6
2.3 Relative rarity of significant elements and impact thresholds.....	7
2.4 Existing condition.....	7
2.4.1 Design and construction of the MOS.....	7
2.4.2 Construction of the WTS pipeline.....	11
2.4.3 Current land use and description.....	15
2.4.4 MOS within the project area.....	17
2.4.5 Conservation policies from CMP.....	21
<b>3. The Proposed Works.....</b>	<b>25</b>
3.1 Project background.....	25
3.2 Overview of proposed activities.....	25
3.3 Works interacting with the MOS.....	32
3.3.1 Service crossings.....	32
3.3.2 Hardstands, crane pads and mobile gantry.....	33
3.3.3 Excavation of launch/receival shafts.....	34
3.3.4 Pipe delivery.....	35
3.3.5 Installing pipes – slip line process.....	36
3.3.6 Backfilling to protect MOS from collapse.....	37
3.4 Multiple Benefits Action Plan.....	44
<b>4. Information to support an assessment against s101(2) of the Heritage Act 2017.....</b>	<b>47</b>
4.1 Impact of the proposal on the significance of the place.....	47
4.1.1 Construction of service crossings, hardstands, crane pads and mobile gantry.....	47

Main Outfall Sewer (H1932)  
Heritage Impact Statement

---

4.1.2	Bridging and backfilling of MOS .....	48
4.1.3	Tree removal.....	50
4.1.4	Works near the Werribee River Aqueduct.....	50
4.1.5	Public access and interpretation .....	50
4.2	Reasons why the proposal should be supported.....	50
4.2.1	Reasonable or economic use.....	50
4.2.2	Duty of public authority.....	51
4.2.3	World Heritage matters .....	52
4.2.4	Matters relating to protection and conservation.....	52
<b>5.</b>	<b>Information to support assessment against s101(3) of the Heritage Act 2017 .....</b>	<b>53</b>
5.1	Neighbouring heritage places.....	53
5.2	Other relevant matters.....	53
<b>6.</b>	<b>Other considerations .....</b>	<b>54</b>
6.1	Has the applicant advised whether the works trigger the need for a Cultural Heritage Management Plan under the Aboriginal Heritage Act 2006 and has one been approved? .....	54
6.2	Has the applicant advised whether the works contravene any existing Cultural Heritage Management Plan under the Aboriginal Heritage Act 2006? .....	54
<b>7.</b>	<b>Summary of impacts and conclusion .....</b>	<b>55</b>
7.1	Impacts.....	55
7.1.1	Collapse of the MOS.....	55
7.1.2	Bridging and backfilling the MOS.....	55
7.1.3	Tree removal.....	55
7.1.4	Inadvertent damage to Werribee River Aqueduct.....	56
7.1.5	Public access and interpretation .....	56
7.1.6	Cumulative impacts.....	56
7.2	Mitigation measures.....	56
7.2.1	Hierarchical approach during detailed design development .....	56
7.2.2	Backfill material.....	56
7.2.3	Arborist assessment.....	56
7.2.4	Interpretation plan .....	57
7.3	Recommended conditions and staging.....	57
<b>8.</b>	<b>References .....</b>	<b>58</b>

## Tables

Table 2-1. Relative rarity of significant elements and impact thresholds (Black <i>et al.</i> 2018) .....	7
Table 2-2. Summary of condition and threats (Black <i>et al.</i> 2018:91) .....	17
Table 2-3. Description and images of types of cross-section of MOS within current project area (Black <i>et al.</i> 2018:37-38) .....	19
Table 2-4. Approach and type of backfill material within the MOS from 1984 works (MMBW 1984).....	20

Table 2-5. Relevant conservation policies from the MOS CMP (Black <i>et al.</i> 2018).....	21
Table 3-1. Proposed crossing of the MOS and reasoning for requirement.....	32
Table 3-2. Locations of MOS where construction activities proposed, and backfilling requirement (Confidential contractor 2025).....	38
Table 3-3. Action 3 from the Multiple Benefits Action Plan (Bailey and Grinspum 2025) .....	44
Table 3-4. Action 5 of the Multiple Benefits Action Plan (Bailey and Grinspum 2025) .....	46

## Figures

Figure 1-1. Location of Main Outfall Sewer (MOS) (Black <i>et al.</i> 2018) with approximate location of WTS proposed works indicated in green rectangle.....	3
Figure 1-2. Location of VHR and other listed heritage places within and in the vicinity of the WTS project area .....	4
Figure 2-1: Werribee River Aqueduct under construction (Black <i>et al.</i> 2018:151).....	8
Figure 2-2: Aqueduct over the Werribee River (Rudd 1893, cited in Black <i>et al.</i> 2018:151) .....	9
Figure 2-3: Outfall sewer no. 1 (MOS) during construction, Werribee c. 1893 (Museums Victoria 2022).....	9
Figure 2-4: 1951 aerial imagery of the section of the MOS subject to project works with approximate location of project area in red (Victorian Land Registry Services 2021) .....	10
Figure 2-5: 1975 aerial imagery of the section of the MOS subject to project works with approximate location of project area in red (Victorian Land Registry Services 2021) .....	11
Figure 2-6: 1985 aerial imagery of section of the MOS subject to the works with approximate location of project area in red (Victorian Land Registry Services 2021).....	12
Figure 2-7: Indicative cross section for the WTS construction, at the Maltby Bypass (Scott 2015).....	12
Figure 2-8: Werribee River facing west, showing the various WTS aqueducts; left to right the 1960s aqueduct, original 1890s aqueduct, and 2010 aqueduct (Source: Melbourne Water) .....	13
Figure 2-13: Construction of the WTS north of the Princes Highway (date unknown) (Melbourne Water).....	14
Figure 2-14: Well treed section of the easement at Werribee (not in the project area) (Image 5986, Black <i>et al.</i> 2018:24).....	16
Figure 2-15: Map of types of cross section within the current project area (Black <i>et al.</i> 2018:36) .....	18
Figure 3-1. Proposed works locations as of August 2025 (Map 1 of 5).....	27
Figure 3-2. Proposed works locations as of August 2025 (Map 2 of 5).....	28
Figure 3-3. Proposed works locations as of August 2025 (Map 3 of 5).....	29
Figure 3-4. Proposed works locations as of August 2025 (Map 4 of 5).....	30
Figure 3-5. Proposed works locations as of August 2025 (Map 5 of 5).....	31
Figure 3-6. Example of 160 tonne crawler crane and mobile gantry (Confidential contractor 2025).....	33
Figure 3-7. Indicative layout of the mobile gantry with pipe being transported (Confidential contractor 2025) .....	34
Figure 3-8. Example cross sections along the WTS alignment showing possible layout at shafts and along the alignment (Confidential contractor 2025).....	34
Figure 3-9. Indicative method for excavating the launch/receival shafts (Confidential contractor 2025) .....	35
Figure 3-10. Indicative method for excavating launch/receival shafts (Confidential contractor 2025) .....	35

Main Outfall Sewer (H1932)  
Heritage Impact Statement

---

Figure 3-11. Indicative layout for pipe delivery, with freeway at right, MOS towards left and Federation Trail to far-left side of image (Confidential contractor 2025)..... 36

Figure 3-12. Indicative method of moving pipes along the alignment for installation into the launch/receival shaft (Confidential contractor 2025) ..... 37

Figure 3-13. Existing and proposed backfill locations of the MOS in the project area (Map 1 of 5)..... 39

Figure 3-14. Existing and proposed backfill locations of the MOS in the project area (Map 2 of 5)..... 40

Figure 3-15. Existing and proposed backfill locations of the MOS in the project area (Map 3 of 5)..... 41

Figure 3-16. Existing and proposed backfill locations of the MOS in the project area (Map 4 of 5)..... 42

Figure 3-17. Existing and proposed backfill locations of the MOS in the project area (Map 5 of 5)..... 43

## Acronyms and abbreviations

Acronym	Definition
CCTV	closed circuit television
CHMP	Cultural Heritage Management Plan
CMP	Conservation Management Plan
DTP	Department of Transport and Planning
GRP	Glass Reinforced Plastic
GWW	Greater Western Water
HCPS	Hoppers Crossing Pump Station
HIS	Heritage Impact Statement
HV	Heritage Victoria
Jacobs	Jacobs Group (Australia) Pty Ltd
KPI	key performance indicator
KRA	key responsibility areas
MMBW	Melbourne and Metropolitan Board of Works
MOS	Main Outfall Sewer
MW	Melbourne Water
RAPs	Registered Aboriginal Parties
t	tonne
VHR	Victorian Heritage Register
WTP	Western Treatment Plant
WTS	Western Trunk Sewer

## 1. Project Details

### 1.1 Place

This is a Heritage Impact Statement (HIS) for:

**Main Outfall Sewer**

**VHR number H1932**

### 1.2 Proposal

This HIS forms part of a permit application for the Western Trunk Sewer Rehabilitation Project, described as follows.

#### 1.2.1 Description

The proposed works will undertake the rehabilitation of 4.55 km of the 4.5 m diameter circular concrete sewer pipe that comprises the Western Trunk Sewer (WTS) from maintenance hole WTS001 in the Western Treatment Plant (WTP) to maintenance hole WTS014 at Wattle Avenue in Werribee. The rehabilitation of the sewer will be primarily delivered through a slip-lining methodology, where a Glass Reinforced Plastic (GRP) liner will be lined (pushed) within the existing sewer pipe. Access to the sewer will be achieved by a series of strategically placed shafts located over existing maintenance holes into the sewer. The works will also include the rehabilitation or decommissioning of 14 concrete maintenance holes between WTS001 and WTS014 as well as reinstatement of reticulation connections at the end of the works. Temporary works such as sewer flow management, access tracks, cleaning, odours and ventilation control, and other preparation requirements will also be required to facilitate the works.

The works are proposed to be undertaken within a portion of the VHR extent of registration of the Main Outfall Sewer (MOS) (VHR H1932) from its western most point on the west bank of the Werribee River, in the vicinity of maintenance hole WTS006 to maintenance hole WTS012 at Duncan's Road in Werribee (a distance of approximately 2.5 km).

No direct impact to the MOS will occur as part of the actual rehabilitation works to the WTS, with the exception of one location near Werribee River (WTS006k) where the construction access shaft may expose the decommissioned connection to the MOS. However, access routes for construction traffic that cross or run parallel to the MOS will be required. Consideration to backfilling the MOS to strengthen it and inhibit its collapse may be required, subject to the type, weight and volume of traffic that will be required to use the crossing. The section of MOS which is located adjacent to the WTS in publicly accessible land is considered high risk by Melbourne Water. Backfilling sections of the MOS which present a high risk to public safety is considered a suitable risk control.

Projects works are also proposed to be undertaken in the WTP adjacent to the registered curtilage of the Former Metropolitan Farm (VHR H2400). However, these works are not expected to encroach into the registered curtilage of the Former Metropolitan Farm (H2400) apart from the potential use of existing roads as access for construction traffic. Any potential impact arising from these works will be managed under a separate permit application or permit exemption application if required.

#### 1.2.2 Timeline

The overall project timeline is as follows:

- Development phase – Early 2025 – Late 2025
- Delivery phase including procurement and mobilisation – Early 2026 – Mid 2027

- Rehabilitation works – Mid 2027 – late 2029
- Reinstatement and practical completion – End 2029.

### **1.2.3 Location**

The project is located in Werribee, to the west of Melbourne, within the City of Wyndham local government area. The proposed works are approximately 5.5 km in length and 100 m in width, extending from the WTP and Linear Park Road in the west, through the intersection of the Werribee River and Princes Freeway, and east along the Princes Freeway for 4 km to Wattle Avenue and South Road. Approximately 2.5 km of these works are proposed to occur in the 25 km extent of registration of the MOS (H1935), from the WTS006 at the eastern extent of the registered curtilage to WTS012 at Duncans road, Werribee. The location of the full extent of the MOS is shown in Figure 1-1 and the location of the proposed works is in Figure 1-2.

## **1.3 Pre-application meetings**

### **1.3.1 June 2025**

A pre-application meeting was held on 26 June 2025 with Emily Good of Heritage Victoria and was attended by Michael Farlie of Melbourne Water, and Martin Zweep and Troy Kraska of Jacobs Group (Australia) Pty Ltd (Jacobs). The project background proposed works methodology and potential impacts was presented by Melbourne Water and Jacobs. The potential impacts discussed included the possibility that backfilling sections of the MOS between WTS007 and WTS010 may be considered where heavy construction traffic may be required to cross the MOS, and the need to excavate within the registered curtilage of the MOS in order to access the WTS.

It was also discussed that since Melbourne Water are undertaking this project as a 'design and construct' project, the ultimate form of the project is unknown, as this would be determined by the successful contractor. Emily Good advised that it would be possible to use the tender set of documents for the application, which would be based on the assessment of the maximum degree of impact, but would minimise the need for further assessment at a later date. It was discussed that the permit could be conditional of the submission and endorsement of 'issued for construction' drawings ahead of each stage of works.

### **1.3.2 September 2025**

Following receipt of two construction tenders by Melbourne Water, including proposed construction methodologies and approaches, with more details relevant to the potential impacts on the MOS, a second pre-application meeting occurred with Emily Good of Heritage Victoria on 15 September 2025.

An update of the proposed scope and location of works were discussed including the crossing of the MOS by heavy vehicles and machinery, the works within close proximity of the MOS (including shafts to access the WTS, and gantry cranes for the movement and installation of WTS pipe sections), and the removal of trees along the MOS.

Alternative options for backfilling the MOS and building up crossings or using bridging structures were also discussed. Emily Good advised that the preference would be to build up over the MOS rather than backfilling within it, and if building up was not possible to clearly articulate the reasons why. It was also advised that a clear statement should be made regarding Section 101(2)(d) of the Heritage Act regarding why the works need to occur to enable Melbourne Water to undertake its statutory functions. The issue of cumulative impact was also discussed, and that consideration of cumulative impacts on the heritage place as a whole (and not just the section where works are proposed) be undertaken.

Main Outfall Sewer (H1932)  
Heritage Impact Statement

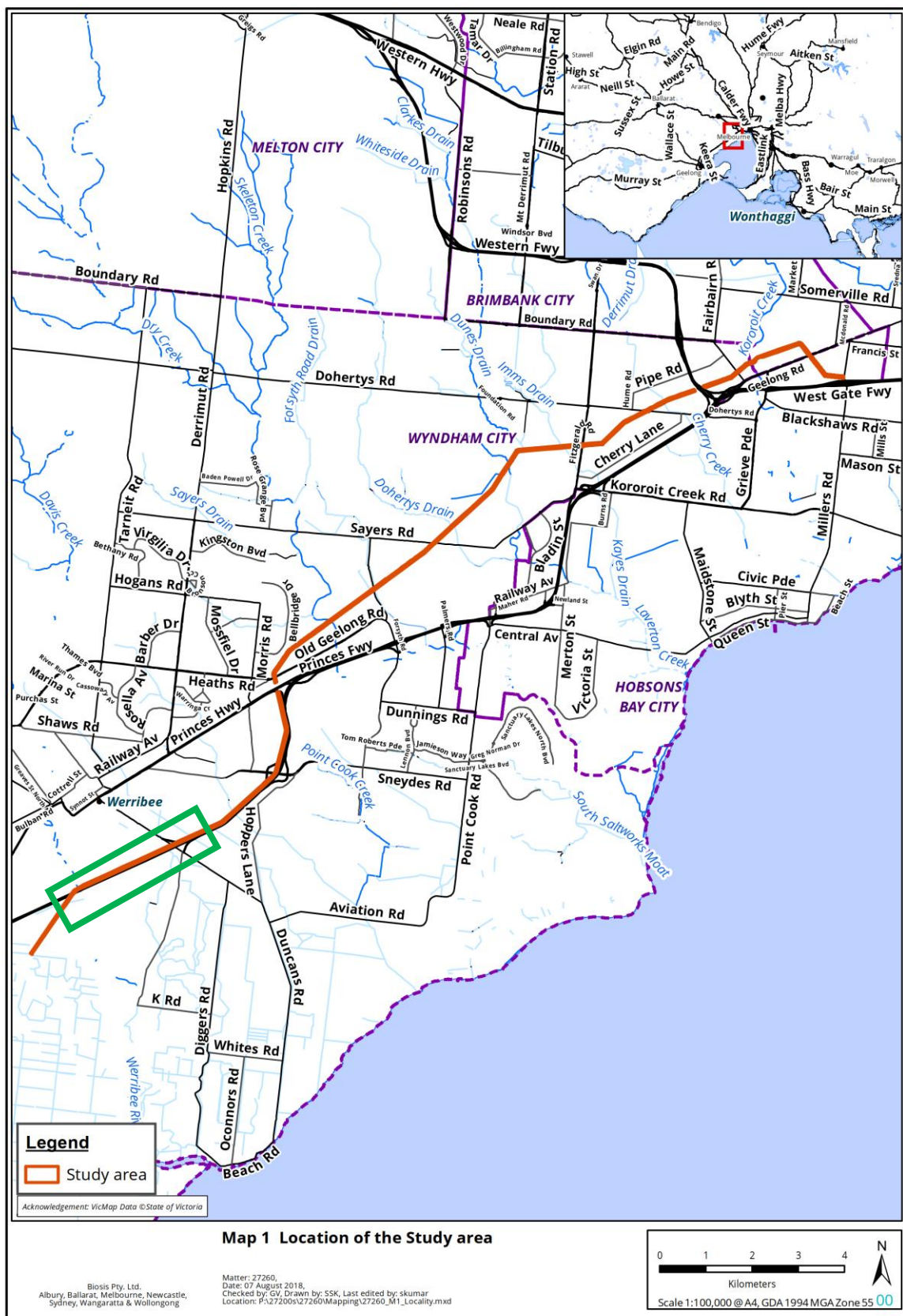


Figure 1-1. Location of Main Outfall Sewer (MOS) (Black et al. 2018) with approximate location of WTS proposed works indicated in green rectangle

Main Outfall Sewer (H1932)  
Heritage Impact Statement

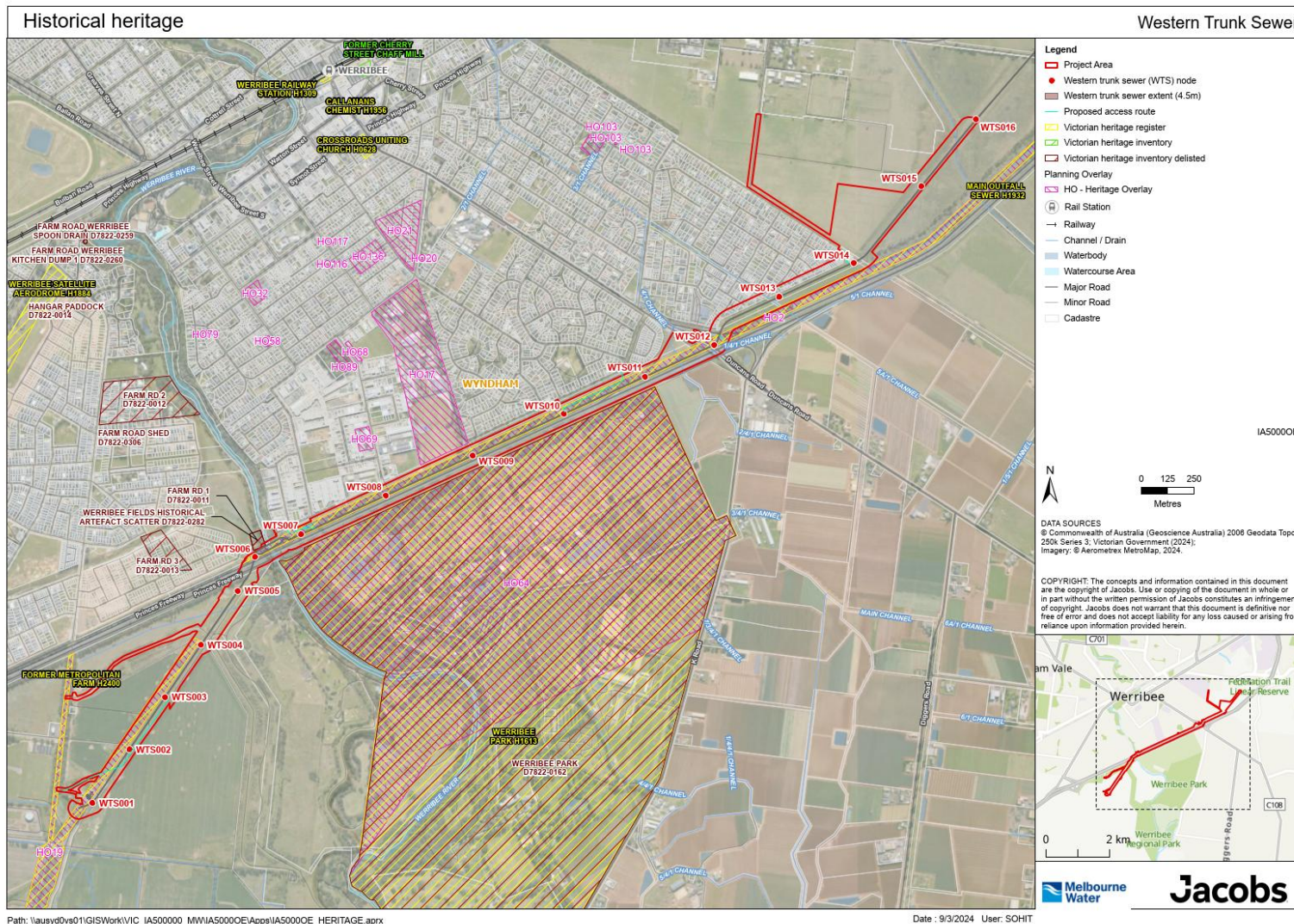


Figure 1-2. Location of VHR and other listed heritage places within and in the vicinity of the WTS project area

## 1.4 Prepared by

Martin Zweep

Principal Heritage Consultant

Jacobs Group (Australia) Pty Ltd

Level 13, 452 Flinders Street

Melbourne VIC 3000

0409 173 195

[martin.zweep@jacobs.com](mailto:martin.zweep@jacobs.com)

Karen Murphy

Technical Director, Archaeology and Cultural Heritage

Jacobs Group (Australia) Pty Ltd

Level 13, 452 Flinders Street

Melbourne VIC 3000

0429 166 475

[karen.murphy@jacobs.com](mailto:karen.murphy@jacobs.com)

## 1.5 Prepared for

Melbourne Water

990 La Trobe Street

Docklands VIC 3008

## 2. The Place

### 2.1 VHR statement of significance

#### What is significant?

The Main Outfall Sewer was constructed in 1892-4 and was a vital link in the sewerage system of Melbourne which, when it was constructed in the 1890s, was the largest civil engineering project ever undertaken in Victoria. The Main Outfall Sewer consists of a semicircular brick or concrete lined channel (in places arched over to form a circular tunnel with an earth covering) and three brick arched aqueducts. The sewer was constructed by seven contractors employing 1300 workers and cost £240,748. During the 1880s the phenomenal growth of Melbourne led to a crisis in sanitation. The situation was exacerbated by the existence within the metropolitan area of many municipalities which would have to agree on any sewerage system. A Royal Commission recommended the formation of a Metropolitan Board of Works, comprised of commissioners from each of the local government authorities, with responsibility for both water supply and sewerage. Eminent British engineer James Mansergh was appointed to advise on a suitable system. At a time when most cities dumped their untreated wastes directly into rivers and the sea, Mansergh advised treatment of Melbourne's sewage by broad irrigation with a capacity large enough able to deal with the expansion in population expected over 50 years. The system he conceived, and which was implemented in only slightly modified form began with a water closet at every property which delivered the sewage by gravity through a network of underground sewers of increasing diameter to a steam pumping station at Spotswood (VHR 1555) where it was forced up wrought iron rising mains to Brooklyn to begin its 25 kilometre journey along the Main Outfall Sewer to the sewage farm at Werribee. As could be expected, the Main Outfall Sewer has had much repair and replacement of fabric over the last century, and its function has now been entirely replaced by the Western Trunk Sewer. Nonetheless, there is still extensive original fabric remaining within its easement.

#### How is it significant?

The Main Outfall Sewer is of historical and scientific (engineering) significance to the State of Victoria.

#### Why is it significant?

The Main Outfall Sewer is historically important as an artefact of the process of development of Melbourne into a modern metropolis. The decision in 1890 to build a sewerage system with a capacity well in excess of the contemporary population was far sighted. The project not only addressed an existing sanitary crisis but also enabled expansion of the city into new areas because the 'downstream' sewerage infrastructure was of sufficient capacity. Unlike the rest of the system, which is underground and out of sight, the Main Outfall Sewer is a visible manifestation of the entire system. The Main Outfall Sewer is also a tangible link with the formation of the Melbourne Metropolitan Board of Works whose role as the unifying force for major infrastructure projects in Melbourne over the last century is of enormous historical importance. The construction of the system is all the more remarkable because, although conceived during the years of the 1880s Boom, its completion was achieved during the years of the catastrophic 1890s Depression.

The Main Outfall Sewer is of scientific (engineering) importance as a major link in the most extensive engineering project undertaken in Victoria to that date. The concrete and brick open and covered sewer is a fine example of the technology of the period, exhibiting a high level of integrity. The three major red brick aqueducts over Kororoit Creek, Skeleton Creek and the Werribee River are excellent examples of multi-spanned, arched masonry bridges.

### 2.2 VHR extent of registration

There is no map of the extent of registration gazetted for the MOS (H1932).

1. All the land contained in the approximately 40m wide sewerage easement beginning on the west side of Millers Road Brooklyn, between Cypress Avenue and Primula Avenue, and continuing to the south side of the Princes Highway, then from the north side of the Princes Highway to the east side of Little Boundary Road, then from the west side of Little Boundary Road to the east side of the Western Ring Road, then from the west

side of the Western Ring Road to the north side of Doherty's Road Laverton North, then from the south side of Doherty's Road to the east side of Fitzgerald Road, then from the west side of Fitzgerald Road to the north side of Leakes Road, then from the south side of Leakes Road to the north side of Sayers Road, then from the south side of Sayers Road Laverton to the east side of Forsyth Road, then from the west side of Forsyth Road Truganina to the north side of Old Geelong Road Hoppers Crossing, then from the south side of Old Geelong Road to the north side of the Melbourne to Geelong Railway, then from the south side of the Princes Highway alongside the Princes Freeway (Maltby By-pass) Werribee to where the easement finishes on the north side of the Princes Freeway at the Melbourne Water Western Treatment Plant as shown on Diagram 1932 held by the Executive Director.

2. All of the structure forming the Main Outfall Sewer including open and covered brick and concrete channels, brick aqueducts over Kororoit Creek, Skeleton Creek and Werribee River, all tunnels and culverts, but excluding all fabric associated with later modifications to the Main Outfall Sewer, the later concrete aqueducts and all infrastructure relating to the Western Trunk Sewer.

## 2.3 Relative rarity of significant elements and impact thresholds

The *Main Outfall Sewer, Victoria, Conservation Management Plan (CMP)* (Black *et al.* 2018) includes an assessment of significant elements of the MOS, their relative rarity across the full extent of the MOS, and the proposed acceptable impact level. This information is presented in Table 2-1.

Table 2-1. Relative rarity of significant elements and impact thresholds (Black *et al.* 2018)

Type of structure	Number/extent	Abundance/rarity	Level of significance	Proposed acceptable impact level
Main Outfall Sewer easement and plantings	24 km	Common	Primary	Up to 20% of current extent (but maintaining linear connection)
Aqueducts	3	Rare	Primary	Minor alterations only
Open channel (section types D, E and J)	7 km	Moderately common	Primary	Up to 10% but no more than 100 m in any one section
Original covered channel (section types A and B)	10 km	Common	Primary	Up to 50% (but maintaining linear connection)

## 2.4 Existing condition

### 2.4.1 Design and construction of the MOS

The MOS (H1932) was constructed between 1892 and 1894, and alongside the Metropolitan Farm, played a vital role in the sewerage systems of Melbourne. The sewer was the largest civil engineering project ever undertaken in Australia at the time. As the population of Melbourne skyrocketed, Melbourne experienced a crisis in sanitation, resulting in a Royal Commission which recommended the creation of a Metropolitan Board of Works, made up of commissioners from many municipalities. Under the advice of James Mansergh, an eminent British engineer, the Board implemented a system of gravity sewers leading from Melbourne to the Metropolitan Farm via the MOS.

Main Outfall Sewer (H1932)  
Heritage Impact Statement

---

The design of the MOS generally comprised a semi-circular cross section open sewer, and covered portions constructed using tunnelling or open cut methods across a 40-50 m easement. The semi-circular sewer was a brick or concrete lined channel and was sealed (arched over) in areas that were backfilled. The MOS also has three brick aqueducts (including one over the Werribee River in the current project area (Figure 2-1, Figure 2-2)) (Victorian Heritage Database 2001). The pipeline extended for 25 km, linking Melbourne and the WTP (Engineers Australia 2014). The construction involved major earthworks, with materials brought to site by a temporary rail line (Figure 2-3). In the 1960s, concrete covered viaducts were added across the Werribee River to replace the brick and bluestone open channelled viaducts. The 1960s viaducts were 190 m long, and spanned a 70 m length over the Werribee River (Jaydo n.d.). These were again updated in 2010. These activities caused significant disturbance across those areas used for installation of the pipeline and viaducts (Victorian Heritage Database 2001).

When the MOS was decommissioned in the 1980s, it comprised of 15 km of covered sewer and 9.3 km of open sewer, with approximately 6.5 km constructed above the natural ground on embankments. After decommissioning, sections of the MOS have been demolished, such as where roads and embankments cross it with the ends sealed with concrete blockwork (Black *et al.* 2018:27).

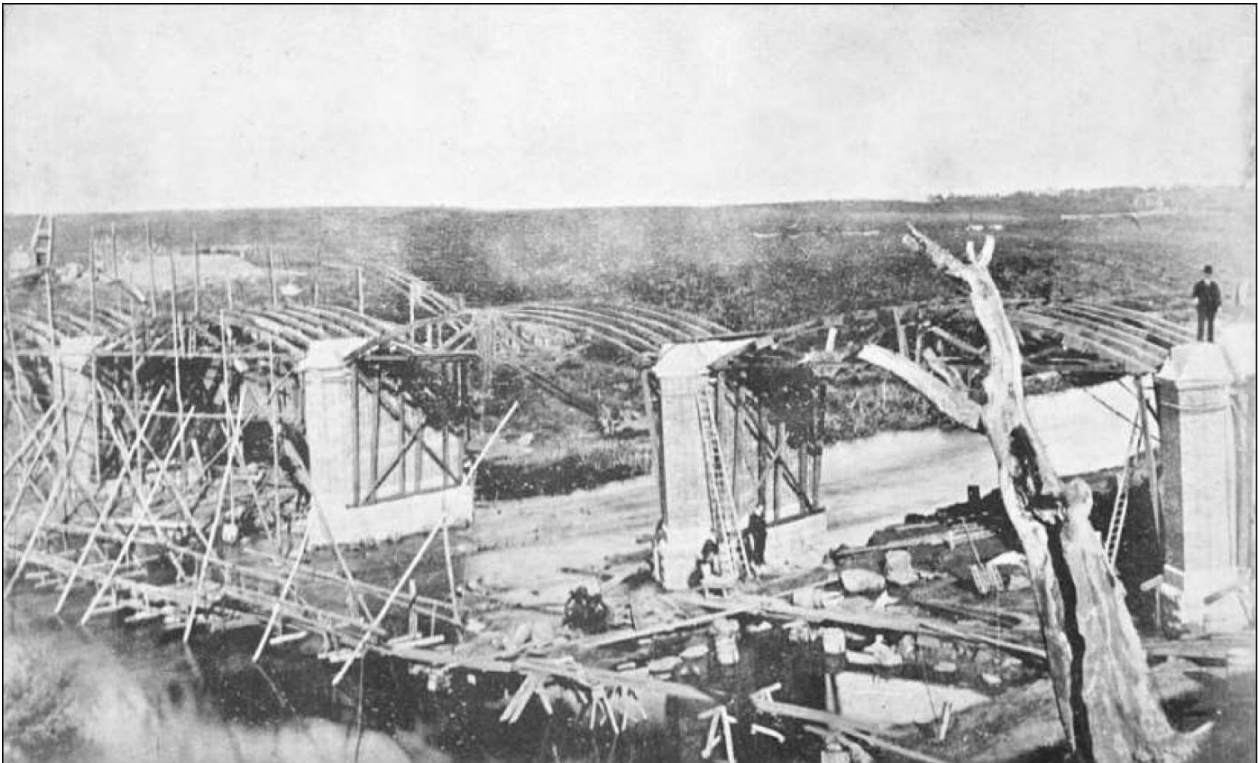


Figure 2-1: Werribee River Aqueduct under construction (Black *et al.* 2018:151)

Main Outfall Sewer (H1932)  
Heritage Impact Statement

---



Figure 2-2: Aqueduct over the Werribee River (Rudd 1893, cited in Black *et al.* 2018:151)

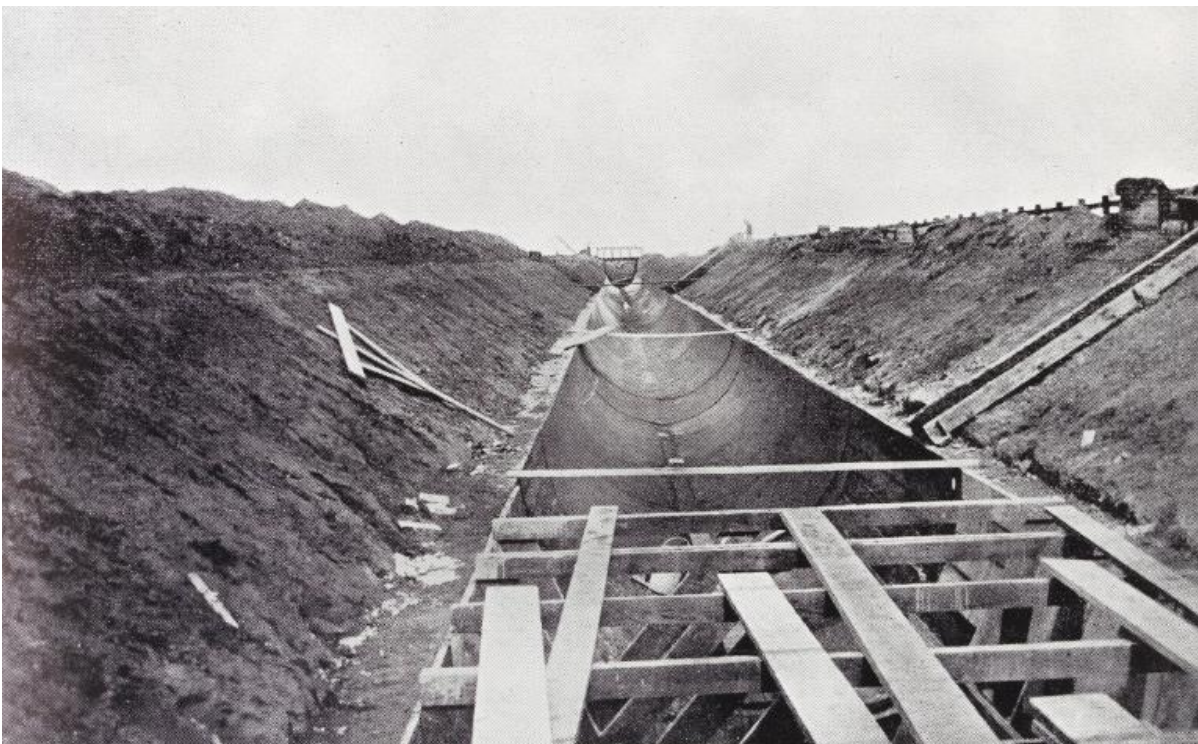


Figure 2-3: Outfall sewer no. 1 (MOS) during construction, Werribee c. 1893 (Museums Victoria 2022)

Main Outfall Sewer (H1932)  
Heritage Impact Statement

---

There is no documentary evidence of the planting of trees along the MOS after its completion, neither in the CMP, nor in the research undertaken for this project. Despite this, the CMP does indicate that there are 'significant trees' to be managed, and that the 'original plantings' are in only fair to poor condition (Black *et al.* 2018:93). The only evidence providing some indication of tree planting is from the aerial imagery. The earliest date of aerial imagery able to be found is dated 1951 (Figure 2-4), more than 50 years after the construction of the MOS.

Rows of trees are visible along the alignment of the MOS within the project area, less regimented in the west near the Werribee River Aqueduct, but more regimented and regular in the east towards Duncans Road. In comparison, this 1951 image shows much more substantial plantings along a road perpendicular to the MOS, both to the north and south, indicating these were much larger trees than those along the MOS. The present alignment of these trees appears to follow Mary McKillop Drive to the north of the MOS and enter across Werribee Park and Werribee Zoo on the south side of the MOS, in the direct orientation towards the Werribee Mansion.

The aerial image from 1975 (Figure 2-5), shows the western trees appear much more sparsely planted, and towards the eastern end of the project area, they are thicker and more regimented, but with bare patches along the alignment of trees. The Werribee Park trees to the south of the MOS appear to have been substantially removed by this time. By 1984, the aerial image (Figure 2-6) shows the significant disturbance from the construction of the WTS, although the tree plantings along the MOS are still present, and still petering out before the Duncans Road intersection with the freeway.

The smaller size of the trees along the MOS in 1951 compared to the avenue leading to and crossing Werribee Park (with the first substantial dwelling and development established there in the 1850s and 1860s) may suggest that they were planted more than 30 years after the Werribee ones, but also the species could be different. Further information may come to the light from the project's proposed arborist assessment regarding the age of the current trees.

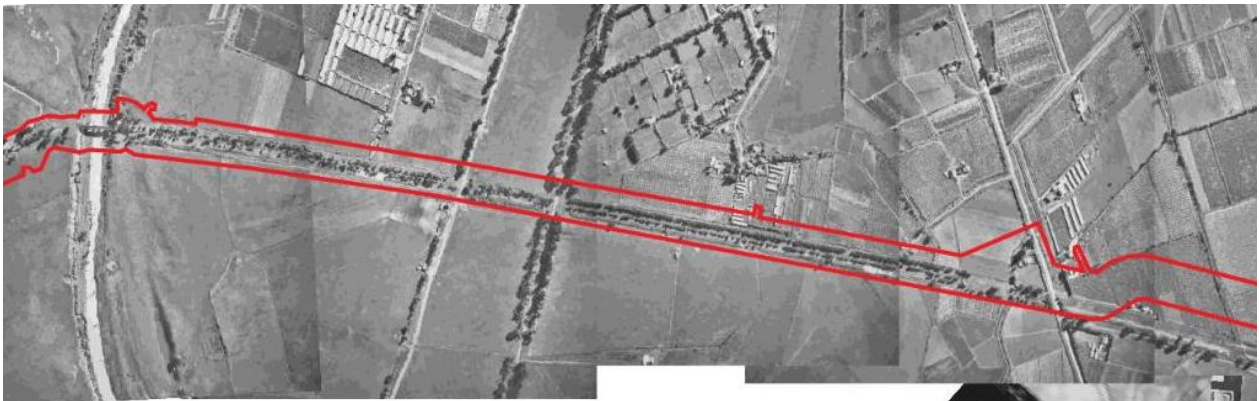


Figure 2-4: 1951 aerial imagery of the section of the MOS subject to project works with approximate location of project area in red (Victorian Land Registry Services 2021)



Figure 2-5: 1975 aerial imagery of the section of the MOS subject to project works with approximate location of project area in red (Victorian Land Registry Services 2021)

## 2.4.2 Construction of the WTS pipeline

The WTS was designed to replace the MOS, and was constructed in stages, with the first part of the sewer (from maintenance hole WTS001 to WTS012) built from 1983 to 1985, and the pipe comprising an internal diameter of 4.5 m. The WTS alignment over the Werribee River was replaced in 2010. This process involved large-scale construction involving major earthworks, having a considerable impact to the 40-50 m wide easement to depths of up to approximately 8 m.

The WTS was constructed using open trench and tunnelling technologies, with the section between the Brooklyn Pumping Station and Hoppers Crossing, comprising 15.2 km of tunnel, with the remaining 7.2 km constructed using open cut methods (between Brooklyn Pumping Station and the WTP) (Wang and Wijekoon 2024). Design drawings show that the WTS was constructed using open cut techniques (including benching) within the project area, with a 'working strip' width of approximately 134 m (to the edge of the MOS), and trench areas of 26.5 m in places (Figure 2-7) (Scott 2015). Within the vicinity of the MOS, open cut construction was used from maintenance holes WTS009 to WTS010 (Ghalehsari 2019; Scott 2015). However, the WTS was constructed using narrower open cut trenches with temporary shoring from 100 metres west of maintenance hole WTS011 to WTS013, reducing the overall construction footprint to the pipe width and shored area along this section (Wang and Wijekoon 2024).

Aerial photography from 1985 shows the aftermath of the WTS construction and its associated ground impacts, which would have disturbed any archaeological material that may have been present (Figure 2-6). The earthworks involved the removal and redistribution of soil across the project area, which is clearly illustrated in Figure 2-9 to Figure 2-13. Construction plans also note that the WTS was backfilled and had storage locations for spoil. Therefore, the soil excavated during construction was returned to the trench and surrounding area during remediation of the site.



Main Outfall Sewer (H1932)  
Heritage Impact Statement

---



Figure 2-8: Werribee River facing west, showing the various WTS aqueducts; left to right the 1960s aqueduct, original 1890s aqueduct, and 2010 aqueduct (Source: Melbourne Water)



Figure 2-9: Construction of the WTS at Farm Road on 25 July 1983, facing east (Melbourne Water)



Figure 2-10: Construction of the WTS at Farm Road on 25 July 1983 (Melbourne Water)

Main Outfall Sewer (H1932)  
Heritage Impact Statement

---



**Figure 2-11: Back-end fill during construction of the WTS at Farm Road in February 1983 (Melbourne Water)**



**Figure 2-12: Construction of the WTS at Farm Road on 25 July 1983 (Melbourne Water)**



**Figure 2-13: Construction of the WTS north of the Princes Highway (date unknown) (Melbourne Water)**

## 2.4.3 Current land use and description

### 2.4.3.1 The project area and easement

The project area continues to be utilised for the WTS. The MOS has no current operational use. As noted in the CMP (Black *et al.* 2018:23):

In 2005, the easement incorporating the MOS and the WTS was transferred from Melbourne Water to the Crown for the purpose of VicRoads constructing the Federation Trail along the easement. Melbourne Water and VicRoads subsequently entered into a 'Deed of Agreement' where VicRoads is responsible for managing the easement, while Melbourne Water is responsible for maintaining the sewer (except at the road crossings which falls to VicRoads).

The current description of the MOS (taken from the CMP (Black *et al.* 2018:ii, 23)) is as follows:

The MOS is a 25-kilometre brick and concrete structure that carried sewerage from the pumping station at Spotswood (now Scienceworks) to the treatment farm at Werribee. The MOS ran by gravity along a grade of 1:2640, or two feet per metre. Approximately 15 kilometres of the sewer line consisted of an uncovered system, with a semicircular cross section. The remainder of the MOS was circular, with a diameter of 3.5 metres, and covered. The covered sections of the MOS are mainly where the invert of the sewer is more than 3.5 metres below the natural ground surface, as well as before and after the three aqueducts that were initially constructed to be used as vehicular bridges, with the covered sewer along as the road approaches. Other sections were covered over later to reduce nuisance caused by the smell near populated areas such as at Brooklyn, and Laverton. Road crossings are present over sections of the MOS while there are three aqueducts constructed in arched designs of red brick over the Werribee River, Skeleton Creek and Kororoit Creek, all of which are still extant. Additional structures were erected over these creek crossings to enlarge the capacity of the sewer in the twentieth century. Other changes have included concreting the earth embankments on the side of the sewer and raising the sides of the brick channel with continuous concrete lintels.

...

Much of the easement was planted with trees, generally located in rows along the outer edge. Sugar Gums predominate, but at the Metropolitan Farm end, there were a mix of conifers and eucalypts. However, natural attrition and clearance for reconstruction of the sewer, adjacent development or possibly just cleaning up, has resulted in only scattered remnants of the early plantings, and a few small sections where conditions were favourable and so tree rows have survived relatively intact. One of the best sections is at Werribee, east of the Werribee River (see [Figure 2-14]).



Figure 2-14: Well treed section of the easement at Werribee (not in the project area) (Image 5986, Black *et al.* 2018:24)

The description of the project area (dating to February 2025), with a particular focus on the vegetation, from the project ecological assessment (Bettioli *et al.* 2025), is as follows:

A significant proportion of the Project Area comprises the section of the existing sewer alignment that runs parallel to Federation Trail (WTS006 to WTS011). The trail is lined with both native and non-native mature trees, considered to be planted as amenity screening vegetation. Young amenity screening plantings of Bottlebrush *Callistemon* spp., Eucalyptus spp. and Paperbarks *Melaleuca* spp., with tree guards present in some places are also abundant along the trail. The understorey is generally dominated by exotic grasses and other herbaceous weed species, particularly over the existing sewer alignment and adjacent vehicle access track. There are however some small, degraded patches of native vegetation comprised of native grasses and shrubs. Between WTS011 and WTS014, the Project Area predominantly consists of existing public main roads, roadside amenity plantings and an area of fill embankment.

### 2.4.3.2 Public access and facilities

The CMP (Black *et al.* 2018:87, 91) describes the public access and facilities of the MOS in relation to the Federation Trail and the Greening the Pipeline project as follows:

The presence of the Federation Trail provides a considerable opportunity in utilising existing infrastructure to enhance the public access and enjoyment of the MOS. Existing interpretation as part of the Federation Trail can also be utilised in developing future facilities as part of Greening the Pipeline.

...

Melbourne Water, Wyndham council, City West Water and VicRoads are collaborating in a project called 'Greening the Pipeline', aimed at converting 25 kilometres of the Main Outfall Sewer reserve into a parkland to service a growing population in Melbourne's west...To satisfy heritage requirements, disturbance to the Main Outfall Sewer was minimised and its structure retained beneath the park. Filling of the Main Outfall Sewer in-situ was considered

to be a form of preservation according to Heritage Victoria...The park includes viewing areas to showcase the old Main Outfall Sewer infrastructure, along with interpretation signs for community education...Greening the Pipeline provides considerable opportunities to enhance the heritage values of the MOS and improve the level of interpretation and visitor experience.

**2.4.3.3 General condition and threats to MOS elements**

The general condition and threats to the stability of various elements of the MOS were assessed as part of the 2018 CMP. The key elements of relevance to the current proposal are the covered channels and tree plantations, details of which are provided in Table 2-2.

Table 2-2. Summary of condition and threats (Black *et al.* 2018:91)

Type of structures	Condition	Threats
Covered channels	Generally sound – CCTV footage indicates spalling	Collapse of cover, blockage of channel, erosion of cover Corrosion of iron/steel pipe lining
Tree plantations	Most original plantings are now senescent and in only fair to poor condition	Natural senescence, disease, storm damage, bushfire, vandalism

A structural assessment was undertaken of a small section of the MOS in 2017 by JV Consulting Engineers. As the CMP notes, while this was only a small section of the buried pipeline of the MOS, ‘it provides a general indication of the likely structural condition of the overall MOS’ (Black *et al.* 2018:119).

The CMP (Black *et al.* 2018:119) states that the Structural Assessment ‘concluded that some parts of the MOS were structurally adequate, while other parts were structurally inadequate and required substantial works, described in the report as ‘full rebuild or restore’. The report also notes that:

‘...From a constructability point of view, due to the age and fragility of the MOS it may not be possible to remove the precast roof nor feasible to individually remove each brick without completely destroying a section of the MOS, hence J.V. Consulting believe it may be practical and cost effective to rebuild this section. Another option would be installing/driving a smaller pipe through the section and grout around to fill the voids.’ (JV Consulting Engineers 2017, cited in Black *et al.* 2018:119)

**2.4.4 MOS within the project area**

**2.4.4.1 Types of cross section**

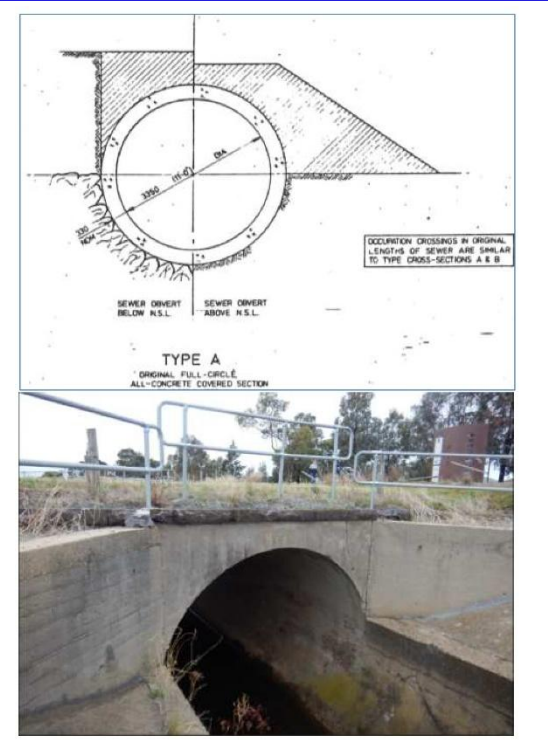
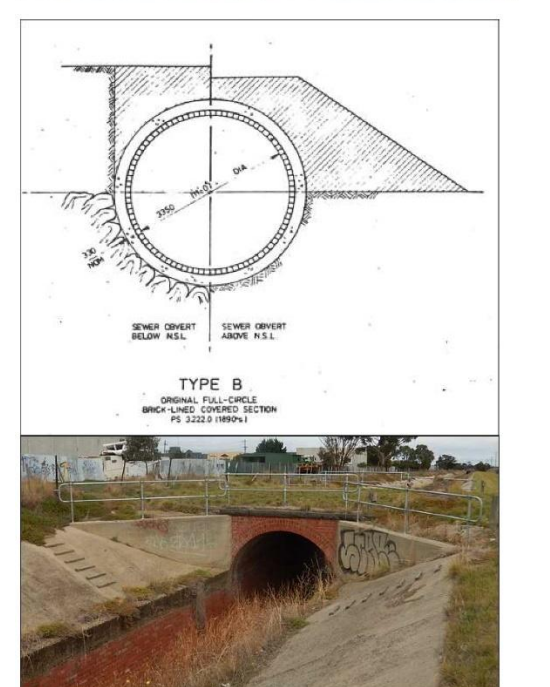
Across the entire MOS there are various construction cross section types, as depicted in MMBW drawings from 1979 (see Black *et al.* 2018:35). Within the project area, there are two types of cross-sections – mostly Type A with a small section of Type B (locations mapped in Figure 2-15). The description of each type, detailed drawing and example photo is provided in Table 2-3.

Main Outfall Sewer (H1932)  
Heritage Impact Statement



Figure 2-15: Map of types of cross section within the current project area (Black et al. 2018:36)

Table 2-3. Description and images of types of cross-section of MOS within current project area (Black *et al.* 2018:37-38)

Description	Image
<p><b>Type A</b> is an original form of all concrete covered section, confined to the occupation crossings, and the outfall on the west side of Werribee River, where the fall in the sewer dictated that the channel would be below ground level. Type A is formed from a full circle concrete pipe, which is believed to have no or minimal reinforcement. This type is either buried below natural ground level, or soil is built up over the top, such as at road crossings, where some examples have bluestone coping stones across to top of the opening. Later concrete wingwalls have been constructed at some ends.</p>	
<p><b>Type B</b> is similar to Type A, but includes brick lining around the full circumference. It is assumed the brick lining was a response to problems with chemical attack of the concrete. This type also has bluestone coping to the end walls and generally, the end walls are also of brick, with later concrete wing walls having been added.</p>	

**2.4.4.2 Backfilling to date**

The covered sections of the MOS within the project area have been partially backfilled on previous occasions. Based on data from 1984 MMBW plans, 2020 freeway interchange plans, and 2024 drone investigation in the MOS for this project, the sections of the MOS within the project area that are already backfilled are mapped in Figure 3-13 to Figure 3-17.

In 1984 filling and stabilisation of the MOS was undertaken adjacent to the construction of Sections 1 and 2<sup>1</sup> of the WTS (MMBW plans from Melbourne Water, C3250\_00\_081 to C3250\_00\_082 and C3222\_81\_001 to C3222\_81\_003). These works also included construction of access and hardstand areas over the MOS along WTS Section 2, construction of sewer connections, the removal of temporary works, and landscaping and tree planting along WTS Section 2. Four different types of approach to filling and two types of backfill material were used in the MOS within the current project area, described in Table 2-4.

**Table 2-4. Approach and type of backfill material within the MOS from 1984 works (MMBW 1984)**

Fill Type Approach	Fill Type Description	Backfill Material Type	Backfill Material Type Description
1	MOS fill under ventilation works at WTS manholes and under future freeway interchange	B	Selected refill free from clay lumps retained on a 150mm sieve and from stones retained on a 75mm sieve, compacted in layers not exceeding 300mm thickness (after compaction) to not less than 95% maximum dry density obtained in the AS1289 standard compaction test.
5	MOS fill under Maltby Bypass Reserve. Existing protective bridge over MOS across part of reserve only. Fill sewer to limit of Malby Bypass Road Reserve with Cement Stabilised Crushed Rock from opening either side of the Reserve.	A	Refer Backfill Type A = Cement stabilised crushed rock to be 20mm B grade, stabilised by addition of one part cement to 18 parts crush rock by weight. To be compacted in layers not exceeding 300mm thickness where possible to not less than 95% maximum dry density obtained in the AS1289 standard compaction test.
6	MOS fill at western side of Werribee Aqueduct	B	Selected refill free from clay lumps retained on a 150mm sieve and from stones retained on a 75mm sieve, compacted in layers not exceeding 300mm thickness (after compaction) to not less than 95% maximum dry density obtained in the AS1289 standard compaction test.
8	MOS fill under Duncans Road Overpass; Fill sewer with cement stabilised crushed rock from opening 20m either side of Duncans Road Overpass.	A	Cement stabilised crushed rick to be 20mm B grade, stabilised by addition of one part cement to 18 parts crush rock by weight. To be compacted in layers not exceeding 300mm thickness where possible to not less than 95% maximum dry density obtained in the AS1289 standard compaction test.

<sup>1</sup> Section 2 of the WTS includes the MOS within the VHR extent of registration, within the current project area. Section 1 is outside the VHR extent of registration towards the WTP.

In 2020, for the Duncans Road Overpass Freeway Interchange works, sections of the MOS in the project area were backfilled (or 'grouted'), including a 100 m section underneath the new overpass, and a 100 m section to the west of the overpass (WBHO Beca drawings from Melbourne Water, C3222\_83\_001 – c3222\_83\_003). The backfill material used was 3% stabilised sand which was inserted by intermittent drilling every 20 m along the MOS near WTS012.

Melbourne Water undertook a CCTV drone inspection of the MOS in 2024 (Truong 2024). The results were variable with only some of the documented backfill being able to be confirmed. The inspection was unable to confirm backfill of MOS under Duncans Road on-ramp, but backfill was confirmed on both sides of the Duncans Road off ramp. Backfill immediately upstream and downstream of the Werribee River Aqueduct was found, however the extent of backfill cannot be confirmed. The MOS was unable to be inspected near WTS004 to WTS006 and WTS007 to WTS009.

### 2.4.5 Conservation policies from CMP

The conservation policies from the *Main Outfall Sewer, Victoria, Conservation Management Plan* (Black et al. 2018) which are of relevance to the current project are presented in Table 2-5.

Table 2-5. Relevant conservation policies from the MOS CMP (Black et al. 2018)

Policy no	Policy	Details
6.4.9	<b>Demolition or irreversible changes</b>	<p>“Demolition” in this instance means the removal of or moving the brick and concrete structure as well as the earth embankments and cover. Reshaping the channel, embankment and other landforms within the MOS reserve should also be considered demolition.</p> <p>Demolition may occur where there is consideration for a public authority to perform its statutory duty (Section 101 of Heritage Act).</p>
6.4.10	<b>Backfilling Main Outfall Sewer channel</b>  [refers to open channels]	<p>Backfilling or covering over sections of the MOS has occurred in the past as part of decommissioning works. Covering over sections of pipe has also been undertaken to reduce odour. The development of the Williams Landing Pilot Park also involved filling in and landscaping over a section of the MOS under a permit from Heritage Victoria. Therefore, the potential for further backfilling and covering sections needs to be considered. Backfilling or covering over previously open sections of the MOS should be avoided, except where it is undertaken:</p> <ul style="list-style-type: none"> <li>▪ To ensure public safety.</li> <li>▪ To provide additional access across the MOS in areas where the MOS presents a barrier to the passage of pedestrians or vehicles.</li> <li>▪ To provide public recreation facilities in order to enhance public appreciation of the MOS consistent with the CMP.</li> <li>▪ To improve or manage drainage, either by using the channel as an operational stormwater drains (as has been done under a Heritage Victoria Permit at Jones Road) or to provide drainage across the channel.</li> <li>▪ As a temporary measure to stabilise or ‘mothball’ sections of channel for future use of conservation.</li> <li>▪ Where the filling or covering impacts on no more than 20% of the overall remaining open channel.</li> </ul>

Policy no	Policy	Details
6.5.2	<b>Altering, adapting or extending heritage assets</b>	<p>The integrity of the Main Outfall Sewer is an important part of its significance and contributes to an understanding of how it has functioned since it was constructed. Future changes to the fabric should therefore be minimised. Alterations to a heritage asset (including adaptation or extensions) should be planned and carried out in a manner that aims to minimise impacts on its heritage significance. Changes to significant fabric should be minimised and should only be permitted if it can be demonstrated that, as appropriate:</p> <ul style="list-style-type: none"> <li>▪ the proposed works are necessary to facilitate the efficient and safe working of the Main Outfall Sewer by supporting the continued historic use of the asset, or</li> <li>▪ it will enable the asset to be adapted for a compatible new use, or</li> <li>▪ the option of undertaking no changes is not feasible due to technical, safety, operational or other management constraints in accordance with relevant standards, or</li> <li>▪ any changes are sympathetic to the original fabric, or</li> <li>▪ there are other examples of the structure or feature within the Main Outfall sewer, which will remain intact as an example of that building, structure or feature, or</li> <li>▪ the changes are required by a Statutory Authority to meet its Statutory functions (i.e. drainage).</li> </ul> <p>Where changes are made records should be made in accordance with policy 6.4.7 and consideration should be given to the need for interpretation in accordance with policy 6.7.</p>
6.5.4	<b>Reversibility of works</b>	<p>Alterations or extensions that do not contribute to the conservation of a heritage asset should be undertaken in such a way that they are reversible wherever practical.</p>
6.5.5	<b>Demolition</b>	<p>The demolition or removal of significant fabric should be discouraged unless the demolition or removal is only of part of the heritage asset and it can be demonstrated to the satisfaction of the responsible authority that, as appropriate:</p> <ul style="list-style-type: none"> <li>▪ the fabric to be removed is not of primary significance and its removal will not adversely affect the significance of the asset, or</li> <li>▪ it will assist in the long-term conservation of the asset, or</li> <li>▪ it will facilitate the historic use of the asset by enabling it to be upgraded to meet current day standards, or</li> <li>▪ it is essential to ensure public safety.</li> </ul> <p>Demolition approval will be considered by Heritage Victoria on its merits. Melbourne Water or responsible party should record the asset prior to commencing demolition, in accordance with Heritage Council guidelines and should lodge the record with the Melbourne Water archives, State Library, the Public Records Office of Victoria, and the local council library.</p>
6.5.12	<b>Significant trees</b>	<p>Significant trees should receive proper care and maintenance to ensure that the trees survive in good condition according to their normally</p>

Policy no	Policy	Details
		<p>expected lifespan. It should be noted that trees along the MOS are generally within the part of the reserve currently managed by VicRoads. This should include:</p> <ul style="list-style-type: none"> <li>▪ land management plans to identify strategies for major cyclical replacement when the trees become senescent as well as incidental replacement of individual dead, dying or dangerous specimens. When trees are replaced, the process should be documented (photographs and written record before, during &amp; after) for future record, and</li> <li>▪ regular maintenance regimes for monitoring condition, pruning, pest and disease and track and roadside weed management.</li> </ul> <p>Trees should be replaced in accordance with Melbourne Water's or responsible party's biodiversity aims and strategies. In general, the approach should be to replace 'like with like' species to maintain the significance and integrity of the vegetation fabric, unless an alternative planting scheme has been devised in accordance with an approved land management plan.</p> <p>Manage surrounding vegetation to maintain the integrity and condition of the tree/s. Remove weed vegetation species.</p> <p>Ensure that any future development, or changes in immediate environmental conditions, adjacent to the tree/s does not have a detrimental impact upon the integrity and condition of the of the tree/s. Investigate ways in which adjacent development could include or coordinate with recovery and improvement of the tree/s integrity and condition.</p>
6.6	<b>Use</b>	<p>Use objectives:</p> <ul style="list-style-type: none"> <li>▪ To support the continued historic use of the Main Outfall Sewer and its component parts as part of a linear recreation facility.</li> <li>▪ To ensure that the Main Outfall Sewer has a use compatible with its heritage significance that is consistent with the long-term conservation of the place and the system as a whole.</li> <li>▪ To ensure that future uses do not compromise the identified cultural significance of the place.</li> </ul>
6.6.2	<b>Change of use - no use</b>	<p>For assets such as pipes that are not suitable for re-use, the option should be to decommission the asset and treat it as an artefact. This entails leaving the asset in-situ (i.e., where it is located) wherever possible, making it secure and taking whatever steps are necessary to prevent deterioration, such as backfilling or covering, previously exposed channel or pipe. Removal or relocation of the asset should not be allowed except in accordance with policy 6.5.5.</p> <p>The present retention of the underground components of the rising main represents a decommissioned non used component of the Main Outfall Sewer.</p>

Policy no	Policy	Details
6.7	<b>Interpretation</b>	<p>Interpretation objective:</p> <ul style="list-style-type: none"> <li>▪ To ensure that interpretation of the Main Outfall sewer assists in conserving or revealing its significance.</li> </ul> <p>...</p> <p>The significance of the Main Outfall Sewer is not immediately apparent and finding ways in which to communicate its heritage significance is integral to the conservation of this historic system. Interpretation of the Main Outfall Sewer is integral to the conservation of the system in that it is a way of protecting its heritage values. It provides the opportunity to raise public awareness of its significance and to promote understanding of how Melbourne Water manages the heritage in its care.</p> <p>...</p> <p>6.7.4 Location of interpretation</p> <p>It is not desirable to install a high degree of interpretation infrastructure in new locations where it would be intrusive and have an adverse impact upon the significance of the Main Outfall Sewer. The siting of interpretation must be carefully thought through as part of an interpretation plan development and must be suited to the landscape in which it is sited and to the purpose for which it is needed.</p> <p>...</p> <p>Preference should be given to locating new interpretation infrastructure at locations which already have some interpretation, e.g., current entrances to Federation Trail.</p>
7.2.2	<b>Buried pipeline repairs</b>	<p>A Structural Assessment of the Main Outfall Sewer, at 28 Jones Road, Brooklyn, was undertaken in April 2017 by J.V. Consulting Engineers. While this only addresses a small section of the MOS, it provides a general indication of the likely structural condition of the overall MOS.</p> <p>This concluded that some parts of the MOS were structurally adequate, while other parts were structurally inadequate and required substantial works, described in the report as 'full rebuild or restore'. The report also notes that '...From a constructability point of view, due to the age and fragility of the MOS it may not be possible to remove the precast roof nor feasible to individually remove each brick without completely destroying a section of the MOS, hence J.V. Consulting believe it may be practical and cost effective to rebuild this section.</p> <p>Another option would be installing/driving a smaller pipe through the section and grout around to fill the voids.' Costs of such repairs are likely to be very high and may not be justified in the context of maintaining the MOS primarily for use as open space. In the event that works are required to provide alternative uses for the buried sections, Heritage Permits will be required for any works that impact on the MOS structures.</p>

## 3. The Proposed Works

### 3.1 Project background

The WTS shallow conduit conveys sewage flows between the Hoppers Crossing Pump Station and the WTP. This 4.5m diameter reinforced concrete pipe is a critical asset in Melbourne Water's network, conveying approximately 57% of Melbourne's sewage flow. Ongoing condition monitoring has revealed poor structural conditions, necessitating proactive intervention. The section identified as being the highest priority is between WTS007 and WTS012. This is approximately a 2.1km length. The WTS was constructed to transfer sewage flows from Brooklyn to the WTP and is a major part of the State of Victoria's sewerage infrastructure. The WTS services the Western System which contributes approximately 57% of the total annual flow generated within Melbourne and most of the total industrial pollution loading.

The single conduit extends 15.3 km as a deep tunnel from the Brooklyn Discharge Access Shaft to the Hoppers Crossing Inlet Shaft and continues as a shallow conduit from the Hoppers Crossing Pump Station (HCPS) to maintenance hole WTS001 at the Western Treatment Plant (WTP). WTS commissioning occurred in stages; WTS001-WTS012 was commissioned in 1985, and the full WTS was commissioned in 1991. The section of sewer that crosses Werribee River from WTS006 to WTS006K was replaced with the Werribee River Aqueduct in 2011 and does not require rehabilitation by this Project. There are Greater Western Water (GWW) sewer connections at maintenance holes WTS005, WTS007, WTS008, WTS009, WTS014 and further upstream from the project area at WTS018 that contribute additional flows. GWW connections at existing maintenance holes within the project area must be retained or updated to retain service to GWW. There is also a private sewer connection at WTS007 that contributes flow.

Since commissioning, the WTS shallow conduit has been subject to biogenic sulphuric attack leading to significant corrosion of the concrete structure. Currently, the WTS has reached its serviceable life and therefore requires rehabilitation from the WTS001 Outlet, approximately 4.55km upstream to WTS014.

### 3.2 Overview of proposed activities

The proposed project activities in the extent of registration of the MOS include rehabilitating the WTS's shallow conduit section between maintenance holes WTS006 and WTS012. The construction methodology described in the following sections are based on the 80% design current as of August 2025.

Rehabilitation of the sewer will be done through slip-lining, where pipe sleeves are inserted into the existing sewer, before being adhered to the existing WTS pipe. The main project works will include the excavation of launching and receival shafts along the existing sewer alignment, as well as pipe re-lining activities. Machinery movements within the activity area may also cause some disturbance to the topsoils. Laydown areas may result in some compaction of existing ground surfaces.

The following works are to occur over the current WTS alignment and comprise the main construction activities:

- Excavation of the launch/retrieval pits or shafts: 14 m x 10 m to a maximum depth of 8-9 m (critical works). Typically, retrieval pits will have a smaller footprint compared with the launch shafts.
- Sewer pipe preparation and cleaning.
- Slip lining/pipe jacking and all other associated works.
- Installation of trench protection.
- Grouting every 50 m along the WTS alignment. This will involve drilling a borehole to insert grout between the existing WTS and new lining.
- Excavation and/or filling with soils (imported or from within the activity area) and/or gravel to create crane pads.

Main Outfall Sewer (H1932)  
Heritage Impact Statement

---

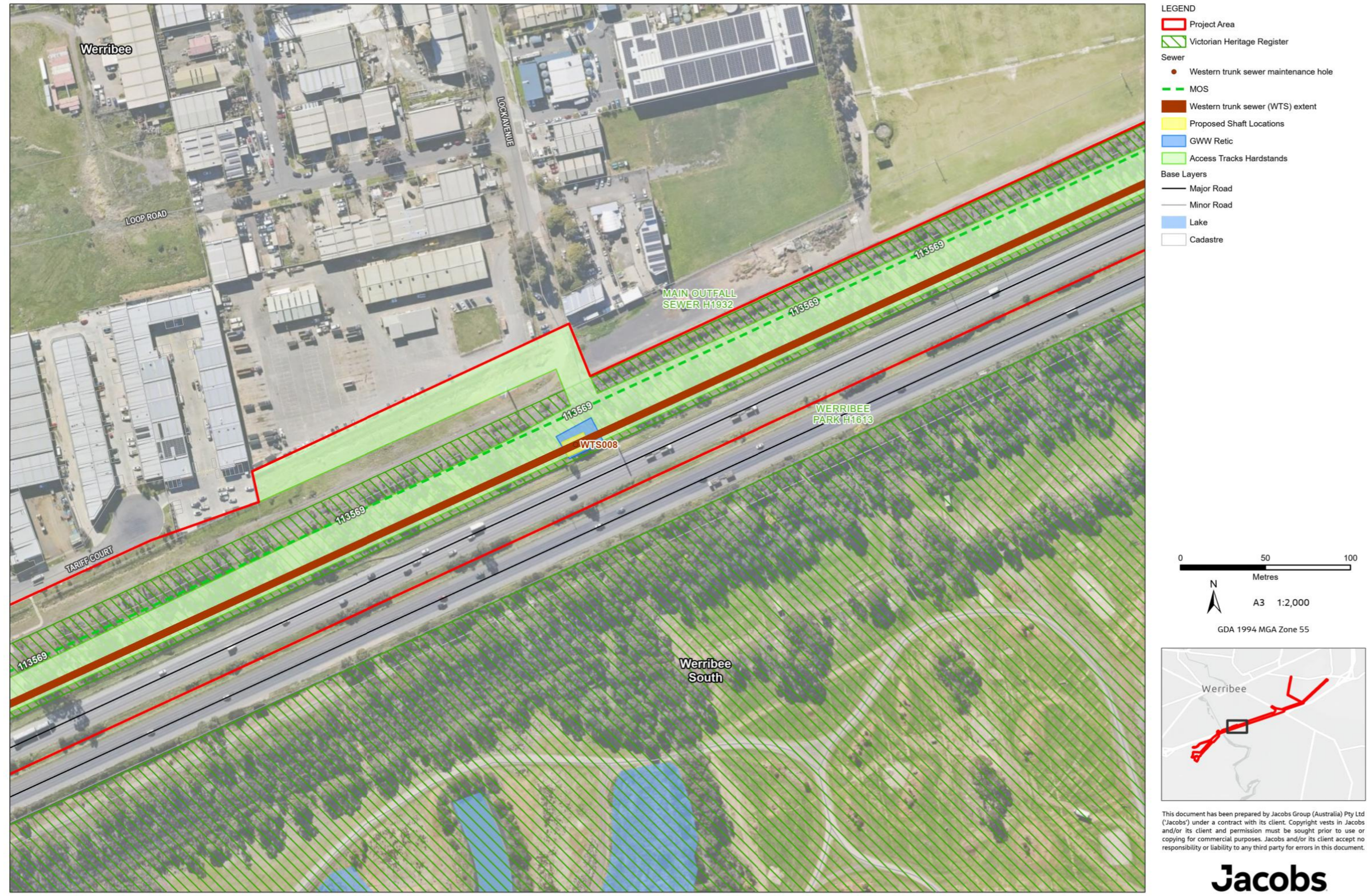
- Excavation and/or filling with imported soils and/or gravel to create a construction machinery track (e.g. crane track).
- Excavation and/or filling with imported soils and/or gravel for light and heavy-vehicle access track construction, if required.
- Vegetation removal and clearance.
- Placement of ventilation units (temporary works in shipping containers).
- Hoarding and fencing (e.g. fencing may be in the form of concrete barriers).
- Temporary bridge crossings over the WTS.
- Works relating to testing and commissioning of the WTS.
- Flow management of utility services.
- Utility protection and/or relocation.

Supporting works are required to facilitate the main construction activities. These include:

- Establishment of site office cabin(s) and amenities area(s) which may include excavation and/or filling with soils (imported or from within the activity area) and/or gravel to prepare the ground.
- Materials stockpiles and storage which may include excavation and/or filling with imported soils and/or gravel to prepare the ground.
- Soil stockpiling.
- Vehicle and plant movement (including a large capacity crane).
- Site hoarding/security fencing/signage.
- Protection works of other Melbourne Water or other authorities' assets involving excavation over the service and installing protective arrangements, as deemed necessary.
- Relocation works of other authorities' assets, involving excavation over the existing service to remove, excavation for new service alignment to install, and all other associated works deemed necessary.
- Connection to other authorities' assets and/or Melbourne Water assets and all other associated works deemed necessary, if required.



Proposed Western Trunk Sewer Rehabilitation Works Locations

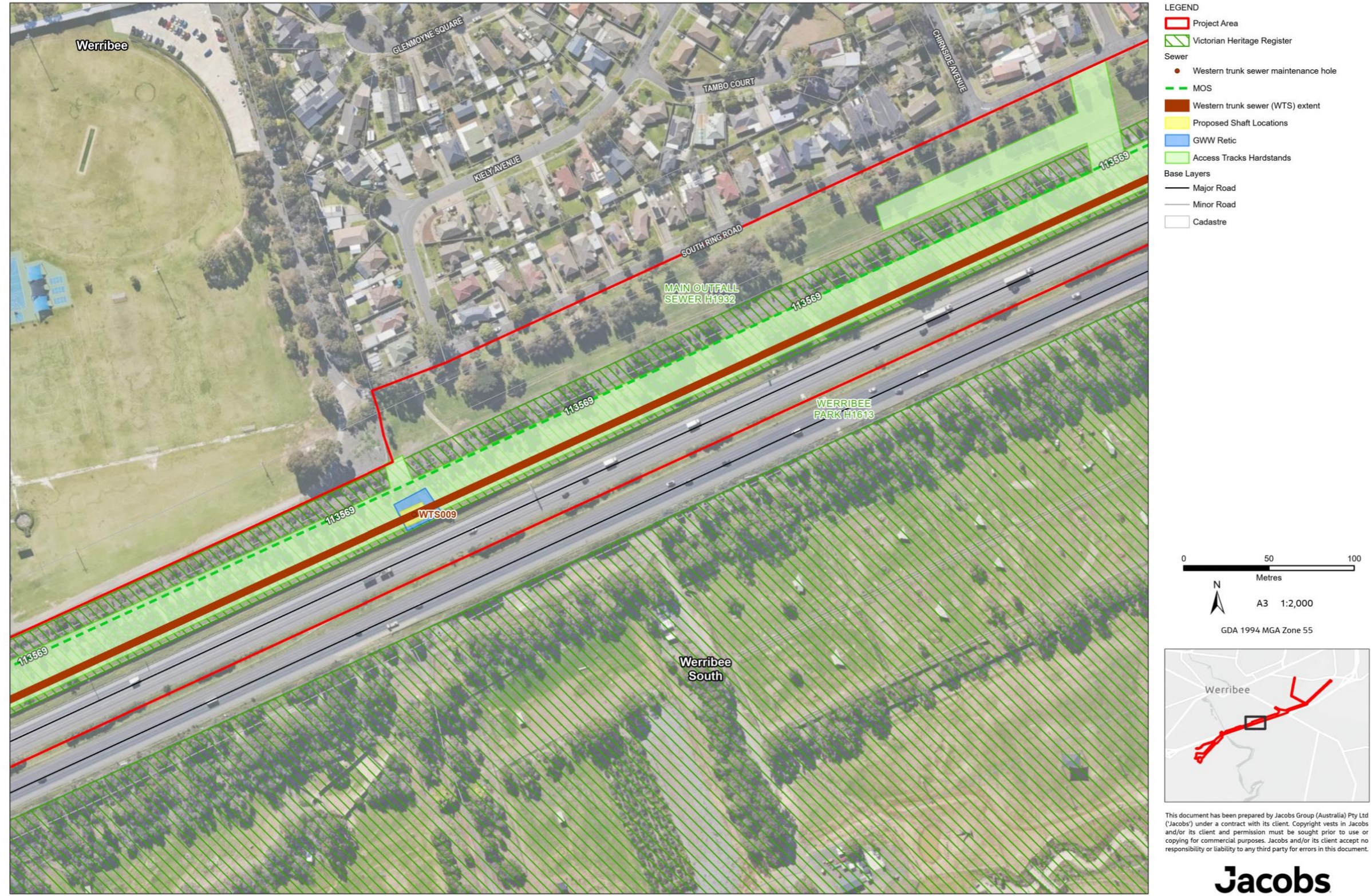


IA5000TY

Data Source: © Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Victorian Government (2025); Imagery: © Aerometrex MetroMap, 2025  
\\ausyd0vs01\GISProj\VIC\_IA5000TY\_WTS\Apps\ArcPro\Figures\Heritage\IA5000TY\_Heritage\_MOSHIS.aprx | Date: 18/11/2025

Figure 3-2. Proposed works locations as of August 2025 (Map 2 of 5)

Proposed Western Trunk Sewer Rehabilitation Works Locations



IA5000TY

Data Source: © Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Victorian Government (2025); Imagery: © Aerometrex MetroMap, 2025  
\\ausyd0vs01\GISProj\VIC\_IA5000TY\_WTS\Apps\ArcPro\Figures\Heritage\IA5000TY\_Heritage\_MOSHIS.aprx | Date: 18/11/2025

Figure 3-3. Proposed works locations as of August 2025 (Map 3 of 5)

Proposed Western Trunk Sewer Rehabilitation Works Locations

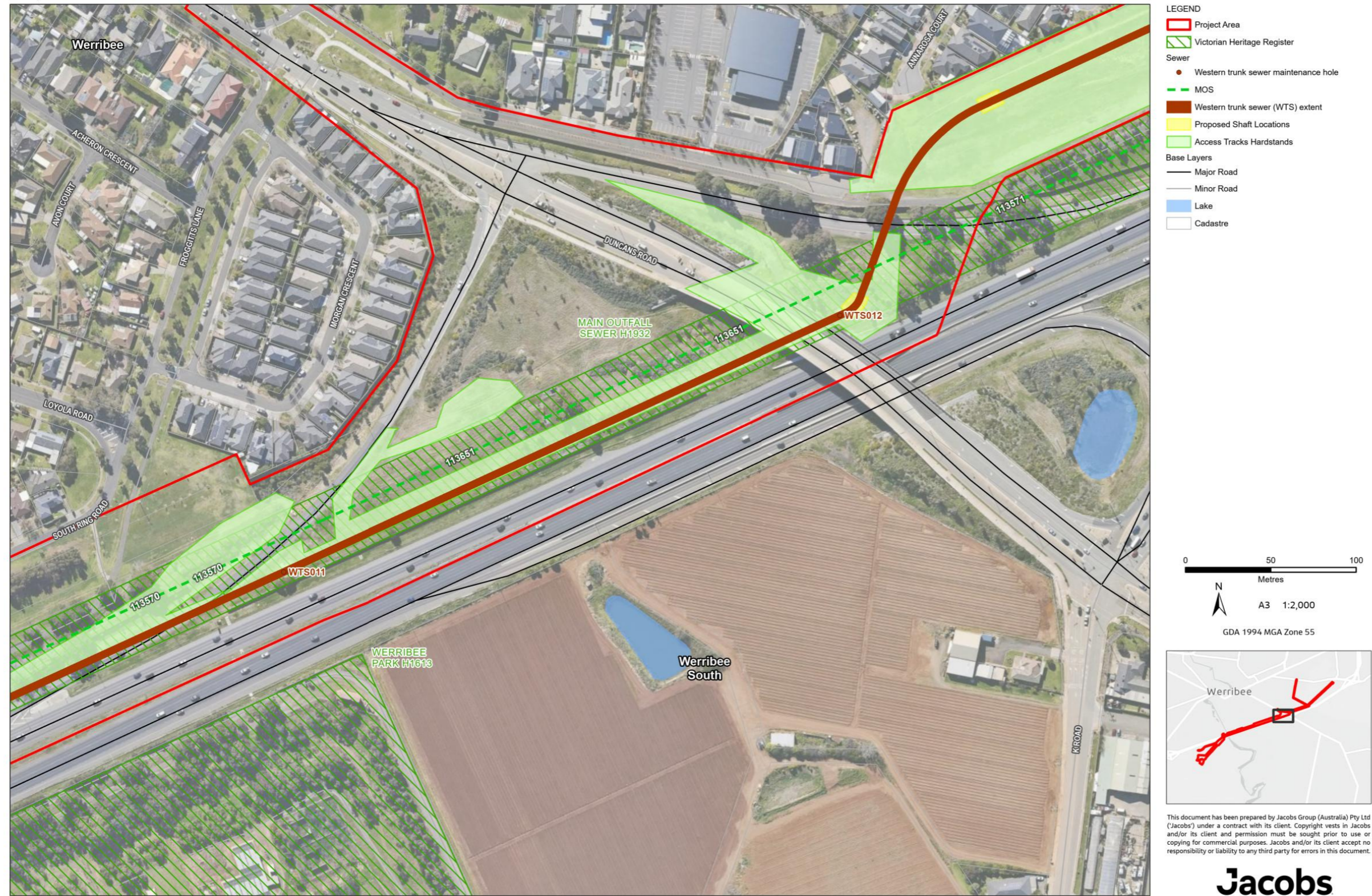


IA5000TY

Data Source: © Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Victorian Government (2025); Imagery: © Aerometrex MetroMap, 2025  
 \\ausyd0vs01\GISProj\VIC\_IA5000TY\_WTS\Apps\ArcPro\Figures\Heritage\IA5000TY\_Heritage\_MDSHS.aprx | Date: 18/11/2025

Figure 3-4. Proposed works locations as of August 2025 (Map 4 of 5)

Proposed Western Trunk Sewer Rehabilitation Works Locations



IA5000TY

Data Source: © Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Victorian Government (2025); Imagery: © Aerometrex MetroMap, 2025  
\\ausyd0vs01\GISProj\VIC\_IA5000TY\_WTS\Apps\ArcPro\Figures\Heritage\IA5000TY\_Heritage\_MOSHIS.aprx | Date: 18/11/2025

Figure 3-5. Proposed works locations as of August 2025 (Map 5 of 5)

### 3.3 Works interacting with the MOS

The works with direct or potential interactions with the MOS including the following:

- Construction of access tracks crossing the MOS
- Vehicle and plant movement on or near the MOS.
- Pipe transport and pipe jacking on or near the MOS
- New launch and retrieval shafts into WTS in proximity to MOS.

The key risk of impact to the MOS from these activities is due to the heavy loads which have the potential to collapse or otherwise damage the MOS below the ground surface. The following description of the construction method is based on the tender design and is considered to be the Preliminary Design. Further details will be developed during the detailed design phase. The proposed locations of the main works by the preferred contractor for the work are mapped on Figure 3-1 to Figure 3-5.

#### 3.3.1 Service crossings

Heavy vehicles will include pipe deliveries, quarry trucks and trailers, cranes, drum rollers and plant float trailers. Haul roads will cross existing services, including the MOS. The crossings required to transit the MOS are provided in Table 3-1 with reasoning as to why they are required in those locations.

A detailed *Traffic Access Options Report* (Don *et al.* 2025) was undertaken in 2025 for the project, to obtain in-principle approval from DTP and Wyndham City Council (WCC). The assessment considered a range of constraints including engineering constraints, heritage, ecology and planning approval constraints, interfacing projects, and transport network constraints. Other considerations included existing traffic volumes, crash history, public transport network, pedestrian and cyclist facilities and heavy vehicle routes. The project area was divided into five separate work areas that need to be accessed, and multiple options were assessed for each work area to rank the options from most viable to least viable. Feedback on the assessment was provided by DTP and WCC. This comprehensive options assessment has in-principle approval, and ‘the preferred contractor will then be responsible for development of the access strategy detail and making submissions for formal approval...’ (Farmakidis and Don 2025:31).

Table 3-1. Proposed crossing of the MOS and reasoning for requirement

Crossing	Reasoning for requirement to cross the MOS
Crossing near WTS007	To access WTS007 to WTS010 shafts. Melbourne Water drawings show this area is already backfilled. Contractor will confirm in Delivery Phase.
Crossing near WTS010	To exit from WTS010. Due to space restriction, the pipe delivery vehicle (6 m long pipe on truck) cannot turn around to exit at WTS007. Alternative exit where delivery vehicles continue to drive into Duncans Road city-bound highway off-ramp has been considered, but this also requires MOS backfilling to allow sufficient turning movement.
Crossing near WTS011	By crossing the MOS at this point towards the north of the MOS and having the access track sufficiently away from the MOS, the contractor is able to avoid backfilling the MOS between WTS011 and WTS012.
Crossing near WTS012	To facilitate construction activities near WTS012 shaft. The MOS is close to WTS, and therefore an effect on the MOS is unavoidable. Additionally, WTS012 is at the end of a bend. It is a Melbourne Water requirement that a WTS012 maintenance hole or one adjacent to WTS012 is required to be rehabilitated/constructed, ensuring the bend can be inspected during service.

### 3.3.2 Hardstands, crane pads and mobile gantry

Hardstands, crane pads and a mobile gantry will be installed during site establishment works. The key considerations for these works regarding the MOS are the load limits. The size of the pipes which are to be installed within the WTS are also a constraining factor as they are each 6m in length, 4.31 m outer diameter and weigh 9.5 tonne (t) each.

Work areas for plant laydown, carparking, construction compounds, and stockpile areas will require the installation of hardstands as part of site establishment. Some of these may be in the vicinity or partly over the top of the MOS and will be confirmed during detailed design.

To enable the delivery, movement and installation of the pipe sections into the WTS, crane pads will be required at each of the Launch and Receival Shafts and to erect the mobile gantry. Indicative layouts of the crane pads and mobile gantry are shown in Figure 3-7 and Figure 3-8.

The crane pads are designed to hold a 160-t crawler crane which will:

- Support the construction of the Launch/Receival Shaft
- Lift and lower the slip frame and pipes into the Launch Shaft
- Lift the pipes from the delivery vehicles to the storage location or to the mobile gantry.

In addition to the crane pads, a 'runway' between WTS008 and WTS010 will be installed to enable the mobile gantry to operate between the crane pads. Examples of the crawler crane and mobile gantry are shown in Figure 3-6.

The construction of the 160 t crawler crane pads will include stripping of vegetation, scraping of topsoil, placement of geogrid/geofabric, placement and compaction of crushed rock. The mobile gantry will be erected on the crane pads, and a runway for the mobile gantry will be established on two 1.5 m wide strips. The construction of the strips will require stripping of ground surface, placing geofabric, and placing and compacting crushed rock, then placing TrueGrid with topsoil and grass.

The crawler crane will be mobilised at each launch shaft site to unload pipes and install the jacking frame required to install the pipes in the WTS. Due to its 6.8 m width, it is not able to travel being launch shaft sites. The mobile gantry crane will be used to shift the pipes along the WTS alignment between launch shafts.



Figure 3-6. Example of 160 tonne crawler crane and mobile gantry (Confidential contractor 2025)

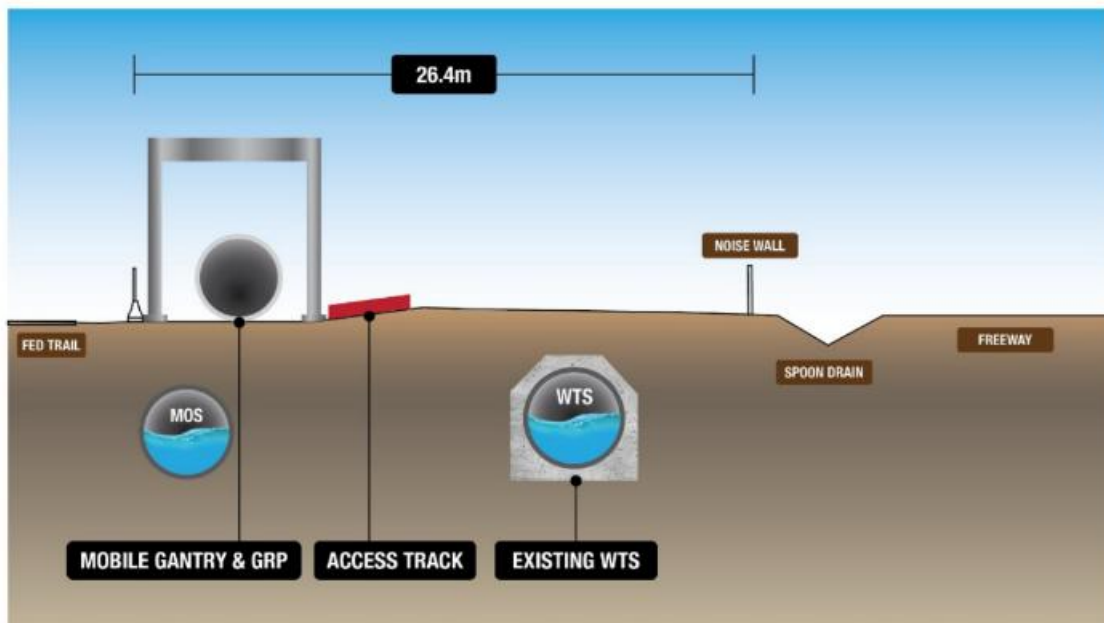


Figure 3-7. Indicative layout of the mobile gantry with pipe being transported (Confidential contractor 2025)

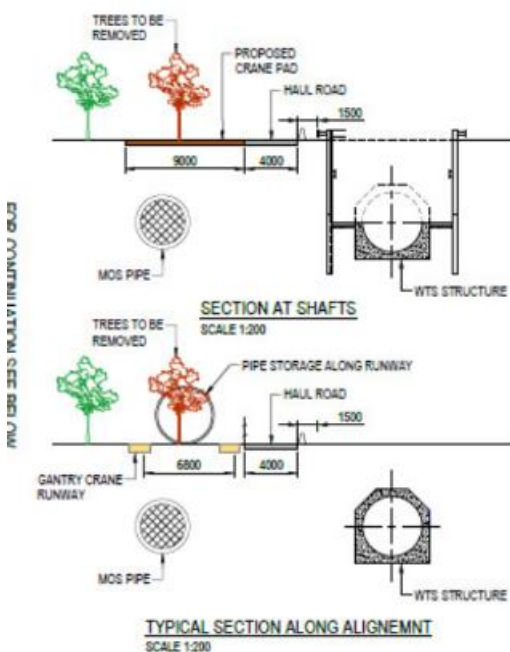


Figure 3-8. Example cross sections along the WTS alignment showing possible layout at shafts and along the alignment (Confidential contractor 2025)

### 3.3.3 Excavation of launch/receival shafts

Launch and Receival Shafts are required to launch the slip line pipes and to receive the pipe from either direction. The shafts are designed to be a sufficient size to enable safe installation and operation of the pipe jacking frames. An indicative diagram of the approach to excavation of the shafts is shown in Figure 3-9 and Figure 3-10, with the MOS shown at left of the diagrams.

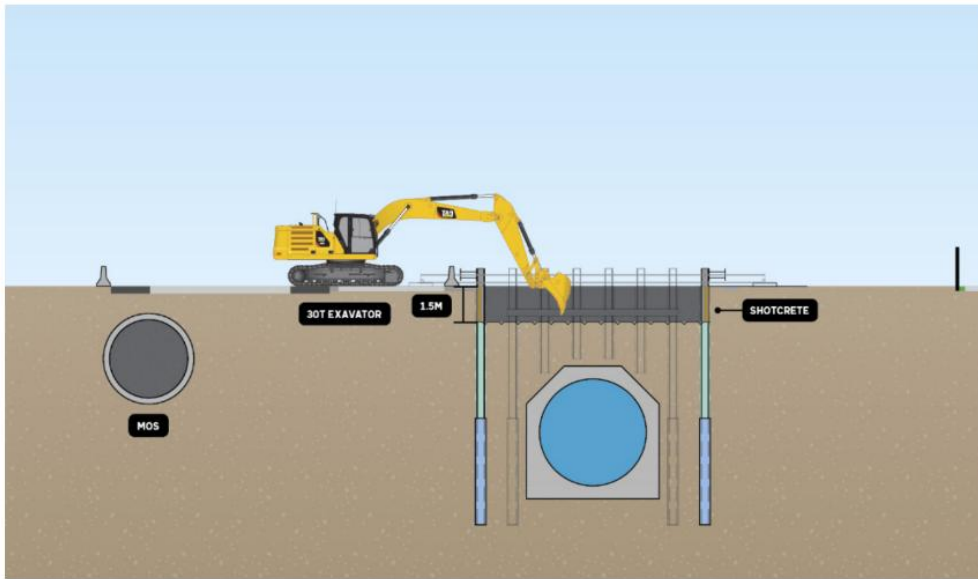


Figure 3-9. Indicative method for excavating the launch/receival shafts (Confidential contractor 2025)

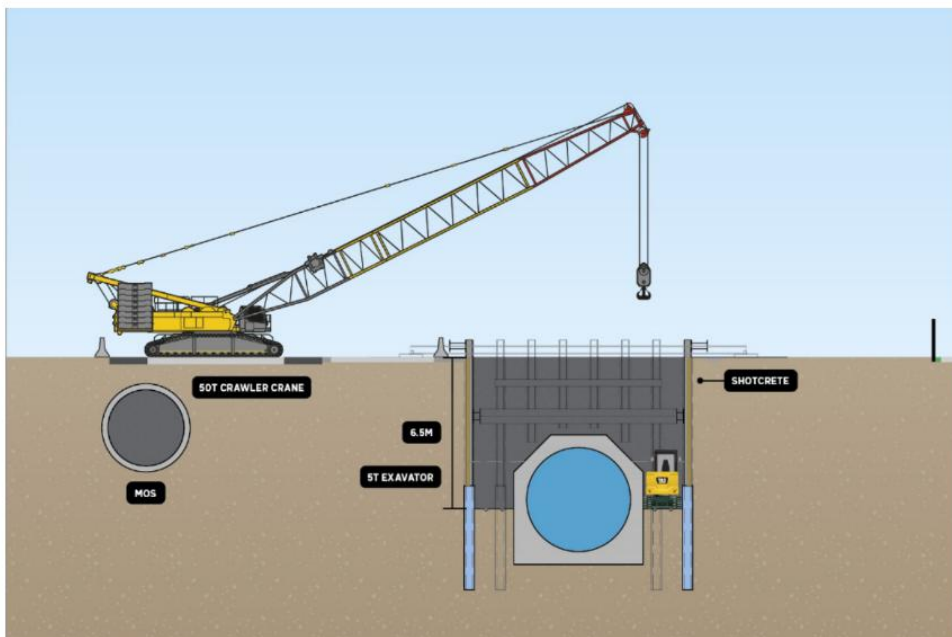


Figure 3-10. Indicative method for excavating launch/receival shafts (Confidential contractor 2025)

### 3.3.4 Pipe delivery

The slip line pipes will be required to be delivered to the project area and in some instances moved to storage locations along the alignment. An indicative layout for delivery of the pipes from the Princes Freeway, across the WTS is shown in Figure 3-11.

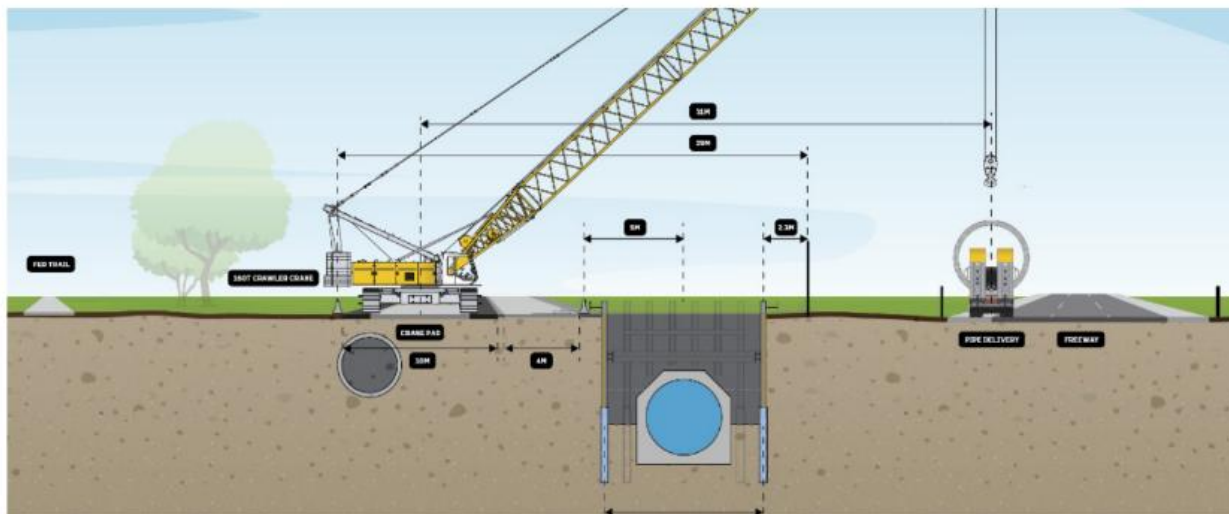


Figure 3-11. Indicative layout for pipe delivery, with freeway at right, MOS towards left and Federation Trail to far-left side of image (Confidential contractor 2025)

### 3.3.5 Installing pipes – slip line process

The process for installing the slip line pipes into the WTS include three stages:

- Shifting the pipes from the storage location to the lubrication station
- Lubricating the pipe spigot
- Installing the pipe in the sewer.

Surface preparation works at each shaft will include:

- Installation of temporary odour control unit
- Set up pipe lubrication station
- Mobilise and commission the cranes and mobile gantry
- Delivery of all pipes for each shaft, and storage of them adjacent to the shaft
- Place jacking frame power pack and hydraulic container adjacent to shaft.

The pipes will be shifted along the alignment, horizontally, using the mobile gantry crane. Each pipe will be unloaded and shifted up to 140 m along the alignment during a night shift. Then the pipes will be shifted during the day shift to allow space for further unloading of the pipes during the next night shift. Pipes are to be stored along the alignment along the top of the MOS.

Depending on the location of the shaft, the pipes will be shifted as follows:

- the pipe shifted horizontally from the storage location to the lubrication station using a 50t mobile gantry (Figure 3-12)
- the pipes will be stored around a 90t slew crane and will be lifted from their storage location directly onto the pipe rollers
- the pipes shifted horizontally along the alignment using a 100t crawler crane to load the pipe onto a flatbed truck, shifting the pipe to the 160-t crawler crane to unload it and place it on the pipe rollers.

Once the pipes are installed at each shaft, the jacking frame and 160 t crawling crane will be relocated to the next launch shaft. The jacking frame will be removed for the launch shaft using the 160t crane and transported to the next shaft by semi-trailers. A crane will unload the section of jacking frame at the next

shaft. Once the jacking frame is removed, the 160t crane will be disassembled, relocated to the next shaft and reassembled.

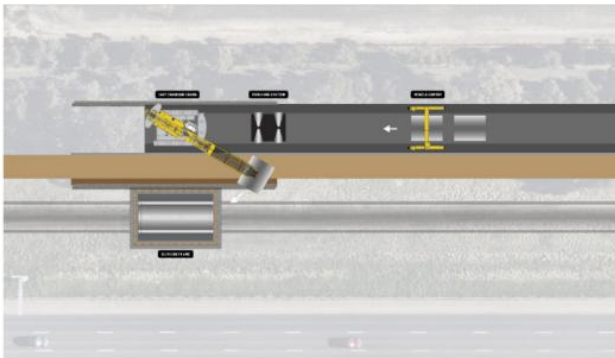


Figure 120: Pipe movement method R05 to R09 – Stage 1

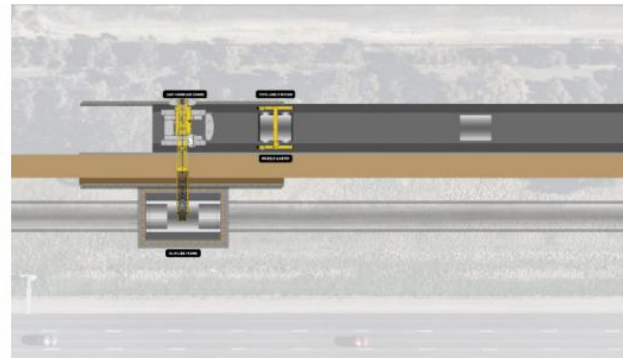


Figure 121: Pipe movement method R05 to R09 – Stage 2

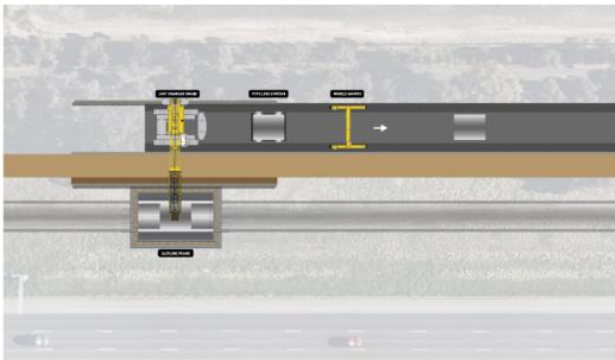


Figure 122: Pipe movement method R05 to R09 – Stage 3

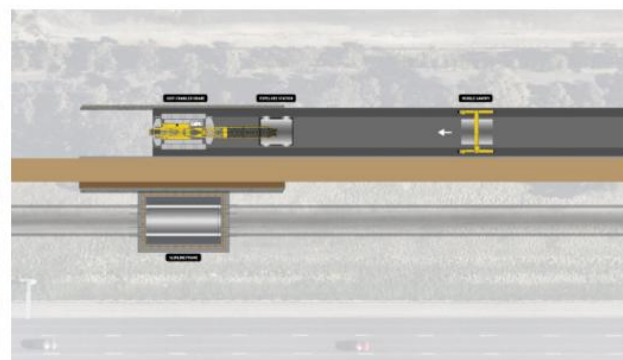


Figure 123: Pipe movement method R05 to R09 – Stage 4

Figure 3-12. Indicative method of moving pipes along the alignment for installation into the launch/receive shaft (Confidential contractor 2025)

### 3.3.6 Backfilling to protect MOS from collapse

Options for protecting the MOS include steel bridge crossing, steel plates over the top, or being filled with flowable fill.

Some sections of the MOS have previously been backfilled for protection during other works, such as for the construction of the Duncans Road offramp and bridge. Based on the current design, approximately 1340 m of the alignment within the WTS project area may require backfilling to ensure protection of the MOS. The condition of the existing MOS backfill will be checked as part of the Detailed Design Phase of the project in early 2026. The currently known locations of backfill within the MOS within the current project area are shown in Figure 3-13 and Figure 3-17. This HIS is based on the assumption that all sections of the MOS between WTS006 and WTS012 may need to be backfilled for the proposed works.

Given the close proximity of the MOS to the WTS, the constrained corridor for works between the Princes Freeway and the MOS, and the loads required for the works to be undertaken, the protection of the MOS from collapse along much of the project area between WTS006 and WTS012 is likely required. One of the options for protection of the MOS is to backfill the MOS prior to works occurring.

Based on the current known extent of the backfill within the section of the MOS between WTS006 and WTS012, and the proposed construction requirement at various locations, Table 3-2 indicates a potential maximum amount of backfilling, proposed by the contractor, that may be required to enable the construction methodology described above to be implemented. The contractor will confirm the extent of the existing

backfill in the delivery phase of the project, but the current proposed additional backfilling is shown in Figure 3-13 to Figure 3-17.

**Table 3-2. Locations of MOS where construction activities proposed, and backfilling requirement (Confidential contractor 2025)**

Location	Length (m)	Construction requirement	Protection required
WTS007	130	Access track crossing	Already backfilled
WTS007 – WTS008	340	Near access track	Backfill
WTS008	90	Crane pad	Already backfilled
WTS008 – WTS009	370	Crane pad	Backfill
WTS009	80	Crane pad	Already backfilled
WTS009 – WTS010	410	Crane pad	Backfill
WTS010	50	Crane pad	Backfill
WTS010 – WTS011	130	Crane pad	Backfill
	210	Nil	Nil
	110	Nil	Already backfilled
WTS011 – WTS012	20	Access track crossing	Backfill
	260	Nil	Nil
	100	Access track crossing	Already backfilled
WTS012	20	Crane pad	Backfill

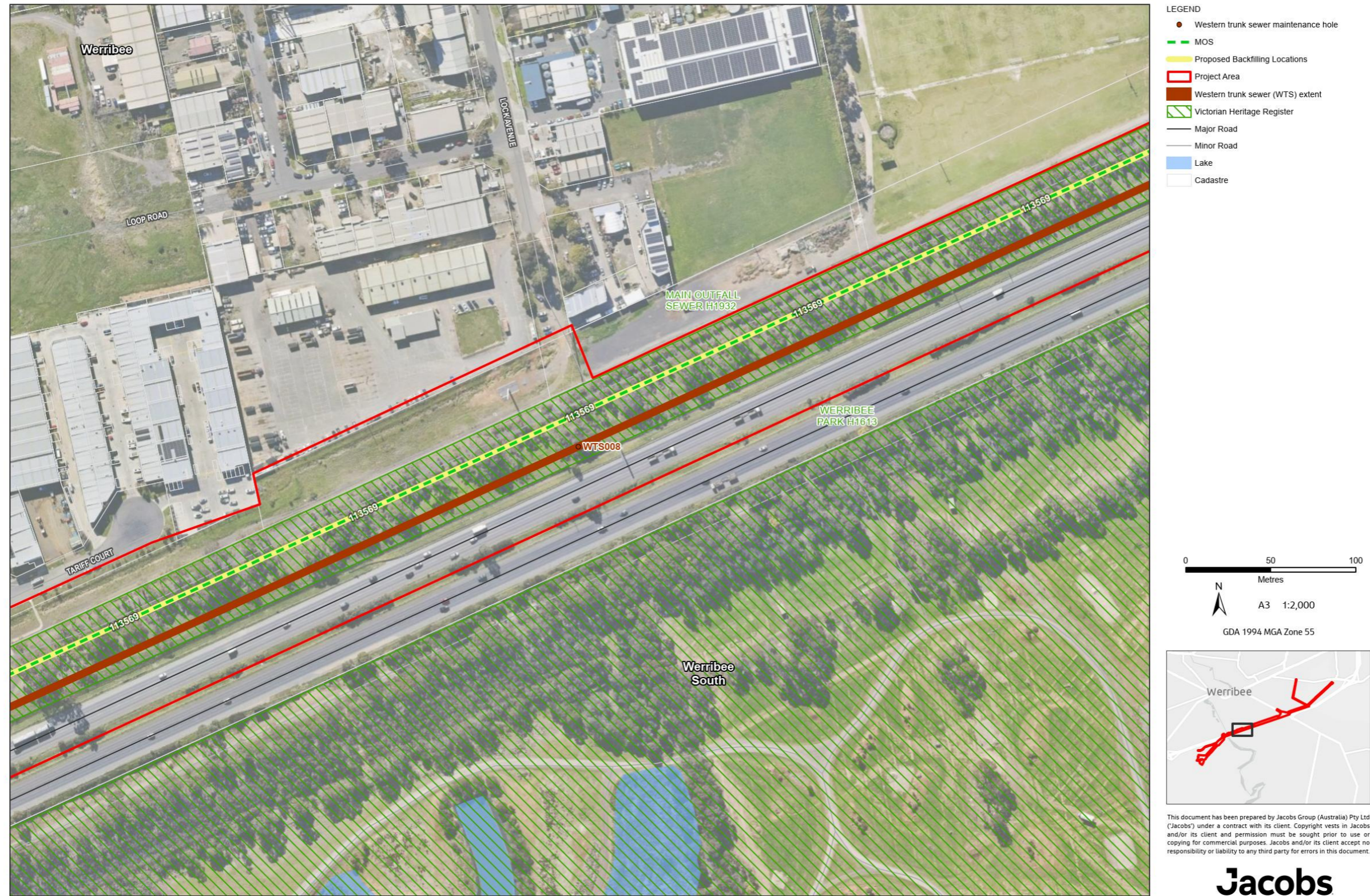
A potential approach for the backfilling would be to mark out the location of the extent of backfilling and expose the top of the MOS at these locations. Bulkheads would be required at the end of each section of backfilling, and these would be formed by pumping low slump concrete. Once the bulkheads/stop ends of each section of backfilling are installed, holes would be drilled every 50 m in the top of the MOS and the MOS backfilled with a flowable fill. This is a similar approach to previous backfilling activities as part of the Duncans Road Overpass upgrade in 2020, when the MOS was drilled every 20 m in the vicinity of WTS012 to backfill in that location.

The material proposed to be used to backfill the MOS is a highly flowable stabilised sand product, which is consistent with materials and methods used previously on the MOS. The proposed mix is from Heidelberg Materials, namely Zpipe, a higher flowable version of their Liquifill 2. As built drawings from previous sections of MOS backfilling provide further details. It is proposed that a material that has the ability to potentially be removed/reversed in future without destroying or damaging the existing concrete or brick fabric of the MOS be used. In 1984 and 2020 the materials used to backfill were as follows:

- 1984 – Two types of fill were used within the current project area – Cement stabilised crushed rock (Backfill Type A) and Selected refill free from clay lumps and stones (Backfill Type B).
- 2020 – The type of fill used was 3% cement stabilised sand.



Existing and Potential Backfilling of the Main Outfall Sewer

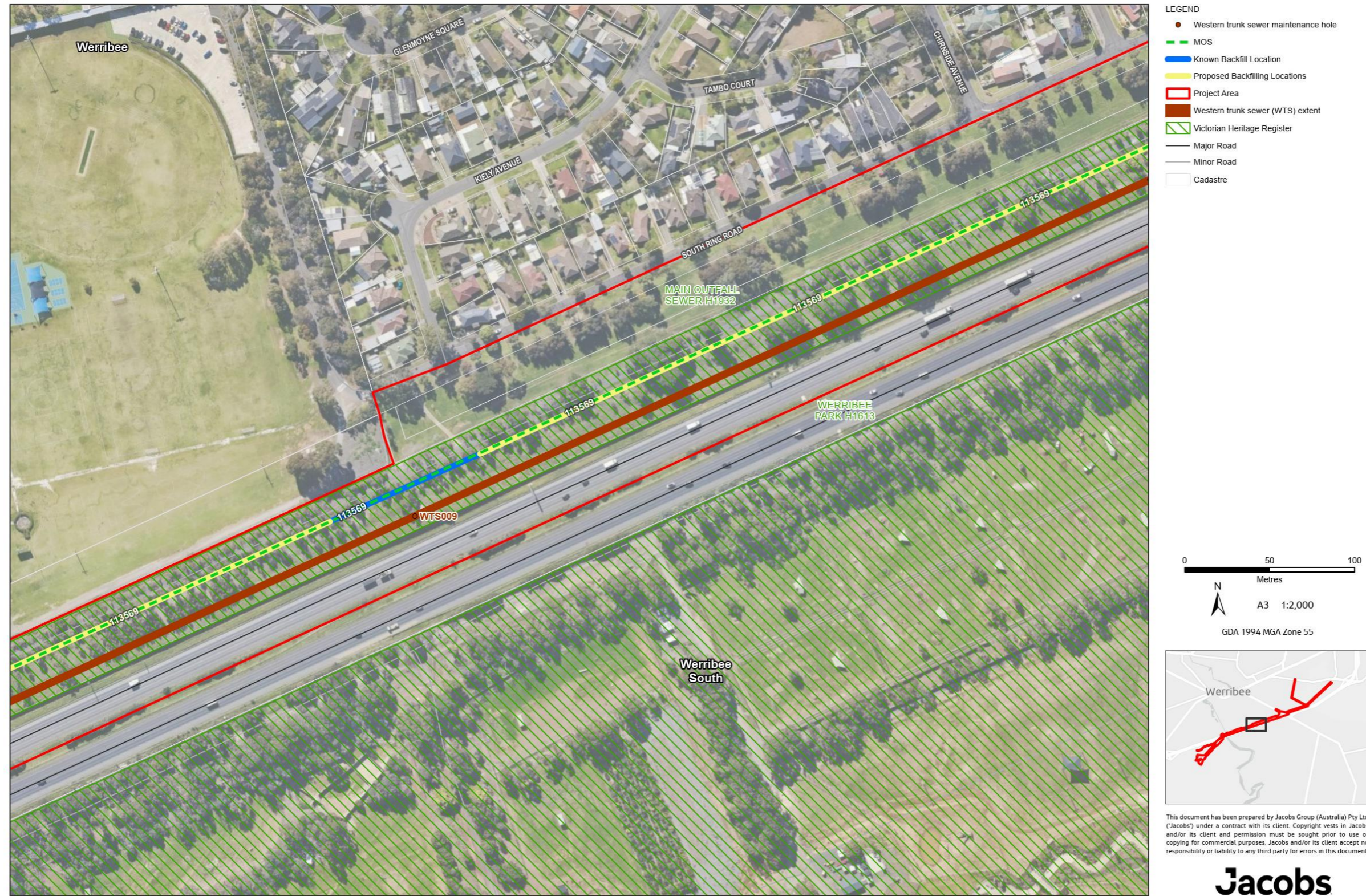


IA5000TY

Data Source: © Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Victorian Government (2025); Imagery: © Aerometrex MetroMap, 2025  
\\ausyd0vs01\GISProj\VIC\_IA5000TY\_WTS\Apps\ArcPro\Figures\Heritage\IA5000TY\_Heritage\_MOSHIS.aprx | Date: 11/21/2025

Figure 3-14. Existing and proposed backfill locations of the MOS in the project area (Map 2 of 5)

Existing and Potential Backfilling of the Main Outfall Sewer



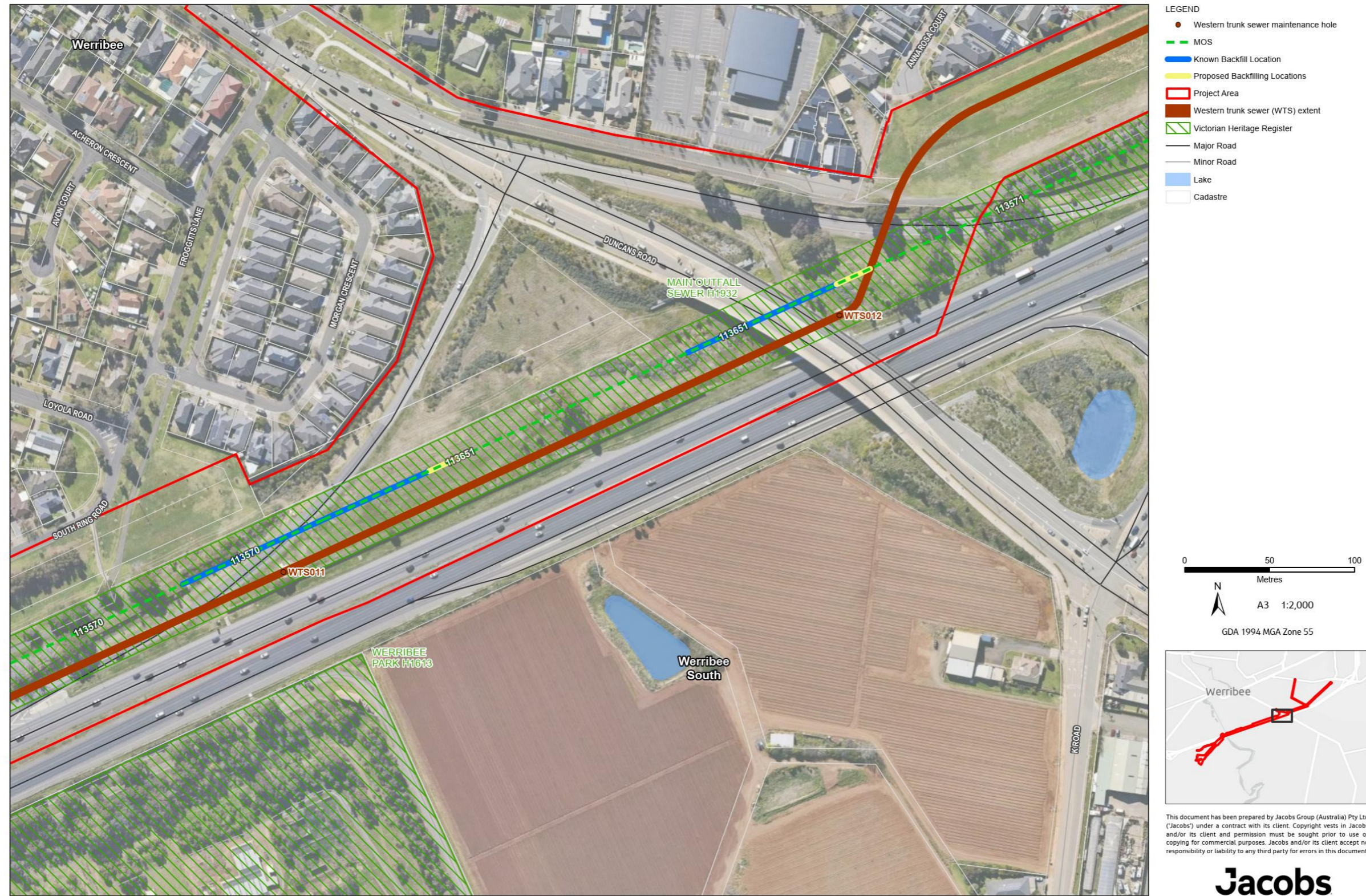
IA5000TY

Data Source: © Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Victorian Government (2025); Imagery: © Aerometrex MetroMap, 2025  
\\ausyd0vs01\GISProj\VIC\_IA5000TY\_WTS\Apps\ArcPro\Figures\Heritage\IA5000TY\_Heritage\_MOSHIS.aprx | Date: 11/21/2025

Figure 3-15. Existing and proposed backfill locations of the MOS in the project area (Map 3 of 5)



Existing and Potential Backfilling of the Main Outfall Sewer



IA5000TY

Data Source: © Commonwealth of Australia (Geoscience Australia) 2006 Geodata Topo 250k Series 3; Victorian Government (2025); Imagery: © Aerometrex MetroMap, 2025  
\\ausyd0vs01\GISProj\VIC\_IA5000TY\_WTS\Apps\ArcPro\Figures\Heritage\IA5000TY\_Heritage\_MOSHIS.aprx | Date: 11/21/2025

Figure 3-17. Existing and proposed backfill locations of the MOS in the project area (Map 5 of 5)

### 3.4 Multiple Benefits Action Plan


As part of this project, Jacobs has developed a *Multiple Benefits Action Plan* for Melbourne Water for the current project (Bailey and Grinspum 2025). The Plan aims ‘to leverage the WTS rehabilitation project as a catalyst for broader positive change. It outlines a comprehensive strategy for maximising community, cultural, and environmental benefits alongside the essential infrastructure upgrade. The plan aims to transform the WTS corridor into a thriving, biodiverse parkland that integrates seamlessly with the surrounding environment, providing a space for community connection with nature and heritage’ (Bailey and Grinspum 2025).

The Action Plan has five key actions:

1. Connecting to Country: Incorporating Indigenous thinking and design processes
2. Education: Developing programmes on cultural heritage, environmental conservation, and sustainability
3. Backfilling the Melbourne Outfall Sewer: Facilitating community open space improvements
4. Nature Positive Revegetation: Implementing a strategy to improve biodiversity and promote urban cooling
5. Werribee River Activity Node: Creating an open space node with viewing platform and educational signage (Bailey and Grinspum 2025).

Action 3 (Backfilling the MOS) (Table 3-3) is of direct relevance to the physical impact of potential backfilling of the MOS proposed as part of the construction methodology. Action 5 (Werribee River Activity Node) (Table 3-4) is relevant to the potential for mitigating impacts to the MOS and for meeting conservation policies in the CMP through interpretation. The Action Plan is currently aimed at the Development Phase of the project and as such is currently at a high level. Melbourne Water will work with the Development Phase proponents to assess and propose how these actions will be delivered and ensure alignment with Melbourne Water’s Key Responsibility Areas (KRAs) and Key Performance Indicators (KPIs) for the WTS rehabilitation works. An updated Multiple Benefits Action Plan will be adopted for the Delivery Phase (Bailey and Grinspum 2025).

**Table 3-3. Action 3 from the Multiple Benefits Action Plan (Bailey and Grinspum 2025)**

Action 3: Backfill the Melbourne Outfall Sewer (MOS)	
	Prepare a proposal for backfilling the Melbourne Outfall Sewer (MOS) to facilitate community open space improvements as identified within the Zone 1 Greening the Pipeline Masterplan extents.
Multiple Benefits Outcomes	WTS Multiple Benefits Action Plan Objectives, MW KRAs & KPIs Alignment
<p><b>Public Health and Safety</b></p> <ul style="list-style-type: none"> <li>• Improved public safety through repurposing of unused infrastructure</li> <li>• Potential for enhanced flood resilience in the area</li> </ul> <p><b>Active Transport and Recreation</b></p> <ul style="list-style-type: none"> <li>• New opportunities for shared pathways and active transport connectivity</li> <li>• Increased access to open spaces for community</li> <li>• Enhanced opportunities for active and passive recreation</li> </ul> <p><b>Community Wellbeing</b></p>	<p><b>WTS Multiple Benefits Action Plan Objectives:</b></p> <p><b>P2.</b> Prioritise public health, safety, and prevent harm to the community and environment.</p> <p><b>S1.</b> Enhance the WTS corridor to support future Council masterplans</p> <p><b>S3.</b> Create a thriving, connected, and community-focused space emphasising transport links and node</p> <p><b>MW KRA &amp; KPIs:</b></p> <p><b>KRA: Performance</b></p> <p>KPI: Project innovation &amp; customer improvement</p> <p>KPI: Environmental measures &amp; Initiatives</p>

- Improved physical and mental health from increased access to green spaces
- Enhanced social interaction and community connectedness
- Increased public access to inclusive, quality open spaces

**Urban Design and Aesthetics**

- Enhanced amenity and aesthetic values in the urban landscape
- Improved neighbourhood liveability and visual appeal
- Creation of distinctive, vibrant places within the community

**Resource Recovery and Circularity**

- Repurposing of idle or underutilised sites for productive community use

**Economic Benefits**

- Possible increased property values in surrounding areas

**Collaborative Partnerships**

- Opportunities for co-design processes with the community and stakeholders
- Potential for partnerships with local government and community groups


**Potential Pathways**

1. Melbourne Water to provide contractors with existing plans and specifications related to the Zone 1 Greening the Pipeline Masterplan.
2. Contractor to submit a proposal for backfilling the Melbourne Outfall Sewer to enable future open space.
3. Melbourne Water to facilitate coordination between the contractor and relevant stakeholders (e.g., local council, community groups) to ensure alignment with broader community objectives.

**Key Stakeholders**

- Melbourne Water
- Heritage Victoria
- Utility owners
- Traditional Owners groups Registered Aboriginal Parties (RAPs)
- Wyndham City Council
- Werribee River Association
- Department of Transport and Planning (DTP)

**Table 3-4. Action 5 of the Multiple Benefits Action Plan (Bailey and Grinspum 2025)**

Action 5: Werribee River Activity Node	
	<p><b>Facilitate the design of an open space node and path connection with a viewing platform including educational/interpretive signage at the intersection of the Federation Trail and Werribee River as identified in the <i>Werribee Waterway Amenity Action Plan</i> and the <i>Greening the Pipeline Masterplan</i>.</b></p>
Multiple Benefits Outcomes	WTS Multiple Benefits Action Plan Objectives, MW KRAs & KPIs Alignment
<p><b>Active Transport and Recreation</b></p> <ul style="list-style-type: none"> <li>• New/improved shared pathways and active transport connectivity</li> <li>• Increased opportunities for active and passive recreation</li> <li>• Improved physical and mental health from increased physical activity</li> </ul> <p><b>Community Engagement</b></p> <ul style="list-style-type: none"> <li>• Enhanced access to inclusive, quality open spaces</li> <li>• Improved sense of community connectedness</li> </ul> <p><b>Environmental Enhancement</b></p> <ul style="list-style-type: none"> <li>• Protection and improvement of waterway values and conditions</li> </ul> <p><b>Cultural Heritage</b></p> <ul style="list-style-type: none"> <li>• Increased recognition of cultural values significant to Aboriginal people</li> <li>• Enhanced preservation of landscapes providing a unique sense of place</li> </ul> <p><b>Urban Design and Aesthetics</b></p> <ul style="list-style-type: none"> <li>• Enhanced amenity and aesthetic values</li> <li>• Improved neighbourhood liveability and visual appeal</li> </ul> <p><b>Economic Benefits</b></p> <ul style="list-style-type: none"> <li>• Potential increased opportunities for local businesses</li> <li>• Possible tourism opportunities</li> </ul>	<p><b><u>WTS Multiple Benefits Action Plan Objectives:</u></b></p> <p><b>S1.</b> Enhance the WTS corridor to support future Council masterplans</p> <p><b>S3.</b> Create a thriving, connected, and community-focused space emphasising transport links and node</p> <p><b>S5.</b> Enhance the sense of place and caring for Country and cultural heritage through Indigenous Design</p> <p><b><u>MW KRAs &amp; KPIs:</u></b></p> <p><b>KRA: Collaboration and Diligence</b> KPI: External Stakeholder Satisfaction</p> <p><b>KRA: Performance</b> KPI: Project innovation &amp; customer improvement KPI: Environmental measures &amp; Initiatives</p>
<p><b>Potential Pathways:</b></p> <ol style="list-style-type: none"> <li>1. Contractor to submit a proposal detailing how their design and construction approach will:             <ol style="list-style-type: none"> <li>a) Facilitate future implementation of the activity node</li> <li>b) Align with the Werribee Waterway Amenity Action Plan and Greening the Pipeline Masterplan</li> <li>c) Preserve opportunities for future enhancements</li> </ol> </li> <li>2. Melbourne Water to initiate internal discussions on developing the Werribee River Activity Node as a corporate initiative, using the rehabilitation project as a catalyst for broader planning.</li> </ol>	
<p><b>Key Stakeholders</b></p> <ul style="list-style-type: none"> <li>- Melbourne Water</li> <li>- Traditional Owners groups Registered Aboriginal Parties (RAPs)</li> <li>- Wyndham City Council</li> <li>- Werribee River Association</li> <li>- Department of Transport and Planning (DTP)</li> <li>- Utility owners</li> </ul>	

## **4. Information to support an assessment against s101(2) of the Heritage Act 2017**

### **4.1 Impact of the proposal on the significance of the place**

**s101(2)(a) – the extent to which the application, if approved, would affect the cultural heritage significance of the registered place or registered object**

#### **4.1.1 Construction of service crossings, hardstands, crane pads and mobile gantry**

Without any mitigation, the main potential impact from the proposed works is the risk of collapse or damage of the MOS due to the following activities:

- substantial weight of heavy machinery (up to 160 t cranes) crossing the MOS to get to the WTS to undertake construction
- construction and use of crane pads for excavation of the launch/receival shafts between the WTS and the MOS, with potential for overlap over the top of the MOS (as shown in the extent of the access track hardstand and proposed shaft locations in Figure 3-1 to Figure 3-5, and the diagrams in Section 3.3.
- heavy pipe sections being transported along the MOS and WTS alignment, with potential for overlap over the top of the MOS (as shown in the extent of the access track hardstand and proposed shaft locations in Figure 3-1 to Figure 3-5, and the diagrams in Section 3.3).

The age of the MOS infrastructure, and the potential for relatively poor condition (as indicated in the structural assessment report by JV Consulting Engineers referred to in the CMP (2017, cited in Black *et al.* 2018)), and the fact that previous major infrastructure works for the WTS (in 1984) and the Duncans Road Overpass Upgrade (in 2020) identified and managed the risk of collapse to the MOS as part of their works, supports this as a continuing risk in relation to the currently proposed works.

Depending on the extent and location of the proposed works over or close to the MOS, there are two key options for reducing the risk of MOS collapse during the project. In more contained or narrower areas of crossing/intersection with the MOS, there is an option to install and use of steel or reinforced concrete plank bridging structures or plates which may be used in conjunction with a build-up of fill layers over the top of the MOS, to spread the heavy loads to an acceptable level and reduce the risk of MOS collapse. The alternative approach to reducing the risk of collapse, is to backfill the MOS with an appropriate material.

At the current design phase of the project, the level of detail regarding the use of a bridging structure or backfilling has yet to be developed. This would occur during the detailed design phase of the project which will commence in early 2026.

It is proposed that a hierarchical approach to decision making will be considered during the Detailed Design Phase for the project to minimise and mitigate potential impacts of collapse to the MOS, as follows:

1. Can heavy machinery (such as cranes) be placed elsewhere away from MOS? Can crossing of the MOS by heavy machinery and vehicle be avoided by alternative routes? If not, why not?
2. Can a bridging structure be used to support heavy machinery on crane pads, or the transport of pipes along the alignment where intersecting with the location of the MOS? If not, why not?
3. If crossing the MOS or establishment of crane pads and mobile gantry over the MOS cannot be avoided, backfilling will be required.

As can be noted from the information from the contractor's tender (see Table 3-1 – Crossing near WTS011), consideration of the location of crossings has already begun, and does have the potential to reduce the amount of backfilling required by being able to sufficiently move the access track away from the MOS.

## 4.1.2 Bridging and backfilling of MOS

### 4.1.2.1 Bridging

The use of bridging structures is likely to have limited physical impact on the MOS and will reduce the risk of collapse of the MOS due to project works. The bridging structures can be construction using a build-up of fill in conjunction with steel plates or bridges. They are temporary and are able to be removed after the works are completed. These bridging structures would have no direct intersection with the sub-surface MOS fabric.

### 4.1.2.2 Backfilling

#### 4.1.2.2.1 Impacts

Backfilling the MOS to reduce the risk of collapse would have a direct physical impact on the original structure and fabric of the MOS. The physical impact would include drilling into the top of the MOS to insert the backfill material, and use of a material that could stick to the interior of the MOS in such a way as the material could not be removed without damaging the MOS fabric or structure, or that the interior structure would never be visible again. The use of backfilling would impact the cultural heritage significance of the MOS in that there would be a reduced ability to view and/or understand the original internal structure and material in the backfilled locations of the MOS. This would impact on the place's scientific (engineering) significance particularly in relation to the particular types of original covered channels situated within the project area – Section Type A and B. However, as noted in the CMP, the Type A and Type B sections of covered channel are common across the place, with some 10 km of covered sections present. A complete understanding of the extent of MOS backfill outside the project area is currently unknown. The CMP indicates that up to 50% of covered channel across the extent of the MOS is a proposed acceptable level of impact (see Table 2-1).

There is a 3.3 km extent of the MOS within the VHR extent of registration that is within the project area. The maximum proposed requirement for backfilling the MOS in the project area would be an additional 1.34 km to be backfilled, resulting in a total 1.9 km (58%) of the section between WTS006 and WTS0012 potentially becoming backfilled.

The process of backfilling would not impact on the historical significance of the place, in relation to the tangible, visible manifestation of the system related to the above ground elements of the MOS, as all of the proposed works relate to the underground and 'out of sight' sections of the system. The linear connection and alignment of the MOS would also still be retained in place.

#### 4.1.2.2.2 Management and mitigation of impacts

**Conservation Policy 6.4.10 Backfilling Main Outfall Sewer Channel** (in the CMP) only refers to the open channels of the MOS (see Table 2-5). It notes that backfilling or covering over of open sections of the MOS have occurred in the past. This includes the development of the Williams Land Pilot Park as part of the Greening the Pipeline project, for which a Heritage Victoria permit was issued in 2016. While the conservation policy refers to open channels, similar conditions where this activity are acceptable also apply to the closed channels:

- To ensure public safety.
- To provide additional access across the MOS in areas where the MOS presents a barrier to the passage of pedestrians or vehicles.
- To provide public recreation facilities in order to enhance public appreciation of the MOS consistent with the CMP (Policy 6.4.10, Black et al. 2018).

The backfilling of the MOS in the project area enables human (public) safety (in terms of construction employees during construction), would provide access across the MOS for the essential construction works which would otherwise be inaccessible, and ultimately, following completion of the works, would enable improved public recreation facilities and public access in line with the aims of the Greening the Pipeline project. The public safety aspect of backfilling is also applicable due to the risk of the MOS collapse in a location proposed for potential future public access to the area around the MOS for recreation purposes.

**Conservation Policy 6.5.2 Altering, Adapting or Extending Heritage Assets** notes that the integrity of the MOS is 'an important part of its significance and contributes to an understanding of how it has functioned since it was constructed' and therefore changes to significant fabric should be minimised. It outlines that changes should only be permitted if the following conditions (relevant to the current project) can be demonstrated that:

- the option of undertaking no changes is not feasible due to technical, safety, operational or other management constraints in accordance with relevant standards, or
- any changes are sympathetic to the original fabric, or
- there are other examples of the structure or feature within the Main Outfall Sewer, which will remain intact as an example of that building, structure or feature, or
- the changes are required by a Statutory Authority to meet its Statutory functions (i.e. drainage) .

The proposal of backfilling sections of the MOS in the project area that have not already been backfilled meets these criteria or would be further demonstrated during development of the detailed design for the project. Due to the technical requirements for rehabilitation the sewer using the construction methodology proposed, backfilling is appropriate. Due to safety for construction workers or potential future public users from potential MOS collapse, backfilling is appropriate. There are other intact examples of covered sections of the MOS (within the 10 km total length of covered MOS channels). The maximum proposed requirement for backfilling the MOS in the project area would be an additional 1.34 km to be backfilled, resulting in a total 1.9 km in the section between WTS006 and WTS0012 becoming backfilled. Further backfilling the MOS enables the critical rehabilitation of the WTS to be carried out, without which Melbourne Water as a Statutory Authority would be unable to meet its statutory functions.

Conservation Policy 6.5.2 also recommends that records of the changes be made in line with Policy 6.4.7 and consideration of interpretation of the place in accordance with Policy 6.7 be undertaken.

**Conservation Policy 6.5.4 Reversibility of Works** states that 'Alterations or extensions that do not contribute to the conservation of a heritage asset should be undertaken in such a way that they are reversible wherever practical'. The backfilling of the MOS for the proposed project would use materials similar to those previously used in backfilling in this section of the MOS, such as cement stabilised crushed rock (used in 1984), or stabilised sand (used in 2020). This would enable the backfill to be removed / reversed.

**Conservation Policy 6.6 Use** indicates that one of the objectives of use (of relevance to the current project) is 'to support the continued historic use of the Main Outfall Sewer and its component parts as part of a linear recreation facility'. As noted above the backfilling of the MOS in the project area would ultimately enable improved public recreation facilities and public access in line with the aims of the Greening the Pipeline project. The public safety aspect of backfilling is also applicable due to the risk of the MOS collapse in a location for future public access.

**Conservation Policy 6.6.2 Change of Use – No Use** states that for assets such as pipes which are no longer operational, they should be left in situ where possible, made secure and that deterioration be prevented. The policy does recommend backfilling in direct relation to open channels rather than buried pipes, but a similar approach is still appropriate to managing the underground channels of the MOS, as has been undertaken previously, and for this current project.

### **4.1.3 Tree removal**

As noted in the Existing Condition section, referring to the design and construction of the MOS (Section 2.4.1), there is no documentary evidence of the planting of trees as part of its construction, with the earliest evidence in aerial images dating to 1951, more than 50 years after MOS construction. Further, as noted in discussing the current land use and description of the project area and easement (Section 2.4.3.1), the CMP refers to only scattered remnants of early plantings (but does not identify the locations of these). The ecological assessment for this project describes mature native and non-native trees along being lining the Federation Trail, alongside the WTS and the MOS, described as amenity screening. Other vegetation is described as young amenity screening plantings of bottlebrush, eucalyptus and paperbarks, with an understorey of exotic grasses and weeds, with only small degraded patches of native vegetation, primarily native grasses and shrubs. The VHR Statement of Significance does not identify the tree plantings along the MOS to be part of its significance, either as part of its historical importance as a demonstrating a process of the development of modern Melbourne; nor are the any plantings of relevance to the scientific (engineering) importance of the MOS.

From this information it is suggested that the even the mature trees present in the project area are unlikely to be original or early plantings related to the MOS, however, as recommended by the ecology assessment, an arborist assessment will be taken in the next phase of the project, which can clarify the age and species of the mature trees present, and which may be subject to removal for the construction of the project.

### **4.1.4 Works near the Werribee River Aqueduct**

While no works are proposed to the Werribee River Aqueduct as part of the project, there is the potential for the construction of hardstand in its vicinity on either side of the river. In order to manage the risk of unintended impact to the aqueduct from machinery, vehicles or dust during construction, standard construction measures such as barrier fencing and dust control would be put in place between the works and at either end of the aqueduct to manage this risk. Detailed design would ensure there is a sufficient distance from the works to the aqueduct.

### **4.1.5 Public access and interpretation**

The project provides an opportunity for a positive impact on the cultural heritage significance of the MOS through increased knowledge and information, with the ability for increased public access (where the MOS is backfilled for safety), and for additional heritage interpretation. The Multiple Benefits Action Plan prepared for the project has identified two key actions of direct relevance to the heritage place, including backfilling of the MOS (Action 3) to allow for future public open space for a variety of community benefits, and the development of a Werribee River Activity Node (Action 4) to allow for increased recognition of heritage values and tourism opportunities. This Plan is currently at the Development Phase of the project with further development of the actions to be carried out in the Delivery Phase. The future development of the Plan will include an analysis of existing heritage interpretation related to the MOS, and a project specific interpretation plan as to how this could be improved or further developed as part of this project.

## **4.2 Reasons why the proposal should be supported**

### **4.2.1 Reasonable or economic use**

#### **s101(2)(b) – the extent to which the application, if refused, would affect the reasonable or economic use of the registered place or registered object**

The proposal is not considered against this matter.

## 4.2.2 Duty of public authority

### **s101(2)(d) – if the applicant is a public authority, the extent to which the application, if refused, would unreasonably detrimentally affect the ability of the public authority to perform a statutory duty specified in the application**

The applicant – Melbourne Water – is a public authority owned by the Victorian Government. The Minister for Water, in consultation with the Treasurer, appoints their Board of Directors. Melbourne Water is responsible for providing essential services for the Greater Melbourne region. They manage 10 major water storage reservoirs, 40 service reservoirs, tanks and basins, 13 water treatment plants and the sewer and water pipeline infrastructure between these facilities.

The *Water Act* 1989 (Vic) provides the legal framework for managing Victoria's water resources. It states that Melbourne Water has the power to make by-laws: special rules published in the Government Gazette which apply within a specific area of Melbourne Water's responsibility. Melbourne Water currently has one operating by-law, By-law No. 1 – which was made on 13 September 2018. Its objectives (and therefore Melbourne Water's statutory duty) includes:

- protecting, preventing pollution of and preventing damage to the water supply catchments and the water supply system
- prohibiting interference with water supply facilities and certain catchment areas
- enabling Melbourne Water to publish notices specifying land, areas and works subject to prohibited access or activity.

The WTS shallow conduit conveys sewage flows between the Hoppers Crossing Pump Station and the WTP, conveying approximately 57% of Melbourne's sewage flow and is a major part of the State of Victoria's sewerage infrastructure. Ongoing condition monitoring has revealed poor structural conditions, necessitating proactive intervention. The section identified as being the highest priority is between WTS012 and WTS007. Since commissioning in 1991, the WTS shallow conduit has been subject to biogenic sulphuric attack leading to significant corrosion of the concrete structure. Currently, the WTS has reached its serviceable life and therefore requires rehabilitation from the WTS001 Outlet, approximately 4.55km upstream to WTS014.

The key risk of not rehabilitating the WTS is the failure of the trunk sewer, which could lead to environmental, social, and economic ramifications such as:

- Ecosystem damage from the release of raw sewage into creeks, rivers and Port Philip Bay
- Water contamination threatening terrestrial and marine flora and fauna
- Public health risks from exposure to raw sewage
- Service disruptions to widespread homes and businesses, causing both inconvenience and potential health hazards
- Emergency repairs which are complicated, expensive and disruptive
- Penalties for environmental damage and non-compliance with environmental regulations

Therefore, if this application was to be refused, it would unreasonably detrimentally effect Melbourne Water from performing its statutory duty under the Water Act.

### **4.2.3 World Heritage matters**

**s101(2)(e) – if the application relates to a listed place or to a registered place or registered object in a World Heritage Environs Area, the extent to which the application, if approved, would affect (i) the world heritage values of the listed place; or (ii) any relevant Approved World Heritage Strategy Plan**

This matter is not relevant to the proposal as there are no World Heritage matters in or near the registered place.

### **4.2.4 Matters relating to protection and conservation**

**s101(2)(f) – any matters relating to the protection and conservation of the registered place or registered object that the Executive Director considers relevant**

There are no other matters considered in relation to protection and conservation of the place.

## **5. Information to support assessment against s101(3) of the Heritage Act 2017**

### **5.1 Neighbouring heritage places**

**s101(3)(a) – the extent to which the application, if approved, would affect the cultural heritage significance of any adjacent or neighbouring property that is (i) included in the Heritage Register; or (ii) subject to a heritage requirement or control in the relevant planning scheme**

The Former Metropolitan Farm (H2400) is also situated within the project area, but the works address in the current HIS do not intersect with the extent of registration for the place. The works specifically within the MOS extent would have no effect on the Former Metropolitan Farm. Crossover works that are proposed there will be dealt with under a separate permit or permit exemption.

Werribee Park (H1613) is situated to the south of the registered MOS, on the opposite side of the freeway. The proposed works will have no effect on Werribee Park.

### **5.2 Other relevant matters**

**s101(3)(b) – any other relevant matter**

There are no other relevant matters considered in this application.

## **6. Other considerations**

### **6.1 Has the applicant advised whether the works trigger the need for a Cultural Heritage Management Plan under the Aboriginal Heritage Act 2006 and has one been approved?**

The proposed works do trigger the need for a Cultural Heritage Management Plan (CHMP). Two CHMPs have been prepared for the project (one for each Registered Aboriginal Party for the project area) and the current status of these is as follows:

- CHMP 20502 was approved by the RAP (Bunurong Land Council Aboriginal Corporation) on 12 November 2025. This covers the majority of the project works within the VHR extent to the east side of the Werribee River.
- CHMP 20501 was submitted to the RAP (Wadawurrung Traditional Owners Aboriginal Corporation) for evaluation on 16 October 2025 and is currently withdrawn pending further discussions. This covers the small section of the project area works within the VHR extent to the west side of the Werribee River.

### **6.2 Has the applicant advised whether the works contravene any existing Cultural Heritage Management Plan under the Aboriginal Heritage Act 2006?**

The work does not contravene any existing CHMP. The proposed works will be covered by the above two CHMPs once these are both approved.

## **7. Summary of impacts and conclusion**

### **7.1 Impacts**

#### **7.1.1 Collapse of the MOS**

Without any mitigation, the main potential impact from the proposed works is the risk of collapse or damage of the section of the MOS within the project area, particularly from the substantial weight of the heavy machinery required to be used and moved around the site during rehabilitation of the WTS.

#### **7.1.2 Bridging and backfilling the MOS**

Depending on the extent and location of the proposed works over or close to the MOS, there are two key options for reducing the risk of MOS collapse during the project. In more contained or narrower areas of crossing/intersection with the MOS, there is an option to install and use steel or concrete bridging structures or plates which may be used in conjunction with a build-up of fill layers over the top of the MOS, to spread the heavy loads to an acceptable level and reduce the risk of MOS collapse. The alternative approach to reducing the risk of collapse, is to backfill the MOS with an appropriate material.

The use of bridging structures is likely to have limited physical impact on the MOS and will reduce the risk of collapse of the MOS due to project works. The bridging structures can be constructed using a build-up of fill in conjunction with steel plates or bridges. They are temporary and are able to be removed after the works are completed. These bridging structures would have no direct intersection with the sub-surface MOS fabric. This option would therefore not impact on the cultural heritage significance of the MOS.

Backfilling the MOS to reduce the risk of collapse would have a direct physical impact on the original structure and fabric of the MOS. The physical impact would include drilling into the top of the MOS to insert the backfill material, and use of a material that could stick to the interior of the MOS in such a way as the material could not be removed without damaging the MOS fabric or structure, or that the interior structure would never be visible again. The use of backfilling would impact the cultural heritage significance of the MOS in that there would be a reduced ability to view and/or understand the original internal structure and material in the backfilled locations of the MOS. This would impact on the place's scientific (engineering) significance particularly in relation to the particular types of original covered channels situated within the project area – Section Type A and B. However, as noted in the CMP, the Type A and Type B sections of covered channel are common across the place, with some 10 km of covered sections present. The CMP indicates that up to 50% of covered channel across the extent of the MOS is a proposed acceptable level of impact (see Table 2-1). While the extent of backfilling across the entirety of the 10 km is not known, within the WTS project area within the VHR extent of registration, the project proposes to backfill up to a maximum of 58% of the MOS between WTS006 and WTS012. This represents the majority of publicly accessible land where the MOS is located and hence reduces the public safety risk.

The process of backfilling would not impact on the historical significance of the place, in relation to the tangible, visible manifestation of the system related to the above ground elements of the MOS, as all of the proposed works relate to the underground and 'out of sight' sections of the system. The linear connection and alignment of the MOS would also still be retained in place.

#### **7.1.3 Tree removal**

The available information suggests that even the mature trees present in the project area are unlikely to be original or early plantings related to the MOS, and are therefore do not contribute to the cultural heritage significance of the MOS. As such, the proposed removal of trees along the MOS, would not impact on the place's cultural heritage significance.

### **7.1.4 Inadvertent damage to Werribee River Aqueduct**

While no works are proposed to the Werribee River Aqueduct as part of the project, there is the potential for the construction of hardstand in its vicinity on either side of the river. In order to manage the risk of unintended impact to the aqueduct from machinery, vehicles or dust during construction, the use of standard construction protection measures such as barrier fencing and dust suppression would be used.

### **7.1.5 Public access and interpretation**

The project provides an opportunity for a positive impact on the cultural heritage significance of the MOS through increased knowledge and information, with the ability for increased public access (where the MOS is backfilled for safety), and for additional heritage interpretation. The Multiple Benefits Action Plan prepared for the project has identified two key actions of direct relevance to the heritage place, including backfilling of the MOS (Action 3) to allow for future public open space for a variety of community benefits, and the development of a Werribee River Activity Node (Action 4) to allow for increased recognition of heritage values and tourism opportunities.

### **7.1.6 Cumulative impacts**

While sections of the covered channels in the of the MOS within the project area have previously been backfilled, additional backfilling will be minimised as much as practicable while still reducing the risk of collapse due to the proposed works. Even with additional sections backfilled as part of this project, the cumulative impact of this on the MOS as a whole is assessed as being acceptable. This is because substantial sections of the 10 km of covered channel would be retained, all elements of above ground primary significance (aqueducts, channels etc) would not be impacted, and the cultural heritage significance of the registered place as a whole would not be impacted.

## **7.2 Mitigation measures**

### **7.2.1 Hierarchical approach during detailed design development**

A hierarchical approach to decision making will be used during the Detailed Design Phase for the project to minimise and mitigate potential heritage impacts related to the collapse to the MOS, and the subsequent impacts related to backfilling the MOS, as follows:

1. Can heavy machinery (such as cranes) be placed elsewhere away from the MOS? Can crossing of the MOS by heavy machinery and vehicles be avoided by alternative routes? If not, why not?
2. Can steel plates or a steel bridging structure be used to support heavy machinery on crane pads, or the transport of pipes along the alignment where intersecting with the location of the MOS? If not, why not?
3. If crossing the MOS or establishment of crane pads and mobile gantry over the MOS cannot be avoided, backfilling will be required.

### **7.2.2 Backfill material**

The backfilling of the MOS for the proposed project will use materials similar to those previously used in backfilling in this section of the MOS, such as cement stabilised crushed rock (used in 1984), or stabilised sand (used in 2020). This would enable the backfill to be removed / reversed.

### **7.2.3 Arborist assessment**

An arborist assessment will be taken in the Delivery Phase of the project, which can clarify the age and species of the mature trees present in the project area, to further support the assessment that they are not original to the construction of the MOS and are not of contributory significance to the registered place.

#### **7.2.4 Interpretation plan**

As part of the future development of the Multiple Benefits Action Plan, a project specific heritage interpretation plan for this section of the MOS will be prepared, and the interpretation plan implemented as part of the project.

### **7.3 Recommended conditions and staging**

The following conditions are recommended as part of the permit application:

- Given the timeline presented in Section 1.2.2, with the delivery phase commencing in early 2026, and the rehabilitation works occurring from mid-2027 through to late 2029, an extended permit expiry date is recommended to cover the extent of construction works. Backfilling works are currently proposed to be undertaken from June 2027 to September 2027.
- The submission of updated drawings, plans, and construction methodology is recommended to be submitted to Heritage Victoria during the detailed design development process, for endorsement of the plans by the Executive Director. This is proposed to occur by mid-2026.
- The submission of an interpretation plan is recommended to be submitted to Heritage Victoria following the detailed design development, for endorsement by the Executive Director.

## 8. References

- Bailey, A. and R. Grinspum 2025 *Western Trunk Sewer RFP Phase Multiple Benefits Action Plan*. Prepared for Melbourne Water, Jacobs Group (Australia) Pty Ltd, Melbourne.
- Bettiol, J., J. Ding and R. Fisher 2025 *Western Trunk Sewer - Existing Conditions Ecological Assessment*. Prepared for Melbourne Water, Jacobs Group (Australia) Pty Ltd, Melbourne.
- Black, A., J. Strickland and G. Vines 2018 *Main Outfall Sewer, Victoria, Conservation Management Plan*. Prepared for Melbourne Water, Biosis Pty Ltd, Melbourne.
- Don, L., S. Kabir, S. Quinn and G. Farmakidis 2025 *Western Trunk Sewer Rehabilitation Traffic Access Options Report*. Prepared for Melbourne Water, Jacobs Group (Australia) Pty Ltd, Melbourne.
- Engineers Australia 2014 *Nomination for the Engineering Heritage Australia Heritage Recognition Program: Melbourne Sewerage System, Nineteenth Century Scheme*, Engineers Australia, Melbourne.
- Farmakidis, G. and L. Don 2025 *Western Trunk Sewer Rehabilitation Traffic Access Strategy Report (Draft)*. Prepared for Melbourne Waater, Jacobs Group (Australia) Pty Ltd, Melbourne.
- Ghalehsari, A. 2019 *Project Design Report: Project 08 Duncans Rd – Geotechnical Design Report*. Report to WBHO Infrastructure Pty Ltd.
- Jaydo n.d. *Western Trunk Sewer – Werribee River Aqueduct Project*, Jaydo.
- Museums Victoria 2022 *Pumping Station*. Retrieved 2 November 2022 from <https://museumsvictoria.com.au/scienceworks/resources/pumping-station/>.
- Scott, A. 2015 *Melbourne Water Western Trunk Sewer Structural Assessment Report* to Melbourne Water.
- Truong, K. 2024 *Results from 2024 Main Outfall Sewer CCTV Drone Inseption by Melbourne Water (file note)*, Melbourne Water, Melbourne.
- Victorian Heritage Database 2001 *Main Outfall Sewer (VHR H1932/Brimbank HO13/Hobsons Bay HO169/Wyndham HO26)*. Retrieved 7 August 2023 from <https://vhd.heritagecouncil.vic.gov.au/places/11868>.
- Victorian Land Registry Services 2021 *Landata: Aerial Photography (1930s-1990s)*. Retrieved 20 October 2021 from [https://www.landata.vic.gov.au/tpc\\_plan\\_records.aspx](https://www.landata.vic.gov.au/tpc_plan_records.aspx).
- Wang, M. and M. Wijekoon 2024 *Western Trunk Sewer Structural Assessment: Western Trunk Sewer shallow conduit*. Report to Melbourne Water, Jacobs Group (Australia) Pty Ltd, Melbourne.