MODIFICATION REPORT

State Significant Infrastructure Approval (SSI_6307)

Modification of existing SSI boundary to include the expanded construction footprint to facilitate two stormwater outlets into Iron Cove Creek

DECEMBER 2016

Document controls

Title:	WestConnex M4 East State significant infrastructure approval (SSI_6307) Modification Report Two stormwater connections into Iron Cove Creek

Approval and authorisation	
Prepared by:	Verity Blair M4 East –Post-approvals Co-ordinator Sydney Motorway Corporation
Accepted on behalf of WCXM4 Co by:	David Kelly Environmental Manager, M4 East
	Signed:
	Date: 8 December 2016
Accepted on behalf of the Roads and Maritime Services by:	Philip Knudsen Project Director WestConnex Delivery Interface
	Signed:
	Date: 8 December 2016

Document Status	Date
Rev A Final	8/12/2016

Executive summary

M4 East Infrastructure Approval

The NSW Government's *Long Term Transport Master Plan* (Transport for NSW, 2012) sets out a number of projects to meet Sydney's transport challenge. WestConnex is the largest integrated transport and urban revitalisation project in Australia. When completed, it will link the M4 Motorway at Parramatta to the central business district, Sydney Airport and Port Botany precincts and the M5 Motorway in south west Sydney. The M4 East involves the construction of twin tunnels from Homebush to Haberfield, and includes four interchanges at the M4 Motorway, Concord Road, Wattle Street and Parramatta Road.

The M4 East project is declared State significant infrastructure (SSI) and is therefore subject to Part 5.1 of the (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act), which establishes an assessment and approval regime for SSI developments. The M4 East project, as part of the WestConnex program of works, was declared critical State significant infrastructure by the (NSW) Minister for Planning on 5 December 2014.

An environmental impact statement (EIS) was completed in September 2015, and exhibited between 9 September and 2 November 2015. Subsequently, a submissions report was prepared and submitted to the (NSW) Department of Planning and Environment (DPE) in December 2015. Planning approval was granted by the Minister for Planning under Part 5.1 of the EP&A Act on 11 February 2016.

Planning approvals process

Pursuant to Section 115ZI of the EP&A Act, Roads and Maritime Services (Roads and Maritime), as the proponent of the project, is seeking approval for the modification of the Infrastructure Approval (SSI_6307).

Purpose of this report

This report has been prepared to support an application by Roads and Maritime to modify the existing M4 East SSI boundary to include the expanded construction footprint boundary to facilitate the installation (including associated access and works areas for construction and maintenance) of two stormwater pipe outlets into the Dobroyd Stormwater Channel no. 53, the canalised Iron Cove Creek (referred to herein as Iron Cove Creek) within Reg Coady Reserve, in Haberfield, NSW.

A component of the Approved Project includes the construction of a new stormwater drainage channel within Reg Coady Reserve. This stormwater drainage channel was included and approved under the revised environmental management measures (REMMs) as part of the M4 East submissions report (AECOM GHD 2015b). REMM FD16 was implemented due to uncertainties around the condition of the existing XD11 drainage channel and stated that '*a new drainage structure near XD11 will be constructed to mitigate the impacts of flooding on existing residential development*

located to the east (upstream) of Wattle Street'. Although the stormwater drainage structure was approved, the impact of the outlets into the heritage listed Iron Cove Creek were not assessed.

This proposed modification is therefore submitted to modify the existing M4 East SSI boundary to include the expanded construction footprint boundary to facilitate the installation (including associated access and works areas for construction and maintenance) of two stormwater pipe outlets into Iron Cove Creek.

The modification application has been prepared to:

- Describe the proposed modification.
- Provide justification for modification to the Infrastructure Approval for the project.
- Assess the environmental and community impacts of the proposed modification.

The proposed modification, its justification and assessment of the potential environmental impacts of the proposal, are provided in this report.

Conclusions and next steps

The proposed modification to the M4 East project is essential to facilitate maintenance work on installation of a new drainage channel through Reg Coady Reserve to mitigate the impacts of flooding on existing residential development located to the east (upstream) of Wattle Street.

The installation of the two stormwater outlets would result in negligible impacts to the heritage value of Dobroyd Stormwater Channel No. 53, a locally listed heritage item on the Sydney Water Heritage and Conservation (Section 170) Register (No. 4571056). A heritage impact assessment, undertaken to assess the impacts of installing the stormwater outlets into Iron Cove Creek, concluded that the installation of the outlets will not result in an adverse effect on the historic, aesthetic and social significance of Dobroyd SWC No 53, nor will there be an adverse effect on the rarity and representativeness of the canal. The integrity of the fabric has been altered such that the new stormwater outlets represent an additional, though compatible, alteration. The installation of the outlets will not affect the integrity of the canal in its entirety.

The Minister for Planning will subsequently decide whether to grant approval to, or refuse, the proposed modification, under Section 115ZI of the EP&A Act. Should the proposed modification be approved, Roads and Maritime would continue to consult with stakeholders in accordance with the approved Community Communication Strategy for the M4 East project.

Contents

Attachments

Attachment A: Heritage Assessment

Abbreviations and Glossary

Term	Meaning
Acid sulfate soils (ASS)	The acidic soils that result from the disturbance or drainage and subsequent oxidation of previously waterlogged potential acid sulfate soils.
ASSMP	Acid Sulfate Soil Management Plan
CEMP	Construction Environmental Management Plan
CoA	Conditions of Approval
CSJ JV	CPB Contractors Samsung John Holland Joint Venture
DP&E	(NSW) Department of Planning and Environment
EIS	Environmental impact statement
EP&A Act	(NSW) *Environmental Planning and Assessment Act 1979*
EPL	Environment Protection Licence
EWMS	Environmental Work Method Statements
FFMP	Construction Flora and Fauna Management Plan
HCA	Heritage Conservation Area
HMP	Construction Heritage Management Plan
ICNG	Interim Construction Noise Guideline
LEP	Local Environmental Plan
LGA	Local Government Area
LTTMP	NSW Long Term Transport Master Plan
NCA	Noise catchment area
NML	Noise Management Levels
NSW	New South Wales
NVMP	Construction Noise and Vibration Management Plan
OEH	Office of Environment and Heritage
Proponent	The person or organisation that proposes carrying out a project or activity.
REMM	Revised Environmental Management Measure
RCBC	Reinforced concrete box culvert
Roads and Maritime	(NSW) Roads and Maritime Services
SEPP	State Environmental Planning Policy
SRD	State and Regional Development
SSI	State Significant Infrastructure
SWMP	Construction Soil and Water Management Plan
TAMP	Construction Traffic and Access Management Plan
UDLP	Urban Design and Landscape Plan

1 Introduction

1.1 Purpose of this report

This report has been prepared to support an application (NSW) from Roads and Maritime Services (Roads and Maritime), the proponent of the project, to modify the existing Infrastructure Approval for the WestConnex M4 East project (SSI_6307). It is intended to assist the (NSW) Minister for Planning in forming a view as to the merits of the proposed modification.

The application for modification of the Infrastructure Approval has been prepared to:

- Describe the changes to the existing project approval and the proposed modification.
- Provide justification for the modification.
- Assess the potential impacts of the proposed modification and describe the measures proposed to mitigate any potential impacts.

1.2 Background

WestConnex is a key recommendation of the *State Infrastructure Strategy 2012-2032* (Infrastructure NSW, 2012) (State Infrastructure Strategy) and was the subject of a Business Case approved by the NSW Government in September 2013. WestConnex is also identified as a key element of Sydney's road future in the NSW Government's *Long Term Transport Master Plan* (Transport for NSW, 2012) (LTTMP) which sets out a number of projects to meet Sydney's transport challenge.

WestConnex is the largest integrated transport and urban revitalisation project in Australia. It will link the M4 Motorway at Parramatta with the central business district (CBD), Sydney Airport and the Port Botany precincts and the M5 Motorway in south-west Sydney via a 33 kilometre tolled motorway completely free of traffic signals. When completed, WestConnex would save 40 minutes on a typical journey between Parramatta and Sydney Airport, bypassing up to 52 sets of traffic signals.

The NSW Government will deliver WestConnex in a series of project stages, with a commitment for completion by 2023. When complete, it is expected that about 400,000 vehicles per day will use the WestConnex Motorway.

WestConnex is being delivered through a series of projects in three stages over 10 years, as follows:

- Stage 1: M4 Widening – Parramatta to Homebush.
- Stage 1: M4 East (this project) – Homebush to Haberfield.
- Stage 2: New M5 – Beverly Hills to St Peters.
- Stage 2: New M5 King Georges Road Interchange Upgrade.
- Stage 3: M4-M5 Link – Haberfield to St Peters.

Each stage will be subject to its own environmental assessment, consultation and planning approval process.

The M4 East project includes the construction of twin tunnels, 5.5 kilometres in length, which run from Homebush to Haberfield. It also includes associated surface works to connect to the existing road network, with four interchanges at the M4 Motorway, Concord Road, Wattle Street and Parramatta Road. Figure 1-1 shows the location of the project and the key features.

The M4 East project, as approved, includes the following key features:

- Widening, realignment and resurfacing of the M4 between Homebush Bay Drive and Underwood Road at Homebush.
- Upgrade of the existing Homebush Bay Drive interchange to connect the western end of the new tunnels to the existing M4 and Homebush Bay Drive, while maintaining all current surface connections.
- Two new three-lane tunnels (the mainline tunnels), one eastbound and one westbound, extending from west of Pomeroy Street at Homebush to near Alt Street at Haberfield, where they would terminate until the completion of the possible future M4–M5 Link (which is subject to planning approval). Each tunnel would be about 5.5 kilometres long and would have a minimum internal clearance (height) to in-tunnel services of 5.3 metres.
- A new westbound on-ramp from Parramatta Road to the M4 at Powells Creek, west of George Street at North Strathfield.
- An interchange at Concord Road, North Strathfield/Concord with on-ramps to the eastbound tunnel and off-ramps from the westbound tunnel. Access from the existing M4 to Concord Road would be maintained via Sydney Street. A new on-ramp would be provided from Concord Road southbound to the existing M4 westbound, and the existing on-ramp from Concord Road northbound to the existing M4 westbound would be removed.
- Modification of the intersection of the existing M4 and Parramatta Road, to remove the left turn movement from Parramatta Road eastbound to the existing M4 westbound.
- An interchange at Wattle Street (City West Link) at Haberfield, with an on-ramp to the westbound tunnel and an off-ramp from the eastbound tunnel. The project also includes on- and off-ramps at this interchange that would provide access to the M4–M5 Link. In addition, the westbound lanes of Wattle Street would be realigned.
- An interchange at Parramatta Road at Ashfield/Haberfield, with an on-ramp to the westbound tunnel and an off-ramp from the eastbound tunnel. In addition, the westbound lanes of Parramatta Road would be realigned.
- Installation of tunnel ventilation systems, including ventilation facilities within the existing M4 road reserve near Underwood Road at Homebush (western ventilation facility) and at the corner of Parramatta Road and Wattle Street at Haberfield (eastern ventilation facility). The eastern ventilation facility would serve both the M4 East and M4–M5 Link projects. Provision has also been made for a fresh air supply facility and emergency smoke extraction facility at Cintra Park at Concord.
- Associated surface road work on the arterial and local road network, including reconfiguration of lanes, changes to traffic signalling and phasing, and permanent road closures at a small number of local roads.

- Pedestrian and cycle facilities, including the permanent re-routing of part of the existing eastbound cycleway on the northern side of the M4 from west of Homebush Bay Drive to near Pomeroy Street, and a new westbound cycleway on-ramp connection from Queen Street at North Strathfield to the existing M4.
- Tunnel support systems and services such as electricity substations, fire pump rooms and tanks, water treatment facilities, and fire and life safety systems including emergency evacuation infrastructure.
- Motorway operations complex on the northern side of the existing M4, east of the Homebush Bay Drive interchange.
- Provision of road infrastructure and services to support the future implementation of mart motorway operations (subject to separate planning approval).
- Installation of tolling gantries and traffic control systems along the length of the project.
- Provision of new and modified noise walls.
- Provision of low noise pavement for new and modified sections of the existing M4.
- Utility adjustments, modifications, relocations and protection.
- Temporary construction ancillary facilities and temporary works to facilitate the construction of the project.

This report has been prepared to modify the existing Infrastructure Approval for the M4 East project to include the installation two stormwater pipe outlets into Iron Cove Creek in Haberfield.

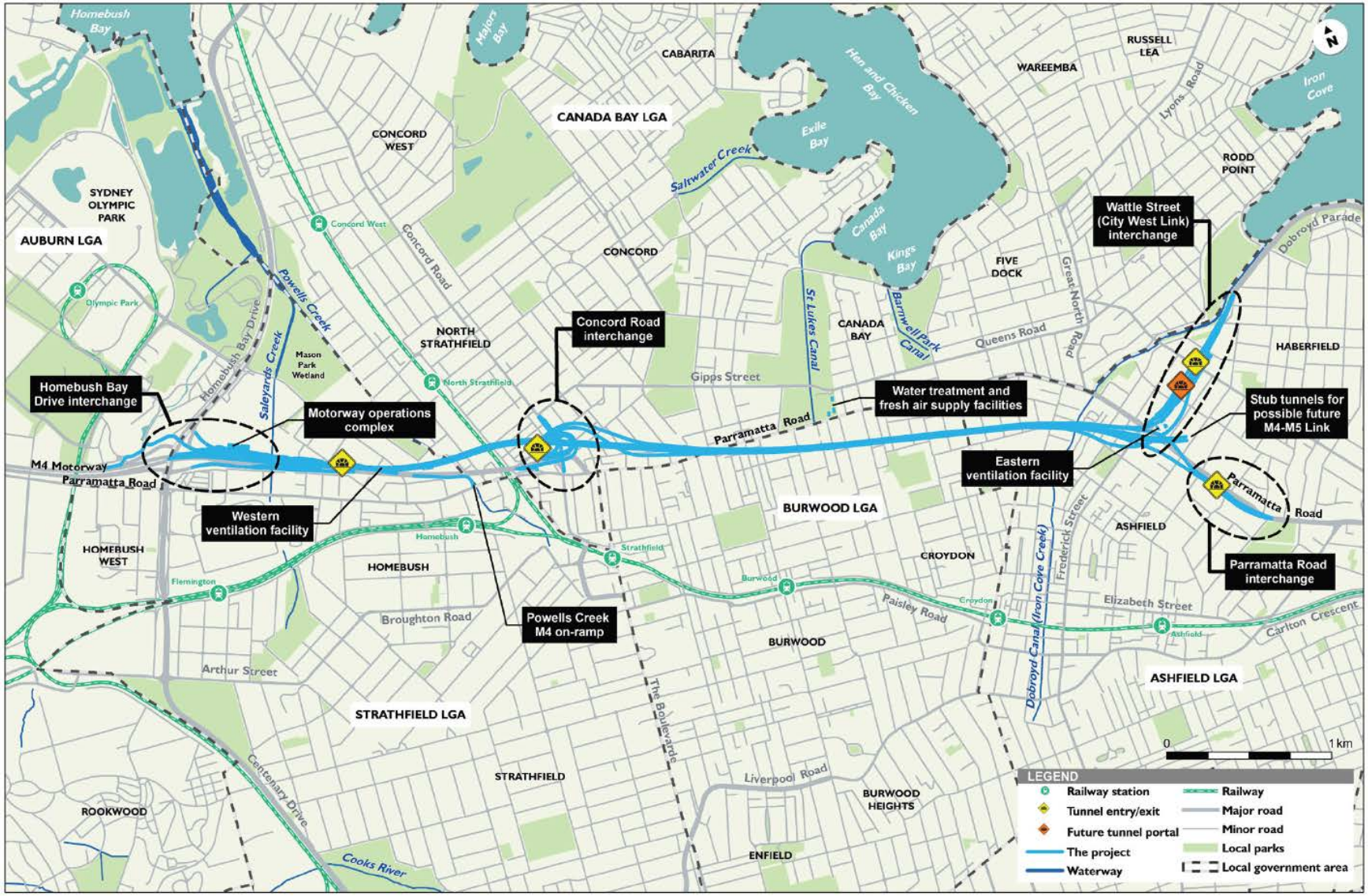


Figure 1-1: Approved project location and key features

Source: AECOM GHD (2015)

2 Statutory context

2.1 Infrastructure approval

The M4 East project was declared State significant infrastructure (SSI) and critical SSI in the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP). The project is therefore subject to Part 5.1 of the (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act), which establishes an assessment and approval regime for SSI developments.

Roads and Maritime Services (Roads and Maritime) completed an environmental impact assessment of the WestConnex M4 East project (the Project EIS) in September 2015. The Project EIS identified a range of environmental, social and planning issues associated with the construction and operation of the M4 East project and proposed measures to mitigate or manage those potential impacts.

The Project EIS was publicly exhibited between 9 September and 2 November 2015. Following public exhibition, submissions from the community and stakeholders were received and addressed by Sydney Motorway Corporation and Roads and Maritime in the M4 East submissions report which was lodged with the Secretary in December 2015.

After consideration of the Project EIS and submissions report, the Minister for Planning approved the M4 East Project (SSI 6307) under Section 115ZB of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 11 February 2016. The approval incorporated the Minister's Conditions of Approval (CoA).

For the purposes of this environmental assessment, the concept design described and assessed in the Project EIS and consequently approved by the Minister, is referred to as the Approved Project.

2.2 M4 East project modification

Under section 115ZI(2) of the EP&A Act, Roads and Maritime may request the Minister to modify the Minister's approval of a State significant infrastructure project. Roads and Maritime Services is not required to obtain the Minister's approval for a modification if the project as modified will be consistent with the Minister's approval. Project modifications that are deemed to be inconsistent would require a modification to the CoA under Section 115ZI(2) of the EP&A Act (or alternatively Section 74W(2) of the EP&A Act including the transition provisions in Schedule 6A of that statute).

Pursuant to Section 115ZI of the EP&A Act, Roads and Maritime as the proponent of the project, is seeking approval for the modification of the Infrastructure Approval for the M4 East project (SSI_6307). Section 115ZI of the EP&A Act relates to the modification of the Minister's approval and states:

> *(1) In this section:*
>
> ***"Minister's approval"** means an approval to carry out State significant infrastructure under this Part, and includes an approval granted on the determination of a staged infrastructure application.*

"modification" *of an approval means changing the terms of the approval, including revoking or varying a condition of the approval or imposing an additional condition on the approval.*

(2) The proponent may request the Minister to modify the Minister's approval for State significant infrastructure. The Minister's approval for a modification is not required if the infrastructure as modified will be consistent with the existing approval under this Part.

Note. Section 380AA of the Mining Act 1992 provides that a request for the modification of approval for State significant infrastructure for the mining of coal can only be made by or with the consent of the holder of an authority under that Act in respect of coal and the land concerned.

(3) The request for the Minister's approval is to be lodged with the Secretary. The Secretary may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.

(4) The Minister may modify the approval (with or without conditions) or disapprove of the modification.

Roads and Maritime is seeking approval from the Minister for Planning to modify the Infrastructure Approval for the M4 East project (SSI_6307). The proposed modifications are described in detail in Chapter 3 of this modification report.

The proposed modification will facilitate the installation of two stormwater outlets into the Iron Cove Creek as part of a new stormwater drainage structure required to mitigate the impacts of flooding on existing residential development located to the east (upstream) of Wattle Street. Further details of the proposed modifications are discussed in Chapter 3.

3 Description of proposed modification

3.1 Overview

Section 115ZI of the EP&A Act allows for the modification of SSI planning approvals granted by the Minister for Planning, as described in Section 2. The proposal seeks to modify the M4 East SSI boundary to include the expanded construction footprint boundary to facilitate the installation (including associated works area and access required for installation and maintenance) of two stormwater pipe outlets that would be installed into the wall of Iron Cove Creek (refer to Figure 3.1). The proposed modification has been designed in consultation with Sydney Water.

A component of the Approved Project includes the construction of a new stormwater drainage channel within Reg Coady Reserve. This stormwater drainage channel was included and approved under the revised environmental management measures (REMMs) as part of the M4 East Submissions Report (AECOM GHD 2015b) (refer to Table 6.1). REMM FD16 was implemented due to uncertainties around the condition of the existing XD11 drainage channel and stated that '*a new drainage structure near XD11 will be constructed to mitigate the impacts of flooding on existing residential development located to the east (upstream) of Wattle Street';*

The existing drainage channel (XD11) will be decommissioned, including the existing culvert outlet to Iron Cove Creek, along with two other redundant outlets. The pipes will be removed or grouted and the culvert outlet will be grated or capped with a concrete plug. Advice will be sought from the heritage advisor prior to these works being undertaken.

Notwithstanding, the impacts of the stormwater drainage outlets on Iron Cove Creek were not assessed under Section 115ZB of the EP&A Act and the assessment of these impacts is therefore the subject of this modification report.

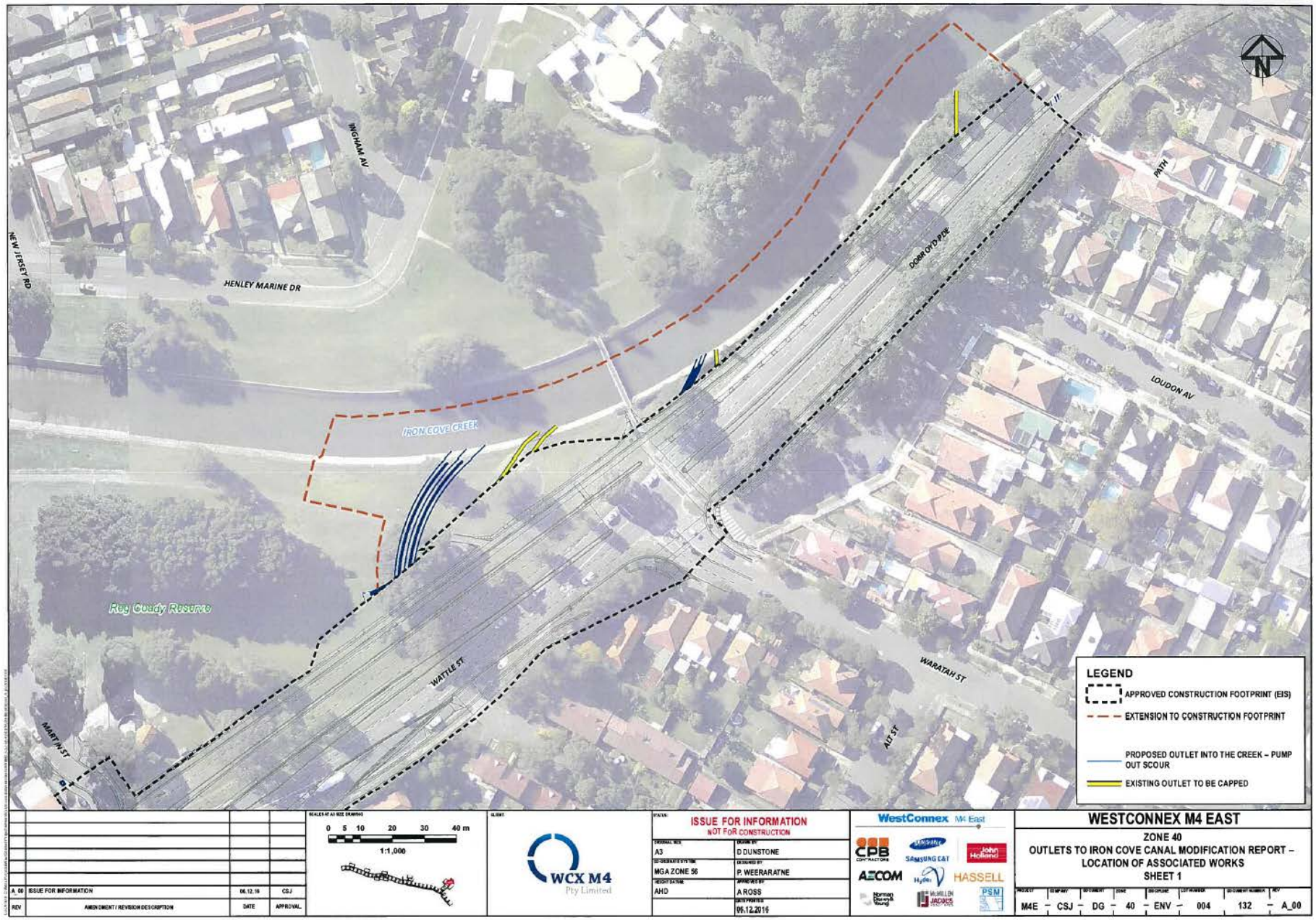
3.2 Approved project

Roads and Maritime Services (Roads and Maritime) proposes to undertake works which include the diversion and protection of existing services that conflict with the construction and/or operation of the M4 East project in accordance with CoA B41, which states:

> *B41 Utilities, services and other infrastructure potentially affected by construction and operation must be identified prior to construction to determine requirements for access to, diversion, protection, and/or support. Consultation with the relevant owner and/or provider of services that are likely to be affected by the SSI must be undertaken to make suitable arrangements for access to, diversion, protection, and/or support of the affected infrastructure as required*.

As stated above in section 3.1, the new drainage structure and associated works through Reg Coady Reserve are required given the uncertainties around the existing drainage/stormwater infrastructure and the need to ensure adequate flooding mitigation was in place.

Figure 3-1: Stormwater outlet locations



3.3 Description of proposed modification

3.3.1.1 Stormwater outlets

Twin box culvert outlet

Drainage design in the area is constrained by the relatively low outfall levels and high tide waters from Iron Cove Creek, and flows from external catchments located to the south of Wattle Street. Two direct connections to Iron Cove Canal are proposed.

Due to the widening of Wattle Street, the new pavement has to be constructed over the existing Sydney Water box culvert. Soil testing in the area indicated the presence of soft soils within the footprint of the existing culvert and project area. Due to this constraint, affecting the ability to provide the required compaction levels, and uncertainty about the structural integrity of the existing culvert, a new set of culverts and pipe networks are proposed to replace the existing culvert and twin pipes beneath Wattle Street rather than providing a protection structure for the existing drainage at this location. These existing drainage assets will be abandoned and new 2 m x 2.7 m x 1.2 m reinforced concrete boxed culverts (RCBCs) are proposed immediately west of the existing culvert outlet.

A new connection to Iron Cove Canal will be provided approximately 14 m upstream of the existing culvert outlet. This stormwater outlet comprises two boxed culverts terminating at Iron Cove Canal, with the outlets themselves to be cast insitu. The width of the opening is approximately 12 m, with the wingwalls extending out approximately 5m and mirroring the grade of the existing concreted banks, tying in to the canal bottom. A new base slab will be laid within the outlets (refer Figure 3.3).

Single pipe culvert (2 x 900 mm pipes)

To mitigate flooding impacts resulted from the proposed road works, a single 1050 mm diameter pipe culvert is proposed just upstream of the proposed new twin RCBCs. This outlet comprises two 900 mm stormwater pipes connecting into the existing Iron Cove Canal, with a head wall and wing walls at the exit. The width of the opening is approximately 6 m, with wingwalls, a head wall and a new base slab (refer Figure 3.4).

The portion of the proposed Wattle Street longitudinal drainage system located to the west of Martin Street will connect to the new culverts. A gross pollutant trap is proposed to treat low flows carried by the longitudinal drainage system before discharging runoff into Iron Cove Creek. The combined culvert and pipe system have been designed to prevent flood impacts in excess of the requirements of the project for up to the 100 year ARI event.

3.4 Land use

The proposed modification would be undertaken in a highly urbanised environment, with works being carried out in the suburb of Haberfield, located within the Inner West Council Local Government Area (LGA). The proposed works would be undertaken within Reg Coady Reserve, an area classified as public recreational and within the Iron Cove Creek itself. Reg Coady Reserve is located directly west of Wattle Street, and Timbrell Park located adjacent to Iron Cove Creek.

Iron Cove Creek or Dobroyd Canal Stormwater Channel No 53 is a local heritage item on the Sydney Water Heritage & Conservation (Section 170) Register (No. 4571056). The Canal is not listed on the Ashfield Local Environmental Plan 2013, nor any other heritage registers or lists.

Some of the construction activities related to the installation of the two stormwater outlets would be undertaken on council land as well as within a Sydney Water owned asset (Iron Cove Creek).

Reg Coady Reserve is identified within the *Ashfield Local Environmental Plan 2013* (Ashfield LEP) as the Haberfield Heritage Conservation Area (HCA), and is identified as having local heritage significance.

3.5 Key features of the design

3.5.1.1 Constructability

If approved, the stormwater outlets into Iron Cove Creek would be constructed by CPB Contractors Samsung John Holland joint venture, which is a consortium comprising CPB Contractors, Samsung C&T Corporation and John Holland (CSJ). CSJ has been engaged by the Project Company (WCXM4 Co) to design and construct the M4 East Project.

Details of the proposed works have been prepared and submitted to demonstrate to Sydney Water how the Iron Cove Creek box culvert and twin 900 diameter pipes at Reg Coady Reserve and Wattle Street, Haberfield will be protected from the proposed M4 East Motorway temporary haul road construction, and the Wattle Street Road Widening works as part of the M4 East Motorway works over the existing culverts.

3.5.1.2 Key construction activities

General construction activities associated with the connection of the two stormwater outlets into Iron Cove Creek will be undertaken at low tide, due to the requirement to complete works on face of the canal wall.

Prior to any construction activities being undertaken, appropriate sediment control measures will be implemented to ensure construction related waste does not enter the canal. During low tide, a coffer dam will be constructed above the high tide line using a cylindrical rubber weir (or similar) filled with air or sand bags depending on availability. This dam will have a 5m radius (approximately) from the proposed location of the outlets and a silt curtain will also be installed as a secondary control. A temporary sump will be installed to dewater the excavation as required.

Once the dam has been erected the canal wall will be sawcut and jackhammered to remove the required section for the new box culvert opening and the base slab will be poured.

A sump pump, sand bags and vacuum truck will be onsite to ensure residue is collected and disposed of appropriately. The vacuum truck will remain on site for the during construction until a wash down of the work area has been completed. The trenches will be back filled and the coffer dam removed from the channel. No heavy mechanical plant will be used on the canal wall.

The works will require closure of the footpath the runs parallel to the creek within Reg Coady. The footpath will be diverted during construction works, which are estimated to be completed within four days.

Twin box culvert outlet

The box culvert is a twin culvert with precast units to be placed on a cast insitu concrete base slab founded on stabilised soils. The culvert is made up of twin barrels with units 2700 mm wide x 1200 mm high. The culvert headwall is cast insitu and will require a new break to be inserted into the existing southern wall of Iron Cove Creek. Excavation of the connecting stormwater pipe trench will initially be undertaken to within 2 m of Iron Cove Creek, and will then be undertaken to behind the creek face, with any interaction with the concrete lining of the creek at this stage, occurring with hand tools only.

Soil mixing will be undertaken, extending 1.5 m past the walls of the extent of the box culvert and the mixing will completed up to 2 m from the edge of the Iron Cove Creek walls. Trimming and excavation of soil to the required levels for installation of the culvert will occur.

Excavation for the outlet will be completed and the culvert entrance will be blocked with sandbags to ensure no water is able to get through. The precast units will be installed using a crane established away from the face of the canal wall. The excavation face will have shotcrete applied if required to ensure batter stability. The base slab will then be poured and prepared for the outlet.

Single pipe culvert (2 x 900 mm pipes)

To mitigate flooding impacts resulted from the proposed road works, a single 1050 mm diameter pipe culvert is proposed just upstream of the proposed new twin RCBCs. This outlet comprises two 900 mm stormwater pipes connecting into the existing Iron Cove Canal, with a head wall and wing walls at the exit. The width of the opening is approximately 6 m, with wingwalls, a head wall and a new base slab. Excavation of the connecting stormwater pipe trench will initially be undertaken to within 2 m of Iron Cove Creek, and will then be undertaken to behind the creek face, with any interaction with the concrete lining of the creek at this stage, occurring with hand tools only.

Soil mixing will be undertaken, extending 1.5 m past the walls of the extent of the box culvert with the mixing will completed up to 2 m from the edge of the Iron Cove Creek walls. Trimming and excavation of soil to required levels for installation of the culvert.

3.5.1.3 Trenching methodology

The following trenching methodology is proposed to be adopted:

- Ensure excavations are started from the downstream end.
- Place spoil a minimum 1m away from the edge of the trench. Use spoil to make an earth bund to delineate work area and protect any water entering into trench.
- Benching, battering or combination of both for every 1.5m high.
- If unsuitable is encountered remove and replace with general fill (as required).

- Inspect trench after any rain event ensure trench is safe before recommencing.

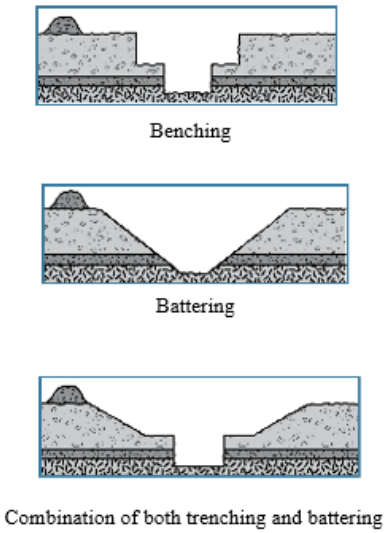


Figure 3-2: Trenching methodology

3.5.1.4 Flood Management during construction

Existing velocities in Iron Cove Creek are relatively high (in the order of 3 m/s in the 100 year ARI). Overland flow velocities are less than 0.5 m/s in the 100 year ARI, but at the low point at Waratah Street the overtopping velocities are as high as 1.5 m/s under existing conditions.

The Reg Coady Flood Management Plan applies in the event of heavy rainfall and 1-2 year average recurrence interval (ARI) storm event, the procedure is to be followed by all workers of, and visitors to, the Project. The catchment draining to Parramatta Road at Iron Cove creek is approximately 630 ha and the critical storm duration is estimated to be 60 minutes. Due to this the flood warning times are relatively short and a warning will be issued on the basis of a daily assessment of heavy rainfall expected to reach the 1-2 year ARI storm event.

If required due to flooding concerns, the coffer dam removed from the channel.

3.5.1.5 Erosion and sediment controls during construction

An Erosion and Sediment Control (ERSED) Plan will be implemented at all times. The ERSED Plan will detail the requirements for erosion and sediment controls which are to be installed prior to and during the proposed works.

Site specific erosion and sediment controls may include:

- concrete washout basins;
- sediment fencing;
- sand bags;
- works being carried out at low tide behind the coffer dam setup; and
- silt curtains in place behind coffer dam as a secondary control.

3.5.1.6 Vegetation Clearance

The proposed modification will not require any vegetation clearance.

It is noted that one tree would be required to be removed in Reg Coady to facilitate the construction of an approved stormwater structure however this has been assessed separately under Major Consistency Assessment – Addendum 4: Utilities and services enabling works as it the removal of the tree does not directly relate to the works being sought under this modification.

3.5.1.7 Access

The proposed modification would not result in additional property acquisition requirements and would not result in any change to traffic access arrangements. Construction access to install the two stormwater outlets would be via Reg Coady Reserve.

Pedestrian access to the footpath that runs parallel to Iron Cove Creek across Reg Coady Reserve, would be diverted and managed during construction period.

Vehicular access to Reg Coady Reserve would be via Martin Street and Dobroyd Parade to the approved ancillary facilities compound located at the end of Martin Street. This access route was approved by the Department of Planning and Environment (DPE) on 19 July 2016, as part of the approval for the Site Specific Ancillary Facility Management Plan for the Dobroyd Utility Compound.

Figure 3-3: Twin box culvert outlet design drawing

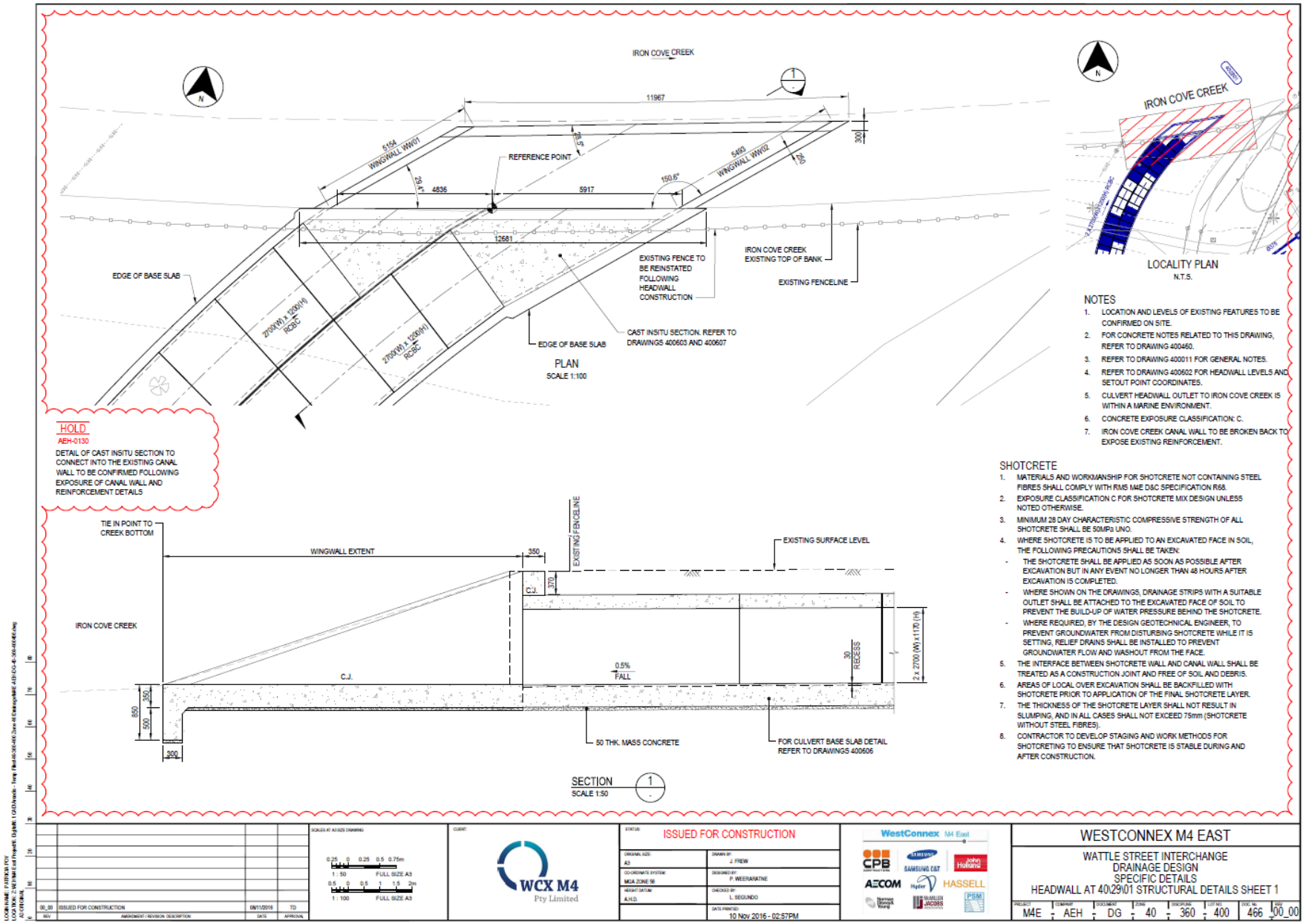
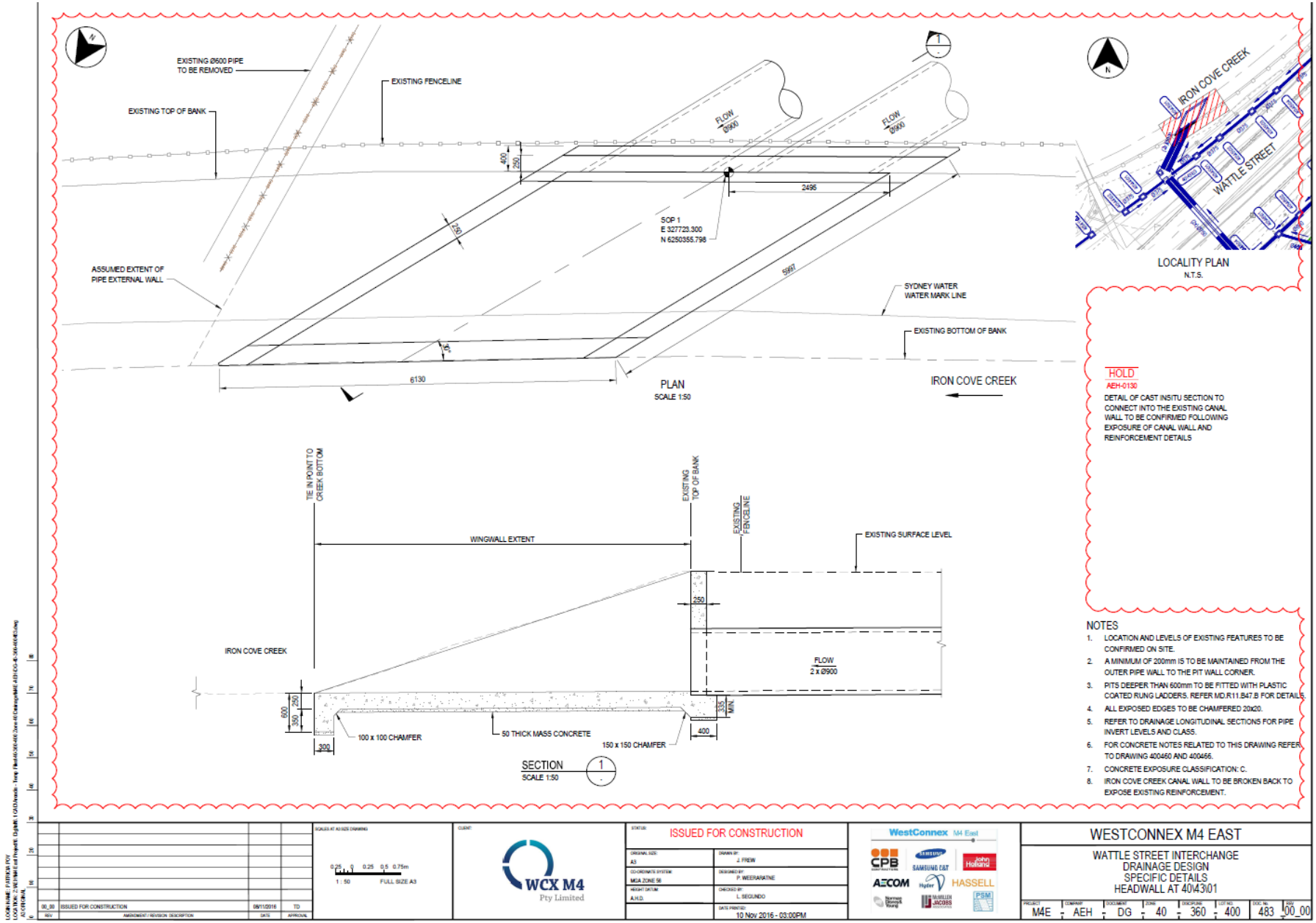


Figure 3-4: Single pipe culvert outlet design drawing



4 Stakeholder consultation

4.1 Overview

Roads and Maritime has undertaken preliminary consultation with DPE regarding the proposed modification.

4.2 Sydney Water Consultation

The detailed design associated with this proposed modification was completed in consultation with Opus (Sydney Water's Water Services delegate). This design was approved on 23 May 2016.

The Sydney Water Heritage Manager has been informed of the proposed works and raised no objections to the proposed approach and suggested mitigation. It is intended that a copy of this report will be submitted to the Sydney Water Heritage Manager for review and approval.

5 Environmental assessment

5.1 Scope of environmental assessment

The Approved Project EIS (GHD, AECOM 2015a) details the potential environmental impacts of the approved project and provides proposed environmental management measures to avoid or reduce potential environmental impacts during construction and operation of the M4 East project. The Submissions Report (GHD, AECOM 2015b) includes revised management measures to manage potential environmental impacts and issues raised during the submissions process.

Management measures are also provided in the Minister's CoAs for the project, and comprise administrative conditions, specific environmental conditions, environmental monitoring and auditing, compliance monitoring and tracking, community information, consultation and involvement, and environmental management. Should additional management measures be required for this modification, the Minster's CoA would need to be amended, as required.

The focus of this modification is where the stormwater outlets disperse into Iron Cove Creek. Therefore, only potential environmental impacts associated with these works have been assessed. The potential environmental issues affected by the proposed modification include:

- Property and land use.
- Soil and water quality.
- Contamination.
- Non-aboriginal heritage.

These key environmental issues are addressed throughout the following sections. Environmental issues that would not result in a change to the impact assessment in the M4 East project are not discussed in this document.

5.2 Property and land use

Property and land use impacts as a result of the M4 East project were assessed in Section 12 of the of the EIS and the Volume 2A, Appendix D of the EIS. The proposed modification would be situated outside of the construction footprint detailed in Section 5.3 of the EIS and Section 6.1.9 of the submission report. However, there would be limited impacts to property and adjoining land, with no additional properties proposed to be acquired.

The proposed works would be constructed on land owned by Inner West Council and Sydney Water. Access to the footpath in Reg Coady would be diverted to allow installation of the pipe trench and to install required safe working areas. The footpath would be re-instated on completion of the construction activities.

Consultation for the proposed modification was undertaken as discussed in Chapter 4. No additional management and mitigation measures for the proposed modification are required in relation to property and land use.

5.3 Soil and Water Quality

5.3.1.1 Construction Impacts

The proposed modification requires construction activities to be undertaken within Iron Cove Creek, which has the potential for to result in construction related waste entering the canal. Soil and water impacts will be minimised during construction, through the implementation of erosion and sediment controls.

All other erosion and sediment controls will be implemented in accordance with the approved Construction Soil and Water Management Plan (SWMP) to mitigate any potential erosion and sedimentation issues associated with the installation of the two stormwater outlets into the wall of Iron Cove Creek (refer to Section 3.3.5).

5.3.1.2 Operational Impacts

The two stormwater outlets channel stormwater into Iron Cove Creek, a creek that was specifically canalised for use as a stormwater channel. No soil or water impacts are therefore anticipated from the operation of the two stormwater outlets.

5.4 Contamination

The proposed modification is in an area designated, within the EIS, as ‘disturbed soils (potential acid sulfate soils). Indicators of potential acid sulfate soils were found within Reg Coady Reserve, during Phase II contaminated land and acid sulfate soils (ASS) assessments undertaken in late 2015 and early 2016.

The new drainage structure, including the two stormwater outlets, have been nominated as an area where excavated material will be treated using a vertical mixing method. This method is used to stabilise / solidify soft soil profiles that contain sands and loams, commonly associated with ASS is undertaken.

All vertical mixing and treatment of ASS would be undertaken in accordance with the approved Acid Sulfate Soils Management Plan (ASSMP), which was recently revised to include this on-site treatment of acid sulfate soils.

Should unexpected contamination be uncovered, the Unexpected Finds Protocol for contaminated land within the Contaminated Land Management Plan will be implemented and contaminated material managed accordingly.

5.5 Non-Aboriginal heritage impacts

Non-Aboriginal heritage impacts associated with the M4 East project were discussed in Section 19 of the EIS and in the *Non-Aboriginal Heritage Impact Assessment* (GML Heritage, 2015) (Volume 2H, Appendix S of the EIS).

The proposed modification would be partially undertaken within the Haberfield Heritage Conservation Area (HCA) listed in the Ashfield Local Environment Plan (LEP) 2013 (ref no. C42). The scale of the modification would not impact the heritage values of the HCA, however the potential impacts to Iron Cove Creek have been assessed.

The proposed modification involves the installation two stormwater culvert outlets, both with wings wall and a head wall, into the face of Dobroyd Stormwater Channel No. 53, a locally listed heritage item on the Sydney Water Heritage and Conservation (Section 170) Register (No. 4571056).

Under CoA B23 of the Approved Project, the project is not to *destroy, modify or otherwise physically effect any heritage items outside of the SSI footprint.*

The proposed modification seeks an extension to the SSI footprint, allowing for the outlets to be inserted into the face of Iron Cove Creek, in compliance with CoA B23. An assessment of potential impacts to non-aboriginal heritage is required for this change, with a heritage impact assessment conducted in December 2016 (see Appendix A).

Iron Cove Creek has historical, aesthetic, social and technical significance, rarity and representativeness, but has been substantially altered which has affected its integrity (S170 Inventory). The installation of the stormwater outlets represents a change to the fabric of the canal and therefore was assessed by a heritage consultant.

The heritage assessment concludes that the function of Dobroyd Stormwater Channel No 53 is to channel overflow and stormwater from Ashfield, Croydon and Haberfield to Iron Cove. The insertion of two stormwater outlets is consistent with the historic and technical function of the Dobroyd Canal and as such represents a new phase in its history. The heritage significance of the canal is respected.

The aim of the works is to mitigate the impacts of flooding on existing residential development located to the east (upstream) of Wattle Street, thus ensuring the protection of the houses and heritage value of the Haberfield HCA. The installation of the outlet will not affect the integrity of the canal in its entirety.

Inserting the two stormwater outlets into the canal wall will remove large sections of the 1920s and 1930s phases of the construction of the canal. This represents a loss of original fabric; however, the loss is mitigated by the compatibility of the continuity of function. Care will be taken to minimise damage during works, which will be undertaken in consultation with a heritage consultant and Sydney Water.

No other heritage items or archaeologically sensitive areas were identified within or surrounding the land subject to the activities.

A Construction Heritage Management Plan has been prepared and approved by DPE as part of the CEMP in accordance with the relevant conditions of approval. Unexpected heritage finds identified during construction would be managed in accordance with the Construction Heritage Management Plan.

The mitigation and management measures presented in the EIS and Submissions Report (refer to Chapter 6 of this report) and CoAs for the M4 East project are considered satisfactory to manage any potential impacts to non-aboriginal heritage. In addition, when the final design and locations for the two stormwater outlets have been determined, works should be undertaken in consultation with a heritage consultant and the Sydney Water Heritage Manager.

6 Environmental management measures

6.1 Environmental management measures

Chapter 29 of the EIS identified a range of environmental outcomes and management measures that would be implemented to reduce the identified environmental and social impacts associated with the construction and operation of the M4 East project. Following consideration of issues raised in submissions received during the EIS exhibition period, the environmental management measures for the project were revised in Chapter 8 of the submissions report.

All of these environmental management measures would be applied to the proposed modification. Where these measures are relevant to the assessment of the impacts of the proposed modification, they have been included below in Table 6.1.

6.2 Conditions of approval

The M4 East project, including all approved modifications to the Infrastructure Approval (SSI_6307), would be undertaken in accordance with the relevant conditions of approval.

If approved, the SSI boundary would be modified to include the expanded construction footprint boundary to facilitate the installation of two stormwater outlets and therefore all works would be undertaken in accordance with the Infrastructure Approval. The project would be required to construct the proposed modification in accordance with the specified environmental management measures and conditions of approval.

Table 6.1 Revised Environmental Management Measures (REMM) applicable to the proposed modification

REMM	Environmental management measure	Relevance to proposed modification
SW2	Work method statements will be prepared for waterway works with particular emphasis on the early implementation of erosion and scour protection requirements.	Due to the proposed modification being undertaken within Iron Cove Creek, specific work method statements would be developed and implemented prior to commencement of the works to ensure early implementation of additional erosion mitigation measures.

REMM	Environmental management measure	Relevance to proposed modification
SW6	Measures will be implemented to minimise the risk of erosion and sedimentation. These measures may include: - Disturbed areas will be minimised and revegetated or stabilised as soon as practical - Erosion control measures such as sediment fences, check dams, temporary ground stabilising, diversion berm or site regrading will be installed as appropriate - Where practical, clean water will be diverted away from works or disturbed areas - Measures will be employed to control ground stability and limit run-off lengths and velocities within the construction ancillary facilities - Wheel wash or rumble grid systems will be installed, where practical, at compound heavy vehicle exit points to minimise the transfer of soil from construction areas to roadways - Erosion and sedimentation controls will be regularly inspected to maintain performance to the design criteria and design specifications. Controls are to be upgraded or altered if these objectives are found to not be satisfied.	The proposed modification comprises of construction works that would be conducted within Iron Cove Creek, therefore there is a potential for erosion and sedimentation impacts. All construction activities would be undertaken in accordance with the SWMP with the following additional control measures implemented: • Prior to any construction activities being undertaken, appropriate sediment control measures will be implemented to ensure construction related waste does not enter the canal. • During low tide, a coffer dam will be constructed above the high tide line using a cylindrical rubber weir filled with air or sand bags depending on availability. This dam will have a 5m radius (approximate) from the proposed location of the outlets and a silt curtain will also be installed as a secondary control. • A temporary sump will be installed to dewater the excavation as required. • Bunding and diversionary socks around the vacuum truck hoses to prevent a spill. • A vacuum truck would be used in conjunction with the core drill to capture any construction related waste as it is produced.

REMM	Environmental management measure	Relevance to proposed modification
SW9	Measures will be implemented to minimise the risk of spills. These measures may include: - Spill containment will be included at locations where there is direct discharge of stormwater to receiving waterways - Appropriately bunded areas will be provided for storage of hazardous materials such as oils, chemicals and fuels - Adequate controls around stockpile areas and excavation works will be installed to minimise the risk of contaminants being washed into waterways or stormwater systems - Maintenance of containment/spill infrastructure and clean-up procedures for on-site spills will be undertaken - Spilt materials and/or any contaminated materials will be disposed of appropriately.	The proposed modification comprises of construction works that would be conducted within Iron Cove Creek. All construction activities would be undertaken in accordance with the SWMP to reduce the potential for spills, with the following additional control measures implemented: • During low tide, a coffer dam will be constructed above the high tide line using a cylindrical rubber weir filled with air or sand bags depending on availability. This dam will have a 5m radius (approximate) from the proposed location of the outlets and a silt curtain will also be installed as a secondary control. • Bunding and diversionary socks around the vacuum truck hoses to prevent a spill. • A vacuum truck would be used in conjunction with the core drill to capture any construction related waste as it is produced.
C12	If acid sulfate soils are encountered, they will be managed in accordance with the Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998).	All construction activities related to the excavation of the pipe trench would be conducted in accordance with the ASSMP and SWMP.
FD16	A new drainage structure near XD11 will be constructed to mitigate the impacts of flooding on existing residential development located to the east (upstream) of Wattle Street.	The proposed modification facilitates the implementation of this REMM.

REMM	Environmental management measure	Relevance to proposed modification
NAH8	Photographic recording will be undertaken of listed, and contributory heritage items and affected sections of the heritage conservation areas – contributory streetscapes and houses where a major adverse impact will be caused by the project, as identified in the Construction Heritage Management Plan in the Powell's Estate Conservation Area, Thornleigh House gates and driveway, and the Haberfield Conservation Area. During demolition, where practical and as advised by a qualified heritage consultant, recycle elements of heritage fabric from listed heritage items and affected sections of the heritage conservation areas – contributory streetscapes and houses where a major adverse impact will be caused by the project, as identified in the Construction Heritage Management Plan in the Powell's Estate Conservation Area, Thornleigh House gates and driveway, and the Haberfield Conservation Area. The recording methodology will be generally in accordance with the NSW Heritage Office guidelines Photographic Recording of Heritage Items Using Film or Digital Capture (2006b), but the detail of the recording required will be determined by the significance of the items/groups/streetscapes (least effective).	A Heritage Management Plan has been prepared and approved by the DP&E. The Heritage Management Plan would be applied to the construction of the proposed modification, if approved.
NAH34	The fabric of Dobroyd Stormwater Channel No. 53 will be protected during construction works on the advice of a suitably qualified civil engineer (highly effective).	The design of the two stormwater outlets has been designed by civil engineers in consultation with Sydney Water. All work would be undertaken in consultation with a Heritage Consultant.

7 Conclusion

The proposed modification is required to facilitate the construction of a new drainage structure through Reg Coady Reserve to replace the existing XD11 drainage channel. This drainage structure would channel water into Iron Cove Creek by way of two stormwater outlets.

While the infrastructure noted above has approval, consideration of the impacts impacts to heritage value of Iron Cove Creek, locally listed heritage item on the Sydney Water Heritage and Conservation (Section 170) Register (No. 4571056) was not undertaken and is therefore the subject of this modification. The modification of the existing SSI boundary to include the expanded construction footprint boundary provides for the installation of the two stormwater outlets, including access and works areas for the construction and maintenance.

A heritage impact assessment was undertaken to assess the impacts of installing the stormwater outlets on the heritage value of Iron Cove Creek. The heritage assessment concludes that inserting two stormwater outlets is consistent with its function as a canal channelling overflow and stormwater from Ashfield Croydon and Haberfield into Iron Cove. Further, there will not be an adverse effect on the historic, aesthetic and social significance of Dobroyd SWC No 53, nor will there be an adverse effect on the rarity and representativeness of the canal. The integrity of the fabric has been altered such that the new stormwater outlets represent an additional, though compatible, alteration and as such, the project complies with the requirements of Minister's CoA B23

The proposed modification would be constructed as part of the wider M4 East project. Therefore this modification would adopt all of the management measures committed to in the M4 East project as well as DP&E conditions of approval.

The proposed modification is considered to be justified, with negligible impacts on the heritage value of Iron Cove Creek and would ensure adequate stormwater drainage is provided in the area to mitigate the impacts of flooding on existing residential development located to the east (upstream) of Wattle Street.

8 References

AECOM (AECOM) 2015a. WestConnex M4 East Environmental Impact Statement Traffic and Transport Assessment, prepared September 2015

AECOM 2015b. WestConnex M4 East Traffic and transport assessment of design changes, prepared December 2015

AECOM 2015c. WestConnex M4 East Aboriginal Heritage Assessment, prepared September 2015

AECOM Australia Pty Ltd and GHD Pty Ltd (AECOM GHD) 2015. WestConnex M4 East Environmental Impact Statement, prepared September 2015

Austroads 2010. Guide to Road Design

DECCW 2009. Interim Construction Noise Guideline (ICNG)

GHD Pty Ltd (GHD) 2015. M4 East Project Biodiversity Impact Assessment, September 2015

GML Heritage 2015. WestConnex M4 East Non-Aboriginal Heritage Impact Assessment, September 2015

Infrastructure NSW 2012. State Infrastructure Strategy 2012-2032

Office of Environment and Heritage (OEH) 2013. Native Vegetation of the Sydney Metropolitan Area.

Roads and Maritime Services (Roads and Maritime) 2015. M4 East Submissions Report, prepared December 2015.

SLR Consulting Australia Pty Ltd (SLR) 2015. WestConnex M4 East Project Construction and Operational Road Traffic Noise and Vibration Impact Assessment

Transport for NSW 2012. Long Term Transport Master Plan

Attachment A

Heritage Assessment