

# Western Sydney Airport

## Soil and Water Construction Environmental Management Plan

December 2019



**Western  
Sydney  
Airport**

## Document Control

File Name	Document Name	Revision
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## Revision History

Revision	Date	Description	Author	Reviewer
0	24/09/2018	Approved	WSA	S Reynolds
0.1	09/11/2018	Draft updated to include Experience Centre and Site Office and Material Importation	WSA	S Reynolds
0.2	23/11/2018	Draft updated to address comments on the Experience Centre and Site Office phase and Material Importation phase	WSA	S Reynolds
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1	14/12/18	Revision update to include the Experience Centre and Site Office phase and Material Importation phase	WSA	S Reynolds
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1.3	30/09/2019	Issued to WSU and Stakeholders	WSA	S Bellido
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1.5	06/12/2019	Minor update	WSA	S Bellido
1.5a	10/06/2019	For Approval	WSA	S Reynolds
2.0	18/12/2019	Approved	WSA	S Reynolds

## Plan Authorisation

Position	Name	Signature	Date
Environment Manager	S Reynolds		06/12/2019

## Glossary and Definitions

Item	Definition
<b>Airports Act</b>	Airports Act 1996 (Cth)
<b>Airport</b>	The airport located at the Airport Site. Note: The Airport is referred to in the Act as Sydney West Airport known as Western Sydney International (Nancy-Bird Walton) Airport, or, more commonly, Western Sydney International.
<b>Airport Lease</b>	An airport lease for the Airport granted under section 13 of the Act
<b>Airport Lessee Company</b>	The company that is granted a lease over the Airport Site
<b>Airport Site</b>	The site for Sydney West Airport as defined in the Act
<b>ANZECC Guidelines</b>	Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000 Guidelines)
<b>Approver</b>	(a) for condition 30 of the Airport Plan (Biodiversity Offset Delivery Plan) and any matter relating to the Biodiversity Offset Delivery Plan – the Environment Minister or an SES employee in the Environment Department; and (b) for other matters – the Infrastructure Minister or an SES employee in the Infrastructure Department.
<b>Apron</b>	The part of an airport used for: a. the purposes of enabling passengers to embark/disembark an aircraft; b. loading cargo onto, or unloading cargo from, aircraft; and/or c. refuelling, parking or carrying out maintenance on aircraft
<b>Associated Site</b>	An 'associated site for Sydney West Airport' as set out in section 96L of the Act
<b>Blue Book</b>	<i>Managing Urban Stormwater: Soils and Construction</i> (Landcom 2004)
<b>Bulk Earthworks</b>	The large scale earthworks required to flatten the Stage 1 area in preparation for further construction works as described in section 6 of the Construction Plan
<b>Condition</b>	A condition set out in Part 3 of the Airport Plan in accordance with section 96C of the Act
<b>Construction Impact Zone</b>	The part or parts of the Airport Site or an Associated Site on which Main Construction Works are planned to occur, as detailed in the Construction Plan approved in accordance with Condition 1.
<b>Construction Period</b>	The period from the date of commencement of Main Construction Works in any part of the Airport Site until the date of commencement of Airport Operations.
<b>Environment Department</b>	Commonwealth Department of the Environment and Energy
<b>Environment Minister</b>	The Minister responsible for the EPBC Act
<b>Environmental Impact Statement</b>	The environmental impact statement prepared in relation to the Airport under the EPBC Act
<b>EPBC Act</b>	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
<b>Groundwater</b>	Water found below the surface, usually in porous rock, soil or in underground aquifers
<b>Heavy metal</b>	Any metal or metalloid of environmental concern

Item	Definition
<b>Infrastructure Department</b>	The Department of the State administered by the Infrastructure Minister
<b>Infrastructure Minister</b>	The Minister responsible for the Act from time to time
<b>Laws</b>	Statutes, regulations, rules, bylaws and other subordinate legislation of the Commonwealth or a state or territory
<b>Main Construction Works</b>	Substantial physical works on a particular part of the Airport Site (including large scale vegetation clearance, bulk earthworks and the carrying out of other physical works, and the erection of buildings and structures) described in Part 3 of the Airport Plan, other than TransGrid Relocation Works or Preparatory Activities
<b>Non-conformance</b>	Failure to conform to the requirements of the Airport Plan (including the SEMF)
<b>Preparatory Activities</b>	<p>The following:</p> <ul style="list-style-type: none"> <li>a. day-to-day site and property management activities;</li> <li>b. site investigations, surveys (including dilapidation surveys), monitoring, and related works (e.g. geotechnical or other investigative drilling, excavation, or salvage);</li> <li>c. establishing construction work sites, site offices, plant and equipment, and related site mobilisation activities including access points, access tracks and other minor access works, and safety and security measures such as fencing, but excluding bulk earthworks);</li> <li>d. enabling preparatory activities such as: <ul style="list-style-type: none"> <li>(i) demolition or relocation of existing structures (including buildings, services, utilities and roads);</li> <li>(ii) the disinterment of human remains located in grave sites identified in the European and other heritage technical report in volume 4 of the EIS; and</li> <li>(iii) application of environmental impact mitigation measures; and</li> </ul> </li> <li>e. any other activities which an Approver determines are Preparatory Activities</li> </ul>
<b>the Project</b>	Western Sydney Airport – Stage 1 development
<b>Remediation Action Plan or RAP</b>	The Western Sydney Airport Remediation Action Plan provides a detailed summary of the nature and extent of known contamination on the Site. The RAP also documents the requirement for remediation of the identified contamination, the remediation approach and the implementation of the remediation that must be undertaken to ensure the suitability of the Site for its intended end-use as an airport.
<b>SES Officer</b>	An SES employee under the Public Service Act 1999 (Cth)
<b>Sydney West Airport</b>	The Airport. Note: this is the name used in the Act. The Airport is known as Western Sydney International (Nancy-Bird Walton) Airport, or, more commonly, Western Sydney International.
<b>Western Sydney International (Nancy Bird Walton) Airport (WSI)</b>	The Airport. Note: Under the Act the Airport is referred to as Sydney West Airport
<b>WSA</b>	<p>WSA Co Limited (ACN 618 989 272), the entity responsible for constructing and operating the Airport in accordance with the Airport Plan.</p> <p>For the purposes of the Airports Act 1996 (Cth), WSA is the “airport-lessee company” for WSI</p>

## Acronyms and abbreviations

Item	Definition
<b>AEPR</b>	Airports (Environment Protection) Regulations 1997
<b>AHD</b>	Australian Height Datum
<b>ARI</b>	Average Reoccurring Interval
<b>AS</b>	Australian Standard
<b>BEC</b>	Bulk Earthworks Contract
<b>CEMP</b>	Construction Environmental Management Plan
<b>DO</b>	Dissolved Oxygen
<b>ECM</b>	Environmental Control Map
<b>EEW</b>	Early Earthworks Contractor
<b>EPBC</b>	Environment Protection and Biodiversity Conservation Act 1999
<b>EIS</b>	Environmental Impact Statement
<b>EPA</b>	NSW Environment Protection Authority
<b>EWMS</b>	Environmental Work Method Statement
<b>ISO 14001</b>	AS/NZS ISO 14001:2015 – Environmental Management Systems
<b>km</b>	kilometres
<b>LAA</b>	Licensed Asbestos Assessor
<b>LTEMP</b>	Long Term Environmental Management Plan
<b>m, m<sup>2</sup> and m<sup>3</sup></b>	Metres, square metres and cubic metres
<b>MI</b>	Material Importation
<b>ML and ML/d</b>	Megalitres and megalitres per day
<b>NTU</b>	Turbidity units
<b>OEH</b>	NSW Office of Environment and Heritage
<b>PFAS</b>	Polyfluoroalkyl Substance
<b>PFOS</b>	Perfluorooctyl Sulfonate
<b>RAP</b>	Remediation Action Plan
<b>SEMF</b>	Site Environmental Management Framework. The SEMF is contained within the Construction Plan (included as Appendix 2).
<b>TN</b>	Total nitrogen
<b>TSS</b>	Total Suspended Solids
<b>WSI</b>	Western Sydney International (Nancy-Bird Walton) Airport

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# 1 Introduction

## 1.1 Background/Context

This WSA Soil and Water Construction Environmental Management Plan (Soil and Water CEMP) (this plan) has been prepared to satisfy the requirements of the Soil and Water CEMP set out in the Conditions for the Stage 1 Development of the Western Sydney International (Nancy Bird Walton) Airport (WSI) detailed in Section 3.10.2 of the Airport Plan. Specifically, Section 3.10.2 Condition 8(1) of the Airport Plan requires that a WSA Soil and Water CEMP be approved under the Airport Plan prior to the commencement of Main Construction Works under the Airport Plan.

This Soil and Water CEMP provides the management approach and requirements (including environmental mitigation measures, controls, monitoring and reporting) for soil and water during construction of the Stage 1 Development. This plan forms one of nine CEMPs which are collectively covered by the WSA Site Environmental Management Framework (SEMF). To ensure the environmental resources, responsibilities and management measures are implemented during the construction activities, the SEMF is contained within the Construction Plan (included as Appendix 2). The implementation of the Construction Plan and the SEMF are aligned with other Project level management plans including the Community and Stakeholder Engagement Plan and the Sustainability Plan as illustrated in Figure 1.

The Construction Plan including the SEMF and the nine CEMPs provide the environmental management approach and requirements and therefore should not be read in isolation to each other due to interconnecting management outcomes and objectives. Specifically, for the Soil and Water CEMP, it is considered that the following management plan linkages can be made:

- **Aboriginal Cultural Heritage CEMP** – The management of soil should be undertaken in alignment with the Aboriginal Cultural Heritage CEMP, the Topsoil Management Protocol which has been developed to manage any areas with a high potential for surface artefacts.
- **Air Quality CEMP** – It is considered that the management of air quality, dust control, is closely aligned with the outcomes and management objectives of this Soil and Water CEMP. Water application to the ground's surface for the purpose of dust suppression will need to be undertaken in accordance with this Soil and Water CEMP.
- **Biodiversity CEMP** – The management of surface water runoff is imperative to the management and protection of down-gradient receiving waters. The water quality monitoring program and set criteria has been designed to ensure the monitoring of any down-gradient water quality impacts which may have the potential to impact of aquatic fauna.
- **Waste and Resources CEMP** – Water storage for its application for soil compaction and dust suppression forms a major component of the Stage 1 Development construction. Water is considered a valuable resource and where possible, the project will strive to maximise the reuse captured / stored water as opposed to drawing on groundwater and potable water sources. In addition, any contaminated or unsuitable soil generated as a result of the works will need to be managed and disposed of in accordance with the Waste and Resources CEMP.
- **Sustainability Plan**– Water is considered a valuable resource. Where possible, the project will maximise the reuse of stored water on site as opposed to drawing on groundwater and potable (municipal) supply sources. In addition, the project works will aim towards maximising the reuse and recycling of material / spoil on site and minimise the need for off-site disposal.

Where relevant, linkages to other CEMPs and management objectives have been included in the risk assessment and the environmental control measures, Section 6.5 and Section 7 respectively.

Table 1 highlights relationships and linkages of this Soil and Water CEMP with other CEMPs and management plans, including key cross-referencing to Airport Plan and EIS requirements.

**Table 1 Soil and Water CEMP relationship with other CEMP documentation**

CEMP or Plan	Airport Plan Condition (3.10.2)	EIS Chapter 28 Table: Management area	EIS Chapter 28 Table: Mitigation measures
Aboriginal Cultural Heritage	11	28-12	28-13
Air Quality	10	28-10	28-11
Biodiversity	7	28-04	28-05
Community and Stakeholder Engagement Plan	15	28-20	28-21
European and other Heritage	12	28-14	28-15
Noise and Vibration	6	28-02	28-03
<b>Soil and Water (this plan)</b>	8	28-06	28-07
Sustainability Plan	29	28-37	28-38
Traffic and Access	9	28-08	28-09
Visual and Landscape	14	28-18	28-19
Waste and Resources	13	28-16	28-17

**Key**

Moderate to high relevance to this CEMP

Some relevance to this CEMP

The review and document control process for this Plan are described further in Section 9 of the SEMF.

The context of this Plan in relation to the WSA environmental management system is presented in Figure 1.

## 1.2 Document purpose

The purpose of this plan is to provide the foundation for the management of soil and water quality impacts in accordance with best practice and legal requirements (including environmental mitigation measures, controls, monitoring and reporting) during the construction phase of the Stage 1 Development based on the assessment undertaken as part of the EIS.

This Plan details the soil and water quality management requirements that must be satisfied in order to demonstrate compliance with Condition 8 of Section 3.10.2 of the Airport Plan for the construction of the Stage 1 development of Western Sydney International.

Legal and other requirements are identified and maintained in a register within the SEMF (refer SEMF Appendix C). Mitigation measures (specific to soil and water) required to satisfy these requirements are derived from the EIS and through risk assessment processes (refer Section 6.6) and included within this CEMP (refer Section 7).

Implementation of these measures is ensured through monitoring, training and competence, inspection, audit and report actions detailed in Sections 9 and 10, with the responsibilities for implementation identified in Section 8. Continual improvement processes in relation to compliance with regulatory requirements are detailed in the SEMF.

In summary, this plan sets out to achieve the following:

- Provision of details for the management and mitigation measures to be implemented, including timing and responsibilities;
- Ensuring the commitments of the Conditions (as set out in the Airport Plan) are met and satisfied by both WSA Co and contractors;
- Provision of process for monitoring implementation, reporting, and auditing of soil and water quality related management and compliance related issues;
- Commitment to meeting the requirements of AS/NZS ISO 14001: 2016 Environmental Management Systems, including the need for continual improvement;
- Provision of a process to be implemented for the management of complaints, for stakeholder engagement, and for the management of emerging environmental issues as they arise; and
- Provision of a system including procedures, plans and documentation for implementation by WSA personnel and contractors to enable Project completion in accordance with the environmental requirements.

Effective implementation of this plan will assist WSA and relevant contractors to achieve compliance with necessary environmental regulatory and policy requirements in a systematic manner with an outcome of continual environmental management performance.

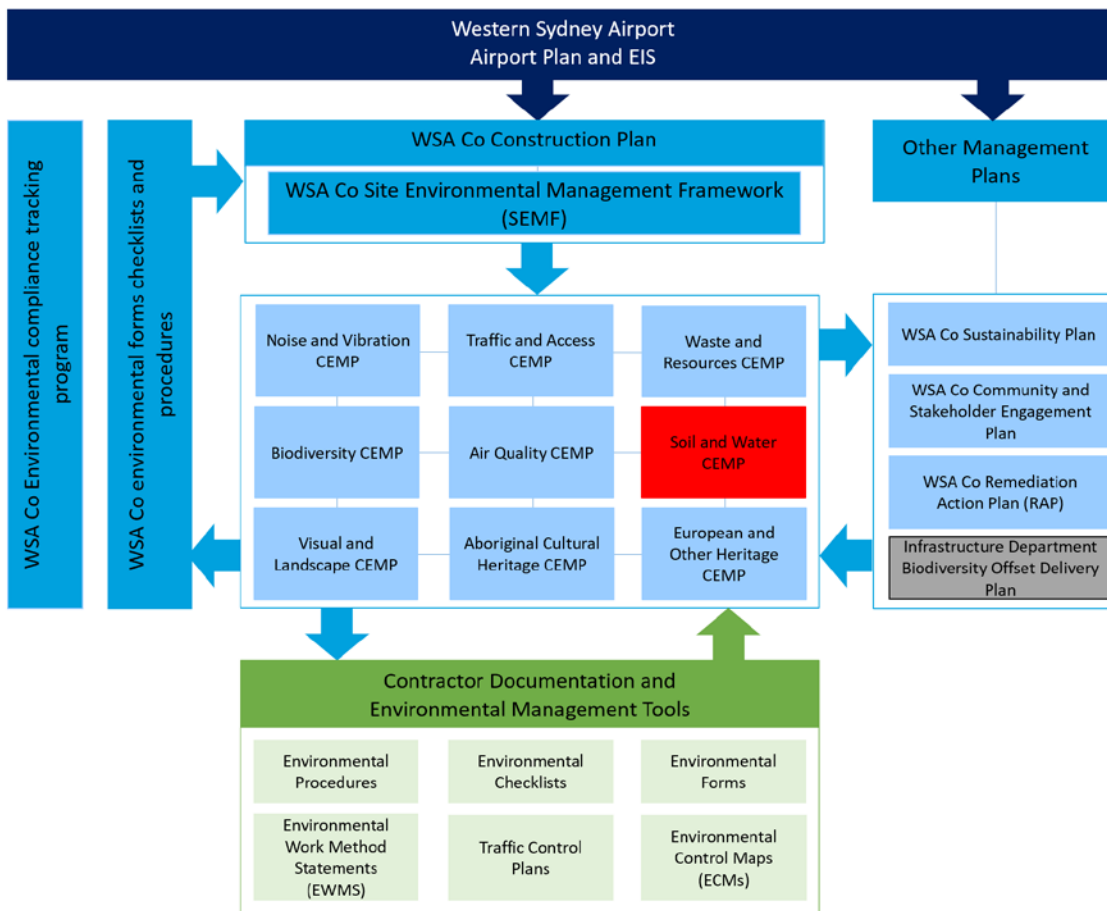
### **1.3 WSA environmental management system overview**

WSA co-operates in general accordance with AS/NZS ISO 14001:2016 – Environmental management systems. A copy of the WSA environmental policy is provided in Appendix E of the SEMF.

The Stage 1 Development will be undertaken in accordance with the Construction Plan including the SEMF and the associated CEMPs (including this Plan).

The SEMF forms an appendix to the Construction Plan and is the overarching environmental plan for the implementation of the nine CEMPs. It provides a structured and systematic approach to environmental management and provides an expectation and guidance with regards to environmental management for the overall construction of the Stage 1 Development.

The structure of the environmental management system for the Project is shown in Figure 1.



**Figure 1 WSA Environmental Management System and CEMP context**

## 1.4 Consultation requirements of this plan

Airport Plan Condition 35 outlines the consultation requirements during the preparation of the CEMP documentation and requires consultation with any NSW Government agencies as specified by the NSW Department of Premier and Cabinet as well as the Environment Department and OEH for specific CEMPs. NSW Government agencies specified by Department of Premier and Cabinet for consultation for this Soil and Water CEMP, include the NSW Environment Protection Authority (EPA) and the NSW Department of Primary Industry - Water (DPI Water).

Further, Airport Plan Condition 8(3) requires that this CEMP has taken into account Table 28-6 of the EIS which states the CEMP should also be prepared in consultation with the NSW Environment Protection Authority and relevant local councils.

In addition to the above consultation requirements, the Soil and Water CEMP was also developed in consultation with the Airport Environment Officer (AEO). The focus of the consultation was primarily with regards to the water quality monitoring requirements and the applicable water quality criteria.

Consultation has been completed during the development of this CEMP (Revision 0) and subsequently during the review and update of Revision 1 of this document. A summary of the stakeholder and government authority consultation completed and used to inform the review of Revision 1 and finalisation of Revision 2 is presented in Table 2.

Consultation will continue with agencies, councils and other relevant stakeholders throughout the Project where there is a change to a CEMP. The outcomes of this consultation will be documented in subsequent revisions of the relevant CEMPs, with details of such consultation included in the applicable document.

### 1.4.1 Consultation to inform Revision 2

A consultation plan outlining the process for engaging with stakeholders was prepared by the WSA Community and Engagement team. The plan and a scoping document outlining the Bulk Earthworks project and potential modification of the CEMPs was provided to the stakeholders as required by the Airport Plan Conditions.

Details of the construction phases were described in the correspondence to provide context to the stakeholders on the level of impact that would result from the next phase of construction activities. Prior to contract award, stakeholders were invited to attend a site visit (bus tour) on 9 July 2019 to assist the stakeholders to understand the size and scale of the site elements. Following the Bulk Earthworks Contract (**BEC**) award, the CEMPs were updated to reflect the next stage of construction. In October 2019, stakeholders were provided with the nine draft CEMPs to review and were requested to provide comment. To facilitate the review stakeholders were invited to attend a workshop on 8th October 2019, where an overview of the Bulk Earthworks phase was presented, and key aspects discussed. A summary of the consultation is provided in Table 2.

**Table 2 Soil and Water CEMP consultation summary**

Activity	Date	Invitees	Summary of issues
<b>Consultation Summary</b>			
Site visit for stakeholders	9 July 2019	<ul style="list-style-type: none"> <li>• Liverpool City Council</li> <li>• Penrith City Council</li> <li>• NSW Health</li> <li>• NSW Aboriginal Affairs</li> <li>• Transport for NSW (RMS)</li> <li>• Western Sydney Unit</li> <li>• Department of Energy and Environment</li> <li>• South Western Sydney Local Health District</li> <li>• Rural Fire Service</li> <li>• DFSI – Waste Assets Management Corporation</li> <li>• NSW Government Architect</li> <li>• Planning and Environment (OEH)</li> <li>• Western Sydney Planning Partnership (DPE/GSC/Councils)</li> <li>• Department of Primary Industries – Water</li> <li>• Greater Sydney Commission</li> <li>• City Deal Alliance (Councils)</li> <li>• Department of Planning Industry and Environment</li> </ul>	As part of the continuous improvement of the consultation process, a site visit (bus tour) for stakeholders was organised. This has been included due to the good feedback from the last CEMP round where a workshop was held. It is a useful element to assist stakeholders to understand size and scale and also have discussions related to site elements as they are seen during the bus tour.
CEMPs provided to stakeholders for comment	October 2019	<ul style="list-style-type: none"> <li>• Liverpool City Council</li> <li>• Penrith City Council</li> <li>• NSW Health</li> <li>• NSW Aboriginal Affairs</li> </ul>	<b>Key themes:</b> <ul style="list-style-type: none"> <li>- Noise during out of hours construction;</li> <li>- Water quality and water source</li> <li>- Air quality and dust management</li> <li>- Source of imported material</li> <li>- Biodiversity surveys</li> <li>- Heritage management</li> </ul>
Stakeholder Workshop	8th October 2019	<ul style="list-style-type: none"> <li>• Transport for NSW (RMS)</li> <li>• Western Sydney Unit</li> </ul>	

Activity	Date	Invitees	Summary of issues
		<ul style="list-style-type: none"> <li>• Department of Energy and Environment</li> <li>• South Western Sydney Local Health District</li> <li>• Rural Fire Service</li> <li>• DFSI – Waste Assets Management Corporation</li> <li>• NSW Government Architect</li> <li>• Planning and Environment (OEH)</li> <li>• Western Sydney Planning Partnership (DPE/GSC/Councils)</li> <li>• Department of Primary Industries – Water</li> <li>• Greater Sydney Commission</li> <li>• City Deal Alliance (Councils)</li> </ul> Department of Planning Industry and Environment	

## 1.5 Certification and approval

This Soil and Water CEMP has been reviewed and approved for issue by the WSA Co Environment Manager prior to submission to Western Sydney Unit, Australian Government Department of Infrastructure, Transport, Regional Development and Cities (Infrastructure Department).

## 1.6 Distribution

All WSA personnel and contractors will have access to this Soil and Water CEMP via the Project document control management system. The Approved Plan must be published on WSA's website within one month of being approved and be available until the end of the Construction Period. An electronic copy can be found on the Project website - <http://wsaco.com.au/project/index.aspx>

This document is uncontrolled when printed. One controlled hard copy will be maintained by the quality manager at the Project office.

## 2 Scope of works

The Construction Plan details the construction staging of the Stage 1 Development as progressing generally from the north-east to the south-west of the Airport Site, allowing for the relocation of the Northern Road and a TransGrid transmission line.

The delivery of the Stage 1 Development will be through a packaging strategy with a wide variety of package sizes, risk profiles and contracting entities. Each package will have different levels of environmental risk and environmental obligations, depending on the scope of works, location of works and sensitivity of the receiving environment and cultural heritage issues and relevant statutory requirements and obligations.

Stage 1 Development of the Project comprises the following key features as described in the Construction Plan (which is consistent with the Airport Plan and EIS Chapter 5):

- Site preparation
- Utilities
- Ancillary developments
- Airside precinct
- Ground transport
- Other building activities
- Terminal
- Aviation support facilities

Details of the Project construction activities, staging and programming including the phases of works are described in Section 6 of the Construction Plan (WSA00-WSA-00000-CN-PLN-000001) as required by the Airport Plan Condition 1(5). This Plan applies to the Bulk Earthworks, Early Earthworks and Material Importation phases of works as described in Section 6 of the Construction Plan (WSA00-WSA-00000-CN-PLN-000001). A variation to this Plan will be submitted before work other than Preparatory Activities is undertaken on any other phases of the Project.



## 3 Objectives and targets

### 3.1 Objectives

The key objective of this Soil and Water CEMP is to ensure that impacts associated with soil and water quality are managed to within permitted criteria as far as practicable and to ensure that best practice controls and procedures are implemented.

To achieve this objective, the following will be undertaken:

- Ensure appropriate treatment of water prior to off-site discharge or disposal
- Minimise the risk of pollution incidents from the construction of the Stage 1 Development
- Minimise the export of sediment from the airport site
- Protect the quantity and quality of groundwater
- Minimise potable water use during construction
- Ensure appropriate treatment of any contaminants identified throughout construction
- Ensure appropriate measures are implemented to address the management and mitigation measures detailed in Table 28-6 and Table 28-7 in Chapter 28 of the EIS
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 3 of this Plan.

### 3.2 Targets and performance criteria

Performance criteria specific to soil and water have been established for the management of soil and water impacts during the construction phase of the works which have been, in part, derived from the performance criteria identified in the EIS, Table 28-6 are outlined in Table 3.

**Table 3 Soil and water targets and performance criteria**

Aspect	Target / Performance criteria	Document Reference
Environmental management compliance	Compliance with the requirements and mitigation measures set out in this Soil and Water CEMP	CEMP compliance audits (refer Section 9) Site environmental inspection checklist
Environmental management compliance	Compliance with the performance criteria in this CEMP which have been developed taking into account the general duty not to pollute under the AEPRs (Reg 4.01) and the related limits.	CEMP compliance audits (refer Section 9) Site environmental inspection checklist AERPs
Erosion and sedimentation	Establishment and maintenance of erosion and sedimentation controls in accordance with the NSW Blue Book (NSW Government, 2018) and the current soil and water conditions.	Site environmental inspection checklist Contractor erosion and sedimentation control plans (as referenced / included in the EWMS and ECMs).
Water quality	Compliance with the water quality monitoring requirements of this Soil and Water CEMP, including the monitoring frequency and criteria.	Water quality monitoring records CEMP compliance audits (refer to Section 9)
Contamination disposal	Disposal of any material from site in accordance with the NSW EPA Waste Classification Guidelines (2014).	Soil testing / classification data Water testing / classification data

Aspect	Target / Performance criteria	Document Reference
		Waste classification certificates

The above targets in Table 3 have been set to provide a benchmark performance objective to which WSA Co will endeavour to achieve. Failure to achieve the targets will not be considered a non-conformance, however, will prompt internal review of environmental management and assessment of potential improvement opportunities.

## 4 Legal and other requirements

Relevant environmental legislation and other requirements are identified below.

### 4.1 Relevant legislation and guidelines

As Western Sydney International is to be developed under the Airport Plan determined under the Airports Act, some state laws will not be applicable to the Project (s112 of this Act). Where state law is applicable, this plan will set out the relevant applicable state legislation and requirements and demonstrate how compliance with those laws including obtaining relevant permits will be achieved. Where state laws are not applicable, there may nonetheless be a requirement to have regard to those laws, for example, through mitigation measures to be incorporated in CEMPs to satisfy conditions under the Airport Plan.

### 4.2 Legislation

Legislation and regulations and their relevance to soil and water quality and this Plan are summarised in Table 4.

**Table 4 Principal legislation and relevance**

Legislation or regulation	Relevance	CEMP compliance provisions
<b>Commonwealth</b>		
<i>Airports Act 1996</i> (Airports Act)	The Airports Act and Airports Regulations set out the framework for the regulation and management of activities at airports that could have potential to cause environmental harm. This includes offences related to environmental harm, environmental management standards, monitoring and incident response requirements. The Airport Plan prepared under the Airports Act covers a number of environmental matters and, in particular, details specific measures to be carried out for the purposes of preventing, controlling or reducing the environmental impact associated with the airport. Criminal offences are applicable if these measures are not complied with.	This CEMP forms part of the overall WSA Co environmental management system which has as a target, full compliance with the Airport Plan.
Airports (Environment Protection) Regulations 1997 (AEPR)	Imposes a general duty to prevent or minimise environmental pollution once an airport lease is granted. Promotes improved environmental management practices at airports. Includes provisions setting out definitions, acceptable limits and objectives for water (and air quality), as well as monitoring and reporting requirements.	Refer to commentary on Airport Plan above. Section 6 – Soil and Water aspects and Impacts Section 9 – Inspection, monitoring, auditing and reporting
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Provides for the protection of matters of national environmental significance including species, populations, communities and their habitat that could be impacted by contamination or pollution.	Section 7 – Environmental Control Measures Biodiversity CEMP

Legislation or regulation	Relevance	CEMP compliance provisions
Environment Protection and Biodiversity Conservation Regulation 2000 (as amended) (EPBC Regulation)	Provides for the protection of world heritage sites (including the Gondwana Rainforests) and wetlands of international importance (i.e. Ramsar sites).	Section 7 – Environmental Control Measures European and Other Heritage CEMP
Work Health and Safety Act 2011 (NSW) and Work Health and Safety Act 2011 (Cth)	Provides a general overview of how to make workplaces safe and healthy. The Act outlines WSA's legal responsibilities and duties as an employer and business owner with regards to work health and safety.	Section 9 – Inspection, Monitoring, auditing and reporting WSA RAP 2019
Work Health and Safety Regulations 2017 (NSW) and Work Health and Safety Regulations 2011 (Cth)	The Regulations set out the standards that WSA need to meet for specific hazards and risks, such as noise, machinery, and manual handling. The Regulations also set out the licenses that may be required for specific activities, the records you need to keep, and the reports you need to make.  Specific to this Soil and Water CEMP, Chapter 8 of the Regulations provide specific requirements with regards to the management of asbestos containing materials.	Section 9 – Inspection, monitoring, auditing and reporting WSA RAP 2019
<b>NSW</b>		
Water Act 1912 (Water Act)	Provides for the protection of groundwater in the few areas in NSW where water-sharing plans have not come into effect.	Section 7 – Environmental Control Measures
Protection of the Environment Operations Act 1997 (POEO Act) and the Protection of the Environment Operations (General) Regulation 2009 (POEO (General) Regulations)	Establishes the process for issuing environmental protection licences (EPL) for certain scheduled activities - For the works covered by this CEMP (as detailed in Table 5), the need to obtain an EPL has not been identified, however, it may apply to future works. Places responsibility on the part of developers to prevent water pollution while also controlling waste during construction. Defines water and land pollution and the circumstances when pollution has been caused.	Section 7 – Environmental Control Measures
Protection of the Environment Operations (Waste) Regulation 2014	Establishes the process for issuing environmental protection licences (EPL) for certain scheduled activities - For the works covered by this CEMP (as detailed in Table 5), the need to obtain an EPL has not been identified, however, it may apply to future works. Places responsibility on the part of developers to prevent water pollution while also controlling waste during construction.	Section 7 – Environmental Control Measures
Soil Conservation Act 1938	Establishes controls to prevent soil erosion and land degradation.	Section 7 – Environmental Control Measures Air Quality CEMP (for the management of dust generation and associated soil erosion prevention measures)

Legislation or regulation	Relevance	CEMP compliance provisions
Fisheries Management Act 1994	Provides for the conservation of fish stocks, habitat, threatened fish species, populations and communities. Promotes ecologically sustainable development. Promotes commercial and recreational fishing and aquaculture.  Promotes the sharing of fishery resources.  Provides for social and economic benefits for the wider community in terms of fish management.	Section 7 – Environmental Control Measures  Biodiversity CEMP
Contaminated Land Management Act 1997	Provides for the investigation and remediation of contaminated land considered to pose a significant risk to human health or the environment.	Section 7 – Environmental Control Measures
Water Management Act 2000	Provides for the protection, enhancement and restoration of water sources and ecosystems, ecological processes and biological diversity.	Section 7 – Environmental Control Measures
The Water Management (General) Regulation 2011 or the NSW Aquifer Interference Policy	Defines the conditions where ‘aquifer interference approval’ is needed and clarifies the difference between ‘minimal impacts’ and major ‘dewatering’ activities.	Extraction of water from aquifers is not currently anticipated. Cuttings are not anticipated to be at depths that will interact with aquifers. Biodiversity CEMP
Pesticides Act 1999	Promotes the protection of human health, the environment, property and trade in relation to the use of pesticides, having regard to the principles of ecologically sustainable development within the meaning of the Protection of the Environment Administration Act 1991; Aims to minimise risks to human health, the environment, property and trade; Promotes collaborative and integrated policies in relation to the use of pesticides, Establishes a legislative framework to regulate the use of pesticides.	Section 7 – Environmental Control Measures  Section 9 - Inspection, monitoring, auditing and reporting

### 4.3 Guidelines and standards

Guidelines and standards that are relevant to soil and water quality management and this plan are summarised in Table 5.

**Table 5 Relevant guidelines and standards**

Guidelines and standards
<ul style="list-style-type: none"> <li>Acid Sulfate Soil and Rock – Victorian EPA Publication 655.1 – July 2009</li> <li>Acid Sulfate Soil Manual (ASSMAC 1998)</li> <li>AS/NZS ISO 14001:2016 Environmental management systems – Requirements with guidance for use</li> <li>Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000 Guidelines)</li> <li>The Heads of EPAs Australia and New Zealand (HEPA), PFAS National Environmental Management Plan, January 2018.</li> </ul>

## Guidelines and standards

- Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA), Draft - October 2016
- Contaminated Land Management - Guidelines for the NSW Site Auditor Scheme, 3rd edition (EPA 2017)
- DEC: Environmental Compliance Report Liquid Chemical Storage, Handling and Spill Management Part B Review of Best Practice and Regulation November 2005
- Department of Environment and Conservation (DEC): Storage and Handling Liquids: Environmental Protection Participant's Manual May 2007
- Department of Infrastructure, Planning and Natural Resources (DIPNR), 2003. Roads and Salinity Guideline
- Department of Land and Water Conservation (DLWC), 1998. Constructed Wetlands Manual
- Fairfull, S. and Witheridge, G. (2003) Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings. NSW Fisheries
- Guidelines for assessing former orchards and market gardens (DEC 2005)
- Guidelines for consultants reporting on contaminated sites (OEH 2011)
- Guidelines for the assessment and management of groundwater contamination (DEC 2007)
- Guidelines on the duty to report contamination under the Contaminated Land Management Act 1997 (EPA 2015)
- Liverpool Local Environmental Plan 2008 (NSW)
- Managing Urban Stormwater: Soils and Construction. Landcom, (4th Edition) March 2004 (reprinted 2006) (the "Blue Book"). Volume 1 and Volume 2
- National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended)
- National Environment Protection (National Pollution Inventory) Measure 1998 (as amended)
- National Water Quality Management Strategy
- NSW EPA, 1995. Sampling design guidelines (EPA 1995)
- NSW EPA, 2003. Guidelines for the vertical mixing of soil on former broad-acre agricultural land
- NSW EPA, 2014. Waste classification guidelines.
- NSW EPA, 2016. Addendum to the Waste Classification Guidelines (2014) Part 1: Classifying Waste, October 2016 (PFAS solid waste criteria).
- NSW Fisheries, November 2003, Policy and Guidelines for Fish Friendly Waterway Crossings
- NSW Water Quality Objectives
- Penrith Local Environmental Plan 2010 (NSW)
- Safe Work Australia Model Code of Practice: How to Safely Remove Asbestos (April 2016)
- State Environmental Planning Policy No 52—Farm Dams and Other Works in Land and Water Management Plan Areas (NSW)
- State Environmental Planning Policy No 55—Remediation of Land (NSW)
- State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 (NSW)
- The Heads of EPAs Australia and New Zealand (HEPA), PFAS National Environmental Management Plan, January 2018.
- Volume 2A Installation of Services (DECCW 2008)

#### Guidelines and standards

- Volume 2C Unsealed Roads (DECCW 2008)
- Volume 2D Main Roads Construction (DECCW 2008)
- WorkCover NSW Guidelines for managing asbestos in or on soil (March 2014)

## 4.4 Approvals and other specifications

- Functional Specifications;
- Western Sydney Airport Plan (2016);
- Western Sydney Airport Environmental Impact Statement;
- WSA Sustainability Plan;
- WSA Community and Stakeholder Engagement Plan; and
- WSA Construction Plan.

## 4.5 Airport Plan Conditions

Conditions relevant to soil and water quality management during construction are provided in Table 6.

**Table 6 Conditions of Approval relevant to soil and water quality management**

Condition No.	Condition	Timing	Responsibility	Document reference
1.4	The Site Occupier must ensure that no CEMP is inconsistent with the approved Construction Plan	Ongoing	WSA	This document (Soil and Water CEMP) and the WSA Construction Plan
1.5	The approved Construction Plan may provide for Main Construction Works to be carried out in phases that commence at different times for different parts of the Airport Site or an Associated Site. If it does, the Site Occupier may prepare a CEMP in relation to one or more phases, and the criteria for approval of such a CEMP are taken to exclude any matter irrelevant to the phases for which approval is sought. A variation of the CEMP must be submitted for approval in accordance with condition 41 (Variation of Approved Plans) prior to commencement of any new phase.	Ongoing	WSA	This document (Soil and Water CEMP) and the WSA Construction Plan
5.3	In carrying out a Preparatory Activity, the Site Occupier must not act inconsistently with any approved CEMP or the approved Construction Plan.	Ongoing	WSA	WSA Construction Plan (Appendix 2)



Condition No.	Condition	Timing	Responsibility	Document reference
8.1	The Site Occupier must not: Commence Main Construction Works until a <i>Soil and water CEMP</i> has been prepared and approved in accordance with this condition; or Carry out any development described in Part 3 of the Airport Plan inconsistently with the approved Soil and Water CEMP	Prior to Main Construction Works	WSA	This document (Soil and Water CEMP)
8.2	The Site Occupier must: Prepare, and Submit to an Approver for approval; a Soil and Water CEMP in relation to the carrying out of the developments described in Part 3 of the Airport Plan.	Prior to Main Construction Works	WSA	This document (Soil and Water CEMP)
8.3	The criteria for approval of the Soil and Water CEMP are that an Approver is satisfied that:  a) in preparing the Soil and Water CEMP, the Site Occupier has taken into account Table 28-6 in Chapter 28 of the EIS; and  b) the Soil and Water CEMP complies with Table 28-7 in Chapter 28 of the EIS and is otherwise appropriate.	Prior to Main Construction Works	Approver	Sections 4.4 – Approvals and other specifications Section 7 – Environmental Control Measures
8.4	The groundwater monitoring to be undertaken for the Soil and Water CEMP must include groundwater monitoring points adjacent to woodlands in areas outside the Construction Impact Zone (but within the Airport Site).  Note: This measure is intended to implement a groundwater monitoring network in relation to likely groundwater dependent vegetation.	Prior to Main Construction Works	WSA	Section 9.4 – Groundwater monitoring program
8.5	The Soil and Water CEMP must include the following trigger-action-response measures in relation to groundwater levels in areas outside the Construction Impact Zone (but within the Airport Site):  a) target criteria, set with reference to relevant standards and site-specific parameters;  b) trigger values and corresponding corrective actions to prevent recurring or long-term exceedance of the target criteria described in (a); and  c) corrective actions to compensate for any recurring or long-term exceedance of the target criteria described in (a).  d) Note: Exceedance in this context should be understood to mean either elevated	Prior to Main Construction Works	WSA	Section 9.4.2 – Groundwater Criteria

Condition No.	Condition	Timing	Responsibility	Document reference
	or depressed groundwater levels, with reference to an acceptable bandwidth.			
8.6	The Soil and Water CEMP must include soil, groundwater and surface water PFAS contamination monitoring requirements, testing and disposal procedures appropriate to the risk posed by any contamination, and consistent with relevant Commonwealth environmental management guidance on PFOS and PFOA as prepared by the Environment Department.	Prior to Main Construction Works	WSA	Section 5.1.5 – PFAS Monitoring, and Testing
34.1	<p>A person carrying out or operating an aspect of the Stage 1 Development must not act inconsistently with:</p> <ul style="list-style-type: none"> <li>a) National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended);</li> <li>b) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (under the National Water Quality Management Strategy) including the draft default guideline values for perfluorooctanoic acid (PFOS) and perfluorooctane sulfonic acid (PFOA) in freshwater as applied by the state government; and</li> <li>c) relevant Commonwealth environmental management guidance on PFOS and PFOA.</li> </ul>	During construction	WSA	<p>Section 9 – Inspection, Monitoring, Auditing and Reporting</p> <p>Section 5.1.5 – PFAS Monitoring, and Testing</p>
35	<p>An Approver must not approve a plan referred to in Chapter 28 of the EIS unless he or she is satisfied that the Plan Owner:</p> <ul style="list-style-type: none"> <li>(a) in preparing the plan, has: <ul style="list-style-type: none"> <li>i) consulted with any NSW Government agencies specified by the NSW Department of Premier and Cabinet; and</li> <li>ii) in the case of the ... Soil and Water CEMP ..., also consulted the Environment Department and OEH; and</li> </ul> </li> <li>(b) has provided: <ul style="list-style-type: none"> <li>i) the Approver; and</li> <li>ii) each consulted agency,</li> </ul> </li> </ul> <p>with an explanation of how any responses have been addressed.</p>	Ongoing	Approver	<p>This document (Soil and Water CEMP)</p> <p>Section 1.4 - Consultation requirements of this plan</p>
37 to 42	Set out requirements in relation to informing other parties of conditions, keeping records, publishing reports, independent audits,	Ongoing	WSA and Approver	This document (Soil and Water CEMP)

Condition No.	Condition	Timing	Responsibility	Document reference
	variation to approved plans and publication of approved plans.			Section 9.6 – Environmental Reporting SEMF

## 4.6 Environmental Impact Statement requirements

The requirements of soil and water management to be taken into account and addressed during the construction phase of the Stage 1 Development are included in the EIS, specifically Table 28-6. A summary of these requirements and how they have been addressed in this Soil and Water CEMP is presented in Table 7.

**Table 7 Summary of soil and water quality management requirements**

EIS Reference	Topic	Summary	Soil and Water CEMP Reference
Table 28-6	Performance criteria	<p>The performance criteria for the Soil and Water CEMP would include:</p> <ul style="list-style-type: none"> <li>• Compliance with the approved Soil and Water CEMP;</li> <li>• Compliance with the water pollution and soil pollution accepted limits outlined in the AEPR, including any local standards approved under the AEPR; and</li> <li>• Establishment of erosion and sedimentation controls in line with 'NSW OEH Blue Book - Managing urban stormwater: soils and construction' at the start of construction and progressively as construction progresses.</li> </ul>	Section 3 – Objectives and targets
Table 28-6	Implementation framework	<p>A Soil and Water CEMP will be approved prior to commencement of Main Construction Works for the proposed airport. The Soil and Water CEMP will collate measures to mitigate and manage potential impacts to the receiving environment and will include cross-references to other environmental management plans where relevant.</p> <p>The Soil and Water CEMP will as a minimum:</p> <ul style="list-style-type: none"> <li>• Detail the management and mitigation measures to be implemented, including those outlined in Table 28-7</li> </ul>	Section 7- Environmental control measures
		<ul style="list-style-type: none"> <li>• Describe the process for managing complaints, stakeholder engagement, and emerging environmental management issues as they arise</li> </ul>	Section 9.8 – Environmental Incidents and complaints management
		<ul style="list-style-type: none"> <li>• Specify the process for monitoring implementation reporting and auditing</li> </ul>	Section 9 - Inspection, monitoring, auditing and reporting
		<ul style="list-style-type: none"> <li>• Identify details of the party responsible for implementing the Soil and Water management CEMP.</li> </ul>	Section 8 – Environmental roles and responsibilities
Table 28-6	Monitoring	<p>General monitoring requirements are set out under the AEPR. These include that:</p> <ul style="list-style-type: none"> <li>• Monitoring must take place under direction of an appropriately qualified person; and</li> <li>• The results for the monitoring must be kept in a written record.</li> </ul>	Section 9 - inspection, monitoring auditing and reporting
		Additional monitoring requirements include that:	-
		The most suitable surface and groundwater monitoring locations will be determined in consultation with NSW EPA and relevant local councils.	Section 9 - inspection, monitoring auditing and reporting

EIS Reference	Topic	Summary	Soil and Water CEMP Reference
		Regular site inspections will be conducted to monitor the effectiveness of the soil and water management controls. Inspection results will be recorded, and the inspection log made available to the Department of Infrastructure and Regional Development upon request.	Section 9 - inspection, monitoring auditing and reporting
		The frequency of site inspections will be increased during and immediately after wet weather when there is a higher potential for the off-site transport of sediment from the airport site.	Section 9.1 - Environmental inspections
		Groundwater elevation monitoring will be conducted to detect potential impacts to base flow in the vicinity of potentially sensitive creeks or groundwater dependent vegetation. Monitoring will be undertaken quarterly through construction up to a minimum period of three years after completion of the Stage 1 development and until any identified impacts stabilise.	Section 9 - inspection, monitoring auditing and reporting
		Groundwater quality monitoring of alluvial and Bringelly Shale aquifers will be conducted at major infrastructure locations, down gradient from those locations and in the vicinity of groundwater dependent vegetation or watercourses. Monitoring will initially be undertaken quarterly and adjusted as appropriate.	Section 9 - inspection, monitoring auditing and reporting
		Monthly surface water quality monitoring will be conducted to monitor performance of the drainage system. The monitoring will occur once the surface water drainage system is in place and take place at basin outflow and during selected upstream and downstream conditions.	Section 9 - inspection, monitoring auditing and reporting Appendix D – Example of Soil and Water Monitoring and Inspection
Table 28-6	Auditing and reporting	General reporting requirements are set out under AEPR. In addition, an annual report will be prepared and submitted to the Secretary of the Department of Infrastructure and Regional Development in relation to compliance with <i>Soil and water management CEMP</i> for the period until the airport commences operations.	Section 9.6 - Environmental reporting
		Additional auditing and reporting measures that will be implemented will include:	-
		<ul style="list-style-type: none"> <li>Recording in a log book any exceptional incidents that cause excessive pollution of receiving waters and the action taken to resolve the situation; and</li> </ul>	Section 9.8 – Environmental incidents and complaints management
		<ul style="list-style-type: none"> <li>Reporting pollution incidents resulting in offsite impacts to the NSW Environment Protection Authority</li> </ul>	Section 9.8 – Environmental incidents and complaints management

EIS Reference	Topic	Summary	Soil and Water CEMP Reference
		The Community and Stakeholder Engagement Plan provides for the development of a complaints log and includes specific measures for how complaints will be managed.	Section 9.8 – Environmental incidents and complaints management
		Details regarding the required environmental management and mitigation controls associated with the management of soil and water. Including the following: <ul style="list-style-type: none"> <li>• Surface water management system</li> <li>• Development of local standards</li> <li>• Erosion and sedimentation</li> <li>• Leaks and spills of fuel or other chemicals</li> <li>• Groundwater inflows</li> <li>• Land contamination</li> </ul>	Section 7 - Environmental control measures
Table 28-6	Responsibility	Responsibilities include:	-
		The Soil and Water CEMP will be prepared in consultation with the NSW Environment Protection Authority and relevant local councils	Section 1.4 - Consultation requirements of this plan
		The Soil and Water CEMP will be submitted for approval to the Infrastructure Minister or an SES Officer in the Infrastructure Department	Section 1.5 – Certification and approval
		The design and construct (D&C) contractor will be responsible for implementing site specific environmental procedures and work method statements applicable to the proposed works in accordance with the requirements of the Soil and Water CEMP	Section 1.2 – Purpose Section 8 – Environmental roles and responsibilities
		The airport environment officer will be responsible for day to day regulatory oversight of the AEPR compliance at the airport after an airport lease is granted	Section 8 – Environmental Roles and responsibilities

## 5 Existing environment

The following information is primarily summarised from Chapter 17 -Topography, geology and soils and Chapter 18 - Surface and groundwater of the EIS Volume 2A. In addition, some background information has been obtained from two site contamination investigations completed in 2016 as follows:

- Preliminary (Phase 1) Contaminated Assessment Report, Proposed Western Sydney Airport (GHD 2016a)
- Detailed Site Contaminated Investigation, Proposed Western Sydney Airport (GHD 206b)

For the purpose of this CEMP, it is considered that any receiving water and soil are sensitive receivers and should be managed accordingly (refer to Sections 6 and 7 regarding environmental management).

For the purpose of the phase of Main Construction Works covered by this CEMP, the existing environment described herein is considered consistent and acceptable for consideration in the risk assessment process and the identification of suitable environmental mitigation measures and controls - for details with regards to environmental mitigation measures and controls for the management of impacts refer to Section 7.

### 5.1 Soil

#### 5.1.1 Topography

The Airport Site is part of an elevated ridge system dividing the Nepean River and South Creek catchments. The site is characterised by rolling landscapes typical of Bringelly Shale. The site features a prominent ridge in the west, reaching an elevation of about 120 metres Australian Height Datum (AHD), and smaller ridge lines in the vicinity with elevations of about 100 metres AHD. The broad topography of the Airport Site generally slopes away from the ridges in the west, with elevations generally between 40 metres and 90 metres AHD, with the lower elevations toward Badgerys Creek.

#### 5.1.2 Geology

The dominant geology formations beneath the Airport Site are Bringelly Shale, the Luddenham Dyke and alluvium.

Bringelly Shale is a Triassic geological unit mainly comprising claystone and siltstone, with some areas of sandstone. This unit underlies most of the Airport Site. Bringelly Shale is the top unit of the Wianamatta Group and is about 150 metres thick beneath the Airport Site, along with some overlying weathered material.

Luddenham Dyke is a Jurassic groundmass of olivine basalt, analcite, augite, feldspar and magnetite in the west of the Airport Site. The dyke outcrops towards the peak of the ridge in the west of the Airport Site.

Alluvium at the Airport Site comprises of Quaternary sedimentary deposits along Cosgroves Creek and Badgerys Creek. These sedimentary deposits can be up to five metres thick and are made up of fine sands, silts and clays with some areas of gravelly clay.

#### 5.1.3 Soil attributes

##### *Soil types*

Geotechnical investigations at the Airport Site indicated surficial silt and/or clay topsoils overlying firm residual clays from the weathering of Bringelly Shale, with areas of alluvial gravels, sands, silt and clays associated with Badgerys Creek,

Soils at the Airport Site have also been classified as Kurosols, which occur over the majority of the Airport Site, and Hydrosols in the vicinity of Badgerys Creek. Kurosols are characterised by a strong texture contrast between their A horizons (topsoils) and their strongly acid B horizons (subsoils). Hydrosols are characterised by prolonged periods of saturation.



While parts of the Airport Site have been used for agricultural activities, the site is not mapped as biophysical strategic agricultural land.

### **Saline soils**

Soil salinity mapping of Western Sydney indicates moderate salinity potential. Additionally, there are some localised areas of high salinity potential associated with Badgerys Creek and drainage lines to the south and west of the Airport Site. Soil samples from the geotechnical investigations returned relatively low salinity levels, between 120 and 384 mg/L. Any further soil salinity sampling will be considered further as part of the requirements for waste management, in particular the monitoring and analysis of waste materials to be taken off-site in accordance with the WSA Waste and Resources CEMP.

### **Acid sulfate soils**

Acid sulfate soils are not expected at the Airport Site given that it is not a coastal location and has an elevation ranging between 40 and 120 metres AHD. Field testing during the geotechnical investigation indicated that isolated acid sulfate soil may be present, but not to an extent requiring measures for acid sulfate soil management.

## **5.1.4 Contaminated land**

A range of contaminants associated with prior land uses may be present at the Airport Site. Previous and current land uses that may potentially result in contamination include agriculture, light commercial and building demolition works.

A review of the contamination register administered by the Infrastructure Department, historic aerial photos, and subsequent inspection of the Airport Site identified further evidence of potential contamination. Evidence included:

- Chemical storage tanks and drums;
- Rubbish dumping;
- Stockpiled demolition waste;
- Fibre cement sheeting;
- Hydrocarbon stains; and
- Stockpiled fill materials of unknown origin.

Contaminants associated with this evidence include fuels, lubricants, solvents, acids, asbestos, heavy metals, ash, herbicides, pesticides and pathogens. About half the properties were considered to present at least moderate risk of contamination. Historic demolition sites, stockpiled demolition waste and fill material of unknown origin indicated potential for asbestos to be present. Elevated levels of copper, nickel and zinc were also identified across the Airport Site. In general, these levels were considered attributable to natural background conditions. Surface water and groundwater sampling also returned elevated concentrations of metals attributable to natural background conditions.

## **5.1.5 PFAS monitoring / testing requirements**

Based on the findings of previous investigations (GHD 2016a, and 2016b), the key sources of potential contamination identified at the site were generally associated with agricultural land use, land filling, uncontrolled dumping of waste, fuel storage, market gardening storage of abandoned vehicles and demolition of rural/residential buildings. As per the Remediation Action Plan (RAP) 2019 soil samples collected from the site confirm presence of the following contamination:

- Asbestos fragments;
- Fibrous asbestos; and

- Localised hotspots of petroleum hydrocarbons and heavy metal contamination in soils (generally near roadways).

The potential for per- and polyfluoroalkyl substances (PFAS) and PFOS (Perfluorooctyl Sulfonate) is relatively low given the prior use of the Airport Site. As per EIS mitigation measure SW14 the risk posed by PFAS has been assessed on this project, however, consistent with condition 8(6), ongoing monitoring of PFAS will be undertaken by:

- Testing for PFAS in groundwater, as per the Ground Water Monitoring program, Section 9
- Testing in surface water, as per Appendix D, and;
- Material to be removed from site, or to be used within the site, near roadways will be sampled for PFAS before reuse/export is authorised.

The PFAS monitoring and testing requirements in this Soil and Water CEMP will be updated if there is an increase in levels found in groundwater, soil or surface water onsite. PFAS testing will be undertaken as per the relative guidance levels in the PFAS National Environmental Management Plan, January 2018, as per the groundwater monitoring program detailed in Section 9 and Appendix D.

## 5.2 Surface water and groundwater

### 5.2.1 Climate and rainfall

The Airport Site hosts an automatic weather station operated by the Bureau of Meteorology. For the EIS, average measures were taken from 1998 to 2015 which are shown in Table 8 and have been cross checked against 2019 measurements. Average annual rainfall at the Airport Site is 676.6 millimetres (mm).

Climate and rainfall data have been updated since the EIS development. There is a strong seasonal variation in temperature at Badgerys Creek. During the data collection and review period for the EIS and in 2019, January was the hottest month while June and July were the coldest months as presented below in Table 10.

The rainfall data collected during the EIS indicates that February is the wettest month, with an average rainfall of 114 millimetres while July is the driest month, with an average rainfall of 30 millimetres. In 2019, the average rainfall in February is 342 millimetres while July remains the driest month.

In the EIS and 2019, the annual average relative humidity reading at Badgerys Creek was 73 per cent. The month with the highest relative humidity on average was June, at 79 per cent. September and October had the lowest relative humidity.

**Table 8 Average monthly rainfall at the Airport Site\***

Statistic	J	F	M	A	M	J	J	A	S	O	N	D
Mean monthly rainfall (mm) a	76	95	83	48	36	61	23	35	33	54	69	56
Highest monthly rainfall (mm) a	192	342	285	253	156	250	72	231	82	182	173	131
Lowest monthly rainfall (mm) a	1	13	21	2	2	2	0.4	1	1	0.4	8	0.0
Highest daily	138	107	68	84	54	109	28	70	51	63	63	65

Statistic	J	F	M	A	M	J	J	A	S	O	N	D
rainfall (mm) a												
Evaporation (mm) b	173	128	116	76	50	38	38	56	75	120	146	154

Note: \* All data has been rounded to the nearest decimal point (except for July, October and December *Lowest monthly rainfall*).

- Data from Bureau of Meteorology automatic weather station
- Data from Bureau of Meteorology Parramatta weather station, as the nearest representative location with available evaporation data

Weather statistics continue to be monitored and recorded from the on-site weather station. All weather monitoring data is automatically recorded and stored electronically on a cloud-based system for future reference if required. The maintenance of weather station data will continue throughout the duration of the construction phase of the project.

### 5.2.2 Catchments

The Airport Site lies in the east of the Hawkesbury-Nepean catchment, which covers an area of 21,400 square kilometres. The Hawkesbury-Nepean catchment is characterised by meandering watercourses and is highly disturbed by clearing and urbanisation. All of the Airport Site subcatchments drain to the Hawkesbury-Nepean system downstream of Lake Burragorang.

Most of the Airport Site drains to South Creek, which then flows to the Hawkesbury River. South Creek has a sub-catchment area of 414 square kilometres with headwaters located near Narellan to the south of the Airport Site. The south-western corner of the Airport Site drains to Duncans Creek, which then flows to the Nepean River.

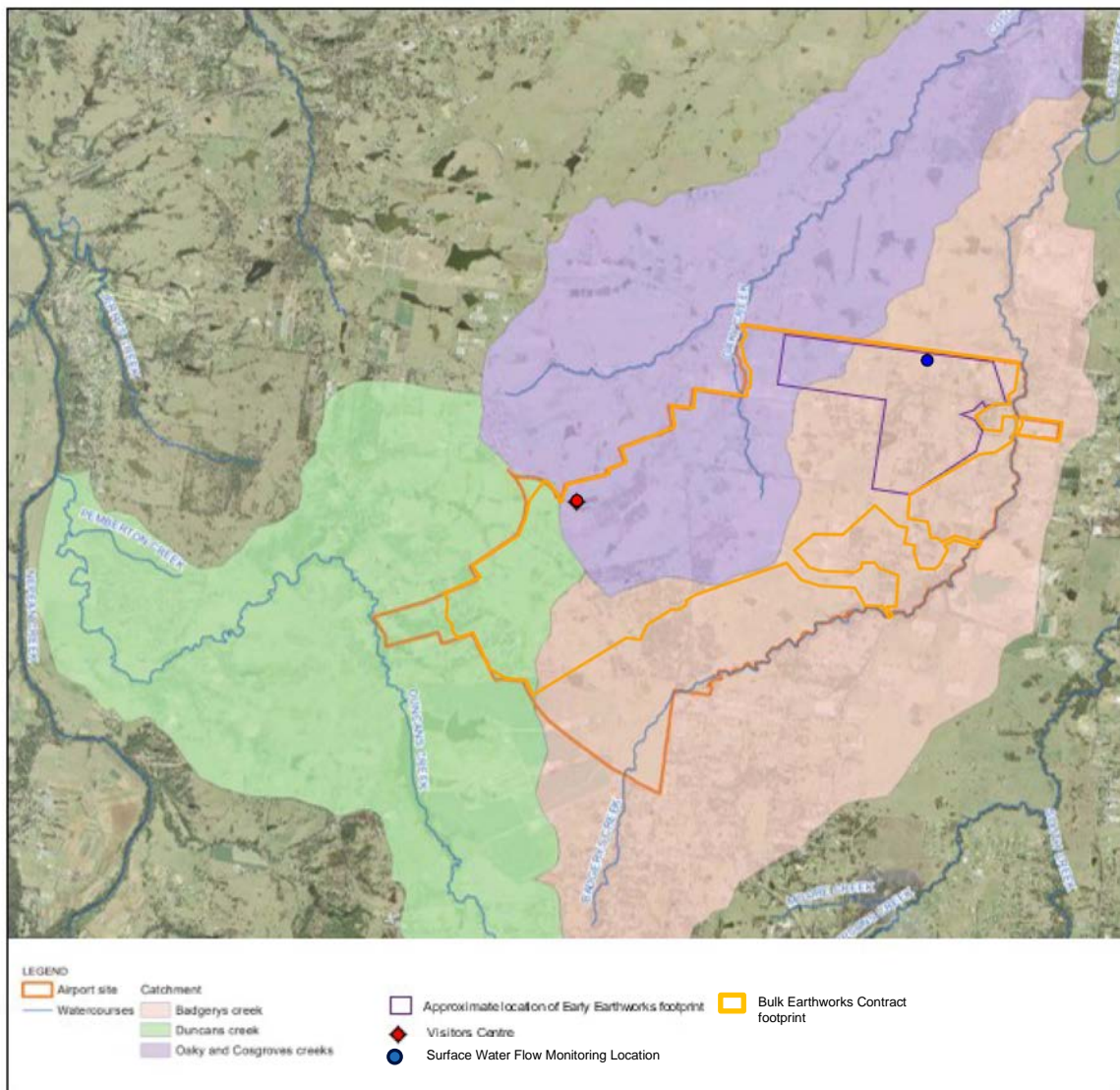
Land uses within the Airport Site were predominantly agricultural (85 per cent), with smaller areas of rural residential (10 per cent), forest (four per cent) and horticulture (one per cent).

### 5.2.3 Watercourses

The Airport Site contains around 64 kilometres of watercourses and drainage lines. The major watercourses include Badgerys Creek, Oaky Creek and Cosgroves Creek in the South Creek Catchment and Duncans Creek, which is a tributary of the Nepean River. Bank erosion and head cut are evident at Badgerys Creek and Cosgroves Creek, despite these watercourses also having well vegetated riparian zones.

Badgerys Creek has its headwaters in the vicinity of Findley Road, Bringelly, approximately two kilometres south of the Airport Site and continues downstream until its confluence with South Creek. It flows in a north to north-east direction and forms the south-eastern boundary of the Airport Site as far as Elizabeth Drive. Ecologically sensitive riparian vegetation is located along sections of Badgerys Creek.

The key surface water catchments and their relationship to the Airport Site are provided in Figure 2.



**Figure 2 Local hydrological catchments**

## 5.2.4 Flooding

The floodplain is more extensive on the western bank of Badgerys Creek than on the eastern bank due to the wider and flatter floodplain at the Airport Site. Existing surface water flows at the Airport Site during one-year average reoccurring interval (ARI) and 100-year ARI storms were simulated in hydrologic and hydraulic models. In the one-year ARI event, flooding is mostly confined to main watercourse channels and dams, while overbank flooding is expected in a 100-year ARI event. Refer to Figure 3 for the extent and degree of flooding in a 100-year ARI associated with Badgerys Creek and Cosgroves Creek, which indicates only a minor encroachment into the Early Earthworks footprint, restricted to a small area in the north-east of the site. Similarly, the Experience Centre and Site Office area, and the Material Importation area are not impacted by flooding as indicated in Figure 3. The relative catchment area impacted by the BEC, and the associated increase in hardstand area, has the potential to increase downstream flows and flood levels. The design includes a number of detention basins to ensure no adverse flood impacts are experienced on downstream properties.

For the Bulk Earthworks, the drainage design considers the cost benefit of the various drainage elements while addressing potential project risks, durability, performance, operational issues and safety as well as community expectations in relation to the environmental impacts of the project, specifically water quality management and

flooding. The drainage design provides the required flood immunity to the airport runways, taxiways and other airport works as identified by EIS. Impacts have been assessed for the 1% AEP.

Site-specific flood management measures will be implemented to avoid or control/mitigate risk and ensure that appropriate response procedures are in place. This will include minimising flood risk by storing flood-sensitive materials and infrastructure outside of the 100-year flood zone as shown in Figure 3 for example, locating stockpiles outside of areas of frequent inundation, for examples areas near waterways.

The project will monitor rainfall and weather forecasts with reference to conditions that will trigger high rain events for both preparation of site for erosion and sedimentation mitigation, and potential for flooding in high rainfall events.

Flood mitigation will include:

- Daily weather observations;
- Securing the site and materials;
- Safe procedures for moving flood-sensitive equipment and materials away from areas near creeks, and out of the 100-year ARI;
- Actions to mitigate any adverse impact of flooding on neighbouring properties of the site;
- Relocating moveable plant to higher ground; and
- Emergency Response Plan to manage flood risk for the full range of flooding up to the probable maximum flood, including an evacuation procedure for compound staff.

## 5.2.5 Surface water quality

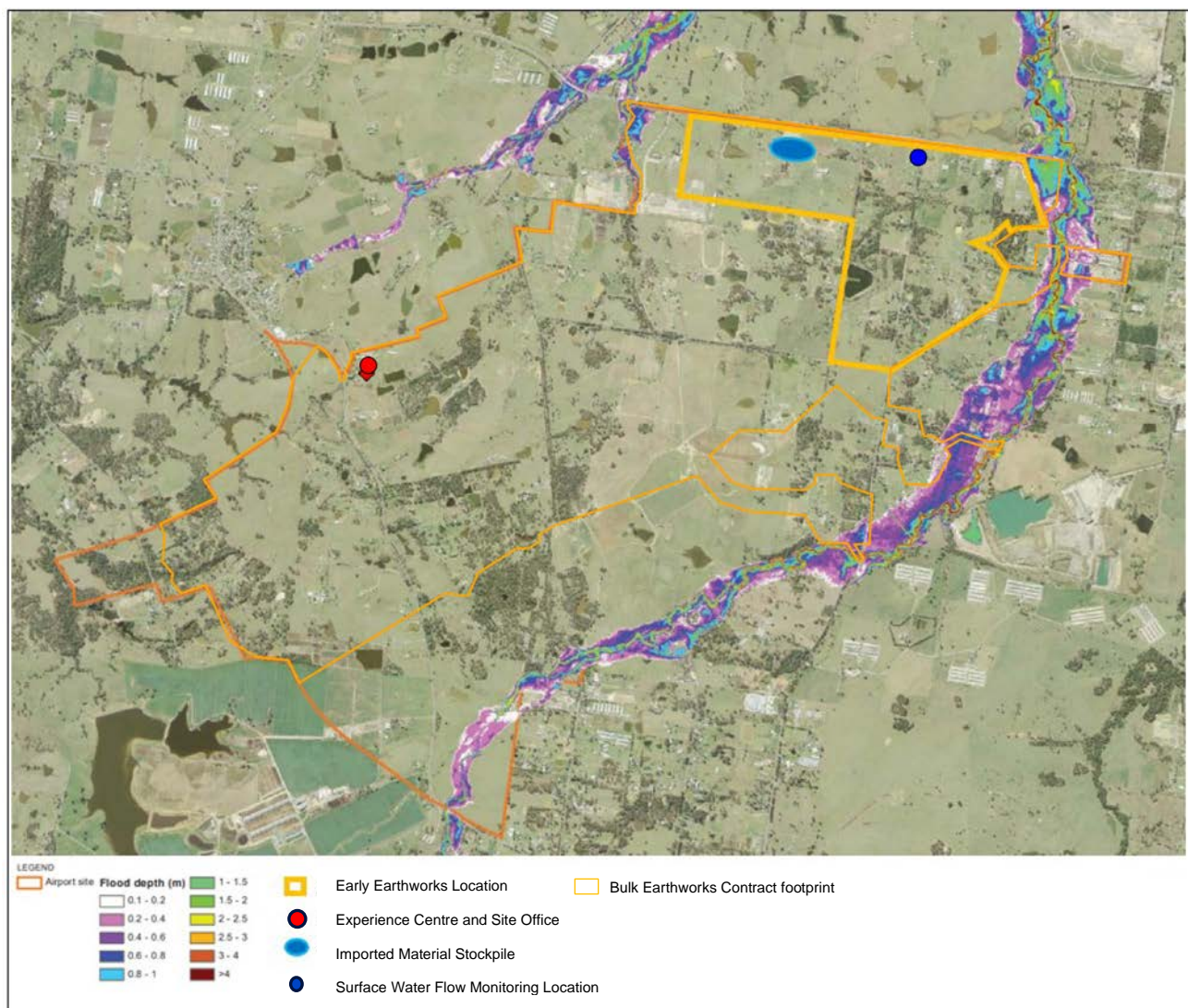
Water quality modelling and monitoring of existing surface water quality was undertaken at upstream, downstream and major outflow locations in and around the Airport Site as part of the environmental assessment for the EIS and in subsequent monitoring. The results indicated that the water quality is generally poor and that the nutrient loads are generally well above both the AEPR accepted limits and the default values in the ANZECC guidelines. The data suggest that the surface water background concentrations were generally above the ANZECC freshwater criteria with exceedances detected for the following analytes / parameters:

- |            |                  |
|------------|------------------|
| ● Chromium | ● Copper         |
| ● Zinc     | ● Total nitrogen |
| ● Nitrate  | ● Phosphorous    |
| ● Iron     |                  |

Turbidity and total suspended solids were found to be within acceptable levels, while dissolved oxygen levels were found to be relatively low. Conductivity levels were high and above those for typical lowland rivers. Some exceedances of chromium, copper and zinc were also detected.

Overall, both the Airport Site and downstream catchments are degraded, particularly in terms of nutrients which is representative of a catchment that has been disturbed by agricultural and other rural development. The existing water quality does not typically satisfy the AEPR limits or default ANZECC guideline criteria for the protection of aquatic ecosystems, primary and secondary contact recreation, as well as irrigation water use for food and non-food crops.





**Figure 3 Existing flood depths – 100-year ARI, Badgerys and Cosgroves Creeks**

### 5.2.6 Groundwater

Groundwater monitoring was undertaken as part of the environmental impact assessment completed for the EIS in addition to ongoing monitoring completed post-EIS up until the present. The obtained data indicates that groundwater at the Airport Site is generally of a relatively poor quality with limited beneficial use or environmental value. The aquifers at the Airport Site include:

- An unconfined aquifer in the shallow alluvium of the main watercourses at the Airport Site;
- An intermittent aquifer in weathered clays overlying the Bringelly Shale;
- A confined aquifer within the Bringelly Shale; and
- A confined aquifer within the Hawkesbury Sandstone.

The variations in depths to groundwater, described in Table 9, indicates low potential for connectivity between groundwater aquifers.

**Table 9 Measured depths of the various aquifers at the Airport Site**

Groundwater	Measured depths
Within the alluvium	0.7 metres – 4.7 metres
Within weathered clays overlying Bringelly Shale	2.4 metres – 4 metres
Within Bringelly Shale	3.0 metres – 11.7 metres
Within Hawkesbury Sandstone	100 metres below ground level

There are in excess of 42 registered groundwater bores within five kilometres of the site centre. The location of these groundwater receptors in Figure 7.

Overall, the available data suggest that groundwater is sparsely used, with only 12 bores for domestic, stock, industrial, farming and irrigation purposes. It is noted that all of these bores are generally screened at significant depth and are expected predominantly to intersect the underlying Hawkesbury Sandstone.

Historical groundwater monitoring data suggest that the groundwater quality has background concentrations of lead, zinc and copper consistently above the selected ANZECC (2000) freshwater criteria. Total nitrogen and phosphorous concentrations were all above freshwater criteria for lowland rivers with some exceedances of the irrigation criteria. Isolated samples had concentrations of nitrate above ANZECC (2000) freshwater criteria. Concentrations of sulphate above human health drinking criteria are present at several locations across the site.

This water quality data obtained suggests that only deeper groundwater in the Hawkesbury Sandstone is suitable for the uses outlined above and that shallow groundwater in the Bringelly Shale is unsuitable for beneficial domestic, stock, irrigation and industrial water use purposes.

Based on the available groundwater quality data, the groundwater assessment included as part of the EIS concluded that:

- The groundwater in the area of the Airport Site has low beneficial use potential for stock and potable purposes;
- The groundwater contributions to surface water are expected to represent a small part of the overall surface water flows in the area; and
- In terms of groundwater management during construction of the proposed airport, salinity, metals (particularly cadmium, copper, lead and zinc), sulphate, total nitrogen and phosphorous may require further consideration if discharge to surface water is being considered.

## 5.2.7 Cumulative impacts

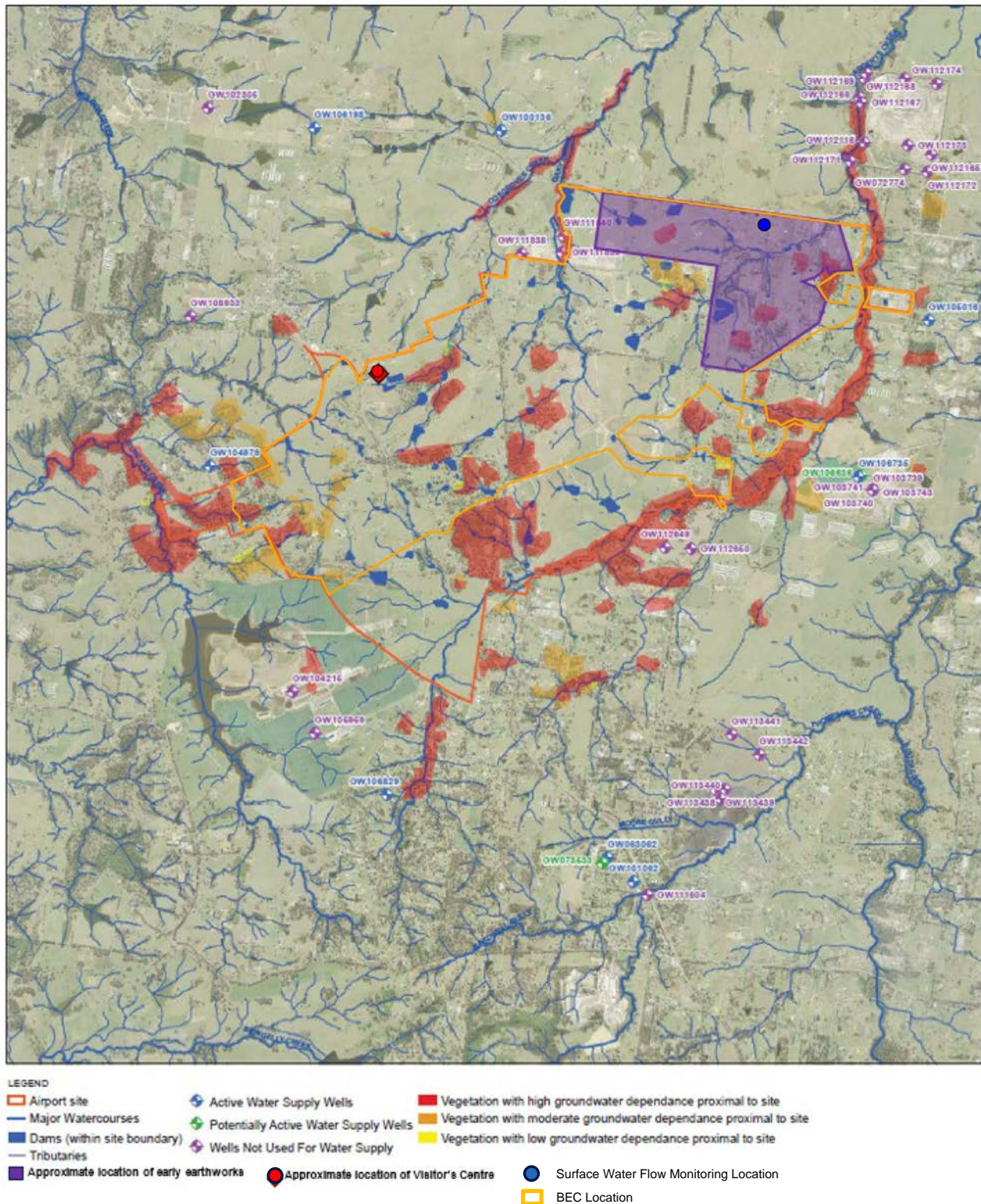
The EIS assessed the cumulative impacts of the development in relation to soil and water. Under current available climate change predictions for the region, a decrease in rainfall is predicted during spring, at least in the near future. A decrease in rainfall has the potential for a range of impacts on the surface water environment, including drying of creeks and associated impacts on stream health and ecology. The basins have been designed for existing climatic conditions and have the effect of creating a minor decrease in flows to the downstream creeks (refer to EIS Section 6.1.1 and 6.2.1). If rainfall, and resulting runoff, to the basins decreases in the future, together with a general decrease in rainfall in the wider catchment, the airport site impacts on surface water runoff could be exacerbated. This may also compound the impacts of changes in rainfall seasonality and intensity locally.

The EIS predicts that summer rainfall will increase in the future and it is possible that the intensity of flood-producing rainfall events will likewise increase in the future. The concept design of the basins result in no increase in flooding downstream (though localised increases in flow are possible at discharge locations). The future impact of changes to summer rainfall in the area is not predicted to be any worse as a result of the



proposed airport. The exception is the reach on Oaky Creek downstream of the airport site where the proposed airport tends to increase flood levels. Figure 3 shows the flood depths for the surrounding waterways.

The potential increased localised flows at discharge points do have the potential to cause erosion and scour at basin outlets which can be managed with mitigation measures, refer Section 7. On the airport site, the flood immunity of any runways and associated infrastructure could be reduced in the future as a result of increases in the magnitude of flood events. The design makes provision for this through the sizing of stormwater infrastructure on the airport site for no overflow considering the present day 100 year event flow plus an increase of 30 per cent in intensity to account for the possible future effects of climate change. Cumulative impacts are therefore expected to be minimal on downstream environments in the case of an increase in rainfall intensity.



**Figure 4 Groundwater receptors (Source: EIS Figure 5)**

## 6 Soil and water aspects and impacts

### 6.1 Construction activities

Construction activities that may affect soil and water quality include:

- Topsoil stripping and soil disturbance;
- Vegetation clearing;
- Bulk earthworks;
- Road construction and other civil works;
- Storage of fuels and chemicals, refuelling;
- Stockpiling of materials;
- Water use;
- Use of vehicles, plant and machinery on site;
- Site demobilisation and landscaping works.

### 6.2 Soil impacts

#### 6.2.1 Topography and geology

The earthwork activities will change the topography of the Airport Site from rolling landscapes to a built environment with some landscaping. The earthworks will affect the upper geological units of the Bringelly Shale, Luddenham Dyke and alluvium down to approximately 30 metres depth. Following bulk earthworks, the elevation of the airport site within the construction impact zone would be generally level with elevations between approximately 50 and 100 metres AHD, with no major embankments.

Refer to the Construction Plan (Section 6) for further details on the scope of work for bulk earthworks that may affect the upper units of the Bringelly Shale as described above.

#### 6.2.2 Soil erosion and degradation

The Bulk Earthworks will involve the excavation of approximately 26 million cubic metres of material including about 1.9 million cubic metres of topsoil within the construction impact zone

Topsoil will be stockpiled while the remaining excavated material will be distributed within the construction impact zone. As cut and fill requirements are expected to be equal, most soil material will remain at the Airport Site and will not generally be moved further than two kilometres. Note, for details for the management and implementation of the Topsoil Protocol, refer to the Aboriginal Cultural Heritage CEMP.

Clearing and Bulk Earthworks will temporarily increase the area of exposed soil at the Airport Site, ultimately increasing the risk of erosion. The majority of Bulk Earthworks will occur in the Blacktown and South Creek soil landscapes. The Blacktown soil landscapes have a slight to moderate erosion potential for non-concentrated flows. The South Creek soil landscapes, and some subsoils in the Blacktown soil landscape, have higher erosion potential.

If improperly managed, topsoil stockpiles will not only present an erosion hazard but will also potentially lose their chemical and physical fertility over time.



### 6.2.3 Land contamination

Construction of the Stage 1 Development has the potential to interact with existing sources of potential contamination. Construction will also involve the storage, treatment and/or handling of fuel, sewage and other potential contaminants.

Although unlikely, the accidental release or mobilisation of contaminants has the potential to affect human health and the environment through contact with pathogens (such as sewage), inhalation (such as asbestos or chemical vapours), or mobilisation to surface waters and bioaccumulation. These events will be managed in the first instance through implementation of applicable Australian Standards for the storage and handling of hazardous materials. In the unlikely event of a significant leak of spill or contaminants, remediation will be implemented as soon as practicable.

Bulk Earthworks will involve the management of asbestos contamination in accordance with the RAP. The RAP enables the achievement of site suitability via the mechanism of capping, containment and long-term management. This includes opportunities for asbestos material to be retained in situ where it is observed at depth or placed in areas that require filling to achieve final levels. Included in the decision-making process is the end land use for the airport site such as air side and land side locations as well as geotechnical properties of the material.

The RAP provides alternative options for the management of asbestos based on end-use consideration. These other options include visual clearance by a Licensed Asbestos Assessor (LAA) and excavation and validation. Where capping and containment or certified clearance by a LAA of asbestos impacted soils occurs, the associated soils are to be managed under a Long-Term Environmental Management Plan (LTEMP). However, where the excavation and validation of asbestos impacted soils occurs, no further controls will be required in respect of asbestos in these areas and future potential exposure to residual contamination managed via an Unexpected Finds Protocol as part of the site LTEMP.

The revised management strategy applies to areas of known contaminated soils at the site including surface soils, subsurface soils and existing stockpiles, as well as to other potential contaminated-soils that may be encountered during construction of the WSI.

In addition to this there may be unexpected finds of contamination (other than asbestos) encountered during construction activities. The unexpected finds procedure is outlined further in Appendix C. The assessment criteria for onsite reuse and validation is outlined in detail in the RAP.

## 6.3 Surface water impacts

Site preparation and construction will transform approximately 60 per cent of the Airport Site from a rolling grassy and vegetated landscape to essentially a built landscape with some landscaping. These changes will alter the catchment areas within the Airport Site and the permeability of the ground surface, altering the duration, volume and velocity of surface water flow from this site.

### 6.3.1 Watercourse

The Bulk Earthworks program will involve the removal of one kilometre of minor watercourses within the construction impact zone, the majority being drainage lines and valley fills with less defined channels. In addition, all farm dams of varying sizes will be removed as part of the Bulk Earthworks project. Construction will also change the topography and permeability of sub-catchment areas at the Airport Site, affecting flows in receiving watercourses upstream and downstream of the Airport Site. These changes will occur progressively during construction.

### 6.3.2 Flooding

Construction of the Stage 1 Development will modify drainage direction and overland flow paths, changing the nature of flooding on the Airport Site. As construction progresses and the impervious area expands, the volume of runoff from the Airport Site will also increase.

There is a high likelihood of large rainfall events during construction. This has the potential to disrupt construction activities due to flooding and waterlogged soils, as well as the potential for downstream flooding. Detention basins will be established at the commencement of the construction program to mitigate the increase in runoff, reducing offsite impacts of surface water flows.

### **6.3.3 Surface water quality**

These conditions will present a risk of erosion and associated surface water quality impacts. Bulk Earthworks will not occur within 300 metres of Cosgroves Creek or 880 metres of Duncans Creek. Works will be required to occur adjacent to Badgerys Creek. Refer to Section 7 for details of the management measures.

The design capacity and placement of detention basins will ensure that all drainage water from disturbed areas will be captured prior to discharge. The water management system will include the main detention basins supplemented by a series of interim sediment basins and control measures within the immediate work area. The water management system will have the effect of improving the quality of the surface water prior to release to receiving waters by allowing sediment to settle within the basins.

Construction will also involve the use of a range of fuels and chemicals. These substances may be released to the environment in the event of a mishap during refuelling, maintenance or general storage or handling.

## **6.4 Groundwater impacts**

### **6.4.1 Groundwater recharge**

As stated in the EIS, groundwater recharge may be affected by compaction and the establishment of impermeable surfaces across the Airport Site during construction. Re-profiling the land may lead to a temporary increase in rainfall recharge during Bulk Earthworks, as the fill is expected to have a higher overall permeability than the existing site conditions. However, as construction progresses, the proportion of paved surfaces will have increased, reducing recharge to below existing conditions.

Overall, minimal change to local groundwater recharge will be expected as the existing shale derived clay soils have low permeability resulting in most of the rainfall at the site being released as stormwater runoff rather than infiltrating to groundwater. As stated in the EIS it is not expected that a reduction in recharge will affect any sensitive ecological receptors or beneficial uses of the groundwater system.

### **6.4.2 Groundwater drawdown**

The EIS considered the potential for groundwater drawdown at the Airport Site. The EIS stated that drawdown is anticipated as a result of Airport Site re-profiling and dewatering of excavation beneath the water table. The extensive re-profiling will result in a lowering of groundwater elevations in areas that currently have higher topographic elevation. It is also expected to result in reduced groundwater flow rates and reduced discharge to surrounding surface features. However, the re-profiling will not result in dewatering of the groundwater system below the level of the surrounding creeks and there will be no potential for creeks to dry up due to groundwater drawdown.

Establishment of basements in the terminal complex as part of the Stage 1 Development will likely intercept the underlying shale aquifers and require dewatering and management throughout construction. As per Section 18.5.4.2 of the EIS due to low inherent hydraulic conductivities of the geology in these areas, it can be expected that seepage volumes will be relatively small.

### **6.4.3 Groundwater quality**

Potential groundwater quality risks include isolated spills and incidents occurring during construction, and diffuse impacts associated with general construction activities such as the use of machinery. Contaminants of primary concern are usually hydrocarbons; however, other chemicals such as herbicides, pesticides and fertiliser may also be used during construction. Impacts may result from the infiltration of pollutants through

the ground surface or through dirty water retention facilities (such as temporary sediment basins) to the underlying groundwater systems.

Groundwater seepage into excavations for building basements will need to be managed by pumping seepage to stormwater management facilities or other suitable treatment systems. Chemicals of concern in groundwater seepage include:

- Total dissolved solids;
- Metals;
- Total nitrogen;
- Phosphorus; and
- Sulphate.

Groundwater present in the shallow geology has been identified to have high salinity values. The excavation and sue of this material for infilling could permit the release of additional salts into groundwater. This will only occur where increased recharge occurs to fill areas, and where a shallow groundwater table develops in the fill material.

## 6.5 Water usage

Water will be utilised during construction for soil conditioning, dust suppression and other construction activities.

An estimated 650 ML of water will be required to support the Stage 1 Bulk Earthworks. Non-potable water sources will be primarily be used to meet this requirement. However, potable water may be required to be supplied from existing assets operated by Sydney Water. Non-potable water sources will include stormwater runoff captured in sediment dams or existing farm dams. Groundwater is not currently proposed to be utilise as a water source.

To meet water demand, it may be necessary to access water from other sources such as groundwater or surface water sources within the catchment. However, water extraction from such alternative sources will be subject to a new assessment and consideration of necessary approvals when required.

## 6.6 Risk Assessment

A risk assessment has been undertaken as part of the review and development of this CEMP and in accordance with Environmental Aspects, Impact and Risk Procedure (Appendix D of the SEMF). The parts of the overall risk assessment relevant to Biodiversity have been extracted and summarised in Table 10 applies to all phases of works that the Construction Plan authorises.

The identification of construction activities and associated impacts that could eventuate during construction of the Project is central to the selection of appropriate environmental safeguards.

The risk management process involved an assessment of all specific Project activities/aspects in or near environmentally sensitive areas and resulted in the development of a list of environmental risks (effects and impacts) and a corresponding risk mitigation strategy and risk ranking.

The identification of risks included a review of the works, and review of the environmental risks identified by the EIS. The mitigation measures in the risk assessment are in-line with the EIS mitigation measures in Section 7 of this CEMP, Table 10.

**Table 10 Soil and water risk assessment**

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level <sup>2</sup> pre-mitigation	Mitigation measure <sup>1</sup>	Risk level <sup>2</sup> post-mitigation	Management tools
01	Site establishment	Site and delivery vehicles travelling on unsealed roads	Sedimentation	Offsite sediment discharge/pollution to waterways, ecological areas, local drainage	C4 (Sig)	SW_29 SW_30 SW_31 SW_32 SW_33 SW_34	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• Environmental Control Map (ECM)</li> </ul>
02			Sedimentation	Offsite sediment discharge/pollution to waterways, ecological areas, local drainage	C4 (Sig)	SW_29 SW_30 SW_31 SW_32 SW_33 SW_34	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
03		Erosion and sedimentation of site compound areas	Erosion and sedimentation	Offsite sediment discharge/pollution to waterways,	C4 (Sig)	SW_29 SW_30 SW_31	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> </ul>

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level <sup>2</sup> pre-mitigation	Mitigation measure <sup>1</sup>	Risk level <sup>2</sup> post-mitigation	Management tools
				ecological areas, local drainage		SW_32 SW_33 SW_34		<ul style="list-style-type: none"> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
04	Site establishment (continued)	Erosion and sedimentation of project areas	Ground disturbance	Unnecessary disturbance of areas not requiring construction causing erosion and sedimentation issues to waterways, ecological areas, local drainage	C4 (Sig)	SW_38	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
05	Utility works	Potholing and trenching	Sedimentation	Offsite sediment discharge/pollution to waterways, ecological areas, local drainage	B2 (Low)	SW_29 SW_30 SW_31 SW_32 SW_33 SW_34	B2 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>



Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level <sup>2</sup> pre-mitigation	Mitigation measure <sup>1</sup>	Risk level <sup>2</sup> post-mitigation	Management tools
06	Earthworks and Construction	Topsoil stripping / clearing and grubbing	Sedimentation	Offsite sediment discharge/pollution to waterways, ecological areas, local drainage	C4 (Sig)	SW_29 SW_30 SW_31 SW_32 SW_33 SW_34	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Aboriginal Cultural Heritage CEMP (in particular, the Topsoil Management Protocol)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
07	Earthworks Construction (continued)	Excavation	Sedimentation	Build up of water in excavations causing runoff to site / offsite areas	B2 (Low)	Ground water MM (SW_15-23) SW_29 SW_30 SW_31 SW_32 SW_33 SW_34	B2 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
08		Excavation (Cont.)	Ground water	Intercepting ground water causing sediment runoff to waterways,	C2 (Mod)	Ground water MM (SW_15-23)	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> </ul>

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level <sup>2</sup> pre-mitigation	Mitigation measure <sup>1</sup>	Risk level <sup>2</sup> post-mitigation	Management tools
				ecological areas, local drainage				<ul style="list-style-type: none"> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
09	Earthworks and Construction (continued)	Stockpiling materials	Erosion and sedimentation	Offsite sediment discharge/pollution to waterways, ecological areas, local drainage	C3 (Sig)	SW_29 SW_30 SW_31 SW_32 SW_33 SW_34 SW_35 SW_36	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
10		Constructing waterway crossings	Sedimentation	Sediment discharge to creeks / erosion of crossing platform	C3 (Sig)	SW_29 SW_30 SW_31 SW_32 SW_33 SW_34	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level <sup>2</sup> pre-mitigation	Mitigation measure <sup>1</sup>	Risk level <sup>2</sup> post-mitigation	Management tools
11		Piling	Groundwater	Intercepting ground water leading to offsite sediment discharge	C2 (Mod)	Ground water MM (SW_15-23)	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
12	Culvert construction	Culvert excavation	Sedimentation	Sediment discharge to creeks / offsite	C4 (Sig)	Ground water MM (SW_15-23) SW_29 SW_30 SW_31 SW_32 SW_33 SW_34	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
13	Concrete works	Drainage	Pollution to waterways / ecological areas	Offsite concrete runoff /pH rise to waterways, ecological areas, local drainage	B3 (Mod)	SW_29 SW_30 SW_31 SW_32 SW_33 SW_34	B2 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> </ul>

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level <sup>2</sup> pre-mitigation	Mitigation measure <sup>1</sup>	Risk level <sup>2</sup> post-mitigation	Management tools
								<ul style="list-style-type: none"> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
14		Concrete pours	Pollution to waterways / ecological areas	Offsite concrete runoff /pH rise to waterways, ecological areas, local drainage	B3 (Mod)	SW_29 SW_30 SW_31 SW_32 SW_33 SW_34	B2 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• Environmental Control Map (ECM)</li> </ul>
15	Waste storage	Concrete washouts	Pollution to waterways / ecological areas	Offsite concrete runoff /pH rise to waterways, ecological areas, local drainage	B3 (Mod)	SW_29 SW_30 SW_32 SW_33 SW_34	B2 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level <sup>2</sup> pre-mitigation	Mitigation measure <sup>1</sup>	Risk level <sup>2</sup> post-mitigation	Management tools
16		Temporary waste storage	Excess waste generation	Improper storage of waste concrete causing excess material waste (cross contamination of soils)	B3 (Mod)	SW_26 SW_27 SW_29 SW_30 SW_32 SW_33 SW_34	B2 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
17	Contaminated material works (Remediation)	Excavation	Asbestos	Cross contamination of surrounding areas	C4 (Sig)	SW_24 SW_25	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
18				Improper validation of contaminated/ remediated areas	C4 (Sig)	SW_24 SW_25	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> </ul>

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level <sup>2</sup> pre-mitigation	Mitigation measure <sup>1</sup>	Risk level <sup>2</sup> post-mitigation	Management tools
								<ul style="list-style-type: none"> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
19				Cross contamination of surrounding areas	B2 (Low)	SW_24 SW_25	B1 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
20	Contaminated material works (Remediation) (continued)	Excavation (continued)	Acid Sulphate Soils	Improper validation of contaminated/ remediated areas	B2 (Low)	SW_24 SW_25	B1 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level <sup>2</sup> pre-mitigation	Mitigation measure <sup>1</sup>	Risk level <sup>2</sup> post-mitigation	Management tools
21			PFOS/PFAS	Cross contamination of surrounding areas	B2 (Low)	SW_14 SW_24 SW_25	B1 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
22		Excavation (continued)		Improper validation of contaminated/ remediated areas	B2 (Low)	SW_14 SW_24 Testing as per Appendix D and this Soil and Water CEMP	B1 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
23	Site water management	Dewatering	Sedimentation	Incorrect treatment and discharge of sediment basins	C4 (Sig)	SW_33	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> </ul>

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level <sup>2</sup> pre-mitigation	Mitigation measure <sup>1</sup>	Risk level <sup>2</sup> post-mitigation	Management tools
								<ul style="list-style-type: none"> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
24			Sedimentation	Incorrect treatment and discharge of sediment traps and excavations throughout site	C4 (Mod)	SW_29 SW_30 SW_31 SW_32	C2 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
25	Road paving activities	Milling and excavation of road surfaces	Erosion and sedimentation	Offsite sediment discharge/pollution to waterways, ecological areas, local drainage	C3 (Sig)	SW_29 SW_30 SW_31 SW_32	C2 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>



Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level <sup>2</sup> pre-mitigation	Mitigation measure <sup>1</sup>	Risk level <sup>2</sup> post-mitigation	Management tools
26	Road paving activities	Asphalt works	Contamination	runoff to surrounding areas from asphalt if laid in intermittent weather	C3 (Sig)	SW_13	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
27	Chemical use	Storage of chemicals	Contamination	Site and surrounding area contamination due to chemical runoff	B3 (Mod)	SW_13 Chemical storage MM (SW_40-SW_46)	B2 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
28	Chemical use (continued)	General use of chemicals onsite	Contamination	Site and surrounding area contamination due to chemical runoff	B3 (Mod)	SW_13 Chemical storage MM (SW_40-SW_46)	B2 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• Waste and Resources CEMP</li> <li>• Air Quality CEMP</li> <li>• EWMS</li> </ul>

Ref	Activity	Construction Aspect	Environmental Aspect	Potential Impact	Risk level <sup>2</sup> pre-mitigation	Mitigation measure <sup>1</sup>	Risk level <sup>2</sup> post-mitigation	Management tools
								<ul style="list-style-type: none"> <li>• Traffic and Access CEMP</li> <li>• Complaints Procedure</li> <li>• Induction</li> <li>• ECM</li> </ul>
29	General	Plant and machinery	Flooding	Construction activities are inundated with flood waters resulting in isolation of plant and machinery and potential for chemical release into waters	C3 (Sig)	SW_47 SW_48 SW_49 SW_50	C2 (Mod)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP (in particular GWMP, CPSWMP, ESCPs)</li> <li>• WSA Emergency and Incident Response Procedure</li> </ul>
30	Water treatment facility operation	Operation of facility	Sewage discharge/overflow	Soil pollution	C2 (Mod)	SW_51	C1 (Low)	<ul style="list-style-type: none"> <li>• Soil and Water CEMP</li> <li>• ECM</li> <li>• WSA Emergency and Incident Response Procedure</li> </ul>

<sup>1</sup> Refer to Table 11 for mitigation measures and controls

<sup>2</sup> Derived from risk assessment process detailed in Section 6

## 7 Environmental control measures

Mitigation and management measures that will be implemented during construction are detailed in Table 11 and are consistent with those provided in Tables 28-6 and 28-7 in Chapter 28 of the EIS, as per Condition 10 (Section 3.10.2) of the Airport Plan. Operational mitigation and management measures relevant to the construction phase from Table 28-29 and 28-30 of Chapter 28 of the EIS have also been provided below. The relevant control measures will be included in the site-specific Environmental Work Method Statement (EWMS) and Environmental Control Map (ECM) – refer to Section 4.3 of the SEMF for further detail. For monitoring of the implementation of control measures, refer to Section 9.

**Table 11 Soil and water environmental control measures**

Ref	Mitigation measure	When to implement	How to implement	Responsibility for Implementation	Reference
<b>BEC: Bulk Earthworks Contract    EEW: Early Earthworks    MI: Material Importation    All Contractors: BEC, EEW, MI and other contractors as delegated by WSA</b>					
<b>SURFACE WATER MANAGEMENT</b>					
SW_01	As part of the detailed design process for the Stage 1 Development, a surface water management system will be developed. Development of a surface water management system for the Airport Site may involve a progressive process of design and implementation covering both the construction and operational phases. This may include the implementation of temporary system elements specifically for the construction phase. The system will include:	Pre-construction / Construction	<p>To be developed by the BEC Design Team as per SW_01 and will include SW_02, SW_03, SW_04, SW_05, SW_06, SW_07, SW_08, SW_09, SW_10. This document will be implemented under the supervision of the construction and environmental management teams.</p> <p>The design should take in to consideration the requirements and recommendations for site drainage works of the guidelines in Managing Urban Stormwater: Soils and Construction published by the New South Wales Government (commonly known as the “Blue Book”).</p>	BEC Design team	EIS Table 28-7

Ref	Mitigation measure	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract    EEW: Early Earthworks    MI: Material Importation    All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
SW_02	A detailed design of basins and channels to capture the majority of runoff, including during construction;	Pre-construction / Construction	Design will be completed as per SW_01 Construction sediment basin design capacities are calculated using the Blue Book RUSLE equation for the 80th Percentile 5-Day rain event (27.6mm) refer Blue Book Table 6.3a. Additional water retention and erosion and sediment controls will be implemented throughout the catchment in accordance with the ESCP to protect project assets and completed construction works. The ESCP is to be developed in consultation with a Soil Conservationist.	BEC Design team EEW and BEC Contractors	EIS Table 28-7
SW_03	Refined drainage system design performance standards to optimise capacity and release timing, mimicking natural flows as far as practicable. This is to be undertaken during the design refinement process, from concept to detailed design.	Pre-construction / Construction	As above	BEC Design team	EIS Table 28-7
SW_04	Separate bio-retention basins to provide additional treatment for low flows and separation of these features from the drainage system to protect contained water during flood events;	Pre-construction / Construction	As above	BEC Design team	EIS Table 28-7
SW_05	Pollutant traps to prevent debris and other coarse material entering the drainage system;	Pre-construction / Construction	As above	BEC Design team	EIS Table 28-7
SW_06	Stabilisation structures at outlets to include rock check dams at regular intervals along channels and energy dissipaters at basin outlets;	Pre-construction / Construction	As above	BEC Design team	EIS Table 28-7
SW_07	Capacity for containment of accidental leaks or spills in the drainage system at maintenance areas, fuel farms or other areas where fuels or chemicals are stored or handled in accordance with Australian standards;	Pre-construction / Construction	As above	BEC Design team	EIS Table 28-7

Ref	Mitigation measure	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract    EEW: Early Earthworks    MI: Material Importation    All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
SW_08	Measures to address impacts on downstream and upstream uses, including sensitive environmental values;	Pre-construction / Construction	As above	BEC Design team	EIS Table 28-7
SW_09	Volumes and sources of construction water; and	Pre-construction / Construction	As above	BEC Design team	Good practice
SW_10	Processes for treatment and discharge of any water from site and associated monitoring, reporting and regulatory approval requirements	Pre-construction / Construction	As above	BEC Design team	Good practice
<b>DEVELOPMENT OF LOCAL STANDARDS</b>					
SW_11	Local standards for water quality may be developed under the AEPR, with due consideration to the Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000) and the results of baseline water quality monitoring taking place for a minimum of 24 months prior to the commencement of Main Construction Works.	Pre-construction/ Construction	May be undertaken as per SW_11 but will not be undertaken if AEPR duty in Reg 4.01 can be satisfied based on the measures in this plan.	WSA - Environment Manager	N/A

Ref	Mitigation measure	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract    EEW: Early Earthworks    MI: Material Importation    All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
<b>EROSION AND SEDIMENTATION</b>					
SW_12	<p>ESCPs will be reviewed by the Project Soil Conservationist or a Certified Professional in Erosion and Sediment Control (CPESC) for all works involving soil disturbance unless the Airport Environment Officer agrees that soil and water risks do not warrant this.</p> <p>ESCPs will be prepared in accordance with the 'NSW OEH Blue Book – Managing urban stormwater: soils and construction'.</p>	Prior to works involving soil disturbance	<p>To be implemented in accordance with the described mitigation measure and Section 4 of the SEMF. ESCPs will be developed for each catchment and implemented across the Project where there is a risk of erosion and sediment loss.</p> <p>Construction sediment basin design capacities are calculated using the Blue Book RUSLE equation for the 80th Percentile 5-Day rain event (27.6mm) refer Blue Book Table 6.3a. Additional water retention and erosion and sediment controls will be implemented throughout the catchment in accordance with the ESCP to protect project assets and completed construction works. The ESCP is to be developed in consultation with a Soil Conservationist.</p>	All Contractors – Project Soil Conservationist, and environment team.	Good practice EIS Table 28-7
<b>SPILL RESPONSE</b>					
SW_13	A protocol will be developed and implemented to respond to and remedy leaks or spills.	Construction	<p>The WSA emergency spill response procedure is included as Appendix B.</p> <p>The requirements of the procedure is included in inductions undertaken by all staff, workers and visitors before attending the site.</p>	All Contractors – Environment Manager	EIS Table 28-7

Ref	Mitigation measure	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract    EEW: Early Earthworks    MI: Material Importation    All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
PFAS					
SW_14	The risk posed by PFAS contamination will be identified and if necessary, the Contractor environmental management plan is to include soil, groundwater and surface water PFAS contamination monitoring requirements, testing and disposal procedures consistent with relevant Commonwealth environmental management guidance on PFOS and PFOA as prepared by the Environment Department.	Pre-construction Construction	To be implemented in accordance with the described mitigation measure and Section 5.1.5 and Section 9.2 of this plan.	All Contractors – Environment Manager	Condition 8(6) and 34
GROUNDWATER MANAGEMENT					
SW_15	A groundwater management plan is to be developed and implemented identifying:	Prior to Main Construction Works	The bulk earthworks will have two impacts on the groundwater system: <ul style="list-style-type: none"><li>In cut areas, the shallow alluvium soils and associated aquifer will be removed by the excavation</li><li>In fill areas, the alluvium soils and associated aquifer will be buried by the fill.</li></ul> A groundwater management plan will only be developed and implemented should groundwater be encountered/used. If required, the groundwater management plan is to be prepared and implemented in accordance with the described mitigation measure prior to BEC commencing, refer Section 9.4 detailing the management measures to be implemented	BEC, EEW – Environment Manager and Design Manager.	Condition 8(4) and 8(5)
SW_16	Details of work that intercepts groundwater or requires groundwater extraction;				
SW_17	An assessment of aquifer impacts resulting from groundwater interception or extraction;				
SW_18	Extraction methodology and management measures for discharge; and				
SW_19	Groundwater monitoring and inspection programs.				
GROUNDWATER INFLOWS					
SW_20	To mitigate the impacts associated with groundwater inflows the following measures will be implemented:	N/A	Note.	BEC, EEW – Site supervisor,	EIS Table 28-7

Ref	Mitigation measure	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract    EEW: Early Earthworks    MI: Material Importation    All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
SW_21	Groundwater inflows will be reused or released with appropriate treatment;	Construction	Will be undertaken as per SW_21 under supervision of the construction and environmental management teams.	environment team and construction team	EIS Table 28-7
SW_22	Where groundwater is released to surface waters, treatment will be undertaken to bring water pollution below the accepted limits set out in the AEPR or any local standards; and	Construction	Will be undertaken as per SW_22 under supervision of the construction and environmental management teams. Refer to section 9.3.3 for discharge criteria.		EIS Table 28-7
SW_23	Corrective measures will be developed and implemented to supplement groundwater supplies in the unlikely event of impacts to dependent vegetation or watercourses.	Construction	Will be undertaken as per SW_23 under supervision of the construction and environmental management teams. Refer section 9.4		EIS Table 28-7
LAND CONTAMINATION					
SW_24	A remedial action plan and unexpected finds protocol will be established to facilitate the quarantining, isolation and remediation of contamination identified throughout the construction program.	Prior to Main Construction Works and implemented during construction	A remedial action plan and unexpected finds protocol (Appendix C) have been established. These should be discussed during the compulsory induction undertaken by all staff, workers and visitors before attending the site.	All Contractors – all staff including site supervisors, environment team and construction team.	EIS Table 28-7
SW_25	Any asbestos identified on site will be managed in accordance with applicable regulatory requirements.	Construction	The unexpected finds protocol (Appendix C) outlines the process of dealing with unexpected asbestos finds. This will be followed and reported upon occurrence in accordance with applicable regulatory requirements.	All Contractors– all staff including site supervisors, occupational hygienist, safety team and construction team.	-
SW_26	Any material requiring off-site disposal shall be done in accordance with the Waste and Resources CEMP.	Construction	To be implemented in accordance with the described mitigation measure. Refer to Waste and Resources CEMP for further detail.	All Contractors – Site supervisors & Engineers.	Waste and resources CEMP (EIS Table 28-17) - Good practice



Ref	Mitigation measure	When to implement	How to implement	Responsibility for Implementation	Reference
<b>BEC: Bulk Earthworks Contract    EEW: Early Earthworks    MI: Material Importation    All Contractors: BEC, EEW, MI and other contractors as delegated by WSA</b>					
SW_27	Waste classification details for any waste material removed from site shall be documented and maintained on project records (in accordance with the NSW Waste Classification Guidelines, 2014).	Construction	To be implemented in accordance with the described mitigation measure. Refer to Waste and Resources CEMP for further detail.	All Contractors – Site supervisors & Engineers.	Waste and resources CEMP (EIS Table 28-17) Good practice
<b>EROSION AND SEDIMENTATION</b>					
SW_28	Impacts associated with erosion and sediment will be mitigated through:	Note	NA	NA	NA
SW_29	Implementation of ESCPs;	Construction	ESCPs will be implemented progressively by the contractor prior to the next stage of works. Environmental site inspections would be undertaken by the WSA Environment Manager (or delegate) on a weekly basis to evaluate the effectiveness of environmental controls implemented by the contractor.	All Contractors – Environment team, Site Supervisors and Engineers. WSA - Environment Manager (or delegate)	Good practice
SW_30	Installing a site drainage system prior to commencement of Bulk Earthworks;	Construction	To be implemented in accordance with the described mitigation measure. Drainage design must be undertaken in accordance with Australian Rainfall and Runoff, 2016 and the Australian National Committee on Large Dams (ANCOLD) and NSW Dams Safety Committee (DSC) guidelines must be used in the design and construction of the flood detention basins and water quality basins	All Contractors – Site supervisors & engineers.	EIS Table 28-7
SW_31	Minimising the surface area disturbed at any one time by, where practical, staging construction works and stabilising soils with vegetation or appropriate cover materials;	Construction	Will be undertaken as per SW_31. Mitigation measure WR_06 of Waste and Resources CEMP notes that mulch will be utilised onsite for environmental controls and ground stabilisation.	All Contractors – Site superintendent, supervisors and engineers.	EIS Table 28-7

Ref	Mitigation measure	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract    EEW: Early Earthworks    MI: Material Importation    All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
SW_32	Establishing erosion and sediment controls in accordance with the 'NSW OEH Blue Book – Managing urban stormwater: soils and construction';	Construction	To be implemented in accordance with the described mitigation measure.	All Contractors – Site supervisors & environment team.	EIS Table 28-7
SW_33	Providing intermediate sediment retention basins within the construction impact zone to provide additional treatment prior to completion of the airport's site drainage system. Specific erosion control measures will be developed for the management of highly erodible soils such as those anticipated in the Luddenham and South Creek soil landscapes;	Pre-construction/ Construction	To be implemented in accordance with the described mitigation measure. Refer to SW_01 & SW_02 for further detail.	EEW, BEC - Design Team	EIS Table 28-7
SW_34	Mulching cleared vegetation for use in erosion control at construction sites;	Construction	Will be undertaken as per SW_34. Mitigation measure WR_06 of Waste and Resources CEMP also notes that mulch will be utilised onsite for environmental controls and ground stabilisation.	BEC, EEW – Site supervisors, engineers and environment team.	EIS Table 28-7
SW_35	Covering and stabilising soil stockpiles with vegetation or mulch;	Construction	Will be undertaken as per SW_35. Mitigation measure WR_06 of Waste and Resources CEMP also notes that mulch will be utilised onsite for environmental controls and ground stabilisation.	BEC, EEW – Site supervisors, engineers and environment team.	EIS Table 28-7
SW_36	Stockpiling topsoil at a maximum height of two metres, where practicable; and	Construction	Will be undertaken as per SW_36. Environmental site inspections will be undertaken by the WSA Environment Manager (or delegate) on a weekly basis to evaluate the effectiveness of environmental controls implemented by the contractor.	BEC – Site supervisors.	EIS Table 28-7
SW_37	Distributing and seeding topsoil over landscaped areas at the completion of Bulk Earthworks.	Construction	Will be undertaken as per SW_37 under supervision of the construction and environmental management teams.	BEC, EEW – Site supervisors, engineers and environment team.	EIS Table 28-7

Ref	Mitigation measure	When to implement	How to implement	Responsibility for Implementation	Reference
<b>BEC: Bulk Earthworks Contract    EEW: Early Earthworks    MI: Material Importation    All Contractors: BEC, EEW, MI and other contractors as delegated by WSA</b>					
SW_38	New water way crossings or upgrades of existing crossings, if required on the airport site, must be designed and constructed to minimise potential impacts on riparian and aquatic habitats and fish passage.	Construction	To be implemented in accordance with the described mitigation measure.	BEC Contractor – Site supervisors, engineers and environment team.	EIS, Section 16.7.2 Mitigation and management of impacts
<b>PROGRAMMING</b>					
SW_39	Construction programming will allow for progressive rehabilitation of disturbed areas will be undertaken to minimise soils exposure and the potential for dust generation, erosion and sedimentation, and visual impacts.	Pre-construction/ construction	To be implemented in accordance with the described mitigation measure.	BEC, EEW – Site supervisors, engineers and environment team.	Good practice
<b>LEAKS OR SPILLS OF FUEL OR OTHER CHEMICALS</b>					
SW_40	To minimise the risk of leaks or spills the following mitigation measures will be put in place:	Note	NA	NA	EIS Table 28-7
SW_41	Maintenance areas, fuel farms and other areas where fuels or chemicals are stored or handled will be bunded to contain any accidental spills or leaks;	Construction	Will be undertaken as per the described mitigation measure.  Environmental site inspections will be undertaken by the WSA Environment Manager (or delegate) on a weekly basis to evaluate the effectiveness of environmental controls implemented by the contractor	All Contractors – workshop foreman and site supervisors.	EIS Table 28-7
SW_42	Fuel and other chemicals will be stored and handled in accordance with relevant Australian standards such as:	Construction	Australian standards listed will be considered when storing fuel and other chemicals.  Environmental site inspections will be undertaken by the WSA Environment Manager (or delegate) on a weekly basis to evaluate the effectiveness of environmental controls implemented by the contractor	All Contractors – site supervisors	EIS Table 28-7

Ref	Mitigation measure	When to implement	How to implement	Responsibility for Implementation	Reference
<b>BEC: Bulk Earthworks Contract    EEW: Early Earthworks    MI: Material Importation    All Contractors: BEC, EEW, MI and other contractors as delegated by WSA</b>					
SW_43	AS 1940-2004 The storage and handling of flammable and combustible liquids;	Construction	Refer to SW_41	All Contractors – site supervisors	EIS Table 28-7
SW_44	AS/NSZ 4452:1997 The storage and handling of toxic substances;	Construction	Refer to SW_41	All Contractors – site supervisors	EIS Table 28-7
SW_45	AS/NZS 5026:2012 The storage and handling of Class 4 dangerous goods; and	Construction	Refer to SW_41	All Contractors – site supervisors	EIS Table 28-7
SW_46	AS/NZS 1547:2012 On-site domestic wastewater management.	Construction	Refer to SW_41	All Contractors – site supervisors	EIS Table 28-7
<b>FLOOD MANAGEMENT</b>					
SW_47	Weather forecast and monitoring is to be undertaken daily as part of the pre-start meeting and the day's activities are to be modified if and as required.	Construction	Will be undertaken as per SW_47.	All Contractors – Site supervisors and environment team.	Good practice
SW_48	In the event that rain forecast is likely to exceed 20mm in any 24-hour period, work activities are to be re-assessed and if deemed necessary (i.e. in the event of prolonged rainfall and actual or potential for rising creek levels), any plant and machinery (and moveable items) are to be relocated to an area outside of the 100-year ARI area (refer to Section 6.3.2) and away from any watercourse.	Construction	Will be undertaken as per SW_48 under the supervision of the construction and environmental management teams.	All Contractors – Site supervisors and environment team	Good practice
SW_49	Where possible, temporary stockpiles and plant and equipment storage are to remain outside of the area identified as being within the 100-year ARI (refer to Figure 6). If required, a flood marker is to be installed on site to indicate the 100-year ARI extent.	Construction	Will be undertaken as per SW_49 under the supervision of the construction and environmental management teams.	All Contractors – Site supervisors and environment team	Good practice

Ref	Mitigation measure	When to implement	How to implement	Responsibility for Implementation	Reference
BEC: Bulk Earthworks Contract    EEW: Early Earthworks    MI: Material Importation    All Contractors: BEC, EEW, MI and other contractors as delegated by WSA					
SW_50	If flooding occurs on the site, the WSA Emergency Plan and/or Contractor Emergency Plan is to be implemented.	Construction	<p>Will be undertaken as per SW_50.</p> <p>The applicable Emergency Plan will be discussed during the inductions undertaken by all staff, workers and visitors before attending the site.</p>	<p>BEC/EEW Contractors within the CIZ – all personnel under the direction of the site supervisors</p> <p>WSA for areas outside the CIZ</p>	Good practice
<b>WATER TREATMENT FACILITY OPERATION</b>					
SW_51	The treated water irrigation scheme will be designed and operated in accordance with the risk framework and management principles contained in the National Guidelines on Water Recycling (EPHC 2006) and Environmental guidelines: Use of effluent by irrigation (DEC 2004).	Operation	<p>The Water Treatment Plant Operational Management Plan has been prepared. WTP will be operated in accordance with the relevant guideline.</p> <p>The project treated water irrigation scheme will be designed by others in future work phases.</p>	WSA	Table 28-30

## 8 Environmental roles and responsibilities

The key environmental management roles and responsibilities for the construction phase of the work are detailed in Section 4.5 of the SEMF. Specific responsibilities for the implementation of environmental controls are detailed in Section 7 of this Plan.

The BEC and EEW Contractors have engaged a Project Soil Conservationist who will be and consulted throughout construction to provide advice on erosion and sediment control design, installation, maintenance and the development of Progressive Erosion and Sediment Control Plans. WSA will ensure enough resources are allocated on an ongoing basis to ensure effective implementation by both WSA and the responsible contractors.

The roles and responsibilities for the management of asbestos as required by the RAP is detailed in Table 12.

**Table 12 Roles and responsibilities for the management of asbestos**

Roles	Responsibilities	Prep Activities	EEW	Material Import	BEC
Contractors (BEC and EEW)	Responsible for undertaking the remediation works as defined in the RAP and securing all relevant approvals required to undertake the works.	x	x		x
Licensed Asbestos Assessor	Engaged by the Contractor. Competent and experienced in identifying asbestos in accordance with the requirements of SafeWork Australia (2016). They will work closely with the Remediation Contractor and the Environmental Advisor and will be responsible for undertaking air monitoring, risk assessment and issue of clearance certificates for visual presence of asbestos on surfaces as part of the validation works for the site.	x	x		x
Hygienist	Engaged by the Contractor to monitor air quality, WHS requirements and completes an assessment of the overall condition of the asbestos, where fibres could be inhaled in by workers, where asbestos is likely to crumble and become airborne and if they can be disturbed.	x	x		x
Site Auditor	Accredited by the NSW EPA and will undertake an independent non-statutory review of all relevant environmental reports prepared for the remediation of the site. The Site Auditor will prepare a Site Audit Report (SAR) and Site Audit Statement (SAS) confirming the suitability of the site for its intended use.	x	x	x	x
Environmental Advisor	Suitably qualified and competent environmental consultant who has specific demonstrated experience in the type of remediation set out in this RAP. Their role is to provide independent, technical advice, direction and validation of the remediation and to document that all remediation works undertaken at the site are conducted to the satisfaction of WSA and the Site Auditor.	x	x	x	x
WSA Environment Team	Overall responsibility for environmental management and remediation of the site.	x	x	x	x
WSA Design Team/ALC	Approves the location is suitable for the placement of material based on the land use	x	x		x



## **9 Inspection, monitoring, auditing and reporting**

Monitoring, inspection and auditing will be undertaken to measure effectiveness and facilitate continuous improvement of soil and water quality management.

General environmental monitoring, inspection and auditing requirements are summarised in Table 19 of the SEMF.

A summary of the environmental inspection, monitoring and auditing requirements is provided below, with details of how they apply to soil and water management where applicable.

### **9.1 Environmental inspections**

#### **9.1.1 WSA environmental inspections**

Environmental site inspections at active, exposed work sites will be undertaken by the environmental team on a weekly basis to evaluate the effectiveness of environmental controls implemented by the contractor.

The weekly site inspection is to include a visual check of general construction activities and any soil and water quality mitigation measures and or controls including but not limited to the following:

- Observations and evaluation of the effectiveness of erosion and sediment controls measures
- Observation of dust generation from specific construction activities including those from vehicle tracking and excavation works;

The findings of the WSA site environmental inspection will be recorded on a WSA Site Environmental Inspection Checklist included as Appendix B of the SEMF with an accompanying photographic style inspection report.

#### **9.1.2 Contractor environmental inspections**

Regular site inspections will be undertaken to monitor compliance with this plan at active, exposed work sites. Inspection results will be recorded, and the inspection log made available to Infrastructure Department upon request. Any exceedance of soil and water quality criteria will be reported in the monthly report and discussed at the Environmental Coordination meeting and appropriate remedial action will be taken.

More frequent site inspections by the person accountable for soil and water quality issues will be conducted onsite when activities with a high potential to cause erosion are being carried out.

The Contractor's Environmental Manager and/or Environmental Coordinators will undertake inspections in accordance with the Contractor Environmental Management Framework. This will include weekly and post rainfall (>10mm in a 24 hour period) inspections of the work sites to evaluate the effectiveness of environmental controls. The Contractor's Environmental Coordinators will record inspection findings on an inspection checklist form.

If any maintenance and/or deficiencies in environmental controls or in the standard of environmental performance are observed, they will be recorded on the checklist form. Records will also include details of any maintenance required, the nature of the deficiency, any actions required and an implementation priority.

#### **9.1.3 Pre-start inspection**

Prior to the commencement of works on each shift, an informal inspection will be carried out by the relevant contractor and will include a check of relevant environmental controls and resources required to ensure effective operation and maintenance. This is to include an inspection of relevant soil and water quality management mitigation measures and controls where applicable. Works are not to commence unless inspections are found to be satisfactory.

The foreman will undertake the pre-work inspections.

## 9.2 Soil and water monitoring

General environmental monitoring requirements are set out in the AEPR (and within Table 28-6 of the EIS) and include the following:

- Monitoring must take place under the direction of an appropriately qualified person; and
- The results of the monitoring must be kept in a written record.

Specific soil and water quality monitoring requirements, including timing and responsibilities, are included in Table 12.

**Table 13 Soil and water quality monitoring requirements**

Reference	Requirement	Timing	Responsibility
SW_M_01	The most suitable surface and groundwater monitoring locations have been determined in consultation with the NSW EPA and relevant local councils, including monitoring locations adjacent to woodland areas and outside of the construction impact zone (but within the Airport Site);	Pre-construction and during construction	WSA Environment Manager
SW_M_02	Regular site inspections will be conducted to monitor the effectiveness of the soil and water management controls. Inspection results will be recorded, and the inspection log made available to the Infrastructure Department upon request;	During construction	BEC, EEW
SW_M_03	The frequency of site inspections will be increased during and immediately after wet weather (considered >20mm in any 24-hour period) when there is a higher potential for the off-site transport of sediment from the Airport Site;	During construction	BEC, EEW
SW_M_04	Groundwater elevation monitoring will be conducted to detect potential impacts to base flow in the vicinity of potentially sensitive creeks or groundwater dependent vegetation. Monitoring will be undertaken quarterly through construction up to a minimum period of three years after the completion of the Stage 1 development and until any identified impacts stabilise;	During construction	WSA Environment Manager
SW_M_05	Groundwater quality monitoring of alluvial and Bringelly Shale aquifers will be conducted at major infrastructure locations, down gradient from those locations and in the vicinity of groundwater dependent vegetation or watercourses. Monitoring will initially be undertaken quarterly and adjusted as appropriate; and	During construction	WSA Environment Manager
SW_M_06	Monthly surface water quality monitoring will be conducted to monitor performance of the drainage system. This monitoring will occur once the surface water drainage system is in place and take place at basin outflows and during selected upstream and downstream conditions.	During construction	WSA (Stage 1 Development surface monitoring program) BEC, EEW (monitoring for work activities)

Where a non-conformance is detected, or monitoring results are outside of the expected range, a review of the processes and results will be completed. Where a non-conformance is identified, the process described in the SEMF (Section 8.1) will be implemented.

### 9.2.1 Contractor Wet Weather and Additional Monitoring

Monitoring would be undertaken for wet weather events in excess of 20 mm (within a 24-hour period) as described in Table 13. Additional water quality monitoring may be undertaken during high risk construction activities, such as installation or removal of temporary waterway crossings or in response to an incident, enquiry or complaint.

In the case of wet weather or additional monitoring, where there is a variance greater than 20% between upstream and downstream further analysis and/or investigation will be performed to determine if the changes in water quality relate to construction activities. Monitoring parameters and subsequent trigger levels for incident response monitoring may differ depending on the incident type, and guidance may be obtained from an appropriately qualified independent industry professional.

## 9.3 Project-wide surface water quality monitoring program

The following sections detail both, a Project-wide surface monitoring program (Stage 1 Development surface monitoring program) by WSA, in addition to targeted water quality monitoring program by each contractor associated with specific construction activities, including those covered by this CEMP (Refer to Table 14).

Calibration of all monitoring equipment will be undertaken in accordance with the relevant manufacturer's specification prior to first usage. All calibration records will be retained on site, including calibration certification (where undertaken by a third-party) and any other pre and post calibration records.

Water quality monitoring sites and monitoring network are adequate for the current bulk earthworks. Monitoring has been undertaken confirming existing mitigation measures are adequate.

### 9.3.1 Stage 1 Development surface water quality monitoring, sampling and reporting

#### Monitoring locations

The Stage 1 Development surface water monitoring program by WSA will utilise a series of ten pre-selected surface water monitoring location points as detailed in Table 14 and presented in Figure 5. These locations are based off the previously used monitoring locations for the background / baseline monitoring undertaken for the Airport Site and enable a consistent approach moving forward, allowing for ease of comparison and interpretation against historical data.

**Table 14 Surface water quality monitoring locations**

Name	Receiving water	Latitude (°N)	Longitude (°E)	Street address	Description
D/S Basin 1	Badgerys Creek	-33.873794	150.754716	1727-1447 Elizabeth Drive	This site is located off Elizabeth Drive with a road bridge at the sampling site. The surrounding area is mainly pasture.
D/S Basin 2	Badgerys Creek	-33.893885	150.747222	76 Fuller Street.	To access this site, park at the end of Fuller Street (the road gate needs to be unlocked) and walk through a paddock to reach the creek.
D/S Basin 3 New	Badgerys Creek	-33.898961	150.738342	679 Badgerys Creek Road	This site is located off Badgerys Creek Road with a road bridge running over the Creek. The surrounding area is pasture/ mixed native-exotic forest.

Name	Receiving water	Latitude (°N)	Longitude (°E)	Street address	Description
D/S Basin 6	Oaky Creek	-33.869251	150.721278	2111 Elizabeth Drive	This site is located off Elizabeth Drive with a road bridge at the sampling site. The surrounding area is mainly pasture with a few homes.
D/S Basin 7	Cosgrove Creek Tributary	-33.872049	150.713461	223 Adams Road.	D/S Basin 7 is located off Adams Road, with a small road bridge at site. Access is off road bridge.
D/S Basin 8	Tributary	-33.887897	150.675722	336 Willowdene Avenue	This site is located off Willowdene Ave, access from road bridge at site.
D/S Basin 9	Duncan's Creek	-33.898923	150.683626	Lot 32 392 Willowdene Avenue	This site is located off Willowdene Ave.
D/S Residual	Duncan's Creek	-33.900330	150.645150	527 Greendale Road	The site is located off Greendale Road with a road bridge present at site. Access down to the creek is difficult; the alternative is to stand on the roadside on a narrow bridge, which is unsafe in a 70-80 km speed zone with blind corners in both directions.
U/S Airport New	Badgerys Creek	-33.912333	150.704744	1675 The Northern Road	The site is located off The Northern Road.
U/S Airport 2	Badgerys Creek anabranch	-33.914444	150.705994	1655 The Northern Road	The site is located off The Northern Road opposite a fertiliser company.





## Monitoring

Monitoring and sampling will be undertaken by a consultant on a monthly basis on behalf of WSA. Both in situ sampling and 'ex situ' sampling (collecting 'grab' samples) for laboratory analyses, will be conducted. Observations on visual assessments will be recorded on a water quality monitoring form at the time of the sampling event.

## Sampling

***In situ sampling*** - In situ measurements of water quality parameters are essential to determine site conditions that can vary dramatically, or frequently, in waterbodies. In situ monitoring will be conducted (where possible) from locations away from the water's edge, and in areas where water is sufficiently deep.

Using a calibrated portable water quality monitoring probe / meter the following parameters will be recorded:

- Temperature (°C);
- Conductivity (µS/cm);
- Turbidity (NTU);
- pH (pH units); and
- Dissolved Oxygen (mg/L and % saturation);

***Grab Samples*** - Samples will be collected from discrete locations at each site as detailed in Table 15 in appropriate bottles as provided by the relevant NATA accredited laboratory. All sampling equipment will be decontaminated between each site as required. The collected samples will be transported to the NATA accredited laboratory as soon as possible with adequate ice supplies included in the transportation container to ensure the samples remain cool. All sample batches submitted to the laboratory will be accompanied by a Chain-of-Custody form, a copy of which will be saved and maintained on project records. All analysis will be undertaken as per the instruction on the Chain-of-custody form in accordance with the required standards and procedures as per NATA requirements.

All sampling and preservation techniques will be in accordance with the Australian Standards for water quality sampling (AS/NZS 5667.1:1998).

## Reporting

The WSA monthly report will include details of monitoring completed during the month. The detail included in the monthly report will be the following as a minimum:

- Date and time of the sampling event;
- Description of the weather and any potential influencing conditions;
- Description of the monitoring location of the sampling event at the time of the sampling observations regarding the condition of the waterway and associated water levels and water flow (if any);
- A summary of all monitoring and sampling results; and
- Interpretation of the results and comparison against the relevant criteria (refer to Section 9.3.3), including identification of any water quality exceedances and potential sources of the exceedance.

### 9.3.2 Contractor surface water quality monitoring and reporting

#### Monitoring

The monitoring plans by each contractor will be appropriate to the level of risk associated with the scope of activities and be prepared in accordance with the legislation and guidelines identified in Section 4. An example Monitoring and Inspection Procedure is included in Appendix D. Each contractor should develop a monitoring and inspection procedure.

Monitoring and inspections from the Contractor will include, but not be limited to:

- Up and downstream of the work site water quality monitoring at nominated locations;
- Where relevant monitor adjacent to woodlands at representative locations to the work,
- Groundwater monitoring, both level and quality at nominated locations;
- Construction water quality prior to discharge (e.g. sediment basin, excavation etc); and
- Weekly and post rainfall inspections to evaluate the effectiveness of erosion and sediment controls measures.

The type, timing, frequency, assessment criteria and associated reporting requirements are detailed in the plan. The plan includes detailed inspection criteria such as:

- Monitoring locations;
- What is to be monitored;
- Type of monitoring; and
- Frequency of monitoring.

## Reporting

The Contractor will be responsible for reporting monthly to WSA on the results of the water quality monitoring undertaken during the reporting period.

The monthly Contractor's water quality monitoring report will include the following as a minimum:

- Date and time of the sampling event;
- Description of the weather and any potential influencing conditions;
- Description of the monitoring location of the sampling event at the time of the sampling observations regarding the condition of the waterway and associated water levels and water flow (if any);
- A summary of all monitoring and sampling results; and
- Interpretation of the results and comparison against the relevant criteria (refer to Section 9.6).

WSA will utilise the relevant information from the any water quality monitoring and reporting undertaken by the contractor to inform the monthly report compiled for the Stage 1 Development surface water quality monitoring and reporting.

### 9.3.3 Surface water quality limits

#### AEPR water quality limits

The Airports Act specifies offences relating to environmental harm, environmental management standards, and monitoring and incident response requirements, including in relation to water pollution. Standards in relation to water pollution include water quality criteria such as oxygen content, pH, salinity and turbidity.

Part 4 of the AEPR imposes a duty on the operator of an undertaking to at an airport to take all reasonable and practicable measures:

- (a) to prevent the generation of pollution from the undertaking; or
- (b) if prevention is not reasonable or practicable—to minimise the generation of pollution from the undertaking.

Both the Airport Plan conditions and Part 6 of the AEPR address monitoring of pollution levels. The AEPR requires that testing be undertaken by laboratory analysis accredited by the NATA.

Schedule 2 of AEPR sets out acceptable limits for water pollution which are assumed to satisfy the general duty not to pollute. Key parameters from these acceptable limits, considered applicable to the construction



phase of the Stage 1 development have been extracted and provided in Table 15. Refer to the AEPR for a complete list of the acceptable limits for water quality.

**Table 15 Key water quality parameters under the AEPR**

Parameter	Criteria
Total Phosphorous	< 0.01 mg/L*
Total nitrogen (TN)	< 0.1 mg/L*
Dissolved oxygen (DO)	80% of average level for a normal 24 hr period or > 6 mg/L
Total suspended solids (TSS)	Change not more than 10% from seasonal mean or; visual clarity within the euphotic zone is reduced by more than 10% from the seasonal mean
pH	6.5 – 9.0
Salinity	> 1000 mg/L or an increase of > 5%

\*It should be noted that these regulations are approximately five times more stringent than the current Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000) (ANZECC guidelines) for total phosphorus and total nitrogen (EIS, 2016).

## Construction water quality discharge criteria

In consideration of the AEPR, the background water quality as presented in the EIS (refer to Table 17) and the existing water quality at the Airport Site (as presented in Table 18), WSA, following consultation with the AEO, has adopted the following construction water discharge criteria as presented in Table 16 during the construction phase of the Stage 1 Development. The criteria selected are representative of the potential contaminants that may result from construction activities. The earthworks contractors are required to meet the discharge criteria included in Table 16 prior to discharge to receiving waters.

Site waters, including sediment basins, will not be discharged until the relevant criteria as detailed in Table 16 have been reached, observed by the Contractors Environmental Team. An on-site discharge permit is issued by the Contractor's Environment manager verifying the water quality where water is discharged within the airport site. Where water is to be discharged off-site, e.g. Badgerys Creek, the WSA Environment Manager must approve the permit to pump. An EWMS will be developed and implemented by EEW and BEC to detail the dewatering and sampling methodology. Prior to off-site discharge occurring the timing will consider that works should not adversely affect upstream or downstream sensitive environmental values or properties, where possible.

**Table 16 Construction water quality discharge criteria**

Parameter	Criteria	Sampling method	Analytical method
<b>Receiving water within the Airport Site (AEPR)</b>			
pH	6.5 –9.0	Probe or Grab Sample	Field analysis and confirmed as required with laboratory assessment
Total Suspended Solids (TSS)	Not more than 10% from the existing level in the receiver water	Grab Sample	Field analysis and confirmed as required with laboratory assessment
DO (%sat)	80% of level in the receiving water or > 6 mg/L	Grab sample (probe)	Field analysis and confirmed as required with laboratory assessment
DO (mg/L)		Grab sample (probe)	Field analysis and confirmed as required with laboratory assessment

Parameter	Criteria	Sampling method	Analytical method
Oil and Grease	No visible	Visual assessment for oil sheen	Field analysis and confirmed as required with laboratory assessment
<b>Receiving water outside the Airport Site (ANZECC)</b>			
pH	6.5 –8.5	Probe or Grab Sample	Field analysis and confirmed as required with laboratory assessment
Turbidity <sup>1</sup>	6- 50 NTU	Probe or Grab Sample	Field analysis and confirmed as required with laboratory assessment
DO (%sat)	>80%	Grab sample (probe)	Field analysis and confirmed as required with laboratory assessment
DO (mg/L)	>6	Grab sample (probe)	Field analysis and confirmed as required with laboratory assessment
Oil and Grease	No visible	Visual assessment for oil sheen	Field analysis and confirmed as required with laboratory assessment

<sup>1</sup> Turbidity in lowland rivers can be extremely variable. Values at the low end of the range would be found in rivers flowing through well vegetated catchments and at low flows. Values at the high end of the range would be found in rivers draining slightly disturbed catchments and in many rivers at high flows.

### 9.3.4 Airport Site water quality

The EIS referenced water quality criteria that was based on the existing water quality developed during the study period from 2015 to 2016. In addition, further water quality assessment has continued since the development of the EIS between 2016 - 2018. The results of the water quality monitoring have provided information about the existing background levels. The water quality is considered in the EIS as being degraded due to the previous land uses. This has particularly resulted in elevated levels of Total Nitrogen and Total Phosphorous.

Table 17 provides a summary of the background water quality at the Airport site

**Table 17 Airport Site Background water quality criteria**

Guideline / source	Total suspended Solids (mg/L)	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)
Background water quality criteria <sup>1</sup>	23.2	0.92	6.2
ANZECC Guidelines Default Trigger Levels	40	0.05	0.5
AEPR Limits	Change not more than 10% from seasonal mean	0.01	0.1

<sup>1</sup> Based on monthly water quality monitoring data obtained during 2015 and 2016 at various locations around the airport site, consisting of more than 80 samples for each parameter.

### 9.3.5 Receiving water quality targets

The criteria that was used to assess the condition of the water quality during the EIS and subsequent monitoring is provided in Table 17. The targets were based on the AEPR and ANZECC guidelines and will continue to be referenced during the Stage 1 Development monthly water quality program to determine

potential construction impacts. The WSA monthly report will include a comparison of the receiving water quality against the target provided in Table 18 and any exceedance will be discussed further in the report with regards to consideration of upstream and downstream water quality and the likely source of any exceedances. Appropriate action will be taken to mitigate against future exceedances where appropriate.

Following twelve months of implementation and monitoring against the water quality targets of receiving waters (as presented in Table 18), and every twelve months thereafter, WSA will undertake a review process of the criteria to refine the criteria to accurately reflect actual conditions and in an effort to demonstrate a process of continual improvement.

**Table 18 Receiving water quality target**

Analyte	Assessment Guideline	Assessment guideline source*
pH (in situ)	6.5-9.0	AEPR
Conductivity (µS/cm)	125-2,200	ANZECC
DO (%sat)	80% of average level for a normal 24 hr period or >6 mg/L	AEPR
DO (mg/L) >6 mg/L		
Turbidity (NTU) <sup>1</sup>	6-50	ANZECC
Faecal Coliforms (CFU/100mL)	150	AEPR
SS (mg/L)	6	ANZECC
NOx (mg/L)	0.04	
TKN (mg/L)	N/A	-
TN (mg/L)	0.1	AEPR
TP (mg/L)	0.01	
Chlorophyll-a (mg/m <sup>3</sup> )	2	
Arsenic (mg/L)	0.05	
Cadmium (mg/L)	0.0002	
Chromium (mg/L)	0.01	
Copper (mg/L)	0.002	AEPR
Lead (mg/L)	0.001	
Nickel (mg/L)	0.015	
Zinc (mg/L)	0.005	
Mercury (mg/L)	0.0001	
TPH C6 – C9 fraction (µg/L)	150	
TPH > C9 fraction (µg/L)	600	
per- and poly-fluoroalkyl substances	9ug/L	NEMP Fresh Water Aquatic Ecosystem - 99% species protection target

\*In the absence of criteria from the Airports (Environmental Protection) Regulations 1997, criteria were sourced from the ANZECC (2000) Freshwater Guidelines

1 Note: Turbidity in lowland rivers can be extremely variable. Values at the low end of the range would be found in rivers flowing through well vegetated catchments and at low flows. Values at the high end of the range would be found in rivers draining slightly disturbed catchments and in many rivers at high flows.

## 9.4 Stage 1 Development Groundwater monitoring program

The following sections detail the Stage 1 Development groundwater monitoring program by WSA.

### 9.4.1 Groundwater monitoring, sampling and reporting

#### Monitoring Locations

The groundwater monitoring program will utilise the existing network of 15 groundwater monitoring wells that were installed during the baseline groundwater monitoring program. The location of the groundwater monitoring locations is shown in Figure 9 and are summarised in Table 19.

Calibration of all monitoring equipment will be undertaken in accordance with the relevant manufacturer's specification prior to first usage. All calibration records will be retained on site, including calibration certification (where undertaken by a third-party) and any other pre and post calibration records

**Table 19 Groundwater monitoring locations and well details**

Well ID (Refer to Figure 9)	Installation date	Data Logger	Location Easting	Location Northing	Well Depth (mbtoc)	Well screen (mbgl)
GW01	21/12/2016	LT	285489	6246780	10.80	7 – 10
GW04	14/12/2016	-	288574	6246161	20.87	17 – 20
GW05	14/12/2016	LT	288574	6246161	10.76	7 – 10
GW06	13/12/2016	LT	288413	6246761	20.35	17 – 20
GW07	13/12/2016	LT	288413	6246761	10.27	7 – 10
GW08	15/12/2016	LT	289013	6246245	10.67	7 – 10
GW14	15/12/2016	-	290400	6246870	10.75	7 – 10
GW 16	15/12/2016	-	290461	6247764	10.77	7 – 10
GW 17	19/12/2016	LT, B	291523	6247399	21.85	17 – 20
GW18	19/12/2016	LT	291523	6247399	10.81	7 – 10
GW19	21/12/2016	LT	291738	6248976	10.81	7 – 10
GW20	20/12/2016	-	292130	6249000	20.83	17 – 20
GW21	20/12/2016	-	292130	6249000	10.84	7 – 10
GW22	21/12/2016	-	289283	6249162	10.65	7 – 10
GW23	16/12/2016	-	291265	6247780	10.82	7 – 10

LT=Level and Temperature Logger

B= Barometric Pressure Logger

Table 19 above includes indication of which groundwater wells have electronic logging instrumentation installed.

#### Monitoring and Sampling

Manual monitoring and sampling of the groundwater wells will be undertaken on a quarterly basis (i.e. every three months).

A groundwater sample will be obtained every quarter by a low-flow pump as per Water Sampling Guideline for the purposes of laboratory analysis including the following analytes:

- Nitrogen (speciated) and total phosphorus;
- Dissolved metals (field filtered As, Cd, Cr, Cu, Ni, Pb, Zn and Hg);
- Total recoverable hydrocarbons (TRH);
- Trace phenols and polycyclic aromatic hydrocarbons (PAHs);
- Benzene, toluene, ethylbenzene, xylene (BTEX);
- Volatile organic compounds (VOCs); and
- PFAS

In-situ groundwater field parameters will be checked and recorded including the following:

- pH;
- Temperature (°C);
- Electrical conductivity (uS/cm);
- Dissolved oxygen (mg/L); and
- Oxidation reduction potential (mV)

### **Groundwater criteria**

The assessment criteria adopted for the monitoring program was derived from the potential receptors identified in the EIS groundwater assessment. These include:

- Beneficial use capacity of groundwater and surface water quality;
- Potential recreational users of groundwater and surface water (farm dams and creeks);
- Use of groundwater and surface water for stock watering;
- Aquatic ecosystems located in creeks and farm dams; and
- Groundwater in and around groundwater dependent vegetation.

The adopted assessment criteria to assess impacts to these potential receptors is presented in Appendix E.

### **Analytical trigger values**

The adopted groundwater quality criteria will be utilised as the trigger values for the purpose of this CEMP and associated soil and water management. Where background concentrations exceed adopted criteria, laboratory concentrations should be assessed in the context of those background concentrations. Exceedances will be assessed using statistical interrogation.

### **Groundwater trigger-action-response measures**

The Airport Plan Condition 8(5) is satisfied through simple compliance arrangements that are suitable for specific activities required for this phase of works. More detailed trigger-action-response measures will be implemented for subsequent phases of works that have the potential to alter groundwater conditions.

The proposed trigger value for standing groundwater shall be a trend over a continuous three-month period, and overall change by 20% when compared to baseline data accounting for seasonal fluctuations to groundwater levels. Site specific parameters will be considered by Contractors in accordance with Section 7 of this CEMP and Section 4.4 in the SEMF.

The EIS identified that the bulk earthworks phase is unlikely to significantly impact on groundwater recharge, therefore given the unlikely impact of the works, the proposed approach is considered appropriate. However, in the event that there is a significant change, specialist advice would be obtained and these trigger values may be refined such that they specifically nominate seasonal upper and lower boundaries for the key groundwater monitoring points as nominated in Table 25.

## Corrective actions

Corrective actions to compensate for any reoccurring or long-term exceedances of the above target criteria will be managed through the unexpected find procedure to confirm if the exceedance is accurate, undertake a review of the work activities and confirm if any impacts on the vegetation or the environment has resulted. Any exceedances and its mitigation strategies will be discussed with the Environment Department and the Infrastructure Department. After agreement on corrective actions, implementation of control measures will be undertaken.

Where groundwater monitoring results exceed the adopted criteria (refer Appendix E) and/or are above the results established during the baseline assessment, the following actions would occur:

- Interrogation of dataset by WSA in consultation with the site Contractor and a review of construction activities that are likely to cause impact to groundwater;
- Review of sample collection and QA/QC procedures to assess data quality to confirm the data is representative of site conditions;
- Re-sampling of groundwater if required to confirm results;
- WSA to notify Infrastructure Department if considered a notifiable event (in accordance with Section 9.6);
- Review of on-site activities by the Contractor(s) which may have contributed to exceedance;
- Assess the need for corrective measures or options to mitigate impacts in consultation with Infrastructure Department and groundwater consultant (if required); and
- Implementation of control measures.

## Reporting

A quarterly groundwater monitoring report will be compiled based on the above groundwater monitoring activities. The reports will be reviewed by the WSA Environment Manager and any potential exceedances (as noted in the report) will be reported to Infrastructure Department and managed accordingly. As a minimum, the quarterly monthly groundwater monitoring report will include the following:

- Date, location (well) and time of the sampling event;
- Description of the weather and any potential influencing conditions;
- Factual reporting including lab results and groundwater elevation plots; and
- Interpretation of the results and comparison against the relevant criteria (refer to Section 9.4.2), including identification of any water quality exceedances and potential sources of the exceedance.

### 9.4.2 Contractor's groundwater monitoring, sampling and reporting

The BEC is not currently proposing to extract groundwater. This section of the plan will be updated if groundwater extraction is later deemed necessary by the contractor.

The contractor will consider standard techniques in case of finding ground water as per mitigation measure SW\_15 in Table 11 and the EIS.

## 9.5 Environmental auditing

Refer to Section 8 of the SEMF for environmental auditing requirements, including internal WSA audits, independent audits and audits to be undertaken by contractors.

## 9.6 Environmental reporting

General environmental reporting requirements are detailed in Section 8.3 of the SEMF. In addition, a summary of reporting requirements required under this Soil and Water CEMP (including environmental reporting requirements under the Airport Plan specific to this Soil and Water CEMP) is provided in Table 20.

**Table 20 Soil and water quality reporting**

Action	Scope	Timing / Frequency	Responsibility
Annual reporting	<p>Unless otherwise agreed by an Approver, an annual report will be prepared in relation to compliance with the Soil and Water CEMP.</p> <p>In accordance with Condition 39 (2), WSA will publish each of the annual reports on its website within three months of the end of the period in respect of which the report was prepared, with evidence providing proof of the date of publication to the Infrastructure Department with a copy to the Environment Department. The report must remain on the website for a period of at least 12 months.</p>	Annually	WSA
Monthly compliance reporting	Undertaking monitoring as required by the relevant contractor CEMP. Provide WSA with a monthly summary of all soil and water monitoring undertaken and advise of compliance with criteria	Monthly	All Contractors
Complaints reporting	Recording of complaints and stakeholder interactions	As required	WSA Environment Manager WSA Community and Stakeholder Manager All Contractors
Recording in a log book which is part of the Environmental Site Register any exceptional incidents (required under the 6.02(3) of the AEPR)	Record any exceptional incidents that cause excessive pollution of receiving waters and the action taken to resolve the situation	As required	All
Shut-down inspections	Inspection of contractor works including status of environmental controls prior to shut-down of site for an extended period (i.e. more than 2 days)	Prior to site shut-down	All Contractor
General environmental inspection	Inspection of environmental management controls on site and sighting of site documentation as required by the contractor's CEMP	At least weekly	WSA
General environmental inspection	Inspection of environmental management controls and site documentation for contractor works (as required by the contractor's CEMP).	As per Contractor environmental management system (at least weekly)	Contractor
Post-rainfall inspection	Inspection of environmental controls following a rainfall event exceeding 10 mm in any 24-hour period.	Within 24 hours of the rainfall event (excluding Sunday's and Public Holidays)	Contractor
Reporting pollution incidents (required under the Airport Act)	Report pollution incidents resulting in offsite impacts to the NSW Environment Protection Authority – refer to WSA Environmental Non-conformance Classification and Reporting Procedure	As required	All
Pollution and or excessive noise reporting	In accordance with the AEPR, WSA must give an airport environment officer for the airport, within 14 days, a written report if monitoring results indicate pollution, or excessive noise, occurring as a result of the undertaking of the works associated with the	As required	WSA



Action	Scope	Timing / Frequency	Responsibility
	Stage 1 development. The trigger for a 'pollution event' as per the Airports (Environment Protection) Regulations 1997 is provided in the relevant schedules of the AEPR (refer to Appendix E for a copy of the AEPR acceptable limits for water quality).		
Reporting of non-conformances and improvement opportunities	The management and reporting requirements of environmental non-conformances and improvement opportunities will be in accordance with Section 8 & 9 of the SEMF.	As required	WSA All Contractors

## 9.7 Review of approved plans

WSA will review each approved plan at least every five years (from the date of approval) as required by the Airport Plan. A review will also be completed annually to ensure that it continues to meet the approval criteria. Details of the review will be included in the annual report (refer to Section 8.3 of the SEMF). If the review identifies areas where the plan does not continue to meet the approval criteria for that plan, a variation to the approved plan will be prepared and submitted for approval.

WSA may initiate reviews of Approved Plans at other times in response to improvement opportunities, non-conformances, and changes to scope of work or construction methodology or alterations to legal or contractual requirements.

Any changes identified and implemented through the variation and review process identified above will be communicated to relevant contractors through re-issue of the revised WSA Approved Plan and subsequent training and awareness (refer to refer to Section 5 of the SEMF).

## 9.8 Environmental Incidents and complaints management

The management and reporting of environmental incidents shall be undertaken by the appropriate person as detailed in Section 6 of the SEMF.

All communications and complaints management will be implemented and managed in accordance with Section 7 of the SEMF and the Community and Stakeholder Engagement Plan.

## **10 Competence, training and awareness**

To ensure this Soil and Water CEMP is effectively implemented, each level of management is responsible for ensuring that all personnel reporting to them are aware of the requirements within. The WSA Environment Manager will coordinate the necessary and relevant environmental training in conjunction with other training and development activities.

All competence, training and awareness requirements will be implemented as detailed in Section 5 of the SEMF.

## 11 References

- Department of Infrastructure and Transport (2013). *A Study of Wilton and RAAF Base Richmond for Civil Aviation Operations*, <http://westernsydneyairport.gov.au/scopingstudy/index.aspx>
- Commonwealth Department of Infrastructure and Regional Development, 2016. *Airport Plan (December 2016)*
- Commonwealth Department of Infrastructure and Regional Development, 2016. *Western Sydney Airport Environmental Impact Statement, 2016*
- GHD (2016a), Preliminary (Phase 1) Contaminated Assessment Report, Proposed Western Sydney Airport, ref. 2124265.208989, February 2016
- GHD (2016b), Detailed Site Contaminated Investigation, Proposed Western Sydney Airport, ref. 2124265.212332, February 2016
- GHD (2016c), Western Sydney Airport Remediation Action Plan, ref. 2126850, February 2016.
- GHD (2019), *Western Sydney Airport Remediation Action Plan*, ref. 2126850, June 2019 (WSA00-WSA-00400-EN-PLN-000001).
- NSW Government, 2004. *Managing Urban Stormwater: Soils and Construction Volume 1 (Blue Book)*.
- Standards Australia 2001. Australian and New Zealand environmental management international standard (AS/NZS ISO 14001)

## Appendix A

### Example erosion and sediment control plan

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# PROGRESSIVE EROSION AND SEDIMENT CONTROL PLAN

## WSA BE Package – SP1

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Date: 17 Oct 2019  
Developed by: John Wiggers  
Reviewed by: John Wright  
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### GENERAL CONSTRUCTION NOTES:

1. THIS PROGRESSIVE EROSION AND SEDIMENT CONTROL PLAN (PESCP) SHOULD BE READ IN CONJUNCTION WITH THE PROJECT SOIL AND WATER MANAGEMENT PLAN AND THE ENVIRONMENTAL CONTROL MAPS..
2. THIS PLAN IS TO BE REVISED AS SITE CONDITIONS OR CONSTRUCTION METHODS DETERMINE.
3. ALL EROSION AND SEDIMENT CONTROLS GENERALLY TO BE CONSTRUCTED IN ACCORDNACE WITH THE 'BLUE BOOK'.
4. ALL EXISTING VEGETATED OR UNDISTURBED AREAS OUTSIDE OF THE WORKS ARE TO BE REGARDED AS NO-GO ZONES AND ARE TO BE DELINEATED WITH FLAGGING OR TAPE WHERE REQUIRED.
5. TEMPORARY CONTROLS ADDITIONAL TO THOSE SHOWN ON THIS PLAN MAY BE REQUIRED BY THE PROGRESSION OF WORKS OR WEATHER CONDITIONS.
6. ANY TRACKING OF SEDIMENTS TO ROADWAYS TO BE CONTROLLED BY STABILISED ACCESS/EGRESS POINTS AND REMOVED AS REQUIRED.
7. THE PRINCIPAL OF 'MINIMAL DISTURBANCE' IS TO BE OBSERVED WITH THE CLEARING LIMITS PEGGED PRIOR TO GROUND DISTURBANCE.
8. DUST CONTROLS TO BE REGULARLY CONDUCTED WITH WATER CARTS AND SOIL STOCKPILES STABILISED WITH TEMPORARY COVER IF REQUIRED. HIGH DUST GENERATING ACTIVITIES TO BE MONITORED AND CEASED DURING PERIODS OF HIGH WINDS.
9. CONTROLS WILL BE INSPECTED PRIOR TO, DURING AND POST RAINFALL CAUSING RUNOFF AND AT A MINIMUM WEEKLY. MAINTENANCE AND REPAIRS TO BE CARRIED OUT AS REQUIRED.
10. 'CLEAN WATER' FLOW IS TO BE MAINTAINED AROUND THE SITE WITH SEPARATION BETWEEN CONSTRUCTION OR 'DIRTY' WATERS IF RUN-ON WATER CATCMENTS ARE PRESENT.
11. 'CLEAN WATER' DIVERSION CHANNELS WILL BE SIZED TO CONVEY THE 1:2 YR ARI STORM EVENT WHERE TOPOGRAPHY AND CLEARING LIMITS PERMIT.
12. 'DIRTY WATER' FLOW TO SEDIMENT BASINS IS TO BE MAXIMISED THROUGH THE USE OF DIVERSION BANKS, CUT OFF DRAINS AND WHERE INSTALLED, THE PERMANENT PAVEMENT DRAINAGE NETWORK.' KEY PITS' ARE TO BE IDENTIFIED WITHIN THE PAVEMENT DRAINAGE NETWORK AND DIRTY WATER IS TO BE DIRECTED TO THEM AS A MINIMUM.
13. SEDIMENT BASINS ARE TO BE MANAGED IN ACCORDANCE WITH THE SOIL AND WATER MANAGEMENT PLAN AND DEWATERING EWMS.
14. 'DIRTY WATER' THAT CAN NOT BE DIRECTED TO SEDIMENT BASIN MUST BE DIVERTED TO LOCAL TEMPORARY CONTROL MEASURES.
15. DEWATERING IS TO BE UNDERTAKEN IN ACCORDANCE WITH THE SOIL AND WATER MANAGEMENT PLAN AND EWMS.
16. DISTURBED AREAS ARE TO BE PROGRESSIVELY REVEGETATED WITH STERILE COVER CROP OR PERMANENT REVEGETATION DESIGN. TEMPORARY CONTROLS ARE TO REMAIN UNTIL SITE IS STABILISED (70% SOIL SURFACE COVER).
17. **CONTROLS SHOWN ON PLAN ARE INDICATIVE ONLY. EXACT LOCATION WILL BE MODIFIED TO SUIT SITE CONDITIONS AND FUNCTION PROVIDED THEY ARE LOCATED WITHIN CLEARING LIMITS AND EIS LIMITS WHERE APPROPRIATE.**

#### Soil Landscape Information

Blacktown Soil Landscape  
K Factor: 0.04  
Soil Hydrologic Group: C  
Sediment Type: D

### RECEIVED BY:

Name	Date	Signature
Sally Reynolds	12/11/2019	

## LEGEND

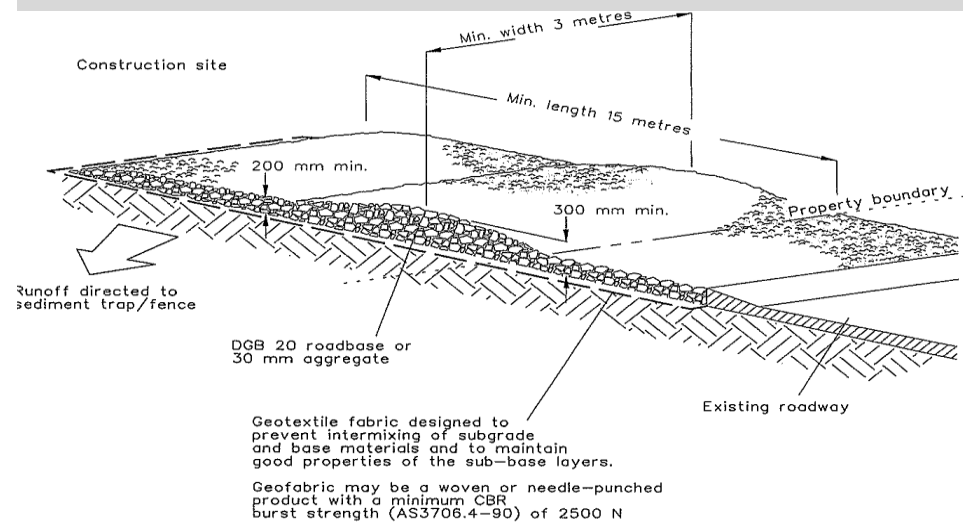
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SILT FENCE	
MULCH BUND	
SEDIMENT BUND	
CLEAN WATER FLOW (CONC.)	
CLEAN WATER FLOW (SHEET)	
CONSTR. WATER FLOW (CONC)	
CONSTR. WATER FLOW (SHEET)	
GEOFABRIC LINING	
STOCKPILE	
SEDIMENT TRAPS	
PIPE	
SAND BAGS	
ROCK FILTER	
SEDIMENT BASIN	
CURRENT ROAD ALIGNMENT	
TEMP CULVERT / PIPE CROSSING	
STABILISED ACCESS	
CAMBER CHANGE	

# PROGRESSIVE EROSION AND SEDIMENT CONTROL PLAN

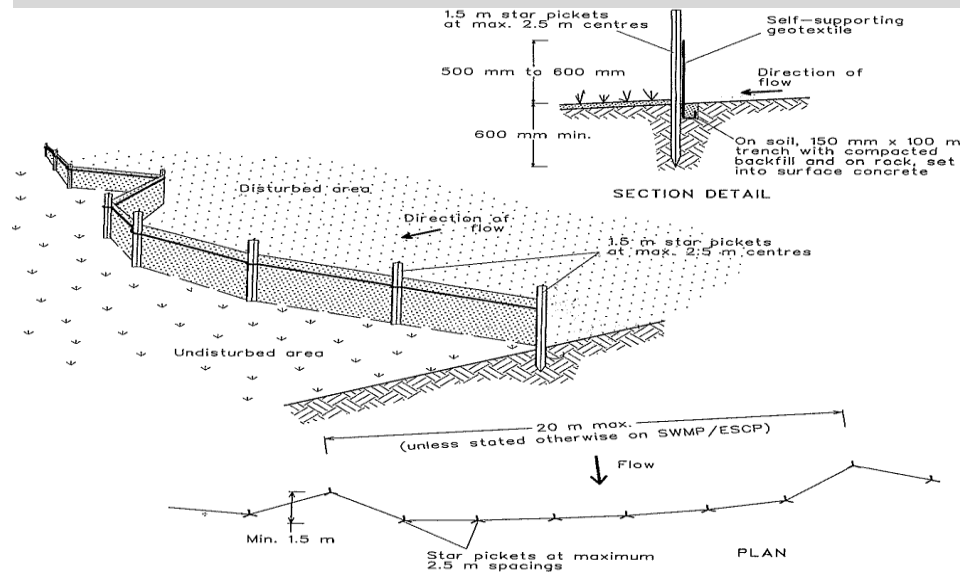
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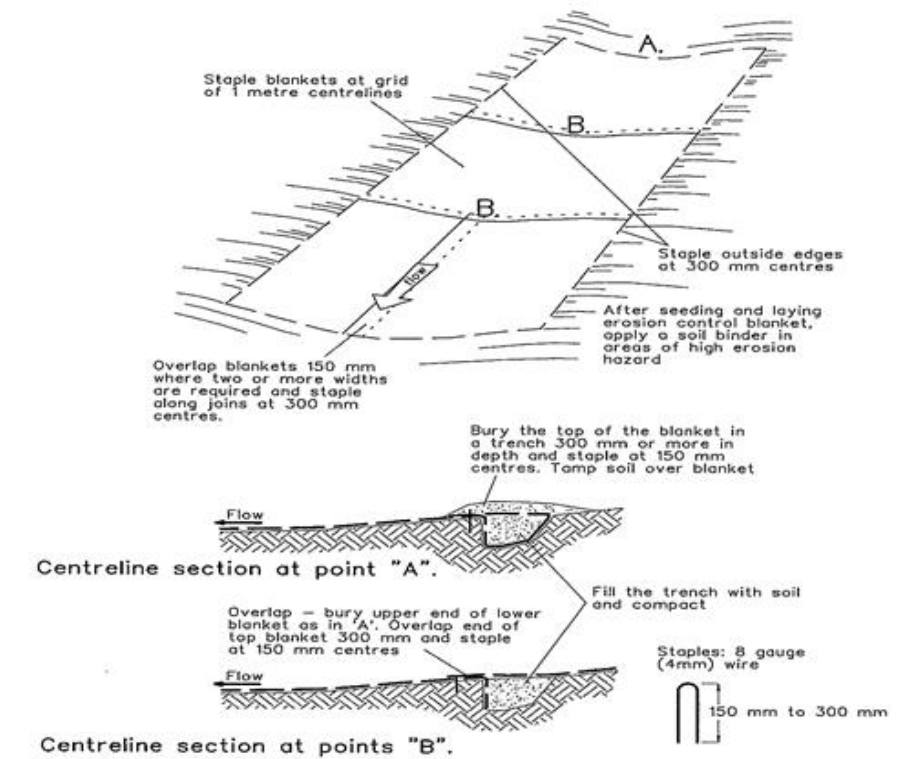
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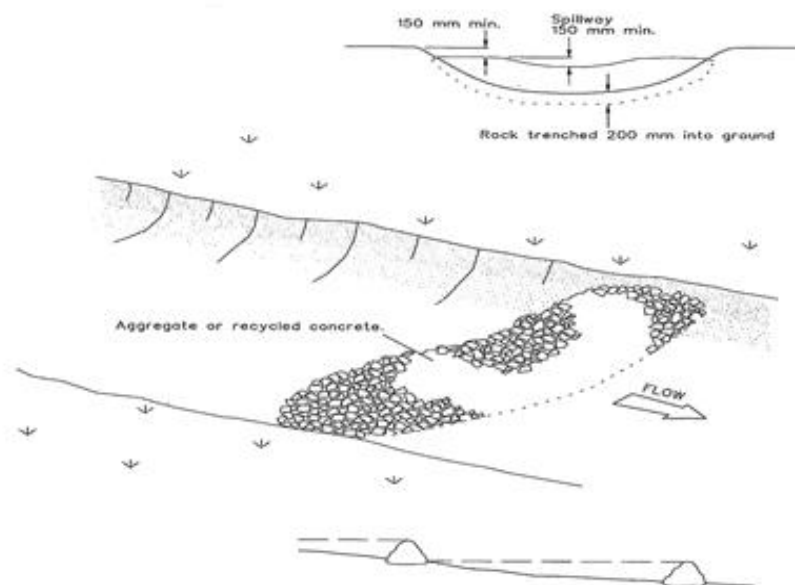
### SEDIMENT FENCE



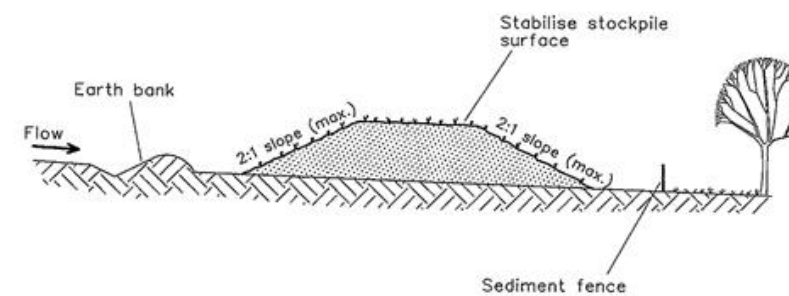
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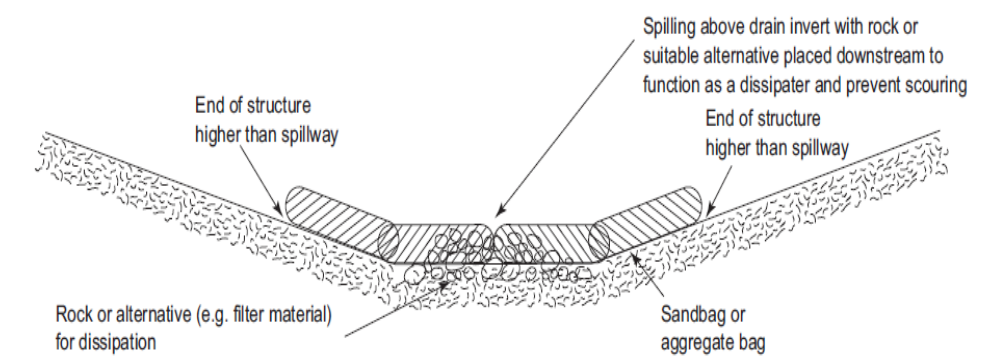
### ROCK CHECK DAMS



### STOCKPILE



### SAND BAG BUND



TYPICAL MEDIAN/TABLE DRAIN APPLICATION





# PROGRESSIVE EROSION AND SEDIMENT CONTROL PLAN

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## LEGEND

RETAINED VEGETATION	
SILT FENCE	
MULCH BUND	
SEDIMENT BUND	
CLEAN WATER FLOW (CONC.)	
CLEAN WATER FLOW (SHEET)	
CONSTR. WATER FLOW (CONC)	
CONSTR. WATER FLOW (SHEET)	
GEOFABRIC LINING	
STOCKPILE	
SEDIMENT TRAPS	
PIPE	
SAND BAGS	
ROCK FILTER	
SEDIMENT BASIN	
CURRENT ROAD ALIGNMENT	
TEMP CULVERT / PIPE CROSSING	
STABILISED ACCESS	
CAMBER CHANGE	



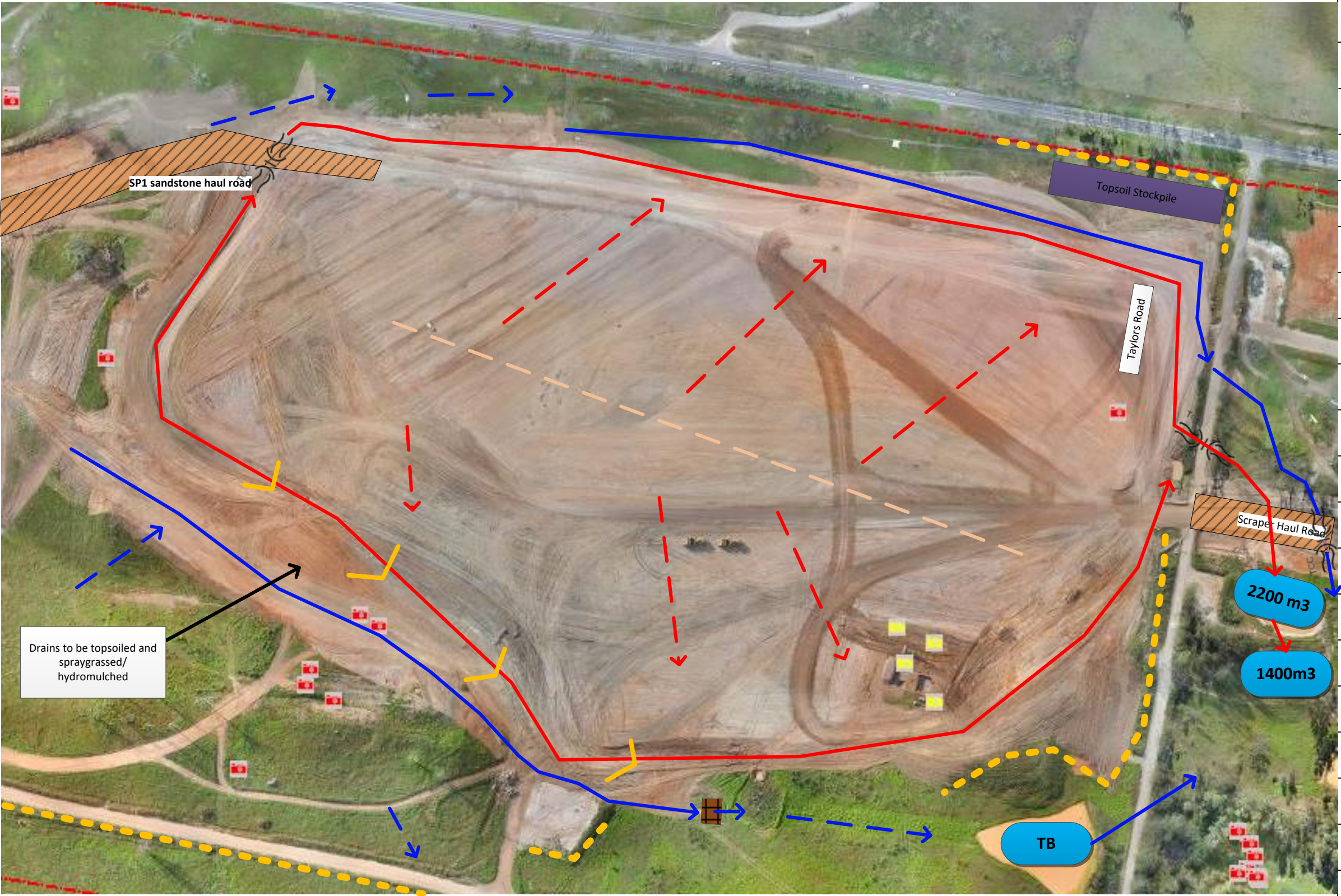


PROGRESSIVE EROSION AND SEDIMENT CONTROL PLAN  
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LEGEND

RETAINED VEGETATION	
SILT FENCE	
MULCH BUND	
SEDIMENT BUND	
CLEAN WATER FLOW (CONC.)	
CLEAN WATER FLOW (SHEET)	
CONSTR. WATER FLOW (CONC)	
CONSTR. WATER FLOW (SHEET)	
GEOFABRIC LINING	
STOCKPILE	
SEDIMENT TRAPS	
PIPE	
SAND BAGS	
ROCK FILTER	
SEDIMENT BASIN	
CURRENT ROAD ALIGNMENT	
TEMP CULVERT / PIPE CROSSING	
STABILISED ACCESS	
CAMBER CHANGE	





## Appendix B

# Emergency spill response procedure

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## Emergency Spill Response Procedure

### Background

This Emergency Spill Response Procedure (ESRP) has been prepared to identify and manage the risk of pollution incidents and facilitate a coordinated management response to pollution incidents during the construction of the Western Sydney Airport Stage 1 Development (the Project).

### Purpose

The primary purpose of the plan is to identify and manage the risk of pollution incidents, plan the project response to pollution incidents and to facilitate coordination with the relevant response agencies.

The objectives of the plan are to:

- minimise and control the risk of a pollution incident at the premises through the early identification of risks and the development of planned actions to minimise and manage those risks; and
- ensure timely communication about pollution incidents by WSA Environment Manager to the AEO construction personnel, Infrastructure Department, and relevant response agencies/authorities.

### Scope

This ESRP for the Project covers pollution incidents that cause actual or potential material harm to the environment and/or human health.

The specific work activities covered by this ESRP is included in Construction Plan Section 2 and Section 6. As required under the SEMF (Section 4.4), prior to commencement of works on site, the contractor is required to prepare and implement appropriate environmental management plans including *Environmental Work Method Statement* (EWMS) and *Environmental Control Maps* (ECMs) which include as a minimum the following details:

- the project office;
- the location of potential pollutant storage (bund chemical storage); and
- emergency access routes.

### Legislation

Key environmental legislation relating to pollution incident response management includes:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- *Protection of the Environment Operations Act 1997* (POEO Act);
- *Protection of the Environment Operations (General) Regulation 2009*; and
- *Protection of the Environment Operations (General) Amendment (Pollution Incident Response Management Plans) Regulation 2012*.

The WSA approach is to carry out construction activities in a planned and controlled manner, considering potential environmental risks, to prevent pollution incidents from occurring on the project. This is achieved using preventive measures including:

- Construction planning including environmental risk assessments,
- Implementation and maintenance of identified control measures,

- Compliance with legislative and regulatory requirements,
- Implementation of, and compliance with, requirements of the project CEMP and associated sub-plans; and
- Implementation and compliance with the requirements of this plan.

## Control Measures

Pre-emptive control measures rest with thorough planning of construction activities and the involvement of key personnel in that planning process. The SEMF requires that an ECM is developed for all activities/location and an EWMS prepared for all activities that carry an inherent level of environmental risk or community interest. All method statements will be prepared to identify risks, ensure sound environmental practices are implemented, and to minimise the risk of environmental incidents or system failures. They will specify actions to be undertaken to ensure compliance with the project approval and CEMP and will draw on the mitigation measures detailed in the specific sub plans detailed in appendices of the CEMP.

## Preparedness

It is considered that the key to effective incident prevention on site is via ongoing monitoring, surveillance and training. During construction, the following preventative strategies will be implemented onsite:

- daily inspections of active work sites;
- completion of Environmental Inspection Checklist;
- issue and quick close-out of non-compliance notices (as required);
- prompt maintenance and repairs;
- ongoing environmental training;
- environmental audits of worksites, sub-contractors and general compliance; and
- environmental and safety information on hazardous substances (e.g. SDS) will be available at the main site office and where such substances are to be stored.

Testing of environmental response procedures will be conducted annually to confirm appropriateness of management measures. Additional testing will be carried out in areas where a pollution risk is present, such as in workshops and work areas near water courses. Personnel involved in emergency response activities will be provided with specific training.

An up-to-date list of emergency response personnel and relevant organisations (emergency services, Department of the Environment and Energy, NSW EPA, etc) will be maintained at the main office and site compounds.

Spill kits are in compound areas, site vehicles and on the Project at the location of high-risk activities. Spill kits will be monitored as part of weekly inspections and will be replenished as required. These kits are designed for immediate containment and management of pollution incidents and, as a minimum, are stocked with the following material;

- Absorbent mats;
- Absorbent floor sweep material;
- Floating booms to control spills in water; and
- Disposal bags.

## Incident Procedure

### Immediate Response

Personnel in the vicinity must stop works. Consider any safety hazards created by the incident and if safe to do so, apply immediate controls to attempt to minimize further harm to the environment. This could include use of spill kit material.

### Immediate Notification

Personnel onsite to immediately contact their supervisor who then will notify the WSA Environment Manager and WSA Construction Manager.

### Classify Incident

Using the classifications listed above, the WSA Environment Manager will assess the incident to determine if it has or is threatening to cause material environmental harm.

### Notify Incident

The WSA Environment Manager will notify relevant stakeholders if the incident causes or threatens to cause material harm to the environment immediately to the following as appropriate:

- Commonwealth Department of the Environment and Energy and Commonwealth Department of Infrastructure, Regional Development and Cities;
- Airport Environment Officer
- Other government agencies that may include:
- NSW EPA;
- Ministry of Health (via the Public Health Unit)
- Work Cover Authority and Comcare;
- Local Authority (i.e. council) if the EPA is not the appropriate authority; and
- Fire and Rescue NSW

### Clean-up Incident

Ensure all components of the incident have been addressed and corrective actions implemented. WSA Environmental Advisor should be consulted to determine if validation sampling is required and the appropriate level of waste characterisation testing prior to offsite disposal.

### Report Incident

The WSA Environment Manager must report the incident through the internal systems, requiring an incident report form to be completed with a copy provided to the WSA Construction Manager and any relevant Contractors.

### Investigate Incident

The WSA Environment Manager shall undertake an incident investigation assisted by the WSA Construction Manager and relevant Contractors.

## Incident Notification

The Contractor Environmental Manager (or equivalent) will notify the WSA Environment Manager who will notify the relevant stakeholders/authorities including the AEO. The following organisations may be notified if the incident 'causes or threatens to cause material harm to the environment':

- Commonwealth Department of the Environment and Energy and Commonwealth Department of Infrastructure Regional Development and Cities;
- NSW EPA;
- Ministry of Health (via the Public Health Unit)
- Work Cover Authority and Comcare;
- Local Authority (i.e. council) if the EPA is not the appropriate authority; and

- Fire and Rescue NSW

The information that will be reported is:

- time, date, location and likely duration of incident;
- location of place where incident is occurring or likely to occur;
- type of incident (e.g. chemical spill, water pollution etc.);
- extent of incident (e.g. magnitude of spill, area covered etc.); and
- action taken or proposed to be taken to deal with the incident and any resulting pollution or threatened pollution.

Notifications to authorities must be verbal communication (i.e. – via telephone call.)

## Incident Notification Details

Position	Responsibility	Contact	Contact Details
Contractor Environmental Manager	24hr availability for activating Emergency Spill Response Procedure (ESRP). Notifying WSA Environment Manager	TBA	TBA
Contractor Community Relations Manager	Notifying community, key stakeholders, coordinating media communications.	TBA	TBA
Contractor Project Director	Notifying WSA and JV partners.	TBA	TBA
Contractor Construction Manager	Notifying Project Director. Managing Incident as per ESRP.	TBA	TBA
Contractor General Superintendent (or – Early Earthworks	Notifying Construction Manager. Notifying Area Manager. Coordinating incident response Liaising with emergency response organisations. Provision of labour, equipment or support to the Environmental Staff and emergency response organisations as requested.	TBA	TBA
WSA Co Environment Manager	Notify the AEO and Infrastructure Department	TBA	TBA
Commonwealth Department of the Environment and Energy	-	-	
NSW EPA	-	-	
Fire and Rescue NSW	-	-	
NSW Health	-	-	
Work Cover NSW	-	-	
Liverpool City Council	-	-	

## Unexpected contamination find protocol

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### Unexpected contamination find protocol

#### Purpose and Scope

This Procedure details the actions to be taken when unexpected contaminated soil/material or water is encountered during construction activities. Other areas of known contamination on the site are to be managed in accordance with the Remediation Action Plan, GHD 2019.

This Procedure is applicable to all activities conducted by construction personnel that have the potential to uncover or encounter contaminated soil/material or water which may be identified due to suspected contaminating odours, visual staining (unusual discolouration) or other foreign material which may indicate the potential for contamination.

#### Process

##### Potential contamination encountered during construction

If any potential contaminated soil/material or water is encountered during construction (e.g. strange soil colours or odours), the following must occur:

- STOP ALL WORK in the immediate / affected area and cordon off the surrounding area to prevent any inadvertent access;
- Immediately notify the Environment Manager (EM);
- The EM will take the lead in relation to the management of the find and notify the Safety Manager (SM) accordingly;
- Wash self or other persons if contact is made with contaminated materials; and
- Recommence works in an alternate area where practicable

##### Potential asbestos encountered during construction

Should potential asbestos be uncovered the following actions must be implemented:

- STOP ALL WORK in the immediate / affected area and cordon off the surrounding area to prevent any inadvertent access;
- Contact the project Occupational Hygienist to investigate the find and provide preliminary identification; and
- If the material is confirmed as asbestos through preliminary identification, the Occupational Hygienist will direct the implementation of specific controls based on the nature and the quantity of the find, this may include:
  - In the case of larger discrete units of bonded asbestos, remove the asbestos and immediately surrounding contaminated material and dispose offsite.
  - In the case of non-bonded asbestos, the material and surrounding soil matrix (to a distance as directed by the Occupational Hygienist) will be removed and disposed offsite.
  - In the case of multiple small asbestos fragments, the material may be tested (either in situ, or as part of a stockpile of material from the area which has been identified to be potentially contaminated, as directed by the Occupational Hygienist) for waste classification purposes and/or potential re-use onsite.

## Personal Protective Equipment

Prior to any contamination investigation / management, appropriate personal protective equipment (PPE) is to be worn as per the relevant Safety Data Sheet(s) (SDS).

This may include, but not be limited to:

- Eye goggles;
- Face mask;
- Rubber boots;
- Rubber gloves; and
- Tyvec Suits.

## Undertake a site/area contamination investigation

The EM is to assess the situation. Samples will be collected (where safe to do so) and analysed to determine if contamination is present. Advice from a suitably qualified contamination specialist may be requested based on the level and extent of the contamination in the area of the find.

The AEO (in consultation with specialists) will determine the appropriate management measures to be implemented. This may include treatment with onsite reuse / capping, or offsite disposal.

Works will be completed following the guidance of the Contamination Specialist.

Both options will require laboratory analysis of the contamination and reference against the relevant guidelines (NEPM for onsite management and NSW EPA 2014 and NSW 2016 Addendum).

Offsite disposal will be tracked by the Environmental Team with details recorded in the Waste Register.

The contamination specialist is to provide a validation report following the removal or remediation of the contamination discovered.

## Notification and Reporting

The EM is to notify of all contamination immediately via phone (or other) to the Airport Environment Officer (AEO) in the first instance and additionally complete incident reporting in accordance with the SEMF. Any other (i.e. external) notification must be undertaken by the EM in accordance with the SEMF and other applicable legislation. Emergency Services will be contacted in the event of safety concerns in accordance with the Project Safety Management Plan.

## Recommence Works

The EM (for all contamination other than asbestos) will advise when works can commence again in that area once it is determined that no further action is required, i.e. the contamination has been removed or a management process has been established. In the case of asbestos contamination, the appointed Occupational Hygienist will provide an Onsite Inspection Clearance Certificate (where asbestos remains but has been 'made safe' so that adjacent works can continue) or An Asbestos Materials Clearance Report (when all asbestos has been removed and has been verified by the Occupational Hygienist) when works may recommence, as described in the *Asbestos Management Plan*.

## Documentation

- Contamination Validation Report/ Testing Results;
- Waste Disposal Records (as applicable);
- Onsite Asbestos Clearance Inspection Report;
- Asbestos Materials Inspection Report;
- Asbestos Materials Clearance Report;
- Waste Analysis and Classification Report;
- Analytical Soil Test Report; and Analytical Asbestos Report



# Appendix D

## Example Soil and Water Monitoring and Inspection

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### Introduction

As per the EIS soil and water Mitigation measure, SW\_01, a Surface Water Management Plan is required to involve a progressive process of design and implementation covering both the construction and operational phases. This Construction Phase Soil and Water Monitoring and Inspection Procedure (CPSWMP) details the methodology for soil and water quality monitoring on the Stage 1 Development.

There are interrelationships with this CPSWMP and the project CEMPs and sub-plans that provide additional information on environmental management relating to soil and water monitoring and inspections. These plans and procedures include:

**Soil and Water Construction Environment Management Plan:** Overarching methodology describing soil and water risks and management on the project.

**Erosion and Sedimentation Control Plans** – Appendix B of the Soil and Water CEMP – These plans specify the surface water controls and site methodology to manage erosion and sedimentation on the Project. These plans are updated throughout construction to remain relevant for specific site circumstances.

**Emergency Spill Response Procedure** – Appendix C of the Soil and Water CEMP. This procedure details how spills on the project are responded too, reported and prevented from reoccurring.

### Objectives

The key objectives of the CPSWMP are to ensure that impacts associated with soil and water quality are managed to within permitted criteria as far as practicable and to ensure that best practice controls and procedures are implemented.

To achieve this, the following will be undertaken:

- Ensure appropriate treatment of water prior to off-site discharge or disposal;
- Minimise the risk of pollution incidents from construction;
- Minimise the export of sediment from the airport site; and
- Sample site surface water to detect effectiveness of controls.

### Potential Construction Impacts

Construction activities that may affect water quality include:

- Removal of vegetation adjacent to waterways and ephemeral drainage lines;
- Clearing of vegetation;
- Concreting works;
- Exposure and mobilisation of exposed soils during construction such as from cleared areas and stockpiles;
- Fuel, chemicals, oils, grease and petroleum hydrocarbon spills from construction machinery directly polluting waterways and soils;

- Earthworks and associated inadequate management of runoff, improper sediment controls from the construction site;
- Excavation and exposure of Acid Sulphate Soils (ASS) to the air (oxidising conditions) resulting in potential for acidic runoff to receiving waterways; and
- Exposure of per- and polyfluoroalkyl substances (PFAS) resulting in mobilisation to waterways.

Potential construction related water quality impacts could include:

- Degraded water quality including lower Dissolved Oxygen (DO) levels, increased nutrients (Nitrogen, Phosphorous), increased turbidity, and altered pH;
- Increased sedimentation smothering aquatic life and affecting aquatic ecosystems;
- Increased levels of nutrients, metals and other pollutants, transported via sediment and runoff to receiving waterways;
- Spills of concrete during concrete pours directly or indirectly polluting receiving waterways;
- Contamination from site compounds, chemical storage areas and wash-down locations;
- Increased levels of litter from construction activities polluting receiving waterways;
- Contamination of receiving waterways as a result of disturbance of contaminated land;
- Acid runoff from disturbance of acid sulfate soil during construction;
- Tannin leachate from cleared/mulched vegetation;
- Scour around pipe outlets; and
- Increase in creek bank instability due to removal of vegetation or excavation.

## Appendix E

### Groundwater quality criteria

Analyte	Criteria		
	ANZECC 2000 – Lowland Rivers (NSW Rivers)	ANZECC 2000 FW 95%	Airports (1997) Fresh Water
<b>Nitrogen (Total)</b>	0.6 mg/L	-	0.1 mg/L
<b>Ammonia as N</b>	0.03 mg/L	0.9 mg/L	-
<b>Nitrate as N</b>	-	7.2 mg/L	-
<b>Dissolved Metals (filtered):</b>			
Arsenic	-	0.013 mg/L	0.05 mg/L
Cadmium	-	0.0002 mg/L	0.0002 mg/L
Chromium (III + IV)	-	0.001 mg/L	0.01 mg/L
Copper	-	0.0014 mg/L	0.002 mg/L
Nickel	-	0.011 mg/L	0.015 mg/L
Lead	-	0.0034 mg/L	0.001 mg/L
Zinc	-	0.008 mg/L	0.005 mg/L
Mercury	-	0.0006 mg/L	0.0001 mg/L
<b>Total recoverable hydrocarbons (TRH) - C10-C36</b>	-	-	600 ug/L
<b>Phenols</b>	-	320 ug/L	50 ug/L
<b>polycyclic aromatic hydrocarbons (PAHs)</b>	-	-	3 ug/L
<b>BTEX</b>			
Benzene	-	950 ug/L	300 ug/L
Toluene	-	-	300 ug/L
Ethylbenzene	-	-	140 ug/L
Xylene (o)	-	350 ug/L	-