



M12 Motorway – West Package Detailed Design

**Division 5.2 and EPBC Act Approval
Consistency Assessment Report**

**Proposed changes between east of
Badgerys Creek and The Northern
Road**

Transport for NSW | September 2021

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Terms

Term	Meaning
AAR	Airport Access Road
ACHAR	Aboriginal Cultural Heritage Assessment Report
Action management plan	EPBC Act: In relation to an action, means a plan for managing the impacts of the action on a matter protected by a provision of Part 3, such as a plan for conserving habitat of a species.
AEP	Annual exceedance probability - refers to the probability of a flood event occurring in any year
AHIMS	Aboriginal Heritage Information System
ANZG	Australian and New Zealand Guidelines
ARI	Average recurrence interval
BAR	Biodiversity Assessment Report
CCHMP	Construction Cultural Heritage Management Plan
CCSI	Critical State Significant Infrastructure
CEMP	Construction Environmental Management Plan
CFFMP	Construction Flora and Fauna Management Plan
Change	Macquarie Dictionary: A variation, adjustment, alteration, deviation or transformation to the project scope, construction methodology or design.
CNVG	Construction Noise and Vibration Guideline
CNVMP	Construction Noise and Vibration Management Plan
Consistent	Macquarie Dictionary: Agreeing or accordant; compatible; not self-opposed or self-contradictory; constantly adhering to the same principles, course, etc.
Consistent with	Means that carrying out the project (as approved) will comply with the terms of the approval despite the proposed change. (See <i>Barrick Australia Ltd v. Williams</i> [2009] NSWCA 275)
Compatible	Macquarie Dictionary definition: Capable of existing in harmony. Capable of orderly, efficient integration with other elements in a system.
CPTED	Crime Prevention Through Environmental Design
CSWMP	Construction Soil and Water Management Plan
CTTMP	Construction Transport and Traffic Management Plan
DAWE	Department of Agriculture, Water and the Environment
DEC	Department of Environment and Climate Change (now EES)

Term	Meaning
DECCW	Department of Environment Climate Change and Water (now EES)
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
EES	Environment, Energy and Science
EIS	Environmental Impact Statement
EPBC Approval	An approval of a controlled action issued by the Australian Government Minister under s133 of the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
EPA	Environment Protection Authority
EPL	Environment Protection License
ESCP	Erosion and Sediment Control Plan
FBA	Framework for Biodiversity Assessment
GDE	Groundwater Dependent Ecosystem
GHG	Greenhouse gas emissions
GIR	Geotechnical interpretive report
ICNG	Interim Construction Noise Guideline
INSW	Infrastructure New South Wales
ISLUS	Integrated speed limit and lane use signs
ITS	Intelligent transport systems
KFH	Key fish habitat
LALC	Local Aboriginal Land Council
LCZ	Landscape Character Zone
LEP	Local Environment Plan
LUIIP	Sydney Land Use and Infrastructure Implementation Plan
MNES	Matters of National Environmental Significance
Modification of an Approval	<i>5.25 Environmental Planning and Assessment Act 1979</i> : Means changing the terms of the Division 5.2 approval, including revoking or varying a condition of the approval or imposing an additional condition on the approval.
NASF	National Airports Safeguarding Framework
NCA	Noise catchment area
NML	Noise Management Level

Term	Meaning
NPWS	National Parks and Wildlife Services
NRAR	Natural Resources Access Regulator
NVIA	Noise and Vibration Impact Assessment
NVIS	Noise and Vibration Impact Statement
ONCR	Operational Noise Compliance Report
ONR	Operational Noise Review
ONVR	Operational Noise and Vibration Review
PACHCI	Procedure for Aboriginal Cultural Heritage Consultation and Investigation
PAD	Potential archaeological deposit
PCT	Plant community type
PMF	Probable maximum flood
PPV	Peak particle velocity
REMM	Revised Environmental Management Measures
RMS	Roads and Maritime Services (now Transport for NSW)
RTA	Roads and Traffic Authority (now Transport for NSW)
SEPP	State Environmental Planning Policy
SMPM	Sydney Motorway Project Model
SMWSA	Sydney Metro – Western Sydney Airport (formerly Sydney Metro – Greater West)
SSD	State Significant Development
SWL	Standing water level
TEC	Threatened ecological community
TfNSW	Transport for NSW
TMC	Traffic Management Centre
TNR	The Northern Road
the Division 5.2 Approval	An approval under Division 5.2 (or the former Part 3A) of the NSW <i>Environmental Planning and Assessment Act 1979</i> for State Significant Infrastructure / Critical State Significant Infrastructure (or formerly Major Projects under Part 3A).
TSC Act	<i>Threatened Species Conservation Act 1995</i> (the TSC Act was repealed and replaced by the <i>Biodiversity Conservation Act 2016</i> on 25 August 2017. The NSW Government established transitional arrangements for biodiversity assessment for the various categories of development consent or approvals that are underway or have already been made.)
UDLP	Urban Design Landscape Plan

Term	Meaning
VMS	Variable messaging sign
VSLs	Variable speed limit signs
WSAGA	Western Sydney Airport Growth Area
WSIA	Western Sydney International Airport
WSUD	Water Sensitive Urban Design

1. Introduction

1.1 Background

Transport for NSW (TfNSW) completed an Environmental Impact Statement (EIS) of the M12 Motorway (the Project EIS) in October 2019. The Project EIS identified a range of environmental, social and planning issues associated with the construction and operation of the M12 Motorway and proposed measures to mitigate and manage those potential impacts.

The Project EIS was publicly exhibited for 34 days from 16 October 2019 to 18 November 2019. Following public exhibition, submissions from community members, special interest and business groups and government authorities were received and addressed by TfNSW in the Project EIS Submissions Report, which was published in October 2020.

TfNSW exhibited an Amendment Report for the M12 Motorway (Amendment Report) in October 2020 in accordance with clause 192(3) of the Environmental Planning and Assessment Regulation 2000 (NSW) (EP&A Regulation). The Amendment Report outlines the proposed design and construction changes to the project following design development since exhibition of the Project EIS and assesses the associated environmental impact. The Amendment Report also details design changes resulting from issues raised in community and stakeholder submissions. In some instances, the design changes further reduce the potential impacts of the project as described in the Project EIS. The Amendment Report was publicly exhibited for 14 days from 21 October 2020 to 4 November 2020. Following public exhibition, submissions from stakeholders were received and addressed by TfNSW in the Amendment Report Submissions Report (AR Submissions Report) in December 2020. An addendum to this report was issued by TfNSW in March 2021 to clarify minor errors in biodiversity impact calculations.

For the purposes of this consistency assessment, the NSW Infrastructure Approval issued by the NSW Minister for Planning and Public Spaces for the M12 Motorway is referred to as the Division 5.2 Approval. The Minister for Planning and Public Spaces approved the M12 Motorway under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 23 April 2021 incorporating the Minister's Conditions of Approval.

The M12 Motorway was referred to the Commonwealth Minister for the Environment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to significant impact on Matters of National Environmental Significance (MNES), namely listed threatened species and communities. The M12 Motorway was subject to assessment via the bilateral agreement between the governments of NSW and the Commonwealth.

The Australian Government Environment Minister's approval was received on 3 June 2021 subject to a number of conditions under sections 130(1) and 133(1) of the EPBC Act. For the purposes of this consistency assessment, the Commonwealth approval issued by the Australian Government Minister for the Environment for the M12 Motorway is referred to as the EPBC Approval.

The project must be carried out in accordance with the Division 5.2 Approval and the following documents:

- M12 Motorway Environmental Impact Statement (TfNSW, 2019)
- M12 Motorway Submissions Report (TfNSW, 2020a)
- M12 Motorway Amendment Report (TfNSW, 2020b)
- M12 Motorway Amendment Report Submissions Report (TfNSW, 2020c)
- M12 Motorway Amendment Report Submissions Report – Amendment Letter (TfNSW, 2021)
- M12 Motorway – Central Package detailed design Division 5.2 and EPBC Act Approval Consistency assessment report – design and boundary changes between Cecil Park and east of Badgerys Creek.

The project must be carried out in accordance with the EPBC Approval and is detailed in the following documents and supporting attachments:

- Submission #3486 - The M12 Motorway Project between the M7 Motorway, Cecil Hills and The Northern Road, Luddenham, NSW

- Notification of referral decision and designated proponent - controlled action; date of decision 19 October 2018; ID: 2018-8286
- Notification of variation to proposal – date of decision 29 June 2020.

1.2 The project as described in the Amendment Report Submissions Report

The key features of the amended project are listed below:

- A new dual-carriageway motorway between the M7 Motorway and The Northern Road with two lanes in each direction with a central median allowing future expansion to six lanes
- Motorway access via three interchanges/intersections:
 - A motorway-to-motorway interchange at the M7 Motorway and associated works (extending about four kilometres within the existing M7 Motorway corridor) with connection between the M12 Motorway and Elizabeth Drive
 - A grade-separated interchange referred to as the WSIA interchange, including a dual-carriageway four-lane airport access road (two lanes in each direction for about 1.5 kilometres) connecting with the WSIA Main Access Road
 - A signalised intersection at The Northern Road with provision for grade separation in the future
- Bridge structures across Ropes Creek, Kemps Creek, South Creek, Badgerys Creek and Cosgroves Creek
- A bridge structure across the M12 Motorway into the Western Sydney Parklands to maintain access to utilities, including the existing water tower and mobile telephone/other service towers on the ridgeline in the vicinity of Cecil Hills, to the west of the M7 Motorway
- Bridge structures at interchanges and at Clifton Avenue, Elizabeth Drive, Luddenham Road and other local roads to maintain local access and connectivity
- Inclusion of active transport (pedestrian and cyclist) facilities through provision of pedestrian bridges and an off-road shared user path, including connections to existing and future shared user path networks
- Modifications to the local road network, as required, to facilitate connections across and around the M12 Motorway including:
 - Realignment of Elizabeth Drive at the WSIA, with Elizabeth Drive overpassing the airport access road and rail infrastructure
 - Two new signalised intersections from Elizabeth Drive into the WSIA, with provisions for future connection to potential developments to the north
 - Widening of Elizabeth Drive under the M7 Motorway and approaches
 - Realignment of Clifton Avenue over the M12 Motorway, with associated adjustments to nearby property access
 - Relocation of Salisbury Avenue cul-de-sac, on the southern side of the M12 Motorway
 - Realignment of Wallgrove Road to connect to Cecil Road, including a connection between Elizabeth Drive and Wallgrove Road via Cecil Road with a signalised intersection with Elizabeth Drive
- Adjustment, protection or relocation of existing utilities
- Ancillary facilities to support motorway operations, smart motorways operation in the future and the existing M7 Motorway operation, including gantries, electronic signage and ramp metering
- Other roadside furniture including safety barriers, signage and street lighting
- Adjustments of waterways, where required, including Kemps Creek, South Creek and Badgerys Creek
- Permanent water quality management measures including swales and basins
- Establishment and use of temporary ancillary facilities, temporary construction sedimentation basins, access tracks and haul roads during construction
- Permanent and temporary property adjustments and property access refinements as required.

A more detailed description of the M12 Motorway is found in Chapter 5 of the Project EIS (TfNSW, 2019) and Chapter 3 of the Amendment Report (TfNSW, 2020b).

1.3 Purpose and subject of consistency assessment

The purpose of this consistency assessment is to:

- Describe the proposed changes relative to the Division 5.2 Approval for the M12 Motorway – West Package shown in the black outline in Figure 1-1. The M12 Motorway – West Package is located between the east of Badgerys Creek and The Northern Road
- Assess the environmental impacts associated with the proposed changes for the M12 Motorway - West Package relative to the Division 5.2 Approval
- Determine if the proposed changes are consistent with the Division 5.2 Approval or whether further approval is required either for a modification application or a new project
- Determine if the proposed changes are consistent with the EPBC Approval or whether a variation to the conditions of approval, a conditioned action management plan or a new referral is required.

The M12 Motorway has been split into three packages to allow for the delivery to be under four construction contracts. This Consistency Assessment is for the M12 Motorway – West Package shown in Figure 1-1.

The assessment has been based on the 80% detailed design including the following studies:






- Biodiversity
- Traffic and transport
- Urban design, landscape and visual amenity
- Aboriginal cultural heritage
- Non-Aboriginal heritage
- Noise and vibration
- Groundwater quality and hydrology
- Climate change risk and greenhouse gas.

The flooding and surface water quality assessments were based on the 100% detailed design due to the availability of the 100% detailed design reports at the time of these assessments. It is noted that no major changes have occurred between the 80% and 100% detailed designs that would affect the assessment. It is also noted there has been minimal change to the construction footprint between the 80% and 100% detailed designs.



Figure 1-1 M12 Motorway - West Package extent

Legend

-  M12 Motorway – West Package
80% detailed design construction footprint
-  Approved M12 Motorway - West Package Amendment Report Submissions Report construction footprint (March, 2021)
-  M12 Motorway Amendment Report Submissions Report Study Area
-  Sydney Metro construction footprint
-  Western Sydney International Airport



Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A3

1:50,000 Date: 10/09/2021

Data sources: - DNRME, TMR, Translink, Geoscience Australia

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2. Proposed change

2.1 Description of proposed changes

The project (SSI-9364) has been approved under Division 5.2 of the EP&A Act. It is also a controlled action under the EPBC Act and has been assessed under the bilateral agreement between the NSW and Commonwealth Governments, an accredited assessment process (EPBC ID: 2018/8286).

The final project description approved under the Division 5.2 Approval and EPBC Approval is detailed in Section 1.2 of the AR Submissions Report. Additional detail about the design, construction and operation of the project can be found in Chapter 5 of the Project EIS and in Chapters 3 and 4 of the Amendment Report.

The project as described in the EPBC Approval (ID: 2018-8286) referral document is detailed in Chapter 1 of the referral document #3486.

The proposed changes to M12 Motorway – West Package are shown in Figure 2-1 and include the following:

- Airport Interchange revised to a free flow directional interchange
- Elizabeth Drive and Airport Access road intersection revised to a single point interchange, comprising:
 - Two separate bridges over the Airport Access Road
 - New entry and exit ramps for access to the Airport Access Road and Elizabeth Drive
- All ramps on the Airport Access Road between the Airport interchange and Elizabeth Drive realigned
- Intersection to the west of the Airport Access Road and Elizabeth Drive replaced with a left-in, left-out arrangement from the Western Sydney International Airport (WSIA) and the northern stub road removed
- Intersection to the east of the Airport Access Road and Elizabeth Drive refined to align with the as-built Badgerys Creek Road
- Elizabeth Drive relocated to the north by about 10 metres at the single point interchange and then tying back into the existing Elizabeth Drive alignment
- Extension of the Airport Access Road and southbound ramp to tie into the WSIA internal road network (this change is within Airport land and is therefore not subject to the NSW Infrastructure Approval and this consistency assessment)
- Reconfiguring BR02 and BR05 at Cosgroves Creek and Badgerys Creek, respectively
- Extending and refining existing utilities relocation designs, including electrical mains and additional water main crossings
- Modification to one operational water quality basin and four additional construction water quality basins
- Refinements to drainage and water quality infrastructure across the M12 Motorway – West Package, including culverts, open channels and cross drainage
- Additional construction access road to the north of BR20
- Amendments to the private property access on Elizabeth Drive west of the Airport Access Road
- Installation of a Variable Messaging Sign (VMS) on the southbound carriageway of The Northern Road.

Further detail on the proposed design changes and the justification for these are listed in Table 2-1.

The proposed changes detailed above change the construction and operational footprints assessed in the Project EIS, Amendment Report and AR Submissions Report. The changes to the construction and operational footprints are shown in Figure 2-2 and Figure 2-3. These figures compare the final exhibited project from the AR Submissions Report to the current 80% detailed design. The proposed changes are generally consistent with the project as described in the Division 5.2 Approval and EPBC Approval as detailed in Table 2-1.

Table 2-1 M12 Motorway – West Package proposed design changes

ID	Proposed change	Justification	Where discussed in approval documentation and whether the change is consistent
1	Airport interchange Airport interchange revised to a free flow directional interchange.	During the 20% detailed design stage a value management exercise was carried out that resulted in a directional interchange that offered greater efficiency and improvements in functionality and safety of the interchange.	Section 5.10 of the Project EIS describes intersections and interchanges and includes a description of the Airport Interchange. An artist's impression of the Airport Interchange is presented in Figure 5-7 of the Project EIS. The proposed change is considered consistent with the intention of the Airport Interchange described in the Approved Project documentation.
2	Single point interchange at Elizabeth Drive Introduction of a single point interchange at Elizabeth Drive with entry and exit ramps connecting the Airport Access Road and Elizabeth Drive.	As a result of stakeholder and community feedback on the Amendment Report, and consultation with Traffic Management Centre (TMC), TfNSW committed to investigating opportunities to provide additional connectivity between Elizabeth Drive and the M12 Motorway at the WSIA entry. The interchange provides connectivity between the M12 Motorway and Elizabeth Drive via the Airport Access Road and subsequent improvements to safety for road users.	Section 5.11.1 of the Project EIS states that ' <i>The full integration of the Elizabeth Drive design and airport access intersection would be considered as part of the Western Sydney Airport design.</i> ' The proposed change is considered consistent with the intention of the Elizabeth Drive and the Airport Access Road intersection described in the approved project documentation.
3	Airport Access Road Realignment of all ramps on the Airport Access Road between the Airport Interchange and the Elizabeth Drive Interchange.	Braided ramps were developed during design development to facilitate all movements between the Airport Interchange and Elizabeth Drive. The change provides safety by improving lane continuity, removing weaving and creating acceptable distances between decision points for drivers.	The Airport Access Road is discussed in the following section in the Approved documents: <ul style="list-style-type: none"> • Section 5.6 of the Project EIS describes the alignment of proposed roads • Section 5.10.2 of the Project EIS describes intersections and interchanges including exit and entry ramps to the Airport Access Road • Section 5.11.1 of the Project EIS describes road intersections and upgrades

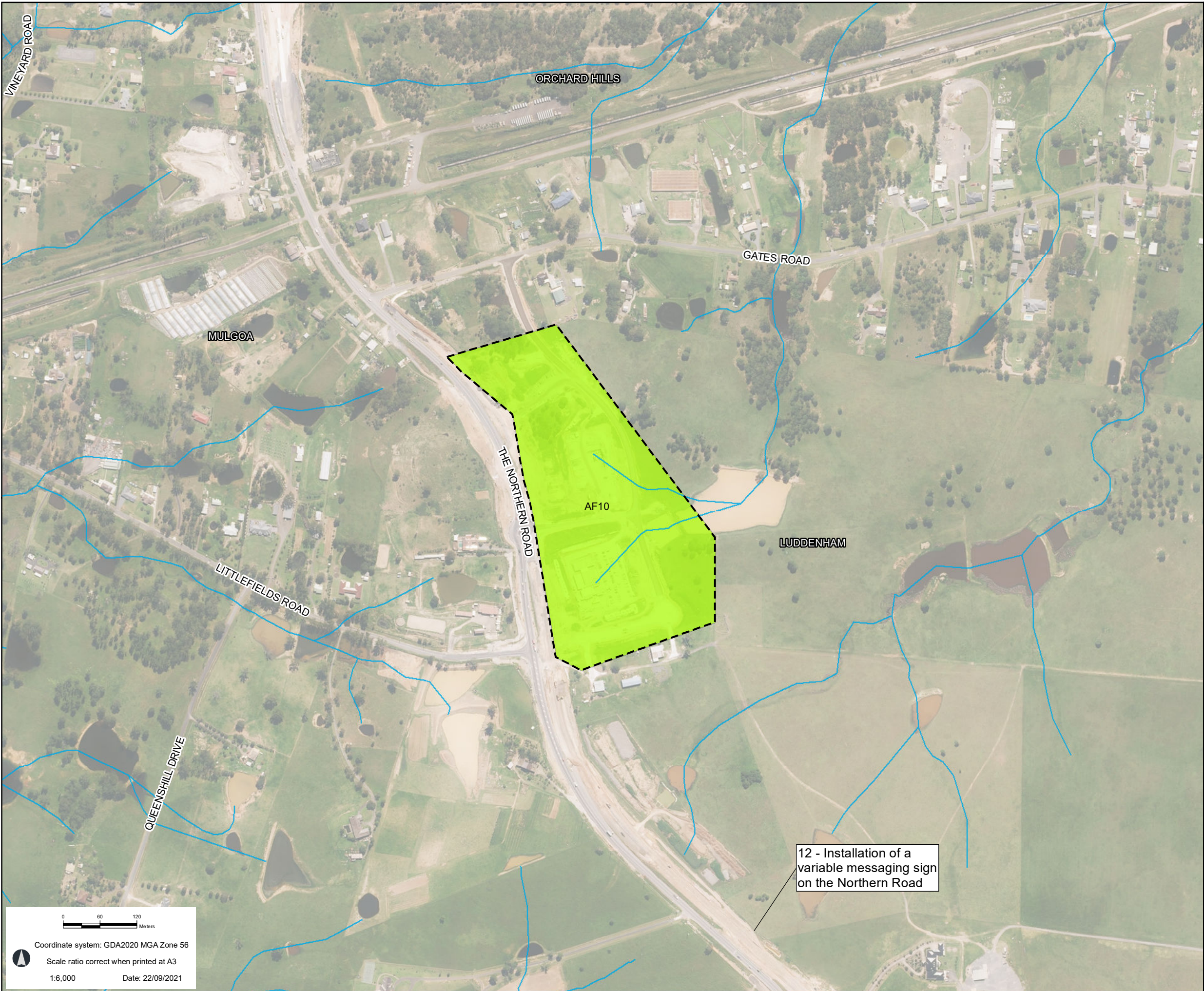
ID	Proposed change	Justification	Where discussed in approval documentation and whether the change is consistent
			<ul style="list-style-type: none"> Section 5.12 of the Project EIS describes the proposed bridges and Table 5-6 of the Project EIS describes bridges. <p>The proposed change is considered consistent with the intention of the Airport Access Road described in the approved project documentation.</p>
4	Removal of signalised intersection on Elizabeth Drive Replacement of the signalised intersection, west of Airport Access Road, with a left-in, left-out arrangement into the WSIA.	Proximity of signalised intersection to the Elizabeth Drive single point interchange was not feasible from a traffic perspective. A signalised intersection further to the west, outside the M12 Motorway - West Package 80% detailed design construction and operational footprints, will provide access into the future Business Park property to the north of Elizabeth Drive. This is outside the scope of the M12 project and would be delivered as part of the Elizabeth Drive Upgrade project.	Section 5.11.1 of the Project EIS describes road intersections and upgrades including Elizabeth Drive. The proposed change is considered consistent with the intention of the Elizabeth Drive intersection described in the approved project documentation.
5	Additional water quality basins and amendments Four new construction basins and modification to one operational basin.	Further flood modelling of the design was carried out as required in the approval documents: Table 7-1 AR submission report states: <i>REMM F01 'Further flood investigations and hydrological and hydraulic modelling will be carried out during detailed design to ensure the flood immunity objectives and design criteria for the project are met.'</i> The water quality basin amendments were required to facilitate design changes ID 1, 2 and 3.	Section 5.13.2 of the Project EIS outlines the proposed locations of permanent water quality basins and are shown in Figure 5-1. Section 6.9.4.2 of the Amendment Report describes the position of operational drainage basins. The proposed change is considered consistent with the intention of the water quality basins described in the approved project documentation.

ID	Proposed change	Justification	Where discussed in approval documentation and whether the change is consistent
6	Changes to the drainage infrastructure on Luddenham Road Culverts and open channel design at the new property access to LOT26, DP6044586 at Luddenham Road.	To mitigate flood impacts to meet the Conditions of Approval.	Section 5.13.1 of the Project EIS describes the drainage and stormwater management infrastructure. Drainage infrastructure at Luddenham Road is not specifically described. The proposed change is considered consistent with the provision of drainage infrastructure for the project as described in the approved project documentation.
7	Changes to the drainage infrastructure to integrate with other infrastructure Substantial changes to cross drainage on Elizabeth Drive and the Airport Access Road to integrate with the SMWSA, WSIA and the Elizabeth Drive future upgrade.	The design was refined to facilitate design change IDs 1, 2 and 3 and comply with flood and afflux criteria. The culverts around Elizabeth Drive and the intersection with the Airport Access Road have been designed to interface with the SMWSA and to minimise flood impacts in the Probable Maximum Flood south of Elizabeth Drive in the WSIA and at the eastern tie-in with the existing road at Badgerys Creek.	Section 5.13.1 describes the drainage and stormwater management infrastructure. Drainage infrastructure interfacing with other projects and Elizabeth Drive is not specifically described. Section 7.8.5 of the Project EIS describes cumulative flooding impacts interfacing with other projects. The proposed change is considered consistent with the provision of drainage infrastructure to integrate with other infrastructure as described in the approved project documentation.
8	Local access roads Local access roadways provided under new southern and northern spans of BR20, SMWSA Bridge over M12 and haul road access across the northern extremity of BR20 within the SMWSA corridor.	To provide local road access across the SMWSA Line during construction.	Section 7.2.6 of the EIS describes the impacts on local roads and access. The Project EIS does not specifically discuss access roads integrating with other projects during construction. However the change is considered consistent with the provision of local access roads for construction traffic access as described in the approved project documentation.
9	Bridge reconfiguration Reconfiguration of bridge BR02 over Cosgroves Creek.	Impacts to the aquatic environment in Cosgroves Creek have been minimised. The 80% detailed design removes the requirement to adjust or realign Cosgroves Creek and minimises in stream impacts by increasing the bridge span lengths enabling	Section 5.12 and Table 5-6 of the Project EIS describe the proposed bridges including the Cosgroves Creek bridge. An example of this structure is presented in Figure 5-11 of the Project EIS.

ID	Proposed change	Justification	Where discussed in approval documentation and whether the change is consistent
		the bridge piers to be located further away from the main creek alignment and changed to higher up the creek bank.	The proposed change is considered consistent with the intention of the provision of a bridge over Cosgroves Creek as described in the approved project documentation.
10	Bridge reconfiguration Realigned bridge BR05 at Badgerys Creek to the southern side of the road corridor.	Impacts to the aquatic environment in Badgerys Creek have been minimised. The 80% detailed design removes the requirement to adjust or realign Badgerys Creek and minimises in stream impacts by increasing the bridge span lengths enabling the bridge piers to be located further away from the main creek alignment and changed to higher up the creek bank. The bridge piers have also been orientated on a skew to align with the creek in order to minimise disruption to creek flows and fish passage.	Section 5.12 and Table 5-6 of the Project EIS describe the proposed bridges including the Badgerys Creek bridge. An example of this structure is presented in Figure 5-11 of the Project EIS. The proposed change is considered consistent with the intention of the provision of a bridge over Badgerys Creek as described in the approved project documentation.
11	Elizabeth Drive relocation Relocation of Elizabeth Drive east of the Airport Access Road to the north by approximately 10 metres at the single point interchange.	Facilitate single phase construction of bridges to suit SMWSA construction program requirements.	Section 5.11.1 of the Project EIS describes the road intersections and upgrades including Elizabeth Drive. The proposed change is considered consistent with the intention of Elizabeth Drive as described in the approved project documentation.
12	Additional Variable Messaging Sign (VMS) Additional VMS on the southbound carriageway of The Northern Road.	The design was reviewed following a request from TfNSW Traffic Management Centre (TMC) following TMC safety review as part of their incident management requirements. Additional signage required to direct incoming traffic from south and northbound towards M12.	Section 5.16 and 5.17 of the Project EIS outline the projects signage provisions. The proposed change is considered consistent with the intention of providing the required signage in the form of VMS as described in the approved project documentation.

ID	Proposed change	Justification	Where discussed in approval documentation and whether the change is consistent
13	Elizabeth Drive and Business Park East intersection reconfiguration The northern leg of the Elizabeth Drive and Business Park East intersection amended to a stub intersection.	To tie-in with internal Airport road south of the temporary roundabout.	Section 5.11.1 of the Project EIS describes the road intersections and upgrades and describes the configuration of Elizabeth Drive, however it does not specifically describe the Elizabeth Drive and Business Park East intersection. The proposed change is considered consistent with the intention of the Elizabeth Drive intersection as described in the approved project documentation.
14	Airport Access Road extension Extension of Airport Access Road and south facing ramps and tie into WSIA internal road network.	Subject to land access agreement between TfNSW and Western Sydney Airport Corporation, M12 would design, build and operate ramps that sit within Western Sydney International Airport land.	Section 5.11.1 of the Project EIS describes road intersections and upgrades. The proposed change is considered consistent with the intention of the Airport Access Road extension and the land access being subject to agreement between TfNSW and Western Sydney Airport Corporation as described in the approved project documentation.
15	Addition of emergency crossovers between Airport Interchange and Elizabeth Drive.	In consultation with Traffic Management Centre (TMC) the design was reviewed and additional crossovers were identified to improve incident management. The refined spacing of the existing crossovers would reduce the interval lengths and improve motorway safety.	Section 5.18 of the Project EIS details emergency or incident facilities. Figure 5-1 illustrates the proposed locations of emergency cross overs and breakdown bays. The proposed change is considered consistent with the intention of providing emergency crossovers between the Airport interchanges and Elizabeth Drive as described in the approved project documentation.
16	<i>Design change removed from Consistency Assessment scope as the change was considered no longer necessary</i>		
17	Electrical easement and points of supply extensions Extension of existing Endeavour Energy Low Voltage mains requiring easements that extend beyond the	This adjustment to the M12 Motorway construction footprint was required to accommodate low voltage power supply to ITS and Lighting across the project.	Section 5.20 of the Project EIS describes utility services located within or near the proposed operational and construction footprint. The Project EIS describes high and low voltage transmissions and distribution lines.

ID	Proposed change	Justification	Where discussed in approval documentation and whether the change is consistent
	M12 EPBC boundary. Assets to be installed by Endeavour Energy.		The proposed change is considered consistent with the intention of power supply and connection as described in the approved project documentation.
18	Construction and operational footprint changes.	As a result of design changes noted in IDs 1-17.	<p>The approved operational and construction boundaries are provided in the AR Submissions Report in Figure 5-2 and Figure 5-3.</p> <p>The proposed changes to construction and operational footprint changes are considered consistent with the description in the approved project documentation.</p>
19	Farm dam yield analysis shows impacts to two additional farm dams.	Condition of Approval E15 issued after the commencement of detailed design requires farm dam yield analysis for affected dams.	<p>Section 5.24.9 of the Project EIS describes the drainage works for the project including farm dam de-watering and infilling and states full or partial impacts to up to 15 dams. The impacts to farm dams are discussed in Section 7.8.4 of the Project EIS.</p> <p>The proposed change to farm dams as described in the approved project documentation is considered consistent.</p>
20	Addition of Sydney Water potable water main crossings	Required to accommodate future utilities for a neighbouring Sydney Water project. Culverts would be provided under the main carriageway during construction enabling utilities to be installed without the need to construct under the completed motorway.	<p>Sydney Water potable water main crossing are a new element to project.</p> <p>Table 5-10 in Section 5.20 of the Project EIS describes potential utility modifications, protection measures and relocations including Sydney Water assets.</p> <p>The proposed change is considered consistent with the intention of water connections as described in the approved project documentation.</p>

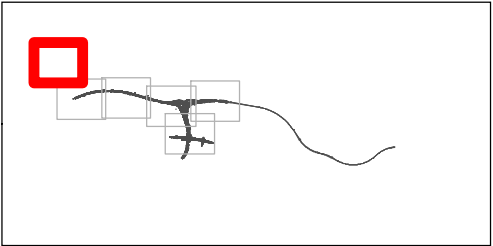


M12 Motorway - West Package
Consistency Assessment

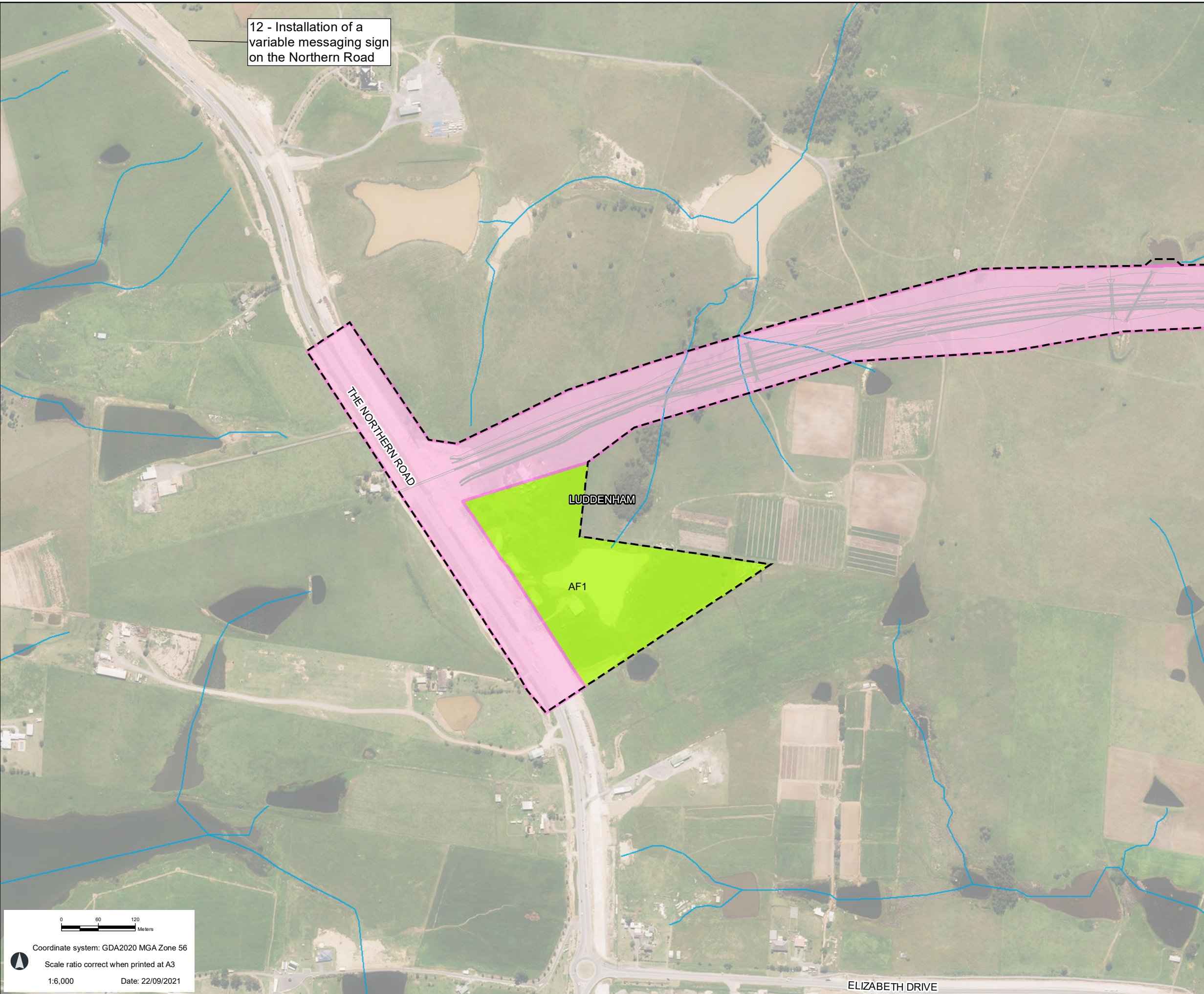
Figure 2-1
Sheet 1
Overview of proposed changes
to the M12 Motorway - West Package

Legend

- Proposed project M12 Motorway - West Package 80% detailed design construction footprint (July, 2021)
- Proposed project M12 Motorway - West Package 80% detailed design operational footprint (July, 2021)
- Ancillary facility
- M12 Motorway - West Package 80% detailed design (May, 2021)
- Bridge
- Water quality basin
- Waterways



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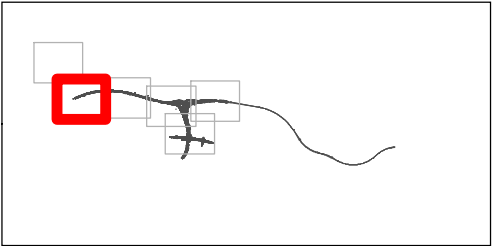


M12 Motorway - West Package
Consistency Assessment

Figure 2-1
Sheet 2
Overview of proposed changes
to the M12 Motorway - West Package

Legend

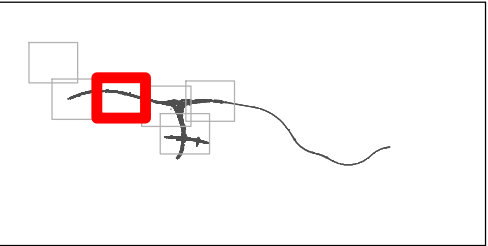
- Proposed project M12 Motorway - West Package 80% detailed design construction footprint (July, 2021)
- Proposed project M12 Motorway - West Package 80% detailed design operational footprint (July, 2021)
- Ancillary facility
- M12 Motorway - West Package 80% detailed design (May, 2021)
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- Water quality basin
- Waterways



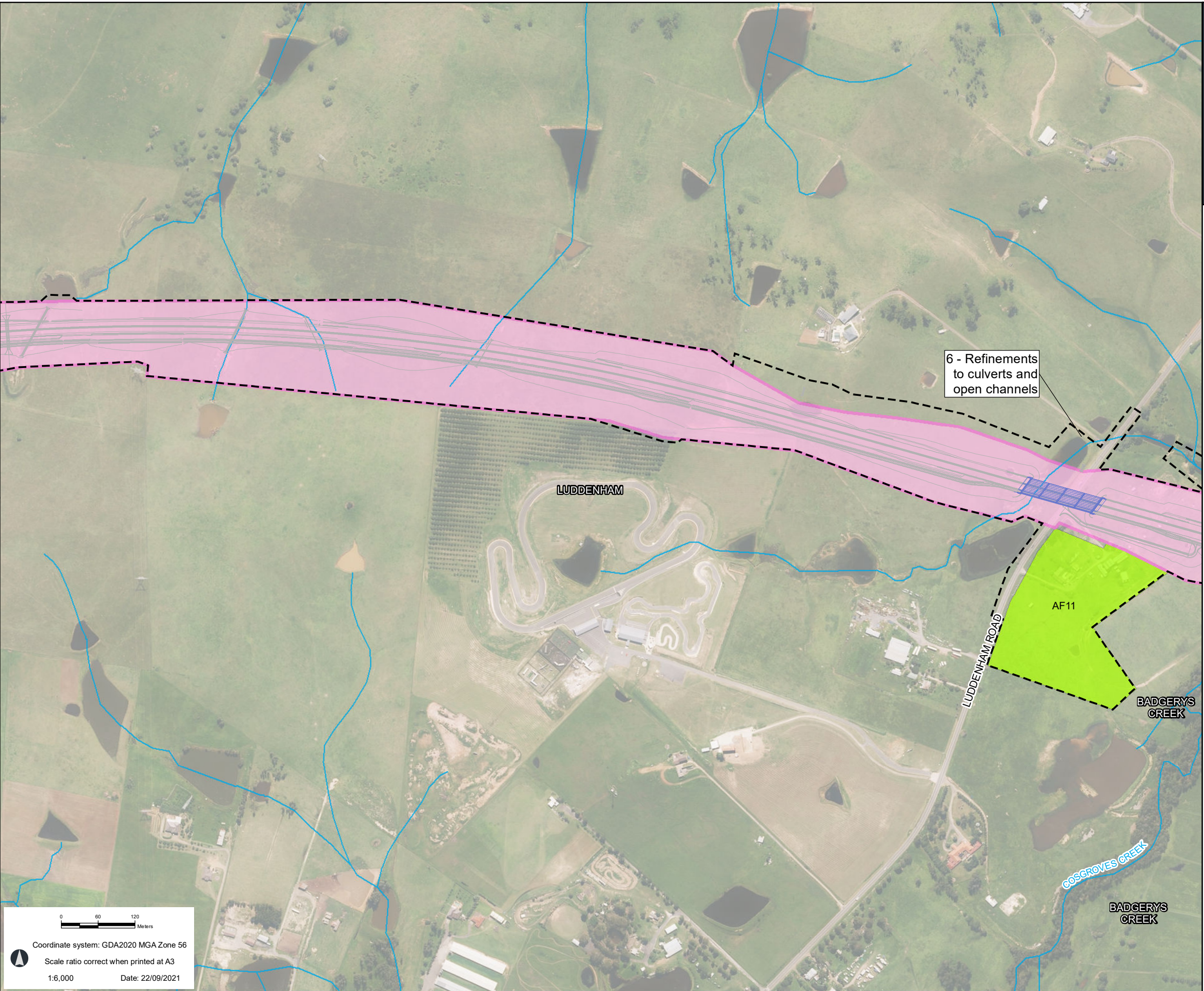
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Figure 2-1
Sheet 3
Overview of proposed changes
to the M12 Motorway - West Package

- Legend**
- Proposed project M12 Motorway - West Package 80% detailed design construction footprint (July, 2021)
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 - Bridge
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 - Waterways



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Meters

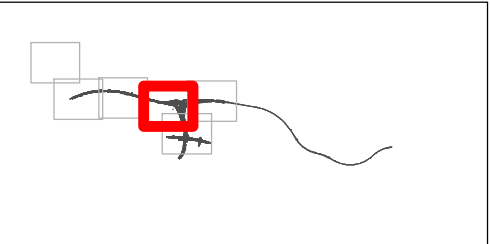
Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A3

1:6,000 Date: 22/09/2021

Legend

- Proposed project M12 Motorway - West Package 80% detailed design construction footprint (July, 2021)
- Proposed project M12 Motorway - West Package 80% detailed design operational footprint (July, 2021)
- Ancillary facility
- M12 Motorway - West Package 80% detailed design (May, 2021)
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- Waterways



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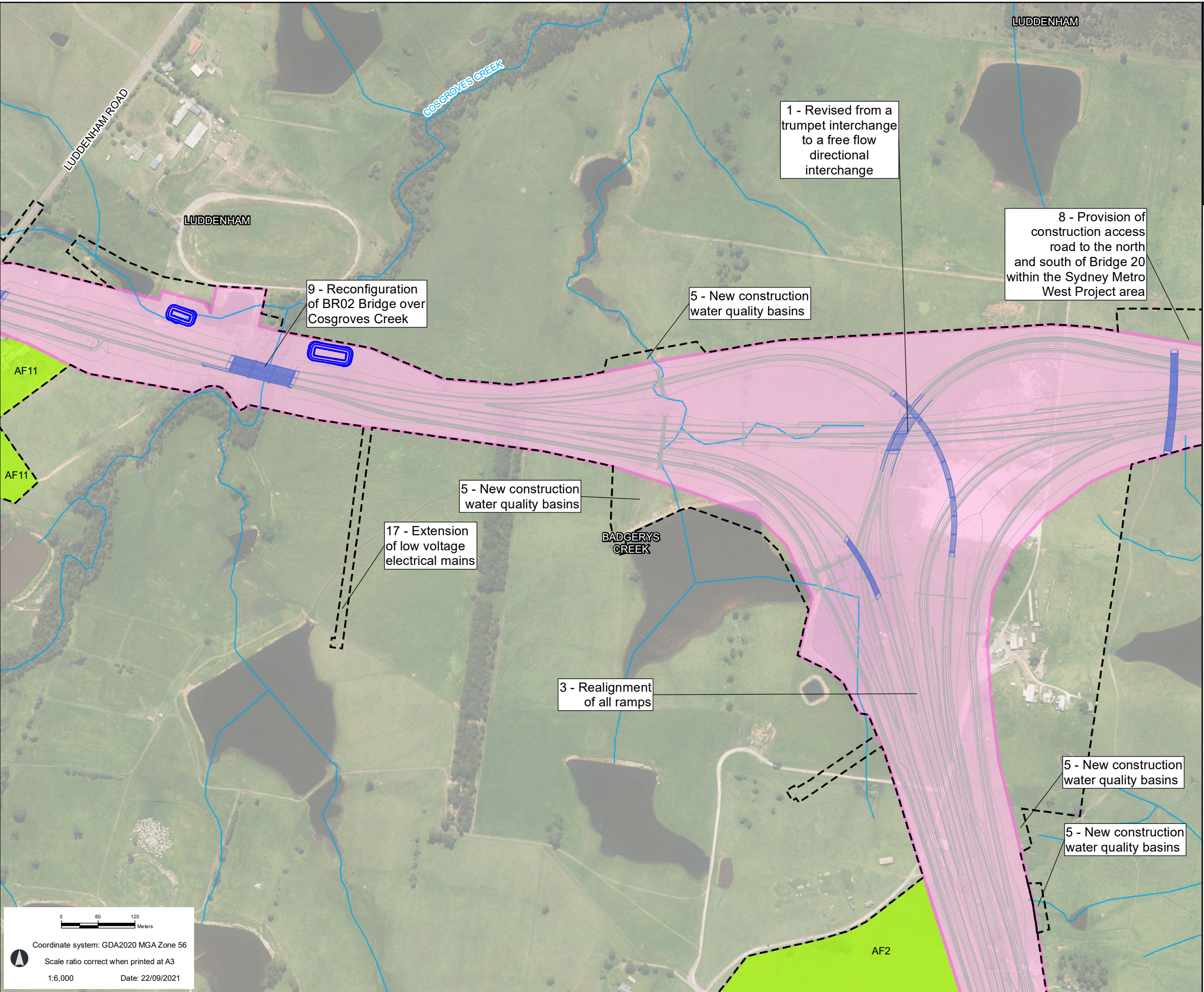
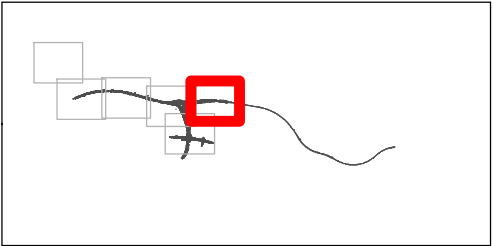


Figure 2-1
Sheet 5
Overview of proposed changes
to the M12 Motorway - West Package

Legend

- Proposed project M12 Motorway - West Package 80% detailed design construction footprint (July, 2021)
- Proposed project M12 Motorway - West Package 80% detailed design operational footprint (July, 2021)
- Ancillary facility
- M12 Motorway - West Package 80% detailed design (May, 2021)
- Bridge
- Water quality basin
- Waterways



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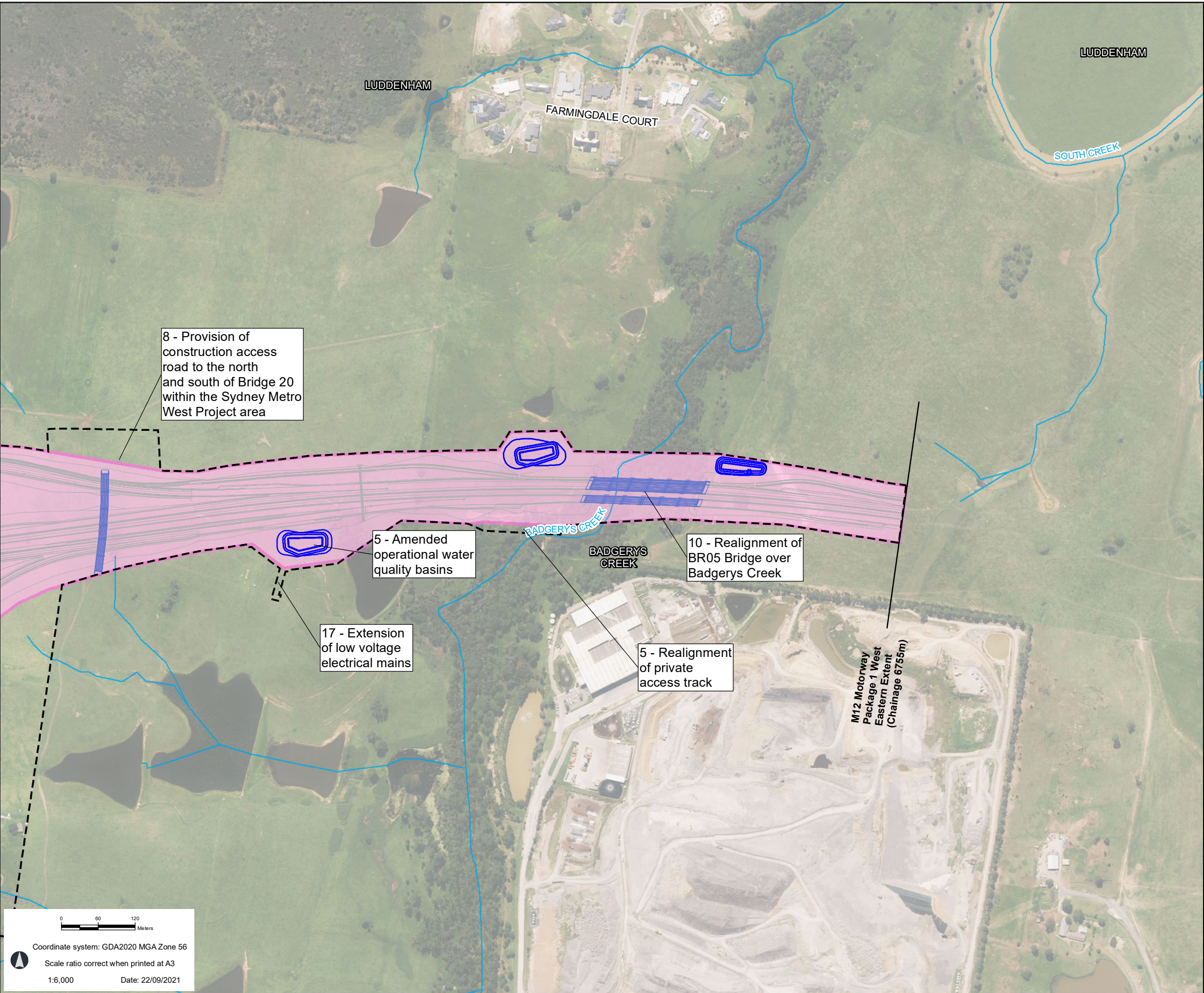
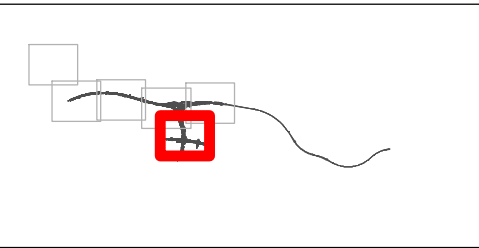


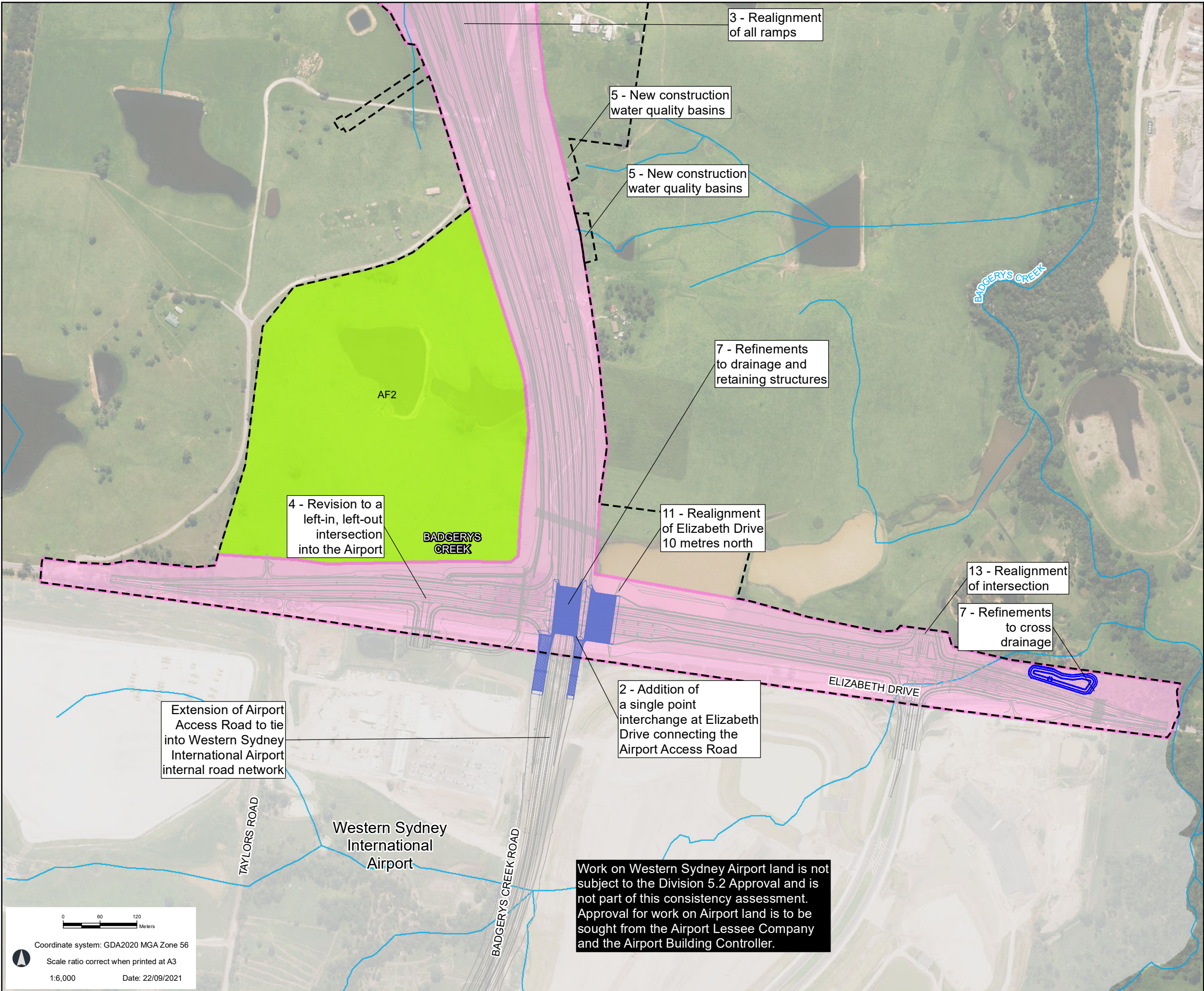
Figure 2-1
Sheet 6
Overview of proposed changes
to the M12 Motorway - West Package

Legend

- Proposed project M12 Motorway - West Package 80% detailed design construction footprint (July, 2021)
- Proposed project M12 Motorway - West Package 80% detailed design operational footprint (July, 2021)
- Ancillary facility
- M12 Motorway - West Package 80% detailed design (May, 2021)
- Bridge
- Water quality basin
- Waterways
- Western Sydney International Airport



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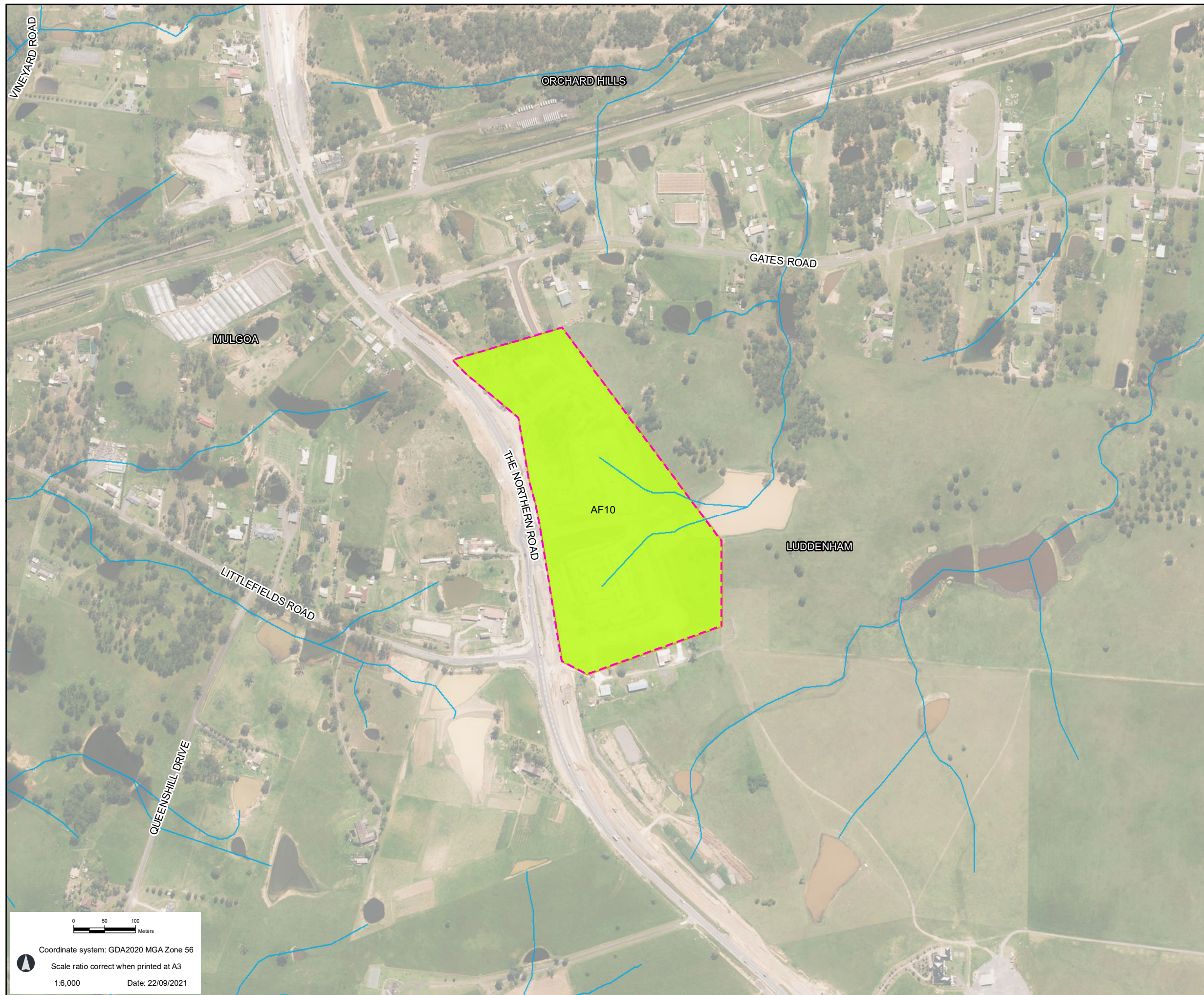


0 60 120 Meters

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A3

1:6,000 Date: 22/09/2021



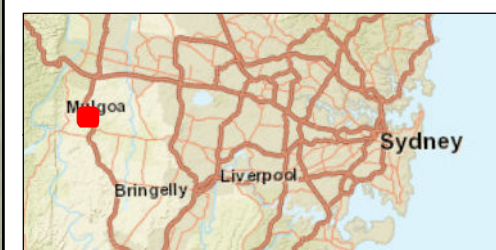
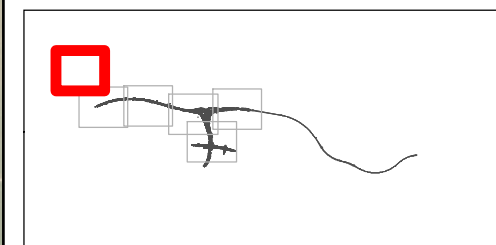
M12 Motorway - West Package Consistency Assessment

Figure 2-2 Sheet 1

Comparison of the M12 Motorway – West
Package Amendment Report Submissions
Report construction footprint with the M12
Motorway – West Package 80% detailed
design construction footprint

Legend

- Proposed project M12 Motorway -
West Package 80% detailed design
construction footprint (July, 2021)
- Approved M12 Motorway - West
Package Amendment Report
Submissions Report construction
footprint (March, 2021)
- Ancillary facility
- Waterways



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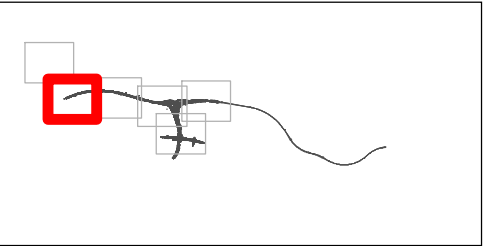
M12 Motorway - West Package
Consistency Assessment

Figure 2-2
Sheet 2

Comparison of the M12 Motorway – West
Package Amendment Report Submissions
Report construction footprint with the M12
Motorway – West Package 80% detailed
design construction footprint

Legend

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0 50 100
Meters

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A3

1:6,000 Date: 22/09/2021



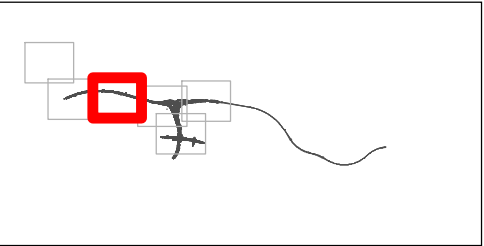
M12 Motorway - West Package
Consistency Assessment

Figure 2-2
Sheet 3

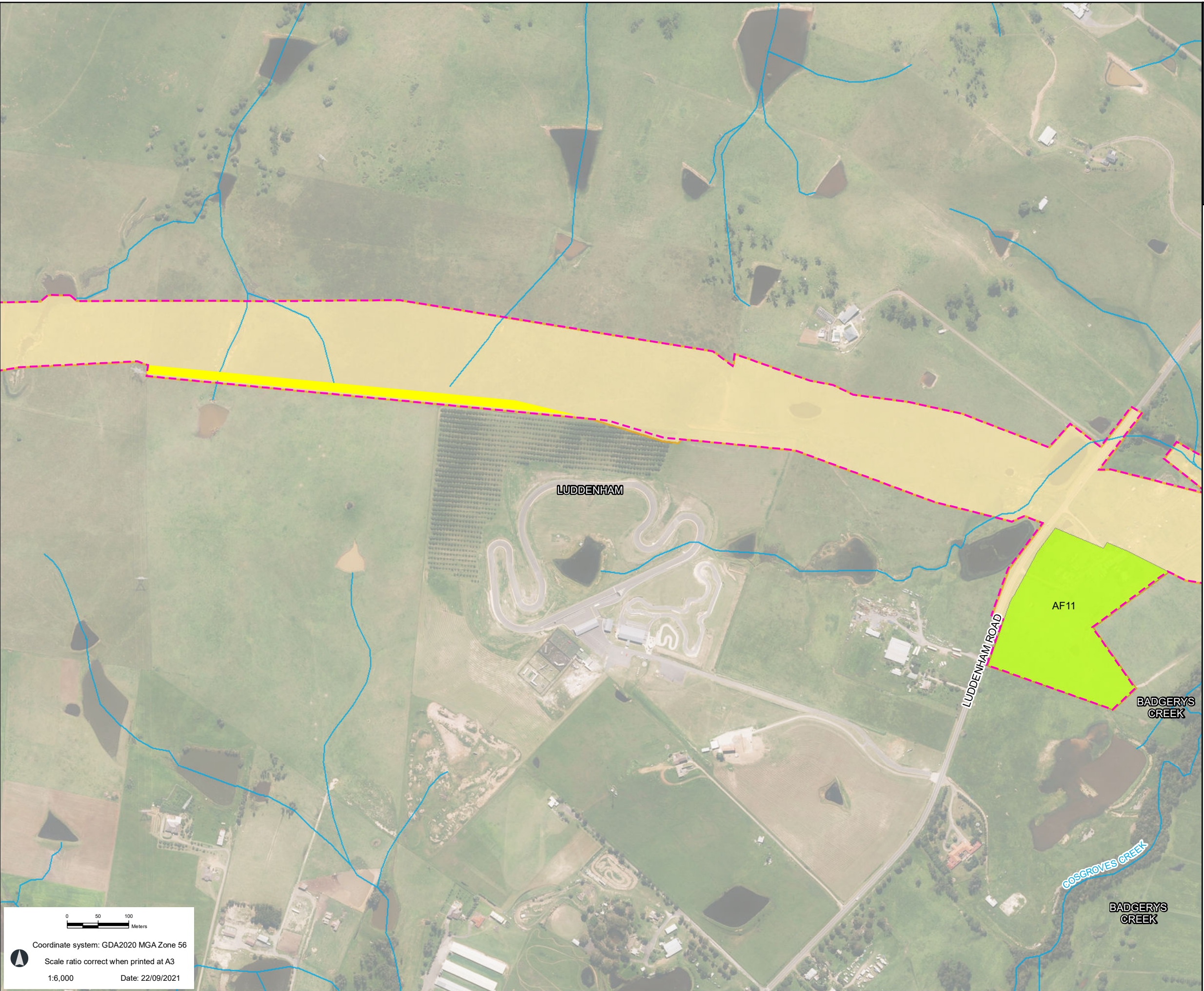
Comparison of the M12 Motorway – West Package Amendment Report Submissions Report construction footprint with the M12 Motorway – West Package 80% detailed design construction footprint

Legend

- Proposed project M12 Motorway - West Package 80% detailed design construction footprint (July, 2021)
- Approved M12 Motorway - West Package Amendment Report Submissions Report construction footprint (March, 2021)
- Ancillary facility
- Exclusion Zone
- Waterways



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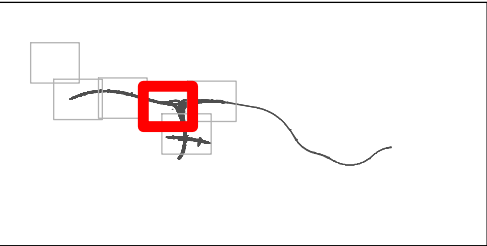
M12 Motorway - West Package
Consistency Assessment

Figure 2-2
Sheet 4

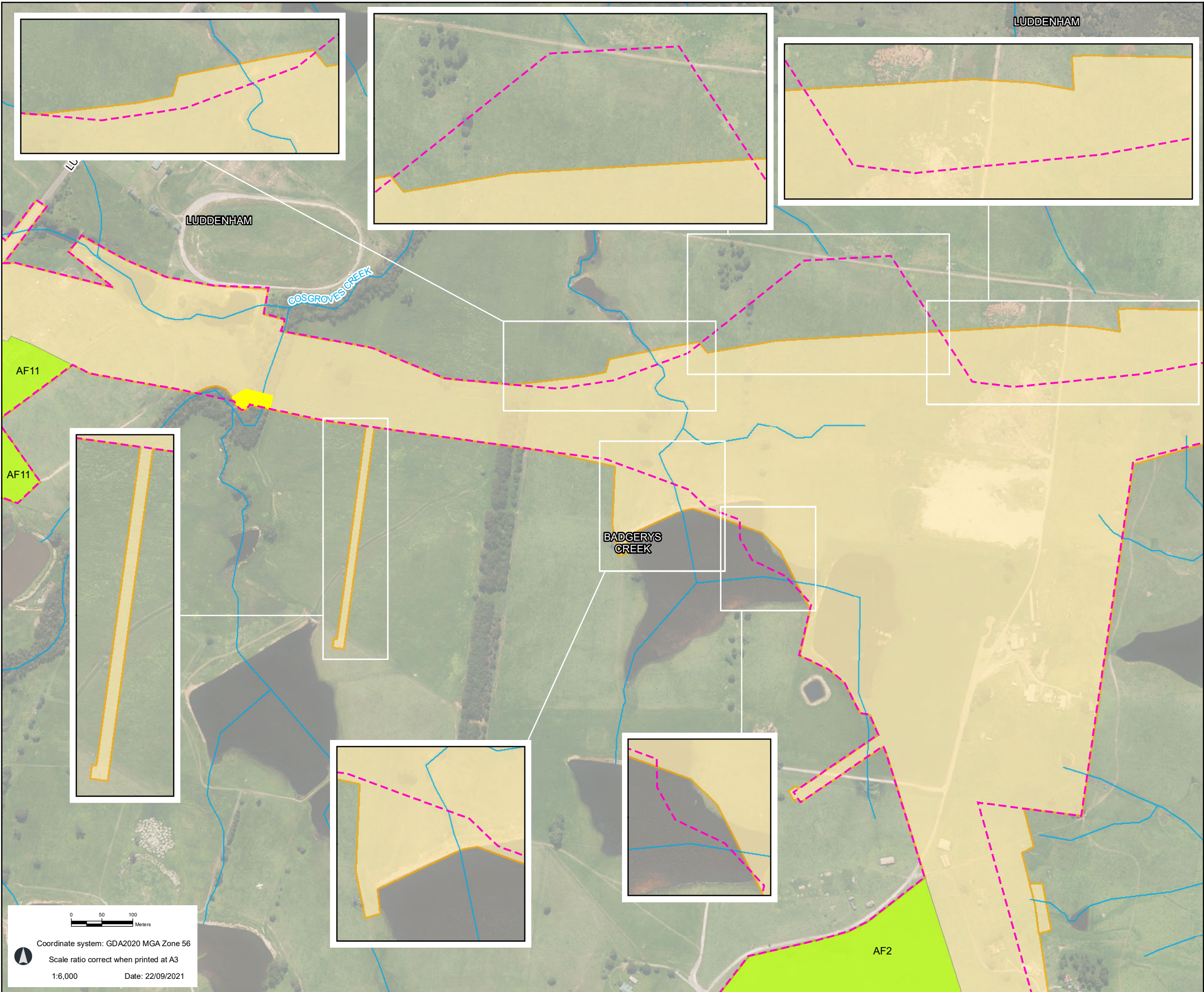
Comparison of the M12 Motorway – West
Package Amendment Report Submissions
Report construction footprint with the M12
Motorway – West Package 80% detailed
design construction footprint

Legend

- Proposed project M12 Motorway -
West Package 80% detailed design
construction footprint (July, 2021)
- Approved M12 Motorway - West
Package Amendment Report
Submissions Report construction
footprint (March, 2021)
- Ancillary facility
- Exclusion Zone
- Waterways



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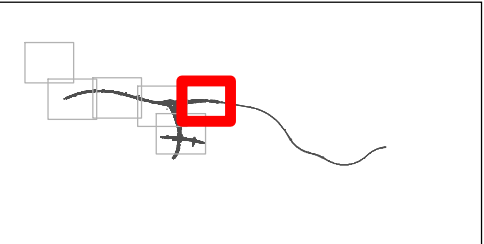
M12 Motorway - West Package
Consistency Assessment

Figure 2-2
Sheet 5

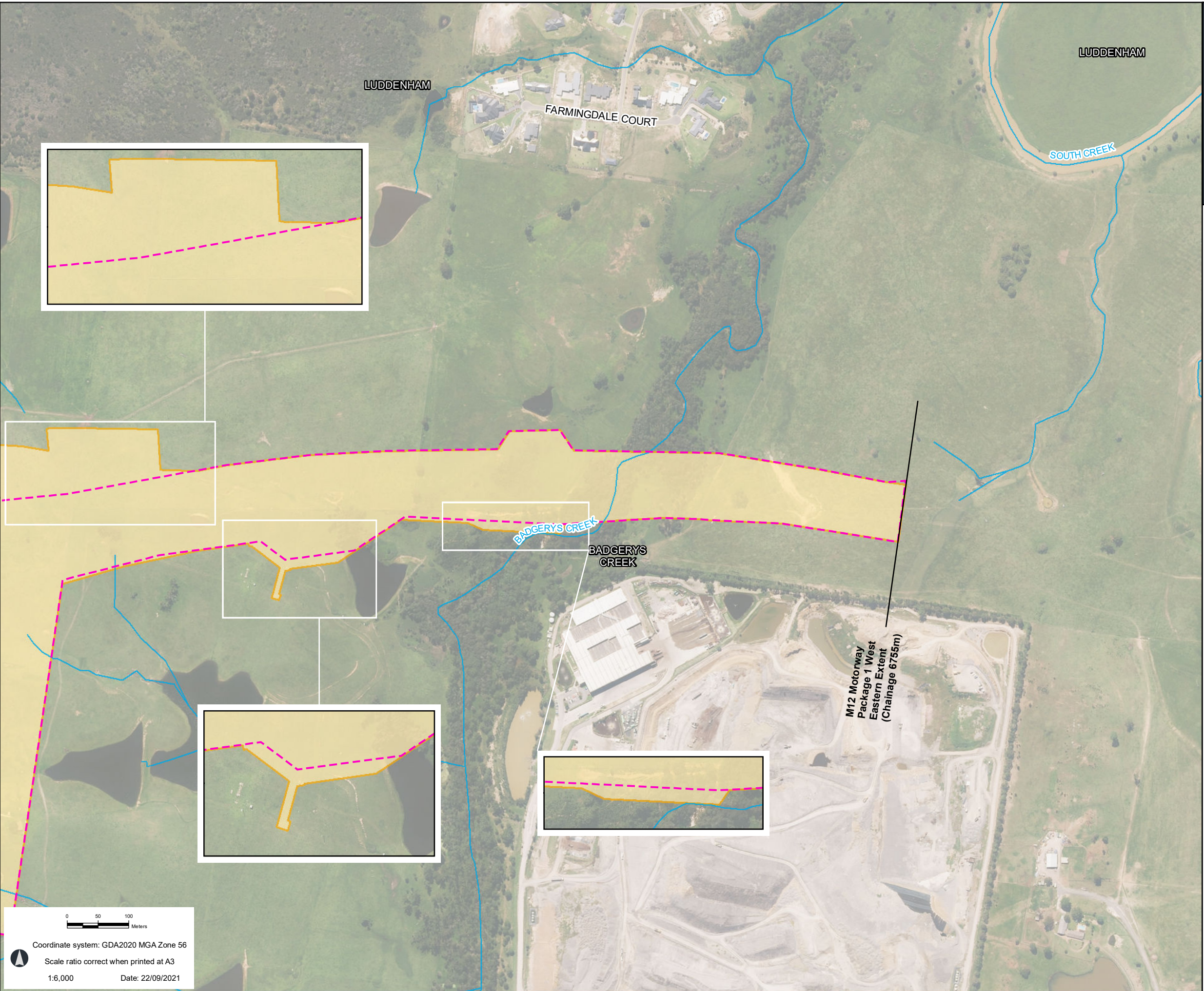
Comparison of the M12 Motorway – West Package Amendment Report Submissions Report construction footprint with the M12 Motorway – West Package 80% detailed design construction footprint

Legend

- Proposed project M12 Motorway - West Package 80% detailed design construction footprint (July, 2021)
- Approved M12 Motorway - West Package Amendment Report Submissions Report construction footprint (March, 2021)
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- Waterways



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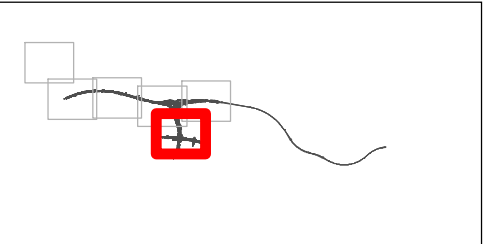
M12 Motorway - West Package
Consistency Assessment

Figure 2-2
Sheet 6

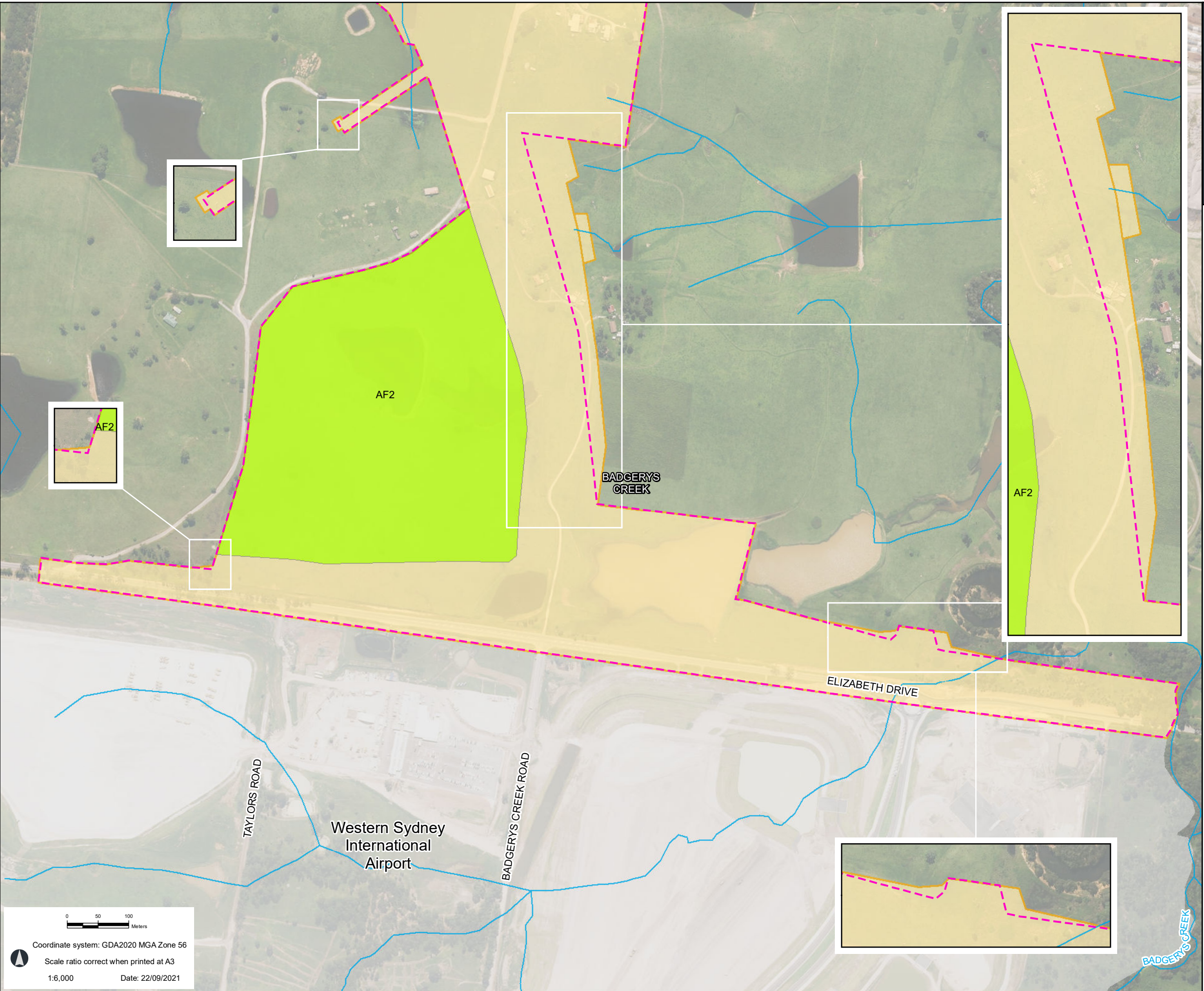
Comparison of the M12 Motorway – West
Package Amendment Report Submissions
Report construction footprint with the M12
Motorway – West Package 80% detailed
design construction footprint

Legend

- Proposed project M12 Motorway -
West Package 80% detailed design
construction footprint (July, 2021)
- Approved M12 Motorway - West
Package Amendment Report
Submissions Report construction
footprint (March, 2021)
- Ancillary facility
- Waterways
- Western Sydney International
Airport



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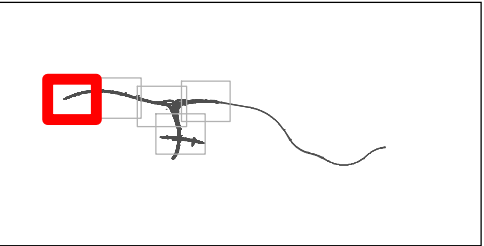
M12 Motorway - West Package
Consistency Assessment

Figure 2-3
Sheet 1

Comparison of the M12 Motorway – West Package Amendment Report Submissions Report operational footprint with the M12 Motorway – West Package 80% detailed design operational footprint

Legend

- M12 Motorway - West Package 80% detailed design operational footprint (July, 2021)
- M12 Motorway - West Package Amendment Report Submissions Report operational footprint
- Waterways



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Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A3

1:6,000 Date: 16/08/2021



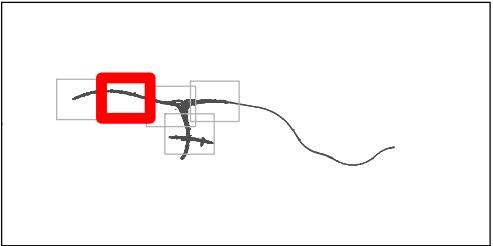
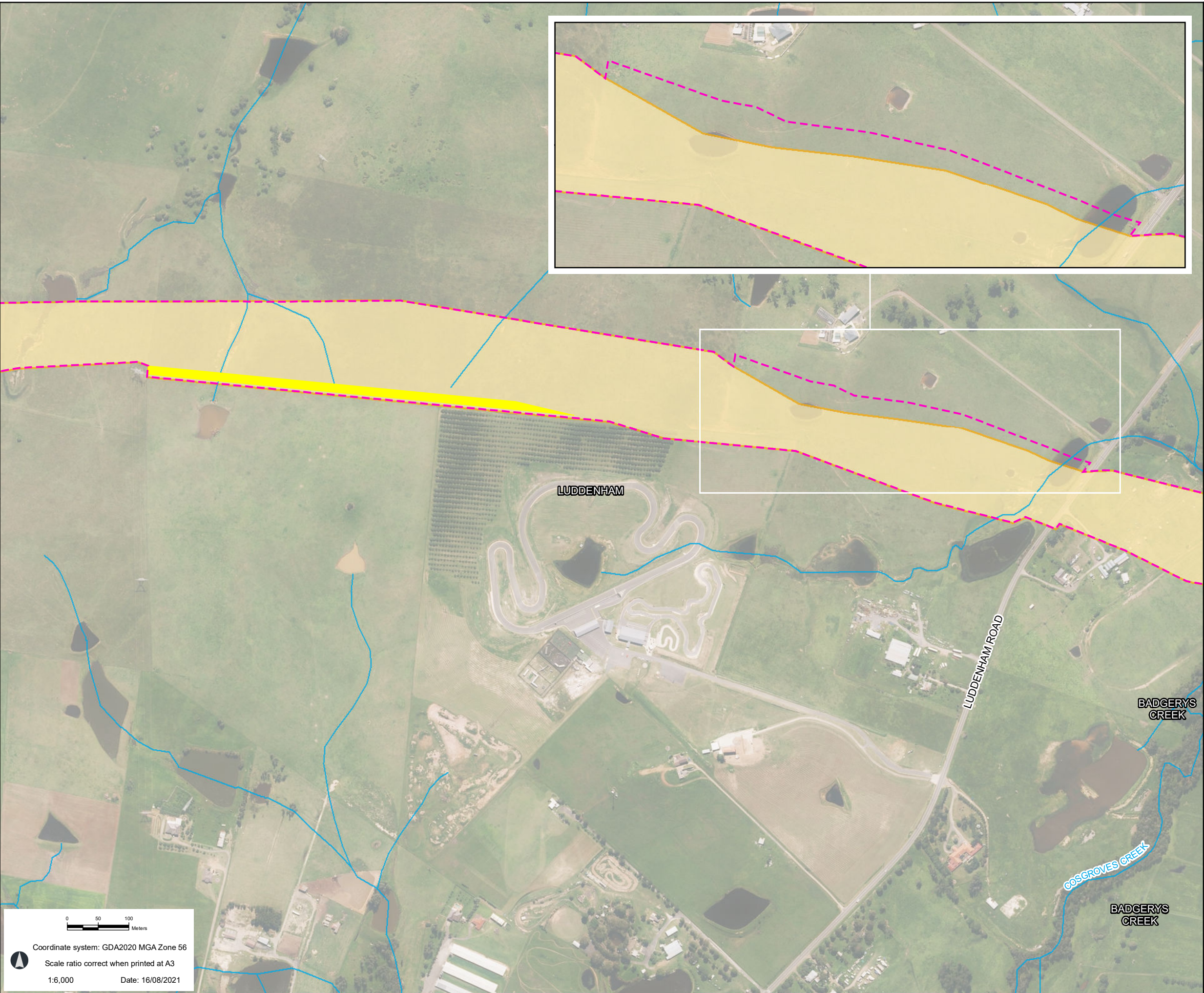
**M12 Motorway - West Package
Consistency Assessment**

**Figure 2-3
Sheet 2**

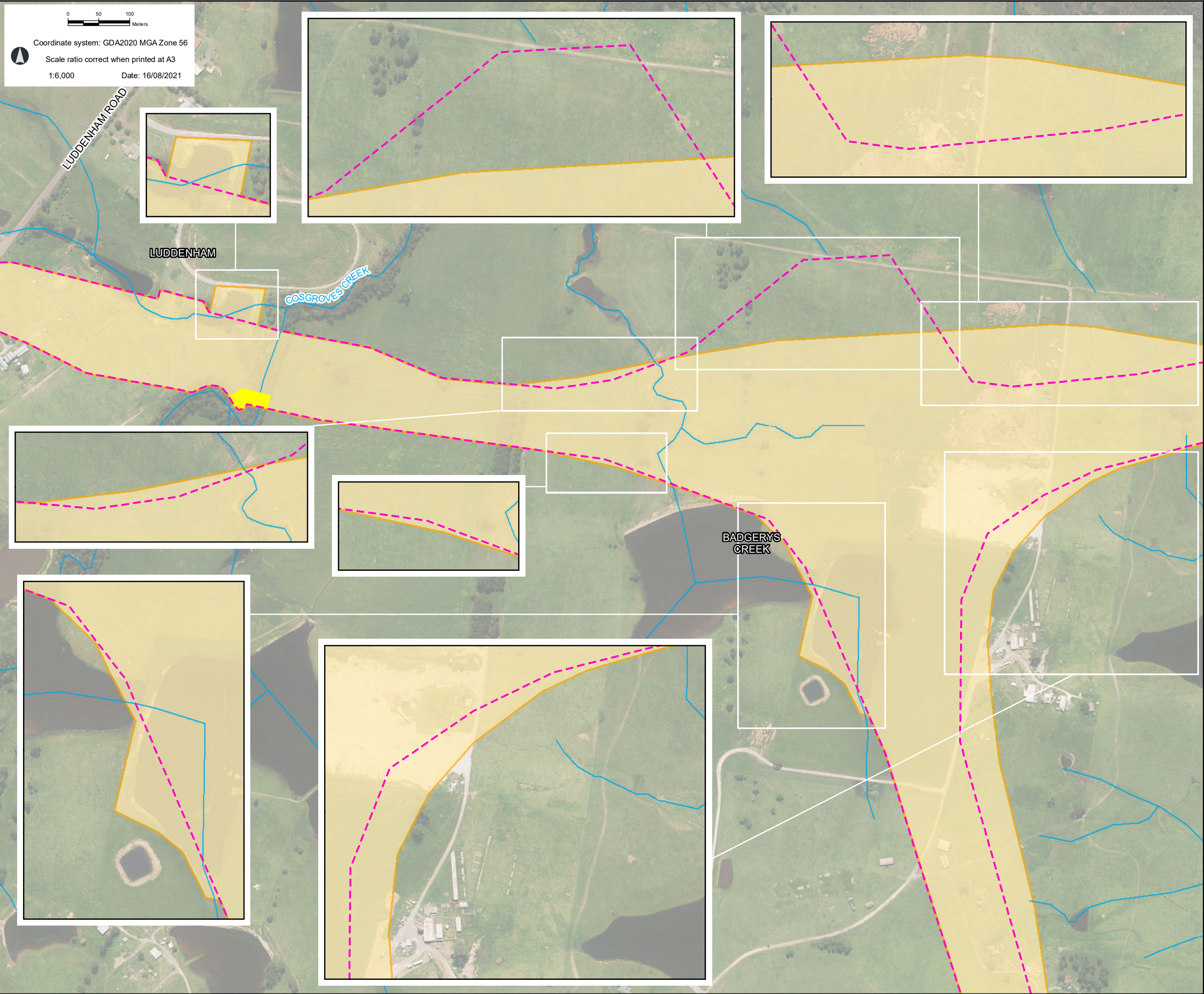
Comparison of the M12 Motorway – West Package Amendment Report Submissions Report operational footprint with the M12 Motorway – West Package 80% detailed design operational footprint

Legend

- M12 Motorway - West Package 80% detailed design operational footprint (July, 2021)
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- Exclusion Zone
- Waterways



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Meters

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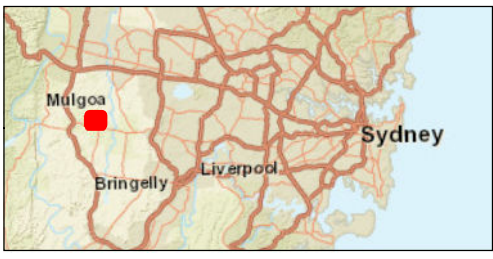
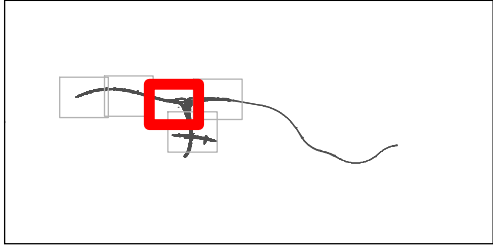


**M12 Motorway - West Package
Consistency Assessment**

**Figure 2-3
Sheet 3**

Comparison of the M12 Motorway – West
Package Amendment Report Submissions
Report operational footprint with the M12
Motorway – West Package 80% detailed
design operational footprint

- Legend**
- M12 Motorway - West Package
80% detailed design operational
footprint (July, 2021)
 - M12 Motorway - West Package
Amendment Report Submissions
Report operational footprint
 - Exclusion Zone
 - Waterways



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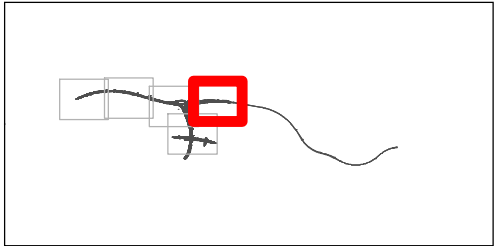
M12 Motorway - West Package
Consistency Assessment

Figure 2-3
Sheet 4

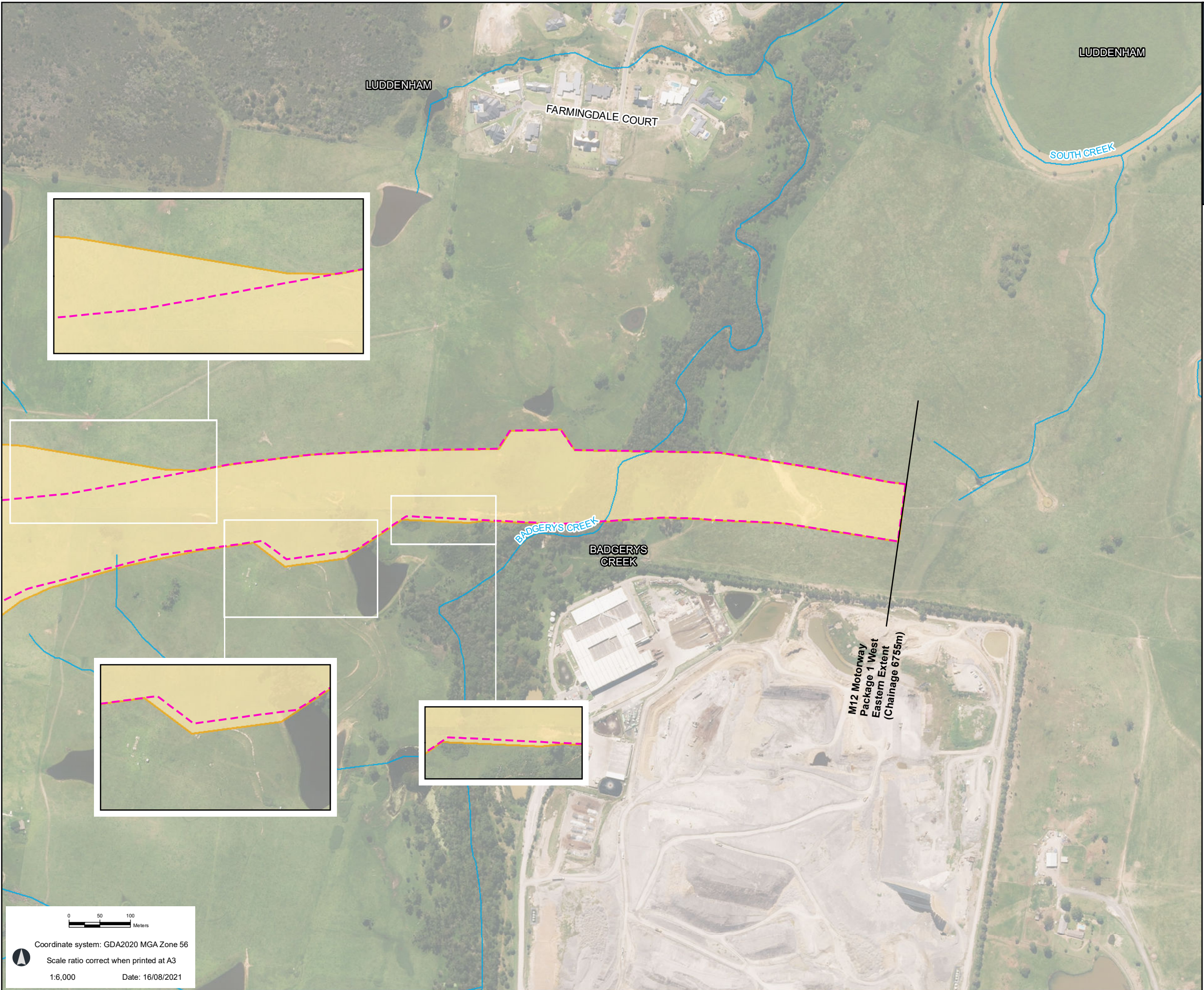
Comparison of the M12 Motorway – West Package Amendment Report Submissions Report operational footprint with the M12 Motorway – West Package 80% detailed design operational footprint

Legend

- M12 Motorway - West Package 80% detailed design operational footprint (July, 2021)
- M12 Motorway - West Package Amendment Report Submissions Report operational footprint
- Waterways



Data sources: - DNRME, TMR, Translink, Geoscience Australia
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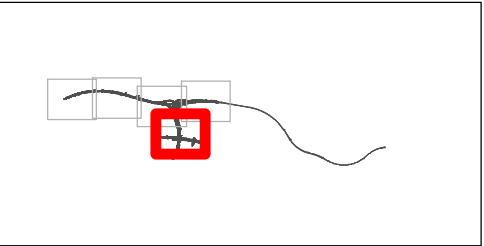
**M12 Motorway - West Package
Consistency Assessment**

**Figure 2-3
Sheet 5**

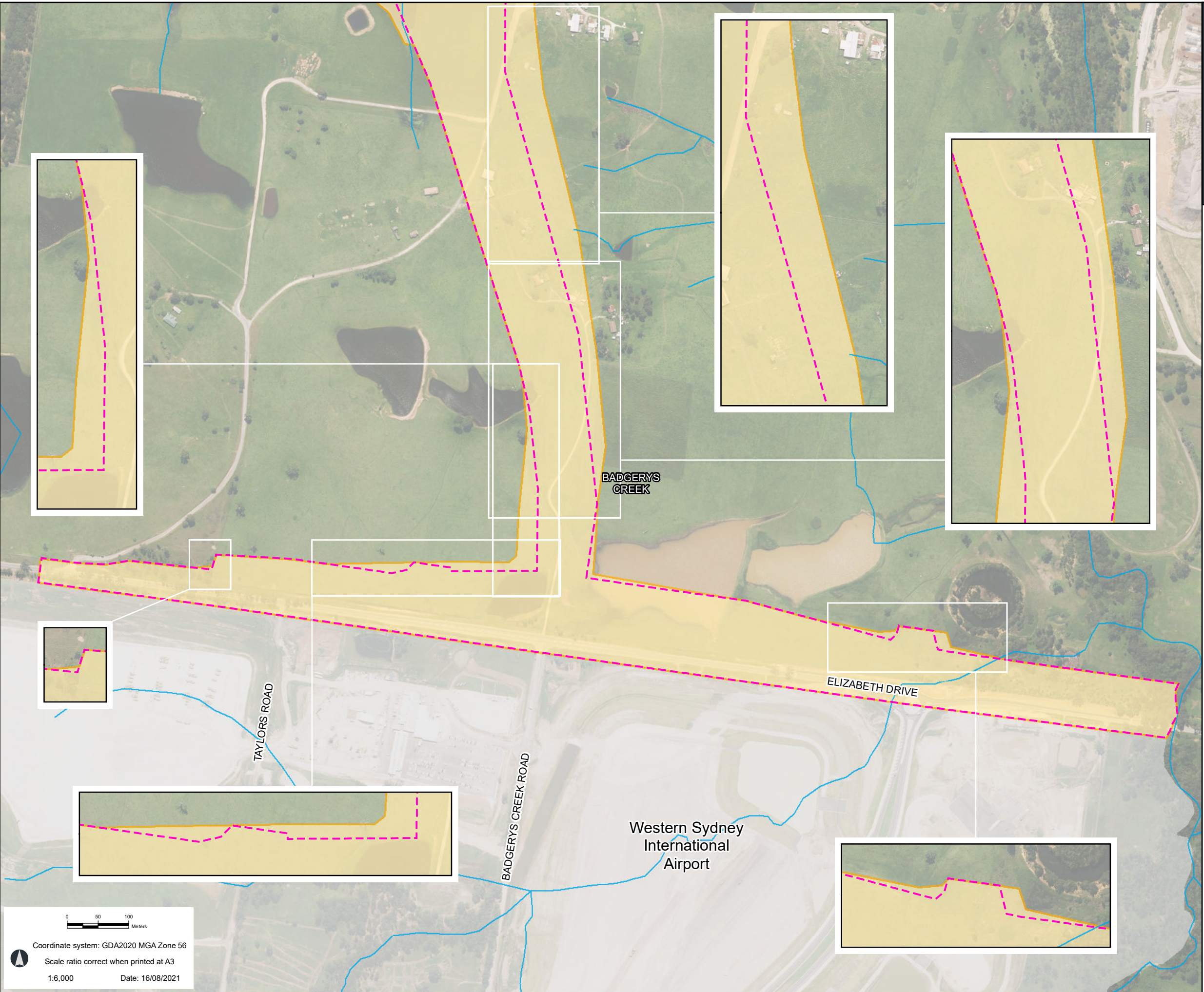
Comparison of the M12 Motorway – West Package Amendment Report Submissions Report operational footprint with the M12 Motorway – West Package 80% detailed design operational footprint

Legend

- M12 Motorway - West Package 80% detailed design operational footprint (July, 2021)
- M12 Motorway - West Package Amendment Report Submissions Report operational footprint
- Waterways
- Western Sydney International Airport



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1:6,000Date: 16/08/2021

2.2 Need

The proposed changes assessed have primarily been derived from detailed design development since the AR Submissions Report. The design development processes included:

- Value engineering carried out at the start of detailed design to review the concept design
- General design review and development process
- Input from TfNSW TMC, following TMC safety review as part of their incident management requirements
- Ongoing consultation with stakeholders such as utility suppliers, WSIA, SMWSA and impacted property owners.

The project objectives presented in the approval documents and considered throughout the design process are:

- Provide sufficient road capacity to meet traffic demand generated by the planned Western Sydney urban development
- Provide a high standard connection to the airport with capacity to meet future freight and passenger needs
- Provide a road which supports and integrates with the broader transport network
- Support the provision of an integrated regional and local public transport system
- Preserve the access function of Elizabeth Drive
- Provide active local transport within the east–west corridor
- Make provision for connection to the future Outer Sydney Orbital.

The Airport interchange revision was derived from a value management exercise, resulting in a directional interchange providing greater efficiency, improved functionality and safety for road users when compared with the intersection layout included in the AR Submissions Report.

As a result of stakeholder and community feedback on the Amendment Report, and consultation with TMC, TfNSW committed to investigating opportunities to provide additional connectivity between Elizabeth Drive and the M12 Motorway at the WSIA entry. The connection was introduced in the form of a single point interchange, which includes entry and exit ramps to Elizabeth Drive. The introduction of the single point interchange provides connectivity between the M12 Motorway and Elizabeth Drive via the Airport Access Road. There are subsequent improvements to safety for road users as a result of lane continuity and reduction of traffic weaving. The intersection to the west of the Elizabeth Drive and Airport Access Road intersection was amended to provide left-in and left-out access to the airport replacing a signalised intersection, which was not feasible so close to the updated Elizabeth Drive and Airport Access Road intersection.

Changes to utility relocations have been applied to facilitate the provision of low voltage power supply to intelligent transport systems (ITS) and lighting across the project.

The changes to the BR02 and BR05 waterway bridges involved realignment of bridge piers and span lengths to reduce the aquatic environmental impacts to Cosgroves and Badgerys Creek.

Design changes have also been implemented to tie into infrastructure projects that interface with the M12 Motorway Project, including the SMWSA and the WSIA. During consultation with TMC, design changes have been implemented in relation to incident management, including emergency crossover bays and ITS infrastructure.

3. Consultation

Consultation on the proposed design changes has been undertaken with WSIA, SMWSA, relevant councils and landowners that would be impacted as a result of the project. Further consultation will be carried out as the detailed design is finalised and to meet the consultation requirements under the Conditions of Approval.

Consultation was also undertaken with Environment, Energy and Science (EES) regarding Planning Approval Condition E6. EES responded on the 1 September 2021 and advised that as the surveys had already been completed that no advice could be provided on the adequacy of any such advice.

4. Environmental assessment

An assessment has been undertaken to compare the environmental impacts of the proposed change relative to the environmental impacts of the project subject to the Division 5.2 Approval and the EPBC Approval. The assessment focuses only on the environmental issues and impacts relevant to the proposed changes. The proposed changes do not result in changes to impacts on socio-economic, soils and contamination, air quality, health and safety, and waste so these aspects have not been considered as part of the assessment. Table 4-1 provides a summary of the environmental assessment of the proposed changes.

Table 4-1 Environmental assessment of the proposed changes

Environmental issue	Consideration of the relative environmental impacts of the proposed modification compared to the Division 5.2 Approval and EPBC Approval
Biodiversity	<p>The proposed changes would result in an overall reduction of about 0.92 hectares of impact to the following plant community types (PCT):</p> <ul style="list-style-type: none"> PCT 849 Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion PCT 850 Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion. <p>The EPBC Act species of concern for the M12 Motorway - West Package are the Grey-headed Flying Fox and Swift Parrot. Impacts to Grey-headed Flying-fox foraging habitat would increase by 0.29 hectares. The impact for Swift Parrot foraging habitat would be reduced by 1.84 hectares.</p> <p>Impacts to the Cumberland Plain Land Snail, endangered under the <i>Threatened Species Conservation Act</i> 1995 (TSC Act) increased by 0.1 hectares. All other threatened species impact is reduced by 0.16 hectares.</p> <p>This change is considered minor and is generally in accordance with the impact outlined in the Project EIS, Amendment Report and AR Submissions Report.</p> <p>The biodiversity assessment is provided in Appendix A and summarised in Section 4.1.</p>
Traffic and transport	<p>The proposed change would not result in substantial changes to the construction and operational traffic assessment presented in the Project EIS, Amendment Report and AR Submissions Report.</p> <p>The traffic and transport assessment is provided in Appendix B and summarised in Section 4.2.</p>
Urban design and visual amenity	<p>The proposed changes would not alter the overall magnitude of the project and therefore the landscape character impact rating and visual impact rating identified in the Project EIS, Amendment Report and AR Submissions Report.</p> <p>The urban design and visual impact assessment is provided in Appendix C and summarised in Section 4.3.</p>
Aboriginal heritage	<p>There are no new Aboriginal heritage items or sites within the additional construction footprint areas. The proposed changes to the construction footprint are considered consistent with areas of impact to previously identified and assessed sites in the Project EIS, Amendment Report and AR Submissions Report.</p> <p>The Aboriginal heritage assessment is provided in Appendix D and summarised in Section 4.4.</p>
Non-Aboriginal heritage	<p>The proposed changes would not result in any additional impacts to the four non-Aboriginal heritage items located within the M12 Motorway - West Package 80% detailed design construction footprint.</p>

Environmental issue	Consideration of the relative environmental impacts of the proposed modification compared to the Division 5.2 Approval and EPBC Approval
	The non-Aboriginal heritage assessment is provided in Appendix E and summarised in Section 4.5.
Noise and vibration	<p>The proposed changes would result in some decreases and increases for construction and operational noise within the M12 Motorway – West Package.</p> <p>It is anticipated that the changes during construction as a result of changes to the construction footprint and road traffic noise would result in negligible changes to noise levels.</p> <p>The changes in operational footprint would lead to a negligible change in noise levels. The receivers identified for noise mitigation in the Approved Project remain the same as the Approved Project.</p> <p>Construction and operational noise impacts will be verified as part of the final noise modelling undertaken for the 100% detailed design in accordance with the Conditions of Approval.</p> <p>The noise assessment is provided in Appendix F and summarised in Section 4.6.</p>
Flooding	<p>There are some residual flood impacts at 100% detailed design however these are considered to be minor and localised in nature.</p> <p>The final drainage design for the detailed design will be developed to ensure performance is consistent with the commitments in the Project EIS, Amendment Report, AR Submissions Report and Conditions of Approval.</p> <p>The flooding impact assessment is provided in Appendix G and summarised in Section 4.7.</p>
Surface water quality and hydrology	<p>The average and total pollutant reductions and water quality are improved by the proposed changes.</p> <p>The surface water quality assessment is provided in Appendix H and summarised in Section 4.8.</p>
Groundwater quality and hydrology	<p>Overall, groundwater inflow and the total take has increased by 3.28 ML/year in the 80% detailed design due to a change in the dimension of the cuts and updated groundwater levels. As the impacts would be localised and not impact the regional groundwater drawdown or flow directions during construction or operation the increase in impacts from the Amendment Report is considered consistent.</p> <p>The groundwater assessment is provided in Appendix I and summarised in Section 4.9.</p>
Socio-economic, land use and property	<p>As described in Section 2.1, the proposed changes would include some increases to the construction and operational project footprints. As a result there is an overall increase in permanent and temporary impacts as a result of the design changes.</p> <p>The M12 Motorway – West Package would impact 12 properties. The design changes do not result in property impacts to any additional properties or landowners that what is assessed in the Amendment Report. However the area of temporary and permanent acquisition for four properties would have additional impacts as a result of the design changes. There is an overall increase of 5.7 hectares for construction and 7.6 hectares for operation. The design changes would not substantially change the construction and operational impacts of the project.</p>
Soils and contamination	The proposed change would not result in substantial changes to the construction and operational soils and contamination assessment presented in the Project EIS, Amendment Report and AR Submissions Report.

Environmental issue	Consideration of the relative environmental impacts of the proposed modification compared to the Division 5.2 Approval and EPBC Approval
Air quality	The design changes would not substantially alter traffic conditions or proximity to sensitive receivers and would therefore be unlikely to substantially alter the air quality impacts during operation.
Health and safety	The proposed changes would not result in substantial changes to the construction and operational health and safety impacts of the project.
Sustainability	The proposed changes would not result in any additional sustainability impacts during the construction and operation of the project.
Waste	Overall, the proposed changes would not substantially alter resource use or waste generation as described in the Project EIS, Amendment Report and AR Submissions Report.
Climate change risk and greenhouse gas	<p>The proposed changes would not result in any significant changes to emission-generating activities during construction as assessed in the Project EIS, Amendment Report and AR Submissions Report and therefore would be unlikely to result in more than a negligible increase in the greenhouse gas emissions during construction and operation.</p> <p>The proposed changes would not result in a change to the climate change risks assessment outlined in the Project EIS, Amendment Report and AR Submissions Report.</p> <p>The climate change risk and greenhouse gas assessment is provided in Section 4.3</p>
Cumulative impacts	The proposed changes assessed would generally be consistent with the outcomes of the Amendment Report and Project EIS. There is a combination of marginally reduced and increased impacts resulting from the proposed changes, which do not significantly increase cumulative impacts.

4.1 Biodiversity

The proposed changes outlined in Section 2.1 have been considered against the outcomes of the biodiversity assessment in the Project EIS and Amendment Report. A Biodiversity Assessment was carried out to assess the change in biodiversity impacts compared to the approved Amendment Report Submissions Report construction and operational footprint. The Biodiversity Assessment is provided in Appendix A and summarised in this section.

4.1.1 Assessment methodology

The assessment methodology involved the following:

- A desktop review and a verification survey was carried out in June 2021, focusing on vegetation and habitat along The Northern Road, Elizabeth Drive and Badgerys Creek areas (Sydney University and Roberts Johns Badgerys Creek Pty Ltd land)
- Revision of vegetation and habitat mapping in accordance with Condition of Approval E5 and E6. During the field survey several areas of mapped native vegetation were refined. Figure 4-1 illustrates the revised vegetation and habitat mapping as a result of the field survey and the comparison between existing mapping provided in the AR Submissions Report to more recent aerial photographs
- Comparison of vegetation calculations between the proposed project M12 Motorway – West Package 80% detailed design construction footprint to the clearing limits approved in the EPBC decision notice

- An updated estimate of impact calculations used to update the Framework for Biodiversity Assessment (FBA) calculator originally prepared for the whole M12 project to recalculate credit obligations.

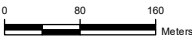
Further detail regarding the assessment methodology is provided in Appendix A.



M12 Motorway - West Package
Consistency Assessment

Figure 4-1
Sheet 1
Revised vegetation mapping for
M12 Motorway - West Package

- Legend**
- Proposed project M12 Motorway - West Package 80% detailed design construction footprint (July, 2021)
 - Approved M12 Motorway - West Package Amendment Report Submissions Report construction footprint (March, 2021)
 - Cadastre
 - Waterways



Coordinate system: GDA2020 MGA Zone 56
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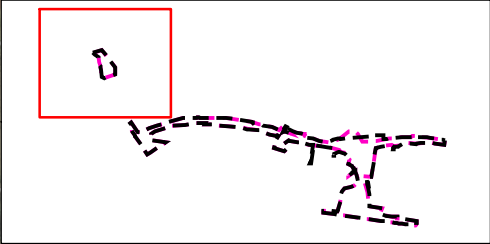


Figure 4-1
Sheet 2
Revised vegetation mapping for
M12 Motorway - West Package

Legend

Proposed project M12 Motorway - West
Package 80% detailed design
construction footprint (July, 2021)

Approved M12 Motorway - West Package
Amendment Report Submissions Report
construction footprint (March, 2021)

Exclusion Zone

Vegetation Zones (80% detailed design)

849 - Grey Box - Forest Red Gum grassy
woodland on flats of the Cumberland
Plain, Sydney Basin Bioregion (HN528)

850 - Grey Box - Forest Red Gum grassy
woodland on shale of the southern
Cumberland Plain, Sydney Basin
Bioregion (derived grassland form)
(HN529)

1800 - Swamp Oak open forest on
riverflats of the Cumberland Plain and
Hunter valley (HN674)

Vegetation Zones (Amendment Report
Submissions Report)

Forest Red Gum - Rough-barked Apple
grassy woodland on alluvial flats of the
Cumberland Plain, Sydney Basin
Bioregion

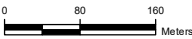
Grey Box - Forest Red Gum grassy
woodland on flats of the Cumberland
Plain, Sydney Basin Bioregion

Grey Box - Forest Red Gum grassy
woodland on shale of the southern
Cumberland Plain, Sydney Basin
Bioregion (derived grassland form)

Swamp Oak open forest on riverflats of
the Cumberland Plain and Hunter valley

Cadastre

Waterways



Coordinate system: GDA2020 MGA Zone 56

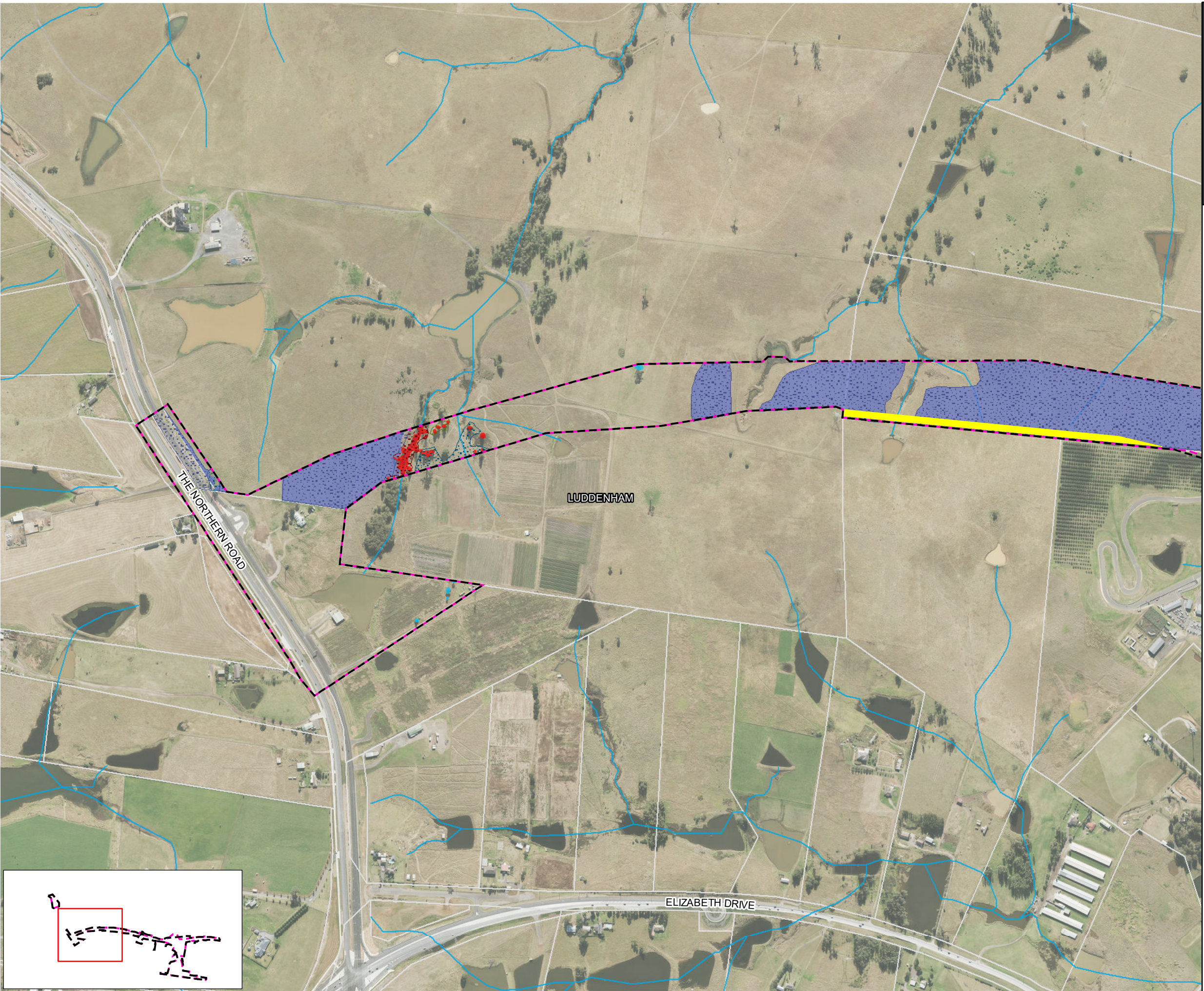


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M12 Motorway - West Package
Consistency Assessment

Figure 4-1
Sheet 3
Revised vegetation mapping for
M12 Motorway - West Package

Legend

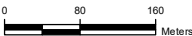
- Proposed project M12 Motorway - West Package 80% detailed design construction footprint (July, 2021)
- Approved M12 Motorway - West Package Amendment Report Submissions Report construction footprint (March, 2021)
- Exclusion Zone

Vegetation Zones (80% detailed design)

- 835 - Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (HN524)
- 849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN528)
- 850 - Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (derived grassland form) (HN529)
- 1800 - Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley (HN674)

Vegetation Zones (Amendment Report Submissions Report)

- Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion
- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion
- Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (derived grassland form)
- Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley
- Cadastrate
- Waterways



Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3
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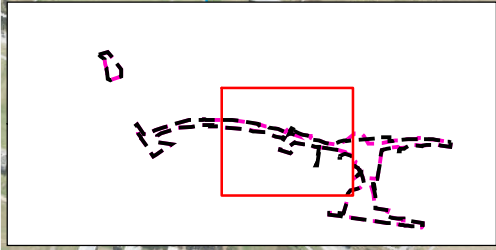
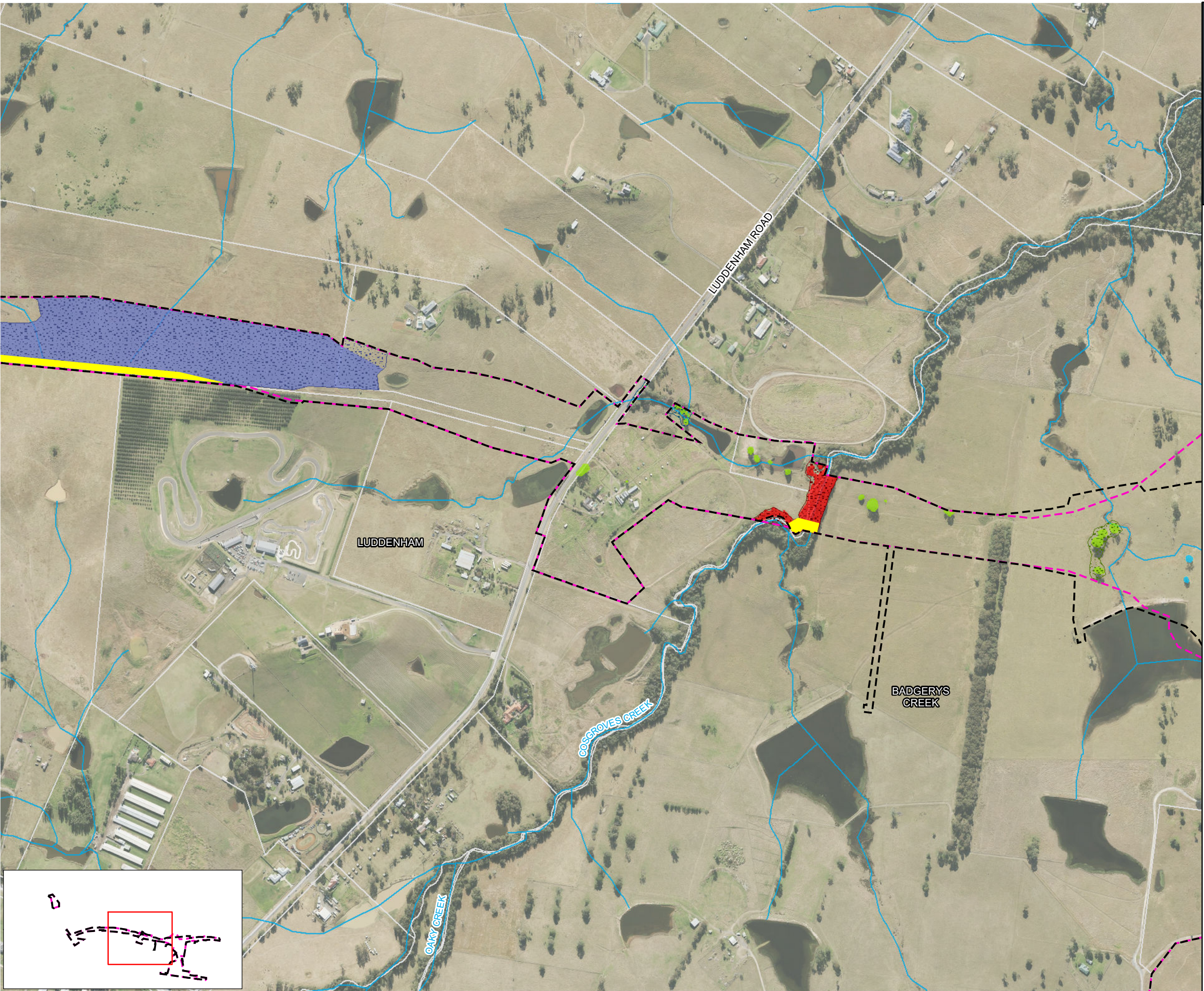
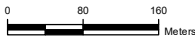


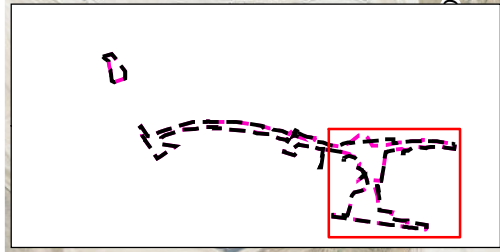
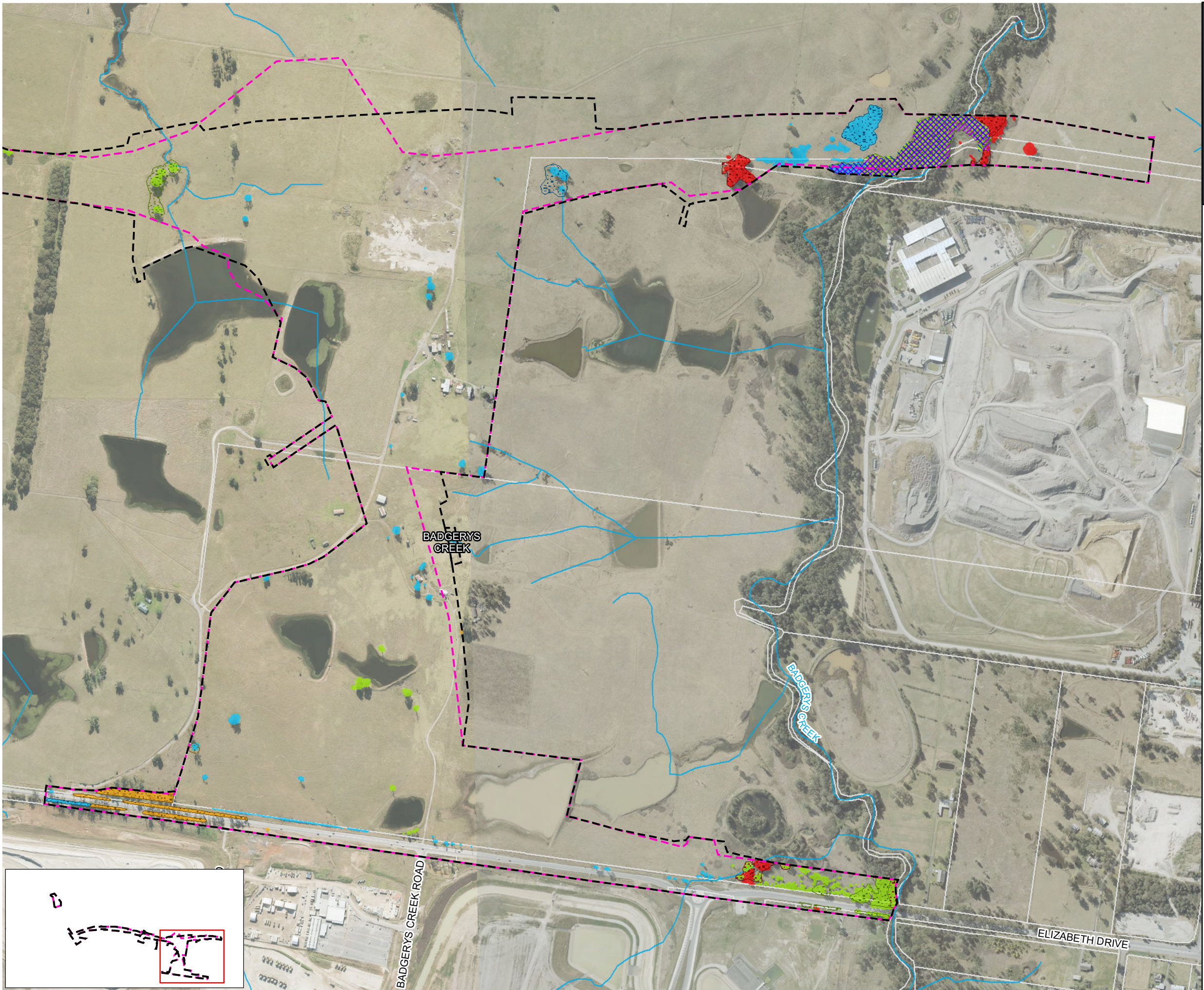
Figure 4-1
Sheet 4
Revised vegetation mapping for
M12 Motorway - West Package

- Legend**
- Proposed project M12 Motorway - West Package 80% detailed design construction footprint (July, 2021)
 - Approved M12 Motorway - West Package Amendment Report Submissions Report construction footprint (March, 2021)
 - Cumberland Plain Land Snail (80% detailed design)
 - Cumberland Plain Land Snail (Amendment Report Submissions Report)
- Vegetation Zones (80% detailed design)**
- 835 - Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (HN524)
 - 849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN528)
 - 850 - Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (HN529)
 - 1800 - Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley (HN674)
- Vegetation Zones (Amendment Report Submissions Report)**
- Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion
 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion
 - Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion
 - Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley
- Cadastre
- Waterways



Coordinate system: GDA2020 MGA Zone 56
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4.1.2 Construction impacts

This section summarises the revised biodiversity impacts (Plant Community Types (PCT), Threatened Ecological community (TECs) and threatened species) assessed in the AR Submissions Report and AR Submissions Report – Amendment Letter as a result of the field survey as part of this Consistency Assessment.

Plant community types

Four PCTs were identified in the construction footprints described in the Project EIS, Amendment Report, AR Submissions Report and the AR Submissions Report Amendment Letter. No additional PCTs were identified in the M12 Motorway - West Package 80% detailed design construction footprint.

There is an overall decrease of 0.92 hectares of native vegetation to be cleared. There are some minor differences in the areas of the four PCTs as a result of refining the vegetation mapping and development of the 80% detailed design compared to the Amendment Report Submissions Report construction footprint, as presented in Table 4-2. There is an increase in area of PCTs 835 and 849 and a small decrease in the area of PCT 850 and 1800 within the M12 Motorway - West Package 80% detailed design construction footprint when compared to the Amendment Report Submissions Report construction footprint.

The revised impact calculations provided in Table 4-2 can be used to update the FBA calculator to recalculate credit obligations.

Threatened ecological communities

Four PCTs in the construction footprint as described in the AR Submissions Report were found to meet the criteria for four TECs listed under the TSC Act. No Additional TECs were identified in the M12 Motorway - West Package 80% detailed design construction footprint.

There is an overall reduction in impacts of 1.85 hectares compared to the AR Submissions Report as presented in Table 4-3. The M12 Motorway - West Package 80% detailed design would have the following change in impact to TECs over that originally reported in the AR Submissions Report:

- Increase of 0.28 hectares of River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Endangered, TSC Act)
- Increase of 0.01 hectares of Cumberland Plain Woodland in the Sydney Basin Bioregion (Critically Endangered, TSC Act)
- A reduction of 1.69 hectares of Cumberland Plain Woodland in the Sydney Basin Bioregion (Critically Endangered, TSC Act) - derived native grassland form
- A reduction of 0.45 hectares of Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions (Endangered, TSC Act).

No PCTs in the M12 Motorway - West Package Amendment Report Submissions Report construction footprint were found to meet the criteria for TECs under the EPBC Act. No additional TECs listed under the EPBC Act were identified in the M12 Motorway - West Package 80% detailed design construction footprint.

Table 4-2 Plant community type impacts

PCT No.	PCT name	Area (ha) originally mapped within M12 Motorway - West Package AR Submissions Report construction footprint	Predicted impact from 80% detailed design (based on revised mapping)	80% detailed design Impact (revised mapping) compared to mapping provided in AR Submissions Report
835	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial	2.66	2.94	+0.28

PCT No.	PCT name	Area (ha) originally mapped within M12 Motorway - West Package AR Submissions Report construction footprint	Predicted impact from 80% detailed design (based on revised mapping)	80% detailed design Impact (revised mapping) compared to mapping provided in AR Submissions Report
	flats of the Cumberland Plain, Sydney Basin Bioregion			
849	Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	1.61	1.64	+0.03
850	Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	18.70	16.99	-0.78
1800	Swamp Oak open forest on river flats of the Cumberland Plain and Hunter valley	2.13	1.68	-0.45
Total		25.1	23.25	-0.92

Note: Area calculations incorporate the area of the exclusion zone on Cosgroves Creek.

Table 4-3 Threatened ecological community impacts

TEC name	Corresponding PCT No. / vegetation zone	Area (ha) originally mapped within M12 Motorway - West Package AR Submissions Report construction footprint	Predicted impact from 80% detailed design (based on revised mapping)	80% detailed design Impact (revised mapping) Compared to mapping in the AR submissions report
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Endangered, TSC Act)	835	2.66	2.94	+0.28
Cumberland Plain Woodland in the Sydney Basin Bioregion (Critically Endangered, TSC Act)	849	2.25	2.26	+0.01
Cumberland Plain Woodland in the Sydney Basin Bioregion (Critically Endangered, TSC Act) - derived native grassland form	850	18.06	16.37	-1.69
Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner	1800	2.13	1.68	-0.45

TEC name	Corresponding PCT No. / vegetation zone	Area (ha) originally mapped within M12 Motorway - West Package AR Submissions Report construction footprint	Predicted impact from 80% detailed design (based on revised mapping)	80% detailed design Impact (revised mapping) Compared to mapping in the AR submissions report
bioregions (Endangered, TSC Act)				
Total		25.1	23.25	-2.04

Note: Area calculations incorporate the area of the exclusion zone on Cosgroves Creek.

Threatened fauna habitat

All PCTs in the construction footprint as described in the AR Submissions Report were identified as foraging habitat for 11 threatened fauna species. No additional threatened fauna species were identified in the M12 Motorway - West Package 80% detailed design construction footprint.

The M12 Motorway - West Package 80% detailed design construction footprint contains some minor differences in areas in comparison to the construction footprint as described in the AR Submissions Report for threatened fauna habitat. There are the following increased impacts (refer to Table 3-3 of Appendix A):

- The revised mapping indicates that there would be an increase (0.1 hectares) in impact to habitat for Cumberland Plain Land Snail due to increased clearing of the mapped habitat at Badgerys Creek (PCT 835 and PCT 849)
- Impacts to Grey-headed Flying Fox (foraging habitat) would increase by 0.29 hectares due to the increase in clearing, largely from the increased habitat removal at Badgerys Creek (PCT 835 and PCT 849).

Impacts to Swift Parrot habitat were not specifically outlined in the Project EIS Biodiversity Assessment Report (BAR) or Project EIS, however Swift Parrot habitat has been assumed by the Department of Agriculture, Water and the Environment (DAWE) to be all PCTs. The impacts to Swift Parrot potential foraging habitat would be decreased by 1.84 hectares compared to the AR Submissions Report.

No change is expected for the White-Bellied Sea-Eagle or roosting habitat for Southern Myotis. There would be a decrease in impacts to all other threatened fauna habitats by 0.16 hectares.

Matters of National Environmental Significance

Potential impact to Matters of National Environmental Significance (NMES) is described in Section 7.1.4 of the Project EIS, Section 6.1.3.3 of the Amendment Report, Section 6.2.3 of the AR Submissions Report and the AR Submissions Report - Amendment Letter. Clearing limit footprints for each species is specified in the EPBC Act Decision Notice (ID: 2018-8286) and outlined in Table 4-4.

The construction footprint for M12 Motorway - West Package as assessed in the Project EIS, Amendment Report, AR Submissions Report and AR Submissions Report – Amendment Letter was identified as having impacts to habitat for the following threatened species that are listed as threatened under the EPBC Act:

- Foraging habitat for Grey-headed Flying-fox (*Pteropus poliocephalus*)
- Foraging habitat for Swift Parrot (*Lathamus discolor*).

The 80% detailed design results in increased impacts to Grey-headed Flying Fox foraging habitat by 0.29 hectares and a decrease in Swift Parrot foraging habitat by 1.84 hectares.

As the habitat removal for Grey-headed Flying-fox would increase over that outlined in the AR Submissions Report, TfNSW may need to provide a letter updating the DAWE. However, as M12 Motorway – West Package is part of a larger project, the impact should be treated in conjunction with impacts from the other

sections of the M12 Motorway Project including M12 East and M12 Central to determine whether the approved clearing thresholds would be exceeded across the whole project.

The impacts from M12 Motorway - West Package would have a minor contribution to the total approved clearing limit footprints for the Grey-headed Flying-fox and Swift Parrot. The small increase in habitat removal as a result of the 80% detailed design would not change the level of significance of potential impacts for these two species. As such, the changes are considered consistent with the Conditions of Approval.

Table 4-4 Review of changes against clearing limits in the EPBC Act decision notice for species location within M12 Motorway – West Package

Threatened species type	Clearing limits (ha)	Comment
Grey-headed Flying Fox (<i>Pteropus poliocephalus</i>) (foraging habitat)	62.69	The proposed 80% detailed design construction footprint would result in removal of an additional 0.29 hectares of foraging habitat. The total impact for M12 Motorway - West Package 80% detailed design construction footprint is 5.20 hectares.
Swift Parrot (<i>Lathamus discolor</i>) (foraging habitat)	80.21	The proposed 80% detailed design construction footprint would result in decreased removal of Swift Parrot foraging habitat by 1.84 hectares. The total impact for M12 Motorway – West Package impact is 23.26 hectares.

4.1.3 Offsets

Section 6.2.5 of the AR Submissions Report presents the biodiversity offsets required for the project. A comparison of ecosystem and species credits calculated for the M12 Motorway - West Package 80% detailed design construction footprint with the credit requirements for the project as described in the AR Submissions Report is provided in Section 3.4 of Appendix A.

The credit requirements presented in this assessment are an estimate only based on proportional impacts from M12 Motorway - West Package and are not calculations made using the FBA calculator.

The 80% detailed design results in an overall increase in ecosystem and species credits. The additional ecosystem and species credits include the following:

- Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion – additional 3.1 ecosystem credits
- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion – additional 4.2 ecosystem credits
- Cumberland Plain Land Snail – additional 2.7 ecosystem and species credits.

4.2 Traffic, transport and access

A traffic and transport assessment was carried out to assess the change in impacts compared to the AR Submissions Report. The traffic and transport assessment is provided in Appendix B and summarised in this section.

4.2.1 Assessment methodology

Traffic modelling

The comparison between the Amendment Report and the 80% detailed design was carried out within the M12 Motorway – West Package study area using the AIMSUN project model. The model area replicates the core study area shown in Figure 4-2.

The traffic models used for the M12 Motorway - West Package 80% detailed design and the Amendment Report are different models. The models primarily differ in size and time period.

The traffic model used for the Project EIS traffic and transport assessment was an AIMSUN hybrid model covering the AM peak 6-10am and PM peak 3-7pm. The assessment considers the future years 2026 and 2036, with the focus on AM and PM peak periods. This model is referred to in the Project EIS as the Western Sydney Airport Growth Area (WSAGA) mesoscopic traffic model. The modelled area is shown as the “wider study area” in Figure 4-2.

In addition, some of the metrics reported in the Project EIS are strategic in nature and have been obtained from the Sydney Motorway Project Model (SMPM) which is a Sydney-wide strategic model developed in EMME.

The Amendment Report presented several metrics to assess the project impact to traffic in the area. Not all these metrics are directly comparable to the outputs of the M12 Motorway - West Package project model, and a quantitative assessment has been made. These metrics and assessment methodology are summarised in Table 4-5.

Table 4-5 Traffic assessment metrics

Metric and Amendment Report reference	Metric comparison	Assessment method
Screenline volumes: Tables 6-18 to 6-21	These are comparable however the timeframes differ between the Amendment Report and the M12 Motorway - West Package project model as follows: <ul style="list-style-type: none">• The Amendment Report reports 7-8am and 8-9am• The current model reports 7.30-8.30am only• The Amendment Report reports 4-5pm and 5-6pm• The current model reports 4.30 to 5.30pm only.	The volumes from the Amendment Report have been interpolated to the time period assessed in the M12 Motorway - West Package project model.
Intersection performance: Table 6-24 and 6-25	These are comparable, although outputs are from different models	N/A
Travel times: Figures 6-13 to 6-20	These are comparable, although outputs are from different models	N/A
Network statistics: Table 6-22 and 6-23	Due to the differing size of the models these metrics cannot be directly compared.	These metrics are strategic in nature. A qualitative assessment will be undertaken to determine changes due to the 80% detailed design.

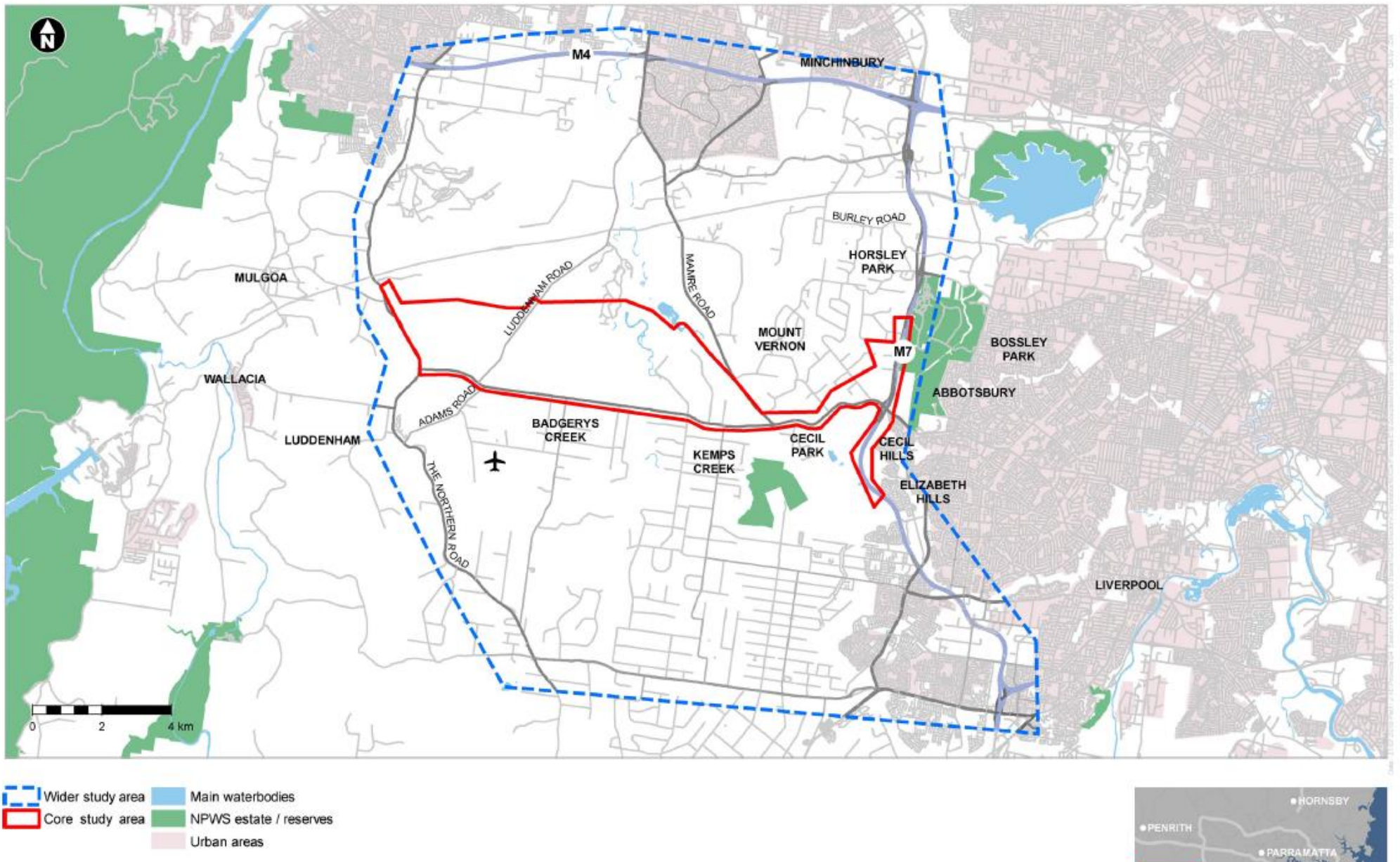


Figure 4-2 Project EIS traffic and transport assessment model area

4.2.2 Construction impacts

Section 7.2.5 of the Project EIS identified a number of potential transport and traffic impacts that may occur during construction. The following construction impacts associated with the 80% detailed design are consistent with the project as described in the Project EIS and Amendment Report:

- Work site and construction ancillary facility access assumptions
- Road closures, detours and other temporary traffic management
- Construction worker parking and impacts on on-street parking
- Impacts on public transport
- Impacts on pedestrians and cyclists
- Other impacts of construction.

These changes are considered consistent as there is either no change in impact as described in the Project EIS and Amendment Report, or the change is minor and can be managed in accordance with existing management measures outlined in the AR Submissions Report.

Haulage routes and heavy vehicle movements

Haulage routes described in Section 4.2.6 of the Amendment Report and Section 5.24.17 of the Project EIS are consistent with the 80% detailed design. The total number of heavy vehicles however has increased since the Amendment Report. The work zone and locations remain unchanged from the Amendment Report (Table 4-7 of the Amendment Report).

Predicted truck movements outside the construction footprint are described in Table 4-6. The construction of the 80% detailed design would result in a 39 percent increase of heavy vehicles within the M12 Motorway – West Package 80% detailed design construction footprint. The increase in predicted truck movements is a result of additional fill required for the project.

Table 4-6 Haulage routes and predicted truck movements

Haulage routes	Amendment Report		80% detailed design		Percent change (%)
	Site access via	Approximate total truck movements	Site access via	Approximate total truck movements	
M7 Motorway, Elizabeth Drive and The Northern Road	AF 1 (and AF 10)	16,671	AF1/10	3,533	-79
M7 Motorway and Elizabeth Drive	AF 2 (and AF 3)	30,124	AF2/3	54,863	82
M7 Motorway, Elizabeth Drive, The Northern Road, and Luddenham Road	AF11	18,566	AF11	32,365	74
Total		65,361	Total	90,761	39

Worksite and construction ancillary facility traffic generation

The forecast average daily heavy vehicle generation and peak AM and PM light vehicle generation from each of the ancillary facilities for 80% detailed design compared to the Amendment Report is provided in Table 4-7.

Table 4-7 Construction traffic generation for the amended project (inbound and outbound average)

Site	Design stage	Average daily heavy vehicle generation	Morning peak light vehicle generation	Morning peak heavy vehicle generation	Evening peak light vehicle generation	Evening peak heavy vehicle generation
AF1/10	80% detail design	80	100 (at peak construction)	20	100 (at peak construction)	20
	Amendment Report	200	93	20	93	20
AF2/3	80% detail design	220	100 (at peak construction)	16	100 (at peak construction)	16
	Amendment Report	180	93	16	93	16
AF11	80% detail design	220	100 (at peak construction)	16	100 (at peak construction)	16
	Amendment Report	160	93	16	93	16
80% detail design total		520	300	52	300	52
Amendment Report total		540	279	52	279	52

Comparing construction traffic generation in Table 6-10 of the Amendment Report with the 80% detailed design identifies the following changes in vehicle generation for three ancillary facilities within the M12 Motorway – West Package:

- Daily heavy vehicle generation – decrease by 20 vehicles (decrease by four percent)
- Morning and evening peak light vehicle generation – increase of 21 vehicles (increase by seven percent)
- Morning and evening peak heavy vehicle generation – same as Amendment Report.

Heavy vehicle numbers are a result of the amended earthworks materials utilising AF1/10, AF2/3 and AF11.

The 80% detailed design assumes that about 100 light vehicles would arrive and leave each ancillary facility each day during construction. Majority of these movements would be during the morning and evening peak periods.

Heavy vehicle movements into site AF2/3 generally account for the imported fill material required for the new embankments along Elizabeth Drive, including pavement and retaining wall materials.

Heavy vehicle movements for AF11 in Table 4-7 refer to heavy vehicles accessing AF11. There are additional heavy vehicles crossing Luddenham Road that are required for haulage which are not reflected in Table 4-7.

Heavy vehicle average daily rates are not expected to change over the full duration of the works, but rather for certain periods where haulage activities or significant material imports are required.

The change to heavy vehicle movements is considered consistent with the impacts described in the Project EIS and Amendment Reports due to the changes being able to be managed in accordance with existing management measures outlined in the AR Submissions Report and in Section 5.2.

Intersection performance and level of service

Despite the increase in construction traffic resulting from the 80% detailed design, the peak volumes have not changed substantially, therefore there is minimal change from that described in the Project EIS and Amendment Report for peak travel time and LoS and are considered consistent.

4.2.3 Operational impacts

The following operational traffic impacts are considered to be consistent with the project as described in the Project EIS and Amendment report:

- Public transport
- Parking
- Network statistics
- Travel times.

These impacts are considered consistent as there is either no change from the impacts as described in the Project EIS and Amendment Report or the change is minor and can be managed in accordance with existing management measures. They have therefore not been discussed further in this section.

Traffic performance

Screenline volumes

Screenline traffic volumes were presented in the Amendment Report to demonstrate the total traffic volume on each link within the screenline. Figure 4-3 illustrates the screenline locations within the M12 Motorway – West Package project model.

Table 3-3 to Table 3-10 of Appendix F present the comparative analysis of screenline volumes between the Amendment Report and the 80% detailed design. In all scenarios the M12 Motorway carries more traffic in the 80% detailed design and subsequently the alternate routes along the screenline are generally carrying less traffic. There is also a reduction in traffic along parallel routes suggesting the connection of the Airport Access Road and Elizabeth Drive encourages more traffic to use the M12 Motorway than Elizabeth Drive and The Northern Road.

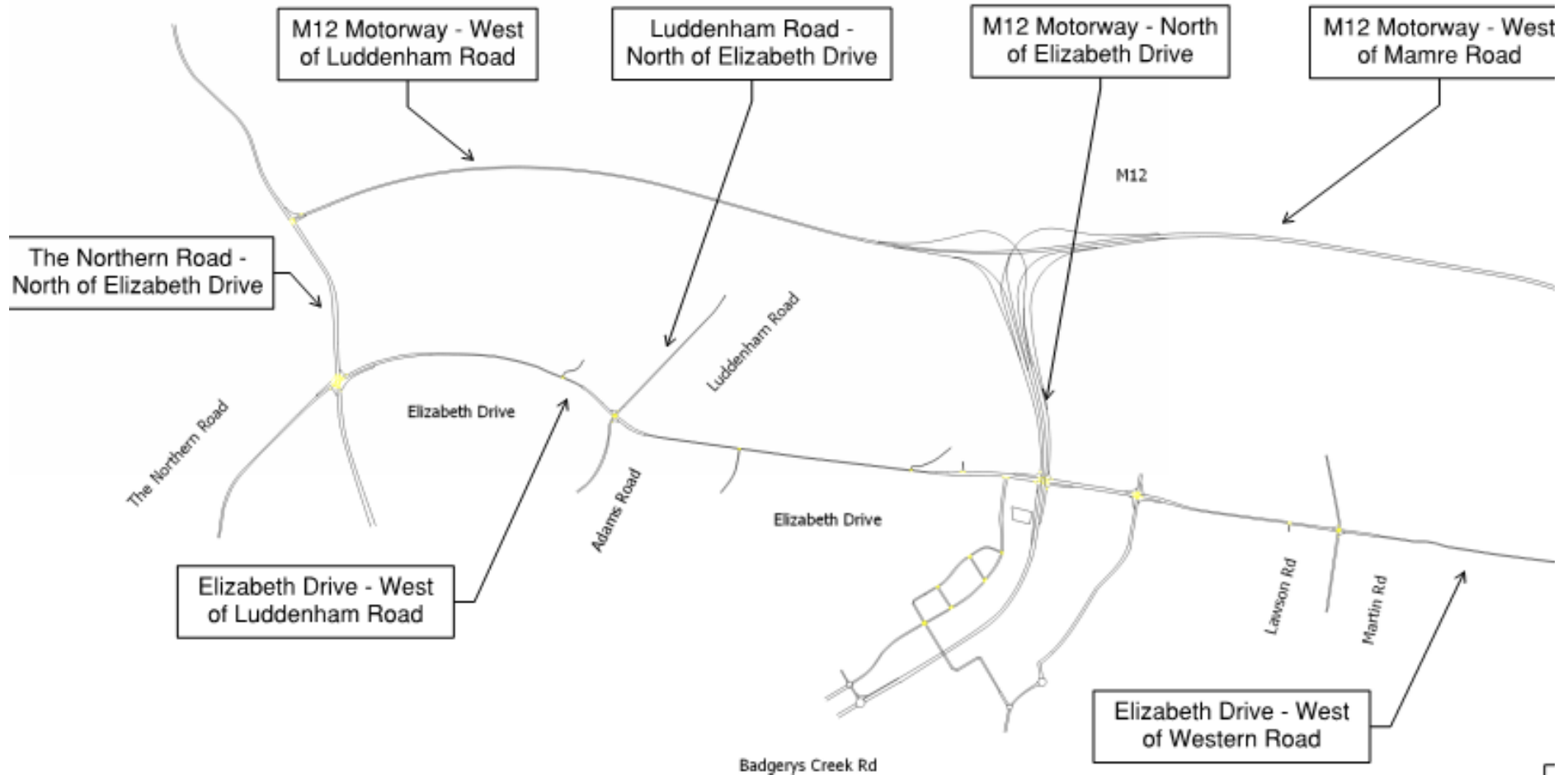


Figure 4-3 Assessed screenline locations within the M12 Motorway – West Package project model

Intersection performance

The intersections assessed within the M12 Motorway - West Package study area include the following:

- Elizabeth Drive and The Northern Road
- The Northern Road and M12 Motorway
- Elizabeth Drive and Luddenham Road
- Elizabeth Drive and Business Park West
- Elizabeth Drive Interchange
- Elizabeth Drive and Business Park East.

Analysis of intersection performance between the Amendment Report and the 80% detailed design results in unchanged or improved performance for all intersections in 2026. All intersections would perform at a LoS C or better. Intersection performance in 2036 would result in unchanged or improved intersection performance, except for Elizabeth Drive / Luddenham Road intersection and Elizabeth Drive / Business Park East intersection. All other intersections would perform at a LoS D or better.

The Elizabeth Drive / Luddenham Road intersection would change from a LoS C (AM peak) and LoS D (PM peak) in the Amendment Report to a LoS F (all peaks) in the 80% detailed design. A large amount of future development is proposed for the area to the south of the intersection. This intersection is outside the project scope and the upgrade of this intersection would form part of the Elizabeth Drive Upgrade project in the future. Future modelling in this area is likely to be able to resolve the performance of this intersection. The Elizabeth Drive / Business Park East intersection would change from a LoS B in the AM peak in the Amendment Report to a LoS C in the 80% detailed design.

Local roads and access

There are two primary changes that affect local roads, connectivity and access within the M12 Motorway – West Package 80% detailed design construction footprint. These changes include:

- The Airport Interchange being revised to a free flow directional interchange. Described further below
- Connecting the Airport Access Road to Elizabeth Drive with a single point interchange.

Airport Interchange

Changes to the Airport Interchange and the Airport Access Road at 80% detailed design improves connectivity, operational functionality, traffic performance of the transport network, route legibility and road user safety. The Airport Interchange layout is a high capacity and operationally efficient layout that can operate at the required design speeds in comparison to the Amendment Report arrangement. This layout also better manages changes in traffic travel patterns and demands if there is a change in the land use.

Elizabeth Drive Interchange

Connecting Elizabeth Drive and the Airport Access Road using a single point interchange offers improved connectivity of traffic movement between these links. Overall, this encourages more traffic onto the M12 Motorway rather than using the surrounding network for these movements.

Removing the signalised intersection at the Business Park West intersection would streamline traffic movement along Elizabeth Drive. This arrangement could not have been maintained with the inclusion of the Elizabeth Drive Interchange due to the proximity. Traffic from Business Park West would be able to access Elizabeth Drive and the M12 Motorway from within the business park itself via connecting links to the Airport Access Road once the business park is developed in the future.

Freight

The change in freight volumes would mirror the proportional change in general traffic volumes as provided in the screenline analysis above. The input demands to the model have not been altered since the Amendment Report.

The changes to access and connectivity would apply to freight movements between the WSIA, Business Park, the M12 Motorway and Elizabeth Drive. The design changes encourage heavy vehicles to use more appropriate higher order roads in the network, such as using the M12 Motorway rather than Elizabeth Drive and The Northern Road for parallel trips. The revised connectivity arrangement also encourages the use of the Airport Access Road to access Elizabeth Drive from the Business Park West.

Active transport

The 80% detailed design has amended the alignment of the shared use path at the Airport Interchange. However, the continuity of the shared use path remains unchanged. The shared use path link is provided between the Airport Access Road and Elizabeth Drive, but it is not expected that there would be a significant change to cyclists' travel demand around the project.

The proposed pedestrian crossings at the Business Park West intersection have been removed in the 80% detailed design due to the signalised intersections along Elizabeth Drive being removed. The removal of the pedestrian crossings would require pedestrians to use the signalised crossing at the Elizabeth Drive and Airport Access Road intersection which may add additional travel time. It should also be noted that a grade separated option is now provided for this movement along a new shared path near the Elizabeth Drive / Airport Access Road intersection.

Road safety

It is expected that overall crashes would decrease as the volume of future traffic has, in most cases, shifted to using the M12 Motorway rather than Elizabeth Drive. Motorways are generally safer than arterial roads as they have higher design speed with wider geometry curves, wider lanes, better pavement and lighting condition, fewer intersection and stop-start traffic, and separation of sensitive road users from vehicular traffic.

Additionally, other road safety benefits would be expected associated with the Airport Interchange, which includes:

- Minimises traffic weaving for entry and exit ramps between the M12 Motorway and Airport Access Road when accessing the WSIA and Elizabeth Drive. Road safety would be improving for road user legibility, reducing lane changing and the associated risk of side-swipe collisions and off-carriageway type accidents
- Reduced the number of tight curves on grades (loop ramps)
- Reduced congestion, which is expected to decrease the likelihood of vehicle crashes.

4.3 Urban design, landscape character and visual amenity

A landscape character and visual amenity assessment was carried out to assess the change in impacts compared to the Approved Project described in the AR Submissions Report. The landscape character and visual amenity assessment is provided in Appendix C and summarised in this section.

4.3.1 Assessment methodology

The assessment methodology involved the following:

- Review Landscape Character Zones (LCZs) identified in the Project EIS and Amendment Report and of LCZs where proposed design changes occur
- Assess changes to the magnitude of impact for each LCZ assessed as a result of proposed design changes
- Review viewpoints identified in the Project EIS and Amendment Report and identification of where proposed design changes would be visible
- Identify additional viewpoints potentially impacted by the proposed change
- Revise the magnitude of change and overall visual impact where proposed changes are visible.

4.3.2 Landscape character impact assessment

Three LCZs are identified within the M12 Motorway – West Package. These were based on the surrounding land use, built form, vegetation cover and topography (see Table 7-62 and Figure 7-49 of the Project EIS). The design changes assessed are located within LCZ 3 – Rural plains.

Construction

The project involves changes to the construction footprint as described in Section 2.1 and shown in Figure 2-2 however the construction activities within each LCZ are largely the same as described in the Project EIS and Amendment Report. Therefore, the impacts to the landscape character during construction remains unchanged from the Project EIS and Amendment Report.

Operation

The 80% detailed design involves the same base infrastructure (road elements, bridges and landscaping) between the project as described in the Amendment Report and the 80% detailed design. The impact on LCZ 3 remains unchanged from the impact assessment described in Section 7.3.5 in the Project EIS.

4.3.3 Visual impact assessment

Based on a review of the 80% detailed design, the following viewpoints from the Project EIS and Amendment Report were compared for operational impacts associated with the 80% detailed design:

- Viewpoint 7: View east along Elizabeth Drive
- Viewpoint 8: View north from Badgerys Creek Road

Three new viewpoints have also been identified and are illustrated in Figure 4-4, which have the potential to be impacted by the 80% detailed design during operation as a result of the design changes:

- Viewpoint A: View along M12 towards Airport Interchange looking east
- Viewpoint B: View from Airport Access Road eastbound off ramp to M12 looking north
- Viewpoint C: View along M12 towards Airport Interchange looking west.

Construction

The project involves changes to the construction footprint as described in Section 2.1 and shown in Figure 2-2 however the construction activities and provision of ancillary facilities, the visual impacts at viewpoints are similar in nature during construction, and would be consistent with those described in the Project EIS and Amendment Report.

Operation

The assessment identified that the two existing viewpoints (viewpoint 7 and 8) would experience the same overall impact assessment rating (low-moderate) when compared to the Project EIS and Amendment Report. This is due to the amended design being of similar nature to the design described in the Project EIS at each of these locations. The 80% detailed design would have impacts at the following three additional viewpoints:

- Viewpoint A: Moderate
- Viewpoint B: Moderate
- Viewpoint C: Moderate.

The impact assessment ratings for each viewpoint are provided in Table 4-8. Visualisations of the operational impact at each of the updated and additional viewpoints is provided in Table 4-9.






Figure 4-4 Viewpoint locations

Table 4-8 Summary of visual impacts during operation at updated and additional viewpoints

Viewpoint		Project as per Amendment Report			80% detailed design			Notes
		Sensitivity	Magnitude	Impact	Sensitivity	Magnitude	Impact	
7	<u>Existing viewpoint:</u> View east along Elizabeth Drive	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	There would be limited views from nearby areas, against the existing rural-residential backdrop. The new elements introduced are generally similar in nature and within the footprint of the construction footprint in the AR Submissions Report.
8	<u>Existing viewpoint:</u> View north from Badgerys Creek Road	Low	Moderate	Moderate -Low	Low	Moderate	Moderate -Low	There would be limited views from nearby areas, against the existing rural-residential backdrop. The new elements introduced are generally similar in nature and within the footprint of the construction footprint in the AR Submissions Report. Overall assessment is Moderate-Low.
A	New Viewpoint M12 towards Airport interchange looking east	NA	NA	NA	Moderate	Moderate	Moderate	There would be limited views from nearby areas, against the existing rural-residential backdrop. The new elements introduced are generally similar in nature and within the footprint of the construction footprint in the AR Submissions Report.
B	New Viewpoint Airport Access Road eastbound off ramp to M12	NA	NA	NA	Moderate	Moderate	Moderate	There would be limited views from nearby areas, against the existing rural-residential backdrop. The new elements introduced are generally similar in nature and within the footprint of the construction footprint in the AR Submissions Report.
C	New Viewpoint View along M12 towards Airport interchange looking west	NA	NA	NA	Moderate	Moderate	Moderate	There would be limited views from nearby areas, against the existing rural-residential backdrop. The new elements introduced are generally similar in nature and within the footprint of the construction footprint in the AR Submissions Report.

Table 4-9 Operational visual impacts comparison between the Amendment Report and the 80% detailed design

Viewpoint during operation - Amendment Report and Project EIS	Viewpoint during operation - 80% detailed design
Viewpoint A: M12 towards Airport interchange looking east	
	

Viewpoint during operation - Amendment Report and Project EIS	Viewpoint during operation - 80% detailed design
Viewpoint B: Airport Access Road eastbound off ramp to M12	
	
Viewpoint C: View along M12 towards Airport interchange looking west	

Viewpoint during operation - Amendment Report and Project EIS



Viewpoint during operation - 80% detailed design

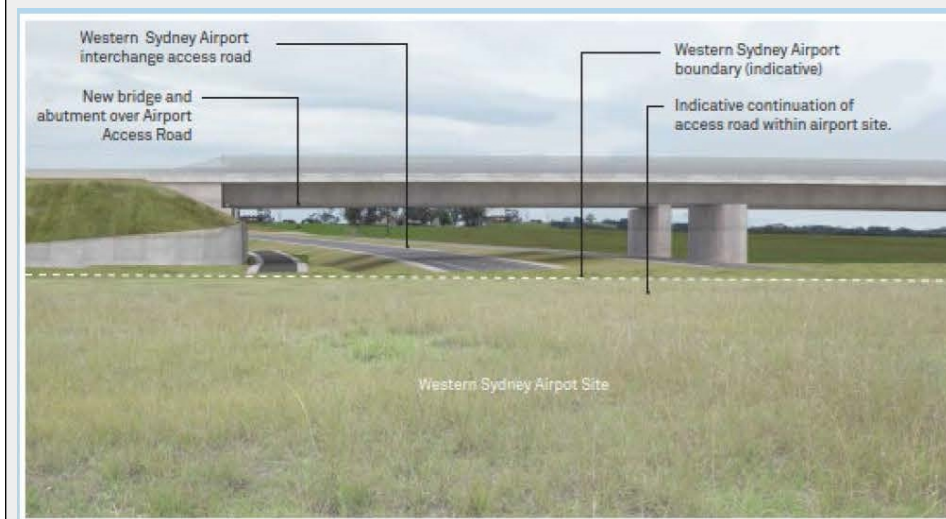


Viewpoint 7: View east along Elizabeth Drive



Viewpoint 8: View north from Badgerys Creek Road

Viewpoint during operation - Amendment Report and Project EIS



Viewpoint during operation - 80% detailed design



4.3.4 Cumulative impact

The Project EIS identified that the project would have a moderate to high contribution to cumulative landscape character and visual impacts in the area. The cumulative landscape character and visual impacts associated with the 80% detailed design would be likely to remain unchanged from the assessment carried out as per Section 7.3.7 of the Project EIS.

4.4 Aboriginal cultural heritage

The proposed changes outlined in Section 2.1 have been considered against the outcomes of the Aboriginal heritage assessment in the Project EIS and Amendment Report. An Aboriginal heritage assessment was carried out to assess the change in Aboriginal heritage impacts compared to the approved Amendment Report Submissions Report construction footprint. The Aboriginal heritage assessment is provided in Appendix D and summarised in this section.

4.4.1 Assessment methodology

The methodology for this assessment is described in Section 7.5.2 of the Project EIS and Section 6.5 of the Amendment Report. These methodologies contain detailed descriptions and explanations on the assessment guidelines and assessment methods used.

As part of this Consistency Assessment an updated search of the Aboriginal Heritage Information Management System (AHIMS) was carried out. The AHIMS search did not identify any additional archaeological heritage sites.

4.4.2 Construction impacts

The majority of footprint adjustment areas fall within the 'detailed investigation area' previously assessed for Aboriginal cultural heritage during preparation of the Project EIS, Amendment Report and AR Submission Report. Each site is described in Chapter 7.5 of the Project EIS and Chapter 6.5 of the Amendment Report. Identified Aboriginal archaeological sites within the M12 Motorway – West Package project area includes:

- TNR AFT 14
- Isolated artefact 4
- CCW (part of Cosgroves Creek Complex Aboriginal site complex)
- CCE T1 (part of Cosgroves Creek Complex Aboriginal site complex)
- CCE T2 (part of Cosgroves Creek Complex Aboriginal site complex)
- CCE T3 (part of Cosgroves Creek Complex Aboriginal site complex)
- M12A1 (part of South Creek Complex Aboriginal site complex)
- BCW (part of South Creek Complex Aboriginal site complex)
- BCE (part of South Creek Complex Aboriginal site complex), and
- BWB (part of Badgerys Creek Upstream Complex Aboriginal site complex).

A small section of the proposed construction footprint adjustment extends beyond the 'detailed investigation area' previously assessed in the Project EIS, Amendment Report and AR Submissions Report. This area is located within Lot 101 DP848215, east of Cosgroves Creek and about 200 metres south of Aboriginal archaeological site CCE T1. The revised AHIMS search did not identify any additional Aboriginal archaeological sites within or near this construction footprint change. No Aboriginal objects, archaeological sites or areas of Aboriginal archaeological potential have been identified or considered likely to occur within this area outside the 'detailed investigation area'.

The Approved M12 Motorway - West Package Amendment Report Submissions Report construction footprint partially or totally encompasses the identified sites listed above and will be impacted by the M12 Motorway - West Package project. Impacts to the sites from the proposed M12 Motorway - West Package 80% detailed design construction footprint is considered to be consistent with the existing impacts identified in the Project EIS, Amendment Report and AR Submissions Report. As the impacts are considered to be consistent, the revised environmental management measures included in Section 5.2 for the sites will be maintained for the construction footprint adjustment areas.

The identified changes to Aboriginal heritage impacts from the 80% detailed design are considered consistent with the Approved Project.

4.5 Non-Aboriginal heritage

A non-Aboriginal assessment was carried out to assess the change in non-Aboriginal heritage impacts compared to the Approved Amendment Report Submissions Report construction footprint. The non-Aboriginal heritage assessment is provided in Appendix E and summarised in this section.

4.5.1 Assessment methodology

The methodology for this assessment is described in Section 7.6.2 of the Project EIS and Section 6.6 of the Amendment Report. These methodologies contain detailed descriptions and explanations on the assessment guidelines and assessment methods used. The Non-Aboriginal heritage assessment for this consistency assessment involved the following:

- Review the changes in the construction footprint between the AR Submissions Report and the 80% detailed design
- Reviewing the heritage significance of each non-Aboriginal heritage item within the M12 Motorway – West Package
- Further impact assessment for the Fleurs Radio Telescope site within the M12 Motorway – West Package.

4.5.2 Impact assessment

Table 4-10 summarises the impact comparison between the approved AR Submissions Report construction footprint and the M12 Motorway – West Package 80% detailed design construction footprint. The assessment of each heritage item is described in detailed below. The heritage items within and in the vicinity of the M12 Motorway – West Package 80% detailed design construction footprint are illustrated in Figure 4-5.

Table 4-10 Comparison of non-Aboriginal heritage impacts between the AR Submissions Report and the 80% detailed design

Heritage item name	Register listings	Significance	Heritage impacts – AR Submissions Report construction footprint	Heritage impacts – M12 Motorway – West package 80% detailed design construction footprint
McGarvie Smith Farm	Penrith LEP 2010 I857	State	Major	Major
The Fleurs Radio Telescope Site	Penrith LEP 2010 I832	State to National	Minor	Minor

Heritage item name	Register listings	Significance	Heritage impacts – AR Submissions Report construction footprint	Heritage impacts – M12 Motorway – West package 80% detailed design construction footprint
Luddenham Road alignment	Penrith LEP 2010 I843	Local	Negligible	Negligible
McMaster Field Station	Potential item	State	Major	Major

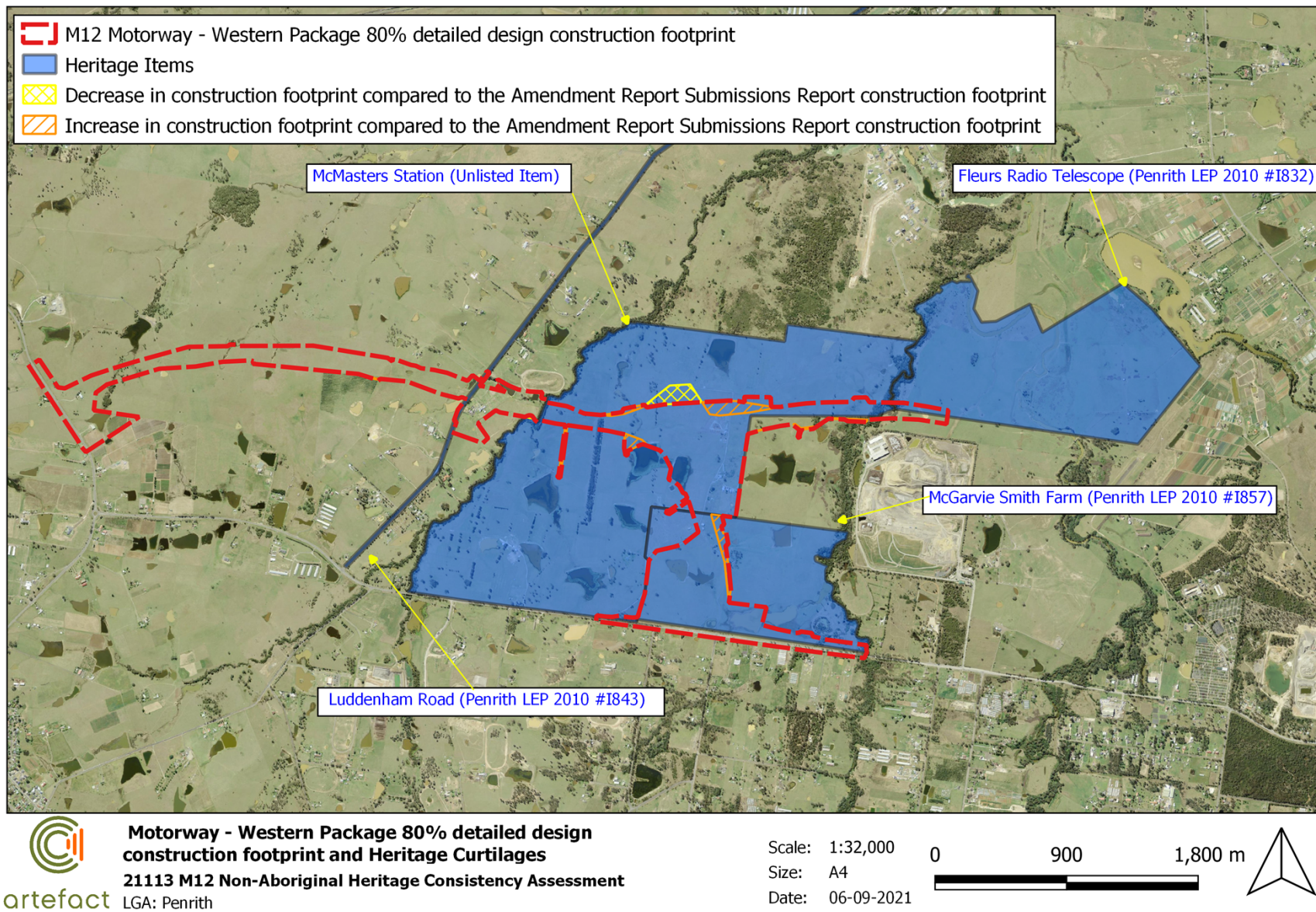


Figure 4-5 Location of heritage items in the vicinity of the M12 Motorway - West Package 80% detailed design construction footprint

McGarvie Smith Farm

The design changes would impact an additional 4.5 hectares of land within the curtilage of the McGarvie Smith Farm to the east of the Airport Access Road. It has been assumed that all structures and landscapes within this increased construction footprint would be removed for construction. The comparison of the M12 Motorway - West Package Amendment Report Submissions Report construction footprint and the M12 Motorway - West Package 80% detailed design construction footprint with respect to heritage significant fabric of the McGarvie Smith Farm is illustrated in Figure 4-5.

The increased construction footprint results in the removal of a building denoted in the Project EIS as McGarvie Smith Farm 8. Table 6-1 of Appendix J (Non-Aboriginal heritage Assessment Report) of the Project EIS assesses the heritage value of the fabric. McGarvie Smith Farm 8 has an overall moderate contribution heritage grading to the McGarvie Smith Farm.

The McGarvie Smith Farm 8 building was partly within the Approved Amendment Report Submissions Report construction footprint and was proposed to be demolished. Therefore the non-Aboriginal heritage impacts are consistent with impacts in the AR Submissions Report and Approved Project.

Widening the construction footprint to the east of the Airport Access Road would also remove a larger area of the rural landscape of the site, which is considered a component of the McGarvie Smith Farm. The additional 4.5 hectares of construction footprint would not demonstrably alter the degree of loss of context and wider landscape of the heritage item. This is because the Amendment Report and Project EIS described the removal of all structures and landscaping for the majority of the landscape between Elizabeth Drive and the entrance road of the property.

The impacts would be considered consistent with the heritage impacts in the AR Submissions Report, which would result in a major impact to the wider landscape character of the McGarvie Smith Farm, as well as a direct impact to the heritage curtilage.

The Fleurs Radio Telescope Site

The M12 Motorway - West Package 80% detailed design construction footprint would not involve any modification to the construction footprint within the curtilage of the Fleurs Radio Telescope heritage site. The proposed bridge over Badgerys Creek (BR05) would be realigned as part of the M12 Motorway – West Package, however this would not involve any increase to the size of the construction footprint (and subsequent demolition extent) within the boundary of this heritage item.

There would be no change in the degree of adverse impact to the heritage significance of the Fleurs Radio Telescope from M12 Motorway - West Package 80% detailed design construction footprint.

The demolition of the residual elements of the South Creek 5 Antenna Complex would impact an element of little heritage value and would result in no change to the degree of adverse impact to the heritage item from the project.

The demolition of the cable alignment for the M12 Motorway - West package would involve the removal of up to 100 metres of the former cable alignment, an element graded of moderate value to the heritage significance of the item overall. This would result in a minor adverse impact to the heritage significance of the Fleurs Radio Telescope.

There would be no change in the degree of adverse impact to the heritage significance of the Fleurs Radio Telescope from M12 Motorway - West Package 80% detailed design construction footprint, resulting in a **minor** adverse heritage impact to the heritage item.

Environmental management measure NAH05 has been revised to include archival recording and is provided in full in Table 5-2.

Luddenham Road alignment

The 80% detailed design would alter stormwater drainage culverts and channels directly near Luddenham Road. However drainage works for the M12 Motorway – West Package would not be located within the

curtilage of the listed item of Luddenham Road itself. The heritage impact to this item would remain as a negligible impact to the heritage significance of the item.

McMaster Field Station

The design changes involve an increase to the construction footprint within the curtilage of the McMaster Field Station. The design changes involve the addition of three small segments. The revision of the Airport Interchange would also reduce the construction footprint within the curtilage of this item. The location of the McMasters Field Station is shown in Figure 4-5.

New areas of ground disturbance are located in greenfield areas of the property and only one farming shed would be removed. The heritage value of this building was not assessed in the Project EIS, Amendment Report or AR Submissions Report, however aerial imagery shows that this building is a modern corrugated metal storage silo associated with a nearby modern scrap yard. This building is of little heritage value to the significance of the item overall. The removal of this element would not increase the degree of adverse impact to the heritage significance of the item overall.

The increased construction footprint would involve modification to the landscape directly next to the northern edge of one of the existing dams on the property. The construction of a water quality basin in this area is presumed to modify the dam. Dams within the site are considered of moderate heritage value to the heritage significance of the item overall.

The increase to the construction footprint would not significantly change the overall degree of impact to the heritage item from the AR Submissions Report. The M12 Motorway - West Package 80% detailed design construction footprint would avoid demolishing the main complex of historic buildings at the property. Despite the preservation of these structures, the large alteration to the landscape, context, views and historic legibility of the item from the project would remain as a major adverse impact to the heritage significance of the item.

4.6 Noise and vibration

A qualitative noise assessment was carried out to compare the Amendment Report noise assessment to the proposed impacts of the 80% detailed design. The noise and vibration assessment is provided in Appendix F and summarised in this section.

4.6.1 Assessment methodology

The methodology for this assessment is described in Section 7.7 of the Project EIS and Section 6.7.1 of the Amendment Report. These methodologies contain detailed descriptions and explanations on the assessment guidelines and assessment methods used. The noise and vibration assessment for this consistency assessment involved the following:

- Review of Approved Project documentation
- Identifying design changes since Approved Project, including horizontal and vertical alignment changes
- Qualitative assessment of impacts from the Approved Project to 80% detailed design
- Summarise if the design changes are consistent with the noise and vibration outcomes from the Approved Project
- Identify if the design changes resulted in updates to the proposed noise and vibration mitigations recommended for the Approved Project
- Where it is recommended that further noise modelling is required, this shall be undertaken by TfNSW as part of the 100% detail design.

This review has included a high-level review of the Noise and vibration assessment report (NVAR) 50% detailed design model to identify any design or parameter changes. No other project models were reviewed.

No additional ambient noise surveys were carried out for the amended project, as the amended construction and operational footprints are largely consistent with the project as described in the EIS. Monitoring locations and ambient noise survey results are detailed in Section 7.7.5 of the EIS.

4.6.2 Construction noise

This section summarises the changes to construction noise and vibration impacts between the Approved Project and 80% detailed design.

A qualitative assessment of changes has been completed based on available information. The key features of the Approved Project are provided in Section 1.2 of the EIS and Amendment Report NVIAs. This review has been tailored to include the relevant portions of the M12 Motorway – West Package.

The Approved Project included an assessment of construction noise and vibration, including construction traffic noise, at receivers in the M12 Motorway – West Package for a number of representative construction scenarios.

Receivers assessed included noise-sensitive and vibration sensitive receivers, including heritage buildings and other structures.

Construction noise and vibration impacts were assessed for relevant scenarios based on scenarios and equipment schedules. Ground borne noise was not considered as part of the assessments due to the distance to receivers, which are considered sufficient to manage the potential for associated impacts to human comfort and amenity.

The safe working distances for vibration generating plant, and potentially affected vibration sensitive receivers were outlined in Figure 5-12 of the EIS NVIA.

The Approved Project completed a construction traffic assessment based on typical industry accepted methods. No noticeable increases in road traffic noise were predicted.

Construction noise

Horizontal alignment

The 80% design modifies the Approved Amendment Report Submissions Report construction footprint at several locations which has the potential to impact the outcomes of the Amendment Report NVIA. The most significant change is that the construction footprint moves up to 25 metres closer to several structures in NCA07, being the heritage listed McGarvie Smith Farm. One building in McGarvie Smith Farm is located within the M12 Motorway – West Package 80% detailed design construction footprint, however this building (McGarvie Smith Farm 8) was already identified for demolition as part of the project, therefore no additional noise or vibration impacts are anticipated.

No notable changes are noted for NCA08, NCA09 and NCA10.

Due to the changes in the footprint, there is minimal changes to noise and vibration outcomes impacts as a result of construction.

Vertical alignment

Minor changes to vertical alignment have been identified as part of the constructability assessment, which may result in additional exposure during construction activities.

It is considered that potential noise impacts from vertical alignment modifications are negligible. Due to the distance between these changes in vertical alignment to affected receivers.

Construction traffic noise

The Traffic and transport consistency assessment memo identified changes to construction works associated with heavy vehicle movements and traffic haulage activities when accessing Ancillary Facilities (AF), refer to Section 4.2.2). The changes in forecast heavy vehicle movements are summarised in Table

4-11, alongside the estimated potential change in road traffic noise emissions. The change in noise levels has been estimated by a desktop calculation based on relative change in traffic volumes.

Table 4-11 Qualitative assessment of potential changes to construction road traffic noise

Haulage route (access)	Total truck movements		Estimated change in noise level
	Approved Project	80% detailed design	
M7 Motorway, Elizabeth Drive and The Northern Road (AF 1 & AF 10)	16,671	3,533	-7 dBA
M7 Motorway and Elizabeth Drive (AF 2 & AF 3)	30,124	54,863	+3 dBA
M7 Motorway, Elizabeth Drive, The Northern Road and Luddenham Road (AF 11)	18,566	32,365	+3 dBA

There is potential for construction traffic noise for site accesses at AF 1 and AF 10 to be notably lower than previously assessed in the Amendment Report. A 7 dBA reduction in noise levels for the construction traffic movements in the 80% detailed design would be a perceptible difference in noise levels at sensitive receivers.

For the access routes to AF 2, AF 3 and AF 11, there is potential for road traffic noise levels to increase by 3 dBA from those assessed as part of the Approved Project. This noise level change is typically the lower threshold of perceptible (audible) difference in noise levels but may trigger a requirement to review previous assumptions with respect to the management of construction noise on these haulage routes. The mitigation measures and Conditions of Approval are considered adequate to address the changes in noise level. Construction noise will be addressed in the Construction Noise Management Plan.

When considering the increase in traffic numbers in context of daily construction activity, the change in daily heavy vehicle movements would be consistent with the changes in the total road traffic volumes.

Construction noise and vibration impacts are generally limited to NCA07, with the footprint moving closer to McGarvie Smith Farm. This is to be demolished as part of the project, and there will be no additional impacts.

It is anticipated that the 80% detailed design will result in negligible changes to the noise mitigation requirements of the Approved Project, with the exception of some changes to haulage traffic. The mitigation recommendations in Figure 7-3 of the Amendment Report NVIA would remain unchanged.

4.6.3 Operational noise

This section summarises the operational noise impacts and changes between the Approved Project NVIA and 80% detailed design. A qualitative assessment of changes has been completed based on available information. The documents reviewed to inform this assessment include the EIS Noise and Vibration Impact assessment (EIS NVIA, included as Appendix K of the Project EIS), Amendment Report NVIA (included as Appendix G of the Amendment Report) and 50% detailed design Noise and vibration Assessment Report (NVAR) (GHD, 2020).

The following elements have been found to be consistent with the Approved Project and have not been considered further:

- Policy implementation (Section 3 of the EIS NVIA, unchanged in Amendment Report NVIA)
- Noise mitigation measures and their effectiveness: No changes from Amendment Report NVIA and AR Submissions Report
- Sensitivity analysis: No changes from Amendment Report NVIA.

The following elements were identified to potentially impact the Approved Project outcomes:

- The horizontal and vertical road alignment changes since the Amendment Report NVIA
- Traffic volumes changes since the Amendment Report NVIA
- Surface corrections adopted in the noise modelling have changed from the Amendment Report NVIA to incorporate the low noise diamond grind pavement surface as part of the Approved Project.

Operational road noise

The 50% detailed design NVAR included commentary on the changes in the design and road traffic noise assessment between the EIS and Amendment Report. This commentary has been reviewed as part of the Consistency Assessment, and identified the following parameter modifications with the potential to impact noise impact outcomes:

- Road source traffic volumes
- Road traffic noise emissions source heights
- Surface corrections adopted in the noise modelling have changed from the Amendment Report NVIA to incorporate the low noise diamond grind pavement surface as part of the Approved Project.

The principal design changes that relate to operational road traffic noise impacts include:

- Changes to the horizontal alignment (footprint)
- Changes in vertical alignment (elevation)
- Changes in traffic volumes as a result of new connections to the Motorway
- Change in intersections and entry and exit ramps and alignments of lanes.

A qualitative assessment of potential operational noise changes has been completed based on the available design information and the road traffic noise assessment undertaken for the 50% detailed design. Four noise catchment areas (NCAs) are located within the M12 Motorway – West Package including NCA07, NCA08, NCA09 and NCA10. The design changes that have the potential to impact operational noise are described below.

Horizontal alignment

The change in horizontal alignment has the potential to increase noise impacts by up to about 1dB for receivers in NCA07, however the impacted receivers would be demolished as part of the M12 Project and would not be impacted during operation. There is expected to be a decrease in noise levels by about 1.7dBA for one receiver west of Luddenham Road in NCA09. There are no changes to noise level impacts in NCA08 and NCA10.

Vertical alignment

The vertical alignment changes between the Amendment Report and the 80% detailed design are mainly due to the changes at the Airport Interchange and the Elizabeth Drive Interchange. These design changes result in a reduction of about four metres at the Airport Interchange and an increase of about 10 metres at the Elizabeth Drive Interchange compared to the design assessed in the Amendment Report NVIA. Reductions of up to five metres occur along the majority of the M12 Motorway – West Package in NCA07, and eastern parts of NCA09, with increases up to two metres to the western portion of the Motorway in NCA10.

The majority of other changes to vertical alignment along the M12 Motorway are either minimal (increases up to one metre) or there is a reduction in height compared to the Approved Project. Changes to the proposed vertical geometry of the alignment may result in changes in road traffic noise levels where changes exceed one metre. Whilst this has the potential to change road traffic noise levels by an estimated 2 dBA, this is not anticipated to be a change in noise related impact

The changes in vertical alignment outlined in this section have been incorporated into noise modelling as part of the 50% detailed design NVAR (GHD, 2020). The 50% detailed design NVAR noted that these

vertical changes resulted in minor to moderate impacts compared to the Amendment Report and therefore the 80% detailed design which is currently adopting the 50% detailed design NVAR.

Road traffic noise modelling will be finalised based on the 100% detailed design in accordance with the conditions of approval for the project to confirm the noise impacts and mitigation required. This is particularly relevant for receivers in NCA08, NCA09 and NCA10 where increases in vertical alignment above one metre are anticipated and the road in question is the dominant noise source.

An Operational Noise and Vibration Review will be prepared to document the outcomes from the 100% detailed design noise modelling and will be submitted to the Planning Secretary for information in accordance with the Conditions of Approval.

Traffic volumes

The Traffic and Transport memo (refer to Section 4.2 and Appendix B) identified that road traffic volumes have changed between the Amendment Report design and the 80% detailed design. It is noted that this document does not include the full scope of the Elizabeth Drive upgrades, which would result in traffic shifting from the M12 Motorway to Elizabeth Drive. As a result, the noise assessment may underestimate traffic volumes on Elizabeth Drive and overestimate the traffic volumes on the M12 Motorway.

The traffic volumes assessed in Section 3.2.1 of Traffic and Transport Consistency Assessment Memo (Appendix B) are based on peak hour volumes as opposed to annual average daily traffic volumes as is required for road noise assessment. Peak hour volumes are considered to provide a worst-case scenario of traffic volumes and the following assessment is qualitative only. Impacts over the relevant assessment periods cannot be quantitatively assessed and this assessment provides an indicative assessment of potential impact.

Overall, there is a general increase in road traffic volumes on the M12 Motorway with reductions in road traffic volumes on the connecting surrounding roads. Based solely on the traffic volumes, the changes to traffic volumes on Elizabeth Drive, Luddenham Road and The Northern Road are estimated to reduce traffic noise emissions from the Amendment Report design by about 1 dBA. However, it is likely that the traffic volumes presented are overestimated, therefore these changes in noise levels are likely to be highly conservative.

Estimated changes in noise levels are qualitative due to the inherent limitations based on changes from the Approved Project. Where possible, estimates are based on changes from the Approved Project and relative changes in volumes.

Road traffic noise modelling and an Operational Noise and Vibration Review (ONVR) will be carried out at the 100% detailed design stage in accordance with Conditions of Approval and will quantitatively evaluate potential changes to road traffic noise as a result of changes in the traffic volumes from the Approved Project. A report will be produced to confirm the operational noise impacts and mitigation measures and will be submitted to the Planning Secretary for information.

Intersections, lanes and ramps

Assuming minimal changes to traffic volumes, the potential impacts from the distribution of traffic on new routes has been qualitatively assessed, considering changes to the configurations of lanes and off ramps with the new intersection, changes to on and off ramps, realignment of Elizabeth Drive 10 metres to the north, and revision of the intersection exiting the WSIA.

In summary, these changes would result in either no change to road traffic noise levels from the Amendment Report NVIA design or a relatively minor change of not more than 2 dBA.

Noise mitigation

Use of low-noise diamond grind concrete and at-property treatment is the preferred mitigation strategy for M12 Motorway – West Package, as discussed in Section 3.10.3 of the AR Submissions Report.

A low-noise diamond grind pavement is considered a noise mitigation treatment implemented across the Project (i.e. no longer a mitigation approach) and has been included in the 50% detailed design noise

modelling. Consequently, at-property treatment of eligible sensitive receiver properties is expected to be the primary additional noise mitigation approach.

Where the assessment has conservatively identified that changes in road traffic volumes could result in a perceptible increase in road traffic noise, for example up to 5 dBA, it does not change the approach to mitigate and manage road traffic noise from the Approved Project.

The receivers identified in Section 6.7.4.2 of the AR Submissions Report for consideration of road traffic noise mitigation are expected to remain largely consistent as a result of the 80% detailed design changes. There may be some changes in the number of discrete receivers triggering property treatment as the assessment against the noise criteria can be influenced by relatively small margins, for example less than 1 dBA. Receivers will be verified as part of the final noise modelling undertaken for the 100% detailed design in accordance with the Conditions of Approval.

Based on the proposed changes at the 80% detailed design, the following are to be completed in accordance with the Conditions of Approval (refer to Section 5.1) and revised environmental management measures (refer to Section 5.2) for the project:

- Update the detailed road traffic noise prediction modelling for the final detailed design, consistent with Condition of Approval E51 and E52
- Confirm road traffic noise mitigation requirements, in addition to the diamond grind pavement surface, based on the completion of the road traffic noise modelling, consistent with Condition of Approval E51 and E52, and revised environmental management measure NV14
- Update the detailed design NVAR reporting and complete the ONVR based on the completed road traffic noise assessment for the final design, consistent with Condition of Approval E51 and E52 and revised environmental management measure NV14
- Verify road traffic noise levels upon project opening as part of an Operational Noise Compliance Report, consistent with Condition of Approval E60.

4.7 Flooding

A flooding assessment was carried out to assess the change in flooding impacts compared to the compare the proposed changes to the Approved AR Submissions Report construction footprint and design development. The flooding assessment is provided in Appendix G and summarised in this section.

4.7.1 Assessment methodology

The following methodology was carried out to assess the consistency with the Approved Project:

- Review the flooding assessment and TUFLOW model carried out at 100% detailed design against the Amendment Report and AR Submissions Report
- Update of flood immunity and hydraulic impact predictions for the 100% detailed design
- Identify changes to the impacts documented in the Project EIS, Amendment Report and AR Submissions Report and Conditions of Approval
- Review the revised environmental management measures presented in the AR Submissions Report and identify any updates required to address any changes to impacts from the 100% detailed design taking into consideration the requirements of the Division 5.2 Approval dated 23 April 2021.

Further detail for the flooding assessment methodology is provided in Appendix G.

Study area

The study area as described in Section 6.8 of the Amendment Report has not changed. The key areas where the M12 Motorway – West Package would influence, or be influenced by flooding are:

- The minor waterway next to Luddenham Road where bridged by the M12 Motorway – West Package
- Cosgroves Creek

- Badgerys Creek where the M12 Motorway – West Package main alignment crosses the creek
- Badgerys Creek where Elizabeth Drive crosses the creek.

Modelling

Hydrology

The hydrological characteristics of the catchments within the study area are described in Section 7.8 of the Project EIS. The characteristics were unchanged in the Amendment Report and have remained generally similar in detailed design. A detailed description of the hydrology and hydraulics modelling is provided in Section 3.2 of Appendix B.

During detailed design, the hydrologic modelling for the project was updated. The model update included the following key updates:

- Australian Rainfall and Runoff 2019 rainfall input and methods
- XP-RAFTS and DRAINS models replace the rainfall-on-grid method used in the Amendment Report and used as inflows for the regional creek catchments (Cosgroves, Badgerys and South Creeks)
- Application of inflows from the WSIA.

Hydraulics

Section 7.8.2 of the Project EIS and Section 6.8.1.1 of the Amendment Report describes the hydraulic modelling stage. The latest WSIA designs included in the WSIA flood model were updated in the M12 Motorway – West Package detailed design TUFLOW model, including bulk earthworks and cross-drainage structures at the temporary WSIA roundabout at Elizabeth Drive onto Badgerys Creek Road. Culverts and topography have also been updated in the hydraulic model.

4.7.2 Construction impacts

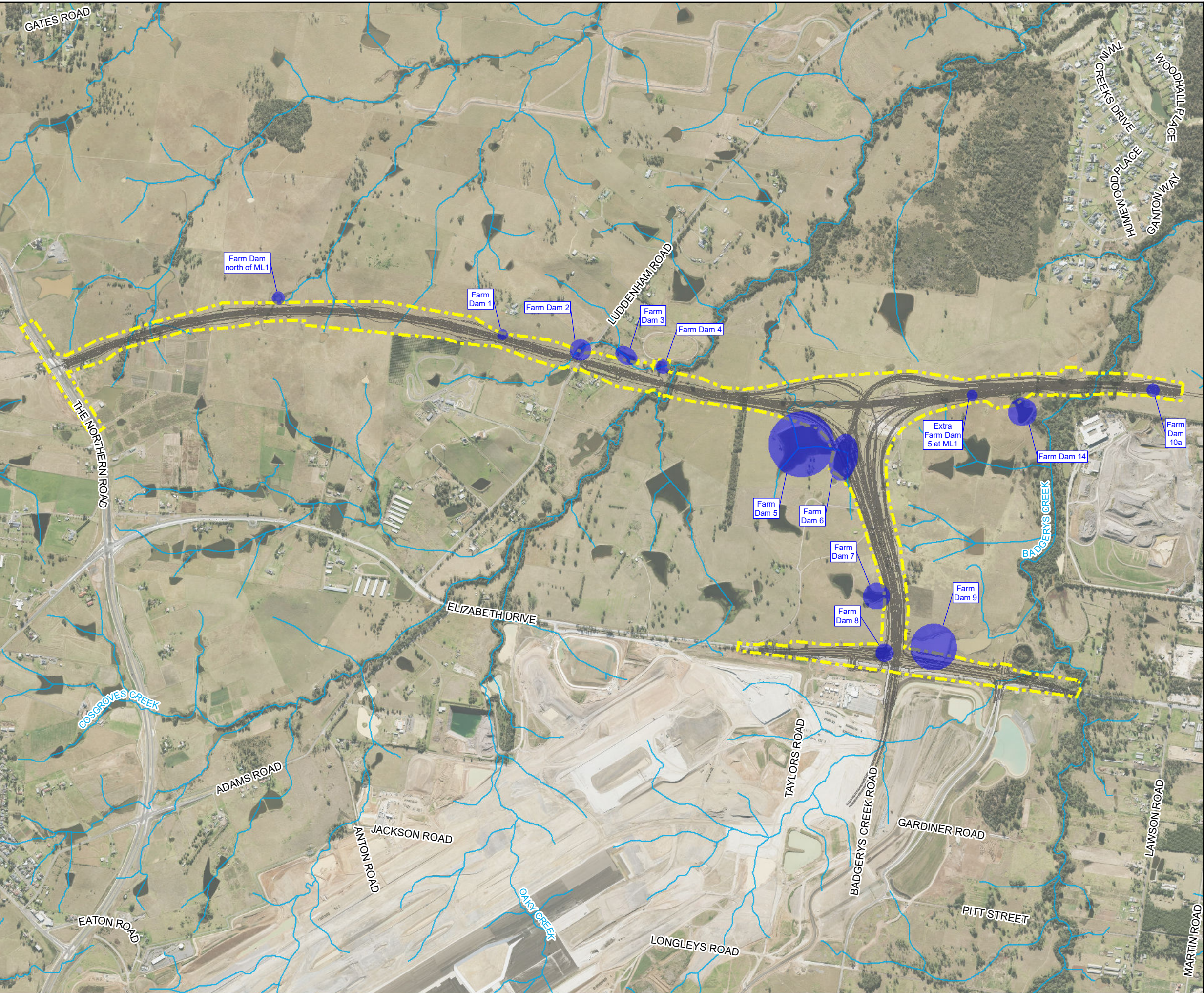
Section 6.8.3.1 of the Amendment Report identified several flood impacts that may occur during construction due to earthworks, stockpile and ancillary facilities and temporary creek crossings during the construction of the waterway bridges. No change is expected for these activities compared to the Amendment Report.

Farm dams

Partial or complete infilling of 12 farm dams have been included in the 100% detailed design. The locations of the dams are shown in Figure 4-6. During construction, Dams 1, 2, 8, Extra 5 and 10a will be completely infilled. All others will be partially infilled up to two to four metres past the M12 Motorway – West Package operational footprint to facilitate landowner access around the periphery of these dams.

During construction, these dams would need to be dewatered. There will also be permanent loss of floodplain storage associated with changes to the farm dam footprints.

In the event of a major flood event during construction, the overland flow path connecting Farm dams 2, 3, 4 eastwards to Cosgroves Creek would need to be replicated by the new open channels and culverts associated with M12 Motorway – West Package property adjustment works along Luddenham Road. As property adjustment works and the works at these dams should be completed at a similar time.

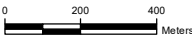


M12 Motorway - West Package
Consistency Assessment

Figure 4-6
Farm Dams

Legend

- Farm dam
- M12 Motorway – West Package
detailed design operational
footprint
- M12 Motorway – West package
detailed design



Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3
1:20,000 Date: 2/09/2021

Data sources: - DNRME, TMR, Translink, Geoscience Australia
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4.7.3 Operational impacts

Section 6.8.3.2 of the Amendment Report identified several flood impacts during operation. The potential impacts on flooding behaviour have been considered during development of the detailed design. This section focuses on changes to impacts when compared to the project as described in the Amendment Report.

No change is expected for the following activities compared to the Amendment Report and are considered consistent with the Approved Project:

- Land use impact
- Impacts on buildings and inundation durations
- Changes in surrounding catchments
- Hydraulic functions of flow conveyance
- Emergency management, evacuation and access
- Social and economic costs.

Operational impacts that have changed since the Amendment Report include:

- Increases in flood affection
- Farm dams
- Changes to peak stormwater flows, downstream velocity and scour potential
- Flood hazards.

These impacts are discussed in the following sections.

Increases in flood affection

The increases in flood affection are a result of the increased level of detail in the flood assessment completed as part of the 100% detailed design compared to the Project EIS and Amendment Report, including:

- Increased M12 Motorway – West Package road catchment runoff due to the road design changes (e.g. additional ramps and intersection refinement)
- Cross-drainage culvert modelling allowing for obstruction to flows across the M12 Motorway
- Further developing the property adjustment works around farm dams
- Optimising waterway bridge designs within the M12 Motorway - West Package 80% detailed design operational footprint.

The flood impacts described below are consistent with Condition of Approval E16 to E23 that accounted for the future land use in the vicinity of the M12 Motorway project, according to the Western Sydney Aerotropolis Plan (Western Sydney Planning Partnership and NSW Government, WSA2020) adopted in detailed design.

The changes in afflux have been reduced across the M12 Motorway – West Package in the 100% detailed design by between 15 to 100 millimetres at Luddenham Road, Cosgroves Creek, Badgerys Creek and Badgerys Creek Elizabeth Drive. Table 4-12 summarises the change to flood impacts between the Project EIS and Amendment Report and the 100% detailed design for BR01, BR02, BR05 and Badgerys Creek Elizabeth Drive cross drainage.

Table 4-12 One percent AEP flood impact comparison

Location	Stage	Project EIS and Amendment Report	100% detailed design
Luddenham Road BR01	Afflux at the operational footprint	Upstream (south): + ≤ 31mm Downstream (north): + ≤ 27mm	Upstream (south): + ≤ 30mm Downstream (north): + ≤ 30mm

Location	Stage	Project EIS and Amendment Report	100% detailed design
	Afflux outside the operational footprint	Upstream (south): + ≤ 20 to 40mm Downstream (north): + ≤ 20 to 40mm	Upstream (south): Reduction ≤ 30mm Downstream (north): + ≤ 80mm at the existing 3xRCP900 culvert. This is located in land zoned as Environment & Recreation where up to 100mm afflux is allowed.
Cosgroves Creek BR02	Afflux at the operational footprint	Upstream (south): + ≤ 5mm Downstream (north): + ≤ 0mm	Upstream (south): + ≤ 100mm Downstream (north): + ≤ 25mm These impacts are located in land zoned as Environment & Recreation where up to 100mm afflux is allowable under the Project Conditions of Approval.
	Afflux outside the operational footprint	Upstream (south): 0mm Downstream (north): 0mm	Upstream (south): + ≤ 10mm Downstream (north): + ≤ 25mm
Badgerys Creek BR05	Afflux at the operational footprint	Upstream (south): + ≤ 17mm Downstream (north): + ≤ 35mm	Upstream (south): + ≤ 60mm Downstream (north): + ≤ 95mm These impacts are located in land zoned as Environment & Recreation where up to 100mm afflux is allowed.
	Afflux outside the operational footprint	Upstream (south): Reduction ≤ 20mm Downstream (north): Reduction ≤ 20mm	Upstream (south): + ≤ 100mm Downstream (north): + ≤ 70mm
Badgerys Creek Elizabeth Drive	Afflux – Badgerys Creek	+ ≤ 75mm	+ ≤ 15mm
	Afflux - floodplain	+ ≤ 50mm	+ ≤ 20mm
	Afflux downstream of Elizabeth Drive	- ≤ 25mm	- ≤ 30mm

Luddenham Road BR01

The BR01 span has been reduced by about eight percent compared to the Project EIS and Amendment Report. The flood impacts at this location are due to further development of the flood model to reflect the required property adjustment works north of BR01 along the western verge of Luddenham Road and shared user pathway connection from the M12 Motorway West mainline. The changes in afflux are a result of changes to Farm dam 2, new property access, drainage and the shared user path.

The existing flood immunity of Luddenham Road and the adjacent existing driveways remain unchanged compared to existing conditions, however there are some flood impacts along Luddenham Road downstream (north) of the M12 Motorway – West Package at the existing culvert.

Up to 80 millimetres afflux is noted downstream (north) of the M12 Motorway – West package 80% detailed design construction footprint along the western side of Luddenham Road as overland flows are diverted to

the existing culvert under Luddenham Road. The impacts are confined to the road reserve of Luddenham Road. However there is no significant change to the flood immunity or hazardous nature of flooding along Luddenham Road as flooding is reduced along the section of road immediately south that is located below Bridge BR01 and is therefore considered consistent with the Approved Project.

Cosgroves Creek BR02

The 100% detailed design reduces the BR02 span over Cosgroves Creek by about 28 percent compared to the Amendment Report. Further property access development around BR02 resulted in a new property access road along the eastern abutment of BR02. Consultation with the landowners resulted in the property access road being lifted above the one percent AEP flood level under the bridge causing a further constriction to the existing waterway area.

Table 4-12 summarises the change to flood impacts between the EIS and Amendment Report and the 100% detailed design. While there has been an increase in peak one percent AEP flood levels, the 95-millimetre increase is within the limits set in the Conditions of Approval and is considered consistent with the Approved Project.

Badgerys Creek BR05

The 100% detailed design reduces the BR05 span over Badgerys Creek by about 26 percent compared to the Amendment Report. Further development of the property access requirements around this bridge resulted in a new property access road provided along the eastern abutment of BR05. In discussion with the landowners, the property access road has been lifted above the one percent AEP flood level under the bridge causing a further constriction to the existing waterway.

Table 4-12 summarises the change to flood impacts between the EIS and Amendment Report and the 100% detailed design. While there has been an increase in peak one percent AEP flood levels, the 43-60 millimetres increase is within the limits set out in the conditions of approval and considered consistent with the Amendment Report.

Badgerys Creek Elizabeth Drive

The M12 Motorway - West Package TUFLOW model has been refined at detailed design to incorporate the latest WSIA flood model information. The new cross-drainage designs under Elizabeth Drive have been sized at detailed design to minimise flood impacts in WSIA land upstream (south) of Elizabeth Drive.

Table 4-12 summarises the change to flood impacts between the EIS and Amendment Report and the 100% detailed design. Flood levels in this area have been reduced at detailed design compared to the Project EIS and Amendment Report.

Farm dams

Farm dams were assessed as part of the 100% detailed design and are shown in Figure 4-6. The 100% detailed design and the design changes have resulted in some change to flooding impacts where farm dams are partially or completely infilled. Table 4-5 of Appendix G describes the changes to each dam.

New open channels have been included where required to minimise flood impacts to surrounding areas around the dams. The civil works, flood impacts and associated flood impact mitigation measures developed in the 100% detailed design are described in further detail in Appendix G.

Some velocity impacts are noted beyond the project operational footprint for Farm dam 4, Farm dam 5 at AAR and Farm dam 7. Some velocity impacts are noted beyond the project operational footprint. In these areas further assessment and additional mitigation measures will be implemented to mitigate scour potential in consultation with affected landowners in accordance with Conditions of Approval E17.

Change in peak flows, downstream velocity and scour potential

Peak flows due to the M12 Motorway – West Package 100% detailed design are similar to the Amendment Report. The peak flows in the creeks (Cosgroves and Badgerys Creeks) and at culvert outlet locations are generally within 10 percent of the existing peak flows.

There are six areas within the M12 Motorway – West Package that result in an increase of more than 10 percent in the one percent AEP. The changes are due to refining the TUFLOW flood model at 100% detailed design to reflect property adjustment work around farm dams.

Areas that show a change of more than 10 percent in the one percent AEP include the flowing areas:

- North of the Airport Interchange (Reference at Project EIS/ Amendment Report: CC DL 4600 and CC DL 5050)
- Farm dam east of farm dam 9 (Reference at Project EIS/ Amendment Report: BC DL 5150)
- Mainline (ML1) CH10985 (Reference at Project EIS/ Amendment Report: CC DL 1010)
- Mainline (ML1) CH11115
- Mainline (ML1) CH12085 (Reference at Project EIS/ Amendment Report: SC DL 2100)
- Mainline (ML1) CH12205 (Reference at Project EIS/ Amendment Report: SC DL 2200).

Any changes to flood impacts associated with these areas are compliant with Condition of Approval E17 for afflux, changes to velocity, duration of inundation and hazard. Table 4-6 of Appendix G describes the change at each location in detail. Scour protection has been provided at the associated culvert outlets to mitigate proposed increased flows and velocities. The rock protection is sized for the one percent AEP outlet velocities noted in these areas.

At 100% detailed design, scour protection has been provided at the following areas to mitigate against increases in scour potential:

- Culvert inlet and outlet locations
- Open channels where erosive velocities are expected
- Waterway bridge abutments and piers (BR02 and BR05).

Where increases in velocities in areas outside the project operational footprint exceed the limits set out in Condition of Approval E17, mitigation measures will be implemented in consultation with affected landowners as per Condition of Approval E17.

Change in flood hazard

One per cent AEP

While an increase from H2 to H5 hazard category is observed along the western side of Luddenham Road adjacent to the access to Lot 26 DP 604586, this is not considered to be a significant increase in flood hazard given its location.

Probable maximum flood

No criteria for probable maximum flood (PMF) events were noted in the Project EIS or Amendment Report. Impacts on flood behaviour during the PMF have been assessed for increases in the hazardous nature of flooding that would lead to an increased risk to life in accordance with the principles of the NSW Floodplain Development Manual. The changes in PMF flood hazard are generally localised and do not significantly alter the overall hazard of the affected areas.

Table 4-13 PMF change in hazard at 100% detailed design

Location	Change in hazard at 100% detailed design
The minor waterway next to Luddenham Road	The change in flood hazard on Luddenham Road is minimal however flood hazard is increased to H5 along the western abutment of BR01 into the M12 Motorway – West Package open channel running along the western verge of Luddenham Road. This

Location	Change in hazard at 100% detailed design
where bridged by the M12 Motorway – West Package	channel conveys runoff across the new property access to LOT26 DP604586 and existing driveway to LOT25 DP604586. Flood hazard has also increased to H5 on Luddenham Road itself locally at the tie in with the driveway to LOT25 however the existing road is already at H5 outside of this local area of increase.
Cosgroves Creek at BR02	Increases in flood hazard up to the H5 category are noted along the fringes of the upstream floodplain, however this dissipates to H2 within 50m of the existing floodplain of Cosgroves Creek. New areas of flooding upstream of the M12 are as high as H4 directly adjacent to the existing floodplain however this dissipates to H1 within 40m of the existing flood extents.
Badgerys Creek at BR05	Flood hazard is generally similar along the existing flood extents however there is some increase to H6 along the fringes of the floodplain. New flooding within the Suez Kemps Creek Resource Recovery Centre is noted where flood levels overtop the road/ drainage bund north of the property resulting in water ponding within the site with hazard up to H6. In this area, some of the impact is also due to works by the M12 Motorway - Central Package. PMF flood impacts in this area is detailed as part of the M12 Motorway – Central Package. There is no catchment interaction between the M12 Motorway - West Package and M12 Motorway – Central Package in all other events up to the five percent AEP.
Badgerys Creek where Elizabeth Drive crosses the creek	Hazard is mostly unchanged in this area, however there is some increase in hazard along the fringe of the flood extent up to H5 but dissipates to H1 within 5m of the existing flood extents. It should be noted the latest WSIA flood information shows the Airport Access Road which ties into the Airport Access Road at the Project Operational Boundary is overtopped by up to 1m in the PMF event and is rated H5. As such, the M12 Motorway – West Package drainage strategy does not reduce the flood immunity of this access.

4.8 Surface water quality and hydrology

A surface water quality assessment was carried out to compare the proposed changes to the Approved Project. The surface water quality memo is provided in Appendix H and summarised in this section.

4.8.1 Assessment methodology

Water quality modelling using the eWater MUSIC - Model for Urban Stormwater Improvement Conceptualisation (MUSIC), was carried out to determine the pollutant load reductions that can be achieved by permanent water quality swales (with rock check dams) for total suspended solids, total nitrogen and total phosphorus.

The MUSIC model was set up to represent local rainfall conditions and proposed catchment characteristics (surface area and perviousness). The catchment delineation is identified in accordance with longitudinal drainage systems and local topography. Model parameters for bio-retention basin and swales are based on the recommendation of the Water Sensitive Urban Design Technical Guidelines Version 3 (Penrith City Council, 2015). The aim of the MUSIC model is to ensure that the water quality objectives are achieved in accordance with the conditions of approval.

The results of the MUSIC model were compared against the result previously achieved for the road and pavement drainage proposed in the Amendment Report and Project EIS. Where there has been no change

in the surface water quality and hydrology assessment between the Project EIS and the Amendment Report, the details of Project EIS have been used.

4.8.2 Assessment of potential construction impacts

As per Section 7.9.4 of the Project EIS, potential surface water quality impacts on receiving waterways during construction are to be effectively mitigated through local erosion and sediment controls detailed in Erosion and Sediment Control Plans (ESCPs) to be prepared as part of the construction soil and water management plan before construction commences. The number of water quality basins in the Amendment Report is the same as the EIS. A total of 19 temporary sediment basins are proposed in the Project EIS, including nine for Cosgroves Creek and 10 for Badgerys Creek. In the 100% detailed design, a total of 30 temporary sediment basins are proposed, including 20 for Cosgroves Creek and 10 for Badgerys Creek. While the number of temporary sediment basins has increased, all the catchments in the construction footprint area have been taken into consideration and the required erosion and sediment controls provided for. This approach remains in accordance with the requirements of the Blue Book and is considered consistent with the Project EIS.

In addition, Condition of Approval E105 requires construction water quality impact assessments to be carried out to ensure the construction water discharge does not compromise the water quality objectives of the receiving waters. During detailed design it has been confirmed that the construction water discharge does not compromise water quality objectives if the recommended sedimentation basin discharge criteria are adopted. The water quality impact assessment has been submitted as part of the Environmental Protection License application for the M12 Motorway – West Package.

4.8.3 Assessment of potential operational impacts

Table 7-138 in Section 7.9.4 of the Project EIS indicates that the pollutant loads from water quality basins at Sensitive Receiving Environments (SREs) are lower than pre-development conditions for Cosgroves Creek and Badgerys Creek.

The MUSIC modelling results for the 100% detailed design are presented in Table 4-14. There is an overall improvement of pollutant loads on Total Suspended Solids (TSS), Total Phosphorous (TP) and Total Nitrogen (TN) for flows discharging into Cosgroves Creek and Badgerys Creek.

Table 4-14 Comparison of pollutants loading discharging to key SREs under pre-development and post development conditions for the 100% detailed design

Location		Indicators			Comment
		TSS (kg/yr)	TN (kg/yr)	TP (kg/yr)	
Cosgroves Creek	Pre-development	2370	47	10.2	Pollutant reduction target achieved for TSS, TP and TN
	Post-development	1870	45	4.54	
	Percent change (%)	-21%	-4%	-55%	
Badgerys Creek	Pre-development	9640	161	34.4	Pollutant reduction target achieved for TSS, TP and TN
	Post-development	4260	157	16.3	
	% change (%)	-56%	-2%	-53%	

Figure 6-7 in Appendix M of the Project EIS indicates that the mean concentration of TSS downstream of the minor crossings without sensitive receptors (creeks) is slightly higher than pre-development but within

the recommended limit. Figure 6-8 and Figure 6-9 in Appendix M of the Project EIS shows that the mean concentration of TP and TN are higher than the recommended limit but lower than pre-development conditions.

As part of detailed design development, a check of pollutants concentration was carried out at downstream confluence points of the M12 at Cosgrove Creek and Badgerys Creek and it was found that the mean concentrations of the post-development pollutant concentration on TSS, TP and TN are lower than pre-development conditions (refer to Table 4-15).

Table 4-15 shows an overall improvement on mean concentration for TSS, TP and TN for both Cosgroves Creek and Badgerys Creek. The notable reduction in concentration is due to post-development conditions producing more runoff in small rainfall events compared to pre-development conditions. In these small events, the proposed treatment measures are very effective in reducing the pollutant concentration but is of lesser effectiveness in more significant events.

Table 4-15 Comparison of pollutants concentration at confluence points downstream of the project under pre-development and post development conditions for 100% detailed design

Location		Mean concentration (mg/L)			Comment
		TSS (EIS limit 20-75 mg/l)	TN (EIS limit = 0.35mg/l)	TP (EIS limit = 0.025mg/l)	
Cosgroves Creek	Pre-development	30.0	1.28	0.131	Overall improvement in water quality and achieves water quality objectives to maintain or improve water quality
	Post-development	14.3	0.995	0.104	
	% change	-54%	-28%	-29%	
Badgerys Creek	Pre-development	29.9	1.28	0.129	Overall improvement in water quality and achieves water quality objectives to maintain or improve water quality
	Post-development	11.9	0.899	0.092	
	% change	-61%	-32%	-33%	

Water quality treatment

Section 7.9.3 and Figure 7-125 of the Project EIS illustrates the sensitive receiving environments within the footprint.

In Section 7.9.4 of the EIS and Section 5.2.1 of the Amendment Report, six operational water quality basins were proposed. Between the Amendment Report, two basins increased in size by about 30 percent due to an increase in road pavement catchment area. One basin was relocated due to modification of the horizontal road alignment. Figure 4-7 illustrates the location of the basins between the Amendment Report and the 100% detailed design. Between the Amendment Report and 100% detailed design, all wet basins were amended to bio-retention basins and the total length of swales across the M12 Motorway – West Package has decreased by 929 kilometres overall. Table 4-16 summarises the changes in operational water quality basins and Table 4-17 summarises the change in vegetated swale lengths. Vegetated swale length has been reduced to Cosgrove and Badgerys Creek tributaries due to topographic constraints. Water quality targets have been met and exceeded with the reduced vegetated swale length.

Table 4-16 Comparison of water quality basins

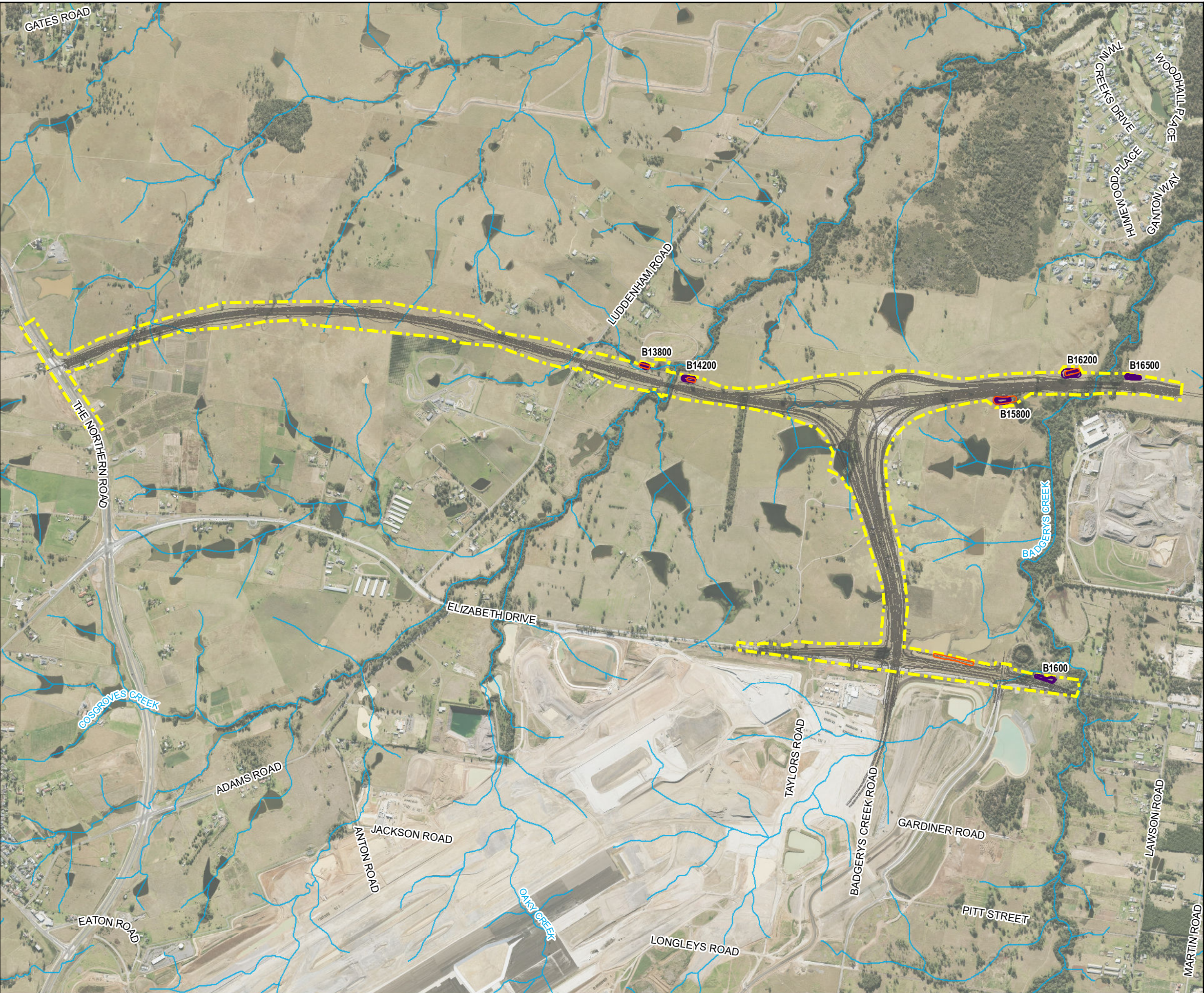
Name (Project EIS /100% detail design)	Project EIS treatment type	Amendment Report treatment type	100% detailed design treatment type (filter area m ²)	Receiving creek
B3890/ B13800	Wet Basin	No change	Bio-retention Basin (180)	Cosgrove Creek
B4080/ B14200 B4080	Wet Basin	No Change	Bio-retention Basin (550)	Cosgrove Creek
B5800/ B15800	Wet Basin	Basin Size Changed *	Bio-retention Basin (600)	Badgerys Creek
B6200/ B16200	Wet Basin	Basin Size Changed *	Bio-retention Basin (500)	Badgerys Creek
B16500	Wet Basin	No Change	Bio-retention Basin (300)	Badgerys Creek
B1351/ B1600 (Elizabeth Drive eastern end)	Wet Basin	Location Changed Compared to Project EIS**	Bio-retention Basin (450)	Badgerys Creek

*The basin size has increased by approximately 30 percent between Project EIS and Amendment Report. This was caused by increased road pavement catchment area.

**The basin was relocated in the Amendment Report because the horizontal road alignment has been modified.

Table 4-17 Comparison of change in vegetated water quality swales

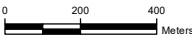
Name	Project EIS swale length (m)	100% detail Design swale length (m)	Receiving Creek
Swale to Cosgrove Creek main creek	511	1357	Cosgrove Creek
Swale to Badgerys Creek main creek	471	870	Cosgrove Creek
Swale to Cosgrove Creek tributaries	4672	2947	Badgerys Creek
Swale to Badgerys Creek tributaries	2040	1791	Badgerys Creek



M12 Motorway - West Package
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Figure 4-7
Operational water quality basins

- Legend**
- Operational water quality basins as per M12 Motorway - West package detailed design
 - Operational water quality basins as per Amendment Report
 - M12 Motorway – West Package detailed design operational footprint
 - M12 Motorway – West package detailed design



Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3
1:20,000 Date: 3/09/2021

Data sources: - DNRME, TMR, Translink, Geoscience Australia
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Accidental spill management

Section 7.9 of the Project EIS stated that operational water quality basins were designed to contain a 20,000-litre spill. The Project EIS also stated that the proposed swales would not be able to contain such a large spill volume and there is the potential for the spill to flow to downstream waterways. In these instances, the spill would be managed in accordance with standard operational emergency spill response procedures.

A spill risk assessment was carried out at 100% detailed design by considering factors such as:

- Compliance with the Project EIS, EIS Submissions Report, Amendment Report, AR Submissions Report and conditions of approval
- Potential vehicle conflict areas (i.e. intersections and interchanges)
- Road geometry
- Heavy vehicle and / or dangerous goods route
- Speed environment
- Proximity of SREs
- Impact on SREs
- Topographical or man-made features which may enhance the spill reaching a sensitive area.

All basins are provided with a 20,000-litre spill containment capacity as a result of the assessment. Provisions for sandbags and check dams are also proposed wherever is feasible for spills at medium risk locations to contain the spill. This oil spill containment strategy has also been provided at the M12 Motorway/SMWSA interface except for one direct discharge location at the north east corner of Airport Access Road and Elizabeth Drive interchange. This is due to space restrictions for temporary oil containment measures. Compared to the Project EIS, the oil spill strategy efficiency has been improved by including the provisions for sandbags and check dams. Thus, the 100% detailed design has provided adequate spill containment capacity.

4.9 Groundwater quality and hydrology

A groundwater quality assessment was carried out to compare the proposed changes to the approved project. The surface water quality memo is provided in Appendix I and summarised in this section.

4.9.1 Assessment methodology

The methodology comprises the following:

- Comparison of the Project EIS and Amendment Report with the 80% detailed design, including the construction and operational footprints and the location and dimensions of the road cuts
- Assessment of the inflow at the road cuts and the extent of drawdown considering the maximum observed standing water level (SWL) from the most recent monitoring records
- Comparison of the inflow at the road cuts and the drawdown extent undertaken during this consistency assessment with the assessment undertaken for the Project EIS and Amendment Report
- Assessment of:
 - The impact on groundwater dependent ecosystems (GDEs)
 - The impact on other groundwater users
 - Groundwater take and licencing
 - Cultural values
 - Groundwater quality, including salinity
 - Cumulative impacts
 - Mitigation measures, particularly whether inflows to the cuts are expected to evaporate
 - Construction and operation impacts

- The groundwater inflow estimates are based on the Dupuit-Forchheimer's equation and the groundwater drawdown extent estimate is based on the Cooper-Jacob's equation.

Since January 2020, 20 monitoring wells have been recording groundwater levels as part of a monitoring program. Table 3-1 of Appendix D summarises the maximum observed SWL from groundwater level monitoring records used to inform this assessment.

An assessment has been carried out to compare the groundwater impacts of the design changes relative to the groundwater impacts provided in the Project EIS and Amendment Report. The assessment focuses on the road cuts, which constitute the largest impact for groundwater. Given the risk to groundwater from bridge piles and fill were assessed as very low, minor and /or localised in the Project EIS, any changes during detailed design are also deemed low/minor and therefore have not been considered in detail as part of the assessment.

Cuts

The Amendment Report identified three areas of cut that may potentially intersect the water table, including the Western Cut, the Airport interchange northern cut and the Airport interchange southern cut. The 80% detailed design includes six additional areas of cut that may potentially intercept the water table. These additional cuts may not have been discussed in the Project EIS or Amendment Report as the cuts were not predicted to intercept groundwater during the concept design stage.

The 80% detailed design has the following cuts:

- Cut 1 (not mentioned in the Project EIS or Amendment Report)
- Cut 1-AAR (not mentioned in the Project EIS or Amendment Report)
- Cut 2 (named the Western Cut in the Project EIS and Amendment Report)
- Cut 2-AAR (named the Airport interchange southern cut in the Amendment Report)
- Cut 3 (not mentioned in the Project EIS or Amendment Report)
- Cut 4 (not mentioned in the Project EIS or Amendment Report)
- Cut 5 (not mentioned in the Project EIS or Amendment Report)
- Cut 6 (named the Airport interchange northern cut in the Amendment Report)
- Cut 7 (not mentioned in the Project EIS or Amendment Report).

The location of these cuts is shown in Figure 4-8 and described in further details in the sections below.

Table 3.2 of Appendix I provides a comparison for each cut including naming, dimensions and characteristics of cuts where groundwater is anticipated to be intersected or groundwater is close to the base of the cut. The comparison identified the following:

- Only Cut 2, Cut 5 and Cut 6 are expected to intercept groundwater based on the most recent maximum observed SWL (as last recorded on 07/05/2021)
- There is no groundwater level data associated with Cut 7, however the intersection of groundwater is possible and is discussed below
- The base of Cut 2-AAR and Cut 4 is less than one metre from the maximum observed SWL.

4.9.2 Construction impact assessment

Groundwater level drawdown

Each road cut intersecting groundwater would lower the groundwater level to the base of the cut. The SWL decline of each cut expected to intercept groundwater is presented in Appendix I. The change in SWL due to the road cuttings ranges from 2.3 and 8.44 metres for Cut 2, Cut 5, Cut 6 and Cut 7.

Groundwater levels

The inflow and drawdown of groundwater at each cut anticipated to intercept groundwater has been estimated to identify if the impact on the environment has changed from the potential impact stated within the EIS and Amendment Report. Table 3-4 of Appendix I provides an estimate of inflow and drawdown based on the 80% detailed design.

Table 3-6 of Appendix I provides a comparison of the maximum inflow and lateral drawdown extent between the Amendment Report and the 80% detailed design. The total inflow and extent of drawdown has increased compared to the EIS and Amendment Report. Overall, there is an increase of 3.37 ML/year at day 365 for Cut 2, Cut 5, Cut 6 and Cut 7.

The magnitude of potential drawdown associated with the four cuts that are anticipated to intersect the water table is sufficiently small such that:

- Regional groundwater drawdown will not occur
- Regional groundwater flows directions will not change
- Changes to SWLs are anticipated to be localised.

Groundwater dependent ecosystems

The Project EIS and Amendment Report did not identify any impact to GDE. Due to groundwater drawdown increasing, the potential for groundwater drawdown to reach GDEs was assessed.

Appendix I includes the assessment of drawdown and the potential to intersect GDE. Drawdown is not anticipated to intersect any GDE.

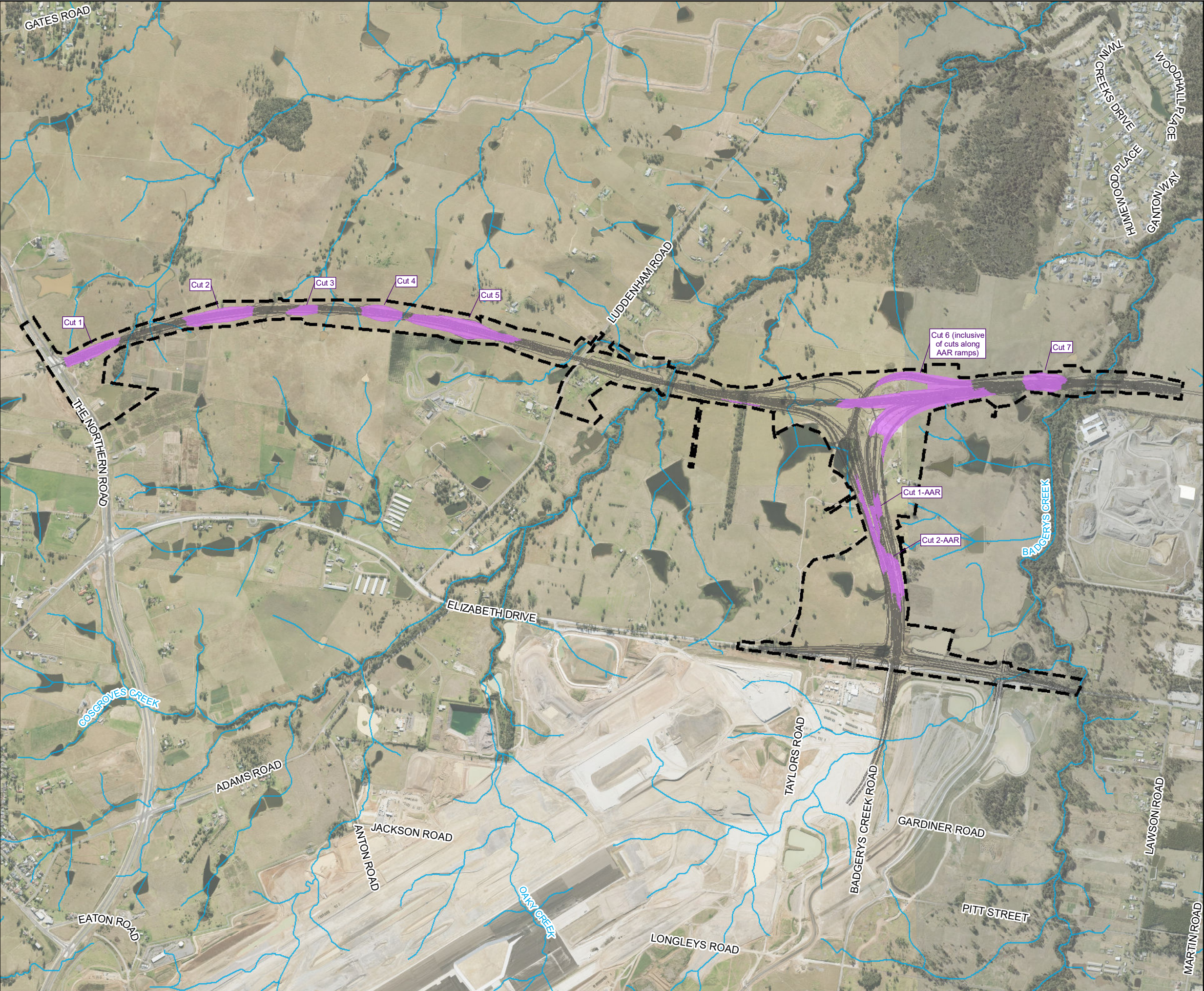
Groundwater bores

No new registered groundwater bores were identified. As mentioned in the Project EIS, the closest registered groundwater bore with a use relating to water supply (such as irrigation, stock and domestic, water supply or commercial/industrial) is approximately 400 metres from the construction footprint and beyond any drawdown estimated from the road cuts. No registered groundwater bores are anticipated to be impacted by the project construction and operation.

Groundwater take and licensing

As discussed in Section 2.1 of the Project EIS, the project is exempt from requiring a water use approval, a water supply work approval and a water access licence.

As a result of the design changes, the total take (inflow) has increased by 3.37 ML/year, from 7.87 ML/year estimated in the Amendment Report to 11.15 ML/year (including the indicative take from Cut 7) in the 80% detailed design.



M12 Motorway - West Package
Consistency Assessment

Figure 4-8
Cut Locations

- Legend**
- Cut extents
 - M12 Motorway – West Package detailed design construction footprint
 - M12 Motorway – West package detailed design



0 200 400
Meters

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3
1:20,000 Date: 22/09/2021

Data sources: - DNRME, TMR, Translink, Geoscience Australia
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Mitigation of inflow by evaporation

At each cut, the evaporation is greater than the inflow, therefore the estimated groundwater inflows are anticipated to fully evaporate. Table 4-18 summaries the groundwater evaporation assessment.

Given the evaporation rate is considerably greater than inflow, higher inflow that is expected to occur early in the excavation of the cuts and not captured in the inflow methods used, are largely anticipated to readily evaporate. An additional mitigation measure is proposed to minimise impacts to monitor inflows to cuts (revised environmental management measure GW06) (refer to Table 5-2).

Table 4-18 Groundwater evaporation assessment

Cut ID	Detailed design max inflow (kL/day) at day 365	Evaporation rate (kL/day)
Cut 2-AAR	0	Not calculated
Cut 2	1.04	7.25
Cut 5	5.76	16.82
Cut 6	4.02	48.90
Cut 7	0.89	6.02

4.9.3 Operational impact assessment

Impacts to groundwater during the operational phase of the 80% detailed design project are assessed as generally consistent with those described in the Project EIS and Amendment Report. This is because the Project EIS, Amendment Report and 80% detailed design are assessed as unlikely to cause changes to regional groundwater levels and flow directions, with regional drawdown not anticipated. Changes to groundwater systems, if any, are anticipated to be highly localised to the project footprint and limited to the near surface groundwater systems.

Groundwater dependent ecosystems

There would not be any additional impacts on mapped GDEs as a result of potential cut de-watering and associated groundwater level changes since the Amendment Report.

4.10 Climate change risk and greenhouse gas

This section provides a review of the proposed design changes in terms of impacts to climate change risks and greenhouse gas emissions and identifies if they are consistent with the Approval document, if additional or reduced impacts are predicted or if predicted impacts are substantially the same as reported in the Approval documents.

4.10.1 Assessment methodology

A review of the greenhouse gas and climate change risks identified in the Amendment Report was undertaken to determine whether the proposed design changes would result in any additional risks or changes to the consequences or likelihoods of these risks occurring.

4.10.2 Impact assessment

Construction

Climate change risk

Three potential construction phase climate change risks were identified in the Project EIS and Amendment Report as having either moderate or high unmitigated risks. The proposed design changes are unlikely to result in additional construction phase risks or change the consequence or likelihood of these risks occurring, therefore the design changes are considered to be consistent with the approved project.

Greenhouse gas

Table 6-70 of the Amendment Report summarises the construction emissions for the entire M12 project. The design changes are anticipated to result in an increase in Scope 1 emissions associated with the Approved Project:

- An increase in size and complexity of the Airport interchange is likely to result in an increase in onsite fuel consumption from plant and equipment
- Small increases in vegetation clearing would result in a small increase in emissions.

No additional Scope 2 emissions are anticipated as a result of the design changes, when using the methodology described in the Project EIS.

Design changes are anticipated to result in an increase in Scope 3 emissions associated with the approved project:

- An increase in the size and complexity of the Airport interchange would result in an increase in the size and number of bridges and structures within the M12 Motorway – West package. This would therefore result in an increase in the quantity of steel and concrete required for the project. Steel and concrete have high embodied carbon rates, therefore an increase in these materials would result in an increase in the projects emissions
- The extension of the Airport Access Road to tie into the WSIA internal road network would also result in an increase in steel and concrete quantities and therefore embodied carbon impacts. While this design change is on airport land and not subject to the NSW Infrastructure Approval or this consistency assessment, it has been considered here for completeness.

The design changes are likely to result in some increases to the projects greenhouse gas footprint. However, these increases are still considered to be consistent with the approved project.

Operation

Climate change risk

Twelve potential operational phase climate change risks were identified in the Project EIS and Amendment Report as having either moderate or high unmitigated risks. The proposed design changes are unlikely to result in additional operational phase risks or change the consequence and likelihood these risks occurring; therefore, the design changes are considered to be consistent with the approved project.

Greenhouse gas

Table 6-71 of the Amendment Report summarises the operational emissions for the entire M12 Project. An increase in size and complexity of the Airport Interchange may result in an increase in the lighting and ITS equipment required for the project. This would therefore result in an increase in the projects operational electricity demand and associated greenhouse gas emissions.

One of the key reasons for the revised interchange design was to improve the safety for road user, increase efficiency for future predicted increases in traffic and improve the ease of integrating connection points for the proposed future Outer Sydney Orbital. The methodology adopted in the Project EIS to assess

emissions associated with road user vehicles correlates traffic speeds to greenhouse gas emissions via the assumption that vehicles operate more efficiently the higher the travel speeds and less congestion there is on the road network. This increase in efficiency could therefore result in a reduction in future fuel consumption and associated greenhouse emissions per vehicle kilometres travelled. The improvement to efficiency in travel speeds as a result of the revised interchange would therefore result in some reductions in operational vehicle emissions.

The design changes are likely to result in some increases to the project's greenhouse gas footprint. However, these increases are still considered to be consistent with the Approved Project.

5. Consistency assessment – the Division 5.2 Approval

5.1 Minister's Conditions of Approval

The proposed change has been assessed in Table 5-1 in relation to the relevant Conditions of Approval.

Table 5-1 Consistency against relevant Minister's conditions of approval for the project

No.	Condition of Approval	Discussion	Consistent
A1	The Proponent must carry out the CSSI in accordance with the terms of approval and generally in accordance with: a) M12 Motorway Environmental Impact Statement (dated October 2019); b) M12 Motorway Submissions Report (dated October 2020); c) M12 Motorway Amendment Report (dated October 2020); d) M12 Motorway Amendment Report - Submissions Report (dated December 2020); and e) M12 Motorway Amendment Report - Submissions Report - Amendment (dated 8 March 2021).	The proposed change described in Section 2.1 of this report can be carried out in accordance with the terms of this approval and is generally in accordance with the description of the approved project in the Project EIS, Amendment Report and AR Submissions Report.	Yes
A2	The CSSI must only be carried out in accordance with all procedures, commitments, preventative actions, performance outcomes and mitigation measures set out in the documents listed in Condition A1 unless otherwise specified in, or required under, this approval.	The proposed changes can be carried out in accordance with all procedures, commitments, preventative actions, performance criteria and mitigation measures set out in the Project EIS as amended by the Amendment Report and AR Submissions Report. This assessment proposed one additional REMM GW06 described in Section 5.2.	Yes
A3	In the event of an inconsistency between: a) The terms of this approval and any document listed in Condition A1, the terms of this approval will prevail to the extent of the inconsistency; and b) any document listed in Condition A1, the most recent document will prevail to the extent of the inconsistency.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	Note: For the purpose of this condition, there will be an inconsistency between a term of this approval and any document if it is not possible to comply with both the term and the document.		
Biodiversity			
E2	The clearing of native vegetation must be minimised with the objective of reducing impacts to threatened ecological communities and threatened species habitat.	<p>Clearing of some PCTs has been reduced while clearing of others have increased as a result of the proposed design changes and design development, however overall clearing has been reduced. The proposed changes and revised mapping would result in an overall reduction in clearing of about 0.92 hectares. The predicted impacts to PCTs have had the following changes between the AR Submissions Report and the 80% detailed design:</p> <ul style="list-style-type: none"> • PCT 835 - increased by 0.28 hectares • PCT 849 - increased by 0.03 hectares • PCT 850 - reduced by 0.78 hectares • PCT 1800 - reduced by 0.45 hectares. <p>The design of Bridge BR05 (Badgerys Creek) does not impact on the White-bellied Sea-Eagle nest which is located to the south and is located beyond the current EPBC Approval footprint and proposed M12 Motorway – West Package 80% detailed design construction footprint.</p>	Yes
E3	The Proponent must meet the biodiversity offset obligations for ecosystem and species credits as set out in Table 1, Table 2 and Table 3 in accordance with the M12 Motorway Amendment Report - Submissions Report (December 2020) and M12 Motorway Amendment Report - Submissions Report - Amendment (dated 8 March 2021) within 12 months of the commencement of construction. The offset obligations must be carried out in accordance with the NSW Biodiversity Offsets Policy for Major Projects and can be achieved by:	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<p>a) acquiring and retiring “biodiversity credits” within the meaning of the Biodiversity Conservation Act 2016; and/or</p> <p>b) properties secured with the NPWS, on the basis of a draft credit report to show what the property would provide and written confirmation from NPWS that the financial contributions for acquisition and management have been received; and/or</p> <p>c) making a payment into the Biodiversity Conservation Fund; or</p> <p>d) a Biodiversity Offset Strategy prepared in consultation with EES and DAWE that provides supplementary measures or where the Proponent intends to utilise the biodiversity credit variation rules.</p> <p>Notes</p> <p>1: Following repeal of the Threatened Species Conservation Act 1995 on 25 August 2017, “biodiversity credits” created under that Act are taken to be “biodiversity credits” under the Biodiversity Conservation Act 2016 by virtue of clause 19 of the Biodiversity Conservation (Savings and Transitional) Regulation 2017.</p> <p>2: The determination of biodiversity credits under the Biodiversity Conservation Act 2016 that are reasonably equivalent to biodiversity credits created under the Threatened Species Conservation Act 1995 remaining to be retired must be carried out in accordance with clause 22 of the Biodiversity Conservation (Savings and Transitional) Regulation 2017.</p>		
E4	<p>The Proponent may review and update the ecosystem and species credit requirements in Table 1, Table 2 and Table 3 to reflect the final construction footprint and resulting extent and type of plant community types to be cleared and the extent of threatened species habitat impacted by the construction of the CSSI (excluding certified areas). Where the construction of the CSSI is staged, the Proponent may review and update the ecosystem and species credit requirements in Table 1, Table 2 and Table 3 for each stage of the CSSI. Amendments to the ecosystem and species credit requirements must be undertaken in consultation with EES and DAWE and submitted to the Planning Secretary for approval within six (6) months of determining the final</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

No.	Condition of Approval	Discussion	Consistent
	construction footprint and, where the CSSI is staged, within six (6) months of determining the final construction footprint for each stage.		
E5	<p>The review and update of credit requirements must be undertaken by:</p> <ul style="list-style-type: none"> a) using the vegetation mapping in the EIS, M12 Motorway Amendment Report - Appendix A Biodiversity supplementary technical report (October 2020), and M12 Motorway Amendment Report – Submissions Report (December 2020); and/or b) completing verification surveys to confirm the extent, type and condition of threatened species and ecological communities to be impacted. 	Verification surveys completed as part of the biodiversity consistency assessment for the M12 Motorway – West Package proposed 80% construction footprint. The verification survey results have been outlined in Section 1 of Appendix A.	Yes
E6	Where verification surveys are required, they must be undertaken in consultation with EES. Any additional surveys must be undertaken at the time of year when ground cover is most likely to be predominantly native. If verification surveys are not possible at a time when groundcover is most likely to be native, the assumed presence of any relevant species and ecosystems may be applied to conservatively evaluate impacts and associated credit requirements.	The verification survey was undertaken in June 2021. Winter is an appropriate time to detect the quality of the ground cover given annual weeds will have died off. However, native species can be harder to detect when not in flower. Survey timing did not influence the verification survey as targeted surveys for threatened species were not undertaken. The TECs subject to this assessment can confidently be identified year-round with no influence from seasonality. Consultation was undertaken with EES regarding Planning Approval Condition E6. On 1 September 2021 provided comment and advised that as the surveys had already been completed that no advice could be provided on the adequacy of any such advice.	Yes
E7	<p>The Proponent must submit to the Planning Secretary and DAWE for information:</p> <ul style="list-style-type: none"> a) a copy of the Credit Retirement Report; and/or b) a receipt confirming payment to the Biodiversity Conservation Fund; and/or c) correspondence from NPWS, 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	for the retirement of the ecosystem and species credits required by Condition E3 within one (1) month of receiving the report and/or making the payments and/or receiving correspondence from NPWS.		
E9	If <i>Pimelea spicata</i> is recorded in the surveys carried out under Condition E8, any impacts to the species must be offset in accordance with the options available under Condition E3 and in consultation with EES. The Proponent must provide details of the required biodiversity credits to the Planning Secretary, EES and DAWE for information prior to works that impact the threatened species.	Not applicable to the M12 Motorway – West Package. There are no known <i>Pimelea spicata</i> plants within the M12 Motorway - West Package 80% detailed design construction footprint.	N/A
E10	Within one (1) month before the commencement of operation of the CSSI, or where the operation of the CSSI is staged one (1) month before the commencement of operation of the relevant stage, the Proponent must provide evidence to the Planning Secretary, for information, that it has implemented measures agreed with the Western Sydney Parklands Trust to compensate the acquisition of land from the Western Sydney Parklands Biobank Site (Biobanking Agreement Site ID 199) for the CSSI.	Not applicable to the M12 Motorway – West Package.	Yes
E11	The Proponent must minimise impacts to Key Fish Habitat (KFH) as defined in Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013 update). Residual impacts to KFH must be offset at a ratio of 2:1 habitat offset requirement in accordance with the Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013 update) and in consultation with DPI Fisheries.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E12	Payment of the habitat offset requirement must be made to the DPI Fish Conservation Trust Fund prior to the commencement of Work that impacts KFH in Badgerys Creek, Cosgroves Creek, Kemps Creek and South Creek.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E13	The Proponent must submit to the Planning Secretary a receipt confirming payment to the DPI Fish Conservation Trust Fund within one (1) month of making the payment.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
E14	A minimum width of three (3) metres and a minimum height of 1.5 metres must be provided to maintain fauna passage below the Badgerys Creek, Cosgroves Creek, South Creek and Kemps Creek bridges. The three-metre-wide passage must consist of a natural substrate or other surface type that will not hinder fauna movement	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E15	<p>Prior to vegetation clearing, the Proponent must identify where it is practicable for the CSSI to reuse native trees and vegetation that are to be removed. If it is not possible for the CSSI to reuse all removed native trees and vegetation, the Proponent must consult with the relevant council(s), Western Sydney Parklands Trust and Landcare groups and relevant government agencies to determine if:</p> <ul style="list-style-type: none"> a) hollows, tree trunks, mulch, bush rock and root balls salvaged from native vegetation impacted by the CSSI; and b) collected plant material, seeds and/or propagated plants from native vegetation impacted by the CSSI, c) could be used by others in habitat enhancement, beneficial re-use and rehabilitation work, before pursuing other disposal options. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
Flooding			
E16	<p>Measures identified in the documents listed in Condition A1 that are aimed at minimising the impact of the CSSI on flood behaviour must be incorporated into the detailed design of the CSSI.</p> <p>The incorporation of these measures into the detailed design must be reviewed and endorsed by a suitably qualified and experienced person in consultation with directly affected landowners, DPI Water, DPI Fisheries, EES, Infrastructure NSW (INSW) and relevant councils.</p>	<p>The 100% detailed design flood impact assessment has been assessed against the requirements of the Project Approval, which are generally in line with the Amendment Report to minimise impacts on flood behaviour. The drainage infrastructure has been designed to mitigate flood impacts, which have been determined in the TUFLOW flood model. This model is based on hydrologic and hydraulic models developed at the Amendment Report stage.</p> <p>Consultation with affected landowners would be ongoing. The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

No.	Condition of Approval	Discussion	Consistent
E17	<p>Unless otherwise agreed by the Planning Secretary, the CSSI must be designed and constructed to limit impacts on flooding characteristics in areas outside the project boundary during any flood event up to and including the 1% AEP flood event, to the following:</p> <ul style="list-style-type: none"> a) a maximum increase in inundation time of one hour; b) a maximum increase of 10 mm in above-floor inundation to habitable rooms where floor levels are currently exceeded; c) no above-floor inundation of habitable rooms which are currently not inundated; d) a maximum increase of 50 mm in inundation of land zoned as residential, industrial or commercial; e) a maximum increase of 100 mm in inundation of land zoned as rural, primary production, environment zone or public recreation; f) no significant increase in the flood hazard or risk to life; and g) maximum relative increase in velocity of 10%, where the resulting velocity is greater than 1.0 m/s, unless adequate scour protection measures are implemented and/or the velocity increases do not exacerbate erosion as demonstrated through site-specific risk of scour or geomorphological assessments. <p>Where the Proponent cannot meet the requirements set out in clauses (d), (e) and (g) alternative flood levels or mitigation measures may be agreed to with the affected landowner.</p> <p>In the event that the Proponent and the affected landowner cannot agree on the measures to mitigate the impact as described in clauses (d), (e) and (g), the Proponent must engage a suitably qualified and experienced independent person to advise and assist in determining the impact and relevant mitigation measures.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement. Where criteria are not strictly met for each clause, consultation requirements under the condition would be implemented to achieve compliance with the condition.</p> <ul style="list-style-type: none"> a) The 10 percent AEP and one percent AEP have been assessed at 100% detailed design. Changes in duration are less than one hour in all events assessed up to the one percent AEP except in two minor locations (over areas less than 0.1ha). In these areas, the surrounding areas are already inundated for similar durations b) There are no habitable rooms within the areas where the project affects or is affected by flooding c) There are no habitable rooms within the areas where the project affects or is affected by flooding d) Non-compliant afflux in farm dams 5 (up to 150mm) and 7 (up to 100mm) are noted in the five percent AEP where the dam is partially infilled within the M12 Motorway – West Package 80% detailed design operational footprint. These areas are however contained within the existing physical footprints of the existing farm dams. Afflux is compliant in the one percent AEP and there is no significant increase in flood hazard in these areas e) New flooding up to 200mm is noted in the five percent AEP north of BASIN 1700. Afflux is compliant in the one percent AEP. Hazard is low (H1) in up to the five percent AEP. Furthermore, the small, localised area in question is trapped by the existing flood extents east and west of it, which have flood depths >0.5m in as frequent as the 20 percent AEP. As such, it is unlikely any critical infrastructure would be developed in this area. 	Yes

No.	Condition of Approval	Discussion	Consistent
		<p>f) The only location where an increase is noted is at Luddenham Road at the northern shoulder of the tie-in with the new property access to LOT26, DP604586. Hazard increases locally from H2 to H5 in the one percent AEP event only. While an increase from H2 to H5 hazard category is observed along the western side of Luddenham Road adjacent to the access to LOT26 DP604586, this is not considered to be a significant increase in flood hazard given its location along the edge of the road and its localised nature.</p> <p>g) Where velocities have increased by more than 10 percent, impacts have been mitigated through the implementation of scour protection measures such as rock or concrete lining. These occur mainly at culvert outlets and at partially infilled farm dams. Where any scour protection works would be out of the project boundary, the existing scour potential of flooding in the area has been assessed and shown to not be worsened under design conditions. Hazard in the affected areas is also noted to be similar under both design and existing conditions.</p>	
E18	All updated hydrologic and hydraulic assessments undertaken during detailed design must be consistent with the Australian Rainfall and Runoff – A Guide to Flood Estimation (GeoScience Australia, 2019).	All updated hydrologic and hydraulic assessments are consistent with the Australian Rainfall and Runoff – A Guide to Flood Estimation (GeoScience Australia, 2019). The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E19	Updated flood modelling must be undertaken for the full range of flood events, including 5% AEP, 1% AEP, PMF and 0.5% AEP or 0.2% AEP and must have regard to the Wianamatta (South) Creek Catchment Flood Study - Existing Conditions (Revision H) (Advisian Worley Group, November 2020) when validating existing flood behaviour and constraints. The modelling must identify changes in post-development flood behaviour including cumulative flood	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The flood assessment that is being undertaken for 100% detailed design is based on the range of events set out in Condition of Approval E19 and with regard to</p>	Yes

No.	Condition of Approval	Discussion	Consistent
	impacts associated with Western Sydney International Airport and SMWSA, where this information is available, prior to detailed design being finalised.	Wianamatta (South) Creek Catchment Flood Study - Existing Conditions (Revision H) (Advisian Worley Group, 2020). Further details of the assessment methodology for the 100% detailed design are provided in Section 3.2.1 of Appendix B. The flood assessment that is being undertaken for 100% detailed design utilises the latest information available on the WSIA and SMWSA projects. Refer to Section 4.7.1 and 3.2.1 of Appendix B.	
E20	Flood information including flood summary reports, models and geographic information system outputs, and work as executed information on finished ground levels and the dimensions and finished levels of all structures within the flood prone land, must be provided to the relevant council, EES and INSW in order to assist in preparing relevant documents and to reflect changes in flood behaviour as a result of the CSSI. The relevant council(s), EES and INSW must be notified in writing that the information is available no later than one month following the operation of the CSSI. Information requested by the relevant council(s), EES or INSW must be provided no later than six (6) months following the completion of construction or within another timeframe agreed with the relevant council(s), EES and INSW	The proposed changes to the project would not impact on the ability to comply with this requirement. The M12 Motorway – West Package detailed design information has been provided to TfNSW for distribution to the relevant parties. Relevant flood information that is developed to support the 100% detailed design will be made available to relevant council(s), EES and INSW in accordance with Condition of Approval E20.	Yes
E21	The flood models, data and summary reports must be uploaded to the NSW Flood Data Portal and access provided to the relevant councils, EES and INSW.	The proposed changes to the project would not impact on the ability to comply with this requirement. Relevant flood information that is developed to support the 100% detailed design will be made available to relevant council(s), EES and INSW in accordance with Condition of Approval E20.	Yes
E22	The designs of all bridge, culvert and other cross drainage structures must include for potential blockages consistent with the procedures in the Australian Rainfall and Runoff – A Guide to Flood Estimation (GeoScience Australia, 2019).	The proposed changes to the project would not impact on the ability to comply with this requirement. This has been done at detailed design. The design of bridge, culvert and other cross drainage structures has	Yes

No.	Condition of Approval	Discussion	Consistent
		considered the potential for blockage in accordance with the procedures in GeoScience Australia, 2019.	
E23	The CSSI must not preclude the future raising of Elizabeth Drive to achieve a minimum of 1% AEP level of flood immunity, unless otherwise agreed by the Planning Secretary.	The proposed changes to the project would not impact on the ability to comply with this requirement. Under the detailed design for the M12 Motorway – West Package the upgraded section of Elizabeth Drive achieves a one percent AEP level of flood immunity except at its tie-in to the existing road to the west of the bridge over Badgerys Creek. While subject to detailed design of that project, it is expected that the future Elizabeth Drive project would remove the tie in works for the M12 Motorway – West Package and upgrade the existing bridge over Badgerys Creek in order to achieve a minimum of one percent AEP level of flood immunity.	Yes
E24	<p>For property/ies zoned primary production and where hydrologic modelling predicts that the CSSI will potentially reduce and adversely affect the available stormwater runoff yield to a farm dam, the Proponent must, in consultation with the affected landowner:</p> <ul style="list-style-type: none"> a) calculate the nature and extent of impacts on water supply; b) determine what measures may be implemented to prevent, mitigate, compensate or offset a loss in water supply; and c) implement the measures agreed with the landowner at no cost to the landowner. d) The agreed measures must be implemented prior to undertaking any works that would directly affect the flow of water into a landowner's farm dam. <p>In the event that the Proponent and landowner cannot agree on the measures to mitigate the impact, the Proponent shall engage a suitably qualified and experienced independent person to advise and assist in determining appropriate mitigation measures.</p>	<p>According to the WSA2020 land zoning, there is no Agribusiness Zoned land (i.e. land zoned primary production) that is located downstream of the M12 Motorway – West Package that may be impacted by changes in stormwater runoff yield.</p> <p>Therefore, this condition is not applicable to the Project.</p>	Yes

No.	Condition of Approval	Discussion	Consistent
Heritage			
E25	Construction and operation of the CSSI should aim to not diminish the potential of the following heritage items for nomination to the State Heritage Register beyond the impacts to significance already identified in the documents listed in Condition A1: McGarvie Smith Farm, McMaster Field Station and Fleurs Radio Telescope Site.	<p>The detailed design of M12 Motorway - West Package has been undertaken in a manner that avoids impacts to Non-Aboriginal Heritage items beyond that assessed as part of the Project EIS and Amendment Report. The demolition of buildings/structures associated with McGarvie Smith Farm has been kept to those identified as requiring demolition by the Project EIS/Amendment Report (i.e. Farm 6, 7, 8, Shed 1, Shed 2 and one silo). No buildings or structures associated with McMaster Field Station require demolition.</p> <p>The majority of identified heritage features of the Fleurs Radio Telescope Site are located outside of the M12 Motorway - West Package 80% detailed design construction footprint (i.e. they exist within the M12 Motorway – Central package).</p>	Yes
E26	<p>An experienced and qualified heritage specialist(s) must prepare and/or endorse the:</p> <ul style="list-style-type: none"> • Heritage Interpretation Plan required by Condition E27; • archival photographic digital recording required by Condition E28; and • Heritage Report required by Condition E29. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E27	<p>A Heritage Interpretation Plan must be prepared that identifies and interprets the key heritage values and stories of the heritage items impacted by the CSSI. The Heritage Interpretation Plan must include, but not be limited to:</p> <ul style="list-style-type: none"> • integration of heritage themes and values in the design of the CSSI; • design elements (form and fabric) and themes for the CSSI; • consideration of the design concepts for Western Sydney International Airport and Sydney Metro Western Sydney Airport; and • opportunities for design responses for Aboriginal and non-Aboriginal heritage. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<ul style="list-style-type: none"> The Heritage Interpretation Plan must be provided to Western Sydney International Airport and Sydney Metro Western Sydney Airport to assist in guiding opportunities for integration of heritage themes and values into their design. The Heritage Interpretation Plan must be prepared in accordance with the Interpreting Heritage Places and Items Guidelines (NSW Heritage Office, 2005), and in consultation with Heritage NSW, Aboriginal Cultural Heritage Advisory Committee, LALC and relevant council(s). <p>The Plan must be implemented and inform the Place, Design and Landscape Plan required by Condition E69.</p> <p>The Heritage Interpretation Plan must be submitted to the Planning Secretary and Heritage NSW for information prior to finalising the Place, Design and Landscape Plan required by Condition E69.</p> <p>Note: Nothing in this condition prevents the Proponent from preparing separate Heritage Interpretation Plans for Aboriginal and Non-Aboriginal Heritage.</p>		
E28	<p>Archival photographic digital recording must be undertaken as outlined in the documents listed in Condition A1 for all listed heritage items and for all sites assessed to have heritage significance which will be affected by the CSSI. The recordings must be undertaken prior to the commencement of Work which may impact the items. The recordings must include buildings, structures and landscape features and detailed maps showing the location of features. The archival recording must be prepared in accordance with How to Prepare Archival Records of Heritage Items (NSW Heritage Office, 1998) and Photographic Recording of Heritage Items Using Film or Digital Capture (NSW Heritage Office, 2006).</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes
E29	<p>Following completion of all Work described in the documents listed in Condition A1 in relation to heritage items, a Heritage Report including the details of archival recordings, further historical research either undertaken or to be carried out and archaeological excavations (with artefact analysis and identification of a final repository for finds), must be prepared in accordance</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement</p>	Yes

No.	Condition of Approval	Discussion	Consistent
	with any guidelines and standards required by the Heritage Council of NSW and Heritage NSW. Note: Nothing in this condition prevents the Proponent from preparing separate Heritage Reports for Aboriginal and Non-Aboriginal Heritage.		
E30	The Heritage Report must be submitted to the Planning Secretary and Heritage NSW for information within 12 months of completing all Work described in the documents listed in Condition A1 in relation to heritage items. Copies of the Heritage Report must also be provided to relevant local libraries and relevant local historical societies.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E31	An Unexpected Heritage Finds and Human Remains Procedure must be prepared to manage unexpected heritage finds in accordance with any guidelines and standards prepared by the Heritage Council of NSW and Heritage NSW. The Procedure must be prepared in consultation with Heritage NSW and form part of the Heritage CEMP Sub Plan required by Condition C4.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E32	The Unexpected Heritage Finds and Human Remains Procedure, as submitted to the Planning Secretary, must be implemented for the duration of Work. Note: Human remains that are found unexpectedly during the carrying out of work may be under the jurisdiction of the NSW State Coroner and must be reported to the NSW Police immediately.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E33	Where previously unidentified Aboriginal objects are discovered, all work must immediately stop in the vicinity of the affected area. Works potentially affecting the previously unidentified objects must not recommence until Heritage NSW has been informed. The measures to consider and manage this process must be specified in the Unexpected Heritage Finds and Human Remains Procedure required by Condition E31 and include registration in the Aboriginal Heritage Information Management System (AHIMS).	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
Noise and vibration			

No.	Condition of Approval	Discussion	Consistent
E34	<p>Work must only be undertaken during the following hours:</p> <ul style="list-style-type: none"> a) 7:00 am to 6:00 pm Mondays to Fridays, inclusive; b) 8:00 am to 6:00 pm Saturdays; and c) at no time on Sundays or public holidays. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E35	<p>Except as permitted by an EPL, highly noise intensive works that result in an exceedance of the applicable noise management level (NML) at the same receiver must only be undertaken:</p> <ul style="list-style-type: none"> a) between the hours of 8:00 am to 6:00 pm Monday to Friday; b) between the hours of 8:00 am to 1:00 pm Saturday; and c) if continuously, then not exceeding three hours, with a minimum cessation of work of not less than one hour. <p>For the purposes of condition, 'continuously' includes any period during which there is less than one hour between ceasing and recommencing any of the Work.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E36	<p>Notwithstanding Condition E34 and E35, Work may be undertaken outside the hours specified in any of the following circumstances:</p> <ul style="list-style-type: none"> a) Safety and Emergencies including: <ul style="list-style-type: none"> i. for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or ii. where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm. <p>On becoming aware of the need for emergency work in accordance with Condition E36(a), the Proponent must notify the ER, the Planning Secretary and the EPA of the reasons for such emergency work. The Proponent must use best endeavours to notify all noise and/or vibration affected sensitive land user(s) of the likely impact and duration of the emergency work.</p> b) Work that causes: <ul style="list-style-type: none"> i. LAeq(15 minute) noise levels: <ul style="list-style-type: none"> – no more than 5 dB(A) above the rating background level at any residence in accordance with the ICNG, and 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<ul style="list-style-type: none"> – no more than the ‘Noise affected’ NMLs specified in Table 3 of the ICNG at other sensitive land user(s); and ii. LAFmax(15 minute) noise levels no more than 15 dB(A) above the rating background level at any residence during the night-time period; and iii. continuous or impulsive vibration values, measured at the most affected residence, that are no more than the preferred values for human exposure to vibration, specified in Table 2.2 of Assessing Vibration: a technical guideline (DEC 2006); and iv. intermittent vibration values measured at the most affected residence that are no more than the preferred values for human exposure to vibration, specified in Table 2.4 of Assessing Vibration: a technical guideline (DEC 2006). <p>c) By Approval, including:</p> <ul style="list-style-type: none"> i. where different construction hours are permitted or required under an EPL in force in respect of the CSSI; or ii. works which are not subject to an EPL that are approved under an Out-of-Hours Work Protocol as required by Condition E37; or negotiated agreements with directly affected residents and sensitive land user(s). 		
E37	<p>An Out-of-Hours Work Protocol must be prepared to identify a process for the consideration, management and approval of Work, which is outside the hours defined in Condition E34, and that are not subject to an EPL. The Protocol must be approved by the Planning Secretary before commencement of the out-of-hours Work. The Protocol must be prepared in consultation with the ER. The Protocol must provide:</p> <p>a) identification of low and high-risk activities and an approval process that considers the risk of activities, proposed mitigation, management, and coordination, including where:</p> <ul style="list-style-type: none"> i. the ER reviews all proposed out-of-hours activities and confirm their risk levels, ii. low risk activities can be approved by the ER, and iii. high risk activities that are approved by the Planning Secretary; 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<ul style="list-style-type: none"> b) a process for the consideration of out-of-hours work against the relevant NML and vibration criteria; c) a process for selecting and implementing mitigation measures for residual impacts in consultation with the community at each affected location, including respite periods consistent with the requirements of Condition E47. The measures must consider the predicted noise levels and the likely frequency and duration of the out-of-hours work that sensitive land user(s) would be exposed to, including the number of noise awakening events; d) procedures to facilitate the coordination of out-of-hours Work including those approved by an EPL or undertaken by a third party, to ensure appropriate respite is provided; and e) notification arrangements for affected receivers for all approved out-of-hours Work and notification to the Planning Secretary of approved low risk out-of-hours Work. <p>This condition does not apply to Work where the requirements of Condition E36(a) or (b) are met.</p>		
E38	<p>Mitigation measures must be implemented with the aim of achieving the following construction noise management levels and vibration objectives:</p> <ul style="list-style-type: none"> a) construction 'Noise affected' NML established using the Interim Construction Noise Guideline (DECC, 2009); b) vibration criteria established using the Assessing vibration: a technical guideline (DEC 2006) (for human exposure); c) BS 7385 Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2" as they are "applicable to Australian conditions"; and d) the vibration limits set out in the German Standard DIN 4150-3: Structural Vibration- effects of vibration on structures (for structural damage). <p>Any construction or early works identified as exceeding the noise management levels and/or vibration criteria must be managed in accordance with the respective Noise and Vibration CEMP Sub-plan or Early Works Environmental Management Plan.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

No.	Condition of Approval	Discussion	Consistent
	Note: The ICNG identifies 'particularly annoying' activities that require the addition of 5 dB(A) to the predicted level before comparing to the construction NML.		
E39	Noise generating work in the vicinity of potentially affected community, religious, educational institutions, noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories and operating theatres) resulting in noise levels above the NMLs must not be timetabled within sensitive periods, unless offers of other reasonable arrangements have been made to the affected institutions and are implemented at no cost to the affected institution.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E40	Noise and Vibration Impact Statements (NVIS) must be prepared for any Work that may exceed the noise management levels and vibration criteria specified in Condition E38 at any residence outside the construction hours identified in Condition E34, or where receivers will be highly noise affected. The NVIS must include specific mitigation measures identified through consultation with affected sensitive land user(s) and the mitigation measures must be implemented for the duration of the Work. A copy of the NVIS must be provided to the ER prior to the commencement of the associated Work. The Planning Secretary may request a copy/ies of the NVIS.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E41	Owners and occupiers of properties at risk of exceeding the screening criteria for cosmetic damage must be notified before Work that generates vibration commences in the vicinity of those properties. If the potential exceedance is to occur more than once or extend over a period of 24 hours, owners and occupiers must be provided with a schedule of potential exceedances on a monthly basis for the duration of the potential exceedances, unless otherwise agreed by the owner and occupier. These properties must be identified and considered in the Noise and Vibration CEMP Sub-plan required by Condition C4 and the Communication Strategy required by Condition B1	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E42	The Proponent must conduct vibration testing during vibration generating activities that have the potential to impact on heritage items to identify	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	minimum working distances to prevent cosmetic damage. In addition, vibration monitoring must be undertaken during construction for relevant remaining Fleurs Radio Telescope structures, the Upper Canal (in consultation with WaterNSW) and McMaster Farm and McGarvie-Smith Farm group of remaining buildings. In the event that the vibration testing and attended monitoring shows that the preferred values for vibration are likely to be exceeded, the Proponent must review the construction methodology and, if necessary, implement additional mitigation measures.		
E43	Advice from a heritage specialist must be sought on methods and locations for installing equipment used for vibration, movement and noise monitoring at heritage-listed structures.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E44	Before conducting at-property treatment at any heritage item identified in the documents listed in Condition A1, the advice of a suitably qualified and experienced built heritage specialist must be obtained and implemented to ensure such work does not have an adverse impact on the heritage significance of the item.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E45	<p>All Work undertaken for the delivery of the CSSI, including that undertaken by third parties (such as utility relocations), must be coordinated to ensure respite periods are provided. The Proponent must:</p> <ul style="list-style-type: none"> a) reschedule any work to provide respite to impacted noise sensitive land user(s) so that the respite is achieved in accordance with Condition E47; or b) where respite outlined in Condition E47 cannot be achieved, consider the provision of alternative respite or mitigation to impacted noise sensitive land user(s); and c) provide documentary evidence to the ER in support of any decision made by the Proponent in relation to respite or mitigation. <p>The consideration of respite must also include all other CSSI, SSI and SSD projects which may cause cumulative and/or consecutive impacts at receivers affected by the delivery of the CSSI.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
E46	<p>Mitigation measures such as temporary alternative accommodation or other agreed mitigation measures, must be offered/ made available to residents affected by out-of-hours Work (including where utility works are being undertaken for the CSSI or under a road occupancy licence) where the construction noise levels between:</p> <ul style="list-style-type: none"> a) 10:00 pm and 7:00 am, Monday to Friday; b) 10:00 pm Saturday to 8:00 am Sunday; and c) 6:00 pm Sunday and public holidays to 7:00 am the following day unless that day is Saturday then to 8:00 am, are predicted to exceed the NML by 25 dB(A) or are greater than 75 dBA (LAeq(15 min)), whichever is the lesser and the impact is planned to occur for more than two (2) nights over a seven (7) day rolling period. <p>The NML must be reduced by 5 dB where the noise contains annoying characteristics and may be increased by 10 dB if the property has received at-property noise treatment. The noise levels and duration requirements identified in this condition may be changed through an EPL applying to the CSSI.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E47	<p>In order to undertake out-of-hours Work outside the hours specified under Condition E34, the Proponent must identify appropriate respite periods for the out-of-hours work in consultation with the community at each affected location on a regular basis.</p> <p>This consultation must include (but not be limited to) providing the community with:</p> <ul style="list-style-type: none"> a) a progressive schedule for periods no less than three (3) months, of likely out-of-hours Work; b) a description of the potential Work, location and duration of the out-of-hours Work; c) the noise characteristics and likely noise levels of the Work; and d) likely mitigation and management measures which aim to achieve the relevant noise management levels and vibration criteria under Condition E38(a) and (b) (including the circumstances of when respite or relocation 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<p>offers will be available and details about how the affected community can access these offers).</p> <p>The outcomes of the community consultation, the identified respite periods and the scheduling of the likely out-of-hour Work must be provided to the ER, EPA and the Planning Secretary for information prior to Work scheduled for the subject period being undertaken.</p> <p>Note: Respite periods can be any combination of days or hours where out-of-hours work would not be more than 5 dB(A) above the rating background noise level at any residence.</p>		
E48	Crushing and grinding works must only be undertaken during the hours specified in Condition E34 unless otherwise approved by the Planning Secretary or through an EPL or it meets the requirements of Condition E36(a)	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E49	Blasting is not permitted as part of this CCSI	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E50	<p>An independent and experienced noise specialist must be approved by the Planning Secretary to verify the validity (including being accurate and consistent with the requirements of this approval) of the:</p> <ul style="list-style-type: none"> a) operational noise modelling required under Conditions E51; b) Operational Noise Review required under Condition E52; and c) Operational Noise Compliance Report required under Condition E60. <p>The Planning Secretary's approval of the noise specialist must be sought no later than one (1) month before undertaking operational noise modelling.</p> <p>Each verification must be submitted to the Planning Secretary for information within 30 days of the verification and be attached to submitted documentation as relevant.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E51	<p>Noise modelling of the detailed design must be undertaken and address the following parameters:</p> <ul style="list-style-type: none"> a) application of source emission corrections to consider the proportions of heavy vehicles; 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<ul style="list-style-type: none"> b) modelling heavy vehicles using three distinct sources in line with Appendix B4 of the NSW Road Noise Policy (DECCW, 2011); c) road surface corrections to address the assessment timeframes outlined in the NSW Road Noise Policy (DECCW, 2011) corresponding to the year of opening, and ten (10) years after opening; and meteorological conditions in accordance with the NSW Road Noise Policy. 		
E52	<p>An Operational Noise Review (ONR) must be prepared (based on the detailed design of the CSSI) to confirm noise mitigation measures that would be implemented for the operation of the CSSI. The ONR must be prepared in consultation with the Planning Secretary and relevant council(s) and must:</p> <ul style="list-style-type: none"> a) confirm the appropriate operational noise objectives and levels for existing sensitive receivers; b) confirm the operational noise impacts based on the final design of the CSSI and modelling undertaken under Condition E51, including operational daytime LAeq, 15 hour and night-time LAeq, 9-hour traffic noise contours; c) review the suitability of the operational noise mitigation measures identified in the documents listed in Condition A1 and, where necessary, investigate and identify additional noise and vibration mitigation measures required to achieve the noise criteria outlined in the NSW Road Noise Policy (DECCW, 2011), including the timing of implementation; d) include a consultation strategy to seek feedback from directly affected landowners on the noise and vibration mitigation measures; and e) procedures for the management of operational noise and vibration complaints. <p>The ONR must be undertaken at the Proponent's expense and be submitted to the Planning Secretary for information prior to implementing at-property noise mitigation, unless otherwise agreed by the Planning Secretary.</p> <p>The Proponent must implement the identified noise mitigation measures and make the ONR publicly available following its submission to the Planning Secretary for information.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	Note: The design of noise barriers and the like must be undertaken in consultation with the community as part of the Place, Design and Landscape Plan required under Condition E69.		
E53	Operational noise mitigation measures as identified in Condition E52 that will not be physically affected by construction and where the noise management level in Condition E38(a) is likely to be exceeded, must be implemented within six (6) months of the commencement of construction in the vicinity of the impacted residence(s) to minimise construction noise impacts, unless otherwise agreed by the Planning Secretary in accordance with Condition E55. The operational noise mitigation measures must be detailed in the Noise and Vibration CEMP Sub-plan required by Condition C4.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E54	If the ONR required by Condition E52 is not prepared within six (6) months of the commencement of construction, the at-property operational noise mitigation measures required by Condition E53 must be consistent with the measures and the properties identified in Appendix G of the M12 Motorway Amendment Report (October 2020).	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E55	All requests to the Planning Secretary under Condition E53 must be accompanied by a report justifying why operational noise mitigation measures will not be implemented within six (6) months, along with details of the temporary measures that the Proponent would implement to reduce construction noise impacts, until such time that the operational noise mitigation measures are implemented. The report must be submitted to the Planning Secretary before the commencement of construction which would affect identified residences. All temporary measures must be implemented within six (6) months of the commencement of construction in the vicinity of the impacted residences. Note: Not having finalised detailed design is not sufficient justification for not implementing the proposed mitigation measures.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
E56	The implementation of at-property treatment does not preclude the application of other noise and vibration mitigation and management measures including temporary accommodation to address construction noise.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E57	All operational noise mitigation measures must be implemented prior to operation of the CSSI.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E58	Within 12 months of the commencement of operation of the CSSI, the Proponent must undertake monitoring of operational noise to compare actual noise performance of the CSSI against the noise performance predicted in the review of operational noise mitigation measures required by Condition E52	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E59	Classified traffic counts must be undertaken simultaneously with noise measurements to confirm traffic volumes and traffic mix assumptions.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E60	<p>An Operational Noise Compliance Report (ONCR) must be prepared to document the findings of the operational noise monitoring carried out under Condition E58. The ONCR must be prepared in accordance with the Model Validation Guideline (RMS, 16 May 2018 Version 1.1) and must address the following:</p> <ul style="list-style-type: none"> a) compliance with the operational noise levels predicted in the review of operational noise mitigation measures required under Condition E52; b) compliance with the operational noise levels in terms of criteria and noise goals established in the NSW Road Noise Policy (DECCW, 2011); c) methodology, location and frequency of noise monitoring undertaken, including grouping monitoring sites at which CSSI noise levels are ascertained with specific reference to locations indicative of impacts on receivers. Monitoring locations must be grouped by - <ul style="list-style-type: none"> i. pavement type, ii. topography; d) visibility of sensitive receivers, i.e. line of sight and shielded by mounds and/or noise walls; e) model light and heavy vehicles separately; f) pavement corrections for light and heavy vehicles; 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<p>g) details on the acoustic performance of the different pavement types used for the CSSI ;</p> <p>h) effects of meteorological conditions on traffic noise consistent with the requirements of the NSW Road Noise Policy (DECCW, 2011);</p> <p>i) details of any complaints and enquiries received in relation to operational noise generated by the CSSI between the date of commencement of operation and the date the report was prepared; NSW Government 43Department of Planning, Industry and Environment Conditions of Approval for M12 Motorway SSI 9364</p> <p>j) any required recalibrations of the noise model taking into consideration factors such as noise monitoring, and actual traffic numbers and proportions;</p> <p>k) an assessment of the performance and effectiveness of applied noise mitigation measures together with a review and if necessary, reassessment of mitigation measures; and</p> <p>l) identification of additional measures to those identified in the review of noise mitigation measures required by Condition E52, that are to be implemented with the objective of meeting the criteria outlined in the NSW Road Noise Policy (DECCW, 2011), when these measures are to be implemented and how their effectiveness is to be measured and reported to the Planning Secretary and the EPA.</p> <p>The ONCR must be submitted to the Planning Secretary and the EPA for information within 60 days of completing the operational noise monitoring (required by Condition E58) and be made publicly available.</p> <p>Any additional measures identified in Condition E60(l) must be implemented within 18 months of submitting the ONCR to the Planning Secretary, unless an alternative timeframe is agreed to by the Planning Secretary</p>		
Place, design and landscaping			
E61	<p>The CSSI must be constructed in a manner that minimises visual impacts of construction ancillary facilities, including but not limited to, providing temporary landscaping and vegetative screening of the construction sites, minimising light spill, and incorporating architectural treatment and finishes within key</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

No.	Condition of Approval	Discussion	Consistent
	elements of temporary structures that reflect the context within which the construction sites are located		
E62	<p>The CSSI must be constructed and operated with the objective of minimising light spillage to surrounding properties. All lighting associated with the construction and operation of the CSSI must be consistent with the requirements of Australian Standard 4282-2019 Control of the obtrusive effects of outdoor lighting, relevant Australian Standards in the series AS/NZ 1158 – Lighting for Roads and Public Spaces, and the National Airports Safeguarding Framework (NASF) Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports.</p> <p>Additionally, mitigation measures must be provided to manage residual night lighting impacts to protect properties adjoining or adjacent to the CSSI, in consultation with affected landowners.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E63	<p>Active transport facilities must be designed, constructed and/or rectified in accordance with the Guide to Road Design Part 6A: Paths for Walking and Cycling (Austroads, 2017) and relevant Australian Standards (AS) such as AS 1428.1-2009 Design for access and mobility. The active transport links must also incorporate relevant Crime Prevention Through Environmental Design principles.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The Shared User Path within M12 Motorway - West Package has been designed to meet the requirements of Austroads 2017 and incorporates relevant Crime Prevention Through Environmental Design measures.</p>	Yes
E64	<p>The place, design and landscape outcomes of the CSSI must be informed by and be consistent with the Urban Design Concept and have consideration of the Urban Design Opportunities as detailed in Appendix G Landscape character, visual impact assessment and urban design report of the EIS.</p> <p>Advice on how the Urban Design Opportunities have been considered and progressed must be provided to the Planning Secretary for information when submitting the Place, Design and Landscape Plan (as required by Condition E69) to the Planning Secretary. Where an Urban Design Opportunity has not progressed, advice as to why must also be provided to the Planning Secretary for information.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
E65	Landscaping must improve parkland, open space and native vegetation and fauna connectivity, including between areas of existing parkland and open space adjacent to and intersecting the CSSI, and through the revegetation of areas with local provenance species, where practicable, between adjoining areas of remnant Cumberland Plain Woodland to re-link them. In implementing these requirements, the Proponent must have regard to wildlife strike risk in proximity to the Western Sydney International Airport.	The M12 Motorway - West Package landscape design has been developed to improve native vegetation and fauna connectivity (i.e. Cosgroves Creek and Badgerys Creek) whilst considering the potential of wildlife strike risk given the proximity of the WSIA. Plant species selection will primarily include locally occurring native plants that are adapted to the climatic conditions and weather extremes of the Cumberland Plain. These indigenous species are generally drought tolerant once established and have a greater capacity to survive and recover from bushfires due to various pyrophytic adaptations. The plant species selected for landscaping are predominantly from the Cumberland Plain Woodland vegetation community that are well-adapted to the current climatic conditions and are best placed to survive the hotter and drier climate predicted for Western Sydney.	Yes
E67	The CSSI must minimise impacts on useable open space. Impacts to the Western Sydney Parklands must be mitigated and offset by an agreed direct payment for improved recreation and access infrastructure and a land compensation payment for the Western Sydney Parkland Trust to use in expanding the parklands. These payments will be in accordance with an agreement established with the Western Sydney Parkland Trust. All offsets must be delivered prior to operation, unless agreed by the Planning Secretary.	The proposed changes to the project would not impact on the ability to comply with this requirement. No useable open space presented in M12 Motorway – West Package. Western Sydney Parklands is located within the M12 Motorway – Central Package and M12 Motorway - East Package.	Yes
E68	Place making, design and landscape outcomes must be informed by input and review by independent and qualified practitioners in the following fields (practitioners may cover more than one field if suitably qualified): <ul style="list-style-type: none"> • public art / cultural interpretation public art; • Aboriginal cultural heritage; • European cultural heritage; • landscape architecture; and • active transport. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<p>These practitioners must be approved by the Planning Secretary at least one (1) month before the commencement of construction and must hold current membership of a relevant professional body, unless otherwise approved by the Planning Secretary. These practitioners must be involved through participation in the Design Review Panel committed to by the Proponent in the documents listed in Condition A1, and in the development and review of the Place, Design and Landscape Plan.</p> <p>Advice and recommendations made by the practitioners must be provided to the Planning Secretary for information when submitting the Place, Design and Landscape Plan to the Planning Secretary.</p> <p>Note: The considerations that the Department will consider when deciding to approve a practitioner are set out in 'Seeking Approval from the Department for the appointment of independent experts, Post approval guidance for Infrastructure Projects' (DPIE, 2020).</p>		
E69	A Place, Design and Landscape Plan must be prepared to inform the final design of the CSSI and to give effect to the commitments made in the documents listed in Condition A1. The Plan does not apply to works, which for technical, engineering, or ecological requirements, or other requirements as agreed by the Planning Secretary, do not allow for alternate design outcomes.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E70	<p>The Place, Design and Landscape Plan must be prepared by a suitably qualified and experienced person in consultation with relevant councils, Western Sydney Parklands Trust, Heritage NSW, the community and affected landowners and businesses. The Place, Design and Landscape Plan must include, but not be limited to:</p> <ul style="list-style-type: none"> a) an analysis of the built, natural, heritage and community context and the urban design objectives, principles and standards for the CSSI; b) identification of opportunities for heritage interpretation during design and construction consistent with the Heritage Interpretation Plan required by Condition E27; c) the design of the CSSI elements including their form, materials and detail; 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<ul style="list-style-type: none"> d) the design of the CSSI landform and earthworks; NSW Government 45 Department of Planning, Industry and Environment Conditions of Approval for M12 Motorway SSI 9364 e) the location of existing vegetation, areas of vegetation to be retained and proposed planting and seeding details, including the use of local indigenous species for revegetation activities. f) active transport infrastructure, including amenities to be provided along the shared user path; g) developed visualisations, cross sections and plans showing the proposed design outcome; h) demonstrated integration of Crime Prevention Through Environmental Design principles into the detailed design process; and details of strategies to rehabilitate, regenerate or revegetate disturbed areas including riparian corridors and successfully establish and maintain the resulting new landscape and associated elements. 		
E71	<p>Revegetation and the provision of replacement trees must be informed by a Tree Survey undertaken during detailed design. The Tree Survey must identify the number, type and location of any trees to be removed. The Tree Survey must be submitted to the Planning Secretary for information with the Place, Design and Landscape Plan.</p> <p>Where trees are to be removed, the Proponent must provide a net increase in the number of replacement trees at a ratio of 2:1, except trees that are offset under Condition E3. Replacement trees must have a minimum pot size consistent with the relevant authority's plans / programs / strategies for vegetation management, street planting, or open space landscaping, or as agreed by the relevant authority(ies).</p> <p>Note: For the purposes of this condition, the relevant authority is that State or local government authority that owns or manages the land on which the replacement trees will be planted.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E72	Construction of permanent surface-built works or landscaping that are the subject of the Place, Design and Landscape Plan must not be commenced (in the area to which the Place, Design and Landscape Plan applies) until the	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	Place, Design and Landscape Plan has been submitted to the Planning Secretary for information, after considering advice received from the Design Review Panel committed to by the Proponent.		
E73	The Place, Design and Landscape Plan must be implemented during construction and operation.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E74	The ongoing maintenance and operation costs of place, open space, landscaping and recreational items and work implemented as part of this approval remain the Proponent's responsibility until satisfactory arrangements have been put in place for the transfer of the asset to the relevant authority. Before the transfer of assets, the Proponent must maintain items and work to at least the maintenance requirements established in the Place, Design and Landscape Plan, required by Condition E69.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
Traffic and transport			
E93	The Planning Secretary's approval is required before any heavy vehicles used for spoil and fill haulage or concrete deliveries (for the purpose of the CSSI) are driven on local roads within one (1) kilometre of early works, construction and construction ancillary facilities and that are not identified for use by heavy vehicles in the documents listed in Condition A1. The local roads must be identified in the Early Works Environment Management Plan and Traffic Management CEMP Sub-plan.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E94	All requests to the Planning Secretary for approval to use local roads in accordance with Condition E93, must include a traffic and pedestrian impact assessment and be prepared in consultation with the relevant local council(s). The assessment must be undertaken by an appropriately qualified and experienced person and must include a swept path analysis if required by the Department. The traffic and pedestrian impact assessment must: a) demonstrate that the use of local roads will not compromise the safety of the public and have no more than minimal amenity impacts;	The proposed changes to the project would not impact on the ability to comply with this requirement. No new local roads are proposed to be used during construction that weren't identified in the Project EIS/ Amendment Report.	Yes

No.	Condition of Approval	Discussion	Consistent
	<p>b) provide details as to the date of completion of the road dilapidation surveys for the subject local roads; and</p> <p>c) describe the measures that will be implemented to avoid where practicable the use of local roads past schools, aged care facilities and childcare facilities during peak times for operation.</p> <p>The outcomes and recommendations of the traffic and pedestrian impact assessment must be incorporated into the Site Establishment Management Plan or Traffic Management CEMP Sub-plan as relevant.</p>		
E95	<p>Before any local road is used by a heavy vehicle for the purposes of the CSSI, a Road Dilapidation Report must be prepared for the road unless otherwise agreed by the relevant road authority. A copy of the Road Dilapidation Report must be provided to the relevant road authority within three (3) weeks of completion of the survey and at least two (2) weeks before the road is used by heavy vehicles associated with the construction of the CSSI.</p> <p>If damage to roads occurs as a result of the construction of the CSSI, the Proponent must rectify the damage to restore the road to at least the condition it was in pre-construction in consultation with the relevant road authority. Rectification works must be undertaken within three (3) months of the subject road no longer being used for the construction of the CSSI unless an alternative timeframe is agreed to by the relevant road authority.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E96	<p>During construction, all reasonably practicable measures must be implemented to maintain pedestrian and vehicular access to, and parking in the vicinity of, residences, businesses and affected properties. Disruptions are to be avoided, and where avoidance is not possible, minimised. Where disruption cannot be minimised, alternative pedestrian and vehicular access, and parking arrangements must be developed in consultation with affected residents, businesses and affected property owners and implemented before the disruption. Adequate signage and directions to businesses must be provided before, and for the duration of, any disruption.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
E97	The CSSI (including new or modified local roads, parking, pedestrian and cycle infrastructure) must be designed to meet relevant design, engineering and safety guidelines, including the Austroads Guide to Traffic Management.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E98	<p>An independent Road Safety Audit is to be undertaken by an appropriately qualified and experienced person during design development (audit of the plans) and prior to opening (pre-opening audit) to assess the safety performance of new or modified roads (road safety audit), parking, pedestrian and cycle infrastructure provided as part of the CSSI (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including Austroads Guide to Traffic Management.</p> <p>Audit findings and recommendations of the detailed design plans (audit of the plans) must be actioned before construction of the relevant infrastructure. The pre-opening audit findings and recommendations must be actioned prior to the relevant infrastructure being made available for use. All audit findings must be made available to the Planning Secretary on request, within the timeframe stated in the request.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>Road safety audits have been completed for the design development phase.</p>	Yes
E99	Safe pedestrian and cyclist access must be maintained around work sites during Work. In circumstances where pedestrian and cyclist access are restricted or removed due to Work, an alternate route which complies with the relevant standards must be provided and signposted.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
Water			
E105	The CSSI must be designed, constructed and operated so as to maintain the NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval, unless an Environment Protection License (EPL) in force in respect of the CSSI contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with.	The 100% detailed design of M12 Motorway - West Package has incorporated dry bioretention operational water quality control basins as discussed in Section 4.8. Construction basins (i.e. temporary basins) have been developed based on the requirements of the Blue Book. The construction water quality assessment proposed, is based on sedimentation basin discharge	Yes

No.	Condition of Approval	Discussion	Consistent
		<p>criteria, which satisfied the water quality objective requirements.</p> <p>To assess water quality objectives, total suspended solids (TSS), total phosphorus (TP) and total nitrogen (TN) existing and design concentrations have been assessed for the M12 Motorway - West Package. The post-development stormwater pollutant concentrations are less than existing (pre-development) stormwater pollutant concentrations and hence the M12 Motorway - West Package is working towards achieving or maintaining the water quality objectives.</p>	
E106	Drainage feature crossings (permanent and temporary watercourse crossings and diversions) and drainage swales and depressions must be carried out in accordance with relevant guidelines and designed by a suitably qualified and experienced person.	The proposed changes to the M12 Motorway - West Package would not impact on the ability to comply with this requirement. The water quality design changes have been designed in accordance with relevant guidelines.	Yes
E107	Work on waterfront land must have regard to the Guidelines for controlled activities on waterfront land – Riparian Corridors (NRAR, 2018), Controlled activities on waterfront land – Guidelines for watercourse crossings on waterfront land (NSW Office of Water, 2012) and Policy and Guidelines for Fish Habitat Conservation and Management (DPI Fisheries, 2013).	The proposed changes to the M12 Motorway - West Package would not impact on the ability to comply with this requirement.	Yes
E108	<p>The Proponent must consult DPI Fisheries and EES during the detailed design of the watercourse crossings. The consultation must include:</p> <ul style="list-style-type: none"> a) design of bridges; b) design of scour protection; and c) details of riparian revegetation. 	<p>Ongoing consulting with relevant government agencies and stakeholder has been carried out.</p> <p>The proposed changes to the M12 Motorway - West Package would not impact on the ability to comply with this requirement. Consultation with Department of Primary Industries – Fisheries and Environment, Energy and Science will be ongoing.</p>	Yes

No.	Condition of Approval	Discussion	Consistent
E109	Rehabilitation and revegetation of the riparian corridor and banks of watercourses impacted by the CSSI must be commenced within three (3) months of the completion of the watercourse work, bridge works (sub-structure, super-structure and pavement) and any other construction work required in the riparian corridor.	The proposed changes to the M12 Motorway - West Package would not impact on the ability to comply with this requirement.	Yes
E110	<p>All new or modified drainage systems associated with the CSSI must be designed to:</p> <ul style="list-style-type: none"> a) where stormwater drainage is discharged to a council's stormwater system, meet the capacity constraints of any council's drainage system to receive and convey the proposed flows from the CSSI, or otherwise upgrade council's drainage system at the Proponent's expense, in consultation with the relevant council(s); b) minimise impacts on the receiving environment at the final outflow point resulting from any additional flow volume (including, but not limited to scour, flooding, water quality impacts, and impacts on riparian vegetation, aquatic ecology and property); and ensure mitigation measures are implemented where increased flows through cross drainage systems adversely impact on council or Sydney Water drainage infrastructure and the receiving environment. 	<ul style="list-style-type: none"> a) The only component of the stormwater drainage design associated with a council stormwater system is associated with Luddenham Road (Penrith City Council). The stormwater drainage discharge to the council's systems has been designed with due consideration of the system's existing capability. The peak flows through this existing culvert have not increased due to M12 Motorway – West Package works therefore does not have an impact on the capacity of the existing structure b) The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement. Where any increase is noted, impacts at the receiving environment at the final outflow point have been assessed against the requirements of Condition of Approval E17. The water quality complies with Condition of Approval E105. The design has been developed to minimise impacts on riparian vegetation, aquatic ecology and property. c) The peak flows through this existing culvert have not increased due to M12 Motorway - West Package works therefore does not have an impact on the capacity of the existing structure. 	Yes

The proposed change can be accommodated within the Conditions of Approval.

5.2 Statement of Commitments / revised environmental management measures

The proposed change has been assessed in Table 5-2 in relation to the relevant commitments / revised environmental management measures in the context of the Division 5.2 Approval.

Additional and/or modified environmental management measures to those presented in the AR Submissions Report have been made bold and deleted measures, or parts of measures, have been struck out.

Table 5-2 Consistency against relevant Statement of Commitments and revised environmental management measures

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
Biodiversity			
B03	Native vegetation, threatened species and threatened species habitat removal will be minimised where practicable through detailed design. This will include avoiding the nest and surrounds of the White-bellied Sea-Eagle, where practicable.	<p>The M12 Motorway – West Package 80% detailed design construction footprint would result in an overall impact of 23.25 hectares to native vegetation. The 80% detailed design resulted in an overall decrease in native vegetation removal of 0.92 hectares since the AR Submissions Report. Clearing of some PCTs has been reduced while clearing of others have increased as a result of the proposed design changes and design development.</p> <p>The predicted impacts to PCTs have had the following changes between the AR Submissions Report and the 80% detailed design:</p> <ul style="list-style-type: none"> • PCT 835 - increased by 0.28 hectares • PCT 849 - increased by 0.03 hectares • PCT 850 - reduced by 0.78 hectares • PCT 1800 - reduced by 0.45 hectares. <p>The design of Bridge BR05 (Badgerys Creek) does not impact on the White-bellied Sea-Eagle nest which is located to the south and is located beyond the current EPBC Approval footprint and proposed M12 Motorway – West Package 80% detailed design construction boundary.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
B05	<p>Pre-clearing surveys will be carried out in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 1: Pre-clearing process). The following species identified on or near the study area will require particular attention:</p> <ul style="list-style-type: none"> White-bellied Sea-Eagle <p>If design cannot avoid the White-bellied Sea-Eagle nest, then pre-clearing measures to avoid impact on the nest will be implemented. This will include pre-clearing survey to establish if it is currently being used and removal of the nest by an ecologist experienced in similar procedures. The potential impacts of habitat removal will be minimised by removing the nest outside of the nesting period (typically lays between June and September, with young remaining in the nest for 70 days).</p> <p>An initial pre-clearing inspection will be carried out at least 21 days prior to commencement of clearing, to give the ecologist time to check the nest and then relocate if needed.</p> <ul style="list-style-type: none"> Cumberland Plain Land Snail <p>Pre-clearance surveys will be carried out immediately before clearing works by a qualified ecologist in all vegetated areas to be disturbed that were identified as known or potential habitat for Cumberland Plain Land Snail (see Section 6.2). As identified in the CFFMP, all individual Cumberland Plain Land Snails found during pre-clearance surveys will be translocated to adjacent areas of suitable habitat.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The White-bellied Sea-Eagle nest is located to the south of Bridge BR05 (Badgerys Creek) and is located beyond the current EPBC Approval footprint and proposed M12 Motorway – West Package 80% detailed design construction boundary.</p>	Yes
B08	<p>Revegetation will be carried out in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 3: Re-establishment of native vegetation) and the Landscape Plan prepared for the project.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes
B10	<p>Removal of riparian vegetation at creek crossings will be minimised and vegetation connectivity across the riparian zone will be maintained where possible.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
B13	Creek adjustments will be investigated and removed or minimised during detailed design where feasible. Proposed creek adjustments will be designed such that they result in minimal changes to flow velocities.	Creek adjustments are no longer proposed as part of M12 Motorway – West Package. The detailed design of Bridge BR05 over Badgerys Creek has eliminated the need for the creek adjustment / realignment.	Yes
B15	Bridge pier locations within instream (main waterway channel) or on creek banks will be avoided during detailed design at the South Creek, Cosgroves Creek, Badgerys Creek and Kemps Creek crossings. Where avoidance is not possible, further biodiversity assessment will be required.	The proposed changes to the project would not impact on the ability to comply with this requirement. The detailed designs of Bridge BR02 over Cosgroves Creek and Bridge BR05 over Badgerys Creek have resulted in the increase of the bridge span lengths. This has enabled the bridge piers to be located further away from the main creek channel and higher up the creek bank. The bridge piers have been placed on a skew to align with the creeks so as to minimise disruption to creek flows. The predicted aquatic biodiversity impacts from Bridge BR02 at Cosgroves Creek and from Bridge BR05 at Badgerys Creek are expected to be less than that of what was assessed in the Project EIS and Amendment Report.	Yes
B17	Permanent and temporary waterway crossings will be designed and constructed to maintain fish passage in accordance with Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge, 2003). Crossing types should be matched to waterway type as per Table 1 in Fairfull and Witheridge (2003).	The proposed changes to the project would not impact on the ability to comply with this requirement. The detailed designs of Bridge BR02 (Cosgroves Creek) and Bridge BR05 (Badgerys Creek) are unlikely to impede fish passage based on the design optimisation implemented (refer to REMM B15 comments above) during the operational phase. Temporary waterway crossings are to be designed, constructed and maintained by the appointed Construction Contractor.	Yes
B21	Interruptions to water flows associated with groundwater dependent ecosystems will be minimised through detailed design.	The proposed changes to the project would not impact on the ability to comply with this requirement. The Project EIS / Amendment Report identified moderate to high potential Groundwater Dependent Ecosystems	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
		<p>(GDEs) were mapped with the M12 Motorway – West Package study area associated with Cosgroves Creek and Badgerys Creek. Bridge BR02 and BR05 traverse these creeks respectively. At Bridge BR02 (Cosgroves Creek) groundwater was observed at about 2.5 metres below the natural surface level and within the stiff clay alluvium. The discrete piles at each support (abutment or pier) will be spaced at a minimum five metre interval which is considered unlikely to impact groundwater levels and flows. At Bridge BR05 (Badgerys Creek) groundwater levels were observed within the alluvial deposits at depths ranging from 2.9 metres to 4.0 metres. Bridge BR05 substructure has discrete piles at a five-metre spacing which is considered unlikely to impact groundwater levels and flows. Boreholes for both bridge piles will be drilled so that steel reinforcement and concrete pour can be undertaken as soon as practicable following final socket cleaning and within 24 hours of the borehole being drilling. The drawdown extent at each road cut intersecting groundwater (Cut 2, Cut 5, Cut 6 and Cut 7) have been revised and are provided in Section 4.9. The anticipated drawdown is not expected to intersect any GDE.</p>	
B23	<p>Connectivity measures will be implemented in accordance with Wildlife Connectivity Guidelines for Road Projects (TfNSW, under preparation). Fencing will be located to reduce roadkill of fauna species and funnel animals to creek crossings where safe passage will be available. Detailed design is to retain fauna passage at all four main creek lines (Cosgroves, South, Kemps and Badgerys Creeks).</p>	<p>Cosgroves Creek (Bridge BR02) and Badgerys Creek (Bridge BR05) are located within the M12 Motorway – West Package detailed design package. At both bridges (BR02 and BR05) a dry fauna passage for identified target species such as the Eastern Grey Kangaroo has been provided.</p> <p>In addition a canopy rope structure has been provided to support the movement of sugar gliders under both bridges. At both bridges fauna exclusion fencing extends for 150 metres from the bridge abutments to tie in with the urban controlled access fencing. Urban controlled access fencing</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
		is to be installed along the TfNSW project boundary. The 1.8-metre-high chain link fencing is likely to prevent most medium to large mammals (e.g. Eastern Grey Kangaroo, Swamp Wallaby, Common Wombat and Short-beaked Echidna) from accessing the carriageway and will therefore act as a 'supplementary fauna exclusion fence'.	
B24	<p>Exclusion zones will be set up at the limit of clearing in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 2: Exclusion zones).</p> <p>Exclusion zones will be set up to protect potential indirect impacts to threatened flora in accordance with the areas identified in the EIS and this amendment report (including Figure 1-2 of Appendix A of the amendment report).</p>	<p>Within the M12 Motorway – West Package 80% detailed design an additional exclusion zone was established by the Amendment Report. This exclusion zone is located on the upstream side of Cosgroves Creek in the vicinity of Bridge BR02 (i.e. south of Bridge BR02). The 80% detailed design of M12 Motorway – West Package has complied with the established exclusion zone.</p> <p>An additional exclusion zone was established during the detail zone and is located to the west of Luddenham Road to the south of the proposed M12 Motorway (refer to Figure 4-1).</p>	Yes
B28	<p>Shading impacts will be minimised through detailed design of bridge and culvert structures. The need for artificial lighting during construction and operation will be minimised through detailed design where feasible, including directing lighting away from vegetated areas where practicable.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>Bridge BR05 (Badgerys Creek) is a twin bridge arrangement with a nine-metre-wide space between the bridge structures. Bridge BR02 (Cosgroves Creek) is a single deck bridge which is about 27 metres wide. Plant species selection for revegetation / landscaping at these bridges has been developed with due consideration of potential shading impacts and the existing vegetation communities present.</p> <p>At Bridge BR05 (Badgerys Creek) lighting is provided along the northern edge of the Eastbound bridge deck and the southern edge of the westbound bridge deck. The 12-metre-high lighting poles will be spaced at about 45 metre centres. Light spill is controlled with appropriate orientation</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
		of the light towards to shared user path and bridge. At Bridge BR02 (Cosgroves Creek) lighting is provided along the southern edge of the bridge deck to illuminate the shared user path and bridge. The 5.5-metre-high poles will be spaced at 35 metre centres. Light spill is controlled with appropriate orientation of the lighting towards to shared user path and bridge.	
Traffic and transport			
TT01	<p>A construction transport and traffic management plan (CTTMP) will be prepared as part of the CEMP in consultation with relevant local Councils, and in accordance with relevant guidelines.</p> <p>The CTTMP will outline:</p> <ul style="list-style-type: none"> • Staging and planning of works to minimise the need to occupy roads where practicable, including identification of haulage routes • Safe alternative routes for pedestrians and cyclists in accordance with relevant safety and accessibility standards • The requirements for traffic control plans to be prepared for each work area which will include details of site access and specific traffic control measures (including signage) to manage traffic movements • Road safety audit requirements • Parking arrangements for construction staff • Identification of access arrangements at construction sites detailing vehicle access movements • Measures to minimise changes to the existing road network, property access, bus stops and pedestrian/cyclist facilities where feasible • Measures to communicate and notify of any changes in traffic conditions on roads or paths to road users, emergency services, public transport operators, and other relevant stakeholders 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<ul style="list-style-type: none"> Measures to manage construction traffic interfaces and access arrangements with WSIA and Sydney Metro – Western Sydney Airport Requirements for appropriate warning and signage for traffic and other road users such as cyclists and pedestrians in the vicinity of work areas and work site access, and road diversions. 		
TT02	Changes to bus stops will be implemented in consultation with TfNSW, relevant councils, and relevant bus operators. Alternate temporary bus stops will be provided with appropriate signage to direct commuters. Safe access will be provided in accordance with relevant safety and accessibility standards.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT03	Movements of haulage vehicles will be planned to minimise movements on the road network during the AM and PM peak periods where practicable.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT04	Consultation will be carried out with the operators of the M7 Motorway to develop measures to manage the potential impacts of construction within the operating M7 Motorway corridor.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT05	<p>TfNSW will continue to work with Western Sydney Parklands Trust to support the delivery of a shared user path within Western Sydney Parklands to connect from Range Road to the existing M7 Motorway shared user path.</p> <p>If it is determined during consultation that the shared user path connection through the Western Sydney Parklands will not be delivered, TfNSW will provide an alternative alignment for the shared user path in this section via either Elizabeth Drive, or alongside the M12 Motorway from Range Road to the M7 Motorway shared user path network.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT06	A road dilapidation report will be prepared before impacts on local roads in consultation with relevant councils and other relevant stakeholders. The report will document the existing conditions of local roads and	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	outline measures to repair damage to roads from heavy vehicle movements associated with the project.		
TT07	Existing property access would be maintained at all times. Any changes to access arrangements or alternative access that are necessary during construction will be done with consultation with the landowner. Any changes to access will provide the same equivalent pre-existing level of access unless agreed to by the landowner. Property access that is physically affected by the project will be reinstated to at least an equivalent standard, in consultation with the landowner.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT08	A signage strategy will be prepared as part of the CTTMP to provide for appropriate signage for businesses where existing signage is obscured/no longer visible or where customers are required to use alternative access to reach the businesses during construction.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT09	Traffic signals will be coordinated to minimise congestion and manage traffic flows.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT10	Investigate and develop an appropriate traffic solution to manage the expected traffic delays during construction in the vicinity of Devonshire Road. The options considered and the preferred solution will be documented in a memo and then implemented through the CTTMP for the project.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
Urban design, landscape character and visual amenity			
LVIA01	An Urban Design and Landscape Plan (UDLP) will be prepared to minimise landscape character and visual impacts, and detail and guide the implementation of landscape features to be installed as part of the project, including re-vegetation requirements. This will include requirements for the provision of vegetative screening to soften the appearance of structural elements of the project such as	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<p>noise barriers and provide screening of sensitive views. The UDLP will also consider the requirements of the heritage interpretation framework that will be prepared for the project (NAH02).</p> <p>The UDLP will be prepared in accordance with applicable guidelines, be consistent with the concept project identity in the EIS and relevant urban design objectives and principles for the project including consideration of implementation of Crime Prevention Through Environmental Design (CPTED) principles, and in consultation with relevant councils.</p>		
LVIA02	A detailed Landscape Plan will be prepared for the project and implemented throughout construction. The plan will guide the implementation of measures to minimise landscape character and visual impacts, including revegetation requirements.	The detailed design of the M12 Motorway - West Package includes an Urban Design Package and a Landscape Design Package which guide the implementation of measures to minimise the landscape character and visual impacts of the project. For example, the planting schedules for the planting mixes have been developed to reflect the Landscape Character Zones identified in the Urban Design Framework. The detailed design landscape plans show the extent of revegetation and implementation methods.	Yes
LVIA03	Existing vegetation within the construction footprint will be retained and protected where possible. This includes densely vegetated areas such as remnant riparian forests and Cumberland Woodlands in Western Sydney Parkland	The extent of native vegetation clearing for the M12 Motorway - West Package is described in Section 4.1 and illustrated in Figure 4-1.	Yes
LVIA04	Site levels and grades for the project will integrate with the surrounding terrain to help the visual assimilation of the project into the surrounding landscape where practicable. Engineered slopes will have gradients no steeper than 3H:1V where possible to maximise the establishment of vegetation on these batters and allow for appropriate maintenance.	Due to the construction footprint constraints and requirements associated with the engineering design, many of the engineered batters are 2H:1V. However, where possible, batters surrounding the Interpretive Nodes and the interpretative mounding proposed within the landscape areas of the Airport interchange will be 3H:1V or shallower.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
LVIA05	Project elements such as ancillary facility hoardings will be designed and maintained to minimise impacts on landscape character and visual amenity. This will include selecting colours and materials that are visually recessive and blend into the surrounding landscape where practicable, and the prompt removal of graffiti.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
LVIA06	Where noise mitigation such as noise barriers are required, they will be designed with the aim of minimising visual impacts	The Noise and Vibration Assessment Report prepared for the M12 Motorway at 50% detailed design (TfNSW, 2020) did not identify the need for noise barriers or mounds as part of the M12 Motorway - West Package. With respect to the M12 Motorway - West Package, the only noise mitigation requirement applicable is the requirement for the pavements to be Low Noise Diamond Grind (LNDG) and at-property treatments.	Yes
LVIA07	Temporary and permanent lighting will be designed and implemented with consideration of: <ul style="list-style-type: none"> • The need to orientate lighting to minimise light spill and glare impacts on nearby receivers • The need to minimise vandalism and maintenance requirements • Requirements of the National Airports Safeguarding Framework (NASF) (National Airports Safeguarding Advisory Group, n.d.) for operational lighting • Opportunities to implement sustainability initiatives in design such as energy efficient or solar lighting. 	The proposed changes to the project would not impact on the ability to comply with this requirement. Lighting design has been undertaken in accordance with the requirements of Australian relevant Standards. And NASF guidelines. The light poles have been located carefully to minimise light spillage to the surrounding environment and is consistent with the Project EIS design and therefore do not have any additional impacts. Potential to incorporate solar lighting in the design has been considered in the design.	Yes
LVIA08	TfNSW will investigate opportunities to undertake early tree planting in consultation with landowners to soften impact of structural elements and screen sensitive views.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
LVIA09	The findings and recommendation of the Aboriginal cultural heritage design process managed by Balarinji will be incorporated into the urban	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	design and implemented as part of the project, including interpretive initiatives.		
LVIA10	Shared user paths to be delivered as part of the project will not preclude connections to future open space corridors and land use as identified in the Western Sydney Land Use and Infrastructure Implementation Plan (LUIIP) (DPE 2018). Where further design of adjacent open space corridors is undertaken, shared user paths will be provided to connect at an appropriate location. Shared user paths will be designed to be located away from road-side edges to provide an immersive landscape experience for pedestrians and cyclists, where possible.	The strategy to provide shared user path connections to future open space corridors is outlined in the Urban Design Framework and is envisaged to be further developed as appropriate in the UDLP. The shared user path locations have been designed to be located away from road-side edges to provide an immersive landscape experience for pedestrians and cyclists, where possible.	Yes
LVIA11	Establish an Urban Design Review Panel to provide advice and input into the development of the UDLP.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
LVIA12	Highly visible elements of the project including potential noise barriers, retaining walls, bridge structures and urban design material selection will be designed to satisfy functional requirements and adopt the design principles detailed in the M12 Motorway EIS Landscape Character, Visual Impact Assessment and Urban Design Report. The proposed designs will be documented in the relevant UDLP for the project.	Urban design treatments incorporated into the detailed design of bridges include: <ul style="list-style-type: none"> • Individual columns with independent headstock • Reducing the number of required columns • Curved, boat-shaped pier headstocks • Urban design treatments incorporated into the detailed design of retaining structures (i.e. walls) include: <ul style="list-style-type: none"> • A standard design philosophy across all retaining walls • Selection of facing panels, to match the urban design requirements of the project • Feature architectural cladding that ties in with the wider project • Noise barriers and noise mounds were not required as part of the M12 Motorway - West Package. 	Yes
LVIA13	Consider a standard design for retaining walls and major structures across the project, to present a coordinated 'suite of elements.'	Standard bridge barrier and Super-T sections used across the bridges within the M12 Motorway - West Package 80% detailed design. A standard design has been adopted for all retaining structures (i.e. walls) which also includes the selection of facing panels.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
LVIA14	<p>The project must consider CPTED principles during detailed design to minimise safety risks to all users. The project must carry out periodic CPTED reviews by a qualified professional and implement any additional recommendations where reasonable and feasible.</p>	<p>The M12 Motorway - West Package 80% detailed design has incorporated the following CPTED measures:</p> <ul style="list-style-type: none"> • Maintain clear sight lines for visual transparency along the full length of bridges with an alignment that allows to see through the two ends of a bridge • Maintain clear sight lines for visual transparency along the full length of retaining structures (i.e. walls) • Avoid abrupt transitions at interfaces between shared user path and bridge structures • Avoid abrupt transitions at the end of retaining walls • Avoid hidden pockets or black spots to reduce the occurrence of illegal activity • Provide clear sight lines and alert users to be aware of oncoming pedestrian and cyclist traffic. 	Yes
LVIA15	<p>A tree management strategy will be prepared for the project, outlining:</p> <ul style="list-style-type: none"> • Measures to minimise tree removal to retain and protect as many trees within the construction footprint as reasonable and feasible • Measures to avoid damage to trees that are to be retained within the construction footprint to ensure the maintenance of health and stability of the trees in accordance with AS4970-2009 Protection of trees on development sites • Requirements for the pruning of trees to be carried out by a suitably qualified person in accordance with AS 4373-2007 Pruning of amenity trees • Consideration of maintenance requirements and safety standards • Requirements for the replacement trees where removal cannot be avoided including: <ul style="list-style-type: none"> — Net increase in the number of trees (not identified as within an EEC) — Where it is not practicable to plant trees in the operational footprint an alternative location will be identified in consultation 	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<p>with relevant councils and in consideration of future development in the local area</p> <ul style="list-style-type: none"> Minimum pot size in accordance with part 3.2.1 (Rural road reserves) in the TfNSW Landscape Guideline (2018) subject to long-term viability of the plant. 		
LVIA16	Revegetation for the project will consider the land use requirements of the National Airports Safeguarding Framework (NASF) (National Airports Safeguarding Advisory Group, n.d.) to minimise the risk of wildlife strikes at the Western Sydney Airport.	The proposed changes to the project would not impact on the ability to comply with this requirement. The M12 Motorway - West Package 80% detailed design for Landscaping is currently being developed with input/advice from an aviation ecologist (Biodiversity Australia).	Yes
LVIA17	Carry out appropriate soil analysis and identify soil preparation requirements for landscaping treatments to inform the Urban Design and Landscaping Plan and vegetation management in accordance with TfNSW Batter Surface Stabilisation Guideline (Roads and Maritime 2015).	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
LVIA18	Species selected for landscaping will consider species that are resilient to future modelled climatic conditions and are suitable for establishment on road embankments.	Future modelled climatic conditions indicate that Western Sydney will continue to experience regular extreme heat events. The plant species selected for landscaping are predominantly from the Cumberland Plain Woodland vegetation community that are well-adapted to the current climatic conditions and are best placed to survive the hotter and drier climate predicted for Western Sydney. Tree species from the Cumberland Plain Woodland, including <i>Eucalyptus crebra</i> , <i>Eucalyptus tereticornis</i> , <i>Corymbia maculata</i> and <i>Melaleuca stypheloides</i> , which are specified throughout the project, were recorded as having no to minimal canopy damage following a visual assessment after the highest temperature ever recorded in Sydney, of 48.9 degree Celsius in 2020. This assessment was conducted by the Which Plant Where project funded	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
		by the Hort Frontiers Green Cities Fund, Macquarie University, Western Sydney University and the NSW Office of Environment and Heritage.	
Aboriginal cultural heritage			
AH01	<p>A construction cultural heritage management plan (CCHMP) will be developed for the project in consultation with the project RAPs and EESG. The CCHMP will include:</p> <ul style="list-style-type: none"> • An unexpected finds procedure for the discovery of Aboriginal ancestral remains, Aboriginal objects or new Aboriginal sites consistent with TfNSW Standard Management Procedure Unexpected Heritage Items (Roads and Maritime, 2015). This procedure will also outline requirements to manage unexpected human remains finds in accordance with NSW statutory requirements, and relevant guidelines and standards prepared by EESG. The Procedure will outline the process for consulting with the RAPs in the event that previously unidentified Aboriginal heritage is discovered • Procedures for the management and curation of salvaged Aboriginal objects • Detailed locations and installation procedures for fencing and protective coverings • Details of permissible activities inside protected Aboriginal areas • Details of permissible activities inside protected Aboriginal areas • Procedures for consideration of heritage aspects within site inductions and toolbox talks for construction workers and supervisors. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
AH02	<p>A detailed Aboriginal Cultural Salvage Strategy will be prepared for the project in consultation with project RAPs and EESG to guide the salvage excavation process for Aboriginal sites that will be salvaged. The strategy will address specific questions about each site and will be</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<p>based on the salvage excavation methodology outlined in the ACHAR and prepared in consultation with EESG and project RAPs.</p> <p>All salvage collections and excavations will be carried out by a suitably qualified and experienced archaeologist. The method and extent of excavation required, and management of artefacts finds will be determined in consultation with project RAPs and EESG.</p> <p>Following completion of all salvage works associated with Aboriginal heritage sites, an Aboriginal Cultural Heritage Report will be prepared in accordance with relevant guidelines and in consultation with project RAPs and EESG. The Aboriginal Cultural Heritage Report will document all results of the salvage activities including analysis of artefacts from collections and excavations and management of all artefact finds.</p>		
AH03	<p>Impacts on identified Aboriginal sites will be minimised where feasible in consultation with a suitably qualified and experienced archaeologist. Measures considered will include (but not be limited to):</p> <ul style="list-style-type: none"> • Designing and locating bridges (including bridge pylons), haulage routes and other access roads to minimise potential disturbance of soils where feasible • Focusing protection measures on the zone within 100 metres of creeks including consideration of opportunities to cover the original cultural deposits in temporary protective barriers such as geotextile fabric and a layer of clean fill. 	<p>An assessment was completed as part of detailed design to assess the feasibility of in-situ protection of cultural heritage deposits within 100 metres of Cosgroves Creek and Badgerys Creeks (which are traversed by Bridges BR02 and BR05 respectively). The assessment considered geotechnical conditions at both creeks and the constructability needs in assessing whether an opportunity exists to cover the original cultural deposits in temporary barriers such as geotextile fabric and a layer of clean fill. Based on the geotechnical constraints (i.e. ground conditions) and constructability requirements at Cosgroves and Badgerys Creeks it is not considered feasible to cover the cultural deposits in a temporary barrier such as geotextile fabric and a layer of clean fill (i.e. in-situ protection).</p>	Yes
AH04	<p>An investigation will be carried out during detailed design to minimise impacts on the CHRP site where feasible.</p>	<p>CHRP is not within the M12 Motorway – West Package construction footprint.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
AH05	<p>Investigations will be carried out during detailed design to determine the feasibility of retaining cultural deposits between the pylons of bridges or elevated structures at the following sites:</p> <ul style="list-style-type: none"> • BCW • BCE • SCW T1 • SCW T2 • SCE. <p>This will include covering the original cultural deposits beneath temporary protective barriers where feasible, such as geotextile fabric and a layer of clean fill material.</p>	<p>Aboriginal Heritage sites BCE and BCW are located either side of Badgerys Creek where the main line of the M12 Motorway traverses Badgerys Creek via Bridge BR05. The remaining sites are not located within the M12 Motorway - West Package. During detailed design an assessment has been carried out to determine the feasibility of in-situ protection of cultural heritage deposits within 100 metres of Badgerys Creeks (which is traversed by Bridge BR05). The assessment took into consideration the geotechnical conditions at Badgerys Creek and the constructability needs in assessing whether an opportunity exists to cover the original cultural deposits in temporary barriers such as geotextile fabric and a layer of clean fill. Based on the geotechnical constraints (i.e. ground conditions) and constructability requirements at Badgerys Creek it is not considered feasible to cover the cultural deposits in a temporary barrier such as geotextile fabric and a layer of clean fill (i.e. in-situ protection).</p>	Yes
AH06	<p>Salvage collection of surface artefacts will be carried out at the following sites:</p> <ul style="list-style-type: none"> • BCE • SCW T2 • KCW • PCP8 • CHRP • RR • M12A1 • Isolated artefact 4 • TNR-AFT-14. 	<p>BCE, M12A1, Isolated Artefact 4 and TNR-AFT-14 are located within the M12 Motorway - West Package. Salvage collection of surface artefacts will be carried out by others prior to construction.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
AH07	<p>Salvage excavation will be carried out at the following sites:</p> <ul style="list-style-type: none"> • CCW • BWB • BCW • SCW T1 • SCW T2 • SCE • KCW • CHRP. <p>The methodology and extent of excavations required for the above sites will be in accordance with site specific requirements outlined in the ACHAR prepared for the project.</p>	CCW, BWB and BCW are part of the M12 Motorway - West Package. Salvage collection of surface artefacts will be carried out by others prior to construction.	Yes
AH08	Exclusion zones will be set up in the form of an appropriate barrier / fencing along the portion of AHIMS site 45-5-2721 (PAD-OS-7) that extends into the refined construction footprint, with visible signage notifying construction personnel to avoid ground impacts	AHIMS site 45-5-2721 (PAD-OS-7) is not located within the M12 Motorway - West Package.	Yes
AH09	Archaeological test excavation will be carried out at PAD-OS-7 in the instance that construction restrictions result in impacts to that site. Test excavations would be conducted in accordance with Requirement 16a of the Code of Practice (DECCW 2010), Stage 2 PACHCI (Roads and Maritime 2011) and in consultation with RAPs.	PAD-OS-7 is not located within the M12 Motorway - West Package.	Yes
Non-Aboriginal heritage			
NAH01	<p>A construction cultural heritage management plan (CCHMP) will be prepared for the project as part of the CEMP in consultation with DPC (Heritage). The CCHMP will include as a minimum:</p> <ul style="list-style-type: none"> • A list, plan and maps with GIS layers showing the location of identified heritage items both within, and near, the construction footprint 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<ul style="list-style-type: none"> • A significance assessment and statement of significance for each item • Protocols and procedures including inductions and toolbox talks for all contractors and subcontractors working in the area to be informed of all exclusion zones, the elements and their significance, to prevent accidental damage or encroachment • Protocols and procedures to be implemented during construction to avoid or minimise impacts on items of heritage significance including protective fencing • The TfNSW Unexpected Heritage Items Procedure (Roads and Maritime, 2015) which would be followed in the event that unexpected heritage finds are uncovered during construction. 		
NAH02	<p>A suitably qualified heritage specialist will be engaged to prepare a heritage interpretation framework to guide development of the detailed urban design for the project. This framework will be prepared in accordance with the Interpreting Heritage Places and Items Guidelines (NSW Heritage Office, 2005) and will include:</p> <ul style="list-style-type: none"> • Integration of heritage themes and values to be incorporated • Collaboration with other design elements and themes for the project, including those associated with Western Sydney Airport and Sydney Metro – Western Sydney Airport, to develop an integrative design approach with surrounding development • Opportunities for design responses for Aboriginal and non-Aboriginal heritage. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NAH03	<p>Impacts on Non-Aboriginal heritage items will be avoided or minimised where reasonable and feasible. Where impacts are unavoidable, works will be carried out in accordance with the measures for individual Non-Aboriginal heritage items outlined in measures NAH04 to NAH11.</p>	The detailed design of M12 Motorway - West Package has been undertaken in a manner that avoids impacts to Non-Aboriginal Heritage items beyond that assessed as part of the Project EIS and Amendment Report. The demolition of buildings/structures associated with McGarvie Smith Farm has been kept to those identified as requiring demolition by the EIS/AR (i.e. Farm 6, 7, 8, Shed 1, Shed 2 and one	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
		<p>silo). No buildings or structures associated with McMaster Field Station require demolition.</p> <p>The majority of identified heritage features of the Fleurs Radio Telescope Site are located outside of the M12 Motorway - West Package 80% detailed design construction footprint, with the South Creek Antenna Complex (of little value) and a 100-metre portion of the Cable alignment (of moderate value) located within the M12 Motorway - West Package 80% detailed design construction footprint. The removal of these elements would not alter the degree of adverse impact (minor) to the heritage item.</p> <p>Urban design and landscape treatments as part of M12 Motorway - West Package will limit impacts to the landscape and vista to and from the scenic landscape associated with the confluence weir of South, Kemps and Badgerys Creek.</p>	
NAH04	<p>A suitably qualified heritage consultant will be engaged to prepare an archival photographic recording of the site in accordance with the Heritage Information Series How to prepare archival records of heritage items (NSW Heritage Office, 1998). This will include both buildings and landscape features such as dams, and earthworks. The recording will include a detailed map showing the location of the features.</p> <p>Options will be investigated to provide funding support to the property's current owner to prepare a thematic heritage study of CSIRO and other agricultural research stations, including both McGarvie Smith Farm and McMaster Field Station, and other relevant agricultural research stations and similar facilities located in NSW. The thematic study will include a review of the role of such properties in veterinary research, association with agricultural, pastoral and animal husbandry groups, use of pioneering methods and practices and contribution to the development of farming in Australia. In the event that landowners do not prepare this study, TfNSW will engage a heritage specialist to do so.</p>	<p>McGarvie Smith Farm is located within the M12 Motorway - West Package 80% detailed design construction footprint. The EIS/Amendment Report identified that the project would result in the demolition of five buildings (i.e. McGarvie Smith Farm 6, 7, 8, Shed 1 and Shed 2) and one silo. The 80% detailed design of M12 Motorway - West Package has not impacted on any additional buildings/structures other than those identified in the EIS/AR at McGarvie Smith Farm as described in Section 4.5.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
NAH05	<ul style="list-style-type: none"> All extant elements of the radio telescopes and associated infrastructure, including rubbish mounds situated outside the construction footprint will be left intact Ground penetrating radar, or other remote sensing survey techniques, will be carried out under the supervision of a suitably qualified and experienced archaeologist before any ground disturbance within the heritage curtilage of the Fleurs Radio Telescope Site contained within the construction footprint to identify any sub-surface cables: <ul style="list-style-type: none"> If additional sub-surface FST components are unexpectedly identified during ground penetrating radar survey which have not been discussed as part of the consistency assessment, then additional assessment and management would be required. This would include, but may not be limited to, archival survey and recording. Measures will be included in the CHMP to describe how the heritage values of the site will be conserved and managed during construction TfNSW will engage a suitably qualified heritage consultant to prepare an archival photographic recording of the impacted areas of the property, in accordance with DPC (Heritage) Heritage NSW guidelines (Heritage Council of NSW 2006). The archival recording report will include but not be limited to: <ul style="list-style-type: none"> Detailed survey drawings and photographic archival recording of remaining above-ground elements of the Fleurs Radio-telescope site. This survey will detail the exact location and orientation of remnant fabric within the landscape, including fabric associated with the former location of FST antenna X3 and X4, the concrete pad between antennas X3 and X4, and the former vehicle 	<p>The majority of identified heritage features of the Fleurs Radio Telescope Site are located outside of the M12 Motorway - West Package 80% detailed design construction footprint, with the South Creek Antenna Complex (of little value) and a 100-metre portion of the Cable alignment (of moderate value) located within the M12 Motorway - West Package 80% detailed design construction footprint. Ground penetrating radar would be conducted to identify whether any cables are present along the portion of the Cable alignment within the M12 Motorway - West Package 80% detailed design construction footprint.</p> <p>The 80% detailed design of the M12 Motorway - West Package extends into the heritage curtilage of the Fleurs Radio Telescope Site. Implementation of the requirements of REMM NAH05 relate to the pre-construction phase and will be undertaken by others.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<p>access track. Survey drawings will be included in the archival recording report</p> <ul style="list-style-type: none"> – Outcomes of the remote sensing survey undertaken by GHD in 2021 to provide a comprehensive record of the site (or as comprehensive as possible prior to excavation) – Details of sample cables collected including original exact location by description, co-ordinates and mapping. <ul style="list-style-type: none"> • Prior to construction TfNSW will consult with relevant interested organisations (such as CSIRO, Universities, amateur telescopic organisations, local heritage bodies and other special interest groups) to determine if there is interest in retaining sub-surface cabling (including details on the type and length cabling to be retained) or other structures identified during archival recording, remote sensing or any unexpected additional cables found during construction. • The M12 West and M12 Central Contractor will (with advice from TfNSW Overarching Archival Recording Contractor) be responsible for the following: <ul style="list-style-type: none"> – Retrieval of a sample of each type of cable / compressed air hose along the cable alignment between antennas X3 and X4 with supervision by a heritage specialist. This will include retrieval of 1-2m (or a length directed by TfNSW following consultation with stakeholders) of each type of cable / compressed air hose including the relevant attachment. The selection of the types and length of cables / hose to be collected will include consideration of the following: 		

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<ul style="list-style-type: none"> ▪ Physical review of the cables / hose types visible at South Creek 3 Antenna Complex, South Creek 4 Complex, and South Creek 5 Antenna Complex ▪ Any additional information identified through remote sensing survey of the cable alignment ▪ Discussion with archival recording or other relevant heritage specialists where required ▪ Outcomes from the consultation undertaken by TfNSW with interested parties ▪ Cable samples will be collected, with consideration given to potentially contaminated materials, such as asbestos and PCBs. Appropriate WHS measures will be implemented in accordance with the Contractor's WHS Plan. ▪ Cable samples will be tagged, including exact location by description and relevant coordinates of the cabling prior to its extraction. ▪ Safe storage of cable samples until collection by interested parties. If samples are unclaimed by interested parties within three months, they will be appropriately disposed of at a licensed landfill by the contractor. – Where cabling is not impacted by construction works, it can remain in-situ, otherwise the contractor is responsible for appropriate disposal. • Concrete Plinths: <ul style="list-style-type: none"> – Prior to construction the contractor must establish an exclusion zone around the concrete plinths at South Creek 3 Antenna Complex (Central) and South Creek 5 		

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<p>Antenna Complex (West) to protect against inadvertent impacts during construction</p> <ul style="list-style-type: none"> – If leaving the plinths in situ during construction is not practicable, they will be removed and stored temporarily with survey information providing details of their position relative to each other and orientation. The Contractor will then investigate opportunities for re-establishing the concrete plinths on site close to their original location and/or as part of the interpretative display for the Radio Telescope site. If re-established, the survey information collected prior to their removal must be used to ensure that the plinths are located in the same orientation and arrangement – Prior to removal of the concrete plinths, the contractor is to identify whether any of the plinths are used as state survey marks. The contractor must comply with the preservation of survey infrastructure requirements in TfNSW specification G71. It is noted TS7279 is located on one of the plinths at X3. <ul style="list-style-type: none"> • Measures for M12 Central only: <ul style="list-style-type: none"> – Prior to construction the contractor must establish an exclusion zone around the former location of antenna X3 at South Creek 3 Antenna Complex to protect against inadvertent impacts during construction. Design consideration should be given to revegetation of the former location of antenna X3 to stabilise the eroding margins of the basin. 		

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<ul style="list-style-type: none"> – Prior to construction the contractor must establish around the metal shed at South Creek 3 Antenna Complex to protect against inadvertent impacts during construction. • The heritage interpretation framework for the project (NAH02) will include interpretation measures that will improve community awareness of the history of the Fleurs Radio Telescope as well as determine suitable locations for the presentation of information that are publicly accessible. 		
NAH06	<ul style="list-style-type: none"> • Relevant conservation policies outlined in the Upper Canal CMP (NSW Public Works Government Architect's Office, 2016) will be considered during detailed design and incorporated into CCHMP to ensure heritage fabric is not impacted by the project • The CCHMP will be consistent with and require implementation of relevant measures outlined in the Guidelines for development adjacent to the Upper Canal and Warragamba Pipelines (WaterNSW 2020) which sets out guidelines for designing, planning or assessing development on land adjacent to the canal at this location. Additional structures identified in the construction footprint will be investigated and measures implemented to avoid or minimise impacts • Guidelines and associated safe working distances to be adhered to for heritage structures as outlined in Appendix K of the EIS • A safe working distance exclusion zone will be established around the exposed tunnel air shaft in the M7 Motorway median in accordance with the process outlined in noise and vibration management measures NV09 - NV10 • Transport for NSW will provide an updated report to WaterNSW on project design changes as they relate to the WaterNSW Upper Canal corridor during detailed design. 	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) heritage item is not located with the M12 Motorway - West Package 80% detailed design construction footprint.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
NAH07	<ul style="list-style-type: none"> • A suitably qualified heritage consultant will be engaged to prepare an archival photographic recording of the impacted area, in accordance with DPC (Heritage) guidelines (Heritage Council of NSW 2006). This will include both buildings and landscape features such as dams, and earthworks. The recording will include a detailed map showing the location of the features • Options will be investigated to provide funding support to property's current owner to prepare a thematic heritage study of CSIRO and other agricultural research stations, including both McMaster Field Station and McGarvie Smith Farm, and other relevant agricultural research stations and similar facilities located in NSW. The thematic study will include a review of the role of such properties in veterinary research, association with agricultural, pastoral and animal husbandry groups, use of pioneering methods and practices and contribution to development of farming in NSW and Australia. In the event that landowners do not prepare this study, TfNSW will engage a heritage specialist to do so • A potential use zone will be established around the McMaster Farm group of buildings, including a suitable buffer zone, and no construction activities will take place within this zone. This zone will be incorporated into the construction heritage management plan (CHMP). The potential use zone will include safe working distances to be adhered to for heritage structures as outlined in Appendix K of the EIS. Before occupying or utilising the buildings, a dilapidation survey will be carried out and a heritage architect will be engaged to advise on proposed modifications and management measures to avoid and minimise impact on the buildings. 	<p>McMaster Field Station is located within the M12 Motorway - West Package 80% detailed design construction footprint. The EIS/Amendment Report identified that the project would not require the demolition of any heritage significant buildings/structures associated with property. The 80% detailed design of M12 Motorway - West Package does not impact on any additional heritage significant buildings/structures within the McMaster Field Station property.</p>	Yes
NAH08	<ul style="list-style-type: none"> • A suitably qualified heritage consultant will be engaged to prepare an archival photographic recording of the impacted area before its disturbance and/or removal, in accordance with DPC (Heritage) guidelines (Heritage Council of NSW 2006). The recording will include a detailed map showing the location of the features 	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The Fleurs Aerodrome is not located with the M12 Motorway - West Package 80% detailed design construction footprint.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<ul style="list-style-type: none"> An interpretive framework developed for the project will include consideration of elements to enable the continued interpretation and understanding of the airstrip at Fleurs Aerodrome as a linear and continuous element. This will be carried out in consultation with Department of Defence and consider opportunities for involvement of veterans groups Relevant guidelines and associated safe working distances will be adhered to for remaining heritage structures as outlined in the Appendix K of the EIS. 		
NAH09	A suitably qualified archaeologist will be present during the excavation of the area occupied by the Cecil Park Archaeological site to confirm that the significance of artefacts and remains are in line with the findings of the test excavations already completed. If remains with the potential to be considered 'relics' (as defined in the Heritage Act 1977) are found, then works will stop and the unexpected finds procedure (RMS, 2015) will be followed.	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The Cecil Park School, Post Office and Church Site is not located within the M12 Motorway - West Package 80% detailed design construction footprint.</p>	Yes
NAH10	<ul style="list-style-type: none"> Management measures identified in the project UDLP (LVIA01) will be implemented during detailed design to minimise impacts on landscape and vistas Flooding management measures (F01 to F08) and surface water quality and hydrology management measures (SWH01 to SWH14) will be implemented to reduce broader impacts on the surrounding scenic landscape. 	In relation to the scenic landscape, the nearest and most prominent detailed design features within M12 Motorway - West Package are Bridge BR05 (Badgerys Creek) and associated motorway to the east and west of the bridge and the Airport Interchange respectively. Views from the Scenic Landscape towards M12 Motorway - West Package. The design of Bridge BR05 (Badgerys Creek) comprises a simple low-lying bridge which is recessive in the landscape. To the east of Bridge BR05 the motorway will be visible from the scenic landscape. Urban design and landscape treatments to minimise impacts on the landscape and vista include revegetation (i.e. trees) that will screen the motorway. To the west of Bridge BR05 the motorway is in cut and therefore will not be visible from the scenic landscape. The Airport Interchange is located about 1.5 kilometres from the scenic landscape and is a major	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
		<p>feature of the M12 Motorway - West Package. Given this distance from the interchange the view from the scenic landscape is less significant. The Airport interchange has been designed to provide a gateway experience and be a wayfinding measure. The Airport interchange will include indigenous artwork and feature landscaping. Bridges and ramp associated with the Airport interchange have been designed to be elegant, consistent and appear to flow. In addition, visual transparency has been incorporated. The landscape design for M12 Motorway - West Package has been developed to ensure that the views to the scenic landscape beyond the motorway have been maintained/enhanced.</p> <p>The proposed changes would not impact on the ability of REMM F01 to F08 and SWH01 to SWH14 to be implemented. A review of REMM F01 to F08 and REMM SWH01 to SWH14 is provided in this table for each corresponding REMM</p>	
NAH11	Where post and rail fencing of heritage significance is identified within the construction footprint, Transport for NSW will seek to avoid directly impacting such features. Where avoidance is not practicable, Transport for NSW will seek to minimise and mitigate impact in consultation with a suitably qualified heritage specialist.	The EIS / Amendment Report assessed potential impacts to Luddenham Road as negligible.	Yes
Noise and vibration			
NV01	<p>A construction noise and vibration management plan (CNVMP) will be prepared for the project to mitigate and manage noise and vibration impacts during construction. The CNVMP will be implemented for the duration of construction of the project and will:</p> <ul style="list-style-type: none"> Identify nearby sensitive receivers Include a description of the construction activities equipment and working hours 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<ul style="list-style-type: none"> Identify relevant noise and vibration performance criteria for the project and license and approval conditions. Include modelling results showing construction noise impacts based on detailed design information Outline standard and additional mitigation measures from the Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime 2016) and information about when each will be applied Outline requirements for the development and implementation of an Out-of-hours Work Protocol Outline requirements for noise and vibration monitoring that will be carried out to monitor project performance associated with the noise and vibration criteria Describe community consultation and complaints handling procedures in accordance with the Community Communication Strategy to be developed for the project Outline measures to manage noise impacts associated with heavy vehicle movements both on and offsite Outline measures to minimise cumulative construction impacts and the likelihood for 'construction fatigue' from concurrent and consecutive projects in the area Outline requirements to minimise and manage construction fatigue, in consultation with the community. 		
NV02	Measures to minimise and manage construction fatigue are to be investigated through the planning of construction staging.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV03	<p>Detailed noise assessments will be carried out for ancillary facilities with the potential to involve high noise generating activities (including batching plant operations). The assessments will consider the proposed site layouts and noise generating activities that will occur at the facilities and assess predicted noise levels against the relevant noise management criteria.</p> <p>The assessments will also consider the requirement for appropriate noise mitigation within ancillary facilities and adjacent to construction</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	works, depending on the predicted noise levels. Any mitigation measures required will be implemented before the start of activities that generate noise and vibration impacts.		
NV04	<p>Monitoring will be carried out at the start of high noise and vibration activities to confirm that actual noise and vibration levels are consistent with the noise and vibration impact predictions. Where mitigation measures were included, measurements will be carried out to confirm the effectiveness.</p> <p>Where the monitoring identifies higher levels of noise and vibration compared to predicted levels, or where mitigation is shown to be ineffective against measured noise and vibration levels, additional mitigation measures will be identified and implemented to appropriately manage impacts where feasible and reasonable.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV05	Where reasonable and feasible, receivers identified as requiring at-property treatment for operational noise mitigation will be identified and offered treatment before construction activities begin that are likely to impact them	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV06	Activities that generate vibration will be managed to avoid impacts on structures and sensitive receivers. This includes implementing appropriate safe working distances where practicable.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV07	The use of alternatives to vibration generating equipment will be considered where vibration impacts are predicted.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV08	<p>Where works are within the minimum working distances and considered likely to exceed the cosmetic damage objectives (as shown in Figure 7-3 of Appendix G of the amendment report), construction works will not proceed unless:</p> <ul style="list-style-type: none"> • A different construction method with lower source vibration levels is used, where feasible 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<ul style="list-style-type: none"> Attended vibration measurements are carried out at the start of the works to determine the risk of exceeding the vibration objectives. 		
NV09	Building Condition Surveys will be offered in writing to property owners before construction where there is a potential for construction activities to cause structural or cosmetic damage. A comprehensive report will be prepared by a suitably qualified professional before the relevant works begin and will comprise a written and photographic condition.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV10	<p>Surveys will be carried out to confirm the existing condition of the WaterNSW Upper Canal System and Jemena high pressure gas pipelines to determine appropriate vibration criteria. This will also include consideration of distances from the vibration intensive activity (piling, rock-breaking and vibratory rolling), as well as ground conditions.</p> <p>A vibration criterion of a peak particle velocity (PPV) will be determined in consultation with the relevant utility/service providers, including WaterNSW.</p> <p>In-situ monitoring will be carried out to confirm the vibration levels and assess the impact of vibration. Where the monitoring identifies exceedances in the relevant criteria, or where impacts are identified, additional mitigation measures will be identified and implemented to appropriately manage impacts.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV11	<p>The following structures have the potential to be within the safe working distances for sensitive structures (Group 3 from DIN 4150):</p> <ul style="list-style-type: none"> Item 1: McGarvie Smith Farm Item 2: Fleurs Radio Telescope Site Item 4: Upper Canal System Item 6: McMaster Field Station Item 7: Fleurs Aerodrome. <p>A detailed survey will be completed to determine the potential for vibration impacts and to define appropriate criteria for each heritage</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	item. Vibration monitoring will be carried out when vibration intensive tasks are occurring within the minimum working distances to heritage structures. Where the monitoring identifies exceedances in the relevant criteria, or where impacts are identified, additional mitigation measures will be identified and implemented to appropriately manage impacts.		
NV12	<p>Construction vehicle movements (both on and offsite) will be managed to minimise noise impacts. Where feasible, this will include (but not be limited to):</p> <ul style="list-style-type: none"> • Establishment and use of internal haul routes, or existing major roads where this is not feasible • Restriction of heavy vehicle movements to standard construction hours • Locating traffic marshalling areas away from residences to minimise noise impacts from idling vehicles • Instructing workers on the operation of heavy vehicles entering and exiting the site to minimise noise. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV13	The likelihood of cumulative construction noise impacts will be considered during detailed design when detailed construction schedules of other projects are available. Construction works will be scheduled with the aim of minimising concurrent works near sensitive receivers where possible in consultation with managers of other nearby projects that are likely to result in a cumulative impact. This will include the coordination of respite between the various construction projects where receivers are likely to experience concurrent construction impacts where feasible. Coordination between project teams would be carried out throughout construction	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV14	<p>Operational noise and vibration mitigation measures will be identified in an Operational Noise and Vibration Review (ONVR).</p> <p>Requirements for mitigation measures, including quieter noise pavements, noise barriers, and at-property treatments, will be reviewed as part of the ONVR and as the detailed design progresses.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	The implementation of treatments will be carried out in accordance with TfNSW Noise Mitigation Guidelines (2015). Owners of residences identified as eligible for noise treatment triggered by the project will be contacted by TfNSW and/or TfNSW's contractor.		
NV15	Within 12 months of start of operation of the project, actual operational noise performance will be compared to predicted operational noise performance. The need for additional mitigation or management measures to address identified operational performance issues and meet relevant operational noise criteria will be assessed and implemented where feasible and reasonable.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
Flooding			
F01	Further flood investigations and hydrological and hydraulic modelling will be carried out during detailed design to ensure the flood immunity objectives and design criteria for the project are met. The modelling will be used to define the nature of both mainstream flooding and major overland flow along the full length of the project corridor under pre- and post- project conditions and to define the full extent of any impact that the project will have on patterns of both mainstream flooding and major overland flow. The hydraulic model(s) will be based on two-dimensional hydraulic modelling software. The modelling will consider any updated regional flood modelling and information available at the time	Further flood modelling has been undertaken to inform the design and minimise flood impacts.	Yes
F02	Should the updated flood modelling show the project will result in an adverse flooding impact, TfNSW will consult with landowners regarding appropriate mitigation measures to be implemented by the contractor in relation to each individual property.	Should the updated flood modelling show the project will have an adverse flooding impact, TfNSW will consult with affected landowners and the proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
F03	A flood management plan will be prepared as part of the CEMP for the project and will detail the processes for flood preparedness, materials management, weather monitoring, site management and flood incident	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<p>management. The flood management plan will be developed in accordance with:</p> <ul style="list-style-type: none"> Managing Urban Stormwater, Soils and Construction, Volume 1 4th Edition, March 2004 (Landcom 2004) and Managing Urban Stormwater, Volume 2D – Main Road Construction (DECC 2008) TfNSW Erosion and Sedimentation Management Procedure (Roads and Traffic Authority 2009) TfNSW Technical Guideline: Temporary Stormwater Drainage for Road Construction (Roads and Maritime 2011) TfNSW Stockpile Management Guideline (Roads and Maritime 2011). 		
F04	Creek adjustments would be re-considered and/or further refined to minimise the impact on the creeks during detailed design.	During M12 Motorway – West Package detailed design development, creek adjustments were minimised and the need for creek adjustment of Cosgroves Creek Badgerys Creek was eliminated.	Yes
F05	Detailed construction staging plans will be developed during detailed design so that bridges and culverts are constructed in a way that minimises flood risk.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
F06	Measures to address potential impacts of culvert blockage on afflux will be further investigated during detailed design and may include the installation of debris deflectors, trash racks or similar on drainage inlets where reasonable and feasible.	Sensitivity testing assuming all cross-drainage structures as 100% blocked has been undertaken. Testing showed that the flood immunity of the M12 Motorway - West Package is generally maintained, except for some isolated locations in particular along the Airport Access Road. This confirms that the proposed alignment generally has substantial freeboard and is not overly sensitive to full culvert blockage.	Yes
F07	During the detailed design phase, TfNSW will seek to refine the design of the works at Elizabeth Drive near Badgerys Creek to minimise flood affectation. Mitigation measures may include adjustment of road levels and/or flood relief culverts through the road.	The culverts and road design on Elizabeth Drive have been designed to reduce flooding on Elizabeth Drive and ties back to the existing road level at the M12 Motorway – West Package Limit of works.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
F08	Activities that may affect existing drainage systems during construction will be carried out so that existing hydraulic capacity of these systems is maintained where practicable.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
F09	The proposed bridges, culverts and changes to watercourses will be further refined during the detailed design to minimise potential flooding impacts.	The bridges and culverts have been sized to minimise flood impacts in line with the flood impact criteria as described in Table 5-1). The bridges across waterways (i.e. BR02 at Cosgroves Creek and BR05 at Badgerys Creek) have been designed (i.e. piers on a skew) to match the flow direction of the creeks and minimise potential flood impacts.	Yes
F10	Ongoing consultation will be carried out with WSIA and as further details of their flood management and earthworks are developed, these will be incorporated into an updated M12 Motorway flood model for the detailed design phase of the project.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
Surface water quality and hydrology			
SWH01	<p>A construction soil and water management plan (CSWMP) will be prepared for the project. The plan will outline measures to manage soil and water impacts associated with the construction works, including contaminated land.</p> <p>The CSWMP will provide:</p> <ul style="list-style-type: none"> Measures to minimise/manage erosion and sediment transport both within the construction footprint and offsite including requirements for the preparation of erosion and sediment control plans (ESCP) for all progressive stages of construction Measures to manage waste including the classification and handling of spoil Procedures to manage unexpected contaminated finds including asbestos which would be outlined in the contaminated land 	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<p>management plan and asbestos management plan to be prepared for the project</p> <ul style="list-style-type: none"> • Measures to manage stockpiles including locations, separation of waste types, sediment controls and stabilisation • Measures to manage groundwater de-watering and impacts including mitigation required • Processes for de-watering of water that has accumulated on site and from sediment basins, including relevant discharge criteria • Measures to manage potential tannin leachate • Measures to manage accidental spills including the requirement to maintain materials such as spill kits • Measures to manage potential saline soils • Details of surface water and groundwater quality monitoring to be carried out before, throughout, and following construction • Controls for sensitive receiving environments including SEPP Coastal Wetlands which may include but not be limited to: <ul style="list-style-type: none"> – Designation of ‘no go’ zones for construction plant and equipment – Creation of catch/diversion drains and sediment fences at the downstream boundary of construction activities where practicable to ensure containment of sediment-laden runoff and diversion toward sediment sump treatment areas (not sediment basins) to prevent flow of runoff to the SEPP Coastal Wetland. • Erosion and sediment control measures will be implemented and maintained at all work sites in accordance with the principles and requirements in Managing Urban Stormwater –Soils and Construction, Volume 1 (Landcom 2004) and Volume 2D (NSW Department of Environment, Climate Change and Water 2008), commonly referred to as the “Blue Book”, as well as relevant TfNSW Guidelines. 		

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
SWH02	A soil conservation specialist will be engaged by both TfNSW and the Contractor for the duration of construction of the project to provide advice on the planning and implementation of erosion and sediment control including review of ESCPs.	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
SWH03	A water reuse strategy will be developed for both construction and operational phases of the project to reduce reliance on potable water. This strategy will be prepared during the detailed design stage and implemented throughout the project and will outline the construction and operational water requirements and potential water sources to supply the water demand in consultation with Sydney Water. Alternative water supply options to potable water will be investigated, with the aim of reusing water using recycled water where feasible.	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
SWH04	<p>Stockpiles will be managed to minimise the potential for mobilisation and transport of dust and sediment in runoff in accordance with TfNSW Stockpile Sites Management Guideline (Roads and Maritime, 2015). This will include:</p> <ul style="list-style-type: none"> • Minimising the number of stockpiles, area used for stockpiles, and time that they are left exposed • Locating stockpiles away from drainage lines, waterways and areas where they may be susceptible to wind erosion • Stabilising stockpiles, establishing appropriate sediment controls and suppressing dust as required. 	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
SWH05	<p>A construction water quality monitoring program will be developed and included in the CSWMP for the project to establish baseline conditions, observe any changes in surface water and groundwater during construction, and inform appropriate management responses.</p> <p>The program will be based on the water quality monitoring methodology water quality indicators and the monitoring locations identified in the Surface water and hydrology assessment report (Appendix M of the EIS) and supplementary memo (Appendix I of the amendment report), and Groundwater quality and hydrology assessment report (Appendix N</p>	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<p>of the EIS) and supplementary memo (Appendix J of the amendment report).</p> <p>Baseline monitoring will be carried out monthly for a minimum of 12 months before the start of construction. As a minimum this will include three wet weather sampling events over six months where feasible.</p> <p>Sampling locations and monitoring methodology to be carried out during construction will be further developed in detailed design in accordance with the Guideline for Construction Water Quality Monitoring (RTA 2003) and the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018). It will include collection of samples for analysis from sedimentation basin discharge points, visual monitoring of other points of release of construction waters and monitoring of downstream waterways.</p>		
SWH06	<p>An operational water quality monitoring program will be developed and implemented following the completion of construction to observe any changes in surface water and groundwater following construction and inform appropriate management responses.</p> <p>The program will be based on the water quality monitoring methodology, water quality indicators, and the monitoring locations presented in the Surface water and hydrology assessment report (Appendix M of the EIS), and Groundwater quality and hydrology assessment report (Appendix N of the EIS).</p> <p>The monitoring program will be carried out monthly and will preferentially monitor following wet weather events when rainfall results in discharge from control sites or is greater than a nominated rainfall threshold which will be identified in detailed design. Monitoring will be carried out for a minimum of 12 months following the completion of construction, or until the affected waterways are certified by a suitably qualified and experienced independent expert as being rehabilitated to an acceptable condition and/or the permanent water quality structures are deemed to be operating satisfactorily.</p>	<p>The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	Should the results of monitoring identify that the water quality management measures are not effective in adequately mitigating water quality impacts, additional mitigation measures will be identified and implemented as required.		
SWH07	<p>The performance water quality controls developed for the design as set out in the EIS and the amended water quality and hydrology controls outlined in the amendment report (including but not limited to temporary and permanent sediment basins) will be verified as the detailed design develops for the project to ensure the objectives of the project are achieved.</p> <p>In the instance that water quality modelling carried out during detailed design cannot demonstrate that the water quality controls would be effective in mitigation potential impacts, potential additional mitigation measures would be identified and implemented where possible.</p>	<p>The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.</p> <p>Water quality model has been developed for the detailed design of M12 Motorway – West Package. The water quality modelling consists of required mitigation measures including temporary and permanent basins and vegetated swales. The result shows that both pollutant loads (within 500m of sensitive receptors) and overall pollutant concentrations on TSS, TP and TN have been reduced in post-development conditions comparing to the pre-development conditions. Temporary basins have been developed based on the requirements of the Blue Book.</p>	Yes
SWH08	<p>Further water quality assessment will be undertaken during detailed design to establish site specific discharge criteria for construction sediment basins.</p> <p>Based on this, the number, location and size of the basins will be further refined during the detailed design with consideration to the relevant NSW EPA Environment Protection Licence application requirements and the environmental values of the downstream receiving waterway.</p>	The proposed changes to M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
SWH09	<p>Practical measures to prevent water pollution and control, abate or mitigate impacts to the environment will be investigated at the detailed design stages of the project with the aim to make improvements to the currently proposed water quality controls. Such measures may include:</p> <ul style="list-style-type: none"> • Larger or high efficiency temporary basins • Alternative dry bioretention operational basins 	The detailed design of M12 Motorway – West Package has incorporated dry bioretention operational water quality control basins in order to satisfy the safety requirements of Guideline C of the National Airport Safeguarding Framework (NASF). Temporary basins have been developed based on the requirements of the Blue Book.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
SWH10	The use of water sensitive urban design measures will be considered during detailed design to meet water quality objectives.	The drainage water quality measures (i.e. open channels and basins) have been integrated with the landscape design in accordance with the urban design objectives.	Yes
SWH11	A de-watering management plan will be prepared as part of the CSWMP which will outline the de-watering methodology, supervision requirements, staff responsibilities and training, and approvals required before any de-watering activity begins.	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
SWH12	<p>The following measures will be carried out to manage activities within watercourses or on waterfront land:</p> <ul style="list-style-type: none"> • Implementing practices to minimise disturbance of banks • Undertaking bank stabilisation and installing instream structures • Maintaining minimum flows to assist in maintaining the viability of aquatic communities and preventing barriers to fish passage • Constructing instream crossings during low flows and design so that drainage off crossing doesn't contribute sediment load to the stream • All drainage feature crossings (permanent and temporary watercourse crossings and stream diversions), drainage swales and depressions will be designed by a suitably qualified and experienced professional and will be designed and constructed in accordance with relevant guidelines. 	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
SWH13	A set of hydrologic and hydraulic models will be developed, which are to be used to define the nature of both mainstream flooding and major overland flow along the full length of the project operational footprint under pre- and post-project conditions. The hydraulic model is to extend a sufficient distance upstream and downstream of the project operational footprint, to negate any boundary effects and to define the full extent of any impact that the project will have on patterns of both mainstream flooding and major overland flow. The hydraulic model(s) is to be based on the TUFLOW (or equivalent) two-dimensional (in plan) hydraulic modelling software.	<p>Flood models have been developed for the 100% detailed design of M12 Motorway - West Package. The flood model consists of a hydrologic model using DRAINS and XPRAFTS software, and a hydraulic model using TUFLOW software.</p> <p>The final drainage design for the 100% detailed design is ongoing and has been developed to ensure performance is consistent with the commitments of the AR Submissions Report. Consultation with affected landowners would be ongoing and the proposed changes to the M12 Motorway -</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<p>The models will be used to verify the nature and extent of impacts and to confirm the type of mitigation measures required, including potential mitigation measures identified throughout the EIS (see Table 5-9 in Appendix M of the EIS) and this amendment report and supplementary memo (see Table 5-6 in Appendix I of the amendment report).</p> <p>The models will also be used during detailed design to describe the interaction between the project and flows particularly with respect to culverts and to assist in refining the design for flows arriving at and travelling through culverts.</p> <p>If further modelling identifies impacts to private properties, TfNSW will consult with landowners regarding appropriate management measures to be implemented.</p>	<p>West Package would not impact on the ability to comply with this requirement.</p> <p>A comparison of the flooding impacts has been carried out and is summarised in Section 4.7.</p>	
SWH14	<p>Consideration will be given to the design of operational water quality, erosion and sediment controls incorporated into the design of the construction access track being left in place upstream from the SEPP wetland, and within the proximity area of the SEPP Coastal Wetland ID117.</p>	<p>The proposed changes to the M12 Motorway - West Package would not impact on the ability to comply with this requirement.</p>	Yes
Groundwater quality and hydrology			
GW01	<p>Groundwater monitoring will be carried out as part of the construction water quality monitoring program for the project.</p> <p>The groundwater monitoring will be based on the water quality monitoring methodology, water quality indicators and the monitoring locations shown in the Groundwater quality and hydrology assessment report Appendix N of the EIS and Table 7-1 in the groundwater supplementary technical memorandum (Appendix J of Amendment Report).</p> <p>Baseline groundwater monitoring will be carried out at least monthly for at least six months before construction. Monitoring will also be carried out at least monthly during construction and will continue for at least six</p>	<p>Monitoring wells BH104, BH112, BH202, BH207, BH209, BH217, BH223, BH301, BH302 and BH145 were sampled between 22 and 24 August 2018 during the EIS stage (Appendix O Soils and contamination assessment report).</p> <p>The next sampling event occurred on the 16 and 17 June 2020 at monitoring wells BH209, BH411, BH421, BH456 and BH458 and on 3 August 2020 at monitoring wells BH117, BH204, BH414, BH431 and BH440 (WSP, 2020a).</p> <p>Extra sampling was undertaken to assess for groundwater aggressivity only, as part of the GIR.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	months of operation to verify that there are no groundwater impacts, and that management measures are adequate.	<p>Groundwater level monitoring has been conducted monthly since June 2020 and is continuing. The hydrographs are presented in the GIR.</p> <p>The groundwater monitoring plan should be revised prior to construction to include an updated list of monitoring wells to be monitored.</p> <p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	
GW02	<p>Potential impacts on groundwater flows will be reconsidered as the detailed design for the project progresses, particularly in relation to the project's vertical alignment and extent of road cuttings. The aim of this will be to ensure that the groundwater controls proposed for the design as set out in this document would remain effective in mitigating groundwater impacts.</p> <p>In the instance that, during detailed design it cannot be demonstrated that the groundwater controls would be effective in mitigating potential impacts, or if observed groundwater inflow rates into the western cut or airport interchange northern and southern cuts are higher than estimated, additional measures will be implemented to minimise potential impacts on groundwater flows due to road cuttings or other sub-surface components of the project.</p>	<p>Inflow estimates have been revised in the Groundwater quality and hydrology memo provided in Appendix D and summarised in Section 4.9.</p> <p>For consistency, the method used to estimate inflow in the Amendment Report was used in this consistency assessment. Note this method does not:</p> <ul style="list-style-type: none"> • Account for the inflow from the base of the cut • Allow for the higher inflows that occur shortly following excavation. • The measures (principally evaporation) in place to mitigate the inflow at day 365 and year 5 are appropriate. Given the evaporation rate is considerably greater than inflow (conservative estimate for day 365), higher inflow that is expected to occur early in the excavation of the cuts and not captured in the inflow methods used, are largely anticipated to readily evaporate. <p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes
GW03	Installation of supplementary groundwater monitoring bores in the area of both airport interchange cuts would be carried out at detailed design stage, to better understand groundwater depths and levels (and groundwater quality) in these areas.	New monitoring wells have been installed in Cut 2-AAR (formerly called Airport interchange southern cut) and Cut 6 (formally called Airport interchange northern cut).	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
		A monitoring well has not been installed at Cut 7 and is recommended to obtain a better understanding on potential inflows.	
GW04	<p>Monitoring for M12 Motorway – West Package</p> <p>Groundwater will be monitored at the airport interchange northern cut (Cut 6), and airport interchange southern cut (Cut 2-AAR), and the western cut (Cut 2), Cut 1, Cut 3, Cut 4, Cut 5, Cut 7 and Cut 1-AAR during the construction phase and operational phase as outlined in Table 7-1 in the groundwater supplementary technical memorandum (Appendix J of Amendment Report) and the M12 Motorway - West Package Detailed Design Consistency Assessment Memo. The groundwater indicators to be monitored will be as per Section 7.2.5 of Appendix N of the EIS.</p> <p>Groundwater inflows to the airport interchange northern and southern cuts and the western cut Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR are to be observed by the groundwater monitoring contractor during the construction and operational phases at monthly intervals. As part of observing the airport interchange northern and southern cuts and the western cut groundwater inflows at the identified cuts, the groundwater monitoring contractor is to estimate the groundwater inflow rates and note the areas where groundwater inflow is occurring.</p> <p>During construction, if groundwater inflows are observed from the airport interchange northern and southern cuts and the western cut, the cuts identified through the detailed design of the M12 Motorway - West Package including Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR, the groundwater quality from the cut is to be sampled.</p> <p>Operational phase groundwater quality sampling, including the quality sampling of the airport interchange northern and southern cuts and the western cut Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR inflows, is to occur at a monthly interval for at least 6 months.</p>	<p>Inflow monitoring is not applicable at the detailed design stage.</p> <p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
GW05	<p>Monitoring for M12 Motorway – Central Package</p> <p>Groundwater quality, levels and inflows will be monitored at Clifton Avenue (Cut 9) during construction and operation as outlined in the M12 Central consistency assessment report (GHD, 2021).</p> <p>The groundwater indicators to be monitored will be as per Section 7.2.5 of Appendix N of the EIS. Groundwater inflows are to be monitored at monthly intervals. As part of observing inflows at the identified cuts, the groundwater inflow rate is to be estimated and the areas where groundwater inflow is occurring noted.</p> <p>During construction, if groundwater inflow rates are observed from the cuts identified through the detailed design of the M12 Motorway – Central Package including Cut 9, the groundwater quality from the cut is to be sampled.</p> <p>Operational phase groundwater quality sampling, including the quality sampling of Cut 9 inflows, is to occur at monthly intervals for at least six months.</p>	<p>A proposed additional revised environmental management measure for the M12 Motorway – Central Package and does not apply to the M12 Motorway – West Package.</p>	N/A
GW06	<p>M12 Motorway – West Package monitoring</p> <p>The Construction Contractor will estimate the potential groundwater inflows that are expected in the first year of construction in order to confirm if evaporation will sufficiently mitigate potentially higher inflows likely to be expected early during construction.</p> <p>The estimate of groundwater inflows is to be undertaken for Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR. The estimate is to include groundwater inflow from both the walls and base of the cuts and will consider the construction methodology and staging for each cut. In addition, the estimate will utilise the maximum observed groundwater levels (as sourced from M12 West groundwater monitoring data).</p> <p>The results of the estimated groundwater inflows will be assessed in order to confirm whether evaporation will be sufficient to mitigate the potentially higher inflows likely to be expected early</p>	<p>A proposed additional revised environmental management measure.</p>	N/A

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	during construction. If evaporation is determined not to be a sufficient control measure, the Construction Contractor will identify and implement additional mitigation measures. The additional mitigation measures are to be documented in the Construction Contractor's CEMP and Construction Soil and Water Management Plan.		
Climate change risk and greenhouse gas			
CC01	<p>Detailed design will incorporate appropriate adaptation measures for all climate change risks with an original risk rating of moderate or above. These will include but not be limited to:</p> <ul style="list-style-type: none"> • Consideration of the full range of potential temperature extremes on the project (particularly bridge structures) which may occur as a result of climate change and consider material capacity to withstand heat during material type selection to minimise the likelihood of infrastructure failures • Consideration of energy dissipation at culvert outlets when velocities exceed existing magnitudes • Consideration of the use of native species which are typically more fire tolerant and can more rapidly regenerate after fire events • Maintenance of fauna passage along main creek lines under bridges. 	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
CC02	A climate change monitoring and adaptive management framework will be prepared and implemented for the project. The framework will incorporate performance monitoring criteria and measures, and the requirement for periodic review of the climate change risk assessment and framework against updated climate data to ensure currency.	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
CC03	An adaptive management approach will be applied to workplace health and safety planning during construction and operation in line with the	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	WHSMP. This will include use of TfNSW Work Health and Safety Procedures.		
GG01	Targets to reduce GHG emissions during construction and operation will be included in the project's sustainability management plan.	The management and implementation of sustainability during the detailed design of the M12 Motorway - West Package is governed by the Sustainability Management Plan.	Yes
GG02	Updated GHG assessment based on the detailed design for the project and the final project when built will be carried out.	An updated Greenhouse Gas Assessment for the detailed design has been completed and is summarised in Section 4.10	Yes
GG03	Vegetation removal will be minimised where practicable.	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement. The extent of native vegetation clearing for the M12 Motorway - West Package as a whole is summarised in Section 4.1	Yes
GG04	The procurement of goods and services will consider goods and services that: <ul style="list-style-type: none"> • Are from local suppliers • Make use of recycled materials or materials with a low embodied energy content • Are energy efficient or have low embodied energy • Minimise the generation of waste. 	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
GG05	Construction plant and equipment will be well maintained to maximise fuel efficiency.	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes

The proposed change is consistent with the environmental management measures incorporated as part of the Division 5.2 Approval.

5.3 Project objectives

The principal objectives of the Western Sydney Infrastructure Plan Program are detailed within Section 3.3.1 of the Project EIS and include:

- Development and demand – Support a western Sydney airport, land use change and residential growth, balancing the functional, social, environmental and value for money considerations
- Connectivity to airport – Provide a resilient connection for freight and passengers to a western Sydney airport at Badgerys Creek
- Integrated network – Provide road improvements to support and integrate with the broader transport network
- Customer focus – Provide meaningful engagement with customers and stakeholders throughout the program life.

The project specific objectives are outlined within Section 3.3.2 of the Project EIS and include:

- Provide sufficient road capacity to meet traffic demand generated by the planned western Sydney urban development
- Provide a high standard connection to the airport with capacity to meet future freight and passenger needs
- Provide a road which supports and integrates with the broader transport network
- Support the provision of an integrated regional and local public transport system
- Preserve the access function of Elizabeth Drive
- Provide active local transport within the east–west corridor
- Make provision for connection to the future Outer Sydney Orbital.

The proposed change supports the project objectives.

As such the proposed change is consistent with the program and project objectives.

5.4 Consistency questions – the Division 5.2 Approval

Table 5-3 presents a set of questions that assist TfNSW to determine whether the proposed changes can be considered consistent with the Division 5.2 Approval.

Table 5-3 Division 5.2 Approval consistency questions

Consistency question	Discussion	Yes/No
1 Is the proposed change likely to result in changes to the scope and impacts of the project to an extent that would be considered a radical transformation of the project as a whole, as to be, in reality, an entirely new project?	The proposed change detailed in Section 2.1 of this report would not result in a significant change to the project as a whole. The impacts associated with the proposed changes would be managed in accordance with the revised environmental management measures proposed in the AR Submissions Report.	No
2 Would any conditions of approval need to be amended in light of the change?	The proposed changes would not impact on the ability to comply with any of the conditions of approval. A review of the proposed changes against the conditions of approval is provided in Section 5.1.	No
3 Would the statement of commitments or environmental	The proposed changes would not impact on the ability to comply with any of environmental management measures	Yes

Consistency question	Discussion	Yes/No
management measures need to change?	identified in the AR Submissions Report. A review of the proposed changes against the environmental management measures is provided in Section 5.2.	
4 Would the proposed change be 'generally in accordance with' the documents incorporated in Standard Condition A1 (or A2)?	As described in Table 5-1, the proposed change is considered generally in accordance with the documents incorporated in Condition A1.	Yes
5 Would the environmental impacts of the project as a whole be altered by the proposed change to the extent that the proposed change would not be consistent with the Approval?	The environmental assessment detailed in Chapter 4 has found that the impacts are consistent with those impacts identified in the AR Submissions Report. These impacts can therefore be managed through safeguards identified in the AR Submissions Report.	No
6 Considering the project as a whole, would the magnitude of the change be viewed as consistent with the project?	The magnitude of the proposed change is negligible in comparison to the project as a whole. The proposed changes are consistent with the program and project objectives detailed in Section 5.3.	Yes

6. Consistency assessment – EPBC Approval

6.1 Commonwealth Minister's Conditions of Approval

Table 6-1 below addresses those conditions of approval relevant to the proposed change in the context of the Commonwealth Approved Project.

Table 6-1 Consistency against relevant Commonwealth Minister's conditions of approval for the project

No.	Condition of Approval	Discussion	Consistent
1	The approval holder must not clear in the locations identified in condition E8 of the State Infrastructure approval, until it has completed the additional surveys and provided the results to the Department as required by condition E8 of the State Infrastructure approval.	Condition of approval E8 of the State Infrastructure approval relates to additional surveys of <i>Pimelea spicata</i> (Spiked Rice-flower), which is not applicable to the M12 Motorway – West Package.	Yes
2	The approval holder must submit to the Department a map(s) of the final construction footprint within six months of the final construction footprint being determined, and where the action is staged, a map of the final construction footprint for each stage, within six months of the final construction footprint for that stage being determined.	TfNSW will submit the final construction footprint is submitted to the Commonwealth DAWE within six months of it being determined.	Yes
3	The approval holder must not clear protected matters outside the final construction footprint.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
4	To minimise the impacts of the action on protected matters the approval holder must not clear more than the following specified amounts, or another specified amount determined in consultation with the Department in accordance with condition E4 of the State Infrastructure approval within the final construction footprint: <ul style="list-style-type: none"> a. 42.89 hectares of known Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest threatened ecological community b. 0.44 hectares of known Western Sydney Dry Rainforest and Moist Woodland on Shale threatened ecological community c. 100 known <i>Pultenaea parviflora</i> individuals; 	<ul style="list-style-type: none"> a. This TEC is not present within the M12 Motorway - West package b. This TEC is not present within the M12 Motorway - West package c. This threatened species is not known to be present within the M12 Motorway - West package d. This threatened species is not known to be present within the M12 Motorway - West package 	Yes

No.	Condition of Approval	Discussion	Consistent
	<ul style="list-style-type: none"> d. The number of <i>Pimelea Spicata</i> individuals identified in the additional surveys required by condition E8 of the State Infrastructure approval e. 62.71 hectares of known foraging habitat for Grey-headed Flying Fox (<i>Pteropus poliocephalus</i>); f. 80.21 hectares of known foraging habitat for Swift Parrot (<i>Lathamus discolor</i>). 	<ul style="list-style-type: none"> e. The M12 Motorway - West package 80% detailed design would result in an increase of 0.29 Hectares of known foraging habitat for Grey-headed Flying Fox f. The M12 Motorway - West package 80% detailed design would result in a decrease of 1.84 hectares of known foraging habitat for Swift Parrot (<i>Lathamus discolor</i>). <p>Condition of Approval E4 of the State Infrastructure approval allows TfNSW to review and update the ecosystem and species credit requirements to reflect the final construction footprint and resulting extent and type of plant community types to be cleared and the extent of threatened species habitat impacted by the construction within six months of determining the final construction footprint. The revised impacts are therefore in accordance with the approval and a modification would not be required.</p>	
5	<p>For the protection of protected matters the approval holder must:</p> <ul style="list-style-type: none"> a. Implement conditions A24 of Part A, Schedule 2 and C4, C5, C8, C9 and C10 of Part C, Schedule 2 of the State Infrastructure approval, where they relate to monitoring, managing, avoiding, mitigating, recording, or reporting on, impacts to protected matters b. Implement biodiversity conditions E2 to E10 of Part E, Schedule 2 of the State Infrastructure approval where they relate to monitoring, managing, avoiding, mitigating, offsetting, recording, or reporting on, impacts to protected matters c. Notify the Department in writing within 2 business days of formally proposing any change to the conditions of the State Infrastructure approval for which conditions 5a or 5b apply, and within 5 business days of becoming aware of the NSW Government proposing a change d. Notify the Department in writing of any change to the State Infrastructure approval for which conditions 5a and 5b apply, within 5 	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

No.	Condition of Approval	Discussion	Consistent
	business days of a change to the State Infrastructure approval being finalised.		

The proposed change can be accommodated within the EPBC conditions of approval.

6.2 EPBC Approval consistency questions

Table 6-2 presents a set of questions that assist Transport to determine whether the proposed change can be considered consistent with an EPBC Approval.

Table 6-2 EPBC Approval consistency questions

Consistency question	Discussion	Yes or no?
1 Would any conditions of the EPBC Approval need to be varied in light of the change?	Commonwealth Condition of approval 4 - The clearing of native vegetation must be minimised with the objective of reducing impacts to threatened ecological communities and threatened species habitat may need to be varied. As the M12 Motorway - West Package is part of the larger M12 project, it may be that the increased proposed clearing of Matters of National Environmental Significance habitat may be offset by a decrease in other parts of the project. Where there is an increase in clearing limits for the project as a whole, TfNSW can submit revised clearing limits with a finalised construction footprint to DAWE in accordance with Commonwealth Condition of Approval 2 and 4.	No
2 Would an approved action management plan required by a condition of approval need to be varied as a result of the proposed change?	Not applicable	N/A
3 Would the proposed change constitute a 'new project' under the EPBC Act?	Importantly, there would not be a change to the level of significance of potential impacts and/or any new significant impacts. The impacts will increase but to a minor degree. It is considered unlikely that the changes are such that they would constitute a new project under the EPBC Act.	No

7. Conclusion

Based on the consistency assessment in this report, the proposed change is considered:

- ☐ Consistent with the Division 5.2 Approval
- ☐ ~~Not consistent with the Division 5.2 Approval. A modification to the project approval must be prepared and submitted for approval by the Minister.~~
- ☐ Consistent with the EPBC Approval
- ☐ ~~Not consistent with the EPBC Approval. A written request to vary the condition/s of approval / approved action management plan must be prepared and submitted for approval by the Minister for the Environment / A new EPBC referral is required~~
- ☐ ~~A radical transformation of the project and as such a new project should be developed with new and separate planning approvals obtained as necessary.~~

8. Other considerations


8.1 Permits, licenses and other approvals

There are no additional approval requirements or changes to any permits, licenses or other approvals as a result of the proposed change.

9. Certification

Author

This consistency assessment provides a true and fair review of the proposed change for the M12 Motorway – West Package project.



Name	Sarah Saunders	Signature	
Position	Senior Environmental Planner	Date	5 October 2021
Organisation	WSP		

Transport for NSW

The proposed change, subject to the implementation of all the environmental requirements of the project, is consistent with the Division 5.2 Approval.


[And]

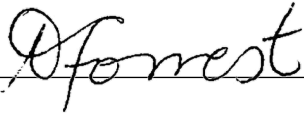
The proposed change, subject to the implementation of all the environmental requirements of the project, is consistent with the EPBC Approval.

Name	Suzette Graham	Name	Kandiah Mahendran
Signature		Signature	
Position	Environment and Sustainability Manager, M12	Position	Project Manager, M12 West Package
Date	5 October 2021	Date	5 October 2021

I have examined the proposed changes by reference to the Division 5.2 Approval in accordance with Section 5.25(2) of the EP&A Act and I have examined the proposed changes by reference to the EPBC Approval. I consider that the proposal is consistent with the Division 5.2 Approval and EPBC Approval.

I agree with the recommendations of the Environment and Sustainability Manager and approve of the carrying out the proposed change in accordance with those recommendations.

Name	Tanya Coates
Signature	
Position	A/Director Environment and Sustainability Western Parkland, Integrated Precincts, Urban Renewal
Date	6 October 2021

Name	Deanne Forrest
Signature	
Position	Project Director, M12
Date	5/10/2021

10. References

- Advisian Worley Group, 2020. Wianamatta (South) Creek Catchment Flood Study - Existing Conditions (Revision H)
- GeoScience Australia, 2019. The Australian Rainfall and Runoff – A Guide to Flood Estimation
- Penrith City Council, 2015. Water Sensitive Urban Design Technical Guidelines Version 3
- Roads and Maritime, 2019. Biodiversity Assessment Report (BAR)
- TfNSW, 2019. M12 Motorway Environmental Impact Statement
- TfNSW, 2020a. M12 Motorway Submissions Report
- TfNSW 2020b. M12 Motorway Amendment Report
- TfNSW, 2020c. M12 Motorway Amendment Report Submissions Report
- TfNSW, 2020d. M12 Motorway Noise and Vibration Assessment Report (the 50% detailed design NVIA)
- TfNSW, 2021. M12 Motorway Amendment Report Submissions Report – Amendment Letter

Appendix A

Biodiversity consistency assessment memo



MEMO

TO: TfNSW

FROM: Lukas Clews

SUBJECT: Biodiversity Consistency Assessment Memo for M12 Motorway - West Package Detailed Design

OUR REF: M12WDD-WSP-ALL-EN-MEM-000012.docx

DATE: 4 August 2021

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

Transport for NSW (TfNSW) are proposing to construct and operate the M12 Motorway project (the project) to provide direct access between the Western Sydney Airport at Badgerys Creek and Sydney's motorway network. The M12 Motorway would run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for a distance of about 16 kilometres and is expected to be opened to traffic prior to opening of the Western Sydney International Airport.

This Consistency Assessment is for the M12 Motorway - West Package, between The Northern Road, Luddenham and approximately 250 metres east of Badgerys Creek. It is proposed to be a four-lane dual-carriageway motorway including a new grade separated interchange with the Airport Access Road to provide connection to the Western Sydney International Airport. An overview of the M12 Motorway – West Package is illustrated in Figure 1-1.

Detailed design for the M12 Motorway – West Package (shown in Figure 1-1) is being completed and has resulted in changes requiring further environmental assessment. During design development of detail design changes requiring further environmental assessment have been identified. The Consistency Assessment is based on the 80% detail design submission.

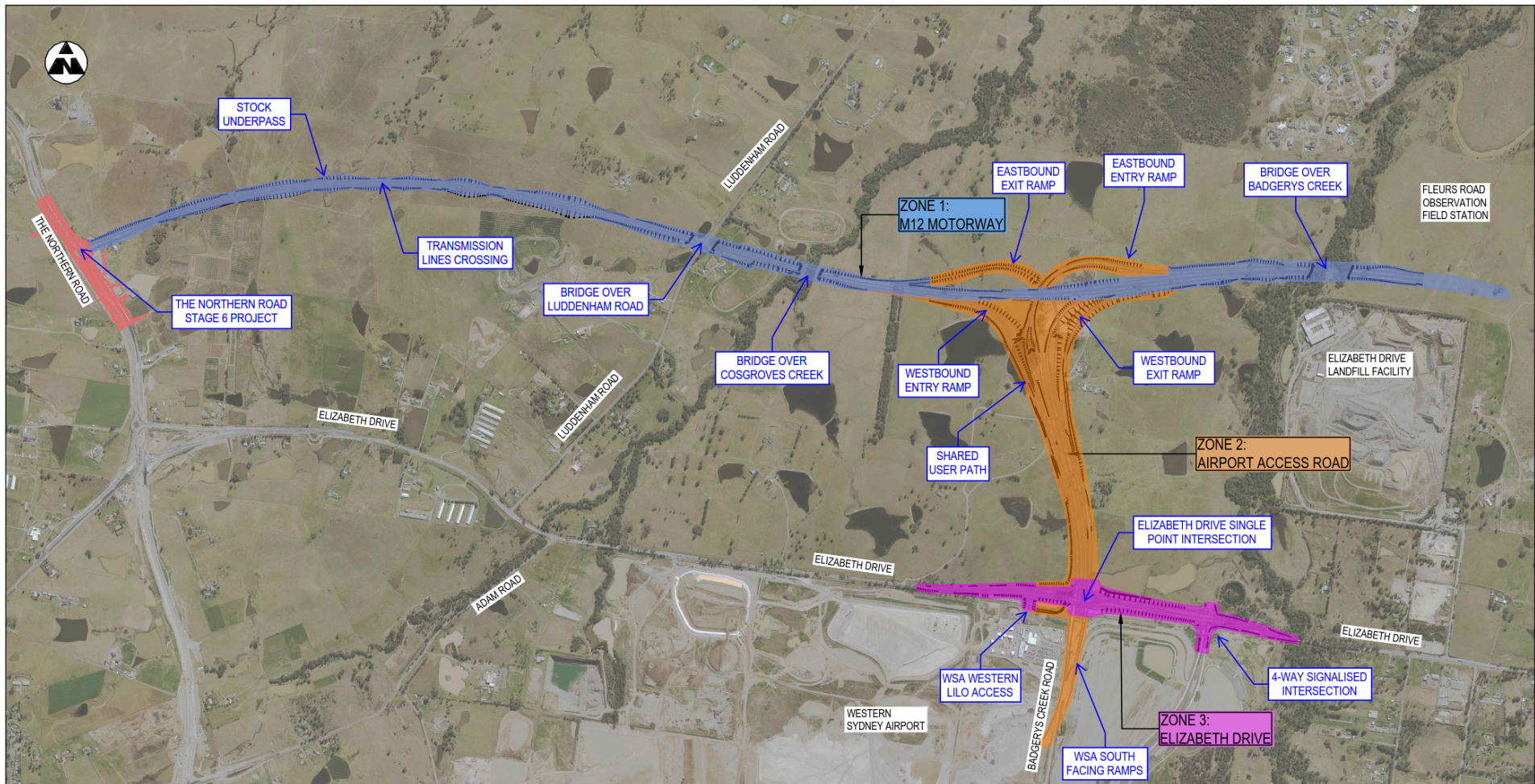


Figure 1-1 Project overview – key features

1.2 SCOPE OF THIS REPORT

In the event of proposed changes to the M12 Motorway Approved Project, a review for consistency is required by the proponent for the construction and operational phases of the M12 Motorway - West Package. The Consistency Assessment will determine if the proposed changes are generally in accordance with the impacts of the approved project and satisfy the requirements of the Planning Approval dated 23 April 2021 and Commonwealth Approval dated 3 June 2021.

This memo provides a review of the proposed changes in terms of impacts to biodiversity and identifies if they are consistent with the Approved Project or if additional or reduced impacts are predicted.

The verification survey undertaken as part of this biodiversity assessment for the Consistency Assessment allowed under NSW Conditions E5 and E6 was used to see if any areas of biodiversity value (particularly those identified as either Grey-Headed Flying-Fox habitat or Swift Parrot habitat) could be reduced.

This memo provides revised biodiversity impact calculations for the M12 Motorway - West Package that are required to update the previous Framework for Biodiversity Assessment (FBA) calculations, noting that the FBA has been since superseded by the Biodiversity Assessment Method (BAM). Biodiversity assessment for major projects is currently done under the *Biodiversity Conservation Act 2016* (BC Act) which came into effect in August 2017. During preparation of the biodiversity assessment for the project, Roads and Maritime (now TfNSW) applied to have the project defined as a 'pending or interim planning application' under Clause 27(1) of the Biodiversity Conservation (Savings and Transitional) Regulation 2017 based on having undertaken 'substantial environmental assessment' prior to the commencement of the BC Act. This application was granted by a delegate of the Secretary of the Department of Planning, Industry and Environment (DPIE) (Planning and Assessment) on 5 April 2018. Accordingly, the former planning provisions (being the *Threatened Species Conservation Act 1995* (TSC Act), the NSW Biodiversity Offsets Policy for Major Projects (2014) and the Framework for Biodiversity Assessment 2014 (FBA) continue to apply to the project.

1.3 DESCRIPTION OF PROPOSED CHANGE

The project as described in the Division 5.2 Approval and EPBC Approval dated 3 June 2021 is outlined in Section 1.2 of the Consistency Assessment and a detailed description is provided in Chapter 5 of the Environmental Impact Assessment (EIS) (Roads and Maritime, 2019). The amended project is detailed in Chapter 2 of the Amendment Report (Transport for NSW, 2020a) and Chapter 1 of the Amendment Report Submissions Report (AR Submissions Report) (Transport for NSW, 2020).

The proposed changes to M12 Motorway West include the following which are shown in Figure 2-1 of the Consistency Assessment:

- Airport interchange revised to a free flow directional interchange
- Elizabeth Drive and Airport Access Road intersection revised to a single point interchange, comprising:
 - Two separate bridges over the Airport Access Road
 - New entry and exit ramps for access to the Airport Access Road and Elizabeth Drive
- All ramps on the Airport Access Road between the Airport interchange and Elizabeth Drive realigned
- Intersection to the west of the Airport Access Road and Elizabeth Drive replaced with a left in, left out arrangement from the Western Sydney International Airport and the northern stub road removed
- Intersection to the east of the Airport Access Road and Elizabeth Drive refined to remove the northern stub road
- Elizabeth Drive widened to the north by about 10 metres at the single point interchange, east of the Airport Access Road
- Extension of the Airport Access Road and southbound ramp to tie into the Western Sydney International Airport internal road network (area within Airport land to be assessed and approved in the Airport Approval)
- Reconfiguring BR02 and BR05 at Cosgroves Creek and Badgerys Creek respectively
- Extending and refining existing utilities, including low voltage mains and additional water main crossings

- Modification to one operational water quality basin and four additional construction water quality basins
- Refinements to drainage and water quality infrastructure across the M12 Motorway - West Package, including culverts, open channels and cross drainage
- Additional construction access road to the north of BR20
- Amendments to the private property access on Elizabeth Drive west of the Airport Access Road
- Installation of a Variable Messaging Sign (VMS) on the southbound carriageway of The Northern Road Stage 6.

2. METHODS

2.1 VERIFICATION AND REVISION OF VEGETATION MAPPING

As the majority of the vegetation and habitat mapping used in the EIS and Amendment Report is several years old, a verification survey was carried out in accordance with NSW Conditions E5 and E6 to identify if there were any areas of biodiversity value (particularly those identified as either Grey-Headed Flying-Fox habitat or Swift Parrot habitat) that can be reduced in size.

GIS data from the Biodiversity Assessment Report (BAR) (Roads and Maritime, 2019) Amendment Report (AR) (Transport for NSW, 2020a) AR Submissions Report (Transport for NSW, 2020b), AR Submissions Report – Amendment Letter (Transport for NSW, 2021) was collated along with the 80% detailed design including the proposed changes as detailed in Section 1.3. A tree survey was undertaken in 2020 by Cadence Consulting Surveyors and this data was also used to inform the mapping revision as it provides accurate tree locations.

The verification survey was undertaken on 17 June 2021 and focused on the areas of vegetation and habitat along the Northern Road, Elizabeth Drive, and Badgerys Creek areas (Sydney University and BHL land). During the field survey the vegetation mapping was verified using the following methodology:

- The vegetation and habitat mapping from the EIS and Amendment Report was imported into a mobile GIS along with the project construction boundaries. The GIS was used in the field for navigation and to record GPS points and photographs
- Where mapped vegetation boundaries were found to be incorrect in the field, GPS points were recorded to indicate where amendment of mapping was required
- Where additional areas of native vegetation that had not been originally mapped were identified, a GPS point was recorded to indicate where amendment of mapping was required
- Where a PCT was found to have been misidentified in accordance with the NSW PCT classification, a GPS point was recorded to indicate where amendment of mapping was required. PCTs were identified based on the species present in the upper, middle and ground stratum, the geology, soil type and landscape position
- The mapping of TECs was verified and the identification of TECs was checked for consistency with the Threatened Species Scientific Committee Final Determination for the TEC.

The verification survey was undertaken in June 2021. Winter is an appropriate time to detect the quality of the ground cover given annual weeds will have died off. However, native species can be harder to detect when not in flower. Survey timing did not have an influence on the verification survey as no targeted surveys were carried out for threatened species and the PCTs and TECs subject to this assessment can confidently be identified year-round with no influence from seasonality. Once the field survey was completed, the vegetation and habitat mapping was revised in a desktop GIS. The vegetation and habitats were originally mapped within the entire AR Submissions Report study area corridor and this existing data was revised based on what was observed during the June 2021 field survey, the tree mapping data provided by Cadence Consulting Surveyors, and more up-to-date aerial photography streamed from Aerometrex (Metromap). The GIS was used to make updates to the vegetation and habitat mapping polygons based on the data collected in the field, tree mapping data provided by Cadence Consulting Surveyors, and the aerial photography.

The revised biodiversity impacts (e.g. impact to area of Plant Community Types (PCTs), Threatened Ecological Community's (TECs) and threatened species habitats) were then calculated against the proposed project 80% detailed design construction footprint developed as a result of the design changes as part of the 80% detailed design.

2.2 REVISED IMPACT CALCULATIONS

The revised vegetation mapping (plus any threatened species records and threatened species polygons) within the amended construction footprint were compared with the original mapping to identify the revised biodiversity impacts. Table 3-1, Table 3-2 and Table 3-3 compare the changes in impact between the 80% concept design (AR Submissions Report and AR Submissions Report – Amendment Letter) and the 80% detail design construction boundary.

Appendix A illustrates the changes in impact between the 80% concept design (AR Submissions Report and AR Submissions Report – Amendment Letter) and the 80% detail design construction footprints. Section 3 details the changes to biodiversity impacts.

The difference in biodiversity impacts will determine whether the changes are deemed consistent with the biodiversity impacts identified in the AR Submissions Report and AR Submissions Report – Amendment Letter.

2.3 REVIEW AGAINST BIODIVERSITY CLEARING LIMITS IN THE EPBC ACT DECISION NOTICE

As part of this assessment the vegetation calculations have been compared in the amended proposed project 80% detailed design construction footprint to the clearing limits approved in the EPBC decision notice. Figures included in Appendix A illustrate the changes.

2.4 PROVISION OF DATA FOR FBA CALCULATOR

Section 3 provides an estimate of potential area of impact and credit requirements with a proportional split of credits based on the original credits required for the entire M12 Motorway Project.

The updated estimate of impact calculations provided in Section 3 will be used to update the FBA calculator originally prepared for the whole M12 project to recalculate credit obligations.

3. RESULTS

3.1 VERIFICATION OF MAPPING AND REVISIONS

During the field survey there were several areas of mapped native vegetation that required refining. Appendix A illustrates the revision to vegetation and habitat mapping as a result of the field survey and the comparison between existing mapping provided in the Amendment Report to more recent aerial photographs. Vegetation mapping refinement was required for the following reasons:

- Some vegetation boundaries have changed naturally (e.g. tree death, shrub growth) since the original surveys completed in 2017 – 2019. These areas were identified in the field with GPS and from aerial photography
- Construction along The Northern Road has removed a portion of vegetation mapped as Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT 850 – Low). The mapping in this area was amended based on aerial photography so that the edge of construction could be captured
- An area of Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 849 - Moderate/Good_Poor) was mapped at the edge of Luddenham Road in the road verge, but the vegetation stops at the fence and the road verge contains exotic grassland. This area was verified in the field and from aerial photography
- Scattered native trees in exotic grassland areas and small clumps of native trees that were not originally mapped have been mapped based on a combination of the tree mapping data provided by Cadence Consulting Surveyors, field survey,

and aerial photography. These trees have been assigned to the most likely PCT based on species, geology, soil and landscape position

- Some small areas of native trees and regrowth shrubs to the north of Elizabeth Drive were not originally mapped so these were added to Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 849 - Moderate/Good_Poor) and Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 849 - Moderate/Good_Other (Derived Shrubland)). These areas were identified in the field with GPS and from aerial photography
- The mapping around Badgerys Creek near Elizabeth Drive required updating to account for regrowth of shrubs and trees. Some mapping in this area was reassigned from Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley (PCT 1800) to Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 835) based on dominance of eucalypts in the canopy on the western side of Badgerys Creek. These areas were identified in the field with GPS and from aerial photography
- Additional areas of regrowth native shrubland that were not previously mapped were found to the west of Badgerys Creek (northern part) and these areas were assigned to Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 849 - Moderate/Good_Other (Derived Shrubland)). These areas were identified in the field with GPS and from aerial photography
- An area to the west of Badgerys Creek (northern part) situated on top of a hill and dominated by *Eucalyptus moluccana* and *Eucalyptus eugenioides* in the canopy was reassigned to Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 849 - Moderate/Good_Poor) from the original mapping of Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 835 - Moderate/Good_Poor). This patch of vegetation is on top of a hill off the Badgerys Creek floodplain and is more representative of Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 849). This vegetation was reassigned based on the species present and landscape position observed during the field survey
- The boundaries of the vegetation mapping were refined to more closely follow the outlines of vegetation as seen on the more up-to-date aerial photography streamed from Aerometrex (Metromap). The boundaries of the vegetation mapping follow tree canopies so there will be some areas where trees overhang features such as dams or roads but this has been minimised where possible.

3.2 REVISED IMPACT CALCULATIONS

This section summarises the revised biodiversity impacts (PCTs, TECs and threatened species) assessed in the AR Submissions Report and AR Submissions Report – Amendment Letter as a result of the field survey. Note that only direct impacts have been calculated as indirect impacts were not calculated for M12 Motorway - West Package. Indirect impacts were calculated for the M12 East and M12 Central on areas within the Western Sydney Parklands and at Clifton Avenue.

3.2.1 PLANT COMMUNITY TYPES

The revised impact calculations for the M12 Motorway - West Package based on the revised vegetation mapping are provided in Table 3-1. Overall, the changes in extent of impact from the revised vegetation mapping compared to the mapping provided in the AR Submissions Report are less than one hectare (see Table 3-1). The revised mapping shows that increased impacts are expected for the following PCTs (see Table 3-1):

- PCT 835 - Moderate/Good_Poor
- PCT 849 - Moderate/Good_Other (Derived Shrubland).

The revised mapping shows that reduced impacts are expected for the following PCTs:

- PCT 849 - Moderate/Good_Poor
- PCT 850 - Moderate/Good_Medium



- PCT 850 - Low
- PCT 1800 - Moderate/Good_Poor.

In line with the revised mapping, the 80% detailed design is expected to have increased impacts to the following PCTs over that originally reported in the AR Submissions Report (see Table 3-1):

- PCT 835 - Moderate/Good_Poor
- PCT 849 - Moderate/Good_Other (Derived Shrubland).

The 80% detailed design is expected to have reduced impacts to the following PCTs over that originally reported in the AR Submissions Report (see Table 3-1):

- PCT 849 - Moderate/Good_Poor
- PCT 850 - Low
- PCT 1800 - Moderate/Good_Poor
- PCT 850 - Moderate/Good_Medium.

The revised impact calculations provided in Table 3-1 can be used to update the FBA calculator to recalculate credit obligations.

Table 3-1 Predicted impact to Plant Community Types (PCTs)

PCT NO.	PCT NAME	VEGETATION ZONE	AREA (HA) ORIGINALLY MAPPED WITHIN M12 MOTORWAY AR SUBMISSIONS REPORT CONSTRUCTION FOOTPRINT	AREA (HA) REVISED MAPPING WITHIN M12 AR SUBMISSIONS REPORT CONSTRUCTION FOOTPRINT	DIFFERENCE IN REVISED MAPPING COMPARED TO AR SUBMISSIONS REPORT	PREDICTED IMPACT FROM 80% DETAILED DESIGN M12 MOTORWAY – WEST PACKAGE (BASED ON REVISED MAPPING)	80% DETAILED DESIGN IMPACT M12 MOTORWAY – WEST PACKAGE (REVISED MAPPING) COMPARED TO MAPPING PROVIDED IN AR SUBMISSIONS REPORT
835	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	835 - Moderate/Good_Poor	2.66	2.82	+0.16	2.94	+0.28
849	Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	849 - Moderate/Good_Poor	1.13	0.64	-0.49	0.74	-0.39
		849 - Moderate/Good_Other (Derived Shrubland)	0.48	0.88	+0.4	0.90	+0.42
		Combined PCT 849 Veg Zones	1.61	1.52	-0.09	1.64	+0.03
850	Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	850 - Moderate/Good_Medium	0.64	0.61	-0.03	0.62	-0.02
		850 - Low	18.06	17.30	-0.76	16.37	-1.69
		Combined PCT 850 Veg Zones	18.70	17.91	-0.79	16.99	-0.78
1800	Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley	1800 - Moderate/Good_Poor	2.13	1.68	-0.45	1.68	-0.45

Note: Area calculations incorporate the area of the exclusion zone on Cosgroves Creek.

3.2.2 THREATENED ECOLOGICAL COMMUNITIES

Table 3-2 summarises the revised impact calculation for impacts to TECs based on the revised vegetation mapping.

Overall, the changes in extent of impact from the revised vegetation mapping compared to the AR Submissions Report mapping are small in terms of hectares to be removed (see Table 3-2). Changes to PCT impacts outlined in Table 3-1, results in a change to TECs impacts, outlined in Table 3-2. It should be noted that there are no EPBC Act listed TECs within the M12 Motorway - West Package project area. The revised mapping shows that increased impacts to the following TECs are expected:

- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Endangered, Threatened Species Conservation Act 1995 (TSC Act)).

The revised mapping show that reduced impacts to the following TECs are expected:

- Cumberland Plain Woodland in the Sydney Basin Bioregion (Critically Endangered, TSC Act)
- Cumberland Plain Woodland in the Sydney Basin Bioregion (Critically Endangered, TSC Act) - derived native grassland form
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions (Endangered, TSC Act).

The 80% detailed design is expected to have increased impacts to the following TECs over that originally reported in the AR Submissions Report (see Table 3-2):

- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Endangered, TSC Act)
- Cumberland Plain Woodland in the Sydney Basin Bioregion (Critically Endangered, TSC Act).

The 80% detailed design is expected to have reduced impacts to the following TECs over that originally reported in the AR Submissions Report (see Table 3-2):

- Cumberland Plain Woodland in the Sydney Basin Bioregion (Critically Endangered, TSC Act) - derived native grassland form
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions (Endangered, TSC Act).

Table 3-2 Predicted impact to Threatened Ecological Communities (TECs)

THREATENED ECOLOGICAL COMMUNITY	CORRESPONDING PCT NO. / VEGETATION ZONE	AREA (HA) ORIGINALLY MAPPED WITHIN M12 WEST AR SUBMISSIONS REPORT CONSTRUCTION FOOTPRINT	AREA (HA) REVISED MAPPING WITHIN M12 WEST AR SUBMISSIONS REPORT CONSTRUCTION FOOTPRINT	DIFFERENCE IN REVISED MAPPING COMPARED TO AR SUBMISSIONS REPORT	PREDICTED IMPACT FROM 80% DETAILED DESIGN M12 MOTORWAY – WEST PACKAGE (BASED ON REVISED MAPPING)	80% DETAILED DESIGN IMPACT M12 MOTORWAY – WEST PACKAGE (REVISED MAPPING) COMPARED TO MAPPING IN THE AR SUBMISSIONS REPORT
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Endangered, TSC Act)	835 - Moderate/Good_Poor	2.66	2.82	+0.16	2.94	+0.28
Cumberland Plain Woodland in the Sydney Basin Bioregion (Critically Endangered, TSC Act)	849 - Moderate/Good_Poor 849 - Moderate/Good_Other (Derived Shrubland) 850 - Moderate/Good_Medium	2.25	2.14	-0.11	2.26	+0.01
Cumberland Plain Woodland in the Sydney Basin Bioregion (Critically Endangered, TSC Act) - derived native grassland form	850 - Low	18.06	17.30	-0.76	16.37	-1.69
Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions (Endangered, TSC Act)	1800 - Moderate/Good_Poor	2.13	1.68	-0.45	1.68	-0.45

Note: Area calculations incorporate the area of the exclusion zone on Cosgroves Creek.

3.2.3 THREATENED SPECIES

Table 3-3 details the revised impact calculation for impacts to threatened species habitat based on the revised mapping. Overall, the changes in extent of impact from the revised mapping compared to the AR Submissions Report mapping are small in terms of hectares to be removed (see Table 3-3). However, there would be an increase in impact to habitat for the Grey-headed Flying-fox (foraging habitat). For all other species the extent of impact from the revised mapping compared to the AR Submissions Report mapping impact is reduced.

The revised mapping does not have any impact on the White-Bellied Sea-Eagle nest which is located outside of the AR Submissions Report construction footprint.

The 80% detailed design is expected to have increased impacts to the following threatened species habitats over that originally reported in the AR Submissions Report (see Table 3-3):

- The revised mapping indicates that there would be an increase in impact to habitat for Cumberland Plain Land Snail due to increased clearing of the mapped habitat at Badgerys Creek (PCT 835 and PCT 849)
- Impacts to Grey-headed Flying-fox (foraging habitat) would increase due to the increase in clearing, largely from the increased habitat removal at Badgerys Creek (PCT 835 and PCT 849).

Impacts to the remaining ecosystem credit species would be reduced due to the refinement of the habitat mapping.

Impacts to Swift Parrot habitat were not specifically outlined in the BAR or EIS, however Swift Parrot habitat has been assumed by the Department of Agriculture, Water and the Environment (DAWE) to be all PCTs. The impacts to Swift Parrot potential foraging habitat will be decreased as a result of the revised mapping.

The White-Bellied Sea-Eagle nest is located about 20 metres outside the proposed 80% detailed design construction footprint. A White-Bellied Sea-Eagle was seen using the nest during the field survey in June 2021 so it is still active.

No change is expected to roosting habitat for Southern Myotis as there will be no change in impacts to any identified hollow-bearing trees that may provide habitat for this species. Mapping for this species has not been revised.

Table 3-3 Predicted impact to threatened fauna habitat

THREATENED FAUNA SPECIES	STATUS		HABITAT COMPONENT	AREA (HA) ORIGINALLY MAPPED WITHIN M12 WEST AR RTS CONSTRUCTION BOUNDARY	AREA (HA) REVISED MAPPING WITHIN M12 WEST AR RTS CONSTRUCTION BOUNDARY	DIFFERENCE IN REVISED MAPPING COMPARED TO AR SUBMISSIONS REPORT	PREDICTED IMPACT FROM 80% DETAILED DESIGN M12 MOTORWAY – WEST PACKAGE (BASED ON REVISED MAPPING)	80% DETAILED DESIGN IMPACT M12 MOTORWAY – WEST PACKAGE (REVISED MAPPING) COMPARED TO ORIGINAL MAPPING PROVIDED IN AR SUBMISSIONS REPORT
	TSC ACT	EPBC ACT						
Species Credits (species that contribute to the calculation of species credits)								
Cumberland Plain Land Snail	E	Not listed	Mapped species polygon	1.64	1.52	-0.12	1.74	+0.1
Southern Myotis (breeding habitat)	V	Not listed	Hollow-bearing trees (breeding habitat)	0.34	0.34	No change to impacts to identified Southern Myotis trees	0.34	No change to impacts to identified Southern Myotis trees
Ecosystem Credits (species that contribute to the calculation of ecosystem credits)								
Grey-headed Flying-fox (foraging habitat)	V	V	PCT 835 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Other (Derived Shrubland), PCT 850 - Moderate/Good_Medium	4.91	4.96	+0.05	5.20	+0.29
Yellow-bellied Sheathtail-bat	V	-	PCT 835 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Other (Derived Shrubland), PCT 850 - Moderate/Good_Medium, PCT 1800 - Moderate/Good_Poor	7.04	6.63	-0.41	6.88	-0.16
Eastern Freetail-bat	V	-	PCT 835 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Other (Derived Shrubland), PCT 850 - Moderate/Good_Medium, PCT 1800 - Moderate/Good_Poor	7.04	6.63	-0.41	6.88	-0.16



THREATENED FAUNA SPECIES	STATUS		HABITAT COMPONENT	AREA (HA) ORIGINALLY MAPPED WITHIN M12 WEST AR RTS CONSTRUCTION BOUNDARY	AREA (HA) REVISED MAPPING WITHIN M12 WEST AR RTS CONSTRUCTION BOUNDARY	DIFFERENCE IN REVISED MAPPING COMPARED TO AR SUBMISSIONS REPORT	PREDICTED IMPACT FROM 80% DETAILED DESIGN M12 MOTORWAY – WEST PACKAGE (BASED ON REVISED MAPPING)	80% DETAILED DESIGN IMPACT M12 MOTORWAY – WEST PACKAGE (REVISED MAPPING) COMPARED TO ORIGINAL MAPPING PROVIDED IN AR SUBMISSIONS REPORT
	TSC ACT	EPBC ACT						
Greater Broad-nosed Bat	V	-	PCT 835 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Other (Derived Shrubland), PCT 850 - Moderate/Good_Medium, PCT 1800 - Moderate/Good_Poor	7.04	6.63	-0.41	6.88	-0.16
Eastern Bentwing-bat (foraging habitat)	V	-	PCT 835 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Other (Derived Shrubland), PCT 850 - Moderate/Good_Medium, PCT 1800 - Moderate/Good_Poor	7.04	6.63	-0.41	6.88	-0.16
Little Bentwing-bat (foraging habitat)	V	-	PCT 835 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Other (Derived Shrubland), PCT 850 - Moderate/Good_Medium, PCT 1800 - Moderate/Good_Poor	7.04	6.63	-0.41	6.88	-0.16
Eastern False Pipistrelle	V	-	PCT 835 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Poor, PCT 849 - Moderate/Good_Other (Derived Shrubland), PCT 850 - Moderate/Good_Medium, PCT 1800 - Moderate/Good_Poor	7.04	6.63	-0.41	6.88	-0.16



THREATENED FAUNA SPECIES	STATUS		HABITAT COMPONENT	AREA (HA) ORIGINALLY MAPPED WITHIN M12 WEST AR RTS CONSTRUCTION BOUNDARY	AREA (HA) REVISED MAPPING WITHIN M12 WEST AR RTS CONSTRUCTION BOUNDARY	DIFFERENCE IN REVISED MAPPING COMPARED TO AR SUBMISSIONS REPORT	PREDICTED IMPACT FROM 80% DETAILED DESIGN M12 MOTORWAY – WEST PACKAGE (BASED ON REVISED MAPPING)	80% DETAILED DESIGN IMPACT M12 MOTORWAY – WEST PACKAGE (REVISED MAPPING) COMPARED TO ORIGINAL MAPPING PROVIDED IN AR SUBMISSIONS REPORT
	TSC ACT	EPBC ACT						
White-Bellied Sea-Eagle (breeding habitat)	V	-	Nest site (breeding habitat)	No impact. Nest located outside of construction footprint.	No impact. Nest located outside of construction footprint.	No impact. Nest located outside of construction footprint.	No impact. Nest located outside of construction footprint.	No impact. Nest located outside of construction footprint.
Other species not assessed in the BAR but outlined in the conditions of approval								
Swift Parrot (foraging habitat)	CE	CE	All PCTs	25.10	23.93	-1.17	23.26	-1.84

Note: Area calculations incorporate the area of the exclusion zone on Cosgroves Creek.

3.3 REVIEW AGAINST BIODIVERSITY CLEARING LIMITS IN THE EPBC ACT DECISION NOTICE

The EPBC Act species of concern to M12 Motorway – West Package are Grey-headed Flying Fox and Swift Parrot. The predicted impacts to both of these species are outlined in Table 3-3. The impacts from M12 Motorway – West Package would have a minor contribution to the total approved clearing limits for Grey-headed Flying Fox and Swift Parrot when compared to the other M12 sections.

Overall, the changes in extent of impact to habitat for Grey-headed Flying Fox and Swift Parrot from the revised mapping compared to the original mapping provided in the AR Submissions Report are small in terms of hectares to be removed (see Table 3-3). There would be an increase in impact for the M12 Motorway – West Package in terms of habitat for Grey-headed Flying-fox (foraging habitat) at an additional 0.05 hectares. The predicted impact for Swift Parrot foraging habitat would be reduced by 1.84 hectares.

In line with the revised mapping, the 80% detailed design is expected to have increased impacts to habitat for Grey-headed Flying Fox (foraging habitat) at an additional 0.29 hectares over that mapped in the AR Submissions Report. The predicted impact for Swift Parrot foraging habitat would be reduced by 0.92 hectares over that mapped in the AR Submissions Report.

The impacts from M12 Motorway – West Package would have a minor contribution to the total approved clearing limits for the Grey-headed Flying Fox and Swift Parrot. The estimated increases in habitat removal from the revised mapping and 80% detailed design are minor in the context of the M12 Motorway Project as a whole. It is unlikely that the small increases in habitat removal for Grey-headed Flying Fox as a result of the 80% detailed design would result in a change to the level of significance of potential impacts for these two species. As such, the changes are considered to be generally in accordance with the Conditions of Approval. Where the changes are not deemed to be significant, TfNSW are able to submit amended clearing limits within six months of finalising the construction footprint.

As the habitat removal for Grey-headed Flying Fox would increase over that outlined in the AR Submissions Report, TfNSW may need to provide a letter updating the DAWE. However, as M12 Motorway – West Package is part of a larger project, the impact should be treated in conjunction with impacts from the other sections of the M12 Motorway Project to determine whether the approved clearing thresholds will be exceeded as a whole.

Table 3-4 provides a review of the biodiversity impacts for EPBC Act listed species against the clearing limits in the EPBC Act decision notice.

Table 3-4 Review of changes against clearing limits in the EPBC Act decision notice

TO MINIMISE THE IMPACTS OF THE ACTION ON PROTECTED MATTERS THE APPROVAL HOLDER MUST NOT CLEAR WITHIN THE CONSTRUCTION FOOTPRINT MORE THAN:	
42.89 hectares of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest threatened ecological community	Not applicable to M12 Motorway – West Package. There is no Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest threatened ecological community within the M12 Motorway – West Package construction footprint.
0.44 hectares of Western Sydney Dry Rainforest and Moist Woodland on Shale threatened ecological community	Not applicable to M12 Motorway – West Package. There is no Western Sydney Dry Rainforest and Moist Woodland on Shale threatened ecological community within the M12 Motorway – West Package construction footprint.
100 <i>Pultenaea parviflora</i> individuals comprising no more than 90 individuals from the Clifton Avenue population and no more than 10 individuals from the population north of the Western Sydney Parklands;	Not applicable to the M12 Motorway – West Package. There are no known <i>Pultenaea parviflora</i> plants within the footprint. E8 only applies to surveys conducted in the M12 East section of the project.

TO MINIMISE THE IMPACTS OF THE ACTION ON PROTECTED MATTERS THE APPROVAL HOLDER MUST NOT CLEAR WITHIN THE CONSTRUCTION FOOTPRINT MORE THAN:

The number of <i>Pimelea spicata</i> individuals identified in the additional surveys and as required by condition E8 of the State Infrastructure approval	Not applicable to the M12 Motorway – West Package. There is no known <i>Pimelea spicata</i> plants within the footprint.
62.69 hectares of foraging habitat for Grey-headed Flying Fox (<i>Pteropus poliocephalus</i>)	The proposed 80% detailed design construction footprint would result in an additional 0.29 hectares. The total impact for M12 Motorway – West Package is 5.20 hectares. As M12 Motorway – West Package is part of a larger project, the impact should be treated in conjunction with impacts from the other sections of the M12 Motorway Project to determine whether the approved clearing thresholds will be exceeded as a whole.
80.21 hectares of foraging habitat for Swift Parrot (<i>Lathamus discolor</i>)	The proposed 80% detailed design construction footprint would result in a decreased impact to Swift Parrot habitat. The total impact for M12 Motorway – West Package impact is 23.26 hectares.

3.4 BIODIVERSITY CREDITS

An estimate of potential credit requirements with a proportional split of credits based on the original credits required for the entire M12 project has been provided.

The amended impact calculations provided in this memo can be used to update the FBA calculator to recalculate credit obligations. We recommend that the FBA calculator is used to develop the credit requirement for M12 Motorway – West Package as the information provided in Table 3-5 and Table 3-6 is an estimate only based on proportional impacts from M12 Motorway – West Package and are not calculations made using the FBA calculator.

Table 3-5 and Table 3-6 provide a proportional split of biodiversity credits based on the calculated impacts of the M12 Motorway – West Package 80% detailed design construction footprint and revised vegetation mapping. The credit split was calculated based on the impacts of the M12 Motorway – West Package 80% detailed design construction footprint as a percentage of the total impacts of the entire M12 project as provided in the AR Submissions Report.

Biodiversity credits are outlined in Table 3-5 for Ecosystem credits and Table 3-6 for Species Credits. The ecosystem credits include the additional impacts to Grey-headed Flying-fox identified in Table 3-3. Grey-headed Flying-fox is not species credit species for M12 Motorway – West Package as only foraging habitat would be impacted.

The total impact to PCTs from the M12 project has been taken from the AR Submissions Report for use in calculating the biodiversity credit requirements for M12 Motorway – West Package. The biodiversity credit numbers in Table 3-5 and Table 3-6 have been rounded to one decimal point to allow for a more accurate split of biodiversity credits across the various project stages.

Of note is that the calculation of biodiversity credits is for direct impacts only as indirect impacts were not calculated for M12 Motorway – West Package. The calculation of indirect impacts was restricted to the areas within Western Sydney Parklands and east of Clifton Avenue which are to the east of M12 Motorway – West Package.

Table 3-5 Proportional biodiversity credit split for Ecosystem credits (direct impact)

PCT NO.	BVT NO.	PCT NAME	TOTAL M12 PROJECT IMPACT (HA) (BASED ON AR SUBMISSIONS REPORT)	M12 MOTORWAY – WEST PACKAGE SECTION OF AR SUBMISSIONS REPORT CONSTRUCTION FOOTPRINT IMPACT (HA) REVISED MAPPING	PROPORTIONAL IMPACT FROM M12 MOTORWAY – WEST PACKAGE SECTION AR CONSTRUCTION FOOTPRINT	PREDICTED IMPACT (HA) FROM 80% DETAILED DESIGN REVISED MAPPING	PROPORTIONAL IMPACT FROM 80% DETAILED DESIGN	TOTAL M12 PROJECT ECOSYSTEM CREDITS (BASED ON AR SUBMISSIONS REPORT)	ECOSYSTEM CREDITS REQUIRED FOR M12 MOTORWAY – WEST PACKAGE SECTION OF AR SUBMISSIONS REPORT CONSTRUCTION FOOTPRINT	ECOSYSTEM CREDITS REQUIRED FOR M12 MOTORWAY – WEST PACKAGE BASED ON 80% DETAILED DESIGN	EXPECTED CHANGE IN CREDIT REQUIREMENT (IF NO REDUCTION IN VEGETATION CLEARING IN OTHER M12 PACKAGES)
835	HN524	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	3.18	2.82	89%	2.94	92%	105	93.5	96.6	+3.1
849	HN528	Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	6.34	1.52	24%	1.64	26%	210	50.4	54.6	+4.2
850	HN529	Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	60.52	0.61	1%	0.62	1%	1908	19.1	19.1	No change
1800	HN674	Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley	2.82	1.68	60%	1.68	60%	75	45	45	No change

Notes: Total impact taken from the 80% detailed design and revised vegetation mapping. Credit numbers in the table rounded to one decimal point.

Table 3-6 Proportional biodiversity credit split for Species credits in the M12 Motorway - West Package construction boundary based off 80% detailed design and revised vegetation mapping

SPECIES NAME	TOTAL M12 PROJECT IMPACT (HA) (BASED ON AR RTS)	M12 MOTORWAY – WEST PACKAGE SECTION AR RTS FOOTPRINT IMPACT (HA) REVISED MAPPING	PROPORTIONAL IMPACT FROM M12 MOTORWAY – WEST PACKAGE SECTION AR FOOTPRINT	PREDICTED IMPACT (HA) FROM 80% DETAILED DESIGN REVISED MAPPING	PROPORTIONAL IMPACT FROM 80% DETAILED DESIGN	TOTAL M12 PROJECT SPECIES CREDITS (BASED ON AR SUBMISSIONS REPORT)	SPECIES CREDITS REQUIRED FOR M12 MOTORWAY – WEST PACKAGE SECTION OF AR RTS FOOTPRINT	SPECIES CREDITS REQUIRED FOR M12 MOTORWAY – WEST PACKAGE BASED ON 80% DETAILED DESIGN	EXPECTED CHANGE IN CREDIT REQUIREMENT (IF NO REDUCTION IN VEGETATION CLEARING IN OTHER M12 PACKAGES)
Cumberland Plain Land Snail	5.22	1.52	29%	1.74	33%	66	19.1	21.8	+2.7
Southern Myotis (breeding habitat)	0.96	0.34	35%	0.34	35%	23	8.1	8.1	No change

Notes: Total impact taken from the 80% detailed design and revised vegetation mapping. Credit numbers in the table rounded to one decimal point.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 OVERALL

In terms of impacts to PCTs the revision of mapping has resulted in increases and decreases in vegetation removal compared to that reported in the AR Submissions Report. A number of changes to the mapping were made in an attempt to refine the vegetation and habitat mapping to rectify PCTs and more closely match the edges of vegetation based on more up to date aerial photography and GPS data collected on the ground. Vegetation was amended to ensure that the mapping reflects on ground conditions.

The impacts to TECs reflect the changes to impact to PCTs. It should be noted that there are no EPBC Act listed TECs within the M12 Motorway – West Package Project construction footprint.

The White-Bellied Sea-Eagle nest will not be directly impacted as it is located about 20 metres outside the 80% Detailed Design construction footprint. No change is expected to roosting habitat for Southern Myotis as there will be no change in impacts to identified hollow-bearing trees that may provide habitat for this species. Mapping for this species has not been revised. The revised mapping indicates that there would be an increase in impact to habitat for Cumberland Plain Land Snail due to increased clearing of the mapped habitat at Badgerys Creek (PCT 835 and PCT 849). Impacts to the ecosystem credit species Grey-headed Flying-fox (foraging habitat) would increase, largely from the increased habitat removal at Badgerys Creek (PCT 835 and PCT 849). Impacts to other ecosystem credit species would be reduced.

Impacts to Swift Parrot habitat was not specifically outlined in the BAR or EIS, however Swift Parrot habitat has been assumed by the Department of Agriculture, Water and the Environment (DAWE) to be all PCTs. The impacts to Swift Parrot potential foraging habitat will be reduced as a result of the refinement of habitat areas from the revised mapping.

4.2 CONSISTENCY WITH DIVISION 5.2 APPROVAL

The comparison of the potential impacts of the proposed design changes against the Approved Project has identified additional positive, negative and neutral impacts to PCTs, TECs and threatened species. The Division 5.2 Approval indicates that the proponent must carry out the State Significant Infrastructure (SSI) in accordance with the conditions of approval (or the terms of the approval) and generally in accordance with the identified documents or, generally in accordance with the description of the SSI in the identified documents. The term ‘generally in accordance with’ implies a degree of flexibility to undertake minor changes to the project while being consistent with the approval, with minor being interpreted in the context of the project as a whole.

For the most part, the identified changes to biodiversity impacts from the 80% detailed design can be considered as minor in the context of the project as a whole. The increases in impact to TECs including River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Endangered, TSC Act) and Cumberland Plain Woodland in the Sydney Basin Bioregion (Critically Endangered, TSC Act) (and their respective PCTs) at an additional 0.28 hectares and 0.01 hectares respectively is small in the context of the impact from the project as a whole. The same applies for the increases in impact to threatened species habitat. The 80% detailed design is expected to have increased impacts to:

- Habitat for Cumberland Plain Land Snail due to increased clearing of the mapped habitat at Badgerys Creek (PCT 835 and PCT 849) at an additional 0.1 hectares
- Habitat for Grey-headed Flying-fox (foraging habitat) would increase due to the increase in clearing, largely from the increased habitat removal at Badgerys Creek (PCT 835 and PCT 849) at an additional 0.29 hectares.

While most of the additional identified biodiversity impacts are considered to be minor, and generally in accordance with the Conditions of Approval, the additional impact to PCT 835 and the associated River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions TEC exceeds the clearing estimate provided in the AR Submission Report by 0.28 hectares. These additional impacts are due to revision of mapping and the extension of the 80% detailed design footprint in the area of Badgerys Creek. As M12 Motorway – West Package is part of a larger project, the impact should be treated in conjunction with impacts from the other sections of the

M12 Motorway Project to determine whether the approved clearing thresholds will be exceeded as a whole. Condition E4 allows TfNSW to review and update the ecosystem and species credit requirements to reflect the final construction footprint and resulting extent and type of plant community types to be cleared and the extent of threatened species habitat impacted by the construction within six months of determining the final construction footprint. The revised impacts are therefore in accordance with the approval and a modification would not be required.

4.2.1 MINISTER'S CONDITIONS OF APPROVAL

Table 4-1 below addresses those conditions of approval relevant to the proposed change in the context of the Approved Project.

Table 4-1: Consistency against relevant Minister's conditions of approval for the project

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
E2	The clearing of native vegetation must be minimised with the objective of reducing impacts to threatened ecological communities and threatened species habitat.	<p>Clearing of some PCTs has been reduced while clearing of others have increased as a result of the proposed design changes and design development.</p> <p>The predicted impacts to PCTs have had the following changes between the AR Submissions Report and the 80% detailed design:</p> <ul style="list-style-type: none"> • PCT 835 has increased by 0.28 hectares • PCT 849 has increased by 0.03 hectares • PCT 850 has been reduced by 0.78 hectares • PCT 1800 has been reduced by 0.45 hectares. <p>The design of Bridge BR05 (Badgerys Creek) does not impact on the White-bellied Sea-Eagle nest which is located to the south and is located beyond the current EPBC Referral Boundary and proposed 80% detailed design construction boundary.</p>	Yes
E3	<p>The Proponent must meet the biodiversity offset obligations for ecosystem and species credits as set out in Table 1, Table 2 and Table 3 in accordance with the M12 Motorway Amendment Report - Submissions Report (December 2020) and M12 Motorway Amendment Report - Submissions Report - Amendment (dated 8 March 2021) within 12 months of the commencement of construction. The offset obligations must be carried out in accordance with the NSW Biodiversity Offsets Policy for Major Projects and can be achieved by:</p> <p>(a) acquiring and retiring “biodiversity credits” within the meaning of the <i>Biodiversity Conservation Act 2016</i>; and/or</p> <p>(b) properties secured with the NPWS, on the basis of a draft credit report to show what the property would provide and written confirmation from NPWS that the financial contributions for acquisition and management have been received; and/or</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
	<p>(c) making a payment into the Biodiversity Conservation Fund; or</p> <p>(d) a Biodiversity Offset Strategy prepared in consultation with EES and DAWE that provides supplementary measures or where the Proponent intends to utilise the biodiversity credit variation rules.</p> <p><i>Notes</i></p> <p><i>1: Following repeal of the Threatened Species Conservation Act 1995 on 25 August 2017, “biodiversity credits” created under that Act are taken to be “biodiversity credits” under the Biodiversity Conservation Act 2016 by virtue of clause 19 of the Biodiversity Conservation (Savings and Transitional) Regulation 2017.</i></p> <p><i>2: The determination of biodiversity credits under the Biodiversity Conservation Act 2016 that are reasonably equivalent to biodiversity credits created under the Threatened Species Conservation Act 1995 remaining to be retired must be carried out in accordance with clause 22 of the Biodiversity Conservation (Savings and Transitional) Regulation 2017.</i></p>		
E4	<p>The Proponent may review and update the ecosystem and species credit requirements in Table 1, Table 2 and Table 3 to reflect the final construction footprint and resulting extent and type of plant community types to be cleared and the extent of threatened species habitat impacted by the construction of the CSSI (excluding certified areas). Where the construction of the CSSI is staged, the Proponent may review and update the ecosystem and species credit requirements in Table 1, Table 2 and Table 3 for each stage of the CSSI. Amendments to the ecosystem and species credit requirements must be undertaken in consultation with EES and DAWE and submitted to the Planning Secretary for approval within six (6) months of determining the final construction footprint and, where the CSSI is staged,</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
	within six (6) months of determining the final construction footprint for each stage.		
E5	<p>The review and update of credit requirements must be undertaken by:</p> <p>(a) using the vegetation mapping in the EIS, M12 Motorway Amendment Report - Appendix A Biodiversity supplementary technical report (October 2020), and M12 Motorway Amendment Report – Submissions Report (December 2020); and/or</p> <p>(b) completing verification surveys to confirm the extent, type and condition of threatened species and ecological communities to be impacted.</p>	Verification surveys completed as part of the biodiversity consistency assessment for the M12 Motorway – West Package proposed 80% construction footprint. The verification survey result has been outlined in Section 5.	Yes
E6	Where verification surveys are required, they must be undertaken in consultation with EES. Any additional surveys must be undertaken at the time of year when ground cover is most likely to be predominantly native. If verification surveys are not possible at a time when groundcover is most likely to be native, the assumed presence of any relevant species and ecosystems may be applied to conservatively evaluate impacts and associated credit requirements.	The verification survey was undertaken in June 2021. Winter is a good time to detect the quality of the ground cover given annual weeds will have died off. However, native species can be harder to detect when not in flower. Survey timing did not influence the verification survey as we did not do any targeted surveys for threatened species. The TECs subject to this assessment can confidently be identified year-round with no influence from seasonality.	Yes
E7	<p>The Proponent must submit to the Planning Secretary and DAWE for information:</p> <p>(a) a copy of the Credit Retirement Report; and/or</p> <p>(b) a receipt confirming payment to the Biodiversity Conservation Fund; and/or</p> <p>(c) correspondence from NPWS,</p> <p>for the retirement of the ecosystem and species credits required by Condition E3 within one (1) month of receiving the report and/or making the payments and/or receiving correspondence from NPWS.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
E9	If <i>Pimelea spicata</i> is recorded in the surveys carried out under Condition E8, any impacts to the species must be offset in accordance with the options available under Condition E3 and in consultation with EES. The Proponent must provide details of the required biodiversity credits to the Planning Secretary, EES and DAWE for information prior to works that impact the threatened species.	Not applicable to the M12 Motorway – West Package. There is are no known <i>Pimelea spicata</i> plants within the footprint.	N/A
E10	Within one (1) month before the commencement of operation of the CSSI, or where the operation of the CSSI is staged one (1) month before the commencement of operation of the relevant stage, the Proponent must provide evidence to the Planning Secretary, for information, that it has implemented measures agreed with the Western Sydney Parklands Trust to compensate the acquisition of land from the Western Sydney Parklands Biobank Site (Biobanking Agreement Site ID 199) for the CSSI.	Not applicable to the M12 Motorway – West Package.	Yes
E11	The Proponent must minimise impacts to Key Fish Habitat (KFH) as defined in Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013 update). Residual impacts to KFH must be offset at a ratio of 2:1 habitat offset requirement in accordance with the Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013 update) and in consultation with DPI Fisheries.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E12	Payment of the habitat offset requirement must be made to the DPI Fish Conservation Trust Fund prior to the commencement of Work that impacts KFH in Badgerys Creek, Cosgroves Creek, Kemps Creek and South Creek.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E13	The Proponent must submit to the Planning Secretary a receipt confirming payment to the DPI Fish Conservation Trust Fund within one (1) month of making the payment.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E14	A minimum width of three (3) metres and a minimum height of 1.5 metres must be provided to maintain fauna passage below the Badgerys Creek,	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
	Cosgroves Creek, South Creek and Kemps Creek bridges. The three-metre wide passage must consist of a natural substrate or other surface type that will not hinder fauna movement		
E15	<p>Prior to vegetation clearing, the Proponent must identify where it is practicable for the CSSI to reuse native trees and vegetation that are to be removed. If it is not possible for the CSSI to reuse all removed native trees and vegetation, the Proponent must consult with the relevant council(s), Western Sydney Parklands Trust and Landcare groups and relevant government agencies to determine if:</p> <p>(a) hollows, tree trunks, mulch, bush rock and root balls salvaged from native vegetation impacted by the CSSI; and</p> <p>(b) collected plant material, seeds and/or propagated plants from native vegetation impacted by the CSSI,</p> <p>could be used by others in habitat enhancement, beneficial re-use and rehabilitation work, before pursuing other disposal options.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

4.2.2 STATEMENT OF COMMITMENTS / ENVIRONMENTAL MANAGEMENT MEASURES

The proposed change has been assessed in Table 4-2 in relation to the relevant commitments / environmental management measures in the context of the Division 5.2 Approval.

Table 4-2: Consistency against relevant Statement of Commitments / environmental management measures

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
B03	Native vegetation, threatened species and threatened species habitat removal will be minimised where practicable through detailed design. This will include avoiding the nest and surrounds of the White-bellied Sea-Eagle, where practicable.	<p>Clearing of some PCTs has been reduced while clearing of others have increased as a result of the proposed design changes and design development.</p> <p>The predicted impacts to PCTs have had the following changes between the AR Submissions Report and the 80% detailed design:</p> <ul style="list-style-type: none"> PCT 835 has increased by 0.28 hectares 	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
		<ul style="list-style-type: none"> • PCT 849 has increased by 0.03 hectares • PCT 850 has been reduced by 0.78 hectares • PCT 1800 has been reduced by 0.45 hectares. <p>The design of Bridge BR05 (Badgerys Creek) does not impact on the White-bellied Sea-Eagle nest which is located to the south and is located beyond the current EPBC Referral Boundary and proposed 80% detailed design construction boundary.</p>	
B05	<p>Pre-clearing surveys will be carried out in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 1: Pre-clearing process). The following species identified on or near the study area will require particular attention:</p> <p>— White-bellied Sea-Eagle</p> <p>If design cannot avoid the White-bellied Sea-Eagle nest, then pre-clearing measures to avoid impact on the nest will be implemented. This will include pre-clearing survey to establish if it is currently being used and removal of the nest by an ecologist experienced in similar procedures. The potential impacts of habitat removal will be minimised by removing the nest outside of the nesting period (typically lays between June and September, with young remaining in the nest for 70 days).</p> <p>An initial pre-clearing inspection will be carried out at least 21 days prior to commencement of clearing, to give the ecologist time to check the nest and then relocate if needed.</p> <p>— Cumberland Plain Land Snail</p> <p>Pre-clearance surveys will be carried out immediately before clearing works by a qualified ecologist in all vegetated areas to be disturbed that were identified as known or potential habitat for Cumberland Plain Land Snail (see Section 6.2). As identified in the CFFMP, all individual Cumberland Plain Land Snails found during pre-clearance surveys will be translocated to adjacent areas of suitable habitat.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The White-bellied Sea-Eagle nest is located to the south of Bridge BR05 (Badgerys Creek) and is located beyond the current EPBC Referral Boundary and proposed 80% detailed design construction boundary.</p>	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
B08	Revegetation will be carried out in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 3: Re-establishment of native vegetation) and the Landscape Plan prepared for the project.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
B10	Removal of riparian vegetation at creek crossings will be minimised and vegetation connectivity across the riparian zone will be maintained where possible.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
B13	Creek adjustments will be investigated and removed or minimised during detailed design where feasible. Proposed creek adjustments will be designed such that they result in minimal changes to flow velocities.	Creek adjustments are no longer proposed as part of M12 Motorway – West Package. The detailed design of Bridge BR05 over Badgerys Creek has eliminated the need for the creek adjustment / realignment.	Yes
B15	Bridge pier locations within instream (main waterway channel) or on creek banks will be avoided during detailed design at the South Creek, Cosgroves Creek, Badgerys Creek and Kemps Creek crossings. Where avoidance is not possible, further biodiversity assessment will be required.	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The detailed designs of Bridge BR02 over Cosgroves Creek and Bridge BR05 over Badgerys Creek have resulted in the increase of the bridge span lengths. This has enabled the bridge piers to be located further away from the main creek channel and higher up the creek bank. The bridge piers have been placed on a skew to align with the creeks so as to minimise disruption to creek flows.</p> <p>The predicted aquatic biodiversity impacts from Bridge BR02 at Cosgroves Creek and from Bridge BR05 at Badgerys Creek are expected to be less than that of what was assessed in the EIS and Amendment Report.</p>	Yes
B17	Permanent and temporary waterway crossings will be designed and constructed to maintain fish passage in accordance with Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge, 2003). Crossing types should be matched to waterway type as per Table 1 in Fairfull and Witheridge (2003).	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The detailed designs of Bridge BR02 (Cosgroves Creek) and Bridge BR05 (Badgerys Creek) are unlikely to impede fish passage based on the design optimisation implemented (refer to B15 comments above) during the operational phase. Temporary</p>	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
		waterway crossings are to be designed, constructed and maintained by the appointed Construction Contractor.	
B21	Interruptions to water flows associated with groundwater dependent ecosystems will be minimised through detailed design.	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The EIS / Amendment Report identified moderate to high potential Groundwater Dependent Ecosystems (GDEs) were mapped with the M12 Motorway – West Package study area associated with Cosgroves Creek and Badgerys Creek. Bridge BR02 and BR05 traverse these creeks respectively. At Bridge BR02 (Cosgroves Creek) groundwater was observed at about 2.5 metres below the natural surface level and within the stiff clay alluvium. The discrete piles at each support (abutment or pier) will be spaced at a minimum five metre interval which is considered unlikely to impact groundwater levels and flows. At Bridge BR05 (Badgerys Creek) groundwater levels were observed within the alluvial deposits at depths ranging from 2.9 metres to 4.0 metres. Bridge BR05 substructure has discrete piles at a five metre spacing which is considered unlikely to impact groundwater levels and flows. Boreholes for both bridge piles will be drilled so that steel reinforcement and concrete pour can be undertaken as soon as practicable following final socket cleaning and within 24 hours of the borehole being drilling.</p>	Yes
B23	Connectivity measures will be implemented in accordance with Wildlife Connectivity Guidelines for Road Projects (TfNSW, under preparation). Fencing will be located to reduce roadkill of fauna species and funnel animals to creek crossings where safe passage will be available. Detailed design is to retain fauna passage at all four main creek lines (Cosgroves, South, Kemps and Badgerys Creeks).	<p>Cosgroves Creek (Bridge BR02) and Badgerys Creek (Bridge BR05) are located within the M12 Motorway – West Package detailed design package. At both bridges (BR02 and BR05) a dry fauna passage for identified target species such as the Eastern Grey Kangaroo has been provided.</p> <p>In addition a canopy rope structure has been provided to support the movement of sugar gliders under both bridges. At both bridges fauna exclusion fencing extends for 150 metres from the</p>	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
		bridge abutments to tie in with the urban controlled access fencing. Urban controlled access fencing is to be installed along the TfNSW project boundary. The 1.8-metre-high chain link fencing is likely to prevent most medium to large mammals (e.g. Eastern Grey Kangaroo, Swamp Wallaby, Common Wombat and Short-beaked Echidna) from accessing the carriageway, and will therefore act as a 'supplementary fauna exclusion fence'.	
B24	<p>Exclusion zones will be set up at the limit of clearing in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 2: Exclusion zones).</p> <p>Exclusion zones will be set up to protect potential indirect impacts to threatened flora in accordance with the areas identified in the EIS and this amendment report (including Figure 1-2 of Appendix A of the amendment report).</p>	<p>Within the M12 Motorway – West Package detailed design one exclusion zone was established by the Amendment Report. This exclusion zone is located on the upstream side of Cosgroves Creek in the vicinity of Bridge BR02 (i.e. south of Bridge BR02). The detailed design of M12 Motorway – West Package has complied with the established exclusion zone.</p>	Yes
B28	<p>Shading impacts will be minimised through detailed design of bridge and culvert structures. The need for artificial lighting during construction and operation will be minimised through detailed design where feasible, including directing lighting away from vegetated areas where practicable.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>Bridge BR05 (Bagerys Creek) is a twin bridge arrangement with a nine metre wide space between the bridge structures. Bridge BR02 (Cosgroves Creek) is a single deck bridge which is about 27 metres wide. Plant species selection for revegetation / landscaping at these bridges has been developed with due consideration of potential shading impacts and the existing vegetation communities present.</p> <p>At Bridge BR05 (Badgerys Creek) lighting is provided along the northern edge of the Eastbound bridge deck and the southern edge of the westbound bridge deck. The 12 metre high lighting poles will be spaced at about 45m centres. Light spill is controlled with appropriate orientation of the light towards to shared user path and bridge. At Bridge BR02 (Cosgroves Creek) lighting is provided along the southern edge of the bridge deck to</p>	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
		illuminate the shared user path and bridge. The 5.5 metre high poles will be spaced at 35 metre centres. Light spill is controlled with appropriate orientation of the lighting towards to shared user path and bridge.	

The proposed change is consistent with the Statement of Commitments / environmental management measures incorporated as part of the Division 5.2 Approval.

4.3 CONSISTENCY WITH THE EPBC APPROVAL

It should be noted that there are no EPBC Act listed TECs within the M12 Motorway – West Package project construction footprint. Most of the Part A – Conditions specific to the action are not relevant to M12 Motorway – West Package (i.e. Conditions 2a, 2b, 2c, and 2d are not applicable).

The EPBC Act species of concern to M12 Motorway – West Package are Grey-headed Flying-fox and Swift Parrot. The impacts from M12 Motorway – West Package would have a minor contribution to the total approved clearing limits for Grey-headed Flying Fox. In line with the revised mapping, the proposed 80% detailed design construction footprint is expected to have increased impacts to habitat for Grey-headed Flying Fox over that originally reported in the AR Submissions Report by 0.29 hectares.

The impacts to Swift Parrot potential foraging habitat will be reduced by 1.84 hectares as a result of the refinement of habitat areas from the revised mapping and an exclusion zone reducing impact to PCT 850 - Low.

The impacts from M12 Motorway – West Package would have a minor contribution to the total approved clearing limits for the Grey-headed Flying Fox and Swift Parrot. The estimated increases and decreases in habitat removal from the revised mapping and 80% detailed design are minor in the context of the M12 Project as a whole. It is unlikely that the small increases in habitat removal for Grey-headed Flying-fox from the 80% detailed design would result in a change to the level of significance of potential impacts for this species. As such, the changes are considered to be generally in accordance with the Conditions of Approval.

As the habitat removal for Grey-headed Flying-fox would increase over that outlined in the AR Submissions Report, TfNSW may need to provide a letter updating the DAWE. However, as M12 Motorway – West Package is part of a larger project, the impact should be treated in conjunction with impacts from the other sections of the M12 to determine whether the approved clearing thresholds will be exceeded as a whole.

On a precautionary basis, once additional information is gathered to enable whether there would be an actual increase in clearing for these species across the entire M12, further correspondence should be entered into with DAWE if impacts will be over those prescribed approval limits.

4.3.1 COMMONWEALTH MINISTER'S CONDITIONS OF APPROVAL

Table 4-3 below addresses those conditions of approval relevant to the proposed change in the context of the Commonwealth Approved Project.

Table 4-3: Consistency against relevant Commonwealth Minister's conditions of approval for the project

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
1	The approval holder must not clear in the locations identified in condition E8 of the State Infrastructure approval, until it has completed the additional surveys and provided the results to the Department as required by condition E8 of the State Infrastructure approval.	NSW DPIE CoA E8 relates to additional surveys of <i>Pimelea spicata</i> (Spiked Rice-flower), which is not applicable to the M12 Motorway – West Package.	Yes
3	The approval holder must not clear protected matters outside the final construction footprint.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
4	<p>To minimise the impacts of the action on protected matters the approval holder must not clear more than the following specified amounts, or another specified amount determined in consultation with the Department in accordance with condition E4 of the State Infrastructure approval within the final construction footprint:</p> <ul style="list-style-type: none"> a. 42.89 hectares of known Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest threatened ecological community b. 0.44 hectares of known Western Sydney Dry Rainforest and Moist Woodland on Shale threatened ecological community c. 100 known <i>Pultenaea parviflora</i> individuals; d. The number of <i>Pimelea Spicata</i> individuals identified in the additional surveys required by condition E8 of the State Infrastructure approval e. 62.71 hectares of known foraging habitat for Grey-headed Flying Fox (<i>Pteropus poliocephalus</i>); f. 80.21 hectares of known foraging habitat for Swift Parrot (<i>Lathamus discolor</i>). 	<ul style="list-style-type: none"> a. This TEC is not present within the M12 Motorway - West package b. This TEC is not present within the M12 Motorway - West package c. This TEC is not present within the M12 Motorway - West package d. This TEC is not present within the M12 Motorway - West package e. The M12 Motorway - West package 80% detailed design would result in an increase of 0.29 Hectares of known foraging habitat for Grey-headed Flying Fox f. The M12 Motorway - West package 80% detailed design would result in a decrease of 1.84 hectares of known foraging habitat for Swift Parrot (<i>Lathamus discolor</i>). <p>Condition E4 allows TfNSW to review and update the ecosystem and species credit requirements to reflect the final construction footprint and resulting extent and type of plant community types to be cleared and the extent of threatened species habitat impacted by the construction within six months of determining the final construction footprint. The revised impacts are therefore in accordance with the approval and a modification would not be required.</p>	Yes

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
5	<p>For the protection of protected matters the approval holder must:</p> <ul style="list-style-type: none"> a. Implement conditions A24 of Part A, Schedule 2 and C4, C5, C8, C9 and C10 of Part C, Schedule 2 of the State Infrastructure approval, where they relate to monitoring, managing, avoiding, mitigating, recording, or reporting on, impacts to protected matters b. Implement biodiversity conditions E2 to E10 of Part E, Schedule 2 of the State Infrastructure approval where they relate to monitoring, managing, avoiding, mitigating, offsetting, recording, or reporting on, impacts to protected matters c. Notify the Department in writing within 2 business days of formally proposing any change to the conditions of the State Infrastructure approval for which conditions 5a or 5b apply, and within 5 business days of becoming aware of the NSW Government proposing a change d. Notify the Department in writing of any change to the State Infrastructure approval for which conditions 5a and 5b apply, within 5 business days of a change to the State Infrastructure approval being finalised. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

4.3.2 EPBC APPROVAL CONSISTENCY QUESTIONS

Table 4-4 presents a set of questions that assist TfNSW to determine whether the proposed change can be considered consistent with an EPBC Approval.

Table 4-4: EPBC Approval consistency questions

CONSISTENCY QUESTION	DISCUSSION	YES OR NO?
1 Would any conditions of the EPBC Approval need to be varied in light of the change?	<p>Commonwealth CoA 4 - The clearing of native vegetation must be minimised with the objective of reducing impacts to threatened ecological communities and threatened species habitat may need to be varied.</p> <p>As the M12 Motorway - West Package is part of the larger M12 project, it may be that the increased proposed clearing of Matters of National Environmental Significance (MNES) habitat may be offset by a decrease in other parts of the project.</p>	No

CONSISTENCY QUESTION	DISCUSSION	YES OR NO?
	Where there is an increase in clearing limits for the project as a whole, TfNSW can submit revised clearing limits with a finalised construction footprint to DAWE in accordance with Commonwealth CoA 2 and 4.	
2 Would an approved action management plan required by a condition of approval need to be varied as a result of the proposed change?	Not applicable	N/A
3 Would the proposed change constitute a 'new project' under the EPBC Act?	Importantly, there would not be a change to the level of significance of potential impacts and/or any new significant impacts. The impacts will increase but to a minor degree. It is considered unlikely that the changes are such that they would constitute a new project under the EPBC Act.	No

4.4 RECOMMENDATIONS

4.4.1 STATE

It appears that impacts will increase over and above those approved under the AR Submissions Report, but to a minor degree. Condition E4 allows TfNSW to review and update the ecosystem and species credit requirements to reflect the final construction footprint and resulting extent and type of plant community types to be cleared and the extent of threatened species habitat impacted by the construction within six months of determining the final construction footprint. The revised impacts are therefore in accordance with the approval and a modification would not be required.

Further avoidance to the entities that have an increase in clearing will be considered, but it is not known whether this is achievable as it is assumed that maximum avoidance has already been applied to the 80% detailed design.

4.4.2 COMMONWEALTH

The clearing limits for each PCT and species habitat within the final construction footprint are prescribed. If these limits are to be exceeded (as a whole or individually) then DAWE needs to be notified prior to any works occurring. TfNSW must not clear more than the specified amounts, or another specified amount determined in consultation with DAWE in accordance with Condition E4 of the State infrastructure approval within the final construction footprint.

As the M12 Motorway - West Package is part of the larger M12 project, it may be that the increased proposed clearing of Matters of National Environmental Significance (MNES) habitat may be offset by a decrease in other parts of the project. This should be checked as a priority. Once this is understood, a decision on whether further correspondence is needed with DAWE can be made.

Further avoidance to the MNES entities that have an increase in clearing could be considered, but it is not known whether this is achievable by the Construction contractor as it is assumed that maximum avoidance has already been applied to the 80% detailed design.



APPENDIX A REVISED VEGETATION MAPPING FOR M12 WEST



M12 Motorway Package 1 West
Consistency Assessment

Figure 1
Sheet 1

Revised vegetation mapping for M12 West

Legend

- Proposed project 80% detailed design construction footprint (July, 2021)
- Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)
- Cadastral
- Waterways

0 25 50
Meters

Coordinate system: GDA2020 MGA Zone 56





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Legend

-  Proposed project 80% detailed design construction footprint (July, 2021)
-  Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)

Vegetation Zones (80% detailed design)

-  849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN528)
-  850 - Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (derived grassland form) (HN529)
-  1800 - Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley (HN674)

Vegetation Zones (Amendment Report Submissions Report)

-  Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion
-  Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion
-  Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (derived grassland form)
-  Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley
-  Cadastre
-  Waterways

0 25 50
Meters

Coordinate system: GDA2020 MGA Zone 56

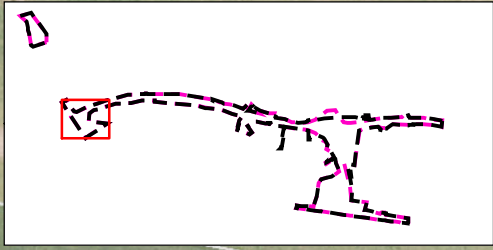
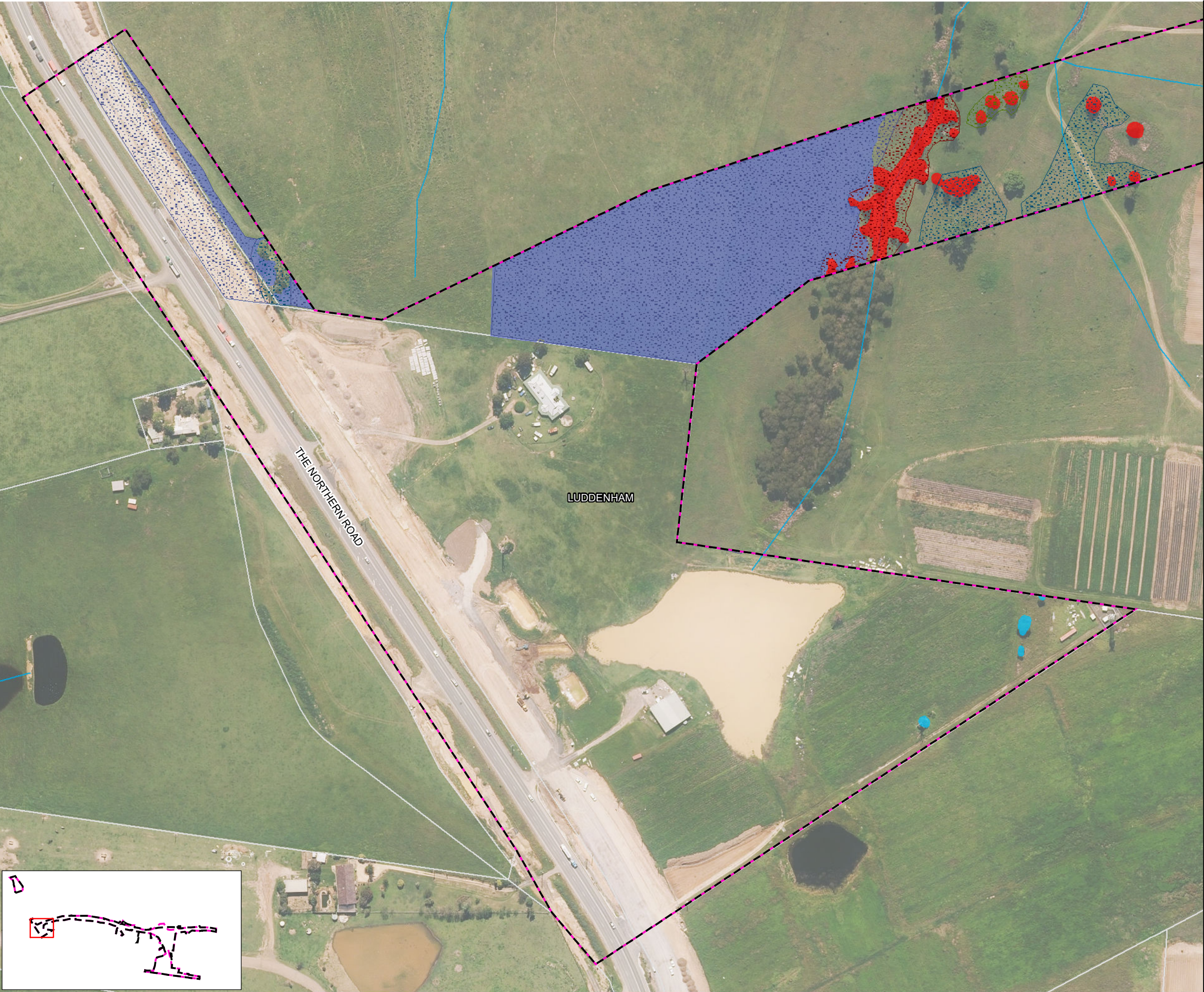


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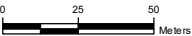
- Proposed project 80% detailed design construction footprint (July, 2021)
- Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)
- Exclusion Zone

Vegetation Zones (80% detailed design)

- 849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN528)
- 850 - Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (derived grassland form) (HN529)

Vegetation Zones (Amendment Report Submissions Report)

- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion
- Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (derived grassland form)
- Cadastral
- Waterways



Coordinate system: GDA2020 MGA Zone 56

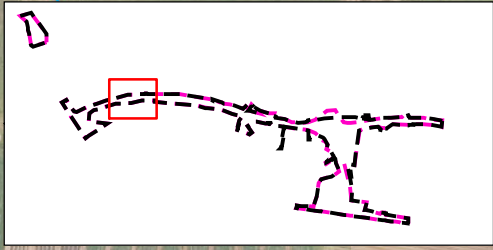
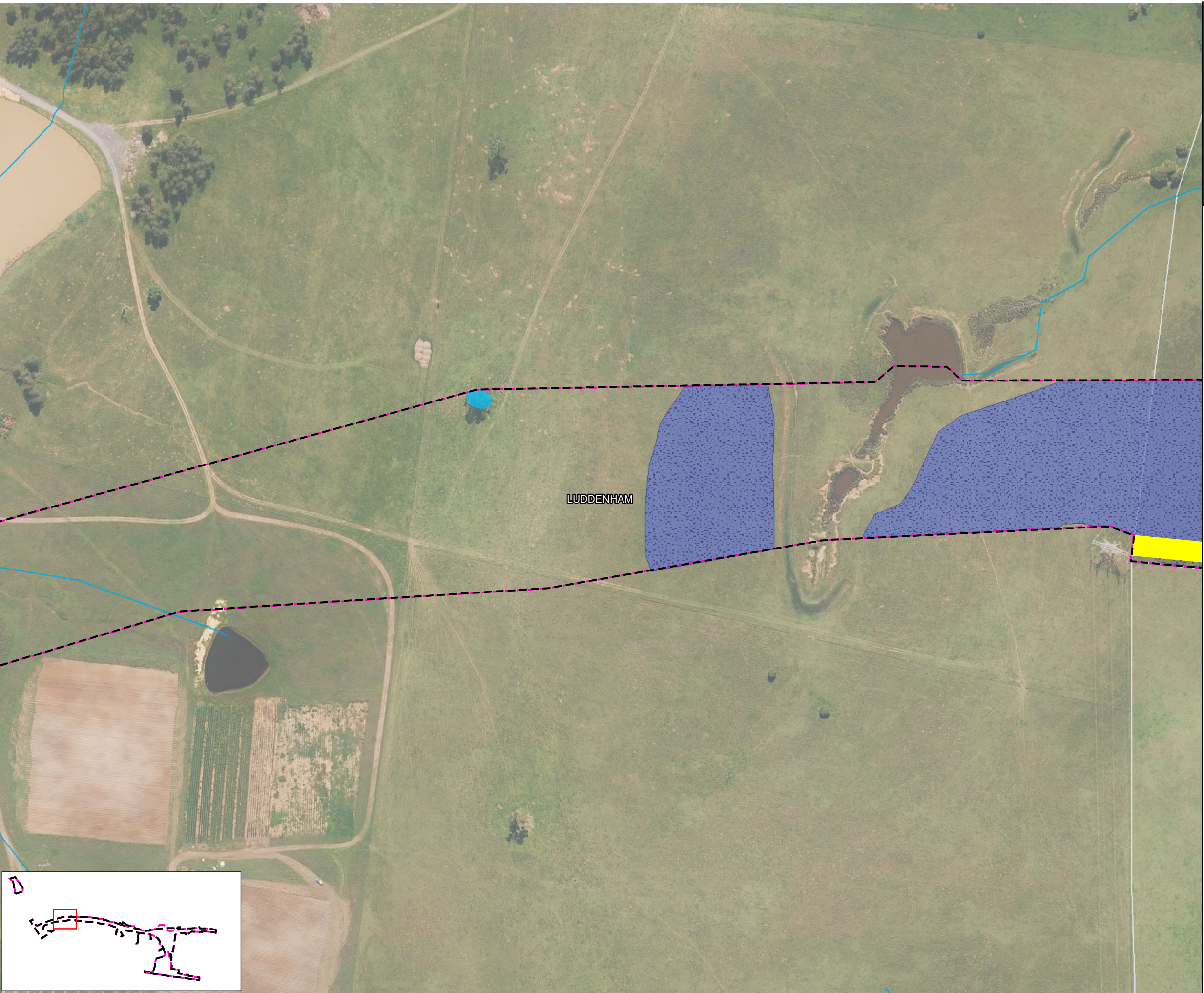


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Legend

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- Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)
- Exclusion Zone

Vegetation Zones (80% detailed design)

- 850 - Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (derived grassland form) (HN529)

Vegetation Zones (Amendment Report Submissions Report)

- Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (derived grassland form)
- Cadastral
- Waterways

LUDDENHAM

0 25 50
Meters

Coordinate system: GDA2020 MGA Zone 56

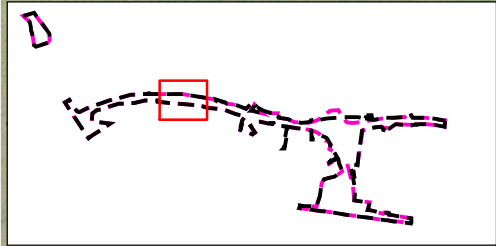


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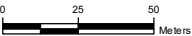
- Proposed project 80% detailed design construction footprint (July, 2021)
- Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)

Vegetation Zones (80% detailed design)

- 835 - Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (HN524)
- 850 - Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (derived grassland form) (HN529)

Vegetation Zones (Amendment Report Submissions Report)

- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion
- Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (derived grassland form)
- Cadastre
- Waterways

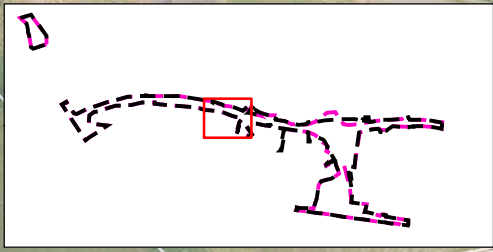


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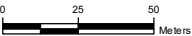
- Proposed project 80% detailed design construction footprint (July, 2021)
- Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)
- Exclusion Zone

Vegetation Zones (80% detailed design)

- 835 - Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (HN524)
- 1800 - Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley (HN674)

Vegetation Zones (Amendment Report Submissions Report)

- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion
- Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley
- Cadastral
- Waterways



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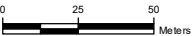
M12 Motorway Package 1 West
Consistency Assessment

Figure 1
Sheet 7

Revised vegetation mapping for M12 West

Legend

- Proposed project 80% detailed design construction footprint (July, 2021)
- Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)
- Cadastre
- Waterways



Coordinate system: GDA2020 MGA Zone 56





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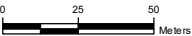
-  Proposed project 80% detailed design construction footprint (July, 2021)
-  Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)

Vegetation Zones (80% detailed design)

-  835 - Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (HN524)
-  849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN528)

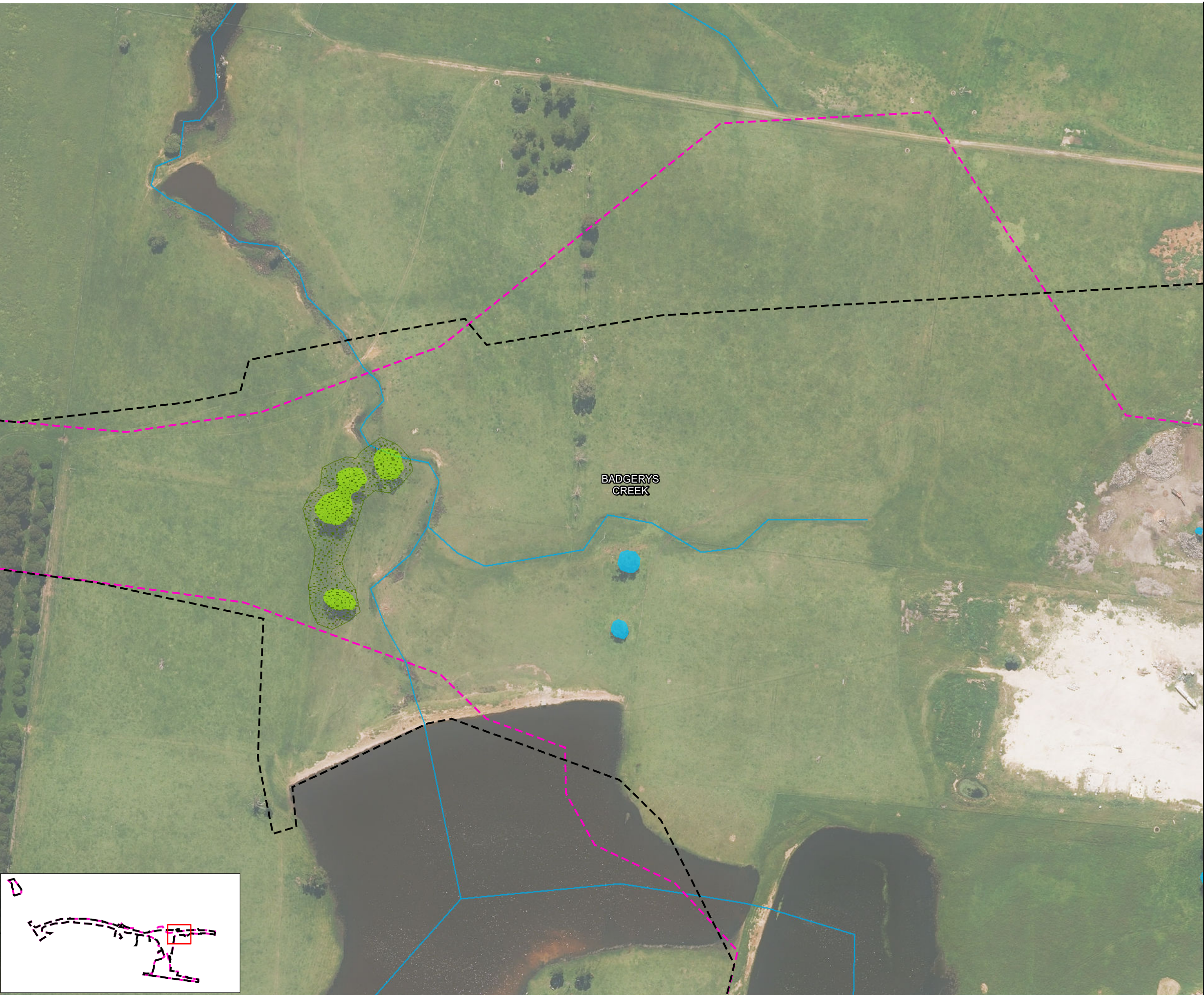
Vegetation Zones (Amendment Report Submissions Report)

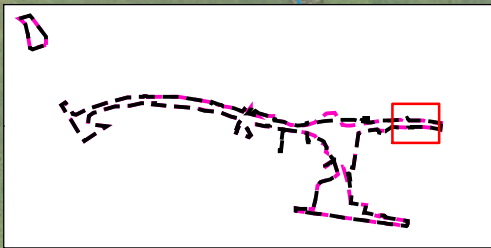
-  Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion
-  Cadastre
-  Waterways



Coordinate system: GDA2020 MGA Zone 56
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M12 Motorway Package 1 West
Consistency Assessment

Figure 1
Sheet 9

Revised vegetation mapping for M12 West

Legend

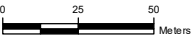
- Proposed project 80% detailed design construction footprint (July, 2021)
- Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)

Vegetation Zones (80% detailed design)

- 849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN528)
- 1800 - Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley (HN674)

Vegetation Zones (Amendment Report Submissions Report)

- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion
- Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley
- Cadastre
- Waterways



Coordinate system: GDA2020 MGA Zone 56

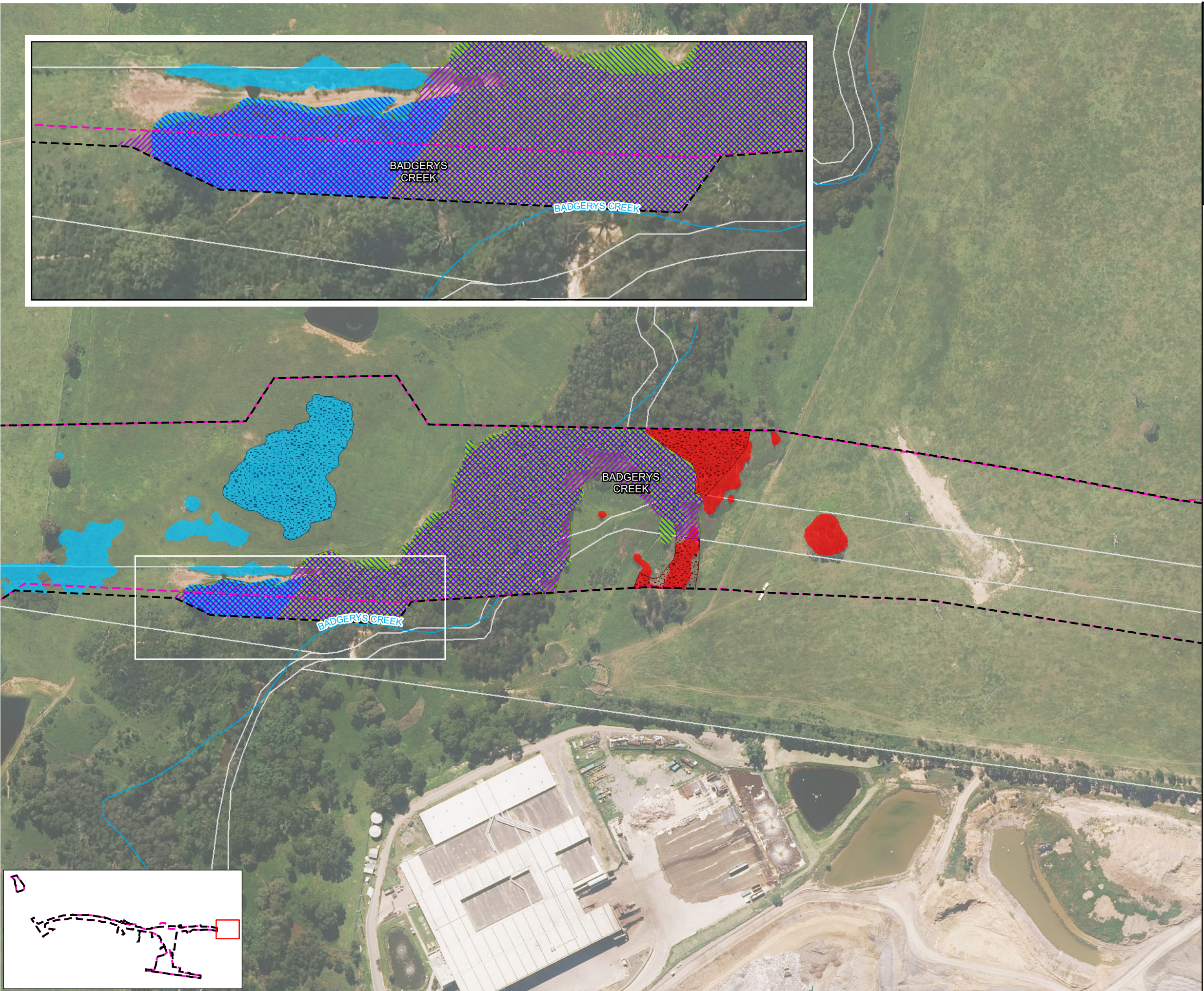


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Legend

- Proposed project 80% detailed design construction footprint (July, 2021)
- Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)
- Cumberland Plain Land Snail (80% detailed design)
- Cumberland Plain Land Snail (Amendment Report Submissions Report)

Vegetation Zones (80% detailed design)

- 835 - Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (HN524)
- 849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN528)
- 1800 - Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley (HN674)

Vegetation Zones (Amendment Report Submissions Report)

- Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion
- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion
- Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley
- Cadastre
- Waterways

0 25 50
Meters

Coordinate system: GDA2020 MGA Zone 56



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M12 Motorway Package 1 West
Consistency Assessment

Figure 1
Sheet 11

Revised vegetation mapping for M12 West

Legend

- Proposed project 80% detailed design construction footprint (July, 2021)
- Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)
- Cadastre
- Waterways



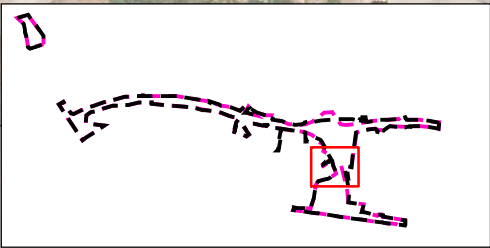
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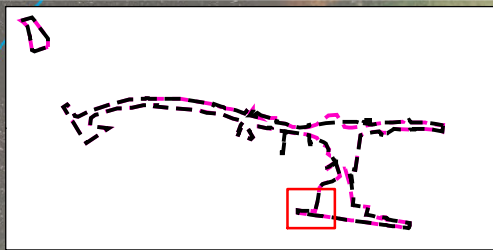
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M12 Motorway Package 1 West
Consistency Assessment

Figure 1
Sheet 12

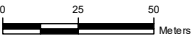
Revised vegetation mapping for M12 West

Legend

- Proposed project 80% detailed design construction footprint (July, 2021)
- Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)

Vegetation Zones (80% detailed design)



- 849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN528)
- 850 - Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (HN529)
- Cadastral
- Waterways





Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3
1:2,500 Date: 28/07/2021

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


Legend

-  Proposed project 80% detailed design construction footprint (July, 2021)
-  Approved M12 West Amendment Report Submissions Report construction footprint (March, 2021)

Vegetation Zones (80% detailed design)

-  849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN528)
-  850 - Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (HN529)

Vegetation Zones (Amendment Report Submissions Report)

-  Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion
-  Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion
-  Cadastre
-  Waterways

0 25 50
Meters

Coordinate system: GDA2020 MGA Zone 56

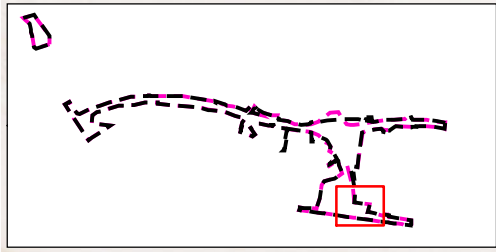


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

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



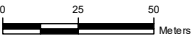
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-  849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (HN528)
-  850 - Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (HN529)

-  Cadastre
-  Waterways



Coordinate system: GDA2020 MGA Zone 56

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

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Vegetation Zones (Amendment Report Submissions Report)

-  Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion
-  Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley
-  Cadastre
-  Waterways

0 25 50
Meters

Coordinate system: GDA2020 MGA Zone 56

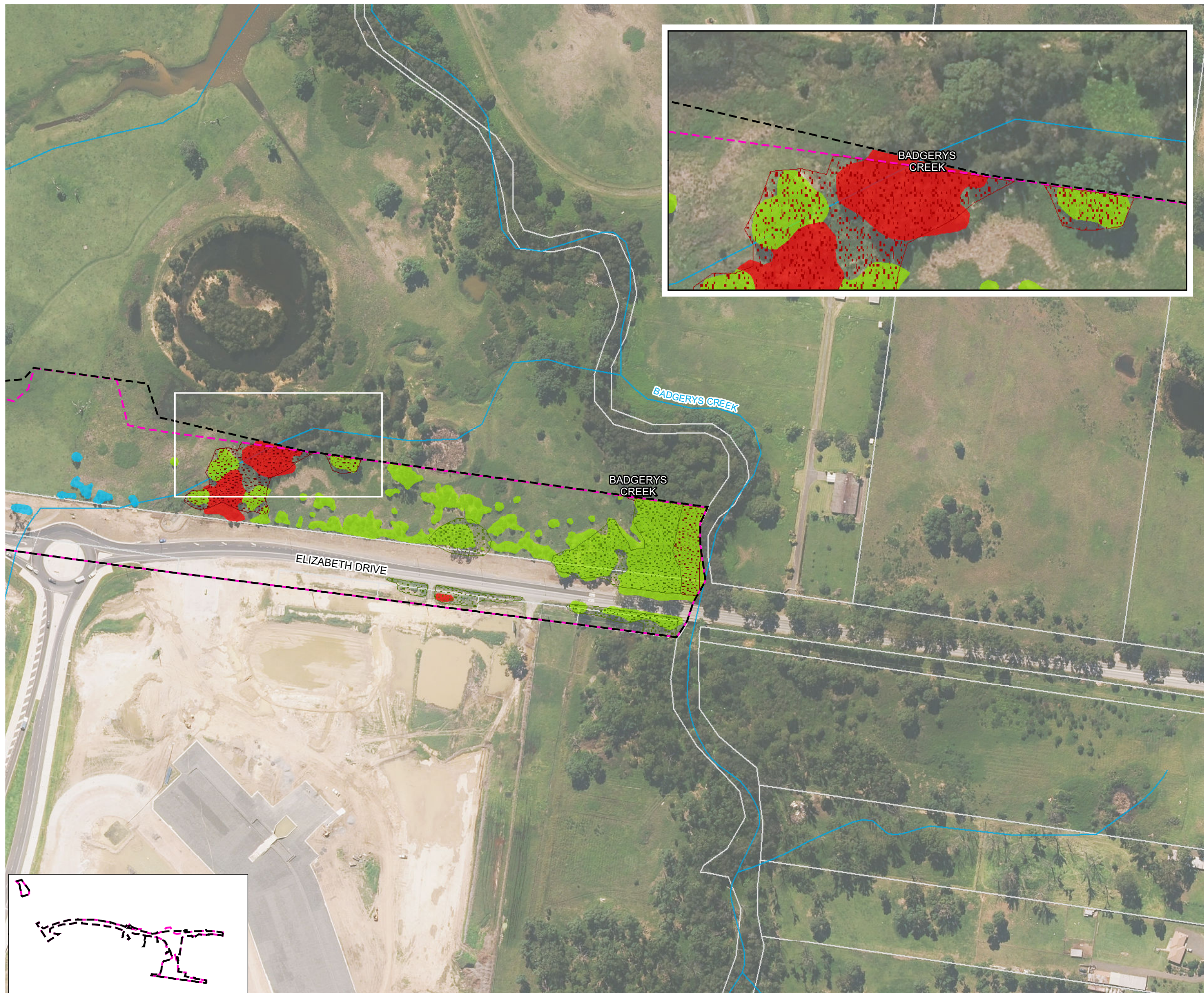


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Appendix B

Traffic and transport consistency assessment memo

MEMO

TO: Transport for NSW

FROM: Sam Black, Technical Executive, Planning and Mobility

SUBJECT: Consistency Assessment – Traffic and transport memo for M12 Motorway - West Package Detailed Design

OUR REF: M12WDD-WSP-ALL-EN-MEM-000016.docx

DATE: 3 September 2021

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

Transport for NSW (TfNSW) are proposing to construct and operate the M12 Motorway project (the project) to provide direct access between the Western Sydney International Airport at Badgerys Creek and Sydney's motorway network. The M12 Motorway would run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for a distance of about 16 kilometres and is expected to be opened to traffic prior to opening of the Western Sydney International Airport.

This Consistency Assessment is for the M12 Motorway – West Package, between The Northern Road, Luddenham and approximately 250 metres east of Badgerys Creek. It is proposed to be a four-lane dual-carriageway motorway, including a new grade separated interchange with the Airport Access Road to provide connection to the Western Sydney International Airport. An overview of the M12 Motorway - West Package is illustrated in Figure 1-1.

Detailed design for the M12 Motorway - West Package (shown in Figure 1-1) is being completed and has resulted in changes requiring further environmental assessment. During design development of detail design changes requiring further environmental assessment have been identified. The Consistency Assessment is based on the 80% detail design submission.

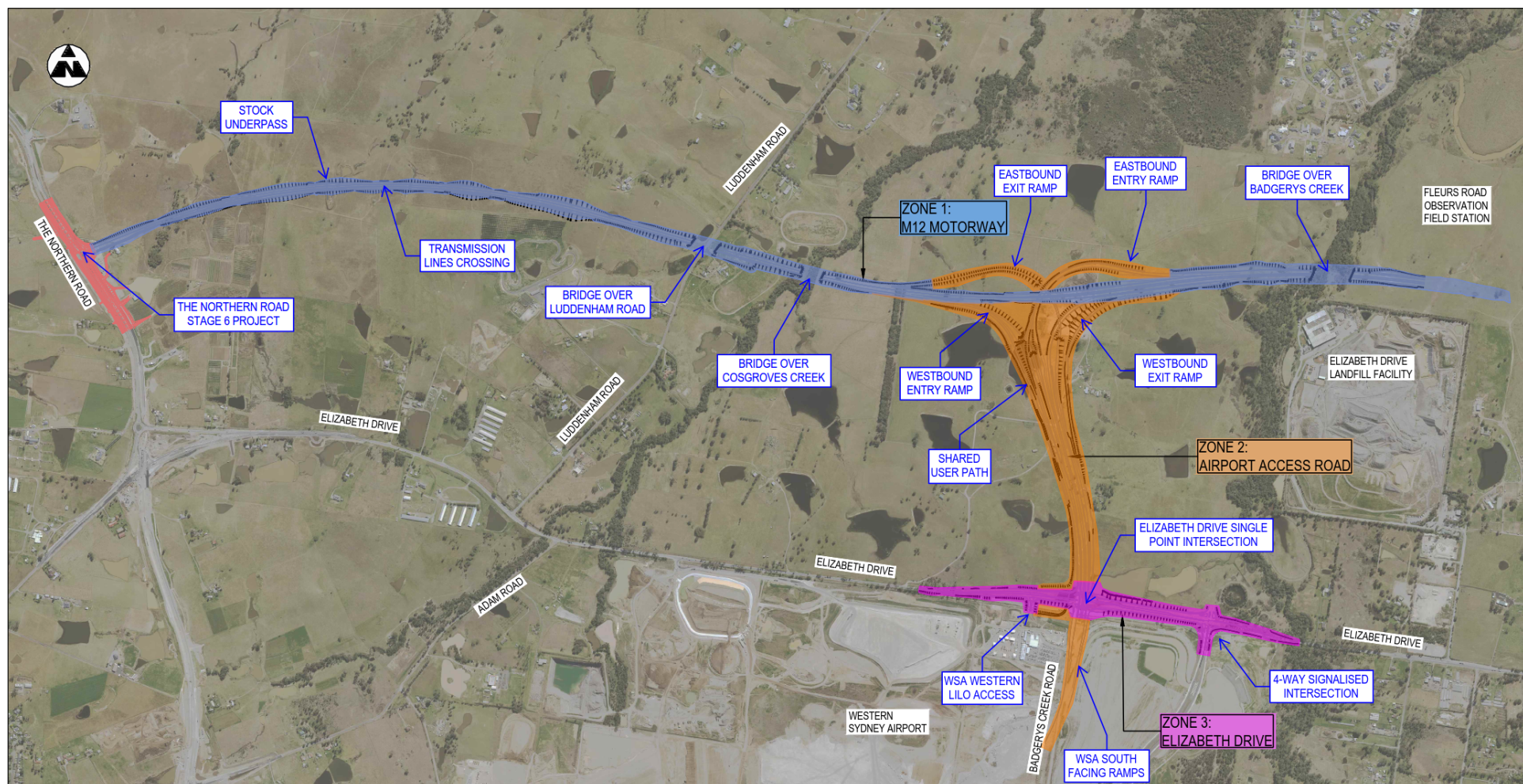


Figure 1-1 M12 Motorway - West Package overview – key features

1.2 SCOPE OF THIS REPORT

In the event of proposed changes to the M12 Motorway Approved Project, a review for consistency is required by the proponent for the construction and operational phases of the M12 Motorway – West Package. The Consistency Assessment will determine if the proposed changes are generally in accordance with the impacts of the approved project and satisfy the requirements of the Planning Approval dated 23 April 2021 and Commonwealth Approval dated 3 June 2021.

This memo provides a review of the proposed changes in terms of impacts to traffic and transport and identifies if they are consistent with the Approved Project or if additional or reduced impacts are predicted.

1.3 DESCRIPTION OF PROPOSED CHANGE

The project as described in the Division 5.2 Approval and EPBC Approval dated 3 June 2021 is outlined in Section 1.2 of the Consistency Assessment and a detailed description is provided in Chapter 5 of the Environmental Impact Assessment (EIS) (Roads and Maritime, 2019). The amended project is detailed in Chapter 2 of the Amendment Report (Transport for NSW, 2020a) and Chapter 1 of the Amendment Report Submissions Report (AR Submissions Report) (Transport for NSW, 2020).

The proposed changes to M12 Motorway - West Package include the following and shown in Figure 2-1 of the Consistency Assessment:

- Airport interchange revised to a free flow directional interchange
- Elizabeth Drive and Airport Access Road intersection revised to a single point interchange, comprising:
 - Two separate bridges over the Airport Access Road
 - New entry and exit ramps for access to the Airport Access Road and Elizabeth Drive
- All ramps on the Airport Access Road between the Airport Interchange and Elizabeth Drive realigned
- Intersection to the west of the Airport Access Road and Elizabeth Drive replaced with a left in, left out arrangement from the Western Sydney International Airport and the northern stub road removed
- Intersection to the east of the Airport Access Road and Elizabeth Drive refined to remove the northern stub road
- Elizabeth Drive widened to the north by about 10 metres at the single point interchange, east of the Airport Access Road
- Extension of the Airport Access Road and southbound ramp to tie into the Western Sydney International Airport internal road network (area within Airport land to be assessed and approved in the Airport Approval)
- Reconfiguring BR02 and BR05 at Cosgroves Creek and Badgerys Creek respectively
- Extending and refining existing utilities, including low voltage mains and additional water main crossings
- Modification to one operational water quality basin and four additional construction water quality basins
- Refinements to drainage and water quality infrastructure across the M12 West project, including culverts, open channels and cross drainage
- Additional construction access road to the north of BR20
- Amendments to the private property access on Elizabeth Drive west of the Airport Access Road
- Installation of a Variable Messaging Sign (VMS) on the southbound carriageway of The Northern Road Stage 6.

1.4 PURPOSE OF TASK

In the event of proposed changes to the M12 Motorway Approved Project, a review for consistency is required by the proponent. The Consistency Assessment will determine if the proposed changes are generally in accordance with the impacts of the approved project and satisfy the requirements of the Planning Approval dated 23 April 2021 and Commonwealth Approval dated 3 June 2021.

A traffic and transport assessment of the proposed changes was carried out to review the proposed changes and identify if they are consistent with the Approved Project and if additional or reduced impacts are predicted. This assessment has specifically reviewed the following approval documents for traffic and transport:

- Roads and Maritime Services (2019, October) M12 Motorway Environmental Impact Statement Appendix F Transport and Traffic Assessment Report
- NSW Government (2020, October) M12 Motorway Amendment Report (Section 6.2 and Appendix B Transport and traffic updated technical report).

This traffic and transport assessment will provide additional information on impacts to receivers associated with the detailed design of the M12 Motorway - West Package. The principal changes which would affect traffic and transport are changes to:

- The Airport Access Road / M12 Interchange revised from a trumpet interchange to a free flow directional interchange
- Connection of Airport Access Road to Elizabeth Drive with a single point interchange
- Change to intersections on Elizabeth Drive.

The traffic and transport operational impacts of the 80% detailed design have been compared against “Option 2” as described in the Amendment Report dated October 2020. Option 2 is described as: at the motorway to motorway “Interchange with the M7, the Interchange provides entry and exit ramps between the M12 Motorway and the M7 Motorway; in addition, it would maintain the existing connection of the M7 Motorway to Elizabeth Drive with new entry and exit ramps. The interchange also provides entry and exit ramps between the M12 Motorway and Elizabeth Drive, Cecil Road and Wallgrove Road.” The AR Submissions Report confirmed that “Option 2” had secured funding and would progress as the preferred option for the project.

2. ASSESSMENT METHODOLOGY

The objective of this assessment is to investigate the impact of changes in the M12 Motorway - West Package Project Area. The EIS was undertaken for the entire M12 Motorway and this presents some difficulties in isolating impacts of the M12 Motorway - West Package, as well as difficulties in comparing certain metrics. Assumptions have been made to develop comparable metrics where deemed feasible. Other aspects have been assessed using professional judgement on a qualitative basis only.

The following areas have been assessed in this traffic and transport assessment:

- Construction traffic impacts including haulage routes and heavy vehicle movements, and worksite and construction ancillary facility traffic generation
- Traffic volumes and operational traffic impacts
- Change to local roads and access
- Public transport – impacts to infrastructure and operations
- Freight – impact to operations
- Active transport – impacts to infrastructure, operations, and safety.

2.1 ROAD SAFETY – IMPACT TO SAFETY RISK, AND CRASH PERFORMANCE. TRAFFIC MODELLING

The operational traffic assessment has been undertaken using an AIMSUN microsimulation model. The assessment considers the future years 2026 and 2036, with the focus on AM and PM peak periods.

The traffic models used for the M12 Motorway - West Package detailed design and the EIS (and subsequent Amendment Report) are different models. The models primarily differ in size and time period.

The traffic model used for the EIS traffic and transport assessment was an AIMSUN hybrid model covering the AM peak 6-10am and PM peak 3-7pm. This model is referred to in the EIS as the Western Sydney Airport Growth Area (WSAGA) mesoscopic traffic model. The modelled area is specified as that shown as the “wider study area” in Figure 2-1.

In addition, some of the metrics reported in the EIS are strategic in nature and have been obtained from the Sydney Motorway Project Model (SMPM) which is a Sydney-wide strategic model developed in EMME.

The M12 Motorway - West Package model used in this assessment was an AIMSUN model provided by TfNSW for the development of the detailed design. The model area is shown in Figure 2-2 and replicates the “core study area” shown in Figure 2-1.

When reviewing the network assumptions across the two models the following differences are noted within the modelled project area. Section 3.2 of Appendix B of the Amendment Report states that the following road upgrades are included in the 2036 modelling:

- Upgrade of the M7 Motorway to three lanes in each direction
- Realignment and upgrade of the Luddenham Road / Adams Road intersection
- Realignment of the Mamre Road to Elizabeth Drive/Devonshire Road intersection
- Upgrade of Elizabeth Drive to four lanes between The Northern Road and Mamre Road.

Only the realignment and upgrade of the Luddenham Road / Adams Road intersection has been included in the project case modelling. The impact of not incorporating the full scope of the Elizabeth Drive upgrade would result in traffic shifting from the M12 to Elizabeth Drive for some trips. Therefore the results below may underestimate traffic volumes on Elizabeth Drive and overestimate traffic volumes on the M12 when compared to a scenario that includes these network upgrades. This should be considered when reviewing these results.

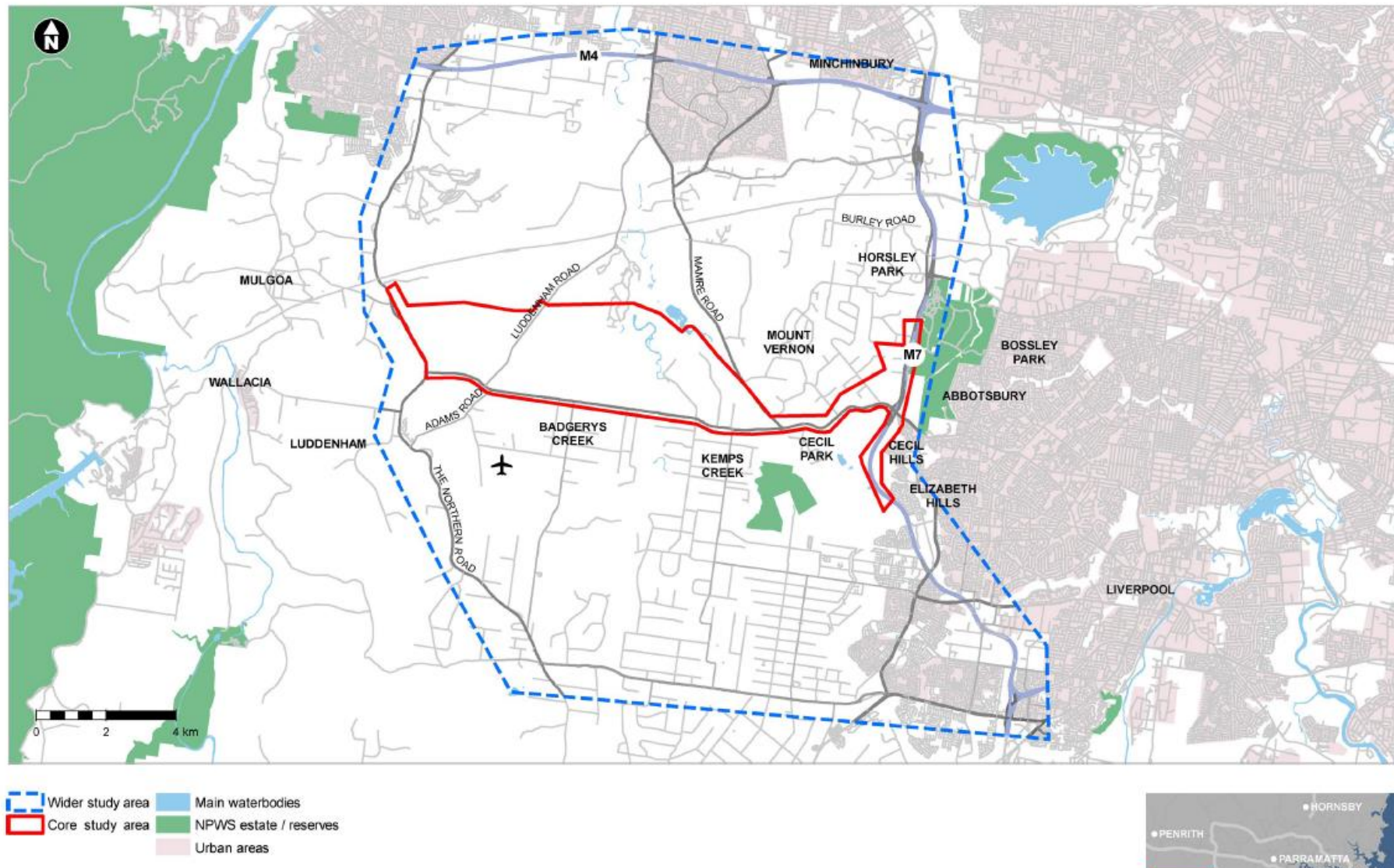


Figure 2-1 EIS traffic and transport assessment model area



Figure 2-2 M12 Motorway - West Package project model area

The Amendment Report presented several metrics to explain the project impact to traffic in the area. As the models used cover different areas, network assumptions and time periods, not all of these metrics are directly comparable to the outputs of the M12 Motorway – West Package project model, and in this case a quantitative assessment has been made. These metrics and the assessment methodology are summarised in Table 2-1.

Table 2-1 *Traffic assessment metrics*

Metric and Amendment Report Reference	Metric comparison	Assessment method
Screenline volumes: Tables 6-18 to 6-21 (Section 6.2.2 of Appendix B page 91 to 102)	These are comparable however the timeframes differ between the Amendment Report and the M12 Motorway – West Package project model as follows: — The Amendment Report reports 7-8am, 8-9am — The current model reports 7.30-8.30am only — The Amendment Report reports 4-5pm and 5-6pm — The current model reports 4.30-5.30pm only.	The volumes from the Amendment Report have been interpolated to the time period assessed in the M12 Motorway – West Package project model.
Intersection performance: Table 6-24 and 6-25 (Section 6.2.2 of Appendix B page 108 to 112)	These are comparable, although outputs are from different models	N/A
Travel times: Figures 6-13 to 6-20 (Section 6.2.2 of Appendix B page 114 to 117)	These are comparable, although outputs are from different models	N/A
Network statistics: Table 6-22 and 6-23 (Section 6.2.2 of Appendix B page 105 to 106)	Due to the differing size of the models these metrics cannot be directly compared.	These metrics are strategic in nature. A qualitative assessment has been undertaken to determine the likelihood of significant change due to the project.

3. ASSESSMENT OF POTENTIAL IMPACTS

A summary of the traffic and transport impacts as a result of the proposed changes compared to the outcomes of the project as described in the Amendment Report Option 2 is presented below.

3.1 CONSTRUCTION TRAFFIC IMPACTS

Section 7.2.5 of the EIS identified a number of potential transport and traffic impacts that may occur during construction of the project. The following construction impacts associated with the amended project are considered to be consistent with the project as described in the EIS and Amendment Report:

- Work site and construction ancillary facility access assumptions
- Road closures, detours and other temporary traffic management
- Construction worker parking and impacts on on-street parking
- Impacts on public transport
- Impacts on pedestrians and cyclists
- Other impacts of construction.

These impacts are considered consistent as there is either no change from the impacts as described in the EIS and Amendment Report or the change is minor and can be managed in accordance with existing management measures outlined in the AR Submissions Report.

3.1.1 HAULAGE ROUTES AND HEAVY VEHICLE MOVEMENTS

Haulage routes described in Section 4.2.6 of the Amendment Report and Section 5.24.17 of the EIS are consistent with the 80% detailed design. The total number of heavy vehicles however has increased since the Amendment Report. The workzone and location remain unchanged from the Amendment Report (Table 4-7 of the Amendment Report).

Predicted truck movements outside the construction footprint are described in Table 3-1. The construction of the 80% detailed design would result in a 39% increase of heavy vehicles within the M12 Motorway – West Package project area.

Table 3-1 Haulage routes and predicted truck movements

Haulage routes	Amendment Report		80% detailed design		% change
	Site access via	Approximate total truck movements	Site access via	Approximate total truck movements	
M7 Motorway, Elizabeth Drive and The Northern Road	AF 1 (and AF 10)	16,671	AF1/10	3,533	-79%
M7 Motorway and Elizabeth Drive	AF 2 (and AF 3)	30,124	AF2/3	54,863	82%
M7 Motorway, Elizabeth Drive, The Northern Road, and Luddenham Road	AF11	18,566	AF11	32,365	74%
Total		65,361	Total	90,761	39%

3.1.2 WORKSITE AND CONSTRUCTION ANCILLARY FACILITY TRAFFIC GENERATION

The forecast light and heavy vehicle generation from each of the ancillary facilities for 80% detailed design compared to the Amendment Report is provided in Table 3-2

Table 3-2 Construction traffic generation for the amended project (inbound and outbound average)

Site	Report	Average daily heavy vehicle generation	Morning peak light vehicle generation	Morning peak heavy vehicle generation	Evening peak light vehicle generation	Evening peak heavy vehicle generation
AF1/10	80% detail design	80	100 (at peak construction)	20	100 (at peak construction)	20
	Amendment Report	200	93	20	93	20
AF2/3	80% detail design	220	100 (at peak construction)	16	100 (at peak construction)	16
	Amendment Report	180	93	16	93	16
AF11	80% detail design	220	100 (at peak construction)	16	100 (at peak construction)	16

Site	Report	Average daily heavy vehicle generation	Morning peak light vehicle generation	Morning peak heavy vehicle generation	Evening peak light vehicle generation	Evening peak heavy vehicle generation
	Amendment Report	160	93	16	93	16
80% detail design total		520	300	52	300	52
Amendment Report total		540	279	52	279	52

Comparing construction traffic generation in Table 6-10 of the Amendment Report the assessment identifies the following changes in vehicles generation for three ancillary facilities within the M12 Motorway – West Package for the 80% detailed design:

- Daily heavy vehicle generation – decrease by 20 vehicles (decrease of four percent)
- Morning and evening peak light vehicle generation – increase of 21 vehicles (increase of seven percent)
- Morning and evening peak heavy vehicle generation – same as Amendment Report.

Changes in heavy vehicle numbers are a result of the increase in required imported earthworks materials for the M12 Motorway - West Package and utilising AF1/10, AF2/3 and AF11 for these materials.

The 80% detailed design assumes that about 100 light vehicles will arrive and leave each ancillary facility each day during construction. Majority of these movements would be during the morning and evening peak.

Heavy vehicle movements into site AF2/3 generally account for the imported fill material required for the new embankments along Elizabeth Drive, including pavement and retaining wall materials. Where these numbers spike, it is a result of concurrent import activities for Airport Access Road including pavement, concrete and retaining wall/controlled fill materials.

Heavy vehicle movements for AF11 are generally the heavy vehicle haulage crossing Luddenham Road between the M12 Motorway Mainline works on either side of Luddenham Road. Where these values exceed 180-200 movements per day, it is a result of concurrent fill material imports for the project for pavement, concrete or controlled fill materials.

Heavy vehicle average daily rates are not expected over the full duration of the works, but rather for certain periods where haulage activities or major material imports are required.

3.1.3 INTERSECTION PERFORMANCE

Even though the total construction traffic has increased, the peak volumes have not changed substantially, therefore there is minimal change from the Amendment Report for peak travel times and LoS.

3.2 OPERATIONAL TRAFFIC PERFORMANCE

3.2.1 SCREENLINE VOLUMES

Screenline traffic volumes were presented in the Amendment Report to demonstrate the total traffic volume on each link within the screenline. Figure 3-1 illustrates the screenline locations within the M12 Motorway – West Package project model.

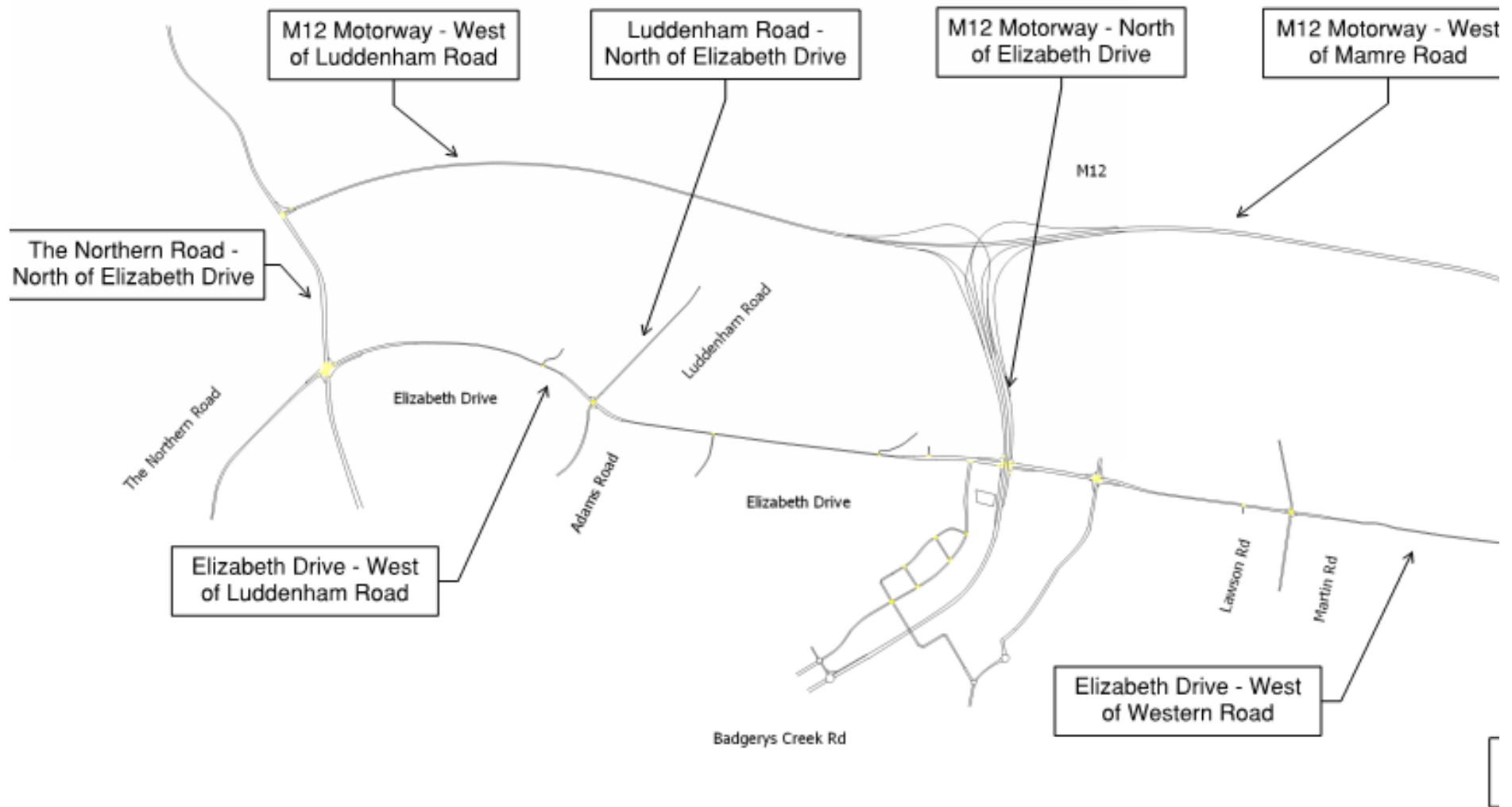


Figure 3-1 Assessed screenline locations within the M12 Motorway – West Package project model

Table 3-3 Morning peak screen line volume summary (east-west screen line) - 2026

Road	Location	Number of vehicles						
		2026 'do minimum'			2026 Amendment Report 'Option 2'			2026 80% detailed design
		7am to 8am	8am to 9am	7.30am to 8.30 am*	7am to 8am	8am to 9am	7.30am to 8.30 am*	7.30am to 8.30 am
East-west screen line (southbound)								
M12 Motorway	North of Elizabeth Drive	N/A	N/A	N/A	773	778	776	808
Luddenham Road	North of Elizabeth Drive	244	339	292	397	468	433	559
The Northern Road	North of Elizabeth Drive	1200	1324	1262	748	725	737	767
Total		1444	1663	1554	1918	1971	1945	2133
East-west screen line (northbound)								
M12 Motorway	North of Elizabeth Drive	N/A	N/A	N/A	460	468	464	963
Luddenham Road	North of Elizabeth Drive	800	1334	1067	660	826	743	439
The Northern Road	North of Elizabeth Drive	1133	1262	1198	1083	1417	1250	1055
Total		1933	2596	2265	2203	2711	2457	2456

Comparison Source: Table 6-18 Amendment Report - Appendix B Traffic and Transport Oct 2020

*Interpolated

Table 3-4 Morning peak screen line volume summary (east-west screen line) – 2036

Road	Location	Number of vehicles						
		2036 'do minimum'			2036 Amendment Report ‘Option 2’			2036 80% detailed design
		7am to 8am	8am to 9am	7.30am to 8.30 am*	7am to 8am	8am to 9am	7.30am to 8.30 am*	7.30am to 8.30 am
East-west screen line (southbound)								
M12 Motorway	North of Elizabeth Drive	N/A	N/A	N/A	1898	1934	1916	1323
Luddenham Road	North of Elizabeth Drive	398	436	417	528	602	565	608
The Northern Road	North of Elizabeth Drive	1577	1602	1590	1032	1099	1066	858
Total		1975	2038	2007	3458	3635	3547	2789
East-west screen line (northbound)								
M12 Motorway	North of Elizabeth Drive	N/A	N/A	N/A	1015	1080	1048	1328
Luddenham Road	North of Elizabeth Drive	976	749	863	693	777	735	706
The Northern Road	North of Elizabeth Drive	1384	1483	1434	1836	1861	1849	1941
Total		2360	2232	2296	3544	3718	3631	3975

Comparison Source: Table 6-18 Amendment Report - Appendix B Traffic and Transport Oct 2020

*Interpolated

Table 3-5 Morning peak screen line volume summary (north-south screen line) – 2026

Road	Location	Number of vehicles						
		2026 'do minimum'			2026 Amendment Report 'Option 2'			2026 80% detailed design
		7am to 8am	8am to 9am	7.30am to 8.30 am*	7am to 8am	8am to 9am	7.30am to 8.30 am*	7.30am to 8.30 am
Eastern north-south screen line (eastbound)								
M12 Motorway	West of Mamre Road	N/A	N/A	N/A	975	1215	1095	1968
Elizabeth Drive	West of Mamre Road	984	1046	1015	623	460	542	544
Total		984	1046	1015	1598	1675	1637	2512
Eastern north-south screen line (westbound)								
M12 Motorway	West of Mamre Road	N/A	N/A	N/A	866	895	881	1093
Elizabeth Drive	West of Mamre Road	1180	849	1015	462	427	445	347
Total		1180	849	1015	1328	1322	1325	1439
Western north-south screen line (eastbound)								
M12 Motorway	West of Luddenham Road	N/A	N/A	N/A	913	1154	1034	1410
Elizabeth Drive	West of Luddenham Road	1055	1509	1282	414	450	432	271
Total		1055	1509	1282	1327	1604	1466	1681
Western north-south screen line (westbound)								
M12 Motorway	West of Luddenham Road	N/A	N/A	N/A	447	529	488	612
Elizabeth Drive	West of Luddenham Road	263	281	272	161	230	196	113
Total		263	281	272	608	759	684	725

Comparison Source: Table 6-19 Amendment Report - Appendix B Traffic and Transport Oct 2020

*Interpolated

Table 3-6 Morning peak screen line volume summary (north-south screen line) – 2036

Road	Location	Number of vehicles						
		2036 'do minimum'			2036 Amendment Report 'Option 2'			2036 80% detailed design
		7am to 8am	8am to 9am	7.30am to 8.30 am*	7am to 8am	8am to 9am	7.30am to 8.30 am*	7.30am to 8.30 am
Eastern north-south screen line (eastbound)								
M12 Motorway	West of Mamre Road	N/A	N/A	N/A	2043	2351	2197	3188
Elizabeth Drive	West of Mamre Road	636	916	776	628	694	661	683
Total		636	916	776	2671	3045	2858	3871
Eastern north-south screen line (westbound)								
M12 Motorway	West of Mamre Road	N/A	N/A	N/A	1779	1842	1811	1983
Elizabeth Drive	West of Mamre Road	1565	1727	1646	708	756	732	751
Total		1565	1727	1646	2487	2598	2543	2734
Western north-south screen line (eastbound)								
M12 Motorway	West of Luddenham Road	N/A	N/A	N/A	1923	2150	2037	2538
Elizabeth Drive	West of Luddenham Road	1608	1717	1663	582	724	653	486
Total		1608	1717	1663	2505	2874	2690	3024
Western north-south screen line (westbound)								
M12 Motorway	West of Luddenham Road	N/A	N/A	N/A	739	794	767	777
Elizabeth Drive	West of Luddenham Road	151	264	208	216	250	233	226
Total		151	264	208	955	1044	1000	1003

Comparison Source: Table 6-19 Amendment Report - Appendix B Traffic and Transport Oct 2020

*Interpolated

Table 3-7 Evening peak screen line volume summary (east-west screen line) – 2026

Road	Location	Number of vehicles						
		2026 'do minimum'			2026 Amendment Report 'option 2'			2026 80% detailed design
		4pm to 5pm	5pm to 6pm	4:30pm to 5:30 pm*	4pm to 5pm	5pm to 6pm	4:30pm to 5:30 pm*	4:30pm to 5:30 pm
East-west screen line (southbound)								
M12 Motorway	North of Elizabeth Drive	N/A	N/A	N/A	552	530	541	860
Luddenham Road	North of Elizabeth Drive	508	492	500	662	713	688	740
The Northern Road	North of Elizabeth Drive	1617	1530	1574	1488	1488	1488	702
Total		2125	2022	2074	2702	2731	2717	2302
East-west screen line (northbound)								
M12 Motorway	North of Elizabeth Drive	N/A	N/A	N/A	746	696	721	1204
Luddenham Road	North of Elizabeth Drive	695	738	717	422	463	443	494
The Northern Road	North of Elizabeth Drive	1379	1284	1332	1037	1000	1019	1634
Total		2074	2022	2048	2205	2159	2182	3332

Comparison Source: Table 6-20 Amendment Report - Appendix B Traffic and Transport Oct 2020

*Interpolated

Table 3-8 Evening peak screen line volume summary (east-west screen line) – 2036

Road	Location	Number of vehicles						
		2036 'do minimum'			2036 Amendment Report 'Option 2'			2036 80% detailed design
		4pm to 5pm	5pm to 6pm	4:30pm to 5:30 pm*	4pm to 5pm	5pm to 6pm	4:30pm to 5:30 pm*	4:30pm to 5:30 pm
East-west screen line (southbound)								
M12 Motorway	North of Elizabeth Drive	N/A	N/A	N/A	928	1012	970	1323
Luddenham Road	North of Elizabeth Drive	942	925	934	816	799	808	608
The Northern Road	North of Elizabeth Drive	1831	1891	1861	1950	2018	1984	858
Total		2773	2816	2795	3694	3829	3762	2789
East-west screen line (northbound)								
M12 Motorway	North of Elizabeth Drive	N/A	N/A	N/A	1664	1713	1689	1917
Luddenham Road	North of Elizabeth Drive	600	576	588	588	574	581	453
The Northern Road	North of Elizabeth Drive	1814	1746	1780	1245	1209	1227	1824
Total		2414	2322	2368	3497	3496	3497	4194

Comparison Source: Table 6-20 Amendment Report - Appendix B Traffic and Transport Oct 2020

*Interpolated

Table 3-9 Evening peak screen line volume summary (north-south screen line) – 2026

Road	Location	Number of vehicles						
		2026 'do minimum'			2026 Amendment Report 'Option 2'			2026 80% detailed design
		4pm to 5pm	5pm to 6pm	4:30pm to 5:30 pm*	4pm to 5pm	5pm to 6pm	4:30pm to 5:30 pm*	4:30pm to 5:30 pm
Eastern north-south screen line (eastbound)								
M12 Motorway	West of Mamre Road	N/A	N/A	N/A	743	677	710	1902
Elizabeth Drive	West of Mamre Road	533	503	518	639	559	599	246
Total		533	503	518	1382	1236	1309	2148
Eastern north-south screen line (westbound)								
M12 Motorway	West of Mamre Road	N/A	N/A	N/A	1219	1153	1186	1776
Elizabeth Drive	West of Mamre Road	967	955	961	706	678	692	375
Total		967	955	961	1925	1831	1878	2151
Western north-south screen line (eastbound)								
M12 Motorway	West of Luddenham Road	N/A	N/A	N/A	420	393	407	945
Elizabeth Drive	West of Luddenham Road	442	518	480	344	358	351	120
Total		442	518	480	764	751	758	1065
Western north-south screen line (westbound)								
M12 Motorway	West of Luddenham Road	N/A	N/A	N/A	1081	1039	1060	1130
Elizabeth Drive	West of Luddenham Road	633	625	629	285	388	337	406
Total		633	625	629	1366	1427	1397	1546

Comparison Source: Table 6-21 Amendment Report - Appendix B Traffic and Transport Oct 2020

*Interpolated

Table 3-10 Evening peak screen line volume summary (north-south screen line) - 2036

Road	Location	Number of vehicles						
		2036 'do minimum'			2036 Amendment Report 'Option 2'			2036 80% detailed design
		4pm to 5pm	5pm to 6pm	4:30pm to 5:30 pm*	4pm to 5pm	5pm to 6pm	4:30pm to 5:30 pm*	4:30pm to 5:30 pm
Eastern north-south screen line (eastbound)								
M12 Motorway	West of Mamre Road	N/A	N/A	N/A	1642	1562	1602	3528
Elizabeth Drive	West of Mamre Road	1121	1158	1140	802	880	841	704
Total		1121	1158	1140	2444	2442	2443	4232
Eastern north-south screen line (westbound)								
M12 Motorway	West of Mamre Road	N/A	N/A		1905	2073	1989	2662
Elizabeth Drive	West of Mamre Road	1367	1519	1443	616	658	637	773
Total		1367	1519	1443	2521	2731	2626	3436
Western north-south screen line (eastbound)								
M12 Motorway	West of Luddenham Road	N/A	N/A	N/A	726	675	701	1820
Elizabeth Drive	West of Luddenham Road	650	767	709	462	504	483	326
Total		650	767	709	1188	1179	1184	2147
Western north-south screen line (westbound)								
M12 Motorway	West of Luddenham Road	N/A	N/A	N/A	1745	1820	1783	1843
Elizabeth Drive	West of Luddenham Road	1158	1206	1182	489	517	503	778
Total		1158	1206	1182	2234	2337	2286	2620

Comparison Source: Table 6-21 Amendment Report - Appendix B Traffic and Transport Oct 2020

*Interpolated

The following analysis compares the screenline volumes of the 80% detailed design against the Amendment Report Option 2. For all scenarios it appears that the M12 Motorway - West Package carries significantly more traffic in the 80% detailed design case. Generally, although not always, this sees a drop in traffic along parallel routes suggesting that the connection of Airport Drive at Elizabeth Drive encourages more traffic to use the M12 rather than Elizabeth Drive and Northern Road.

This is described in more detail below.

EAST-WEST SCREENLINE

For the 80% detailed design case in the AM peak the M12 Motorway - West Package carries more traffic in all scenarios and all travel directions, except northbound in 2026. However, the total volumes show that there is no strong correlation to year of assessment or direction of travel in the AM peak. For the AM peak the 80% detailed design case has an increase in total traffic in 2026 southbound and 2036 northbound.

For the PM peak the M12 Motorway - West Package carries significantly more traffic in all scenarios and all travel directions. Regardless of this the overall traffic volume across the screenline drops in the southbound direction and increases in the northbound direction for all modelled years.

Overall, the M12 Motorway - West Package carries more traffic in the 80% detailed design case, and subsequently the alternate routes along the screenline are generally carrying less traffic.

NORTH-SOUTH SCREENLINES

For the 80% detailed design case in the AM peak the M12 Motorway - West Package carries more traffic in all scenarios and all travel directions across all north-south screenlines. This is except for westbound in 2036 where the volumes remain the same as the Amendment Report. The eastbound direction shows a much larger increase in the 80% detailed design case, particularly at the eastern screenline.

For the 80% detailed design case in the PM peak the M12 Motorway - West Package carries more traffic in all scenarios and all travel directions across all north-south screenlines. The eastbound direction shows a much larger increase at both screenlines.

3.2.2 INTERSECTION PERFORMANCE

The intersections assessed within the M12 Motorway - West Package study area are shown in Figure 3-2 and include:

- Elizabeth Drive and The Northern Road
- The Northern Road and M12 Motorway
- Elizabeth Drive and Luddenham Road
- Elizabeth Drive and Business Park West
- Elizabeth Drive Interchange
- Elizabeth Drive and Business Park East.

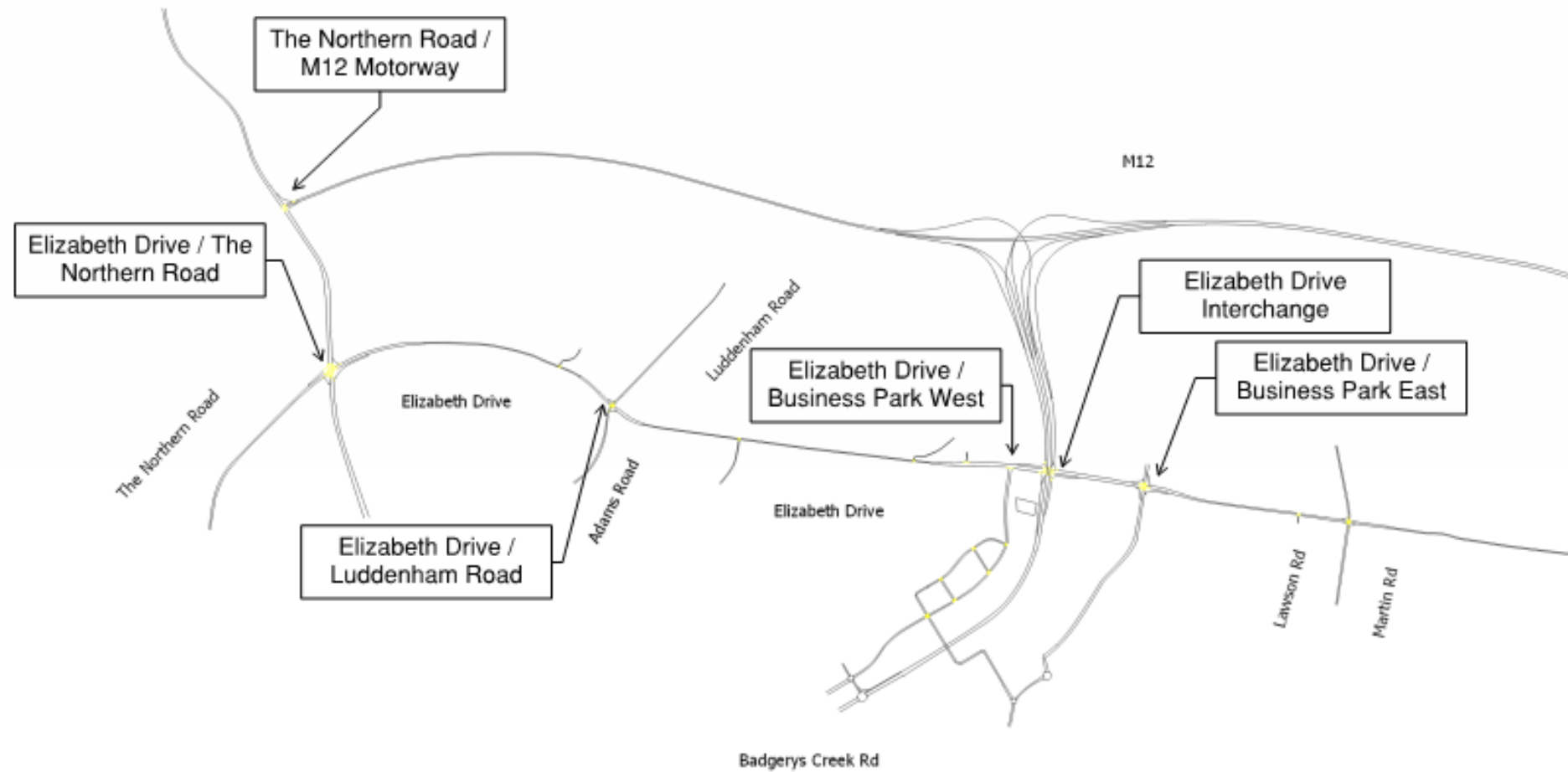


Figure 3-2 Assessed intersections within the M12 Motorway - West Package study area

The intersection performance of each intersection is evaluated based on the Level of Service (LoS) criteria summarised in Table 3-11.

Table 3-11 Level of Service criteria for intersection

LoS	Control delay per vehicle in seconds (s/veh)	Traffic signals	Give way and stop signs
A	≤14	Good operation	Good operation
B	>15-28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	>29-42	Satisfactory	Satisfactory, but accident study required
D	>43-56	Operating near capacity	Near capacity and accident study required
E	>57-70	At capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode.	At capacity, requires other control mode
F	>70	Unsatisfactory with excessive queueing	Unsatisfactory will excessive queueing; requires other control mode

Source: Table 14.3 Control delay for vehicle LoS calculations (RMS Traffic Modelling Guidelines)

This section compares the LoS for affected intersections in the M12 Motorway - West Package study area. The comparison is made between Option 2 of the Amendment Report and the 80% detailed design.

Analysis of the intersection performance shown in Table 3-12 and Table 3-13 demonstrates the following:

- In 2026:
 - The 80% detailed design would result in unchanged or improved performance for all intersections
 - All intersections would perform at a LoS C or better.
- In 2036:
 - The 80% detailed design would result in unchanged or improved intersection performance, except for Elizabeth Drive / Luddenham Road intersection and Elizabeth Drive / Business Park East intersection. All other intersections would perform at a LoS D or better
 - The Elizabeth Drive / Luddenham Road intersection would change from a LoS C (AM peak) and LoS D (PM peak) in the Amendment Report to a LoS F (all peaks) in the 80% detailed design. It should be noted that there is a large amount of future development proposed for the area to the south of the intersection. An upgrade of the Elizabeth Drive / Luddenham Road intersection is outside the M12 Motorway project scope. The intersection upgrade relates to a future proposed Elizabeth Drive upgrade project. Future modelling in this area that considers the full scope of the proposed Elizabeth Drive upgrade project would likely resolve the performance of this intersection
 - The Elizabeth Drive / Business Park East intersection would change from a LoS B in the AM peak in the Amendment Report to a LoS C in the 80% detailed design.

Table 3-12 Intersection performance – 2026 and 2036 scenarios – morning peak

Intersection	2026 'do minimum'		2026 Amendment Report 'option 2'		2026 80% detailed design		2036 'do minimum'		2036 Amendment Report 'option 2'		2036 80% detailed design	
	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS
Elizabeth Drive / The Northern Road	43	D	31	C	23	B	55	D	39	C	23	B
Elizabeth Drive / Luddenham Road	46	D	56	D	36	C	66	E	45	D	133	F
Elizabeth Drive / Business Park East	36	C	33	C	36	C	32	C	27	B	41	C
Elizabeth Drive / Business Park West	30	C	25	B	2	A	66	E	27	B	6	A
The Northern Road / M12 Motorway	N/A	N/A	31	B	24	B	N/A	N/A	31	C	41	C
Elizabeth Drive Interchange	N/A	N/A	N/A	N/A	14	A	N/A	N/A	N/A	N/A	11	A

Comparison Source: Table 6-24 Amendment Report - Appendix B Traffic and Transport Oct 2020

Table 3-13 Intersection performance – 2026 and 2036 scenarios – evening peak

Intersection	2026 'do minimum'		2026 Amendment Report 'option 2'		2026 80% detailed design		2036 'do minimum'		2036 Amendment Report 'option 2'		2036 80% detailed design	
	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS
Elizabeth Drive / The Northern Road*	41	C	42	C	23	B	31	C	41	C	39	C
Elizabeth Drive / Luddenham Road	44	D	45	D	36	C	55	D	39	C	177	F
Elizabeth Drive / Business Park East*	30	C	30	C	24	B	28	B	24	B	26	B
Elizabeth Drive / Business Park West	26	B	26	B	1	A	33	C	22	B	2	A
The Northern Road / M12 Motorway	N/A	N/A	36	C	29	C	N/A	N/A	46	D	44	D
Elizabeth Drive Interchange	N/A	N/A	N/A	N/A	16	B	N/A	N/A	N/A	N/A	13	A

Comparison Source: Table 6-25 Amendment Report - Appendix B Traffic and Transport Oct 2020

3.2.3 TRAVEL TIMES

Travel times have been compared for the M12 Motorway – West Package between WSIA and The Northern Road for 2026 and 2036. Table 3-14 and Table 3-15 summarise the changes in travel time for the morning and evening peak travel times respectively.

Table 3-14 and Table 3-15 compare the 2026 and 2036 80% detailed design travel time with the Amendment Report ‘Option 2’. The travel times for the 80% detailed design are lower for all timeframes for trips from The Northern Road to WSIA. The travel times for the 80% detailed design are similar for the AM and PM peak trips from WSIA to the Northern Road, with the exception of 2026 PM peak trips.

Table 3-14 M12 Motorway morning peak travel times (minutes)

Morning Peak	WSIA to The Northern Road	The Northern Road to WSIA
2026 EIS ‘with amended project - option 2’ (8-9am)	4.2	4.9
2026 80% detailed design (7:30-8:30am)	4.1	4.4
2036 EIS ‘with amended project - option 2’ (8-9am)	4.2	5.1
2036 80% detailed design (7:30-8:30am)	4.3	4.7

Table 3-15 M12 Motorway evening peak travel times (minutes)

Evening Peak	WSIA to The Northern Road	The Northern Road to WSIA
2026 EIS ‘with amended project - option 2’ (5-6pm)	4.5	4.7
2026 Current Design (4:30-5:30pm)	4.1	4.3
2036 EIS ‘with amended project - option 2’ (5-6pm)	4.3	4.7
2036 Current Design (4:30-5:30pm)	4.4	4.3

3.2.4 NETWORK STATISTICS

These metrics are strategic in nature and due to the difference in modelled areas a direct comparison cannot be made. Figure 2-1 shows the size of the area which was considered in calculating the network statistics for the Amendment Report (noted as “wider study area”).

The Amendment Report considers a significant change in demands (moving from WRTM to SMPM and LU14 to LU16) as the key basis for reassessment. With respect to the network statistics the report states “These changes reflect the change to the demand growth in SMPM version 1.1 that has resulted in forecast traffic volumes being lower.” Even with these significant changes in demand, the changes to network statistics were relatively minor.

In this case when comparing the Amendment Report and the 80% detailed design, the land use and demands used in both models remains the same. Therefore, it is unlikely that small changes made to the design since the Amendment Report would have a measurable effect on the overall network statistics produced for the wider study area.

3.3 LOCAL ROADS AND ACCESS

There are two primary areas that affect local roads, connectivity and access within the M12 Motorway – West Package project area. These changes are as follows:

- The Airport Access Road / Airport Interchange is revised from a trumpet interchange to a free flow directional interchange. Additionally, all ramps on the Airport Access Road between the Airport Interchange and Elizabeth Drive have been realigned
- Connection of Airport Access Road to Elizabeth Drive with a single point interchange.

3.3.1 AIRPORT ACCESS ROAD / M12 INTERCHANGE

The 80% detailed design arrangements at the M12 Motorway interchange and along the Airport Access Road offers improvements to connectivity, operational functionality and traffic performance of the transport network. This is a high capacity and operationally efficient layout that can operate at the required design speeds in comparison to the amendment report arrangement. Additionally, this layout can better manage changes in traffic travel patterns and demands if, there is a change in the land use. The benefits are further described below:

- Route legibility (for frequent first-time users) – logical layout with standard left side exits and entries which are commonly understood by the majority of drivers. The concept of proposing a free flow arrangement for the airport interchange provides better legibility to the interchange and improves wayfinding & user orientation
- Connectivity – improved connectivity between Elizabeth Drive and the M12 Motorway as the number of merges and weaving movements are reduced. Route continuity, lane balance and lane compliance has been improved which is integral to safe and efficient traffic operation
- Improved capacity - The removal of loop ramps at the interchange improves the capacity and LoS for those affected movements. The improvement in route continuity/lane compliance avoids unnecessary lane changing, which in turn reduces turbulence which can cause operational and safety issues and a loss of capacity
- Road user safety - right side ramp exits and entries are removed and the number of merges and weaving movements are reduced. These treatments are well known to cause operational and safety issues in system interchanges. Right hand side exits have higher crash rates. The removal of successive exits improves wayfinding and removes the need for complex signage. This is especially important on the approach to an airport where the proportion of unfamiliar drivers would be higher than expected elsewhere on the network.

3.3.2 ELIZABETH DRIVE / AIRPORT ACCESS ROAD INTERSECTION

The reference design at Elizabeth Drive as shown in Section 1.3.2 of Amendment Report Appendix B, Figure 1-1 shows that the Airport Access Road was not connected to Elizabeth Drive, which is illustrated in Figure 3-3. It also shows that the Elizabeth Drive / Business Park West intersection is a full access signalised intersection. In Figure 3-1 of Section 3 of the AR Submissions Report presents a preliminary design of a single point interchange at Elizabeth Drive was provided in response to submissions received.

The proposed change for the 80% design provides a full access single point interchange between Airport Access Road and Elizabeth Drive. The Elizabeth Drive and Business Park West intersection has also been amended to a left-in, left-out intersection rather than a signalised intersection.

Figure 3-4 illustrates the changes to the intersection at 80% detailed design.

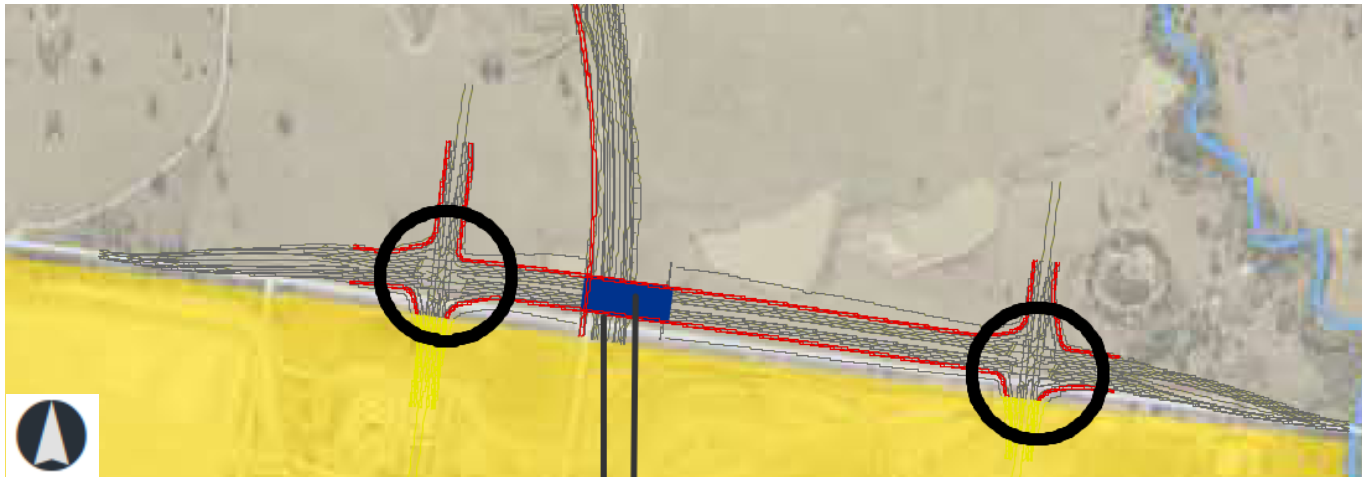


Figure 3-3 Elizabeth Drive and Airport Access Road intersection layout in the Amendment Report (Section 1.3.2 of Appendix B of Amendment Report, Figure 1-1)

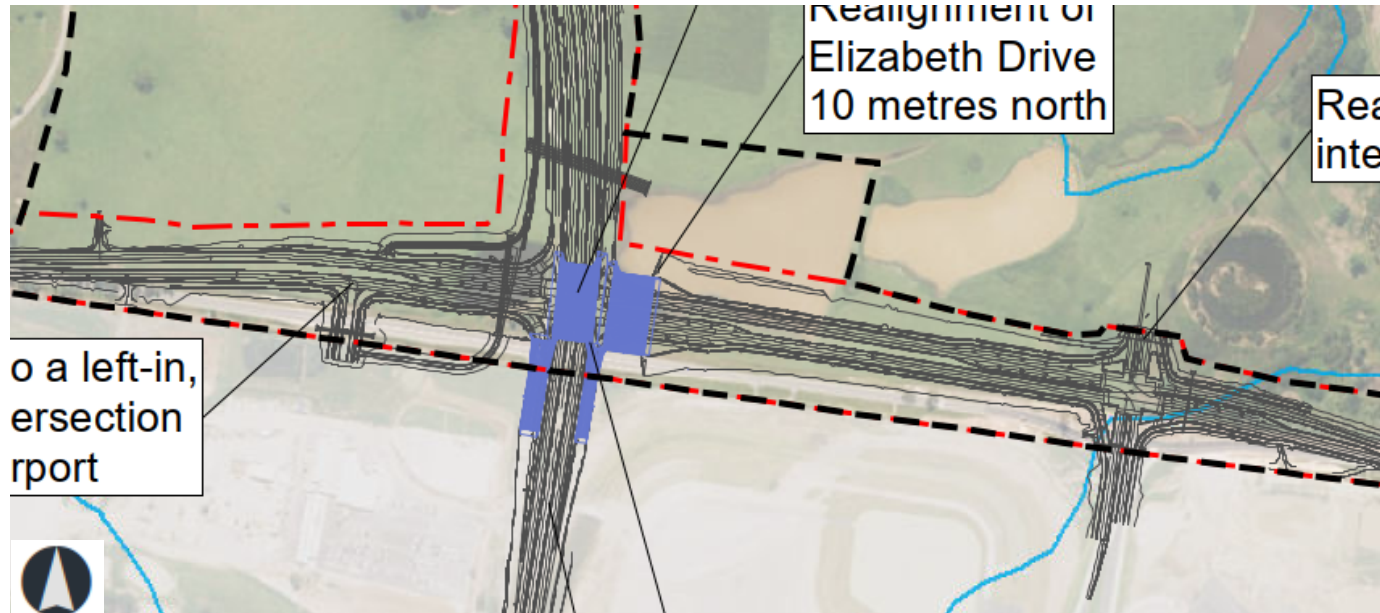


Figure 3-4 Elizabeth Drive and Airport Access Road intersection layout in the 80% detailed design

Connecting Elizabeth Drive and the Airport Access Road using a single point interchange offers improved connectivity of traffic movement between these links. Overall, this encourages more traffic onto the M12 Motorway rather than using the surrounding network for these movements.

The removal of the signalised intersection at the Business Park West intersection would streamline traffic movement along Elizabeth Drive. This arrangement could not have been maintained with the inclusion of the Airport Access Road / Elizabeth Drive intersection due to the proximity. Traffic from the Business Park West would be able to access Elizabeth Drive and the M12 Motorway from within the business park itself via connecting links to the Airport Access Road once this area is developed in future.

Permitted movements at all other existing accesses and intersections remain unchanged and affected properties would have their access reinstated.

3.4 PUBLIC TRANSPORT

Operation of the M12 Motorway would not generate adverse impacts on existing bus routes, bus stops and existing rail services through the project area. The proposed design changes to M12 Motorway – West Package do not preclude the operation of these buses along the M12 Motorway. The project has been planned to integrate with the proposed Sydney Metro Western Sydney Airport, which would be grade-separated as it runs to the east of the Airport Access Road and passes under Elizabeth Drive. Therefore, no substantial change to public transport is expected.

3.5 FREIGHT

The change in freight volumes would mirror the proportional change in general traffic volumes as provided in the screenline analysis. The input demands to the model have not been altered since the Amendment Report.

The changes to access and connectivity mentioned above would also apply to freight movements between the WSIA, Business Park and the M12 Motorway and Elizabeth Drive. In general the new arrangement encourages heavy vehicles to use more appropriate higher order roads in the network, such as using the M12 Motorway rather than Elizabeth Drive and The Northern Road for parallel trips. The revised connectivity arrangement also encourages the use of the Airport Access Road to access Elizabeth Drive from the Business Park West.

3.6 ACTIVE TRANSPORT

The 80% detailed design for the M12 Motorway - West Package project has amended the alignment of the shared use path at the Airport Interchange. However, the continuity of the shared use path remains unchanged. The shared use path link is provided between the Airport Access Road and Elizabeth Drive, but it is not expected that there would be a significant change to cyclists' travel demand around the project area.

The proposed pedestrian crossings at the Business Park West intersection have been removed in the 80% detailed design due to the signalised intersections along Elizabeth Drive being removed. The removal of the pedestrian crossings would require pedestrians to use the Elizabeth Drive and Airport Access Road intersection in order to use a signalised crossing which may add additional travel time. It should also be noted that a grade separated option is now provided for this movement along a new shared path near the Elizabeth Drive / Airport Access Road Intersection.

3.7 PARKING

The M12 Motorway - West Package would primarily be built on undeveloped greenfield area. There is currently no on-street parking permitted on The Northern Road or Elizabeth Drive. Therefore, there would be no change to parking impacts in the project area due to the 80% detailed design.

3.8 ROAD SAFETY

It is expected that overall crashes across the project area would decrease as the volume of future traffic has, in most cases, shifted from travelling on Elizabeth Drive to using the M12 Motorway. Motorways are generally safer than arterial roads as

they have higher design speed with wider geometry curve, wider lanes, better pavement and lighting condition, fewer intersection and stop-start traffic and separation of sensitive road users from vehicular traffic.

In addition, likely road safety benefits are associated with the conversion of the M12 Motorway and Airport Access Road Interchange from a trumpet interchange to a free flow directional interchange. The following improvements are expected to road safety:

- Minimise the number of lane changes on the entry and exit ramps between the M12 Motorway and Airport Access Road to access the WSIA and Elizabeth Drive. Right side ramp exits and entries are removed and the number of merges and weaving movements are reduced. This would improve road safety by improving road user legibility, reducing lane changing and the associated risk of side-swipe collisions and off-carriageway type accidents
- Improved alignment of the M12 Motorway and Airport Access Road Interchange to remove a number of tight curves on grades (loop ramps)
- Reduced congestion at the M12 Motorway and Airport Access Road Interchange, which is expected to decrease the likelihood of vehicle crashes, especially rear-end crashes.

4. CONCLUSIONS

Overall the traffic assessment/outcomes are consistent with the Approved Project.

4.1 MINISTER'S CONDITIONS OF APPROVAL

The proposed change has been assessed in Table 4-1 in relation to the relevant conditions of approval.

Table 4-1: Consistency against relevant Minister's conditions of approval for the project

No.	Condition of Approval	Discussion	Consistent
E93	The Planning Secretary's approval is required before any heavy vehicles used for spoil and fill haulage or concrete deliveries (for the purpose of the CSSI) are driven on local roads within one (1) kilometre of early works, construction and construction ancillary facilities and that are not identified for use by heavy vehicles in the documents listed in Condition A1. The local roads must be identified in the Early Works Environment Management Plan and Traffic Management CEMP Sub-plan.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E94	<p>All requests to the Planning Secretary for approval to use local roads in accordance with Condition E93, must include a traffic and pedestrian impact assessment and be prepared in consultation with the relevant local council(s). The assessment must be undertaken by an appropriately qualified and experienced person and must include a swept path analysis if required by the Department. The traffic and pedestrian impact assessment must:</p> <p>demonstrate that the use of local roads will not compromise the safety of the public and have no more than minimal amenity impacts;</p> <p>provide details as to the date of completion of the road dilapidation surveys for the subject local roads; and</p> <p>describe the measures that will be implemented to avoid where practicable the use of local roads past schools, aged care facilities and childcare facilities during peak times for operation.</p> <p>The outcomes and recommendations of the traffic and pedestrian impact assessment must be incorporated into the Site Establishment Management Plan or Traffic Management CEMP Sub-plan as relevant.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement. No new local roads are proposed to be used during construction that weren't identified in the EIS/ Amendment Report.	Yes
E95	Before any local road is used by a heavy vehicle for the purposes of the CSSI, a Road Dilapidation Report must be prepared for the road unless otherwise agreed by the relevant road authority. A copy of the Road Dilapidation Report must be provided to the relevant road authority within three (3) weeks of completion of the survey and at least two (2) weeks before the road is used by heavy vehicles associated with the construction of the CSSI.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	If damage to roads occurs as a result of the construction of the CSSI, the Proponent must rectify the damage to restore the road to at least the condition it was in pre-construction in consultation with the relevant road authority. Rectification works must be undertaken within three (3) months of the subject road no longer being used for the construction of the CSSI unless an alternative timeframe is agreed to by the relevant road authority.		
E96	During construction, all reasonably practicable measures must be implemented to maintain pedestrian and vehicular access to, and parking in the vicinity of, residences, businesses and affected properties. Disruptions are to be avoided, and where avoidance is not possible, minimised. Where disruption cannot be minimised, alternative pedestrian and vehicular access, and parking arrangements must be developed in consultation with affected residents, businesses and affected property owners and implemented before the disruption. Adequate signage and directions to businesses must be provided before, and for the duration of, any disruption.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E97	The CSSI (including new or modified local roads, parking, pedestrian and cycle infrastructure) must be designed to meet relevant design, engineering and safety guidelines, including the Austroads Guide to Traffic Management.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E98	An independent Road Safety Audit is to be undertaken by an appropriately qualified and experienced person during design development (audit of the plans) and prior to opening (pre-opening audit) to assess the safety performance of new or modified roads (road safety audit), parking, pedestrian and cycle infrastructure provided as part of the CSSI (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including Austroads Guide to Traffic Management. Audit findings and recommendations of the detailed design plans (audit of the plans) must be actioned before construction of the relevant infrastructure. The pre-opening audit findings and recommendations must be actioned prior to the relevant infrastructure being made available for use. All audit findings must be made available to the Planning Secretary on request, within the timeframe stated in the request.	The proposed changes to the project would not impact on the ability to comply with this requirement. Road safety audits have been completed for the design development phase.	Yes
E99	Safe pedestrian and cyclist access must be maintained around work sites during Work. In circumstances where pedestrian and cyclist access is restricted or removed due to Work, an alternate route which complies with the relevant standards must be provided and signposted.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

The proposed change can be accommodated within the Conditions of Approval.

4.2 STATEMENT OF COMMITMENTS / ENVIRONMENTAL MANAGEMENT MEASURES

The proposed change has been assessed in Table 4-2 in relation to the relevant commitments / environmental management measures in the context of the Division 5.2 Approval.

Table 4-2 Consistency against relevant Statement of Commitments / environmental management measures

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
TT01	<p>A construction transport and traffic management plan (CTTMP) will be prepared as part of the CEMP in consultation with relevant local Councils, and in accordance with relevant guidelines.</p> <p>The CTTMP will outline:</p> <ul style="list-style-type: none"> — Staging and planning of works to minimise the need to occupy roads where practicable, including identification of haulage routes — Safe alternative routes for pedestrians and cyclists in accordance with relevant safety and accessibility standards — The requirements for traffic control plans to be prepared for each work area which will include details of site access and specific traffic control measures (including signage) to manage traffic movements — Road safety audit requirements — Parking arrangements for construction staff — Identification of access arrangements at construction sites detailing vehicle access movements — Measures to minimise changes to the existing road network, property access, bus stops and pedestrian/cyclist facilities where feasible — Measures to communicate and notify of any changes in traffic conditions on roads or paths to road users, emergency services, public transport operators, and other relevant stakeholders — Measures to manage construction traffic interfaces and access arrangements with WSIA and Sydney Metro – Western Sydney Airport 	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	<ul style="list-style-type: none"> Requirements for appropriate warning and signage for traffic and other road users such as cyclists and pedestrians in the vicinity of work areas and work site access, and road diversions. 		
TT02	Changes to bus stops will be implemented in consultation with TfNSW, relevant councils, and relevant bus operators. Alternate temporary bus stops will be provided with appropriate signage to direct commuters. Safe access will be provided in accordance with relevant safety and accessibility standards.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT03	Movements of haulage vehicles will be planned to minimise movements on the road network during the AM and PM peak periods where practicable.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT04	Consultation will be carried out with the operators of the M7 Motorway to develop measures to manage the potential impacts of construction within the operating M7 Motorway corridor.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT05	<p>TfNSW will continue to work with Western Sydney Parklands Trust to support the delivery of a shared user path within Western Sydney Parklands to connect from Range Road to the existing M7 Motorway shared user path.</p> <p>If it is determined during consultation that the shared user path connection through the Western Sydney Parklands will not be delivered, TfNSW will provide an alternative alignment for the shared user path in this section via either Elizabeth Drive, or alongside the M12 Motorway from Range Road to the M7 Motorway shared user path network.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT06	A road dilapidation report will be prepared before impacts on local roads in consultation with relevant councils and other relevant stakeholders. The report will document the existing conditions of local roads and outline measures to repair damage to roads from heavy vehicle movements associated with the project.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT07	Existing property access would be maintained at all times.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of Commitment / mitigation measure	Discussion	Consistent
	Any changes to access arrangements or alternative access that are necessary during construction will be done with consultation with the landowner. Any changes to access will provide the same equivalent pre-existing level of access unless agreed to by the land owner. Property access that is physically affected by the project will be reinstated to at least an equivalent standard, in consultation with the landowner.		
TT08	A signage strategy will be prepared as part of the CTTMP to provide for appropriate signage for businesses where existing signage is obscured/no longer visible or where customers are required to use alternative access to reach the businesses during construction.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT09	Traffic signals will be coordinated to minimise congestion and manage traffic flows.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
TT10	Investigate and develop an appropriate traffic solution to manage the expected traffic delays during construction in the vicinity of Devonshire Road. The options considered and the preferred solution will be documented in a memo and then implemented through the CTTMP for the project.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

The proposed change is consistent with the Statement of Commitments / environmental management measures incorporated as part of the Division 5.2 Approval.

4.3 EPBC APPROVAL

The proposed changes in traffic and transport management measures at detailed design do not constitute to any change in project aspects related to the EPBC approval.

5. REFERENCES

NSW Government (2020) M12 Motorway Amendment Report (Section 6.2 and Appendix B Transport and traffic updated technical report)

Roads and Maritime Services (2019) M12 Motorway, Environmental Impact Statement

Roads and Maritime Services (2019a) M12 Motorway Environmental Impact Statement (Appendix F Transport and Traffic Assessment Report)

Transport for NSW (2020a) M12 Motorway, Amendment Report (the Amendment Report)

Transport for NSW (2020b) M12 Motorway, Submissions Report (the Submissions Report)

Transport for NSW (2020c) M12 Motorway, Amendment Report Submissions Report (the AR Submissions Report)

Appendix C

Urban design and visual amenity consistency assessment memo

MEMO

TO: Transport for NSW
FROM: Conybeare Morrison / Context
SUBJECT: Detailed Design Landscape character visual impact assessment
OUR REF: M12WDD-WSP-ALL-EN-MEM-000018.docx
DATE: 9 August 2021

DEFINITIONS AND ABBREVIATIONS

ABBREVIATION	DESCRIPTION
AAR	Airport Access Road
BR	Bridge
EDR	Elizabeth Drive
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EIS	Environmental Impact Statement
LCZ	Landscape Character Zone
LGA	Local Government Area
LMP	Landscape Management Plan
OSO	Outer Sydney Orbital
TfNSW	Transport for NSW
VMS	Variable Message Sign

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

Transport for NSW (TfNSW) are proposing to construct and operate the M12 Motorway project (the project) to provide direct access between the Western Sydney International Airport at Badgerys Creek and Sydney's motorway network. The M12 Motorway would run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for a distance of about 16 kilometres and is expected to be opened to traffic prior to opening of the Western Sydney International Airport.

This Consistency Assessment is for the M12 Motorway – West Package, between The Northern Road, Luddenham and approximately 250 metres east of Badgerys Creek. It is proposed to be a four-lane dual-carriageway motorway with a central median for future six lanes, including a new grade separated interchange with the Airport Access Road to provide connection to the Western Sydney International Airport. An overview of the M12 Motorway - West Package is illustrated in Figure 1-1.

Detailed design for the M12 Motorway - West Package (shown in Figure 1-1 is being completed and has resulted in changes requiring further environmental assessment. During design development of detail design changes requiring further environmental assessment have been identified. The Consistency Assessment is based on the 80% detailed design submission.

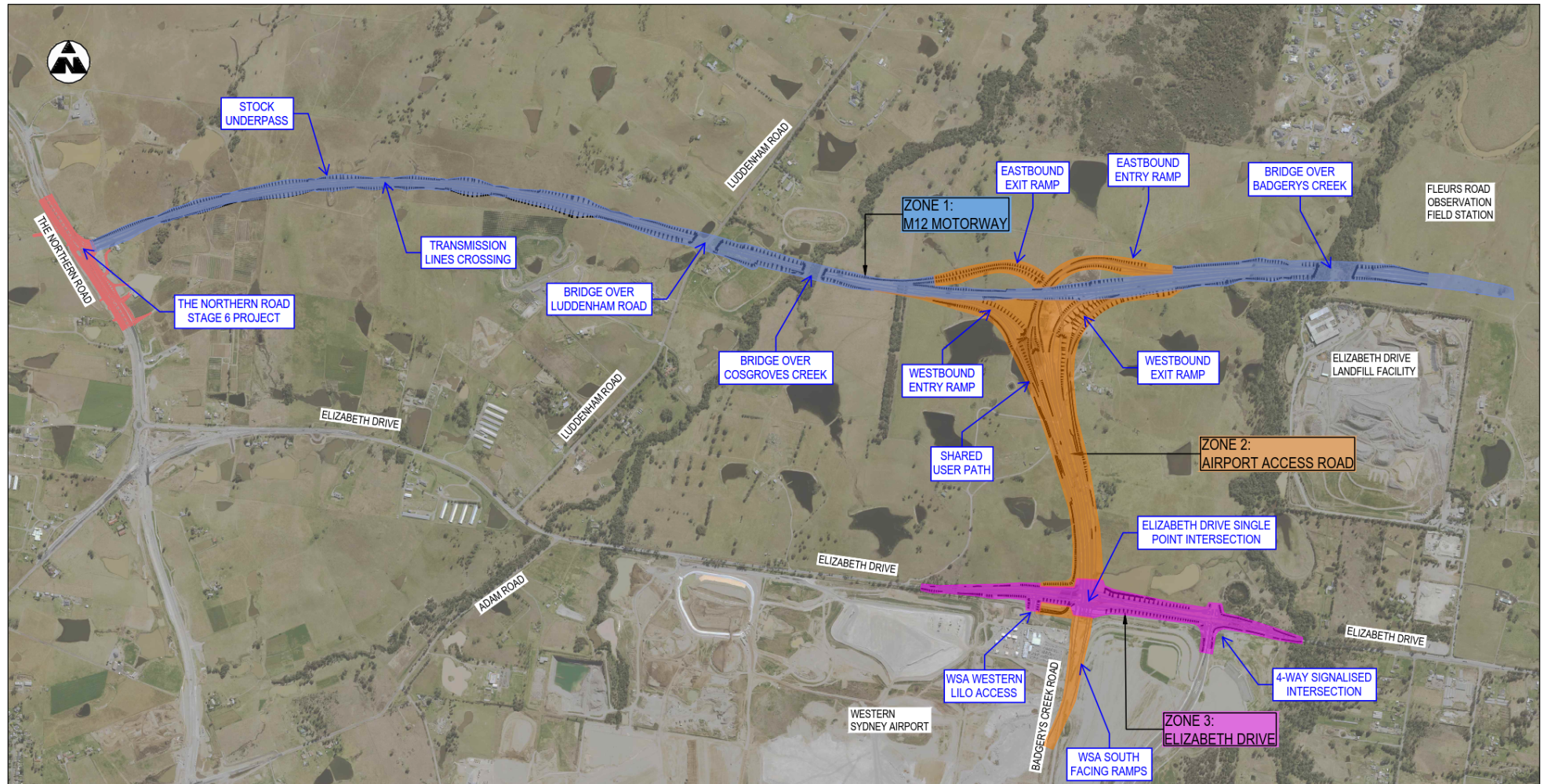


Figure 1-1 M12 Motorway West package overview

1.2 SCOPE OF THIS REPORT

In the event of proposed changes to the M12 Motorway Approved Project, a review for consistency is required by the proponent for the construction and operational phases of the M12 Motorway - West Package. The Consistency Assessment will determine if the proposed changes are generally in accordance with the impacts of the approved project and satisfy the requirements of the Planning Approval dated 23 April 2021 and Commonwealth Approval dated 3 June 2021.

This memo provides a review of the proposed changes in terms of impacts to landscape character and visual impacts and identifies if they are consistent with the approved project or if additional or reduced impacts are predicted.

The key proposed changes in the project are in the area between the Airport interchange, Airport Access Road (AAR) and Elizabeth Drive. The changes in the other areas are related mainly to reconfiguration of bridges at Cosgroves Creek and Badgerys Creek, and refinements/modifications to drainage and utilities. These changes are minor as they do not have any additional visual impacts and therefore it has been deemed appropriate not to reassess these areas in detail. The comparison is therefore focused to the area between the Airport interchange, Airport Access Road (AAR) and Elizabeth Drive illustrated on Figure 1-2. Section 1.3 outlines the key design changes being assessed in this memo.

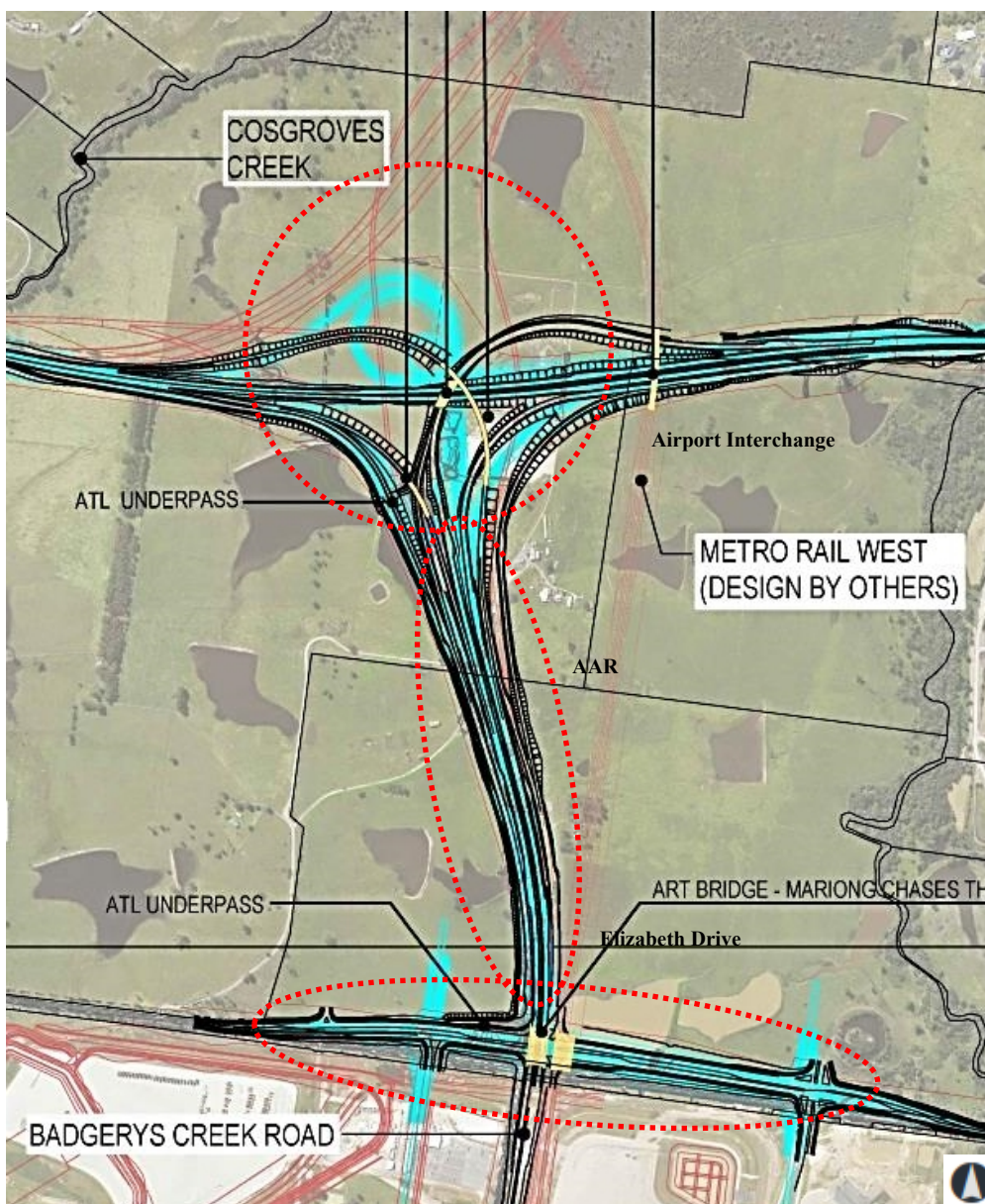


Figure 1-2 Extent of assessment scope for M12 Motorway - West Package 80% detailed design changes

1.3 DESCRIPTION OF PROPOSED CHANGE

The project as described in the Division 5.2 Approval and EPBC Approval dated 3 June 2021 is outlined in Section 1.2 of the Consistency Assessment and a detailed description is provided in Chapter 5 of the Environmental Impact Assessment (EIS) (Roads and Maritime, 2019). The amended project is detailed in Chapter 2 of the Amendment Report (Transport for NSW, 2020a) and Chapter 1 of the Amendment Report Submissions Report (AR Submissions Report) (Transport for NSW, 2020).

The proposed changes to M12 Motorway West - package include the following and shown in Figure 2-1 of the Consistency Assessment:

- Airport interchange revised to a free flow directional interchange
- Elizabeth Drive and Airport Access Road intersection revised to a single point interchange, comprising:
 - Two separate bridges over the Airport Access Road
 - New entry and exit ramps for access to the Airport Access Road and Elizabeth Drive
- All ramps on the Airport Access Road between the Airport interchange and Elizabeth Drive realigned
- Intersection to the west of the Airport Access Road and Elizabeth Drive replaced with a left in, left out arrangement from the Western Sydney International Airport and the northern stub road removed
- Intersection to the east of the Airport Access Road and Elizabeth Drive refined to remove the northern stub road
- Elizabeth Drive widened to the north by about 10 metres at the single point interchange, east of the Airport Access Road
- Extension of the Airport Access Road and southbound ramp to tie into the Western Sydney International Airport internal road network (area within Airport land to be assessed and approved in the Airport Approval)
- Reconfiguring BR02 and BR05 at Cosgroves Creek and Badgerys Creek respectively
- Extending and refining existing utilities, including low voltage mains and additional water main crossings
- Modification to one operational water quality basin and four additional construction water quality basins
- Refinements to drainage and water quality infrastructure across the M12 Motorway - West Package, including culverts, open channels and cross drainage
- Additional construction access road to the north of BR20
- Amendments to the private property access on Elizabeth Drive west of the Airport Access Road
- Installation of a variable message sign (VMS) on the southbound carriageway of The Northern Road Stage 6.

2. ASSESSMENT METHODOLOGY

The Consistency Assessment for the Landscape Character and Visual Impact Assessment has been based on the same methodology as described in the Section 3 of the M12 EIS Appendix G and adopted in the Amendment Report, Section 2.

As per the EIS and the Amendment Report, the landscape character impact and visual impact of the project have been separately assessed for existing conditions only. The landscape character assessment outlines the overall impact of the project on an area's character and sense of place, and visual impact assessment outlines the effect on views. The method to measure impact has been based on the combination of the sensitivity of the existing character or view to change and the magnitude of the project on that area or view.

The same grading matrix that was used in the EIS has been used to assess the landscape character and visual impacts. Refer to Table 2-1.

Table 2-1 Landscape character and visual impact grading mix (EIS, Table 7-59)

Sensitivity	Magnitude				
		High	Moderate	Low	Negligible
	High	High Impact	High - Moderate	Moderate	Negligible
	Moderate	High - Moderate	Moderate	Moderate-Low	Negligible
	Low	Moderate	Moderate-Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

3. LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT

3.1 LANDSCAPE CHARACTER IMPACT ASSESSMENT

The areas covered in the assessment occur mainly in landscape character zone (LCZ) 3 – Rural plains, refer to Figure 3-1 .

Given the similarities in scope and base infrastructure (road elements, bridges and landscaping) between the project as described in the Amendment Report and the 80% detailed design, the impact on the landscape character zone LCZ 3 remains unchanged from the impact assessment described in Section 7.3.5 in the EIS.



Figure 3-1 Landscape character zone per the Amendment report

3.2 VISUAL IMPACT ASSESSMENT

The visual impact assessment has been undertaken by reassessing the impacts on similar viewpoints that were identified in the Amendment Report. Additional viewpoints have been nominated to assess the visual impacts, which were not identified in the Amendment Report. Refer to Table 3-1 and Figure 3-2 which illustrate all the reassessed and new viewpoint locations in this memo.

Table 3-1 Summary of viewpoint locations

Viewpoint	Amendment Report	80% Detailed Design
A	Not provided	✓
B	Not provided	✓
C	Not provided	✓
7	✓	✓
8	✓	✓

As part of the detailed design, the mitigation measures adopted to reduce the visual impact at each viewpoint are aligned with the EIS principles which are to:

- Ensure a Connection to Country is provided
- Positively influence the structure of the Western Parkland City
- Create an active study area and enhance the user experience
- Utilise structures, bridges and earthworks as expressions of identity, place, values and sustainability
- Re-establish natural systems.



Figure 3-2 Viewpoint locations

Table 3-2 illustrates an overview of the key changes between EIS/Amendment Report Design and 80% detailed design from an aerial view perspective showing their greater context.

Table 3-2 Overview of key changes between EIS/Amendment Report and 80% detailed design

REPORT	LOCATION	FIGURE	DESCRIPTION
EIS	Airport Interchange		Loop arrangements for shared path and roads
80% detailed design			Free flow arrangement for shared path and roads

REPORT	LOCATION	FIGURE	DESCRIPTION
EIS	Elizabeth Drive interchange		Grade separated roadways
80% detailed design			Diamond shape interchange Access roads to WSIA

3.2.1 VIEWPOINT A - VIEW ALONG M12 TOWARDS AIRPORT INTERCHANGE LOOKING EAST

Viewpoint A (Figure 3-3, Figure 3-4 and Figure 3-5) is located along the main line of the proposed M12 Motorway - West Package and looking east towards the proposed BR22. BR22 includes a feature Aboriginal artwork that is integrated into the throw screen (referred to as the art bridge) which forms part of the Connection to Country strategy for the project. Views from this location will be experienced looking at BR22 and BR21 (the viaduct) beyond, together with the viaduct sweeping over the lower bridge BR22.

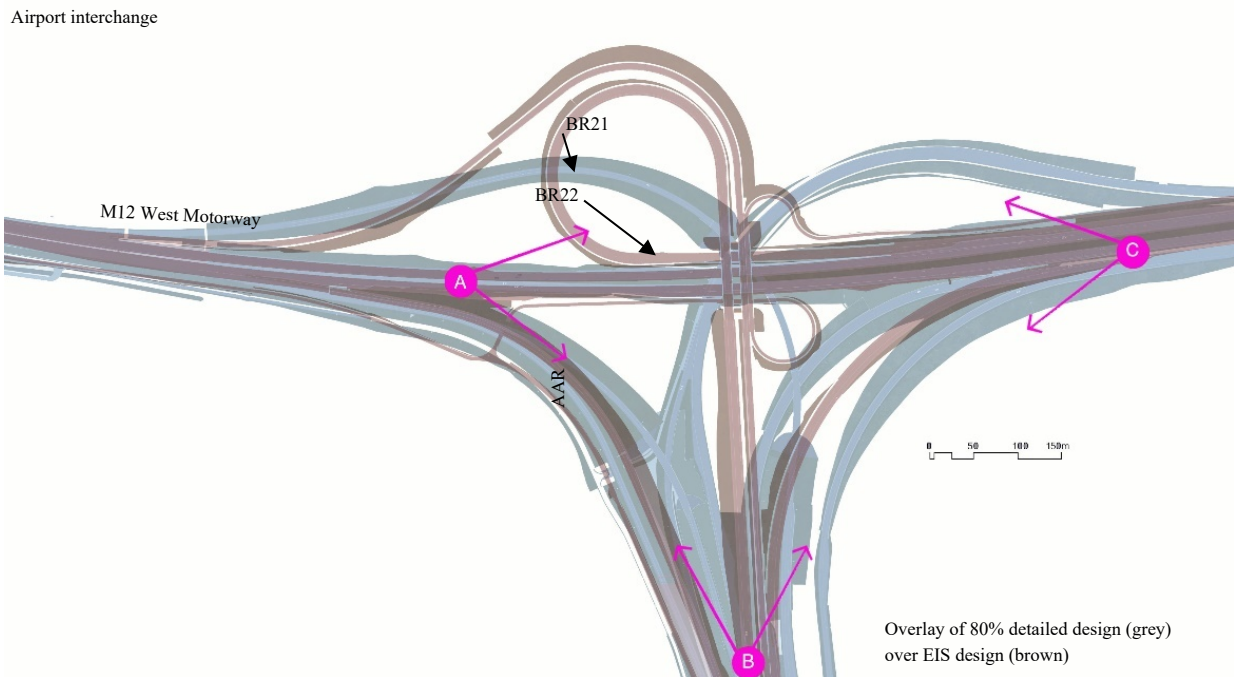


Figure 3-3 Viewpoint keyplan



Figure 3-4 Viewpoint A - 80% Concept Design



Figure 3-5 Viewpoint A - Proposed 80% Detailed Design

Project elements visible include:

- BR22 Bridge Airport Access Road (AAR) eastbound off-ramp and BR21 Bridge (M12W southbound off ramp to AAR) viewed together
- Artwork (Creation) at a distance on BR22
- Batters and earthworks
- Landscape works.

Potential viewers are predominantly motorists travelling along M12 Mainline, as there is no development within the visual catchment of this viewpoint.

ASSESSMENT

Although the visual elements have increased with the additional bridge BR22 and the viaduct beyond, the design has been developed to reduce their visual impact through the following:

- Elegantly designed bridge structures developed as a family of forms that reference other motorways in Sydney
- Allowing for framed views and visual transparency of the corridor
- Articulating the heights of the two bridges seen together to reduce their visual clutter
- Developing place making opportunities through:
 - The incorporation of an Emu sculpture located to the south of Viewpoint A, which has been developed with Aboriginal artists to provide an Aboriginal narrative and connection to country for the project
 - Developing a shared path system that provides for nodes and opportunities for heritage and cultural interpretation
- Feature landscape to soften the visual environment.

3.2.2 VIEWPOINT B – VIEW FROM AAR EASTBOUND OFF RAMP TO M12 WEST

Viewpoint B (Figure 3-6, Figure 3-7 and Figure 3-8) is located along the AAR looking north towards the Airport interchange. Views from this location will be experienced looking at BR21 (the viaduct) beyond.

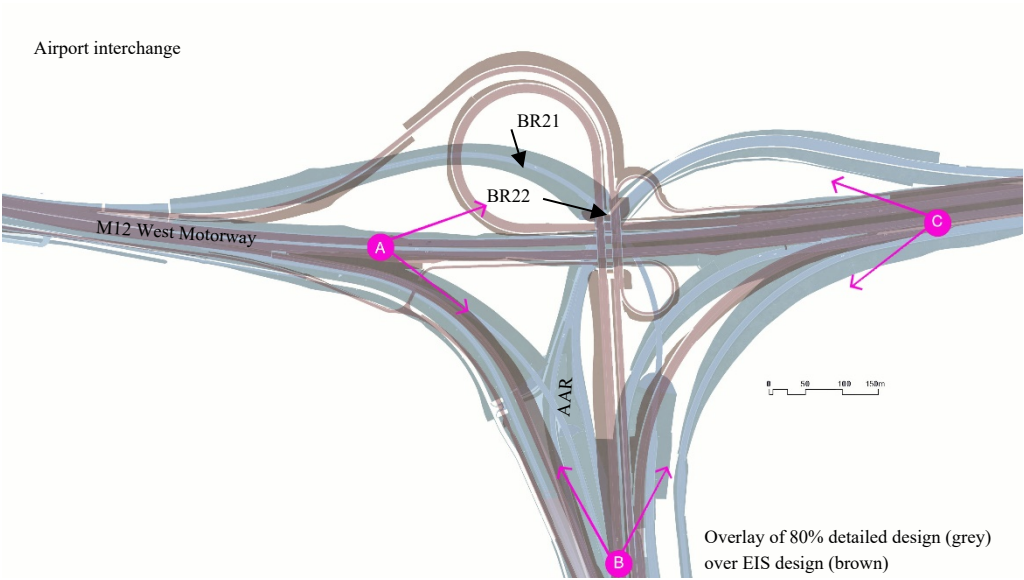


Figure 3-6 Viewpoint keyplan



Figure 3-7 Viewpoint B – 80% Concept Design



Figure 3-8 Viewpoint B – Proposed 80% Detailed Design

Project elements visible include:

- Viaduct BR21 beyond
- M12 Westbound on ramps from AAR
- Batters and earthworks around the M12W westbound on ramps from adjacent AAR
- Batters and earthworks
- Landscape works.

Potential viewers are predominantly motorists travelling along AAR eastbound off ramp to M12, as there is no development within the visual catchment of this viewpoint.

ASSESSMENT

Although the visual elements have increased with the additional bridge BR21 beyond, the design has been developed to reduce their visual impact through the following:

- Elegantly designed bridge structures developed as a family of forms that reference other motorways in Sydney
- Allowing for framed views and visual transparency of the corridor
- Articulating the visual envelope of the large viaduct structure to provide well-proportioned and elevated and sweeping curved profile, with spans maximised to maximize and frame views beyond
- Developing place making opportunities through:
 - The incorporation of an Emu sculpture located south of Viewpoint A, which has been developed with Aboriginal artists to provide an Aboriginal narrative and connection to country for the project
 - Developing a shared path system that provides for nodes and opportunities for heritage and cultural interpretation
- Feature landscape to soften the visual environment.

3.2.3 VIEWPOINT C - VIEW ALONG M12 TOWARDS AIRPORT INTERCHANGE LOOKING WEST

Viewpoint C (Figure 3-9, Figure 3-10 and Figure 3-11) is located along the main line of the proposed M12W Motorway and looking west towards the proposed BR21 bridge. Views from this location will be experienced looking at BR21 and BR22 beyond, together with BR21 sweeping over the lower bridge BR22.

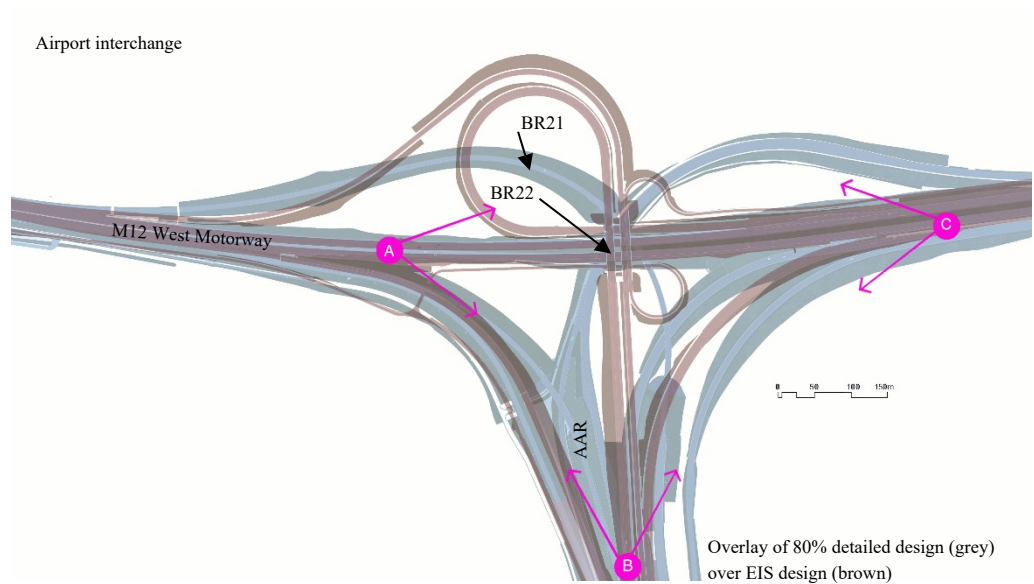


Figure 3-9 Viewpoint keyplan



Figure 3-10 Viewpoint C – 80% Concept Design



Figure 3-11 Viewpoint C – Proposed 80% Detailed Design

Project elements visible include:

- BR21 Bridge in the foreground with BR22 Bridge beyond viewed together
- Artwork (Creation) at a distance beyond on BR22
- Batters and earthworks
- Landscape works.

Potential viewers are predominantly motorists travelling along M12 Mainline, as there is no development within the visual catchment of this viewpoint.

ASSESSMENT

Although the visual elements have increased with the additional bridges BR21 and BR22, the design has been developed to reduce their visual impact through the following:

- Elegantly designed bridge structures developed as a family of forms that reference other motorways in Sydney
- Allowing for framed views and visual transparency of the corridor
- Articulating the heights of the two bridges seen together to reduce their visual clutter
- Developing place making opportunities through:
 - The incorporation of an Emu sculpture located south of Viewpoint A, which has been developed with Aboriginal artists to provide an Aboriginal voice and connection to country for the project
 - Developing a shared path system that provides for nodes and opportunities for heritage and cultural interpretation
- Feature landscape to soften the visual environment.

3.2.4 VIEWPOINT 7 – VIEW EAST ALONG ELIZABETH DRIVE

Viewpoint 7 (Figure 3-12, Figure 3-13 and Figure 3-14) is located along Elizabeth Drive looking east towards the proposed art bridge from Taylors Road. Views from this location are typical of the roadside experience along this portion of Elizabeth Drive, near the future WSIA site.

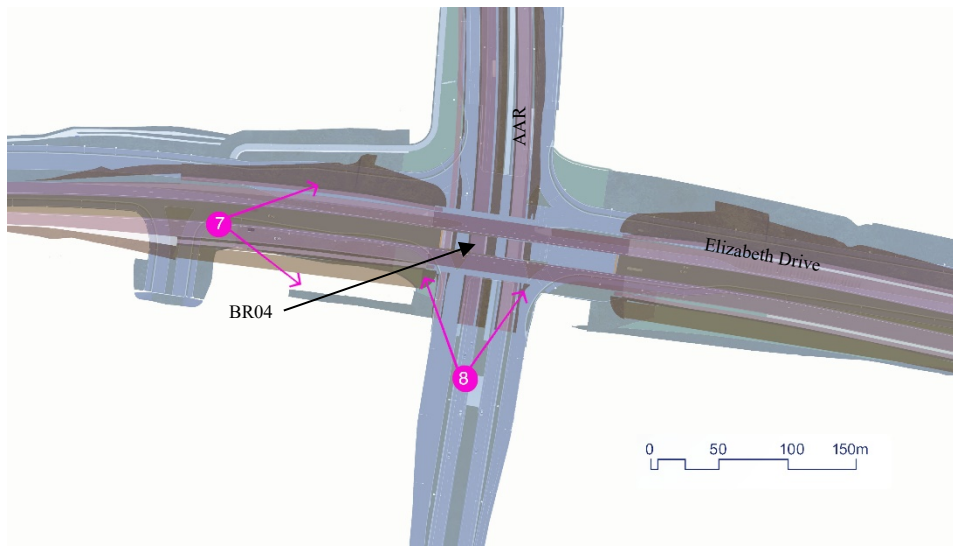


Figure 3-12 Viewpoint key plan



Figure 3-13 Viewpoint 7 - 80% Concept Design



Figure 3-14 Viewpoint 7- Proposed 80% Detailed Design

Project elements visible include:

- Road widening including major fill embankments along Elizabeth Drive leading towards the art bridge
- Art bridge (Mariong chases the male Emu) at a distance
- Minor vegetation clearing
- Landscape works.

Potential viewers are predominantly motorists travelling along Elizabeth Drive, as there are few residential dwellings within the visual catchment of this viewpoint.

ASSESSMENT

Although the visual elements have increased with the additional ramps, they would not be visible from Viewpoint 7 and therefore does not change the level of visual impact. The visual aesthetic has been enhanced with the provision of a feature bridge with art screens developed with Aboriginal artists to provide Connection to Country and enhance the overall user experience.

3.2.5 VIEWPOINT 8 – VIEW NORTH FROM BADGERYS CREEK ROAD

Viewpoint 8 (Figure 3-15, Figure 3-16 and Figure 3-17 and) is located on Badgerys Creek Road looking in a northerly direction to the proposed Elizabeth Drive art bridge and M12 intersection.

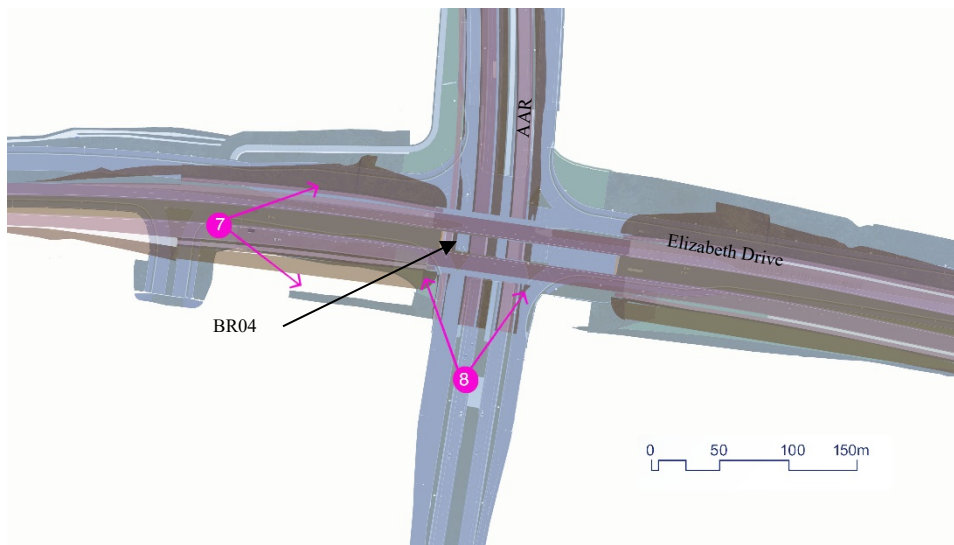


Figure 3-15 Viewpoint key plan



Figure 3-16 Viewpoint 8 - EIS 80% Concept Design



Figure 3-17 Viewpoint 8 - Proposed 80% Detailed Design

Project elements visible include:

- New motorway alignment including retaining structures grading toward Elizabeth Drive art bridge
- Art bridge (Marionng chases the male Emu)
- Road furniture
- Minor vegetation clearing
- Landscape works.

Potential viewers comprise of motorist heading north along Badgerys Creek Road and nearby residences, however, may reduce with the construction of the WSIA.

ASSESSMENT

The visual impact level will be slightly increased at this location due to the visibility of the additional ramp structures and retaining walls. However, the visual impact of these additional elements has been reduced through adopting the following design features:

- Elegantly designed bridge and retaining wall structures developed as a family of forms that reference other motorways in Sydney
- Developing place making opportunities through the use of feature retaining walls that provide connection to country with integrated artwork.

As part of the detailed design, lighting design has been undertaken in accordance with the requirements of Australian Standard 4282-2019 Control of the obtrusive effects of outdoor lighting, relevant Australian Standards in the series AS/NZ 1158 – Lighting for Roads and Public Spaces, and the National Airports Safeguarding Framework (NASF) Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports. The light poles have been located carefully to minimise light spillage to the surrounding environment and is consistent with the EIS design and therefore do not have any additional impacts. Potential to incorporate solar lighting in the design has been considered in the design.

4. ASSESSMENT SUMMARY

Table 4-1 summarises the comparison assessment between the Amendment Report and 80% detailed design. The changes in land use and future development in the area surrounding the M12 West Motorway due to the Western Sydney Aerotropolis Plan would change the existing rural nature of the environment to become more urban. The resultant visual impact due to this change in land use and future developments would be reduced as the surrounding area will become more urbanised and the Motorway will fit in more integrally as part of the urban fabric.

Table 4-1 Assessment summary

VIEWPOINT	AMENDMENT REPORT			80% DETAILED DESIGN			ASSESSMENT SUMMARY
A – New viewpoint (Figure 3-3, Figure 3-4 and Figure 3-5) View along M12W towards Airport interchange looking east	NA	NA	NA	Moderate	Moderate	Moderate	There would be limited views from nearby areas, against the existing rural-residential backdrop. The new elements introduced are generally similar in nature and within the footprint of the concept design boundary. Overall assessment is Moderate.
B – New viewpoint (Figure 3-6, Figure 3-7 and Figure 3-8) View from AAR eastbound off ramp to M12W	NA	NA	NA	Moderate	Moderate	Moderate	There would be limited views from nearby areas, against the existing rural-residential backdrop. The new elements introduced are generally similar in nature and within the footprint of the concept design boundary. Overall assessment is Moderate.
C – New viewpoint (Figure 3-9, Figure 3-10 and Figure 3-11) View along M12W towards Airport interchange looking west	NA	NA	NA	Moderate	Moderate	Moderate	There would be limited views from nearby areas, against the existing rural-residential backdrop. The new elements introduced are generally similar in nature and within the footprint of the concept design boundary. Overall assessment is Moderate.
7 – Existing viewpoint (Figure 3-12, Figure 3-13 and Figure 3-14) View east along Elizabeth Drive	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	There would be limited views from nearby areas, against the existing rural-residential backdrop. The new elements introduced are generally similar in nature and within the



VIEWPOINT	AMENDMENT REPORT			80% DETAILED DESIGN			ASSESSMENT SUMMARY
							footprint of the concept design boundary. Overall assessment is Moderate.
8 – Existing viewpoint (Figure 3-15, Figure 3-16 and Figure 3-17) View north from Badgerys Creek Road	Low	Moderate	Moderate-Low	Low	Moderate	Moderate-Low	There would be limited views from nearby areas, against the existing rural-residential backdrop. The new elements introduced are generally similar in nature and within the footprint of the concept design boundary. Overall assessment is Moderate-Low.

As shown in Figure 2-2 and Figure 2-3 of the Consistency Assessment, there may be a net increase in the overall proposed 80% detailed design construction and operational footprints from the AR Submissions Report, overall visual impact is consistent with the level of impact assessed in the EIS and Amendment Report. Additionally, appropriate mitigation measures as noted below have been provided to enhance the user experience and mitigate any additional impacts due to the amendments in the 80% detailed design. They are also aligned with the principles outlined in the EIS to provide Connection to Country, enhance the aesthetics of the bridges and structures and incorporate measures to re-establish natural systems.

- Elegantly designed bridge structures developed as a family of forms that reference other motorways in Sydney
- Allowing for framed views and visual transparency of the corridor
- Articulating the heights of the bridges where seen together to reduce visual clutter
- Developing place making opportunities through:
 - The incorporation of an Emu sculpture located to the south of Viewpoint A, (Figure 3-5) which has been developed with Aboriginal artists to provide an Aboriginal voice and connection to country for the project
 - Developing a shared path system that provides for nodes and opportunities for heritage and cultural interpretation.

Developing the Airport interchange design to incorporate feature landscape elements in the proposed articulated landforms and increase the visual prominence, thereby receding the visual prominence of the roadway elements.

5. CONCLUSION

Overall the Landscape character visual assessment/outcomes are consistent with the Approved Project.

5.1 MINISTER'S CONDITIONS OF APPROVAL

The proposed change has been assessed in Table 5-1 in relation to the relevant conditions of approval.

Table 5-1 Consistency against relevant Minister's conditions of approval for the project

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
E61	The CSSI must be constructed in a manner that minimises visual impacts of construction ancillary facilities, including but not limited to, providing temporary landscaping and vegetative screening of the construction sites, minimising light spill, and incorporating architectural treatment and finishes within key elements of temporary structures that reflect the context within which the construction sites are located	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E62	The CSSI must be constructed and operated with the objective of minimising light spillage to surrounding properties. All lighting associated with the construction and operation of the CSSI must be consistent with the requirements of <i>Australian Standard 4282-2019 Control of the obtrusive effects of outdoor lighting</i> , relevant <i>Australian Standards in the series AS/NZ 1158 – Lighting for Roads and Public Spaces</i> , and the <i>National Airports Safeguarding Framework (NASF) Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports</i> . Additionally, mitigation measures must be provided to manage residual night lighting impacts to protect properties adjoining or adjacent to the CSSI, in consultation with affected landowners.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E63	Active transport facilities must be designed, constructed and/or rectified in accordance with the <i>Guide to Road Design Part 6A: Paths for Walking and Cycling (Austroads, 2017)</i> and relevant Australian Standards (AS) such as <i>AS 1428.1-2009</i>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
	<i>Design for access and mobility.</i> The active transport links must also incorporate relevant Crime Prevention Through Environmental Design principles.	The Shared User Path within M12 West - Package has been designed to meet the requirements of Austroads 2017 and incorporates relevant Crime Prevention Through Environmental Design measures.	
E64	<p>The place, design and landscape outcomes of the CSSI must be informed by and be consistent with the Urban Design Concept and have consideration of the Urban Design Opportunities as detailed in <i>Appendix G Landscape character, visual impact assessment and urban design report</i> of the EIS.</p> <p>Advice on how the Urban Design Opportunities have been considered and progressed must be provided to the Planning Secretary for information when submitting the Place, Design and Landscape Plan (as required by Condition E69) to the Planning Secretary. Where an Urban Design Opportunity has not progressed, advice as to why must also be provided to the Planning Secretary for information.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E65	Landscaping must improve parkland, open space and native vegetation and fauna connectivity, including between areas of existing parkland and open space adjacent to and intersecting the CSSI, and through the revegetation of areas with local provenance species, where practicable, between adjoining areas of remnant Cumberland Plain Woodland to re-link them. In implementing these requirements, the Proponent must have regard to wildlife strike risk in proximity to the Western Sydney International Airport.	The M12 West - Package landscape design has been developed to improve native vegetation and fauna connectivity (i.e. Cosgroves Creek and Badgerys Creek) whilst taking into account the potential of wildlife strike risk given the proximity of the Western Sydney International Airport. Plant species selection will primarily include locally occurring native plants that are adapted to the climatic conditions and weather extremes of the Cumberland Plain. These indigenous species are generally drought tolerant once established and have a greater capacity to survive and recover from bushfires due to various pyrophytic adaptations. The plant species selected for landscaping are predominantly from the Cumberland Plain Woodland vegetation community that are well-adapted to the current climatic conditions and are best placed to survive the hotter and drier climate predicted for Western Sydney.	Yes
E67	The CSSI must minimise impacts on useable open space. Impacts to the Western Sydney Parklands must be mitigated and offset by an agreed direct payment for	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
	improved recreation and access infrastructure and a land compensation payment for the Western Sydney Parkland Trust to use in expanding the parklands. These payments will be in accordance with an agreement established with the Western Sydney Parkland Trust. All offsets must be delivered prior to operation, unless agreed by the Planning Secretary.	No useable open space presented in M12 West - Package. Western Sydney Parklands is located within the M12 Central and M12 East Packages.	
E68	<p>Place making, design and landscape outcomes must be informed by input and review by independent and qualified practitioners in the following fields (practitioners may cover more than one field if suitably qualified):</p> <ul style="list-style-type: none"> • public art / cultural interpretation public art; • Aboriginal cultural heritage; • European cultural heritage; • landscape architecture; and • active transport. <p>These practitioners must be approved by the Planning Secretary at least one (1) month before the commencement of construction and must hold current membership of a relevant professional body, unless otherwise approved by the Planning Secretary. These practitioners must be involved through participation in the Design Review Panel committed to by the Proponent in the documents listed in Condition A1, and in the development and review of the Place, Design and Landscape Plan.</p> <p>Advice and recommendations made by the practitioners must be provided to the Planning Secretary for information when submitting the Place, Design and Landscape Plan to the Planning Secretary.</p> <p><i>Note: The considerations that the Department will take into account when deciding to approve a practitioner are set out in 'Seeking Approval from the Department for the appointment of independent experts, Post approval guidance for Infrastructure Projects' (DPIE, 2020).</i></p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
E69	A Place, Design and Landscape Plan must be prepared to inform the final design of the CSSI and to give effect to the commitments made in the documents listed in Condition A1. The Plan does not apply to works, which for technical, engineering, or ecological requirements, or other requirements as agreed by the Planning Secretary, do not allow for alternate design outcomes.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E70	<p>The Place, Design and Landscape Plan must be prepared by a suitably qualified and experienced person in consultation with relevant councils, Western Sydney Parklands Trust, Heritage NSW, the community and affected landowners and businesses. The Place, Design and Landscape Plan must include, but not be limited to:</p> <ul style="list-style-type: none"> a an analysis of the built, natural, heritage and community context and the urban design objectives, principles and standards for the CSSI; b identification of opportunities for heritage interpretation during design and construction consistent with the Heritage Interpretation Plan required by Condition E27; c the design of the CSSI elements including their form, materials and detail; d the design of the CSSI landform and earthworks; NSW Government 45 Department of Planning, Industry and Environment Conditions of Approval for M12 Motorway SSI 9364 e the location of existing vegetation, areas of vegetation to be retained and proposed planting and seeding details, including the use of local indigenous species for revegetation activities. f active transport infrastructure, including amenities to be provided along the shared user path; g developed visualisations, cross sections and plans showing the proposed design outcome; 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
	<ul style="list-style-type: none"> h demonstrated integration of Crime Prevention Through Environmental Design principles into the detailed design process; and i details of strategies to rehabilitate, regenerate or revegetate disturbed areas including riparian corridors and successfully establish and maintain the resulting new landscape and associated elements. 		
E71	<p>Revegetation and the provision of replacement trees must be informed by a Tree Survey undertaken during detailed design. The Tree Survey must identify the number, type and location of any trees to be removed. The Tree Survey must be submitted to the Planning Secretary for information with the Place, Design and Landscape Plan.</p> <p>Where trees are to be removed, the Proponent must provide a net increase in the number of replacement trees at a ratio of 2:1, except trees that are offset under Condition E3. Replacement trees must have a minimum pot size consistent with the relevant authority's plans / programs / strategies for vegetation management, street planting, or open space landscaping, or as agreed by the relevant authority(ies).</p> <p><i>Note: For the purposes of this condition, the relevant authority is that State or local government authority that owns or manages the land on which the replacement trees will be planted.</i></p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E72	Construction of permanent surface built works or landscaping that are the subject of the Place, Design and Landscape Plan must not be commenced (in the area to which the Place, Design and Landscape Plan applies) until the Place, Design and Landscape Plan has been submitted to the Planning Secretary for information, after considering advice received from the Design Review Panel committed to by the Proponent.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E73	The Place, Design and Landscape Plan must be implemented during construction and operation.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
E74	The ongoing maintenance and operation costs of place, open space, landscaping and recreational items and work implemented as part of this approval remain the Proponent's responsibility until satisfactory arrangements have been put in place for the transfer of the asset to the relevant authority. Before the transfer of assets, the Proponent must maintain items and work to at least the maintenance requirements established in the Place, Design and Landscape Plan, required by Condition E69.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

5.2 STATEMENT OF COMMITMENTS / ENVIRONMENTAL MANAGEMENT MEASURES

The proposed changes have been assessed in Table 5-2 in relation to the relevant commitments / environmental management measures in the context of the Division 5.2 Approval.

Table 5-2 Consistency against relevant Statement of Commitments / environmental management measures

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
LVIA01	<p>An Urban Design and Landscape Plan (UDLP) will be prepared to minimise landscape character and visual impacts, and detail and guide the implementation of landscape features to be installed as part of the project, including re-vegetation requirements.</p> <p>This will include requirements for the provision of vegetative screening to soften the appearance of structural elements of the project such as noise barriers and provide screening of sensitive views. The UDLP will also consider the requirements of the heritage interpretation framework that will be prepared for the project (NAH02).</p> <p>The UDLP will be prepared in accordance with applicable guidelines, be consistent with the concept project identity in the EIS and relevant urban design objectives and principles for the project including consideration of implementation of Crime Prevention Through Environmental Design (CPTED) principles, and in consultation with relevant councils.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
LVIA02	A detailed Landscape Plan will be prepared for the project and implemented throughout construction. The plan will guide the implementation of measures to minimise landscape character and visual impacts, including revegetation requirements.	The detailed design of the M12 West - Package includes an Urban Design Package (ref: M12WDD-WSP-ALL-DU-RPT-000001) and a Landscape Design Package (ref: M12WDD-WSP-ALL-LA-RPT-000001) which guide the implementation of measures to minimise the landscape character and visual impacts of the project. For example, the planting schedules for the planting mixes have been developed to reflect the Landscape Character Zones identified in the Urban Design Framework (M12PPW-HAS-ALL-DU-RPT-000001) (prepared by Hassell). The detailed design landscape plans show the extent of revegetation and implementation methods.	Yes
LVIA03	Existing vegetation within the construction footprint will be retained and protected where possible. This includes densely vegetated areas such as remnant riparian forests and Cumberland Woodlands in Western Sydney Parkland	The extent of native vegetation clearing for the M12 West - Package as a whole is documented in the Vegetation Clearing Report and Map (M12WEN08) (ref: M12WDD-WSP-ALL-EO-MEM-000002).	Yes
LVIA04	Site levels and grades for the project will integrate with the surrounding terrain to help the visual assimilation of the project into the surrounding landscape where practicable. Engineered slopes will have gradients no steeper than 3H:1V where possible to maximise the establishment of vegetation on these batters and allow for appropriate maintenance.	Due to the project boundary constraints and requirements associated with the engineering design, many of the engineered batters are 2H:1V. However, where possible, batters surrounding the Interpretive Nodes and the interpretative mounding proposed within the landscape areas of the Airport Interchange will be 3H:1V or shallower.	Yes
LVIA05	Project elements such as ancillary facility hoardings will be designed and maintained to minimise impacts on landscape character and visual amenity. This will include selecting colours and materials that are visually recessive and blend into the surrounding landscape where practicable, and the prompt removal of graffiti.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
LVIA06	Where noise mitigation such as noise barriers are required, they will be designed with the aim of minimising visual impacts	The Noise and Vibration Assessment Report prepared for the M12 Motorway by GHD (December 2020) (ref: M12PPW-TFNSW-ALL-NV-RPT-000001) did not identify the need for noise barriers or	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
		mounds as part of the M12 West package. With respect to the M12 West - Package, the only noise mitigation requirement applicable is the requirement for the pavements to be Low Noise Diamond Grind (LNDG) and at-property treatments.	
LVIA07	<p>Temporary and permanent lighting will be designed and implemented with consideration of:</p> <ul style="list-style-type: none"> • The need to orientate lighting to minimise light spill and glare impacts on nearby receivers • The need to minimise vandalism and maintenance requirements • Requirements of the National Airports Safeguarding Framework (NASF) (National Airports Safeguarding Advisory Group, n.d.) for operational lighting • Opportunities to implement sustainability initiatives in design such as energy efficient or solar lighting. 	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>Lighting design has been undertaken in accordance with the requirements of Australian relevant Standards. And NASF guidelines. The light poles have been located carefully to minimize light spillage to the surrounding environment and is consistent with the EIS design and therefore do not have any additional impacts. Potential to incorporate solar lighting in the design has been considered in the design.</p>	Yes
LVIA08	TfNSW will investigate opportunities to undertake early tree planting in consultation with landowners to soften impact of structural elements and screen sensitive views.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
LVIA09	The findings and recommendation of the Aboriginal cultural heritage design process managed by Balarinji will be incorporated into the urban design and implemented as part of the project, including interpretive initiatives.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
LVIA10	Shared user paths to be delivered as part of the project will not preclude connections to future open space corridors and land use as identified in the Western Sydney Land Use and Infrastructure Implementation Plan (LUIIP) (DPE 2018). Where further design of adjacent open space corridors is undertaken, shared user paths will be provided to connect at an appropriate location. Shared user paths	The strategy to provide shared path connections to future open space corridors is outlined in the Urban Design Framework (ref: M12PPW-HAS-ALL-DU-RPT-000001) and is envisaged to be further developed as appropriate in the UDLP (ref: M12WDD-WSP-ALL-LA-RPT-000001). The shared path locations have been designed to	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
	will be designed to be located away from road-side edges to provide an immersive landscape experience for pedestrians and cyclists, where possible.	be located away from road-side edges to provide an immersive landscape experience for pedestrians and cyclists, where possible.	
LVIA11	Establish an Urban Design Review Panel to provide advice and input into the development of the UDLP.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
LVIA12	Highly visible elements of the project including potential noise barriers, retaining walls, bridge structures and urban design material selection will be designed to satisfy functional requirements and adopt the design principles detailed in the M12 Motorway EIS Landscape Character, Visual Impact Assessment and Urban Design Report. The proposed designs will be documented in the relevant UDLP for the project.	<p>Urban design treatments incorporated into the detailed design of bridges include:</p> <ul style="list-style-type: none"> • Individual columns with independent headstock • Reducing the number of required columns • Curved, boat-shaped pier headstocks • Urban design treatments incorporated into the detailed design of retaining structures (i.e. walls) include: <ul style="list-style-type: none"> • A standard design philosophy across all retaining walls • Selection of facing panels, to match the urban design requirements of the project • Feature architectural cladding that ties in with the wider project • Noise barriers and noise mounds were not required as part of the M12 West package. 	Yes
LVIA13	Consider a standard design for retaining walls and major structures across the project, to present a coordinated 'suite of elements'.	Standard bridge barrier and Super-T sections used across the bridges within the M12 West - Package detailed design. A standard design has been adopted for all retaining structures (i.e. walls) which also includes the selection of facing panels.	Yes
LVIA14	The project must consider CPTED principles during detailed design to minimise safety risks to all users. The project must carry out periodic CPTED reviews by a qualified professional and implement any additional recommendations where reasonable and feasible.	<p>The M12 West - Package detailed design has incorporated the following CPTED measures:</p> <ul style="list-style-type: none"> • Maintain clear sight lines for visual transparency along the full length of bridges with an alignment that allows to see through the two ends of a bridge 	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
		<ul style="list-style-type: none"> • Maintain clear sight lines for visual transparency along the full length of retaining structures (i.e. walls) • Avoid abrupt transitions at interfaces between shared user path and bridge structures • Avoid abrupt transitions at the end of retaining walls • Avoid hidden pockets or black spots to reduce the occurrence of illegal activity • Provide clear sight lines and alert users to be aware of oncoming pedestrian and cyclist traffic. 	
LVIA15	<p>A tree management strategy will be prepared for the project, outlining:</p> <ul style="list-style-type: none"> • Measures to minimise tree removal to retain and protect as many trees within the construction footprint as reasonable and feasible • Measures to avoid damage to trees that are to be retained within the construction footprint to ensure the maintenance of health and stability of the trees in accordance with AS4970-2009 Protection of trees on development sites • Requirements for the pruning of trees to be carried out by a suitably qualified person in accordance with AS 4373-2007 Pruning of amenity trees • Consideration of maintenance requirements and safety standards • Requirements for the replacement trees where removal cannot be avoided including: <ul style="list-style-type: none"> – Net increase in the number of trees (not identified as within an EEC) – Where it is not practicable to plant trees in the operational footprint an alternative location will be identified in consultation with relevant councils and in consideration of future development in the local area – Minimum pot size in accordance with part 3.2.1 (Rural road reserves) in the TfNSW Landscape Guideline (2018) subject to long-term viability of the plant. 	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
LVIA16	Revegetation for the project will consider the land use requirements of the National Airports Safeguarding Framework (NASF) (National Airports Safeguarding Advisory Group, n.d.) to minimise the risk of wildlife strikes at the Western Sydney Airport.	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The M12 West - Package detailed design for Landscaping (M12WLW01) (ref: M12WDD-WSP-ALL-LA-RPT-000001) is currently being developed with input/advice from an aviation ecologist (Biodiversity Australia).</p>	Yes
LVIA17	Carry out appropriate soil analysis and identify soil preparation requirements for landscaping treatments to inform the Urban Design and Landscaping Plan and vegetation management in accordance with TfNSW Batter Surface Stabilisation Guideline (Roads and Maritime 2015).	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes
LVIA18	Species selected for landscaping will consider species that are resilient to future modelled climatic conditions and are suitable for establishment on road embankments.	<p>Future modelled climatic conditions indicate that Western Sydney will continue to experience regular extreme heat events. The plant species selected for landscaping are predominantly from the Cumberland Plain Woodland vegetation community that are well-adapted to the current climatic conditions and are best placed to survive the hotter and drier climate predicted for Western Sydney. Tree species from the Cumberland Plain Woodland, including Eucalyptus crebra, Eucalyptus tereticornis, Corymbia maculata and Melaleuca stypheloides, which are specified throughout the project, were recorded as having no to minimal canopy damage following a visual assessment after the highest temperature ever recorded in Sydney, of 48.9 degree celsius in 2020. This assessment was conducted by the Which Plant Where project funded by the Hort Frontiers Green Cities Fund, Macquarie University, Western Sydney University and the NSW Office of Environment and Heritage.</p>	Yes

5.3 EPBC APPROVAL

The proposed changes in landscape and visual character management measures at detailed design do not constitute to any change in project aspects related to the EPBC approval.

6. REFERENCES

Transport for NSW, dated October 2019, M12 Motorway Environmental Impact Statement

Transport for NSW, October 2020, M12 Motorway Submissions Report

Transport for NSW, October 2020, M12 Motorway Amendment Report

Transport for NSW, December 2020, M12 Motorway Amendment Report - Submissions Report

Appendix D

Aboriginal heritage consistency assessment memo



11 August 2021

Suzette Graham, Senior Environment Officer
Sydney Infrastructure Development | Safety, Environment and Regulation
Transport for NSW
27 Argyle Street
Parramatta NSW 2150

Dear Suzette,

**RE. M12 Motorway Project (SSI-9364) West Package
Consistency Assessment – EIS Boundary Adjustment Review
Aboriginal Cultural Heritage**

Introduction and project background

Transport for NSW (TfNSW) are proposing to construct and operate the M12 Motorway project (the project) to provide direct access between the Western Sydney International Airport at Badgerys Creek and Sydney's motorway network. The M12 Motorway would run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for a distance of about 16 kilometres and is expected to be opened to traffic prior to opening of the Western Sydney International Airport.

This Consistency Assessment is for the M12 Motorway - West Package, between The Northern Road, Luddenham and approximately 250 metres east of Badgerys Creek. It is proposed to be a four-lane dual-carriageway motorway with a central median for future six lanes, including a new grade separated interchange with the Airport Access Road to provide connection to the Western Sydney International Airport. An overview of the M12 Motorway - West Package is illustrated in Figure 1.

As part of design development during detailed design for the M12 Motorway - West Package (shown in Figure 1) changes requiring further environmental assessment have been identified. The Consistency Assessment is based on the 80% detail design submission.

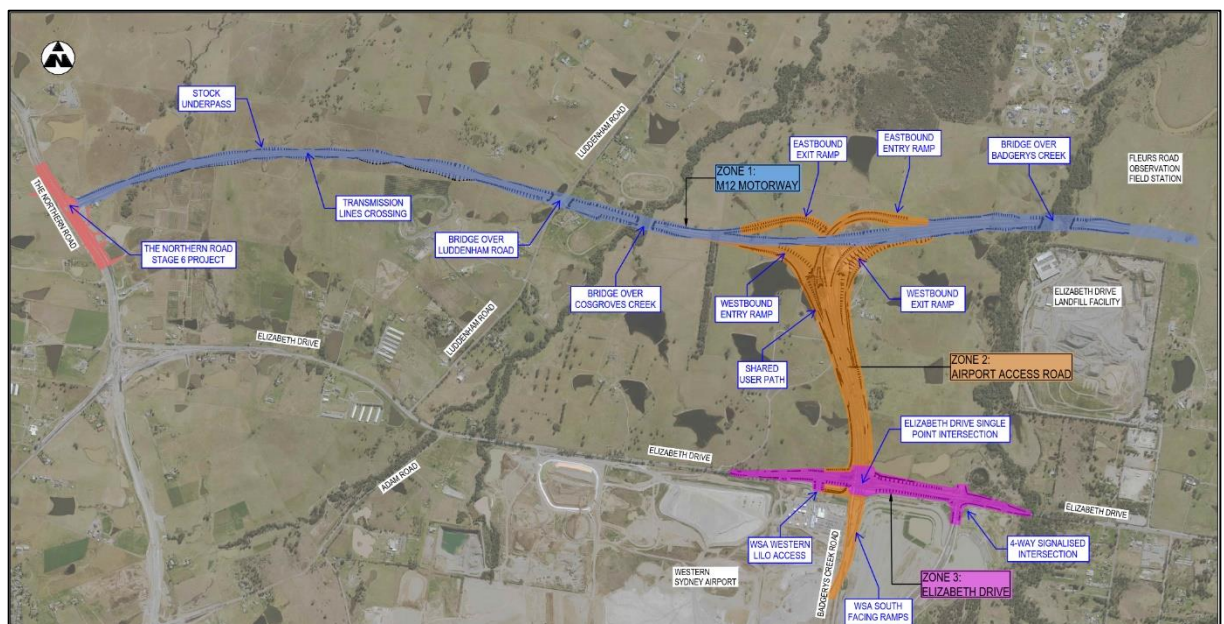


Figure 1. M12 Motorway - West Package project overview.

The project was approved by the Minister for Planning and Public Spaces on 23 April 2021. TfNSW must carry out the CSSI in accordance with the conditions of approval and the following project documentation:

- (a) M12 Motorway Environmental Impact Statement (EIS) (dated October 2019);
- (b) M12 Motorway Submissions Report (dated October 2020);
- (c) M12 Motorway Amendment Report (dated October 2020);
- (d) M12 Motorway Amendment Report - Submissions Report (dated December 2020); and
- (e) M12 Motorway Amendment Report - Submissions Report - Amendment (dated 8 March 2021).

Project documentation specific to Aboriginal cultural heritage includes:

Jacobs Arcadis Joint Venture, October 2019. *M12 Motorway Environmental Impact Statement: Appendix I Aboriginal Cultural Heritage Assessment Report*. Report to Roads and Maritime Services.

Jacobs Arcadis Joint Venture, October 2019. *M12 Motorway Environmental Impact Statement: Archaeological Assessment Report*. Prepared for Roads and Maritime Services.

Jacobs Arcadis Joint Venture, October 2020. *M12 Motorway Amendment Report: Appendix E Aboriginal heritage supplementary technical memorandum*. Prepared for TfNSW.

Consistency assessment

In the event of proposed changes to the M12 Motorway Approved Project, a review for consistency is required by the proponent for the construction and operational phases of the M12 Motorway - West Package. The Consistency Assessment will determine if the proposed changes are generally in accordance with the impacts of the approved project and satisfy the requirements of the Planning Approval (Division 5.2 Approval) dated 23 April 2021 and Commonwealth Approval (EPBC Approval) dated 3 June 2021. A detailed description of the project as described in the Division 5.2 Approval and EPBC Approval dated 3 June 2021 is provided in Chapter 5 of the EIS. The amended project is detailed in Chapter 2 of the Amendment Report and Chapter 1 of the Amendment Report Submissions Report.

The proposed changes to M12 Motorway – West Package include the following:

- Airport interchange revised to a free flow directional interchange
- Elizabeth Drive and Airport Access road intersection revised to a single point interchange, comprising:
 - Two separate bridges over the Airport Access Road
 - New entry and exit ramps for access to the Airport Access Road and Elizabeth Drive
 - All ramps on the Airport Access Road between the Airport Interchange and Elizabeth Drive realigned
 - Intersection to the west of the Airport Access Road and Elizabeth Drive replaced with a left in, left out arrangement from the Western Sydney International Airport and the northern stub road removed
- Intersection to the east of the Airport Access Road and Elizabeth Drive refined to align with the as-built Badgerys Creek Road
- Elizabeth Drive relocated to the north by about 10 metres at the single point interchange, east of the Airport access Road
- Extension of the Airport Access Road and southbound ramp to tie into the Western Sydney International Airport internal road network (area within Airport land to be assessed and approved in the Airport Approval)
- Reconfiguring BR02 and BR05 at Cosgroves Creek and Badgerys Creek, respectively
- Extending and refining existing utilities relocation designs, including electrical mains and additional water main crossings
- Modification to one operational water quality basin and four additional construction water quality basins
- Refinements to drainage and water quality infrastructure across the M12 West project, including culverts, open channels and cross drainage
- Additional construction access road to the north of BR20
- Amendments to the private property access on Elizabeth Drive west of the Airport Access Road
- Installation of a Variable Messaging Sign (VMS) on the southbound carriageway of The Northern Road Stage 6.

The proposed changes would result in changes to the construction and operation footprints of the project. The proposed changes are shown in Figure 2.

Kelleher Nightingale Consulting Pty Ltd (KNC) were engaged to review the proposed changes in terms of impacts to Aboriginal heritage and identify if they are consistent with the Approved project or if additional or reduced impacts are predicted. Assessed boundary adjustment areas were identified where the construction and operational boundary has changed since the finalisation of the project documentation described above and the issue of project approval and now exceeds the previously approved project boundary (Figure 2).

Assessment process

Aboriginal heritage was assessed for the EIS and Amendment Report in the *M12 Motorway Environmental Impact Statement: Appendix I Aboriginal Cultural Heritage Assessment Report*, *M12 Motorway Environmental Impact Statement: Archaeological Assessment Report*, and *M12 Motorway Amendment Report: Appendix E Aboriginal heritage supplementary technical memorandum*.

The majority of boundary adjustment areas fall within the 'detailed investigation area' previously assessed for Aboriginal cultural heritage during preparation of the EIS, Amendment Report and Amendment Report Submission Report. Identified Aboriginal archaeological sites are shown in Figure 1 and include the following:

- TNR AFT 14
- Isolated artefact 4
- CCW (part of Cosgroves Creek Complex Aboriginal site complex)
- CCE T1 (part of Cosgroves Creek Complex Aboriginal site complex)
- CCE T2 (part of Cosgroves Creek Complex Aboriginal site complex)
- CCE T3 (part of Cosgroves Creek Complex Aboriginal site complex)
- M12A1 (part of South Creek Complex Aboriginal site complex)
- BCW (part of South Creek Complex Aboriginal site complex)
- BCE (part of South Creek Complex Aboriginal site complex), and
- BWB (part of Badgerys Creek Upstream Complex Aboriginal site complex).

Sites are described in Chapter 7.5 of the EIS, and Chapter 6.5 of the Amendment Report.

The consistency assessment also undertook an updated search of the Aboriginal Heritage Information Management System (AHIMS) database to confirm the location and status of Aboriginal archaeological sites. Search results are attached as Appendix A. The AHIMS search is consistent with the findings of the EIS, Amendment Report and Amendment Report Submissions Report.

The Approved M12 West Amendment Report Submissions Report construction footprint partially or totally encompasses the identified sites listed above and they will be impacted by the M12 Motorway - West Package. Impacts to the sites from the proposed M12 Motorway - West Package boundary adjustments are considered to be consistent with the existing impacts identified in the EIS, Amendment Report and Amendment Report Submissions Report. As the impacts are considered to be consistent, the existing management requirements and recommendations for the sites should be maintained for the boundary adjustment areas.

A small section of the proposed boundary adjustment extends beyond the 'detailed investigation area' previously assessed for Aboriginal cultural heritage during preparation of the EIS, Amendment Report and Amendment Report Submissions Report. This area is located within Lot 101 DP848215, east of Cosgroves Creek and approximately 200 metres south of Aboriginal archaeological site CCE T1. The revised AHIMS search did not identify any additional Aboriginal archaeological sites within or near this construction footprint change. No Aboriginal objects, archaeological sites or areas of Aboriginal archaeological potential were identified or considered likely to occur within this area.

Result

The identified changes to Aboriginal heritage impacts from the 80% detailed design can be considered consistent with the Approved project. The Aboriginal heritage revised environmental management measures detailed in Section 7.1 of the Amendment Report Submissions Report will be maintained and implemented for the construction footprint amendments.

No further Aboriginal archaeological assessment is warranted.

If you have any questions, please do not hesitate to contact me on 02 9232 5373.

Yours sincerely



Dr Matthew Kelleher
Director/Archaeologist
Kelleher Nightingale Consulting Pty Ltd

FIGURE REDACTED

Figure2. Comparison of Amendment Report Submissions Report and 80% detailed design construction footprint

Appendix A – AHIMS Search Results

APPENDIX REDACTED

APPENDIX REDACTED

APPENDIX REDACTED

APPENDIX REDACTED

APPENDIX REDACTED

Appendix E

Non-Aboriginal heritage consistency assessment memo

MEMO

TO: Transport for NSW

FROM: Artefact

SUBJECT: **Non-Aboriginal Heritage Consistency Assessment**

OUR REF: M12WDD-WSP-ALL-EN-MEM-000017.docx

DATE: **22 September 2021**

Document history and status

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
1	21 June 2021	Duncan Jones	Josh Symons	24 June 2021	Draft
2	29 June 2021	Sarah Saunders	Duncan Jones	9 July 2021	Revised draft
3	6 August 2021	Duncan Jones	Sarah Saunders	6 August 2021	Revised draft
4	3 September 2021	Duncan Jones	Sarah Saunders	6 September 2021	Final

Project name:	M12 Motorway Package West Consistency Assessment
Author:	Sarah-Jane Zammit, Olivia Turner
Project manager:	Duncan Jones
Project number:	21111
Name of organisation:	Artefact Heritage
Document version:	Final

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1. INTRODUCTION

1.1 PROJECT DESCRIPTION

Transport for NSW (TfNSW) are proposing to construct and operate the M12 Motorway project (the project) to provide direct access between the Western Sydney International Airport at Badgerys Creek and Sydney's motorway network. The M12 Motorway would run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for a distance of about 16 kilometres and is expected to be opened to traffic prior to opening of the Western Sydney International Airport.

This Consistency Assessment is for the M12 Motorway - West Package, between The Northern Road, Luddenham and approximately 250 metres east of Badgerys Creek. It is proposed to be a four-lane dual-carriageway motorway, including a new grade separated interchange with the Airport Access Road to provide connection to the Western Sydney International Airport. An overview of the M12 Motorway - West Package is illustrated in Figure 1-1.

Detailed design for the M12 Motorway - West Package is being completed and has resulted in changes requiring further environmental assessment. During design development of detail design changes requiring further environmental assessment have been identified. The Consistency Assessment is based on the 80% detail design submission.

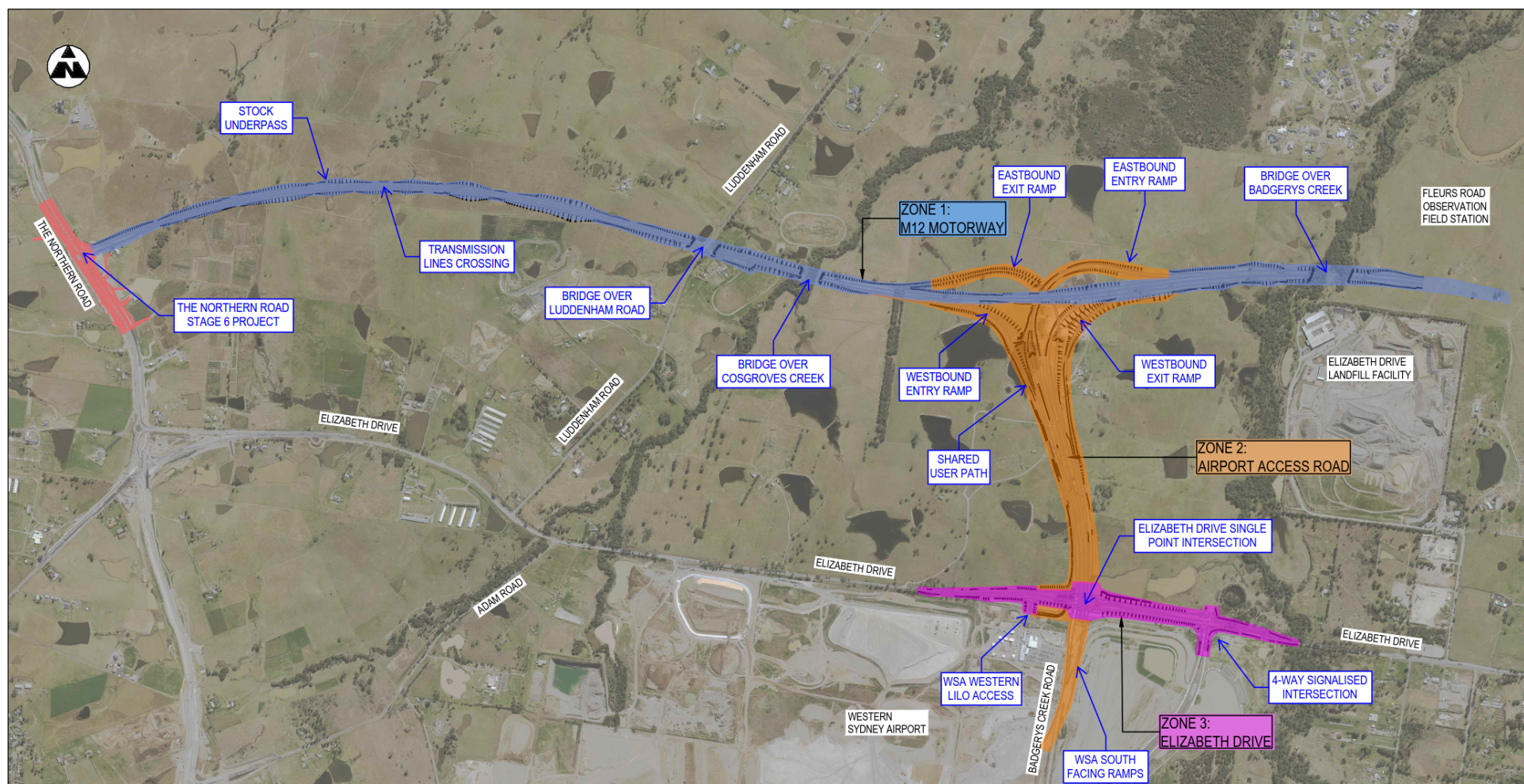


Figure 1-1 M12 Motorway – West Package overview – key features

1.2 SCOPE OF THIS REPORT

In the event of proposed changes to the M12 Motorway Approved Project, a review for consistency is required by the proponent for the construction and operational phases of the M12 Motorway – West Package. The Consistency Assessment will determine if the proposed changes are generally in accordance with the impacts of the approved project and satisfy the requirements of the Planning Approval dated 23 April 2021 and Commonwealth Approval dated 3 June 2021.

This memo provides a review of the proposed changes in terms of impacts to non-Aboriginal heritage and identifies if they are consistent with the Approved Project or if additional or reduced impacts are predicted.

1.3 DESCRIPTION OF PROPOSED CHANGE

The project as described in the Division 5.2 Approval and EPBC Approval dated 3 June 2021 is outlined in Section 1.2 of the Consistency Assessment and a detailed description is provided in Chapter 5 of the Environmental Impact Assessment (EIS) (Roads and Maritime, 2019). The amended project is detailed in Chapter 2 of the Amendment Report (Transport for NSW, 2020a) and Chapter 1 of the Amendment Report Submissions Report (AR Submissions Report) (Transport for NSW, 2020).

The proposed changes to M12 Motorway – West Package include the following and shown in Figure 2-1 of the Consistency Assessment:

- Airport interchange revised to a free flow directional interchange
- Elizabeth Drive and Airport Access Road intersection revised to a single point interchange, comprising:
 - Two separate bridges over the Airport Access Road
 - New entry and exit ramps for access to the Airport Access Road and Elizabeth Drive
- All ramps on the Airport Access Road between the Airport Interchange and Elizabeth Drive realigned
- Intersection to the west of the Airport Access Road and Elizabeth Drive replaced with a left in, left out arrangement from the Western Sydney International Airport and the northern stub road removed
- Intersection to the east of the Airport Access Road and Elizabeth Drive refined to remove the northern stub road
- Elizabeth Drive widened to the north by about 10 metres at the single point interchange, east of the Airport Access Road
- Extension of the Airport Access Road and southbound ramp to tie into the Western Sydney International Airport internal road network (area within Airport land to be assessed and approved in the Airport Approval)
- Reconfiguring BR02 and BR05 at Cosgroves Creek and Badgerys Creek respectively
- Extending and refining existing utilities, including low voltage mains and additional water main crossings
- Modification to one operational water quality basin and four additional construction water quality basins
- Refinements to drainage and water quality infrastructure across the M12 Motorway – West Package, including culverts, open channels and cross drainage
- Additional construction access road to the north of BR20
- Amendments to the private property access on Elizabeth Drive west of the Airport Access Road
- Installation of a Variable Messaging Sign (VMS) on the southbound carriageway of The Northern Road Stage 6.

1.4 AUTHORS AND ACKNOWLEDGEMENTS

This report has been prepared by Sarah-Jane Zammit (Senior Heritage Consultant), Olivia Turner, (Heritage Consultant), and reviewed by Duncan Jones (Principal). Management input and review has been provided by Josh Symons (Technical Director).

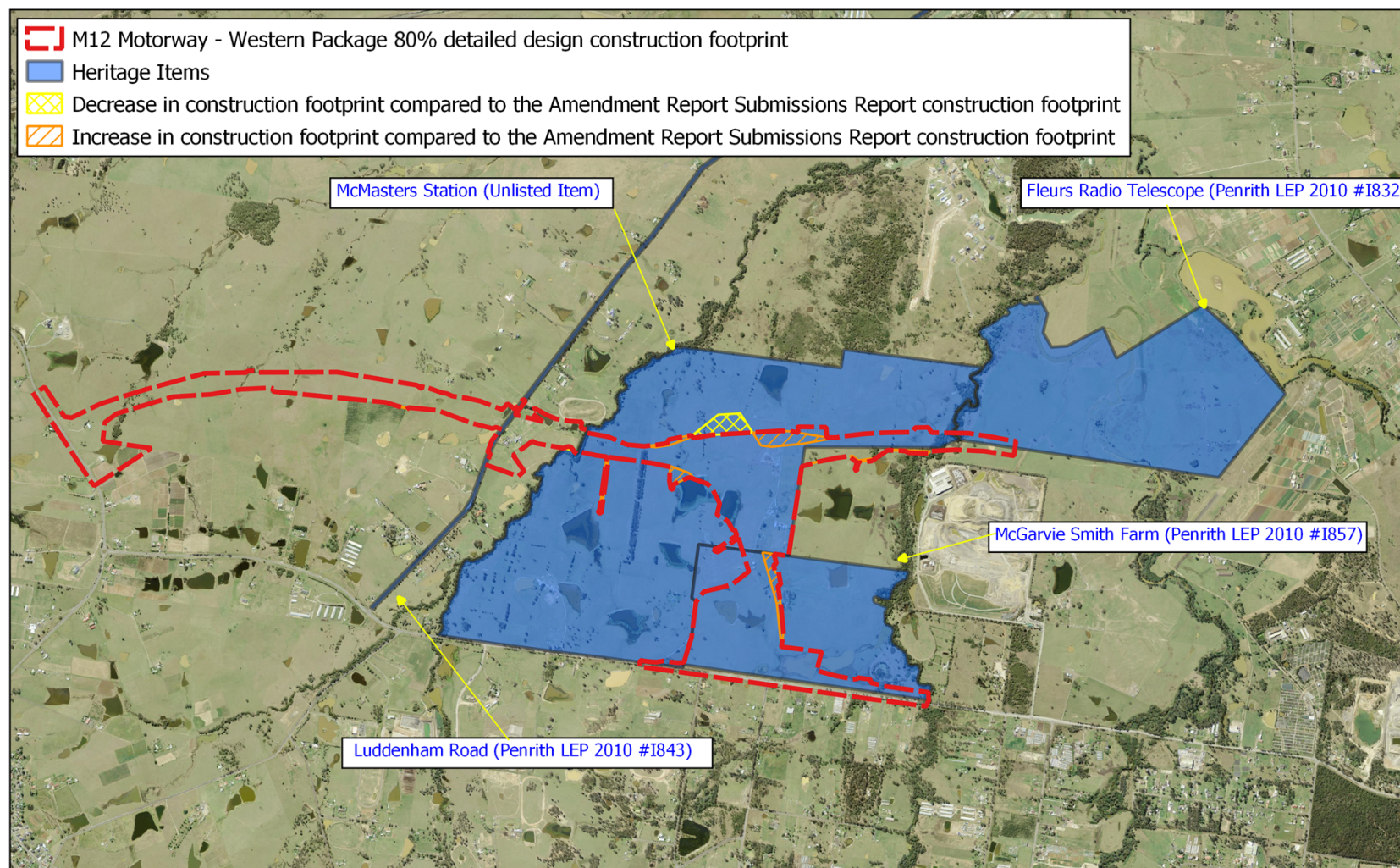
2. ASSESSMENT OF HERITAGE SIGNIFICANCE

2.1 INTRODUCTION

The following significance assessment and discussion of listed and potential heritage items within the M12 Motorway - West Package construction footprint has been sourced from Section 7.6 EIS non-Aboriginal heritage assessments for M12 Motorway project.

Statements of significance presented in this memo have only been supplied for those items within the M12 Motorway - West Package 80% detailed design construction footprint. Assessments of significance have not been provided for items described in the EIS which were assessed as not reaching the threshold of local heritage significance.

The location of heritage items with respect to the M12 Motorway - West Package 80% detailed design construction footprint is shown in Figure 2-1.



Motorway - Western Package 80% detailed design construction footprint and Heritage Curtilages
21113 M12 Non-Aboriginal Heritage Consistency Assessment
 LGA: Penrith

Scale: 1:32,000
 Size: A4
 Date: 06-09-2021

0 900 1,800 m



Figure 2-1: Location of heritage items with respect to the M12 Motorway - West Package 80% detailed design construction footprint

2.2 MCGARVIE SMITH FARM

2.2.1 ASSESSMENT OF SIGNIFICANCE

The McGarvie Smith Farm is listed on the Penrith Local Environment Plan 2010 (Penrith LEP) (I857) as an item of local heritage significance. The EIS assessment identified that the McGarvie Smith Farm may be an item of State heritage significance however this item has not been nominated or listed on the State Heritage Register (SHR).

An assessment of significance for the heritage item has been sourced from the Non-Aboriginal Heritage technical paper from the EIS¹, presented in Table 2-1.

Table 2-1: Assessment of significance for McGarvie Smith Farm

CRITERION	EXPLANATION
A – Historical Significance	The farm's educational purposes for animal husbandry and pastoral experimentation for students from across the Commonwealth as well as the University of Sydney makes it a historically significant site in the history of these industries
B – Associative Significance	McGarvie Smith Farm is associated with a number of leading researchers such as HJ Geddes who, as officer in charge to the farm, was responsible for pioneering water harvesting methods for Australian environments in the middle of the twentieth century. The farm is also associated with Sir John McGarvie, the developer of the first long living anthrax vaccine and the McGarvie Institute. The farm is associated with the University of Sydney. It is also associated with Sir Frederick Tout, who was a director of the McGarvie Institute and assisted in its running.
C – Aesthetic or Technical Significance	Does not meet this criterion. McGarvie Smith Farm does not have any particular aesthetic qualities.
D – Social Significance	The McGarvie Smith Farm is one of a number of farms associated with former Sydney University veterinary students who would have spent some time here, including staying in the student accommodation on site, during operation of the farm as a training facility. Without further consultation or research with the relevant group, this criterion cannot be confirmed.
E – Research Potential	The pioneering and experimental nature of McGarvie Smith Farm lends itself to technical/research significance. Its original function for educational purposes could also extend into the future, albeit from a heritage or historical perspective.
F – Rarity	McGarvie Smith Farm is a relatively intact example of an experimental farm from the 1930s and into mid twentieth century. It is facing endangerment not just to its built environment, but to the modified landscape in the form of innovative water harvesting practices constructed for its time.
G – Representativeness	McGarvie Smith Farm was the leading state institution in pioneering experiments and educations in agricultural and pastoral methods. Other agricultural institutes which contributed to research were established by the Department of Agriculture.

2.2.2 STATEMENT OF SIGNIFICANCE

The following statement of significance has been sourced from the Non-Aboriginal Heritage technical paper prepared for the EIS.²

The McGarvie Smith Farm has a chronological series of surviving structures and infrastructure dating from the 1930s through until recent times. Although all the buildings contribute to the significance of use of the site over time, the two oldest buildings on the complex are McGarvie Smith Farm 1 and McGarvie Smith Farm 2. The farm's educational purposes for animal husbandry and pastoral experimentation for students from across the

¹ Jacobs 2019, *M12 Motorway Environmental Impact Statement Appendix J – Non-Aboriginal Heritage Assessment Report*. Report prepared for TfNSW. pp. 68 - 75

² *Ibid* pp. 68 - 75

Commonwealth as well as the University of Sydney makes it a significant site in the history of these industries. Its link to Sydney University differentiates it from other experimental farms at the time, which were established by the NSW Department of Agriculture. The farm was a leader in finding solutions to the agricultural and pastoral industries of the mid twentieth century. The farm is assessed as being of State significance.

2.2.3 HERITAGE SIGNIFICANT FABRIC AT MCGARVIE SMITH FARM

The Non-Aboriginal Heritage technical paper prepared for the EIS identified a number of significant structures and elements of the McGarvie Smith Farm. Figure 2-2 has been sourced from the non-Aboriginal technical paper prepared for the EIS to demonstrate the location of significant structures in relation to the EIS construction footprint.

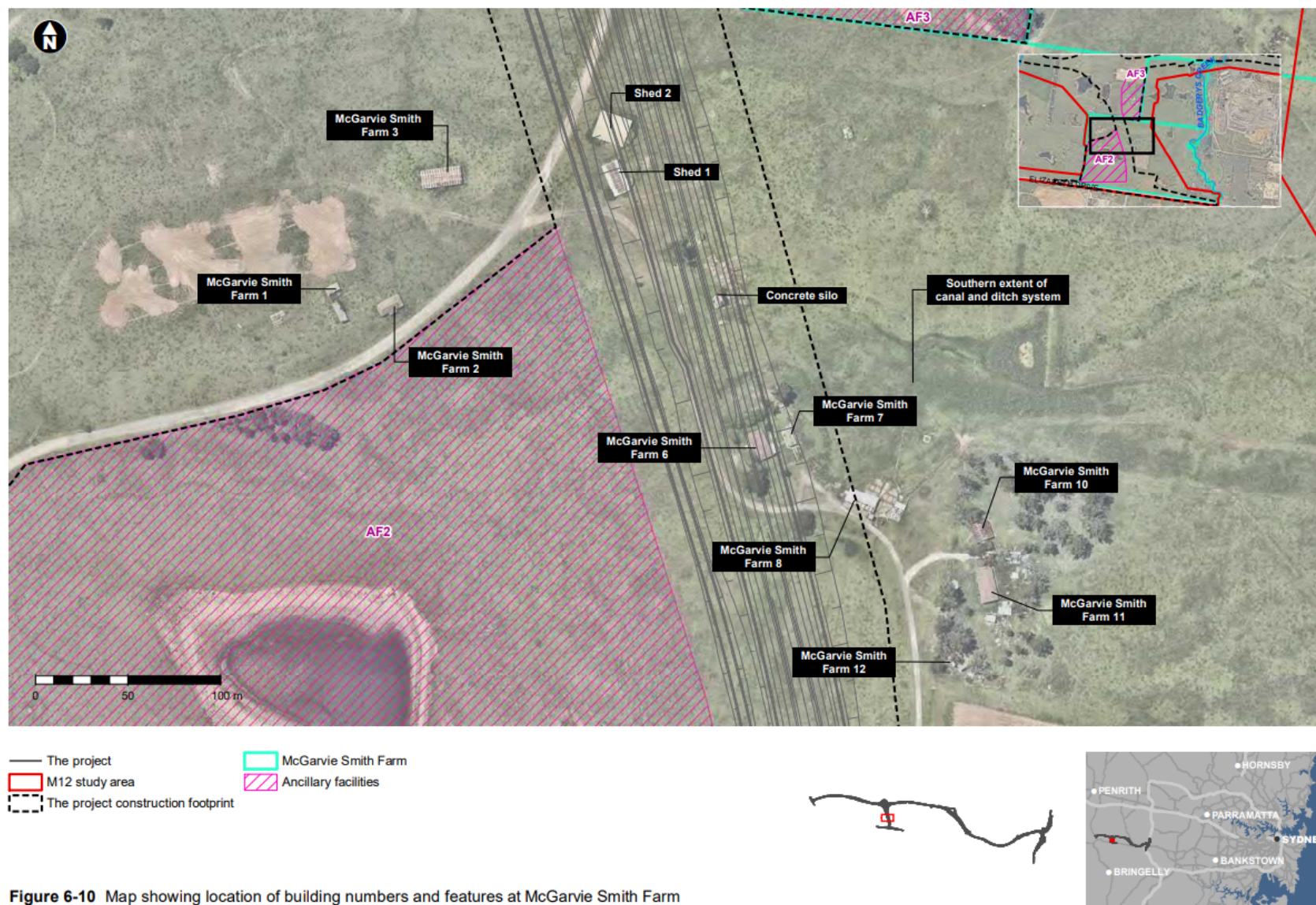


Figure 6-10 Map showing location of building numbers and features at McGarvie Smith Farm

Figure 2-2: Project EIS construction footprint in relation to heritage significant buildings and features at McGarvie Smith Farm (Jacobs 2019: 77)

2.3 FLEURS RADIO TELESCOPE

2.3.1 ASSESSMENT OF SIGNIFICANCE

The Fleurs Radio Telescope is listed on the Penrith LEP (I832) as an item of local heritage significance. The EIS assessment identified that the Fleurs Radio Telescope may be an item of State or potential National heritage significance, however the item has not been nominated or listed for either the SHR or National Heritage Listing (NHL).

An assessment of significance for the heritage item has been sourced from the Non-Aboriginal Heritage technical paper from the EIS³, presented in Table 2-2.

Table 2-2: Assessment of significance for Fleurs Radio Telescope

CRITERION	EXPLANATION
A – Historical Significance	<p>Assessment by Australian Govt et al. (2016)</p> <p>Fleurs was ‘historically important at periods of the State’s history—in the development of radio physics during the 1950s and 1960s’. It has potential historical significance at a local or State level. However, the low to moderate intactness of the site may reduce it to local significance (Australian Govt et al. 2016:77).</p> <p>Revised 2018 Assessment</p> <p>While radioastronomy has been practiced at other scientific sites in Australia the CSIRO field sites around Sydney were the location of the major developments in the field of radioastronomy following WWII. These were the places where Mills, Christiansen, Payne Scott, Pawsey and others established some of the fundamental principles of radioastronomy. This work established the CSIRO as a world leader, as evidenced by the 1952 URSI conference taking place here. Fleurs was significant as the field site which hosted the mature technologies of the interferometer, Mills Cross and cross grating antennas. Hence it can be argued that Fleurs represents a period, prior to the development of the ATNF, where state-based research was leading the way.</p> <p>Tangible elements relating to state significance are standing elements of the Shain Cross and the FST, and the materials of Mills Cross, Chris Cross and FST located in rubbish mounds scattered across the site. While the telescopes are not in good condition and are completely dismantled in some cases, intactness is not a reason for exclusion (OEH 2001:12).</p> <p>At the local level, Fleurs is one site of a number of research stations in the area, including the University of Sydney McGarvie Smith Farm, established in 1936 for veterinarian studies (Australian Govt et al. 2016:139–146), and the CSIRO McMaster Animal Health Research Farm (M12 H4; Australian Govt et al. 2016:124–127). It forms one component of a wider landscape of institutional research facilities interspersed with small scale pastoral and horticultural industries— science at local scale.</p> <p>Intrusive values are associated with agricultural activities such as pasture, fencing, and ploughing, which have contributed to the erasure of the original ground reflecting surfaces and obscured the visibility of the Shain Cross.</p>
B – Associative Significance	<p>Fleurs is associated with pioneering radioastronomers Bernard Mills, Bruce Slee, Alex Shain, Chris Christiansen, Charlie Higgins and J.L. Pawsey. It represents a significant chapter in the history of the CSIRO’s Division of Radiophysics, which was the foundation of the CSIRO’s continuing work in radioastronomy. The ground-breaking scientific contributions of these astronomers has been extensively researched by scholars such as Orchiston (see References). Both Mills and Christiansen became professors at the University of Sydney, which supported Christiansen’s continued work on the Chris Cross and FST. As a school of radioastronomy, these men were technological innovators, dedicated teachers and pioneers of Australian science with international reputations, who launched Australian science onto a world stage.</p> <p>Mills, Shain and Christiansen were each primarily responsible for the design, construction and operation of the antenna which bears their name, although there was clearly also much cross-fertilisation of ideas. The final configuration of the arrays indicates both individual achievement and the impacts of working in a close-knit research group which fostered innovation and experimentation.</p>

³ *Ibid* pp. 76 - 85

CRITERION	EXPLANATION
	The astronomers of Fleurs are associated with State, National and International networks of scientists. Their integration into, or participation in, the local community is not known.
C – Aesthetic or Technical Significance	<p>The antennas demonstrate a high degree of both creative and technical achievement by prominent NSW scientists and technicians. Radioastronomy is now an integral part of astronomy, with a multitude of telescopes worldwide. However, in the 1940s and 1950s, it required true creativity and imagination to devise innovative instruments and visualise their signals to portray a ‘vision’ of the universe which barely existed before. These antennas were integral to the global effort to map the radio universe and understand its relationship to the optical universe. The surveys carried out at Fleurs from the 1950s to the 1980s resolved many of these disparate data sources, enabling us to understand the structure of the universe more fully. The construction and design of the antennas is directly related to a way of perceiving the universe.</p> <p>While scientific instruments are not always associated with aesthetic values, there are some themes that emerge from Fleurs (Table 5 in Gorman 2018). The selection of Fleurs for the siting of the arrays was due to the availability of a sufficiently large area of flat ground in a radio-quiet area, thus relating to local topography. The repetition of modular elements in all three crosses also lends a distinctive appearance, although this is now only evident in the remaining Shain Cross elements.</p> <p>The individual elements of the telescopes are in various states of decay. Further elements have been dismantled and are stockpiled in the rubbish mounds. As noted for the management of heritage values at Mt Stromlo following the 2003 fires, in recent years such decay and destruction are being recognised as having social and aesthetic value in their own right. While nothing as dramatic as a firestorm occurred at Fleurs, there was nonetheless at least two moments of destruction, in the 1990s and in 2005 when the bulk of the site was bulldozed and the materials stockpiled. The demolition created dis-array of the arrays, disrupting the careful geometry that listened to the sky.</p> <p>The antennas have not entirely left the site: they are simply deconstructed, re-arranged from an organic assemblage forming a complete unit, into a bricolage of body parts and groupings defined by material and form.</p> <p>With the exception of the two FST dishes, the remainder of the antenna parts are not sufficiently different from average rural construction materials to be immediately identifiable as scientific instruments. The dishes are an unusual and uncommon feature in the local landscape, where nothing else like them exists; however, due to the flat topography and degree of vegetation along the creek lines, they are not easily visible from surrounding roads and properties.</p> <p>Unlike many dish antennas at major astronomical and satellites tracking stations in Australia, which imported their antennas from the USA, the Fleurs antennas were all manufactured in NSW. Further research could identify how distinctive their style is in comparison to imported antennas.</p>
D – Social Significance	<p>The associations with the site for the local community at the present time would require further consultation. However, it is clear that there has been an interest in Fleurs in the past. For example, local historian Stacker (2002) included the Fleurs antennas in her 2002 pictorial history of Penrith and St Mary’s. The 2005 demolition of the Mills Cross and Chris Cross antennas were, as reported by Orchiston et al. (2005:68), a result of concerns about children playing in the structures. This implies it was frequent enough an activity to warrant concern, and speaks to the re-purposing of the antennas into an informal playground for local children—a charming (albeit alarming from the safety perspective) image. The feelings of the children deprived of their cosmic playground are unknown.</p> <p>However, the ease with which the process of demolition was suggested and approved suggests that the local adult community did not have strong associations with the science or aesthetic qualities of the Fleurs infrastructure.</p> <p>The site has very strong associations for the NSW, national and international astronomy community, including people who worked on the various antennas, former students at the University of Sydney and University of Western Sydney, and historians of astronomy. Numerous works by Orchiston and others, and the continued concern of the IAU radioastronomy working group, emphasise that the physical infrastructure of antennas is meaningful for them, as demonstrated in this quote from Orchiston (2004b:68) prior to the final destruction of the Chris Cross:</p> <p><i>... a visit to Fleurs reveals that the novel Mills Cross and Shain Cross antennas are no more, having long ago rotted, rusted and disintegrated. Thus, to track Slee’s initial exploits in radio astronomy is to explore the early history of these Radiophysics field stations and to mourn the loss of so much of our pioneering radio astronomical heritage. We can but hope that reason will prevail and that those early radio telescopes that have survived,</i></p>

CRITERION	EXPLANATION
	<p><i>including the 18 m Kennedy parabola at Parkes, parts of the Chris Cross and the Fleurs Synthesis Telescope at Fleurs, and the Radioheliograph and Radiospectrograph at Culgoora, will be restored and preserved for posterity.</i></p> <p>With increased interest in the life and work of Ruby Payne-Scott and Australian women scientists generally, the community of women involved with the Fleurs site should not be forgotten. A footnote in a published research paper acknowledges the work of two women who performed calculations for the antennas before computers were installed. The work of women ‘computers’ is increasingly being highlighted at places like the Defence space launch site of Woomera, and further research would undoubtedly lead to the identification of more women involved with science at Fleurs.</p>
E – Research Potential	<p>Assessment by Australian Govt et al. (2016:78) ‘Inherent to most of the sites inspected as part of the March 2016 survey, is a level of research significance. This is largely attributable to the moderate intactness of most of these items. Ranging from the nature of historical community social hubs such as those at Cecil Park, through to the experimental undertakings of institutions in the twentieth century across domains as diverse as radiophysics, animal husbandry, and military defence.’</p> <p>Australian Govt et al. (2016:78) concluded that Fleurs has research potential, despite compromised intactness.</p> <p>Revised 2018 Assessment The site has the potential to contribute to the understanding of the manufacture, and hence the science and technology 2018, behind the construction of early radiotelescopes. These materials are still present on the site, although the Mills Cross and Chris Cross are mainly represented in the rubbish mounds. As the controversy over the 2C catalogue demonstrates, the nature of the instruments was integrally bound up with what was perceived, and hence the theories the data supported. The antennas and their remains are tangible evidence of two intangibles: the radio waves they were designed to pick up, and the cultural context of how the universe was understood in the 1950s and 1960s. The changing configurations of the antennas reflect a positive feedback loop whereby data from one iteration led to the refining of hypotheses and redesigning of the antenna configurations to validate new theories. Without the (admittedly compromised) physical remains at the site, it would not be possible to pursue research into the social context of the technology.</p> <p>Subterranean evidence of cable infrastructure may reveal successive phases of development such as automation, the move from employing women ‘computers’ to electronic computers, and increased power demands as the sophistication of the capacity of instruments increased.</p>
F – Rarity	<p>Assessment by Australian Govt et al. (2016:78) The Fleurs Radio Telescopes are rare examples of early radiophysics technology in Australia, providing the lead in this field during a narrow window of innovation between 1954 and 1963.</p> <p>Further historical and archaeological research is required to determine whether significance is at State or local level due to various historical modifications to the site’s integrity.</p> <p>Revised 2018 Assessment</p> <p>There are few extant remains at other Division of Radiophysics field sites around Sydney. An antenna footing survives at Dover Heights along with a replica antenna created as a memorial. Orchiston notes that of all these significant sites, including Badgerys Creek and Penrith (Figure 4), only the 12 Chris Cross antennas survived in 2004 (Orchiston 2004a:161); four were removed to unknown locations, and none now survive at the site. Fleurs appears to be all that remains as physical fabric in its original location.</p> <p>In the Australian context, the only comparable antenna arrays were built by Grote Reber in Tasmania; his square kilometre dipole array at Bothwell and other non-dish antennas no longer exist. The Molonglo Mills Cross, the technological successor of the Fleurs Mills Cross, is still in operation using one arm.</p> <p>Gorman 2018 shows that there are no other cross antennas or low frequency arrays surviving nationally. Original Mills Cross antennas are rare globally, as the parabolic reflector has superseded cross, horn and other configurations as the most common form of antenna. For example, the Seneca Mills Cross, influential for its role in the discovery of Jovian radio emissions, was destroyed at some point between 1955 and 2005 (however, it is on the Maryland SHR). The Stanford University (California, USA) Mills Cross antenna at Site 515 was destroyed in 2010, much to the dismay of the IAU’s Working Group on Historic Radio Astronomy (Orchiston and Kellerman 2010:246). Orchiston (2004) pointed to the rapidly disappearing infrastructure of radio astronomy in Australia and the central significance of Fleurs in this history. Hence the remaining Shain Cross and FST antennas, based on Mills’ principles, are both rare and endangered.</p>

CRITERION	EXPLANATION
G – Representativeness	<p>Assessment by Australian Govt et al. (2016:78) Australian Govt et al. (2016:79) stated that ‘In nearly all cases, further historical and/or archaeological research is required to fully assess both the significance and intactness of both the sites identified during this project, and those identified from previous studies.’</p> <p>Revised 2018 Assessment The current survey indicates that Fleurs retains portions of the fabric of a scientific field site, in the topography required for the construction of long antenna arrays, and the remnants of the arrays which partially show the original layout in the distinctive cross shape. It demonstrates the characteristics of an early radioastronomy field site, the only one which retains archaeological evidence of the early development of radioastronomy in NSW and nationally.</p>

2.3.2 STATEMENT OF SIGNIFICANCE

The following statement of significance has been sourced from the Non-Aboriginal Heritage technical paper prepared for the EIS.⁴

The Fleurs Radio Telescope Site was a CSIRO facility established in the 1950s for radioastronomy research. Three innovative antenna arrays were designed and built in order to pick up low frequency radio signals from galaxies, the Sun and Jupiter. There are few extant remains at other CSIRO radioastronomy field sites around Sydney. Fleurs appears to be all that remains as physical fabric in its original location. Nationally, no other cross antennas or low frequency arrays survive.

The site is considered to have State and potentially National significance as evidence of groundbreaking scientific discoveries, leading to revisions of our understanding of the origins of the universe, and as evidence of Australia’s pre-eminence in the international development of radioastronomy. There is renewed interest in the history of radioastronomy due to Australia’s key role in the Square Kilometre Array, to which the Fleurs antennas can be considered historical precursors. The elements are considered to have outstanding interpretive potential.

2.3.3 HERITAGE SIGNIFICANT FABRIC AT FLEURS RADIO TELESCOPE

Additional heritage assessment undertaken by Artefact⁵ has identified that some physical remnants of the former Fleurs Radio Telescope site are located within the M12 Motorway - West Package 80% detailed design construction footprint. These specific elements are discussed in Table 2-3.

⁴ Ibid pp. 76 - 85

⁵ Artefact September 2021, *M12 Motorway Haul Road and Fleurs Radio Telescope Consistency Assessment – Non-Aboriginal Heritage Consistency Assessment*. Report prepared for GHD for TfNSW.

Table 2-3: Heritage value of elements of the Fleurs Radio Telescope located within the M12 Motorway - West Package 80% detailed design construction footprint.⁶

SITE	ELEMENT	GRADING	JUSTIFICATION
South Creek 5 Antenna Complex	Former location of antenna X4	Little	Former location of antenna X4 has been backfilled and is no longer visible
	Concrete pad	Little	Element in poor condition, most fabric has been removed, potential remains of a former server rack, concrete pad eroding exposing PVC conduits
	Concrete plinths	Little	Original function unknown, similar to concrete plinths identified in the M12 EIS at South Creek 1 Antenna Complex and North Antenna Complex
Cable alignment	Cables and high-pressure hose	Moderate	Likely to be in good condition – sub-surface. The range of cables and high-pressure hoses that are installed on the alignment between X2, X3 and X4 is indicated by the PVC conduits and cables/hoses visible at SC3AC, SC4C, and SC5AC. The cables and high-pressure hose remains have significance as an element of the Fleurs Synthesis Telescope operation. However, with the antennas removed, most of the operating equipment removed, and cables/hoses severed, their original function and operation is not easily interpreted based on remaining evidence.

2.4 LUDDENHAM ROAD ALIGNMENT

2.4.1 ASSESSMENT OF SIGNIFICANCE

Luddenham Road is listed on the Penrith LEP (I843) as an item of local heritage significance.

An assessment of significance for the heritage item has been sourced from the Non-Aboriginal Heritage technical paper from the EIS⁷, presented in Table 2-4.

Table 2-4: Assessment of significance of Luddenham Road

CRITERION	EXPLANATION
A – Historical Significance	The Luddenham Road Alignment has historical significance as a late nineteenth century road connecting the western settlements of Luddenham and St Marys as part of the growing development in this part of western Sydney and the need for infrastructure to support economic development in the area.
B – Associative Significance	Does not meet this criterion. The Luddenham Road Alignment within the study area has no known historical association significance.
C – Aesthetic or Technical Significance	Does not meet this criterion. The Luddenham Road Alignment within the study area has no aesthetic significance.
D – Social Significance	Does not meet this criterion. The road is only important to the local community for amenity reasons.
E – Research Potential	Does not meet this criterion. As no physical evidence of the original road remains due to modifications over time the item has little or no research or archaeological potential.
F – Rarity	Does not meet this criterion. The Luddenham Road Alignment is not the only colonial road example within NSW and there are better examples with some original features and physical evidence, including the Great North Road and Old Windsor Road.

⁶ Ibid p. 74

⁷ Op cit pp. 86 - 87

CRITERION	EXPLANATION
G – Representativeness	Does not meet this criterion. The Luddenham Road Alignment within the study area is a poor example of early historical NSW roads. Modifications and upgrades within this section of the road have resulted in the loss of a range of characteristics.

2.4.2 STATEMENT OF SIGNIFICANCE

The following statement of significance has been sourced from the Non-Aboriginal Heritage technical paper prepared for the EIS.⁸

This item is considered to have local historical significance as an early road alignment. While the section of Luddenham Road within the study area is located within the original cadastral location of the early road, original fabric associated with the early road no longer exists due to modifications and renewal of the road surface over time.

2.5 MCMASTER FIELD STATION/MCMASTER FARM

2.5.1 ASSESSMENT OF SIGNIFICANCE

The McMaster Field Station and Farm is an unlisted item of local to State heritage significance.

An assessment of significance for the heritage item has been sourced from the Non-Aboriginal Heritage technical paper from the EIS⁹, presented in Table 2-5.

Table 2-5: Assessment of significance for McMaster Field Station and Farm

CRITERION	EXPLANATION
A – Historical Significance	The McMaster Farm holds historical significance at a State level for the contribution it made to the development of farming in Australia, and in particular in NSW.
B – Associative Significance	The McMaster Farm is associated with a number of leading researchers such as the University of Sydney's Sir Frederick Duncan McMaster. His original gift to CSIRO in 1929, for the construction of the Division of Animal Health's first laboratory, located at Sydney University, marked the beginning of a new era of veterinary research.
C – Aesthetic or Technical Significance	There is no aesthetic significance associated with McMaster Farm.
D – Social Significance	The McMaster Farm does not meet this criterion. There is little evidence to suggest that the farm has strong or special associations with a particular community or cultural group.
E – Research Potential	There is potential technical/research significance for McMaster Farm, similar to that for McGarvie Smith Farm due to its pioneering methods and practices
F – Rarity	McMaster Farm is a relatively intact example of an experimental farm developed and managed by the Commonwealth from the 1930s and into mid twentieth century. It is facing potential endangerment to its archaeological heritage, including its modified landscape
G – Representativeness	McMaster Farm was a leading Commonwealth institution in pioneering experiments and education in agricultural and pastoral methods.

⁸ *Ibid* pp. 86 - 87

⁹ *Ibid* pp. 95 - 102

2.5.2 STATEMENT OF SIGNIFICANCE

The following statement of significance has been sourced from the Non-Aboriginal Heritage technical paper prepared for the EIS.¹⁰

The McMaster Farm, an experimental enterprise by CSIRO in the 1930s, is associated with the University of Sydney's FD McMaster Building (a State heritage listed building), both named in honour of Sir Frederick Duncan McMaster. His original gift to CSIRO in 1929, for the construction of the Division of Animal Health's first laboratory, located at Sydney University, marked the beginning of a new era of veterinary research in Australia that saw Australia forge an international reputation for excellence in veterinary research. The landscape has been culturally modified for the purposes of CSIRO research: cultivated fields, fence lines, dams and groves of trees. The potential archaeology and intactness of this landscape rates it as moderately significant at a local or State level. The McMaster Farm potentially holds historical significance at a State level for the contribution it made to the development of farming in Australia, and in particular in NSW.

2.5.3 HERITAGE SIGNIFICANT FABRIC AT MCMASTER FIELD STATION

The Non-Aboriginal Heritage technical paper prepared for the EIS identified a number of heritage significant elements and structures of the McMaster Field Station. Figure 2-3 has been sourced from the Non-Aboriginal Heritage technical paper prepared for the EIS to demonstrate the location of significant structures in relation to the EIS project construction footprint.

¹⁰ *Ibid* pp. 95 - 102

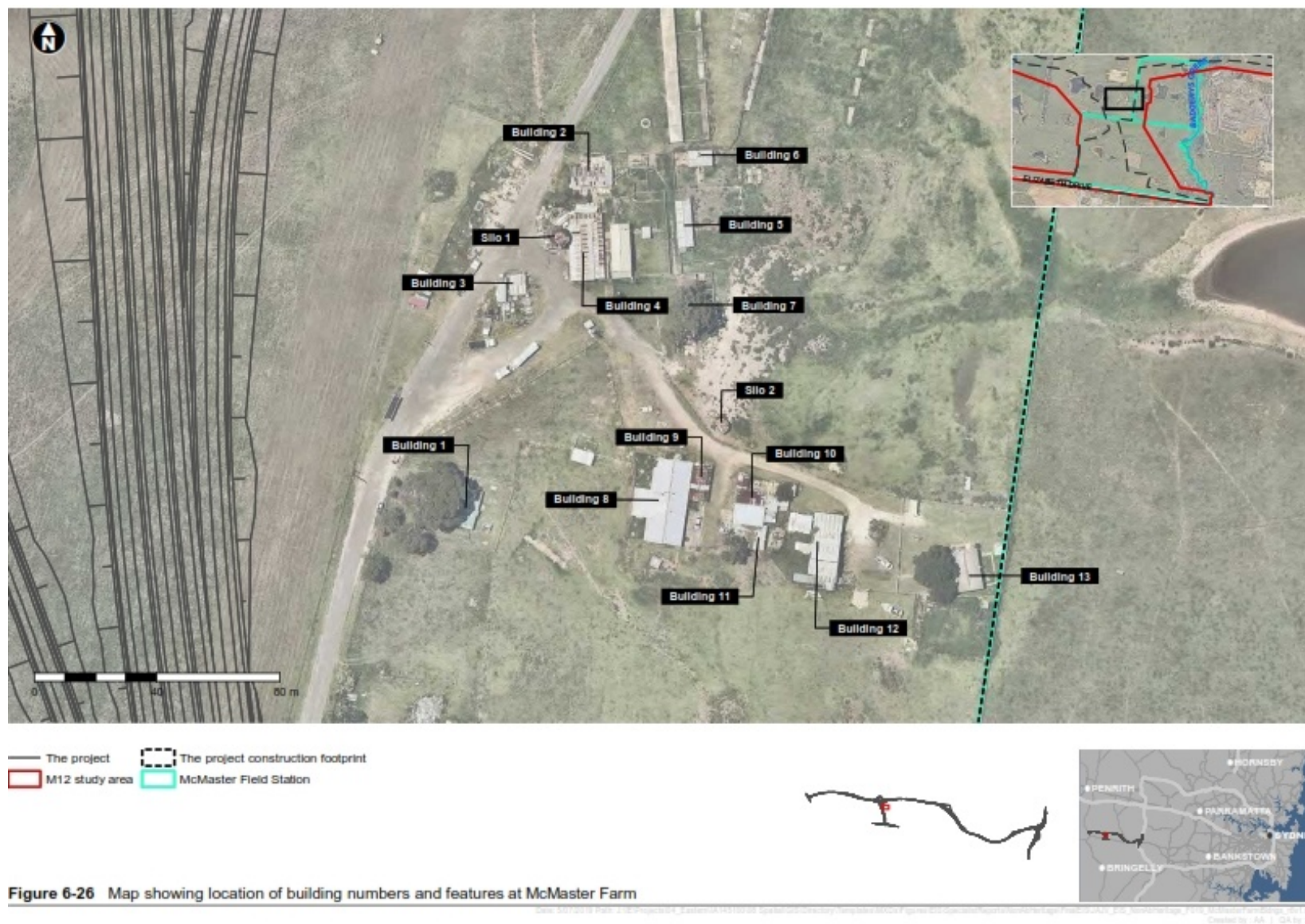


Figure 6-26 Map showing location of building numbers and features at McMaster Farm

Figure 2-3: Project EIS construction footprint in relation to heritage significant buildings and features at McMasters Station (Jacobs 2019: 99)

3. HERITAGE IMPACT ASSESSMENT FROM UPDATED DESIGN

3.1 MCGARVIE SMITH FARM

The M12 Motorway - West Package 80% detailed design construction footprint would require a greater parcel of land to be acquired within the curtilage of the McGarvie Smith Farm. The total/additional area consists of area about 600 metres long and 75 metres wide. The additional parcel of land would be located to the east of the Airport Access Road. It is presumed that all structures or landscapes within this increased construction footprint would be removed for the construction works. The comparison of the M12 Motorway - West Package Amendment Report Submissions Report construction footprint and the M12 Motorway - West Package 80% detailed design construction footprint with respect to heritage significant fabric of the McGarvie Smith Farm is illustrated in Figure 3-1.

The M12 Motorway - West Package 80% detailed design construction footprint would involve removing a building denoted in the EIS Non-Aboriginal Heritage technical paper as “McGarvie Smith Farm 8”. An assessment of the heritage value of the fabric of this item prepared in that assessment is shown in Table 3-1.

Table 3-1: Heritage significant fabric assessment from EIS non-Aboriginal heritage technical paper for building “McGarvie Smith Farm 8”

BUILDING NUMBER	DESCRIPTION	CONTRIBUTION HERITAGE GRADING
McGarvie Smith Farm 8	Further south [of McGarvie Smith Farm item 7] are two brown brick dairy sheds with corrugated iron skillion roofs. They are associated with yards and fencing for livestock. These structures may date from the 1960s to 1980s. The dairy has peeling paint and is overgrown with weeds and grass. There is a large round concrete holding yard with a moveable gate.	Moderate

The McGarvie Smith Farm 8 building was partly within the original M12 Motorway - West Package Amendment Report Submissions Report construction footprint and was proposed to be demolished for the works. This would result in the non-Aboriginal heritage impacts being consistent with impacts in the AR Submissions Report and project approval.

The widening of the construction footprint to the east of the Airport Access Road would also remove a larger area of the rural landscape of the site, which is considered a component of the McGarvie Smith Farm. The addition of the wider 75 metres to the west of the Airport Access Road would not demonstrably alter the degree of loss of context and wider landscape of the heritage item. This is because the Approved Amendment Report Submissions Report construction footprint involved the removal of all structures and landscaping for the majority of the landscape facing Elizabeth Drive of the heritage item to the west of the entrance road of the property.

The impacts would be considered consistent with the heritage impacts in the AR Submissions Report, which would have resulted in a major impact to the wider landscape character of the McGarvie Smith Farm, as well as a direct impact to the heritage curtilage. This consistency assessment confirms that the adverse impact to the heritage significance of the McGarvie Smith Farm would be a **major** impact.

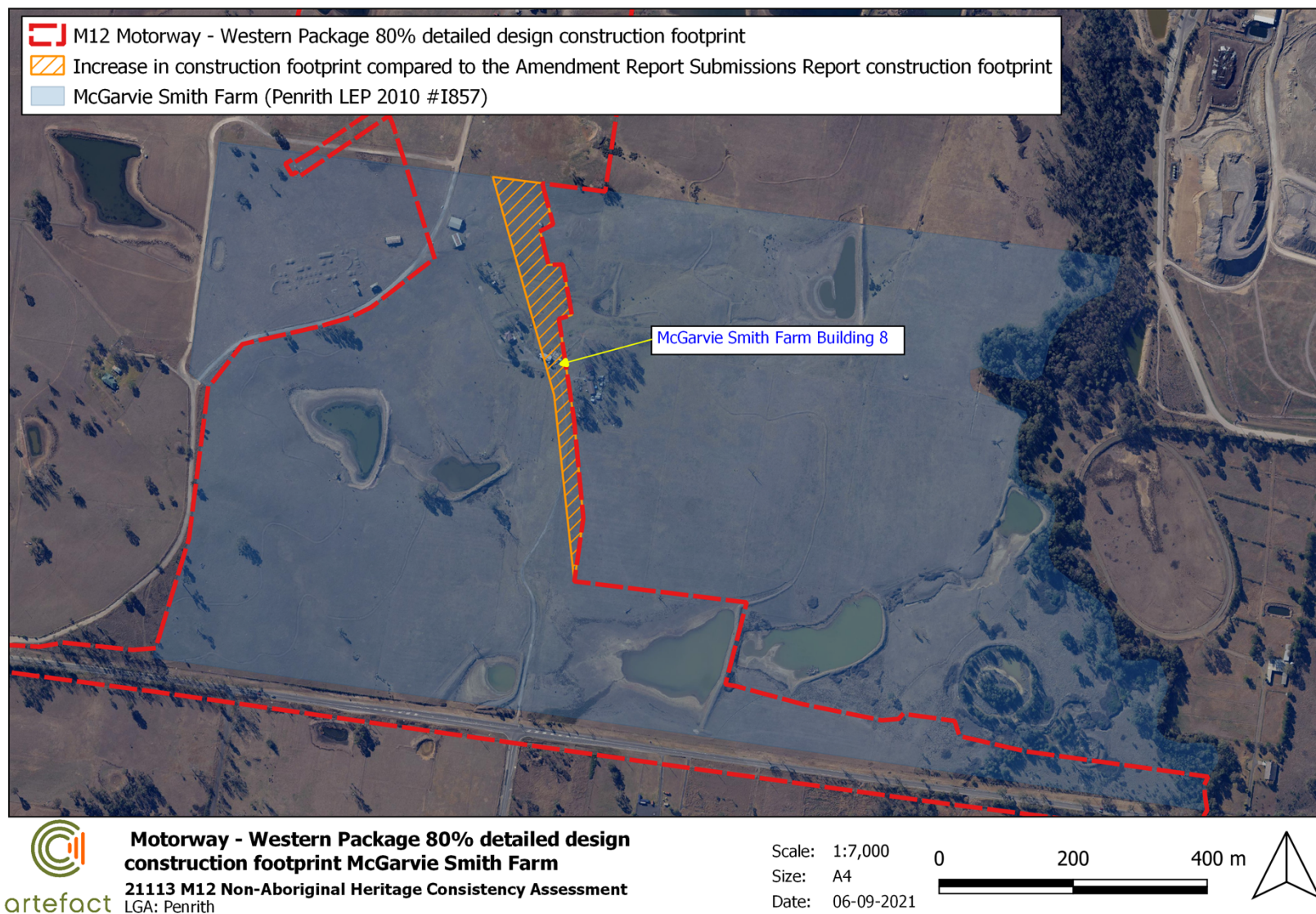


Figure 3-1: Comparison of the M12 Motorway - West Package Amendment Report Submissions Report construction footprint and M12 Motorway – West Package 80% detailed design construction footprint within the heritage curtilage of McGarvie Smith Farm

3.2 THE FLEURS RADIO TELESCOPE SITE

The M12 Motorway – West Package 80% detailed design construction footprint would not involve any modification to the construction footprint within the curtilage of the Fleurs Radio Telescope heritage site. The proposed bridge over Badgerys Creek (BR05) would be realigned as part of the M12 Motorway – West Package 80% detailed design construction footprint, however this would not involve any increase to the size of the construction footprint (and subsequent demolition extent) within the boundary of this heritage item. It is assumed that the realignment of BR05 would not involve any new design elements beyond that already assessed and approved as part of the approved project.

As part of the revised assessment of significance for the Fleurs Radio Telescope site, physical remnants of the former facility have been identified within the M12 Motorway - West Package 80% detailed design construction footprint. These elements consist of the “South Creek 5 Antenna Complex” which has been assessed as possessing little heritage value due to the demolition of the majority of these elements; as well as the former cable alignment, of which about 100 metres of the alignment is located within the M12 Motorway - West Package 80% detailed design construction footprint.

The demolition of the residual elements of the South Creek 5 Antenna Complex would impact an element of little heritage value and would result in no change to the degree of adverse impact to the heritage item from the project.

The demolition of the cable alignment for the M12 Motorway - West package would involve the removal of up to 100 metres of the former cable alignment, an element graded of moderate value to the heritage significance of the item overall. This would result in a minor adverse impact to the heritage significance of the Fleurs Radio Telescope.

There would be no change in the degree of adverse impact to the heritage significance of the Fleurs Radio Telescope from M12 Motorway - West Package 80% detailed design construction footprint, resulting in a **minor** adverse heritage impact to the heritage item.

Environmental management measure NAH05 has been revised to include archival recording for the Fleurs Radio Telescope site and is provided in Table 4-3

3.3 LUDDENHAM ROAD ALIGNMENT

The M12 Motorway - West Package 80% detailed design construction footprint would alter stormwater drainage culverts and channels directly near Luddenham Road, however these would not be located within the curtilage of the listed item of Luddenham Road itself. The proposed drainage works would not modify physical fabric of the item, alter the heritage significant alignment of the road nor change the degree of visual impact to the item from the M12 Motorway - West Package Amendment Report Submissions Report construction footprint. The heritage impact to this item would remain as a **negligible** impact to the heritage significance of the item.

3.4 MCMASTER FIELD STATION

Proposed works for the M12 Motorway - West Package 80% detailed design construction footprint within the heritage curtilage of the McMaster Field Station would involve an increase to the construction footprint for new water quality basins, road access points and minor alterations to ramp configurations. The increase to the construction footprint would involve three small segments added to the construction footprint. In addition, ramp re-configuration would also remove a small area from the construction footprint within the curtilage of this item. The location of the 80% detailed design construction footprint with respect to heritage significant fabric at the McMasters Field Station is shown in Figure 3-2.

New areas of ground disturbance are located in greenfield areas of the property and only one modern farming shed would be removed. The heritage value of this building was not assessed in the EIS, Amendment Report or Amendment Report Submissions Report, however aerial imagery shows that this building is a modern corrugated metal storage silo associated with a nearby modern scrap yard. This building is considered to be of little heritage value to the significance of the item overall. The removal of this element would not increase the degree of adverse impact to the heritage significance of the item overall.

The increased construction footprint would involve modification to the landscape directly next to the northern edge of one of the existing dams on the property. The construction of a water quality basin in this area is presumed to modify the boundary

or barrier of the dam. Dams within the site are considered of moderate heritage value to the heritage significance of the item overall.

The M12 Motorway - West Package Amendment Report Submissions Report construction footprint would result in widespread removal of the rural landscape and impacts to the heritage curtilage of the item. The increase to the construction footprint and design changes would not significantly change the overall degree of impact to the heritage item from the M12 Motorway - West Package Amendment Report Submissions Report construction footprint. The M12 Motorway - West Package 80% detailed design construction footprint would also avoid demolition of the main complex of historic buildings at the property. Despite the preservation of these structures, the large alteration to the landscape, context, views and historic legibility of the item from the 80% detailed design would remain as a **major** adverse impact to the heritage significance of the item.

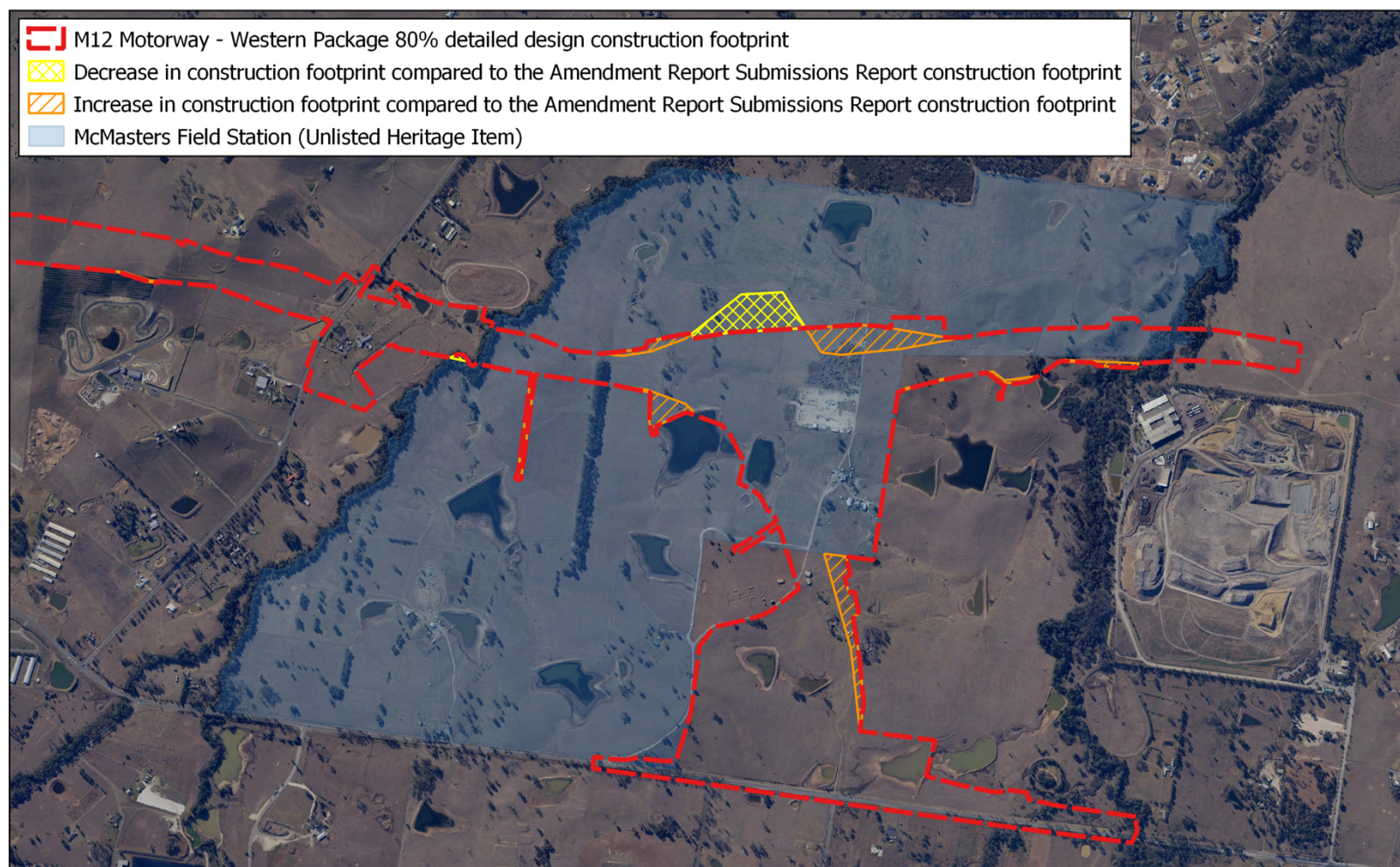


Figure 3-2 Comparison of the proposed M12 Motorway - West Package 80% detailed design construction footprint and M12 Motorway - West Package Amendment Report Submissions Report construction footprint with respect to the heritage curtilage of McMaster Field Station

4. COMPARATIVE IMPACT AND CONSISTENCY ASSESSMENT

4.1 IMPACT ASSESSMENT

The following is a summary of the comparative impacts between the approved project as assessed in the M12 Motorway - West Package Amendment Report Submissions Report Amendment Report construction footprint and the M12 Motorway - West Package 80% detailed design construction footprint detailed design. A comparison of adverse heritage impacts to heritage items located within the M12 Motorway - West Package project area is provided in Table 4-1.

Table 4-1 Comparison of adverse heritage impacts between M12 Motorway - West Package Amendment Report Submissions Report construction footprint and M12 Motorway - West Package 80% detailed design construction footprint

HERITAGE ITEM NAME	REGISTER LISTINGS	SIGNIFICANCE	HERITAGE IMPACTS - AMENDMENT REPORT SUBMISSIONS REPORT CONSTRUCTION FOOTPRINT	HERITAGE IMPACTS – M12 MOTORWAY - WEST PACKAGE 80% DETAILED DESIGN CONSTRUCTION FOOTPRINT
McGarvie Smith Farm	Penrith LEP 2010 I857	State	Major	Major
The Fleurs Radio Telescope Site	Penrith LEP 2010 I832	State to National	Minor	Minor
Luddenham Road Alignment	Penrith LEP 2010 I843	Local	Negligible	Negligible
McMaster Field Station	Potential item	State	Major	Major

4.2 MINISTER'S CONDITIONS OF APPROVAL

The proposed changes have been assessed in relation to the relevant conditions of approval in Table 4-2.

Table 4-2: Consistency against relevant Minister's conditions of approval for the project

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
E25	Construction and operation of the CSSI should aim to not diminish the potential of the following heritage items for nomination to the State Heritage Register beyond the impacts to significance already identified in the documents listed in Condition A1: McGarvie Smith Farm, McMaster Field Station and Fleurs Radio Telescope Site.	<p>The detailed design of M12 Motorway - West Package has been undertaken in a manner that avoids impacts to Non-Aboriginal Heritage items beyond that assessed as part of the EIS and Amendment Report. The demolition of buildings/structures associated with McGarvie Smith Farm has been kept to those identified as requiring demolition by the EIS/AR (i.e. Farm 6, 7, 8, Shed 1, Shed 2 and one silo). No buildings or structures associated with McMaster Field Station require demolition.</p> <p>The majority of identified heritage features of the Fleurs Radio Telescope Site are located outside of the M12 Motorway - West Package 80% detailed design construction footprint (i.e. they exist within the M12 Central detailed design package).</p>	Yes
E26	An experienced and qualified heritage specialist(s) must prepare and/or endorse the: <ul style="list-style-type: none"> (a) Heritage Interpretation Plan required by Condition E27; (b) archival photographic digital recording required by Condition E28; and (c) Heritage Report required by Condition E29. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E27	A Heritage Interpretation Plan must be prepared that identifies and interprets the key heritage values and stories of the heritage items impacted by the CSSI. The Heritage Interpretation Plan must include, but not be limited to: <ul style="list-style-type: none"> (a) integration of heritage themes and values in the design of the CSSI; (b) design elements (form and fabric) and themes for the CSSI; (c) consideration of the design concepts for Western Sydney International Airport and Sydney Metro Western Sydney Airport; and 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
	<p>(d) opportunities for design responses for Aboriginal and non-Aboriginal heritage.</p> <p>The Heritage Interpretation Plan must be provided to Western Sydney International Airport and Sydney Metro Western Sydney Airport to assist in guiding opportunities for integration of heritage themes and values into their design.</p> <p>The Heritage Interpretation Plan must be prepared in accordance with the <i>Interpreting Heritage Places and Items Guidelines</i> (NSW Heritage Office, 2005), and in consultation with Heritage NSW, Aboriginal Cultural Heritage Advisory Committee, LALC and relevant council(s).</p> <p>The Plan must be implemented and inform the Place, Design and Landscape Plan required by Condition E69.</p> <p>The Heritage Interpretation Plan must be submitted to the Planning Secretary and Heritage NSW for information prior to finalising the Place, Design and Landscape Plan required by Condition E69.</p> <p><i>Note: Nothing in this condition prevents the Proponent from preparing separate Heritage Interpretation Plans for Aboriginal and Non-Aboriginal Heritage.</i></p>		
E28	<p>Archival photographic digital recording must be undertaken as outlined in the documents listed in Condition A1 for all listed heritage items and for all sites assessed to have heritage significance which will be affected by the CSSI. The recordings must be undertaken prior to the commencement of Work which may impact the items. The recordings must include buildings, structures and landscape features and detailed maps showing the location of features. The archival recording must be prepared in accordance with <i>How to Prepare Archival Records of Heritage Items</i> (NSW Heritage Office, 1998) and <i>Photographic Recording of Heritage Items Using Film or Digital Capture</i> (NSW Heritage Office, 2006).</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes
E29	<p>Following completion of all Work described in the documents listed in Condition A1 in relation to heritage items, a Heritage Report including the details of archival recordings, further historical research either undertaken or to be carried out and archaeological</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement</p>	Yes

NO.	CONDITION OF APPROVAL	DISCUSSION	CONSISTENT
	excavations (with artefact analysis and identification of a final repository for finds), must be prepared in accordance with any guidelines and standards required by the Heritage Council of NSW and Heritage NSW. <i>Note: Nothing in this condition prevents the Proponent from preparing separate Heritage Reports for Aboriginal and Non-Aboriginal Heritage.</i>		
E30	The Heritage Report must be submitted to the Planning Secretary and Heritage NSW for information within 12 months of completing all Work described in the documents listed in Condition A1 in relation to heritage items. Copies of the Heritage Report must also be provided to relevant local libraries and relevant local historical societies.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E31	An Unexpected Heritage Finds and Human Remains Procedure must be prepared to manage unexpected heritage finds in accordance with any guidelines and standards prepared by the Heritage Council of NSW and Heritage NSW. The Procedure must be prepared in consultation with Heritage NSW and form part of the Heritage CEMP Sub Plan required by Condition C4.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E32	The Unexpected Heritage Finds and Human Remains Procedure, as submitted to the Planning Secretary, must be implemented for the duration of Work. <i>Note: Human remains that are found unexpectedly during the carrying out of work may be under the jurisdiction of the NSW State Coroner and must be reported to the NSW Police immediately.</i>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E33	Where previously unidentified Aboriginal objects are discovered, all work must immediately stop in the vicinity of the affected area. Works potentially affecting the previously unidentified objects must not recommence until Heritage NSW has been informed. The measures to consider and manage this process must be specified in the Unexpected Heritage Finds and Human Remains Procedure required by Condition E31 and include registration in the Aboriginal Heritage Information Management System (AHIMS).	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

4.3 STATEMENT OF COMMITMENTS / REVISED ENVIRONMENTAL MANAGEMENT MEASURES

The proposed change has been assessed in Table 4-3 in relation to the relevant commitments / revised environmental management measures in the context of the Division 5.2 Approval.

Additional and/or modified environmental management measures to those presented in the AR Submissions Report have been made bold.

Table 4-3: Consistency against relevant Statement of Commitments / revised environmental management measures

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
NAH01	<p>A construction cultural heritage management plan (CCHMP) will be prepared for the project as part of the CEMP in consultation with DPC (Heritage). The CCHMP will include as a minimum:</p> <ul style="list-style-type: none"> • A list, plan and maps with GIS layers showing the location of identified heritage items both within, and near, the construction footprint • A significance assessment and statement of significance for each item • Protocols and procedures including inductions and toolbox talks for all contractors and subcontractors working in the area to be informed of all exclusion zones, the elements and their significance, to prevent accidental damage or encroachment • Protocols and procedures to be implemented during construction to avoid or minimise impacts on items of heritage significance including protective fencing • The TfNSW Unexpected Heritage Items Procedure (Roads and Maritime, 2015) which would be followed in the event that unexpected heritage finds are uncovered during construction. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NAH02	<p>A suitably qualified heritage specialist will be engaged to prepare a heritage interpretation framework to guide development of the detailed urban design for the project. This framework will be prepared in accordance with the Interpreting Heritage Places and Items Guidelines (NSW Heritage Office, 2005) and will include:</p> <ul style="list-style-type: none"> • Integration of heritage themes and values to be incorporated • Collaboration with other design elements and themes for the project, including those associated with Western Sydney Airport and Sydney Metro – Western Sydney Airport, to develop an integrative design approach with surrounding development • Opportunities for design responses for Aboriginal and non-Aboriginal heritage. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NAH03	Impacts on Non-Aboriginal heritage items will be avoided or minimised where reasonable and feasible. Where impacts are unavoidable, works will be carried out in	The detailed design of M12 Motorway - West Package has been undertaken in a manner that avoids impacts to Non-Aboriginal Heritage items beyond that assessed as part of the EIS and	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
	<p>accordance with the measures for individual Non-Aboriginal heritage items outlined in measures NAH04 to NAH11.</p>	<p>Amendment Report. The demolition of buildings/structures associated with McGarvie Smith Farm has been kept to those identified as requiring demolition by the EIS/AR (i.e. Farm 6, 7, 8, Shed 1, Shed 2 and one silo). No buildings or structures associated with McMaster Field Station require demolition.</p> <p>The majority of identified heritage features of the Fleurs Radio Telescope Site are located outside of the M12 Motorway - West Package 80% detailed design construction footprint, with the South Creek Antenna Complex (of little value) and a 100 metre portion of the Cable alignment (of moderate value) located within the M12 Motorway - West Package 80% detailed design construction footprint. The removal of these elements would not alter the degree of adverse impact (minor) to the heritage item.</p> <p>Urban design and landscape treatments as part of M12 Motorway - West Package will limit impacts to the landscape and vista to and from the scenic landscape associated with the confluence weir of South, Kemps and Badgerys Creek.</p>	
NAH04	<p>A suitably qualified heritage consultant will be engaged to prepare an archival photographic recording of the site in accordance with the Heritage Information Series How to prepare archival records of heritage items (NSW Heritage Office, 1998). This will include both buildings and landscape features such as dams, and earthworks. The recording will include a detailed map showing the location of the features.</p> <p>Options will be investigated to provide funding support to the property's current owner to prepare a thematic heritage study of CSIRO and other agricultural research stations, including both McGarvie Smith Farm and McMaster Field Station, and other relevant agricultural research stations and similar facilities located in NSW. The thematic study will include a review of the role of such properties in veterinary research, association with agricultural, pastoral and animal husbandry groups, use of pioneering methods and practices and contribution to the development of farming in Australia. In the event that landowners do not prepare this study, TfNSW will engage a heritage specialist to do so.</p>	<p>McGarvie Smith Farm is located within the M12 Motorway - West Package 80% detailed design construction footprint. The EIS/AR identified that the project would result in the demolition of five buildings (i.e. McGarvie Smith Farm 6, 7, 8, Shed 1 and Shed 2) and one silo. The 80% detailed design of M12 Motorway - West Package has not impacted on any additional buildings/structures other than those identified in the EIS/AR at McGarvie Smith Farm as noted in Section 4 of this memo.</p>	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
NAH05	<ul style="list-style-type: none"> All extant elements of the radio telescopes and associated infrastructure, including rubbish mounds situated outside the construction footprint will be left intact Ground penetrating radar, or other remote sensing survey techniques, will be carried out under the supervision of a suitably qualified and experienced archaeologist before any ground disturbance within the heritage curtilage of the Fleurs Radio Telescope Site contained within the construction footprint to identify any sub-surface cables: <ul style="list-style-type: none"> If additional sub-surface FST components are unexpectedly identified during ground penetrating radar survey which have not been discussed as part of the consistency assessment, then additional assessment and management would be required. This would include, but may not be limited to, archival survey and recording. Measures will be included in the CHMP to describe how the heritage values of the site will be conserved and managed during construction TfNSW will engage a suitably qualified heritage consultant to prepare an archival photographic recording of the impacted areas of the property, in accordance with DPC (Heritage) Heritage NSW guidelines (Heritage Council of NSW 2006). The archival recording report will include but not be limited to: <ul style="list-style-type: none"> Detailed survey drawings and photographic archival recording of remaining above-ground elements of the Fleurs Radio-telescope site. This survey will detail the exact location and orientation of remnant fabric within the landscape, including fabric associated with the former location of FST antenna X3 and X4, the concrete pad between antennas X3 and X4, and the former vehicle access track. Survey drawings will be included in the archival recording report Outcomes of the remote sensing survey undertaken by GHD in 2021 to provide a comprehensive record of the site (or as comprehensive as possible prior to excavation) Details of sample cables collected including original exact location by description, co-ordinates and mapping. 	<p>The majority of identified heritage features of the Fleurs Radio Telescope Site are located outside of the M12 W Motorway - West Package 80% detailed design construction footprint, with the South Creek Antenna Complex (of little value) and a 100 metre portion of the Cable alignment (of moderate value) located within the M12 Motorway - West Package 80% detailed design construction footprint. Ground penetrating radar would be conducted to identify whether any cables are present along the portion of the Cable alignment within the M12 Motorway - West Package 80% detailed design construction footprint.</p> <p>The detailed design of the M12 Motorway - West Package extends into the heritage curtilage of the Fleurs Radio Telescope Site. Implementation of the requirements of REMM NAH05 relate to the pre-construction phase and will be undertaken by others.</p>	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
	<ul style="list-style-type: none"> • Prior to construction TfNSW will consult with relevant interested organisations (such as CSIRO, Universities, amateur telescopic organisations, local heritage bodies and other special interest groups) to determine if there is interest in retaining sub-surface cabling (including details on the type and length cabling to be retained) or other structures identified during archival recording, remote sensing or any unexpected additional cables found during construction. • The M12 West and M12 Central Contractor will (with advice from TfNSW Overarching Archival Recording Contractor) be responsible for the following: <ul style="list-style-type: none"> — Retrieval of a sample of each type of cable / compressed air hose along the cable alignment between antennas X3 and X4 with supervision by a heritage specialist. This will include retrieval of 1-2m (or a length directed by TfNSW following consultation with stakeholders) of each type of cable / compressed air hose including the relevant attachment. The selection of the types and length of cables / hose to be collected will include consideration of the following: <ul style="list-style-type: none"> ▪ Physical review of the cables / hose types visible at South Creek 3 Antenna Complex, South Creek 4 Complex, and South Creek 5 Antenna Complex ▪ Any additional information identified through remote sensing survey of the cable alignment ▪ Discussion with archival recording or other relevant heritage specialists where required ▪ Outcomes from the consultation undertaken by TfNSW with interested parties ▪ Cable samples will be collected, with consideration given to potentially contaminated materials, such as asbestos and PCBs. Appropriate WHS measures will be implemented in accordance with the Contractor's WHS Plan. ▪ Cable samples will be tagged, including exact location by description and relevant coordinates of the cabling prior to its extraction. ▪ Safe storage of cable samples until collection by interested parties. If samples are unclaimed by interested parties within three months, 		

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
	<p>they will be appropriately disposed of at a licensed landfill by the contractor.</p> <ul style="list-style-type: none"> — Where cabling is not impacted by construction works, it can remain in-situ, otherwise the contractor is responsible for appropriate disposal. — Concrete Plinths: <ul style="list-style-type: none"> — Prior to construction the contractor must establish an exclusion zone around the concrete plinths at South Creek 3 Antenna Complex (Central) and South Creek 5 Antenna Complex (West) to protect against inadvertent impacts during construction — If leaving the plinths in situ during construction is not practicable, they will be removed and stored temporarily with survey information providing details of their position relative to each other and orientation. The Contractor will then investigate opportunities for re-establishing the concrete plinths on site close to their original location and/or as part of the interpretative display for the Radio Telescope site. If re-established, the survey information collected prior to their removal must be used to ensure that the plinths are located in the same orientation and arrangement — Prior to removal of the concrete plinths, the contractor is to identify whether any of the plinths are used as state survey marks. The contractor must comply with the preservation of survey infrastructure requirements in TfNSW specification G71. It is noted TS7279 is located on one of the plinths at X3. — Measures for M12 Central only: <ul style="list-style-type: none"> — Prior to construction the contractor must establish an exclusion zone around the former location of antenna X3 at South Creek 3 Antenna Complex to protect against inadvertent impacts during construction. Design consideration should be given to revegetation of the former location of antenna X3 to stabilise the eroding margins of the basin. — Prior to construction the contractor must establish around the metal shed at South Creek 3 Antenna Complex to protect against inadvertent impacts during construction. 		

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
	<ul style="list-style-type: none"> The heritage interpretation framework for the project (NAH02) will include interpretation measures that will improve community awareness of the history of the Fleurs Radio Telescope as well as determine suitable locations for the presentation of information that are publicly accessible. 		
NAH06	<ul style="list-style-type: none"> Relevant conservation policies outlined in the Upper Canal CMP (NSW Public Works Government Architect's Office, 2016) will be considered during detailed design and incorporated into CCHMP to ensure heritage fabric is not impacted by the project. The CCHMP will be consistent with and require implementation of relevant measures outlined in the Guidelines for development adjacent to the Upper Canal and Warragamba Pipelines (WaterNSW 2020) which sets out guidelines for designing, planning or assessing development on land adjacent to the canal at this location. Additional structures identified in the construction footprint will be investigated and measures implemented to avoid or minimise impacts. Guidelines and associated safe working distances to be adhered to for heritage structures as outlined in Appendix K of the EIS A safe working distance exclusion zone will be established around the exposed tunnel air shaft in the M7 Motorway median in accordance with the process outlined in noise and vibration management measures NV09 - NV10 Transport for NSW will provide an updated report to WaterNSW on project design changes as they relate to the WaterNSW Upper Canal corridor during detailed design. 	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) heritage item is not located within the M12 Motorway - West Package detailed design construction footprint.</p>	Yes
NAH07	<ul style="list-style-type: none"> A suitably qualified heritage consultant will be engaged to prepare an archival photographic recording of the impacted area, in accordance with DPC (Heritage) guidelines (Heritage Council of NSW 2006). This will include both buildings and landscape features such as dams, and earthworks. The recording will include a detailed map showing the location of the features. Options will be investigated to provide funding support to property's current owner to prepare a thematic heritage study of CSIRO and other agricultural research stations, including both McMaster Field Station and McGarvie Smith Farm, and other relevant agricultural research stations and similar facilities located in NSW. The thematic study will include a review of the role of such properties in veterinary research, association with agricultural, pastoral and animal husbandry groups, use of pioneering methods and practices and contribution to development of farming in NSW and Australia. In the event that landowners do not prepare this study, TfNSW will engage a heritage specialist to do so. 	<p>McMaster Field Station is located within the M12 Motorway - West Package. The EIS/AR identified that the project would not require the demolition of any heritage significant buildings/structures associated with property. The detailed design of M12 Motorway - West Package does not impact on any additional heritage significant buildings/structures within the McMaster Field Station property.</p>	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
	<ul style="list-style-type: none"> A potential use zone will be established around the McMaster Farm group of buildings, including a suitable buffer zone, and no construction activities will take place within this zone. This zone will be incorporated into the construction heritage management plan (CHMP). The potential use zone will include safe working distances to be adhered to for heritage structures as outlined in Appendix K of the EIS. Before occupying or utilising the buildings, a dilapidation survey will be carried out and a heritage architect will be engaged to advise on proposed modifications and management measures to avoid and minimise impact on the buildings. 		
NAH08	<ul style="list-style-type: none"> A suitably qualified heritage consultant will be engaged to prepare an archival photographic recording of the impacted area before its disturbance and/or removal, in accordance with DPC (Heritage) guidelines (Heritage Council of NSW 2006). The recording will include a detailed map showing the location of the features. An interpretive framework developed for the project will include consideration of elements to enable the continued interpretation and understanding of the airstrip at Fleurs Aerodrome as a linear and continuous element. This will be carried out in consultation with Department of Defence and consider opportunities for involvement of veterans groups. Relevant guidelines and associated safe working distances will be adhered to for remaining heritage structures as outlined in the Appendix K of the EIS 	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The Fleurs Aerodrome is not located with the M12 Motorway - West Package.</p>	Yes
NAH09	<ul style="list-style-type: none"> A suitably qualified archaeologist will be present during the excavation of the area occupied by the Cecil Park Archaeological site to confirm that the significance of artefacts and remains are in line with the findings of the test excavations already completed. If remains with the potential to be considered 'relics' (as defined in the Heritage Act 1977) are found, then works will stop and the unexpected finds procedure (RMS, 2015) will be followed. 	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The Cecil Park School, Post Office and Church Site is not located within the M12 Motorway - West Package.</p>	Yes
NAH10	<ul style="list-style-type: none"> Management measures identified in the project UDLP (LVIA01) will be implemented during detailed design to minimise impacts on landscape and vistas Flooding management measures (F01 to F08) and surface water quality and hydrology management measures (SWH01 to SWH14) will be implemented to reduce broader impacts on the surrounding scenic landscape. 	<p>In relation to the scenic landscape, the nearest and most prominent detailed design features within M12 Motorway - West Package are Bridge BR05 (Badgerys Creek) and associated motorway to the east and west of the bridge and the interchange respectively. Views from the Scenic Landscape towards M12 Motorway - West Package. The design of Bridge BR05 (Badgerys Creek) comprises a simple low-lying bridge which is recessive in the landscape. To the east of Bridge BR05 the motorway will be visible from the scenic landscape. Urban design and landscape treatments to</p>	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
		<p>minimise impacts on the landscape and vista include revegetation (i.e. trees) that will screen the motorway. To the west of Bridge BR05 the motorway is in cut and therefore will not be visible from the scenic landscape. The M12 Motorway - West Package interchange is located approximately 1.5 kilometres from the scenic landscape and is major feature of the M12 Motorway - West Package. Given this distance from the interchange the view from the scenic landscape is less significant. The detailed design of the interchange has been developed to provide a gateway experience and be a wayfinding measure. The interchange will include indigenous artwork and feature landscaping. Bridges and ramp associated with the interchange have been design to be elegant, consistent and appear to flow. In addition, visual transparency has been incorporated. Views from the M12 Motorway - West Package towards the Scenic Landscape: The landscape design for M12 Motorway - West Package has been developed to ensure that the views to the scenic landscape beyond the motorway have been maintained/enhanced.</p> <p>The proposed changes would not impact on the ability of REMM F01 to F08 and SWH01 to SWH14 to be implemented. A review of REMM F01 to F08 and SWH01 to SWH14 is provided in Table 5-2 of the Consistency Assessment Report and Appendix G (Flooding) and Appendix I (Surface Water Quality) of the Consistency Assessment Report.</p>	
NAH11	Where post and rail fencing of heritage significance is identified within the construction footprint, Transport for NSW will seek to avoid directly impacting such features. Where avoidance is not practicable, Transport for NSW will seek to minimise and mitigate impact in consultation with a suitably qualified heritage specialist.	The EIS / Amendment Report assessed potential impacts to Luddenham Road as negligible.	Yes

4.4 EPBC APPROVAL

The proposed changes in non-Aboriginal heritage management measures at detailed design do not constitute to any change in project aspects related to the EPBC approval

5. CONCLUSIONS

5.1 CONCLUSIONS

There would be no changes to the degree of impact to the four non-Aboriginal heritage items located within the 80% detailed design for the M12 Motorway - West Package. Adverse heritage impacts from the M12 Motorway - West Package 80% detailed design construction footprint are:

- McGarvie Smith Farm – major direct and indirect impact
- The Fleurs Radio Telescope Site – minor direct and indirect impact
- Luddenham Road Alignment – negligible direct and indirect impact
- McMasters Field Station – major direct and indirect impact.

5.2 SUMMARY OF PROJECT CONSISTENCY ASSESSMENT

The 80% detailed design for the M12 Motorway - West Package is consistent with the non-Aboriginal heritage Minister's Conditions of Approval and Revised environmental management measures.

Appendix F

Noise and vibration consistency assessment memo



MEMO

TO: Transport for NSW
FROM: Rebecca Warren
CC: Steve Walker, Sarah Saunders
SUBJECT: Noise and vibration Consistency Assessment memo
OUR REF: M12WDD-WSP-ALL-EN-MEM-000011.docx
DATE: 3 September 2021

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

Transport for NSW (TfNSW) are proposing to construct and operate the M12 Motorway project (the project) to provide direct access between the Western Sydney International Airport (WSIA) at Badgerys Creek and Sydney's motorway network. The M12 Motorway would run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for a distance of about 16 kilometres and is expected to be opened to traffic prior to opening of the WSIA.

This Consistency Assessment is for the M12 Motorway – West Package, between The Northern Road, Luddenham and approximately 250 metres east of Badgerys Creek. It is proposed to be a four-lane dual-carriageway motorway, including a new grade separated interchange with the Airport Access Road to provide connection to the WSIA. An overview of the M12 Motorway – West Package is illustrated in Figure 1-1.

As part of design development during detailed design for the M12 Motorway –West Package (shown in Figure 1-1) changes requiring further environmental assessment have been identified. The Consistency Assessment is based on the 80% detail design submission.

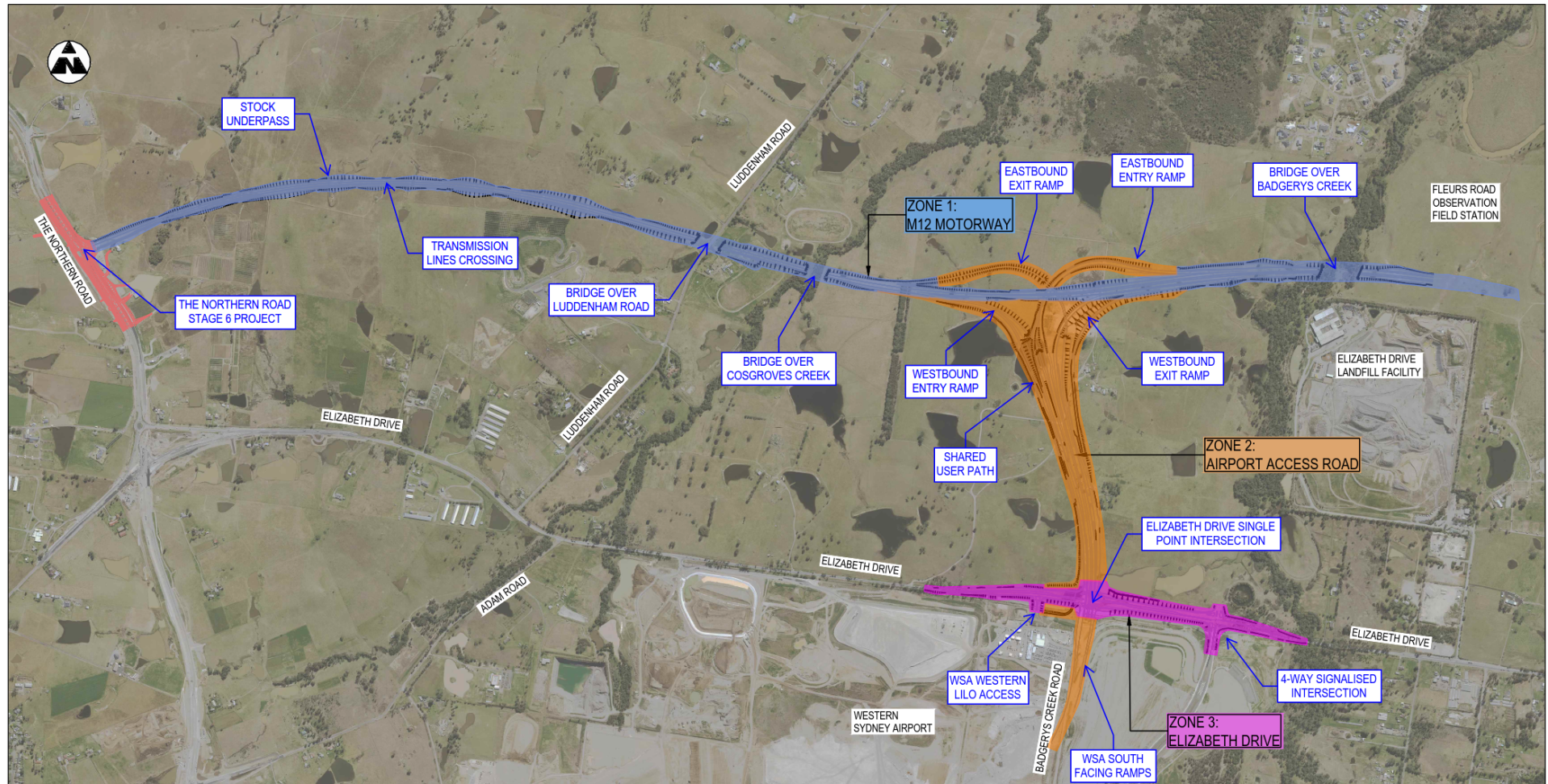


Figure 1-1 M12 Motorway – West Package overview – key features

1.2 SCOPE OF THIS REPORT

In the event of proposed changes to the M12 Motorway Approved Project, a review for consistency is required by the proponent for the M12 Motorway – West Package. The Consistency Assessment will determine if the proposed changes satisfy the requirements of the Planning Approval.

Relevant project approval documentation includes:

- *M12 Motorway Environmental Impact Statement Noise and Vibration Assessment Report* (Transport for NSW, 2019) (the EIS NVIA)
- *M12 Motorway, Submissions Report* (Transport for NSW, 2020) (the EIS Submissions Report)
- *M12 Motorway Amendment Report Noise and vibration updated technical report* (Transport for NSW, 2020) (the Amendment Report NVIA)
- *M12 Motorway, Amendment Report Submissions Report* (Transport for NSW, 2020) (the AR Submissions Report)
- *M12 Motorway Noise and Vibration Assessment Report* (GHD, 2020) (the 50% detailed design NVAR).

This memo provides a review of the proposed changes in terms of impacts to noise and vibration and identifies if they are consistent with the Approved Project or if additional or reduced impacts are predicted. The Approved Project is the project as assessed as part of the EIS NVIA, Amendment Report NVIA and AR Submissions Report.

This document presents the Consistency Assessment for noise and vibration for the 80% detailed design for the M12 Motorway – West Package, with reference to the outcomes in the noise assessments for the Approved Project.

This memo comprises the following scope:

- Review of Approved Project documentation, with regard to operational and construction noise and vibration impacts
- Identification of design changes since the completion of the Approved Project, including horizontal and vertical alignment changes
- Qualitative assessment of impacts from the Approved Project to 80% detailed design
- Summarise if the design changes are consistent with the noise and vibration outcomes from the Project Approval
- Identify if the design changes have resulted in updates to the proposed noise and vibration mitigations recommended for the Approved Project
- Where it is recommended that further noise modelling is required, this shall be undertaken by TfNSW as part of the 100% detail design.

This review has included a high-level review of the NVAR 50% detailed design model to identify any design or parameter changes. No other project models were reviewed.

1.3 DESCRIPTION OF PROPOSED CHANGES

The project as described in the Division 5.2 Approval dated 23 April 2021 and EPBC Approval dated 3 June 2021 is outlined in Section 1.2 of the Consistency Assessment Report and a detailed description is provided in Chapter 5 of the EIS (Roads and Maritime, 2019). The amended project is detailed in Chapter 2 of the Amendment Report (Transport for NSW, 2020a) and Chapter 1 of the AR Submissions Report (Transport for NSW, 2020b).

The proposed changes to M12 Motorway – West Package from the Approved Project include the following and shown in Figure 2-1 of the Consistency Assessment Report:

- Airport interchange revised to a free flow directional interchange
- Elizabeth Drive and Airport Access road intersection revised to a single point interchange, comprising:
 - Two separate bridges over the Airport Access Road
 - New entry and exit ramps for access to the Airport Access Road and Elizabeth Drive
- All ramps on the Airport Access Road between the Airport interchange and Elizabeth Drive realigned

- Intersection to the west of the Airport Access Road and Elizabeth Drive replaced with a left in, left out arrangement from the WSIA and the northern stub road removed
- Intersection to the east of the Airport Access Road and Elizabeth Drive refined to align with the as-built Badgerys Creek Road
- Elizabeth Drive relocated to the north by about 10 metres at the single point interchange, east of the Airport access Road
- Extension of the Airport Access Road and southbound ramp to tie into the WSIA internal road network (area within Airport land to be assessed and approved in the Airport Approval)
- Reconfiguring BR02 and BR05 at Cosgroves Creek and Badgerys Creek, respectively
- Extending and refining existing utilities relocation designs, including electrical mains and additional water main crossings
- Modification to one operational water quality basin and four additional construction water quality basins
- Refinements to drainage and water quality infrastructure across the M12 Motorway - West Package, including culverts, open channels and cross drainage
- Additional construction access road to the north of BR20
- Amendments to the private property access on Elizabeth Drive west of the Airport Access Road
- Installation of a Variable Messaging Sign (VMS) on the southbound carriageway of The Northern Road Stage 6.

The principal changes which would relate to noise and vibration are:

- Changes in the construction and operation footprints of the project
- Changes to the horizontal and vertical design of the civil works and road infrastructure, including main carriageway and entry/exit ramps
- Changes to traffic noise impact arising from the change in intersections and entry and exit ramps and alignments of lanes.

The changes from the Approved Project design (as outlined in the Amendment Report NVIA) compared to the 80% detailed design are presented in Figure 2-1 to Figure 2-3 of the Consistency Assessment Report.

2. OPERATIONAL ROAD NOISE

This section summarises the operational noise impacts and changes between the Approved Project NVIA and 80% detailed design. A qualitative assessment of changes has been completed based on available information. Changes are assessed in Section 2.1 with findings and recommendations summarised in Section 2.4.

It is noted that the Approved Project (EIS and Amendment Report) documentation has been peer reviewed and assessed by regulatory bodies and it is considered that policy, assessment and modelling has been completed largely in accordance with industry guidance. Key elements with the potential to impact the outcomes have been summarised in line with the scope of works provided for the Consistency Assessment.

The key features of the Approved Project are provided in Section 1.2 of the EIS and Amendment Report NVIAs. This review has been tailored to include the relevant portions of the M12 Motorway – West Package.

The EIS NVIA identified noise and vibration sensitive receivers and separated the affectation area into noise catchment areas (NCAs) for ease of assessment, as presented in Figure 2-1. The NCAs relevant to the M12 Motorway – West Package are NCA07 to NCA10.

It is acknowledged that road traffic noise levels at individual receivers, both measured and predicted, can be sensitive to relatively small changes in a range of influencing factors, such as traffic speeds, traffic volumes, road pavement surfaces and the road alignment.

Consequently, this assessment has focused on consistency with the Approved Project with respect to the overall potential noise impacts and the approach to manage and mitigate road traffic noise. To inform the assessment, changes in road traffic noise of less than 2 dBA are deemed to be outside the thresholds of a perceptible change in noise level.

2.1 SUMMARY OF CHANGES FROM APPROVED PROJECT TO 80% DETAILED DESIGN - OPERATION

The documents reviewed include the EIS NVIA, Amendment Report NVIA and 50% detailed design NVAR.

The elements with the potential to influence the noise and vibration assessment and recommended noise mitigation have been reviewed across all documentation.

The following elements have been found to be consistent with the Approved Project to the 80% detailed design, and have not been considered further:

- Policy implementation (Section 3 of the EIS NVIA, unchanged in Amendment Report NVIA)
- Noise mitigation measures and their effectiveness: No changes from Amendment Report NVIA and AR Submissions Report
- Sensitivity analysis: No changes from Amendment Report NVIA.

The elements identified above will not be considered further in this assessment.

The following elements were identified to potentially impact the Approved Project outcomes:

- The horizontal and vertical road alignment has changed from the Amendment Report NVIA. Refer to Section 2.2
- Traffic volumes have changed from the Amendment Report NVIA. Refer to Section 2.2
- Surface corrections adopted in the noise modelling have changed from the Amendment Report NVIA to incorporate the low noise diamond grind pavement surface as part of the Approved Project. Refer to Section 2.2.1.

The 50% detailed design NVAR included commentary on the changes in the design and road traffic noise assessment between the EIS and Amendment Report stages. This commentary has been reviewed as part of the Consistency Assessment, and identified the following parameter modifications with the potential to impact noise impact outcomes:

- Road source traffic volumes



- Road traffic noise emissions source heights
- Surface corrections adopted in the noise modelling have changed from the Amendment Report NVIA to incorporate the low noise diamond grind pavement surface as part of the Approved Project. Refer to Section 2.2.1.

The design changes identified to influence and change the assessment outcomes between the Amendment Report and 80% detailed design are discussed in further detail in Section 2.2.1.

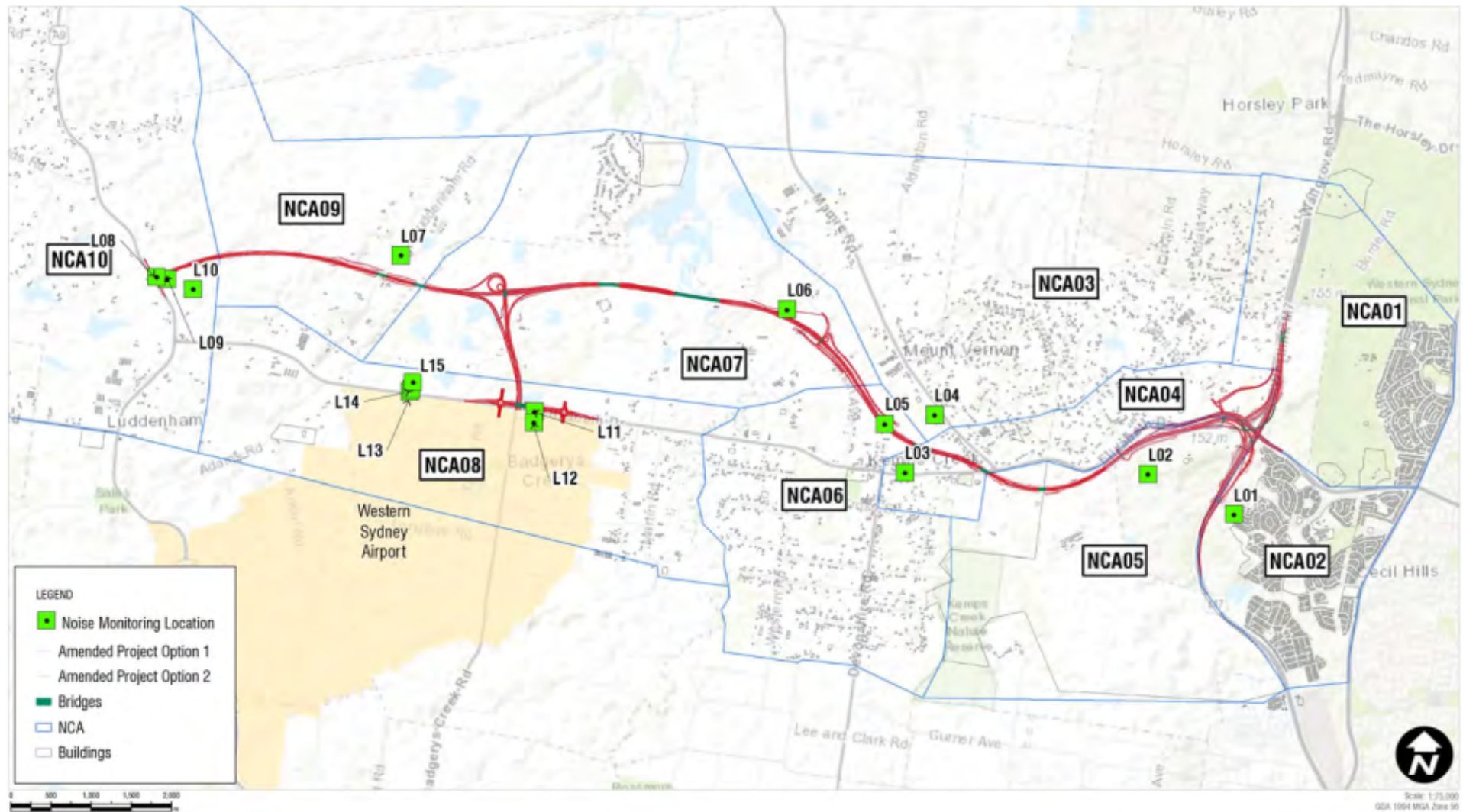


Figure 2-1 Site plan, noise monitoring locations and noise catchment areas

Source: Amendment Report (TfNSW, 2020)

2.2 CHANGES IN OPERATIONAL NOISE IMPACT BETWEEN APPROVED PROJECT AND 80% DETAILED DESIGN

As discussed in Section 1.3, the 80% detailed design includes several design changes from the Amendment Report. Upon review of the assessment reports and project designs, the principal design changes which would relate to operational road traffic noise impacts include:

- Changes to the horizontal alignment (footprint)
- Changes in vertical alignment (elevation)
- Changes in traffic volumes as a result of new connections to the Motorway
- Change in intersections and entry and exit ramps and alignments of lanes.

A qualitative assessment of potential operational noise changes has been completed based on the available design information and the road traffic noise assessment undertaken for the 50% detailed design. Table 2-1 presents a summary of these impacts per NCA for consistency with the Amendment Report NVIA and are discussed in the following sections.

Table 2-1 Qualitative assessment of potential changes to operational road noise impacts – Amendment Report to 80 % detailed design

NCA	Changes due to operational footprint	Potential impact to operational road noise impacts
Changes to horizontal alignment		
NCA07	Increased footprint to east of Airport interchange by between 45 and 60 metres to east.	While there is one additional building inside the M12 Motorway – West Package 80% detailed design construction footprint at McMaster Field Station, this building will be demolished for the project.
	No change to footprint to west of Airport interchange.	No change from Amendment Report NVIA.
	Realignment of Elizabeth Drive 10 metres north.	Negligible change from Amendment Report NVIA.
NCA08	Reduction in operational footprint at Elizabeth Drive interchange. Negligible footprint changes east and south of the interchange.	No change from Amendment Report NVIA.
NCA09	Reduction in operational footprint - 40 metre setback from nearest receiver west of Luddenham Road.	Minor reduction in operational noise levels (~1.7 dBA) at one receiver west of Luddenham Road.
NCA10	No change.	No change.
Changes to vertical alignment		
NCA07	Potential for reduction in height compared to the 80% concept design of M12 Motorway east of Cosgroves Creek.	Potential for reduction in noise levels for receivers east of Cosgroves Creek.

NCA	Changes due to operational footprint	Potential impact to operational road noise impacts
NCA08	Potential for increase to road height up to one metre associated with the Elizabeth Drive interchange.	Potential for increase in noise levels at receivers as a result of the changes in vertical alignment associated with the Elizabeth Drive interchange noting that much of the area within NCA08 is now WSIA.
NCA09	Potential for increase to road height up to one metre on M12 Motorway west of Cosgroves Creek.	Potential for increase in noise levels at receivers on M12 Motorway west of Cosgroves Creek.
NCA10	Potential for increase to road height up to two metres on M12 Motorway west of Cosgroves Creek.	Potential for increase in noise levels at receivers on M12 Motorway west of Cosgroves Creek.
Changes to traffic volumes		
NCA07	<p>Potential for increase to road traffic volumes on M12 Motorway for the majority of road sections.</p> <p>Potential for decrease in road traffic volumes on connecting surrounding roads.</p> <p>Note: These traffic volumes are likely to be overestimated on the M12 Motorway and underestimated on surrounding roads (refer to Section 2.2.3).</p>	<p>Potential for increase in noise levels at receivers in vicinity of M12 Motorway.</p> <p>Potential for decrease in noise levels at receivers in vicinity of connecting surrounding roads.</p> <p>Due to limitations in the traffic assessment, changes in noise level cannot be estimated more quantitatively at this stage (refer to Section 2.2.3).</p>
NCA08	<p>Potential for increase to road traffic volumes on M12 Motorway for the majority of road sections.</p> <p>Potential for decrease in road traffic volumes on connecting surrounding roads.</p> <p>Note: These traffic volumes are likely to be overestimated on the M12 Motorway and underestimated on surrounding roads (refer to Section 2.2.3).</p>	<p>Potential for increase in noise levels at receivers in vicinity of M12 Motorway.</p> <p>Potential for decrease in noise levels at receivers in vicinity of connecting surrounding roads.</p> <p>Due to limitations in the traffic assessment, changes in noise level cannot be estimated more quantitatively at this stage (refer to Section 2.2.3).</p>
NCA09	<p>Potential for increase to road traffic volumes on M12 Motorway for the majority of road sections.</p> <p>Potential for decrease in road traffic volumes on connecting surrounding roads.</p> <p>Note: These traffic volumes are likely to be overestimated on the M12 Motorway and underestimated on surrounding roads (refer to Section 2.2.3).</p>	<p>Potential for increase in noise levels at receivers in vicinity of M12 Motorway.</p> <p>Potential for decrease in noise levels at receivers in vicinity of connecting surrounding roads.</p> <p>Due to limitations in the traffic assessment, changes in noise level cannot be estimated more quantitatively at this stage (refer to Section 2.2.3).</p>
NCA10	Potential for increase to road traffic volumes on the M12 Motorway for the majority of road sections. Potential for decrease in road traffic volumes on connecting surrounding roads.	<p>Potential for increase in noise levels at receivers in vicinity of M12 Motorway.</p> <p>Potential for decrease in noise levels at receivers in vicinity of connecting surrounding roads.</p>

NCA	Changes due to operational footprint	Potential impact to operational road noise impacts
	Note: These traffic volumes are likely to be overestimated on M12 and underestimated on surrounding roads (refer to Section 2.2.3).	Due to limitations in the traffic assessment, changes in noise level cannot be estimated more quantitatively at this stage (refer to Section 2.2.3).
Changes to intersections, lanes and ramps		
NCA07 (north west)	Removal of trumpet interchange moves traffic carrying lane further south by 100 metres to west of intersection. Increases offset distance to Luddenham Road receivers by up to 100 metres.	Minor reduction (<1dBA) in operational noise levels at receivers west of Luddenham Road.
NCA07 (north east)	Eastbound off ramp to east of Airport interchange moves one traffic carrying lane north by up to 100 metres. Decreases offset to Badgerys Creek receivers by up to 40 metres. Elizabeth Drive realigned 10 metres north.	Minor increase (<1dBA) in operational noise levels at receivers in Luddenham east of Luddenham Road. No receivers impacted by Elizabeth Drive northern realignment.
NCA07 (south west)	Realignment of northbound lanes approximately 20 metres west at intersection Elizabeth Drive interchange. Removal of through lane from Airport interchange to left in left out.	These changes will likely counterbalance, with realignment of traffic closer to wester receivers offset by removal of through lane traffic.
NCA07 (south east)	Realignment of southbound lanes onto Airport intersection 10 metres further east, closer to McGarvie Smith farm.	Minor increase (<1dBA) in operational noise levels at nearest receiver in McMaster Field Station east of Elizabeth Drive interchange.
	Minor realignment of southern portion of Elizabeth Drive interchange 2 metres west of receivers in McGarvie Smith Farm.	While there is one additional building inside M12 Motorway – West Package 80% detailed design construction footprint at McGarvie Smith Farm, this building will be demolished for the project.
NCA08	Reduction in operational footprint at Elizabeth Drive interchange, negligible footprint changes east and south of interchange.	No change.
NCA09	No change from Amendment Report NVIA.	No change from Amendment Report NVIA.
NCA10	No change from Amendment Report NVIA.	No change from Amendment Report NVIA.

2.2.1 CHANGES TO HORIZONTAL ALIGNMENT

The change in construction footprint as a result of the design changes at several locations has the potential to result in changes to the operational noise impacts when compared to the Approved Project. Of note, the footprint moves closer to several residences in NCA07 by up to 60 metres due to changes at the Airport interchange which has the potential to marginally increase (less than 1 dBA) road traffic noise levels at an isolated number of residences.

At several other locations the footprint moves by up to 40 metres from sensitive receivers, including NCA09. However, no notable changes are identified for NCA08 and NCA10.

It is noted that one additional structure within McMaster Field Station is anticipated to be situated within the M12 Motorway – West Package 80% detailed design construction footprint. The Non-Aboriginal Heritage Consistency Assessment identified this structure to be a modern farming shed which will be demolished as part of the project, therefore no impacts are anticipated. One building in McGarvie Smith Farm is included in the M12 Motorway – West Package 80% detailed design construction footprint on the eastern side of the Airport Access Road, however this building (McGarvie Smith Farm 8) is already identified for demolition as part of the project, therefore no operational noise impacts are anticipated.

Estimated changes in noise levels from the Approved Project based on the change in the distance between the receivers and the road are detailed in Table 2-1.

2.2.2 CHANGES TO VERTICAL ALIGNMENT

Changes to vertical alignment have been identified as part of the constructability assessment for the detailed design between the Approved Project and 80% detailed design. Due to the Airport interchange revision to a free flow directional interchange, the road heights have been reduced by about four metres in the vicinity of the intersection.

The largest changes in vertical alignment result from the revision of the Airport interchange and introduction of southbound on and off ramp. This change would reduce road surface heights by up to four metres in the vicinity of the intersection.

The 80% detailed design results in increases up to two metres on south bound off ramps to the Elizabeth Drive interchange, with increases in vertical heights up to 10 metres along the intersection itself. Reductions of up to five metres occur along the majority of the M12 Motorway – West Package in NCA07, and eastern parts of NCA09, with increases up to two metres to the western portion of the Motorway in NCA10.

The majority of other changes to vertical alignment along the M12 Motorway east of Cosgroves Creek are either minimal (increases up to one metre) or there is a reduction in height compared to the Approved Project. To the west of Cosgroves Creek, changes in vertical alignment of between one and two metres are observed over portions of the M12 Motorway alignment.

At the Elizabeth Drive interchange, minor vertical increases up to one metre are observed along the majority of the roadway, with the intersection alignment increasing up to 10 metres above the design assessed in the Amendment Report NVIA.

Based on the above it is considered that there would be minor changes to noise impacts to receivers in NCA07. Reduced exposure of receivers to traffic sources on the M12 Motorway, and the distance to potentially affected receivers would lead to a minor reduction in noise levels, however the eastbound on ramps would potentially offset these reductions with minor increases in noise levels. The addition of on ramps as part of the revised interchange were considered as part of the Amendment Report NVIA therefore these impacts would be generally consistent with the Amendment Report NVIA.

Receivers in NCA09 may experience minor increases (1 to 2 dBA) in road traffic noise from the Amendment Report NVIA due to increases in the road surface height of between one to two metres above the Approved Project alignment. Receivers within NCA08 may experience material increases in noise levels as a result of the changes in vertical alignment associated with the Elizabeth Drive Interchange; the nearest potentially affected receiver is about 500 metres north-west of the Elizabeth Drive Interchange.

It is noted that the changes outlined in this section have been incorporated into modelling as part of the 50% detailed design NVAR (GHD, 2020). The 50% detailed design NVAR noted that these vertical changes resulted in minor to moderate

impacts compared to the Amendment Report and therefore the 80% detailed design which is currently adopting the 50% detailed design NVAR.

Road traffic noise modelling will be finalised based on the 100% detailed design in accordance with the conditions of approval for the project to confirm the noise impacts and mitigation required. This is particularly relevant for receivers in NCA08, NCA09 and NCA10 where increases in vertical alignment above one metre are anticipated and the road in question is the dominant noise source.

An Operational Noise and Vibration Review will be prepared to document the outcomes from the 100% detailed design noise modelling and will be submitted to the Planning Secretary for information in accordance with the conditions of approval. These further investigations are discussed in Section 2.4.

2.2.3 CHANGES IN TRAFFIC VOLUMES

The Consistency Assessment Memo – Traffic and Transport (ref: M12WDD-WSP-ALL-EN-MEM-000016) has identified that road traffic volumes have changed between the Amendment Report design and the 80% detailed design stages. It is noted that this document does not include the full scope of the Elizabeth Drive upgrades, which would result in traffic shifting from the M12 Motorway to Elizabeth Drive. As a result, this document may underestimate traffic volumes on Elizabeth Drive and overestimate the traffic volumes on the M12 Motorway.

The traffic volumes assessed in Section 3.2.1 of Traffic and Transport Consistency Assessment Memo are based on peak hour volumes as opposed to annual average daily traffic volumes as is required for road noise assessment.

As a result, impacts over the relevant assessment periods cannot be quantitatively assessed and the following assessment provides an indicative assessment of potential impact. Peak hour volumes are considered to provide a worst-case scenario of traffic volumes and the following assessment is qualitative only.

Overall, there is a general increase in road traffic volumes on the M12 Motorway with reductions in road traffic volumes on the connecting surrounding roads. The change in road traffic volumes on the M12 Motorway varies between the Approved Project and 80% detailed design which results, in about a 1.5 dBA increase in road traffic noise emissions.

The variation is specific to the time of day and direction of travel. For example, eastbound road traffic volumes for the evening peak hour in 2026 could result in a 4.5 dBA increase in road traffic noise whereas morning peak hour traffic volumes for 2036 could represent a 1.5 dBA decrease in road traffic noise levels. A change in road traffic noise of 4.5 dBA could be a perceptible change. However, it is likely that the traffic volumes presented are overestimated, therefore these changes in noise levels are likely to be highly conservative.

Based solely on the traffic volumes, the changes to traffic volumes on Elizabeth Drive, Luddenham Road and The Northern Road are estimated to reduce traffic noise emissions from the Amendment Report design by 1 dBA on average. The potential change in noise emission on each surrounding road does vary with the direction of travel and the time of day. For example, the change in evening traffic volumes on Elizabeth Drive in 2026 could reduce road traffic noise emissions by up to 5 dBA. On The Northern Road the revised traffic volumes could represent an increase road traffic noise emissions by up to 2 dBA in the evening (2036). A change in road traffic noise of 4.5 dBA could be a perceptible change but is noted that the traffic volumes are identified to potentially underestimate traffic volumes on Elizabeth Drive, therefore these reductions are considered highly conservative.

The consequence of the changes in road traffic volumes upon the noise levels at individual sensitive receivers is complex. The difference in noise levels will be specific to the influencing sections of the nearby road network and in this regard the potential change in traffic noise emissions from the Amendment Report design is not consistent for each road section. Due to the inherent limitations of the traffic volumes, further investigation in the Operational Noise and Vibration Review for 100% detailed design is recommended to fully understand the implications of the changes in traffic volumes upon road traffic noise levels throughout the Project Area.

Estimated changes in noise levels in Table 2-1 are qualitative due to the inherent limitations based on changes from the Approved Project. Where possible, estimates are based on changes from the Approved Project and relative changes in volumes.

Whilst there is uncertainty in regards to the road traffic volume datasets with the potential for inconsistency with the Approved Project, the above assessment has been conducted based on peak hour flows, which is highly conservative. Furthermore, road traffic noise modelling is to be undertaken at the 100% detailed design stage in accordance with conditions of approval and these works will quantitatively evaluate potential changes to road traffic noise as a result of changes in the traffic volumes from the Approved Project.

An Operational Noise and Vibration Review will be prepared in accordance with the conditions of approval for the project based on the 100% detailed design modelling. The report will confirm the operational noise impacts and mitigation measures and will be submitted to the Planning Secretary for information. These further investigations are discussed in Section 2.4.

2.2.4 CHANGES IN INTERSECTIONS, LANES AND RAMPS

Potential impacts as a result of the changes to the intersections at the Elizabeth Drive and Airport Access Road, and associated entry and exit ramps are discussed in Table 2-1.

Assuming minimal changes to traffic volumes, the potential impacts from the distribution of traffic on new routes has been qualitatively assessed, considering changes to the configurations of lanes and off ramps with the new intersection, changes to on and off ramps, realignment of Elizabeth Drive 10 metres to the north, and revision of the intersection exiting the WSIA.

In summary, these changes would result in either no change to road traffic noise levels from the Amendment Report NVIA design or a relatively minor change of not more than 2 dBA.

2.3 NOISE MITIGATION APPROACH

The Amendment Report NVIA considered the feasibility of noise barriers in the mitigation assessment, however the AR Submissions Report confirmed that noise barriers are not considered reasonable or feasible in accordance with the Noise Mitigation Guidelines (RMS, 2015).

Use of low-noise diamond grind concrete and at-property treatment is the preferred mitigation strategy for M12 Motorway – West Package, as discussed in the AR Submissions Report.

A low-noise diamond grind pavement surface is part of the Approved Project, and this pavement surface has been included in the 50% detailed design noise modelling which currently informs the 80% detailed design stages. A low-noise diamond grind pavement is considered a noise mitigation treatment already implemented across the Project (i.e. no longer a mitigation approach). Consequently, at-property treatment of eligible sensitive receiver properties is expected to be the primary additional noise mitigation approach.

Where the assessment has conservatively identified that changes in road traffic volumes could result in a perceptible increase in road traffic noise, for example up to 5 dBA, it does not change the approach to mitigate and manage road traffic noise from the Approved Project.

2.4 SUMMARY OF FINDINGS – OPERATIONAL ROAD NOISE

The consistency review identified, in comparison to the Approved Project, the 80% detailed design would result in minor changes to operational road traffic noise over the majority of the M12 Motorway – West Package.

In relation to potential impacts to the surrounding noise environment there is generally no material changes to operational road traffic noise outcomes or noise mitigation requirements of the Approved Project as a result of the changes identified as part of the 80% detailed design.

This report has identified the potential for road traffic noise levels to vary at individual sensitive receivers due to factors such as changes in the horizontal and vertical alignment of the project designs and conservatism in the approach to review the road traffic volumes.

The receivers identified for consideration of road traffic noise mitigation in the Amendment Report NVIA are expected to remain largely consistent as a result of the 80% detailed design changes. There may be some changes in the number of discrete receivers triggering property treatment as the assessment against the noise criteria can be influenced by relatively

small margins, for example less than 1 dB. Notwithstanding, this will be verified as part of the final noise modelling undertaken for the 100% detailed design in accordance with the conditions of approval.

Based on the proposed changes at the 80% detailed design, the following are to be completed in accordance with the conditions of approval (refer to Section 4.1) and revised environmental management measures (refer to Section 4.2) for the project:

- Update the detailed road traffic noise prediction modelling for the final detailed design, consistent with condition of approval E51 and E52
- Confirm road traffic noise mitigation requirements, in addition to the diamond grind pavement surface, based on the completion of the road traffic noise modelling, consistent with condition of approval E51 and E52, and revised environmental management measure NV14
- Update the detailed design NVAR reporting and complete the Operational Noise and Vibration Review (ONVR) based on the completed road traffic noise assessment for the final design, consistent with condition of approval E51 and E52 and revised environmental management measure NV14
- Verify road traffic noise levels upon project opening as part of an Operational Noise Compliance Report, consistent with condition of approval E60.

3. CONSTRUCTION NOISE AND VIBRATION

This section summarises the changes to construction noise and vibration impacts between the Approved Project and 80% detailed design. Changes are assessed in Section 3.1, with findings and recommendations summarised in Section 3.2.

A qualitative assessment of changes has been completed based on available information. The key features of the Approved Project are provided in Section 1.2 of the EIS and Amendment Report NVIAs. This review has been tailored to include the relevant portions of the M12 Motorway – West Package.

The Approved Project included an assessment of construction noise and vibration, including construction traffic noise, at receivers in the M12 Motorway – West Package for a number of representative construction scenarios.

Receivers assessed included noise-sensitive and vibration sensitive receivers, including heritage buildings and other structures.

Construction noise and vibration impacts were assessed for relevant scenarios based on scenarios and equipment schedules. Ground borne noise was not considered as part of the assessments due to the distance to receivers, which are considered sufficient to manage the potential for associated impacts to human comfort and amenity.

The safe working distances for vibration generating plant, and potentially affected vibration sensitive receivers were outlined in Figure 5-12 of the EIS NVIA.

The Approved Project completed a construction traffic assessment based on typical industry accepted methods. No noticeable increases in road traffic noise were predicted.

3.1 . CHANGES IDENTIFIED IN DETAILED DESIGN COMPARED TO THE APPROVED PROJECT

As discussed in Section 1.3, the 80% detailed design includes several changes from the Approved Project.

The principal changes which would relate to construction noise and vibration impacts are changes to:

- Changes to the horizontal alignment (footprint)
- Changes in vertical alignment (elevation)
- Changes in construction traffic volumes and haulage.

It is noted equipment information is subject to change, and the impacts of any changes would be subject to further assessment by the contractor.

A qualitative assessment of potential construction noise and vibration changes has been completed based on available design information. Table 3-1 summarises the impacts per NCA for consistency with the Amendment Report NVIA and are discussed in the following sections.

Table 3-1 Qualitative assessment of potential changes to construction noise and vibration impacts – Amendment Report to 80% detailed design

NCA	Changes from amendment report due to construction footprint	Potential impact to construction noise and vibration impacts from amendment report nvia
Changes to horizontal alignment		
NCA07 (north west)	Minor changes to footprint moving up to 30 metres further north, no receivers impacted	Noise: No change Vibration: No change
NCA07 (north east)	Minor changes near Suez Kemps Creek (~15 metres closer)	Noise: Negligible change Vibration: No change
NCA07 (south west)	No change	Noise: No change Vibration: No change

NCA	Changes from amendment report due to construction footprint	Potential impact to construction noise and vibration impacts from amendment report nvia
NCA07 (south east)	One additional receiver within construction footprint. Construction works move 25 metres further east towards receivers in McGarvie Smith Farm	Noise: Structures within McGarvie Smith Farm to be demolished therefore no impact. Vibration: Structures and one residence in McGarvie Smith Farm to be demolished therefore no impact.
NCA08	Negligible footprint changes east and south of interchange	Noise: No change Vibration: No change
NCA09	No change	Noise: No change Vibration: No change
NCA10	No change	Noise: No change Vibration: No change
Changes to vertical alignment		
NCA07	Negligible	No change
NCA08	Negligible	No change
NCA09	Negligible	No change
NCA10	Negligible	No change
Changes to construction traffic and haulage routes		
NCA07	Potential increase in heavy vehicle movements for site accesses at AF 2	Potential for road traffic noise levels to increase by up to 3 dBA as a result of modified haulage routes for site access at AF 2
NCA08	Negligible	No change
NCA09	Potential increase in heavy vehicle movements for site accesses at AF 11	Potential for road traffic noise levels to increase by up to 3 dBA as a result of modified haulage routes for site access at AF 11
NCA10	Potential reduction in heavy vehicle movements for site accesses at AF 1 and AF 10	Potential noise reduction by up to 7 dBA as a result of modified haulage routes for site accesses at AF 1 and AF 10

3.1.1 CHANGES TO HORIZONTAL ALIGNMENT

The changes from the Approved Amendment Report Submissions Report construction footprint are presented in Figure 2-3 of the Consistency Assessment.

The 80% design modifies the Approved Amendment Report Submissions Report construction footprint at several locations which has the potential to impact the outcomes of the Amendment Report NVIA. The most significant change is that the construction footprint moves up to 25 metres closer to several structures in NCA07, being the heritage listed McGarvie Smith Farm. One building in McGarvie Smith Farm is located within the M12 Motorway – West Package 80% detailed design construction footprint, however this building (McGarvie Smith Farm 8) was already identified for demolition as part of the project, therefore no additional noise or vibration impacts are anticipated.

No notable changes are noted for NCA08, NCA09 and NCA10.

Due to the changes in the footprint, there is minimal changes to noise and vibration outcomes impacts as a result of construction.

3.1.2 CHANGES TO VERTICAL ALIGNMENT

Minor changes to vertical alignment have been identified as part of the constructability assessment, which may result in additional exposure during construction activities.

Based on the above, and in consideration of the distance between these changes in vertical alignment to affected receivers, it is considered that potential noise impacts from vertical alignment modifications are negligible.

3.1.3 CHANGES TO CONSTRUCTION ROAD HAULAGE

The Traffic and Transport Consistency Assessment memo assessed changes to construction traffic between the Amendment Report and the 80% detailed design and are described in this section

The changes associated with the Approved Project construction works are associated with heavy vehicle movements and traffic haulage activities when accessing Ancillary Facilities (AF). The change in noise levels has been estimated by a desktop calculation based on relative change in traffic volumes.

Table 3-2 Qualitative assessment of potential changes to construction road traffic noise

Haulage route (access)	Total truck movements		Estimated change in noise level
	Approved Project	80% detailed design	
M7 Motorway, Elizabeth Drive and The Northern Road (AF 1 & AF 10)	16,671	3,533	-7 dBA
M7 Motorway and Elizabeth Drive (AF 2 & AF 3)	30,124	54,863	+3 dBA
M7 Motorway, Elizabeth Drive, The Northern Road and Luddenham Road (AF 11)	18,566	32,365	+3 dBA

In evaluating the road traffic noise in the context of daily construction activity, it can be assumed that the change in daily heavy vehicle movements would be consistent with the changes to the total road traffic volumes.

There is potential for construction traffic noise for site accesses at AF 1 and AF 10 to be notably lower than previously assessed in the Amendment Report. A 7 dBA reduction in noise levels for the construction traffic movements in the 80% detailed design would be a perceptible difference in noise levels at sensitive receivers.

For the access routes to AF 2, AF 3 and AF 11, there is potential for road traffic noise levels to increase by 3 dBA from those assessed as part of the Approved Project. This noise level change is typically the lower threshold of perceptible (audible) difference in noise levels but may trigger a requirement to review previous assumptions with respect to the management of construction noise on these haulage routes.

3.2 SUMMARY OF CONSTRUCTION FINDINGS

The results of this assessment indicate that the 80% detailed design will generally result in negligible construction noise and vibration changes over the majority of the M12 Motorway –West Package project area.

Construction noise and vibration impacts are generally limited to NCA07, with the footprint moving closer to McGarvie Smith Farm. This is to be demolished as part of the project, and there will be no additional impacts.

It is anticipated that the 80% detailed design will result in negligible changes to the noise mitigation requirements of the Approved Project, with the exception of some changes to haulage traffic. The mitigation recommendations in Figure 7-3 of the Amendment Report NVIA would remain unchanged. Based on the proposed changes at the 80% detailed design, the following are to be completed in accordance with the conditions of approval (refer to Section 4.1) and revised environmental management measures (refer to Section 4.2) for the project:

- Prepare a Construction Noise and Vibration Management Plan (CNVMP) to be implemented during construction to manage potential noise and vibration impacts, consistent with the condition of approval E34 to E49 and revised environmental management measure NV01.

4. CONCLUSION

The key findings of the consistency review are:

- Changes to the proposed horizontal geometry of the alignment may result in changes in road traffic noise levels by a relatively minor margin of 1.7 dBA or less
- Changes in road traffic noise by this margin are likely to not be a perceptible change in road traffic noise at sensitive receivers
- Changes to the proposed vertical geometry of the alignment may result in changes in road traffic noise levels where changes exceed one metre. Whilst this has the potential to change road traffic noise levels by an estimated 2 dBA, this is not anticipated to be a change in noise related impact
- A conservative assessment of changes to road traffic volumes identified that noise levels could be a perceptible increase (noise impact) at some locations, but such changes may not eventuate where final noise modelled for the 80% detailed design utilises road traffic volumes lower than the peak traffic flow conditions
- Any changes in road traffic noise by the margins discussed in this report have not been identified to change the low-noise diamond grind pavement and property treatment mitigation strategy from the Approved Project
- Road traffic noise mitigation (property treatments) identified in the Amendment Report NVIA remain the same, however changes to traffic volumes should be further assessed
- Construction noise and vibration management and mitigation measures remain unchanged
- Assessment outcomes and required measures to manage construction noise and vibration would not materially change at all other sensitive receivers.

Based on the findings outlined in Sections 2.4 and 3.2, no material changes from the Approved Project have been identified as part of this assessment.

Where potential impacts have not been able to be quantified, it is considered that these impacts have already been quantified as part of to 50% detailed design or will be addressed and quantified as part of subsequent assessments to be conducted in accordance with the Minister's conditions of approval or the revised environmental management measures.

Specifically, the following actions will ensure the outcomes of the 80% detailed design modifications are assessed for consistency with the Approved Project:

- The ONVR will be updated for the final detailed design to include the changes identified in this consistency assessment. This is consistent with condition of approval E52 (refer to Section 4.1) and revised environmental management measure NV14 (refer to Section 4.2)
- Road traffic noise levels will be verified within 12 months of project opening as part of an Operational Noise Compliance Report, consistent with Condition of Approval E60
- A CNVMP will be prepared based on the final construction noise and vibration assessment prepared for the 100% detailed design. This is consistent with the requirements of condition of approval C4 and revised environmental management measure NV01 (refer to Section 4.2). Conditions of Approval including E34 to E49 (refer to Section 4.1) will be incorporated into the CNVMP.

4.1 MINISTER'S CONDITIONS OF APPROVAL

The proposed change has been assessed in Table 4-1 in relation to the relevant conditions of approval.

Table 4-1 Consistency against relevant Minister's conditions of approval for the project

No.	Condition of Approval	Discussion	Consistent
E34	<p>Work must only be undertaken during the following hours:</p> <ul style="list-style-type: none"> a 7:00 am to 6:00 pm Mondays to Fridays, inclusive; b 8:00 am to 6:00 pm Saturdays; and c at no time on Sundays or public holidays. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E35	<p>Except as permitted by an EPL, highly noise intensive works that result in an exceedance of the applicable noise management level (NML) at the same receiver must only be undertaken:</p> <ul style="list-style-type: none"> a between the hours of 8:00 am to 6:00 pm Monday to Friday; b between the hours of 8:00 am to 1:00 pm Saturday; and c if continuously, then not exceeding three hours, with a minimum cessation of work of not less than one hour. <p>For the purposes of condition, 'continuously' includes any period during which there is less than one hour between ceasing and recommencing any of the Work.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E36	<p>Notwithstanding Condition E34 and E35, Work may be undertaken outside the hours specified in any of the following circumstances:</p> <ul style="list-style-type: none"> a Safety and Emergencies including: <ul style="list-style-type: none"> i for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or ii where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm. <p>On becoming aware of the need for emergency work in accordance with Condition E36(a), the Proponent must notify the ER, the Planning Secretary and the EPA of the reasons for such emergency work. The Proponent must use best endeavors to notify all noise and/or vibration affected sensitive land user(s) of the likely impact and duration of the emergency work.</p> <ul style="list-style-type: none"> b Work that causes: <ul style="list-style-type: none"> i LAeq(15 minute) noise levels: 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<ul style="list-style-type: none"> — no more than 5 dB(A) above the rating background level at any residence in accordance with the ICNG, and — no more than the ‘Noise affected’ NMLs specified in Table 3 of the ICNG at other sensitive land user(s); and ii LAFmax(15 minute) noise levels no more than 15 dB(A) above the rating background level at any residence during the night time period; and iii continuous or impulsive vibration values, measured at the most affected residence, that are no more than the preferred values for human exposure to vibration, specified in Table 2.2 of <i>Assessing Vibration: a technical guideline</i> (DEC, 2006); and iv intermittent vibration values measured at the most affected residence that are no more than the preferred values for human exposure to vibration, specified in Table 2.4 of <i>Assessing Vibration: a technical guideline</i> (DEC, 2006). c By Approval, including: <ul style="list-style-type: none"> i where different construction hours are permitted or required under an EPL in force in respect of the CSSI; or ii works which are not subject to an EPL that are approved under an Out-of-Hours Work Protocol as required by Condition E37; or iii negotiated agreements with directly affected residents and sensitive land user(s). 		
E37	<p>An Out-of-Hours Work Protocol must be prepared to identify a process for the consideration, management and approval of Work which is outside the hours defined in Condition E34, and that are not subject to an EPL. The Protocol must be approved by the Planning Secretary before commencement of the out-of-hours Work. The Protocol must be prepared in consultation with the ER. The Protocol must provide:</p> <ul style="list-style-type: none"> a identification of low and high-risk activities and an approval process that considers the risk of activities, proposed mitigation, management, and coordination, including where: <ul style="list-style-type: none"> i the ER reviews all proposed out-of-hours activities and confirm their risk levels, ii low risk activities can be approved by the ER, and iii high risk activities that are approved by the Planning Secretary; b a process for the consideration of out-of-hours work against the relevant NML and vibration criteria; c a process for selecting and implementing mitigation measures for residual impacts in consultation with the community at each affected location, including respite periods consistent with the requirements of 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<p>Condition E47. The measures must take into account the predicted noise levels and the likely frequency and duration of the out-of-hours works that sensitive land user(s) would be exposed to, including the number of noise awakening events;</p> <ul style="list-style-type: none"> d procedures to facilitate the coordination of out-of-hours Work including those approved by an EPL or undertaken by a third party, to ensure appropriate respite is provided; and e notification arrangements for affected receivers for all approved out-of-hours Work and notification to the Planning Secretary of approved low risk out-of-hours Work. <p>This condition does not apply to Work where the requirements of Condition E36(a) or (b) are met.</p>		
E38	<p>Mitigation measures must be implemented with the aim of achieving the following construction noise management levels and vibration objectives:</p> <ul style="list-style-type: none"> a construction ‘Noise affected’ NML established using the <i>Interim Construction Noise Guideline</i> (DECC, 2009); b vibration criteria established using the <i>Assessing vibration: a technical guideline</i> (DEC, 2006) (for human exposure); c BS 7385 Part 2-1993 “<i>Evaluation and measurement for vibration in buildings Part 2</i>” as they are “applicable to Australian conditions”; and d the vibration limits set out in the <i>German Standard DIN 4150-3: Structural Vibration- effects of vibration on structures</i> (for structural damage). <p>Any construction or early works identified as exceeding the noise management levels and/or vibration criteria must be managed in accordance with the respective Noise and Vibration CEMP Sub-plan or Early Works Environmental Management Plan.</p> <p><i>Note: The ICNG identifies ‘particularly annoying’ activities that require the addition of 5 dB(A) to the predicted level before comparing to the construction NML.</i></p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes
E39	<p>Noise generating work in the vicinity of potentially-affected community, religious, educational institutions, noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories and operating theatres) resulting in noise levels above the NMLs must not be timetabled within sensitive periods, unless offers of other reasonable arrangements have been made to the affected institutions and are implemented at no cost to the affected institution.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

No.	Condition of Approval	Discussion	Consistent
E40	Noise and Vibration Impact Statements (NVIS) must be prepared for any Work that may exceed the noise management levels and vibration criteria specified in Condition E38 at any residence outside the construction hours identified in Condition E34, or where receivers will be highly noise affected. The NVIS must include specific mitigation measures identified through consultation with affected sensitive land user(s) and the mitigation measures must be implemented for the duration of the Work. A copy of the NVIS must be provided to the ER prior to the commencement of the associated Work. The Planning Secretary may request a copy/ies of the NVIS.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E41	Owners and occupiers of properties at risk of exceeding the screening criteria for cosmetic damage must be notified before Work that generates vibration commences in the vicinity of those properties. If the potential exceedance is to occur more than once or extend over a period of 24 hours, owners and occupiers must be provided with a schedule of potential exceedances on a monthly basis for the duration of the potential exceedances, unless otherwise agreed by the owner and occupier. These properties must be identified and considered in the Noise and Vibration CEMP Sub-plan required by Condition C4 and the Communication Strategy required by Condition B1	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E42	The Proponent must conduct vibration testing during vibration generating activities that have the potential to impact on heritage items to identify minimum working distances to prevent cosmetic damage. In addition, vibration monitoring must be undertaken during construction for relevant remaining Fleurs Radio Telescope structures, the Upper Canal (in consultation with WaterNSW) and McMaster Farm and McGarvie-Smith Farm group of remaining buildings. In the event that the vibration testing and attended monitoring shows that the preferred values for vibration are likely to be exceeded, the Proponent must review the construction methodology and, if necessary, implement additional mitigation measures.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E43	Advice from a heritage specialist must be sought on methods and locations for installing equipment used for vibration, movement and noise monitoring at heritage-listed structures.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E44	Before conducting at-property treatment at any heritage item identified in the documents listed in Condition A1, the advice of a suitably qualified and experienced built heritage specialist must be obtained and implemented to ensure such work does not have an adverse impact on the heritage significance of the item.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
E45	<p>All Work undertaken for the delivery of the CSSI, including that undertaken by third parties (such as utility relocations), must be coordinated to ensure respite periods are provided. The Proponent must:</p> <ul style="list-style-type: none"> a reschedule any work to provide respite to impacted noise sensitive land user(s) so that the respite is achieved in accordance with Condition E47; or b where respite outlined in Condition E47 cannot be achieved, consider the provision of alternative respite or mitigation to impacted noise sensitive land user(s); and c provide documentary evidence to the ER in support of any decision made by the Proponent in relation to respite or mitigation. <p>The consideration of respite must also include all other CSSI, SSI and SSD projects which may cause cumulative and/or consecutive impacts at receivers affected by the delivery of the CSSI.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	<p>Yes</p>
E46	<p>Mitigation measures such as temporary alternative accommodation or other agreed mitigation measures, must be offered/ made available to residents affected by out-of-hours Work (including where utility works are being undertaken for the CSSI or under a road occupancy licence) where the construction noise levels between:</p> <ul style="list-style-type: none"> a 10:00 pm and 7:00 am, Monday to Friday; b 10:00 pm Saturday to 8:00 am Sunday; and c 6:00 pm Sunday and public holidays to 7:00 am the following day unless that day is Saturday then to 8:00 am, <p>are predicted to exceed the NML by 25 dB(A) or are greater than 75 dBA (LAeq(15 min)), whichever is the lesser and the impact is planned to occur for more than two (2) nights over a seven (7) day rolling period.</p> <p>The NML must be reduced by 5 dB where the noise contains annoying characteristics and may be increased by 10 dB if the property has received at-property noise treatment. The noise levels and duration requirements identified in this condition may be changed through an EPL applying to the CSSI.</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	<p>Yes</p>
E47	<p>In order to undertake out-of-hours Work outside the hours specified under Condition E34, the Proponent must identify appropriate respite periods for the out-of-hours work in consultation with the community at each affected location on a regular basis.</p> <p>This consultation must include (but not be limited to) providing the community with:</p> <ul style="list-style-type: none"> a a progressive schedule for periods no less than three (3) months, of likely out-of-hours Work; b a description of the potential Work, location and duration of the out-of-hours Work; 	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	<p>Yes</p>

No.	Condition of Approval	Discussion	Consistent
	<p>c the noise characteristics and likely noise levels of the Work; and</p> <p>d likely mitigation and management measures which aim to achieve the relevant noise management levels and vibration criteria under Condition E38(a) and (b) (including the circumstances of when respite or relocation offers will be available and details about how the affected community can access these offers).</p> <p>The outcomes of the community consultation, the identified respite periods and the scheduling of the likely out-of-hour Work must be provided to the ER, EPA and the Planning Secretary for information prior to Work scheduled for the subject period being undertaken.</p> <p><i>Note: Respite periods can be any combination of days or hours where out-of-hours work would not be more than 5 dB(A) above the rating background noise level at any residence.</i></p>		
E48	Crushing and grinding works must only be undertaken during the hours specified in Condition E34 unless otherwise approved by the Planning Secretary or through an EPL or it meets the requirements of Condition E36(a)	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E49	Blasting is not permitted as part of this CCSI	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E50	<p>An independent and experienced noise specialist must be approved by the Planning Secretary to verify the validity (including being accurate and consistent with the requirements of this approval) of the:</p> <ul style="list-style-type: none"> a operational noise modelling required under Conditions E51; b Operational Noise Review required under Condition E52; and c Operational Noise Compliance Report required under Condition E60. <p>The Planning Secretary's approval of the noise specialist must be sought no later than one (1) month before undertaking operational noise modelling.</p> <p>Each verification must be submitted to the Planning Secretary for information within 30 days of the verification and be attached to submitted documentation as relevant.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E51	<p>Noise modelling of the detailed design must be undertaken and address the following parameters:</p> <ul style="list-style-type: none"> a application of source emission corrections to take into account the proportions of heavy vehicles; 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<ul style="list-style-type: none"> b modelling heavy vehicles using three distinct sources in line with Appendix B4 of the <i>NSW Road Noise Policy</i> (DECCW, 2011); c road surface corrections to address the assessment timeframes outlined in the <i>NSW Road Noise Policy</i> (DECCW, 2011) corresponding to the year of opening, and ten (10) years after opening; and d meteorological conditions in accordance with the <i>NSW Road Noise Policy</i>. 		
E52	<p>An Operational Noise Review (ONR) must be prepared (based on the detailed design of the CSSI) to confirm noise mitigation measures that would be implemented for the operation of the CSSI. The ONR must be prepared in consultation with the Planning Secretary and relevant council(s) and must:</p> <ul style="list-style-type: none"> a confirm the appropriate operational noise objectives and levels for existing sensitive receivers; b confirm the operational noise impacts based on the final design of the CSSI and modelling undertaken under Condition E51, including operational daytime LAeq,15 hour and night-time LAeq, 9-hour traffic noise contours; c review the suitability of the operational noise mitigation measures identified in the documents listed in Condition A1 and, where necessary, investigate and identify additional noise and vibration mitigation measures required to achieve the noise criteria outlined in the <i>NSW Road Noise Policy</i> (DECCW, 2011), including the timing of implementation; d include a consultation strategy to seek feedback from directly affected landowners on the noise and vibration mitigation measures; and e procedures for the management of operational noise and vibration complaints. <p>The ONR must be undertaken at the Proponent's expense and be submitted to the Planning Secretary for information prior to implementing at-property noise mitigation, unless otherwise agreed by the Planning Secretary.</p> <p>The Proponent must implement the identified noise mitigation measures and make the ONR publicly available following its submission to the Planning Secretary for information.</p> <p><i>Note: The design of noise barriers and the like must be undertaken in consultation with the community as part of the Place, Design and Landscape Plan required under Condition E69.</i></p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E53	Operational noise mitigation measures as identified in Condition E52 that will not be physically affected by construction and where the noise management level in Condition E38(a) is likely to be exceeded, must be implemented within six (6) months of the commencement of construction in the vicinity of the impacted residence(s) to minimise construction noise impacts, unless otherwise agreed by the Planning Secretary in	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	accordance with Condition E55. The operational noise mitigation measures must be detailed in the Noise and Vibration CEMP Sub-plan required by Condition C4.		
E54	If the ONR required by Condition E52 is not prepared within six (6) months of the commencement of construction, the at-property operational noise mitigation measures required by Condition E53 must be consistent with the measures and the properties identified in Appendix G of the <i>M12 Motorway Amendment Report</i> (October, 2020).	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E55	All requests to the Planning Secretary under Condition E53 must be accompanied by a report justifying why operational noise mitigation measures will not be implemented within six (6) months, along with details of the temporary measures that the Proponent would implement to reduce construction noise impacts, until such time that the operational noise mitigation measures are implemented. The report must be submitted to the Planning Secretary before the commencement of construction which would affect identified residences. All temporary measures must be implemented within six (6) months of the commencement of construction in the vicinity of the impacted residences. <i>Note: Not having finalised detailed design is not sufficient justification for not implementing the proposed mitigation measures.</i>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E56	The implementation of at-property treatment does not preclude the application of other noise and vibration mitigation and management measures including temporary accommodation to address construction noise.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E57	All operational noise mitigation measures must be implemented prior to operation of the CSSI.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E58	Within 12 months of the commencement of operation of the CSSI, the Proponent must undertake monitoring of operational noise to compare actual noise performance of the CSSI against the noise performance predicted in the review of operational noise mitigation measures required by Condition E52	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E59	Classified traffic counts must be undertaken simultaneously with noise measurements to confirm traffic volumes and traffic mix assumptions.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
E60	<p>An Operational Noise Compliance Report (ONCR) must be prepared to document the findings of the operational noise monitoring carried out under Condition E58. The ONCR must be prepared in accordance with the <i>Model Validation Guideline</i> (RMS, 16 May 2018 Version 1.1) and must address the following:</p> <ul style="list-style-type: none"> a compliance with the operational noise levels predicted in the review of operational noise mitigation measures required under Condition E52; b compliance with the operational noise levels in terms of criteria and noise goals established in the <i>NSW Road Noise Policy</i> (DECCW, 2011); c methodology, location and frequency of noise monitoring undertaken, including grouping monitoring sites at which CSSI noise levels are ascertained with specific reference to locations indicative of impacts on receivers. Monitoring locations must be grouped by - <ul style="list-style-type: none"> i (i) pavement type, ii (ii) topography; d visibility of sensitive receivers, i.e. line of sight and shielded by mounds and/or noise walls; e model light and heavy vehicles separately; f pavement corrections for light and heavy vehicles; g details on the acoustic performance of the different pavement types used for the CSSI ; h effects of meteorological conditions on traffic noise consistent with the requirements of the NSW Road Noise Policy (DECCW, 2011); i details of any complaints and enquiries received in relation to operational noise generated by the CSSI between the date of commencement of operation and the date the report was prepared; NSW Government 43Department of Planning, Industry and Environment Conditions of Approval for M12 Motorway SSI 9364 j any required recalibrations of the noise model taking into consideration factors such as noise monitoring, and actual traffic numbers and proportions; k an assessment of the performance and effectiveness of applied noise mitigation measures together with a review and if necessary, reassessment of mitigation measures; and l identification of additional measures to those identified in the review of noise mitigation measures required by Condition E52, that are to be implemented with the objective of meeting the criteria outlined in the NSW Road Noise Policy (DECCW, 2011), when these measures are to be implemented and how their effectiveness is to be measured and reported to the Planning Secretary and the EPA. 	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes



No.	Condition of Approval	Discussion	Consistent
	<p>The ONCR must be submitted to the Planning Secretary and the EPA for information within 60 days of completing the operational noise monitoring (required by Condition E58) and be made publicly available.</p> <p>Any additional measures identified in Condition E60(l) must be implemented within 18 months of submitting the ONCR to the Planning Secretary, unless an alternative timeframe is agreed to by the Planning Secretary</p>		

The proposed change can be accommodated within the Conditions of Approval.

4.2 STATEMENT OF COMMITMENTS / REVISED ENVIRONMENTAL MANAGEMENT MEASURES

The proposed change has been assessed in Table 4-2 in relation to the relevant commitments / revised environmental management measures in the context of the Division 5.2 Approval.

Table 4-2 Consistency against relevant Statement of Commitments / revised environmental management measures

No.	Statement of commitment / revised environmental management measure	Discussion	Consistent
NV01	<p>A construction noise and vibration management plan (CNVMP) will be prepared for the project to mitigate and manage noise and vibration impacts during construction. The CNVMP will be implemented for the duration of construction of the project and will:</p> <ul style="list-style-type: none"> — Identify nearby sensitive receivers — Include a description of the construction activities equipment and working hours — Identify relevant noise and vibration performance criteria for the project and license and approval conditions. — Include modelling results showing construction noise impacts based on detailed design information — Outline standard and additional mitigation measures from the Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime 2016) and information about when each will be applied — Outline requirements for the development and implementation of an Out-of-hours Work Protocol — Outline requirements for noise and vibration monitoring that will be carried out to monitor project performance associated with the noise and vibration criteria — Describe community consultation and complaints handling procedures in accordance with the Community Communication Strategy to be developed for the project — Outline measures to manage noise impacts associated with heavy vehicle movements both on and offsite — Outline measures to minimise cumulative construction impacts and the likelihood for ‘construction fatigue’ from concurrent and consecutive projects in the area — Outline requirements to minimise and manage construction fatigue, in consultation with the community. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV02	Measures to minimise and manage construction fatigue are to be investigated through the planning of construction staging.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV03	Detailed noise assessments will be carried out for ancillary facilities with the potential to involve high noise generating activities (including batching plant operations). The assessments will consider the proposed site layouts and noise generating activities that will occur at the facilities and assess predicted noise levels against the relevant noise management criteria.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of commitment / revised environmental management measure	Discussion	Consistent
	The assessments will also consider the requirement for appropriate noise mitigation within ancillary facilities and adjacent to construction works, depending on the predicted noise levels. Any mitigation measures required will be implemented before the start of activities that generate noise and vibration impacts.		
NV04	<p>Monitoring will be carried out at the start of high noise and vibration activities to confirm that actual noise and vibration levels are consistent with the noise and vibration impact predictions. Where mitigation measures were included, measurements will be carried out to confirm the effectiveness.</p> <p>Where the monitoring identifies higher levels of noise and vibration compared to predicted levels, or where mitigation is shown to be ineffective against measured noise and vibration levels, additional mitigation measures will be identified and implemented to appropriately manage impacts where feasible and reasonable.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV05	Where reasonable and feasible, receivers identified as requiring at-property treatment for operational noise mitigation will be identified and offered treatment before construction activities begin that are likely to impact them	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV06	Activities that generate vibration will be managed to avoid impacts on structures and sensitive receivers. This includes implementing appropriate safe working distances where practicable.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV07	The use of alternatives to vibration generating equipment will be considered where vibration impacts are predicted.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV08	<p>Where works are within the minimum working distances and considered likely to exceed the cosmetic damage objectives (as shown in Figure 7-3 of Appendix G of the amendment report), construction works will not proceed unless:</p> <ul style="list-style-type: none"> — A different construction method with lower source vibration levels is used, where feasible — Attended vibration measurements are carried out at the start of the works to determine the risk of exceeding the vibration objectives. 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of commitment / revised environmental management measure	Discussion	Consistent
NV09	Building Condition Surveys will be offered in writing to property owners before construction where there is a potential for construction activities to cause structural or cosmetic damage. A comprehensive report will be prepared by a suitably qualified professional before the relevant works begin and will comprise a written and photographic condition.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV10	<p>Surveys will be carried out to confirm the existing condition of the WaterNSW Upper Canal System and Jemena high pressure gas pipelines to determine appropriate vibration criteria. This will also include consideration of distances from the vibration intensive activity (piling, rock-breaking and vibratory rolling), as well as ground conditions.</p> <p>A vibration criterion of a peak particle velocity (PPV) will be determined in consultation with the relevant utility/service providers, including WaterNSW.</p> <p>In-situ monitoring will be carried out to confirm the vibration levels and assess the impact of vibration. Where the monitoring identifies exceedances in the relevant criteria, or where impacts are identified, additional mitigation measures will be identified and implemented to appropriately manage impacts.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV11	<p>The following structures have the potential to be within the safe working distances for sensitive structures (Group 3 from DIN 4150):</p> <ul style="list-style-type: none"> — Item 1: McGarvie Smith Farm — Item 2: Fleurs Radio Telescope Site — Item 4: Upper Canal System — Item 6: McMaster Field Station — Item 7: Fleurs Aerodrome. <p>A detailed survey will be completed to determine the potential for vibration impacts and to define appropriate criteria for each heritage item. Vibration monitoring will be carried out when vibration intensive tasks are occurring within the minimum working distances to heritage structures. Where the monitoring identifies exceedances in the relevant criteria, or where impacts are identified, additional mitigation measures will be identified and implemented to appropriately manage impacts.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV12	<p>Construction vehicle movements (both on and offsite) will be managed to minimise noise impacts. Where feasible, this will include (but not be limited to):</p> <ul style="list-style-type: none"> — Establishment and use of internal haul routes, or existing major roads where this is not feasible 	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

No.	Statement of commitment / revised environmental management measure	Discussion	Consistent
	<ul style="list-style-type: none"> — Restriction of heavy vehicle movements to standard construction hours — Locating traffic marshalling areas away from residences to minimise noise impacts from idling vehicles — Instructing workers on the operation of heavy vehicles entering and exiting the site to minimise noise. 		
NV13	The likelihood of cumulative construction noise impacts will be considered during detailed design when detailed construction schedules of other projects are available. Construction works will be scheduled with the aim of minimising concurrent works near sensitive receivers where possible in consultation with managers of other nearby projects that are likely to result in a cumulative impact. This will include the coordination of respite between the various construction projects where receivers are likely to experience concurrent construction impacts where feasible. Coordination between project teams would be carried out throughout construction	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV14	<p>Operational noise and vibration mitigation measures will be identified in an Operational Noise and Vibration Review (ONVR).</p> <p>Requirements for mitigation measures, including quieter noise pavements, noise barriers, and at-property treatments, will be reviewed as part of the ONVR and as the detailed design progresses.</p> <p>The implementation of treatments will be carried out in accordance with TfNSW Noise Mitigation Guidelines (2015).</p> <p>Owners of residences identified as eligible for noise treatment triggered by the project will be contacted by TfNSW and/or TfNSW's contractor.</p>	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
NV15	Within 12 months of start of operation of the project, actual operational noise performance will be compared to predicted operational noise performance. The need for additional mitigation or management measures to address identified operational performance issues and meet relevant operational noise criteria will be assessed and implemented where feasible and reasonable.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

4.3 EPBC APPROVAL

The proposed changes in groundwater quality management measures at detailed design do not constitute to any change in project aspects related to the EPBC approval.

5. REFERENCES

Roads and Maritime Services, 2015.Noise Mitigation Guidelines

Transport for NSW, 2019. M12 Motorway Environmental Impact Statement Noise and Vibration Assessment Report

Transport for NSW, 2020. M12 Motorway, Submissions Report

Transport for NSW, 2020. M12 Motorway Amendment Report Noise and vibration updated technical report

Transport for NSW, 2020. M12 Motorway, Amendment Report Submissions Report

GHD, 2020. M12 Motorway Noise and Vibration Assessment Report

Appendix G

Flooding consistency assessment memo



TO: Transport for NSW
FROM: May-Wen Yeoh
SUBJECT: Consistency Assessment - Flooding
OUR REF: M12WDD-WSP-ALL-EN-000013
DATE: 3 September 2021

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

Transport for NSW (TfNSW) are proposing to construct and operate the M12 Motorway project (the project) to provide direct access between the Western Sydney International Airport (WSIA) at Badgerys Creek and Sydney's motorway network. The M12 Motorway would run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for a distance of about 16 kilometres and is expected to be opened to traffic prior to opening of the WSIA.

This Consistency Assessment is for the M12 Motorway - West Package, between The Northern Road, Luddenham and approximately 250 metres east of Badgerys Creek. It is proposed to be a four-lane dual-carriageway motorway, including a new grade separated interchange with the Airport Access Road to provide connection to the WSIA. An overview of the M12 Motorway - West Package is illustrated in Figure 1-1.

Detailed design for the M12 Motorway - West Package (shown in Figure 1-1) has been completed and has resulted in changes requiring further environmental assessment. During design development of detail design changes requiring further environmental assessment have been identified. The Consistency Assessment is based on the 100% detail design submission.

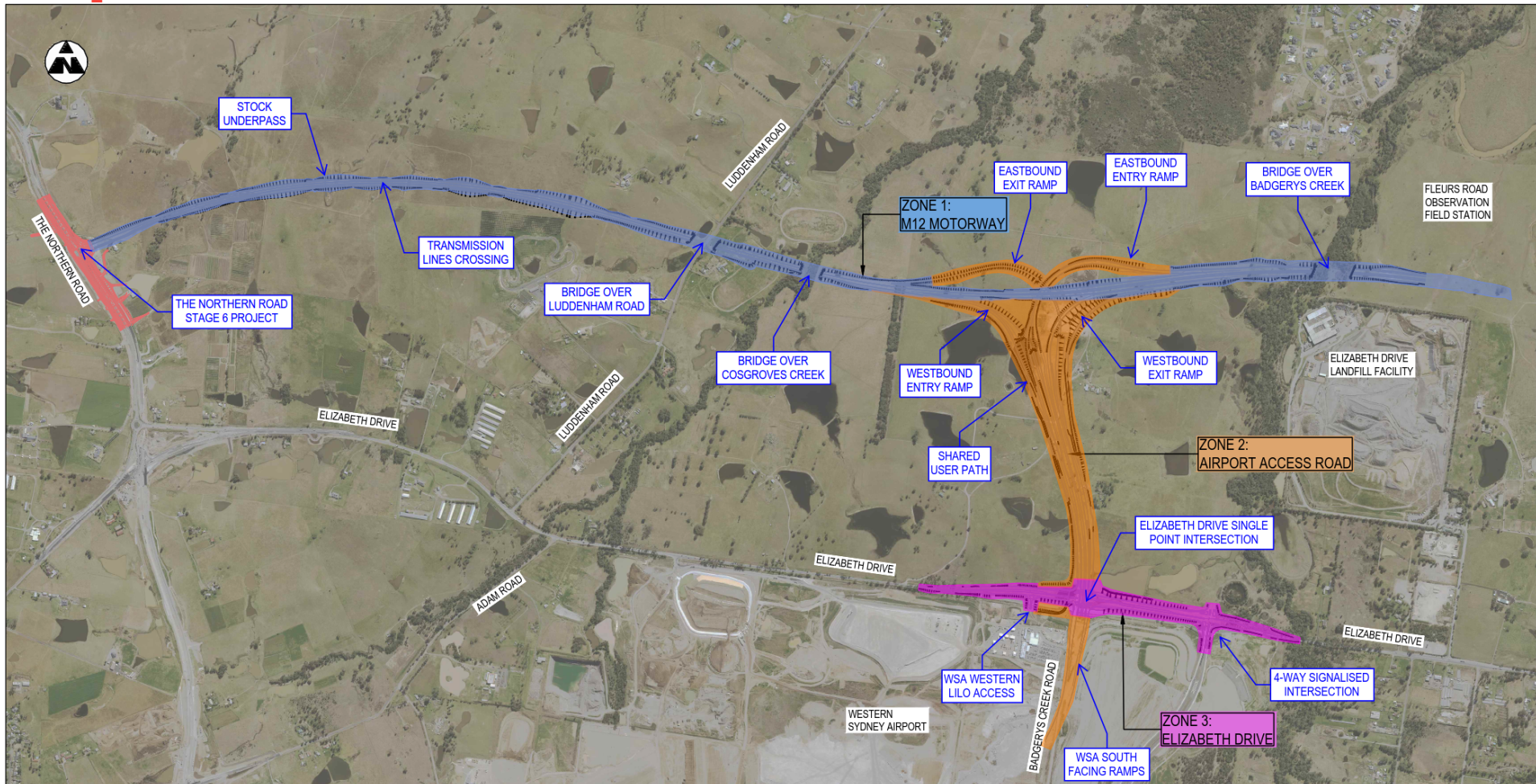


Figure 1-1 M12 Motorway – West Package overview – key features

1.2 SCOPE OF THIS REPORT

In the event of proposed changes to the M12 Motorway Approved Project, a review for consistency is required by the proponent for the construction and operational phases of the M12 Motorway - West Package. The Consistency Assessment will determine if the proposed changes are generally in accordance with the impacts of the approved project and satisfy the requirements of the Planning Approval dated 23 April 2021 and Commonwealth Approval dated 3 June 2021.

This memo provides a review of the proposed changes in terms of impacts to flooding and identifies if they are consistent with the Approved Project or if additional or reduced impacts are predicted.

1.3 DESCRIPTION OF PROPOSED CHANGE

The project as described in the Division 5.2 Approval dated 23 April 2021 and EPBC Approval dated 3 June 2021 is outlined in Section 1.2 of the Consistency Assessment and a detailed description is provided in Chapter 5 of the environmental impact assessment (EIS) (Roads and Maritime, 2019). The amended project is detailed in Chapter 2 of the Amendment Report (Transport for NSW, 2020a) and Chapter 1 of the Amendment Report Submissions Report (AR Submissions Report) (Transport for NSW, 2020).

The proposed changes to M12 Motorway - West Package include the following and shown in Figure 2-1 of the Consistency Assessment:

- Airport interchange revised to a free flow directional interchange
- Elizabeth Drive and Airport Access road intersection revised to a single point interchange, comprising:
 - Two separate bridges over the Airport Access Road
 - New entry and exit ramps for access to the Airport Access Road and Elizabeth Drive
- All ramps on the Airport Access Road between the Airport Interchange and Elizabeth Drive realigned
- Intersection to the west of the Airport Access Road and Elizabeth Drive replaced with a left in, left out arrangement from the Western Sydney International Airport (WSIA) and the northern stub road removed
- Intersection to the east of the Airport Access Road and Elizabeth Drive refined to remove the northern stub road
- Elizabeth Drive widened to the north by about 10 metres at the single point interchange, east of the Airport Access Road
- Extension of the Airport Access Road and southbound ramp to tie into the WSIA internal road network (area within Airport land to be assessed and approved in the Airport Approval)
- Reconfiguring BR02 and BR05 at Cosgroves Creek and Badgerys Creek respectively
- Extending and refining existing utilities, including low voltage mains and additional water main crossings
- Modification to one operational water quality basin and four additional construction water quality basins
- Refinements to drainage and water quality infrastructure across the M12 Motorway - West Package, including culverts, open channels and cross drainage
- Additional construction access road to the north of BR20
- Amendments to the private property access on Elizabeth Drive west of the Airport Access Road
- Installation of a Variable Messaging Sign (VMS) on the southbound carriageway of The Northern Road Stage 6
- Property adjustment works including farm dam adjustments.

2. PURPOSE OF TASK

A hydrology and flooding assessment of the proposed changes was carried out and is summarised in this section. The proposed design changes outlined in Section 2.1 of the M12 Motorway – West Package Detailed Design Consistency Assessment have been considered against the outcomes of the hydrology and flooding assessment in the Division 5.2 Approval dated 23 April 2021. These are listed in condition of approval A1:

- M12 Motorway Environmental Impact Statement (Transport for NSW, 2019)

- M12 Motorway Submissions Report (Transport for NSW, 2020)
- M12 Motorway Amendment Report (Transport for NSW, 2020)
- M12 Motorway Amendment Report - Submissions Report (Transport for NSW, 2020)
- M12 Motorway Amendment Report - Submissions Report – Amendment Letter (Transport for NSW, 2021).

Drainage elements have been further developed in detailed design to align with the development of the M12 Motorway – West Package detailed road design, shared user path (SUP) and associated property adjustment works.

Cross-drainage culverts have remained generally in the same locations as at Amendment Report and Amendment Report Submissions Report. They have been placed to convey overland flow across the M12 Motorway – West Package road embankment at local drainage lines.

There are two waterway bridges (BR02 over Cosgroves Creek and BR05 over Badgerys Creek) and BR01 over Luddenham Road. At EIS and Amendment Report stage, localised adjustments of Badgerys Creek were required however the design of BR05 has now been optimised in detailed design to not require these diversions.

Similar to the Amendment Report and AR Submissions Report, the pit and pipe network to capture pavements runoff on the M12 Motorway – West Package discharge into open channels which directly flow into the new water quality basins located at Cosgroves Creek (at BR02) and Badgerys Creek (at BR05 and Elizabeth Drive).

3. ASSESSMENT METHODOLOGY

The following methodology was carried out to complete the comparison between the EIS, Amendment Report, AR Submissions Report and the condition of approvals and 100% detailed design:

- Review the flooding assessment carried out at 100% detailed design against the Amendment Report and AR Submissions Report
- TUFLOW flood modelling of the 100% Detailed Design
- Update of flood immunity and hydraulic impact predictions for the 100% detailed design
- Identify changes to the impacts documented in the EIS, Amendment Report and AR Submissions Report in terms of the following flood criteria:
 - One percent Annual Exceedance Probability (AEP) afflux
 - One percent AEP change in peak flows
 - One percent AEP scour potential
 - Probable maximum flood (PMF) flood hazard.
- Identify any updates to the revised environmental management measures presented in the AR Submissions Report or additional management measures required to address any changes to impacts from the 100% detailed design taking into consideration the requirements of the Division 5.2 Approval dated 23 April 2021.

3.1 STUDY AREA

The study area as described in section 6.8 of the Amendment Report has not changed. The key areas where the M12 Motorway – West Package would influence, or be influenced by flooding are:

- The minor waterway next to Luddenham Road where bridged by the M12 Motorway – West Package
- Cosgroves Creek
- Badgerys Creek where the M12 Motorway – West Package main alignment crosses the creek
- Badgerys Creek where Elizabeth Drive crosses the creek.

3.2 MODELLING

3.2.1 HYDROLOGY

Section 7.8.2 of the EIS describes the hydrological modelling that has been carried out using Australian Rainfall and Runoff 1987 (ARR1987) rainfall data and methods. XP-RAFTS was used for the major waterways based on a hydraulic model that was originally developed as part of the Updated South Creek Flood Study (Worley Parsons, 2015). TUFLOW rainfall-on-grid modelling supplemented with the Probabilistic Rational Method was used for the minor waterways. The hydrologic modelling was not changed for the Amendment Report.

In detailed design, several significant updates were incorporated into the hydrological modelling for the Project after the Amendment Report stage. The flood models were updated by Lyall & Associates on behalf of TfNSW for the M12 Motorway Project. ARR2019 rainfall input and methods have been used to update the XP-RAFTS model developed as part of the Updated South Creek Flood Study (Worley Parsons, 2015). DRAINS models have been developed for the local catchments draining to the Project corridor. The XP-RAFTS and DRAINS model replace the rainfall-on-grid method used in the Amendment Report.

The DRAINS models comprise of local catchment inflows using the following:

- Initial Loss – Continuing Loss (IL-CL) Model for the Northern Road and M12 road catchments
- RAFTS Storage Routing Model for all other catchments.

The XP-RAFTS models have been used as inflows for the regional creek catchments (Cosgroves, Badgerys and South Creek).

The hydrologic models were validated against previous studies, in particular the Updated South Creek Flood Study (Worley Parsons, 2015). Details of these updates and validation are included in the *Technical Note 1 – M12 Motorway – Detailed Design: Development for Flood Models of M12 West (Draft Model Build Issue)* (Lyall & Associates, 2020).

The hydrologic models developed by TfNSW for detailed design have been reviewed by WSP and adopted for the flood assessments for the M12 Motorway – West Package. As part of the model review process for detailed design, sensitivity testing of key model parameters has been carried out which showed the hydrological models to be generally suitable for use.

The hydrological characteristics of the catchments within the Study Area are described in Section 7.8 of the EIS. The characteristics were unchanged in the Amendment Report and have remained generally similar in detailed design.

A key update at detailed design is the application of inflows from the WSIA. The WSIA latest flood model showed updated outlet locations for the WSIA Basin 1 catchment. The Amendment Report includes all outflow from this catchment via the Basin 1 spillway (refer to Figure 3-1). As part of detailed design, some flows are now distributed via a basin outlet pipe directed towards the Elizabeth Drive at the WSIA roundabout to Badgerys Creek Road.

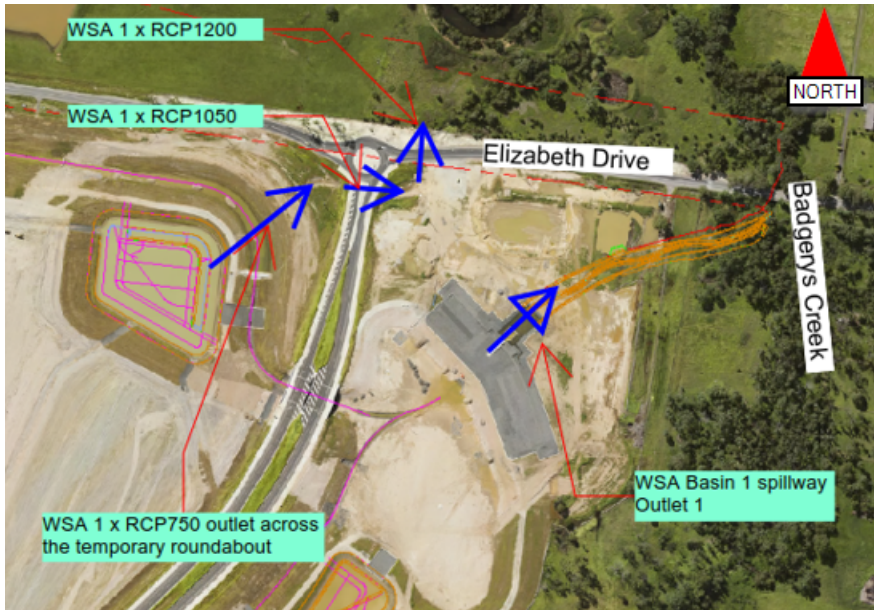


Figure 3-1 WSA Basin 1 outlet locations into the M12 Motorway - West Package flood model. Blue arrows indicate WSA cross-drainage structures (not to scale)

3.2.2 HYDRAULICS

Section 7.8.2 of the EIS and Section 6.8.1.1 of the Amendment Report describes the hydraulic modelling stage. Table 3-1 summarises the changes in approach at detailed design stage.

The latest WSA designs included in the WSA flood model (as discussed in Section 3.2.1) were also updated in the M12 Motorway – West Package detailed design TUFLOW model, including:

- Bulk earthworks
- Cross-drainage structures at the temporary WSA roundabout at Elizabeth Drive onto Badgers Creek Road (see Figure 3-1).

Table 3-1 Comparison of hydraulic methodologies at the EIS and Amendment Report and the 100% detailed design stages

Feature	EIS and Amendment Report	100 % detailed design
Waterway Bridges	<p>Bridges represented by TUFLOW layered flow constrictions (2d_lfesh).</p> <p>Spill-through bridge abutments, bridge piers and bridge deck were included in the model.</p>	No change.
Culverts	<p>Hy-8 software was used to compute headwater levels and velocities of culverts at the minor waterways. Flows and tailwater values for the Hy-8 modelling were based on TUFLOW results.</p> <p>Culverts were not represented in the TUFLOW model. Instead, gaps were created in the modelled earthworks at the locations of proposed culverts so that local overland flow was modelled as crossing the M12 Motorway - West Package unimpeded.</p>	<p>Culverts for minor and major waterways were incorporated into the TUFLOW model. Incorporation of culverts into the TUFLOW model allows for their obstruction to flow and flood retardation effects to be intrinsically modelled.</p>

Feature	EIS and Amendment Report	100 % detailed design
Topography	2011 1m LiDAR. Ground survey and bathymetric survey of creeks and dams were not available at the time of the Amendment Report.	2019 1m LiDAR. 2019 topographical survey 2021 topographical survey in gap areas. 2021 bathymetric survey at dams affected by the project.

3.3 FLOOD IMPACT CRITERIA

The flood impact objectives as described in Table 7-126 of the EIS have now been superseded by the NSW DPIE Project Approval for M12 Motorway (dated 23 April 2021).

The M12 Motorway – West Package flood impact assessments for detailed design have considered the planned future land use for the area. The future land use plans are according to the Western Sydney Aerotropolis Plan (Western Sydney Planning Partnership and NSW Government, WSA2020). The WSA2020 shows most of the region around the M12 Motorway – West Package to be zoned as “Enterprise” and has been assumed to be similar to industrial or commercial areas while the existing land use is agricultural/ rural residential. It should be noted per the DPIE Project Approval, Road/ Transport Zones have been assessed in terms of changes to existing flood immunity and flood hazard.

The flood assessment and associated criteria adopted in the EIS and Amendment Report were based on existing land use. The DPIE Project Approval applies to the future urbanised development of the area as per the WSA2020 and applies to all events up to the one percent AEP.

In accordance with the DPIE Project Approval the flood assessment that has been undertaken for the 100% detailed design has considered a range of flood events up to one percent AEP in magnitude. For the purpose of summarising the key findings of the flood assessment and for comparison with the EIS and Amendment Report, the presentation of results in this memo has focused on the one percent AEP event.

No criteria for PMF events were noted in the Amendment Report or DPIE Project Approval. However there is a requirement in the Functional Specifications for the WSIA that the Airport Access Road (AAR) within the WSIA allows for emergency access up to and including the PMF. As such, the 100% detailed design ensures no increase in discharges towards the WSIA AAR in events up to and including the PMF. Impacts on flood behaviour during the PMF have been assessed for increases in the hazardous nature of flooding that would lead to an increased risk to life in accordance with the principles of the NSW Floodplain Development Manual. Flood hazard categories as defined in ARR2019 Book 6 have been used for flood impact assessment.

The change in flows due to Project works and associated impact assessment has been assessed per the DPIE Project condition of approval E110 (b) to “...*minimise impacts on the receiving environment at the final outflow point resulting from any additional flow volume...*”. Where any increase is noted impacts have been assessed against the requirements of condition of approval E17, particularly in terms of limiting increases in velocities that would otherwise lead to an increase in scour potential to areas outside the project footprint.

4. ASSESSMENT OF POTENTIAL IMPACTS

Appendix A presents the flood mapping of the M12 Motorway – West Package at 100% detailed design.

4.1 EXISTING CONDITIONS

Flood levels in the one percent AEP at the three key areas have remained similar to those presented in Appendix L of the EIS:

- The minor waterway next to Luddenham Road where BR01 is located
- Cosgroves Creek at BR02
- Badgerys Creek at BR05.

Flood extents in the one percent AEP presented in Appendix H of the Amendment Report have changed compared to those to reflect the updated flow distribution of the WSIA Basin 1 catchment outflows (and associated WSIA infrastructure) and updated topographical/ bathymetric survey around the existing farm dam within Sydney Metro - Western Sydney Airport (SMWSA) land at Badgerys Creek where Elizabeth Drive crosses Badgerys Creek.

Overall, flood levels in the one percent AEP in particular for the overtopping of the existing Elizabeth Drive are similar to those presented in Appendix H of the Amendment Report.

It is noted that in Annexure A in Appendix H of the Amendment Report that the existing farm dam within SMWSA located to the north east of the intersection of Elizabeth Drive and the AAR appears partially wet however this is assumed to be a presentation error in the styling of the flood grids. The aerial and site investigations clearly show the presence of a large dam which is confirmed to be more than two metres deep based on latest topographical survey.

4.2 IMPACT ASSESSMENT

4.2.1 CONSTRUCTION

Section 6.8.3.1 of the Amendment Report identified several flood impacts that may occur during construction due to the following:

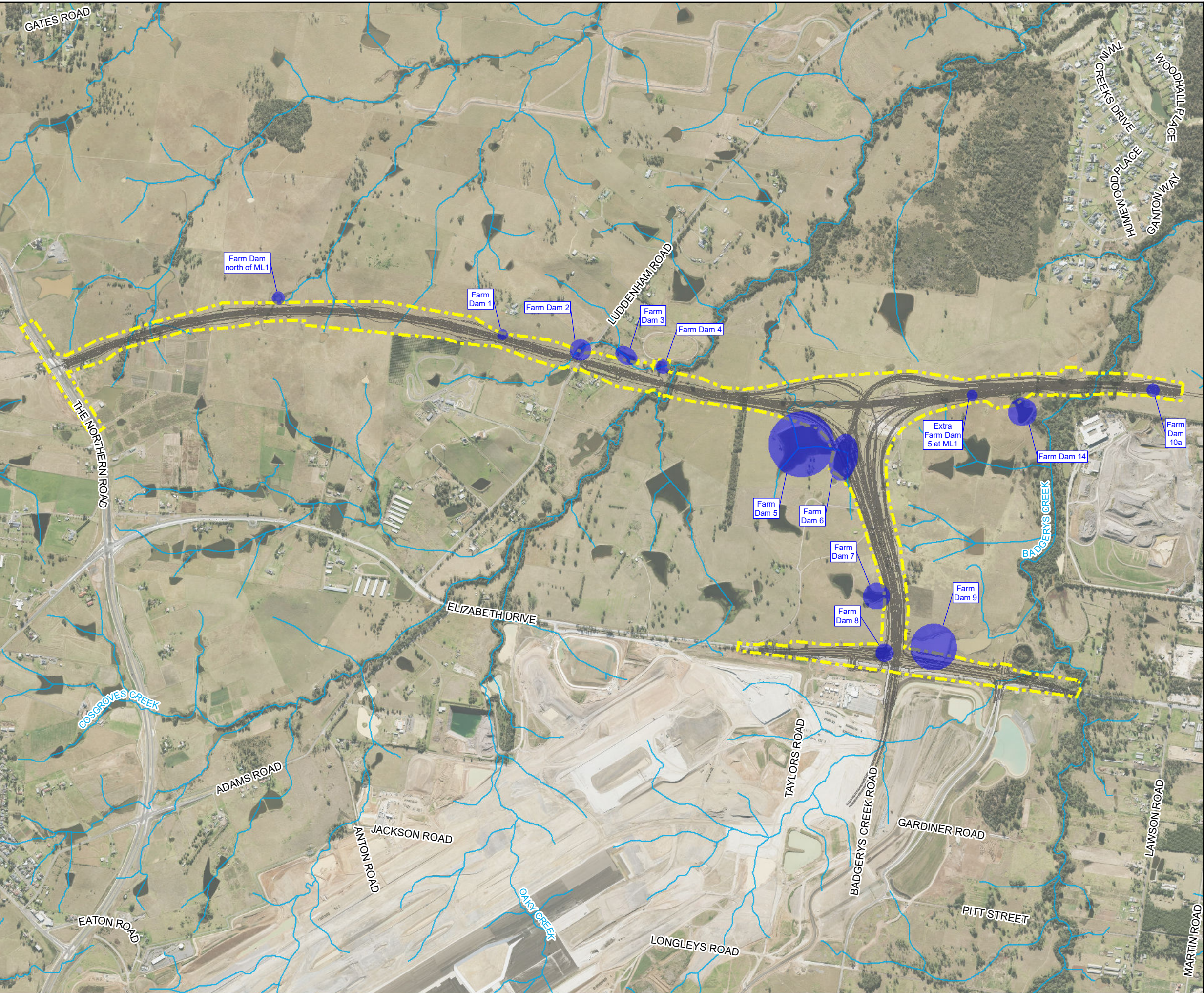
- Earthworks associated with the fill for construction of the M12 Motorway - West Package embankment
- Stockpile and ancillary facilities
- Temporary creek crossings during the construction of the waterway bridges.

No change is expected for these activities compared to the Amendment Report.

Partial/ complete infilling of 12 farm dams have been included in the 100% detailed design. The locations of these are shown in Figure 4-1. Of these, Dams 1, 2, 8, Extra 5 and 10a will be completely infilled. All others will be partially infilled up to 2-4 metres past the M12 Motorway – West Package operational boundary to facilitate landowner access around the periphery of these dams. It should be noted that at EIS and Amendment Report stage, the dams located within the road design footprint would have been considered filled/ partially filled by virtue of overlaying the road design onto the existing ground surface to represent post-project conditions. Beyond these extents, the dam footprints were unchanged.

During construction, these dams would need to be dewatered. There will also be permanent loss of floodplain storage associated with the changes to the dam footprints. The impacts to the existing floodplain due to these works would be similar to those at operational stage.

In the event of a major flood event during construction, the overland flow path connecting Farm dams 2, 3, 4 eastwards to Cosgroves Creek would need to be replicated by the new open channels and culverts associated with M12 Motorway – West Package property adjustment works along Luddenham Road. As such, the works at these dams should be completed in a similar period as the new open channels and culverts along Luddenham Road.



M12 Motorway - West Package
Consistency Assessment

Figure 4-1
Farm Dams

Legend

- Farm dam
- M12 Motorway – West Package
detailed design operational
footprint
- M12 Motorway – West package
detailed design



0 200 400
Meters

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3
1:20,000 Date: 2/09/2021

Data sources: - DNRME, TMR, Translink, Geoscience Australia
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4.2.2 OPERATION

Section 6.8.3.2 of the Amendment Report identified several flood impacts during operation. It should be noted from Table 3-1, in developing the civil requirements of the detailed design, flood impacts due to culverts and any property adjustment works e.g. at farm dams (partial or complete infilling) have now been captured in the flood assessments. The refinement in flood modelling as discussed in Section 3.2 and development of the detailed design has therefore identified additional flood impacts which are discussed here. The one percent AEP event has been assessed as this is the critical event magnitude for the flood immunity of the M12 Motorway – West Package.

INCREASES IN FLOOD AFFECTATION - OTHER PROPERTIES, ASSETS AND INFRASTRUCTURE

In general, operational flood level impacts are similar to those in the Amendment Report in terms of location and extents. The additional impacts in the following sections are mainly a result of the increased level of detail in the flood assessment compared to at EIS and Amendment Report stage, mainly:

- Increase in M12 Motorway – West Package road catchment runoff due to the road design changes (e.g. additional ramps, refinement of intersection requirements) as noted in Section 1.3
- Modelling of cross-drainage culverts allowing for their obstruction to flows across the M12 Motorway – West Package
- Further developing the property adjustment works around farm dams
- Optimisation of the waterway bridge designs within the M12 Motorway - West Package Project Area.

The flood impacts detailed here are compliant against the Project Approval requirements (condition of approval E16 to E23) for the land use (per the WSA2020) adopted in detailed design.

LUDDENHAM ROAD BR01

The BR01 span has been reduced by about eight percent compared to the EIS. The flood impacts at this location are generally not due to the reduction in bridge span at this location but rather due to further development of the flood model to reflect the required property adjustment works north of BR01 along the western verge of Luddenham Road and SUP connection from the M12 Motorway – West Package mainline. They are as detailed below:

- Loss of flood storage by removal of the farm dam 2 and shown on [PDF figure to be added in the PDF version]
-
- Figure 4-1 located directly north of BR01 on the western verge along Luddenham Road
- New property access to LOT26 DP604586 located within the former footprint of farm dam 2
- Associated new open channels and culvert under this new driveway to divert overland flow (previously stored in farm dam 2) towards the existing 3xRCP900 under Luddenham Road
- SUP connection from the M12 Motorway – West Package mainline onto Luddenham Road blocking flows in the existing open channel running along the eastern verge.

The existing flood immunity of Luddenham Road and the adjacent existing driveways remain unchanged compared to existing conditions, however there are some flood impacts along Luddenham Road downstream (north) of the M12 Motorway – West Package at the existing 3xRCP900 culvert.

As shown in Table 4-1, up to 80 millimetres afflux is noted downstream (north) of the project corridor along the western side of Luddenham Road as overland flows are diverted to the existing culvert under Luddenham Road. The impacts are confined to the road reserve of Luddenham Road. It is noted that there is no significant change to the flood immunity or hazardous nature of flooding along Luddenham Road as flooding is reduced along the section of road immediately south that is located below Bridge BR01.

Table 4-1 One percent AEP flood impacts at Luddenham Road BR01

Stage	EIS and Amendment Report	100% detailed design
Afflux at the operational boundary	Upstream (south): + ≤ 31mm Downstream (north): + ≤ 27mm	Upstream (south): + ≤ 30mm Downstream (north): + ≤ 30mm
Afflux outside the operational boundary	Upstream (south): + ≤ 20 to 40mm Downstream (north): + ≤ 20 to 40mm	Upstream (south): Reduction ≤ 30mm Downstream (north): + ≤ 80mm at the existing 3xRCP900 culvert. This is located in land zoned as Environment & Recreation where up to 100mm afflux is allowed.

Cosgroves Creek BR02

The 100% detailed design reduces the BR02 span over Cosgroves Creek by about 28 percent compared to the Amendment Report. Further development of the property access requirements around this bridge resulted in a new property access road along the eastern abutment of BR02. In discussion with the landowners, the property access road has been lifted above the one percent AEP flood level locally under the bridge causing a further constriction to the existing waterway area and ties back in to the existing ground levels at the northern and southern extents of the operational boundary.

Table 4-2 summarises the change to flood impacts between the EIS and Amendment Report and the 100% detailed design. While increases in peak one percent AEP flood levels are greater under the detailed design, they are within the limits set out in the conditions of approval.

Table 4-2 Comparison of the one percent AEP flood impacts at Cosgroves Creek BR02 between the EIS and Amendment Report and the 100% detailed design

Stage	EIS and Amendment Report	Detailed design
Afflux at the operational boundary	Upstream (south): + ≤ 5mm Downstream (north): + ≤ 0mm	Upstream (south): + ≤ 100mm Downstream (north): + ≤ 25mm These impacts are located in land zoned as Environment & Recreation where up to 100mm afflux is allowable under the Project conditions of approval.
Afflux outside the operational boundary	Upstream (south): 0mm Downstream (north): 0mm	Upstream (south): + ≤ 10mm Downstream (north): + ≤ 25mm

Badgerys Creek BR05

The 100% detailed design reduces the BR05 span over Badgerys Creek by about 26 percent compared to the Amendment Report. Further development of the property access requirements around this bridge resulted in a new property access road provided along the eastern abutment of BR05. In discussion with the landowners, the property access road has been lifted above the one percent AEP flood level locally under the bridge causing a further constriction to the existing waterway area and ties back in to the existing ground levels at the northern and southern extents of the operational boundary.

Table 4-3 summarises the change to flood impacts between the EIS and Amendment Report and the 100% detailed design. While increases in peak one percent AEP flood levels are greater under the detailed design, they are within the limits set out in the conditions of approval.

Table 4-3 Comparison of the one percent AEP flood impacts at Badgerys Creek BR05 between the EIS and Amendment Report and the 100% detailed design

Stage	EIS and Amendment Report	100% detailed design
Afflux at the operational boundary	Upstream (south): + \leq 17mm Downstream (north): + \leq 35mm	Upstream (south): + \leq 60mm Downstream (north): + \leq 95mm These impacts are located in land zoned as Environment & Recreation where up to 100mm afflux is allow able under the Project conditions of approval.
Afflux outside the operational boundary	Upstream (south): Reduction \leq 20mm Downstream (north): Reduction \leq 20mm	Upstream (south): + \leq 100mm Downstream (north): + \leq 70mm

Badgerys Creek Elizabeth Drive

The M12 Motorway – West Package TUFLOW model has been refined at detailed design to incorporate the latest WSIA flood model information (as detailed in Section 3.2). The new cross-drainage designs under Elizabeth Drive have been sized at detailed design to minimise flood impacts in WSIA land upstream (south) of Elizabeth Drive. Flood levels in this area have been reduced at detailed design compared to the EIS and Amendment Report.

Table 4-4 Comparison of the one percent AEP flood impacts at Badgerys Creek Elizabeth Drive between the EIS and Amendment Report and the 100% detailed design

Stage	EIS and Amendment Report	100% detailed design
Afflux – Badgerys Creek	+ \leq 75mm	+ \leq 15mm
Afflux - floodplain	+ \leq 50mm	+ \leq 20mm
Afflux downstream of Elizabeth Drive	- \leq 25mm	- \leq 30mm

FARM DAMS

Changes to dams within and around the M12 Motorway - West Package operational footprint have been assessed at detailed design. The dams assessed as part of the 100% detailed design are shown in Figure 4-1. Additional flooding impacts compared to at EIS/ Amendment Report stage are noted where these dams have been partially / completely infilled. New open channels have been put in at detailed design where required to minimise flood impacts to surrounding areas around these dams. The flood impacts and associated flood impact mitigation measures developed in detailed design are summarised in Table 4-5. Locations of these dams are shown in Figure 4-1.

Table 4-5 Comparison of farm dam adjustment works for the M12 Motorway – West Package between the EIS and Amendment Report and the 100% detailed design

Location	EIS and Amendment Report	100% detailed design
Dam north of the M12 Motorway - West Package mainline (ML1)	Partially filled in within the extents of the M12 Motorway – West Package road design footprint.	No change. Flood impacts are compliant.
Farm dam 1	Infilled.	No change. Flood impacts are compliant.

Location	EIS and Amendment Report	100% detailed design
Farm dam 2	Retained.	Infilled. New open channels area required to convey flow along Luddenham Road in lieu of the storage previously provided by the farm dam. The drainage infrastructure associated with works at this farm dam is discussed in Section <i>LUDDENHAM ROAD BR01</i> of this report. Flood impacts are compliant.
Farm dam 3	Partially filled in within the extents of the M12 Motorway – West Package road design footprint.	Partially filled in within the M12 Motorway - West Package 80% detailed design operational footprint. A new spillway and open channel has been designed to replicate the existing flowpath from Farm Dam 3 to 4. The existing path sits within the Project operational footprint and will be infilled to construct the M12 Motorway – West Package maintenance access tracks and M12 Motorway – West Package water quality basin west of BR02. Flood impacts are compliant.
Farm dam 4	Partially filled in within the extents of the M12 Motorway – West Package road design footprint.	Partially filled in within the M12 Motorway - West Package 80% detailed design operational footprint. Refer to farm dam 3. Velocity increased >10% where > 1m/s localised over 0.13ha where partially infilled. Rock fill is proposed for the dam infilling as a scour protection measure. Some velocity impacts are noted beyond the project operational footprint. In these areas further assessment and additional mitigation measures will be implemented to mitigate scour potential in consultation with affected landowners in accordance with Conditions of Approval E17. Afflux and hazard are compliant.
Extra farm dam 5 at ML1	Infilled.	No change. Flood impacts are compliant.
Farm dam 14	Partially filled in within the extents of the M12 Motorway – West Package road design footprint.	No change. Flood impacts are compliant.
Farm dam 10a	Infilled.	No change. Flood impacts are compliant.
Farm dam 5 at AAR	Partially filled in within the extents of the M12 Motorway – West Package road design footprint.	Partially filled in within the M12 Motorway - West Package 80% detailed design operational footprint. A large open channel has been designed to direct one percent AEP flows from within the AAR interchange to discharge north of the M12 Motorway - West via new cross-drainage culverts across the AAR. Velocity increased >10% where > 1m/s localised over 0.23ha where partially infilled. Rock fill is proposed for the dam infilling as a scour protection measure. Some velocity impacts are noted beyond the project operational footprint. In these areas further assessment and additional mitigation measures will be implemented to mitigate scour potential in consultation with affected landowners in accordance with Conditions of Approval E17. Afflux and hazard are compliant.

Location	EIS and Amendment Report	100% detailed design
Farm dam 6	Partially filled in within the extents of the M12 Motorway – West Package road design footprint.	<p>Infilled.</p> <p>Some minor areas of new flooding due to removal of the downstream bund (refer to Figure A-54 of Appendix A M12WDD-WSP-ALL-SD-RPT-000001 for Farm Dam 5). Depths of this new flooding remain less than 50mm in up to the one percent AEP and is compliant. Flows are directed into Farm Dam 5 as per existing conditions. Flood impacts are compliant.</p>
Farm dam 7	Partially filled in within the extents of the M12 Motorway – West Package road design footprint.	<p>Partially filled in within the M12 Motorway - West Package operational footprint.</p> <p>Velocity increased >10% where > 1m/s localised over 0.16ha where partially infilled. Rock fill is proposed for the dam infilling as a scour protection measure. Some velocity impacts are noted beyond the project operational footprint. In these areas further assessment and additional mitigation measures will be implemented to mitigate scour potential in consultation with affected landowners in accordance with Conditions of Approval E17.</p> <p>Afflux and hazard are compliant.</p>
Farm dam 8	Infilled.	No change. Flood impacts are compliant.
Farm dam 9	Partially filled in within the extents of the M12 Motorway – West Package road design footprint.	<p>Partially infilled up to the M12 Motorway - West Package operational footprint and retained during construction for the period of the M12 Motorway – West Package until SMWSA take over the site and commence construction of the SMWSA basin. The existing spillway of Farm Dam 9 also needs to be lowered to 51.8 mAHD (approximately 1.2m) to reduce tailwater conditions at the outlet of the CLVT-AAR-0250.</p> <p>Localised velocity increased >10% where >1m/s over a 0.03ha area at the lowered spillway. Scour protection is provided here.</p> <p>Flood impacts through this area are temporary until the area is redeveloped by SMWSA. The drainage/ flooding arrangement in this area have been agreed with SMWSA (the affected landowner).</p>

ONE PERCENT AEP CHANGE IN PEAK FLOWS, DOWNSTREAM VELOCITY AND SCOUR POTENTIAL

Changes to peak flows due to the M12 Motorway – West Package are similar to the Amendment Report. The peak flows in the creeks (Cosgroves and Badgerys Creeks) and at culvert outlet locations are generally within 10 percent of the existing peak flows.

Table 4-6 summarises the areas that show an increase of more than 10 percent in the one percent AEP and are due to refinement of the TUFLOW flood model carried out as part of the detailed design to reflect property adjustment works around farm dams. It should be noted any flood impacts associated with these areas are compliant with the DPIE Project Approval requirements (condition of approval E17) for afflux, changes to velocity, duration on inundation and hazard.

Table 4-6 One percent AEP peak flow changes at key locations

Location	Existing flow (m ³ /s)	Design flow (m ³ /s)	Percent change at EIS and Amendment Report (%)	Percent change at 100% detailed design (%)	Comment at 100% percent detailed design
North of the AAR Interchange (Reference at EIS/ Amendment Report: CC DL 4600 and CC DL 5050)	4.1	4.7	+3 to +28	+15	Flood impacts are compliant in this downstream area in all events up to the one percent AEP. Scour protection has been provided at the associated culvert outlets. The rock protections is sized for the 1%AEP outlet velocities noted in this area. Furthermore, there is no existing infrastructure in this area.
Farm dam east of farm dam 9 (Reference at EIS/ Amendment Report: BC DL 5150)	3.5	4.0	+12 to +61	+15	Farm dam 9 has been partially infilled and the existing spillway of the dam has been lowered to achieve free-draining conditions for the culvert across the AAR which services both M12 Motorway – West Package and SMWSA. Flood impacts in this area have been minimised and any works post M12 by SMWSA will significantly alter the existing drainage regime through this area.
Mainline (ML1) CH10985 (Reference at EIS/ Amendment Report: CC DL 1010)	3.6	4.5	+12 to +58	+25	Culverts discharge to the same downstream location within 50m of the Project operational footprint. The overall change in flows is 6%. Flood impacts are compliant in this downstream area in all events up to the one percent AEP. Scour protection has been provided at the associated culvert outlets.
Mainline (ML1) CH11115	3.4	2.9	Not assessed	-14	The rock protections is sized for the 1%AEP outlet velocities noted in these areas. Furthermore, there is no existing infrastructure in this area.
Mainline (ML1) CH12085 (Reference at EIS/ Amendment Report: SC DL 2100)	2.6	3.8	+8 to +13 downstream of confluence with SC DL 2200	+45	Flood impacts are compliant in this downstream area in all events up to the one percent AEP. Scour protection has been provided at the associated culvert outlets. The rock protections is sized for the 1%AEP outlet velocities noted in these areas.
Mainline (ML1) CH12205 (Reference at EIS/ Amendment Report: SC DL 2200)	1.5	1.5	-10 to -12	-4	Furthermore, there is no existing infrastructure in this area.

At 100% detailed design, scour protection has been provided at the following areas to mitigate against increases in scour potential:

- Culvert inlet and outlet locations
- Open channels where erosive velocities are expected
- Waterway bridge abutments and piers (BR02 and BR05).

Where increases in velocities in areas outside the project operational footprint exceed the limits set out in Conditions of Approval E17, further assessment and additional mitigation measures may be required and will be implemented in consultation with affected landowners in accordance with Condition of Approval E17.

CHANGE IN HAZARD

The DPIE Project Approval (condition of approval E17) does not allow a significant increase in hazard or risk to life. At detailed design, this has been taken to be:

- H1-H2 increased to H3 and above
- H3-H4 increased to H5 and above.

Flood hazard categories as defined in ARR2019 Book 6.

One percent AEP

While an increase from H2 to H5 hazard category is observed along the western side of Luddenham Road adjacent to the access to LOT26 DP604586, this is not considered to be a significant increase in flood hazard given its location along the edge of the road and its localised nature.

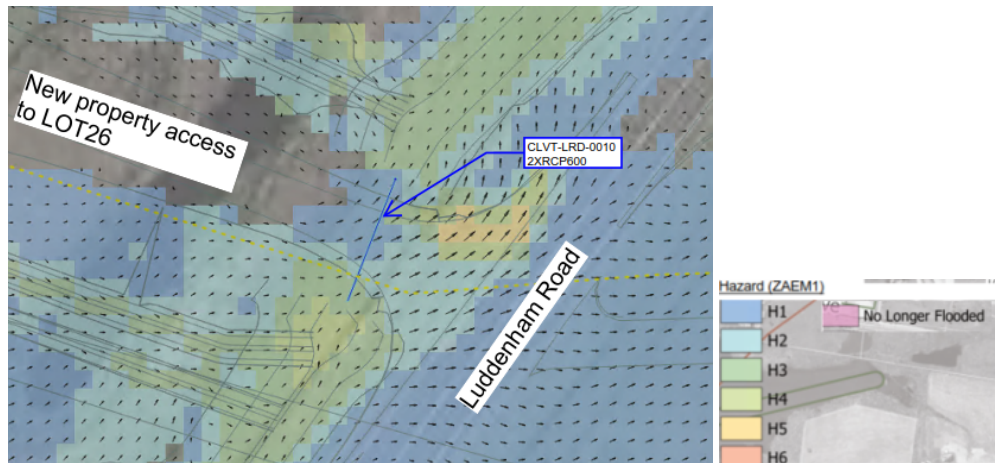


Figure 4-2 One percent AEP Flood hazard and direction of flow at the new property access to LOT26 at 100% detailed design

Probable Maximum Flood

No criteria for PMF events were noted in the EIS, Amendment Report or DPIE Project Approval. Impacts on flood behaviour during the PMF have been assessed for increases in the hazardous nature of flooding that would lead to an increased risk to life in accordance with the principles of the NSW Floodplain Development Manual. The changes in PMF flood hazard are generally localised and do not significantly alter the overall hazard of the affected areas.

Table 4-7 PMF Change in hazard at 100% detailed design

Location	Change in hazard at 100% detailed design
The minor waterway next to Luddenham Road where bridged by the M12 Motorway – West Package	The change in flood hazard on Luddenham Road is minimal however flood hazard is increased to H5 along the western abutment of BR01 into the M12 Motorway – West Package open channel running along the western verge of Luddenham Road. This channel conveys runoff across the new property access to LOT26 DP604586 and existing driveway to LOT25 DP604586. Flood hazard has also increased to H5 on Luddenham Road itself locally at the tie in with the driveway to LOT25 however the existing road is already at H5 outside of this local area of increase.
Cosgroves Creek at BR02	Increases in flood hazard up to the H5 category are noted along the fringes of the upstream floodplain, however this dissipates to H2 within 50m of the existing floodplain of Cosgroves

Location	Change in hazard at 100% detailed design
	Creek. New areas of flooding upstream of the M12 are as high as H4 directly adjacent to the existing floodplain however this dissipates to H1 within 40m of the existing flood extents.
Badgerys Creek at BR05	<p>Flood hazard is generally similar along the existing flood extents however there is some increase to H6 along the fringes of the floodplain.</p> <p>New flooding within the Suez Kemps Creek Resource Recovery Centre is noted where flood levels overtop the road/ drainage bund north of the property resulting in water ponding within the site with hazard up to H6. In this area, some of the impact is also due to works by the M12 Motorway - Central Package. PMF flood impacts in this area is detailed as part of the M12 Motorway – Central Package. There is no catchment interaction between the M12 Motorway - West Package and M12 Motorway – Central Package in all other events up to the 0.05%AEP.</p>
Badgerys Creek where Elizabeth Drive crosses the Creek	<p>Hazard is mostly unchanged in this area, however there is some increase in hazard along the fringe of the flood extent up to H5 but dissipates to H1 within 5m of the existing flood extents.</p> <p>It should be noted the latest WSIA flood information shows the AAR which ties into the Elizabeth Drive at the Project operational footprint is overtopped by up to 1m in the PMF event and is rated H5. As such, the M12 Motorway – West Package drainage strategy does not reduce the flood immunity of this access</p>

5. CONCLUSION

The recommendations from the EIS, Amendment Report and AR Submissions Report have generally been incorporated into the detailed design. Civil works associated with the M12 have also been developed in further detail at 100% detailed design stage. These works have been incorporated into the 100% detailed design flood assessment.

The flood impacts at 100% detailed design are consistent with the EIS, Amendment Report and AR Submissions Report, while the flood assessment at 100% detailed design is being carried out in accordance with the DPIE Project Approval requirements (conditions of approval E16 to E23).

There are some residual flood impacts at 100% detailed design however these are considered to be minor and localised in nature. In accordance with the DPIE Project Approval, where the residual impacts exceed the limits set out in conditions of approval E17(d), (e) and (g) in regard to increases in flood levels and velocities on land outside the project footprint, then the affected landowner will be consulted to agree on the impact or alternative mitigation measures. If an agreement cannot be made, a suitably qualified and experienced independent person to advise and assist in determining the impact and relevant mitigation measures.

5.1 CONSISTENCY WITH DIVISION 5.2 APPROVAL

Table 5-1 below addresses those flood related conditions of approval relevant to the proposed change in the context of the Approved Project. It should be noted the impact assessment at detailed design has been undertaken for all events up to and including the one percent AEP hence there are additional flood impacts noted in this table that associated with more frequent flood events.

Table 5-1 Consistency against relevant Minister's conditions of approval for the project

No.	Condition of Approval	Discussion	Consistent
E16	<p>Measures identified in the documents listed in Condition A1 that are aimed at minimising the impact of the CSSI on flood behaviour must be incorporated into the detailed design of the CSSI.</p> <p>The incorporation of these measures into the detailed design must be reviewed and endorsed by a suitably qualified and experienced person in consultation with directly affected landowners, DPI Water, DPI Fisheries, EES, Infrastructure NSW (INSW) and relevant councils.</p>	<p>The 100% Detailed Design flood impact assessment has been assessed against the requirements of the Project Approval which are generally in line with the Amendment Report to minimise impacts of the CSSI on flood behavior. The CSSI drainage infrastructure have been designed to mitigate flood impacts which have been determined in the TUFLOW flood model. This model is based on hydrologic and hydraulic models developed at the Amendment Report stage.</p> <p>Consultation with affected landowners would be ongoing and the proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes
E17	<p>Unless otherwise agreed by the Planning Secretary, the CSSI must be designed and constructed to limit impacts on flooding characteristics in areas outside the project boundary during any flood event up to and including the 1% AEP flood event, to the following:</p> <p>(a) a maximum increase in inundation time of one hour;</p> <p>(b) a maximum increase of 10 mm in above-floor inundation to habitable rooms where floor levels are currently exceeded;</p> <p>(c) no above-floor inundation of habitable rooms which are currently not inundated;</p> <p>(d) a maximum increase of 50 mm in inundation of land zoned as residential, industrial or commercial;</p>	<p>The proposed changes to the project would not impact on the ability to comply with this requirement. Where criteria are not strictly met for each clause, consultation requirements under the condition would be implemented to achieve compliance with the condition.</p> <p>a. The 10% AEP and 1% AEP have been assessed at 100% detailed design. Changes in duration are less than 1 hour in all events assessed up to the 1% AEP except in two minor locations (over areas <0.1ha). In these areas, the surrounding areas are already inundated in similar durations</p> <p>b. There are no habitable rooms within the areas where the CSSI affects or is affected by flooding</p>	Yes

No.	Condition of Approval	Discussion	Consistent
	<p>(e) a maximum increase of 100 mm in inundation of land zoned as rural, primary production, environment zone or public recreation;</p> <p>(f) no significant increase in the flood hazard or risk to life; and</p> <p>(g) maximum relative increase in velocity of 10%, where the resulting velocity is greater than 1.0 m/s, unless adequate scour protection measures are implemented and/or the velocity increases do not exacerbate erosion as demonstrated through site-specific risk of scour or geomorphological assessments.</p> <p>Where the Proponent cannot meet the requirements set out in clauses (d), (e) and (g) alternative flood levels or mitigation measures may be agreed to with the affected landowner.</p> <p>In the event that the Proponent and the affected landowner cannot agree on the measures to mitigate the impact as described in clauses (d), (e) and (g), the Proponent must engage a suitably qualified and experienced independent person to advise and assist in determining the impact and relevant mitigation measures.</p>	<p>c. There are no habitable rooms within the areas where the CSSI affects or is affected by flooding</p> <p>d. Non-compliant Afflux in farm dams 5 (up to 150mm) and 7 (up to 100mm) are noted in up to the 5%AEP where the dam is partially infilled within the CSSI operational boundary. These areas are however contained within the existing physical footprints of the existing farm dams. Afflux is compliant in the 1%AEP and there is no significant increase in flood hazard in these areas</p> <p>e. New flooding up to 200mm deep is noted in up to the 5%AEP north of BASIN 1700. Afflux is compliant in the 1%AEP. Hazard is low (H1) in up to the 5%AEP. Furthermore, the small localised area in question is trapped by the existing flood extents east and west of it which have flood depths >0.5m in as frequent as the 20%AEP.</p> <p>f. The only location where an increase is noted is at Luddenham Road at the northern shoulder of the tie in with the new property access to LOT26, DP604586. Hazard increases locally from H2 to H5 in the 1% AEP event only. While an increase from H2 to H5 hazard category is observed along the western side of Luddenham Road adjacent to the access to LOT26 DP604586, this is not considered to be a significant increase in flood hazard given its location along the edge of the road and its localised nature.</p> <p>g. Where velocities have increased by more than 10%, impacts have been mitigated through the implementation of scour protection measures such as rock or concrete lining. These occur mainly at culvert outlets and at partially infilled farm dams. Where any scour protection works would be out of the project boundary, the existing scour potential of flooding in the area has been assessed and shown to not be worsened under design conditions. Hazard in</p>	

No.	Condition of Approval	Discussion	Consistent
		the affected areas are also noted to be similar under both design and existing conditions.	
E18	All updated hydrologic and hydraulic assessments undertaken during detailed design must be consistent with the Australian Rainfall and Runoff – A Guide to Flood Estimation (GeoScience Australia, 2019).	All updated hydrologic and hydraulic assessments are consistent with the Australian Rainfall and Runoff – A Guide to Flood Estimation (GeoScience Australia, 2019). The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
E19	Updated flood modelling must be undertaken for the full range of flood events, including 5% AEP, 1% AEP, PMF and 0.5% AEP or 0.2% AEP and must have regard to the Wianamatta (South) Creek Catchment Flood Study - Existing Conditions (Revision H) (Advisian Worley Group, November 2020) when validating existing flood behaviour and constraints. The modelling must identify changes in post-development flood behaviour including cumulative flood impacts associated with Western Sydney International Airport and Sydney Metro Western Sydney Airport, where this information is available, prior to detailed design being finalised.	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>The flood assessment that is being undertaken for 100% detailed design is based on the range of events set out in Condition of approval E19 and with regard to Wianamatta (South) Creek Catchment Flood Study - Existing Conditions (Revision H) (Advisian Worley Group, November 2020). Further details of the assessment methodology for the 100% detailed design is provided in Section 3.2.1.</p> <p>The flood assessment that is being undertaken for 100% detailed design utilises the latest information available on the WSIA and SMWSA projects.</p>	Yes
E20	Flood information including flood summary reports, models and geographic information system outputs, and work as executed information on finished ground levels and the dimensions and finished levels of all structures within the flood prone land, must be provided to the relevant council, EES and NSW in order to assist in preparing relevant documents and to reflect changes in flood behaviour as a result of the CSSI. The relevant council(s), EES and NSW must be notified in writing that the information is available no later than one month following the operation of the CSSI. Information requested by the relevant council(s), EES or NSW must be provided no later than six (6) months following the completion of construction or within another timeframe agreed with the relevant council(s), EES and NSW	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>Relevant flood information that is developed to support the 100% detailed design will be made available to relevant council(s), EES and NSW in accordance with condition of approval E20.</p>	Yes

No.	Condition of Approval	Discussion	Consistent
E21	The flood models, data and summary reports must be uploaded to the NSW Flood Data Portal and access provided to the relevant councils, EES and INSW.	<p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p> <p>Relevant flood information that is developed to support the 100% detailed design will be made available to relevant council(s), EES and INSW in accordance with condition of approval E20.</p>	Yes
E22	The designs of all bridge, culvert and other cross drainage structures must include for potential blockages consistent with the procedures in the Australian Rainfall and Runoff – A Guide to Flood Estimation (GeoScience Australia, 2019).	The proposed changes to the project would not impact on the ability to comply with this requirement. The design of bridge, culvert and other cross drainage structures has considered the potential for blockage in accordance with the procedures in GeoScience Australia, 2019.	Yes
E23	The CSSI must not preclude the future raising of Elizabeth Drive to achieve a minimum of 1% AEP level of flood immunity, unless otherwise agreed by the Planning Secretary.	The proposed changes to the project would not impact on the ability to comply with this requirement. Under the detailed design for the M12 Motorway – West Package the upgraded section of Elizabeth Drive achieves a 1% AEP level of flood immunity except at its tie into the existing road to the west of the bridge over Badgerys Creek. While subject to detailed design of that project, it is expected that the future Elizabeth Drive project would remove the tie in works for the M12 Motorway – West Package and upgrade the existing bridge over Badgerys Creek in order to achieve a minimum of 1% AEP level of flood immunity.	Yes
E24	<p>For property/ies zoned primary production and where hydrologic modelling predicts that the CSSI will potentially reduce and adversely affect the available stormwater runoff yield to a farm dam, the Proponent must, in consultation with the affected landowner:</p> <p>(a) calculate the nature and extent of impacts on water supply;</p> <p>(b) determine what measures may be implemented to prevent, mitigate, compensate or offset a loss in water supply; and</p> <p>(c) implement the measures agreed with the landowner at no cost to the landowner.</p>	According to the WSA2020 land zoning, there is no Agribusiness Zoned land (i.e. land zoned primary production) that is located downstream of the M12 Motorway – West Package that may be impacted by changes in stormwater runoff yield. Therefore, this condition is not applicable to the Project.	Yes

No.	Condition of Approval	Discussion	Consistent
	<p>The agreed measures must be implemented prior to undertaking any works that would directly affect the flow of water into a landowner's farm dam.</p> <p>In the event that the Proponent and landowner cannot agree on the measures to mitigate the impact, the Proponent shall engage a suitably qualified and experienced independent person to advise and assist in determining appropriate mitigation measures.</p>		

5.2 STATEMENT OF COMMITMENTS / ENVIRONMENTAL MANAGEMENT MEASURES

The proposed change has been assessed in Table 5-2 in relation to the relevant commitments / environmental management measures in the context of the Division 5.2 Approval.

Table 5-2 Consistency against relevant Statement of Commitments / environmental management measures

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
F01	Further flood investigations and hydrological and hydraulic modelling will be carried out during detailed design to ensure the flood immunity objectives and design criteria for the project are met. The modelling will be used to define the nature of both main stream flooding and major overland flow along the full length of the project corridor under pre- and post- project conditions and to define the full extent of any impact that the project will have on patterns of both main stream flooding and major overland flow. The hydraulic model(s) will be based on two-dimensional hydraulic modelling software. The modelling will take into account any updated regional flood modelling and information available at the time.	Further flood modelling has been undertaken to inform the design and minimise flood impacts.	Yes
F02	Should the updated flood modelling show the project will result in an adverse flooding impact, TfNSW will consult with landowners regarding appropriate mitigation measures to be implemented by the contractor in relation to each individual property.	Should the updated flood modelling show the project will have an adverse flooding impact, TfNSW will consult with affected landowners and the proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
F03	A flood management plan will be prepared as part of the CEMP for the project and will detail the processes for flood preparedness, materials management, weather	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
	<p>monitoring, site management and flood incident management. The flood management plan will be developed in accordance with:</p> <ul style="list-style-type: none"> — Managing Urban Stormwater, Soils and Construction, Volume 1 4th Edition, March 2004 (Landcom 2004) and Managing Urban Stormwater, Volume 2D – Main Road Construction (DECC 2008) — TfNSW Erosion and Sedimentation Management Procedure (Roads and Traffic Authority 2009) — TfNSW Technical Guideline: Temporary Stormwater Drainage for Road Construction (Roads and Maritime 2011) — TfNSW Stockpile Management Guideline (Roads and Maritime 2011). 		
F04	Creek adjustments would be re-considered and/or further refined to minimise the impact on the creeks during detailed design.	Within the M12 Motorway – West Package detailed design package, the EIS/AR concept design identified the need for creek adjustment of Badgerys Creek downstream of Bridge BR05 (at Badgerys Creek). During detailed design of the M12 Motorway and Bridge BR05 (at Badgerys Creek) the need for creek adjustment of Badgerys Creek was eliminated.	Yes
F05	Detailed construction staging plans will be developed during detailed design so that bridges and culverts are constructed in a way that minimises flood risk.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
F06	Measures to address potential impacts of culvert blockage on afflux will be further investigated during detailed design and may include the installation of debris deflectors, trash racks or similar on drainage inlets where reasonable and feasible.	Sensitivity testing assuming all cross-drainage structures as 100% blocked has been undertaken. Testing showed that the flood immunity of the M12 Motorway - West Package is generally maintained, except for some isolated locations in particular along the Airport Access Road. This confirms that the proposed alignment generally has substantial freeboard and is not overly sensitive to full culvert blockage.	Yes
F07	During the detailed design phase, TfNSW will seek to refine the design of the works at Elizabeth Drive near Badgerys Creek to minimise flood affectation.	The culverts and road design on Elizabeth Drive have been designed to reduce flooding on Elizabeth Drive and ties back to the existing road level at the M12 Motorway – West Package Limit of works.	Yes

NO.	STATEMENT OF COMMITMENT / MITIGATION MEASURE	DISCUSSION	CONSISTENT
	Mitigation measures may include adjustment of road levels and/or flood relief culverts through the road.		
F08	Activities that may affect existing drainage systems during construction will be carried out so that existing hydraulic capacity of these systems is maintained where practicable.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes
F09	The proposed bridges, culverts and changes to watercourses will be further refined during the detailed design to minimise potential flooding impacts.	The bridges and culverts have been sized to minimise flood impacts in line with the flood impact criteria required by the NSW DPIE Project Approval (dated 23 April 2021). The bridges across waterways (i.e. BR02 at Cosgroves Creek and BR05 at Badgerys Creek) have been designed (i.e. piers on a skew) to match the flow direction of the creeks and minimise potential flood impacts.	Yes
F10	Ongoing consultation will be carried out with WSIA and as further details of their flood management and earthworks are developed, these will be incorporated into an updated M12 Motorway flood model for the detailed design phase of the project.	The proposed changes to the project would not impact on the ability to comply with this requirement.	Yes

5.3 EPBC APPROVAL

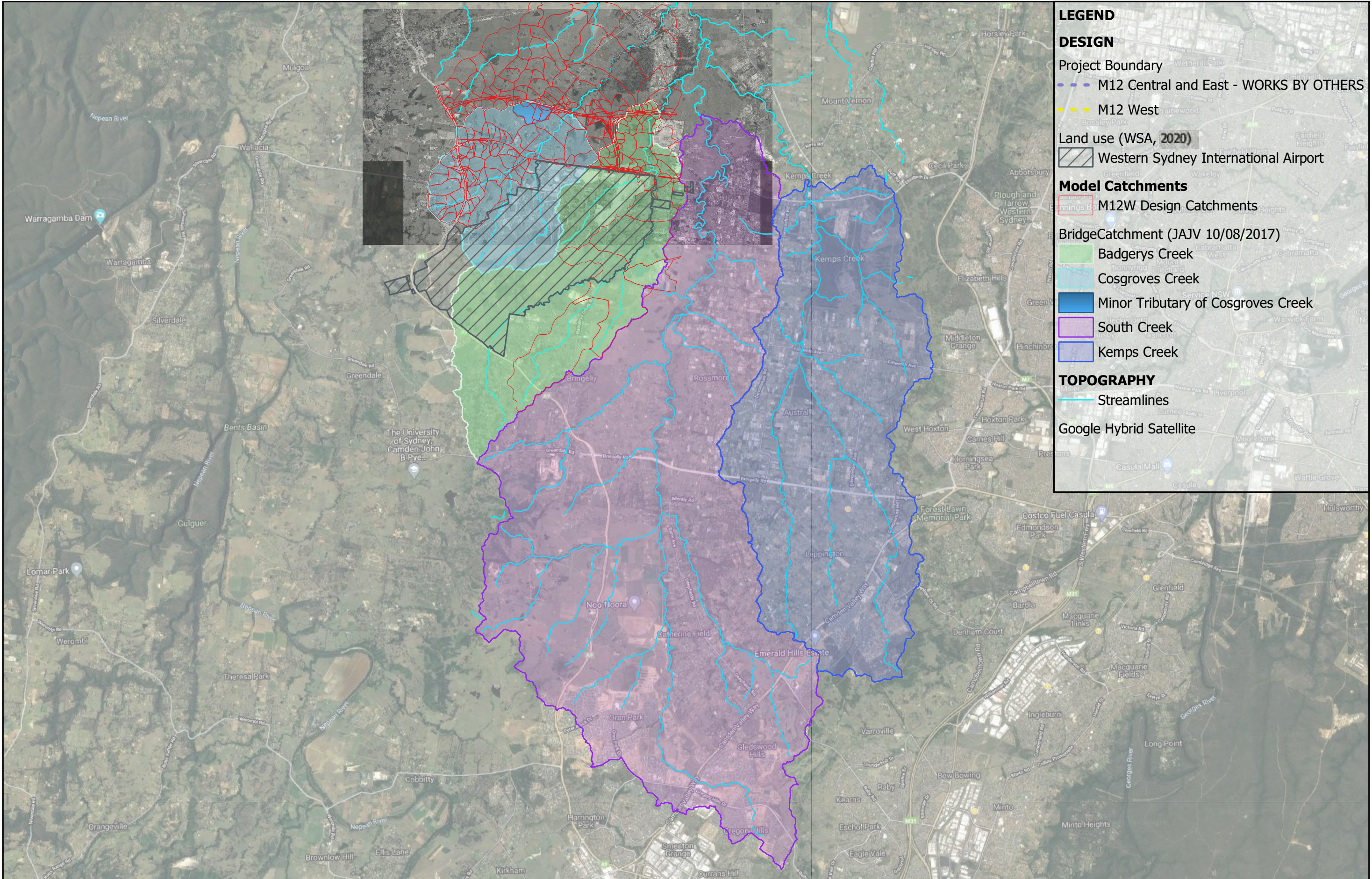
The proposed changes in flooding management measures at detailed design do not constitute to any change in project aspects related to the EPBC approval.

6. REFERENCES

- Advisian Worley Group, 2020. Wianamatta (South) Creek Catchment Flood Study - Existing Conditions (Revision H)
- Geoscience Australia 2019. Australian Rainfall and Runoff Guidelines
- Lyall & Associates, 2020. Technical Note 1 – M12 Motorway – Detailed Design: Development for Flood Models of M12 West (Draft Model Build Issue)
- Transport for NSW, 2019. M12 Motorway Environmental Impact Statement
- Transport for NSW, 2020. M12 Motorway Submissions Report
- Transport for NSW, 2020. M12 Motorway Amendment Report
- Transport for NSW, 2020. M12 Motorway Amendment Report - Submissions Report
- Western Sydney Planning Partnership and NSW Government, November 2020, Western Sydney Aerotropolis Plan
- WSP, 2021. M12 West Hydrologic and Hydraulic Assessment (Document ID: M12WDD-WSP-ALL-SD-RPT-000001)



APPENDIX A 100% DETAILED DESIGN FLOOD MAPPING



Prepared for: TfNSW
Coordinate system: GDA 2020 MGA Zone 56
Aerial Source:

0 1,000 2,000 m



1:130,000



Stage 100% Detailed Design
Version: REV1
Author: MY
Approved by: JB
Date: 30/06/2021

M12 Motorway Package 1 - West
100% DD Catchments
Sheet 1 of 1

A-1



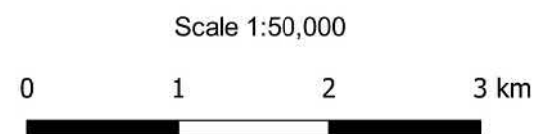
- LEGEND**
- MODEL BUILD**
- TUFLOW Boundary Conditions**
- HQ
 - QT
 - Quadtree (2m grid)
 - TUFLOW model extents (4m grid)
- DESIGN**
- Design Culverts
 - Existing Culverts to be Retained
 - Design Miscellaneous Structures
 - Design Culverts - WORKS BY OTHERS
 - Design Bridges
 - Existing Bridges to be Retained
- Project Boundary**
- WORKS BY OTHERS
 - M12 West
 - Property Boundary_LotLPI_20181225_V03
- Land Use (WSA, 2020)**
- Western Sydney International Airport
- TOPOGRAPHY**
- Streamlines

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REV	Description	Date	Approved



STATUS			
100% Detailed Design			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021



A-2	
M12 Motorway Package 1 - West	
Model Build	
Appendix A	



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Depth (m)

<= 0.05

<= 0.2

0.2 - 0.5

0.5 - 1

1 - 1.5

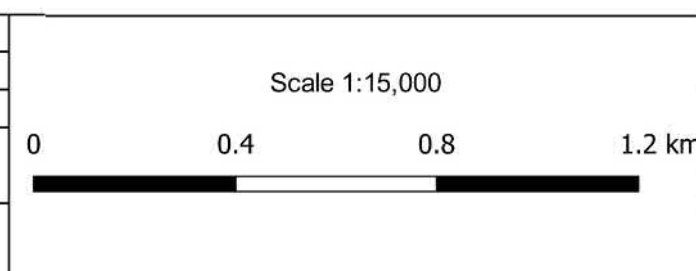
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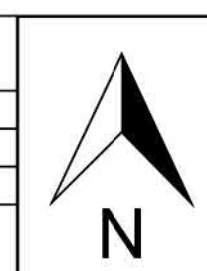
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STATUS			
100% Detailed Design Stage			
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Height Datum	AHD	Date Printed	30/06/2021



A-3 to A-4
M12 Motorway Package 1 - West
Existing Flood Depth 20% AEP
Appendix A



LEGEND

Existing Culverts
Existing Bridges
Project Boundary
WORKS BY OTHERS
M12 West

Land Use (WSA, 2020)
Western Sydney International Airport
Property Boundary_LotLPI_20181225_V03

Flooding
Water Level (mAHD)

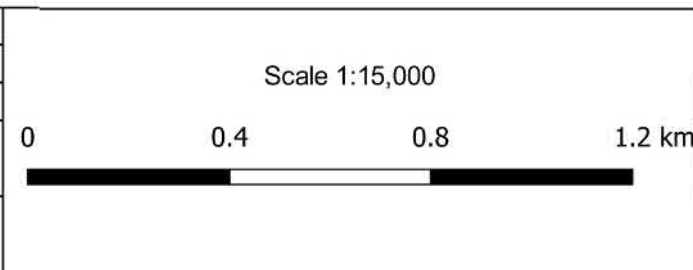
Depth (m)
≤ 0.05
≤ 0.2
0.2 - 0.5
0.5 - 1
1 - 1.5
1.5 - 2
> 2

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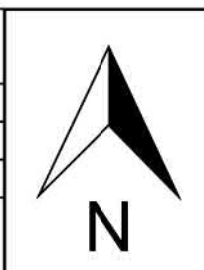
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REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
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Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	30/06/2021



A-3 to A-4
M12 Motorway Package 1 - West
Existing Flood Depth 20% AEP
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Depth (m)

<= 0.05

<= 0.2

0.2 - 0.5

0.5 - 1

1 - 1.5

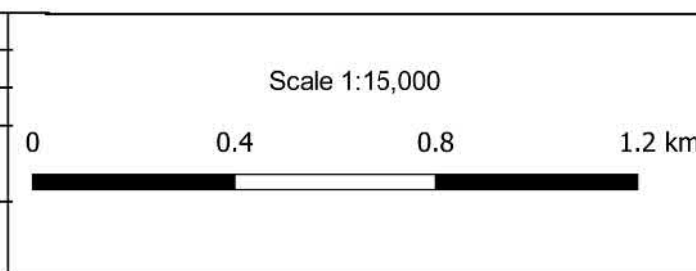
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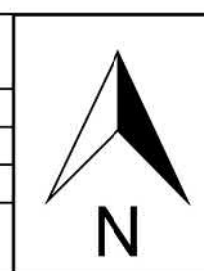
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REV	Description	Date	Approved



STATUS			
100% Detailed Design			
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Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	30/06/2021



A-5 to A-6
M12 Motorway Package 1 - West
Existing Flood Depth 10% AEP
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Depth (m)

<= 0.05

<= 0.2

0.2 - 0.5

0.5 - 1

1 - 1.5

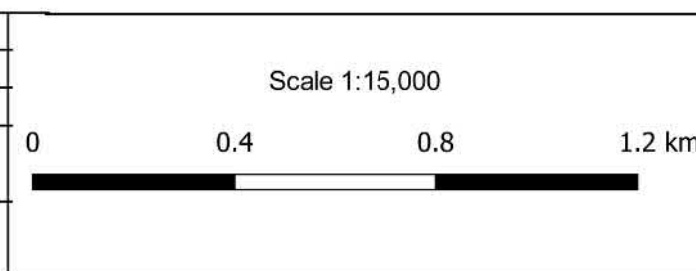
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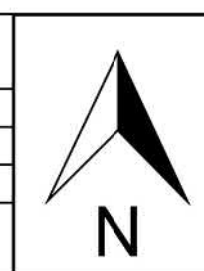
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REV	Description	Date	Approved



STATUS			
100% Detailed Design			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	30/06/2021



A-5 to A-6	
M12 Motorway Package 1 - West	
Existing Flood Depth 10% AEP	
Appendix A	



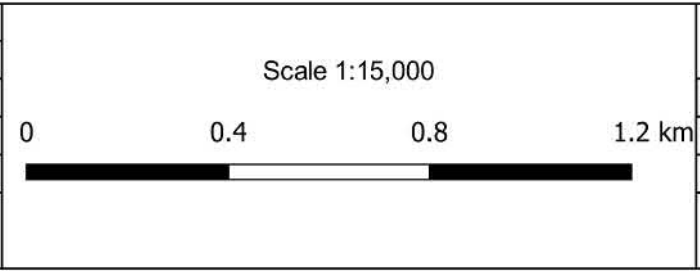
LEGEND
Existing Culverts
Existing Bridges
Project Boundary
WORKS BY OTHERS
M12 West
Land Use (WSA, 2020)
Western Sydney International Airport
Property Boundary_LotLPI_20181225_V03
Flooding
Water Level (mAHD)
Depth (m)
≤ 0.05
≤ 0.2
0.2 - 0.5
0.5 - 1
1 - 1.5
1.5 - 2
> 2

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A	M12 Package 1 - West	2021-06-30	Julia Beck
REV	Description	Date	Approved



STATUS			
Stage: 100% Detailed Design			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	M.Y
Height Datum	AHD	Date Printed	30/06/2021



A-7 to A-8
M12 Motorway Package 1 - West
Existing Flood Depth 5% AEP
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Depth (m)

<= 0.05

<= 0.2

0.2 - 0.5

0.5 - 1

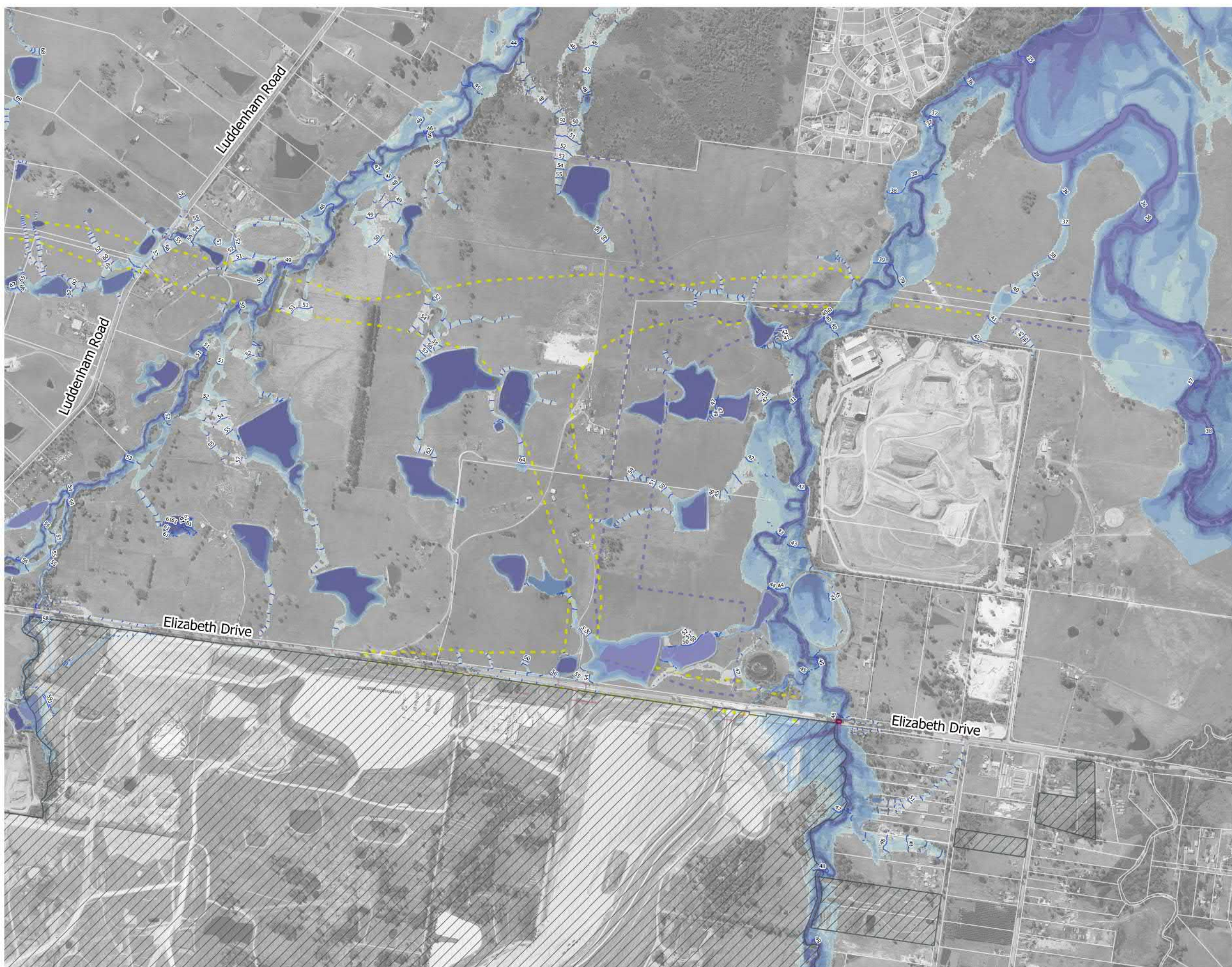
1 - 1.5

1.5 - 2

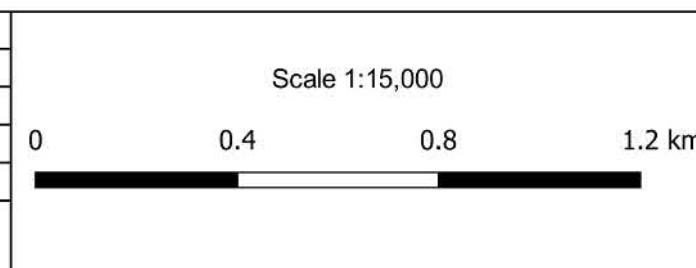
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A	M12 Package 1 - West	2021-06-30	Julia Beck
REV	Description	Date	Approved



STATUS			
Stage: 100% Detailed Design			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	M.Y
Height Datum	AHD	Date Printed	30/06/2021



A-7 to A-8
M12 Motorway Package 1 - West
Existing Flood Depth 5% AEP
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Depth (m)

<= 0.05

<= 0.2

0.2 - 0.5

0.5 - 1

1 - 1.5

1.5 - 2

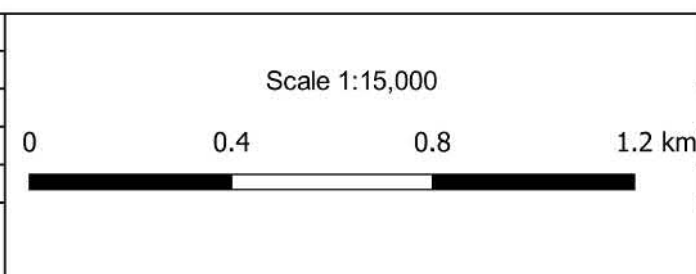
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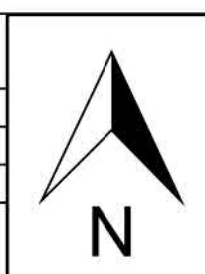
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A	M12 Package 1 - West	2021-06-30	Julia Beck
REV	Description	Date	Approved



STATUS			
Stage: 100% Detailed Design			
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Coordinate System	MGA56	Designed	M.Y
Height Datum	AHD	Date Printed	30/06/2021



A-9 to A-10	
M12 Motorway Package 1 - West	
Existing Flood Depth 1% AEP	
Appendix A	



LEGEND

Existing Culverts
Existing Bridges
Project Boundary
WORKS BY OTHERS
M12 West

Land Use (WSA, 2020)
Western Sydney International Airport
Property Boundary_LotLPI_20181225_V03

Flooding
Water Level (mAHD)

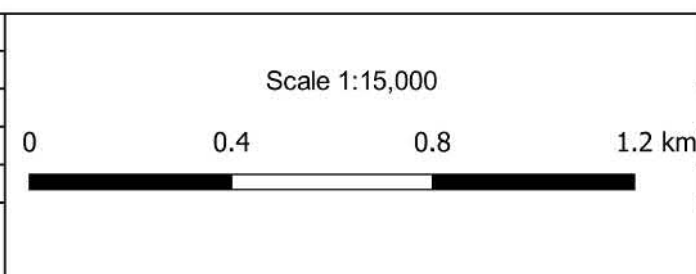
Depth (m)
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≤ 0.2
0.2 - 0.5
0.5 - 1
1 - 1.5
1.5 - 2
> 2

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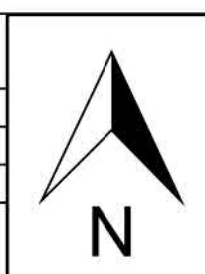
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REV	Description	Date	Approved



STATUS			
Stage: 100% Detailed Design			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	M.Y
Height Datum	AHD	Date Printed	30/06/2021



A-9 to A-10	
M12 Motorway Package 1 - West	
Existing Flood Depth 1% AEP	
Appendix A	



LEGEND

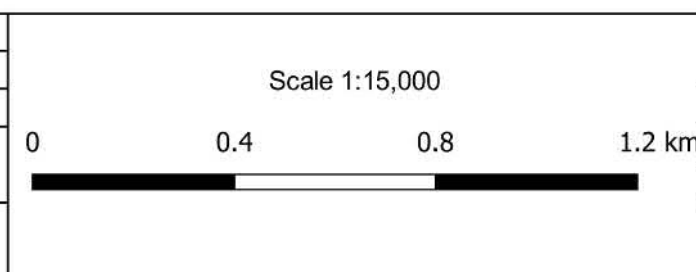
- Existing Culverts
- Existing Bridges
- Project Boundary**
- WORKS BY OTHERS
- M12 West
- Land Use (WSA, 2020)**
- Western Sydney International Airport
- Property Boundary_LotLPI_20181225_V03
- Flooding**
- Water Level (mAHD)
- Depth (m)**
- <= 0.05
- <= 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

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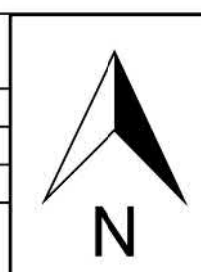
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REV	Description	Date	Approved



STATUS			
100% Detailed Design			
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Height Datum	AHD	Date Printed	30/06/2021
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A-11 to A-12	
M12 Motorway Package 1 - West	
Existing Flood Depth 0.05% AEP	
Appendix A	



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Depth (m)

<= 0.05

<= 0.2

0.2 - 0.5

0.5 - 1

1 - 1.5

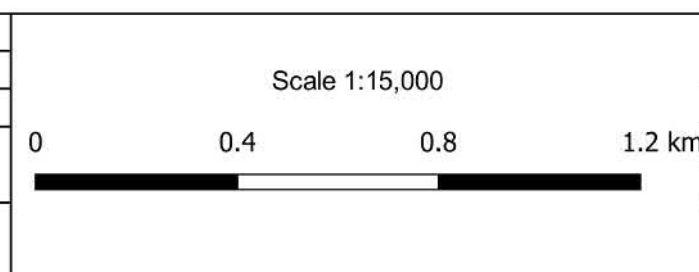
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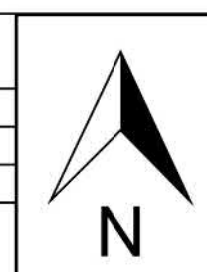
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REV	Description	Date	Approved



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A-11 to A-12	
M12 Motorway Package 1 - West	
Existing Flood Depth 0.05% AEP	
Appendix A	



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Depth (m)

<= 0.05

<= 0.2

0.2 - 0.5

0.5 - 1

1 - 1.5

1.5 - 2

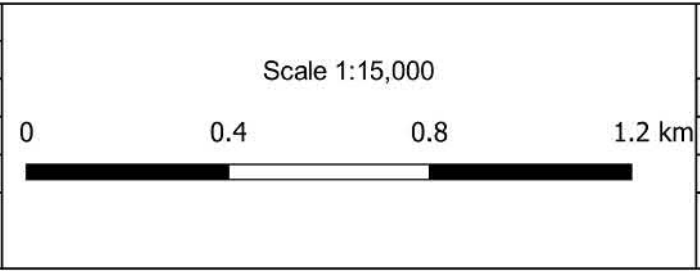
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This map is not a design document.

A	M12 Package 1 - West	2021-06-30	Julia Beck
REV	Description	Date	Approved



STATUS			
Stage: 100% Detailed Design			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	M.Y
Height Datum	AHD	Date Printed	30/06/2021



A-13 to A-14	
M12 Motorway Package - West	
Existing Flood Depth PMF	
Appendix A	



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Depth (m)

<= 0.05

<= 0.2

0.2 - 0.5

0.5 - 1

1 - 1.5

1.5 - 2

> 2

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STATUS

Stage: 100% Detailed Design

Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	M.Y
Height Datum	AHD	Date Printed	30/06/2021



A-13 to A-14

M12 Motorway Package - West

Existing Flood Depth PMF

Appendix A

Scale 1:15,000



A	M12 Package 1 - West	2021-06-30	Julia Beck
REV	Description	Date	Approved

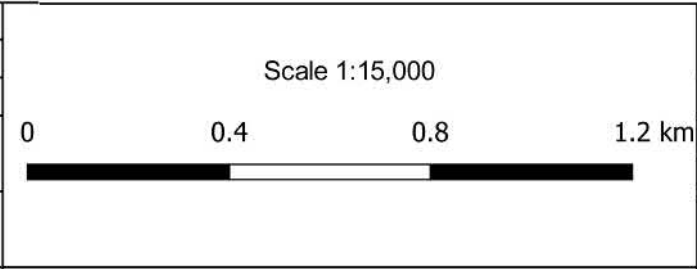


LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport
Flooding
 Water Level (mAHD)
Depth (m)
 <= 0.05
 <= 0.2
 0.2 - 0.5
 0.5 - 1
 1 - 1.5
 1.5 - 2
 > 2

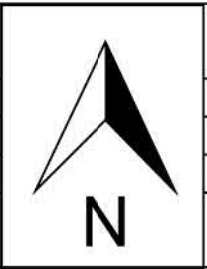
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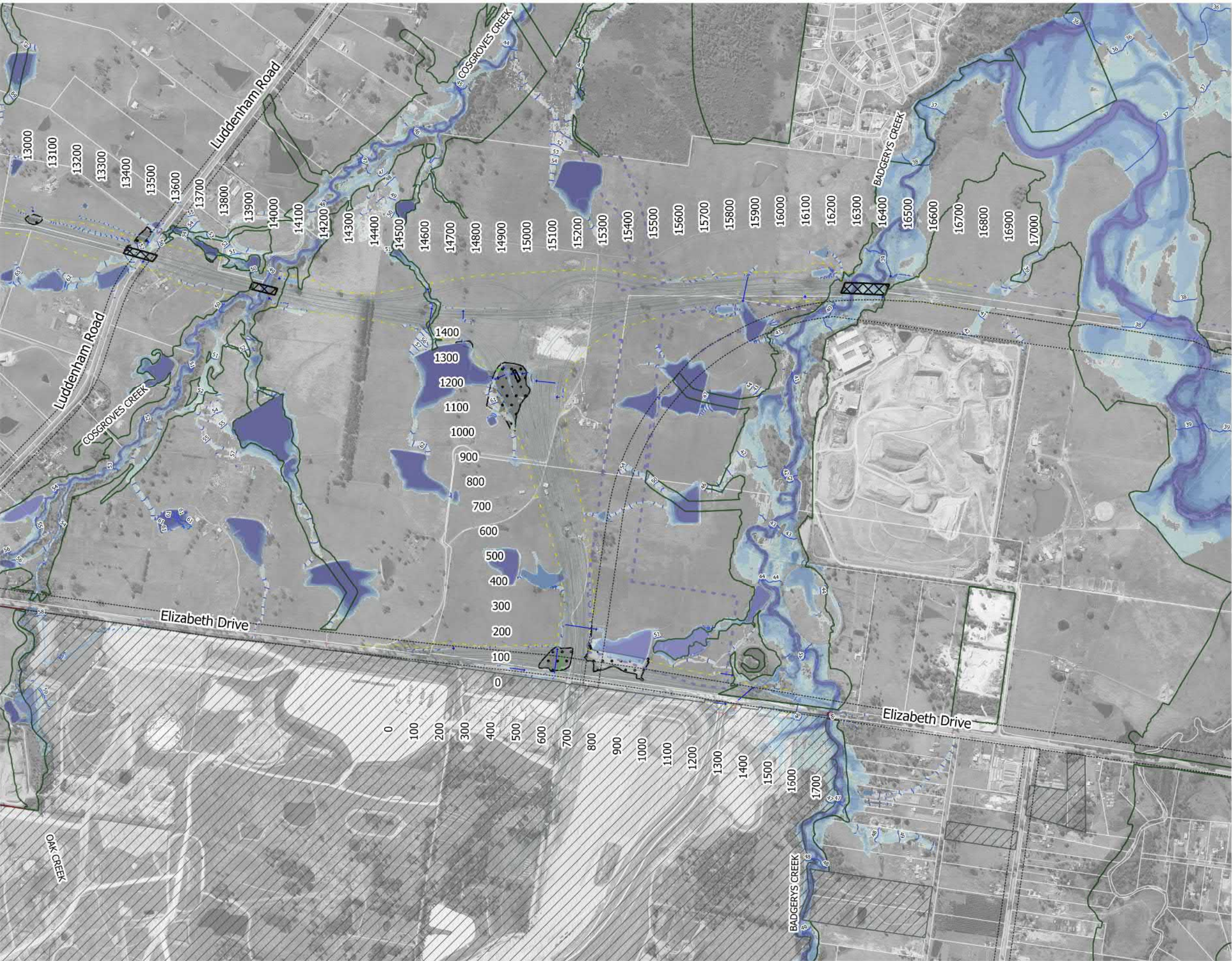
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-15 to A-16	
M12 Motorway Package 1 - West	
Design Flood Depth 20% AEP	
Appendix A	



LEGEND

- Design Bridges
- Road Design
- Design Culverts
- Existing Culverts to be Retained
- Design Miscellaneous Structures
- Design Culverts - WORKS BY OTHERS
- Farm Dam Infill (approx. extents)
- Existing Bridges

Project Boundary

- M12 Central and East - WORKS BY OTHERS
- M12 West

Land Use (WSA, 2020) Enterprise unless noted:

- Environment and Recreation
- Western Sydney International Airport
- Agribusiness
- Property Boundary_LotLPI_20181225_V03
- Transport

Flooding

- Water Level (mAHD)

Depth (m)

- <= 0.05
- <= 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

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This map is not a design document.

				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-15 to A-16	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Design Flood Depth 20% AEP	
					Height Datum	AHD	Date Printed	29/06/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB								
REV	Description	Date	Approved								



LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport
Flooding
 Water Level (mAHD)
Depth (m)

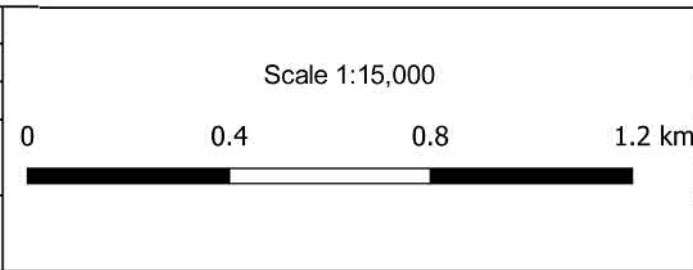
≤ 0.05
≤ 0.2
0.2 - 0.5
0.5 - 1
1 - 1.5
1.5 - 2
> 2

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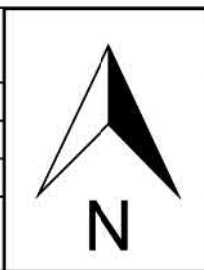
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This map is not a design document.

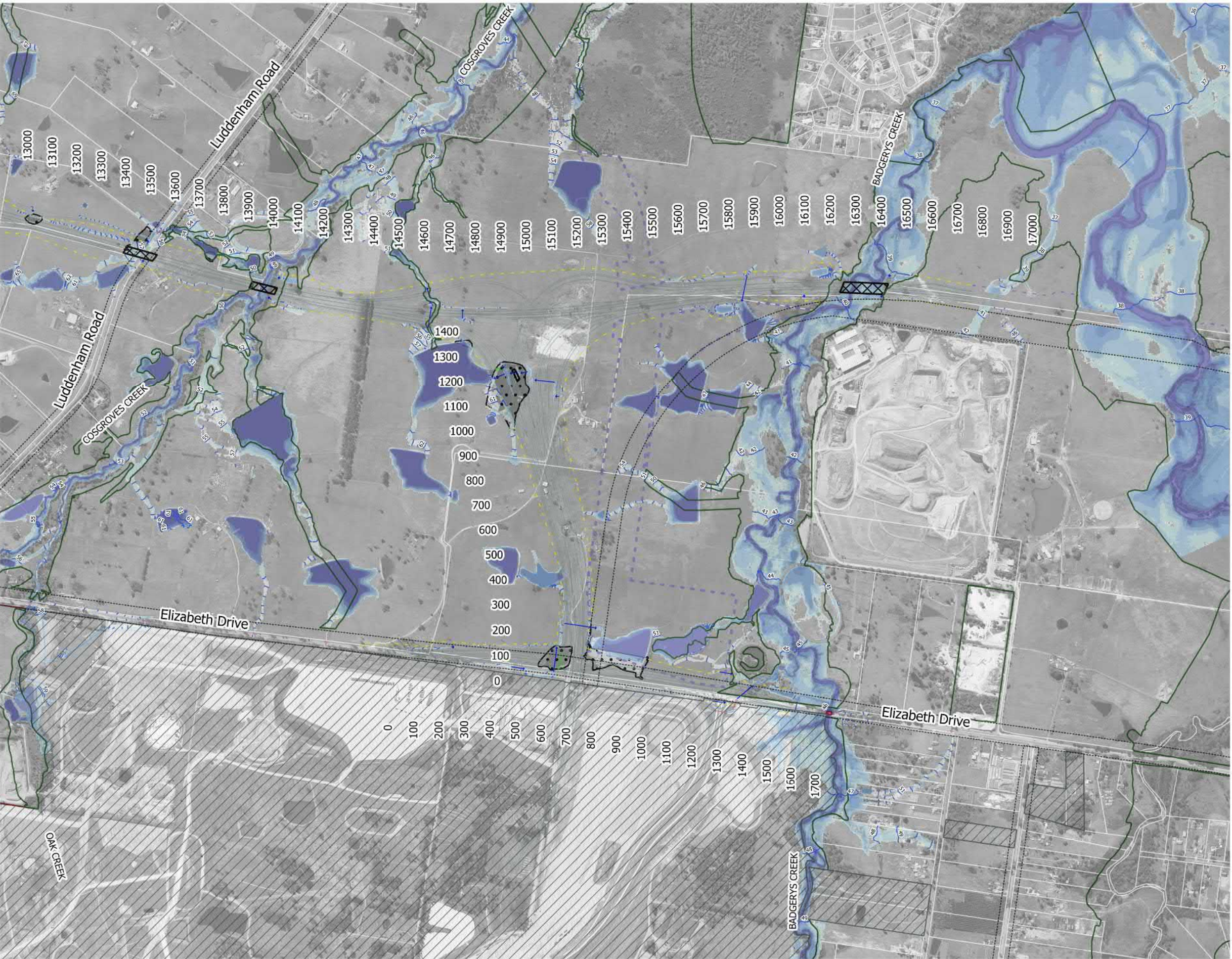
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REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-17 to A-18	
M12 Motorway Package 1 - West	
Existing Flood Depth 10% AEP	
Appendix A	



LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport
Flooding
 Water Level (mAHD)
Depth (m)

<= 0.05
<= 0.2
0.2 - 0.5
0.5 - 1
1 - 1.5
1.5 - 2
> 2

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-17 to A-18	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Existing Flood Depth 10% AEP	
					Height Datum	AHD	Date Printed	29/06/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB								
REV	Description	Date	Approved								

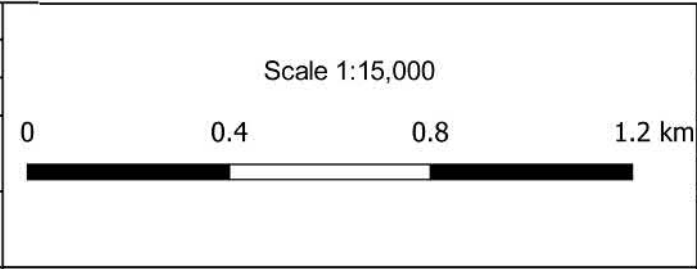


LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport
Flooding
 Water Level (mAHD)
Depth (m)

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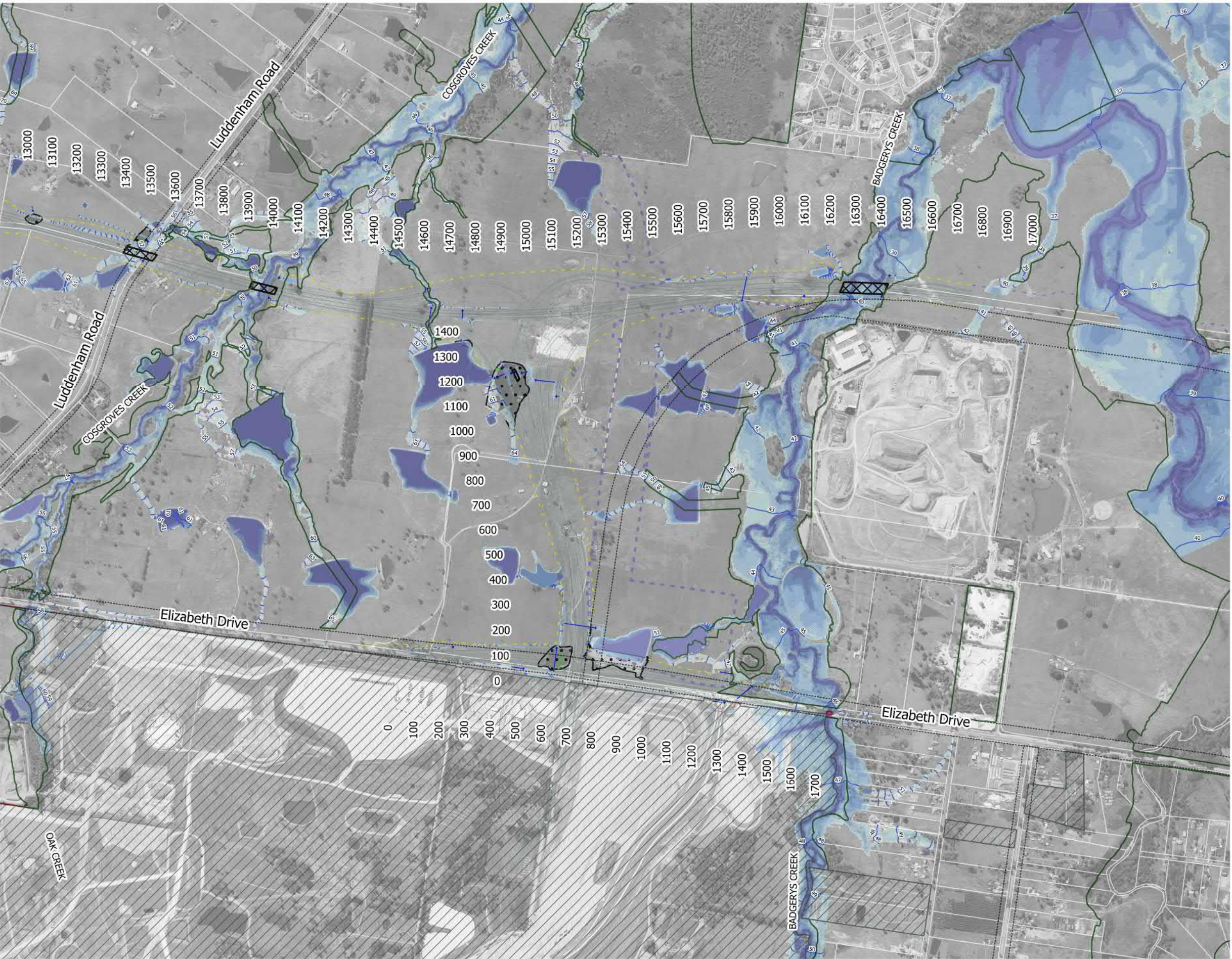
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-19 to A-20
M12 Motorway Package 1 - West
Existing Flood Depth 5% AEP
Appendix A



LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport
Flooding
 Water Level (mAHD)
Depth (m)
 <= 0.05
 <= 0.2
 0.2 - 0.5
 0.5 - 1
 1 - 1.5
 1.5 - 2
 > 2

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-19 to A-20	
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					Coordinate System	MGA56	Designed	MY		Existing Flood Depth 5% AEP	
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A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB								
REV	Description	Date	Approved								



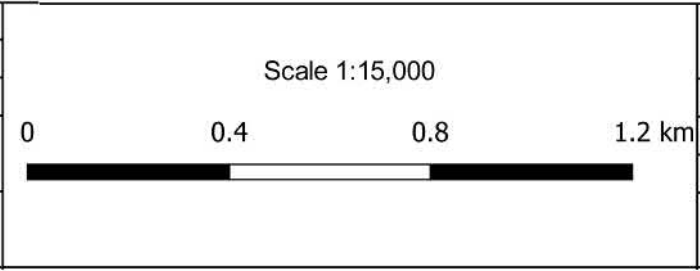
LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport
Flooding
 Water Level (mAHD)
Depth (m)

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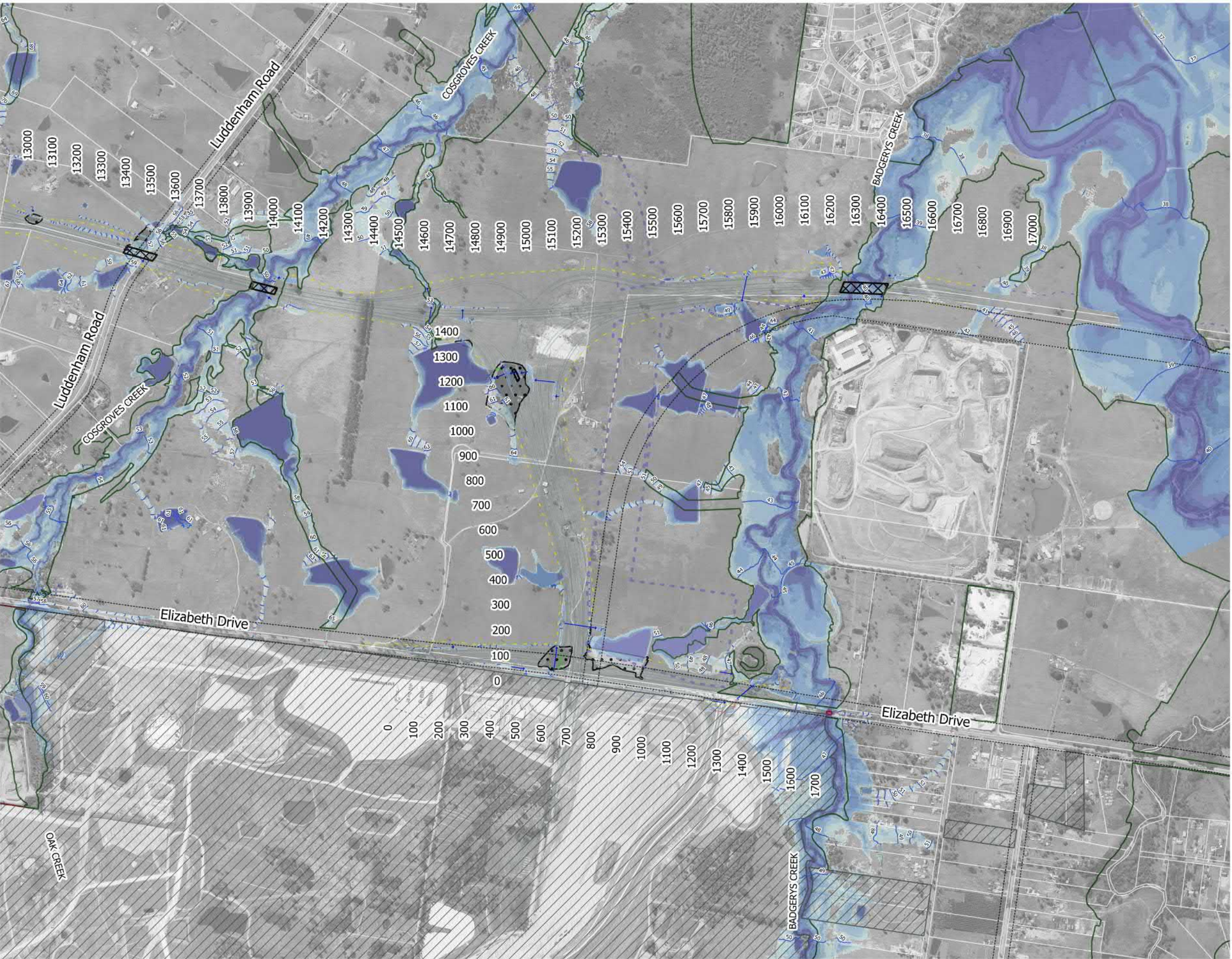
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-21 to A-22	
M12 Motorway Package 1 - West	
Existing Flood Depth 1% AEP	
Appendix A	



LEGEND

- Design Bridges
- Road Design
- Design Culverts
- Existing Culverts to be Retained
- Design Miscellaneous Structures
- Design Culverts - WORKS BY OTHERS
- Farm Dam Infill (approx. extents)
- Existing Bridges

Project Boundary

- M12 Central and East - WORKS BY OTHERS
- M12 West

Land Use (WSA, 2020) Enterprise unless noted:

- Environment and Recreation
- Western Sydney International Airport
- Agribusiness
- Property Boundary_LotLPI_20181225_V03
- Transport

Flooding

- Water Level (mAHD)

Depth (m)

- <= 0.05
- <= 0.2
- 0.2 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-21 to A-22	
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					Coordinate System	MGA56	Designed	MY		Existing Flood Depth 1% AEP	
					Height Datum	AHD	Date Printed	29/06/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB								
REV	Description	Date	Approved								



LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges

Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West

Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport

Flooding
 Water Level (mAHD)

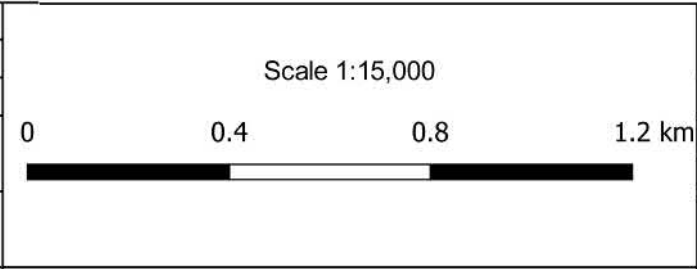
Depth (m)
 <= 0.05
 <= 0.2
 0.2 - 0.5
 0.5 - 1
 1 - 1.5
 1.5 - 2
 > 2

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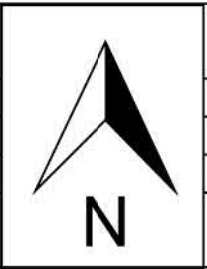
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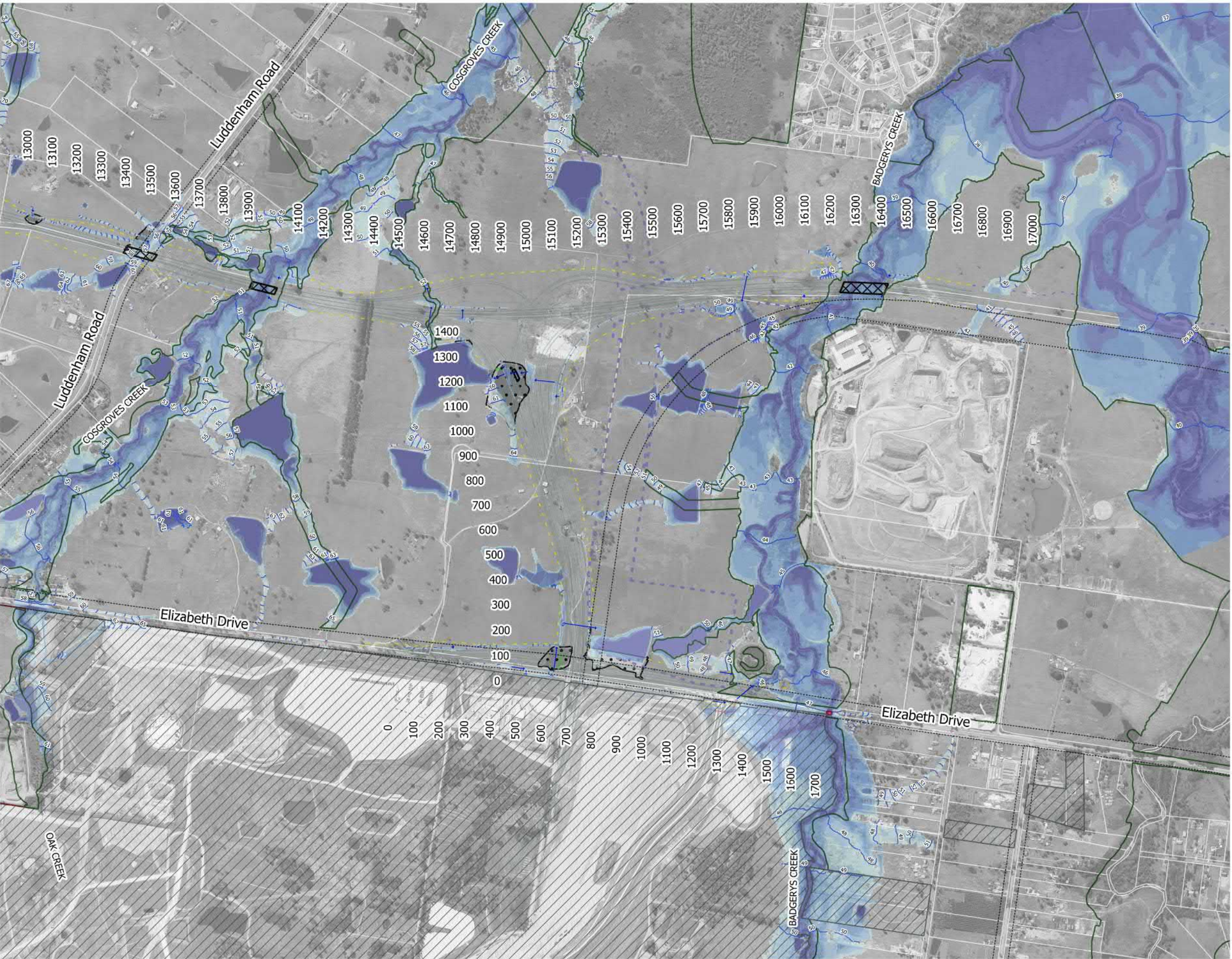
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-23 to A-24
M12 Motorway Package 1 - West
Existing Flood Depth 0.05% AEP
Appendix A



LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport
Flooding
 Water Level (mAHD)
Depth (m)
 <= 0.05
 <= 0.2
 0.2 - 0.5
 0.5 - 1
 1 - 1.5
 1.5 - 2
 > 2

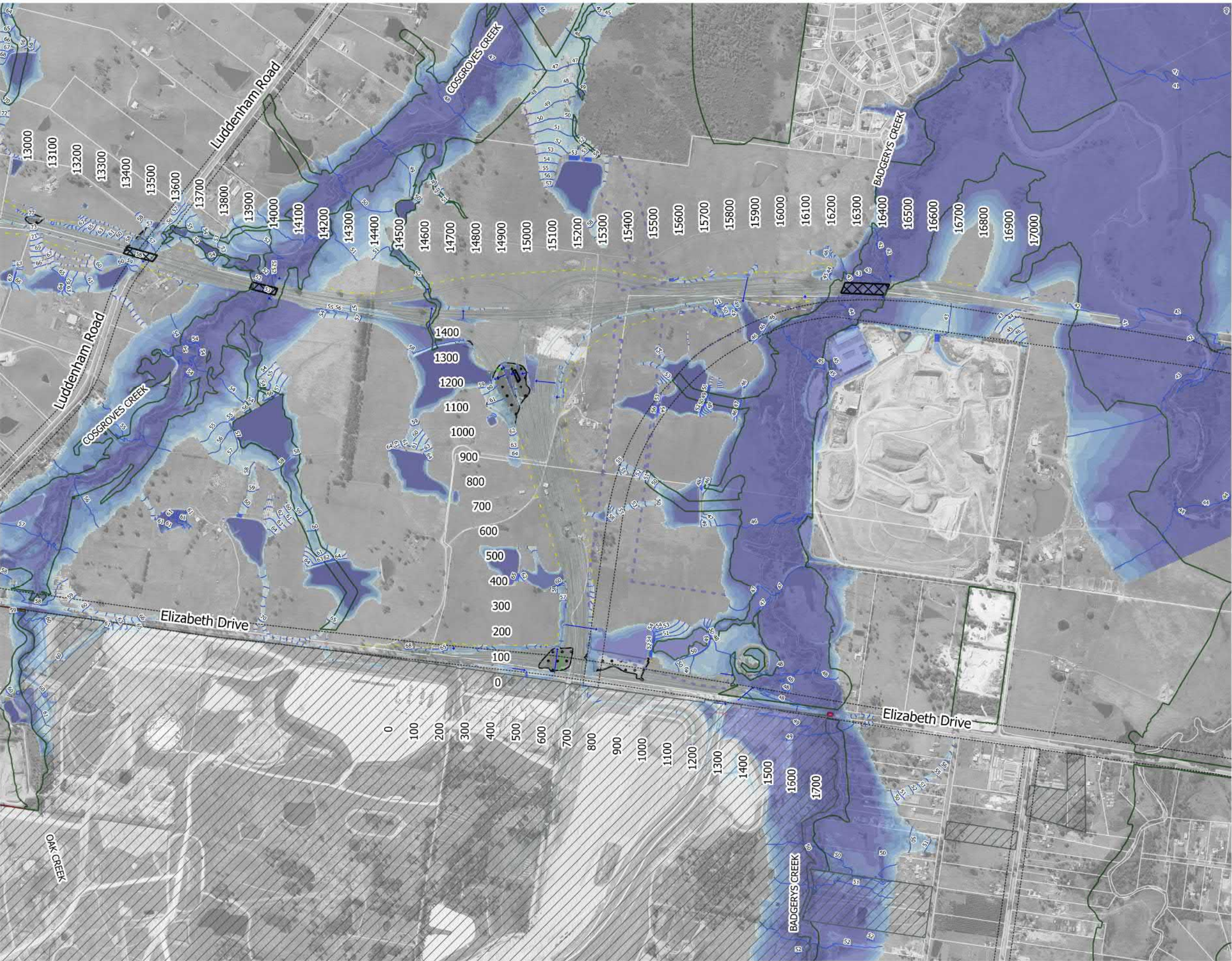
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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-23 to A-24	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Existing Flood Depth 0.05% AEP	
					Height Datum	AHD	Date Printed	29/06/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB								
REV	Description	Date	Approved								



				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div> <div><div></div></div>	<div>STATUS</div> <div>100% Detailed Design Stage</div>				<div><div></div></div> <div>N</div>	A-25 to A-26	
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					Coordinate System	MGA56	Designed	MY			
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB		Height Datum	AHD	Date Printed	29/06/2021		Existing Flood Depth PMF	
REV	Description	Date	Approved							Appendix A	



LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges

Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West

Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport

Flooding
 Water Level (mAHD)

Depth (m)

≤ 0.05
≤ 0.2
0.2 - 0.5
0.5 - 1
1 - 1.5
1.5 - 2
> 2

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-25 to A-26	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Existing Flood Depth PMF	
					Height Datum	AHD	Date Printed	29/06/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB								
REV	Description	Date	Approved								



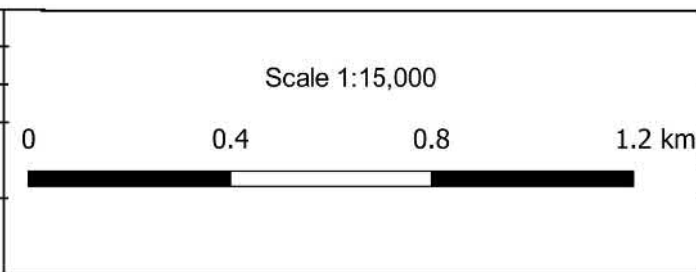
LEGEND

- Existing Culverts
- Existing Bridges
- Project Boundary**
 - WORKS BY OTHERS
 - M12 West
- Land Use (WSA, 2020)**
 - Western Sydney International Airport
 - Property Boundary_LotLPI_20181225_V03
- Flooding**
 - Water Level (mAHD)
- Velocity (m/s)**
 - <= 0.5
 - 0.5 - 1
 - 1 - 1.5
 - 1.5 - 2
 - > 2

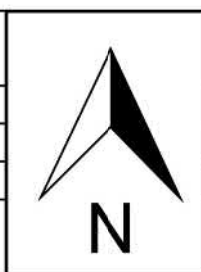
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A	ISSUED FOR 100% DETAILED DESIGN	2021-06-30	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	30/06/2021



A-27 to A-28	
M12 Motorway Package 1 - West	
Existing Flood Velocity 20% AEP	
Appendix A	



LEGEND

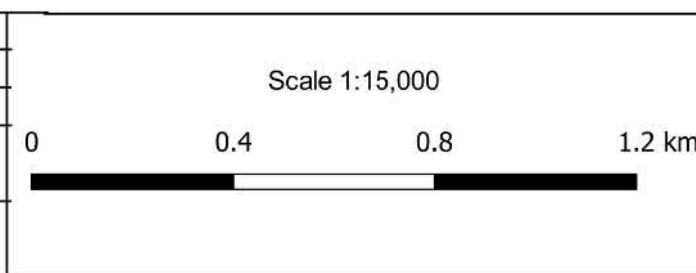
- Existing Culverts
- Existing Bridges
- Project Boundary**
 - WORKS BY OTHERS
 - M12 West
- Land Use (WSA, 2020)**
 - Western Sydney International Airport
 - Property Boundary_LotLPI_20181225_V03
- Flooding**
 - Water Level (mAHD)
- Velocity (m/s)**
 - <= 0.5
 - 0.5 - 1
 - 1 - 1.5
 - 1.5 - 2
 - > 2

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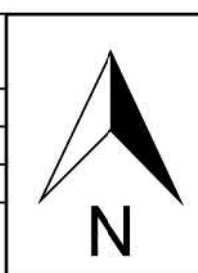
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Height Datum	AHD	Date Printed	30/06/2021



A-27 to A-28
M12 Motorway Package 1 - West
Existing Flood Velocity 20% AEP
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Velocity (m/s)

<= 0.5

0.5 - 1

1 - 1.5

1.5 - 2

> 2

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	<div>STATUS</div> <div>100% Detailed Design</div>					A-29 to A-30	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Existing Flood Velocity 10% AEP	
					Height Datum	AHD	Date Printed	30/06/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-30	JB								
REV	Description	Date	Approved								



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Velocity (m/s)

<= 0.5

0.5 - 1

1 - 1.5

1.5 - 2

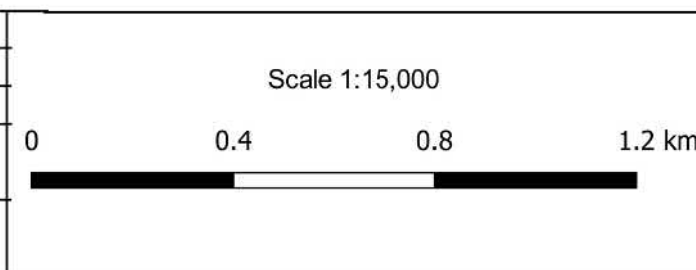
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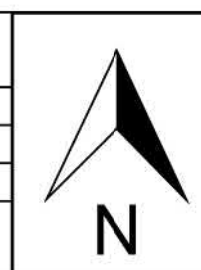
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Height Datum	AHD	Date Printed	30/06/2021



A-29 to A-30	
M12 Motorway Package 1 - West	
Existing Flood Velocity 10% AEP	
Appendix A	



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Velocity (m/s)

<= 0.5

0.5 - 1

1 - 1.5

1.5 - 2

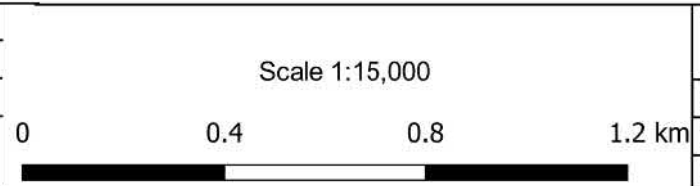
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DISCLAIMER:
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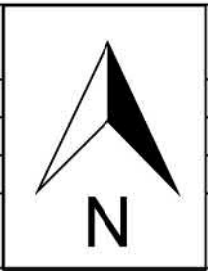
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STATUS			
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Height Datum	AHD	Date Printed	30/06/2021



A-31 to A-32	
M12 Motorway Package 1 - West	
Existing Flood Velocity 5% AEP	
Appendix A	



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Velocity (m/s)

<= 0.5

0.5 - 1

1 - 1.5

1.5 - 2

> 2

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	<div>STATUS</div> <div>100% Detailed Design</div>				<div></div> <div>N</div>	A-31 to A-32	
					Oringinal Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Existing Flood Velocity 5% AEP	
					Height Datum	AHD	Date Printed	30/06/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-30	JB								
REV	Description	Date	Approved								



LEGEND

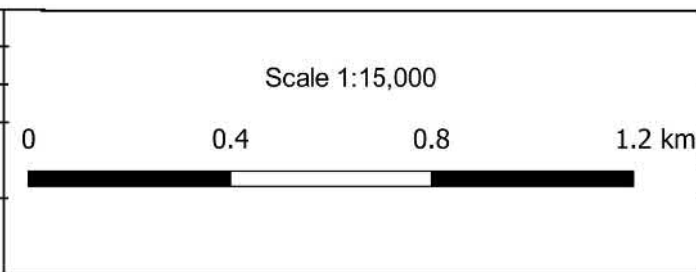
- Existing Culverts
- Existing Bridges
- Project Boundary**
 - WORKS BY OTHERS
 - M12 West
- Land Use (WSA, 2020)**
 - Western Sydney International Airport
 - Property Boundary_LotLPI_20181225_V03
- Flooding**
 - Water Level (mAHD)
- Velocity (m/s)**
 - <= 0.5
 - 0.5 - 1
 - 1 - 1.5
 - 1.5 - 2
 - > 2

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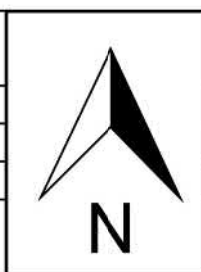
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STATUS			
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Height Datum	AHD	Date Printed	30/06/2021



A-33 to A-34
M12 Motorway Package 1 - West
Existing Flood Velocity 1% AEP
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Velocity (m/s)

<= 0.5

0.5 - 1

1 - 1.5

1.5 - 2

> 2

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design					A-33 to A-34	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Existing Flood Velocity 1% AEP	
					Height Datum	AHD	Date Printed	30/06/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-30	JB								
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LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Velocity (m/s)

<= 0.5

0.5 - 1

1 - 1.5

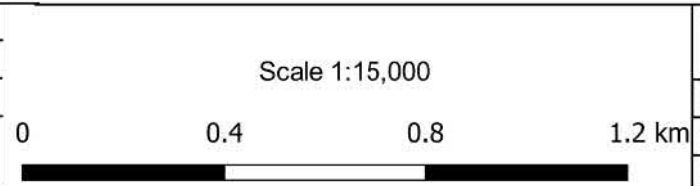
1.5 - 2

> 2

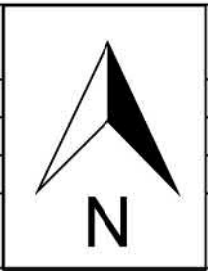
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A-35 to A-36	
M12 Motorway Package 1 - West	
Existing Flood Velocity PMF	
Appendix A	



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Flooding

Water Level (mAHD)

Velocity (m/s)

<= 0.5

0.5 - 1

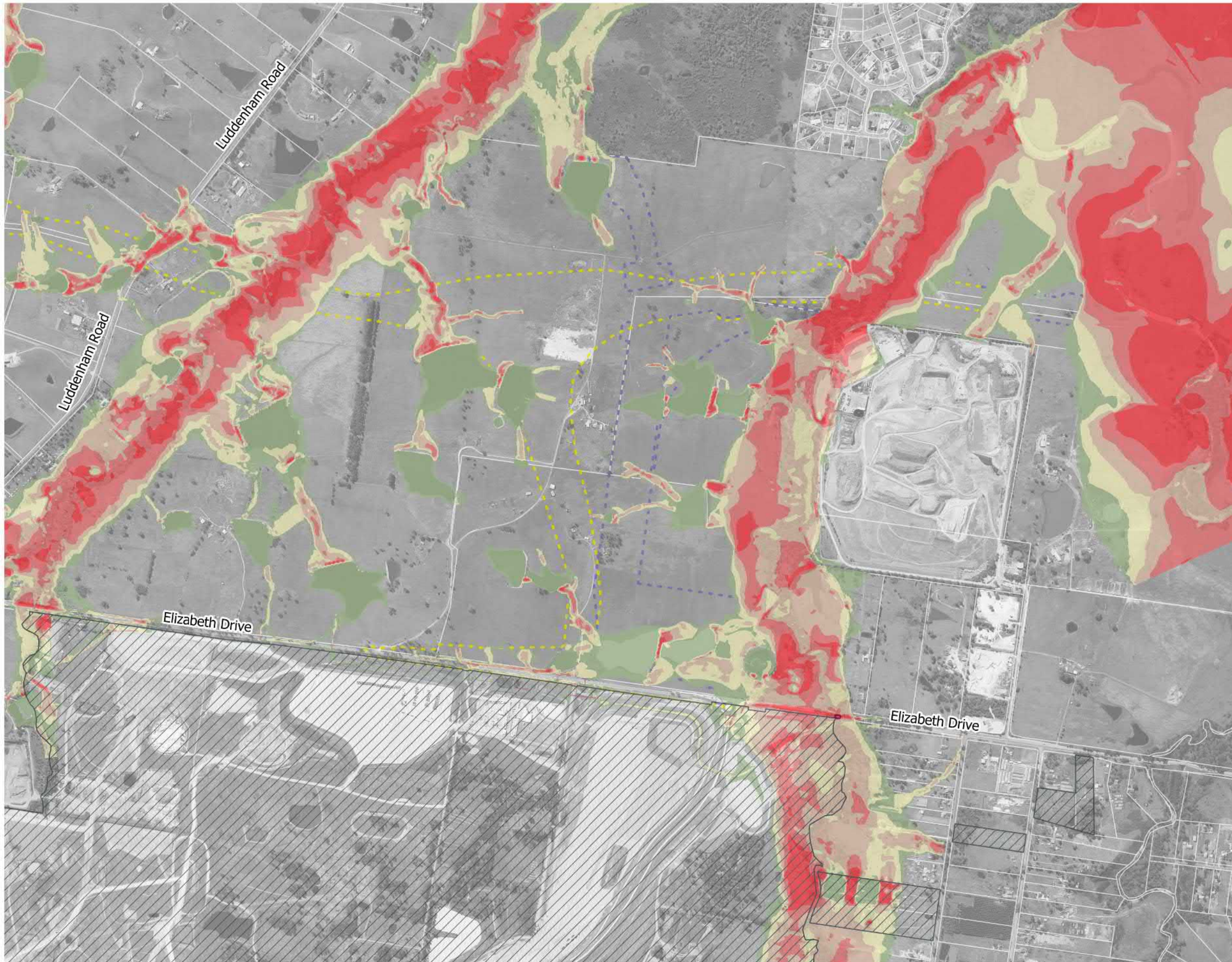
1 - 1.5

1.5 - 2

> 2

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					Coordinate System	MGA56	Designed	MY			
					Height Datum	AHD	Date Printed	30/06/2021		Existing Flood Velocity PMF	
										Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-30	JB								
REV	Description	Date	Approved								



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPi_20181225_V03

Hazard (ZAEM1)

H1

H2

H3

H4

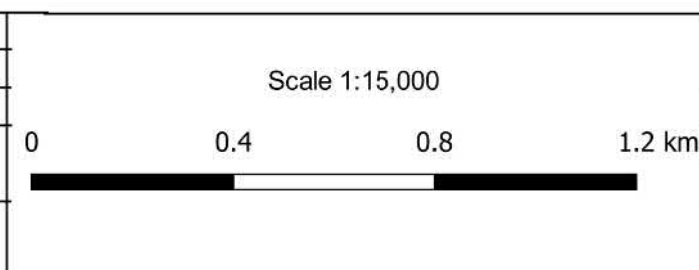
H5

H6

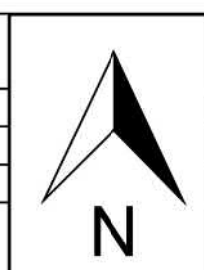
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A-37 to A-38
M12 Motorway Package 1 - West
Existing Flood Hazard 20% AEP
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LottLPi_20181225_V03

Hazard (ZAEM1)

H1

H2

H3

H4

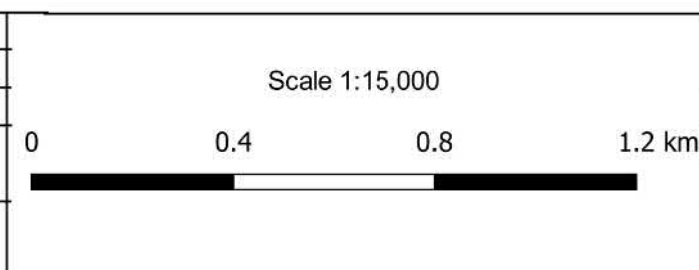
H5

H6

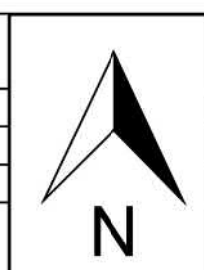
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A-37 to A-38
M12 Motorway Package 1 - West
Existing Flood Hazard 20% AEP
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Hazard (ZAEM1)

H1

H2

H3

H4

H5

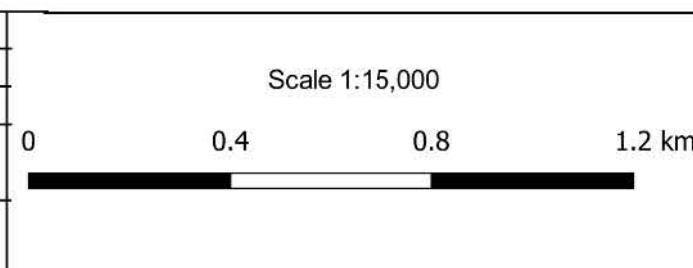
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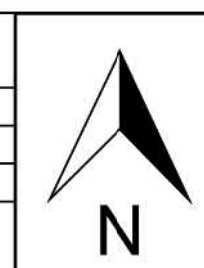
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A-39 to A-40
M12 Motorway Package 1 - West
Existing Flood Hazard 10% AEP
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Hazard (ZAEM1)

H1

H2

H3

H4

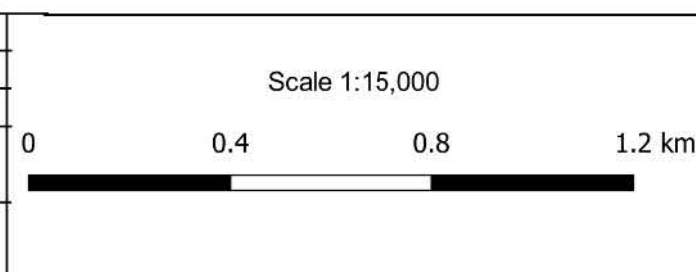
H5

H6

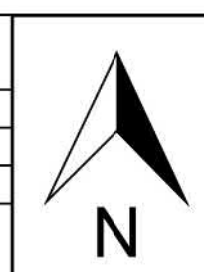
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A-39 to A-40
M12 Motorway Package 1 - West
Existing Flood Hazard 10% AEP
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Hazard (ZAEM1)

H1

H2

H3

H4

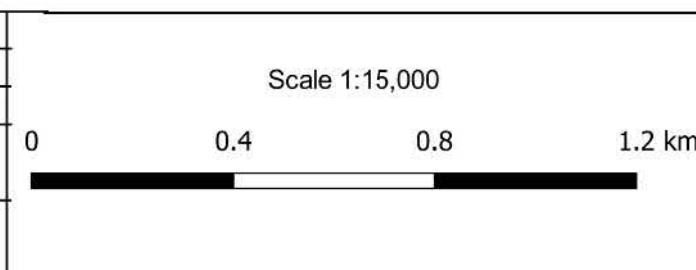
H5

H6

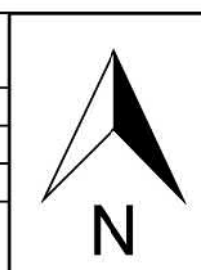
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STATUS			
100% Detailed Design			
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Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	30/06/2021



A-41 to A-42
M12 Motorway Package 1 - West
Existing Flood Hazard 5% AEP
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Hazard (ZAEM1)

H1

H2

H3

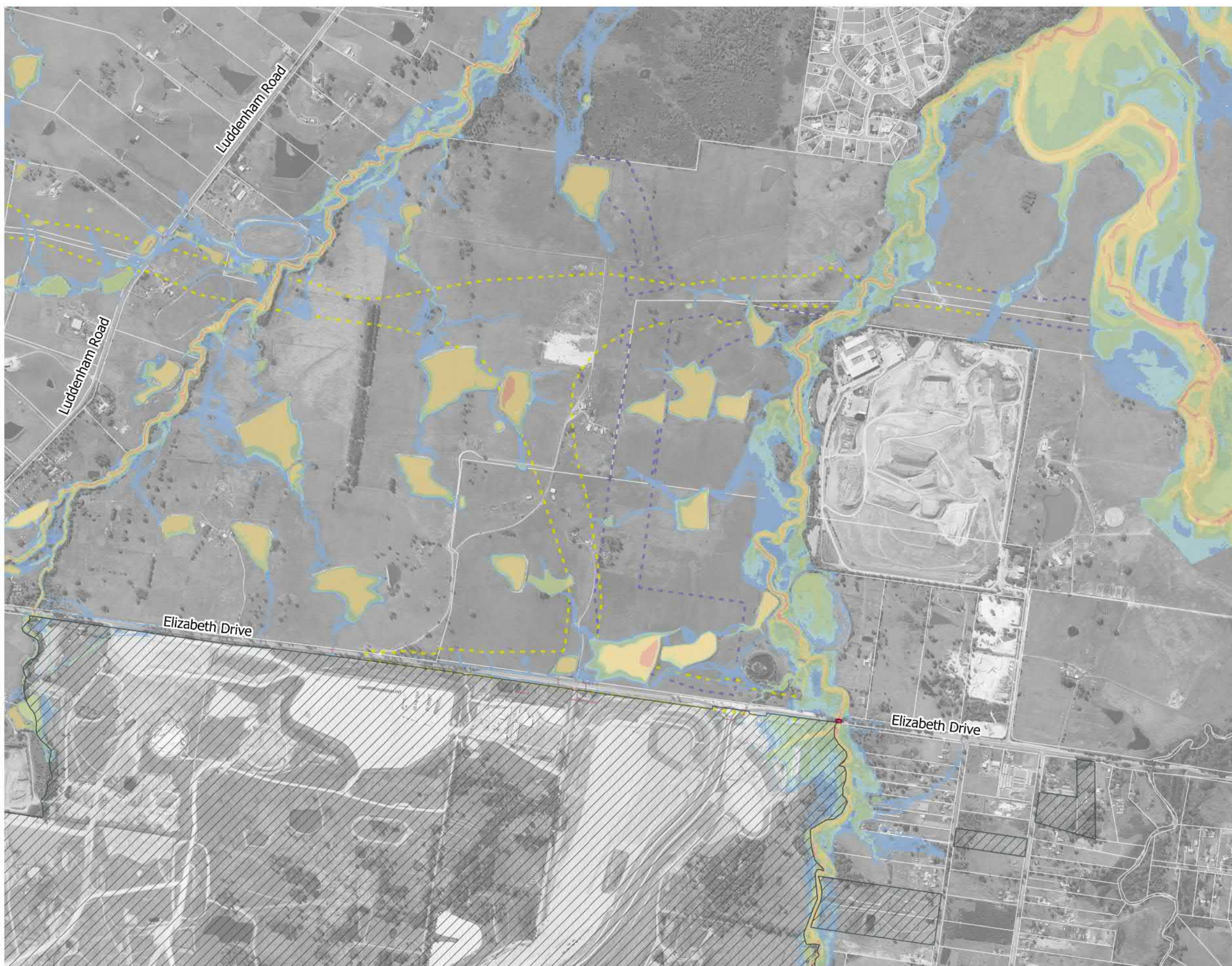
H4

H5

H6

DISCLAIMER:
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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	<div>STATUS</div> <div>100% Detailed Design</div>					A-41 to A-42	
					Oringinal Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY			
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-30	JB		Height Datum	AHD	Date Printed	30/06/2021		Existing Flood Hazard 5% AEP	
REV	Description	Date	Approved							Appendix A	



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Hazard (ZAEM1)

H1

H2

H3

H4

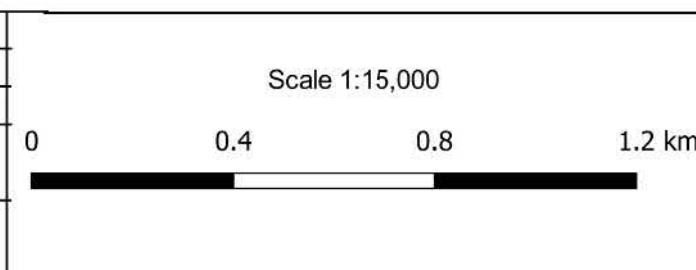
H5

H6

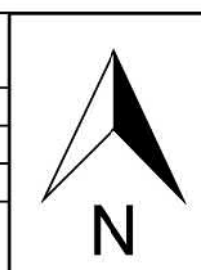
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A	ISSUED FOR 100% DETAILED DESIGN	2021-06-30	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	30/06/2021



A-43 to A-44
M12 Motorway Package 1 - West
Existing Flood Hazard 1% AEP
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Hazard (ZAEM1)

H1

H2

H3

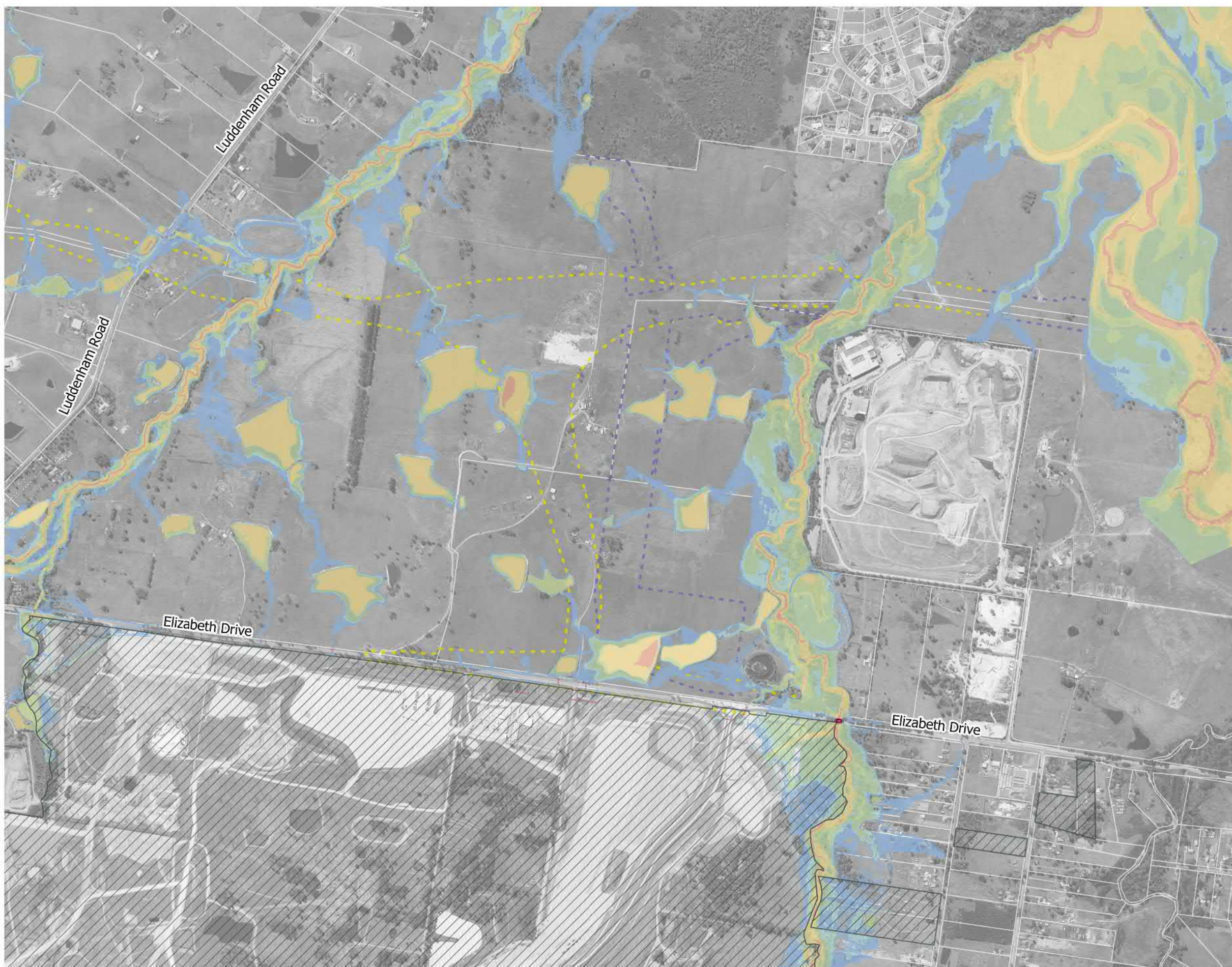
H4

H5

H6

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	<div>STATUS</div> <div>100% Detailed Design</div>					A-43 to A-44	
					Oringinal Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY			
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-30	JB		Height Datum	AHD	Date Printed	30/06/2021		Existing Flood Hazard 1% AEP	
REV	Description	Date	Approved							Appendix A	



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Hazard (ZAEM1)

H1

H2

H3

H4

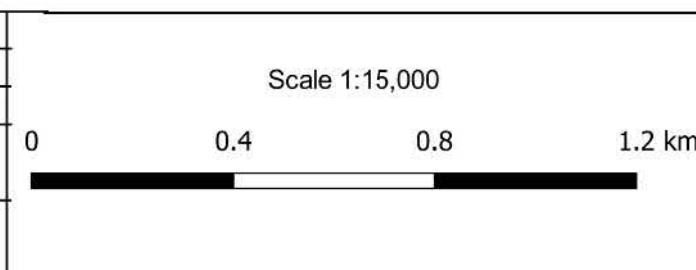
H5

H6

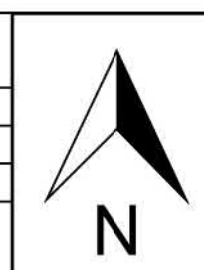
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REV	Description	Date	Approved



STATUS			
100% Detailed Design			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	30/06/2021



A-45 to A-46
M12 Motorway Package 1 - West
Existing Flood Hazard PMF
Appendix A



LEGEND

Existing Culverts

Existing Bridges

Project Boundary

WORKS BY OTHERS

M12 West

Land Use (WSA, 2020)

Western Sydney International Airport

Property Boundary_LotLPI_20181225_V03

Hazard (ZAEM1)

H1

H2

H3

H4

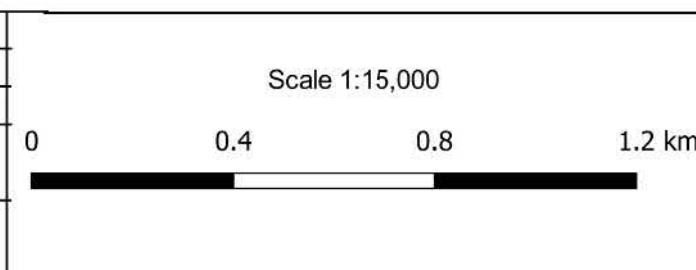
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H6

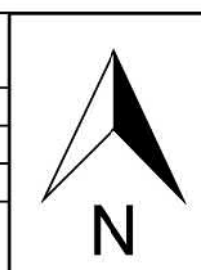
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REV	Description	Date	Approved



STATUS			
100% Detailed Design			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	30/06/2021



A-45 to A-46
M12 Motorway Package 1 - West
Existing Flood Hazard PMF
Appendix A



LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 Works by Others
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport
Afflux (m)

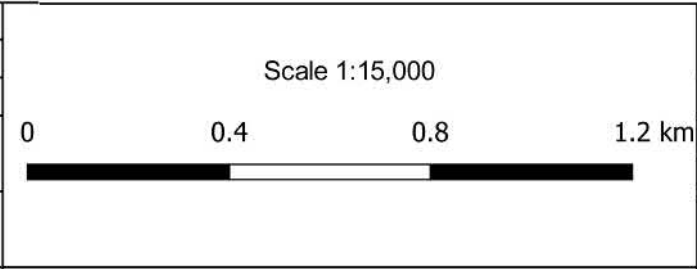
 No Longer Flooded
 Newly Flooded

DISCLAIMER:
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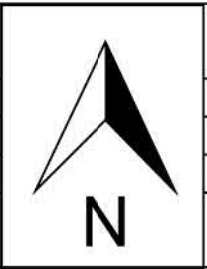
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A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-47 to A-48	
M12 Motorway Package 1 - West	
Afflux 20% AEP	
Appendix A	



LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 Works by Others
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary LotLPI_20181225_V03
 Transport
Afflux (m)

 No Longer Flooded
 Newly Flooded

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-47 to A-48	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Afflux 20% AEP	
					Height Datum	AHD	Date Printed	29/06/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB								
REV	Description	Date	Approved								



LEGEND

Design Bridges

Road Design

Design Culverts

Existing Culverts to be Retained

Design Miscellaneous Structures

Design Culverts - WORKS BY OTHERS

Farm Dam Infill (approx. extents)

Existing Bridges

Project Boundary

Works by Others

M12 West

Land Use (WSA, 2020) Enterprise unless noted:

Environment and Recreation

Western Sydney International Airport

Agribusiness

Property Boundary_LotLPI_20181225_V03

Transport

Afflux (m)

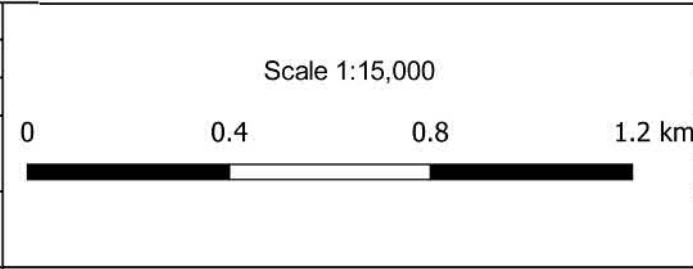
<= -.2
-0.2 - -0.02
-0.02 - -0.01
-0.01 - 0.01
0.01 - 0.02
0.02 - 0.05
0.05 - 0.1
0.1 - 0.2
0.2 - 0.3
0.3 - 0.5
> 0.5
No Longer Flooded
Newly Flooded

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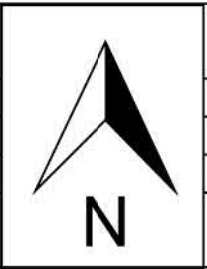
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STATUS			
100% Detailed Design Stage			
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Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-49 to A-50	
M12 Motorway Package 1 - West	
Afflux 10% AEP	
Appendix A	



LEGEND

Design Bridges

Road Design

Design Culverts

Existing Culverts to be Retained

Design Miscellaneous Structures

Design Culverts - WORKS BY OTHERS

Farm Dam Infill (approx. extents)

Existing Bridges

Project Boundary

Works by Others

M12 West

Land Use (WSA, 2020) Enterprise unless noted:

Environment and Recreation

Western Sydney International Airport

Agribusiness

Property Boundary_LotLPI_20181225_V03

Transport

Afflux (m)

<= -.2

-.2 - -.02

-.02 - -.01

-.01 - 0.01

0.01 - 0.02

0.02 - 0.05

0.05 - 0.1

0.1 - 0.2

0.2 - 0.3

0.3 - 0.5

> 0.5

No Longer Flooded

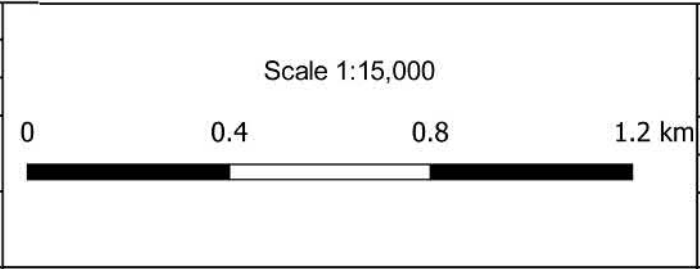
Newly Flooded

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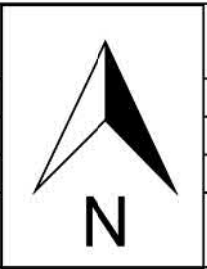
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STATUS			
100% Detailed Design Stage			
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Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-49 to A-50	
M12 Motorway Package 1 - West	
Afflux 10% AEP	
Appendix A	



LEGEND

Design Bridges

Road Design

Design Culverts**Project Boundary**Works by Others**Land Use (WSA, 2020) Enterprise unless noted:**Environment and Recreation**Afflux (m)** ≤ -0.2

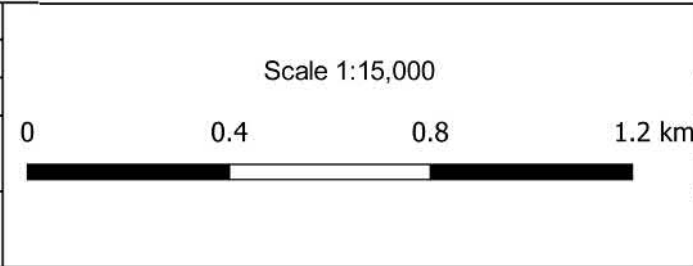
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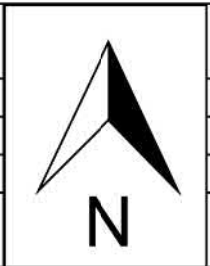
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REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-51 to A-52	
M12 Motorway Package 1 - West	
Afflux 5% AEP	
Appendix A	



LEGEND

- Design Bridges
- Road Design
- Design Culverts
- Existing Culverts to be Retained
- Design Miscellaneous Structures
- Design Culverts - WORKS BY OTHERS
- Farm Dam Infill (approx. extents)
- Existing Bridges

Project Boundary

- Works by Others
- M12 West

Land Use (WSA, 2020) Enterprise unless noted:

- Environment and Recreation
- Western Sydney International Airport
- Agribusiness
- Property Boundary_LotLPI_20181225_V03
- Transport

Afflux (m)

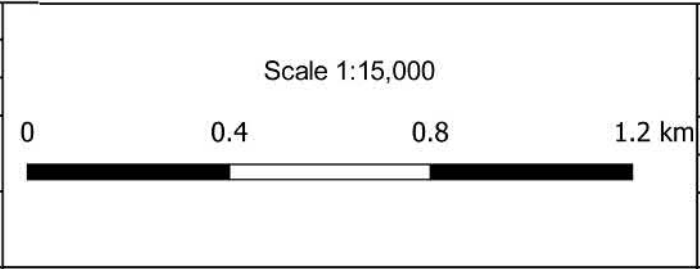
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- 0.2 - -0.02
- 0.02 - -0.01
- 0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- > 0.5
- No Longer Flooded
- Newly Flooded

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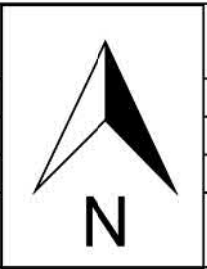
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STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-51 to A-52	
M12 Motorway Package 1 - West	
Afflux 5% AEP	
Appendix A	



LEGEND

Design Bridges

Road Design

Design Culverts

Existing Culverts to be Retained

Design Miscellaneous Structures

Design Culverts - WORKS BY OTHERS

Farm Dam Infill (approx. extents)

Existing Bridges

Project Boundary

Works by Others

M12 West

Land Use (WSA, 2020) Enterprise unless noted:

Environment and Recreation

Western Sydney International Airport

Agribusiness

Property Boundary_LotLPI_20181225_V03

Transport

Afflux (m)

<= -.2

-0.2 - -.02

-0.02 - -0.01

-0.01 - 0.01

0.01 - 0.02

0.02 - 0.05

0.05 - 0.1

0.1 - 0.2

0.2 - 0.3

0.3 - 0.5

> 0.5

No Longer Flooded

Newly Flooded

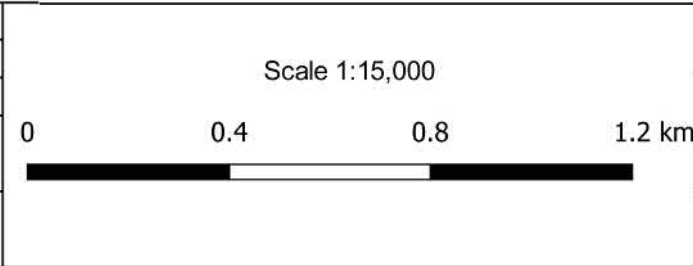
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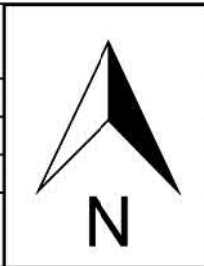
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STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-53 to A-54	
M12 Motorway Package 1 - West	
Afflux 1% AEP	
Appendix A	



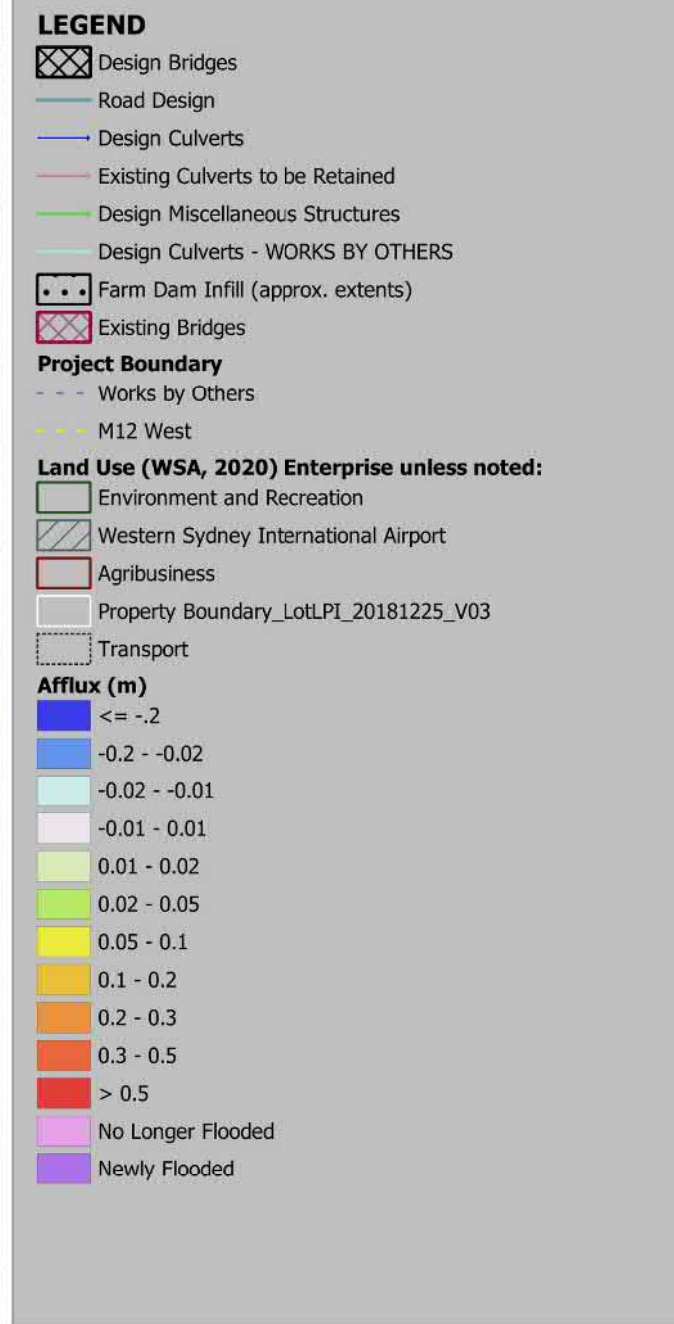
LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 Works by Others
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary LotLPI_20181225_V03
 Transport
Afflux (m)

 No Longer Flooded
 Newly Flooded

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					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY			
					Height Datum	AHD	Date Printed	29/06/2021		Afflux 1% AEP	
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB							Appendix A	
REV	Description	Date	Approved								

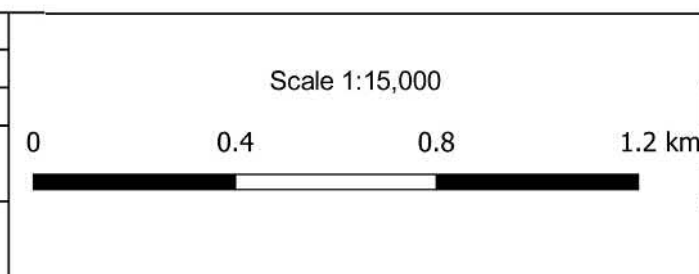


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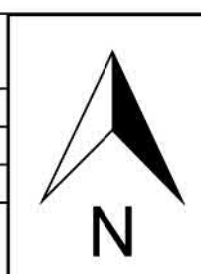
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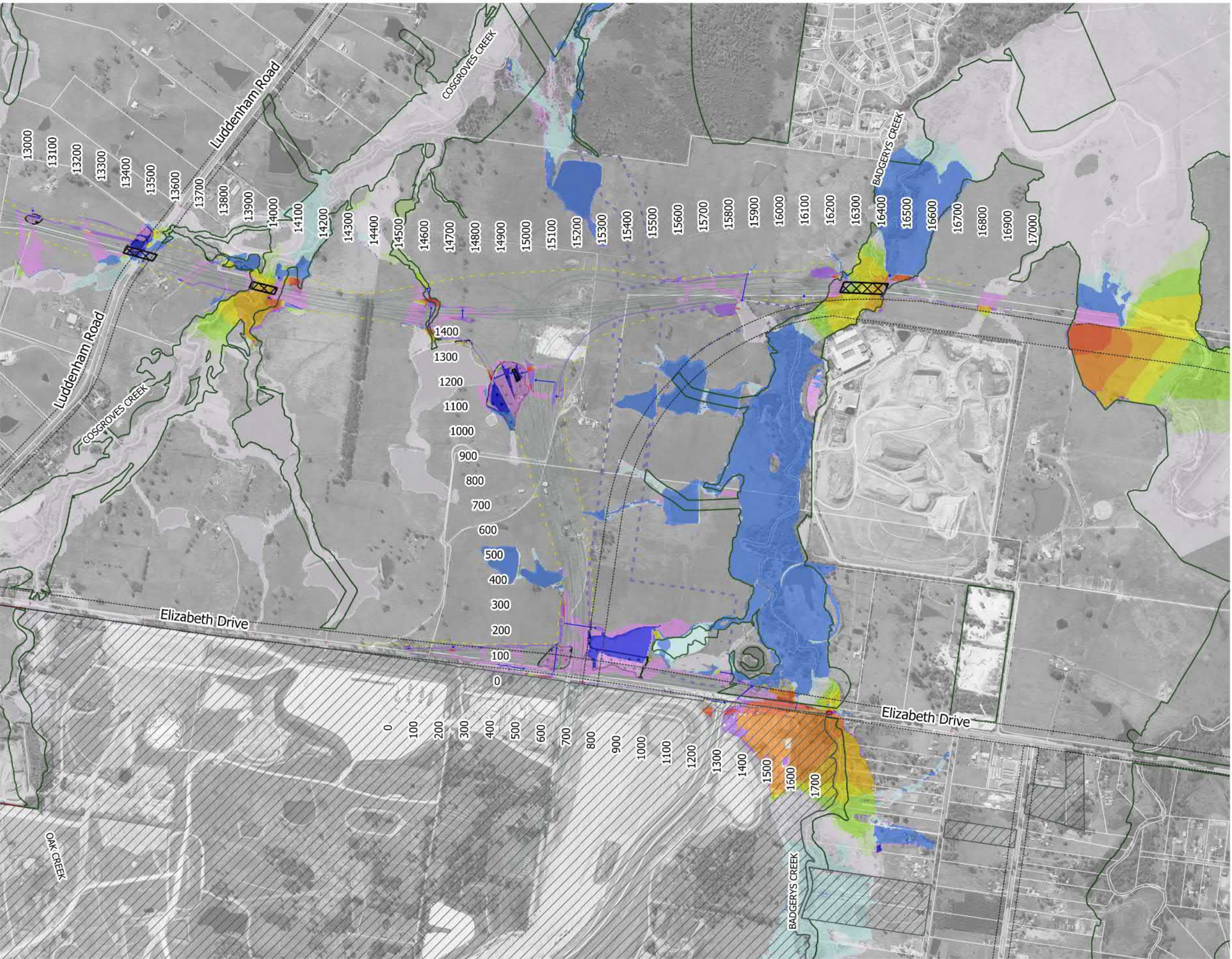
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-55 to A-56	
M12 Motorway Package 1 - West	
Afflux 0.05% AEP	
Appendix A	



LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 Works by Others
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary LotLPI_20181225_V03
 Transport
Afflux (m)

 No Longer Flooded
 Newly Flooded

DISCLAIMER:
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This map is not a design document.

				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-55 to A-56	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY			
					Height Datum	AHD	Date Printed	29/06/2021		Afflux 0.05% AEP	
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB							Appendix A	
REV	Description	Date	Approved								



LEGEND
 Design Bridges
 Road Design
 Design Culverts
 Existing Culverts to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges

Project Boundary
 Works by Others
 M12 West

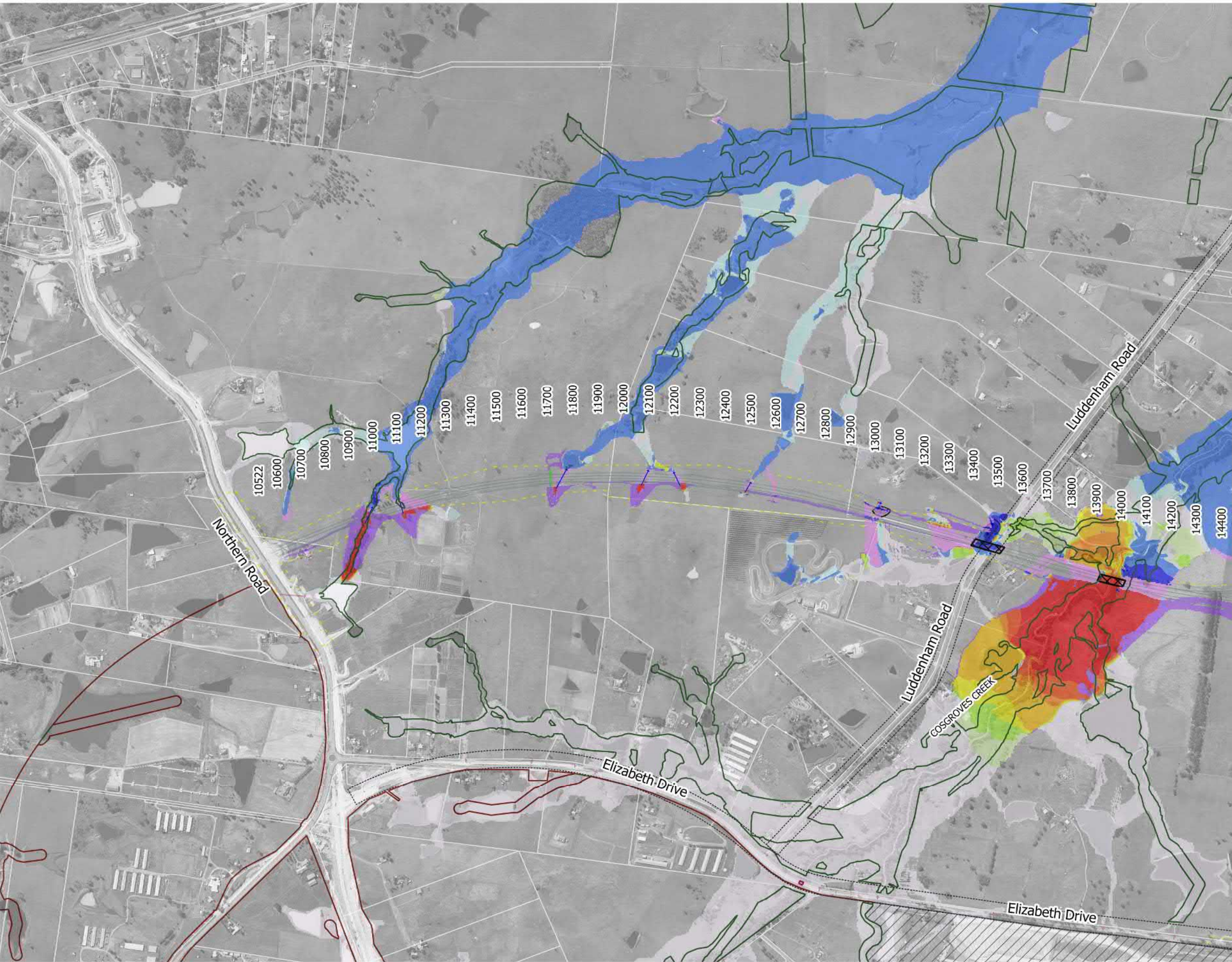
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport

Afflux (m)

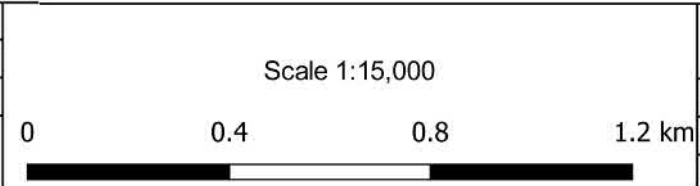
No Longer Flooded
Newly Flooded

DISCLAIMER:
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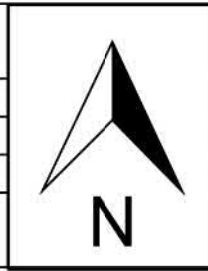
The digital Data included is for information only and will not match the drawings in all locations. Only information that has been formally issued in the form of a hard copy drawing with approved signatures may be relied upon for accuracy and conformity. Any Party seeking to use this data must first verify the accuracy and current status of the information in relation to the formally issued drawings. Any reliance placed on such information shall be at the sole risk of the user. Please verify the accuracy of all information prior to using it.
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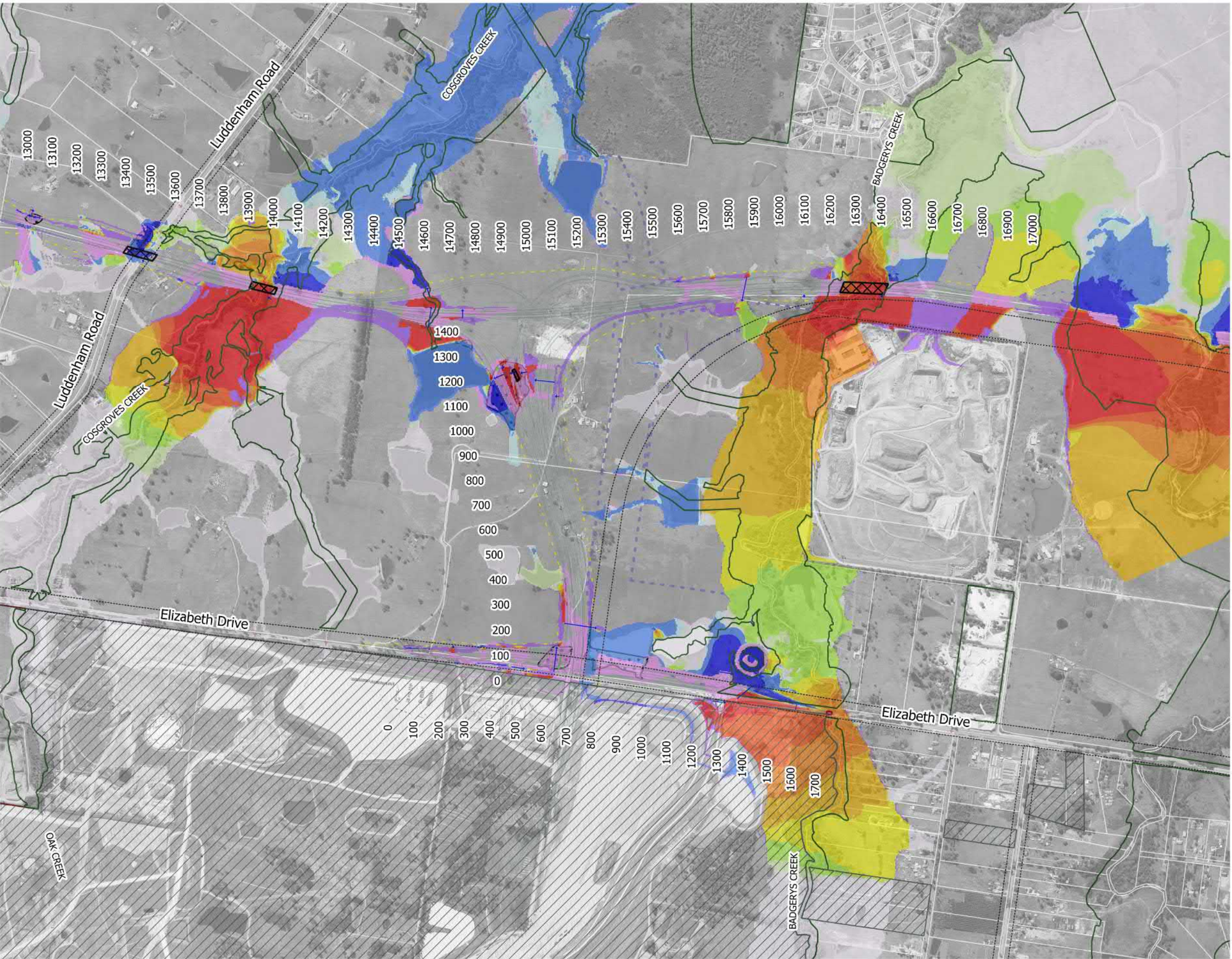
A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-57 to A-58	
M12 Motorway Package 1 - West	
Afflux PMF	
Appendix A	



LEGEND

- Design Bridges
- Road Design
- Design Culverts
- Existing Culverts to be Retained
- Design Miscellaneous Structures
- Design Culverts - WORKS BY OTHERS
- Farm Dam Infill (approx. extents)
- Existing Bridges

Project Boundary

- Works by Others
- M12 West

Land Use (WSA, 2020) Enterprise unless noted:

- Environment and Recreation
- Western Sydney International Airport
- Agribusiness
- Property Boundary_LotLPI_20181225_V03
- Transport

Afflux (m)

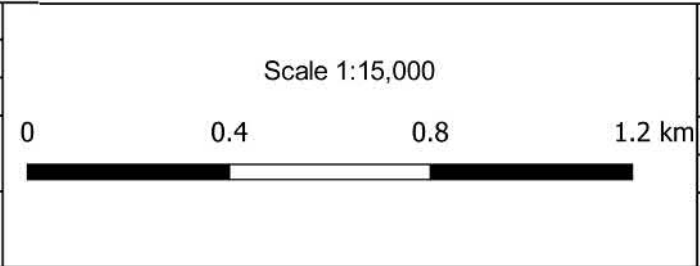
- <= -.2
- 0.2 - -0.02
- 0.02 - -0.01
- 0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- > 0.5
- No Longer Flooded
- Newly Flooded

DISCLAIMER:
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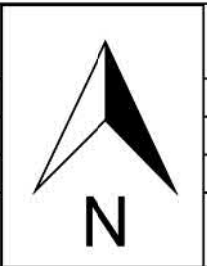
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A	ISSUED FOR 100% DETAILED DESIGN	2021-06-29	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	29/06/2021



A-57 to A-58	
M12 Motorway Package 1 - West	
Afflux PMF	
Appendix A	



LEGEND

- Design Bridges
- Road Design
- Design Culvert
- Existing Culvert to be Retained
- Design Miscellaneous Structures
- Design Culverts - WORKS BY OTHERS
- Farm Dam Infill (approx. extents)
- Existing Bridges

Project Boundary

- M12 Central and East - WORKS BY OTHERS
- M12 West

Land Use (WSA, 2020) Enterprise unless noted:

- Environment and Recreation
- Western Sydney International Airport
- Agribusiness
- Property Boundary_LotLPI_20181225_V03
- Transport

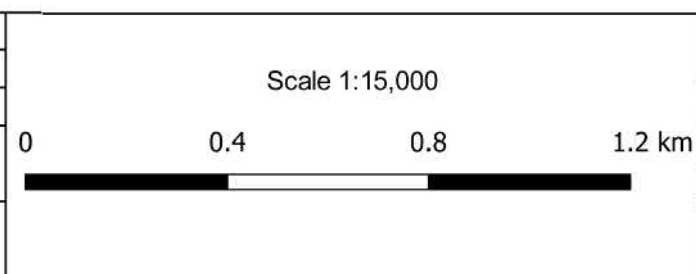
Change in Duration

- <= 1
- > 1
- No Longer Flooded
- Newly Flooded

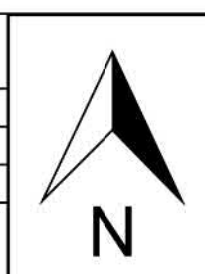
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A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021



A-59 to A60	
M12 Motorway Package 1 - West	
Change in Duration 10% AEP	
Appendix A	



LEGEND

- Design Bridges
- Road Design
- Design Culvert
- Existing Culvert to be Retained
- Design Miscellaneous Structures
- Design Culverts - WORKS BY OTHERS
- Farm Dam Infill (approx. extents)
- Existing Bridges

Project Boundary

- M12 Central and East - WORKS BY OTHERS
- M12 West

Land Use (WSA, 2020) Enterprise unless noted:

- Environment and Recreation
- Western Sydney International Airport
- Agribusiness
- Property Boundary_LotLPI_20181225_V03
- Transport

Change in Duration

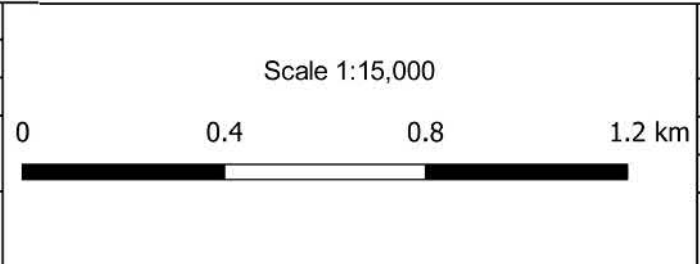
- <= 1
- > 1
- No Longer Flooded
- Newly Flooded

DISCLAIMER:
While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, this map contains data from a number of sources - no warranty is given that the information contained on this is free from error or omission.

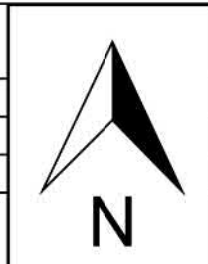
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A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021



A-59 to A60	
M12 Motorway Package 1 - West	
Change in Duration 10% AEP	
Appendix A	



LEGEND

- Design Bridges
- Road Design
- Design Culvert
- Existing Culvert to be Retained
- Design Miscellaneous Structures
- Design Culverts - WORKS BY OTHERS

Farm Dam Infill (approx. extents)

Existing Bridges

Project Boundary

- M12 Central and East - WORKS BY OTHERS
- M12 West

Land Use (WSA, 2020) Enterprise unless noted:

- Environment and Recreation
- Western Sydney International Airport
- Agribusiness
- Property Boundary_LotLPI_20181225_V03
- Transport

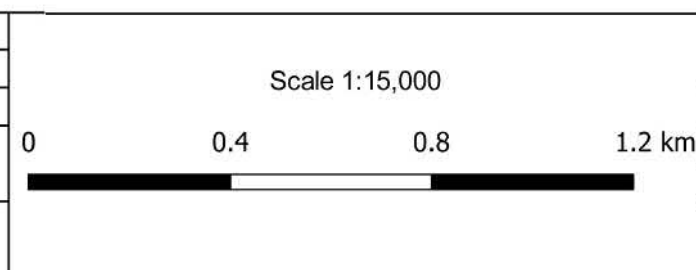
Change in Duration

- <= 1
- > 1
- No Longer Flooded
- Newly Flooded

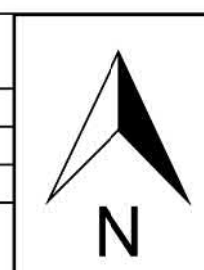
DISCLAIMER:
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A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021



A-61 to A-62	
M12 Motorway Package 1 - West	
Change in Duration 1% AEP	
Appendix A	



LEGEND

- Design Bridges
- Road Design
- Design Culvert
- Existing Culvert to be Retained
- Design Miscellaneous Structures
- Design Culverts - WORKS BY OTHERS
- Farm Dam Infill (approx. extents)
- Existing Bridges

Project Boundary

- M12 Central and East - WORKS BY OTHERS
- M12 West

Land Use (WSA, 2020) Enterprise unless noted:

- Environment and Recreation
- Western Sydney International Airport
- Agribusiness
- Property Boundary_LotLPI_20181225_V03
- Transport

Change in Duration

- <= 1
- > 1
- No Longer Flooded
- Newly Flooded

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div> <div><div></div></div>	<div>STATUS</div> <div>100% Detailed Design Stage</div>				<div><div></div></div> <div>N</div>	A-61 to A-62	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY			
					Height Datum	AHD	Date Printed	02/07/2021		Change in Duration 1% AEP	
										Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB								
REV	Description	Date	Approved								



LEGEND

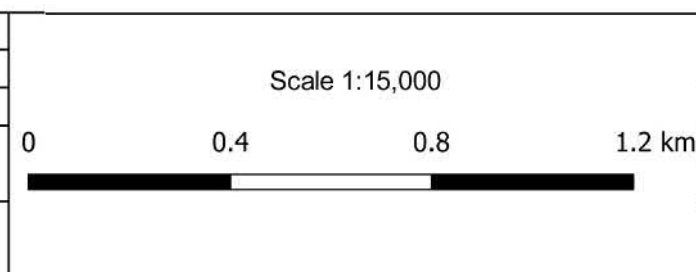
- Design Bridges
- Road Design
- Design Culvert
- Existing Culvert to be Retained
- Design Miscellaneous Structures
- Design Culverts - WORKS BY OTHERS
- Farm Dam Infill (approx. extents)
- Existing Bridges
- Project Boundary**
 - M12 Central and East - WORKS BY OTHERS
 - M12 West
- Land Use (WSA, 2020) Enterprise unless noted:**
 - Environment and Recreation
 - Western Sydney International Airport
 - Agribusiness
 - Property Boundary_LotLPI_20181225_V03
 - Transport
- Changes in Velocity**
 - <= -10%
 - 10 - 10%
 - > 10%
- Velocity at Newly Flooded Areas**
 - <= 0.5
 - 0.5 - 1
 - 1 - 1.5
 - 1.5 - 2
 - > 2
 - No Longer Flooded
 - Newly Flooded

DISCLAIMER:
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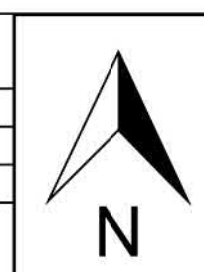
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A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021



A-63 to A-64	
M12 Motorway Package 1 - West	
Change in Velocity 20% AEP	
Appendix A	



LEGEND
 Design Bridges
 Road Design
 Design Culvert
 Existing Culvert to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges

Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West

Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport

Changes in Velocity
 <= -10%
 -10 - 10%
 > 10%

Velocity at Newly Flooded Areas
 <= 0.5
 0.5 - 1
 1 - 1.5
 1.5 - 2
 > 2
 No Longer Flooded
 Newly Flooded

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-63 to A-64	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Change in Velocity 20% AEP	
					Height Datum	AHD	Date Printed	02/07/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB								
REV	Description	Date	Approved								



LEGEND

Design Bridges

Road Design

Design Culvert

Existing Culvert to be Retained

Design Miscellaneous Structures

Design Culverts - WORKS BY OTHERS

Farm Dam Infill (approx. extents)

Existing Bridges

Project Boundary

M12 Central and East - WORKS BY OTHERS

M12 West

Land Use (WSA, 2020) Enterprise unless noted:

Environment and Recreation

Western Sydney International Airport

Agribusiness

Property Boundary LotLPI_20181225_V03

Transport

Changes in Velocity

<= -10%

-10 - 10%

> 10%

Velocity at Newly Flooded Areas

<= 0.5

0.5 - 1

1 - 1.5

1.5 - 2

> 2

No Longer Flooded

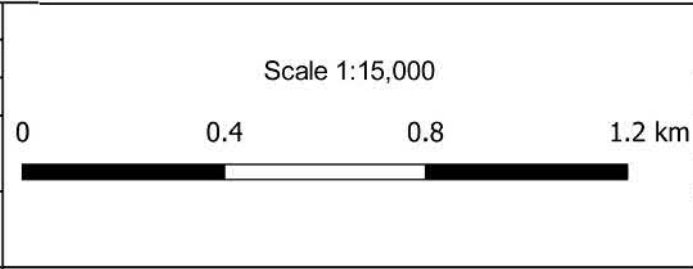
Newly Flooded

DISCLAIMER:
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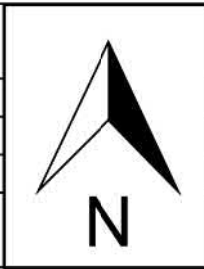
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A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021



A-65 to A-66	
M12 Motorway Package 1 - West	
Change in Velocity 10% AEP	
Appendix A	



LEGEND
 Design Bridges
 Road Design
 Design Culvert
 Existing Culvert to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary LotLPI_20181225_V03
 Transport
Changes in Velocity
 <= -10%
 -10 - 10%
 > 10%
Velocity at Newly Flooded Areas
 <= 0.5
 0.5 - 1
 1 - 1.5
 1.5 - 2
 > 2
 No Longer Flooded
 Newly Flooded

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-65 to A-66	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Change in Velocity 10% AEP	
					Height Datum	AHD	Date Printed	02/07/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB								
REV	Description	Date	Approved								



LEGEND

Design Bridges

Road Design

Design Culvert

Existing Culvert to be Retained

Design Miscellaneous Structures

Design Culverts - WORKS BY OTHERS

Farm Dam Infill (approx. extents)

Existing Bridges

Project Boundary

M12 Central and East - WORKS BY OTHERS

M12 West

Land Use (WSA, 2020) Enterprise unless noted:

Environment and Recreation

Western Sydney International Airport

Agribusiness

Property Boundary_LotLPI_20181225_V03

Transport

Changes in Velocity

<= -10%

-10 - 10%

> 10%

Velocity at Newly Flooded Areas

<= 0.5

0.5 - 1

1 - 1.5

1.5 - 2

> 2

No Longer Flooded

Newly Flooded

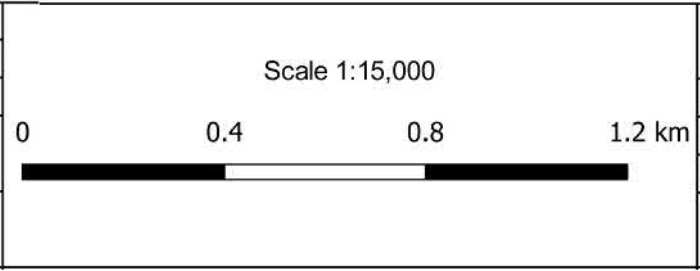
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A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021



A-67 to A-68	
M12 Motorway Package 1 - West	
Change in Velocity 5% AEP	
Appendix A	



LEGEND

Design Bridges

Road Design

Design Culvert**Project Boundary**M12 Central and East - WORKS BY OTHERS**Land Use (WSA, 2020) Enterprise unless noted:**Environment and Recreation**Changes in Velocity**<= -10%**Velocity at Newly Flooded Areas**<= 0.5

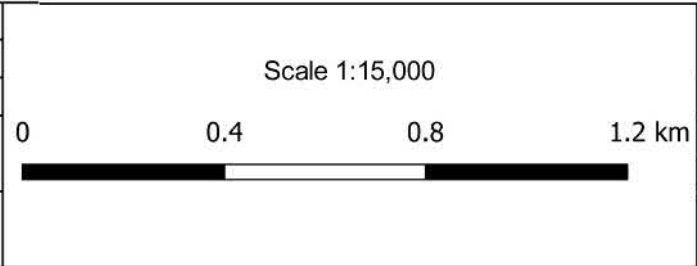
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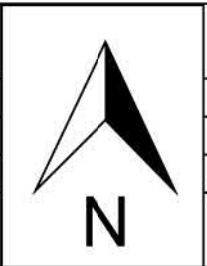
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A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021



A-67 to A-68	
M12 Motorway Package 1 - West	
Change in Velocity 5% AEP	
Appendix A	



LEGEND

Design Bridges

Road Design

Design Culvert

Existing Culvert to be Retained

Design Miscellaneous Structures

Design Culverts - WORKS BY OTHERS

Farm Dam Infill (approx. extents)

Existing Bridges

Project Boundary

M12 Central and East - WORKS BY OTHERS

M12 West

Land Use (WSA, 2020) Enterprise unless noted:

Environment and Recreation

Western Sydney International Airport

Agribusiness

Property Boundary_LotLPI_20181225_V03

Transport

Changes in Velocity

<= -10%

-10 - 10%

> 10%

Velocity at Newly Flooded Areas

<= 0.5

0.5 - 1

1 - 1.5

1.5 - 2

> 2

No Longer Flooded

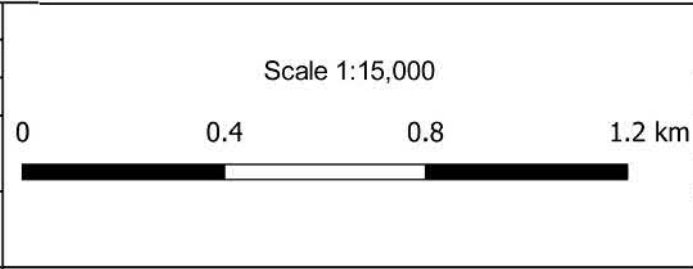
Newly Flooded

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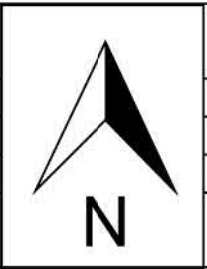
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REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021



A-69 to A-70	
M12 Motorway Package 1 - West	
Change in Velocity 1% AEP	
Appendix A	



LEGEND
 Design Bridges
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 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
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Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport
Changes in Velocity
 <= -10%
 -10 - 10%
 > 10%
Velocity at Newly Flooded Areas
 <= 0.5
 0.5 - 1
 1 - 1.5
 1.5 - 2
 > 2
 No Longer Flooded
 Newly Flooded

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-69 to A-70	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Change in Velocity 1% AEP	
					Height Datum	AHD	Date Printed	02/07/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB								
REV	Description	Date	Approved								



LEGEND

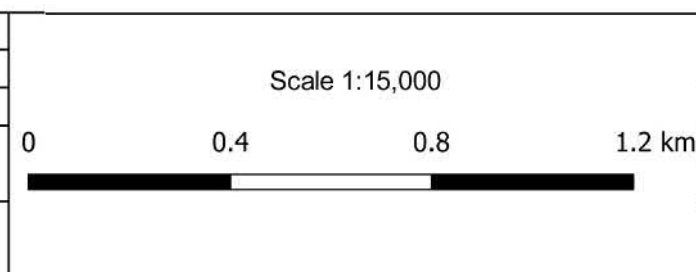
- Design Bridges
- Road Design
- Design Culvert
- Existing Culvert to be Retained
- Design Miscellaneous Structures
- Design Culverts - WORKS BY OTHERS
- Farm Dam Infill (approx. extents)
- Existing Bridges
- Project Boundary**
 - M12 Central and East - WORKS BY OTHERS
 - M12 West
- Land Use (WSA, 2020) Enterprise unless noted:**
 - Environment and Recreation
 - Western Sydney International Airport
 - Agribusiness
 - Property Boundary_LotLPI_20181225_V03
 - Transport
- Changes in Velocity**
 - <= -10%
 - 10 - 10%
 - > 10%
- Velocity at Newly Flooded Areas**
 - <= 0.5
 - 0.5 - 1
 - 1 - 1.5
 - 1.5 - 2
 - > 2
 - No Longer Flooded
 - Newly Flooded

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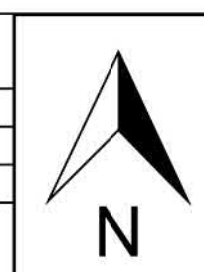
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STATUS			
100% Detailed Design Stage			
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Height Datum	AHD	Date Printed	02/07/2021



A-71 to A-72	
M12 Motorway Package 1 - West	
Change in Velocity PMF	
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LEGEND
 Design Bridges
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 Existing Bridges

Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West

Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport

Changes in Velocity
 <= -10%
 -10 - 10%
 > 10%

Velocity at Newly Flooded Areas
 <= 0.5
 0.5 - 1
 1 - 1.5
 1.5 - 2
 > 2
 No Longer Flooded
 Newly Flooded

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-71 to A-72	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Change in Velocity PMF	
					Height Datum	AHD	Date Printed	02/07/2021		Appendix A	
A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB								
REV	Description	Date	Approved								



LEGEND

Design Bridges

Road Design

Design Culvert

Existing Culvert to be Retained

Design Miscellaneous Structures

Design Culverts - WORKS BY OTHERS

Farm Dam Infill (approx. extents)

Existing Bridges

Project Boundary

M12 Central and East - WORKS BY OTHERS

M12 West

Land Use (WSA, 2020) Enterprise unless noted:

Environment and Recreation

Western Sydney International Airport

Agribusiness

Property Boundary_LotLPI_20181225_V03

Transport

Change in Flood Hazard (ZAEM1)

No Significant Change

Significant Increase to H3

Significant Increase to H4

Significant Increase to H5

Significant Increase to H6

Decrease

Newly Flooded Hazard (ZAEM1)

H1

H2

H3

H4

H5

H6

No Longer Flooded

Newly Flooded

DISCLAIMER:
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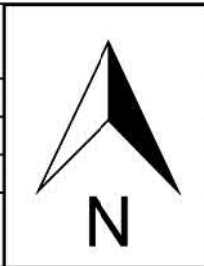
0

0.4

0.8

1.2 km

STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021



A-73 to A-74	
M12 Motorway Package 1 - West	
Change in Hazard 20% AEP	
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 Farm Dam Infill (approx. extents)
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Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport
Change in Flood Hazard (ZAEM1)
 No Significant Change
 Significant Increase to H3
 Significant Increase to H4
 Significant Increase to H5
 Significant Increase to H6
 Decrease
Newly Flooded Hazard (ZAEM1)
 H1
 H2
 H3
 H4
 H5
 H6
 No Longer Flooded
 Newly Flooded

DISCLAIMER:
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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-73 to A-74	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Change in Hazard 20% AEP	
					Height Datum	AHD	Date Printed	02/07/2021		Appendix A	
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LEGEND

Design Bridges

Road Design

Design Culvert

Existing Culvert to be Retained

Design Miscellaneous Structures

Design Culverts - WORKS BY OTHERS

Farm Dam Infill (approx. extents)

Existing Bridges

Project Boundary

M12 Central and East - WORKS BY OTHERS

M12 West

Land Use (WSA, 2020) Enterprise unless noted:

Environment and Recreation

Western Sydney International Airport

Agribusiness

Property Boundary_LotLPI_20181225_V03

Transport

Change in Flood Hazard (ZAEM1)

No Significant Change

Significant Increase to H3

Significant Increase to H4

Significant Increase to H5

Significant Increase to H6

Decrease

Newly Flooded Hazard (ZAEM1)

H1

H2

H3

H4

H5

H6

No Longer Flooded

Newly Flooded

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REV	Description	Date	Approved

Scale 1:15,000

0

0.4

0.8

1.2 km

STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021

A-75 to A-76	
M12 Motorway Package 1 - West	
Change in Hazard 10% AEP	
Appendix A	



LEGEND

Design Bridges

Road Design

Design Culvert

Existing Culvert to be Retained

Design Miscellaneous Structures

Design Culverts - WORKS BY OTHERS

Farm Dam Infill (approx. extents)

Existing Bridges

Project Boundary

M12 Central and East - WORKS BY OTHERS

M12 West

Land Use (WSA, 2020) Enterprise unless noted:

Environment and Recreation

Western Sydney International Airport

Agribusiness

Property Boundary_LotLPI_20181225_V03

Transport

Change in Flood Hazard (ZAEM1)

No Significant Change

Significant Increase to H3

Significant Increase to H4

Significant Increase to H5

Significant Increase to H6

Decrease

Newly Flooded Hazard (ZAEM1)

H1

H2

H3

H4

H5

H6

No Longer Flooded

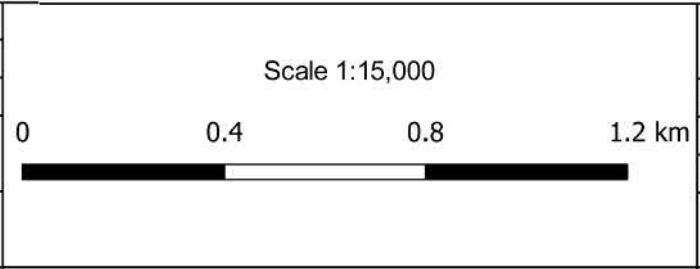
Newly Flooded

DISCLAIMER:
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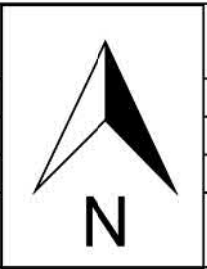
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Height Datum	AHD	Date Printed	02/07/2021



A-75 to A-76	
M12 Motorway Package 1 - West	
Change in Hazard 10% AEP	
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LEGEND

Design Bridges

Road Design

Design Culvert

Existing Culvert to be Retained

Design Miscellaneous Structures

Design Culverts - WORKS BY OTHERS

Farm Dam Infill (approx. extents)

Existing Bridges

Project Boundary

M12 Central and East - WORKS BY OTHERS

M12 West

Land Use (WSA, 2020) Enterprise unless noted:

Environment and Recreation

Western Sydney International Airport

Agribusiness

Property Boundary_LotLPI_20181225_V03

Transport

Change in Flood Hazard (ZAEM1)

No Significant Change

Significant Increase to H3

Significant Increase to H4

Significant Increase to H5

Significant Increase to H6

Decrease

Newly Flooded Hazard (ZAEM1)

H1

H2

H3

H4

H5

H6

No Longer Flooded

Newly Flooded

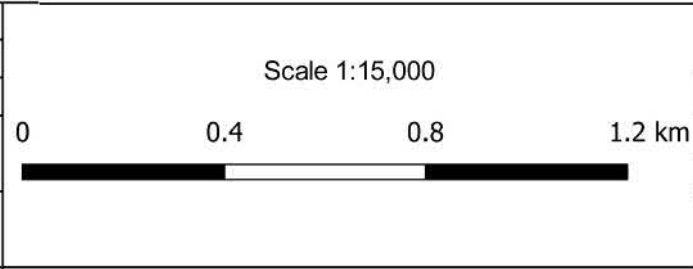
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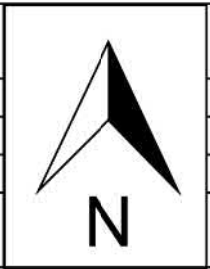
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STATUS			
100% Detailed Design Stage			
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A-77 to A-78	
M12 Motorway Package 1 - West	
Change in Hazard 5% AEP	
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LEGEND

Design Bridges

Road Design

Design Culvert

Existing Culvert to be Retained

Design Miscellaneous Structures

Design Culverts - WORKS BY OTHERS

Farm Dam Infill (approx. extents)

Existing Bridges

Project Boundary

M12 Central and East - WORKS BY OTHERS

M12 West

Land Use (WSA, 2020) Enterprise unless noted:

Environment and Recreation

Western Sydney International Airport

Agribusiness

Property Boundary_LotLPI_20181225_V03

Transport

Change in Flood Hazard (ZAEM1)

No Significant Change

Significant Increase to H3

Significant Increase to H4

Significant Increase to H5

Significant Increase to H6

Decrease

Newly Flooded Hazard (ZAEM1)

H1

H2

H3

H4

H5

H6

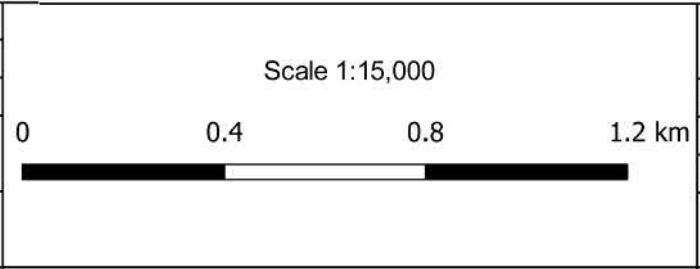
No Longer Flooded

Newly Flooded

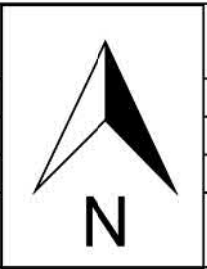
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A-77 to A-78	
M12 Motorway Package 1 - West	
Change in Hazard 5% AEP	
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 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges

Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West

Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary LotLPI_20181225_V03
 Transport

Change in Flood Hazard (ZAEM1)
 No Significant Change
 Significant Increase to H3
 Significant Increase to H4
 Significant Increase to H5
 Significant Increase to H6
 Decrease

Newly Flooded Hazard (ZAEM1)
 H1
 H2
 H3
 H4
 H5
 H6
 No Longer Flooded
 Newly Flooded

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-79 to A-80	
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					Coordinate System	MGA56	Designed	MY		Change in Hazard 1% AEP	
					Height Datum	AHD	Date Printed	02/07/2021		Appendix A	
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REV	Description	Date	Approved								



LEGEND

- Design Bridges
- Road Design
- Design Culvert
- Existing Culvert to be Retained
- Design Miscellaneous Structures
- Design Culverts - WORKS BY OTHERS
- Farm Dam Infill (approx. extents)
- Existing Bridges

Project Boundary

- M12 Central and East - WORKS BY OTHERS
- M12 West

Land Use (WSA, 2020) Enterprise unless noted:

- Environment and Recreation
- Western Sydney International Airport
- Agribusiness
- Property Boundary_LotLPI_20181225_V03
- Transport

Change in Flood Hazard (ZAEM1)

- No Significant Change
- Significant Increase to H3
- Significant Increase to H4
- Significant Increase to H5
- Significant Increase to H6
- Decrease

Newly Flooded Hazard (ZAEM1)

- H1
- H2
- H3
- H4
- H5
- H6
- No Longer Flooded
- Newly Flooded

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				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-79 to A-80	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Change in Hazard 1% AEP	
					Height Datum	AHD	Date Printed	02/07/2021		Appendix A	
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REV	Description	Date	Approved								



LEGEND

Design Bridges

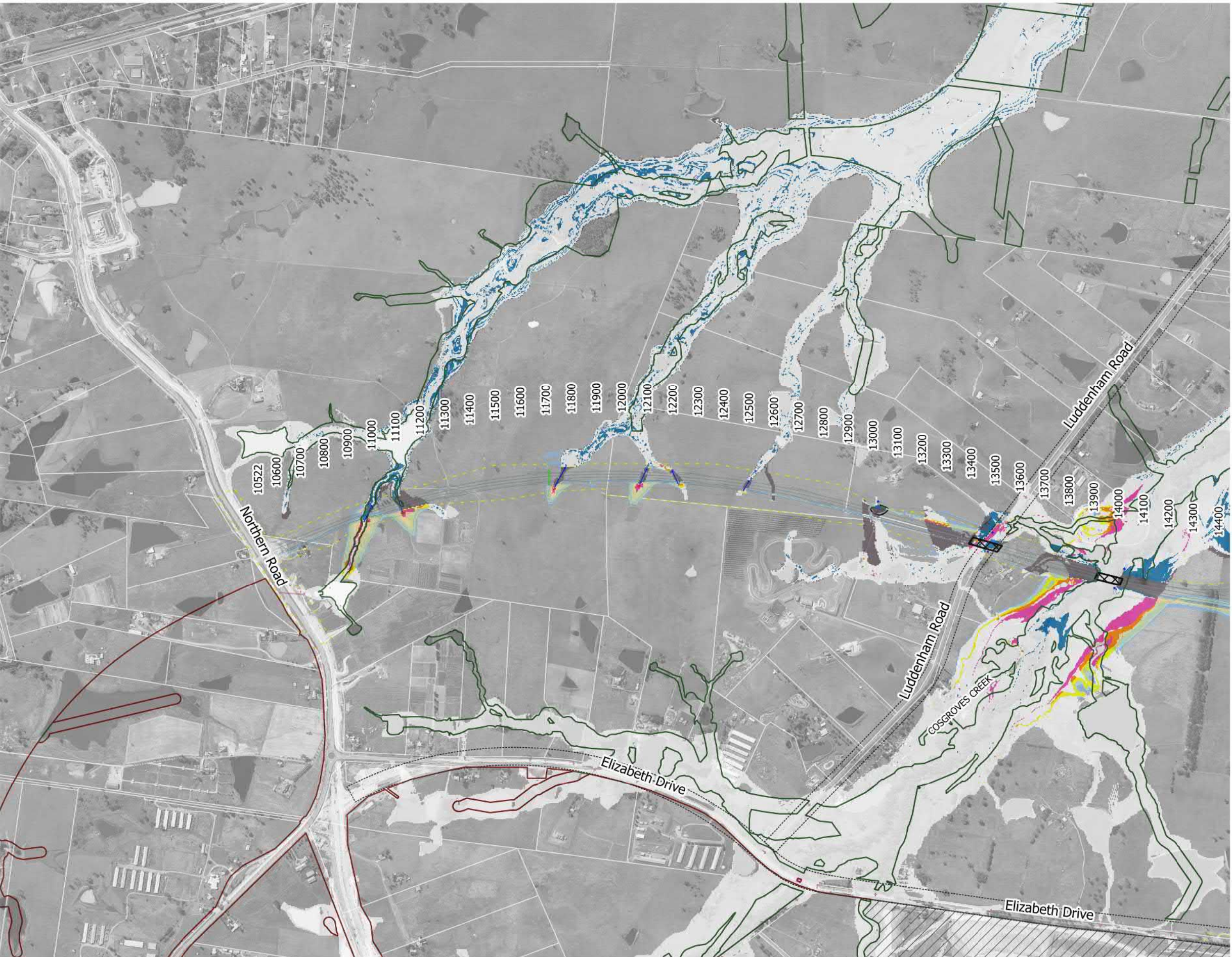
Road Design

Design Culvert**Project Boundary**M12 Central and East - WORKS BY OTHERS**Land Use (WSA, 2020) Enterprise unless noted:**Environment and Recreation**Change in Flood Hazard (ZAEM1)**No Significant Change**Newly Flooded Hazard (ZAEM1)**H1

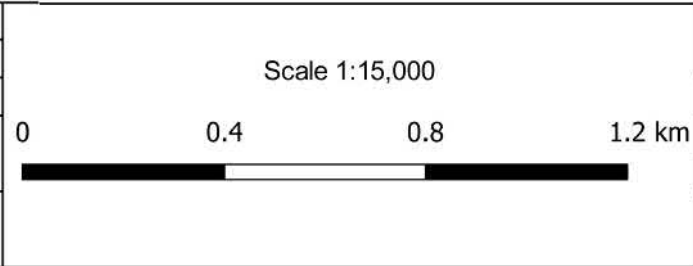
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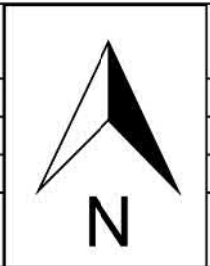
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STATUS			
100% Detailed Design Stage			
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Height Datum	AHD	Date Printed	02/07/2021



A-81 to A-82	
M12 Motorway Package 1 - West	
Change in Hazard PMF	
Appendix A	



LEGEND

Design Bridges

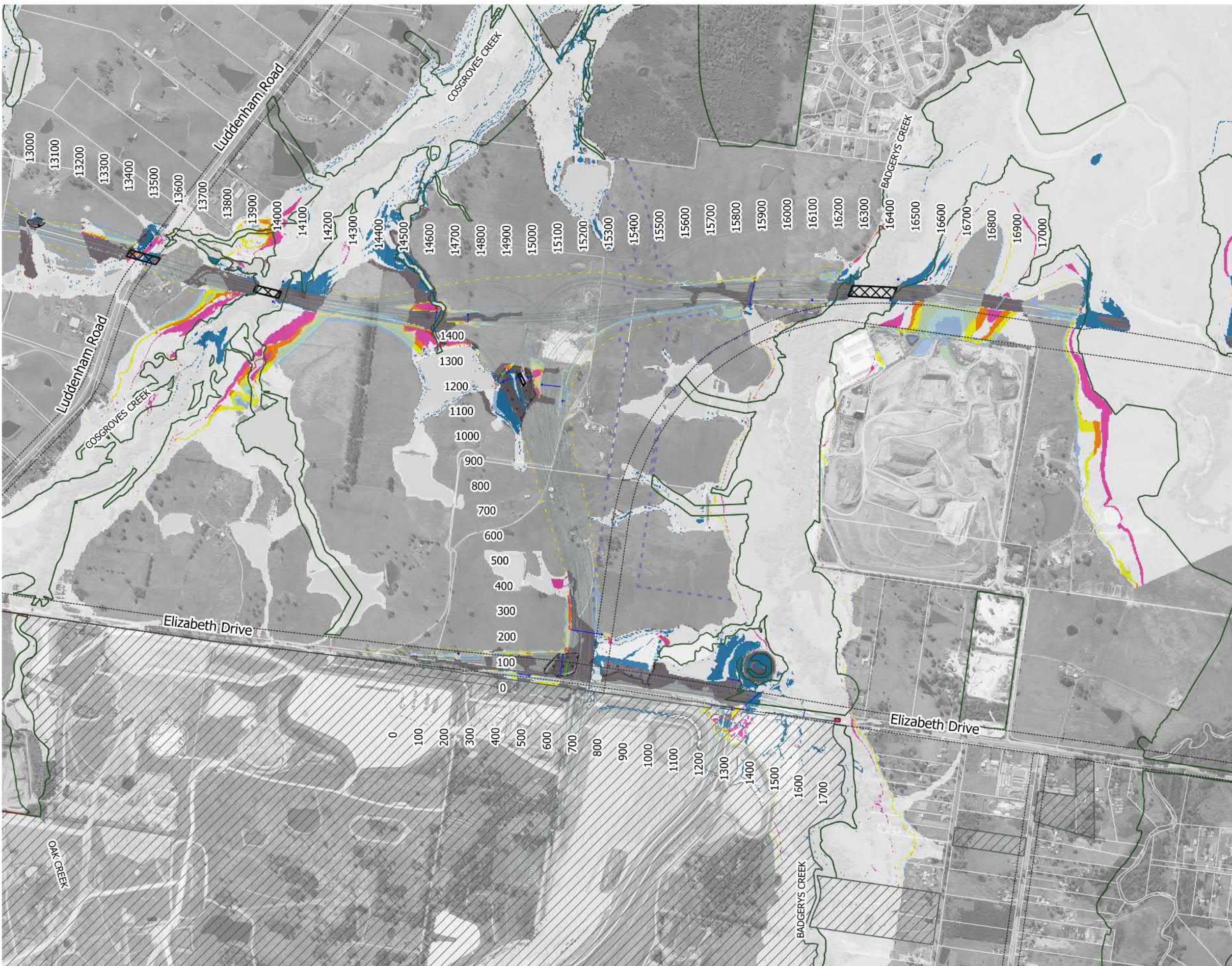
Road Design

Design Culvert**Project Boundary**M12 Central and East - WORKS BY OTHERS**Land Use (WSA, 2020) Enterprise unless noted:**Environment and Recreation**Change in Flood Hazard (ZAEM1)**No Significant Change**Newly Flooded Hazard (ZAEM1)**H1

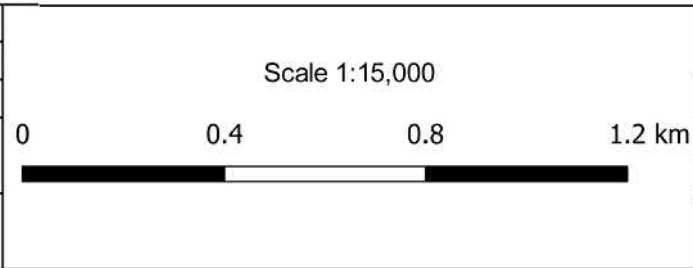
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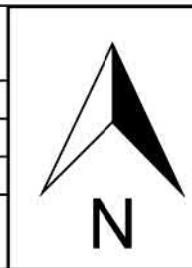
This map is not a design document.



A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021



A-81 to A-82	
M12 Motorway Package 1 - West	
Change in Hazard PMF	
Appendix A	



LEGEND
 Design Bridges
 Road Design
 Design Culvert
 Existing Culvert to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges

Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West

Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport

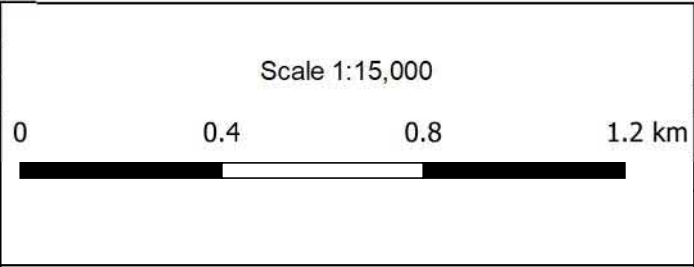
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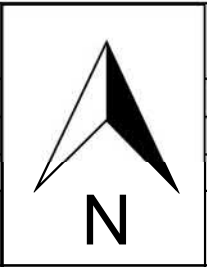
The digital Data included is for information only and will not match the drawings in all locations. Only information that has been formally issued in the form of a hard copy drawing with approved signatures maybe relied upon for accuracy and conformity. Any Party seeking to use this data must first verify the accuracy and current status of the information in relation to the formally issued drawings. Any reliance placed on such information shall be at the sole risk of the user. Please verify the accuracy of all information prior to using it.
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A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB
REV	Description	Date	Approved



STATUS			
100% Detailed Design Stage			
Original Size	A3	Drawn	QGIS
Coordinate System	MGA56	Designed	MY
Height Datum	AHD	Date Printed	02/07/2021



A-83 to A84
M12 Motorway Package 1 - West
Design Flood Velocity 0.05% AEP
Appendix A



LEGEND
 Design Bridges
 Road Design
 Design Culvert
 Existing Culvert to be Retained
 Design Miscellaneous Structures
 Design Culverts - WORKS BY OTHERS
 Farm Dam Infill (approx. extents)
 Existing Bridges
Project Boundary
 M12 Central and East - WORKS BY OTHERS
 M12 West
Land Use (WSA, 2020) Enterprise unless noted:
 Environment and Recreation
 Western Sydney International Airport
 Agribusiness
 Property Boundary_LotLPI_20181225_V03
 Transport
Velocity (m/s)
 <= 0.5
 0.5 - 1
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This map is not a design document.

				<div>Scale 1:15,000</div> <div>00.40.81.2 km</div>	STATUS 100% Detailed Design Stage					A-83 to A84	
					Original Size	A3	Drawn	QGIS		M12 Motorway Package 1 - West	
					Coordinate System	MGA56	Designed	MY		Design Flood Velocity 0.05% AEP	
					Height Datum	AHD	Date Printed	02/07/2021		Appendix A	
REV	Description	Date	Approved								
A	ISSUED FOR 100% DETAILED DESIGN	2021-07-02	JB								

Appendix H

Surface water quality and hydrology consistency assessment memo



MEMO

TO: Transport for NSW

FROM: Ryan Xu, Eric Lam

SUBJECT: Consistency assessment - Surface water quality and hydrology

OUR REF: M12WDD-WSP-ALL-EN-MEM-000015

DATE: 3 September 2021

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

Transport for NSW (TfNSW) are proposing to construct and operate the M12 Motorway project (the project) to provide direct access between the Western Sydney International Airport at Badgerys Creek and Sydney's motorway network. The M12 Motorway would run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for a distance of about 16 kilometres and is expected to be opened to traffic prior to opening of the Western Sydney International Airport.

This Consistency Assessment is for the M12 Motorway - West Package, between The Northern Road, Luddenham and approximately 250 metres east of Badgerys Creek. It is proposed to be a four-lane dual-carriageway motorway, including a new grade separated interchange with the Airport Access Road to provide connection to the Western Sydney International Airport. An overview of the M12 Motorway - West Package is illustrated in Figure 1-1.

Detailed design for the M12 Motorway - West Package (shown in Figure 1-1) is being completed and has resulted in changes requiring further environmental assessment. During design development of detail design changes requiring further environmental assessment have been identified. This Consistency Assessment is based on the 100% detail design submission.

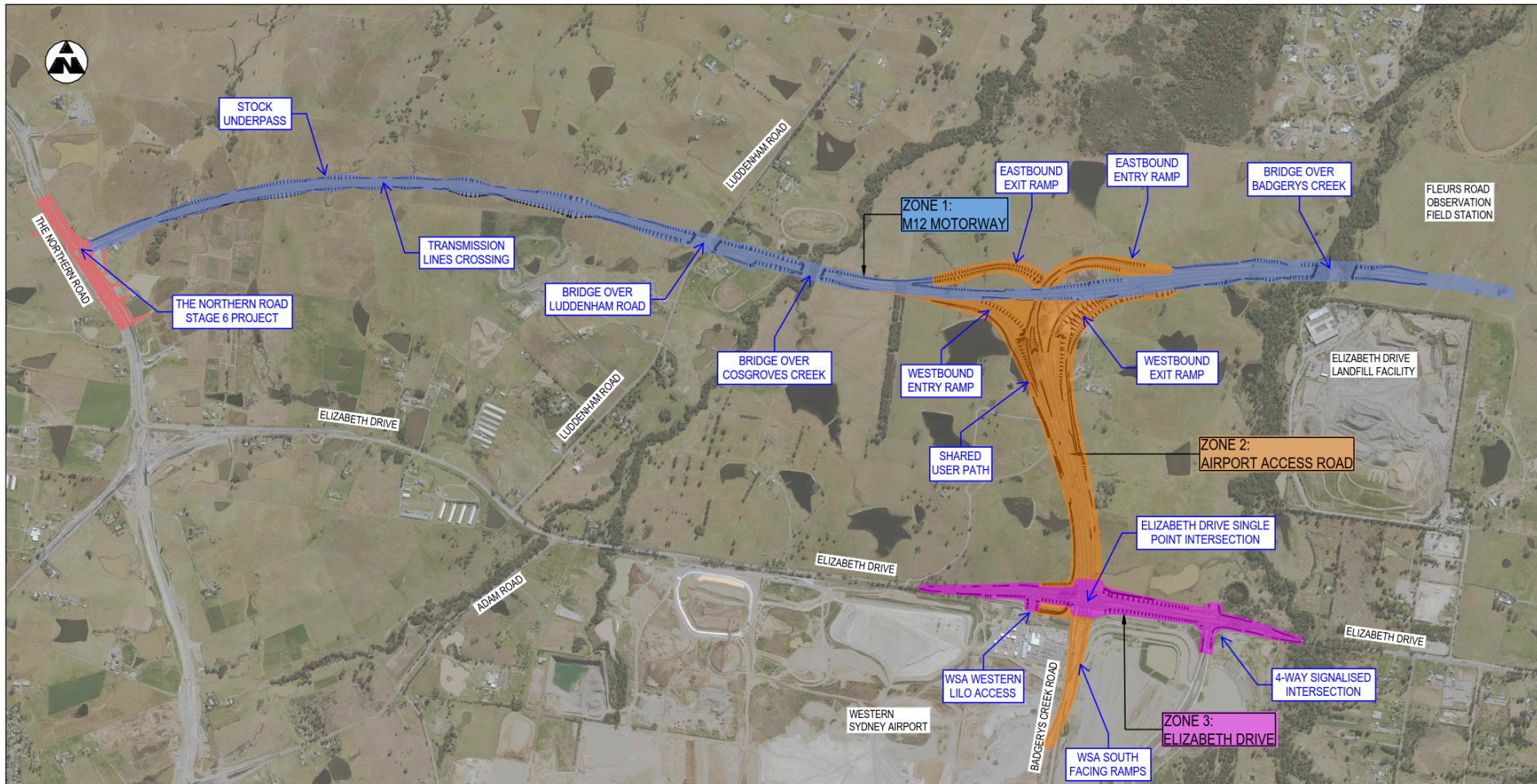


Figure 1-1 M12 Motorway – West Package overview – key features

1.2 SCOPE OF THIS REPORT

In the event of proposed changes to the M12 Motorway Approved Project, a review for consistency is required by the proponent for the construction and operational phases of the M12 Motorway - West Package. The Consistency Assessment will determine if the proposed changes are generally in accordance with the impacts of the approved project and satisfy the requirements of the Planning Approval dated 23 April 2021 and Commonwealth Approval dated 3 June 2021.

This memo provides a review of the proposed changes in terms of impacts to surface water quality and identifies if they are consistent with the Approved Project or if additional or reduced impacts are predicted.

1.3 DESCRIPTION OF PROPOSED CHANGE

The project as described in the Division 5.2 Approval dated 23 April 2021 and EPBC Approval dated 3 June 2021 is outlined in Section 1.2 of the Consistency Assessment and a detailed description is provided in Chapter 5 of the Environmental Impact Assessment (EIS) (Roads and Maritime, 2019). The amended project is detailed in Chapter 2 of the Amendment Report (Transport for NSW, 2020a) and Chapter 1 of the Amendment Report Submissions Report (AR Submissions Report) (Transport for NSW, 2020).

The proposed changes to M12 Motorway – West Package include the following and shown in Figure 2-1 of the Consistency Assessment:

- Airport interchange revised to a free flow directional interchange
- Elizabeth Drive and Airport Access road intersection revised to a single point interchange, comprising:
 - Two separate bridges over the Airport Access Road
 - New entry and exit ramps for access to the Airport Access Road and Elizabeth Drive
- All ramps on the Airport Access Road between the Airport Interchange and Elizabeth Drive realigned
- Intersection to the west of the Airport Access Road and Elizabeth Drive replaced with a left in, left out arrangement from the Western Sydney International Airport (WSIA) and the northern stub road removed
- Intersection to the east of the Airport Access Road and Elizabeth Drive refined to remove the northern stub road
- Elizabeth Drive widened to the north by about 10 metres at the single point interchange, east of the Airport Access Road
- Extension of the Airport Access Road and southbound ramp to tie into the WSIA internal road network (area within Airport land to be assessed and approved in the Airport Approval)
- Reconfiguring BR02 and BR05 at Cosgroves Creek and Badgerys Creek respectively
- Extending and refining existing utilities, including low voltage mains and additional water main crossings
- Modification to one operational water quality basin and four additional construction water quality basins
- Refinements to drainage and water quality infrastructure across the M12 Motorway – West Package, including culverts, open channels and cross drainage
- Additional construction access road to the north of BR20
- Amendments to the private property access on Elizabeth Drive west of the Airport Access Road
- Installation of a Variable Messaging Sign (VMS) on the southbound carriageway of The Northern Road Stage 6.

2. PURPOSE OF THE TASK

In the event of proposed changes to the M12 Motorway Approved Project, a review for consistency is required by the proponent for the construction and operational phases of the M12 Motorway - West Package. The Consistency Assessment will determine if the proposed changes satisfy the requirements of the Planning Approval dated 23 April 2021.

This memo provides a review of the proposed changes in terms of impacts to surface water quality and identifies if they are consistent with the Approved Project or if additional or reduced impacts are predicted.

The purpose of this surface water quality and hydrology memo is to do the following:

- Describe the proposed design changes relative to the Division 5.2 Approval dated 23 April 2021
- Describe proposed changes relative to the Commonwealth Approval dated 3 June 2021
- Assess the environmental impacts associated with the proposed design changes relative to the Division 5.2 Approval
- Determine if the proposed design changes are consistent with the Division 5.2 Approval or whether further approval is required for a modification application.

3. SURFACE WATER QUALITY

3.1 CHANGE IN MANAGEMENT OF SURFACE WATER QUALITY

In Section 7.9.4 of the EIS and Section 5.2.1 of the Amendment Report, six operational water quality basins were proposed. Three operational water quality basins changed between the EIS and Amendment Report. Two basins increased in size by about 30 percent due to an increase in road pavement catchment area. One basin was relocated due to modification of the horizontal road alignment. Table 3-1 presents the comparison between the EIS, Amendment Report and the 100% detailed design and Figure 3-1 illustrates the basin locations between the Amendment Report and the 100% detailed design.

During detailed design development, refinements were made to the proposed road and pavement drainage design that resulted in changes to managing surface water quality. The 100% detailed design proposes about seven kilometres of vegetated water quality swales and six bio-retention basins with some changes to the catchment area of each.

Six operational water quality basins are proposed for the M12 Motorway – West Package. The key change in design since the Amendment Report is the provision of bio-retention basins instead of operational water quality basins for all basins to satisfy the safety requirements of Guideline C of the National Airport Safeguarding Framework (NASF).

Pollutant removal is facilitated by the interaction between the flow and the vegetation along the length of the swales as well as the filter media from bio-retention basins. The location and size of swales and basins have been optimised to maximise the removal of suspended materials and pollutants discharging to Badgerys Creek and Cosgrove Creek which are the key sensitive receiving waterways identified for the M12 Motorway – West Package. Section 7.9.3 and Figure 7-125 illustrates the sensitive receiving environments within the project area. Between concept design (EIS and Amendment Report) and 100% detailed design, all wet basins were amended to bio-retention basins and the total length of swales has decreased from about 7,670 metres to about 7,000 metres, as outlined in Table 3-2. The vegetated swales have been refined at 100% detailed design stage due to the road horizontal alignment update including changes to the Airport Interchange and Airport Access Road/Elizabeth Drive intersection.

In order to achieve the water quality targets and provide treatment within 500 metres of water sensitive receptors, vegetated swales have been provided upstream of M12 Motorway – West Package minor creek tributary crossings across the M12 Motorway – West Package wherever is feasible to minimise the pollutants discharging to tributaries of Cosgrove and Badgerys Creeks along M12 Motorway – West Package.

Table 3-1 details water quality basins and Table 3-2 details the vegetated water quality swales for the M12 Motorway – West Package. The comparison of basin locations between the EIS, Amendment Report and the 100% detailed design is presented in Figure 3-1.

Table 3-1 Comparison of water quality basins

NAME (EIS /100% DESIGN)	EIS TREATMENT TYPE	AMENDMENT REPORT TREATMENT TYPE	100% DETAILED DESIGN TREATMENT TYPE (FILTER AREA M ²)	RECEIVING CREEK
B3890/ B13800	Wet Basin	No change	Bio-retention Basin (180)	Cosgrove Creek
B4080/ B14200 B4080	Wet Basin	No Change	Bio-retention Basin (550)	Cosgrove Creek
B5800/ B15800	Wet Basin	Basin Size Changed *	Bio-retention Basin (600)	Badgerys Creek
B6200/ B16200	Wet Basin	Basin Size Changed *	Bio-retention Basin (500)	Badgerys Creek
B16500	Wet Basin	No Change	Bio-retention Basin (300)	Badgerys Creek
B1351/ B1600 (Elizabeth Drive eastern end)	Wet Basin	Location Changed Compared to EIS**	Bio-retention Basin (450)	Badgerys Creek

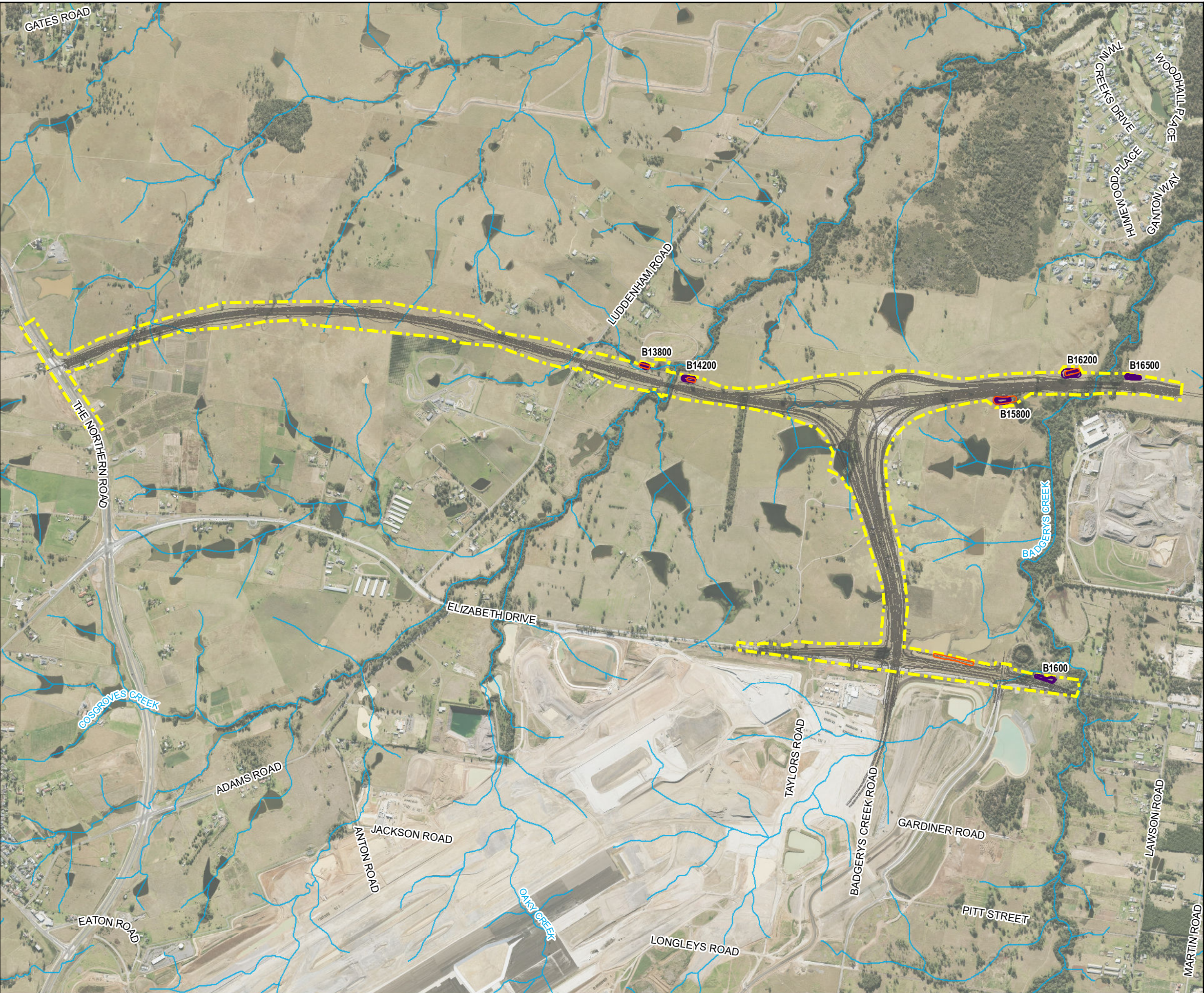
*The basin size has increased by approximately 30% between EIS and Amendment Report. This was caused by increased road pavement catchment area.

**The basin was relocated in the Amendment Report because the horizontal road alignment has been modified.

No vegetated swale design changes were documented in the Amendment Report. Table 3-2 summarises the change in vegetated swale lengths between the EIS and 100% detailed design. The results show that the vegetated swale length has been reduced to Cosgrove and Badgerys Creek tributaries due to topographic constraints. Water quality targets have been met and exceeded with the reduced vegetated swale length.

Table 3-2 Comparison of change in vegetated water quality swales

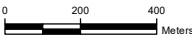
NAME	EIS SWALE LENGTH (M)	100% DETAIL DESIGN SWALE LENGTH (M)	RECEIVING CREEK
Swale to Cosgrove Creek main creek	511	1357	Cosgrove Creek
Swale to Badgerys Creek main creek	471	870	Cosgrove Creek
Swale to Cosgrove Creek tributaries	4672	2947	Badgerys Creek
Swale to Badgerys Creek tributaries	2040	1791	Badgerys Creek



M12 Motorway - West Package
Consistency Assessment

Figure 3-1
Operational water quality basins

- Legend**
- Operational water quality basins as per M12 Motorway - West package detailed design
 - Operational water quality basins as per Amendment Report
 - M12 Motorway – West Package detailed design operational footprint
 - M12 Motorway – West package detailed design



Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3
1:20,000 Date: 3/09/2021

Data sources: - DNRME, TMR, Translink, Geoscience Australia
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4. ASSESSMENT METHODOLOGY

For this assessment, the design details and assessment results in both the EIS and the Amendment Report have been used for the comparison between the Approved Project and the 100% detailed design. Where there has been no change in the surface water quality and hydrology assessment between the EIS and the Amendment Report, the details of EIS have been used.

MUSIC modelling was undertaken to identify the existing pollutant loads and potential pollutant load reduction for the proposed design changes. A MUSIC model was used in the Project EIS and Amendment Report and the same methodology was used. The MUSIC model was set up to represent local rainfall conditions and proposed catchment characteristics (surface area and perviousness). The catchment delineation is identified in accordance with longitudinal drainage systems and local topography. Model parameters for bio-retention basin and swales are based on the recommendation of the Penrith City Council WSUD (Water Sensitive Urban Design) Technical Guidelines Version 3 – June 2015. The aim of the MUSIC model is to ensure that the water quality objective are achieved in accordance with the Conditions of Approval (CoA). The magnitude of the water quality impact predicted by the 100% detailed design MUSIC model is to assess if there has been a change between the Amendment Report and EIS and the 100% detailed design and to determine if the water quality objectives are being met and that the change is consistent with the Project approvals. Section 7.9.4 of the EIS provides the surface water quality impact assessment details and have been used to complete the consistency assessment for surface water quality and hydrology. Further details of the MUSIC model are presented in the 100% Detailed Design Drainage and Water Quality Detailed Design Report (M12WDD-WSP-ALL-SD-RPT-000002).

5. IMPACT ASSESSMENT

5.1 CONSTRUCTION

Section 7.9.4 of the EIS states that the potential surface water quality impacts on receiving waterways during construction are to be effectively mitigated through local erosion and sediment controls detailed in Erosion and Sediment Control Plans (ESCPs) to be prepared as part of the construction soil and water management plan before construction commences. The ESCPs will include appropriately sized temporary sediment basins in accordance with the requirements of the NSW Landcom Managing Urban Stormwater: Soils and Construction ('Blue Book') guideline. A total of 19 temporary sediment basins are proposed in the EIS, including nine for Cosgroves Creek and 10 for Badgerys Creek. ESCPs are not described in the Amendment Report, therefore, there was no change to the number of water quality basins assessed in the Amendment Report.

A review of the current ESCPs (M12WDD-WSP-ALL-EN-RPT-000001 Appendix A) shows that detailed design development adopted a greater number of smaller catchments, resulting in more basins compared to the EIS. In the 100% detailed design, a total of 30 temporary sediment basins are proposed, including 20 for Cosgroves Creek and 10 for Badgerys Creek.

While the number of temporary sediment basins has increased, all the catchments in the construction footprint area have been taken into consideration and the required erosion and sediment controls provided for. This approach remains in accordance with the requirements of the Blue Book and is considered consistent with the EIS and Amendment Report.

In addition, CoA E105 requires construction water quality impact assessments to be carried out to ensure the construction water discharge does not compromise the water quality objectives of the receiving waters. This has been conducted at 100% detailed design and confirmed that this is achieved if the recommended sedimentation basin discharge criteria are adopted. The water quality impact assessment (M12WDD-WSP-ALL-EN-RPT-000010) will be submitted as part of the Environmental Protection License application for the M12 Motorway – West Package.

5.2 OPERATION

Table 7-138 in Section 7.9.4 of the EIS indicates that the pollutants loads from water quality basins at Sensitive Receiving Environments (SREs) are lower than pre-development conditions for Cosgroves Creek and Badgerys Creek.

The results of the MUSIC modelling for the 100% detailed design are presented in Table 5-1. Table 5-1 shows that there is an overall improvement of pollutant loads on Total Suspended Solids (TSS), Total Phosphorous (TP) and Total Nitrogen (TN) for flows discharging into Cosgroves Creek and Badgerys Creek.

Table 5-1 Comparison of pollutants loading discharging to key SREs under pre-development and post development conditions for the 100% detailed design

Location		Indicators			Comment
		TSS (kg/yr)	TN (kg/yr)	TP (kg/yr)	
Cosgroves Creek	Pre-development	2370	47	10.2	Pollutant reduction target achieved for TSS, TP and TN
	Post-development	1870	45	4.54	
	% change	-21%	-4%	-55%	
Badgerys Creek	Pre-development	9640	161	34.4	Pollutant reduction target achieved for TSS, TP and TN
	Post-development	4260	157	16.3	
	% change	-56%	-2%	-53%	

Figure 6-7 in Appendix M of the EIS indicates that the mean concentration of TSS downstream of the minor crossings without sensitive receptors (creeks) is slightly higher than pre-development but within the recommended limit. However, Figure 6-8 and Figure 6-9 in Appendix M of the EIS shows that the mean concentration of TP and TN are higher than recommended limit but lower than pre-development conditions.

As part of detailed design development, a check of pollutants concentration was carried out at downstream confluence points of waterways crossing of the M12 Motorway at Cosgrove Creek and Badgerys Creek and it was found that the mean concentrations at the confluence points exhibit a similar trend where the post-development pollutant concentration on TSS, TP and TN are lower than pre-development conditions (Table 5-2).

Table 5-2 Comparison of pollutants concentration at confluences points downstream of the project under pre-development and post development conditions for 100% detailed design

Location		Mean concentration (mg/l)			Comment
		TSS (EIS limit 20-75 mg/l)	TN (EIS limit = 0.35mg/l)	TP (EIS limit = 0.025mg/l)	
Cosgroves Creek	Pre-development	30.0	1.28	0.131	Overall improvement in water quality and achieves water quality objectives to maintain or improve water quality
	Post-development	14.3	0.995	0.104	
	% change	-54%	-28%	-29%	
Badgerys Creek	Pre-development	29.9	1.28	0.129	Overall improvement in water quality and achieves water quality objectives to maintain or improve water quality
	Post-development	11.9	0.899	0.092	
	% change	-61%	-32%	-33%	

Table 5-2 shows an overall improvement on mean concentration for TSS, TP and TN for both Cosgroves Creek and Badgerys Creek. It should be noted that Table 5-2 shows pollutant concentration estimated in the MUSIC model using flow based sub-sample approach. This means the concentrations are calculated pollutant concentration based on the number of flow samples rather than cumulative mass and cumulative flow. This approach is selected in order to be consistent with the method of calculation of mean concentrations from water quality monitoring samples.

It should be noted that the notable reduction in concentration is due to post-development conditions producing more runoff in small rainfall events compared to pre-development conditions. In these small events, the proposed treatment measures are very effective in reducing the pollutant concentration but is of lesser effectiveness in more significant events. This skews the overall mean concentration to lower values. If only mean concentrations from non-zero flow events are computed for both post and pre-development conditions, the reduction in pollutant concentration would be much lower but it will still improve water quality.

5.3 ACCIDENTAL SPILL MANAGEMENT

Section 7.9 of the EIS stated that operational water quality basins were designed to contain a 20,000 litre spill. The EIS also stated that the proposed swales would not be able to contain such a large spill volume and there is the potential for the spill to flow to downstream waterways. In these instances, the spill would be managed in accordance with standard operational emergency spill response procedures.

A spill risk assessment was carried out at 100% Detailed design (M12WDD-WSP-ALL-SD-RPT-000002), by considering factors such as:

- Compliance with the EIS, EIS Submissions Report, Amendment Report, AR Submissions Report and any conditions of approval
- Potential vehicle conflict areas (i.e. intersections and interchanges)
- Road geometry
- Heavy vehicle and / or dangerous goods route
- Speed environment
- Proximity of SREs
- Impact on SREs
- Topographical or man-made features which may enhance the spill reaching a sensitive area.

Based on the assessment, all basins are provided with a 20,000-litre spill containment capacity. Provisions of sandbags and check dams are also proposed wherever is feasible for spills at medium risk locations to contain the spill. This oil spill containment strategy has also been provided at M12 Motorway / Sydney Metro – Western Airport interface except for a direct discharge location at north east corner of Airport Access Road and Elizabeth Drive Interchange. This is due to space restrictions for temporary oil containment measures. Compared to the EIS, the oil spill strategy efficiency has been improved by including the provisions of sandbags and check dams. Thus, the 100% detailed design has provided adequate spill containment capacity.

6. CONSISTENCY WITH APPROVALS

6.1 MINISTER'S CONDITIONS OF APPROVAL

Table 6-1 addresses those conditions of approval relevant to the proposed change in the context of the Approved Project.

Table 6-1 Consistency against relevant Minister's conditions of approval for the project

No.	Condition of Approval	Discussion	Consistent
E105	The CSSI must be designed, constructed and operated so as to maintain the NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval, unless an Environment Protection License (EPL) in force in respect of the CSSI contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with.	<p>The 100% detailed design of M12 Motorway - West Package has incorporated dry bioretention operational water quality control basins as discussed in Section 3.1. Construction basins (i.e. temporary basins) have been developed based on the requirements of the Blue Book. The construction water quality assessment proposed, is based on sedimentation basin discharge criteria, which satisfied the water quality objective requirements.</p> <p>To assess water quality objectives, total suspended solids (TSS), total phosphorus (TP) and total nitrogen (TN) existing and design concentrations have been assessed for the M12 Motorway - West Package project catchment. The post-development stormwater pollutant concentrations are less than existing (pre-development) stormwater pollutant concentrations and hence the M12 Motorway - West Package is working towards achieving or maintaining the water quality objectives.</p>	Yes
E106	Drainage feature crossings (permanent and temporary watercourse crossings and diversions) and drainage swales and depressions must be carried out in accordance with relevant guidelines and designed by a suitably qualified and experienced person.	The proposed changes to the M12 Motorway - West Package would not impact on the ability to comply with this requirement. The water quality design changes have been designed in accordance with relevant guidelines.	Yes
E107	Work on waterfront land must have regard to the <i>Guidelines for controlled activities on waterfront land – Riparian Corridors</i> (NRAR, 2018), <i>Controlled activities on waterfront land – Guidelines for watercourse crossings on waterfront</i>	The proposed changes to the M12 Motorway - West Package would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
	<i>land</i> (NSW Office of Water, 2012) and <i>Policy and Guidelines for Fish Habitat Conservation and Management</i> (DPI Fisheries, 2013).		
E108	<p>The Proponent must consult DPI Fisheries and EES during the detailed design of the watercourse crossings. The consultation must include:</p> <ul style="list-style-type: none"> a design of bridges; b design of scour protection; and c details of riparian revegetation. 	<p>Ongoing consulting with relevant government agencies and stakeholder has been carried out. WSP has supported TfNSW's consultation efforts via the provision of information and where required the attendance at meetings, briefing sessions and workshops. With respect to M12 Motorway – West Package, the requirements of CoA E108 apply to Badgerys Creek (Bridge BR05) and Cosgroves Creek (Bridge BR02).</p> <p>The proposed changes to the M12 Motorway - West Package would not impact on the ability to comply with this requirement. Consultation with Department of Primary Industries – Fisheries and Environment, Energy and Science will be ongoing.</p>	Yes
E109	Rehabilitation and revegetation of the riparian corridor and banks of watercourses impacted by the CSSI must be commenced within three (3) months of the completion of the watercourse work, bridge works (sub-structure, super-structure and pavement) and any other construction work required in the riparian corridor.	The proposed changes to the M12 Motorway - West Package would not impact on the ability to comply with this requirement.	Yes

No.	Condition of Approval	Discussion	Consistent
E110	<p>All new or modified drainage systems associated with the CSSI must be designed to:</p> <ul style="list-style-type: none"> a where stormwater drainage is discharged to a council's stormwater system, meet the capacity constraints of any council's drainage system to receive and convey the proposed flows from the CSSI, or otherwise upgrade council's drainage system at the Proponent's expense, in consultation with the relevant council(s); b minimise impacts on the receiving environment at the final outflow point resulting from any additional flow volume (including, but not limited to scour, flooding, water quality impacts, and impacts on riparian vegetation, aquatic ecology and property); and c ensure mitigation measures are implemented where increased flows through cross drainage systems adversely impact on council or Sydney Water drainage infrastructure and the receiving environment. 	<ul style="list-style-type: none"> a) The only component of the stormwater drainage design associated with a council stormwater system is associated with Luddenham Road (Penrith City Council). The stormwater drainage discharge to the council's systems has been designed with due consideration of the system's existing capability. The peak flows through this existing culvert have not increased due to M12 Motorway – West Package works therefore does not have an impact on the capacity of the existing structure. b) The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement. Where any increase is noted, impacts at the receiving environment at the final outflow point have been assessed against the requirements of CoA E17. The water quality complies with CoA E105 requirements. The design has been developed to minimise impacts on riparian vegetation, aquatic ecology and property. c) The peak flows through this existing culvert have not increased due to M12 Motorway – West Package works therefore does not have an impact on the capacity of the existing structure. 	Yes

The proposed change can be accommodated within the Conditions of Approval.

6.2 STATEMENT OF COMMITMENTS / REVISED ENVIRONMENTAL MANAGEMENT MEASURES

The proposed change has been assessed in Table 6-2 in relation to the relevant commitments / revised environmental management measures in the context of the Division 5.2 Approval.

Table 6-2: Consistency against relevant Statement of Commitments / revised environmental management measures

No.	Statement of commitment / mitigation measure	Discussion	Consistent
SWH01	<p>A construction soil and water management plan (CSWMP) will be prepared for the project. The plan will outline measures to manage soil and water impacts associated with the construction works, including contaminated land.</p> <p>The CSWMP will provide:</p> <ul style="list-style-type: none"> — Measures to minimise/manage erosion and sediment transport both within the construction footprint and offsite including requirements for the preparation of erosion and sediment control plans (ESCP) for all progressive stages of construction — Measures to manage waste including the classification and handling of spoil — Procedures to manage unexpected contaminated finds including asbestos which would be outlined in the contaminated land management plan and asbestos management plan to be prepared for the project — Measures to manage stockpiles including locations, separation of waste types, sediment controls and stabilisation — Measures to manage groundwater de-watering and impacts including mitigation required — Processes for de-watering of water that has accumulated on site and from sediment basins, including relevant discharge criteria — Measures to manage potential tannin leachate — Measures to manage accidental spills including the requirement to maintain materials such as spill kits — Measures to manage potential saline soils — Details of surface water and groundwater quality monitoring to be carried out before, throughout, and following construction — Controls for sensitive receiving environments including SEPP Coastal Wetlands which may include but not be limited to: <ul style="list-style-type: none"> — Designation of ‘no go’ zones for construction plant and equipment 	<p>The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.</p>	Yes

No.	Statement of commitment / mitigation measure	Discussion	Consistent
	<ul style="list-style-type: none"> — Creation of catch/diversion drains and sediment fences at the downstream boundary of construction activities where practicable to ensure containment of sediment-laden runoff and diversion toward sediment sump treatment areas (not sediment basins) to prevent flow of runoff to the SEPP Coastal Wetland. — Erosion and sediment control measures will be implemented and maintained at all work sites in accordance with the principles and requirements in Managing Urban Stormwater –Soils and Construction, Volume 1 (Landcom 2004) and Volume 2D (NSW Department of Environment, Climate Change and Water 2008), commonly referred to as the “Blue Book”, as well as relevant TfNSW Guidelines. 		
SWH02	A soil conservation specialist will be engaged by both TfNSW and the Contractor for the duration of construction of the project to provide advice on the planning and implementation of erosion and sediment control including review of ESCPs.	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
SWH03	A water reuse strategy will be developed for both construction and operational phases of the project to reduce reliance on potable water. This strategy will be prepared during the detailed design stage and implemented throughout the project and will outline the construction and operational water requirements and potential water sources to supply the water demand in consultation with Sydney Water. Alternative water supply options to potable water will be investigated, with the aim of reusing water using recycled water where feasible.	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
SWH04	<p>Stockpiles will be managed to minimise the potential for mobilisation and transport of dust and sediment in runoff in accordance with TfNSW Stockpile Sites Management Guideline (Roads and Maritime, 2015). This will include:</p> <ul style="list-style-type: none"> — Minimising the number of stockpiles, area used for stockpiles, and time that they are left exposed — Locating stockpiles away from drainage lines, waterways and areas where they may be susceptible to wind erosion — Stabilising stockpiles, establishing appropriate sediment controls and suppressing dust as required. 	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
SWH05	A construction water quality monitoring program will be developed and included in the CSWMP for the project to establish baseline conditions, observe any changes in surface water and groundwater during construction, and inform appropriate management responses.	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes

No.	Statement of commitment / mitigation measure	Discussion	Consistent
	<p>The program will be based on the water quality monitoring methodology water quality indicators and the monitoring locations identified in the Surface water and hydrology assessment report (Appendix M of the EIS) and supplementary memo (Appendix I of the amendment report), and Groundwater quality and hydrology assessment report (Appendix N of the EIS) and supplementary memo (Appendix J of the amendment report).</p> <p>Baseline monitoring will be carried out monthly for a minimum of 12 months before the start of construction. As a minimum this will include three wet weather sampling events over six months where feasible.</p> <p>Sampling locations and monitoring methodology to be carried out during construction will be further developed in detailed design in accordance with the Guideline for Construction Water Quality Monitoring (RTA 2003) and the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018). It will include collection of samples for analysis from sedimentation basin discharge points, visual monitoring of other points of release of construction waters and monitoring of downstream waterways.</p>		
SWH06	<p>An operational water quality monitoring program will be developed and implemented following the completion of construction to observe any changes in surface water and groundwater following construction, and inform appropriate management responses.</p> <p>The program will be based on the water quality monitoring methodology, water quality indicators, and the monitoring locations presented in the Surface water and hydrology assessment report (Appendix M of the EIS), and Groundwater quality and hydrology assessment report (Appendix N of the EIS).</p> <p>The monitoring program will be carried out monthly and will preferentially monitor following wet weather events when rainfall results in discharge from control sites or is greater than a nominated rainfall threshold which will be identified in detailed design. Monitoring will be carried out for a minimum of 12 months following the completion of construction, or until the affected waterways are certified by a suitably qualified and experienced independent expert as being rehabilitated to an acceptable condition and/or the permanent water quality structures are deemed to be operating satisfactorily.</p>	<p>The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.</p>	Yes

No.	Statement of commitment / mitigation measure	Discussion	Consistent
	Should the results of monitoring identify that the water quality management measures are not effective in adequately mitigating water quality impacts, additional mitigation measures will be identified and implemented as required.		
SWH07	<p>The performance water quality controls developed for the design as set out in the EIS and the amended water quality and hydrology controls outlined in the amendment report (including but not limited to temporary and permanent sediment basins) will be verified as the detailed design develops for the project to ensure the objectives of the project are achieved.</p> <p>In the instance that water quality modelling carried out during detailed design cannot demonstrate that the water quality controls would be effective in mitigation potential impacts, potential additional mitigation measures would be identified and implemented where possible.</p>	<p>The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.</p> <p>Water quality model has been developed for the detailed design of M12 Motorway – West Package. The drainage package (M12WDD-WSP-ALL-SD-RPT-00002) The water quality modelling consists of required mitigation measures including permanent basins and vegetated swales. The result shows that the both pollutant loads (within 500m of sensitive receptors) and overall pollutant concentrations on TSS, TP and TN have been reduced in post-development conditions comparing to the pre-development conditions. Temporary (i.e. construction) basins have been developed based on the requirements of the Blue Book.</p>	Yes
SWH08	<p>Further water quality assessment will be undertaken during detailed design to establish site specific discharge criteria for construction sediment basins.</p> <p>Based on this, the number, location and size of the basins will be further refined during the detailed design with consideration to the relevant NSW EPA Environment Protection Licence application requirements and the environmental values of the downstream receiving waterway.</p>	<p>The proposed changes to M12 Motorway – West Package would not impact on the ability to comply with this requirement.</p>	Yes
SWH09	<p>Practical measures to prevent water pollution and control, abate or mitigate impacts to the environment will be investigated at the detailed design stages of the project with the aim to make improvements to the currently proposed water quality controls. Such measures may include:</p>	<p>The detailed design of M12 Motorway – West Package has incorporated dry bioretention operational water quality control basins in order to satisfy the safety requirements of</p>	Yes

No.	Statement of commitment / mitigation measure	Discussion	Consistent
	<ul style="list-style-type: none"> — Larger or high efficiency temporary basins — Alternative dry bioretention operational basins 	Guideline C of the National Airport Safeguarding Framework (NASF). Temporary (i.e. construction) basins have been developed based on the requirements of the Blue Book.	
SWH10	The use of water sensitive urban design measures will be considered during detailed design to meet water quality objectives.	The drainage water quality measures (i.e. open channels and basins) have been integrated with the landscape design (M12WDD-WSP-ALL-LA-DRG-00001-COMBINED) in line with the urban design objectives.	Yes
SWH11	A de-watering management plan will be prepared as part of the CSWMP which will outline the de-watering methodology, supervision requirements, staff responsibilities and training, and approvals required before any de-watering activity begins.	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
SWH12	<p>The following measures will be carried out to manage activities within watercourses or on waterfront land:</p> <ul style="list-style-type: none"> — Implementing practices to minimise disturbance of banks — Undertaking bank stabilisation and installing instream structures — Maintaining minimum flows to assist in maintaining the viability of aquatic communities and preventing barriers to fish passage — Constructing instream crossings during low flows and design so that drainage off crossing doesn't contribute sediment load to the stream — All drainage feature crossings (permanent and temporary watercourse crossings and stream diversions), drainage swales and depressions will be designed by a suitably qualified and experienced professional and will be designed and constructed in accordance with relevant guidelines. 	The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.	Yes
SWH13	A set of hydrologic and hydraulic models will be developed, which are to be used to define the nature of both main stream flooding and major overland flow along the full length of the project operational footprint under pre- and post-project conditions. The hydraulic model is to extend a sufficient distance upstream and downstream of the project operational footprint, to negate any boundary effects and to define the full extent of any impact that the project will have on patterns of both main stream flooding	Flood models have been developed for the detailed design of M12 Motorway – West Package. The flood package M12W SD01 (M12WDD-WSP-ALL-SD-RPT-00001) consists of hydrologic models using DRAINS	Yes

No.	Statement of commitment / mitigation measure	Discussion	Consistent
	<p>and major overland flow. The hydraulic model(s) is to be based on the TUFLOW (or equivalent) two-dimensional (in plan) hydraulic modelling software.</p> <p>The models will be used to verify the nature and extent of impacts and to confirm the type of mitigation measures required, including potential mitigation measures identified throughout the EIS (see Table 5-9 in Appendix M of the EIS) and this amendment report and supplementary memo (see Table 5-6 in Appendix I of the amendment report).</p> <p>The models will also be used during detailed design to describe the interaction between the project and flows particularly with respect to culverts and to assist in refining the design for flows arriving at and travelling through culverts.</p> <p>If further modelling identifies impacts to private properties, TfNSW will consult with landowners regarding appropriate management measures to be implemented.</p>	<p>and XPRAFTS software, and a hydraulic model using TUFLOW software.</p> <p>The final drainage design for the detailed design is ongoing and has been developed to ensure performance is consistent with the commitments of the AR Submissions Report. Consultation with affected landowners would be ongoing and the proposed changes to the M12 Motorway - West Package would not impact on the ability to comply with this requirement.</p> <p>A comparison of the flooding impacts has been carried out in the Flooding Consistency Assessment Memo (M12WDD-WSP-ALL-EN-MEM-000013).</p>	
SWH14	<p>Consideration will be given to the design of operational water quality, erosion and sediment controls incorporated into the design of the construction access track being left in place upstream from the SEPP wetland, and within the proximity area of the SEPP Coastal Wetland ID117</p>	<p>The proposed changes to the M12 Motorway – West Package would not impact on the ability to comply with this requirement.</p>	Yes

The proposed changes are consistent with the Statement of Commitments / environmental management measures incorporated as part of the Division 5.2 Approval.

6.3 EPBC APPROVAL

The proposed changes in water quality management measures at detailed design do not constitute to any change in project aspects related to the EPBC approval.

7. REFERENCES

- NRAR, 2018. Guidelines for controlled activities on waterfront land – Riparian Corridors
- NSW Office of Water, 2012. Controlled activities on waterfront land – Guidelines for watercourse crossings on waterfront land
- DPI Fisheries, 2013. Policy and Guidelines for Fish Habitat Conservation and Management
- Landcom, 2004. NSW Landcom Managing Urban Stormwater: Soils and Construction
- Transport for NSW, 2020. M12 Motorway Amendment report Submission report
- Transport for NSW, 2020. M12 Motorway Amendment report
- Roads and Maritime Services, 2019. M12 Motorway Environmental Impact Statement
- Penrith City Council, 2015. Water Sensitive Urban Design Technical Guidelines Version 3

Appendix I

Groundwater quality and hydrology consistency assessment memo

MEMO

TO: Transport for NSW
FROM: Jeanne Drouet and Andrea Madden
SUBJECT: Consistency assessment for groundwater – M12 Motorway Western Package
OUR REF: M12WDD-WSP-ALL-EN-MEM-000014.docx
DATE: 3 September 2021

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

Transport for NSW (TfNSW) are proposing to construct and operate the M12 Motorway project (the project) to provide direct access between the Western Sydney International Airport at Badgerys Creek and Sydney's motorway network. The M12 Motorway would run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for a distance of about 16 kilometres and is expected to be opened to traffic prior to opening of the Western Sydney International Airport.

This Consistency Assessment is for the M12 Motorway – West Package, between The Northern Road, Luddenham and approximately 250 metres east of Badgerys Creek. It is proposed to be a four-lane dual-carriageway motorway, including a new grade separated interchange with the Airport Access Road to provide connection to the Western Sydney International Airport. An overview of the M12 Motorway – West Package is illustrated in Figure 1-1.

Detailed design for the M12 Motorway – West Package (shown in Figure 1-1) is being completed and has resulted in changes requiring further environmental assessment. During design development of detail design changes requiring further environmental assessment have been identified. The Consistency Assessment is based on the 80% detail design submission.

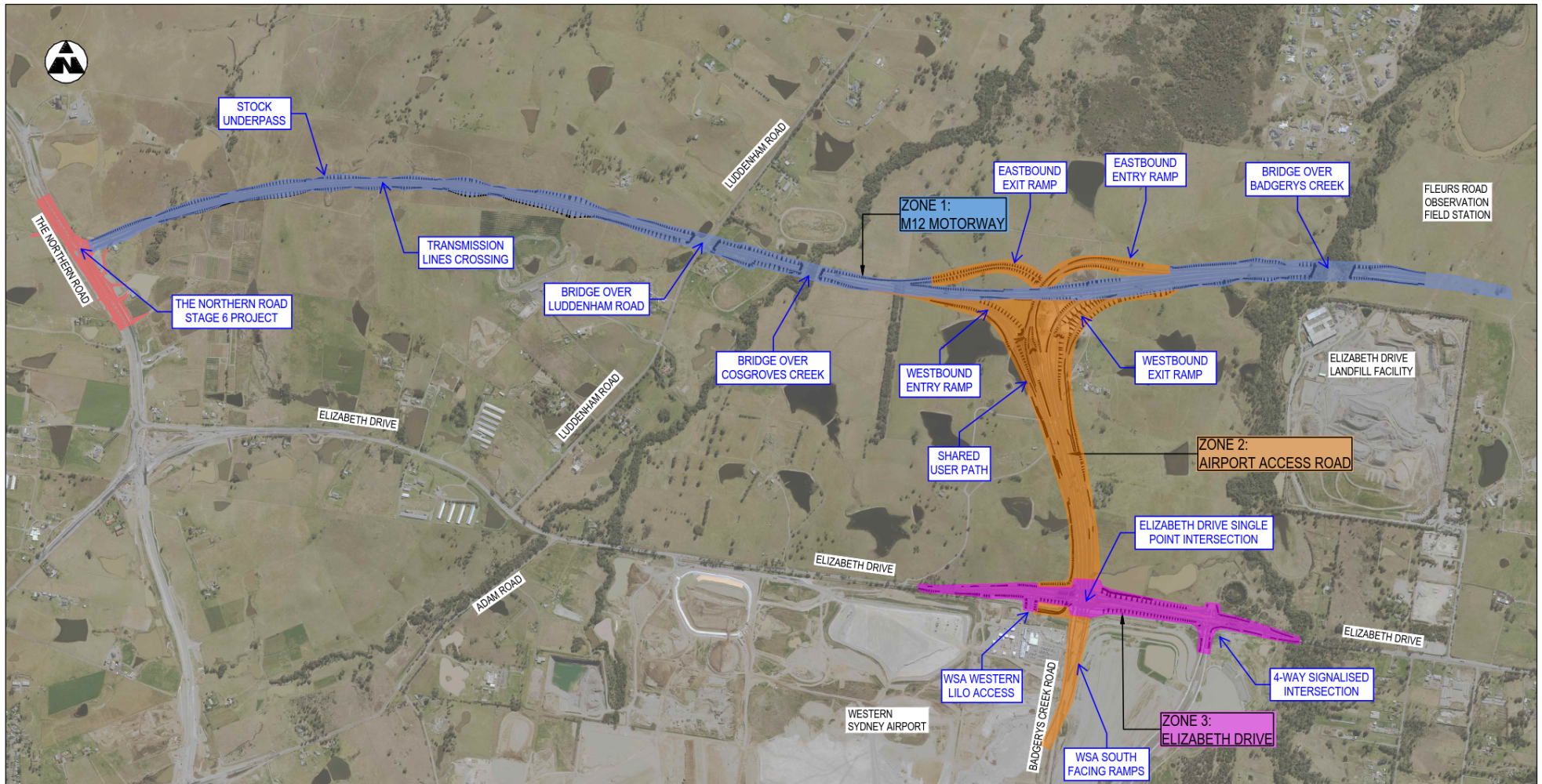


Figure 1-1 M12 Motorway – West Package overview – key features

1.2 SCOPE OF THIS REPORT

In the event of proposed changes to the M12 Motorway Approved Project, a review for consistency is required by the proponent for the construction and operational phases of the M12 Motorway – West Package. The Consistency Assessment will determine if the proposed changes are generally in accordance with the impacts of the approved project and satisfy the requirements of the Planning Approval dated 23 April 2021 and Commonwealth Approval dated 3 June 2021.

This memo provides a review of the proposed changes in terms of impacts to groundwater quality and hydrology and identifies if they are consistent with the Approved Project or if additional or reduced impacts are predicted.

1.3 DESCRIPTION OF PROPOSED CHANGE

The project as described in the Division 5.2 Approval and EPBC Approval dated 3 June 2021 is outlined in Section 1.2 of the Consistency Assessment and a detailed description is provided in Chapter 5 of the Environmental Impact Assessment (EIS) (Roads and Maritime, 2019). The amended project is detailed in Chapter 2 of the Amendment Report (Transport for NSW, 2020a) and Chapter 1 of the Amendment Report Submissions Report (AR Submissions Report) (Transport for NSW, 2020).

The proposed changes to M12 Motorway – West Package include the following and shown in Figure 2-1 of the Consistency Assessment Report:

- Airport interchange revised to a free flow directional interchange
- Elizabeth Drive and Airport Access road intersection revised to a single point interchange, comprising:
 - Two separate bridges over the Airport Access Road
 - New entry and exit ramps for access to the Airport Access Road and Elizabeth Drive
- All ramps on the Airport Access Road between the Airport Interchange and Elizabeth Drive realigned
- Intersection to the west of the Airport Access Road and Elizabeth Drive replaced with a left in, left out arrangement from the Western Sydney International Airport and the northern stub road removed
- Intersection to the east of the Airport Access Road and Elizabeth Drive refined to remove the northern stub road
- Elizabeth Drive widened to the north by about 10 metres at the single point interchange, east of the Airport Access Road
- Extension of the Airport Access Road and southbound ramp to tie into the Western Sydney International Airport internal road network (area within Airport land to be assessed and approved in the Airport Approval)
- Reconfiguring BR02 and BR05 at Cosgroves Creek and Badgerys Creek respectively
- Extending and refining existing utilities, including low voltage mains and additional water main crossings
- Modification to one operational water quality basin and four additional construction water quality basins
- Refinements to drainage and water quality infrastructure across the M12 Motorway – West Package, including culverts, open channels and cross drainage
- Additional construction access road to the north of BR20
- Amendments to the private property access on Elizabeth Drive west of the Airport Access Road
- Installation of a Variable Messaging Sign (VMS) on the southbound carriageway of The Northern Road Stage 6.

Generally, the proposed changes detailed above can be accommodated within the construction and operational footprint assessed in the AR Submissions Report and EIS, except for those construction and operational boundary changes specifically noted, shown in Figure 2-2 and Figure 2-3 of the Consistency Assessment Report.

Of particular relevance to groundwater are the changes to the cuts originally proposed (western cut (in the EIS), Airport interchange northern cut (in the Amendment Report) and Airport interchange southern cut (in the Amendment Report)) and

the updated list of cuts that intersect groundwater (Cut 2, Cut 5 and Cut 6, and potentially Cut 7), as explained in Section 3.1.4).

1.4 PURPOSE OF TASK

The purpose of this consistency assessment in relation to groundwater quality and hydrology is to:

- Review the design changes between the 80% concept design and the 80% detailed design
- Assess groundwater impacts associated with the 80% detailed design
- Determine if the proposed changes are consistent with the groundwater quality and hydrology impact assessment in the EIS and Amendment Report
- Assess whether the proposed changes are consistent with the Statement of Commitments/environmental management measures incorporated as part of the Division 5.2 Approval.

2. ASSESSMENT METHODOLOGY

The methodology comprises the following:

- Comparison of the design exhibited in the EIS and Amendment Report with the 80% detailed design, including the construction and operational footprints and the location and dimensions of the road cuts
- Assessment of the inflow at the road cuts and the extent of drawdown considering the maximum observed standing water level (SWL) from the most recent monitoring records
- Comparison of the inflow at the road cuts and the drawdown extent undertaken during this consistency assessment with the assessment undertaken for the EIS and Amendment Report
- Assessment of:
 - The impact on groundwater dependent ecosystems (GDEs)
 - The impact on other groundwater users
 - Groundwater take and licencing
 - Cultural values
 - Groundwater quality, including salinity
 - Cumulative impacts
 - Mitigation measures, particularly whether inflows to the cuts are expected to evaporate
 - Construction and operation impacts.

3. GROUNDWATER IMPACT ASSESSMENT

An assessment has been carried out to compare the groundwater impacts of the change in design relative to the groundwater impacts provided in the EIS and Amendment Report. The assessment involves the impacts of the design changes in relation to groundwater quality and hydrology, focused on the road cuts, which constitute the largest impact for groundwater. Given the risk to groundwater from bridge piles and fill were assessed as very low, minor and/or localised in the EIS, any changes during detailed design are also deemed low/minor, and have not been considered in detail as part of the assessment.

3.1 ASSESSMENT OF POTENTIAL IMPACTS DURING CONSTRUCTION

3.1.1 OPERATIONAL FOOTPRINT OF THE PROJECT

The operational footprint of the project has increased slightly as a result of the proposed design changes. Figure 2-2 of the Consistency Assessment Report shows the changes to the operational footprint. The updated operational footprint is referred to as the proposed project 80% detailed design operational footprint compared to the former operational footprint referred to as the Approved M12 Motorway – West Package Amendment Report Submissions Report operational footprint. This new

footprint has not changed the groundwater assessment study area which expands two kilometres around the operational footprint.

3.1.2 CONSTRUCTION BOUNDARY OF THE PROJECT

The construction boundary of the project has increased slightly as a result of the design changes. Figure 2-3 of the Consistency Assessment Report shows the changes to the construction footprint. The updated construction footprint is referred to as the proposed project 80% detailed design construction footprint compared to the former construction footprint referred to as the Approved M12 Motorway – West Package Amendment Report Submissions Report construction footprint. This new footprint has not changed the groundwater assessment study area which expands two kilometres around the construction footprint.

3.1.3 THE MAXIMUM OBSERVED GROUNDWATER LEVELS

There are historical monitoring wells and new monitoring wells installed as part of the geotechnical investigation for detailed design. Details on the new monitoring wells, including their location, are in the Geotechnical Interpretive Report (GIR) (WSP, 2021a), with details on the historical wells provided in the EIS. Data loggers recording the groundwater level have been installed in the monitoring wells listed in Table 3.1. Since January 2020, the recording frequency is three hours. The data loggers are still recording and are part of the monitoring program. The maximum observed SWL has been identified from the record of groundwater level monitoring.

The maximum observed SWL for the monitoring wells closest to the cuts are utilised for determining inflow rates (Section 3.1.6).

Table 3.1 Maximum observed SWL (based on the last monitoring event on 7/05/2021)

Bore ID	Near road feature	Max observed SWL (mAHD)
P1-BH426	Between FILL 2-AAR and Cut 2-AAR	60.62
P1-BH507	Cut 2-AAR (East end)	54.94
BH104	Cut 2 (Western Cut)	93.94
BH107	Cut 4	83.99
BH112	Cut 5	80.94
P1-BH421	Cut 6	61.80
P1-BH456	Cut 6	59.68
P1-BH458	Cut 6	59.35
P1-BH501	Between Fill 5 and Cut 6	55.75
BH105	Cut 3	86.16
BH117	FILL 1-AAR	62.83
BH119	Between FILL 1-EDR and FILL 2-EDR	53.61
BH202	Bridge over Cosgroves Creek	47.50
BH204	Fill 5 East	48.33

Bore ID	Near road feature	Max observed SWL (mAHD)
BH209	Fill 7	36.34
P1-BH411	Fill 5 East	50.51
P1-BH431	Fill 2-EDR	53.44
P1-BH440	Fill 7 (East of Cut 7)	37.56
P1-BH506	Fill 1-AAR	61.56
P1-BH522	Between Fill 1-EDR and Fill 2-EDR	53.73

3.1.4 CHANGES AND COMPARISON OF THE CUTS DIMENSIONS

From assessing the proposed modifications listed in Section 1.3 and the information in the GIR (WSP, 2021a), it was found that the base level of the cuts have been modified. These are of particular interest for the groundwater impact assessment because some of the cuts intersect groundwater or are near the water table. In the case of lowering the base of a cut, the surface area in contact with a saturated zone increases, resulting in an increased inflow.

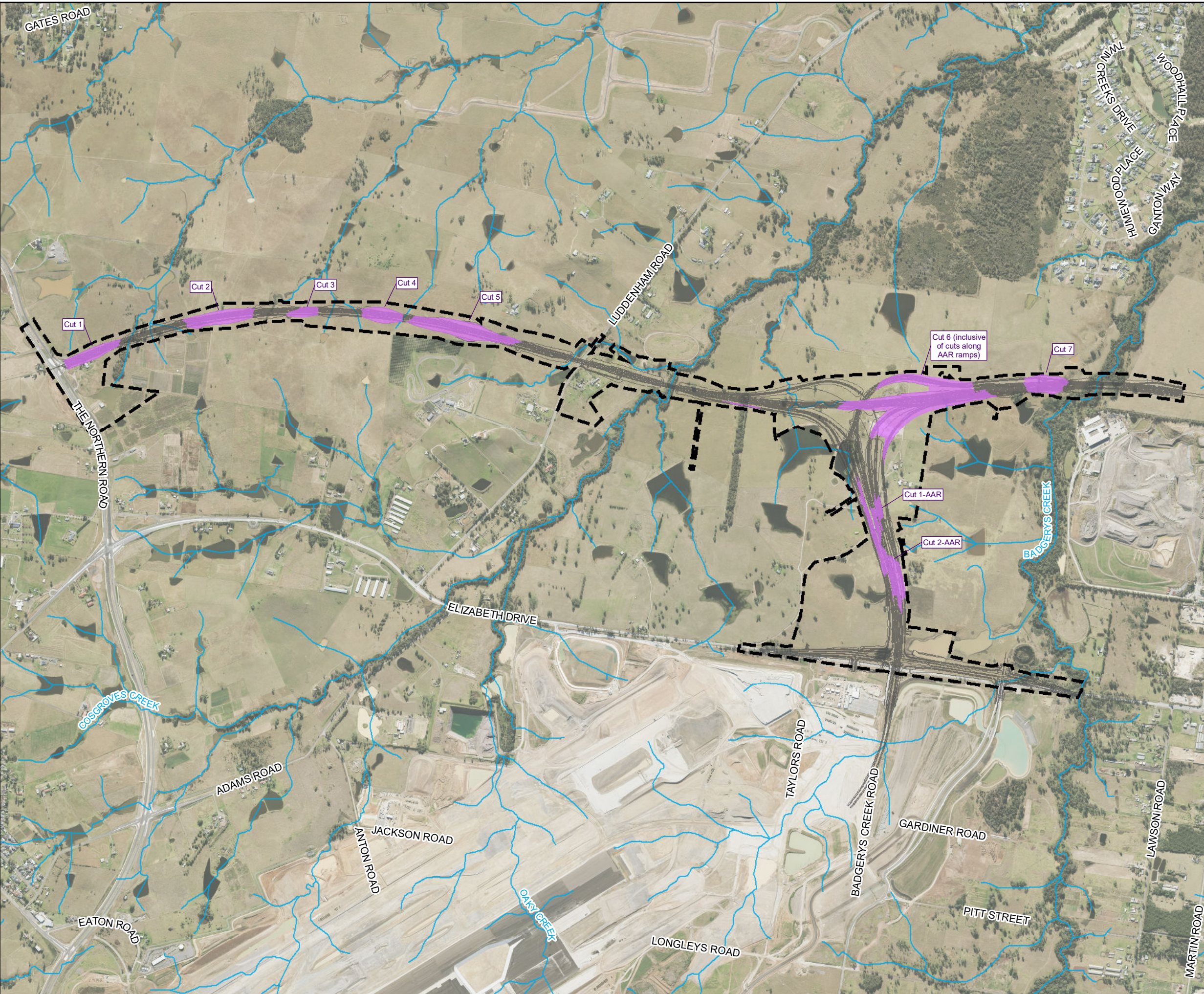
In the EIS and the Amendment Report, the greatest groundwater risks are associated with inflow at the cuts; the cuts identified as intersecting groundwater were the Western Cut, the Airport interchange northern cut and the Airport interchange southern cut.

There are nine cuts within the M12 Motorway – West Package 80% detailed design, including:

- Cut 1 (not mentioned in the EIS or Amendment Report)
- Cut 1-AAR (not mentioned in the EIS or Amendment Report)
- Cut 2 (named the Western Cut in the EIS and Amendment Report)
- Cut 2-AAR (named the Airport interchange southern cut in the Amendment Report)
- Cut 3 (not mentioned in the EIS or Amendment Report)
- Cut 4 (not mentioned in the EIS or Amendment Report)
- Cut 5 (not mentioned in the EIS or Amendment Report)
- Cut 6 (named the Airport interchange northern cut in the Amendment Report)
- Cut 7 (not mentioned in the EIS or Amendment Report).

The location of each cut and dimensions are included in the GIR and shown in Figure 3-1.




Table 3.2 provides a comparison of the naming and dimensions of the cuts, only for those cuts where groundwater is anticipated to be intersected or groundwater is close to the base of the cut. The dimensions are used to estimate the inflow and drawdown at each cut (Section 3.1.6).



M12 Motorway - West Package
Consistency Assessment

Figure 3-1
Cut Locations

Legend

-  Cut extents
-  M12 Motorway – West Package detailed design construction footprint
-  M12 Motorway – West package detailed design



0 200 400
Meters



Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A3

1:20,000

Date: 3/09/2021

Data sources: - DNRME, TMR, Translink, Geoscience Australia
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Table 3.2 Comparison of the dimension and key characteristics of the cuts

Cut ID	Cut ID from EIS/Amendment Report	Amendment Report cut assumption	80% Detailed Design cut assumption	Seepage Area m ²	80% detailed design cut base (mAHD)	max observed SWL (mAHD)	Bore ID within the cut for max observed SWL
Cut 2-AAR	Airport interchange southern cut	Cut base 60 mAHD, SWL 53.32 mAHD at BH119, SWL 60.79 mAHD at BH117, seepage area 30,000 m ² based on SWL 4 m above cut surface	Cut base 61.4 mAHD, SWL 60.62 mAHD, length each side 220 m	0 No seepage is currently expected	61.4	60.62	P1-BH507: 54.94 mAHD P1-BH426: 60.62 mAHD
Cut 2	Western Cut	Cut base 90.23 mAHD, SWL 91.84 mAHD, seepage face estimate 0.5 m height, length 250 m each side (seepage area 250 m ²)	Cut base 90.1 mAHD, SWL 93.94 mAHD, length 365 m (east) and 350 m (west)	2,746	90.1	93.94	BH104 93.94 mAHD
Cut 4	N/A	Not investigated	Cut base 84.2 mAHD, SWL 83.9 mAHD, both lengths 215 m	0	84.2	83.99	BH107 83.99 mAHD
Cut 5	N/A	Not investigated	Cut base 72.5 mAHD, SWL 80.94 mAHD, length 585 m (east) and 575 m (west)	9,790	72.5	80.94	BH112 80.94 mAHD
Cut 6	Airport interchange northern cut	Cut base 57 mAHD, SWL 60.79 mAHD, seepage face 4 m, length 7,500 m (seepage area 60,000 m ²)	Cut base min 55.7 mAHD, SWL 61.8 mAHD. There are eight seepage faces totalling a length of approximately 3,027 m	18,465	55.7	61.8	P1-BH421: 61.8 mAHD, P1-BH456 59.68 mAHD, P1-BH458 59.35 mAHD

Cut ID	Cut ID from EIS/Amendment Report	Amendment Report cut assumption	80% Detailed Design cut assumption	Seepage Area m ²	80% detailed design cut base (mAHD)	max observed SWL (mAHD)	Bore ID within the cut for max observed SWL
Cut 7	N/A	Not investigated	Cut base min 51.2 mAHD, max 53.0 mAHD, SWL unknown (no monitoring well – assumption made 53.5), length 225 m (east) and 190 m (west)	Unknown. Although there is no monitoring well close to Cut 7, an estimate is provided in Section 3.1.6 and Table 3.5.	51.2	Unknown	No monitoring well near the cut

As shown in Table 3.2:

- Only Cut 2, Cut 5 and Cut 6 are expected to intercept groundwater based on the most recent maximum observed SWL (as last recorded on 07/05/2021) (refer to Section 3.1.6 for inflow estimations)
- There is no groundwater level data associated with Cut 7, however the intersection of groundwater is possible (refer to Section 3.1.6)
- The base of Cut 2-AAR and Cut 4 is less than 1 m from the maximum observed SWL.

Note a significant rain event or a series of wet periods could increase the SWL in the vicinity of the cuts and thus could result in some increased inflow for a relatively short period of time for the cuts that intersect groundwater, or actual groundwater inflow for those cuts that are close to the SWL (Cut 2-AAR and Cut 4).

3.1.5 LOCALISED GROUNDWATER LEVEL DRAWDOWN

Each road cut intersecting groundwater will lower the groundwater level to the level of the base of the cut. The SWL decline is the difference between the maximum observed SWL and the elevation of the base of the cut. The SWL decline of each cut that is expected to intercept groundwater is shown in Table 3.3.

Table 3.3 SWL decline

Cut ID	SWL decline (m)
Cut 2	3.84
Cut 5	8.44
Cut 6	6.10
Cut 7	2.3

Although there is no monitoring well close to Cut 7, to obtain an indication of the potential SWL decline, an approximate SWL at Cut 7 was assumed at 53.5 mAHD by extrapolating from other monitoring wells and considering SWLs typically follow topography (rising under hills and falling at valleys).

The maximum predicted change in SWL due to the road cuttings intersecting the water table is 8.44 m at Cut 5.

3.1.6 UPDATED ESTIMATE OF INFLOW AND DRAWDOWN EXTENT

The inflow and drawdown of groundwater at each cut anticipated to intercept groundwater has been estimated to identify if the impact on the environment has changed from the potential impact stated within the EIS and Amendment Report. This was undertaken for a range of hydraulic conductivity values, as per the Amendment Report. The results are presented in Table 3.4.

The method for estimating the inflow at the Western Cut (Cut 2) in the EIS (Darcy's equation) was not retained for the Amendment Report, for estimating the inflow at the Airport interchange northern cut and Airport interchange southern cut. In the Amendment Report, the inflow was estimated by using the Dupuit-Forchheimer well discharge equation for an unconfined groundwater system (no recharge). This method provides the lateral flow to the cut and does not consider inflow from the base of the cut. For consistency, the inflow estimates provided within this memo are based on Dupuit-Forchheimer's equation.

The drawdown extent estimate is based on the method presented in the EIS, the Cooper-Jacob's equation.

Table 3.4 Estimates of inflow and drawdown based on the detailed design of the cuts

Location	Adopted hydraulic conductivity (m/day)	Adopted long-term seepage face height (m ²)	Adopted long-term seepage face area (m ²)	Estimated groundwater inflow at day 365 (kL/day)	Estimated groundwater inflow at day 365 (ML/Year) ¹	Estimated groundwater inflow at year 5 (ML/year)	lateral Extent of drawdown from the cut at day 365 to equilibrium (m)	lateral Extent of drawdown from the cut at year 5 to equilibrium (M)
Cut 2	0.005	3.84	2,746	0.40	0.15	0.08	23	51
Cut 2	0.04	3.84	2,746	1.60	0.58	0.38	65	145
Cut 2	0.09	3.84	2,746	2.86	1.04	0.72	97	217
Cut 5	0.005	8.44	9,790	2.35	0.86	0.48	34	76
Cut 5	0.04	8.44	9,790	8.94	3.26	2.07	96	215
Cut 5	0.09	8.44	9,790	15.78	5.76	3.84	144	322
Cut 6	0.005	6.10	18,465	1.83	0.67	0.35	29	65
Cut 6	0.04	6.10	18,465	6.44	2.35	1.40	82	183
Cut 6	0.09	6.10	18,465	11.01	4.02	2.53	123	274
Total inflows for the maximum scenario (hydraulic conductivity of 0.09 m/day)	-	-	-	29.66	10.83	7.08	-	-

¹ Based on multiplying the inflow at day 365 by 365 days to obtain an indication of an annual inflow amount.

The largest lateral drawdown is predicted for Cut 5, at about 322 m, using the highest hydraulic conductivity of 0.09 m/day.

The total maximum inflow at day 365 is 10.83 ML/year during construction and 7.08 ML/year at year 5 during operation (not accounting for potential inflows from Cut 7). Note the annual inflow is based on the inflow at daily inflow 365 days following inflow commencement, multiplied by 365 days, and does not consider the variability of inflow over time, including the expected higher inflows early during excavation that tend to decrease with time.

Although there is no monitoring well close to Cut 7, to obtain an indication of the potential inflows to the cut and potential lateral drawdown, a SWL of 53.5 mAHD was used for the calculations (by extrapolating from other monitoring wells and considering SWLs typically follow topography (rising under hills and falling at valleys)), the estimates are included in Table 3.5.

Table 3.5 Estimates of inflow and drawdown at Cut 7

Adopted hydraulic conductivity (m/day)	0.005	0.04	0.09
Base of cut (mAHD)	51.2	51.2	51.2
SWL (mAHD)	53.5	53.5	53.5
Total Length (m)	415	415	415
Height (m)	2.3	2.3	2.3
Area (m ²)	954.5	954.5	954.5
Estimated groundwater inflow at day 365 (kL/day)	0.12	0.49	0.89
Estimated groundwater inflow at day 365 (ML/year) ¹	0.04	0.18	0.33
Estimated groundwater inflow at year 5 (ML/year)	0.03	0.12	0.23
Lateral extent of drawdown from the cut at day 365 to equilibrium (m)	18	50	75
Lateral extent of drawdown from the cut at year 5 to equilibrium (m)	40	112	168
Lateral extent of drawdown from the cut at day 365 to equilibrium (m)	18	50	75
Lateral extent of drawdown from the cut at year 5 to equilibrium (m)	40	112	168

¹ Based on multiplying the inflow at day 365 by 365 days to obtain an indication of an annual inflow amount.

3.1.7 COMPARISON OF MAXIMUM INFLOW AND DRAWDOWN

Table 3.6 provides a comparison of the maximum inflow (based on the highest hydraulic conductivity of 0.09 m/day and highest recorded SWL) and lateral drawdown extent estimates for day 365 and year 5 using the same calculation methods used in the EIS and Amendment Report. The total inflow and extent of drawdown has increased compared to the 80% concept design (EIS and Amendment Report).

Table 3.6 Comparison of maximum inflow and drawdown extent between the EIS, Amendment Report and the detailed design (DD)

Cut ID	EIS max Inflow (kL/day) at day 1	EIS max Inflow (ML/Year) at day 1	Amendment max Inflow (kL/day) at day 365	Amendment max Inflow (ML/Year) at day 365	Amendment drawdown extent at year 5 (m)	DD max Inflow (kL/day) at day 365	DD max Inflow (ML/YeaR) at Day 365	DD drawdown extent at year 5 (m)	Impact potential increase /decrease
Cut 2-AAR (Airport interchange southern cut)	-	-	6.45	2.36	222	0	0	0	Decreased (2.36 ML/year at day 365)
Cut 2 (Western Cut)	6.75 ²	2.46 ¹	0.09 ²	0.03 ²	60	2.86 (+3,077%)	1.04	217	Increased (1.01 ML/year at day 365)
Cut 5	-	-	-	-	-	15.78	5.76	322	Increased (5.76 ML/year at day 365)
Cut 6 (Airport interchange northern cut)	-	-	8.36	3.05	222	11.01 (+32%)	4.02	274	Increased (0.97 ML/year at day 365)
Cut 7	-	-	-	-	-	0.89	0.33	168	Increased (0.33 ML/year at day 365)
Total inflow from all cuts			14.9	7.87³		30.55	11.15		Increased (3.28 ML/year at day 365)

¹ Using the EIS estimate method

² Using the Amendment Report method

³ Total inflow as provided in the Amendment Report (Cut 2-AAR and Cut 6 using the Amendment Report method and Cut 2 using the EIS estimate method)

The maximum estimated inflow at day 365 is 2.86 kL/day at Cut 2, 15.78 kL/day at Cut 5, 11.01 kL/day at Cut 6 and 0.89 kL/day at Cut 7. At these cuts, this is an increase of inflow compared to the estimate in the Amendment Report (Cut 5 and Cut 7 were not part of the 80% concept design). Overall, there is an increase of 3.28 ML/year at day 365.

The magnitude of potential drawdown associated with the four cuts that are anticipated to intersect the water table is sufficiently small such that:

- Regional groundwater drawdown will not occur
- Regional groundwater flows directions will not change
- Changes to SWLs are anticipated to be localised.

3.1.8 GROUNDWATER DEPENDENT ECOSYSTEMS

The footprint of the project remains relatively unchanged, therefore the list of identified GDEs and sensitive receptors remains the same as at the EIS and Amendment Report stages.

At the EIS and Amendment Report stages, no GDEs were identified as being impacted. Since the extent of drawdown has now increased in certain areas (refer to Table 3.7), the potential for groundwater drawdown to reach GDEs has been assessed.

The approximate distance between the cuts intersecting groundwater and GDEs is summarised in Table 3.7. Also provided is the lateral extent of drawdown from the cuts. Drawdown is not anticipated to intersect any GDE.

Table 3.7 Assessment of impact to GDE

Cut ID	Distance to nearest GDE (m)	lateral extent of drawdown from the cut at year 5 to equilibrium (m)	lateral drawdown intersecting GDE
Cut 2-AAR	839	0	No
Cut 2	393	217	No
Cut 5	933	322	No
Cut 6	823	274	No
Cut 7	182	168 ¹	No

¹ Based on an estimation of groundwater level (no monitoring well nearby).

3.1.9 REGISTERED GROUNDWATER BORES

The list of registered groundwater bores in the project area at the detailed design stage has been compared to the list of registered groundwater bores at the EIS stage and documented in the EIS (Appendix N, Section 4.9.3) (Roads and Maritime, 2019). No new registered groundwater bores have been identified. As mentioned in the EIS, the closest registered groundwater bore with a use relating to water supply (such as irrigation, stock and domestic, water supply or commercial/industrial) is about 400 metres from the construction footprint and beyond any drawdown estimated from the road cuts. No registered groundwater bores are anticipated to be impacted by the project construction and operation.

3.1.10 GROUNDWATER TAKE AND LICENSING

As discussed in Section 2.1 of the EIS, the project is exempt from requiring a water use approval, a water supply work approval and a water access licence given the project is considered state significant infrastructure and the proponent is a road authority. As a result of the design changes, the total take (inflow) has increased by 3.28 ML/year, from 7.87 ML/year estimated in the Amendment Report to 11.15 ML/year (including the indicative take from Cut 7) currently estimated. Note this is a conservative estimate given the higher hydraulic conductivity of 0.09 m/day and the highest measured SWL were used to estimate the inflow.

3.1.11 CULTURAL VALUES

As the construction and operational footprints have largely remained the same, the statement from the EIS (Section 7.10.3) remains unchanged: the cultural values are not considered applicable to the groundwater assessment for the project.

3.1.12 MITIGATION OF INFLOW BY EVAPORATION

The evaporation rate at each cut anticipated to intersect groundwater is calculated with the same method used in the EIS (Appendix N, Section 5.1.1) (Roads and Maritime Services, 2019). The result is shown in Table 3.8. At each cut, the evaporation is greater than the inflow, therefore the estimated groundwater inflows are anticipated to fully evaporate.

Given the evaporation rate is considerably greater than inflow, higher inflow that is expected to occur early in the excavation of the cuts and not captured in the inflow methods used, are largely anticipated to readily evaporate. As per the new environmental management measure GW06 (refer to Statement of Commitments / environmental management measures

The proposed change has been assessed in **Error! Not a valid bookmark self-reference.** in relation to the relevant commitments / environmental management measures in the context of the Division 5.2 Approval.

Additional and/or modified environmental management measures to those presented in the AR Submissions Report have been made bold and deleted measures, or parts of measures, have been struck out

Table 4.1), the construction contractor will estimate groundwater inflows to Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR prior to construction commencing using their construction methodology to estimate the potential groundwater inflows that are expected in the first year of construction to confirm the inflows expected and if the proposed mitigation measures are sufficient to manage higher inflows that are likely during earthworks activity (that were not estimated during the Amendment Report).

Table 3.8 Assessment of evaporation as a mitigation measure for the inflow

Cut ID	DD max inflow (kl/day) at day 365	Evaporation rate (kl/day)
Cut 2-AAR	0	Not calculated
Cut 2	1.04	7.25
Cut 5	5.76	16.82
Cut 6	4.02	48.90
Cut 7	0.89	6.02

3.1.13 SALINITY

At the EIS and detailed design stage, groundwater has been sampled and analysed, including for total dissolved solids (TDS). The TDS ranges from 5,363 mg/L at Cut 1 to 13,440 mg/L at Cut 6, which indicates the groundwater across the site is saline. Further details are in the GIR (WSP, 2021a).

When saline groundwater evaporates, salts are anticipated to accumulate at the seepage face and in the drain. The salt can be mobilised by rainfall. This risk is addressed in the Acid Sulfate Soil and Salinity Management Plan (WSP, 2021b). No further mitigation measures are proposed.

3.1.14 GROUNDWATER QUALITY

No changes in groundwater quality (as reported in the EIS, Section 7.10.2) are anticipated as a result of the 80% detailed design.

3.1.15 CUMULATIVE IMPACTS

At the EIS and Amendment Report stages, potential groundwater drawdown impacts of the project were deemed minor and localised (Section 3.1.6), with the project expected to have a minor contribution to cumulative groundwater drawdown impacts. There is no change to this expectation as a result of the 80% detailed design changes.

3.2 ASSESSMENT OF POTENTIAL IMPACTS DURING OPERATION

There are anticipated to be no changes in the groundwater impacts during operation as a result of the 80% detailed design (refer to Section 3.1.6, year 5).

3.3 ENVIRONMENTAL MANAGEMENT MEASURES

3.4 GROUNDWATER IMPACTS ASSOCIATED WITH THE 80% DETAILED DESIGN ARE GENERALLY CONSISTENT WITH THE IMPACTS DESCRIBED IN THE APPROVED PROJECT, AND WOULD THEREFORE BE MANAGED THROUGH THE IMPLEMENTATION OF THE ENVIRONMENTAL MANAGEMENT MEASURES DESCRIBED IN STATEMENT OF COMMITMENTS / ENVIRONMENTAL MANAGEMENT MEASURES

The proposed change has been assessed in **Error! Not a valid bookmark self-reference.** in relation to the relevant commitments / environmental management measures in the context of the Division 5.2 Approval.

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Table 4.1.

The groundwater monitoring locations for the baseline, construction and operational phases (Table 7-1 Appendix J of the Amendment Report) should be updated to reflect the newly installed monitoring wells, the newly identified road cuts intersecting groundwater and the new naming of the cuts (refer to GW01 in Statement of Commitments / environmental management measures

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Table 4.1).

Where there is additional and/or modified environmental management measures to those presented in the AR Submissions Report have been made bold and deleted measures, or parts of measures, have been struck out presented in this section and Statement of Commitments / environmental management measures

The proposed change has been assessed in **Error! Not a valid bookmark self-reference.** in relation to the relevant commitments / environmental management measures in the context of the Division 5.2 Approval.

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Table 4.1. One environmental management measure has been modified and one additional environmental management measure is proposed. As per environmental management measure GW04 (refer to Statement of Commitments / environmental management measures

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Table 4.1) groundwater will be monitored at the airport interchange northern cut (**Cut 6**), ~~and airport interchange southern cut (Cut 2-AAR), and the western cut (Cut 2), Cut 1, Cut 3, Cut 4, Cut 5, Cut 7 and Cut 1-AAR~~ during the construction phase and operational phase as outlined in Table 7-1 in the groundwater supplementary technical memorandum (Appendix J of Amendment Report) **and the M12 Motorway - West Package Detailed Design Consistency Assessment Memo**. The groundwater indicators to be monitored will be as per Section 7.2.5 of Appendix N of the EIS.

Groundwater inflows to ~~the airport interchange northern and southern cuts and the western cut~~ **Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR** are to be observed by the groundwater monitoring contractor during the construction and operational phases at monthly intervals. As part of observing ~~the airport interchange northern and southern cuts and the western cut~~ **groundwater inflows at the identified cuts**, the groundwater monitoring contractor is to estimate the groundwater inflow rates and note the areas where groundwater inflow is occurring.

During construction, if groundwater inflows are observed from ~~the airport interchange northern and southern cuts and the western cut~~, **the cuts identified through the detailed design of the M12 Motorway - West Package including Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR**, the groundwater quality from the cut is to be sampled.

Operational phase groundwater quality sampling, including the quality sampling of ~~the airport interchange northern and southern cuts and the western cut~~ **Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR** inflows, is to occur at a monthly interval for at least 6 months.

As per a new environmental management measure GW05 (refer to Statement of Commitments / environmental management measures

The proposed change has been assessed in **Error! Not a valid bookmark self-reference.** in relation to the relevant commitments / environmental management measures in the context of the Division 5.2 Approval.

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Table 4.1), the construction contractor will estimate groundwater inflows to Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR prior to construction commencing using their construction methodology to estimate the potential groundwater inflows that are expected in the first year of construction to confirm the inflows expected and if the proposed mitigation measures are sufficient to manage higher inflows that are likely during earthworks activity

4. CONSISTENCY ASSESSMENT – PROJECT APPROVAL

4.1 MINISTER'S CONDITIONS OF APPROVAL

There are no specific Ministers conditions of approval related to groundwater.

4.2 STATEMENT OF COMMITMENTS / ENVIRONMENTAL MANAGEMENT MEASURES

The proposed change has been assessed in **Error! Not a valid bookmark self-reference.** in relation to the relevant commitments / environmental management measures in the context of the Division 5.2 Approval.

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Table 4.1 Consistency against relevant Statement of Commitments / environmental management measures

Reference	Statement of commitment/ management measure	Discussion	Consistent
B21	Interruptions to water flows associated with groundwater dependent ecosystems will be minimised through detailed design.	The drawdown extent at each road cut intersecting groundwater (Cut 2, Cut 5, Cut 6 and Cut 7) has been revised in this memo. The anticipated drawdown is not expected to intersect any GDE.	Yes
GW01	<p>Groundwater monitoring will be carried out as part of the construction water quality monitoring program for the project.</p> <p>The groundwater monitoring will be based on the water quality monitoring methodology, water quality indicators and the monitoring locations shown in the Groundwater quality and hydrology assessment report Appendix N of the EIS and Table 7-1 in the groundwater supplementary technical memorandum (Appendix J of Amendment Report).</p> <p>Baseline groundwater monitoring will be carried out at least monthly for at least six months before construction. Monitoring will also be carried out at least monthly during construction and will continue for at least six months of operation to verify that there are no groundwater impacts, and that management measures are adequate.</p>	<p>Monitoring wells BH104, BH112, BH202, BH207, BH209, BH217, BH223, BH301, BH302 and BH145 were sampled between 22 and 24 August 2018 during the EIS stage (Appendix O Soils and contamination assessment report).</p> <p>The next sampling event occurred on the 16 and 17 June 2020 at monitoring wells BH209, BH411, BH421, BH456 and BH458 and on 3 August 2020 at monitoring wells BH117, BH204, BH414, BH431 and BH440 (WSP, 2020a).</p> <p>Extra sampling was undertaken to assess for groundwater aggressivity only, as part of the GIR.</p> <p>Groundwater level monitoring has been conducted monthly since June 2020 and is continuing. The hydrographs are presented in the GIR.</p> <p>The groundwater monitoring plan should be reviewed and updated as required prior to construction to include a revised list of monitoring wells to be monitored prior to construction, during construction and during operation.</p>	Yes

Reference	Statement of commitment/ management measure	Discussion	Consistent
		The proposed changes to the project would not impact on the ability to comply with this requirement.	
GW02	<p>Potential impacts on groundwater flows will be reconsidered as the detailed design for the project progresses, particularly in relation to the projects vertical alignment and extent of road cuttings. The aim of this will be to ensure that the groundwater controls proposed for the design as set out in this document would remain effective in mitigating groundwater impacts.</p> <p>In the instance that, during detailed design it cannot be demonstrated that the groundwater controls would be effective in mitigating potential impacts, or if observed groundwater inflow rates into the western cut or airport interchange northern and southern cuts are higher than estimated, additional measures will be implemented to minimise potential impacts on groundwater flows due to road cuttings or other sub-surface components of the project.</p>	<p>Inflow estimates have been revised in this document (Section 3.1.6).</p> <p>For consistency, the method used to estimate inflow in the Amendment Report was used in this consistency assessment. Note this method does not:</p> <ul style="list-style-type: none"> — Account for the inflow from the base of the cut — Allow for the higher inflows that occur shortly following excavation. <p>The measures (principally evaporation) in place to mitigate the inflow at day 365 and year 5 are appropriate. Given the evaporation rate is considerably greater than inflow (conservative estimate for day 365), higher inflow that is expected to occur early in the excavation of the cuts and not captured in the inflow methods used, are largely anticipated to readily evaporate. A revised environmental management measure is proposed; refer to GW05 below.</p> <p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes
GW03	Installation of supplementary groundwater monitoring bores in the area of both airport interchange cuts would be carried out at detailed design stage, to better understand groundwater depths and levels (and groundwater quality) in these areas.	New monitoring wells have been installed in Cut 2-AAR (formerly called Airport interchange southern cut) and Cut 6 (formally called Airport interchange northern cut).	Yes
GW04	<p>Monitoring for M12 Motorway – West Package</p> <p>Groundwater will be monitored at the airport interchange northern cut (Cut 6), and airport interchange southern cut (Cut 2-AAR), and the western cut (Cut 2), Cut 1, Cut 3, Cut 4, Cut 5, Cut 7 and Cut 1-AAR during the construction phase and operational phase as outlined in Table 7-1 in the groundwater</p>	<p>Inflow monitoring is not applicable at the detailed design stage.</p> <p>The proposed changes to the project would not impact on the ability to comply with this requirement.</p>	Yes

Reference	Statement of commitment/ management measure	Discussion	Consistent
	<p>supplementary technical memorandum (Appendix J of Amendment Report) and the M12 Motorway - West Package Detailed Design Consistency Assessment Memo. The groundwater indicators to be monitored will be as per Section 7.2.5 of Appendix N of the EIS.</p> <p>Groundwater inflows to the airport interchange northern and southern cuts and the western cut Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR are to be observed by the groundwater monitoring contractor during the construction and operational phases at monthly intervals. As part of observing the airport interchange northern and southern cuts and the western cut groundwater inflows at the identified cuts, the groundwater monitoring contractor is to estimate the groundwater inflow rates and note the areas where groundwater inflow is occurring.</p> <p>During construction, if groundwater inflows are observed from the airport interchange northern and southern cuts and the western cut, the cuts identified through the detailed design of the M12 Motorway - West Package including Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR, the groundwater quality from the cut is to be sampled.</p> <p>Operational phase groundwater quality sampling, including the quality sampling of the airport interchange northern and southern cuts and the western cut Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR inflows, is to occur at a monthly interval for at least 6 months.</p>		
GW05	<p>Monitoring for M12 Motorway – Central Package</p> <p>Groundwater quality, levels and inflows will be monitored at Clifton Avenue (Cut 9) during construction and operation as</p>	A proposed additional revised environmental management measure. Not relevant for M12 Motorway – West Package.	N/A

Reference	Statement of commitment/ management measure	Discussion	Consistent
	<p>outlined in the M12 Central consistency assessment report (GHD, 2021).</p> <p>The groundwater indicators to be monitored will be as per Section 7.2.5 of Appendix N of the EIS. Groundwater inflows are to be monitored at monthly intervals. As part of observing inflows at the identified cuts, the groundwater inflow rate is to be estimated and the areas where groundwater inflow is occurring noted.</p> <p>During construction, if groundwater inflow rates are observed from the cuts identified through the detailed design of the M12 Motorway – Central Package including Cut 9, the groundwater quality from the cut is to be sampled.</p> <p>Operational phase groundwater quality sampling, including the quality sampling of Cut 9 inflows, is to occur at monthly intervals for at least six months.</p>		
GW06	<p>Monitoring for M12 Motorway – West Package</p> <p>Prior to construction commencing, the Construction Contractor will use their earthworks methodology to estimate the potential groundwater inflows that are expected in the first year of construction in order to confirm the inflows expected and if the proposed mitigation measures are sufficient to manage higher inflows that are likely during early earthworks activity.</p> <p>The estimate of groundwater inflows is to be undertaken for Cut 2, Cut 4, Cut 5, Cut 6, Cut 7 and Cut 2 AAR. The estimate is to include groundwater inflow from both the walls and base of the cuts, and will take into account the construction methodology and staging for each cut. In</p>	A proposed additional revised environmental management measure.	N/A

Reference	Statement of commitment/ management measure	Discussion	Consistent
	<p>addition, the estimate will utilise the maximum observed groundwater levels (as sourced from M12 West groundwater monitoring data).</p> <p>The Construction Contractor will assess the results of the estimated groundwater inflows to confirm whether evaporation will be sufficient to mitigate the potentially higher inflows likely to be expected during early earthwork activities. If evaporation is determined not to be a sufficient mitigation measure, the Construction Contractor will identify and implement additional mitigation measures and these will be documented in the Construction Contractor's CEMP and Construction Soil and Water Management Plan.</p>		

The proposed change is consistent with the Statement of Commitments/ environmental management measures incorporated as part of the Division 5.2 Approval.

4.3 EPBC APPROVAL

The proposed changes in groundwater quality management measures at detailed design do not constitute to any change in project aspects related to the EPBC approval.



5. REFERENCES

Roads and Maritime Services, 2019. M12 Motorway, Environmental impact statement

Transport for NSW, 2020a. M12 Motorway Amendment Report

WSP, 2021a. M12 Motorway Package 1 - West, Geotechnical Interpretive Report, document no. M12WDD-WSP-ALL-GE-RPT-000004

WSP, 2021b. M12 Motorway Package 1 – West, Acid Sulfate Soil and Salinity Management Plan (ASSMP), document no., M12WDD-WSP-ALL-GE-RPT-000007, Design Lot GE05

