



Transport



Appendix B4


Soil and Water Management Sub-plan

Albion Park Rail bypass (Stage 2 – Princes Motorway between Yallah and Oak Flats)


August 2021

Document control




















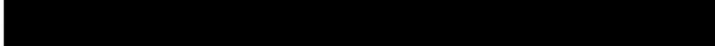


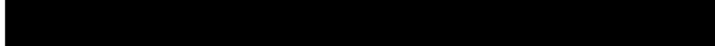





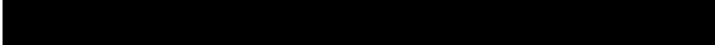



Approval and authorisation

Title	Soil and Water Management Sub-plan Albion Park Rail Bypass (Stage 2 – Princes Highway between Yallah and Oak Flats)
Accepted on behalf of Transport for NSW by	Peter Chudleigh
Signed	
Dated	14 September 2021

Endorsement

Endorsed by the Environmental Representative	Toby Hobbs
Signed	
Dated	27 August 2021

Document status

Revision	Date	Description	Approval
			
			
			
			
			
			
			
			
			
			
			

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Distribution of controlled copies

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The document is uncontrolled when printed. One controlled hard copy of the SWMP as part of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office and on the project website.

Copy number	Issued to	Version

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Glossary/ Abbreviations

Abbreviation	Standard text
ANZECC	Australian and New Zealand Environment Conservation Council
ASM	Acid sulfate material
ASS	Acid sulfate soil
CEMP	Construction Environmental Management Plan
Coastal Management SEPP	<i>State Environmental Planning Policy (Coastal Management) 2018</i>
CLMP	Contaminated Land Management Sub-plan
CoA	Conditions of approval (state or federal). State CoA are the NSW Minister for Planning's conditions of approval. Federal CoA are the federal Conditions of Approval under the EPBC Act.
DPIE	NSW Department of Planning and Environment (now known as Department of Planning, Industry and Environment)
DPI	NSW Department of Primary Industries
DPIE	Department of Planning, Industry and Environment (DPIE) - All references to DPIE should be interpreted as DPIE (formerly known as DPIE).
EIS	Environmental Impact Statement
ESCP	Erosion and Sediment Control Plan
EEC	Endangered Ecological Community
EO	Environment Officer
EM	Environment Manager
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EWMS	Environmental Work Method Statements
NSW Minister, the	NSW Minister for Planning
Non-compliance	Failure to comply with the requirements of the Project approval or any applicable licence, permit or legal requirements
Non-conformance	Failure to conform to the requirements of Project system documentation including this CEMP or supporting documentation
NTU	Nephelometric Turbidity Unit
OEH	Office of Environment and Heritage - All references to OEH should be interpreted as Department of Planning, Industry and Environment, (DPIE) formerly known as OEH.
PESCP	Progressive erosion and sediment control plan
PIRMP	Pollution Incident Response Management Plan
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Project, the	Albion Park Rail bypass
REMM	Revised Environmental Management Measures
Roads and Maritime	Roads and Maritime Services – All references to Roads and Maritime should be interpreted as Transport for NSW (formerly Roads and Maritime Services)
RUSLE	Revised Universal Soil Loss Equation
Secretary	Secretary of the NSW Department of Planning and Environment
SMZ	Selected Material Zone

Abbreviation	Standard text
SPIR	Submissions and Preferred Infrastructure Report- A report developed to respond to submissions raised during the exhibition of the EIS and assess changes from the EIS
SWMP	Soil and Water Management Sub-plan
SWTC	Scope of Works and Technical Criteria (SWTC)
TfNSW	Transport for NSW
TSS	Total suspended solids
UDLCS	Urban Design and Landscape Character Strategy
UZF	Upper Zone Formation

1 Introduction

1.1 Context

This Soil and Water Management Sub-plan (SWMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for the Albion Park Rail bypass (Stage 2 – Princes Motorway between Yallah and Oak Flats) (the Project).

This SWMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the Albion Park Rail Bypass Environmental Impact Statement (EIS), as amended by the Submissions and Preferred Infrastructure Report (SPIR), including the revised environmental management measures (REMM) listed in the SPIR and all applicable legislation.

This revision accounts for the deletion of specific monitoring locations identified in previous revisions based on consultation with NSW EPA, DPI Fisheries and NRAR. Monitoring locations have been removed where construction has been completed and construction related water quality impacts are no longer likely to be experienced in those catchment areas due to a fully stabilised catchment and the use of completed sections of the project by public motorists. This is reflected in the revised Construction water quality monitoring program.

1.2 Background and project description

Transport for NSW (formerly Roads and Maritime Services) is extending the M1 Princes Motorway between Yallah and Oak Flats to bypass Albion Park Rail. The motorway completes the 'missing link' for a high standard road between Sydney and Bomaderry. The project is known as the Albion Park Rail bypass.

The Albion Park Rail Bypass EIS assessed the impacts of construction and operation of the Project on soils and water, within Chapters 8, 16 and 17.

As part of EIS development, a detailed hydrology, flooding and groundwater assessment were prepared to address the Environmental Assessment Requirements issued by the then Department of Planning. The assessments were included in the EIS as Technical paper 3 - hydrology and flooding, and Technical paper 11 - groundwater assessment.

The construction of the proposal would use standard procedures and guidelines to mitigate the following potential impacts:

- Soil erosion and sediment transport
- Landslip and mass movement of soils
- Disturbance of acid sulfate soils (ASS) and / or acid sulfate rock
- Disturbance of saline soils
- Disturbance of contaminated soils (if present)
- Settlement of soft soils
- Stormwater runoff
- Negative impacts on water quality.

The project catchment would experience a net reduction in pollutant export of all pollutants assessed compared to the existing condition. The water quality treatment strategy designed for the operational phase would therefore result in a net reduction in stormwater pollutant loadings entering Lake Illawarra.

1.3 Environmental management systems overview

The overall environmental management system for the Project is described in Chapter 3 of the CEMP.

The SWMP is part of Fulton Hogan's environmental management framework for the Project, as described in Chapter 4 of the CEMP. Management measures identified in this Plan will be incorporated into site or activity specific Environmental Work Method Statements (EWMS) and Progressive Erosion and Sediment Control Plans (PESCP).

EWMS have been developed and signed off by environment and management representatives prior to associated works and construction personnel will be required to undertake works in accordance with the identified mitigation and management measures.

Used together, the CEMP, strategies, procedures, EWMS and PESCP form management guides that clearly identify required environmental management actions for reference by Fulton Hogan personnel and contractors.

The review and document control processes for this Plan are described in Section 1.6 of the CEMP.

1.4 Consultation for preparation of this SWMP

This SWMP (including the construction water quality monitoring program for surface water and groundwater) has been developed in consultation with the Environment Protection Agency (EPA), Department of Primary Industries (DPI) for Water (DPI Water), DPI Fisheries (DPI Fisheries) and relevant Councils (including Wollongong City Council and Shellharbour City Council). A summary of the key issues raised is provided below and it is noted that there were no outstanding issues.

Key observations raised by the EPA generally related to the project boundary; minimisation of the area of the site that is able to generate suspended material when water runs over it; inspection frequency; measurement of rainfall; and the use of Nephelometric Turbidity Unit (NTU) in place of Total suspended solids (TSS) to provide instantaneous in-field readings. The SWMP was revised in response to these observations and reissued to the EPA. It was acknowledged that Fulton Hogan had consulted with the EPA on the SWMP.

DPI Water recommended that groundwater should only be discharged for dewatering when the pH is between 6.5 and 8.5. Fulton Hogan confirmed that all dewatering/ discharge (including of groundwater) will be addressed in a dewatering Environmental Work Method Statement (EWMS), which will be prepared in early 2019, prior to dewatering activities on site. DPI Water accepted this approach.

DPI Fisheries commented on the monitoring of sediment controls and the dewatering EWMS. Fulton Hogan amended the SWMP inspection/ monitoring text and advised that a dewatering EWMS will be prepared in early 2019, prior to dewatering activities on site. DPI Fisheries advised their comments had been adequately addressed.

Wollongong City Council advised it had no comments.

Shellharbour City Council had one comment related to the responsibility for ongoing maintenance of temporary sediment basins. Fulton Hogan advised that all temporary sediment basins will be decommissioned at the end of the project, so there will be no ongoing maintenance of temporary basins beyond that time. Shellharbour City Council confirmed it had no further comment.

An onsite presentation covering reduced construction footprint and monitoring locations was presented to NSW EPA and TfNSW on 20 April 2021. Evidence of this consultation is found in Appendix G of this sub-plan.

As construction nears completion and the project transitions into operation, the project team will continue to consult with the key agencies around the removal of certain monitoring points that may become redundant. Following agency approval or, in the instance where an agency does not respond to the request but a reasonable attempt at consultation regarding the proposed change has been demonstrated, where no objections have been raised, it is proposed that the Environmental Representative will review, endorse and approve the removal of monitoring points as a minor amendment in accordance with the provision of Condition of Approval A24 (i).

A summary of consultation undertaken during preparation of this Plan, including copies of all correspondence, is provided in Appendix A5 of the CEMP.

2 Purpose and objectives

2.1 Purpose

The purpose of this Plan is to describe how Fulton Hogan proposes to manage and protect water quality during construction of the Project.

2.2 Objectives

The key objective of the SWMP (including the construction water quality monitoring program for surface water and groundwater) is to ensure all CoA, revised environmental management measures (REMM) and licence/permit requirements relevant to soil and water including water quality are described, scheduled and assigned responsibility as outlined in:

- The EIS
- Conditions of Approval granted to the project on 30/1/2018
- The environment protection licence (EPL)
- Roads and Maritime specifications G36, G38 and G40.

2.3 Targets

The following targets have been established for the management of soil and water impacts during the project:

- Ensure full compliance with the relevant legislative requirements, CoA and REMM
- Meet EPL water quality discharge parameters for all planned basin discharges (i.e. those within design capacity)
- Manage downstream water quality impacts attributable to the project (i.e. maintain water waterway health by avoiding the introduction of nutrients, sediment and chemicals outside of that permitted by the EPL and/or ANZECC guidelines)
- Ensure training on best practice soil and water management is provided to all construction personnel through site inductions.

2.4 Environmental performance outcomes

Table 2-1 identifies the construction-related environmental performance outcomes identified in the EIS as amended by the SPIR and how these will be achieved.

Table 2-1 Environmental performance outcomes

EIS reference	Environmental performance outcome	How achieved
Section 16.3.1 p501	Erosion and sediment controls during construction would be implemented in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004)	Chapter 6 mitigation measure ID SWMM3
Section 16.5 p510, SW02	The construction surface water quality monitoring program would address the requirements of the project environment protection licence	Appendix B Construction water quality monitoring program
Section 16.3.1 p502	The project would minimise the impact associated with the disturbance of acid sulfate soils.	Chapter 6 mitigation measure ID SWMM87
Section 16.3.2, p505	The construction would maintain flow within watercourses crossed by the project during construction.	Chapter 6 mitigation measure ID SWMM40, SWMM41. FFMP Chapter 6 mitigation measure ID SWMM19.

EIS reference	Environmental performance outcome	How achieved
Section 16.5 SW02, p510	The project would prevent/ minimise pollution of waterways from refuelling of vehicles and other equipment and accidental spills.	Chapter 6 mitigation measure ID SWMM74-SWMM81
Section 17.5 SW02, p528	Construction water quality discharge would comply with the requirements of an environment protection licence for the project	Section 7.4 Chapter 6 mitigation measure ID SWMM60, SWMM61.

3 Environmental requirements

3.1 Relevant legislation and guidelines

3.1.1 Legislation

All legislation relevant to this SWMP is included in Appendix A1 of the CEMP.

3.1.2 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this plan include:

- Acid Sulfate Soil Manual (ASSMAC 1998)
- Acid Sulfate Soil and Rock – Victorian EPA Publication 655.1 – July 2009
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)
- Department of Environment and Conservation (DEC): Bunding & Spill Management. Insert to the Environment Protection Manual for Authorised Officers - Technical section "Bu" November 1997
- Managing Urban Stormwater: Soils and Construction. Landcom, (4th Edition) March 2004 (reprinted 2006) (the "Blue Book"). Volume 1 and Volume 2
- Volume 2A Installation of Services (DECCW 2008)
- Volume 2C Unsealed Roads (DECCW 2008)
- Volume 2D Main Roads Construction (DECCW 2008)
- DIPNR Roads and Salinity Guideline, 2003
- DLWC, 1998. Constructed Wetlands Manual.
- Fairfull, S. and Witheridge, G. (2003) Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings. NSW Fisheries, Cronulla, 16 pp
- NSW Fisheries, November 2003. Fishnote – Policy and Guidelines for Fish Friendly Waterway Crossings (Ref: NSWF – 1181)
- Roads and Maritime Dewatering Guideline
- RTA's Code of Practice for Water Management – Road Development and Management (1999)
- Approved Methods for the Sampling and Analysis of Water Pollutants in NSW – March 2004
- Guidelines for the Management of Acid Sulphate materials: Acid Sulphate Soils, Acid Sulphate Rock and Monosulphidic Black Ooze (RTA 2005)
- Roads and Maritime Environment Direction Management of Tannins from Vegetation Mulch
- Stockpile Site Management Guideline, Roads and Maritime 2011
- Roads and Maritime Guideline for Construction Water Quality Monitoring
- EPA publication "Approved Methods for the Sampling and Analysis of Water Pollutants in NSW."
- Environmental Best Management Practice Guideline for Concreting Contractors, DEC, 2004.

3.2 Minister's Conditions of Approval

The CoA relevant to this Plan are listed in Table 3-1 below and are from the State approval. There are no relevant federal CoA. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 3-1 Conditions of Approval relevant to the SWMP

CoA No.	Condition requirements	Document reference																					
C4	<p>The following CEMP sub-plans must be prepared in consultation with the relevant government agencies identified for each CEMP sub-plan and be consistent with the CEMP referred to in Condition C1.</p> <p>Table 3: CEMP Sub-plan Consultation Requirements</p> <table border="1"> <thead> <tr> <th></th> <th>Required CEMP Sub-plan</th> <th>Relevant government agencies to be consulted for each CEMP Sub-plan</th> </tr> </thead> <tbody> <tr> <td>a)</td> <td>Traffic and transport</td> <td>Relevant Council(s)</td> </tr> <tr> <td>b)</td> <td>Noise and vibration</td> <td>EPA</td> </tr> <tr> <td>c)</td> <td>Fauna and Flora</td> <td>OEH and DPI Fisheries</td> </tr> <tr> <td>d)</td> <td>Soil and water</td> <td>EPA and DPI Water and Fisheries</td> </tr> <tr> <td>e)</td> <td>Heritage</td> <td>OEH, Relevant Council(s), Registered Aboriginal Parties</td> </tr> <tr> <td>f)</td> <td>Flooding and Hydrology</td> <td>OEH and Relevant Council(s)</td> </tr> </tbody> </table>		Required CEMP Sub-plan	Relevant government agencies to be consulted for each CEMP Sub-plan	a)	Traffic and transport	Relevant Council(s)	b)	Noise and vibration	EPA	c)	Fauna and Flora	OEH and DPI Fisheries	d)	Soil and water	EPA and DPI Water and Fisheries	e)	Heritage	OEH, Relevant Council(s), Registered Aboriginal Parties	f)	Flooding and Hydrology	OEH and Relevant Council(s)	Section 1.4
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b)	Noise and vibration	EPA																					
c)	Fauna and Flora	OEH and DPI Fisheries																					
d)	Soil and water	EPA and DPI Water and Fisheries																					
e)	Heritage	OEH, Relevant Council(s), Registered Aboriginal Parties																					
f)	Flooding and Hydrology	OEH and Relevant Council(s)																					
C5	<p>The CEMP sub-plans must state how:</p> <p>(a) The environmental performance outcomes identified in the EIS as amended by the SPIR as modified by these conditions will be achieved</p> <p>(b) the mitigation measures identified in the EIS as amended by the SPIR as modified by these conditions will be implemented;</p> <p>(c) the relevant terms of this approval will be complied with (in particular Part E of this approval);</p> <p>(d) the identification of the relevant environmental specific training and induction processes for construction personnel; and</p> <p>(e) issues requiring management during construction, as identified through ongoing environmental risk analysis, will be managed.</p>	<p>Section 2.4.</p> <p>Through the implementation of this SWMP (in particular refer to Section 3.3).</p> <p>Through the implementation of this SWMP (in particular refer to Part E condition cross references below).</p> <p>Section 7.2</p> <p>Chapter 5 second paragraph Chapter 6</p>																					
C6	<p>The CEMP sub-plans must be developed in consultation with relevant government agencies identified in Table 3 of Condition C4 of this approval. Where an agency(ies) request(s) is not included, the Proponent must provide the Secretary justification as to why. Details of all information requested by an agency to be included in a CEMP sub-plan as a result of consultation, including copies of all correspondence from those agencies, must be provided with the relevant CEMP sub-plan.</p>	Section 1.4																					
C7	<p>Any of the CEMP sub-plans may be submitted to the Secretary for approval along with, or subsequent to, the submission of the CEMP but in any event, no later than one (1) month before commencement of construction.</p>	CEMP (main section) Section 1.4																					
C8	<p>Construction must not commence until the CEMP and all CEMP sub-plans have been approved by the Secretary. The CEMP and CEMP sub-plans, as approved by the Secretary, including any minor amendments approved by the ER must be implemented for the duration of construction. Where the SSI is being staged, construction of that stage is not to commence until the relevant CEMP and sub-plans have been approved by the Secretary, unless otherwise agreed by the Secretary.</p>	CEMP (main section) Section 1.4																					

CoA No.	Condition requirements	Document reference															
C9	<p>The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies identified for each Construction Monitoring Program to compare actual performance of construction of the SSI against performance predicted performance:</p> <p>Table 4: Construction Monitoring Program Consultation Requirements</p> <table border="1"> <thead> <tr> <th></th> <th>Required Construction Monitoring Programs</th> <th>Relevant government agencies to be consulted for each Construction Monitoring Program</th> </tr> </thead> <tbody> <tr> <td>a)</td> <td>Air Quality</td> <td>EPA</td> </tr> <tr> <td>b)</td> <td>Groundwater</td> <td>DPI Water</td> </tr> <tr> <td>c)</td> <td>Surface Water</td> <td>EPA and DPI Fisheries</td> </tr> <tr> <td>d)</td> <td>Noise</td> <td>EPA</td> </tr> </tbody> </table>		Required Construction Monitoring Programs	Relevant government agencies to be consulted for each Construction Monitoring Program	a)	Air Quality	EPA	b)	Groundwater	DPI Water	c)	Surface Water	EPA and DPI Fisheries	d)	Noise	EPA	<p>Section 1.4</p> <p>In accordance with CoA C16, the groundwater and surface water monitoring program requirements have been incorporated into this SWMP. See below.</p>
	Required Construction Monitoring Programs	Relevant government agencies to be consulted for each Construction Monitoring Program															
a)	Air Quality	EPA															
b)	Groundwater	DPI Water															
c)	Surface Water	EPA and DPI Fisheries															
d)	Noise	EPA															
C10	<p>Each construction monitoring program must provide:</p> <p>(a) details of baseline data available</p> <p>(b) details of baseline data to be obtained and when</p> <p>(c) details of all monitoring of the project to be undertaken;</p> <p>(d) the parameters of the project to be monitored;</p> <p>(e) the frequency of monitoring to be undertaken;</p> <p>(f) the location of monitoring;</p> <p>(g) the reporting of monitoring results;</p> <p>(h) procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory; and</p> <p>(i) any consultation to be undertaken in relation to the monitoring programs.</p>	<p>Appendix B Construction water quality monitoring program – item 1.</p> <p>Appendix B Construction water quality monitoring program - item 1.</p> <p>Appendix B Construction water quality monitoring program - item 2.</p> <p>Appendix B Construction water quality monitoring program – item 3.</p> <p>Appendix B Construction water quality monitoring program – Table B-1.</p> <p>Appendix B Construction water quality monitoring program - item 2 and Figure B-1.</p> <p>Appendix B Construction water quality monitoring program – item 6</p> <p>Section 7.8</p> <p>Appendix B Construction water quality monitoring program – item 5</p> <p>Section 7.5</p> <p>Section 1.4</p>															
C11	<p>The Construction Monitoring Programs must be developed in consultation with relevant government agencies as identified in Condition C9 of this approval and must include, to the written satisfaction of the Secretary, information requested by an agency to be included in a Construction Monitoring Programs during such consultation. Details of all information requested by an agency including copies of all correspondence from those agencies, must be provided with the relevant Construction Monitoring Program.</p>	<p>Section 1.4</p>															

CoA No.	Condition requirements	Document reference
C12	The Construction Monitoring Programs must be endorsed by the ER and then submitted to the Secretary for approval at least one (1) month prior to the commencement of construction or within another timeframe agreed with the Secretary.	As permitted by CoA C16, the groundwater and surface water Construction Monitoring Programs have been incorporated into this SWMP. The Construction Monitoring Programs are therefore, endorsed by the ER by virtue of the endorsement of this SWMP on page 1.
C16	Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.	The groundwater and surface water Construction Monitoring Programs have been incorporated into this SWMP.
PART E – SOILS		
E56	Erosion and sediment controls must be installed and appropriately maintained to minimise water pollution. When implementing such controls, any relevant guidance in the <i>Managing Urban Stormwater</i> series must be considered.	Chapter 6 mitigation measure ID SWMM3, SWMM7, SWMM20.
PART E – WATER		
E88	Strategies for the management of ASS during works must be implemented.	Chapter 6 mitigation measure ID SWMM87
E89	Where available and practicable, and of appropriate chemical and biological quality, stormwater, recycled water or other water sources shall be used in preference to potable water for the delivery of the SSI, including dust control.	Chapter 6 mitigation measure ID SWMM68
E90	Drainage feature crossings (permanent and temporary watercourse crossings and stream diversions) and drainage swales and depressions must be undertaken in accordance with relevant guidelines and designed by a suitably qualified and experienced person in consultation with DPI Fisheries and the EPA.	Chapter 6 mitigation measure ID SWMM3, SWMM4, SWMM5
E91	The realignment of Frazers Creek must be undertaken in consultation with and meet the reasonable requirements of DPI Fisheries.	Chapter 6 mitigation measure ID SWMM4 FFMP Chapter 6 mitigation measure ID FFMM17 Community Communication Strategy

3.3 Revised environmental management measures

Relevant REMM from the EIS as amended by the SPIR are listed in Table 3-2 below. This includes a cross reference as to where the measure is addressed in this Plan or other Project management documents.

Table 3-2 Revised environmental management measures relevant to this SWMP

ID No.	Revised environmental management measure	Document reference
SW01	<p>Industry standard erosion and sediment controls will be designed and implemented in accordance with the following specifications and guidelines:</p> <ul style="list-style-type: none"> • Managing Urban Stormwater: Soils and Construction (Landcom, 2004) • Roads and Maritime's Erosion and Sedimentation Management Procedure (PN143) • Roads and Maritime's Soil and Water Management Specification (G38) • The NSW Office of Water's guidelines for Controlled Activities. • Volume 2D Main Road Construction published (DECC, 2008). <p>These controls will be established before the start of construction and maintained in effective working order for the duration of the construction period until the site is restored.</p>	<p>Section 3.1.2</p> <p>Chapter 6 mitigation measure ID SWMM3</p> <p>Chapter 6 mitigation measure ID SWMM2, SWMM6.</p>
SW02	<p>The CEMP will include a construction soil and water quality management plan to manage potential impacts on soils and receiving watercourses, to include, but not be limited to:</p> <ul style="list-style-type: none"> • Objectives and targets for soil and water quality management • Information on the relevant statutory and other requirements relating to soils and water quality, including any permits or licences required for the project • Details of any consultation requirements under the Plan • An overview of the existing environment and potential impacts related to the construction works. <p>Measures to manage impacts of the project including in relation to:</p> <ul style="list-style-type: none"> • Soils, erosion and sedimentation • Stockpile management • Spoil and fill management • Surface water quality • Groundwater levels 	<p>This SWMP</p> <p>Sections 2.2, 2.3</p> <p>Chapter 3</p> <p>Section 7.4</p> <p>Section 1.4</p> <p>Chapters 4, 5</p> <p>Chapters 6</p> <p>Chapter 6 mitigation measure ID SWMM1 - SWMM68.</p> <p>Chapter 6 mitigation measure ID SWMM3, SWMM5, SWMM23, SWMM25, SWMM28, SWMM59, SWMM67.</p> <p>Chapter 6 mitigation measure ID SWMM3, SWMM5, SWMM6, SWMM7.</p> <p>Chapter 6 mitigation measure ID SWMM60 - SWMM68.</p> <p>Section 7.3</p>

ID No.	Revised environmental management measure	Document reference
	<ul style="list-style-type: none"> • Discharges from sedimentation basins, ASS treatment areas and groundwater de-watering • Acid sulfate soils and contaminated lands • Significant weather events (such as heavy rainfall or flooding) • Re-fuelling of vehicles and other equipment and accidental spills • Unexpected finds such as asbestos or contaminated fill <p>A surface water quality monitoring program that as a minimum addresses the requirements of the project environment protection licence</p> <p>Auditing and reporting requirements</p> <p>Site inductions and training for construction personnel in the implementation of the Plan</p> <p>The strategy will be prepared in accordance with the relevant industry standard guidelines and procedures.</p>	<p>Chapter 6 mitigation measure ID SWMM60, SWMM87.</p> <p>Acid sulfate soils: Chapter 6 mitigation measure ID SWMM87</p> <p>Contaminated lands: Chapter 6 mitigation measure ID SWMM85</p> <p>Chapter 6 mitigation measure ID SWMM66</p> <p>Chapter 6 mitigation measure ID SWMM74-SWMM81</p> <p>Unexpected Contaminated Land and Asbestos Finds Procedure (CoA E60) – to be completed separately to this SWMP</p> <p>Chapter 6 mitigation measure ID SWMM64</p> <p>Sections 7.7, 7.8.</p> <p>Section 7.2</p> <p>Section 3.1</p>
SW03	<p>The size, location and number of temporary sedimentation basins to treat site runoff during construction will be confirmed during detailed design. The design process will consider the site constraints (such as topography and ecology), land take, and proximity to receiving waters and / or sensitive receiving waters. They will be designed in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004).</p>	<p>Chapter 6 mitigation measure ID SWMM1-SWMM3</p>
SW04	<p>An emergency spill response procedure will be prepared to minimise the impact of any accidental spills, and include details on the requirements for managing spills, disposing of any contaminated waste, and reporting of any such incidents.</p>	<p>Incident and Emergency Response Plan (IERP) Appendix B</p> <p>WEMP Table 5-2 for disposal of spill kit materials</p> <p>CEMP (main section) Section 3.6 for incident reporting</p>

ID No.	Revised environmental management measure	Document reference
SW05	<p>Areas of potential environmental concern with respect to contamination are identified in this environmental impact statement. The risks posed by work in these areas will be evaluated and managed through a Phase 2 Assessment including:</p> <ul style="list-style-type: none"> • A review of historical information • Targeted sampling and analysis of samples at the areas of potential environmental concern in accordance with the National Environmental Protection (Assessment of Site Contamination) Measure (2013). <p>In the event the Phase 2 Assessment identifies any areas of contamination that are to be impacted by the project, the CEMP will include a strategy to manage these areas, prepared in accordance with the Guidelines for the Management of Contamination (Roads and Maritime, 2013e).</p>	Contaminated Land Management Sub-plan (CLMP)
GW01	<p>Groundwater monitoring will be undertaken adjacent to groundwater dependent ecosystems in close proximity to the project to identify the potential impacts of dewatering or depressurisation of groundwater as a result of the project. The decision to cease groundwater monitoring in the operational phase, following construction, will be confirmed in consultation with a suitably qualified independent expert.</p>	<p>Appendix B Construction water quality monitoring program</p> <p>Annexure B1 Baseline water quality monitoring program (by RMS)</p>

4 Existing Environment

The soil and water quality environment within the work footprint and its environs is described below. This information is a summary of chapter 16 (soils and surface water quality) and chapter 17 (groundwater) of the EIS.

4.1 Topography and soil characteristics

4.1.1 Topography

Topography within the project area generally consists of undulating hills in the north and south, separated by lower lying coastal floodplain (EIS, p488).

The northern-most part of the project area (near Penrose) is on a broad spur made up of the consolidated rock materials of the Berry Formation (siltstone, shales and sandstones). This spur separates the lower lying Quaternary era alluvial and swamp deposits at Koonawarra to the north, and Duck Creek to the south. Relief in the northern portion of the project area averages 3.5 per cent between Penrose in the north, and Duck Creek in the south. Mount Brown, a regionally significant topographical feature (100 metres Australian height datum (AHD)) is situated one kilometre north-east of the project area at Penrose (EIS, p488).

The topography of the project area gently rises in a northerly direction from about nine metres AHD at its crossing of the Duck Creek floodplain near Yallah to about 30 metres AHD in the vicinity of Haywards Bay. The project area then traverses the Macquarie Rivulet and Frazers Creek floodplains at a relatively consistent elevation of less than six metres AHD through to Tongarra Road. From Tongarra Road through to the southern extent of the project area at Oak Flats, the project area is characterised by gently undulating hills of the Berry Formation. This portion of the project area has a local relief of 20 metres and slopes in the order of five per cent (EIS, p488).

4.1.2 Geology

Published geological information contained within the Wollongong-Port Hacking 1:250 000 Geological Series Sheet (Stroud et al, 1985) indicates the project area traverses two principal geological landscapes – the Permian era Berry Formation and Quaternary era alluvial and swamp deposits. The former geological landscape is present in the northern and southern parts of the project area (principally north of Duck Creek and south of Tongarra Road). Quaternary era alluvium and swamp deposits are largely situated within the central part of the project area, mirroring the floodplains of the present day Duck Creek, Macquarie Rivulet and Frazers Creek (EIS, p488). The geological units present within the project area are shown in Figure 4-1.

The Berry Formation is locally comprised of red brown and grey volcanic sandstones north of Duck Creek and mid grey to grey siltstone and fine sandstone to the south of Duck Creek (Troedson and Hashimoto, 2013). Quaternary era alluvium associated with the Duck Creek floodplain is locally described as Holocene floodplain deposits, comprised of silts, fluvial sand and clay (Troedson and Hashimoto, 2013). Further south, near Macquarie Rivulet and Frazers Creek, the Quaternary era alluvial deposits form a complex of related units, including floodplain deposits (silt, fluvial sand, clay), levee deposits (fluvial sand, silt and clay) and alluvial paleo channel filling units (organic mud, peat, clay, silt, fluvial sand) (EIS, p488).

The Albion Park Rail Bypass Factual Geotechnical Report, Stages 1, 2 and 3 (Golder Associates, 2015) describes the geological conditions that were encountered in the course of the preliminary geotechnical investigation. In the northern portion of the project area, the cut face adjacent to the northbound lanes of the Princes Highway is comprised of sandstone of the Berry Formation. Moving south, at the level of the Princes Highway, the bedrock occurs at shallow depths and comprises siltstones of the Berry Formation with a thin veneer of silty residual soils. This ground profile is reasonably consistent in the project area between the Princes Highway and the South Coast Rail Line, across the old golf course and through the cut down towards the Macquarie Rivulet. The depth to bedrock is relatively shallow and outcropping siltstone can be seen in the small cutting on the eastern side of the rail line (EIS, p489).

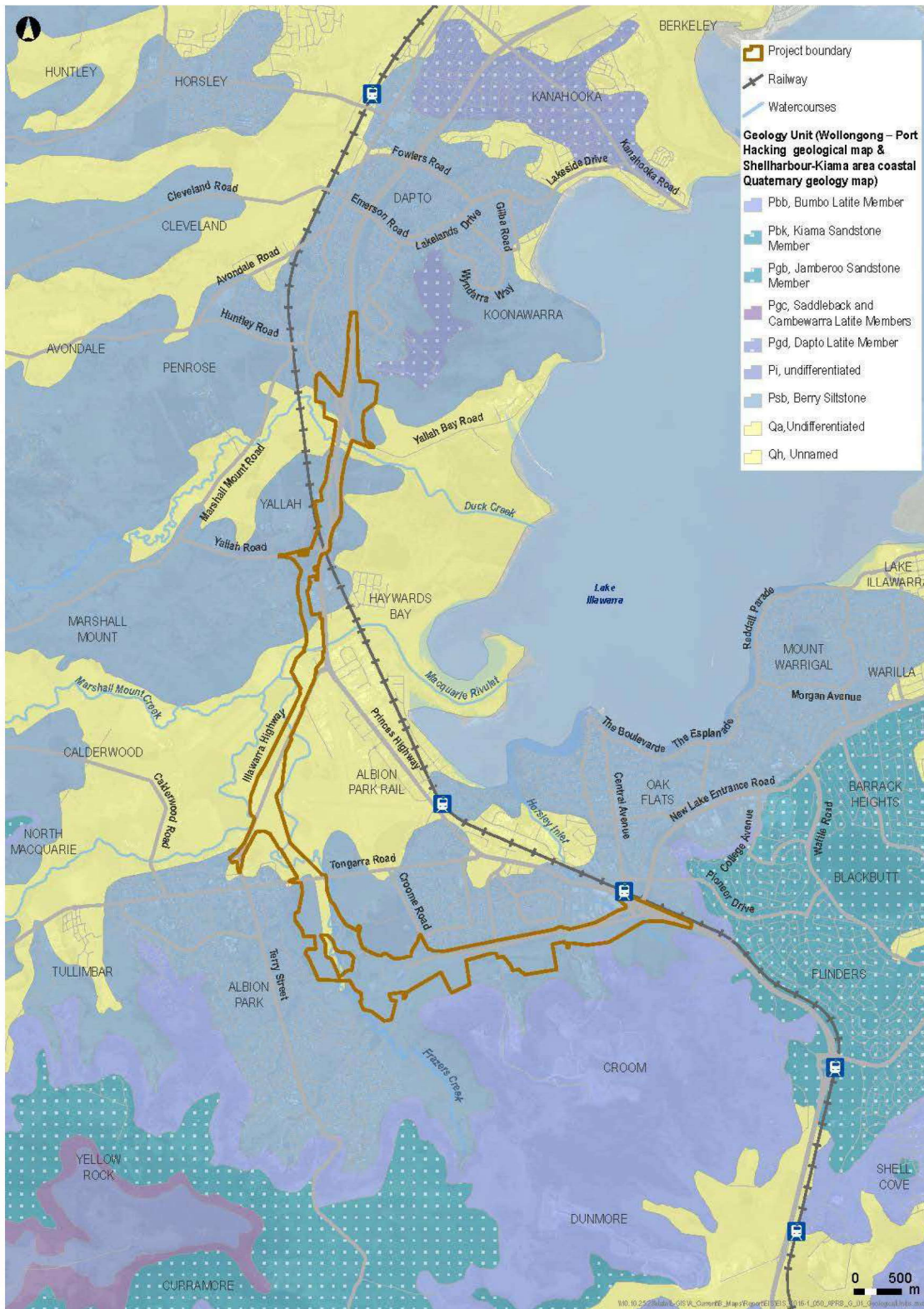


Figure 4-1 Geological units (EIS, p491)¹

¹ It is noted that the project boundary in the SPIR (not the EIS) is the approved project boundary for the overall approved State Significant Infrastructure (SSI 6878). However, the Project forms Stage 2 of SSI 6878 only. Stage 2 comprises the extension of the Princes Motorway between Yallah and Oak Flats and all associated works including bridges, interchanges and local road changes or upgrades (excluding Stage 3 – Yallah Interchange; and any work as part of Stage 1 - Croom Regional Sporting Complex reconfiguration). For additional details refer to the Albion Park Rail bypass Staging Report (Roads and Maritime, March 2018).

In the area south of the Yallah cut, the bedrock level drops off steeply on the northern bank of the Macquarie Rivulet and then rises rapidly on the southern bank, indicating the extent of the remnant channel of the river. Here the deep alluvial soils are potentially compressible (EIS, p489).

The central part of the project area comprises a relatively flat and poorly drained floodplain fed by the Macquarie Rivulet and Frazers Creek. On the southern bank of the Macquarie Rivulet, there is a thin cover of alluvial soil overlying shallow siltstone bedrock. The depth to bedrock rapidly drops off southwards. Further south the surficial soils comprise interbedded varieties of Holocene Age and Pleistocene Age soils. Through the floodplain the depth to bedrock varies between nine metres and 20.5 metres. The covering soils contain zones of soft clays that appear to be coincident with the Pleistocene Age soils (EIS, p488).

As the project route heads south beyond Tongarra Road, the soft alluvial soils are not present, giving way generally to more granular alluvial deposits on approach to the Croom Regional Sporting Complex. Beneath the existing cricket pitch at the Croom Regional Sporting Complex, the depth to bedrock reduces rapidly from around 11 metres to 1.1 metres with a thin veneer of silty clayey residual soils and alluvial soils. While the bedrock mainly comprises siltstone and sandstone, an area of basalt was observed close to the cricket pitch (EIS, p489).

In the region of the existing East West Link, the siltstone bedrock is exposed in the cut faces. Shallow bedrock is typically present for the majority of the East West Link. The higher ground to the south is mainly underlain by latites with some meta-siltstone lenses, with rock head being encountered between one metre and 2.5 metres below existing ground level (EIS, p488).

4.1.3 Soil landscapes

Four soil landscapes, as defined by Hazelton (1992) occur within project area: the Albion Park, Fairy Meadow, Shellharbour and Bombo soil landscapes. The Albion Park and Fairy Meadow soil landscapes are the most common, while the Shellharbour and Bombo soil landscapes are present in a smaller extent to the far north and south of the project area respectively (EIS, p490).

The Albion Park soil landscape is an erosional landscape typified by short steep upper slopes and gentle foot slopes. This soil landscape follows the Berry Geological Formation, and is primarily located in the northern and south-eastern parts of the project area (EIS, p490).

The Fairy Meadow soil landscape is a swamp landscape. It occurs in the project area as a series of broad alluvial plains bisected by Duck Creek, Macquarie Rivulet and Frazers Creek. This soil landscape occurs in the central portion of the study area on unconsolidated Quaternary era deposits. ASS and soft soils within the project area occur principally within the Fairy Meadow soil landscape (EIS, p490).

The erosional Bombo soil landscape follows the distribution of the Bombo Latite. In the project area it takes the form of rolling low hills with benched slopes (EIS, p490).

The erosional Shellharbour soil landscape is characterised by rolling low hills with long side- slopes and broad drainage plains on Budgong Sandstone (EIS, p490).

The geotechnical investigation for the environmental impact statement (Golder Associates, 2015) found a thin veneer of residual soil cover in the north of the project area, over shallow siltstone bedrock. In the central part of the project area, south of Macquarie Rivulet, bedrock was reported at depths of between nine and 20 metres below ground level, overlain by soft clays consistent with the Fairy Meadow soil landscape. Shallow soils were encountered south of the Fairy Meadow soil landscape near the Croom Regional Sporting Complex. Soil landscapes within the project area are shown in Figure 4-2 (EIS, p490).



Figure 4-2 Soil Landscapes (EIS, p492)²

² It is noted that the project boundary in the SPIR (not the EIS) is the approved project boundary for the overall approved State Significant Infrastructure (SSI 6878). However, the Project forms Stage 2 of SSI 6878 only. Stage 2 comprises the extension of the Princes Motorway between Yallah and Oak Flats and all associated works including bridges, interchanges and local road changes or upgrades (excluding Stage 3 – Yallah Interchange; and any work as part of Stage 1 - Croom Regional Sporting Complex reconfiguration). For additional details refer to the Albion Park Rail bypass Staging Report (Roads and Maritime, March 2018).

4.1.4 Acid sulfate soils

The NSW Coastal Acid Sulfate Soils Risk Mapping Series (Department of Land and Water Conservation, 1995) groups land with ASS risk in one of five classes on the basis of the potential impacts that may result from different types of work. In the context of soil disturbance, Class 1 represents the highest risk and Class 5 the lowest risk. The project area includes soils mapped under all five risk classes, as follows (EIS, p493):

- North of Macquarie Rivulet is mapped as Class 5. Soil disturbance would occur in this part of the project area, associated with cuttings to a maximum of eight metres below ground level
- The area around Macquarie Rivulet, Frazers Creek and the associated floodplains is mapped as a complex of Classes 1, 2, 3 and 5. Soil disturbance in this area would be limited to piling for the installation of bridge supports and shallow topsoil stripping from beneath embankments
- The area from the Macquarie Rivulet – Frazers Creek confluence south to Tongarra Road is mapped as Class 4. Shallow soils in this area would be removed in preparation of the construction of elevated soil embankments
- The area between Tongarra Road and the south-eastern extent of the project area at Oak Flats is mapped as Class 5. Elevated embankments are proposed in this area and relatively limited soil would be removed.

As part of the geotechnical investigation for the project, 20 soil samples were collected from boreholes mostly in the central portion of the project area. Laboratory analysis indicated 14 of the 20 samples were found to meet the criteria for the potential to generate acid from exposed soils. The samples that exceeded the trigger levels were collected from boreholes at a range of depths and were located principally on the Macquarie Rivulet and Frazers Creek floodplains, and from the banks of Macquarie Rivulet south to Tongarra Road. A sample from a borehole adjacent to the TransGrid Central Region Dapto Office near the Princes Highway was reported at a concentration that exceeded the trigger level (EIS, p493).

Borehole logs from the project's geotechnical investigation (Golder Associates, 2015) show that pyrite (an indicator for acid sulfate rock) was widely observed within the rock materials in the project area at depths ranging from six through to 20 metres below ground. Analysis of a sample collected from a borehole near Yallah Road indicated acid sulfate rock potential. It is considered likely that there are other areas of acid sulfate rock in the project area, and these would be identified via additional geotechnical investigation during detailed design (EIS, p493).

4.1.5 Soft soils

Soft soils are consistently distributed through the central portion of the site associated with the Fairy Meadow soil landscape, a Quaternary era landscape typified by alluvial and swamp deposits. The thickness of soft soils in the project area ranges from a few metres up to 10 metres across the central domain (Golder Associates, 2015).

4.1.6 Salinity

The Fairy Meadow soil landscape, which occurs within the central part of the project area, is reported to exhibit salinity (Hazelton, 1992). Furthermore, a soil salinity investigation carried out for the nearby West Dapto future growth area (MG Planning, 2006) identified saline soils to the immediate north of the project area, in the suburb of Horsley and near Avondale Road in Penrose. Higher levels of soil salinity are expected in the area due to the estuarine nature of adjacent watercourses.

4.1.7 Contaminated land

According to Chapter 16 of the EIS, there are not any known sites of contamination within the project area that have been regulated under the *Contaminated Land Management Act 1997* (NSW) (EIS, p494).

Based on the background review, and site inspection, a number of potentially contaminating land uses have been identified within the project area. The subject sites are designated as areas of

potential environmental concern for the purposes of this assessment. These areas of potential environmental concern are (Figure 4-3):

- The area adjacent to and within the South Coast Rail Line where it crosses the project. This area includes all of the rail corridor
- Commercial buildings on Yallah Road
- Commercial buildings adjacent to the intersection of the Illawarra and Princes Highways
- Dairy located west of the proposed motorway alignment, near the Illawarra Highway
- A heavy vehicle parking area south of the Durgadin Drive/ East West Link intersection, associated with a quarry.

In addition to the specific areas of potential environmental concern, the local topography and existing infrastructure in the project area (including the Princes Highway and Illawarra Highway) suggests roads and roadside levee banks have commonly been built using fill. Fill has been used in parts of the Croom Regional Sporting Complex to level the playing fields (EIS, p494).

Where the origin of imported fill cannot be reliably identified, the material has the potential to include contaminants. Filled parts of the site are therefore considered to represent areas of potential environmental concern until such time as the composition or source of the fill materials can be determined as suitable for the proposed land use (EIS, p494).

Potential contaminants of concern are commonly grouped according to industry type. The potential contaminants of concern with potential to occur in the project area (and their industry type) include (EIS, p494):

- Hydrocarbons, arsenic, phenolics (creosote), heavy metals, nitrates and ammonia (railway yards)
- Hydrocarbons, metals, solvents (scrap yards)
- Fertilizer, insecticides, fungicides, herbicides (agricultural and horticultural activities)
- Hydrocarbons, metals, solvents, acids/alkalis, refrigerants, antifreeze (engine works).

Filling materials that have been used in the project area have the potential to include some or all of these potential contaminants of concern, along with asbestos (EIS, p494).

The preliminary contamination assessment has identified some areas of potential environmental concern which require further assessment. Consistent with the Guideline for the Management of Contamination (Roads and Maritime, 2013e) and the *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended 2013, this further assessment would include intrusive investigations, sampling and laboratory analysis. The design of the intrusive investigations would be in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure 1999* and the *Contaminated Sites: Sampling Design Guidelines* (Environment Protection Authority, 1995). The further assessment would be documented in a detailed site investigation prepared in accordance with the NSW Environment Protection Authority Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites (Office of Environment and Heritage, 2011b) (EIS, p494).

Should the detailed site investigation confirm the presence of contaminants in excess of the relevant guideline values, and conclude that remediation or management measures are required to make the site suitable for the proposed use, a remedial action plan would be developed. The plan would document the approach to remediation and detail the requirements to validate that the site was suitable for the proposed use (EIS, p494).

Subsequent to the EIS, the Hyder Cardno Joint Venture (HCJV) (employed by Roads and Maritime) identified seven locations which were further investigated within the Albion Park Rail bypass footprint. Environmental Site Assessments (ESAs) for those locations presented advice on the subsurface conditions of the sites relative to their intended land use as a road corridor and provided soil management options when required. Refer to the Contaminated Land Management Sub-plan (CLMP) for additional details as required.



Figure 4-3 Areas of potential environment concern and potential ASS (EIS, p496)³

³ It is noted that the project boundary in the SPIR (not the EIS) is the approved project boundary for the overall approved State Significant Infrastructure (SSI 6878). However, the Project forms Stage 2 of SSI 6878 only. Stage 2 comprises the extension of the Princes Motorway between Yallah and Oak Flats and all associated works including bridges, interchanges and local road changes or upgrades (excluding Stage 3 – Yallah Interchange; and any work as part of Stage 1 - Croom Regional Sporting Complex reconfiguration). For additional details refer to the Albion Park Rail bypass Staging Report (Roads and Maritime, March 2018).